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8ft. x 6ft. Transonic Wind Tunnel Tests on a 1/24 Scale Model of the Fairey Delta 2 (ER. 103)

by

D. J. Kettle

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8' x 6' TRANSONIC WIND TUNNEL TESTS ON A 1/24 SCALE MODEL OF THE FAIREY DELTA 2 (ER.103)

by

D. J. Kettle

SUMMARY

Measurements of longitudinal and lateral stability have been made on a 1/24 scale model of the Fairey Delta 2 (ER.103) in the 8' x 6' transonic tunnel at Farnborough, at Mach numbers from 0·85 to 1·25. The results also include some data on elevator, aileron and rudder power. Some comparisons are made with the results of tests on the same model in the 3' x 3' supersonic tunnel at the R.A.E. Bedford.

Replaces R.A.E. Report No. Aero 2662 - A.R.C. 24,740.

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1 INTRODUCTION

The Fairey Delta 2 (ER.103) is a research aircraft designed to investigate the aerodynamic characteristics of a 60° delta planform through a wide range of lift coefficients and Mach numbers. Flight tests have already been made to determine the aerodynamic derivatives in order that comparisons could be made with the results of wind tunnel and free flight tests and also with theoretical estimates. Wind tunnel data in the Mach number range from 1·4 to 2·0 have been obtained on a 1/24th scale model in the 3' × 3' supersonic tunnel at the R.A.E. Bedford and, so that the transonic speed range be covered, 8' × 6' tunnel tests at the R.A.E. Farnborough were proposed.

This report describes the results of the 8' × 6' tests in the Mach number range 0·85 to 1·25 and includes limited data from the 3' × 3' tests for comparison. The same model was used for both series of tests. The transonic tests were made during March and April, 1959 and consisted of longitudinal and lateral stability measurements.

2 DETAILS OF MODEL

Details of the model dimensions are given in Table 1; Fig.1 is a general arrangement drawing and Figs.2 and 3 show the model mounted in the tunnel. It may be of interest to note that Figs.2 and 3 show the condition of the tunnel as it was prior to 1960, when modifications to the support strut and adjacent tunnel walls were introduced.

2.1 Model construction and mounting

With the exception of the forward portion of the fuselage, pilot's canopy and wing root intakes which were made of Tufnol, the model was constructed of steel. The wing and drag balance which were integral, were machined in steel and the final wing profile was built up with araldite. The fin and rudder was also made of steel; grooves were cut on both sides of the fin at a position corresponding to the rudder hinge line so enabling the rudder to be deflected to the required angle. A similar procedure was adopted for the wing ailerons and elevators. Small details on the model were made of Tufnol - i.e., the wing fences, tail skid and fairing at the fin-body junction.

The engine air intakes and entry ducts were correctly represented as far as the engine entry station and for completeness a fuselage boundary layer bleed was fitted on the inside of each intake. Aft of the engine entry position, the internal ducting was not representative due to the internal balance and sting mounting. As a consequence the cross section of the jet exit was annular; no attempt was made to control the internal flow.

The forward end of the support sting was forked and fixed to the drag balance integral with the wing. The normal force, pitching moment and lateral components were measured at a strain gauge station on the sting aft of the forked joint. The rear end of the sting was fixed to the model support rig of the tunnel in the usual way (Figs.2 and 3).

3 RANGE OF TEST CONDITIONS

The following table summarises the range of the tests which were conducted at a Reynolds number of $2{\cdot}12 \times 10^6$ per foot.

Mach number	Incidence range*	Sideslip	Elevator angles †	Aileron angles †	Rudder angles ‡	Measurements
0.85,0.9,0.95,0.99 1.05,1.15,1.25	-1°,0°,+1° +3°(x2°)+15°	0°	0°	0°	0°	Normal force Axial force Pitching moment Sideforce Yawing moment Rolling moment
0.85,0.90,0.93,0.95,0.97 0.99,1.01,1.05,1.10,1.15 1.20,1.25	-1°,0°,+1° +3°(x2°)+15°	0°	0°	3° upfloat	0°	
ditto	-1°,0°,+1° +3°(x2°)+11°	±1° ±3°	0°	ditto	0°	
ditto	-1°,0°,+1° +3°(x2°)+15°	0°	-4°	ditto	0°	
ditto	-1°,+2°,+5° +8°,+11°	0°	-4°	ditto	±3°	
ditto	-1°,0°,+1° +3°(x2°)+15°	0°	0°	-2° port+ -8° starb'd	0°	

* Wing incidence.

† Angle between control chord and wing chord projected on to the plane of symmetry.

‡ Angle between rudder and fin chords in a plane normal to the plane of symmetry and parallel to the body axis.

\+ Equivalent to -5° aileron relative to 3° aileron upfloat.

The model was tested throughout with boundary layer transition fixed on the wing and fin, by means of a band of roughness at the leading edge extending over 10% of the chord. The transition on the fuselage was also fixed by a band of roughness at 10% of the body length. In both cases the roughness was achieved by carborundum powder (grain size 0·0025") stippled on a base of silver paint.

The tests also included measurements of total head and static pressure at the jet exit in order that corrections might be applied to allow for internal drag. Details of these measurements and the method of estimation are given in Appendix 1.

4 CORRECTIONS TO RESULTS

For the purpose of processing the results of six component force measurements, various corrections to the measured data have been necessary. The corrections include the angular deflections in pitch and yaw due to load, the changes in model weight components due to pitch and yaw, and those due to the various interference terms in the balance equations. Ref.1 gives details of the DEUCE computing procedure and corrections necessary in the 8' × 6' transonic tunnel, and it is not proposed to describe these corrections in this report. Mention should be made however, to the fact that at the present time, no corrections are applied to the results of tests in slotted or porous transonic working sections due to blockage and constraint; they have not been applied in the present case. These effects are the subject of current investigations designed to give a basis for estimation. A further point which it is necessary to mention is that the lateral results have been corrected for tunnel flow angularity. The correction was determined experimentally by measuring the lateral forces and moments over the complete range of roll angle at zero incidence. The flow angularity was assumed to be unaltered when the model was set at incidence.

5 PRESENTATION OF RESULTS

All forces and moments are referred to a right handed system of body axes, as shown superimposed on Fig.1. The longitudinal and lateral results are discussed separately, and Tables 2 to 4 and 5 to 7 contain all the numerical results. Figs.4-16 and 17-39 show respectively a selection of these results together with a number of derived results. Most of the data presented refer to a 'standard' aircraft condition where the ailerons have 3° upfloat, but the longitudinal results also include the case where aileron upfloat is zero.

6 LONGITUDINAL FORCES AND MOMENTS

6.1 Lift

Figs.4,5,6 and 7 show the variation of lift coefficient with incidence throughout the Mach number range; the curves are presented in 'carpet' form. The curves show in general a slight increase of slope up to $C_L \approx 0{\cdot}4$ and above this value there is a gradual loss of lift slope which may be associated with progressive flow separations at the leading edge. With the controls undeflected, these effects are present at all except the highest Mach number (1·25), where, except for a slight loss of slope near the highest incidence tested, the lift curve is virtually linear. A comparison of Figs.4,5 and 6 shows that when the ailerons are upfloated 3° and elevators deflected 4° up, the linear portion of the curves is extended to lower Mach numbers (1·10) Fig.7 further shows that the curves become more nearly linear over the whole of the tested Mach number range, in the trimmed condition. The curves thus demonstrate that upward deflection of the ailerons and elevators have a limiting effect on the extent of upper surface separations.

Figs.4,5 and 6 also show how C_L varies with Mach number at constant incidence. At the higher incidences for instance, there is an increase in C_L of about 0·1 between $M = 0{\cdot}85$ and 0·99; at higher Mach numbers, C_L decreases more gradually. The curves at constant incidence also reflect the variation of lift curve slope with Mach number.

6.2 Pitching moment

The pitching moment results are shown plotted in Figs.8,9 and 10. The curves indicate that the stability characteristics are for the most part, linear throughout the Mach number range tested. In general, the curves show no marked tendency to instability in the C_L range tested; at a C_L of about 0·4 there is a slight tendency for a small forward shift of aerodynamic centre at Mach numbers of 0·85 and 0·90 and within a small range of C_L; this movement is recovered however at higher values of C_L. Earlier unpublished results[2] on a 1/9 scale model of the ER.103 tested in the R.A.E. 10' x 7' High Speed Tunnel also indicated a similar effect occurring at about the same C_L and Mach number. These tests and others, on similar planforms, have shown that the limited degree of instability could be traced to localised flow separations on the upper surface, within a small range of incidence; as incidence was increased slightly above the critical value (between 7° and 8°) these disappeared, due, it is thought to a flow reattachment on the upper surface. At supersonic speeds, the present tests show that the changes of stability over the measured C_L range are very small.

There is an aft movement of the aerodynamic centre by about 8% $\bar{\bar{c}}$ in the Mach number range from 0·85 to 1·0, and for $0 < C_L < 0 \cdot 2$. In the supersonic range (M = 1·0 - 1·25) the aft aerodynamic centre movement is less marked (about 2% $\bar{\bar{c}}$).

6.3 Drag

Figs.11,12 and 13 show the variation of C_D with C_L^2; in all cases the curves are linear except at the higher values of C_L where the influence of flow separations might lead to an increase above the linear rise in C_D. At the highest Mach number, the linear portion of the curves is limited to a C_L of about 0·55 (C_L^2 = 0·3). The curves further show higher slopes at subsonic speeds compared with those at supersonic speeds, and this is shown in Fig.14 where the values of K, the induced drag factor (measured over the linear portions of the curves) are plotted against Mach number. In general, the values are relatively high; the supersonic values of K are roughly 15% lower than the values at M = 0·85 but show the expected slow rise with Mach number.

Certain reservations are made in Appendix 1 concerning the corrections to measured drag due to flow through the internal ducts of the model. The difficulty of obtaining reliable drag measurements when the balance is situated in the engine duct flow has been encountered by other experimenters and in the present case the absolute values of drag shown in Figs.11, 12 and 13 are suspect. However, the results showing increments in drag due to lift are not invalidated and are therefore presented without reservation.

6.4 Comparison of results with 3' × 3' tunnel results

Figs.15 and 16 show a comparison of longitudinal derivatives obtained from the present tests and those from tests in the 3' × 3' supersonic tunnel at the R.A.E. Bedford.

Fig.15(a) shows the values of lift curve slope plotted against Mach number for the trimmed and untrimmed (elevators undeflected and ailerons upfloated 3°) cases. In both cases the present results appear to agree well with the extrapolated supersonic results. The trimmed curve in the transonic speed range shows the smoothing effect of up-elevator on lift curve slope compared with the untrimmed case. Good agreement is similarly shown in Fig.15(b) between the two series of tests, on the position of aerodynamic centre. The transonic results have been estimated for $0 < C_L < 0 \cdot 2$ due to slight non-linearities in the pitching moment curves at subsonic speeds.

Fig.16(a) shows $\partial C_m / \partial \eta$ in the transonic speed range and indicates the sharp reduction of elevator power (about 50%) between M = 0·95 and 1·25. The agreement with the extrapolated supersonic results is good. Values of elevator angle to trim are plotted against Mach number in Fig.16(b). The curves show that in the transonic range, the elevator angle required to trim at a given C_L increases rapidly (in the negative direction) with Mach number. Only two elevator settings were tested in the present tests and so the curves may be inaccurate at the higher values of C_L shown.

7 LATERAL DERIVATIVES

Figs.17-31 give a selection of the lateral forces and moments plotted against angle of sideslip at constant incidence (elevator angle 0° and ailerons upfloated 3°). The curves of yawing moment and sideforce are linear with sideslip angle at all Mach numbers and so curves are presented for four representative Mach numbers only (Figs.24-31). The rolling moment results show non-linearities in some cases and so a complete set of curves covering the measured Mach number range is therefore given.

Many of the curves presented do not pass through the origin and this is probably due partly to model asymmetries and also to flow distortions when the model is yawed. The derivatives (Figs.32-34) have been estimated from the tangents to the curves at zero sideslip. The effects of control deflection are shown in Figs.35-38 and a comparison of the present results with those measured in the 3' × 3' tunnel is given in Fig.39.

7.1 Rolling moment

The curves of rolling moment coefficient against angle of sideslip (Figs.17-23) have a negative slope in general; at each of the measured Mach numbers, the slope increases with incidence. At M = 0·85 and 0·90 the slope is positive for $\alpha_w = -1^\circ$ and zero for $\alpha_w = 0^\circ$. The slopes are negative at $\alpha_w = +1^\circ$ and as the incidence is increased, $-\ell_v$ increases in most cases. An exception to this will be seen in Fig.20 where the curves indicate a positive slope for $\alpha_w = +9^\circ$ at M = 0·97. The incidence conditions for this reversal correspond fairly closely with those for pitching instability noted in para. 6.2 and it is probable that the associated flow separations in the present case are aggravated by sideslip. As with the pitching instability, the values of ℓ_v are seen to recover as the incidence and Mach number is increased. Fig.32, which shows ℓ_v plotted against Mach number, illustrates this region more clearly. The onset of this effect is seen to occur at a Mach number of about 0·93.

7.2 Yawing moment and sideforce

The variation of the yawing moment and sideforce derivatives n_v and $-y_v$ are shown plotted against Mach number in Figs.33 and 34 respectively. The values of n_v increase with Mach number up to about M = 1·2 at all the measured incidences, with a marked rise occurring near M = 1·0 at zero incidence and at about M = 0·95 at the higher incidences. The probable explanation is that the reduction of critical Mach number on the leading (yawed) wing and vice versa, gives a stable contribution to yawing moment due to the difference in the drags of the leading and trailing wings. The curves of sideforce derivative show similar trends; the value of $-y_v$ increases with Mach number, the increase being marked at about M = 0·95 for incidences above about 5°.

7.3 Lateral control power

7.3.1 Ailerons

The variation of ℓ_ξ is plotted in Fig.35 against Mach number at constant incidence. The control settings for this case were -2° on the port aileron and -8° on the starboard aileron corresponding to -5° deflection from the normal upfloat position. The curves show a general reduction of aileron power between M = 1·0 and 1·25, of about 30%. The main feature of the curves is a marked increase of rolling power occurring at a Mach number of about 0·97 and for a small range of incidences above about $+7^\circ$; this is probably associated with a reduced lift divergence Mach number on the port wing (-2° aileron) and increased lift divergence Mach number on the starboard wing (-8° aileron), the combined effect of which is to increase the rolling moment by about 30% for example at $\alpha_W = +9°$. The effect appears to be suppressed at higher Mach numbers and incidences.

The curves of yawing moment and sideforce due to aileron as shown in Figs.36 and 37 show no marked changes with Mach number. The main effect to be noted in Fig.36 is that the application of negative aileron angle (port down and starboard up) produces a positive yawing moment but the amount decreases to zero as the incidence is increased to about +13°. The curves of Fig.37 show a positive sideforce due to negative aileron application and again the effect is reduced with increasing incidence.

7.3.2 Rudder

The change of rudder power with Mach number is shown in Fig.38 to be very small; the effect of incidence also appears to be negligible.

7.4 Comparison of results with 3' × 3' tunnel results

Fig.39 shows a comparison of lateral derivatives obtained from the present tests and those from tests on the same model in the 3' × 3' supersonic tunnel at the R.A.E. Bedford. The general agreement between the two sets of results appears to be good.

8 CONCLUSIONS

The main conclusions from the tests are summarised below.

(i) The lift and pitching moment results do not depart appreciably from straight lines up to the maximum measured value of C_L (about 0·8).

(ii) The present results confirm those from previous tests and show a slight decrease in longitudinal stability within a small incidence range (+7° to +9°) at M = 0·9 and below.

(iii) There is an aft movement of the aerodynamic centre of about 8% $\bar{\bar{c}}$ in the Mach number range from 0·85 to 1·0. Between M = 1·0 and 1·25 there is a further aft movement of about 2% $\bar{\bar{c}}$.

(iv) The drag results tend to indicate the presence of regions of separated flow at moderate values of C_L and subsonic Mach numbers, which is suppressed at supersonic speeds.

(v) There is a 50% reduction of elevator power between M = 0·95 and 1·25.

(vi) The main feature of the measured lateral derivatives is the sudden decrease in the value of $-\ell_v$ at about M = 0·93 and in a small incidence range between +7° and +9°. The effect is probably due to a local flow instability on the wing which, at the same incidences, is also responsible for pitching instability noted in (ii) above.

(vii) There is roughly a 30% decrease of aileron power between M = 1·0 and 1·25.

(viii) The rudder power appears to be unaffected by changes of Mach number and incidence in the range tested.

(ix) The longitudinal and lateral derivatives from the present tests are in good agreement with extrapolated results from the 3' × 3' supersonic tunnel.

LIST OF REFERENCES

No.	Author(s)	Title, etc
1	Courtney, A.L.	Notes on proposed Aero H Data reduction system for 6-component sting model tests. (R.A.E. unpublished).
2	-	Tests on 1/9 scale model of the Fairey Delta 2 (ER.103) in the R.A.E. 10' × 7' High Speed Wind Tunnel. (R.A.E. unpublished).
3	Warren, C.H.E., Weaver, A.K., Hopkin, H.R., Neumark, S.	A proposed scheme of Notation and Nomenclature for the aerodynamics of aeroplanes and missiles. (R.A.E. unpublished).

LIST OF SYMBOLS

Note that all forces and moments are referred to the right-handed system of body axes superposed on Fig.1.

A	wing aspect ratio	
b	wing span	
$\bar{\bar{c}}$	aerodynamic mean chord	
C_L	lift coefficient = lift force/qS	
C_D	drag coefficient = drag force/qS	
C_m	pitching moment coefficient = pitching moment/$qS\bar{\bar{c}}$	referred to body axes
C_ℓ	rolling moment coefficient = rolling moment/qSb	referred to body axes
C_n	yawing moment coefficient = yawing moment/qSb	referred to body axes
C_Y	sideforce coefficient = sideforce/qS	referred to body axes
K	induced drag factor = $\pi A\ \partial C_D/\partial(C_L)^2$	
ℓ_v	rolling moment due to sideslip = $\partial C_\ell/\partial\beta$, β in radians	
ℓ_ξ	rolling moment due to aileron = $\partial C_\ell/\partial\xi$, ξ in radians	
ℓ_ζ	rolling moment due to rudder = $\partial C_\ell/\partial\zeta$, ζ in radians	

LIST OF SYMBOLS (Contd)

M	free stream Mach number
n_v	yawing moment due to sideslip = $\partial C_n/\partial\beta$, β in radians
n_ξ	yawing moment due to aileron = $\partial C_n/\partial\xi$, ξ in radians
n_ζ	yawing moment due to rudder = $\partial C_n/\partial\zeta$, ζ in radians
q	free stream kinetic pressure
S	gross wing area
y_v	sideforce due to sideslip = $\frac{1}{2}\,\partial C_Y/\partial\beta$, β in radians
y_ξ	sideforce due to aileron = $\partial C_Y/\partial\xi$, ξ in radians
y_ζ	sideforce due to rudder = $\partial C_Y/\partial\zeta$, ζ in radians
α_w	wing incidence
β	angle of sideslip
ζ	rudder angle (positive corresponding to clockwise rotation looking along the z-axis)
η	elevator angle (positive corresponding to clockwise rotation looking along the y-axis)
ξ	aileron angle (positive corresponding to clockwise rotation looking outwards along the hinge-line)

(The definitions of ζ, η and ξ are bracketed together: In accordance with Ref.3)

TABLE 1

Details of Fairey Delta 2 (ER.103) complete model

Model scale:- 1/24

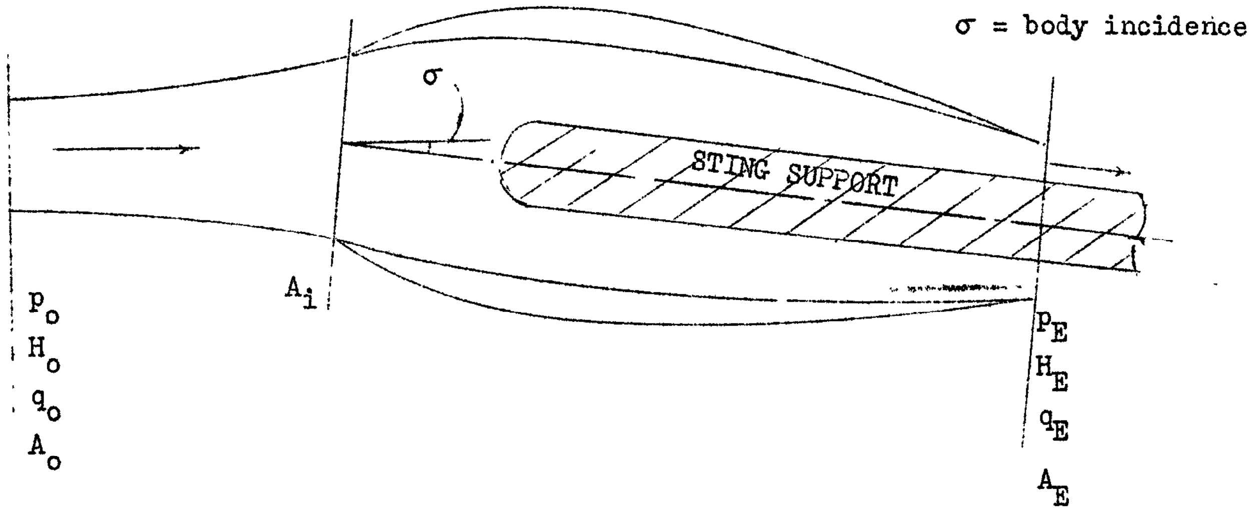
Wing area	0·625 sq ft
Span	1·118 ft
Aerodynamic mean chord	0·698 ft
Centre line chord	1·041 ft
Aspect ratio	2·00
Taper ratio (tip chord/centre line chord)	0·073
Thickness/chord ratio	0·04
Sweepback of leading edge	60°
Dihedral	0°
Fin thickness/chord ratio	0·06
Elevator control area (2 controls)	0·0703 sq ft
Aileron control area (2 controls)	0·0566 sq ft
Rudder control area	0·0158 sq ft
Fin and rudder area (external to fuselage)	0·0655 sq ft
Angle between wing chord and fuselage datum	+1·5°
Duct intake area (2 intakes)	0·75 sq in.
Duct exit area	0·966 sq in.
Moment reference axis aft of leading edge apex	6·8 in. (i.e. 54·4% centre line chord).

APPENDIX 1

DRAG CORRECTION DUE TO DUCT INTERNAL FLOW

During the course of the tests, air was allowed to flow through the internal ducts of the model, but no attempt was made to control the flow quantity. In order that the model external drag might be obtained from the measured values it was necessary to determine the internal drag. Measurements of total head and static pressure at the duct exit station were therefore made over a range of incidences and Mach numbers at zero sideslip, to provide the data necessary for an estimate of the internal drag. A ring of 13 pitot tubes was installed round the annulus formed by the sting support and the end of the fuselage. The tubes were fitted at the centre of the annulus and an additional pitot was fitted to determine the total head variation across the annulus; two static probes were also installed. The mean of the readings from the static probes was assumed to give the mean static pressure at the duct exit. The mean total head at the exit was obtained from the pitot readings at the centre of the annulus and an empirical factor (0·9) applied to allow for total head variation across the annulus. The estimation of the correction due to internal drag was then made using a formula derived as follows.

Consider the external forces exerted on the intake stream tube, between the upstream and duct exit stations and resolved along the wind axis.



Total external force = rate of change of momentum.
Correcting the exit static pressure to free stream static pressure

$$\Delta D + (p_E - p_o)\, A_E \cos\sigma = 2\, q_o\, A_o - 2\, q_E\, A_E \cos\sigma$$

Therefore

$$\Delta C_D = \frac{2\, q_o\, A_o - 2\, q_E\, A_E \cos\sigma}{q_o\, S} - \frac{(p_E - p_o)\, A_E \cos\sigma}{q_o\, S}$$

where S = wing area

$$\Delta C_D = \frac{2\, A_E}{q_o\, S}\left[q_o \cdot \frac{A_o/A_o^*}{A_E/A_E^*} \cdot \frac{A_o^*}{A_E^*} - q_E \cos\sigma\right] - \frac{(p_E - p_o)\, A_E \cos\sigma}{q_o\, S}$$

but since, by continuity of mass, $A_o^*\, H_o = A_E^*\, H_E$

$$\Delta C_D = \frac{2\, A_E}{q_o\, S}\left[q_o \cdot \frac{A_o/A_o^*}{A_E/A_E^*} \cdot \frac{H_E}{H_o} - \left\{q_E + \frac{(p_E - p_o)}{2}\right\} \cos\sigma\right]$$

$$= \frac{A_i}{S}\left[2 \cdot \frac{A_o/A_o^*}{A_E/A_E^*} \cdot \frac{A_E}{A_i} \cdot \frac{H_E}{H_o} - \left\{2\, \frac{q_E}{q_o} \cdot \frac{A_E}{A_i} + \frac{(p_E - p_o)}{q_o} \cdot \frac{A_E}{A_i}\right\} \cos\sigma\right].$$

Using the above formula, estimates of ΔC_D were made and the correction made to the measured values of C_D. Values of ΔC_D are given in the following table.

σ	Mach number											
	0.85	0.90	0.93	0.95	0.97	0.99	1.01	1.05	1.10	1.15	1.20	1.25
$-\frac{1}{2}$	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0031	0.0031	0.0039	0.0037	0.0025	0.0027
$+5\frac{1}{2}$	0.0026	0.0026	0.0027	0.0027	0.0027	0.0028	0.0032	0.0031	0.0038	0.0035	0.0024	0.0026
$+11\frac{1}{2}$	0.0021	0.0027	0.0028	0.0028	0.0032	0.0036	0.0038	0.0036	0.0040	0.0037	0.0026	0.0029

The measured values of C_L were not corrected for the lift due to internal mass flow and momentum losses since the incidence range of the tests was sufficiently small for this correction to be neglected.

The drag corrections estimated above and applied to the main drag measurements (longitudinal results, Tables 2 to 4 and Figs.11 to 13 and 15 to 17) corresponded to about 25% of the measured C_{D_0}. The following limitations and omissions should be noted:-

(a) No attempt was made to control the internal mass flow. The measured values of internal mass flow have been non-dimensionalised and compared with typical values measured on the full scale aircraft by Aero Flight Division at the R.A.E., Bedford. The comparison, given in Fig.43 indicates that the mass flow was about 50% of the flight value at a Mach number of 0·85; at M = 1·25, the model value was about 85% of the full scale value. The model results indicate non-representative mass flows particularly at the lower Mach numbers.

(b) No allowance has been made for the base pressure acting on the support sting cross-sectional area due to the uncertainty of estimation.

(c) The small loss of internal flow momentum due to skin friction on the sting support inside the model could not be determined with any certainty and has been neglected.

(d) The post-exit thrust has been neglected and the effect of the jet on the boat-tail drag has been ignored. The measured value of static pressure at the duct exit was about 12% above the free stream value at M = 0·85 and about 20% above at M = 1·25.

TABLE 2

Longitudinal characteristics

$\eta = 0°$; 0° aileron upfloat

$\alpha_W°$	C_L	C_D^*	C_m	$\alpha_W°$	C_L	C_D^*	C_m
	M = 0·85				M = 1·05		
-0·11	-0.055	0·0056	0·0059	-1·23	-0·101	0·0108	0·0157
+0·92	-0·006	0·0065	0·0036	-0·15	-0·045	0·0100	0·0075
3·07	+0·097	0·0103	-0·0013	+0·95	+0·018	0·0104	-0·0012
5·14	0·207	0·0208	-0·0100	3·13	0·143	0·0161	-0·0206
7·43	0·336	0·0430	-0·0239	5·31	0·269	0·0304	-0·0402
9·58	0·429	0·0704	-0·0257	7·51	0·405	0·0559	-0·0636
11·78	0·560	0·1132	-0·0426	9·71	0·535	0·0928	-0·0861
13·96	0·663	0·1589	-0·0468	11·90	0·658	0·1382	-0·1065
16·12	0·748	0·2096	-0·0516	14·05	0·735	0·1840	-0·1065
	M = 0·90				M = 1·15		
-1·24	-0·105	0·0073	0·0101	-1·23	-0·100	0·0112	0·0156
-0·16	-0·056	0·0067	0·0071	-0·14	-0·040	0·0089	0·0065
+0·91	-0·006	0·0061	0·0035	+0·94	+0·016	0·0097	-0·0029
3·09	+0·104	0·0101	-0·0027	3·13	0·141	0·0152	-0·0243
5·26	0·218	0·0216	-0·0141	5·31	0·263	0·0297	-0·0456
7·47	0·348	0·0445	-0·0278	7·51	0·398	0·0544	-0·0719
9·64	0·442	0·0729	-0·0276	9·70	0·521	0·0889	-0·0930
11·86	0·585	0·1191	-0·0529	11·89	0·636	0·1327	-0·1135
14·04	0·686	0·1667	-0·0596	14·06	0·737	0·1811	-0·1296
16·19	0·764	0·2167	-0·0659				
	M = 0·95				M = 1·25		
-1·23	-0·104	0·0063	0·0081	-1·23	-0·095	0·0108	0·0155
-0·11	-0·054	0·0052	0·0065	-0·14	-0·042	0·0093	0·0083
+0·93	+0·007	0·0054	0·0014	+0·94	+0·016	0·0099	-0·0027
3·09	0·115	0·0096	-0·0058	3·12	0·129	0·0150	-0·0224
5·27	0·235	0·0225	-0·0177	5·30	0·250	0·0288	-0·0472
7·47	0·384	0·0488	-0·0436	7·47	0·362	0·0501	-0·0675
9·66	0·513	0·0847	-0·0589	9·66	0·478	0·0819	-0·0881
11·81	0·607	0·1245	-0·0674	11·84	0·590	0·1226	-0·1091
13·99	0·714	0·1754	-0·0828	14·01	0·689	0·1687	-0·1277
16·14	0·806	0·2312	-0·0942				
	M = 0·99						
-1·23	-0·110	0·0077	0·0155				
-0·15	-0·049	0·0067	0·0080				
+0·93	+0·007	0·0072	0·0020				
3·12	0·136	0·0128	-0·0156				
5·30	0·264	0·0272	-0·0350				
7·50	0·412	0·0546	-0·0629				
9·71	0·553	0·0942	-0·0872				
11·90	0·676	0·1423	-0·1066				
14·04	0·753	0·1887	-0·1066				
16·03	0·866	0·2496	-0·1308				

* C_D partially corrected for internal drag (See Appendix 1)

TABLE 3

Longitudinal characteristics

η = 0°; 3° aileron upfloat

α_W^o	C_L	C_D^*	C_m
	M = 0·85		
-1·25	-0·129	0·0068	0·0208
-0·18	-0·084	0·0046	0·0197
+0·89	-0·033	0·0054	0·0173
3·03	+0·067	0·0085	0·0115
5·18	0·177	0·0173	0·0036
7·35	0·293	0·0364	-0·0056
9·50	0·398	0·0626	-0·0099
11·68	0·530	0·1028	-0·0273
13·84	0·628	0·1458	-0·0321
15·98	0·719	0·1954	-0·0392
	M = 0·90		
-1·25	-0·131	0·0072	0·0241
-0·19	-0·086	0·0053	0·0208
+0·89	-0·034	0·0052	0·0184
3·04	+0·073	0·0075	0·0114
5·21	0·189	0·0173	+0·0003
7·38	0·306	0·0369	-0·0090
9·53	0·408	0·0645	-0·0126
11·73	0·548	0·1072	-0·0365
13·89	0·646	0·1516	-0·0420
16·03	0·740	0·2033	-0·0541
	M = 0·93		
-1·27	-0·142	0·0075	0·0281
-0·19	-0·089	0·0057	0·0231
+0·89	-0·034	0·0054	0·0197
3·05	+0·072	0·0073	0·0121
5.22	0·189	0·0177	0·0004
7·41	0·315	0·0386	-0·0114
9·58	0·428	0·0680	-0·0204
11·77	0·562	0·1118	-0·0435
13·95	0·667	0·1592	-0·0548
16·10	0·758	0·2125	-0·0665
	M = 0·95		
-1·26	-0·147	0·0099	0·0314
-0·19	-0·093	0·0068	0·0260
+0·89	-0·038	0·0060	0·0226
3·06	+0·082	0·0082	0·0106
5·23	0·204	0·0193	-0·0029
7·42	0·339	0·0421	-0·0201
9·58	0·449	0·0720	-0·0296
11·76	0·572	0·1141	-0·0494
13·93	0·684	0·1634	-0·0667
16·10	0·780	0·2192	-0·0776

α_W	C_L	C_D^*	C_m
	M = 0·97		
-1·28	-0·155	0·0091	0·0362
-0·19	-0·095	0·0069	0·0299
+0·89	-0.038	0·0060	0·0257
3·07	+0·088	0·0089	0·0109
5·25	0·212	0·0212	-0·0052
7·45	0·354	0·0439	-0·0265
9·62	0·467	0·0757	-0·0366
11·81	0·592	0·1203	-0·0584
14·00	0·723	0·1754	-0·0851
16·17	0·824	0·2330	-0·1029
	M = 0·99		
-1·27	-0·145	0·0085	0·0376
-0·18	-0·082	0·0058	0·0286
+0·91	-0·022	0·0065	0·0211
3·09	+0·105	0·0108	0·0031
5·27	0·230	0·0230	-0·0135
7·47	0·375	0·0473	-0·0394
9·68	0·517	0·0851	-0·0650
11·86	0·635	0·1288	-0·0826
14·03	0·734	0·1789	-0·0950
	M = 1·01		
-1·27	-0·147	0·0118	0·0365
-0·17	-0·077	0·0089	0·0250
+0·92	-0·014	0·0099	0·0161
3·09	+0·105	0·0140	-0·0001
5·29	0·243	0·0274	-0·0220
7·48	0·376	0·0508	-0·0424
9·68	0·513	0·0866	-0·0669
11·87	0·638	0·1320	-0·0914
14·02	0·727	0·1798	-0·0967
	M = 1·05		
-1·25	-0·130	0·0141	0·0311
-0·17	-0·072	0·0118	0·0238
+0·92	-0·013	0·0112	0·0159
3·10	+0·112	0·0149	-0·0025
5·28	0·240	0·0281	-0·0242
7·47	0·374	0·0512	-0·0452
9·66	0·502	0·0855	-0·0679
11·86	0·635	0·1302	-0·0922
13·99	0·705	0·1730	-0·0929

* C_D partially corrected for internal drag (See Appendix 1)

TABLE 3 (Contd.)

α_W^o	C_L	C_D^*	C_m
	$M = 1·10$		
-1·25	-0·124	0·0123	0·0295
-0·16	-0·063	0·0100	0·0197
+0·93	-0·004	0·0098	0·0118
3·11	+0·117	0·0142	-0·0084
5·29	0·246	0·0273	-0·0304
7·48	0·375	0·0499	-0·0537
9·68	0·503	0·0834	-0·0770
11·87	0·624	0·1266	-0·0969
14·02	0·701	0·1687	-0·0994
	$M = 1·15$		
-1·25	-0·124	0·0138	0·0285
-0·16	-0·060	0·0101	0·0173
+0·93	-0·001	0·0100	0·0072
3·11	+0·119	0·0146	-0·0115
5·30	0·249	0·0276	-0·0344
7·49	0·374	0·0497	-0·0576
9·69	0·503	0·0830	-0·0806
11·87	0·615	0·1242	-0·1003
14·06	0·723	0·1740	-0·1191
	$M = 1·20$		
-1·25	-0·116	0·0126	0·0264
-0·16	-0·060	0·0103	0·0159
+0·93	-0·002	0·0102	0·0065
3·10	+0·114	0·0142	-0·0129
5·29	0·235	0·0271	-0·0349
7·47	0·354	0·0474	-0·0556
9·66	0·477	0·0793	-0·0780
11·85	0·591	0·1203	-0·0993
14·03	0·699	0·1684	-0·1191
	$M = 1·25$		
-1·25	-0·115	0·0119	0·0272
-0·16	-0·058	0·0095	0·0168
+0·93	-0·002	0·0097	0·0076
3·10	+0·113	0·0140	-0·0120
5·28	0·229	0·0263	-0·0340
7·46	0·344	0·0460	-0·0553
9·66	0·467	0·0774	-0·0795
11·84	0·576	0·1156	-0·0985
14·02	0·674	0·1620	-0·1163

* C_D partially corrected for internal drag (See Appendix 1)

TABLE 4

Longitudinal characteristics

$\eta = -4^\circ$; 3° aileron upfloat

M = 0·85

α_W°	C_L	C_D^*	C_m
-1·31	-0·207	0·0148	0·0513
-0·25	-0·161	0·0086	0·0472
+0·82	-0·111	0·0066	0·0465
2·96	-0·004	0·0071	0·0394
5·10	+0·102	0·0128	0·0324
7·25	0·222	0·0288	0·0223
9·40	0·329	0·0522	0·0138
11·58	0·461	0·0889	-0·0004
13·73	0·567	0·1302	-0·0042
15·87	0·656	0·1760	-0·0103

M = 0·90

α_W°	C_L	C_D^*	C_m
-1·31	-0·196	0·0141	0·0476
-0·26	-0·163	0·0095	0·0527
+0·82	-0·109	0·0072	0·0486
2·96	-0·001	0·0064	0·0395
5·12	+0·108	0·0128	0·0322
7·28	0·227	0·0290	0·0216
9·45	0·341	0·0540	0·0151
11·63	0·473	0·0917	-0·0046
13·81	0·586	0·1365	-0·0137
15·95	0·672	0·1832	-0·0224

M = 0·93

α_W°	C_L	C_D^*	C_m
-1·35	-0·224	0·0154	0·0633
-0·28	-0·175	0·0107	0·0602
+0·81	-0·117	0·0084	0·0558
2·96	-0·012	0·0064	0·0457
5·13	+0·107	0·0130	0·0350
7·31	0·229	0·0300	0·0252
9·50	0·350	0·0565	0·0148
11·70	0·490	0·0965	-0·0079
13·88	0·600	0·1411	-0·0214
16·03	0·691	0·1910	-0·0357

M = 0·95

α_W°	C_L	C_D^*	C_m
-1·34	-0·226	0·0163	0·0670
-0·27	-0·174	0·0115	0·0637
+0·81	-0·121	0·0094	0·0610
2·97	-0·012	0·0079	0·0524
5·14	+0·110	0·0144	0·0396
7·31	0·238	0·0326	0·0238
9·48	0·356	0·0583	0·0126
11·68	0·496	0·0990	-0·0113
13·85	0·610	0·1447	-0·0300
16·00	0·702	0·1959	-0·0406

M = 0·97

α_W°	C_L	C_D^*	C_m
-1·34	-0·223	0·0168	0·0696
-1·26	-0·169	0·0124	0·0641
+0·82	-0·113	0·0099	0·0610
2·99	-0·002	0·0087	0·0526
5·17	+0·126	0·0064	0·0396
7·35	0·254	0·0348	0·0237
9·53	0·369	0·0616	0·0133
11·73	0·515	0·1034	-0·0175
13·90	0·626	0·1492	-0·0360
16·08	0·736	0·2045	-0·0584

M = 0·99

α_W°	C_L	C_D^*	C_m
-1·34	-0·219	0·0270	0·0704
-0·26	-0·161	0·0126	0·0638
+0·83	-0·101	0·0101	0·0593
3·02	+0·029	0·0103	0·0435
5·20	0·159	0·0200	0·0220
7·41	0·304	0·0420	-0·0026
9·61	0·444	0·0748	-0·0262
11·77	0·542	0·1129	-0·0304
13·94	0·657	0·1593	-0·0540
16·12	0·776	0·2171	-0·0798

M = 1·01

α_W°	C_L	C_D^*	C_m
-1·33	-0·215	0·0190	0·0694
-0·25	-0·154	0·0146	0·0637
+0·85	-0·089	0·0121	0·0545
3·02	+0·036	0·0119	0·0380
5·21	0·166	0·0226	0·0197
7·40	0·308	0·0439	-0·0059
9·61	0·449	0·0775	-0·0310
11·79	0·575	0·1185	-0·0538
13·94	0·661	0·1621	-0·0588
16·12	0·777	0·2189	-0·0846

M = 1·05

α_W°	C_L	C_D^*	C_m
-1·32	-0·203	0·0200	0·0688
-0·23	-0·142	0·0152	0·0597
+0·85	-0·082	0·0140	0·0518
3·04	+0·048	0·0143	0·0318
5·22	0·176	0·0246	0·0108
7·42	0·311	0·0454	-0·0115
9·62	0·447	0·0772	-0·0346
11·81	0·570	0·1173	-0·0556
13·94	0·643	0·1562	-0·0602
16·12	0·756	0·2121	-0·0852

* C_D partially corrected for internal drag (See Appendix 1)

TABLE 4 (Contd.)

α_W°	C_L	C_D*	C_m
	M = 1·10		
-1·32	-0·185	0·0179	0·0574
-0·23	-0·122	0·0141	0·0477
+0·88	-0·053	0·0125	0·0363
3·06	+0·068	0·0139	0·0171
5·25	0·193	0·0247	-0·0029
7·45	0·321	0·0452	-0·0240
9·65	0·452	0·0760	-0·0482
11·84	0·565	0·1156	-0·0633
14·00	0·644	0·1570	-0·0642
	M = 1·15		
-1·31	-0·181	0·0177	0·0598
-0·21	-0·114	0·0124	0·0453
+0·88	-0·051	0·0110	0·0348
3·06	+0·074	0·0138	0·0150
5·24	0·195	0·0245	-0·0058
7·44	0·330	0·0451	-0·0317
9·63	0·453	0·0759	-0·0504
11·81	0·567	0·1148	-0·0693
13·97	0·655	0·1571	-0·0782
	M = 1·20		
-1·29	-0·166	0·0191	0·0549
-0·21	-0·110	0·0141	0·0455
+0·88	-0.049	0·0125	0·0347
3·06	+0·070	0·0146	0·0143
5·24	0·194	0·0257	-0·0094
7·42	0·310	0·0439	-0·0302
9·61	0·434	0·0742	-0·0518
11·80	0·550	0·1125	-0·0722
13·97	0·652	0·1572	-0·0906
	M = 1·25		
-1·28	-0·158	0·0175	0·0521
-0·20	-0·100	0·0134	0·0420
+0·89	-0·043	0·0120	0·0309
3·07	+0·076	0·0142	0·0089
5·24	0·195	0·0246	-0·0136
7·43	0·315	0·0437	-0·0339
9·61	0·427	0·0718	-0·0537
11·79	0·540	0·1086	-0·0754
13·96	0·637	0·1524	-0·0922

*C_D partially corrected for internal drag (See Appendix 1)

TABLE 5

Longitudinal and Lateral characteristics

$\eta = 0°$; $3°$ aileron upfloat

$\alpha_w°$	$\beta°$	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 0·85				
-1·18	-3·15	-0·116	0·0050	0·0174	0·0002	-0·0040	0·0194
-1·24	-1·06	-0·137	0·0093	0·0202	-0·0004	-0·0019	0·0070
-1·21	+1·07	-0·119	0·0090	0·0204	-0·0002	+0·0011	-0·0090
-1·16	3·15	-0·101	0·0088	0·0199	-0·0006	0·0031	-0·0215
-0·06	3·17	-0·047	0·0072	0·0168	-0·0012	0·0038	-0·0239
-0·13	1·09	-0·068	0·0087	0·0196	-0·0002	0·0014	-0·0091
-0·17	-1·09	-0·095	0·0076	0·0201	0	-0·0014	+0·0061
-0·10	-3·17	-0·078	0·0061	0·0196	+0·0013	-0·0037	0·0192
0·99	-3·18	-0·035	0·0056	0·0157	0·0014	-0·0043	0·0211
0·94	-1·15	-0·043	0·0066	0·0147	0·0003	-0·0018	0·0067
1·00	+1·14	-0·001	0·0071	0·0134	-0·0006	+0·0012	-0·0087
1·05	3·18	+0·006	0·0075	0·0142	-0·0022	0·0042	-0·0240
3·13	-2·91	0·091	0·0109	0·0091	+0·0037	-0·0042	+0·0215
3·06	-0·93	0·078	0·0112	0·0114	0·0012	-0·0018	0·0072
3·04	+0·93	0·069	0·0108	0·0089	-0·0007	+0·0009	-0·0070
3·10	2·90	0·066	0·0106	0·0103	-0·0026	0·0036	-0·0224
5·20	2·94	0·176	0·0190	0·0008	-0·0034	0·0037	-0·0227
5·17	0·97	0·176	0·0192	0·0011	-0·0012	0·0008	-0·0068
5·20	-0·91	0·186	0·0200	0·0003	+0·0012	-0·0019	+0·0068
5·22	-2·94	0·193	0·0199	-0·0016	0·0040	-0·0044	0·0231
7·35	-2·96	0·303	0·0387	-0·0087	0·0040	-0·0051	0·0246
7·33	-0·98	0·298	0·0382	-0·0079	0·0011	-0·0023	0·0094
7·33	+0·98	0·295	0·0380	-0·0091	-0·0012	-0·0010	-0·0080
7·34	2·90	0·291	0·0374	-0·0089	-0·0040	-0·0039	-0·0237
9·49	2·97	0·400	0·0644	0·0114	-0·0056	+0·0032	-0·0215
9·47	0·99	0·392	0·0635	0·0098	-0·0021	0·0007	-0·0057
9·47	-0·99	0·394	0·0640	0·0102	+0·0016	-0·0023	+0·0109
9·49	-2·97	0·403	0·0652	0·0115	0·0054	-0·0048	0·0262
11·56	-2·99	0·532	0·1047	0·0299	0·0068	-0·0049	0·0282
11·65	-0·99	0·533	0·1050	0·0314	0·0020	-0·0024	0·0117
11·64	+0·98	0·527	0·1042	0·0293	-0·0019	-0·0002	-0·0037
11·66	2·99	0·528	0·1041	0·0283	-0·0058	+0·0024	-0·0208

TABLE 5 (Contd.)

M = 0·90

α_W°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·20	-3·16	-0·129	0·0091	0·0238	0·0003	-0·0097	0·0352
-1·26	-1·07	-0·143	0·0095	0·0257	-0·0002	-0·0038	0·0109
-1·23	+1·07	-0·131	0·0096	0·0270	-0·0002	-0·0008	-0·0045
-1·17	3·15	-0·106	0·0090	0·0234	-0·0006	+0·0016	-0·0177
-0·07	3·17	-0·052	0·0074	0·0209	-0·0012	0·0025	-0·0200
-0·13	1·09	-0·071	0·0087	0·0229	-0·0001	-0·0009	-0·0041
-0·18	-1·09	-0·099	0·0079	0·0250	-0·0002	-0·0033	+0·0102
-0·11	-3·17	-0·085	0·0074	0·0240	+0·0009	-0·0058	0·0249
+0·98	-3·18	-0·039	0·0050	0·0187	0·0011	-0·0058	0·0234
0·95	-1·15	-0·042	0·0068	0·0181	0·0002	-0·0033	0·0109
1·00	+1·14	-0·003	0·0079	0·0177	-0·0010	+0·0001	-0·0067
1·05	3·18	+0·001	0·0081	0·0184	-0·0017	0·0031	-0·0217
3·15	-2·91	0·093	0·0106	0·0121	+0·0035	-0·0054	+0·0254
3·08	-0·93	0·084	0·0110	0·0133	0·0008	-0·0032	0·0107
3·05	+0·93	0·062	0·0104	0·0139	-0·0010	-0·0004	-0·0041
3·11	2·91	0·071	0·0104	0·0122	-0·0027	+0·0025	-0·0206
5·23	2·94	0·184	0·0193	0·0013	-0·0041	0·0030	-0·0213
5·20	0·97	0·183	0·0195	0·0023	-0·0015	0·0001	-0·0059
5·23	-0·91	0·190	0·0199	0·0036	+0·0010	-0·0027	+0·0101
5·25	-2·94	0·200	0·0203	0·0016	0·0038	-0·0055	0·0259
7·41	-2·97	0·313	0·0401	-0·0077	0·0034	-0·0056	0·0264
7·38	-0·98	0·307	0·0395	-0·0070	0·0008	-0·0021	0·0085
7·38	+0·99	0·304	0·0391	-0·0068	-0·0010	+0·0005	-0·0072
7·39	2·96	0·303	0·0386	-0·0087	-0·0039	0·0030	-0·0220
9·54	2·97	0·407	0·0659	-0·0132	-0·0063	0·0031	-0·0215
9·54	0·99	0·411	0·0664	-0·0139	-0·0022	0·0001	-0·0047
9·54	-0·99	0·410	0·0668	-0·0127	+0·0018	-0·0022	+0·0106
9·55	-2·98	0·414	0·0675	-0·0142	0·0055	-0·0051	0·0267
11·74	-3·00	0·554	0·1104	-0·0381	0·0058	-0·0050	0·0296
11·72	-0·99	0·542	0·1084	-0·0334	0·0030	-0·0020	0·0108
11·72	+0·99	0·546	0·1093	-0·0342	-0·0008	-0·0003	-0·0043
11·73	2·99	0·544	0·1087	-0·0330	-0·0050	+0·0017	-0·0193

TABLE 5 (Contd.)

α_w°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
				M = 0·93			
-1·22	-3·15	-0·138	0·0091	0·0247	-0·0003	-0·0048	0·0233
-1·26	-1·07	-0·149	0·0104	0·0285	-0·0003	-0·0023	0·0090
-1·24	+1·07	-0·132	0·0102	0·0274	-0·0001	+0·0006	-0·0076
-1·18	3·15	-0·114	0·0097	0·0255	-0·0005	0·0035	-0·0224
-0·07	3·17	-0·052	0·0079	0·0205	-0·0015	0·0038	-0·0227
-0·13	1·10	-0·069	0·0085	0·0230	-0·0006	0·0008	-0·0082
-0·18	-1·09	-0·097	0·0080	0·0231	+0·0001	-0·0020	+0·0084
-0·12	-3·17	-0·085	0·0074	0·0235	0·0010	-0·0045	0·0223
+0·98	-3·18	-0·042	0·0064	0·0198	0·0012	-0·0050	0·0227
0·95	-1·15	-0·042	0·0070	0·0190	0·0003	-0·0022	0·0081
1·00	+1·15	-0·002	0·0076	0·0172	-0·0010	+0·0009	0·0082
1·05	3·18	+0·005	0·0079	0·0171	-0·0021	0·0040	0·0241
3·16	-2·91	0·102	0·0103	0·0091	+0·0033	-0·0044	0·0216
3·10	-0·93	0·096	0·0107	0·0093	0·0010	-0·0023	0·0089
3·06	+0·93	0·073	0·0102	0·0114	-0·0010	+0·0008	-0·0076
3·12	2·91	0·073	0·0099	0·0119	-0·0029	0·0034	-0·0224
5·24	2·94	0·188	0·0195	-0·0013	-0·0041	0·0036	-0·0231
5·22	0·97	0·189	0·0198	+0·0010	-0·0016	0·0010	-0·0082
5·25	-0·91	0·202	0·0207	-0·0009	+0·0010	-0·0020	+0·0079
5·27	-2·94	0·205	0·0208	+0·0009	+0·0041	-0·0049	0·0243
7·43	-2·97	0·329	0·0412	-0·0171	+0·0039	-0·0049	0·0250
7·40	-0·99	0·322	0·0413	-0·0136	+0·0007	-0·0027	0·0103
7·40	+0·98	0·316	0·0407	-0·0131	-0·0016	+0·0009	-0·0072
7·41	2·96	0·317	0·0408	-0·0138	+0·0043	0·0032	-0·0211
9·57	2·97	0·427	0·0701	-0·0202	-0·0060	0·0031	-0·0222
9·57	0·99	0·429	0·0705	-0·0201	-0·0032	0·0006	-0·0059
9·58	-0·99	0·434	0·0713	-0·0200	+0·0008	-0·0021	+0·0089
9·59	-2·98	0·440	0·0721	-0·0223	0·0054	-0·0050	0·0262
11·77	-3·00	0·566	0·1139	-0·0443	0·0059	-0·0049	0·0292
11·76	-0·99	0·565	0·1139	-0·0431	0·0030	-0·0023	0·0105
11·76	+0·99	0·567	0·1144	-0·0431	-0·0007	+0·0002	-0·0065
11·76	2·99	0·558	0·1125	-0·0401	-0·0046	0·0023	-0·0210

TABLE 5 (Contd.)

α_W^o	β^o	C_L	C_D	C_m	C_ℓ	C_n	C_Y
				M = 0·95			
-1·23	-3·15	-0·145	0·0104	0·0283	-0·0001	-0·0049	0·0237
-1·27	-1·07	-0·151	0·0110	0·0309	-0·0002	-0·0021	0·0081
-1·24	+1·07	-0·137	0·0109	0·0307	-0·0004	+0·0009	-0·0081
-1·18	3·16	-0·115	0·0102	0·0267	-0·0007	0·0040	-0·0233
-0·07	3·17	-0·057	0·0089	0·0240	-0·0018	0·0041	-0·0243
-0·13	1·10	-0·071	0·0094	0·0262	-0·0006	0·0011	-0·0079
-0·19	-1·09	-0·104	0·0086	0·0267	-0·0001	-0·0018	+0·0069
-0·13	-3·18	-0·092	0·0079	0·0271	+0·0007	-0·0047	0·0230
+0·98	-3·19	-0·045	0·0070	0·0212	0·0008	-0·0056	0·0247
0·94	-1·15	-0·046	0·0077	0·0217	0	-0·0023	0·0090
1·01	+1·15	-0·002	0·0078	0·0188	-0·0009	+0·0009	0·0081
1·05	3·18	+0·001	0·0084	0·0196	-0·0021	0·0039	0·0235
3·16	-2·91	0·099	0·0109	0·0129	+0·0033	-0·0048	0·0242
3·10	-0·93	0·097	0·0111	0·0109	0·0007	-0·0018	0·0077
3·23	+0·92						
3·12	2·91	0·072	0·0101	0·0129	-0·0031	+0·0033	-0·0225
5·25	2·94	0·195	0·0207	-0·0013	-0·0048	0·0032	-0·0211
5·23	0·97	0·191	0·0205	+0·0012	-0·0020	0·0014	-0·0083
5·27	-0·91	0·208	0·0218	-0·0003	+0·0011	-0·0018	+0·0077
5·29	-2·94	0·216	0·0224	-0·0008	0·0045	-0·0045	0·0241
7·45	-2·97	0·341	0·0442	-0·0174	0·0039	-0·0048	0·0256
7·43	-0·98	0·340	0·0443	-0·0176	0·0008	-0·0021	0·0085
7·42	+0·98	0·333	0·0434	-0·0177	-0·0014	+0·0007	-0·0066
7·44	2·96	0·335	0·0433	-0·0211	-0·0043	0·0035	-0·0225
9·60	2·98	0·443	0·0735	-0·0269	-0·0038	0·0033	-0·0230
9·60	0·99	0·445	0·0739	-0·0267	-0·0022	0·0007	-0·0063
9·60	-0·99	0·450	0·0747	-0·0277	+0·0001	-0·0021	+0·0090
9·63	-2·98	0·464	0·0766	-0·0317	+0·0025	-0·0048	0·0271
11·79	-3·00	0·573	0·1162	-0·0487	0·0058	-0·0047	0·0284
11·78	-0·99	0·573	0·1168	-0·0495	0·0029	-0·0022	0·0108
11·78	+0·99	0·574	0·1170	-0·0488	-0·0006	+0·0001	-0·0060
11·78	2·99	0·568	0·1159	-0·0461	-0·0046	0·0024	-0·0224

TABLE 5 (Contd.)

M = 0·97

α_W°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·23	-3·16	-0·147	+0·0093	+0·0344	-0·0002	-0·0050	+0·0241
-1·29	-1·07	-0·166	0·0110	0·0381	-0·0006	-0·0022	0·0080
-1·26	+1·07	-0·150	0·0114	0·0365	-0·0004	+0·0008	-0·0084
-1·19	3·16	-0·123	0·0105	0·0323	-0·0007	0·0036	-0·0227
-0·08	3·18	-0·059	0·0088	0·0248	-0·0016	0·0040	-0·0239
-0·15	1·10	-0·078	0·0095	0·0281	-0·0008	0·0007	-0·0083
-0·19	-1·09	-0·107	0·0092	0·0309	-0·0004	-0·0020	+0·0074
-0·12	-3·18	-0·092	0·0081	0·0299	+0·0008	-0·0052	0·0246
0·98	-3·19	-0·048	+0·0071	+0·0249	0·0013	-0·0052	+0·0236
0·94	-1·15	-0·046	0·0078	0·0246	0·0002	-0·0023	0·0084
1·02	+1·15	+0·004	0·0082	0·0182	-0·0010	+0·0008	-0·0082
1·05	3·18	0·004	0·0084	0·0193	-0·0022	0·0041	-0·0239
3·18	-2·91	0·115	0·0122	0·0072	+0·0036	-0·0046	+0·0237
3·12	-0·93	0·107	0·0123	0·0082	0·0008	-0·0021	0·0093
3·08	+0·93	0·084	0·0113	0·0097	-0·0017	+0·0003	-0·0059
3·14	2·91	0·084	0·0113	0·0101	-0·0035	0·0032	-0·0220
5·27	2·94	+0·209	+0·0229	-0·0062	-0·0048	+0·0035	-0·0230
5·25	0·97	0·213	0·0232	-0·0062	-0·0022	0·0006	-0·0070
5·27	-0·91	0·214	0·0234	-0·0045	+0·0010	-0·0021	+0·0086
5·30	-2·94	0·233	0·0244	-0·0084	0·0037	-0·0047	0·0248
7·47	-2·97	0·360	0·0468	-0·0250	0·0017	-0·0053	0·0268
7·45	-0·98	0·354	0·0465	-0·0251	0·0003	-0·0020	0·0081
7·44	+0·99	0·351	0·0460	-0·0268	-0·0004	+0·0008	-0·0072
7·46	2·97	0·353	0·0458	-0·0277	-0·0031	0·0039	-0·0240
9·64	2·98	+0·479	+0·0799	-0·0425	-0·0030	+0·0034	-0·0237
9·63	0·99	0·475	0·0794	-0·0379	-0·0017	0·0007	-0·0076
9·64	-1·00	0·484	0·0807	-0·0435	-0·0025	-0·0026	+0·0119
9·64	-2·99	0·482	0·0806	-0·0425	+0·0005	-0·0053	0·0288
11·82	-3·00	0·599	0·1251	-0·0614	0·0050	-0·0055	0·0306
11·80	-0·99	0·594	0·1224	-0·0581	0·0028	-0·0023	0·0108
11·80	+0·99	0·594	0·1226	-0·0592	-0·0011	-0·0001	-0·0042
11·81	2·99	0·593	0·1224	-0·0569	-0·0054	+0·0026	-0·0227

TABLE 5 (Contd.)

M = 0·99

α_w°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·23	-3·16	-0·154	+0·0105	+0·0382	0·0001	-0·0059	+0·0258
-1·28	-1·07	-0·165	0·0119	0·0419	-0·0004	-0·0028	0·0091
-1·24	+1·07	-0·143	0·0110	0·0392	-0·0001	0·0000	-0·0064
-1·18	3·15	-0·116	0·0101	0·0331	-0·0010	+0·0030	-0·0223
-0·07	3·17	-0·054	0·0083	0·0269	-0·0021	0·0028	-0·0216
-0·13	1·09	-0·072	0·0103	0·0287	-0·0010	0·0001	-0·0062
-0·18	-1·09	-0·104	0·0097	0·0310	+0·0002	-0·0027	+0·0092
-0·12	-3·18	-0·092	0·0087	0·0302	0·0013	-0·0059	0·0270
+1·00	-3·19	-0·030	+0·0066	+0·0205	0·0018	-0·0055	+0·0255
0·96	-1·15	-0·036	0·0094	0·0215	0·0002	-0·0030	0·0109
1·02	+1·14	+0·007	0·0092	0·0168	-0·0011	-0·0002	-0·0058
1·06	3·18	+0·013	0·0094	0·0155	-0·0024	+0·0034	-0·0230
3·20	-2·91	0·133	0·0146	-0·0012	+0·0039	-0·0053	+0·0246
3·13	-0·93	0·118	0·0139	+0·0015	0·0009	-0·0023	0·0089
3·09	+0·93	0·092	0·0137	0·0057	-0·0015	-0·0001	-0·0055
3·16	2·91	0·102	0·0136	0·0016	-0·0037	+0·0028	-0·0208
+5·29	+2·94	+0·224	+0·0252	-0·0150	-0·0048	+0·0033	-0·0235
5·27	0·97	0·230	0·0260	-0·0158	-0·0019	0·0004	-0·0075
5·31	-0·91	0·246	0·0278	-0·0185	+0·0011	-0·0025	+0·0082
5·33	-2·95	0·257	0·0283	-0·0198	0·0041	-0·0055	0·0264
7·50	-2·97	0·384	0·0518	-0·0403	0·0040	-0·0061	0·0286
7·47	-0·98	0·378	0·0513	-0·0397	0·0016	-0·0027	0·0095
7·47	+0·99	0·375	0·0509	-0·0399	-0·0017	+0·0006	-0·0072
7·48	+2·97	0·369	0·0503	-0·0390	-0·0041	+0·0041	-0·0254
+9·67	+2·98	+0·511	+0·0868	-0·0637	-0·0063	+0·0041	-0·0257
9·68	+0·99	0·517	0·0881	-0·0650	-0·0023	0	-0·0054
9·68	-0·99	0·521	0·0892	-0·0655	+0·0020	-0·0026	+0·0108
9·69	-2·98	0·520	0·0892	-0·0635	0·0070	-0·0065	0·0312
11·86	-3·01	0·636	0·1322	-0·0810	0·0049	-0·0063	0·0333
11·86	-1·00	0·635	0·1326	-0·0803	-0·0013	-0·0028	0·0144
11·85	+0·98	0·631	0·1318	-0·0791	-0·0065	-0·0001	-0·0039
11·87	2·99	0·635	0·1329	-0·0803	-0·0108	+0·0026	-0·0223

TABLE 5 (Contd.)

α_w°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 1·01				
-1·23	-3·16	-0·146	+0·0148	+0·0341	+0·0007	-0·0064	+0·0268
-1·26	-1·07	-0·146	0·0157	0·0325	-0·0002	-0·0033	0·0100
-1·23	+1·07	-0·129	0·0152	0·0320	-0·0006	+0·0002	-0·0069
-1·17	3·16	-0·107	0·0146	0·0294	-0·0011	+0·0035	-0·0232
-0·05	3·18	-0·041	0·0132	0·0216	-0·0020	0·0036	-0·0234
-0·12	1·10	-0·058	0·0137	0·0227	-0·0008	0·0004	-0·0076
-0·16	-1·09	-0·089	0·0132	0·0282	-0·0002	-0·0029	+0·0094
-0·12	-3·18	-0·086	0·0120	0·0267	+0·0010	-0·0061	0·0266
+1·01	-3·19	-0·024	+0·0113	+0·0172	0·0021	-0·0062	+0·0268
0·97	-1·15	-0·025	0·0115	0·0178	0·0003	-0·0031	0·0114
1·03	+1·15	+0·018	0·0123	0·0125	-0·0011	+0·0003	-0·0070
1·06	3·18	0·014	0·0125	0·0149	-0·0024	0·0038	-0·0240
3·21	-2·92	0·136	0·0167	-0·0042	+0·0042	-0·0061	+0·0274
3·14	-0·93	0·126	0·0164	-0·0036	0·0010	-0·0026	0·0101
3·11	+0·93	0·105	0·0162	+0·0008	-0·0016	0	-0·0059
3·16	2·91	0·103	0·0160	0·0001	-0·0040	+0·0034	-0·0229
+5·31	+2·95	+0·235	+0·0290	-0·0201	-0·0042	+0·0041	-0·0248
5·29	0·97	0·237	0·0289	-0·0194	-0·0021	0·0005	-0·0074
5·32	-0·91	0·247	0·0302	-0·0204	+0·0011	-0·0027	+0·0090
5·35	-2·96	0·261	0·0308	-0·0223	0·0044	-0·0124	0·0437
7·52	-2·97	0·388	0·0545	-0·0429	0·0050	-0·0073	0·0311
7·50	-0·99	0·385	0·0544	-0·0441	0·0015	-0·0030	0·0113
7·49	-0·99	0·384	0·0543	-0·0441	0·0015	-0·0027	0·0101
7·48	+0·99	0·372	0·0532	-0·0407	-0·0015	+0·0009	-0·0084
7·49	2·97	0·366	0·0525	-0·0390	-0·0053	0·0044	-0·0254
+9·69	+2·98	+0·509	+0·0897	-0·0653	-0·0069	+0·0050	-0·0272
9·69	0·99	0·512	0·0902	-0·0647	-0·0026	0·0004	-0·0067
9·69	-1·00	0·516	0·0909	-0·0664	+0·0020	-0·0035	+0·0131
9·70	-2·98	0·520	0·0915	-0·0673	0·0074	-0·0077	0·0331
11·90	-3·01	0·652	0·1373	-0·0947	0·0083	-0·0085	0·0377
11·89	-1·00	0·651	0·1375	-0·0934	0·0027	-0·0035	0·0145
11·88	+0·99	0·646	0·1367	-0·0910	-0·0024	-0·0002	-0·0049
11·89	2·99	0·644	0·1364	-0·0911	-0·0082	+0·0035	-0·0240

TABLE 5 (Contd.)

α_W°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
				M = 1·05			
-1·24	-3·16	-0·148	0·0166	0·0357	+0.0005	-0·0076	0·0295
-1·26	-1·07	-0·146	0·0170	0·0354	-0·0001	-0·0038	0·0114
-1·23	+1·07	-0·122	0·0157	0·0305	-0·0006	+0·0008	-0·0068
-1·17	3·16	-0·102	0·0160	0.0287	-0·0016	0·0050	-0·0254
-0·05	3·18	-0·040	0·0135	0·0214	-0·0023	0·0049	-0·0247
-0·12	1·10	-0·057	0·0143	0·0227	-0·0010	0·0009	-0·0073
-0·17	-1·09	-0·089	0·0145	0·0280	+0·0001	-0·0033	+0·0098
-0·12	-3·18	-0·083	0·0139	0·0252	0·0014	-0·0072	0·0286
1·00	-3·19	-0·023	0·0119	0·0160	+0·0023	-0·0071	0·0275
0·97	-1·15	-0·021	0·0129	0·0163	0·0004	-0·0032	0·0108
1·02	+1·14	+0·010	0·0134	0·0138	-0·0011	+0·0009	-0·0071
1·07	3·18	0·020	0·0144	0·0122	-0·0032	0·0049	-0·0253
3·22	-2·92	0·139	0·0179	-0·0064	+0·0048	-0·0071	+0·0292
3·15	-0·93	0·130	0·0183	-0·0059	0·0011	-0·0031	0·0118
3·11	+0·93	0·106	0·0175	-0·0013	-0·0019	-0·0002	-0·0045
3·18	2·91	0·112	0·0175	-0·0032	-0·0045	+0·0047	-0·0199
5·31	+2·95	0·236	0·0295	-0·0238	-0·0058	0·0047	-0·0252
5·29	0·97	0·235	0·0299	-0·0216	-0·0023	0·0004	-0·0061
5·32	-0·91	0·244	0·0305	-0·0237	+0·0010	-0·0028	+0·0100
5·34	-2·95	0·255	0·0313	-0·0251	0·0047	-0·0072	0·0301
7·52	-2·97	0·383	0·0544	-0·0463	0·0047	-0·0077	0·0321
7·49	-0·99	0·376	0·0540	-0·0456	0·0016	-0·0031	0·0118
7·48	+0·99	0·367	0·0531	-0·0431	-0·0016	+0·0013	-0·0096
7·50	2·97	0·365	0·0527	-0·0435	-0·0059	0·0047	-0·0259
9·70	+2·98	0·503	0·0882	-0·0671	-0·0072	0·0047	-0·0252
9·66	1·00	0·484	0·0855	-0·0643	-0·0053	0·0027	-0·0132
9·69	0·99	0·505	0·0885	-0·0690	-0·0026	0·0003	-0·0059
9·70	-0·99	0·512	0·0895	-0·0690	+0·0021	-0·0030	+0·0117
9·71	-2·98	0·513	0·0898	-0·0709	0·0075	-0·0082	0·0345
11·89	-3·01	0·634	0·1334	-0·0905	0·0080	-0·0093	0·0386
11·89	-1·00	0·636	0·1337	-0·0924	0·0029	-0·0041	0·0166
11·88	+0·99	0·633	0·1332	-0·0914	-0·0027	-0·0002	-0·0046
11·88	2·99	0·627	0·1323	-0·0877	-0·0081	+0·0044	-0·0257

TABLE 5 (Contd.)

$M = 1{\cdot}10$

α_w°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·22	-3·16	-0·135	0·0160	0·0331	0·0005	-0·0082	0·0294
-1·26	-1·07	-0·136	0·0164	0·0315	0·0004	-0·0032	0·0101
-1·23	+1·07	-0·116	0·0157	0·0285	-0·0008	+0·0009	-0·0085
-1·17	3·16	-0·097	0·0160	0·0267	-0·0020	0·0051	-0·0267
-0·05	3·18	-0·034	0·0138	0·0176	-0·0029	0·0052	-0·0262
-0·12	1·09	-0·055	0·0146	0·0215	-0·0013	0·0002	-0·0062
-0·16	-1·09	-0·077	0·0142	0·0236	+0·0004	-0·0035	+0·0102
-0·11	-3·18	-0·075	0·0137	0·0242	0·0017	-0·0082	0·0294
1·01	-3·19	-0·016	0·0125	0·0133	0·0025	-0·0082	0·0297
0·98	-1·15	-0·014	0·0135	0·0125	0·0007	-0·0039	0·0118
1·03	+1·14	+0·017	0·0132	0·0089	-0·0016	+0·0007	-0·0078
1·08	3·18	0·028	0·0143	0·0084	-0·0038	0·0052	-0·0261
3·21	-2·92	0·134	0·0183	-0·0097	+0·0045	-0·0076	+0·0288
3·15	-0·93	0·134	0·0184	-0·0110	0·0009	-0·0036	0·0107
3·12	+0·93	0·112	0·0176	-0·0066	-0·0019	+0·0005	-0·0064
3·18	2·91	0·112	0·0176	-0·0068	-0·0049	0·0046	-0·0242
5·32	2·94	0·237	0·0298	-0·0283	-0·0062	0·0045	-0·0242
5·30	0·97	0·241	0·0302	-0·0278	-0·0023	0·0005	-0·0060
5·33	-0·91	0·250	0·0309	-0·0305	+0·0011	0·0034	+0·0111
5·35	-2·95	0·260	0·0315	-0·0317	0·0054	-0·0076	0·0287
7·53	-2·98	0·383	0·0538	-0·0540	0·0051	-0·0082	0·0324
7·51	-0·99	0·382	0·0540	-0·0531	0·0011	-0·0036	0·0123
7·47	+0·99	0·371	0·0529	-0·0516	-0·0022	+0·0009	-0·0084
7·51	2·97	0·367	0·0525	-0·0501	-0·0063	0·0051	-0·0256
9·71	+2·98	0·504	0·0866	-0·0780	-0·0073	0·0056	-0·0268
9·71	0·99	0·512	0·0887	-0·0778	-0·0028	0·0005	-0·0056
9·71	-1·00	0·509	0·0887	-0·0761	+0·0017	-0·0039	+0·0137
9·72	-2·99	0·513	0·0893	-0·0762	0·0073	-0·0098	0·0370
11·91	-3·01	0·632	0·1322	-0·0982	0·0078	-0·0097	0·0381
11·90	-1·00	0·633	0·1325	-0·0989	0·0022	-0·0050	0·0169
11·91	+0·98	0·635	0·1330	-0·1000	-0·0027	-0·0007	-0·0024
11·91	2·99	0·628	0·1317	-0·0974	-0·0072	+0·0049	-0·0252

TABLE 5 (Contd.)

M = 1·20

α_w^o	β^o	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·20	-3·17	-0·119	0·0162	0·0251	+0·0019	-0·0098	+0·0347
-1·22	+1·07	-0·110	0·0158	0·0235	-0·0003	+0·0009	-0·0073
-1·16	3·16	-0·090	0·0161	0·0205	-0·0025	0·0051	-0·0267
-0·06	3·18	-0·033	0·0140	0·0112	-0·0036	0·0057	-0·0264
-0·12	1·09	-0·046	0·0146	0·0127	-0·0011	0·0006	-0·0059
-0·14	-1·10	-0·064	0·0141	0·0169	+0·0010	-0·0045	+0·0143
-0·10	-3·19	-0·062	0·0137	0·0168	+0·0023	-0·0099	0·0349
+1·03	-3·20	-0·001	0·0127	0·0063	0·0031	-0·0101	0·0354
0·99	-1·15	-0·001	0·0133	0·0062	0·0011	-0·0048	0·0160
1·02	+1·14	+0·018	0·0140	0·0034	-0·0019	+0·0005	-0·0061
1·07	3·18	0·028	0·0149	0·0013	-0·0044	0·0056	-0·0260
3·21	-2·92	0·136	0·0182	-0·0167	+0·0045	-0·0088	+0·0315
3·14	-0·94	0·128	0·0186	-0·0158	0·0013	-0·0036	0·0122
3·12	+0·93	0·113	0·0179	-0·0125	-0·0011	-0·0002	-0·0031
3·18	2·91	0·114	0·0177	-0·0127	-0·0046	+0·0042	-0·0208
5·31	+2·94	0·232	0·0288	-0·0375	-0·0054	0·0046	-0·0239
5·29	0·97	0·234	0·0294	-0·0339	-0·0016	0	-0·0046
5·32	-0·91	0·240	0·0298	-0·0357	+0·0019	-0·0038	+0·0116
5·34	-2·95	0·245	0·0299	-0·0348	0·0054	-0·0089	0·0316
7·51	-2·98	0·367	0·0517	-0·0578	0·0060	-0·0091	0·0334
7·48	-0·99	0·360	0·0510	-0·0575	0·0017	-0·0044	0·0136
7·48	+0·98	0·355	0·0504	-0·0565	-0·0015	+0·0004	-0·0053
7·49	2·97	0·353	0·0503	-0·0558	-0·0058	0·0050	-0·0244
9·68	+2·98	0·473	0·0815	-0·0756	-0·0055	0·0054	-0·0244
9·68	0·99	0·476	0·0824	-0·0779	-0·0019	0·0002	-0·0044
9·68	-1·00	0·483	0·0834	-0·0801	+0·0023	-0·0050	+0·0160
9·70	-2·99	0·488	0·0844	-0·0803	0·0062	-0·0108	0·0383
11·89	-3·01	0·601	0·1251	-0·1009	0·0074	-0·0105	0·0391
11·87	-1·00	0·600	0·1251	-0·1015	0·0029	-0·0049	0·0170
11·87	+0·98	0·596	0·1243	-0·1004	-0·0021	-0·0004	-0·0028
11·87	3·00	0·589	0·1234	-0·0980	-0·0063	+0·0055	-0·0262

TABLE 5 (Contd.)

α_W°	β°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
				M = 1·25			
-1·20	-3·17	-0·116	0·0103	0·0260	0·0017	-0·0099	0·0334
-1·24	-1·07	-0·123	0·0148	0·0284	0·0007	-0·0046	0·0139
-1·22	+1·07	-0·109	0·0141	0·0259	-0·0005	+0·0005	-0·0064
-1·16	3·16	-0·089	0·0137	0·0201	-0·0020	0·0052	-0·0252
-0·05	3·18	-0·031	0·0124	0·0120	-0·0031	0·0047	-0·0238
-0·12	1·09	-0·050	0·0131	0·0167	-0·0009	0	-0·0049
-0·14	-1·10	-0·061	0·0128	0·0186	+0·0006	-0·0046	+0·0143
-0·10	-3·19	-0·065	0·0124	0·0201	0·0021	-0·0096	0·0336
1·03	-3·20	-0·005	0·0114	0·0088	0·0032	-0·0100	0·0341
1·00	-1·15	-0·001	0·0112	0·0072	0·0010	-0·0046	0·0145
1·02	+1·14	+0·014	0·0119	0·0042	-0·0012	+0·0002	-0·0056
1·07	3·18	0·026	0·0131	0·0032	-0·0039	0·0047	-0·0239
3·20	-2·93	0·126	0·0162	-0·0130	+0·0047	-0·0094	+0·0327
3·14	-0·94	0·128	0·0167	-0·0156	0·0012	-0·0047	0·0142
3·12	+0·93	0·113	0·0163	-0·0125	-0·0014	0	-0·0042
3·18	2·91	0·119	0·0164	-0·0142	-0·0045	+0·0048	-0·0225
5·31	+2·94	0·230	0·0278	-0·0343	-0·0052	0·0049	-0·0228
5·28	0·97	0·229	0·0282	-0·0346	-0·0016	0·0001	-0·0040
5·31	-0·92	0·232	0·0283	-0·0344	+0·0017	-0·0043	+0·0134
5·34	-2·95	0·246	0·0289	-0·0370	0·0058	-0·0090	0·0326
7·50	-2·98	0·361	0·0500	-0·0612	0·0061	-0·0087	0·0331
7·48	-0·99	0·360	0·0501	-0·0591	0·0020	-0·0042	0·0142
7·47	+0·98	0·354	0·0495	-0·0591	-0·0019	-0·0003	-0·0032
7·48	2·97	0·349	0·0489	-0·0565	-0·0056	+0·0043	-0·0224
9·67	+2·97	0·470	0·0805	-0·0798	-0·0062	0·0040	-0·0220
9·66	0·99	0·468	0·0805	-0·0784	-0·0016	0·0002	-0·0040
9·66	-1·00	0·470	0·0808	-0·0786	+0·0018	-0·0044	+0·0153
9·67	-2·99	0·470	0·0807	-0·0779	0·0060	-0·0089	0·0345
11·84	-3·01	0·575	0·1179	-0·0978	0·0065	-0·0096	0·0375
11·84	-1·00	0·577	0·1196	-0·0981	0·0026	-0·0043	0·0161
11·84	+0·98	0·580	0·1205	-0·0999	-0·0019	-0·0007	-0·0023
11·84	2·99	0·577	0·1201	-0·0989	-0·0060	+0·0046	-0·0236

TABLE 6

Longitudinal and Lateral characteristics

$\eta = -4^\circ$, 3° aileron upfloat, $\zeta = -3^\circ$

α_w°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 0·85			
-1·30	-0·203	0·0135	0·0472	-0·0014	0·0026	-0·0056
+1·89	-0·054	0·0091	0·0402	-0·0009	0·0025	-0·0058
5·09	+0·105	0·0151	0·0290	-0·0007	0·0026	-0·0054
8·31	0·282	0·0428	0·0146	-0·0011	0·0025	-0·0039
11·54	0·461	0·0913	-0·0017	-0·0006	0·0021	-0·0013
			M = 0·90			
-1·31		0·0156	+0·0514	-0·0008	0·0033	-0·0080
+1·89		0·0100	0·0385	-0·0010	0·0022	-0·0044
5·11		0·0171	0·0269	-0·0010	0·0026	-0·0054
8·34		0·0438	0·0189	-0·0012	0·0026	-0·0052
11·59		0·0956	-0·0054	-0·0003	0·0019	-0·0011
			M = 0·93			
-1·33	-0·223	0·0170	+0·0598	-0·0010	0·0027	-0·0064
+1·89	-0·056	0·0104	0·0461	-0·0011	0·0024	-0·0050
5·11	+0·110	0·0168	0·0355	-0·0009	0·0027	-0·0063
8·35	0·289	0·0460	0·0161	-0·0019	0·0027	-0·0050
11·62	0·493	0·1001	-0·0121	-0·0004	0·0022	-0·0028
			M = 0·95			
-1·33	-0·222	0·0184	+0·0615	-0·0011	0·0032	-0·0080
+1·89	-0·061	0·0121	0·0511	-0·0010	0·0029	-0·0078
5·12	+0·109	0·0186	0·0360	-0·0012	0·0028	-0·0064
8·37	0·301	0·0485	0·0156	-0·0018	0·0027	-0·0051
11·62	0·493	0·1017	-0·0158	-0·0003	0·0021	-0·0018
			M = 0·97			
-1·33	-0·227	0·0186	+0·0698	-0·0010	0·0025	-0·0056
+1·91	-0·050	0·0114	0·0538	-0·0012	0·0024	-0·0048
5·15	+0·130	0·0195	0·0367	-0·0014	0·0025	-0·0053
8·41	0·324	0·0519	0·0094	-0·0014	0·0026	-0·0047
11·67	0·517	0·1072	-0·0230	-0·0004	0·0022	-0·0020
			M = 0·99			
-1·32	-0·214	0·0201	+0·0642	-0·0007	0·0033	-0·0080
+1·92	-0·034	0·0134	0·0455	-0·0012	0·0025	-0·0055
5·18	+0·160	0·0236	0·0240	-0·0012	0·0024	-0·0041
8·46	0·372	0·0596	-0·0149	-0·0006	0·0028	-0·0051
11·70	0·544	0·1168	-0·0325	-0·0027	0·0026	-0·0028

TABLE 6 (Contd.)

α_w^o	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 1·01			
-1·32	-0·220	0·0221	+0·0726	-0·0009	0·0026	-0·0051
+1·93	-0·033	0·0153	0·0504	-0·0011	0·0024	-0·0041
5·19	+0·172	0·0269	0·0131	-0·0013	0·0022	-0·0039
8·46	0·375	0·0623	-0·0214	-0·0011	0·0023	-0·0031
11·73	0·573	0·1222	-0·0585	-0·0009	0·0024	-0·0027
			M = 1·05			
-1·31	-0·203	0·0239	+0·0666	-0·0009	0·0029	-0·0056
+1·94	-0·018	0·0172	0·0407	-0·0013	0·0020	-0·0025
5·20	+0·171	0·0285	0·0145	-0·0013	0·0024	-0·0038
8·49	0·378	0·0632	-0·0231	-0·0012	0·0025	-0·0036
11·76	0·572	0·1208	-0·0634	-0·0010	0·0019	-0·0007
			M = 1·10			
-1·31	-0·190	0·0220	+0.0634	-0·0010	0·0026	-0·0047
+1·96	-0·002	0·0162	0·0332	-0·0013	0·0017	-0·0019
5·23	+0·188	0·0285	0·0003	-0·0014	0·0024	-0·0040
8·51	0·382	0·0625	-0·0334	-0·0014	0·0021	-0·0030
11·81	0·574	0·1206	-0·0660	-0·0012	0·0014	-0·0001
			M = 1·15			
-1·30	-0·172	0·0214	+0·0538		0·0024	-0·0036
+1·97	+0·011	0·0164	0·0205	-0·0010	0·0010	-0·0027
5·25	0·200	0·0300	-0·0080	-0·0011	0·0017	-0·0013
8·83	0·389	0·0631	-0·0443	-0·0010	0·0014	0
11·82	0·570	0·1194	-0·0746	-0·0007	0·0013	+0·0005
			M = 1·20			
-1·30	-0·170	0·0203	+0·0559	-0·0006	0·0020	-0·0032
+1·96	+0·003	0·0148	0·0244	-0·0008	0·0019	-0·0029
5·24	0·190	0·0277	-0·0098	-0·0007	0·0017	-0·0017
8·52	0·373	0·0593	-0·0438	-0·0008	0·0010	+0·0007
11·80	0·545	0·1131	-0·0745	-0·0004	0·0009	0·0014
			M = 1·25			
-1·30	-0·167	0·0210	+0·0602	-0·0007	0·0018	-0·0025
+1·97	+0·012	0·0128	0·0170	-0·0009	0·0011	-0·0004
5·25	0·189	0·0258	-0·0104	-0·0007	0·0008	+0·0011
8·53	0·369	0·0569	-0·0458	-0·0007	0·0006	0·0016
11·81	0·539	0·1084	-0·0764	-0·0003	0·0004	0·0024

TABLE 6 (Contd.)

α_w°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 0·85			
-1·30	-0·205	0·0150	+0·0471	0·0009	-0·0038	0·0045
+1·85	-0·054	0·0095	0·0390	0·0010	-0·0042	0·0059
5·09	+0·100	0·0154	0·0310	0·0008	-0·0044	0·0087
8·32	0·281	0·0425	0·0141	0·0005	-0·0045	0·0092
11·54	0·456	0·0896	-0·0065	0·0012	-0·0046	0·0095
			M = 0·90			
-1·33	-0·216	0·0163	+0·0539	0·0012	-0·0036	0·0035
+1·89	-0·055	0·0096	0·0400	0·0009	-0·0041	0·0057
5·10	+0·103	0·0158	0·0314	0·0006	-0·0040	0·0064
8·34	0·282	0·0432	0·0150	0·0001	-0·0045	0·0085
11·60	0·472	0·0942	-0·0070	0·0013	-0·0050	0·0105
			M = 0·93			
-1·35	-0·234	0·0172	+0·0684	0·0009	-0·0041	0·0051
+1·89	-0·064	0·0094	0·0520	0·0005	-0·0047	0·0078
5·12	+0·104	0·0152	0·0357	0·0005	-0·0043	0·0064
8·38	0·292	0·0449	0·0202	-0·0009	-0·0044	0·0082
11·65	0·483	0·0970	-0·0070	+0·0012	-0·0046	0·0094
			M = 0·95			
-1·35	-0·235	0·0177	+0·0716	0·0009	-0·0042	0·0054
+1·89	-0·067	0·0096	0·0563	0·0007	-0·0043	0·0065
5·13	+0·106	0·0162	0·0410	0·0002	-0·0042	0·0065
8·40	0·300	0·0465	0·0185	-0·0006	-0·0041	0·0066
11·66	0·491	0·0996	-0·0106	+0·0012	-0·0045	0·0088
			M = 0·97			
-1·33	-0·220	0·0189	+0·0664	0·0008	-0·0038	0·0039
+1·90	-0·054	0·0117	0·0522	0·0007	-0·0043	0·0064
5·15	+0·121	0·0194	0·0383	0·0005	-0·0043	0·0070
8·41	0·312	0·0501	0·0157	-0·0002	-0·0046	0·0088
11·70	0·519	0·1080	-0·0221	+0·0008	-0·0050	0·0104
			M = 0·99			
-1·34	-0·228	0·0200	+0·0723	0·0008	-0·0041	0·0052
+1·92	-0·044	0·0124	0·0531	0·0007	-0·0047	0·0071
5·19	+0·156	0·0227	0·0248	0·0004	-0·0044	0·0081
8·48	0·374	0·0596	-0·0135	0·0005	-0·0045	0·0085
11·73	0·538	0·1153	-0·0304	0·0001	-0·0045	0·0093

TABLE 6 (Contd.)

α_w^o	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 1·01			
-1·34	-0·223	0·0217	0·0748	0·0008	-0·0041	0·0051
+1·93	-0·035	0·0153	0·0489	0·0006	-0·0046	0·0073
5·20	+0·162	0·0261	0·0191	0·0004	-0·0046	0·0079
8·49	0·376	0·0628	-0·0178	0·0007	-0·0044	0·0074
11·78	0·576	0·1238	-0·0534	0·0003	-0·0053	0·0114
			M = 1·05			
-1·33	-0·205	0·0240	0·0651	0·0010	-0·0044	0·0053
+1·94	-0·020	0·0174	0·0404	0·0004	-0·0053	0·0092
5·22	+0·180	0·0292	0·0095	0·0006	-0·0047	0·0073
8·50	0·377	0·0635	-0·0232	0·0009	-0·0049	0·0081
11·79	0·567	0·1215	-0·0550	0·0009	-0·0056	0·0121
			M = 1·10			
-1·31	-0·189	0·0219	0·0645	0·0009	-0·0048	0·0067
+1·96	-0·005	0·0154	0·0351	0·0007	-0·0054	0·0097
5·24	+0·190	0·0281	0·0012	0·0003	-0·0047	0·0079
8·53	0·381	0·0623	-0·0327	0·0008	-0·0046	0·0081
11·82	0·566	0·1188	-0·0645	0·0010	-0·0052	0·0073
			M = 1·15			
-1·32	-0·181	0·0208	+0·0598	0·0013	-0·0049	0·0078
+1·96	-0·002	0·0149	0·0295	0·0011	-0·0049	0·0082
5·25	+0·195	0·0278	-0·0066	0·0008	-0·0050	0·0086
8·55	0·386	0·0621	-0·0386	0·0009	-0·0050	0·0097
11·84	0·564	0·1183	-0·0710	0·0010	-0·0051	0·0113
			M = 1·20			
-1·31	-0·173	0·0203	+0·0572	0·0012	-0·0048	0·0079
+1·96	+0·005	0·0132	0·0242	0·0011	-0·0047	0·0082
5·25	0·189	0·0265	-0·0087	0·0011	-0·0048	0·0089
8·54	0·371	0·0592	-0·0405	0·0010	-0·0049	0·0103
11·83	0·548	0·1146	-0·0728	0·0011	-0·0046	0·0104
			M = 1·25			
-1·30	-0·162	0·0191	+0·0544	0·0011	-0·0047	0·0077
+1·97	+0·012	0·0135	0·0215	0·0009	-0·0052	0·0096
5·25	0·187	0·0259	-0·0103	0·0010	-0·0052	0·0103
8·55	0·368	0·0580	-0·0416	0·0011	-0·0050	0·0101
11·83	0·535	0·1110	-0·0738	0·0011	-0·0048	0·0108

TABLE 7

Longitudinal and Lateral characteristics

$\eta = 0^\circ$; $\xi = -2^\circ$ port, -8° starboard; $\zeta = 0^\circ$

M = 0·85

α_w°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·23	-0·129	0·0136	0·0203	0·0146	0·0022	-0·0041
-0·17	-0·085	0·0117	0·0186	0·0144	0·0017	-0·0041
+0·89	-0·034	0·0109	0·0157	0·0142	0·0019	-0·0047
3·02	+0·069	0·0133	0·0091	0·0138	0·0008	-0·0023
5·16	0·180	0·0222	0·0002	0·0144	0·0008	-0·0025
7·32	0·306	0·0425	-0·0107	0·0154	0·0006	-0·0025
9·44	0·401	0·0676	-0·0130	0·0143	0·0005	-0·0018
11·60	0·527	0·1062	-0·0306	0·0126	-0·0016	+0·0031
13·75	0·632	0·1503	-0·0348	0·0128	-0·0024	0·0056
15·88	0·721	0·1988	-0·0417	0·0107	-0·0020	0·0057

M = 0·90

α_w°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·23	-0·126	0·0135	0·0202	0·0151	0·0030	-0·0064
-0·17	-0·082	0·0116	0·0198	0·0153	0·0031	-0·0067
+0·89	-0·035	0·0111	0·0172	0·0145	0·0027	-0·0055
3·03	+0·076	0·0132	0·0078	0·0145	0·0022	-0·0050
5·17	0·189	0·0231	-0·0105	0·0142	0·0009	-0·0018
7·34	0·312	0·0436	-0·0133	0·0167	0·0013	-0·0040
9·49	0·417	0·0704	-0·0165	0·0137	0·0007	-0·0031
11·66	0·547	0·1116	-0·0370	0·0134	-0·0007	+0·0003
13·81	0·652	0·1575	-0·0465	0·0130	-0·0018	0·0025
15·94	0·737	0·2073	-0·0539	0·0102	-0·0013	0·0027

M = 0·93

α_w°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
-1·25	-0·136	0·0138	0·0236	0·0156	0·0041	-0·0090
-0·18	-0·088	0·0115	0·0215	0·0156	0·0034	-0·0075
+0·89	-0·037	0·0106	0·0179	0·0151	0·0027	-0·0052
3·07	+0·115	0·0138	-0·0132	0·0149	0·0018	-0·0034
5·19	0·193	0·0236	-0·0031	0·0154	0·0019	-0·0047
7·36	0·324	0·0455	-0·0164	0·0167	0·0012	-0·0031
9·53	0·452	0·0772	-0·0289	0·0183	0·0007	-0·0031
11·69	0·566	0·1166	-0·0443	0·0141	-0·0007	+0·0002
13·83	0·688	0·1629	-0·0571	0·0128	-0·0015	0·0028
15·97	0·753	0·2140	-0·0652	0·0104	-0·0012	0·0025

TABLE 7 (Contd.)

α_w°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 0·95			
-1·24	-0·135	0·0136	0·0282	0·0150	0·0033	-0·0065
-0·18	-0·091	0·0117	0·0256	0·0155	0·0033	-0·0071
+0·89	-0·035	0·0109	0·0223	0·0151	0·0027	-0·0049
3·05	+0·082	0·0134	0·0102	0·0155	0·0023	-0·0048
5·21	0·204	0·0243	-0·0021	0·0156	0·0020	-0·0048
7·39	0·339	0·0473	-0·0206	0·0179	0·0018	-0·0042
9·56	0·470	0·0804	-0·0367	0·0199	0·0007	-0·0021
11·70	0·568	0·1181	-0·0459	0·0145	-0·0005	+0·0008
13·86	0·678	0·1670	-0·0641	0·0126	-0·0011	+0·0028
16·00	0·773	0·2216	-0·0744	0·0109	-0·0011	+0·0026
			M = 0·97			
-1·25	-0·138	0·0136	0·0288	0·0155	0·0030	-0·0054
-0·18	-0·086	0·0113	0·0243	0·0157	0·0027	-0·0052
+0·91	-0·021	0·0106	0·0183	0·0153	0·0031	-0·0061
3·07	+0·096	0·0053	0·0063	0·0157	0·0022	-0·0049
5·23	0·223	0·0270	-0·0114	0·0164	0·0021	-0·0045
7·41	0·361	0·0510	-0·0328	0·0190	0·0018	-0·0045
9·59	0·495	0·0864	-0·0498	0·0211	0·0007	-0·0016
11·74	0·592	0·1248	-0·0566	0·0141	-0·0008	+0·0030
13·91	0·714	0·1778	-0·0834	0·0135	-0·0018	0·0043
16·06	0·813	0·2342	-0·0975	0·0115	-0·0020	0·0049
			M = 0·99			
-1·25	-0·144	0·0156	0·0334	0·0160	0·0032	-0·0064
-0·17	-0·078	0·0126	0·0237	0·0158	0·0026	-0·0056
+0·92	-0·013	0·0124	0·0163	0·0159	0·0027	-0·0052
3·07	+0·105	0·0166	0·0015	0·0161	0·0022	-0·0048
5·25	0·243	0·0304	-0·0211	0·0160	0·0015	-0·0033
7·42	0·378	0·0551	-0·0416	0·0174	0·0013	-0·0042
9·60	0·510	0·0909	-0·0618	0·0173	0·0003	-0·0033
11·78	0·639	0·1367	-0·0840	0·0159	-0·0010	+0·0008
13·92	0·728	0·1841	-0·0909	0·0137	-0·0021	0·0051
16·07	0·834	0·2423	-0·1124	0·0128	-0·0027	0·0058

TABLE 7 (Contd.)

α°_{w}	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 1·01			
-1·25	-0·144	0·0191	0·0366	0·0156	0·0029	-0·0054
-0·17	-0·082	0·0162	0·0267	0·0157	0·0025	-0·0048
+0·92	-0·016	0·0160	0·0171	0·0156	0·0023	-0·0046
3·09	+0·119	0·0199	-0·0037	0·0157	0·0012	-0·0023
5·25	0·240	0·0324	-0·0195	0·0164	0·0016	-0·0038
7·43	0·381	0·0581	-0·0472	0·0162	0·0009	-0·0032
9·60	0·514	0·0932	-0·0694	0·0151	0·0001	-0·0025
11·79	0·650	0·1403	-0·0941	0·0139	-0·0009	+0·0015
13·92	0·730	0·1859	-0·0962	0·0133	-0·0039	0·0086
16·07	0·831	0·2428	-0·1143	0·0136	-0·0022	0·0053
			M = 1·05			
-1·23	-0·127	0·0191	0·0289	0·0153	0·0028	-0·0055
-0·16	-0·068	0·0168	0·0199	0·0152	0·0025	-0·0054
+0·92	-0·011	0·0166	0·0144	0·0151	0·0020	-0·0043
3·09	+0·116	0·0205	-0·0049	0·0150	0·0009	-0·0016
5·25	0·242	0·0339	-0·0256	0·0148	0·0014	-0·0042
7·43	0·376	0·0576	-0·0483	0·0153	0·0005	-0·0016
9·61	0·508	0·0923	-0·0697	0·0148	0·0008	-0·0036
11·78	0·633	0·1360	-0·0933	0·0137	0·0000	-0·0018
13·91	0·711	0·1800	-0·0958	0·0132	-0·0045	+0·0087
16·08	0·818	0·2382	-0·1165	0·0124	-0·0039	0·0081
			M = 1·10			
-1·24	-0·127	0·0189	0·0313	0·0141	0·0034	-0·0068
-0·15	-0·061	0·0166	0·0201	0·0134	0·0022	-0·0037
+0·93	-0·005	0·0164	0·0128	0·0135	0·0021	-0·0036
3·10	+0·121	0·0204	-0·0093	0·0134	0·0017	-0·0036
5·26	+0·244	0·0333	-0·0299	0·0133	0·0013	-0·0031
7·44	+0·375	0·0566	-0·0538	0·0134	0·0011	-0·0032
9·63	+0·509	0·0909	-0·0779	0·0125	0·0002	-0·0004
11·81	+0·635	0·1346	-0·1014	0·0115	-0·0010	+0·0026
13·96	+0·722	0·1797	-0·1069	0·0102	-0·0039	0·0075

TABLE 7 (Contd.)

α_w°	C_L	C_D	C_m	C_ℓ	C_n	C_Y
			M = 1·15			
-1·25	-0·126	0·0183	0·0296	0·0127	0·0039	-0·0060
-0·16	-0·065	0·0156	0·0171	0·0124	0·0030	-0·0041
+0·92	-0·006	0·0158	0·0088	0·0121	0·0022	-0·0022
3·09	+0·116	0·0201	-0·0131	0·0122	0·0014	-0·0009
5·26	0·239	0·0331	-0·0362	0·0122	0·0013	-0·0016
7·45	0·376	0·0569	-0·0614	0·0117	-0·0005	+0·0024
9·63	0·495	0·0889	-0·0816	0·0115	-0·0012	0·0038
11·82	0·620	0·1318	-0·1047	0·0111	-0·0016	0·0047
13·98	0·725	0·1805	-0·1229	0·0106	-0·0023	0·0057
			M = 1·20			
-1·25	-0·123	0·0185	0·0296	0·0116	0·0034	-0·0038
-0·16	-0·062	0·0161	0·0180	0·0113	0·0030	-0·0034
+0·92	-0·006	0·0153	0·0079	0·0113	0·0028	-0·0031
3·10	+0·115	0·0194	-0·0123	0·0115	0·0019	-0·0017
5·27	0·232	0·0317	-0·0341	0·0114	0·0008	-0·0001
7·44	0·353	0·0531	-0·0567	0·0112	0·0002	+0·0002
9·63	0·477	0·0847	-0·0803	0·0107	-0·0015	0·0041
11·81	0·594	0·1253	-0·1023	0·0103	-0·0019	0·0046
13·98	0·699	0·1731	-0·1224	0·0100	-0·0026	0·0064
			M = 1·25			
-1·24	-0·117	0·0172	0·0278	0·0110	0·0042	-0·0062
-0·16	-0·061	0·0145	0·0185	0·0106	0·0034	-0·0041
+0·93	-0·003	0·0143	0·0085	0·0103	0·0024	-0·0025
3·10	+0·113	0·0182	-0·0122	0·0105	0·0015	-0·0008
5·28	0·237	0·0308	-0·0375	0·0103	0·0002	+0·0011
7·45	0·347	0·0513	-0·0585	0·0103	-0·0005	0·0024
9·63	0·469	0·0824	-0·0798	0·0102	-0·0016	0·0032
11·81	0·578	0·1216	-0·1009	0·0097	-0·0020	0·0048
11·98	0·678	0·1674	-0·1192	0·0097	-0·0020	0·0045

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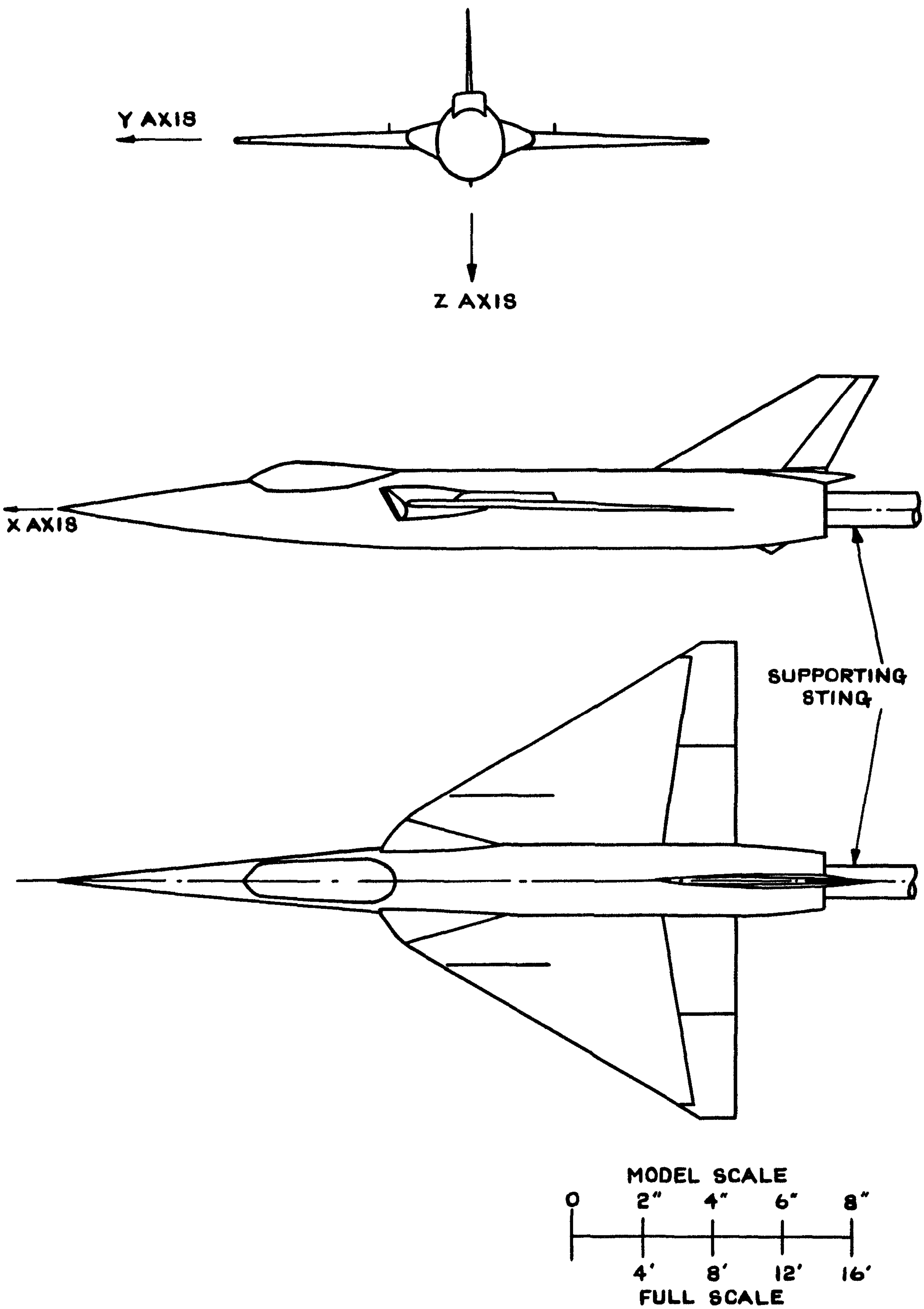


FIG. 1. G.A. OF $\frac{1}{24}$ SCALE MODEL OF FAIREY DELTA 2 (E.R. 103)

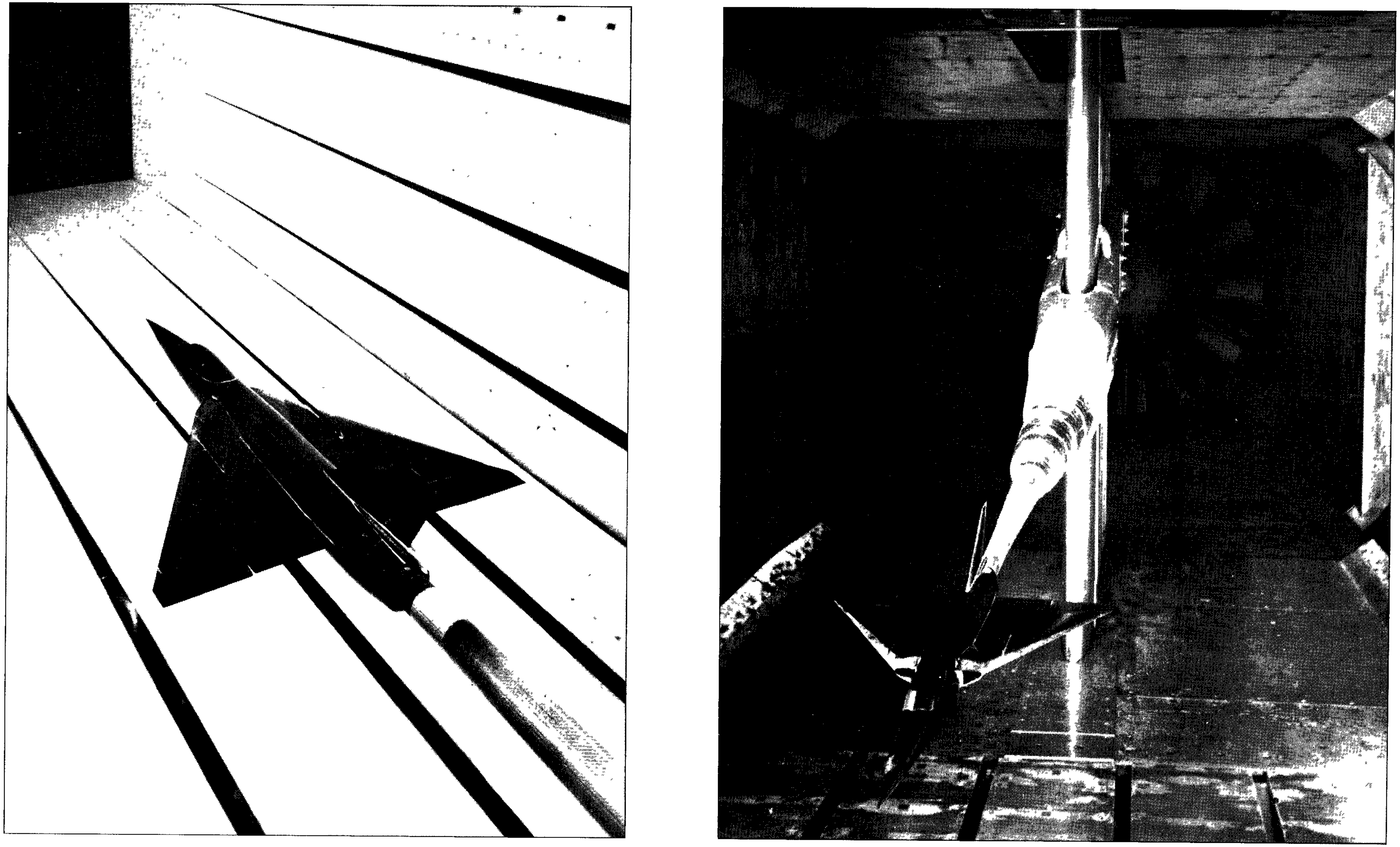


FIG.2 & 3. VIEWS OF 1/24th SCALE MODEL OF FAIREY DELTA 2 MOUNTED IN TUNNEL

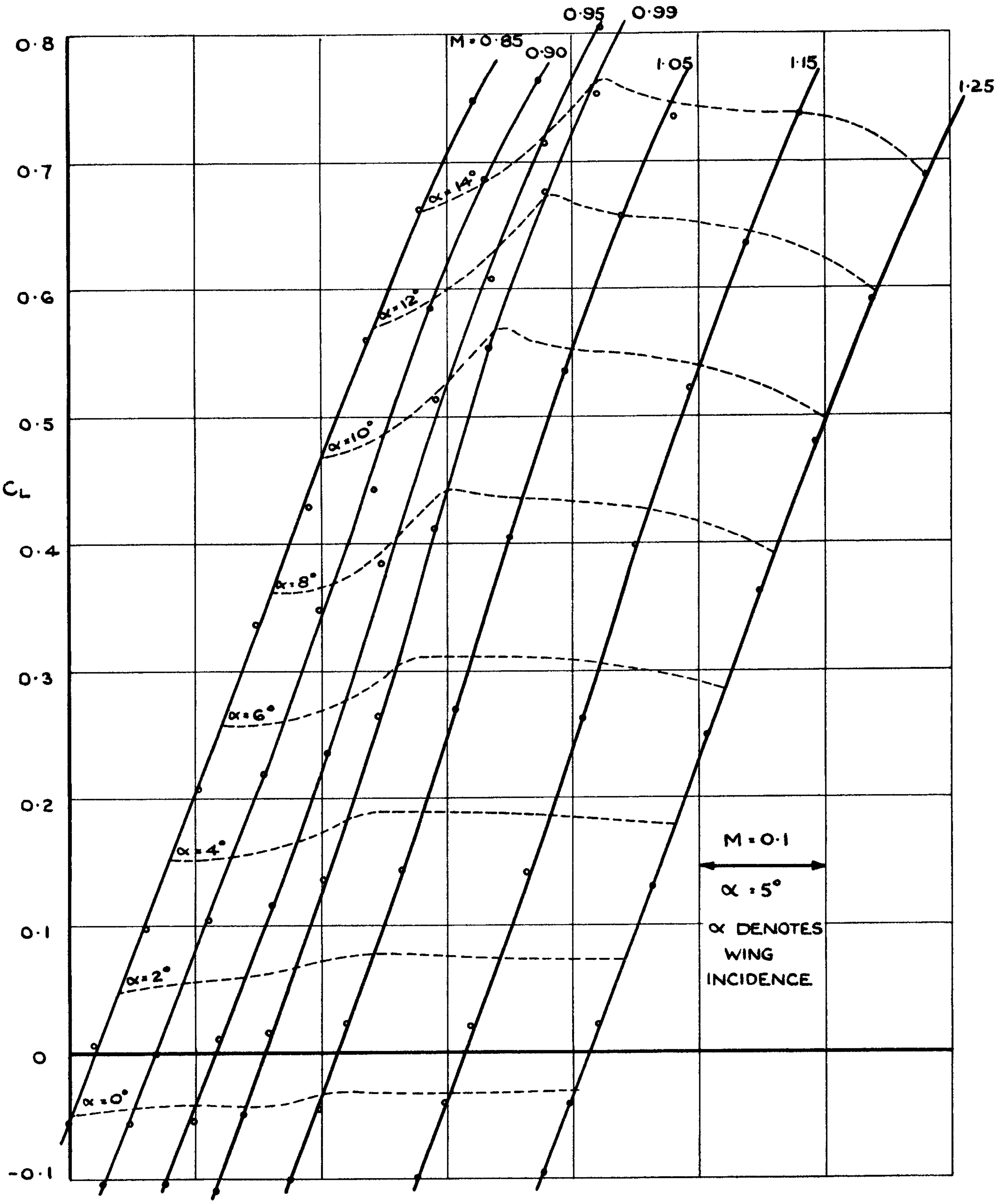


FIG. 4. LIFT CARPET;

η = 0°, 0° AILERON UPFLOAT.
FAIREY ER. 103.

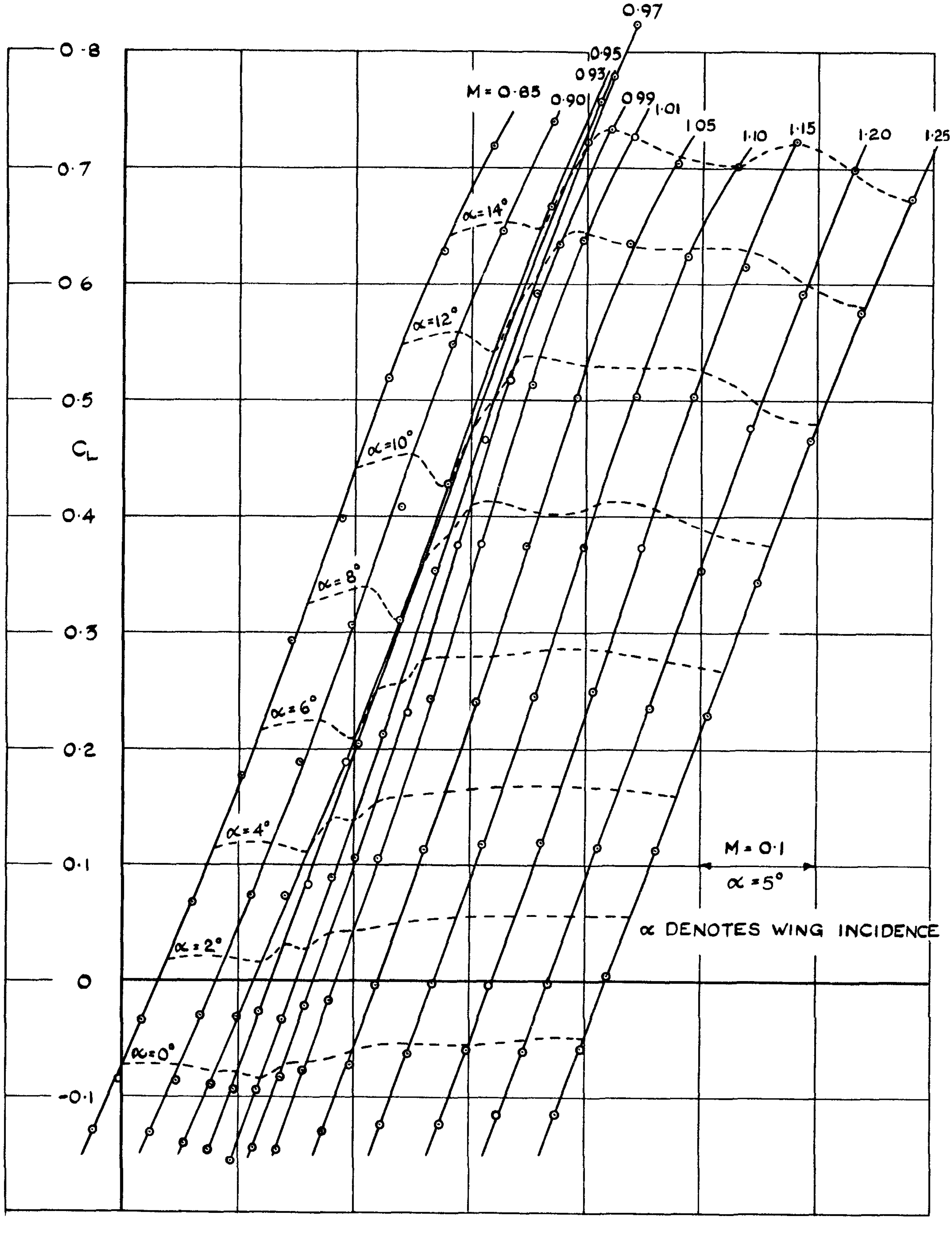


FIG. 5. LIFT CARPET

$\eta = 0°$, 3° AILERON UPFLOAT FAIREY ER 103.

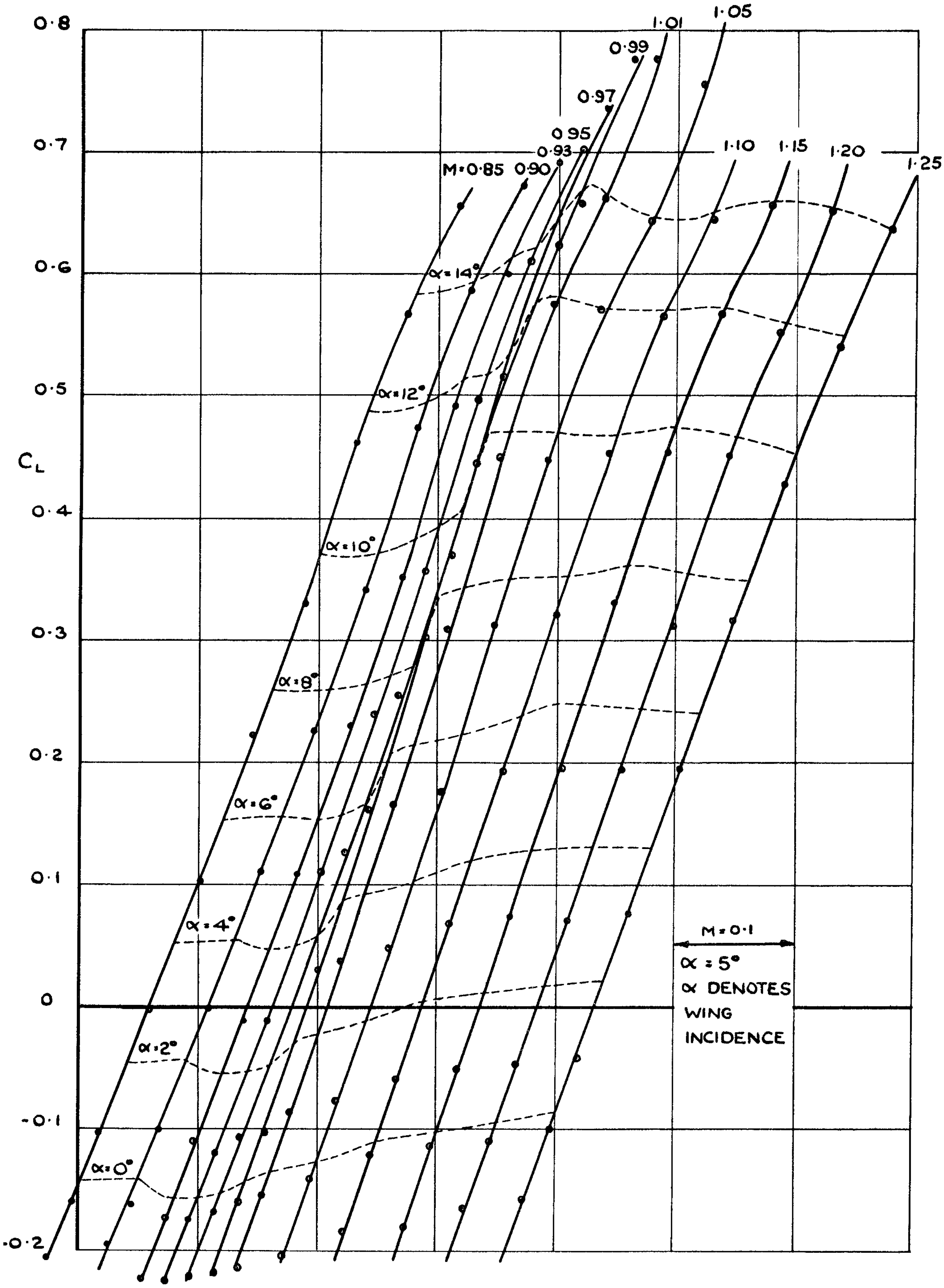


FIG. 6. LIFT CARPET.

$\eta = 4°$, 3° AILERON UPFLOAT.

FAIREY E.R. 103.

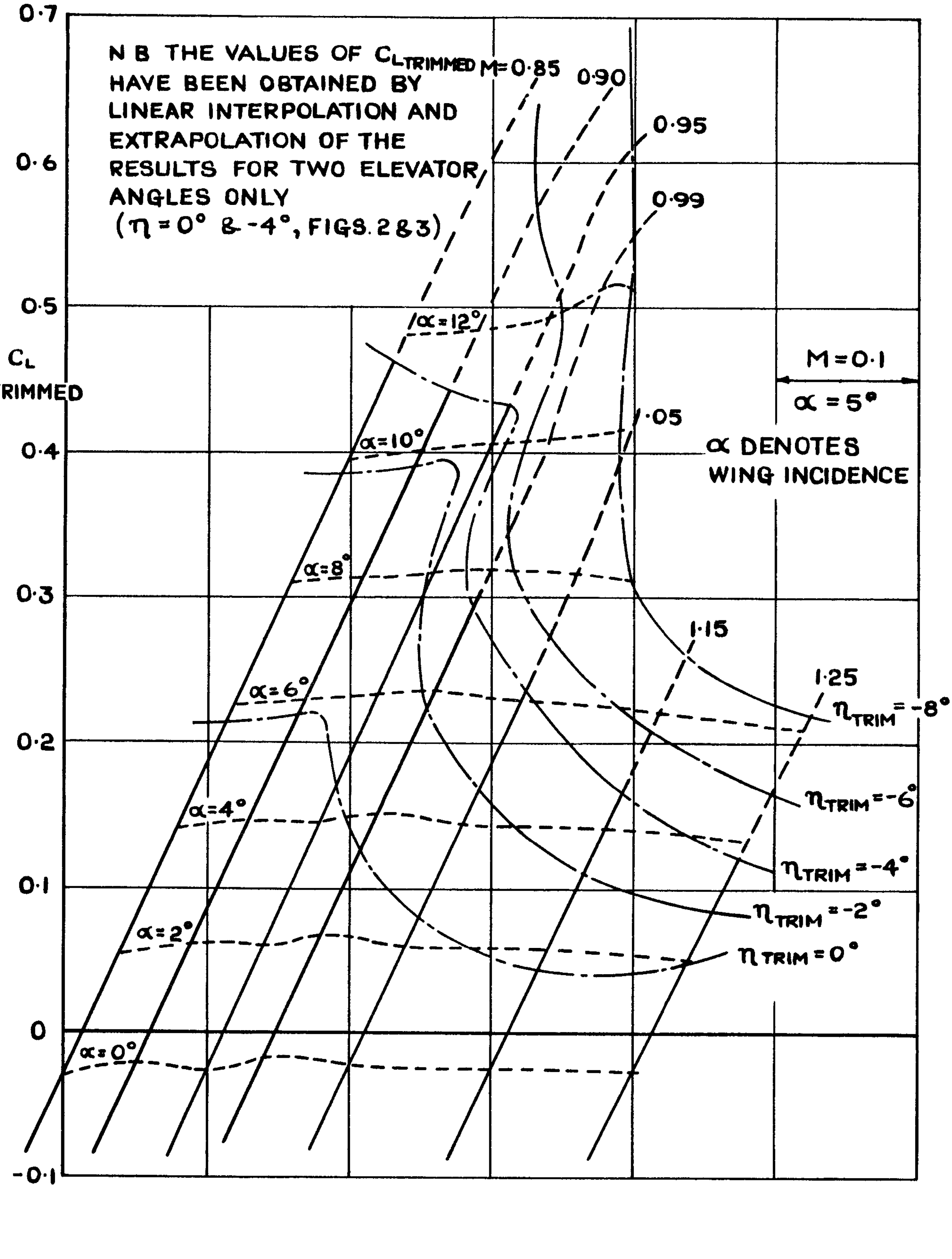


FIG. 7. TRIMMED LIFT CARPET;

3° AILERON UPFLOAT

FAIREY E.R. 103.

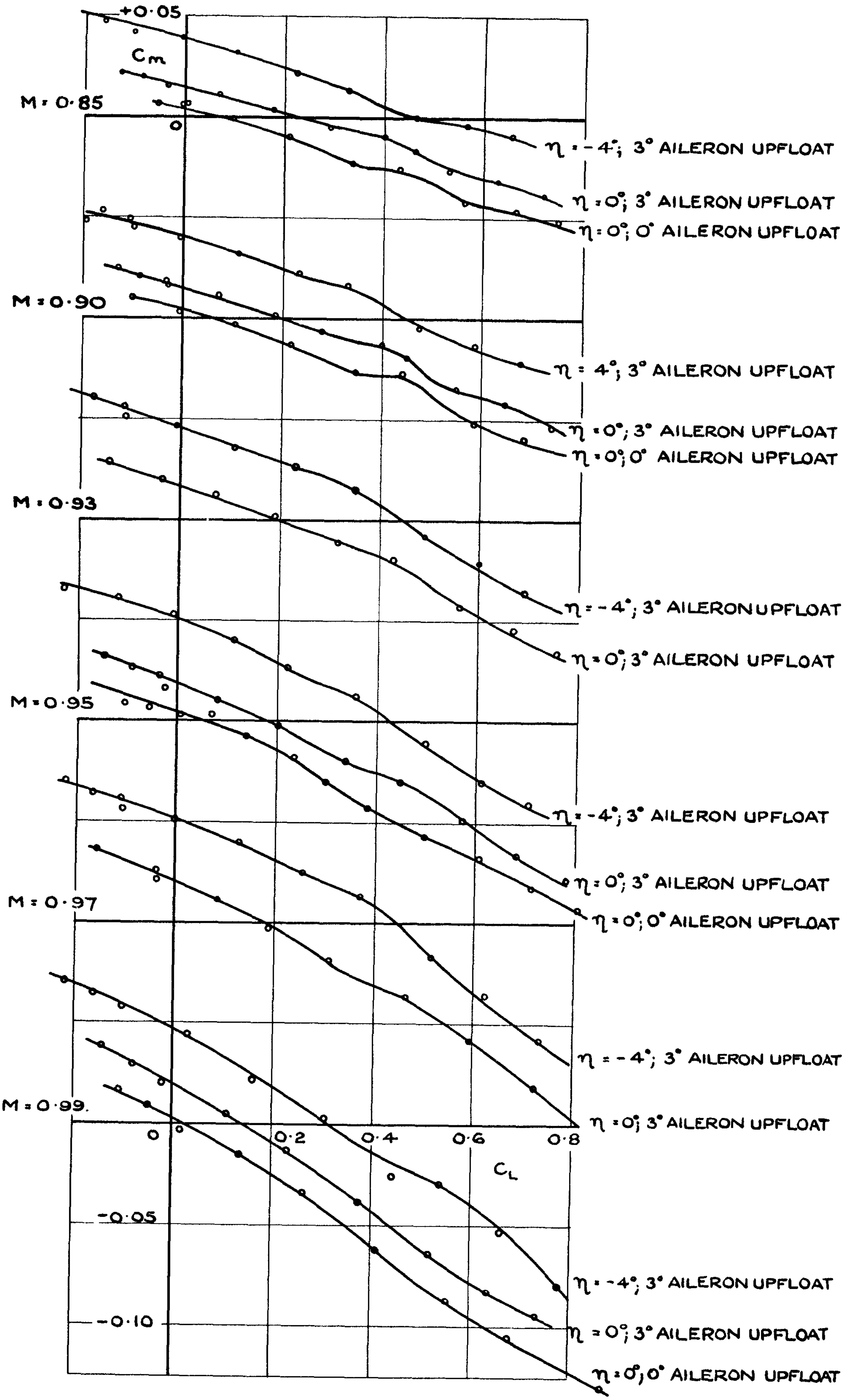


FIG. 8. C_m vs C_L AT VARIOUS SUBSONIC MACH NUMBERS.

FAIREY ER. 103.

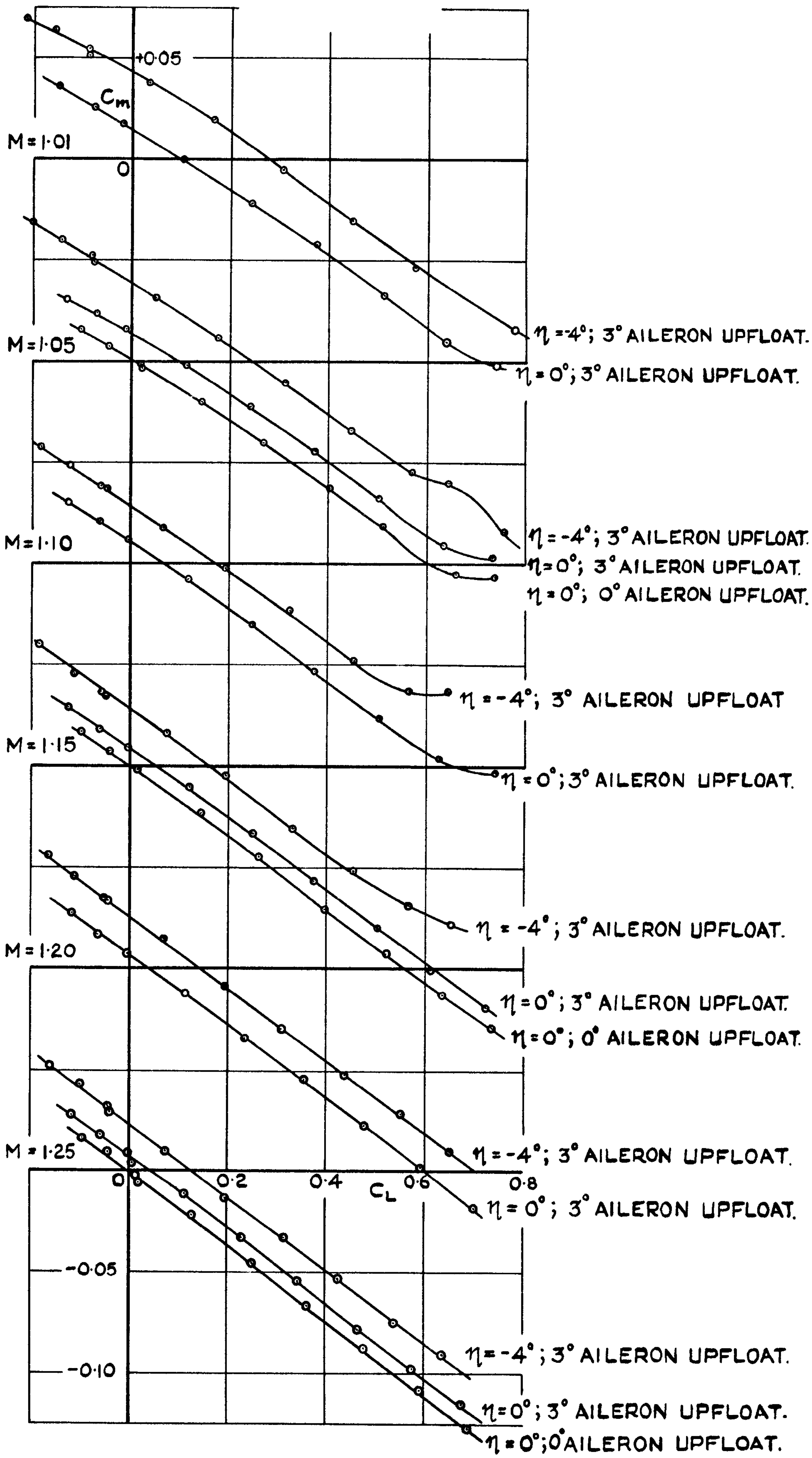


FIG. 9. C_m vs C_L AT VARIOUS SUPERSONIC MACH NUMBERS.

FAIREY E.R. 103.

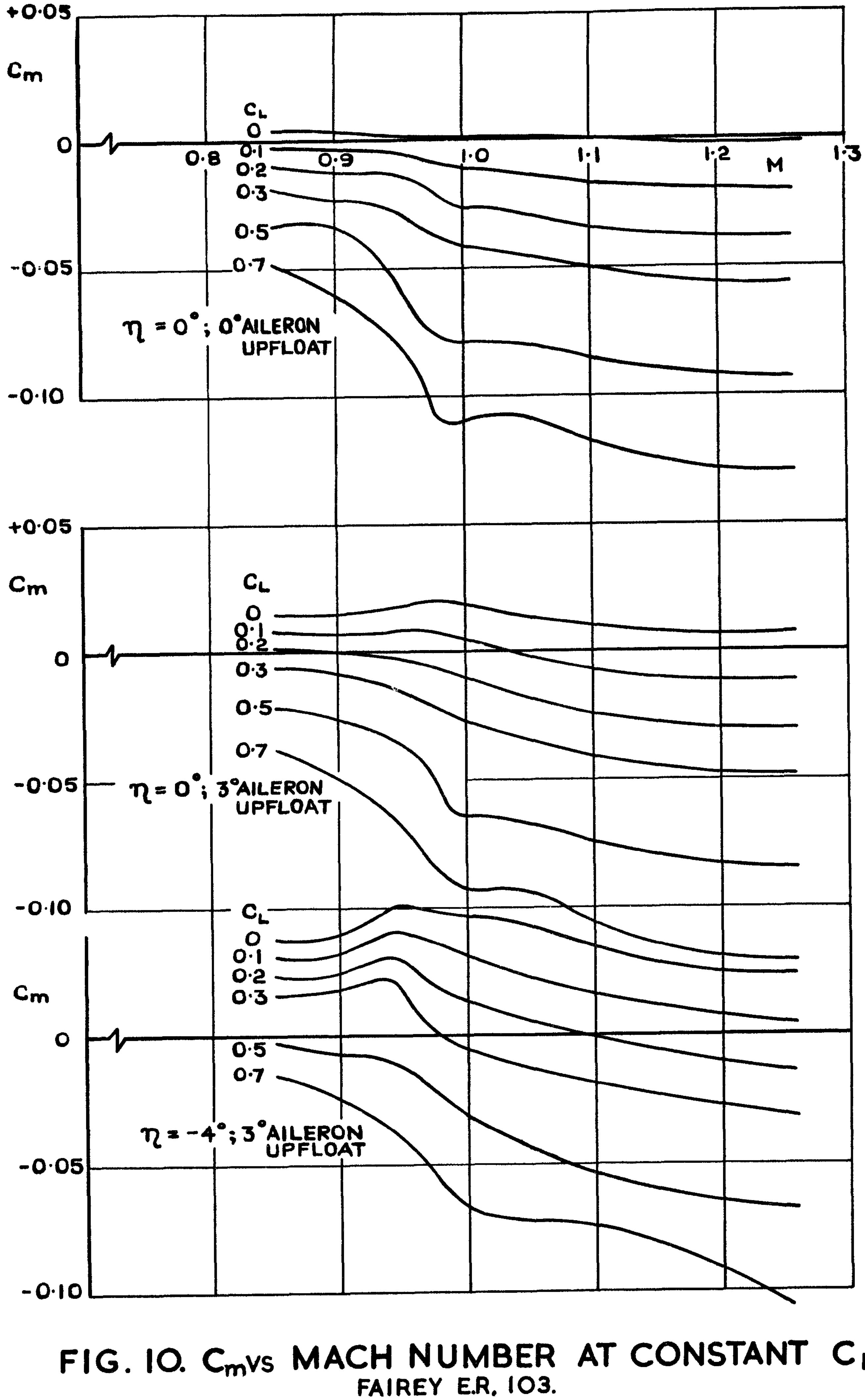


FIG. 10. C_m VS MACH NUMBER AT CONSTANT C_L.
FAIREY E.R. 103.

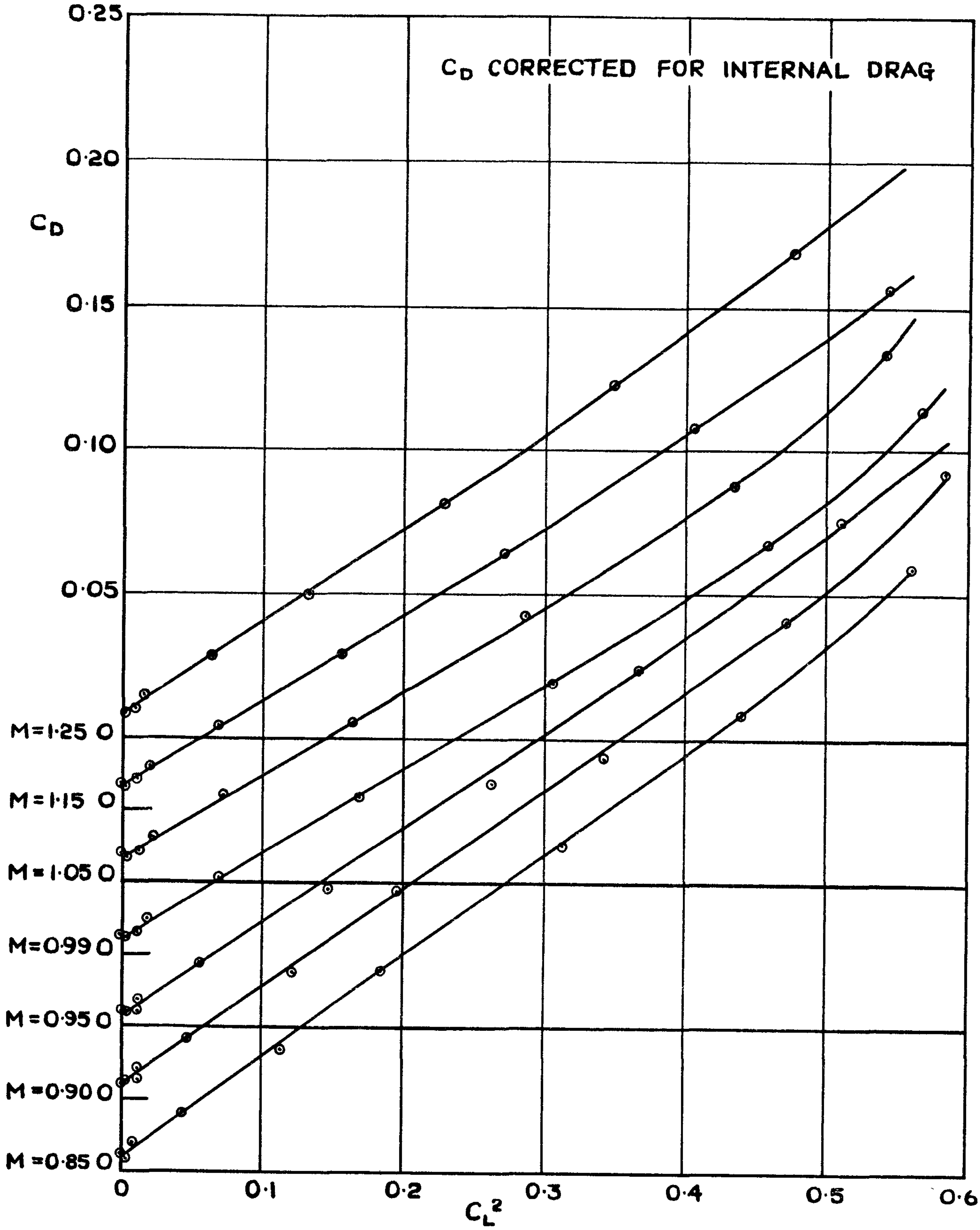


FIG. 11. C_D VS C_L^2 AT CONSTANT MACH NUMBER.
$\eta = 0°; 0°$ AILERON UPFLOAT.
FAIREY E.R. 103.

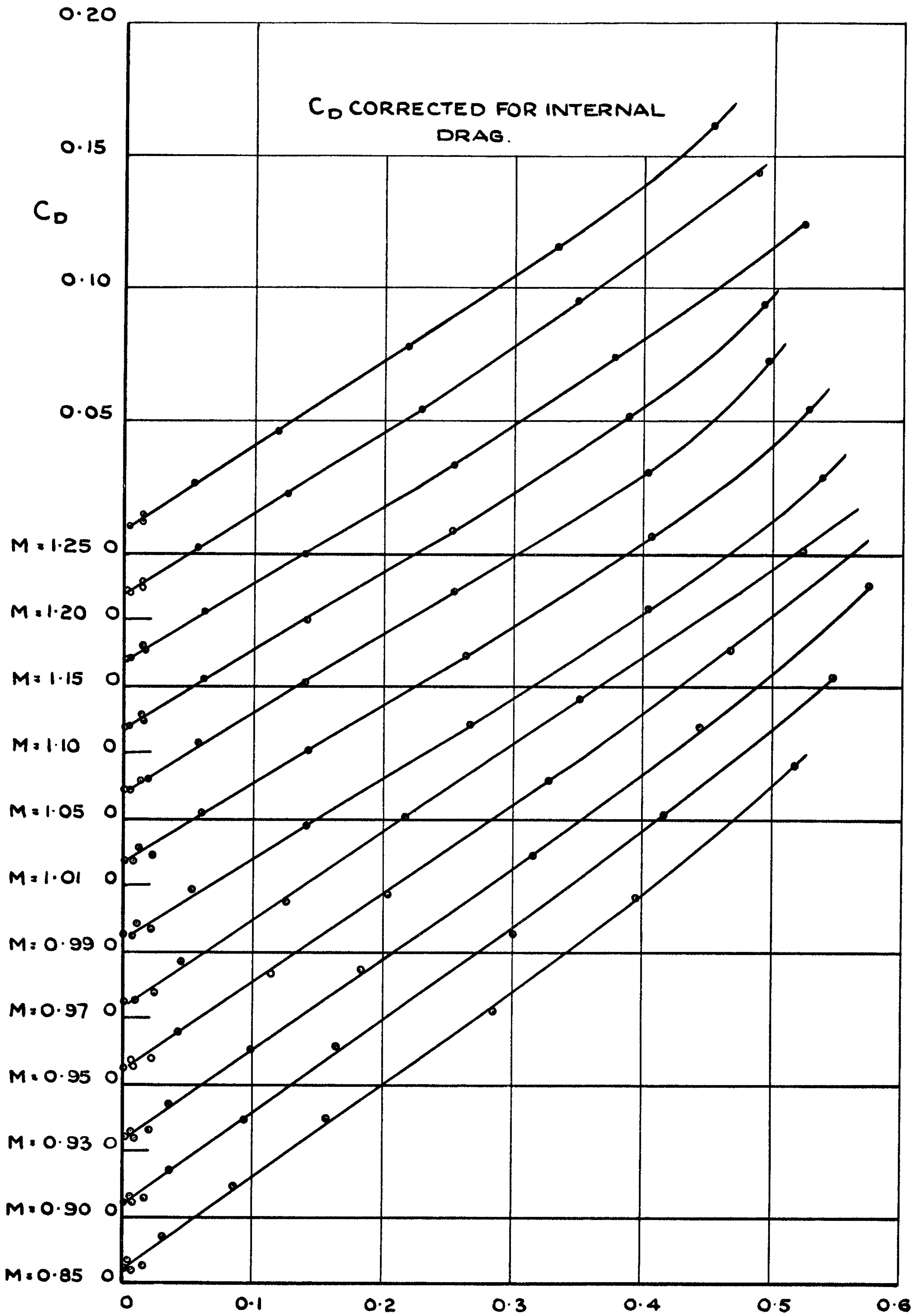


FIG. 12. C_D VS C_L^2 AT CONSTANT MACH NUMBER.

η = 0°, 3° AILERON UPFLOAT.

FAIREY E.R. 103.

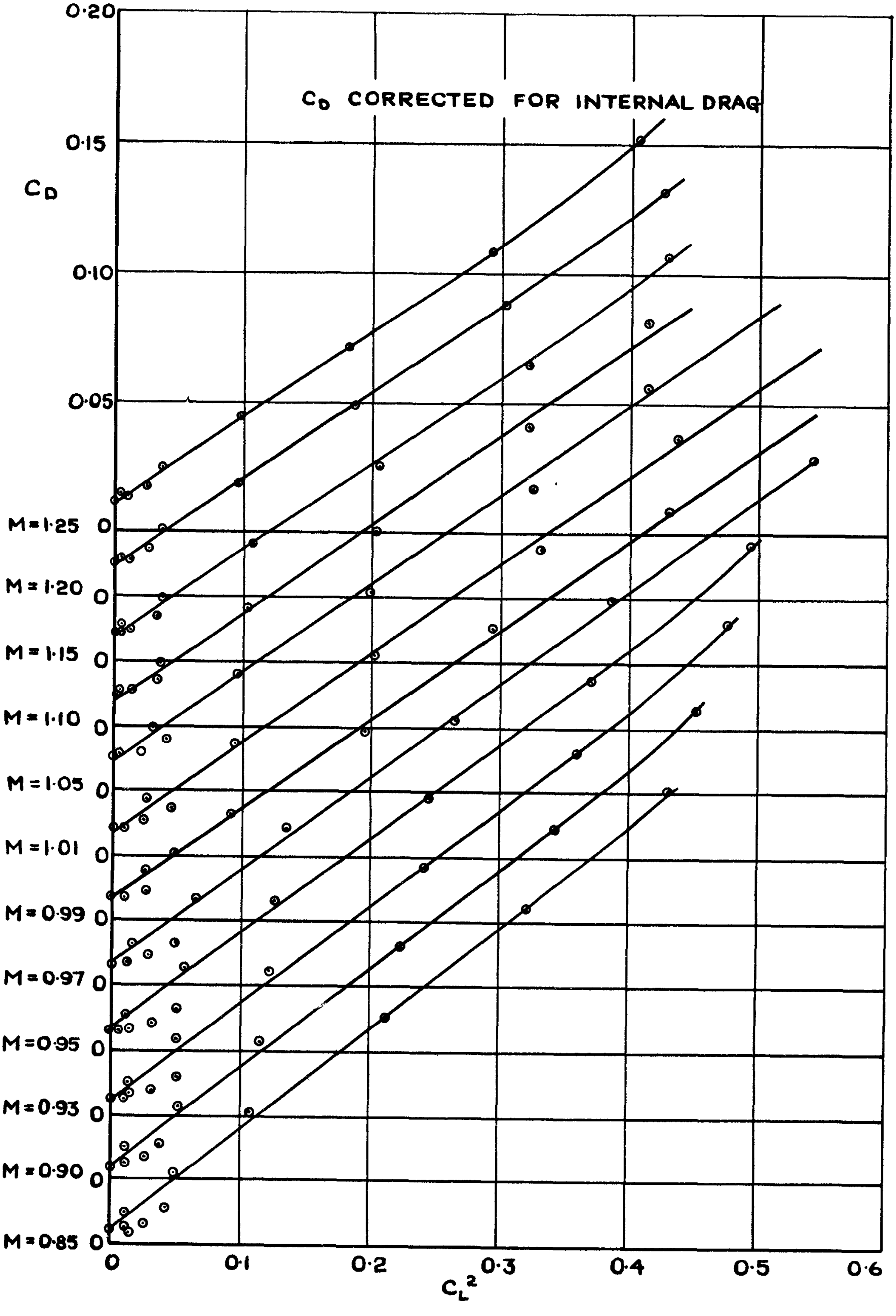


FIG.13. C_D VS C_L^2 AT CONSTANT MACH NUMBER.
$\eta = -4°$, 3° AILERON UPFLOAT
FAIREY E.R. 103.

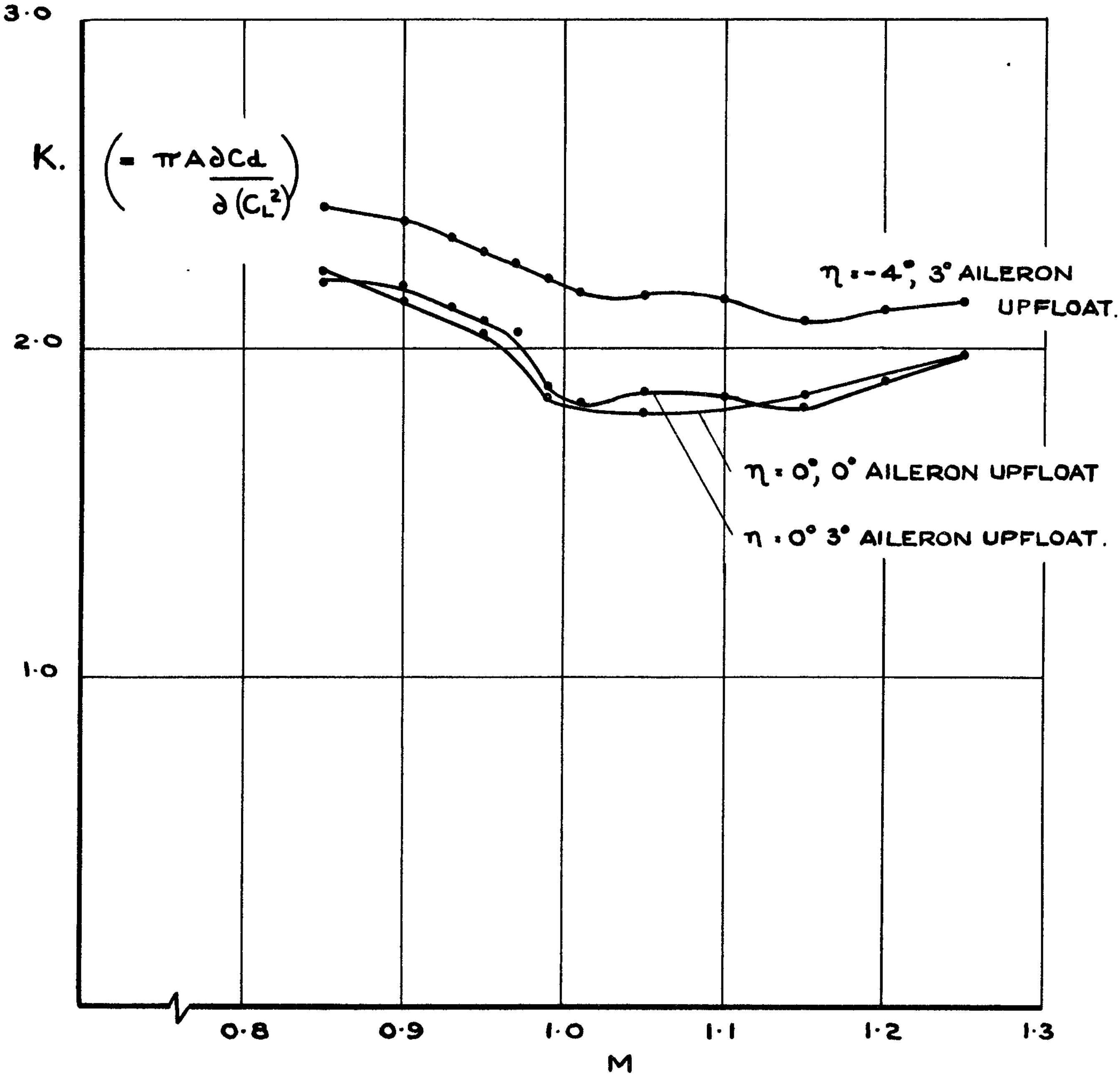


FIG.14. VARIATION OF INDUCED DRAG FACTOR WITH MACH NUMBER.

FAIREY ER. 103.

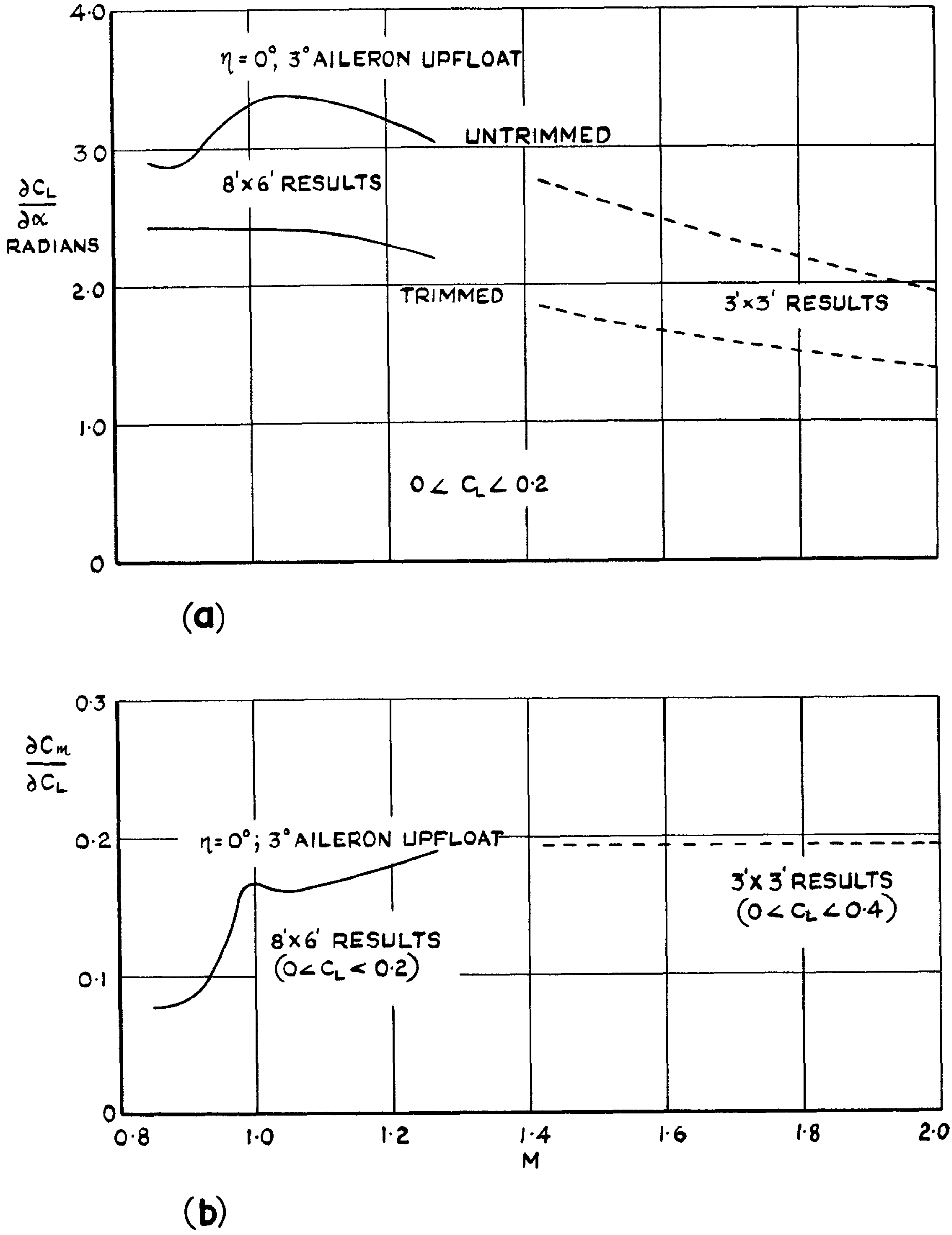
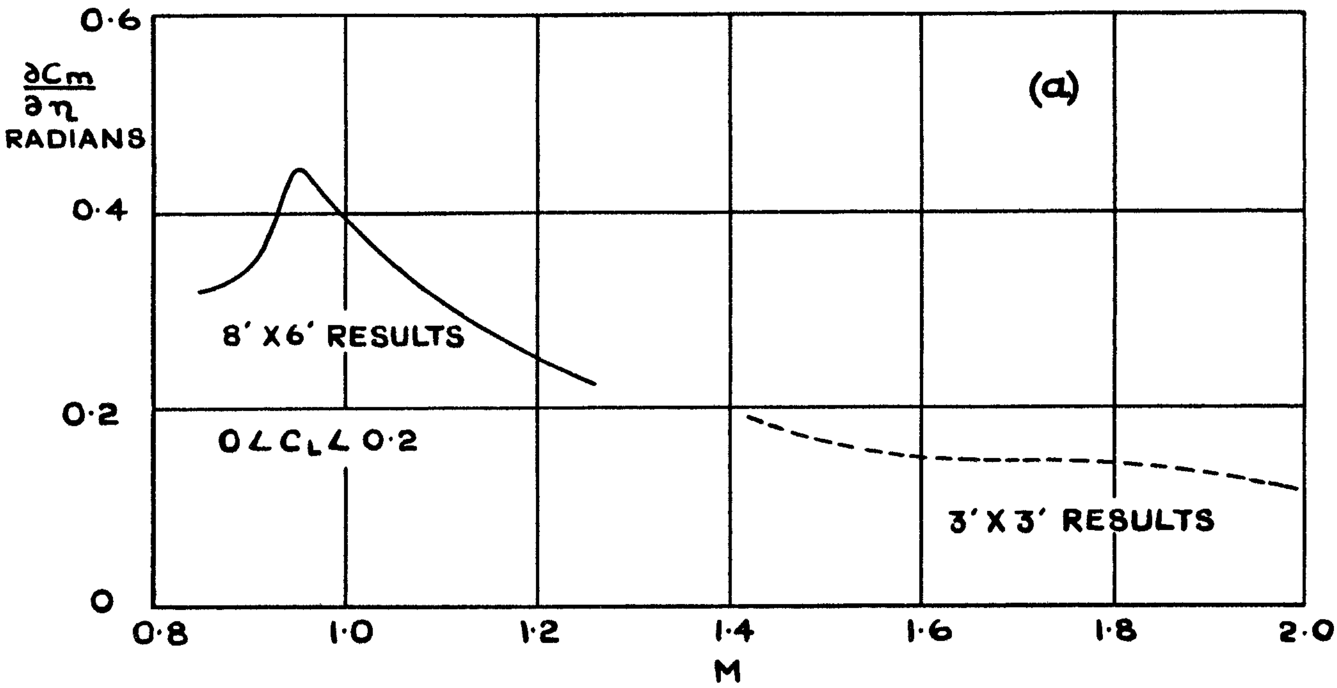


FIG. 15. EFFECT OF MACH No. ON $\partial C_L/\partial\alpha$ & $\partial C_m/\partial C_L$

FAIREY E.R. 103.



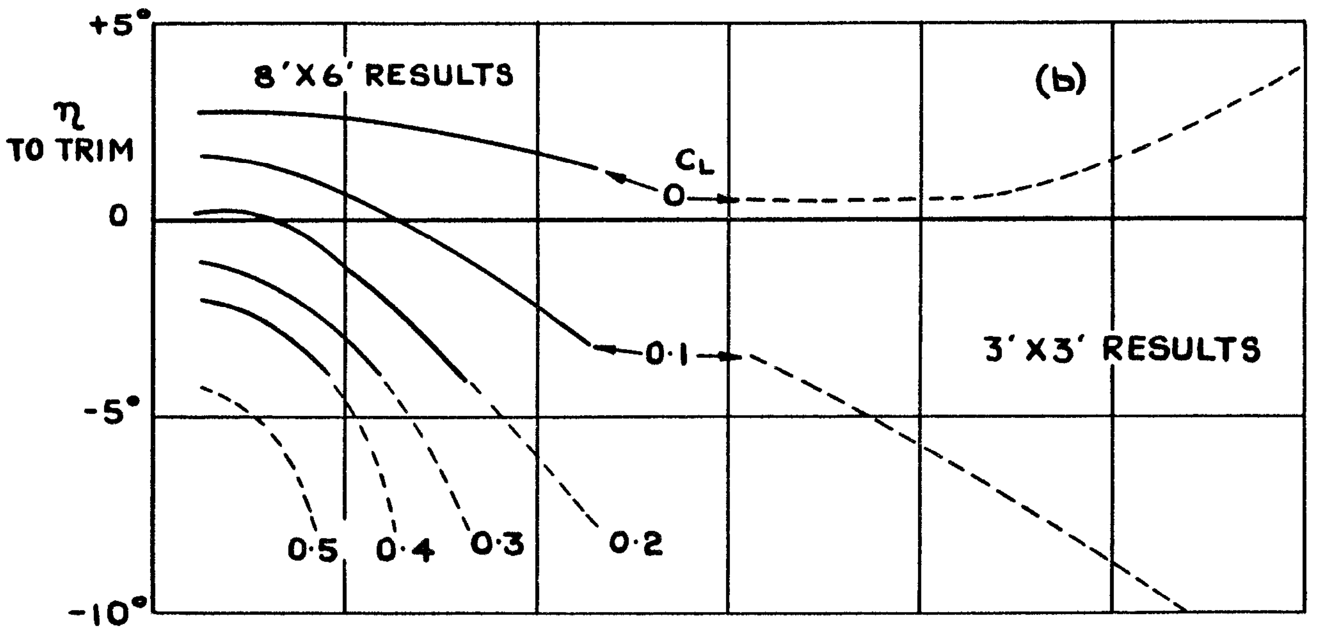


FIG. 16. EFFECT OF MACH No. ON $\partial C_m / \partial \eta$ & η TO TRIM.
FAIREY E.R. 103.

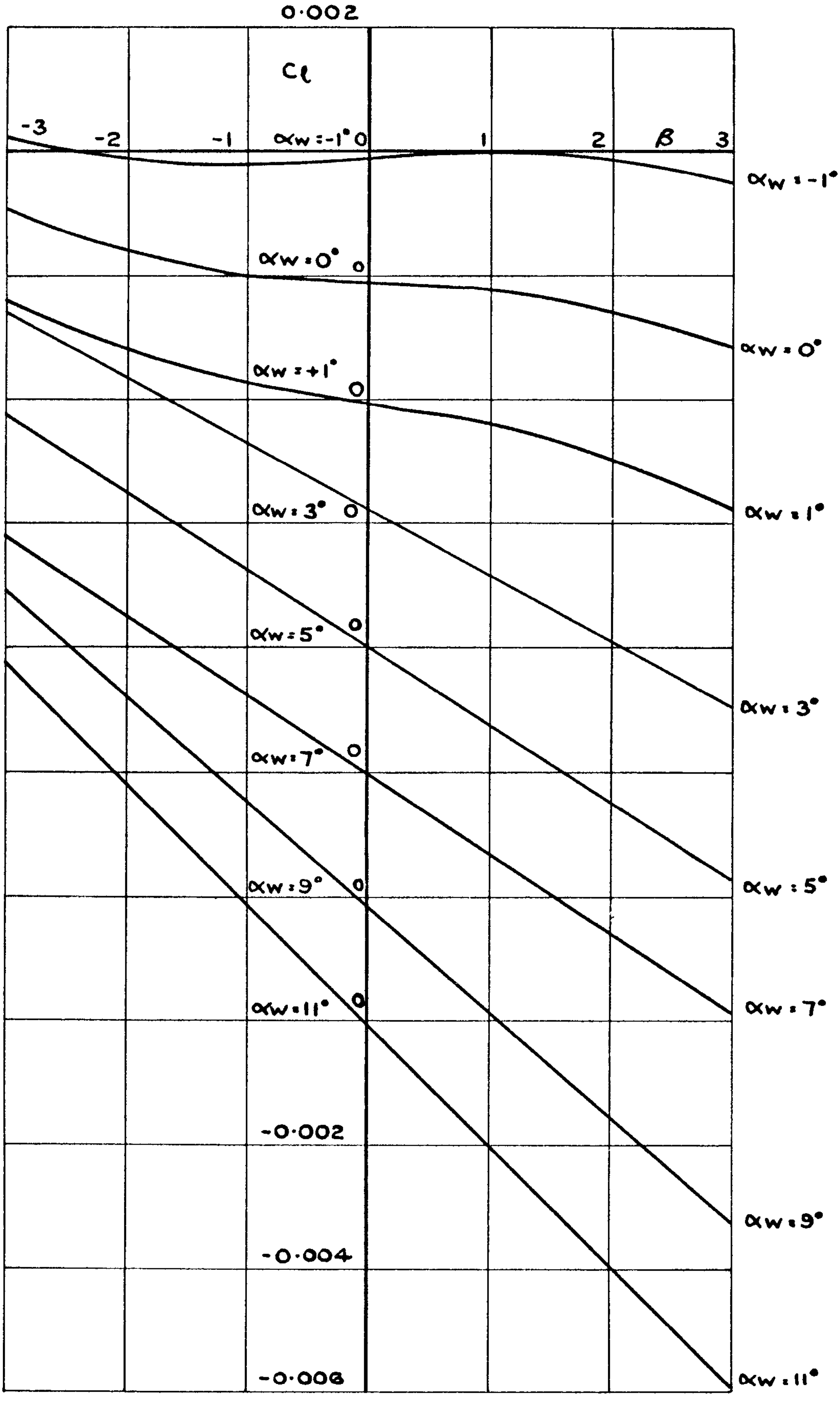


FIG. 17. C_ℓ vs β AT CONSTANT α_w
M = 0·85
η = 0; 3° AILERON UPFLOAT
FAIREY ER.103.

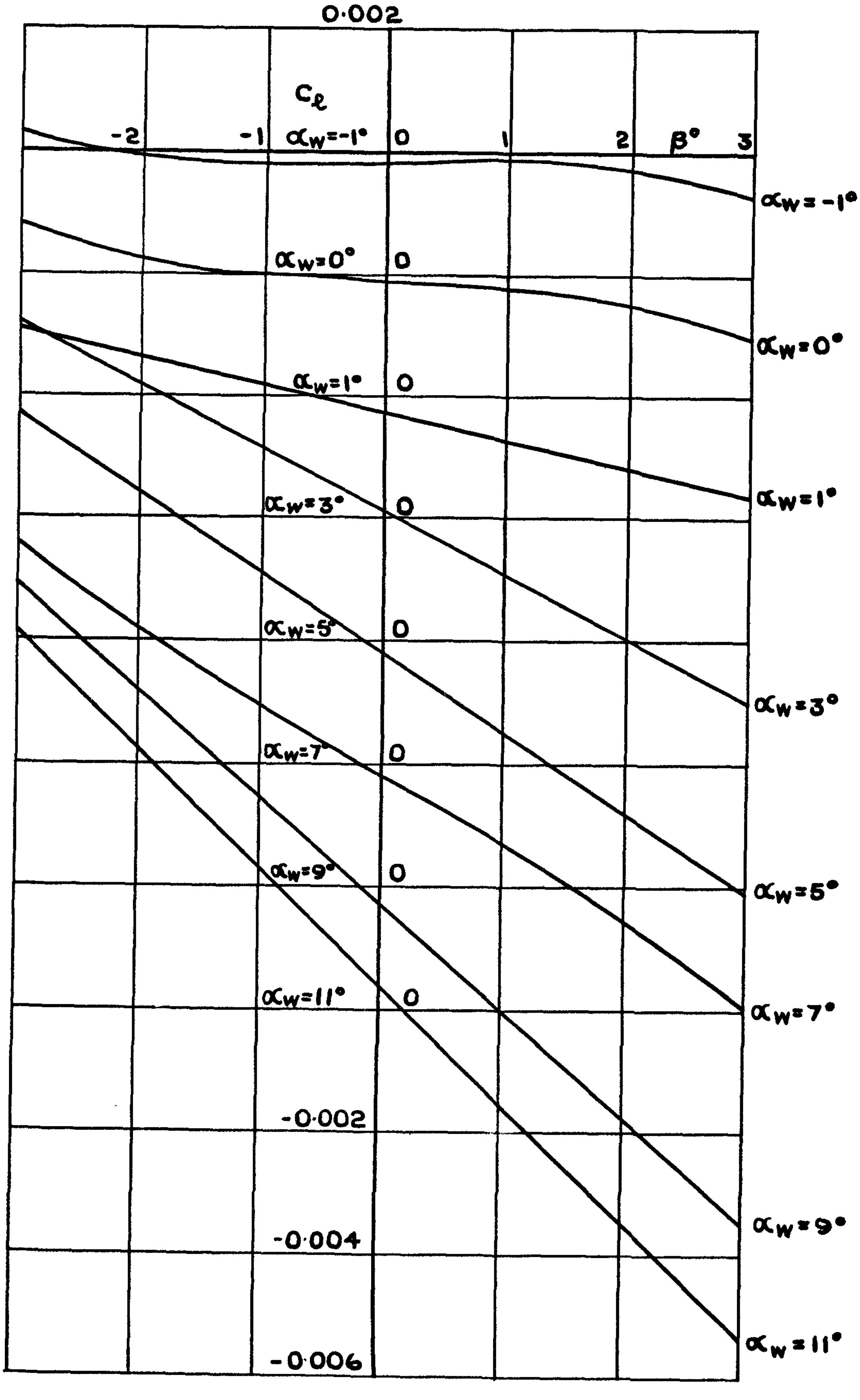


FIG. 18. C_ℓ VS β AT CONSTANT α_W
M = 0·90
$\eta = 0°, 3°$ AILERON UPFLOAT
FAIREY E.R. 103.

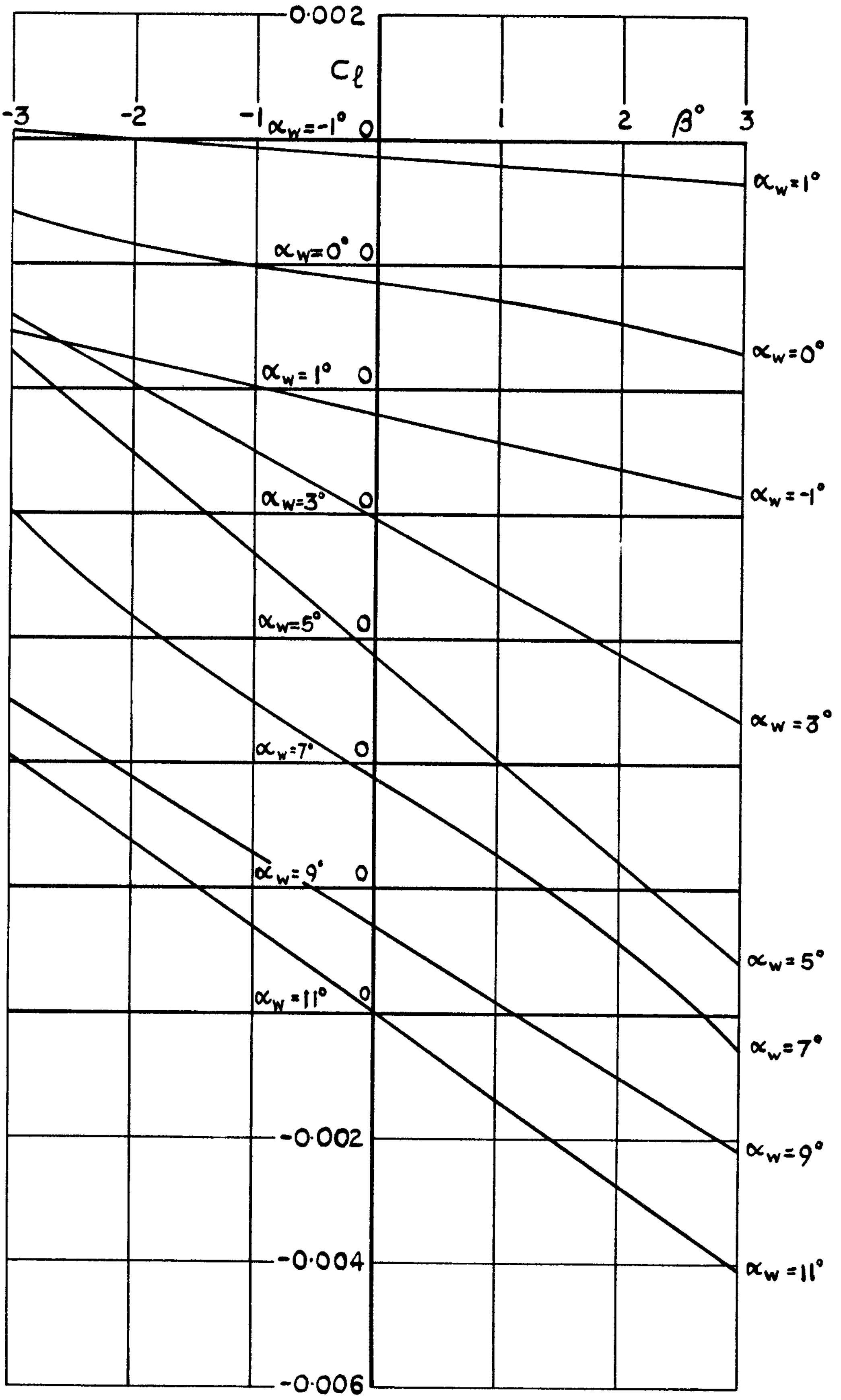


FIG. 19. C_ℓ vs β AT CONSTANT α_w M = 0·95.
$\eta = 0^\circ$, 3° AILERON UPFLOAT. FAIREY E.R. 103.

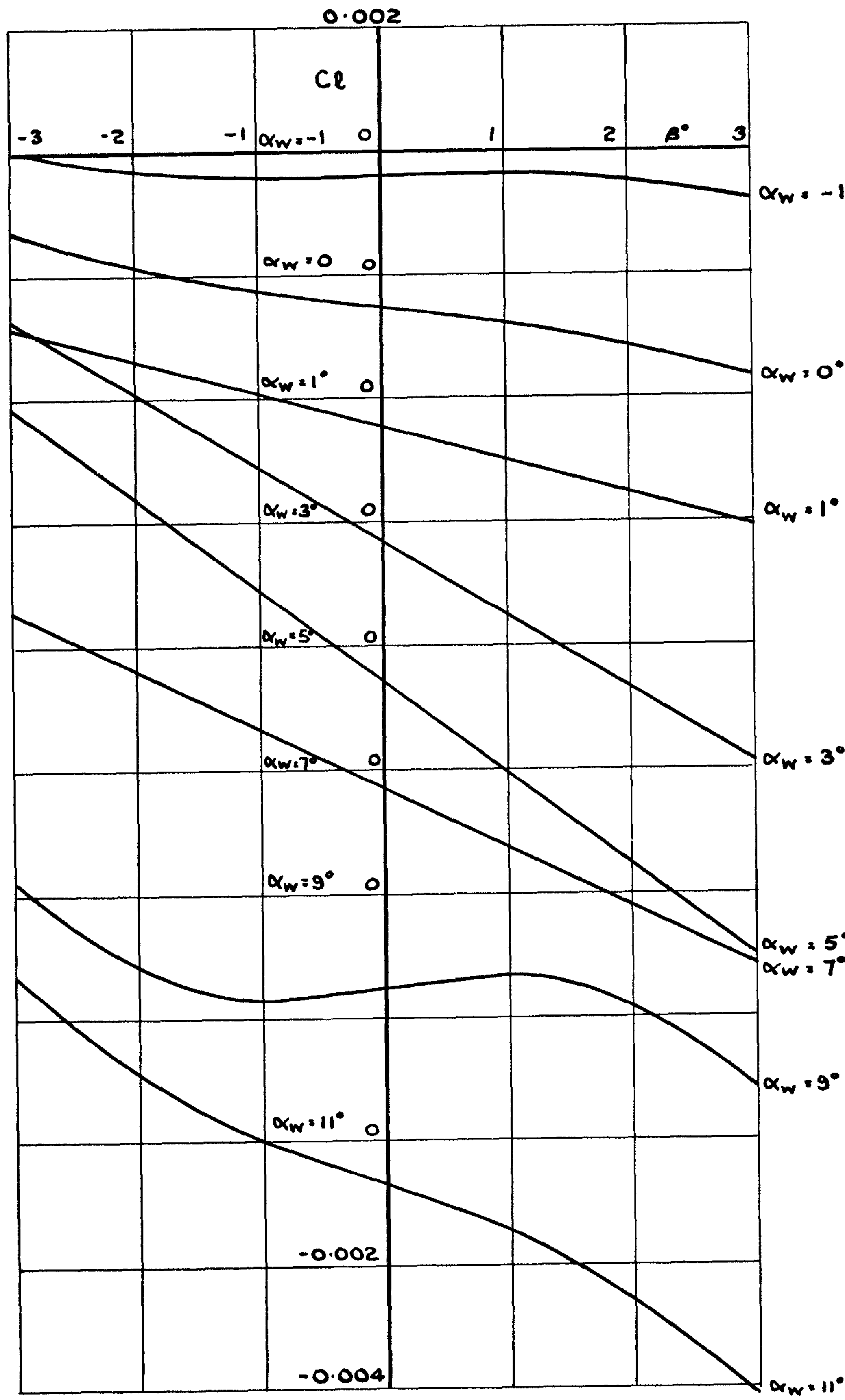


FIG. 20. C_l VS β AT CONSTANT α_w M = 0·97

η = 0°, 3° AILERON UPFLOAT.

FAIREY E.R. 103.

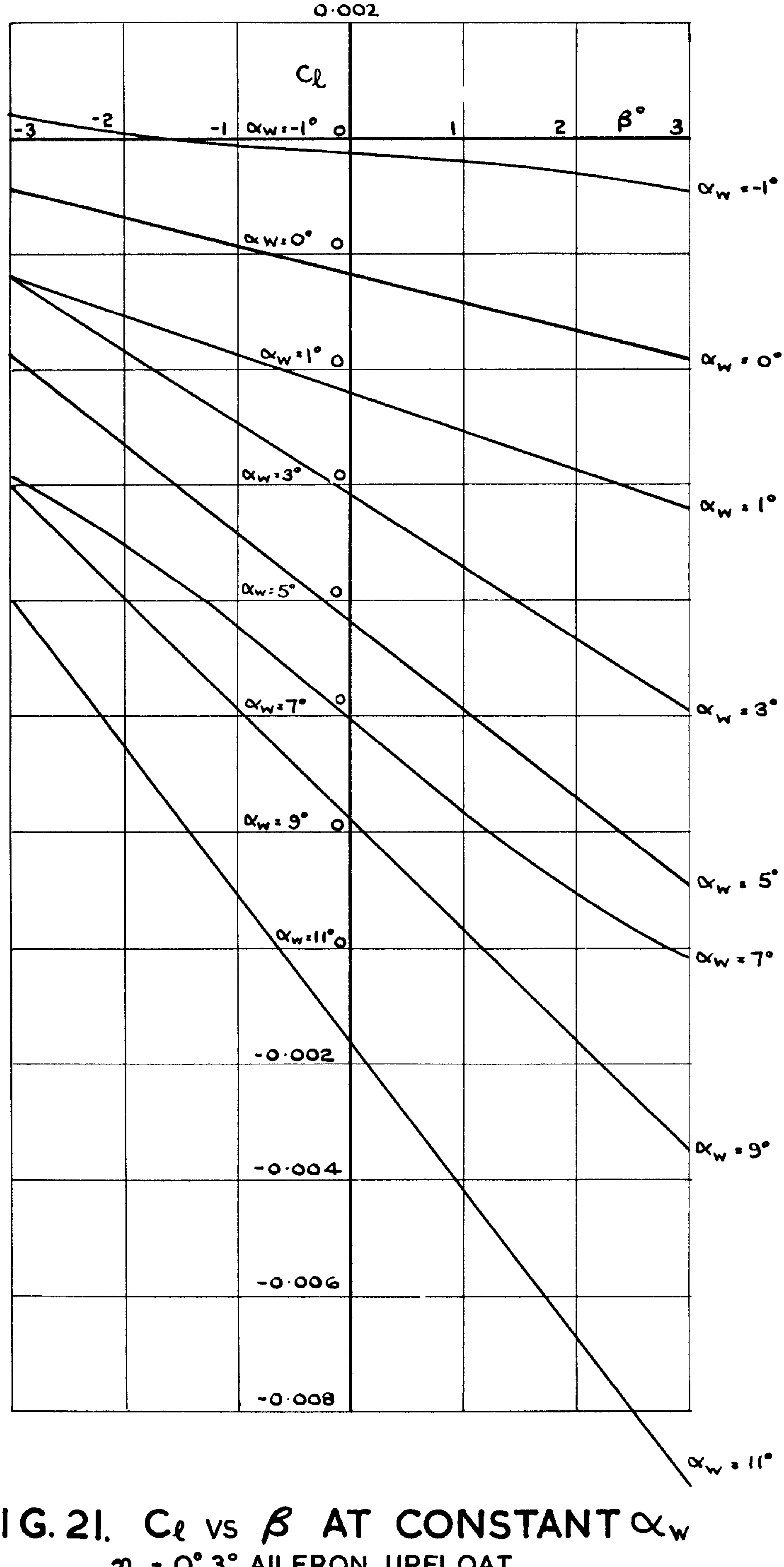


FIG. 21. C_ℓ VS β AT CONSTANT α_w

η = 0°, 3° AILERON UPFLOAT

FAIREY E.R. 103.

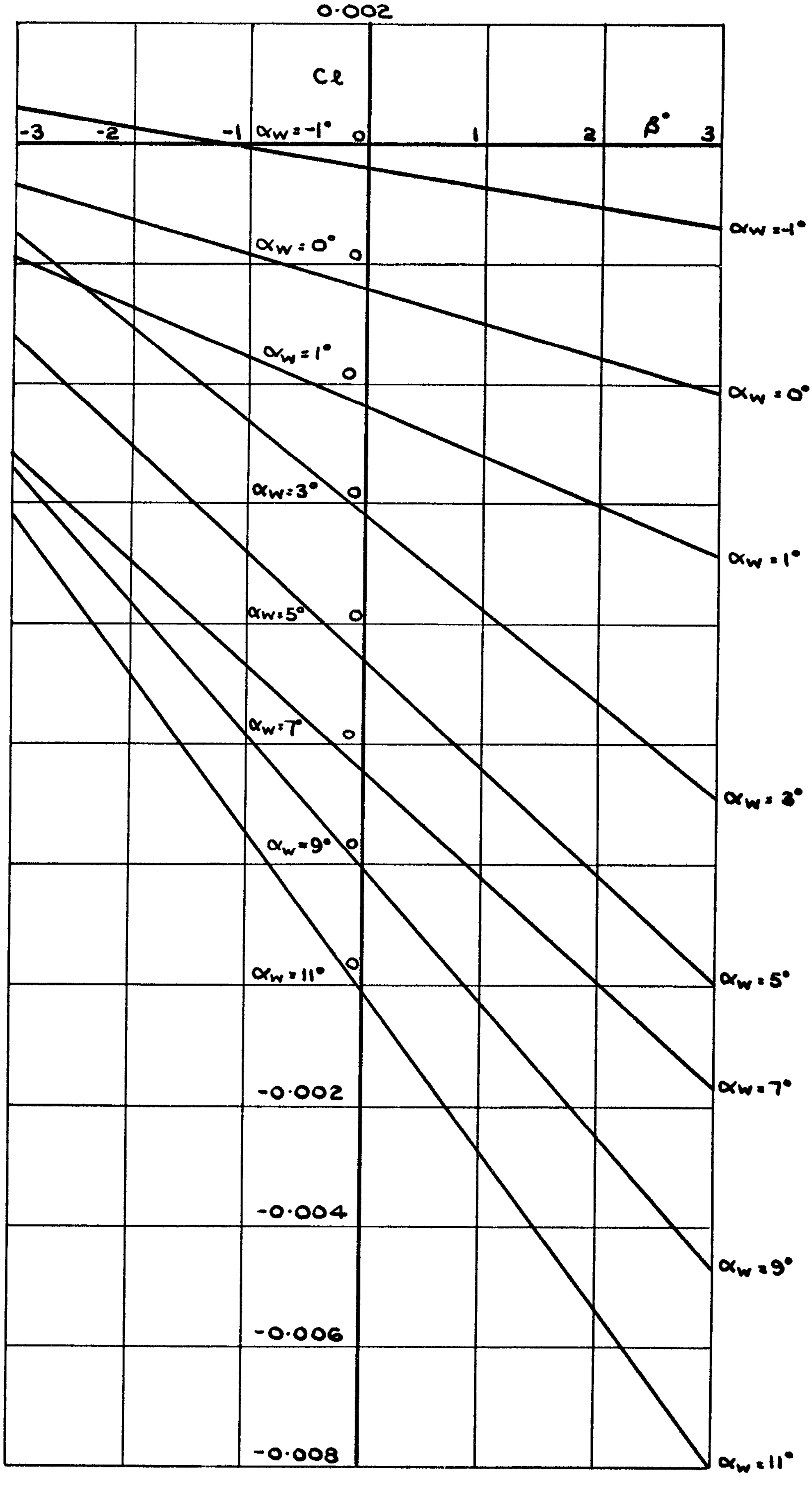


FIG. 22. Cℓ vs β AT CONSTANT α_w.

M = 1·05

η = 0° 3° AILERON UPFLOAT

FAIREY E.R. 103.

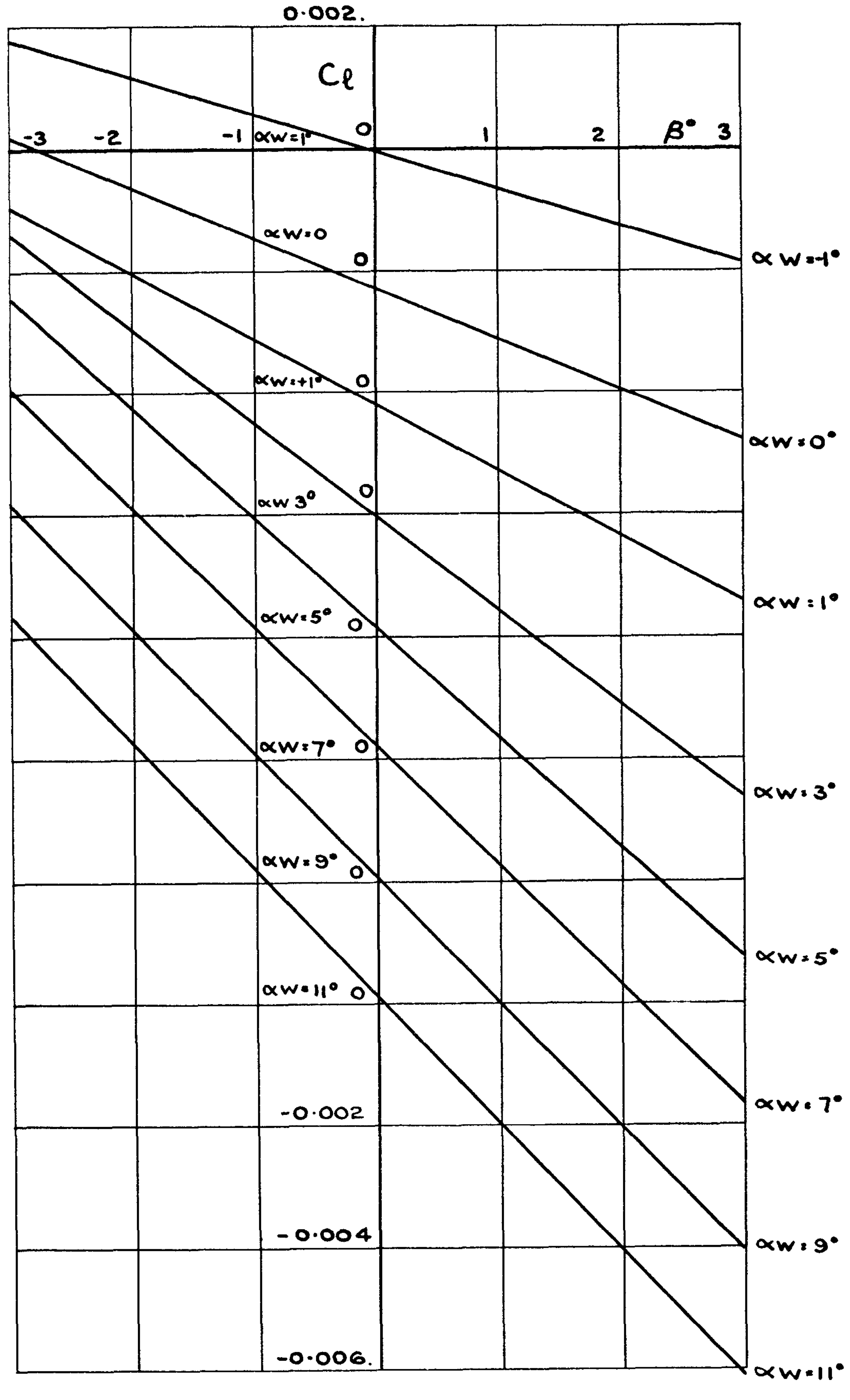


FIG. 23. C_ℓ VS β AT CONSTANT α_w
M = 1·25.

$\eta = 0°$, 3° AILERON UPFLOAT

FAIREY E.R.103.

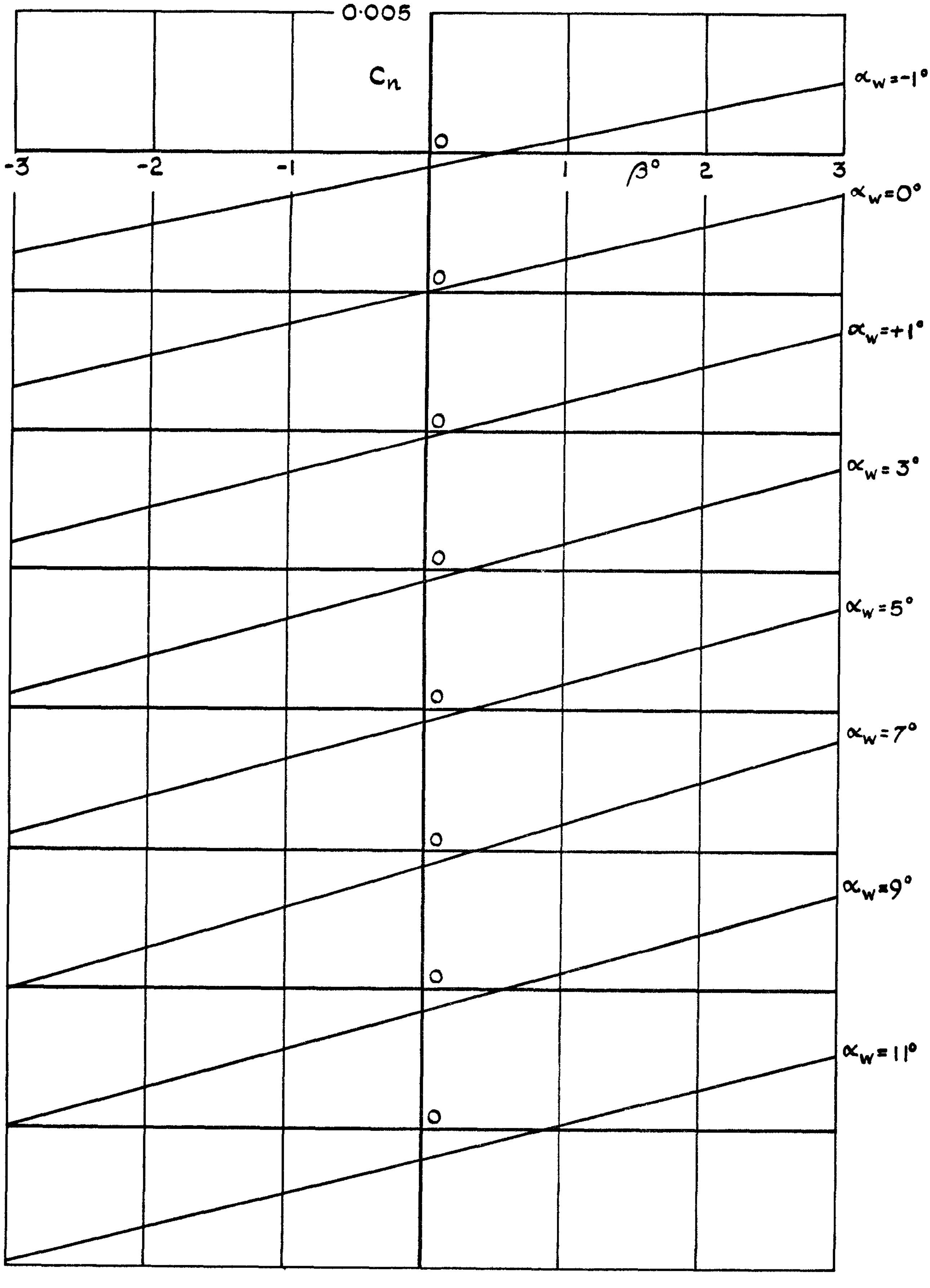


FIG. 24. C_n vs β AT CONSTANT α_w M = 0·85

$\eta = 0°$; 3° AILERON UPFLOAT. FAIREY E.R. 103.

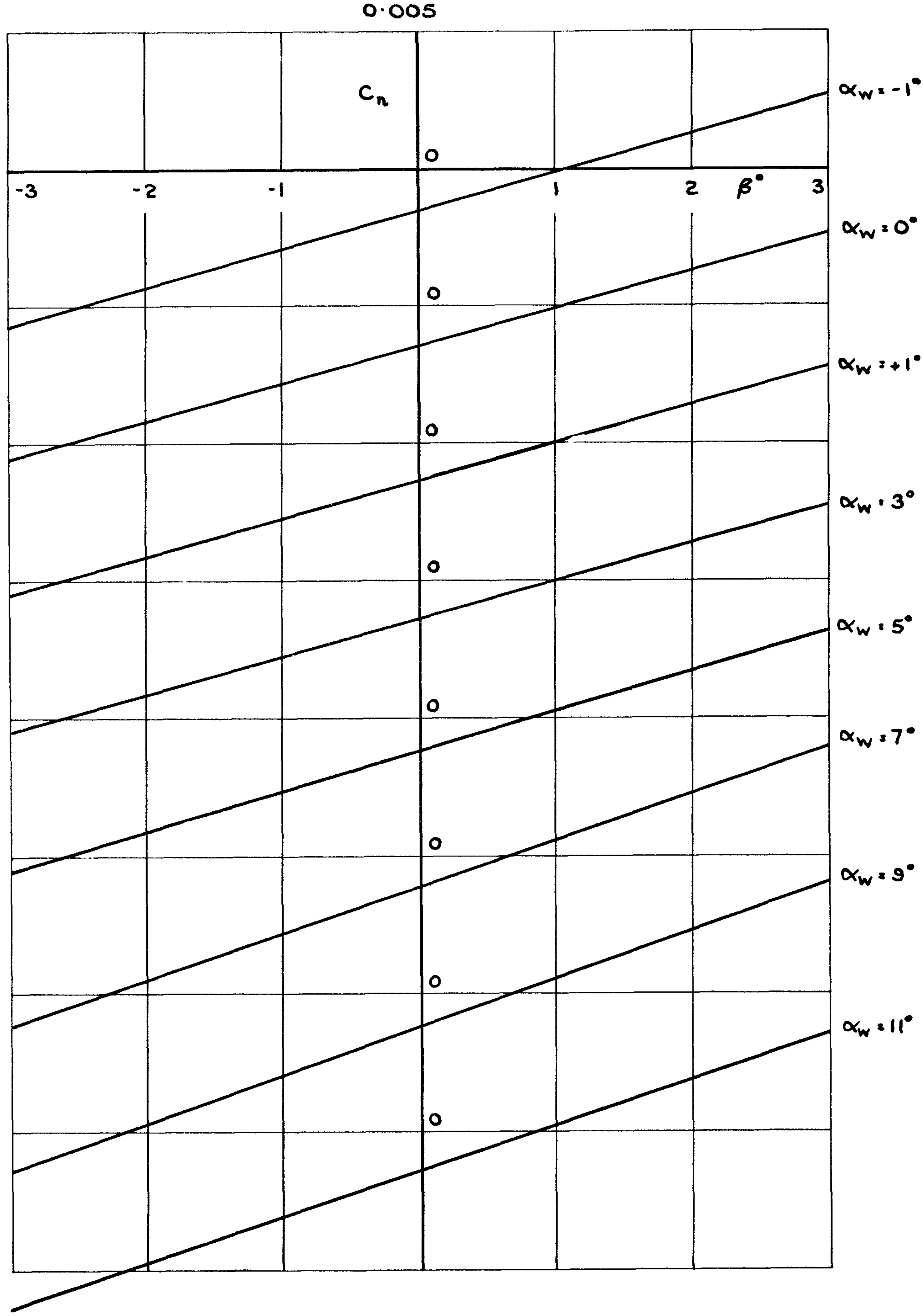


FIG. 25. C_n VS β AT CONSTANT α_w

M = 0·99

$\eta = 0°$; 3° AILERON UPFLOAT

FAIREY E.R.103.

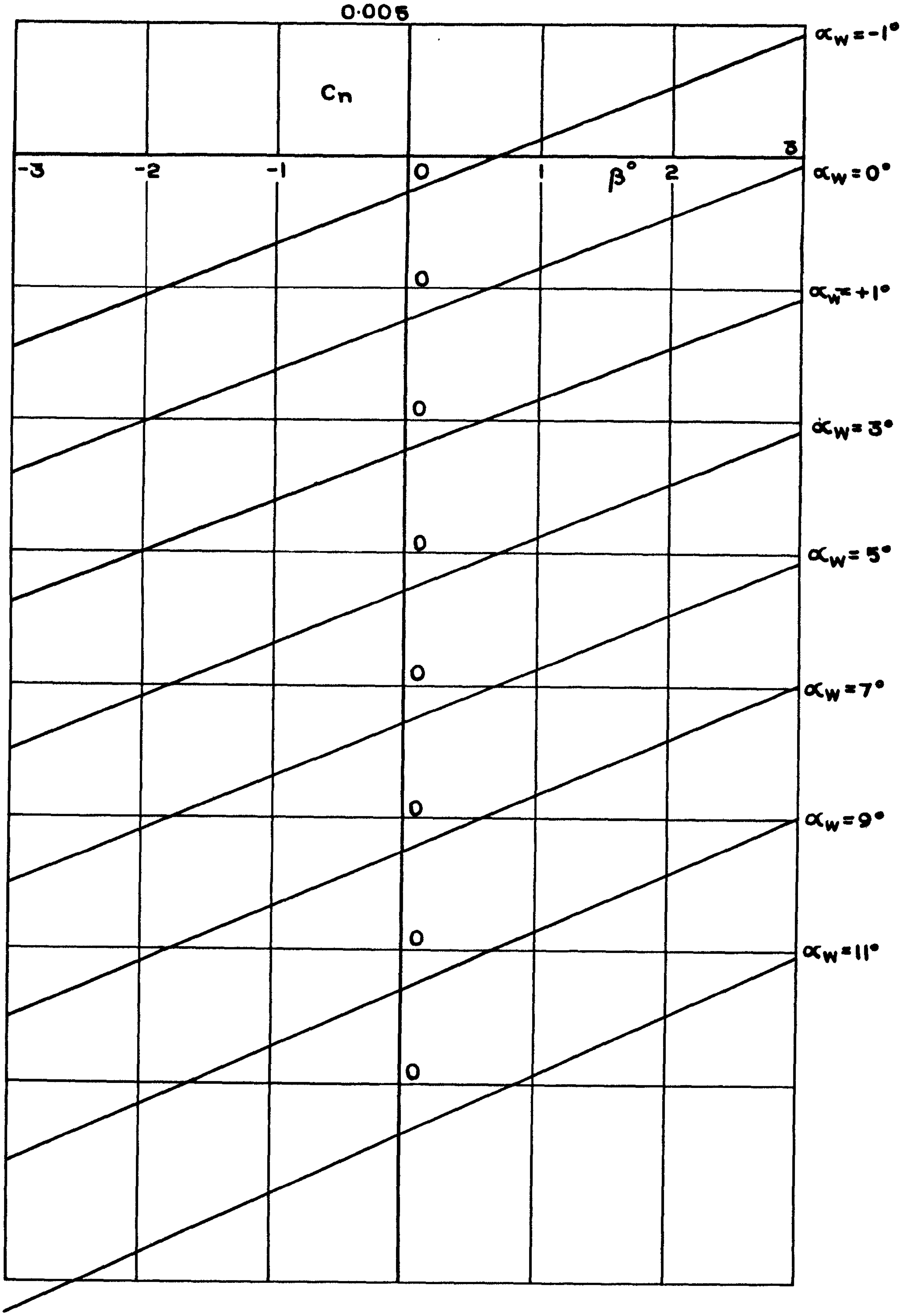


FIG. 26. C_n vs. β AT CONSTANT α_w.
M=1·05
η = 0°; 3° AILERON UPFLOAT
FAIREY E.R. 103.

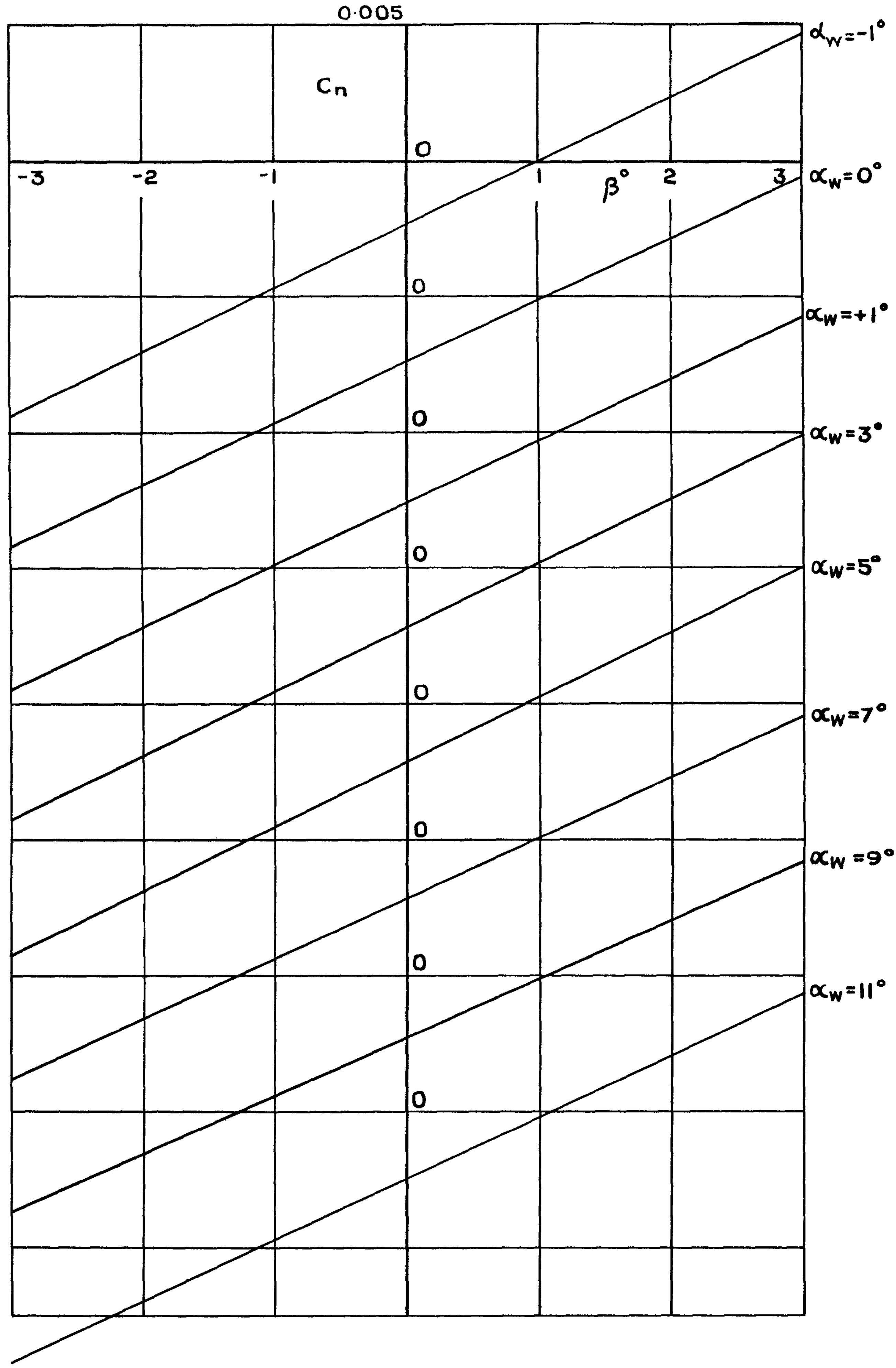


FIG. 27. C_n VS. β AT CONSTANT α_W
$M = 1{\cdot}25$
$\eta = 0°$; 3° AILERON UPFLOAT
FAIREY E.R. 103.

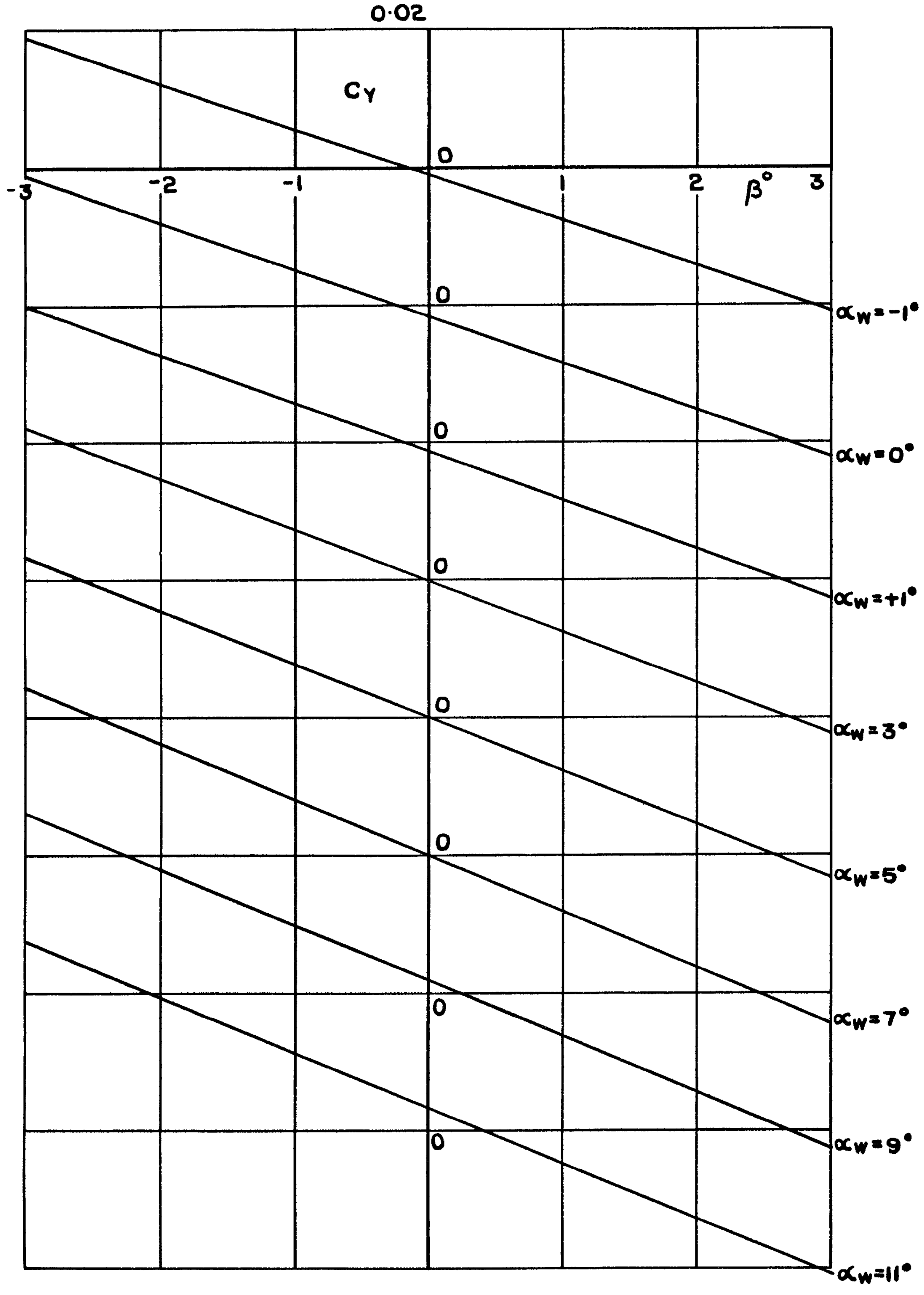


FIG. 28. C_Y VS. β AT CONSTANT α_W

M=0·85

$\eta = 0°; 3°$ AILERON UPFLOAT

FAIREY E.R. 103.

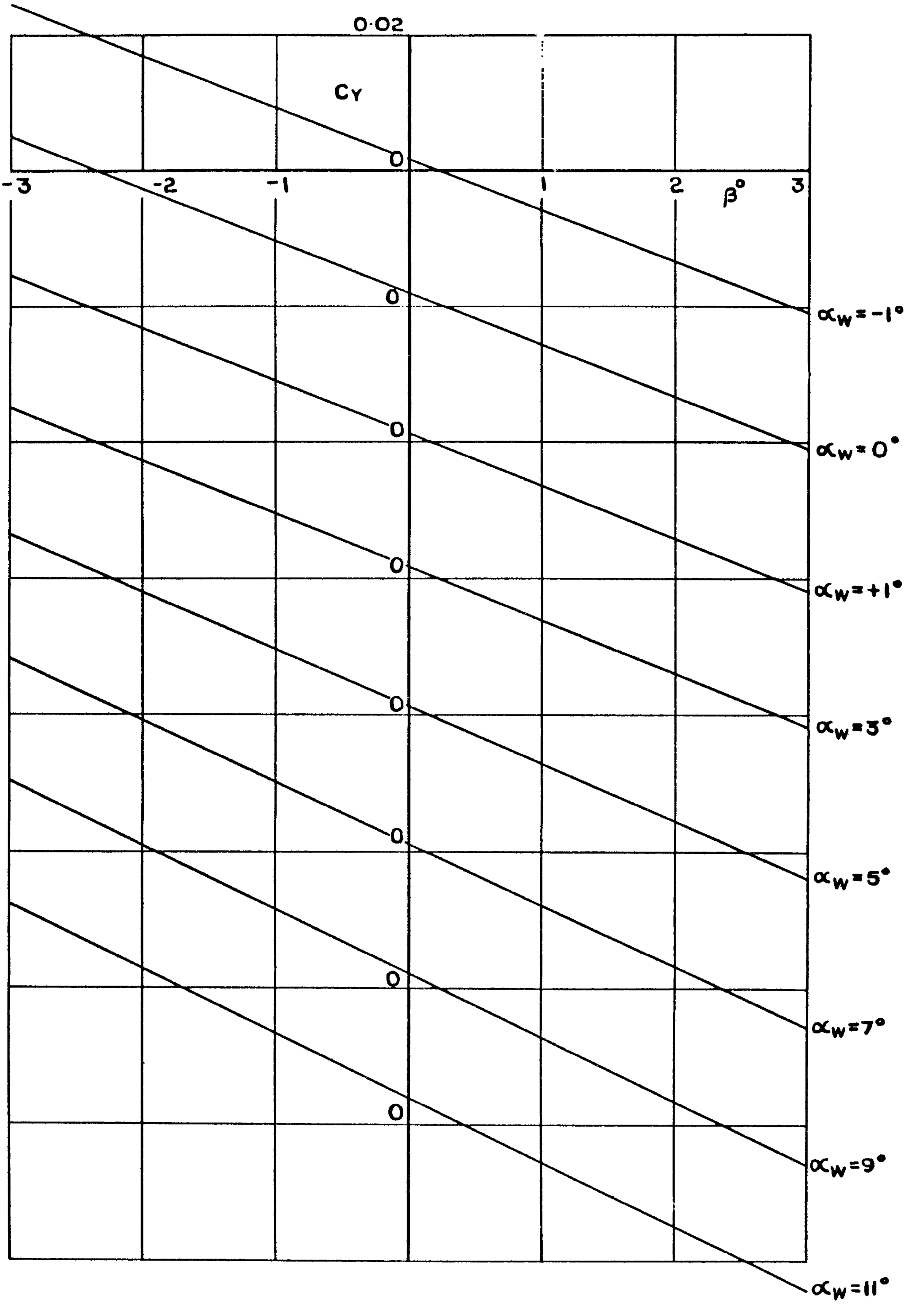


FIG. 29. C_Y VS. β AT CONSTANT α_W

M = 0·99

$\eta = 0°$; 3° AILERON UPFLOAT

FAIREY E.R. 103.

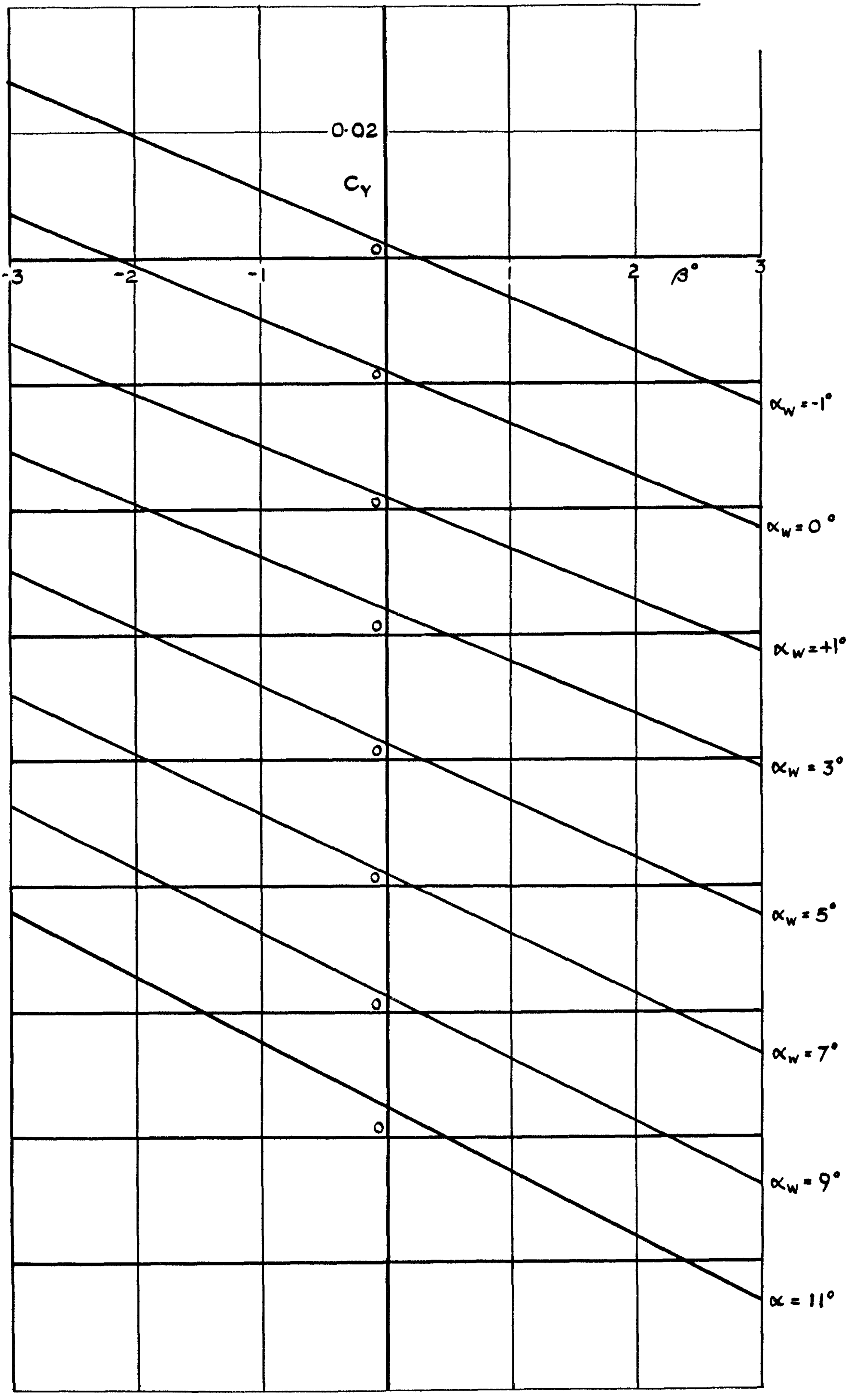


FIG.30. C_Y VS β AT CONSTANT α_W. M=1·05.
$\eta = 0°$; 3° AILERON UPFLOAT, FAIREY E.R. 103.

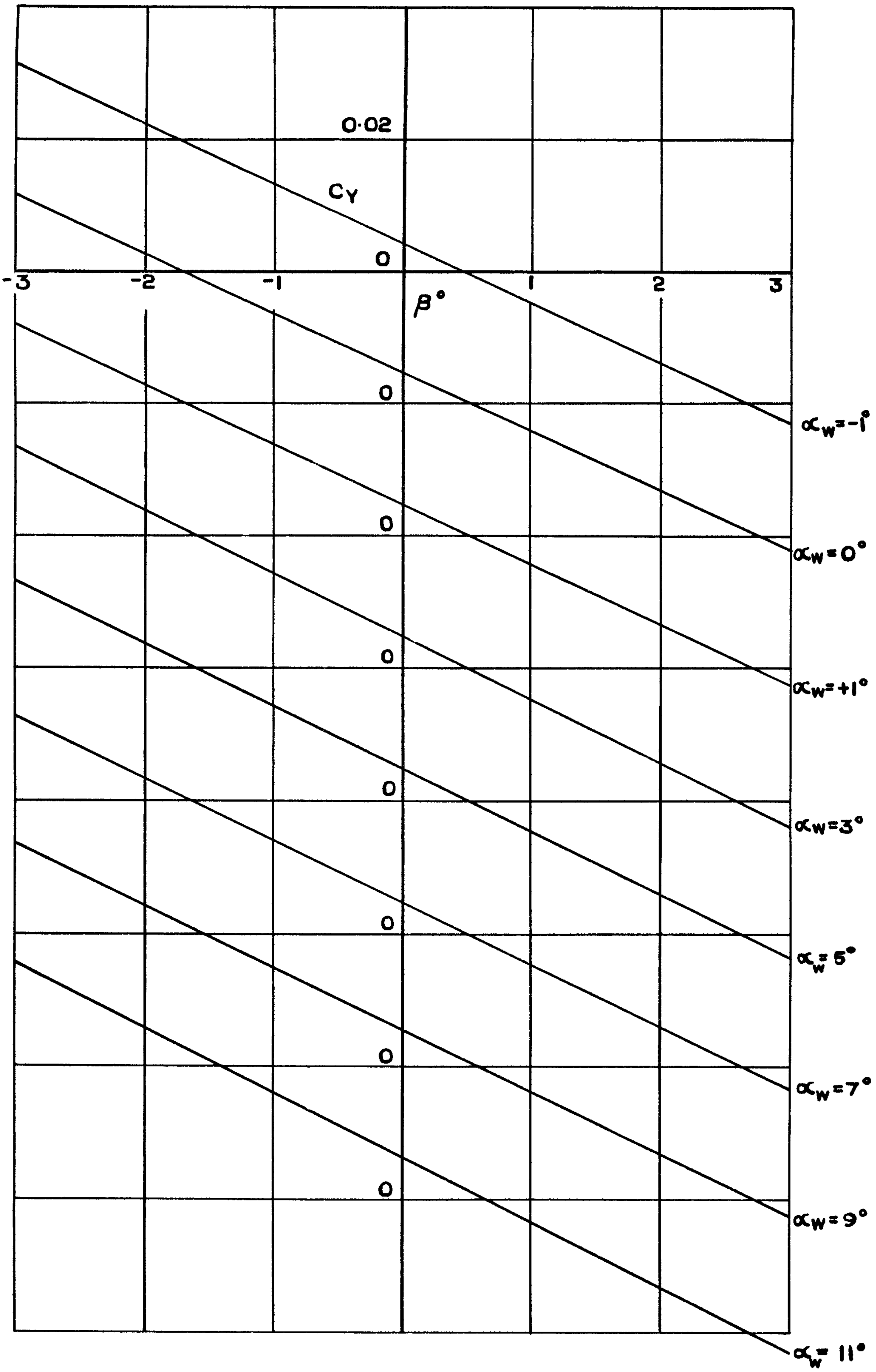


FIG. 31. C_Y VS. β AT CONSTANT α_W

$M = 1{\cdot}25$

$\eta = 0°$ 3° AILERON UPFLOAT

FAIREY E.R. 103.

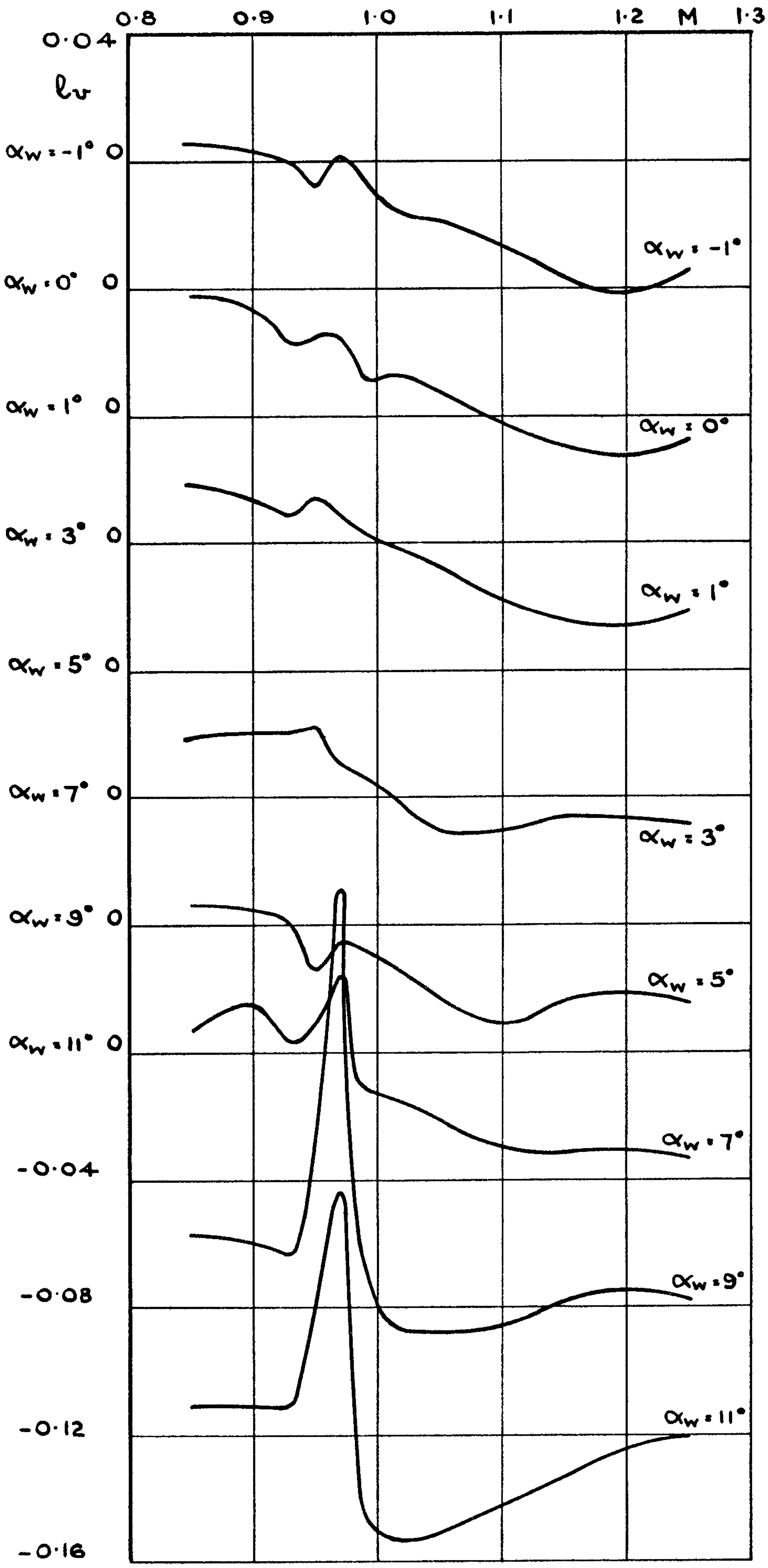


FIG. 32. l_V VS MACH Nº AT CONSTANT α_W.

$\eta = 0°$, 3° AILERON UPFLOAT.

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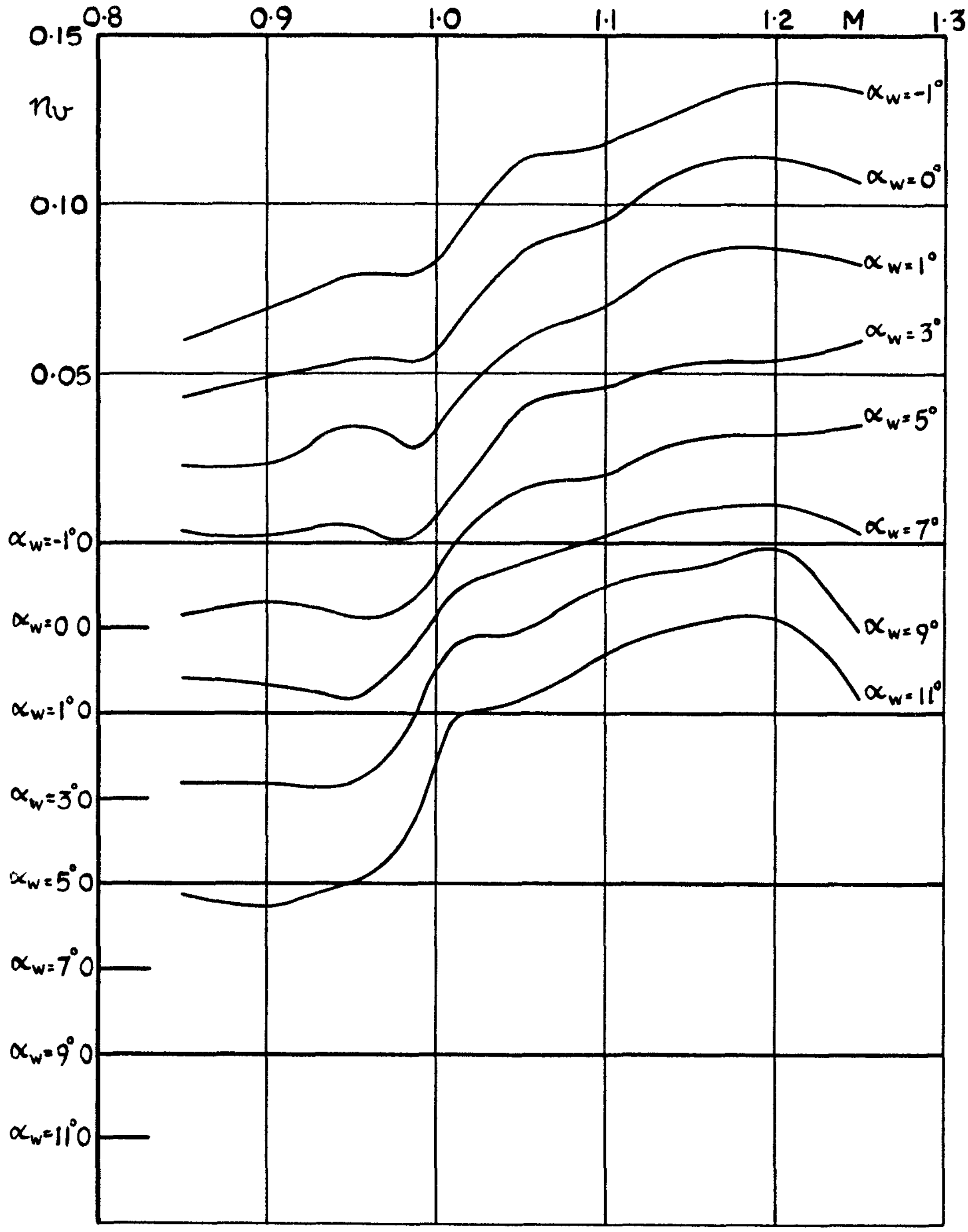


FIG. 33. n_v vs MACH № AT CONSTANT α_w

$\eta = 0°$; 3° AILERON UPFLOAT. FAIREY E.R.103.

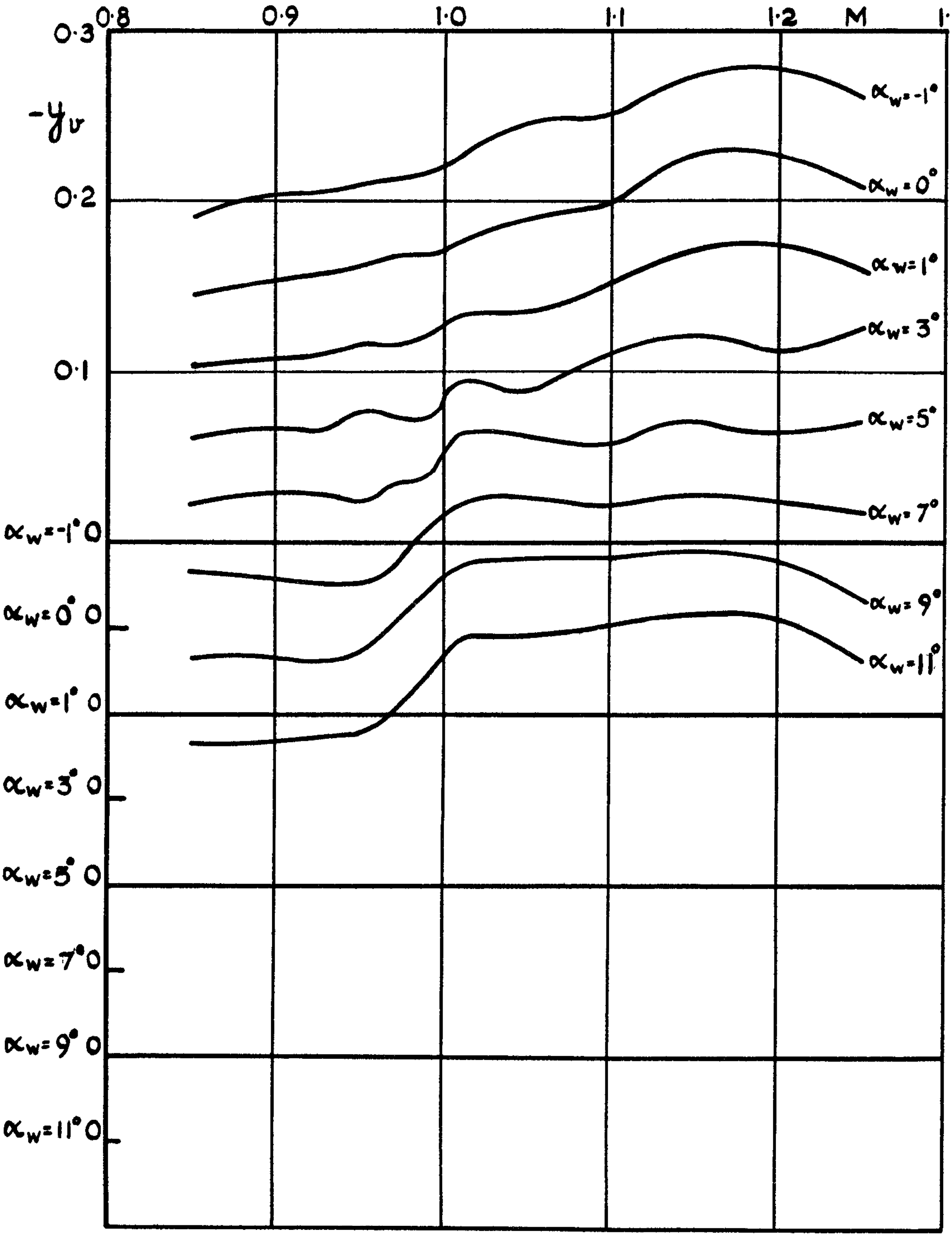


FIG. 34. $-y_v$ VS MACH Nº AT CONSTANT α_w.

$\eta = 0°; 3°$ AILERON UPFLOAT. FAIREY E.R. 103.

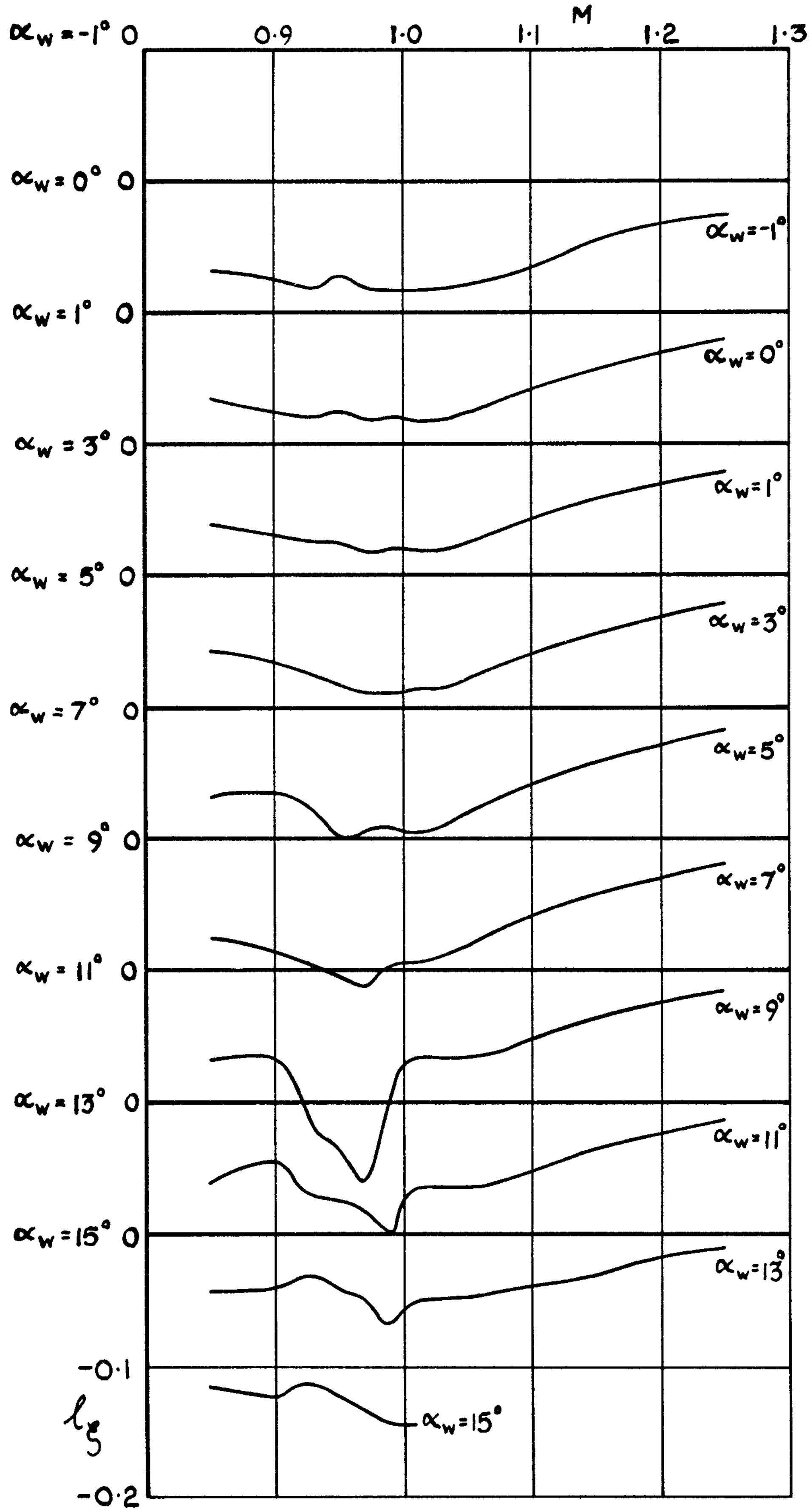


FIG. 35. ROLLING MOMENT DUE TO AILERON

$\eta = 0°$ FAIREY E.R. 103.

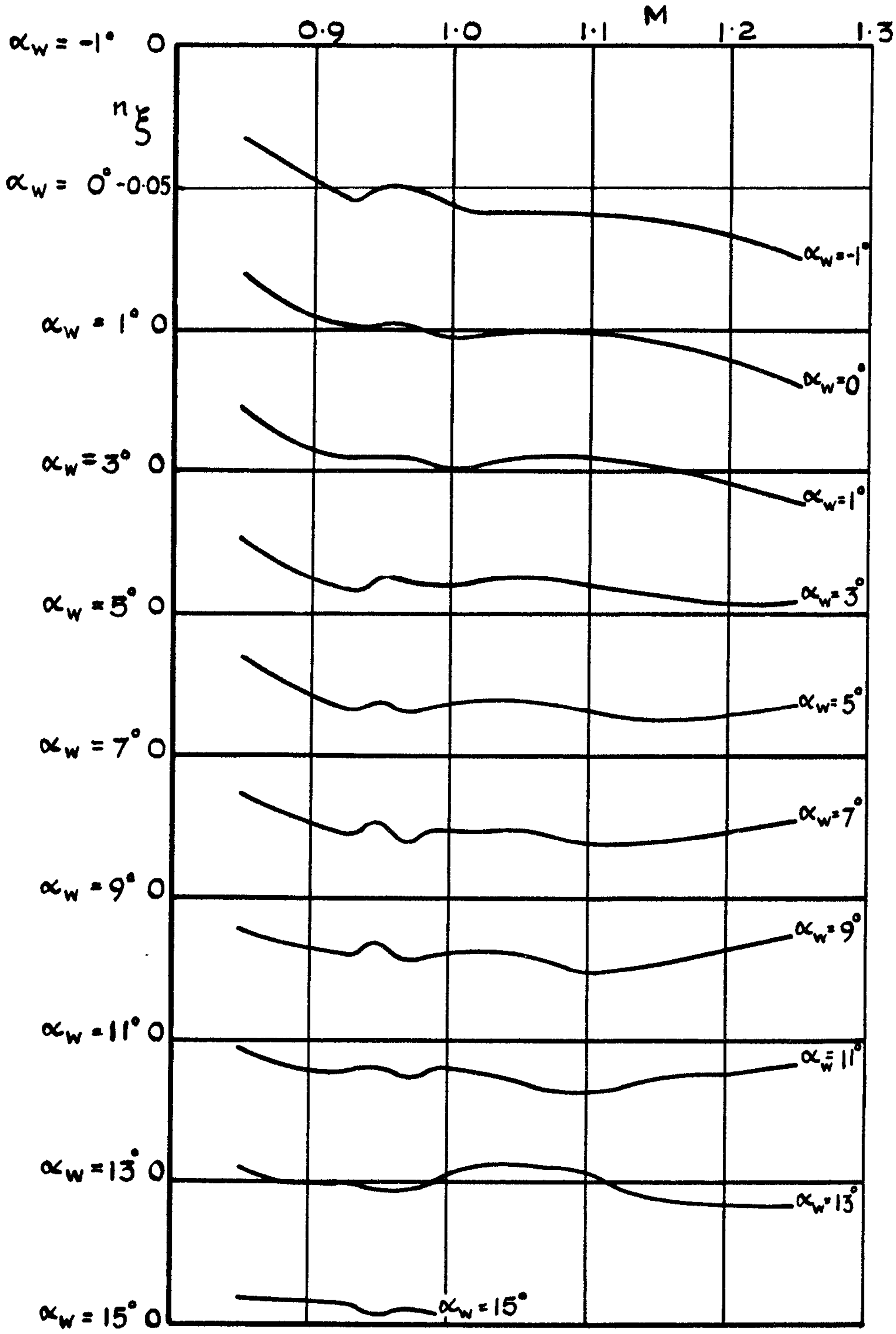


FIG. 36. YAWING MOMENT DUE TO AILERON.

$\eta = 0°$ FAIREY E.R. 103.

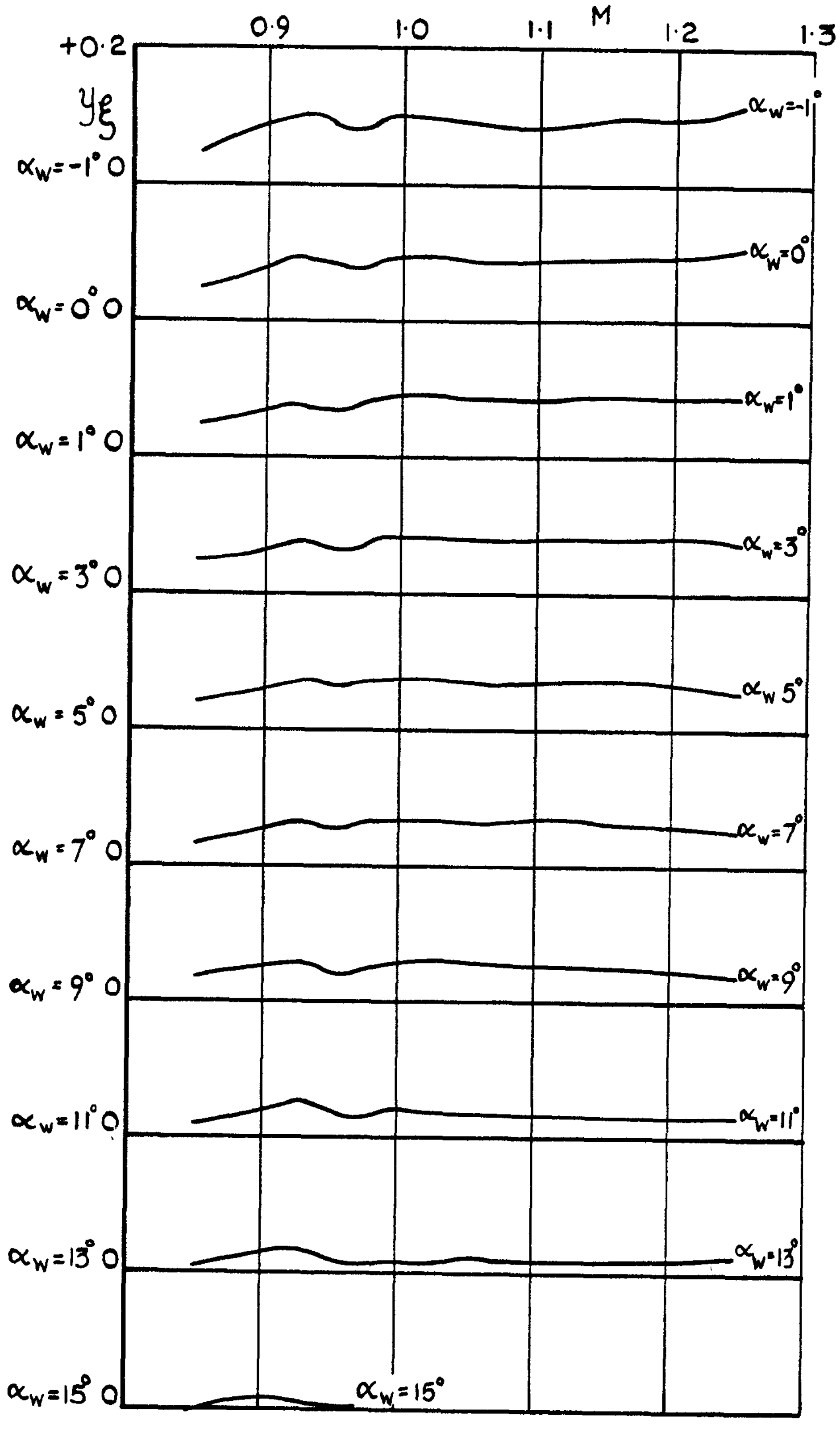
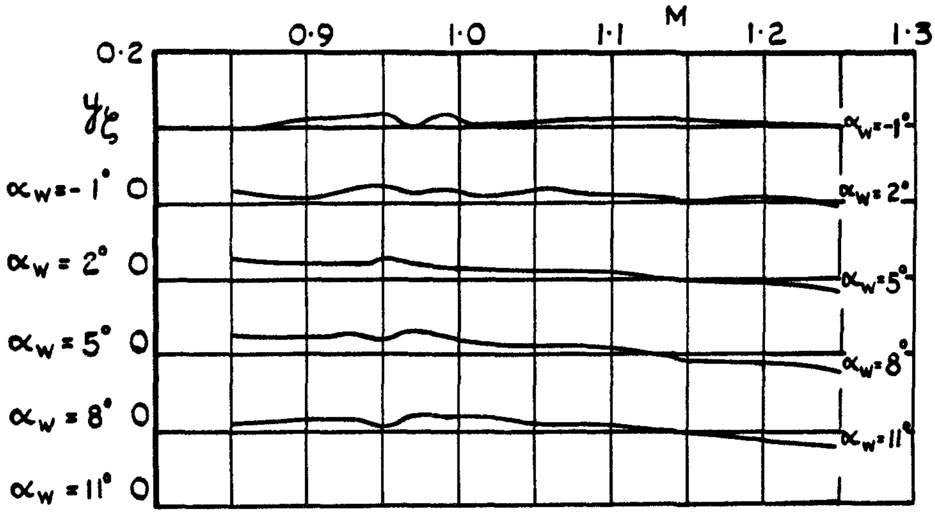
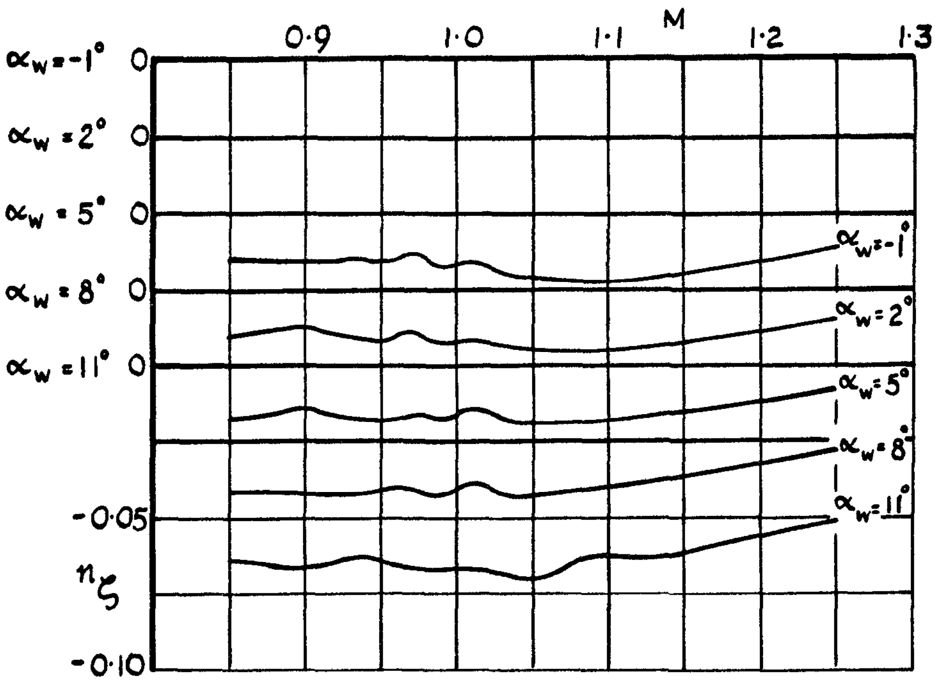


FIG.37. SIDEFORCE DUE TO AILERON.

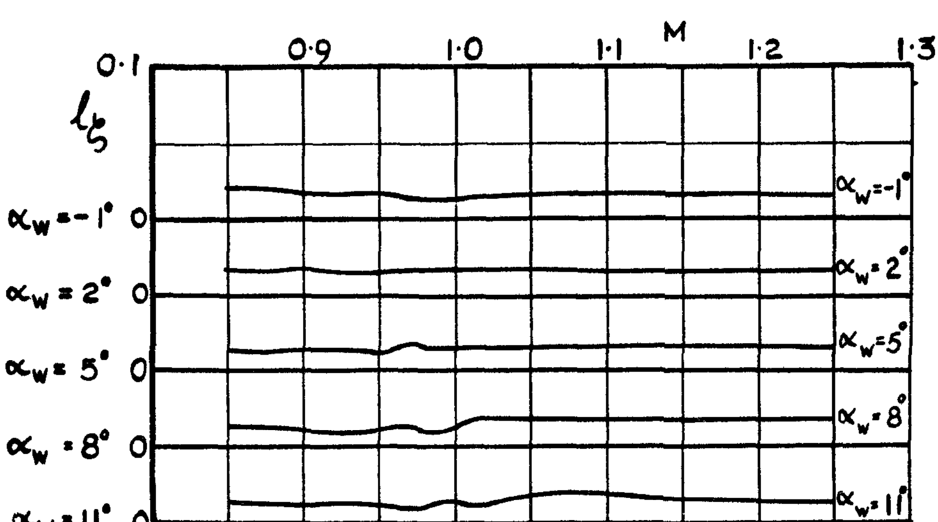
$\eta = 0°$ FAIREY E.R. 103.



y_ζ = MEAN VALUE OBTAINED FROM RESULTS AT ±3° RUDDER ANGLE.



n_ζ = MEAN VALUE OBTAINED FROM RESULTS AT ±3° RUDDER ANGLE.



l_ζ = MEAN VALUE OBTAINED FROM RESULTS ±3° RUDDER ANGLE.

FIG. 38. SIDEFORCE, YAWING MOMENT AND ROLLING MOMENT DUE TO RUDDER.

$\eta = -4°$, 3° AILERON UPFLOAT. FAIREY E.R. 103.

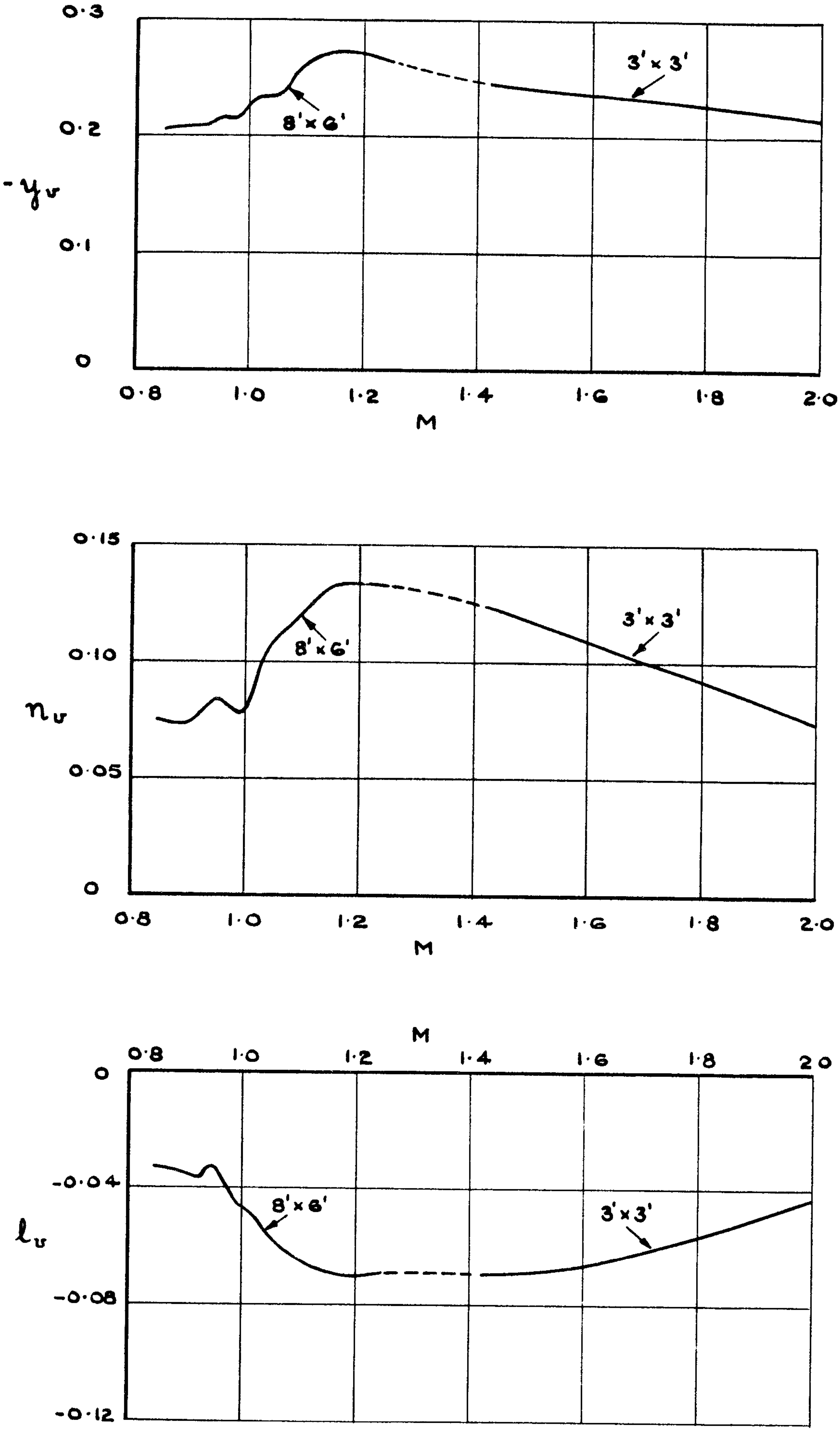


FIG. 39. SIDEFORCE YAWING MOMENT & ROLLING MOMENT VS MACH NO.

$\alpha = 1\frac{1}{2}^\circ$, $\eta = 0^\circ$

FAIREY E.R.103.

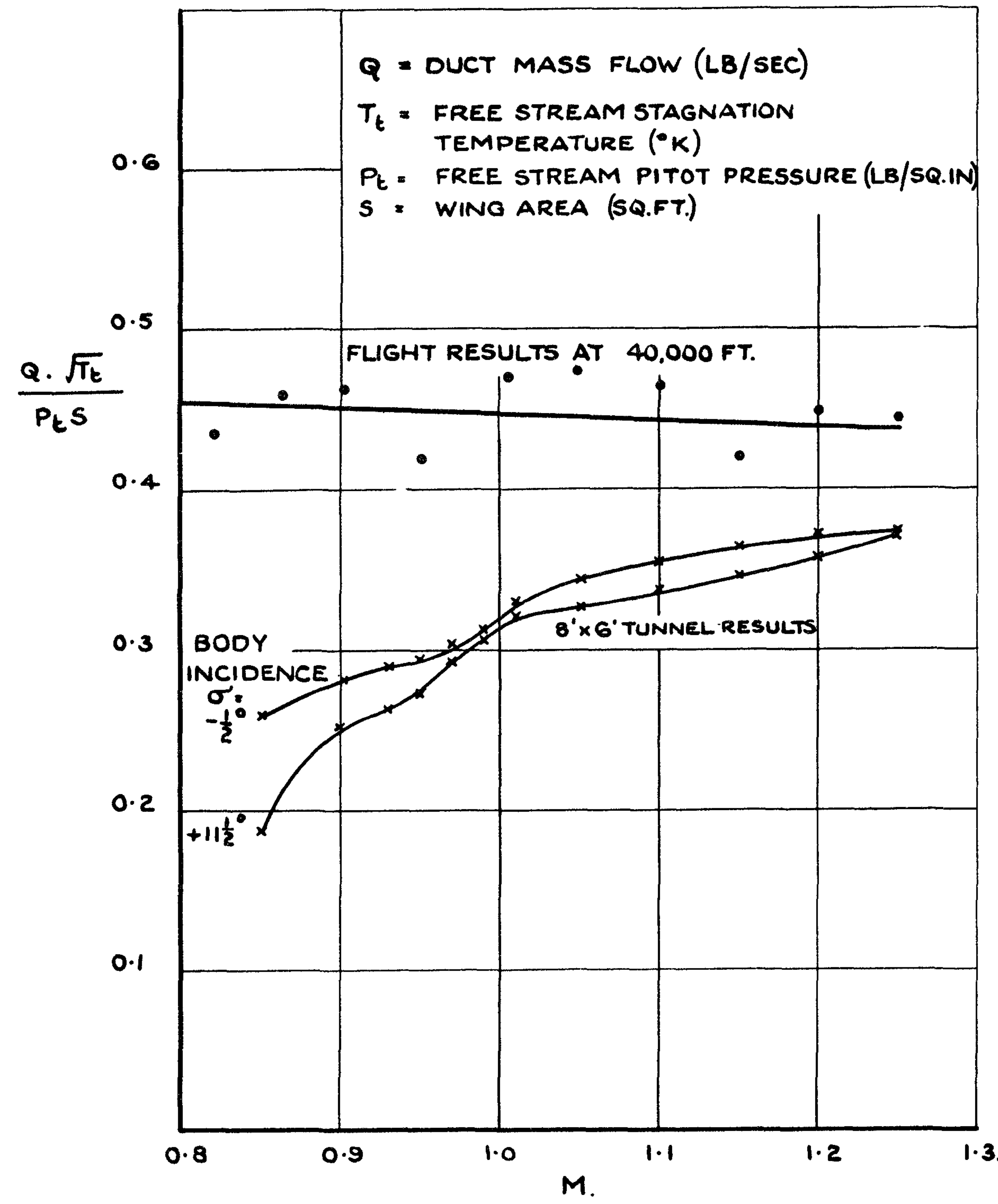


FIG. 40. NON-DIMENSIONAL MASS FLOW vs MACH NUMBER

FAIREY ER.103.

A.R.C. C.P. No.656

[A.I.](42) Fairey Delta 2 :
533.6.013.1 :
533.6.011.35

8' x 6' TRANSONIC WIND TUNNEL TESTS ON A 1/24 SCALE MODEL OF THE FAIREY DELTA 2 (ER.103). Kettle, D. J. May, 1962.

Measurements of longitudinal and lateral stability have been made on a 1/24 scale model of the Fairey Delta 2 (ER.103) in the 8' x 6' transonic tunnel at Farnborough, at Mach numbers from 0.85 to 1.25. The results also include some data on elevator, aileron and rudder power. Some comparisons are made with the results of tests on the same model in the 3' x 3' supersonic tunnel at the R.A.E. Bedford.

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A.R.C. C.P. No.656

[A.I.](42) Fairey Delta 2 :
533.6.013.1 :
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