# REPORT No. 628

## AERODYNAMIC CHARACTERISTICS OF A LARGE NUMBER OF AIRFOILS TESTED IN THE VARIABLE-DENSITY WIND TUNNEL

By Robert M. Pinkerton and Harry Greenberg


### SUMMARY

*The aerodynamic characteristics of a large number of miscellaneous airfoils tested in the variable-density tunnel have been reduced to a comparable form and are published in this report for convenient reference. Plots of the standard characteristics are given for each airfoil and, in addition, the important characteristics are given in tabular form. Included also is a tabulation of important characteristics for the related airfoils reported in N. A. C. A. Report No. 460.*

*This report, in conjunction with N. A. C. A. Report No. 610, makes available in comparable and convenient form the aerodynamic data for airfoils tested in the variable-density tunnel since January 1, 1931.*


### INTRODUCTION

A large number of miscellaneous airfoils not included in the systematic investigations reported in references 1 and 2 have been tested in the variable-density tunnel. The larger part of these airfoils consists of unrelated sections, tests of which were requested by various agencies; and the results, except those published in reference 3, have not heretofore been available in published form. The rest of the airfoils consist of small groups of related sections tested to study the effects of certain local variations in shape.

One of these local shape variations involved changes of the nose shape, consisting primarily of changes of the leading-edge radius. The effects of these changes were determined by tests of modifications of the Göttingen 398 (reference 4), of the Clark Y (reference 5), and of the N. A. C. A. 2412 (unpublished). References 4 and 5 present data on the effect of sharp leading edges. The modifications to the N. A. C. A. 2412 consisted in varying the leading-edge radius from normal to zero (N. A. C. A. 2412, N. A. C. A. 15, 16, 19, and 20) and in dropping the leading edge from the normal position (N. A. C. A. 17 and 18). A second local shape variation involved the rear portion of the airfoil and consisted in reflexing the mean line. Such modifications were made on the Göttingen 398, the Boeing 106, and the N–60 sections, and the results of the tests were published in reference 6. A series of related forward-camber airfoils having reflexed mean lines was tested, and the results were published in reference 7. Another series of reflexed airfoils, for which the results have not been published, includes the N. A. C. A. 21, 23, 24, 25, 26, and 27 airfoils.

The results of these tests, including both published and unpublished data, have not heretofore been available in comparable form nor convenient for ready reference by the user. It has therefore been deemed desirable to collect these data into one report.

This report, in conjunction with reference 2, makes available, in convenient form, comparable data for sections tested in the variable-density tunnel since January 1, 1931. The important fully corrected characteristics for the miscellaneous sections described earlier and also for the sections reported in reference 1 are tabulated for easy reference. In addition to the tabulated data, plots of standard aerodynamic characteristics are presented for the miscellaneous airfoils.

### TESTS AND APPARATUS

Routine airfoil tests were made in the variable-density tunnel at an effective Reynolds Number of approximately 8,000,000. Tests of some of the models were extended through the range of negative angles of attack. Airfoils for which these results were obtained are designated "inverted" sections. The duralumin models were of rectangular plan form with a 5-inch chord and a 30-inch span. A description of the tunnel, the test procedure, and the method of constructing the models is given in reference 8.

The precision of the tests and of the results is discussed in references 1 and 9.

### RESULTS

The method chosen to present these results is intended to be convenient for designers. The important characteristics, fully corrected as described in references 9 and 10, are presented in tables I and II and are comparable with those given in reference 2. These important characteristics are:

$c_{l_{max}}$, the section maximum lift coefficient.

$\alpha_{l_0}$, the angle of zero lift.

$a_0$, the section lift-curve slope.

$c_{l_{opt}}$, the optimum lift coefficient, or the section lift coefficient corresponding to $c_{d_{0_{min}}}$.

$c_{d_{0_{min}}}$, the minimum profile-drag coefficient.

$c_{m_{a.c.}}$, the pitching-moment coefficient about the section aerodynamic center.

*a.c.*, the aerodynamic center, or the point, with respect to the airfoil section, about which the pitching-moment coefficient tends to remain constant over the range of lift coefficients between zero and maximum lift.

*c.p.*, the position of the center of pressure in percentage of the chord behind the leading edge.

$m_6$, the lift-curve slope for aspect ratio 6.

A more complete description of these characteristics is presented in references 9 and 10.

Tables I and II contain these data for available sections tested in the variable-density tunnel, except those given in reference 2. Reference is made to the original publication for the airfoil results that have been previously reported.

Plots of the standard characteristics (figs. 1 to 88) are given for the miscellaneous sections (exclusive of those for the N. A. C. A. 22112, 23112, 24112, and 25112 sections, which are published in reference 7) because they are not available elsewhere. Plots for the sections in table I are given in reference 1.

LANGLEY MEMORIAL AERONAUTICAL LABORATORY,
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS,
LANGLEY FIELD, VA., *October 1, 1937.*

## REFERENCES

1. Jacobs, Eastman N., Ward, Kenneth E., and Pinkerton, Robert M.: The Characteristics of 78 Related Airfoil Sections from Tests in the Variable-Density Wind Tunnel. T. R. No. 460, N. A. C. A., 1933.
2. Jacobs, Eastman N., Pinkerton, Robert M., and Greenberg, Harry: Tests of Related Forward-Camber Airfoils in the Variable-Density Wind Tunnel. T. R. No. 610, N. A. C. A., 1937.
3. Anderson, Raymond F.: The Aerodynamic Characteristics of Airfoils at Negative Angles of Attack. T. N. No. 412, N. A. C. A., 1932.
4. Jacobs, Eastman N.: Characteristics of Two Sharp-Nosed Airfoils Having Reduced Spinning Tendencies. T. N. No. 416, N. A. C. A., 1932.
5. Weick, Fred E., and Scudder, Nathan F.: The Effect on Lift, Drag, and Spinning Characteristics of Sharp Leading Edges on Airplane Wings. T. N. No. 447, N. A. C. A., 1933.
6. DeFoe, George L.: A Comparison of the Aerodynamic Characteristics of Three Normal and Three Reflexed Airfoils in the Variable-Density Wind Tunnel. T. N. No. 388, N. A. C. A., 1931.
7. Jacobs, Eastman N., and Pinkerton, Robert M.: Tests in the Variable-Density Wind Tunnel of Related Airfoils Having the Maximum Camber Unusually Far Forward. T. R. No. 537, N. A. C. A., 1935.
8. Jacobs, Eastman N., and Abbott, Ira H.: The N. A. C. A. Variable-Density Wind Tunnel. T. R. No. 416, N. A. C. A., 1932.
9. Jacobs, Eastman N., and Sherman, Albert: Airfoil Section Characteristics as Affected by Variations of the Reynolds Number. T. R. No. 586, N. A. C. A., 1937.
10. Jacobs, Eastman N., and Rhode, R. V.: Airfoil Section Characteristics as Applied to the Prediction of Air Forces and Their Distribution on Wings. T. R. No. 631, N. A. C. A., 1938.

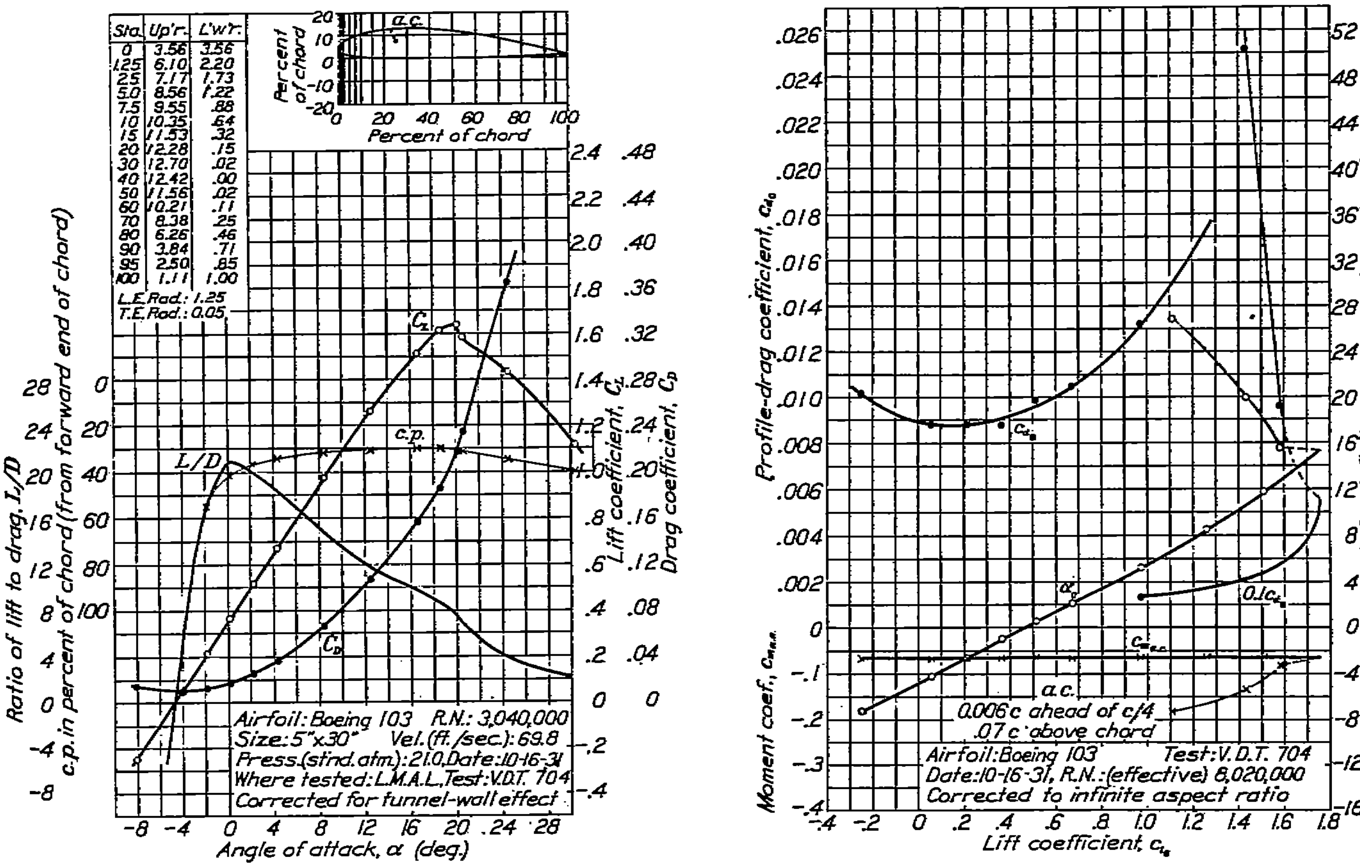



FIGURE 1.—Boeing 103 airfoil.

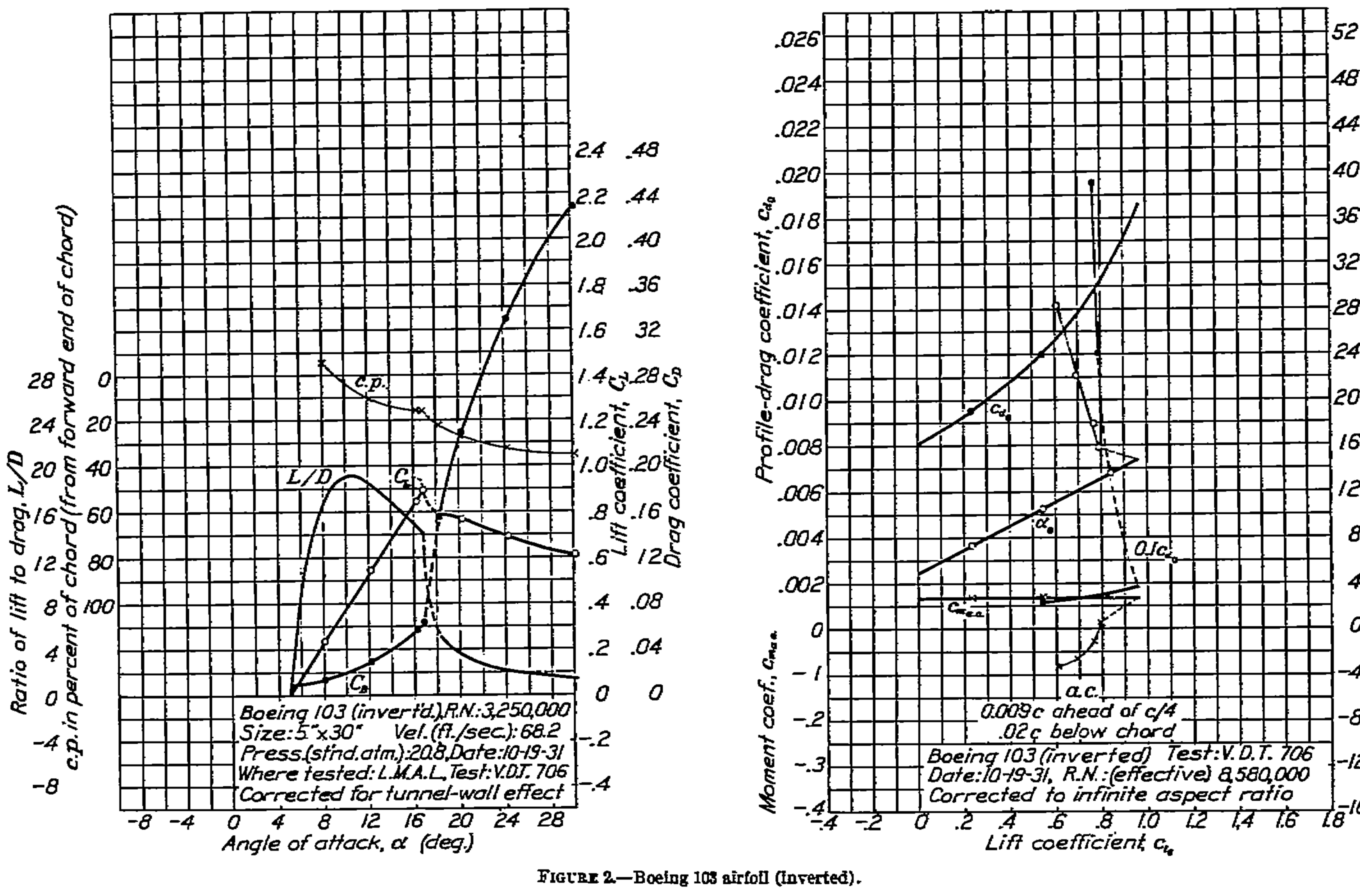



FIGURE 2.—Boeing 103 airfoil (inverted).

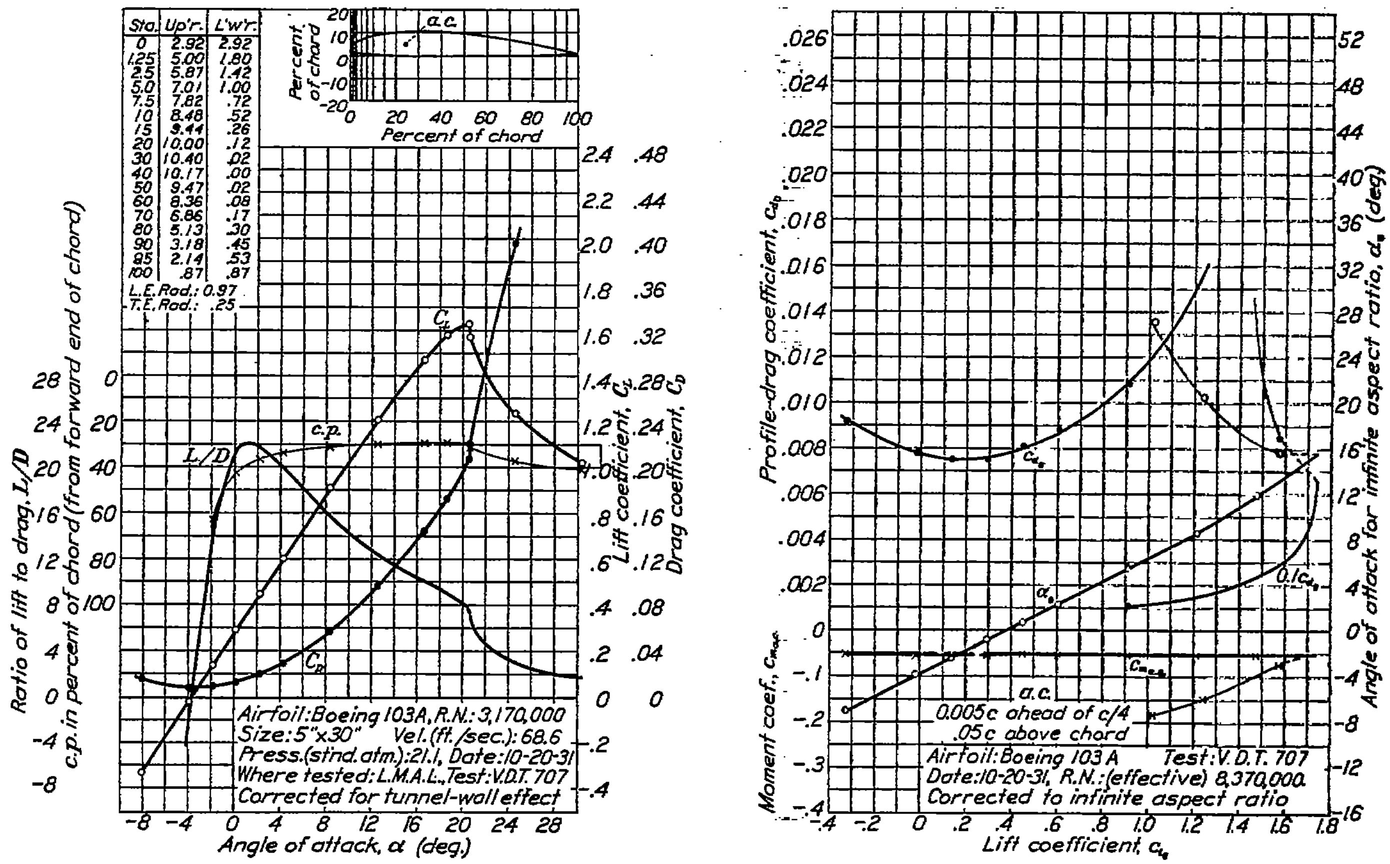



FIGURE 3.—Boeing 103 A airfoil.

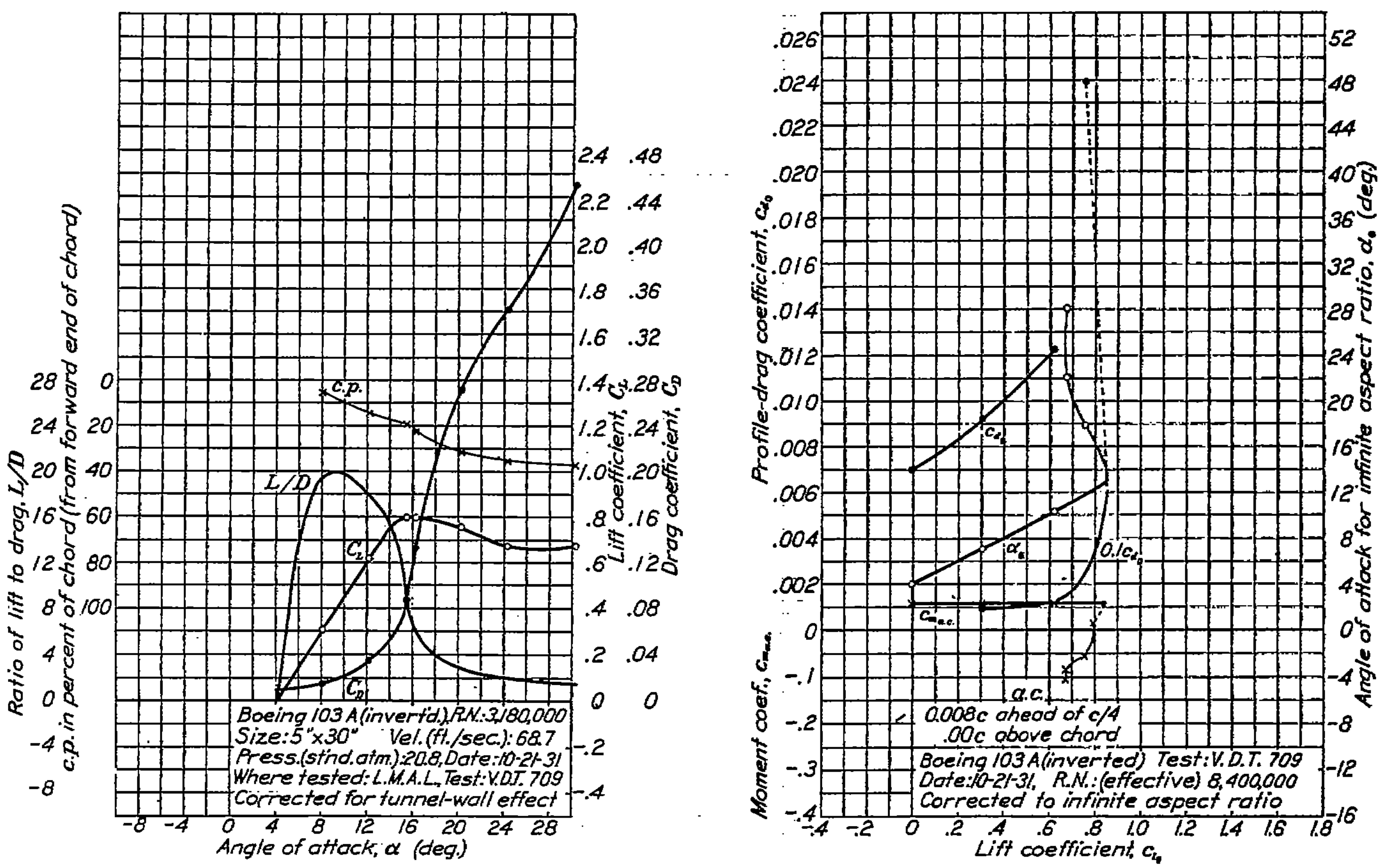



FIGURE 4.—Boeing 103 A airfoil (inverted).

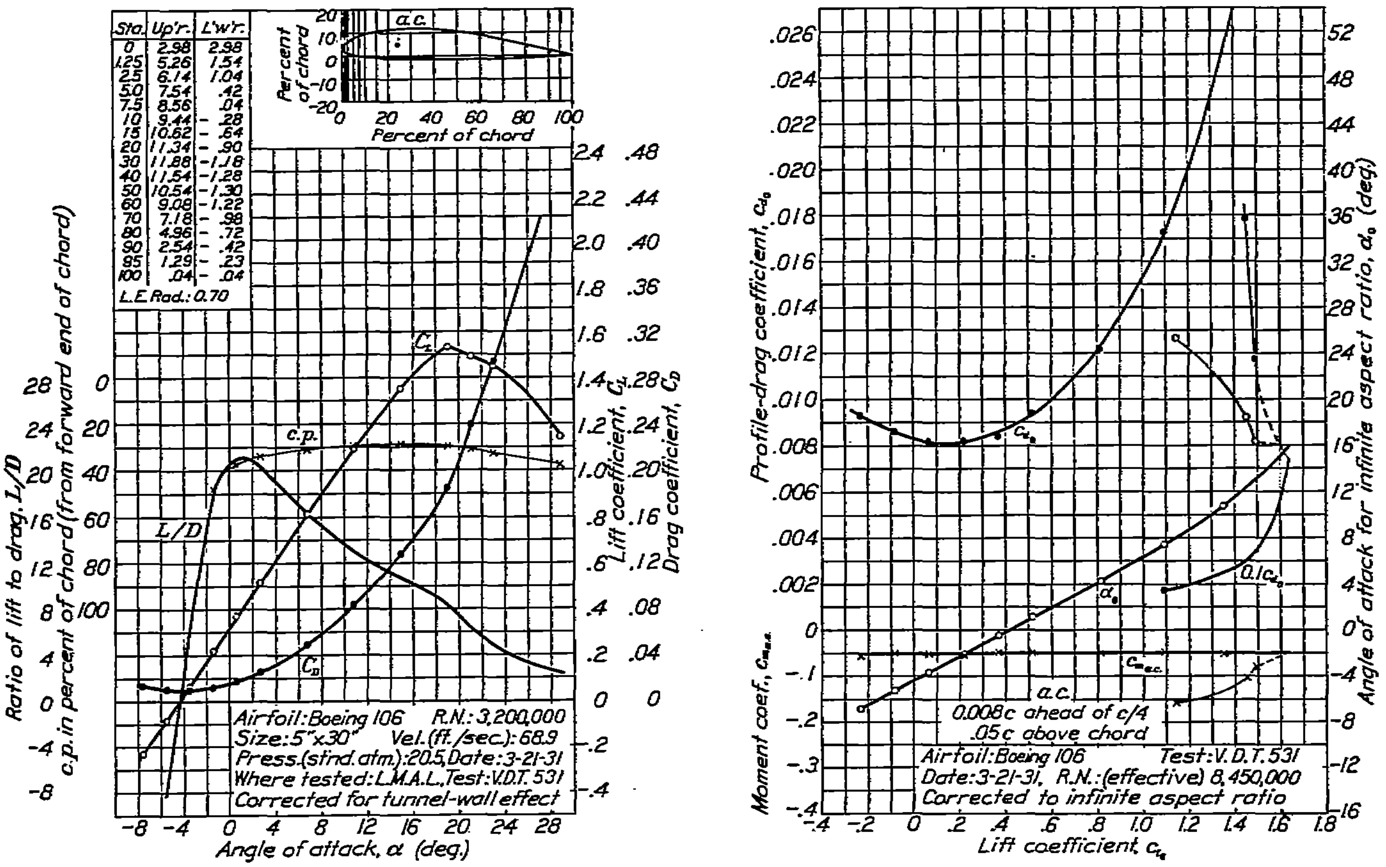



FIGURE 5.—Boeing 106 airfoil.

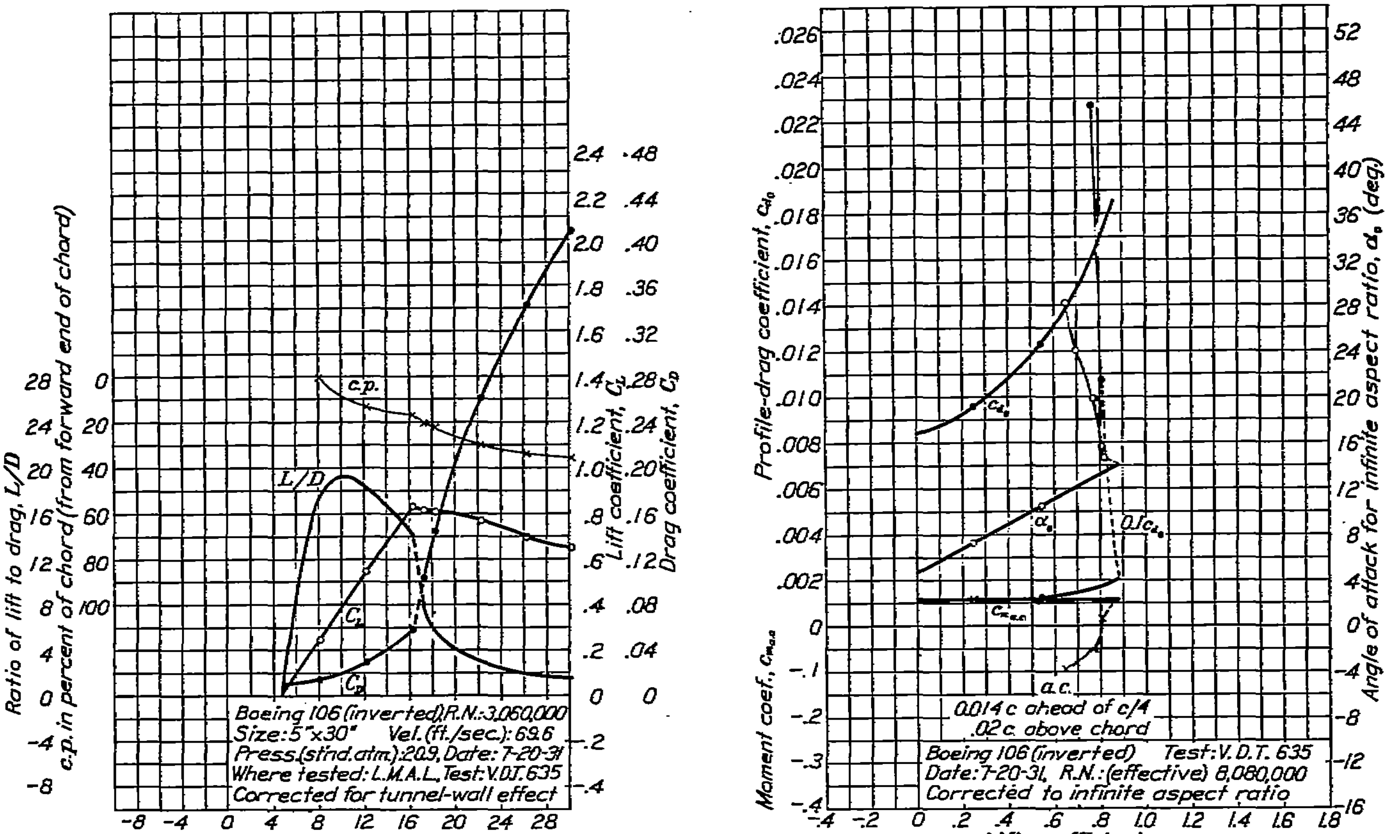



FIGURE 6.—Boeing 106 airfoil (inverted).

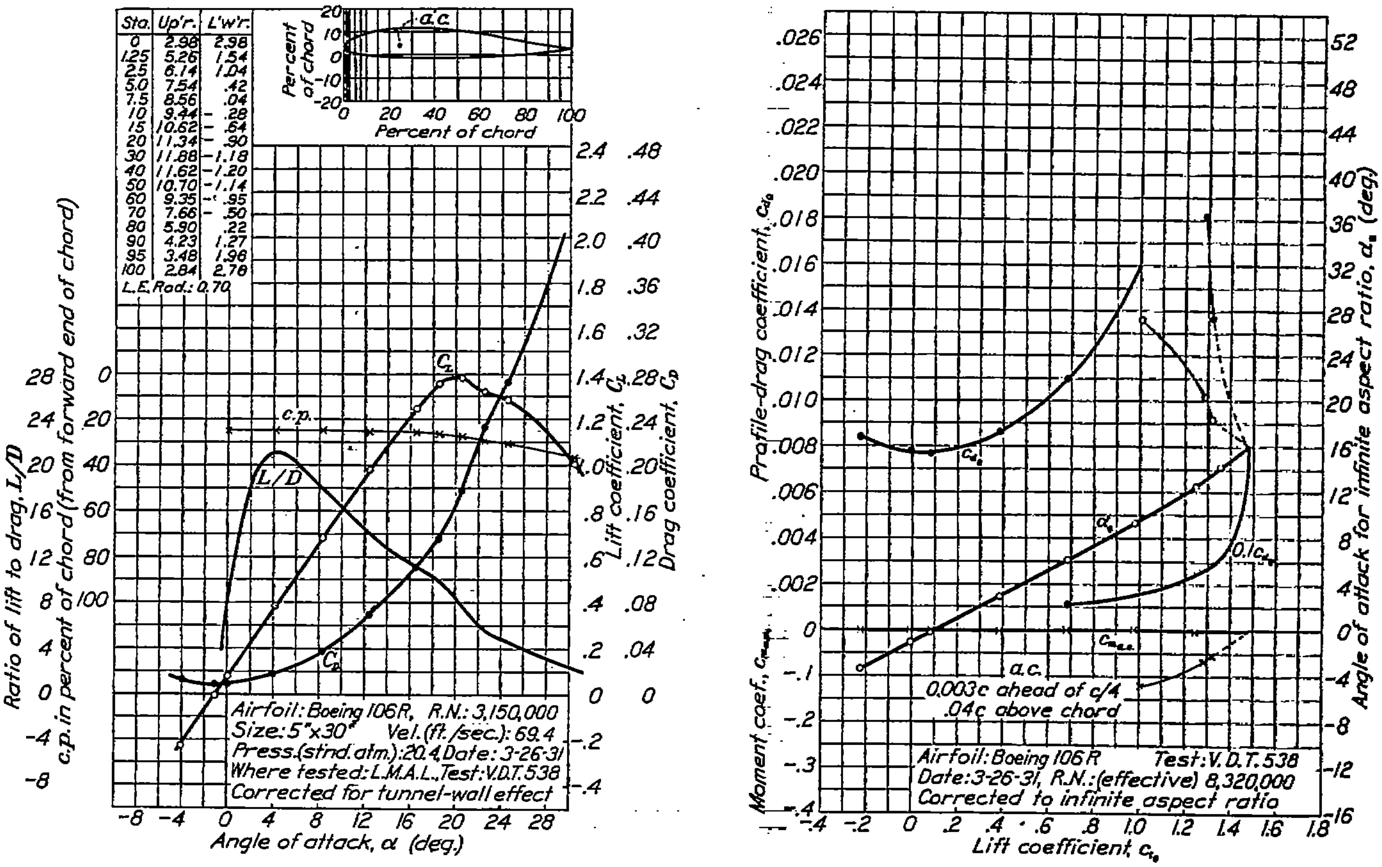



FIGURE 7.—Boeing 106 R airfoil.

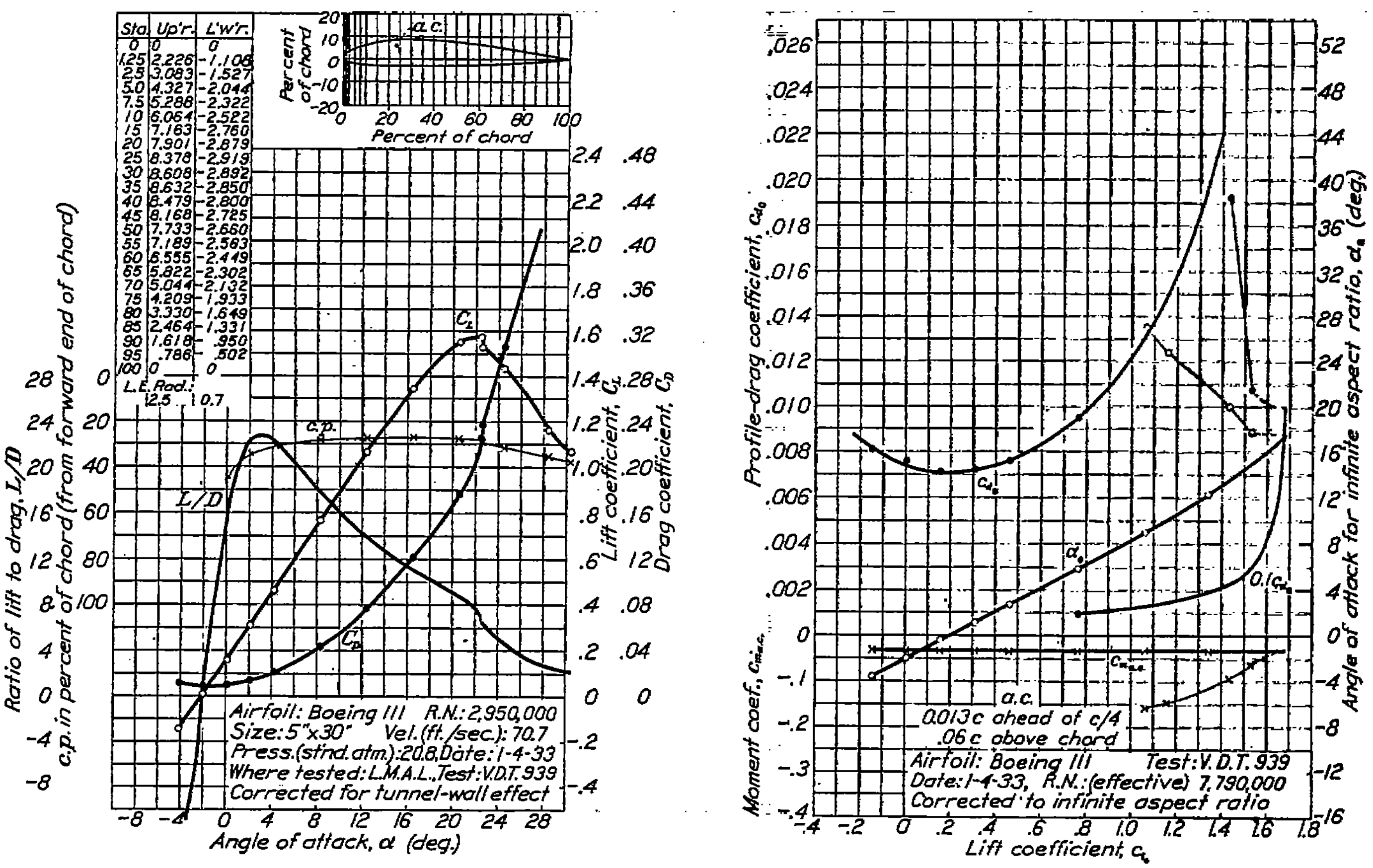



FIGURE 8.—Boeing 111 airfoil.

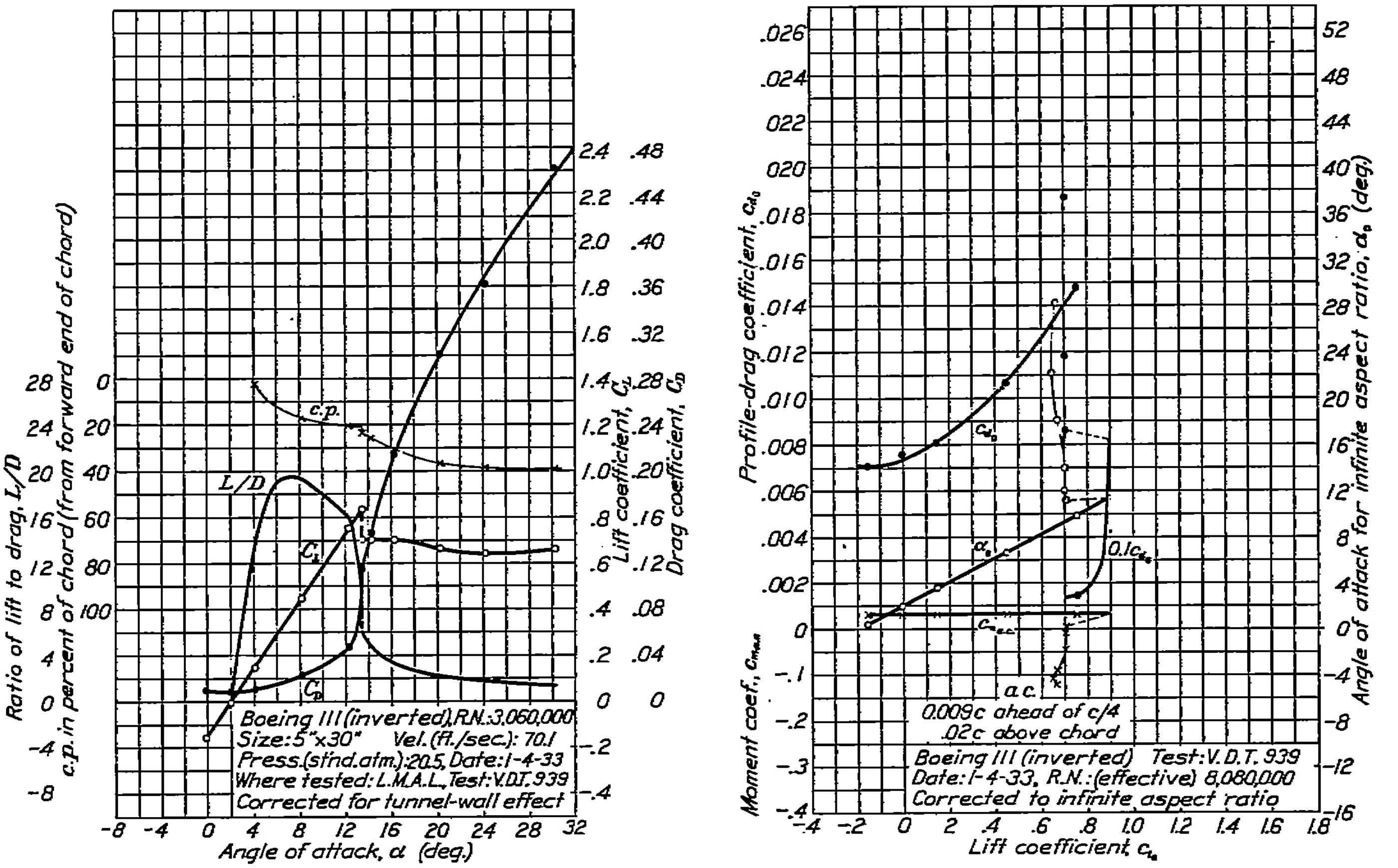
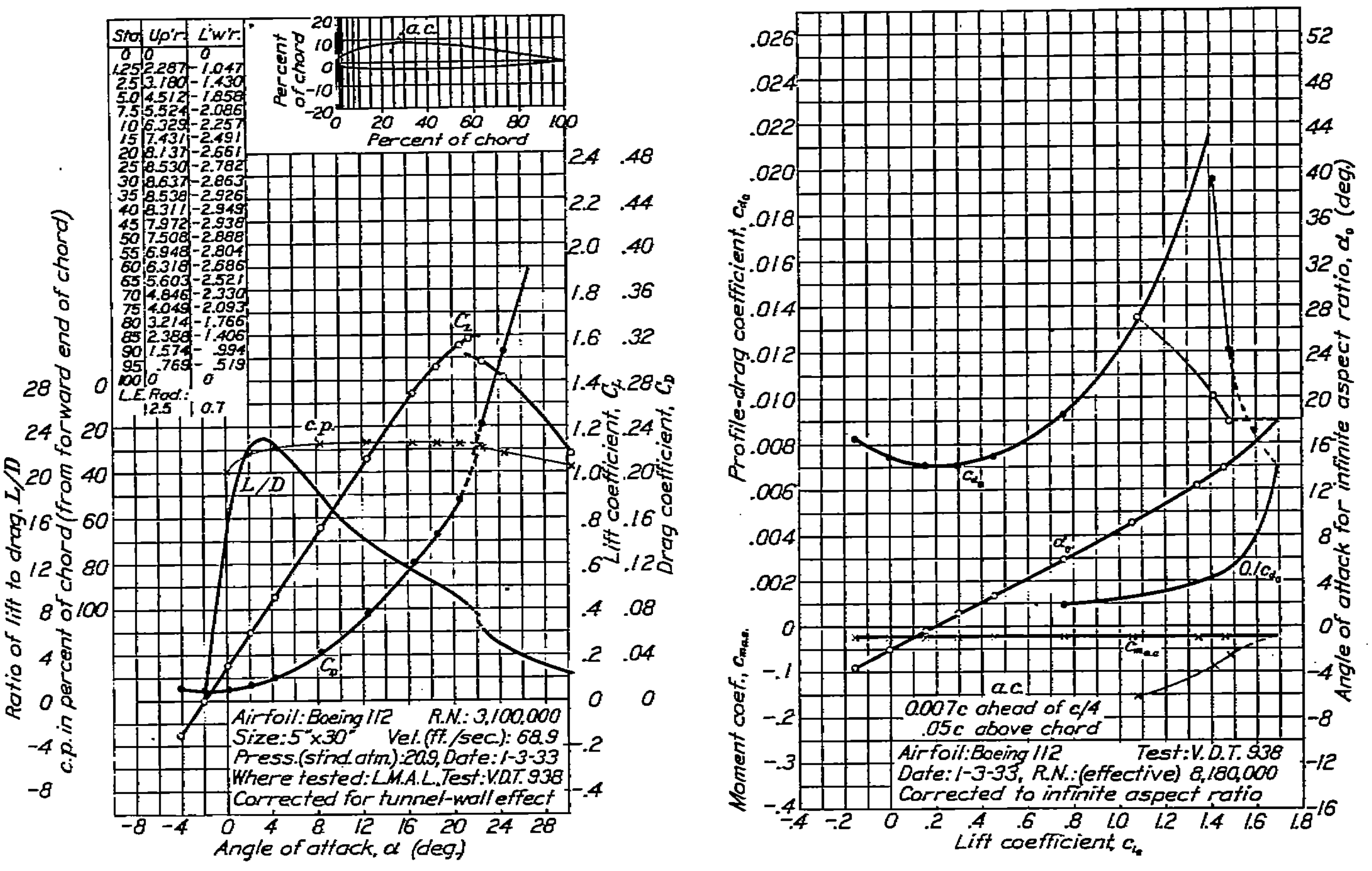



FIGURE 9.—Boeing 111 airfoil (inverted).



| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 0 | 0 |
| 1.25 | 2.287 | -1.047 |
| 2.5 | 3.180 | -1.430 |
| 5.0 | 4.512 | -1.858 |
| 7.5 | 5.524 | -2.086 |
| 10 | 6.329 | -2.257 |
| 15 | 7.431 | -2.491 |
| 20 | 8.137 | -2.661 |
| 25 | 8.530 | -2.782 |
| 30 | 8.637 | -2.863 |
| 35 | 8.538 | -2.926 |
| 40 | 8.311 | -2.949 |
| 45 | 7.972 | -2.938 |
| 50 | 7.508 | -2.888 |
| 55 | 6.948 | -2.804 |
| 60 | 6.318 | -2.686 |
| 65 | 5.603 | -2.521 |
| 70 | 4.846 | -2.330 |
| 75 | 4.049 | -2.093 |
| 80 | 3.214 | -1.766 |
| 85 | 2.388 | -1.406 |
| 90 | 1.574 | -.994 |
| 95 | .769 | -.519 |
| 100 | 0 | 0 |
| L.E. Rad.: | 2.5 | 0.7 |



FIGURE 10.—Boeing 112 airfoil.

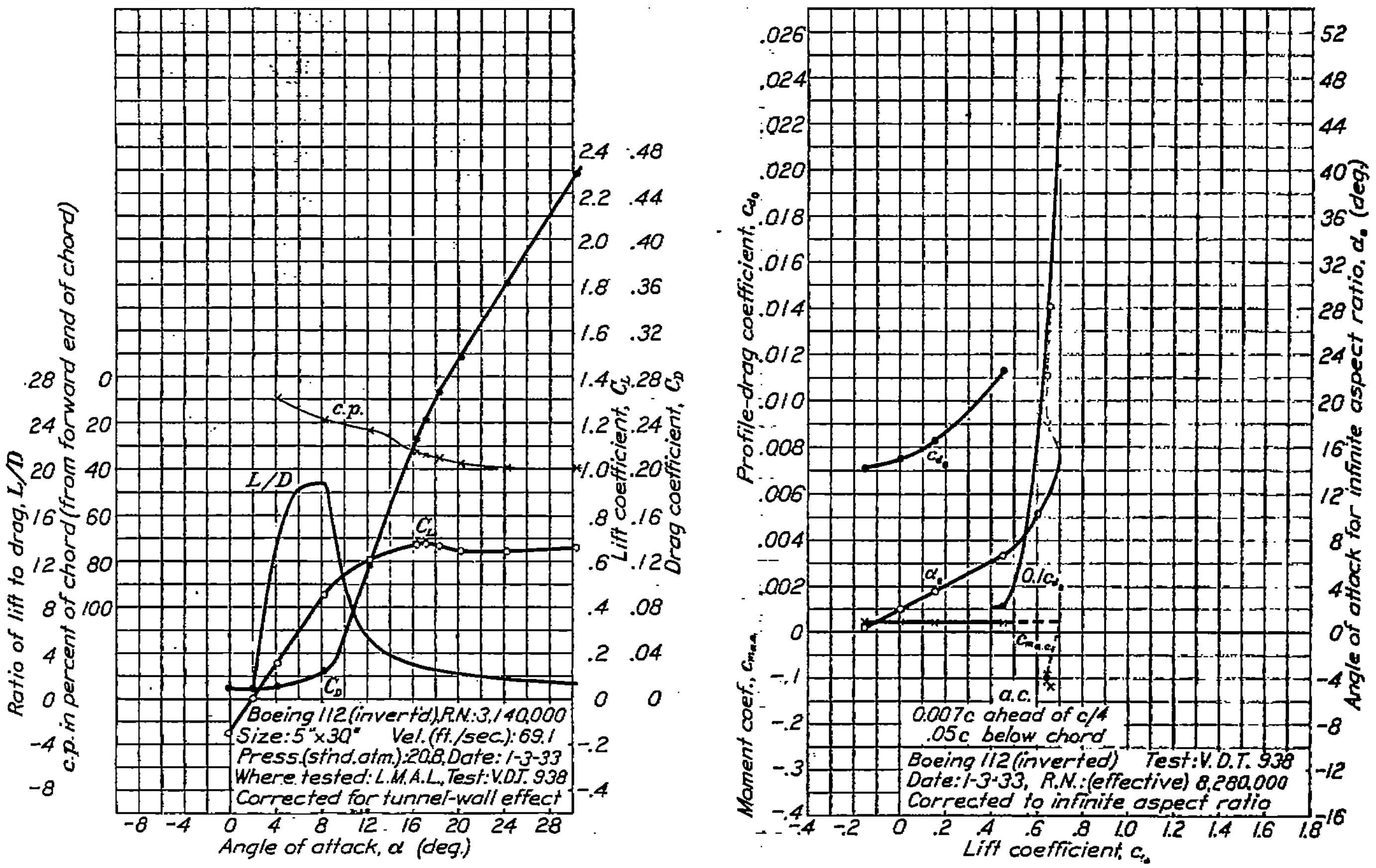
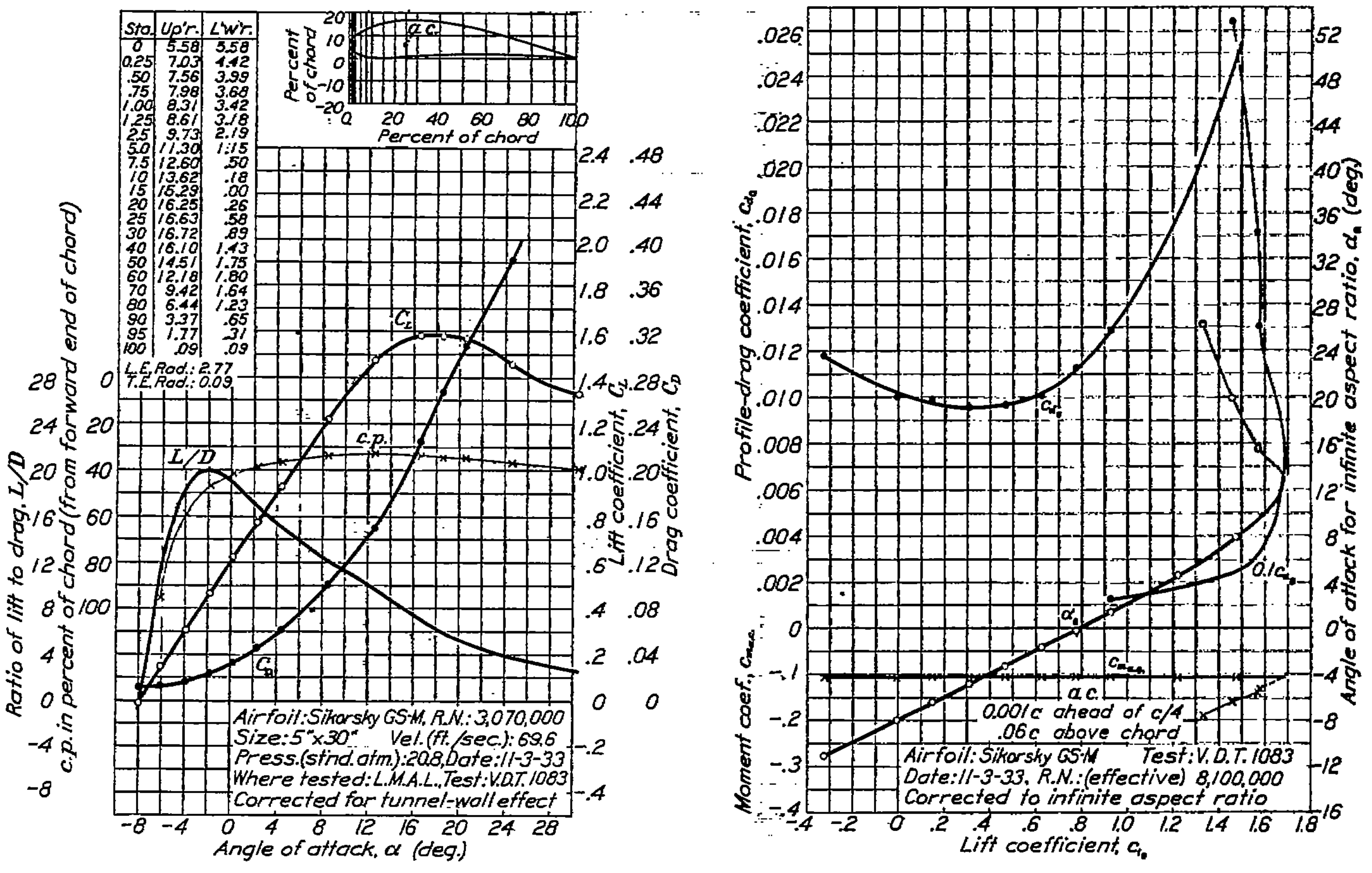



FIGURE 11.—Boeing 112 airfoil (inverted).



| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 5.58 | 5.58 |
| 0.25 | 7.03 | 4.42 |
| .50 | 7.56 | 3.99 |
| .75 | 7.98 | 3.68 |
| 1.00 | 8.31 | 3.42 |
| 1.25 | 8.61 | 3.18 |
| 2.5 | 9.73 | 2.19 |
| 5.0 | 11.30 | 1.15 |
| 7.5 | 12.60 | .50 |
| 10 | 13.62 | .18 |
| 15 | 15.29 | .00 |
| 20 | 16.25 | .26 |
| 25 | 16.63 | .58 |
| 30 | 16.72 | .89 |
| 40 | 16.10 | 1.43 |
| 50 | 14.51 | 1.75 |
| 60 | 12.18 | 1.80 |
| 70 | 9.42 | 1.64 |
| 80 | 6.44 | 1.23 |
| 90 | 3.37 | .65 |
| 95 | 1.77 | .31 |
| 100 | .09 | .09 |

L.E. Rad.: 2.77
T.E. Rad.: 0.09



FIGURE 12.—Sikorsky GS-M airfoil.

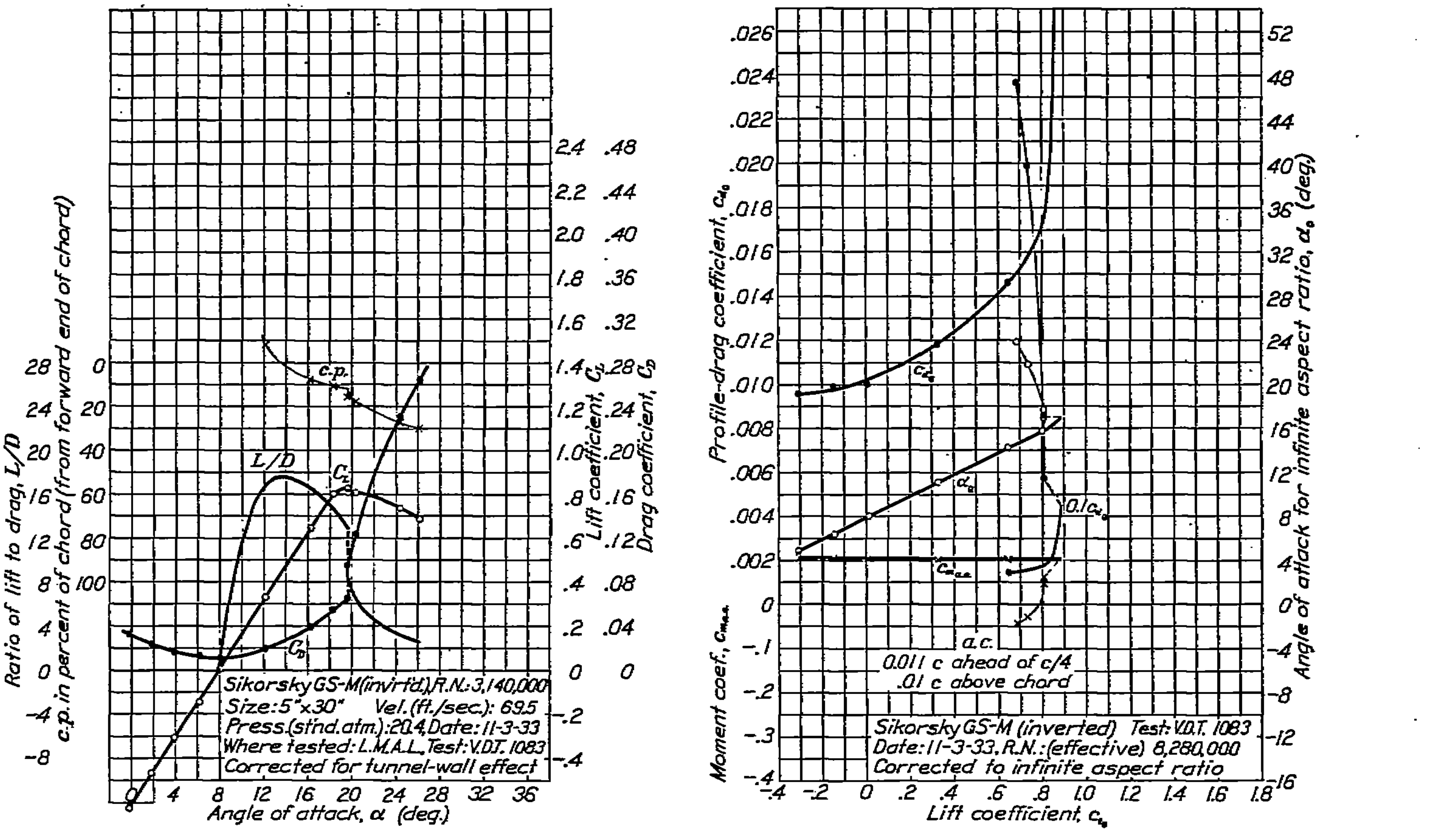



FIGURE 13.—Sikorsky GS-M airfoil (inverted).

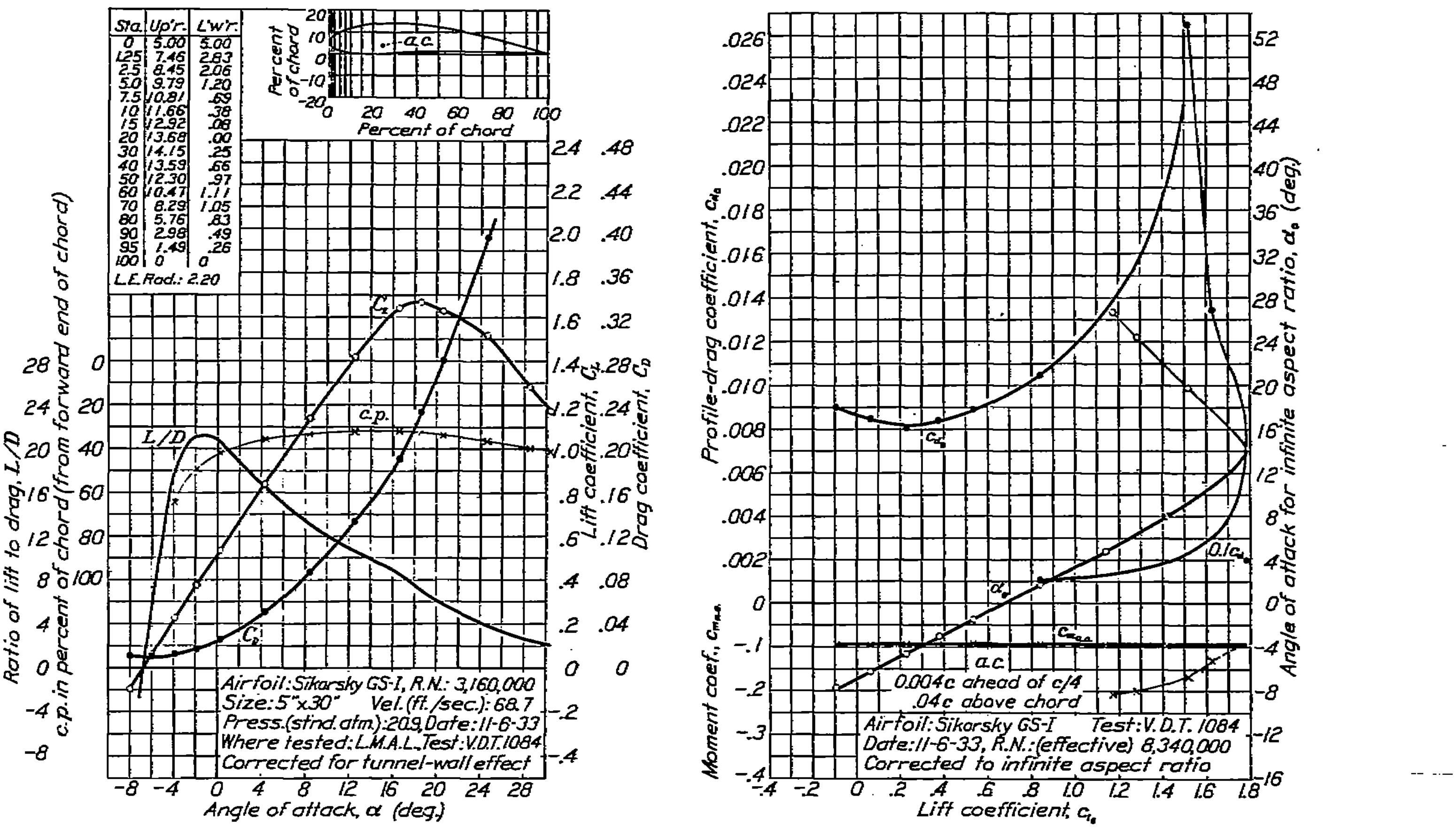



FIGURE 14.—Sikorsky GS-I airfoil.

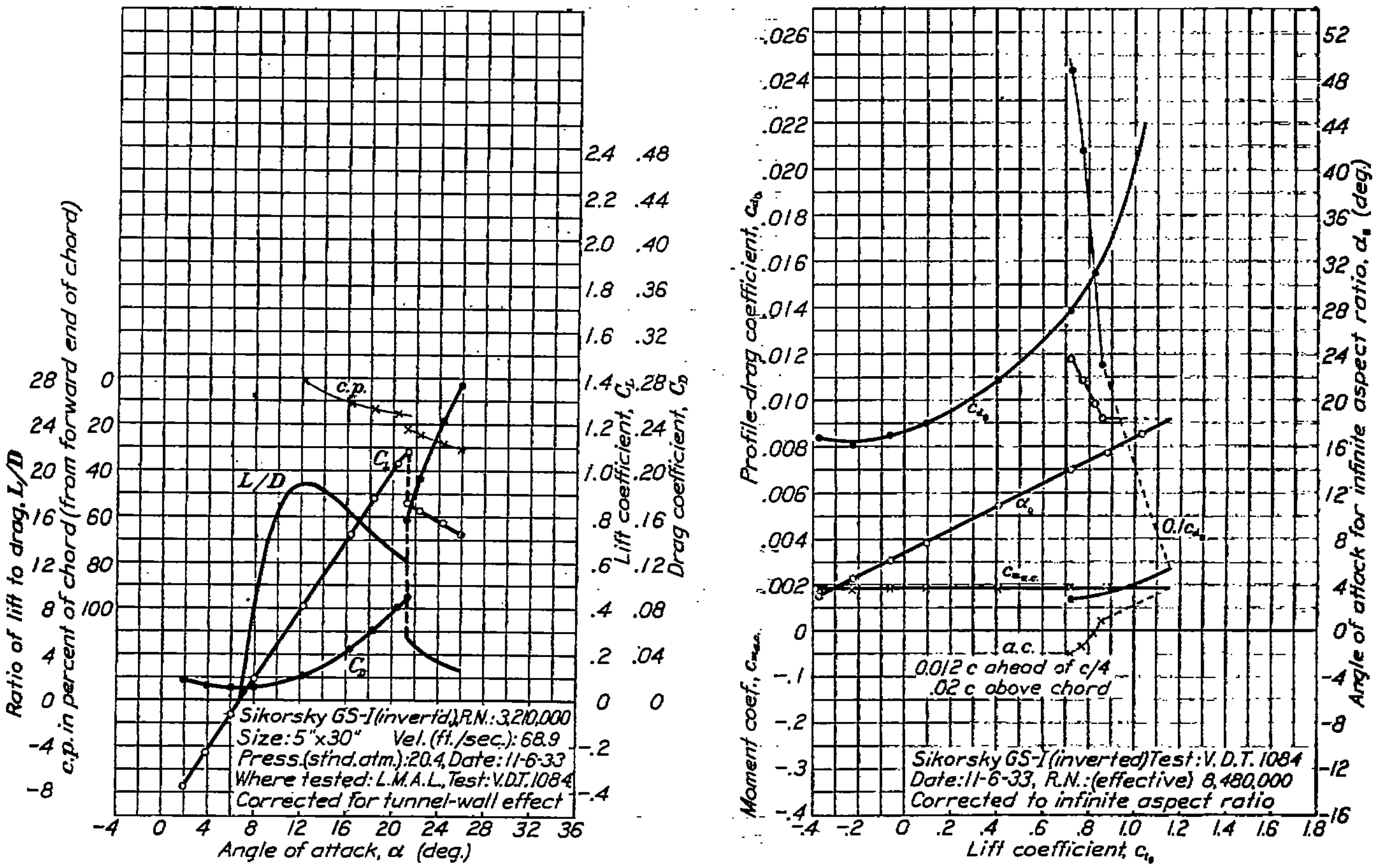
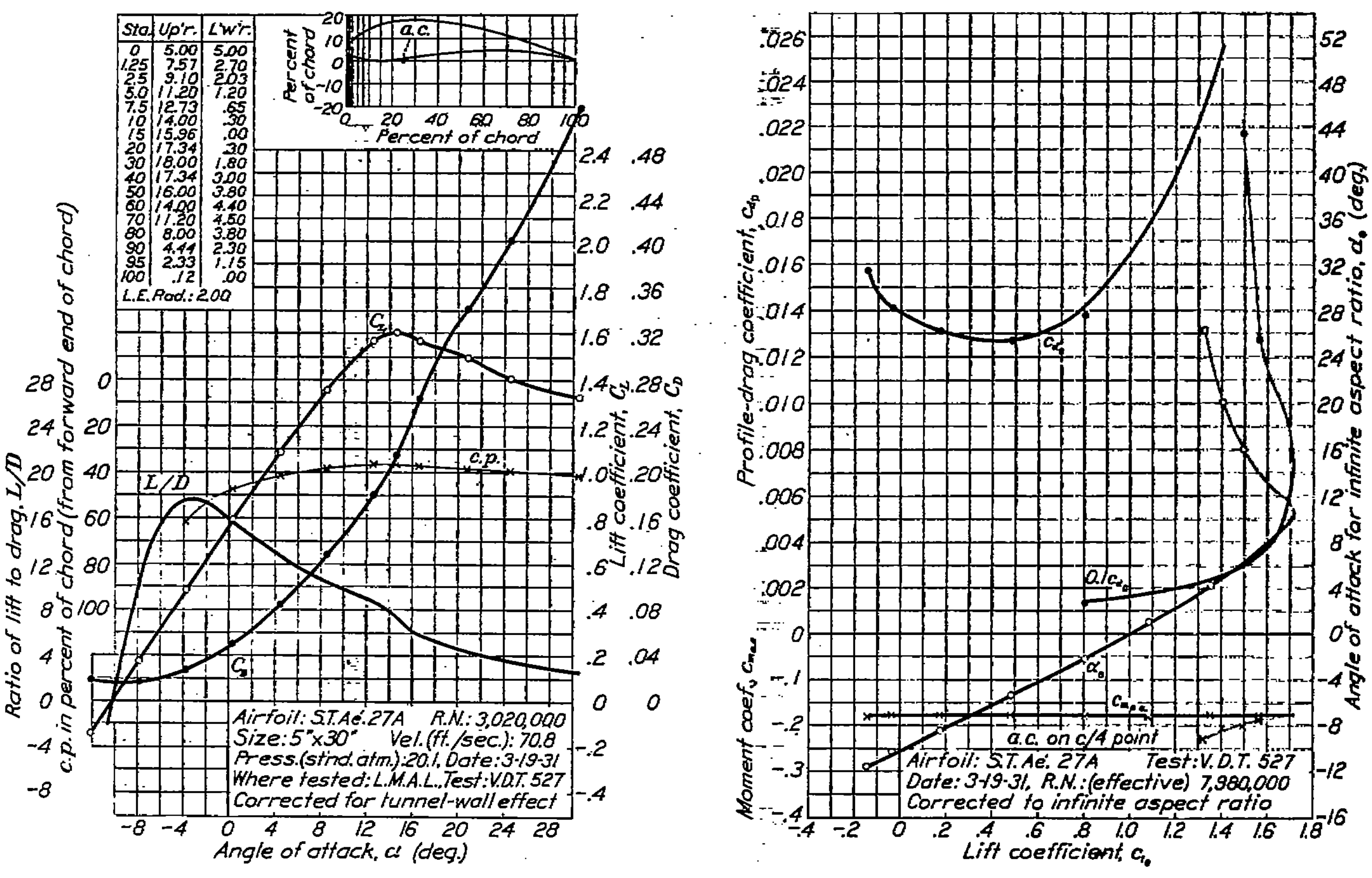



FIGURE 15.—Sikorsky GS-I airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 5.00 | 5.00 |
| 1.25 | 7.57 | 2.70 |
| 2.5 | 9.10 | 2.03 |
| 5.0 | 11.20 | 1.20 |
| 7.5 | 12.73 | .65 |
| 10 | 14.00 | .30 |
| 15 | 15.96 | .00 |
| 20 | 17.34 | .30 |
| 30 | 18.00 | 1.80 |
| 40 | 17.34 | 3.00 |
| 50 | 16.00 | 3.80 |
| 60 | 14.00 | 4.40 |
| 70 | 11.20 | 4.50 |
| 80 | 8.00 | 3.80 |
| 90 | 4.44 | 2.30 |
| 95 | 2.33 | 1.15 |
| 100 | .12 | .00 |

L.E. Rad.: 2.00

FIGURE 16.—S. T. Aé. 27A airfoil.

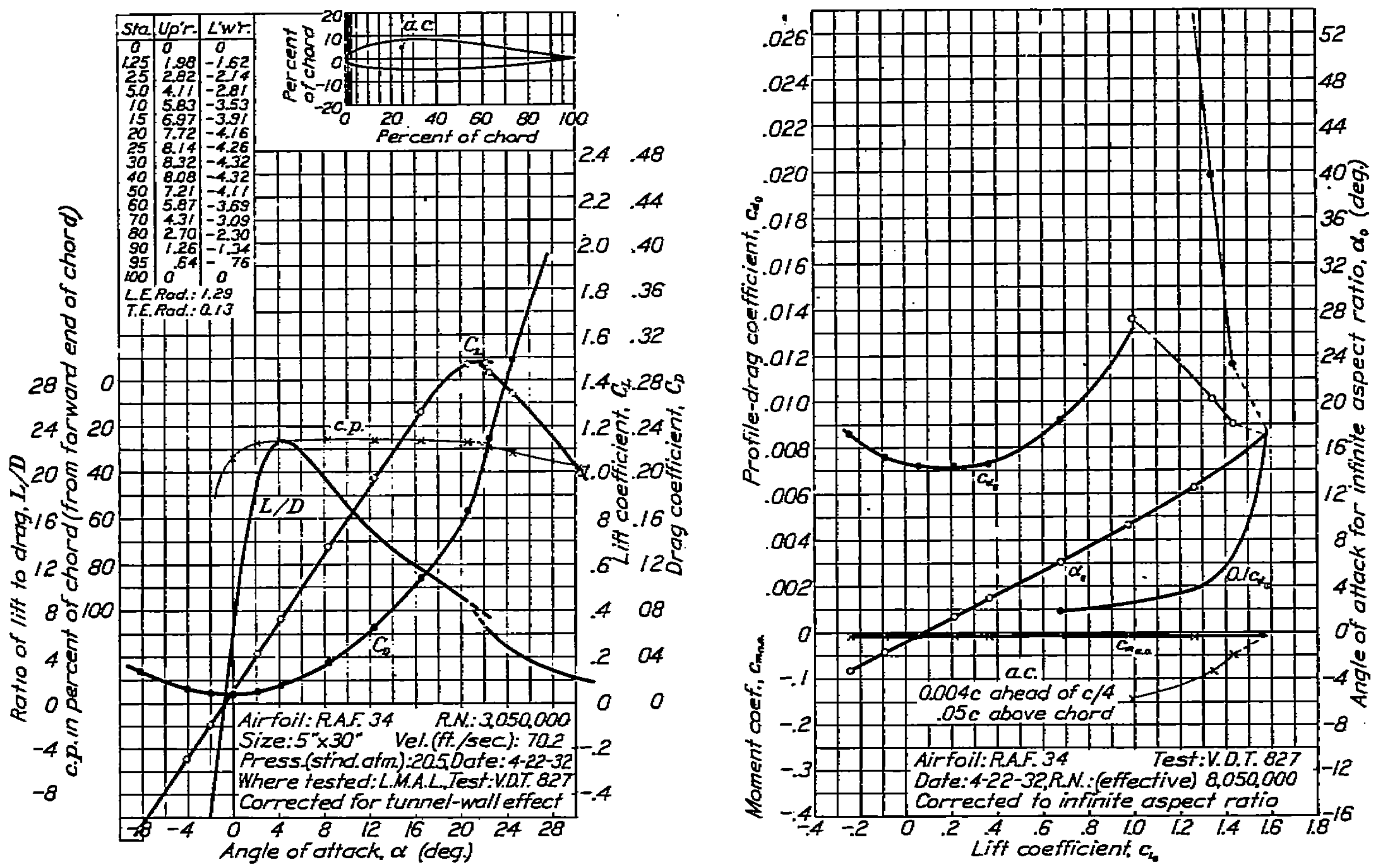



FIGURE 17.—R. A. F. 34 airfoil.

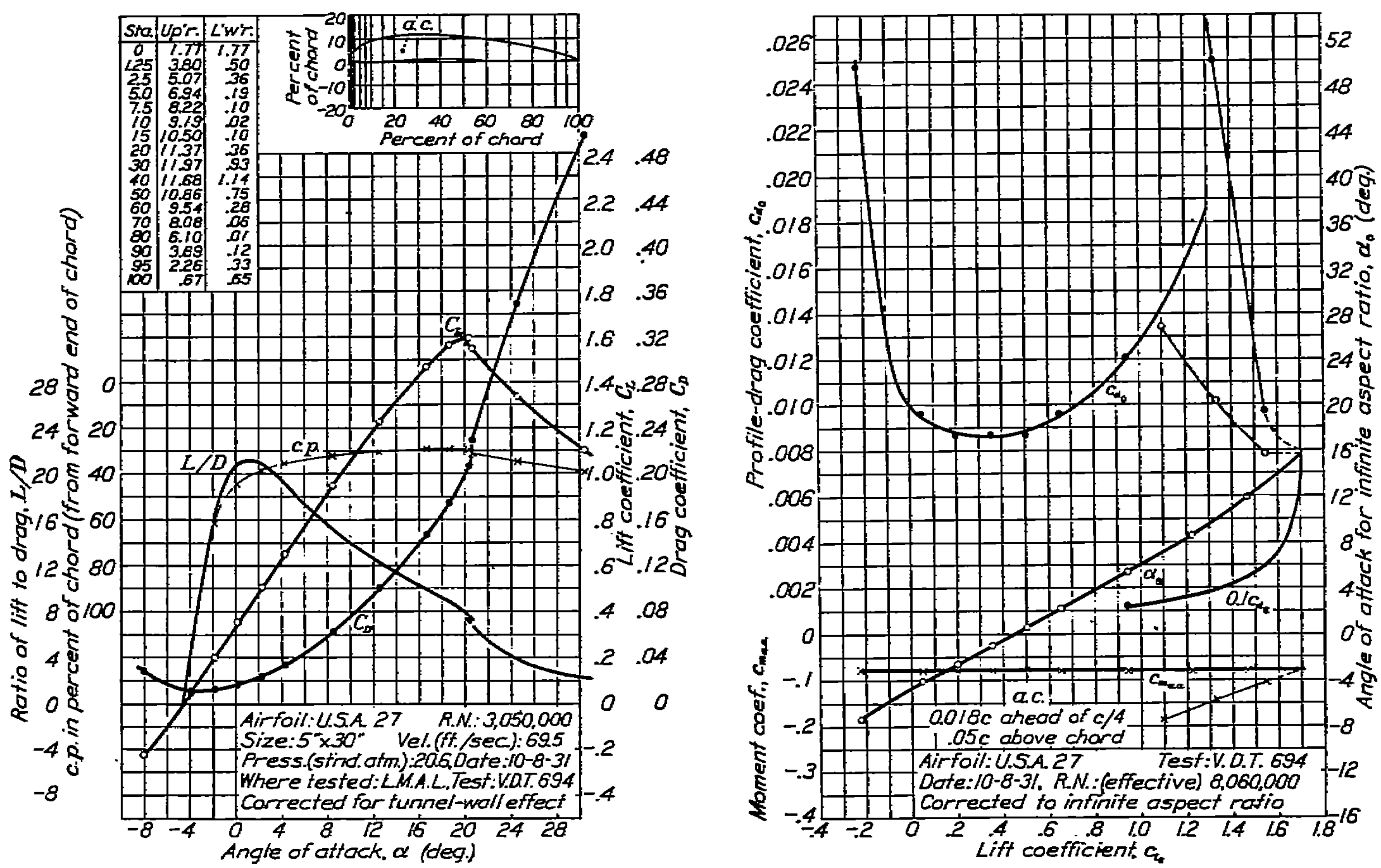



FIGURE 18.—U. S. A. 27 airfoil.

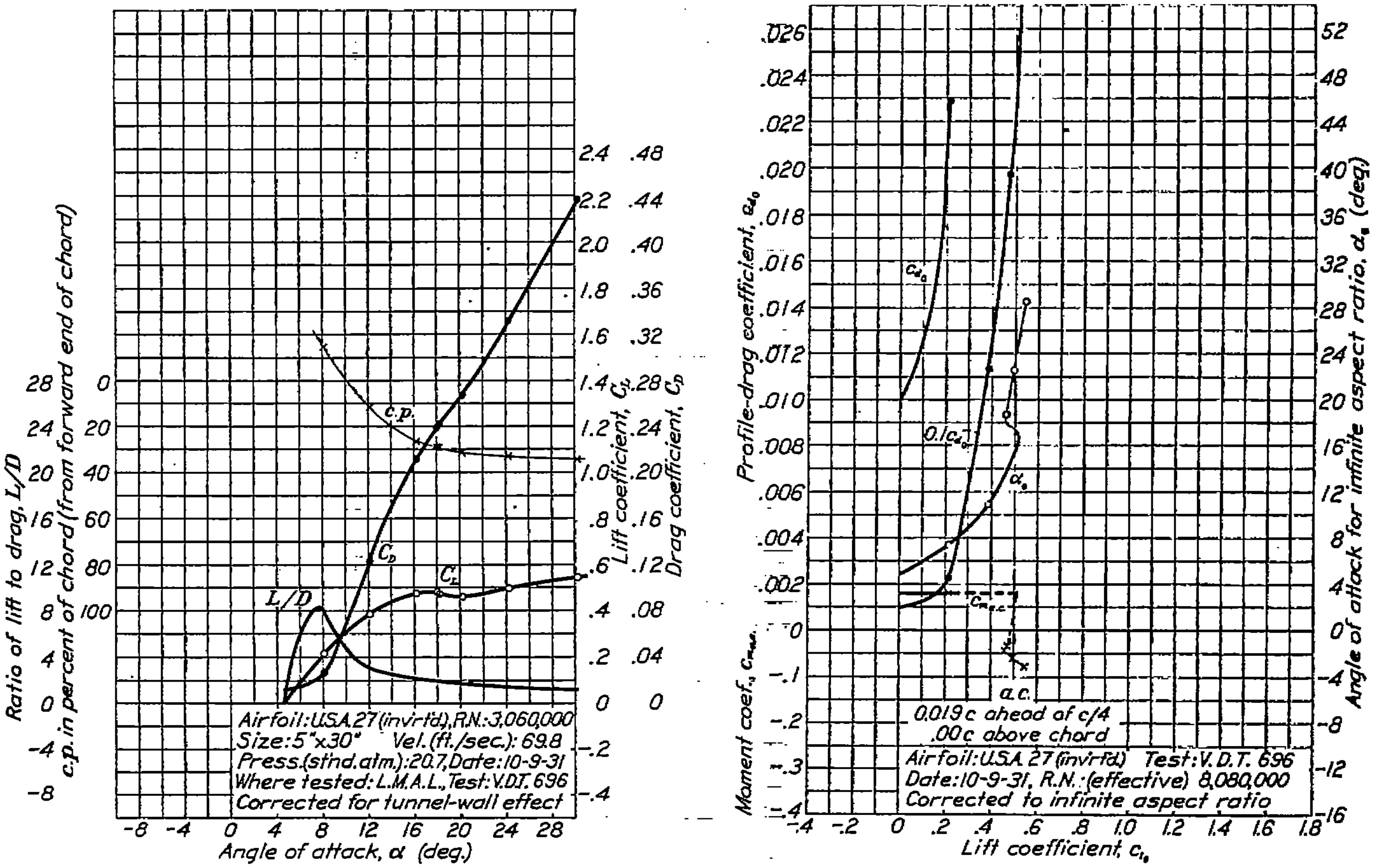
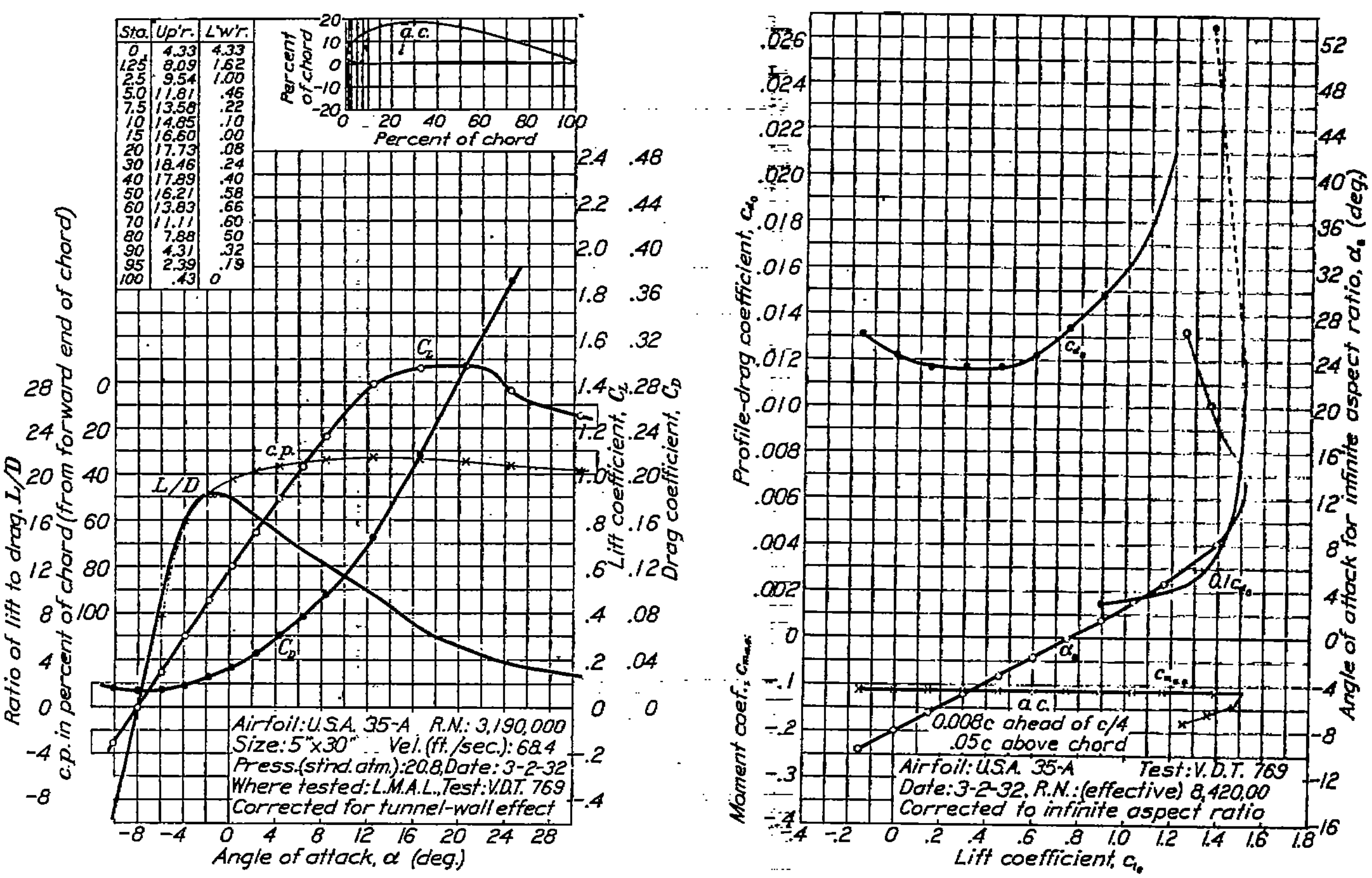



FIGURE 19.—U. S. A. 27 airfoil (inverted).



| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 4.33 | 4.33 |
| 1.25 | 8.09 | 1.62 |
| 2.5 | 9.54 | 1.00 |
| 5.0 | 11.81 | .46 |
| 7.5 | 13.58 | .22 |
| 10 | 14.85 | .10 |
| 15 | 16.60 | .00 |
| 20 | 17.73 | .08 |
| 30 | 18.46 | .24 |
| 40 | 17.89 | .40 |
| 50 | 16.21 | .58 |
| 60 | 13.83 | .66 |
| 70 | 11.11 | .60 |
| 80 | 7.88 | 50 |
| 90 | 4.31 | .32 |
| 95 | 2.39 | .19 |
| 100 | .43 | 0 |



FIGURE 20.—U. S. A. 35-A airfoil.

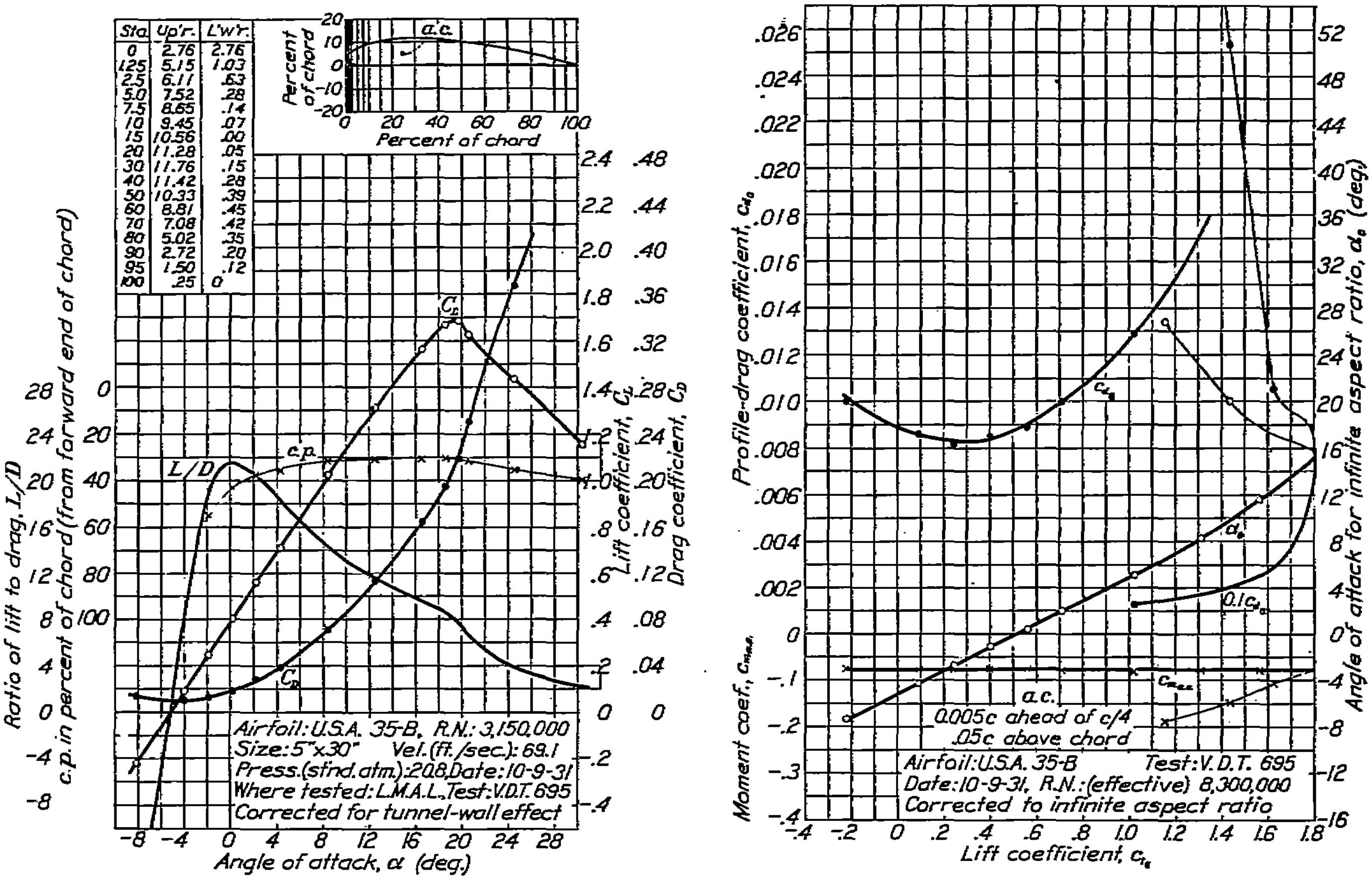



FIGURE 21.—U. S. A. 35-B airfoil.

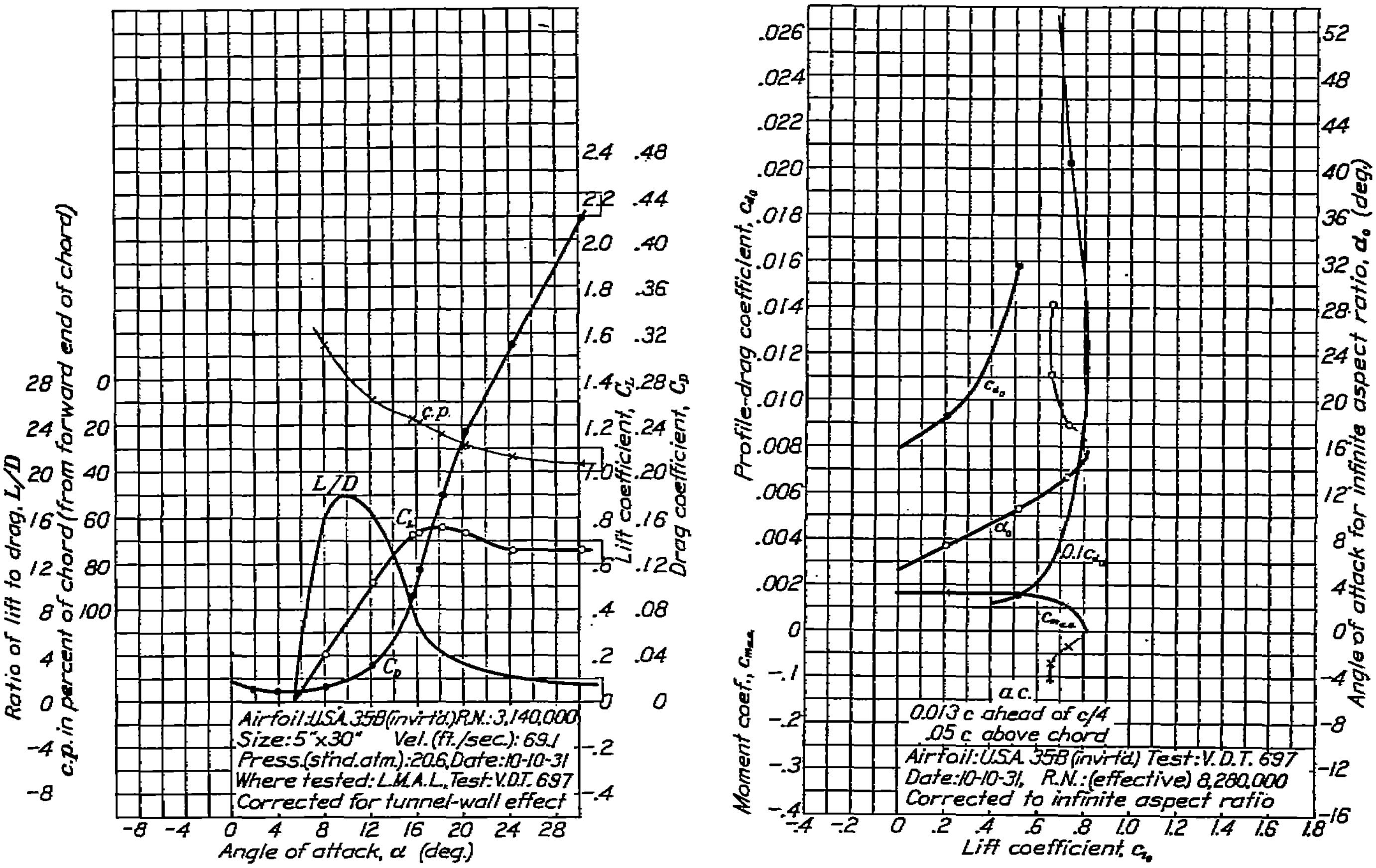



FIGURE 22.—U. S. A. 35-B airfoil (inverted).

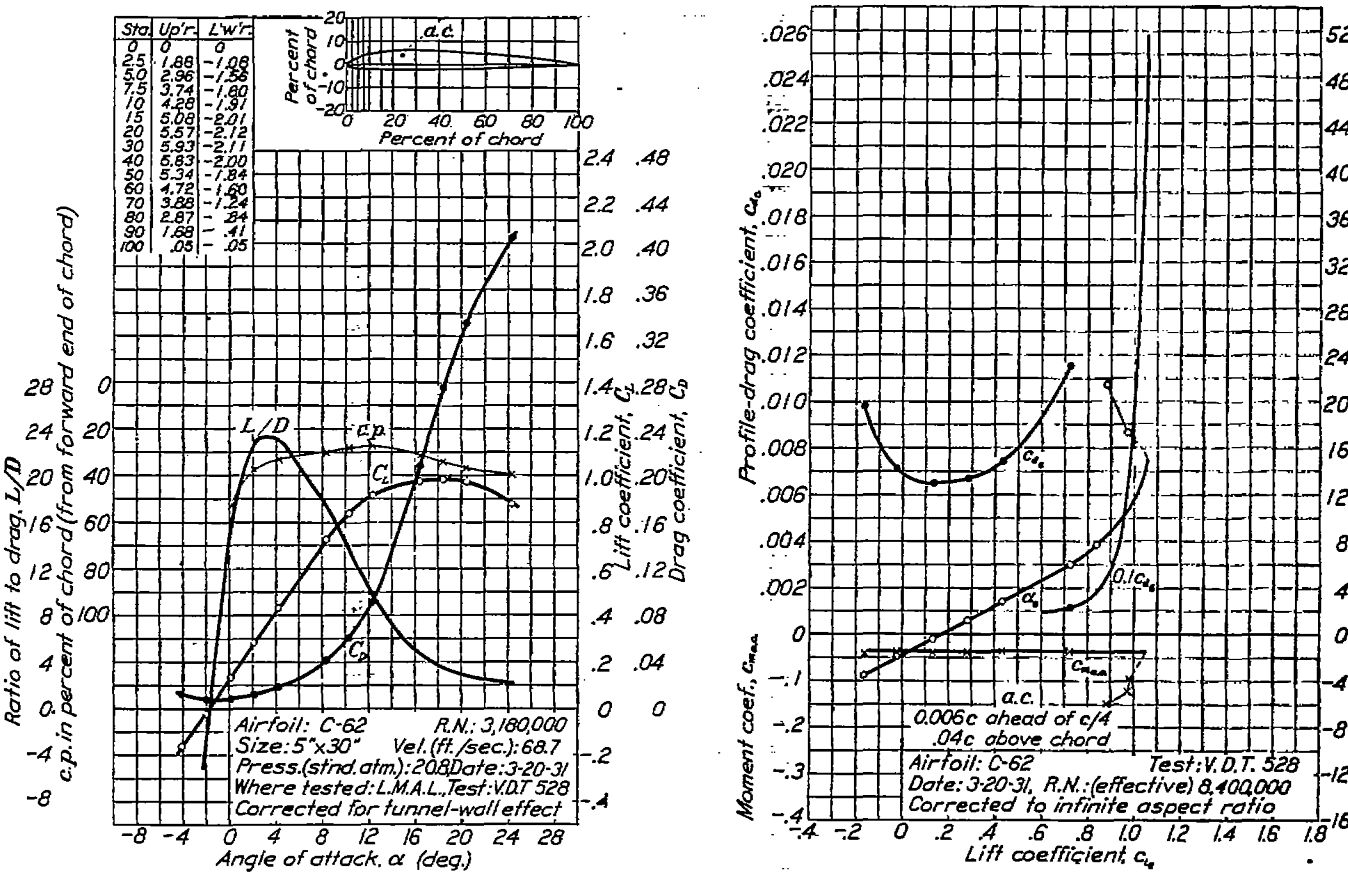



FIGURE 23.—C-62 airfoil.

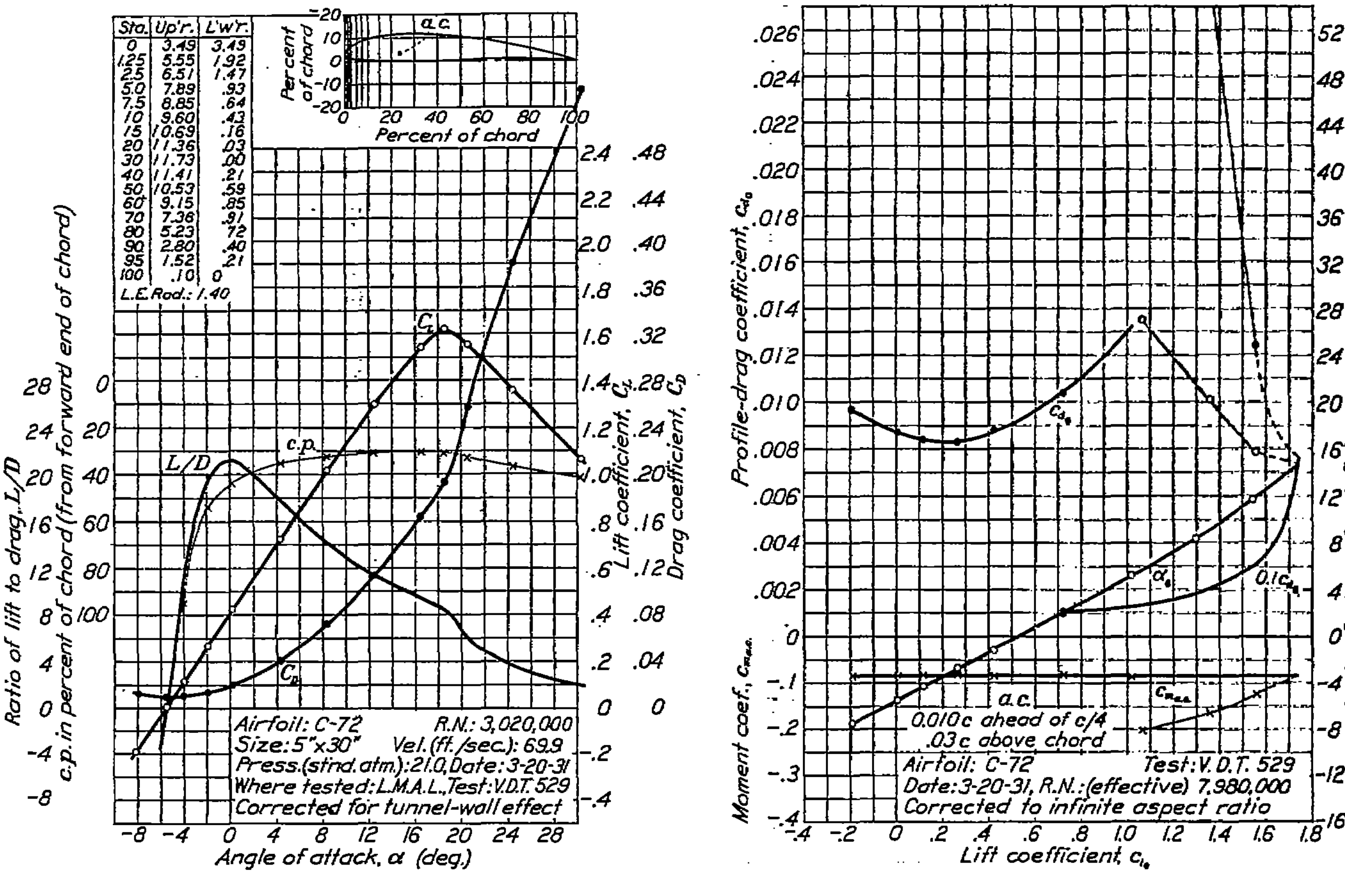



FIGURE 24.—C-72 airfoil.

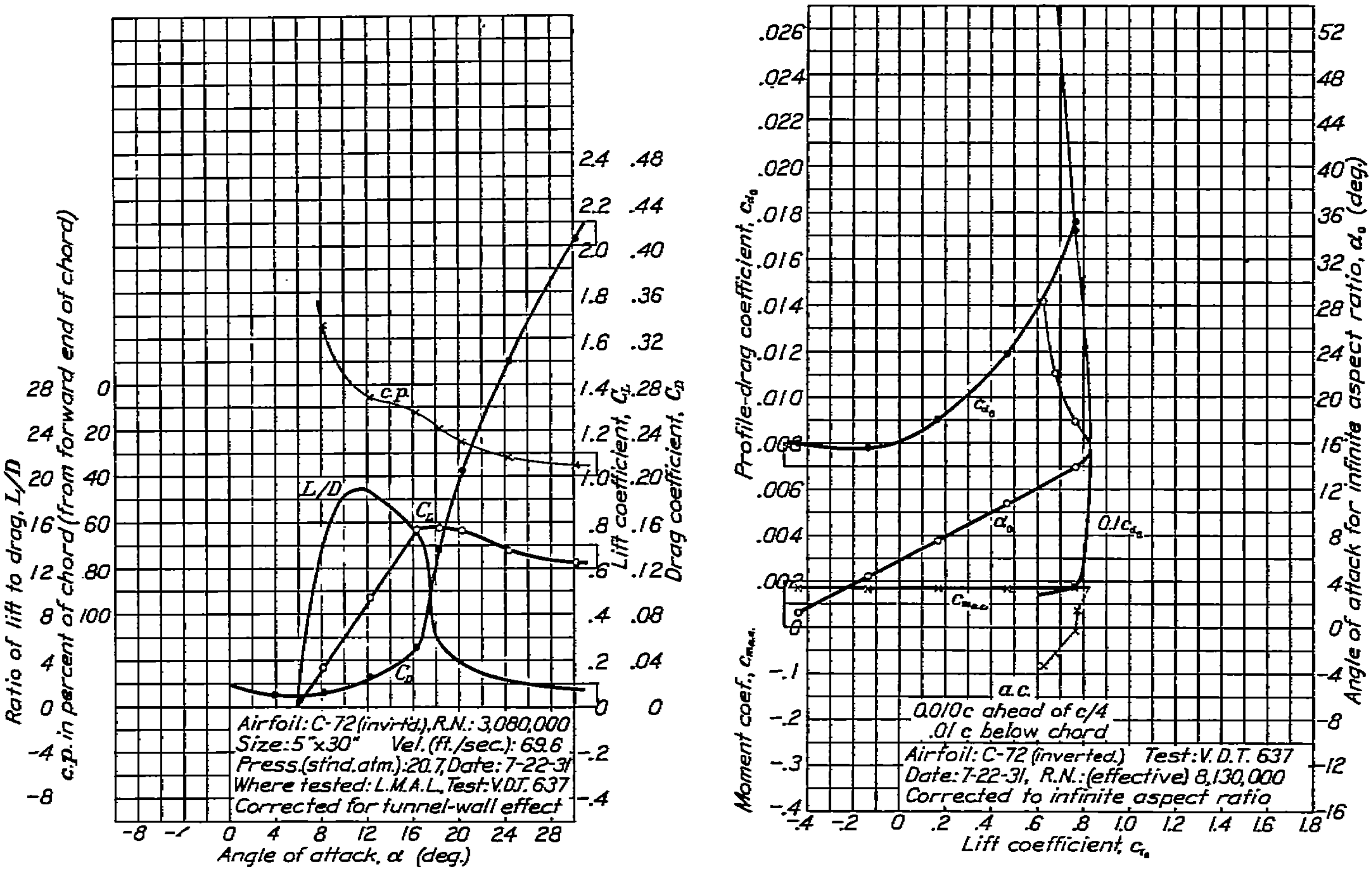
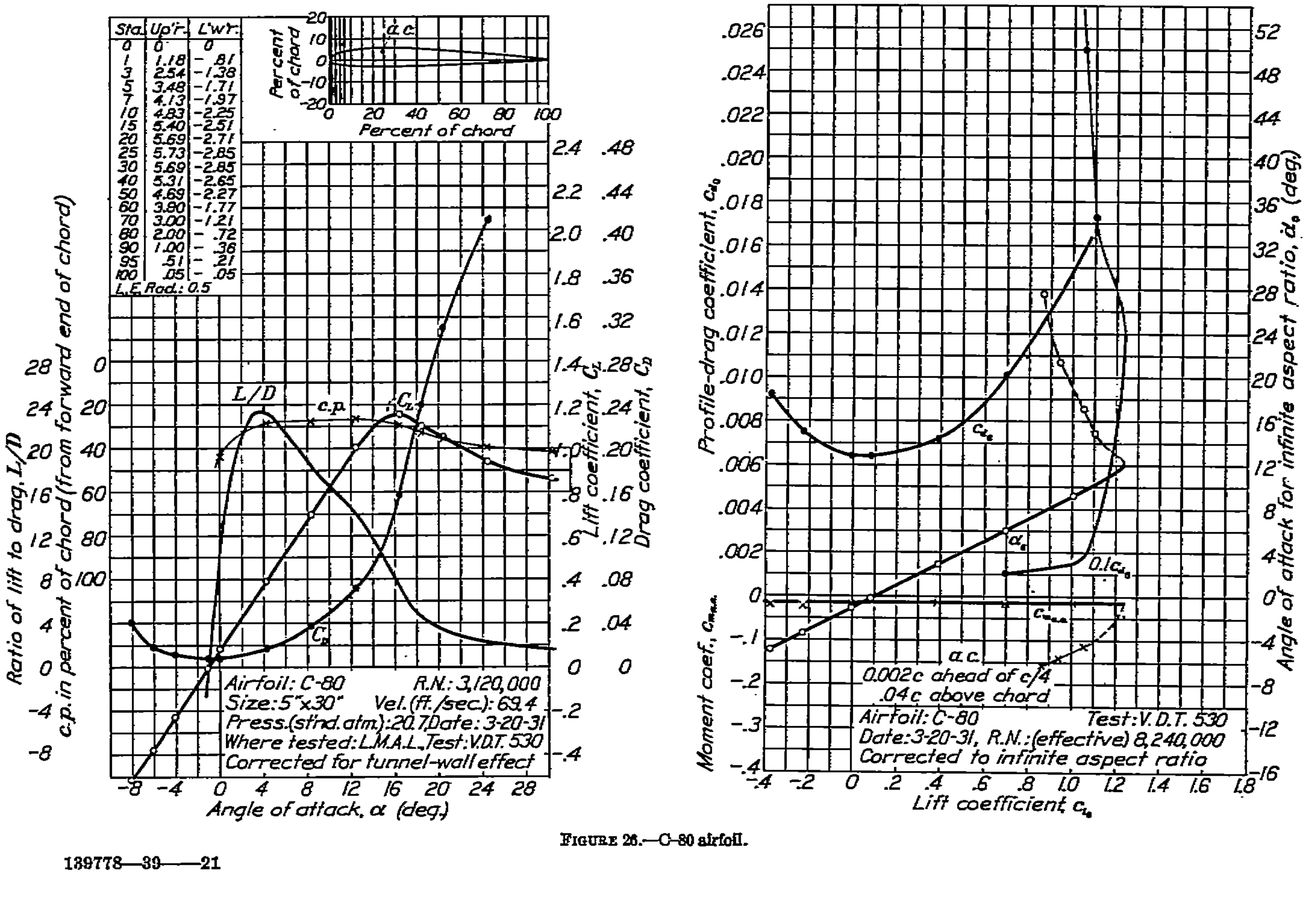



FIGURE 25.—C-72 airfoil (inverted).




| Sta. | Up'r. | L'wr. |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1.18 | − .81 |
| 3 | 2.54 | −1.38 |
| 5 | 3.48 | −1.71 |
| 7 | 4.13 | −1.97 |
| 10 | 4.83 | −2.25 |
| 15 | 5.40 | −2.51 |
| 20 | 5.69 | −2.71 |
| 25 | 5.73 | −2.85 |
| 30 | 5.69 | −2.85 |
| 40 | 5.31 | −2.65 |
| 50 | 4.69 | −2.27 |
| 60 | 3.80 | −1.77 |
| 70 | 3.00 | −1.21 |
| 80 | 2.00 | − .72 |
| 90 | 1.00 | − .36 |
| 95 | .51 | − .21 |
| 100 | .05 | − .05 |

L.E. Rad.: 0.5

FIGURE 26.—C-80 airfoil.

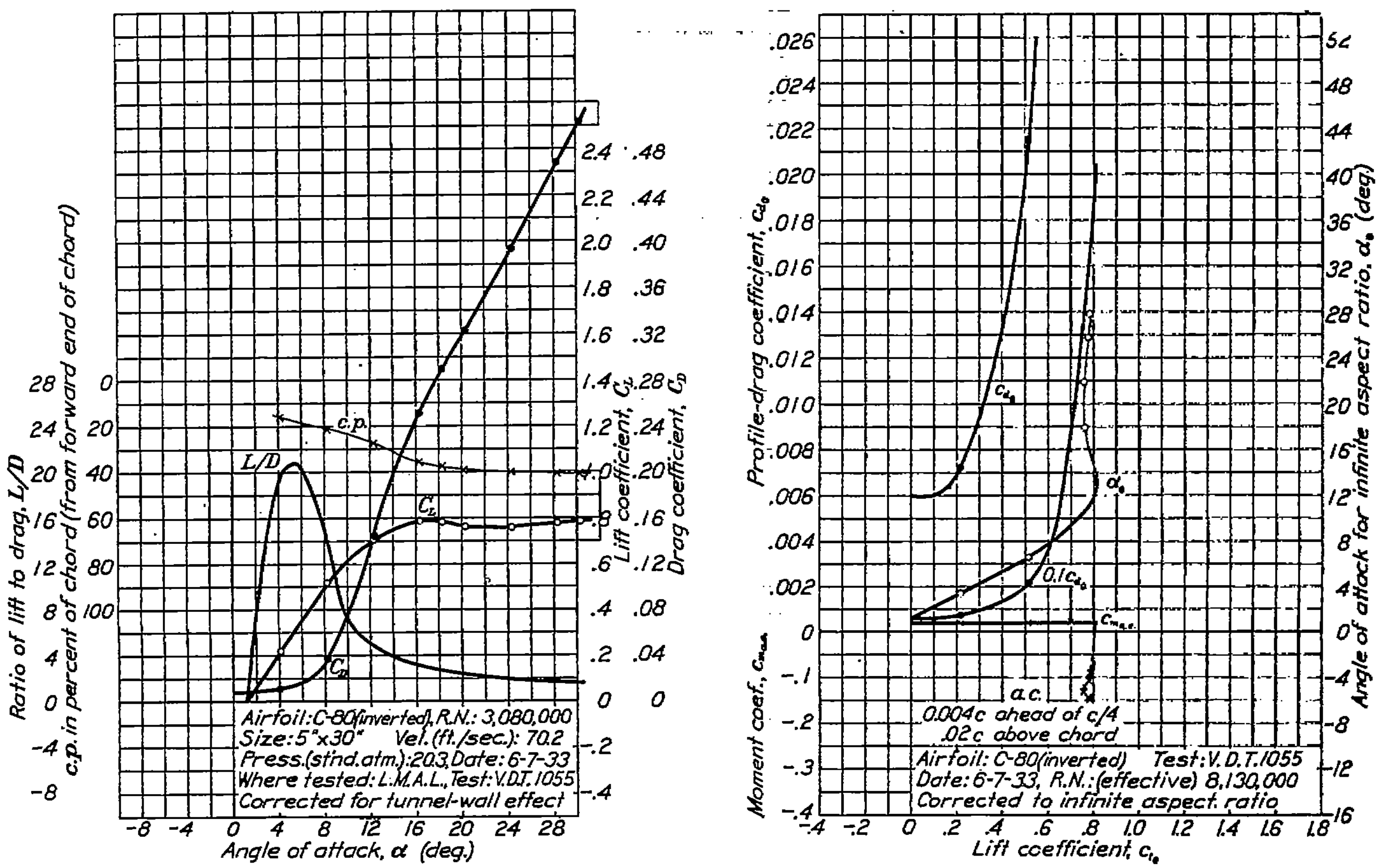
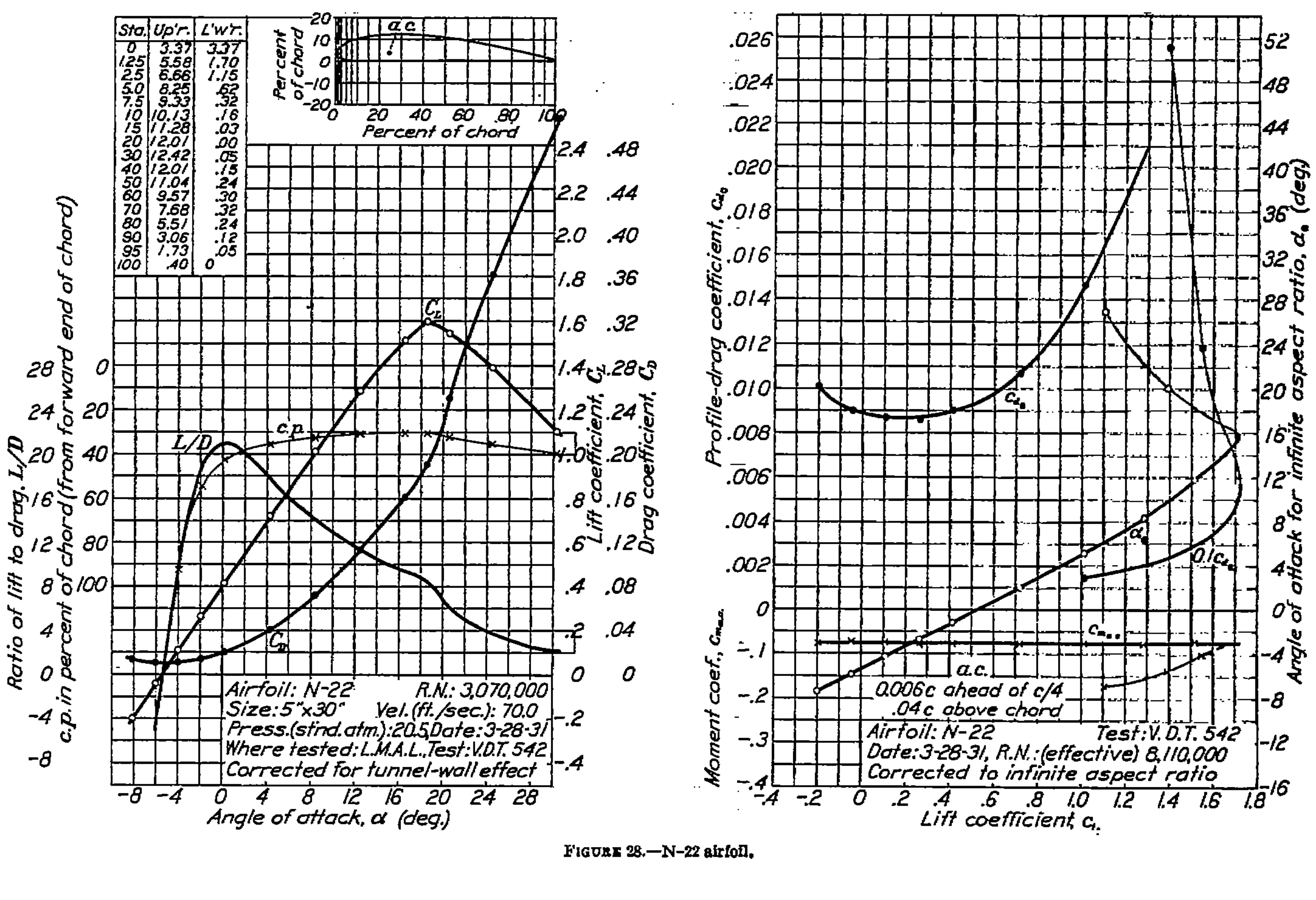



FIGURE 27.—C-80 airfoil (inverted).



| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 3.37 | 3.37 |
| 1.25 | 5.58 | 1.70 |
| 2.5 | 6.66 | 1.15 |
| 5.0 | 8.25 | .62 |
| 7.5 | 9.33 | .32 |
| 10 | 10.13 | .16 |
| 15 | 11.28 | .03 |
| 20 | 12.01 | .00 |
| 30 | 12.42 | .05 |
| 40 | 12.01 | .15 |
| 50 | 11.04 | .24 |
| 60 | 9.57 | .30 |
| 70 | 7.68 | .32 |
| 80 | 5.51 | .24 |
| 90 | 3.06 | .12 |
| 95 | 1.73 | .05 |
| 100 | .40 | 0 |



FIGURE 28.—N-22 airfoil.

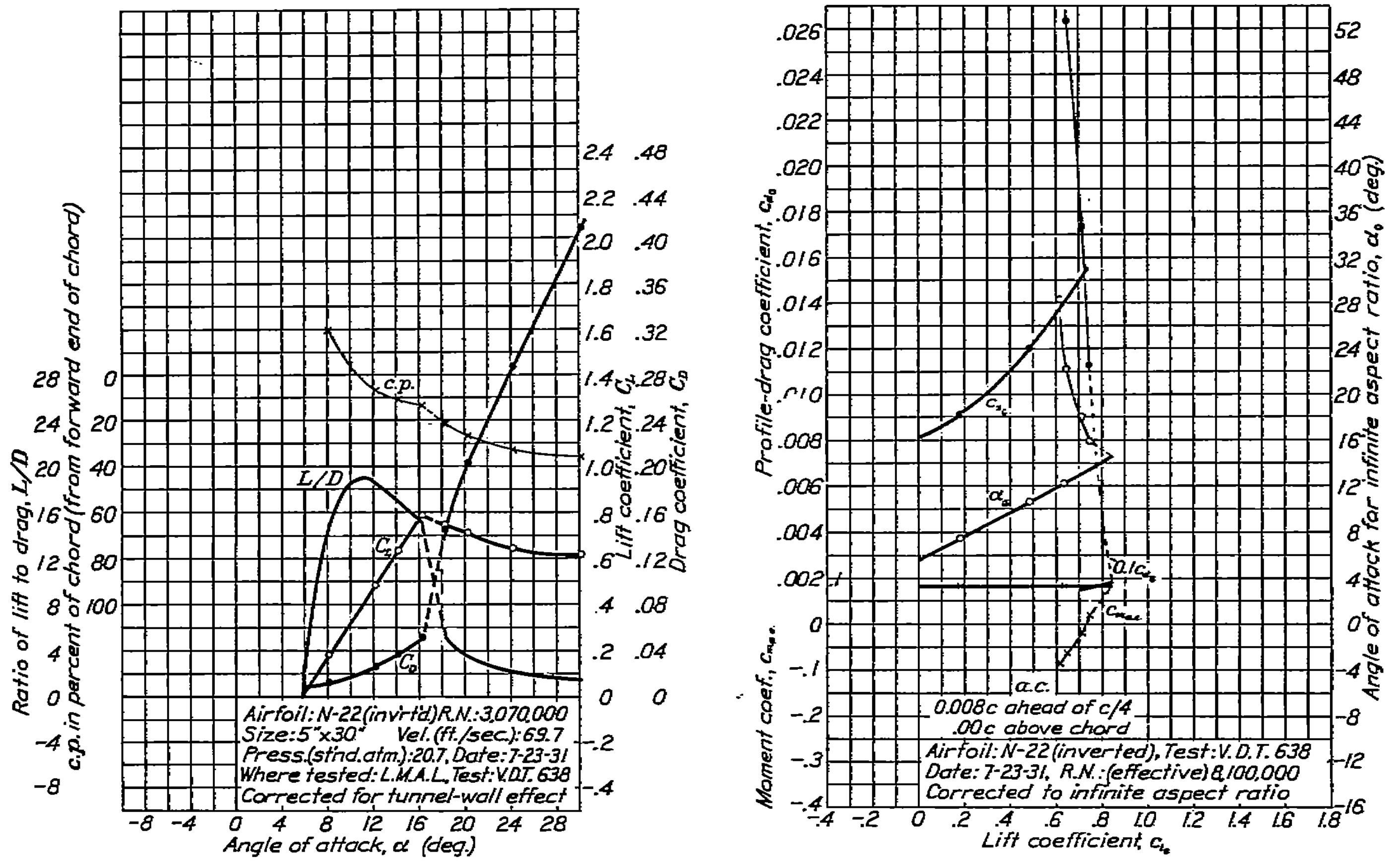
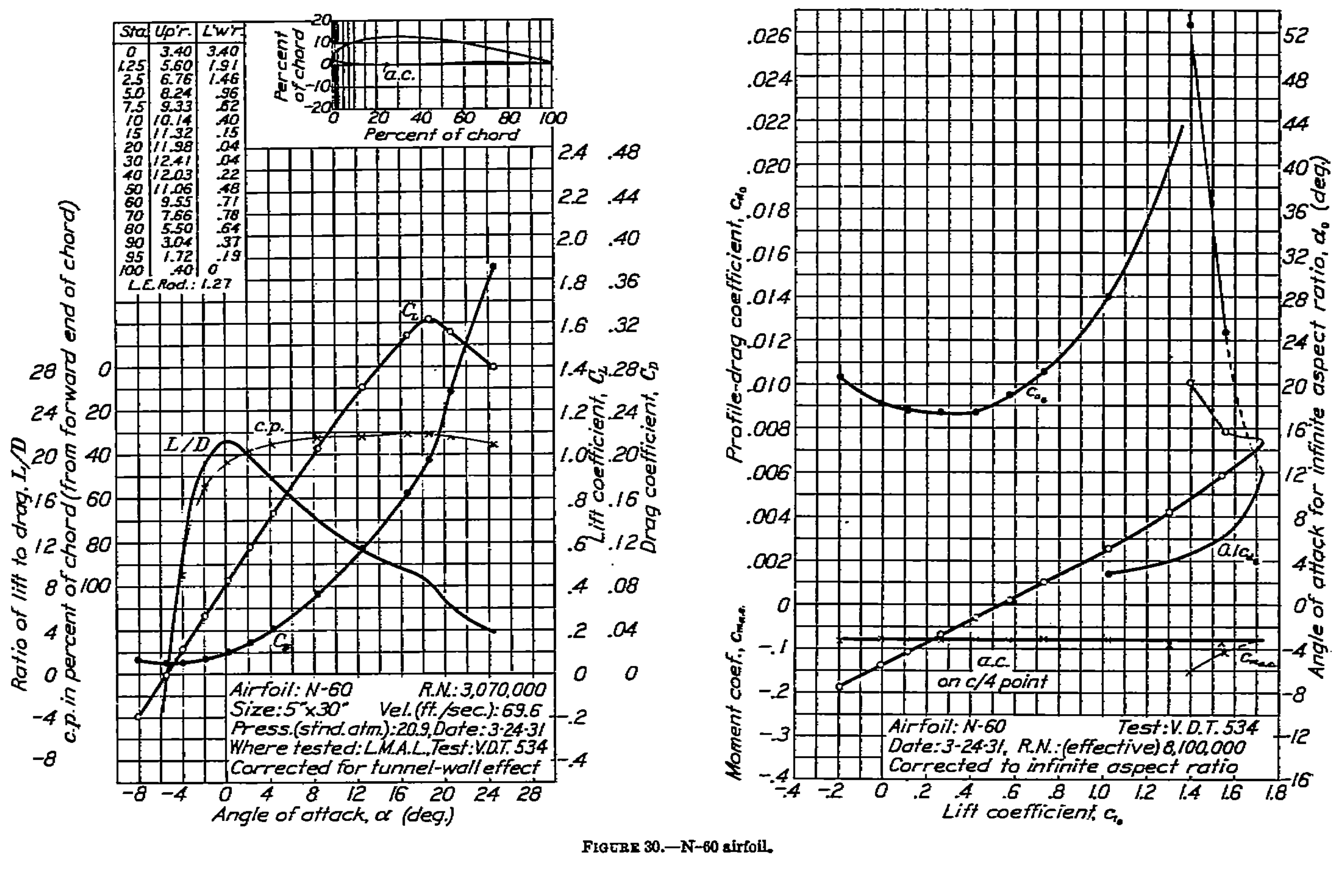



FIGURE 29.—N-22 airfoil (inverted).




| Sta. | Up'r. | L'wr. |
|---|---|---|
| 0 | 3.40 | 3.40 |
| 1.25 | 5.60 | 1.91 |
| 2.5 | 6.76 | 1.46 |
| 5.0 | 8.24 | .96 |
| 7.5 | 9.33 | .62 |
| 10 | 10.14 | .40 |
| 15 | 11.32 | .15 |
| 20 | 11.98 | .04 |
| 30 | 12.41 | .04 |
| 40 | 12.03 | .22 |
| 50 | 11.06 | .48 |
| 60 | 9.55 | .71 |
| 70 | 7.86 | .78 |
| 80 | 5.50 | .64 |
| 90 | 3.04 | .37 |
| 95 | 1.72 | .19 |
| 100 | .40 | 0 |

L.E. Rad.: 1.27

FIGURE 30.—N-60 airfoil.

| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 3.40 | 3.40 |
| 1.25 | 5.60 | 1.91 |
| 2.5 | 6.76 | 1.46 |
| 5.0 | 8.24 | .96 |
| 7.5 | 9.33 | .62 |
| 10 | 10.14 | .40 |
| 15 | 11.32 | .15 |
| 20 | 11.98 | .04 |
| 30 | 12.41 | .04 |
| 40 | 11.95 | .14 |
| 50 | 10.79 | .21 |
| 60 | 9.18 | .34 |
| 70 | 7.42 | .54 |
| 80 | 5.75 | .89 |
| 90 | 4.28 | 1.61 |
| 95 | 3.66 | 2.13 |
| 100 | 3.20 | 2.80 |
| L.E. Rad.: 1.27 | | |

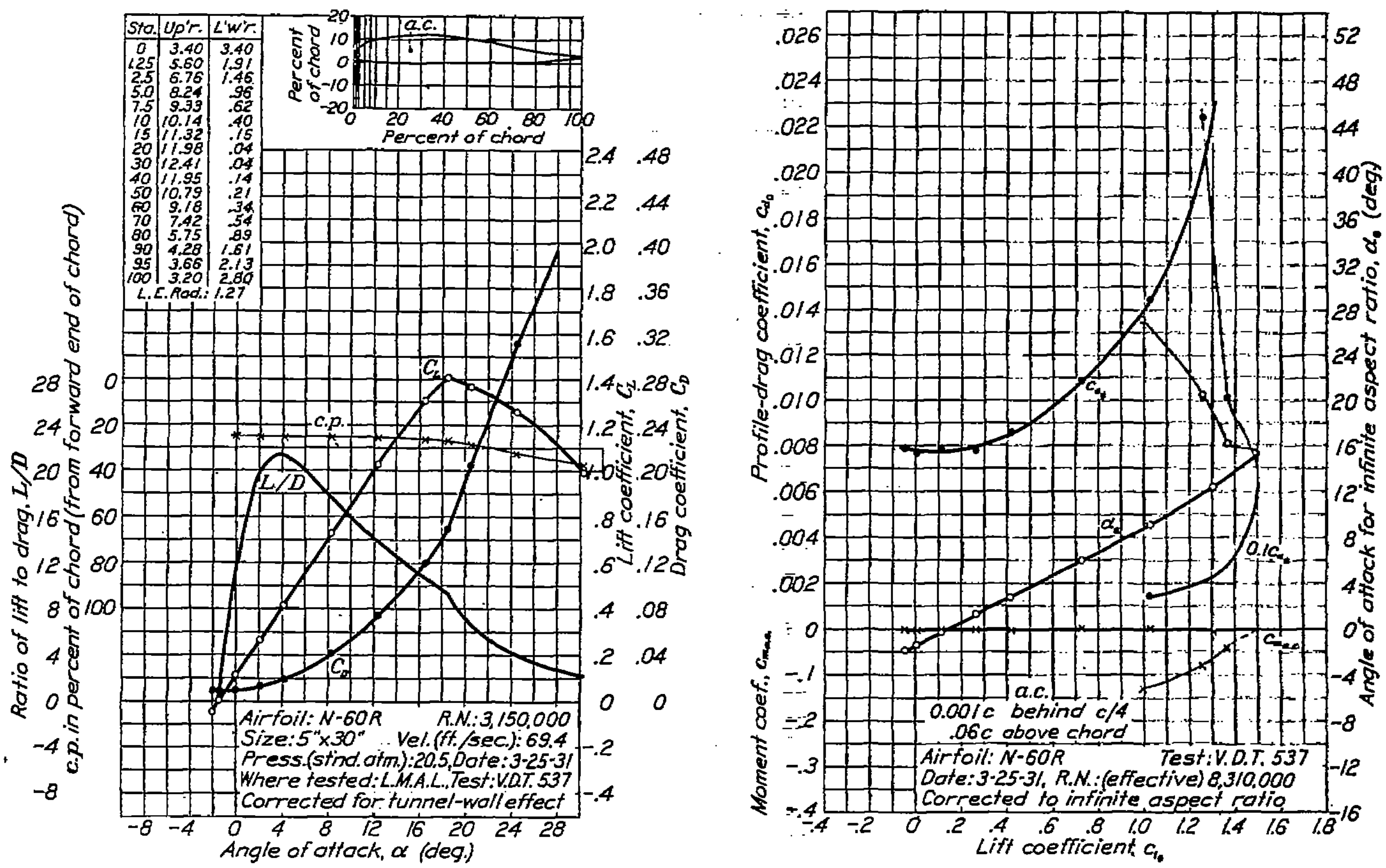



FIGURE 31.—N-60 R airfoil.

| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 0 | 0 |
| .25 | .50 | -.50 |
| .50 | .72 | -.72 |
| .75 | .89 | -.89 |
| 1.00 | 1.02 | -1.02 |
| 1.25 | 1.14 | -1.14 |
| 2.5 | 1.56 | -1.56 |
| 5.0 | 2.18 | -2.18 |
| 7.5 | 2.61 | -2.61 |
| 10 | 2.97 | -2.97 |
| 15 | 3.45 | -3.45 |
| 20 | 3.75 | -3.75 |
| 30 | 4.00 | -4.00 |
| 40 | 3.93 | -3.93 |
| 50 | 3.63 | -3.63 |
| 60 | 3.16 | -3.16 |
| 70 | 2.55 | -2.55 |
| 80 | 1.80 | -1.80 |
| 90 | 1.00 | -1.00 |
| 95 | .57 | -.57 |
| 100 | 0 | 0 |
| L.E. Rad.: 0.45 | | |
| T.E. Rad.: 0.13 | | |

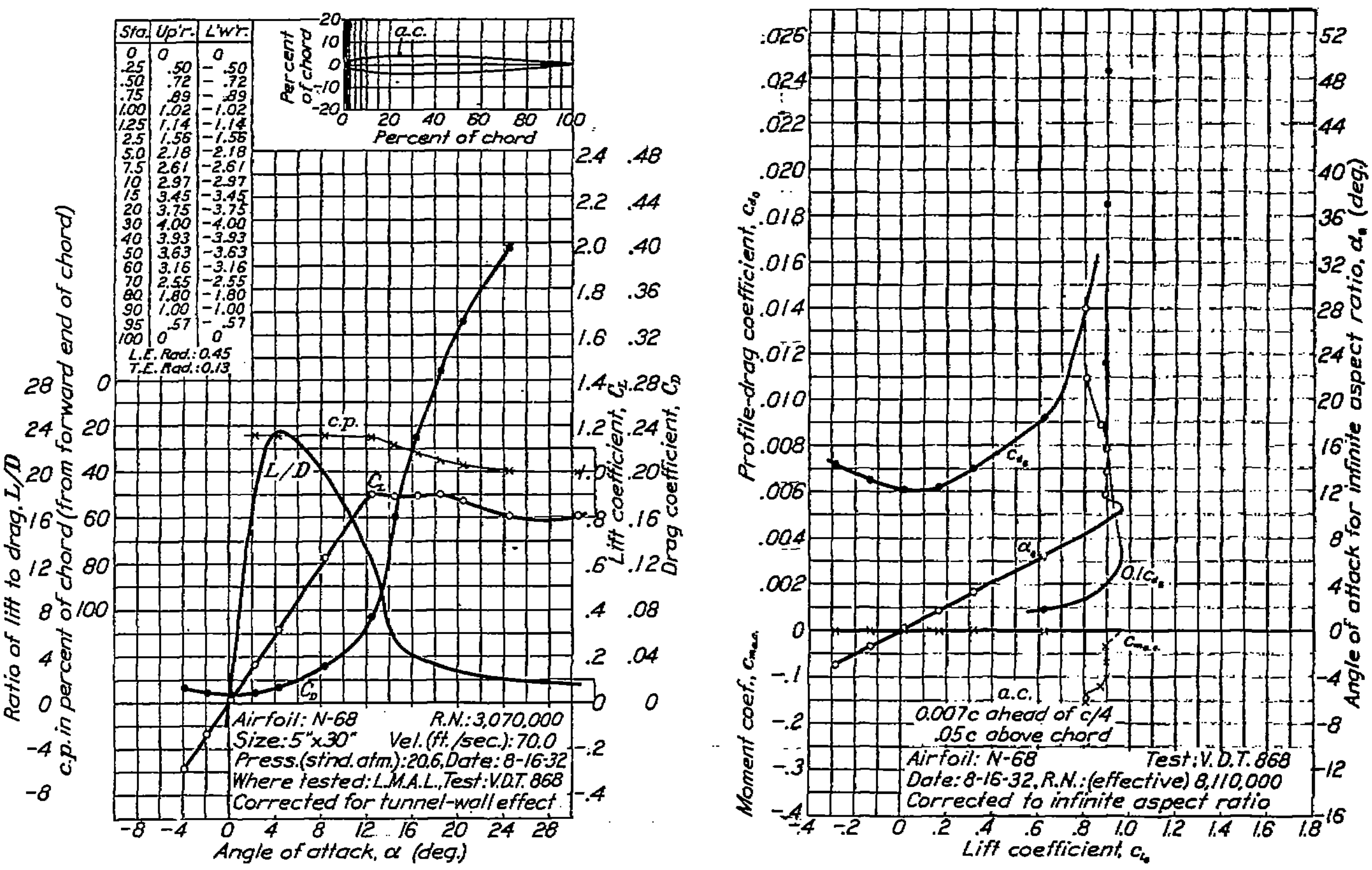



FIGURE 32.—N-68 airfoil.

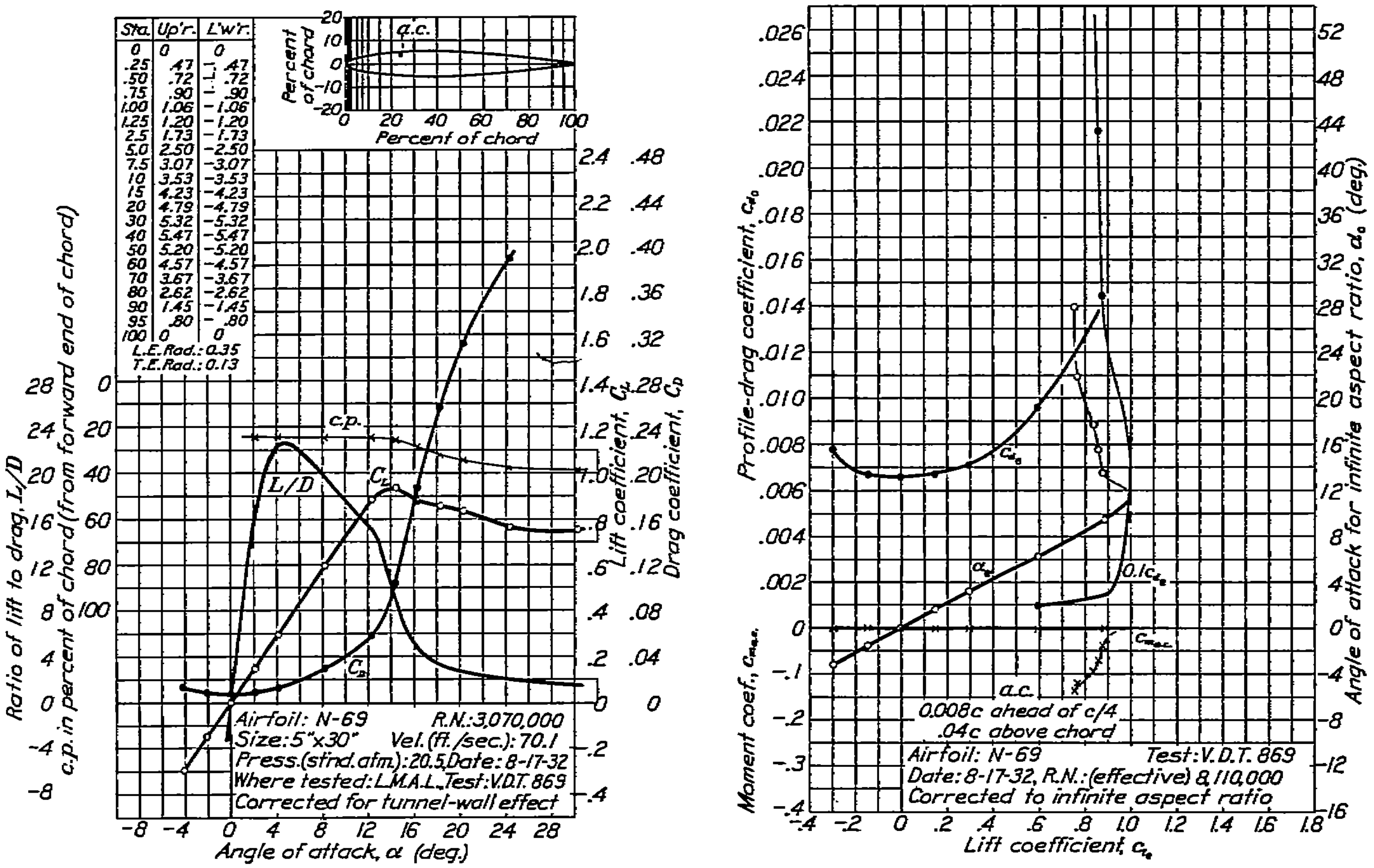



FIGURE 33.—N-69 airfoil.

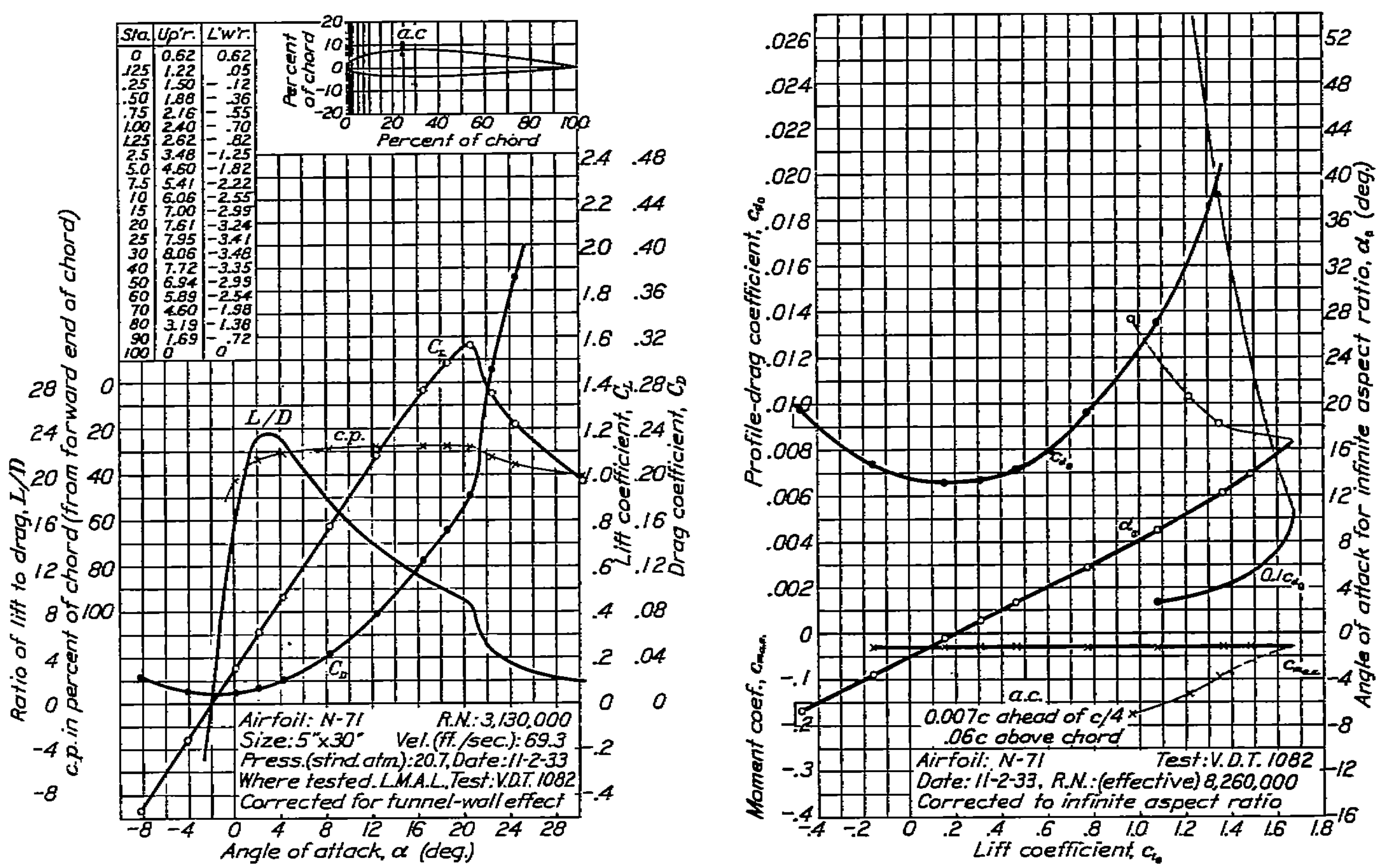



FIGURE 34.—N-71 airfoil.

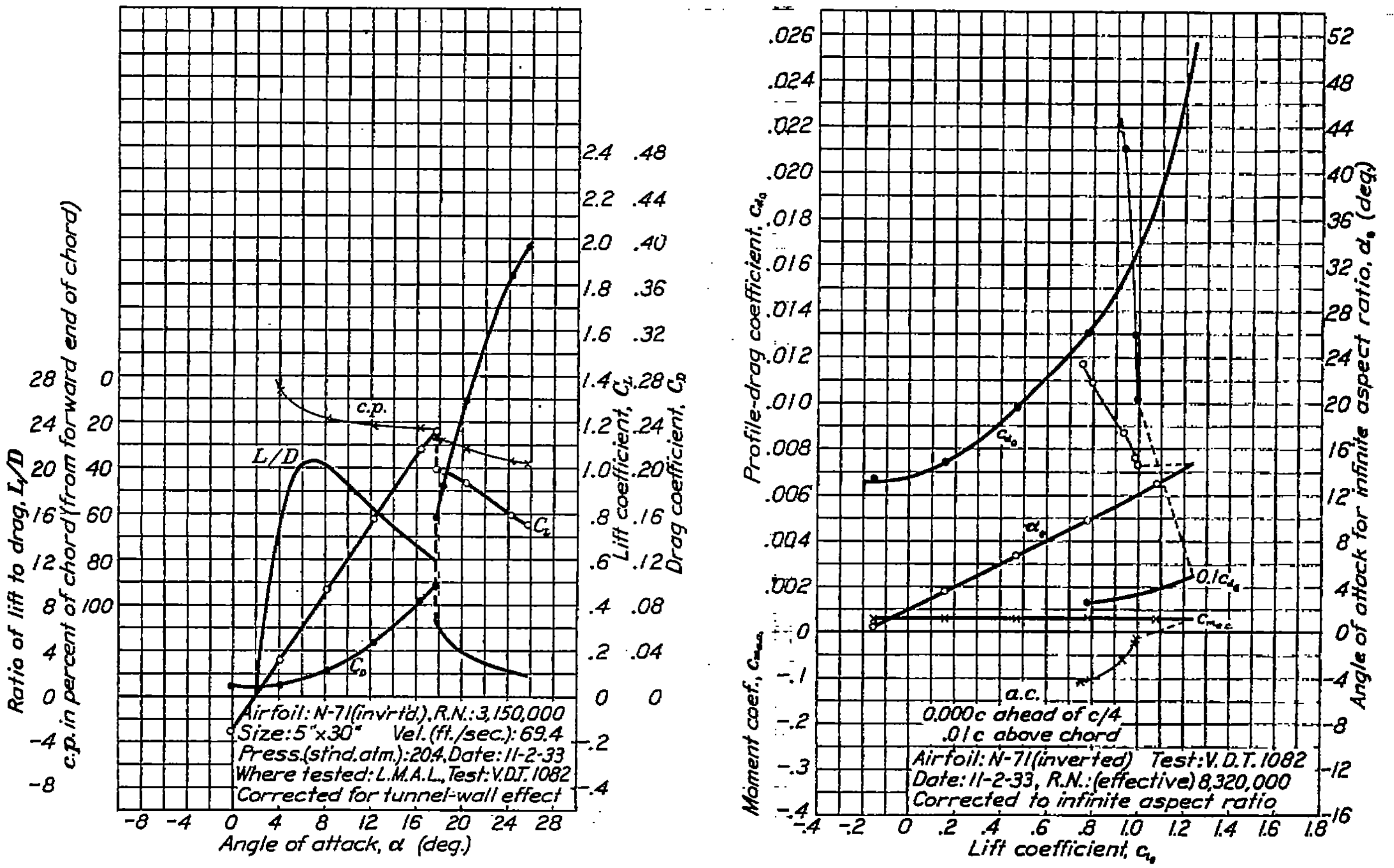
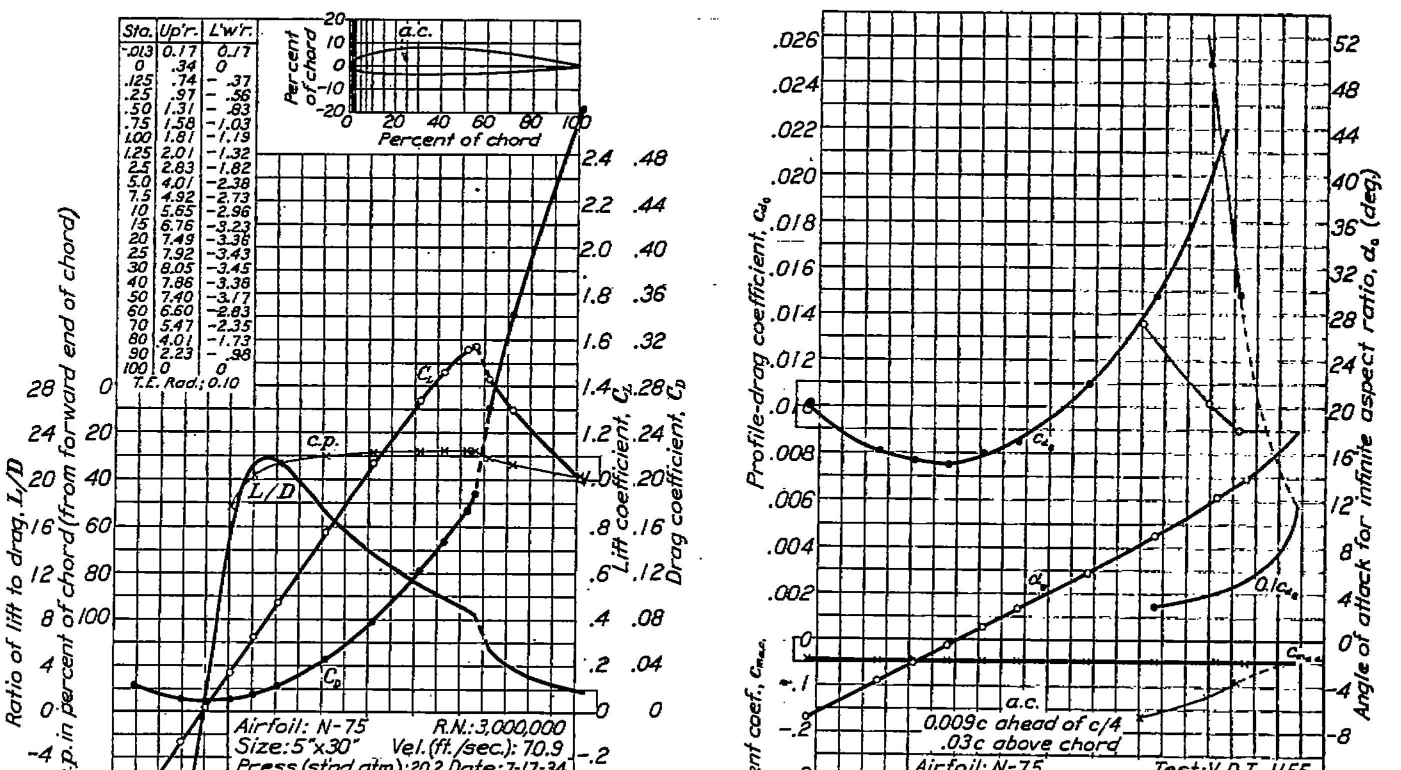



FIGURE 35.—N-71 airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| -.013 | 0.17 | 0.17 |
| 0 | .34 | 0 |
| .125 | .74 | -.37 |
| .25 | .97 | -.56 |
| .50 | 1.31 | -.83 |
| .75 | 1.58 | -1.03 |
| 1.00 | 1.81 | -1.19 |
| 1.25 | 2.01 | -1.32 |
| 2.5 | 2.83 | -1.82 |
| 5.0 | 4.01 | -2.38 |
| 7.5 | 4.92 | -2.73 |
| 10 | 5.65 | -2.96 |
| 15 | 6.76 | -3.23 |
| 20 | 7.49 | -3.36 |
| 25 | 7.92 | -3.43 |
| 30 | 8.05 | -3.45 |
| 40 | 7.86 | -3.38 |
| 50 | 7.40 | -3.17 |
| 60 | 6.60 | -2.83 |
| 70 | 5.47 | -2.35 |
| 80 | 4.01 | -1.73 |
| 90 | 2.23 | -.98 |
| 100 | 0 | 0 |

T.E. Rad.: 0.10

FIGURE 36.—N-75 airfoil.

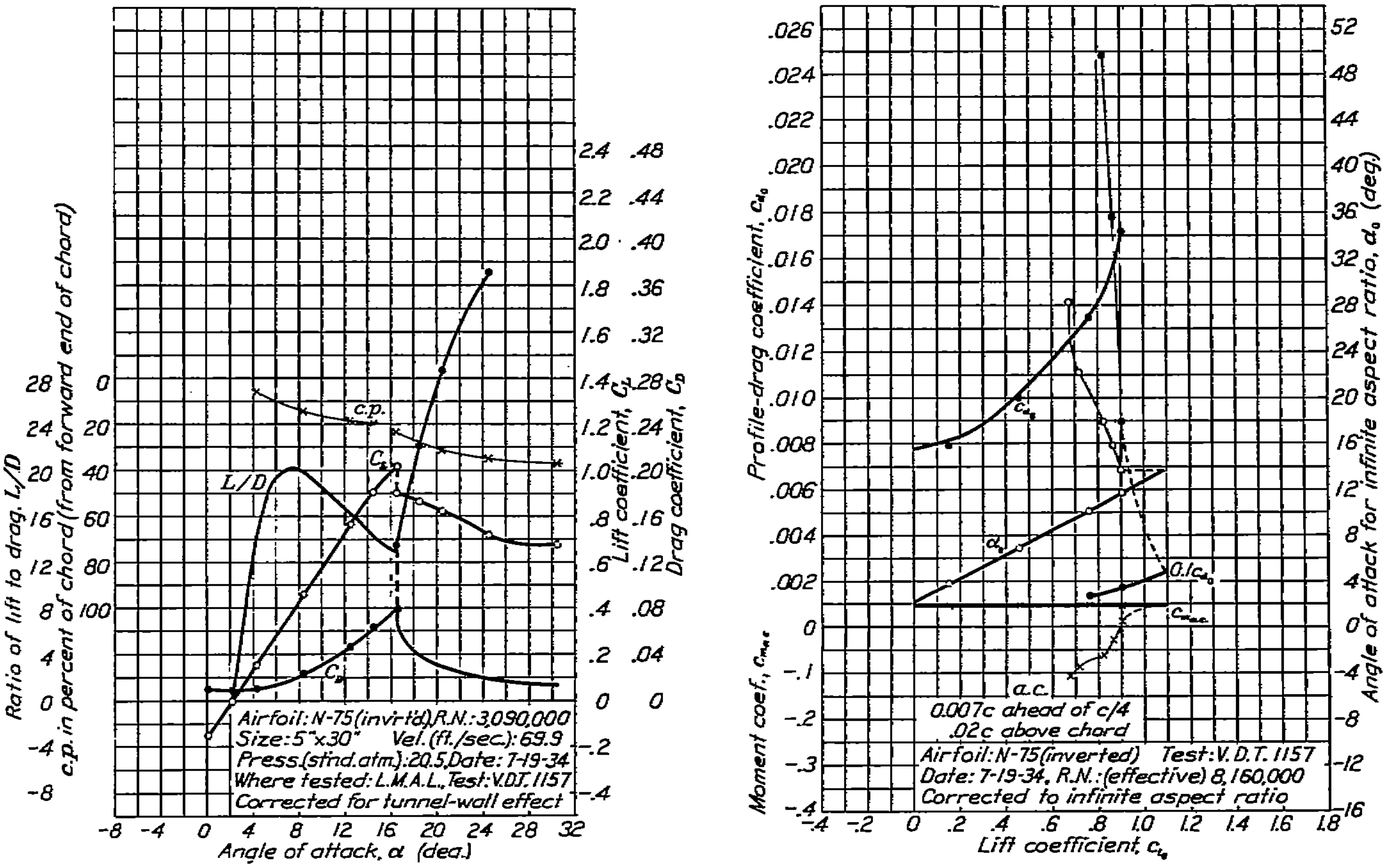
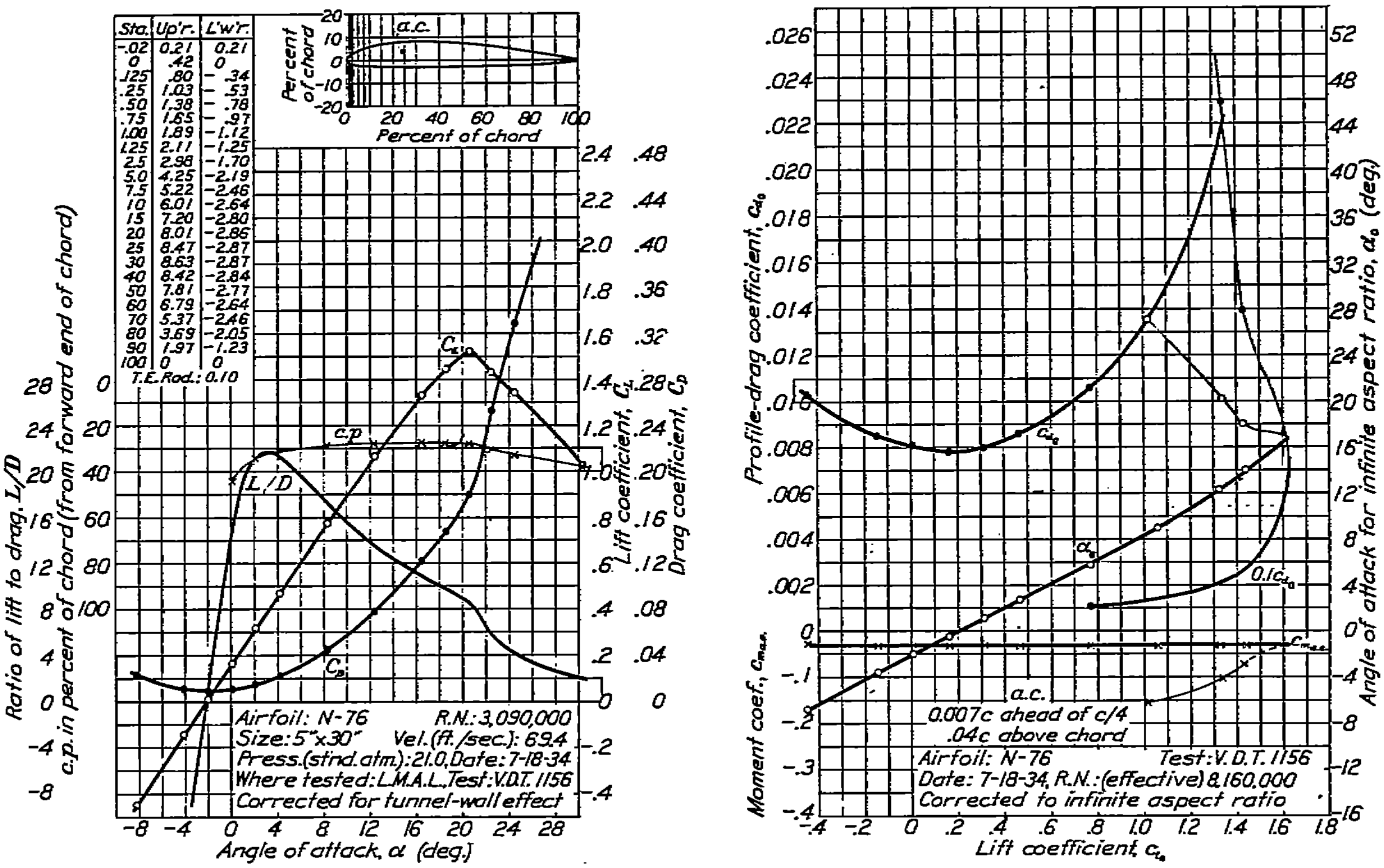



FIGURE 37.—N-75 airfoil (inverted).



| Sta. | Up'r. | L'w'r. |
|---|---|---|
| -.02 | 0.21 | 0.21 |
| 0 | .42 | 0 |
| .125 | .80 | -.34 |
| .25 | 1.03 | -.53 |
| .50 | 1.38 | -.78 |
| .75 | 1.65 | -.97 |
| 1.00 | 1.89 | -1.12 |
| 1.25 | 2.11 | -1.25 |
| 2.5 | 2.98 | -1.70 |
| 5.0 | 4.25 | -2.19 |
| 7.5 | 5.22 | -2.46 |
| 10 | 6.01 | -2.64 |
| 15 | 7.20 | -2.80 |
| 20 | 8.01 | -2.86 |
| 25 | 8.47 | -2.87 |
| 30 | 8.63 | -2.87 |
| 40 | 8.42 | -2.84 |
| 50 | 7.81 | -2.77 |
| 60 | 6.79 | -2.64 |
| 70 | 5.37 | -2.46 |
| 80 | 3.69 | -2.05 |
| 90 | 1.97 | -1.23 |
| 100 | 0 | 0 |

T.E. Rad.: 0.10



FIGURE 38.—N-76 airfoil.

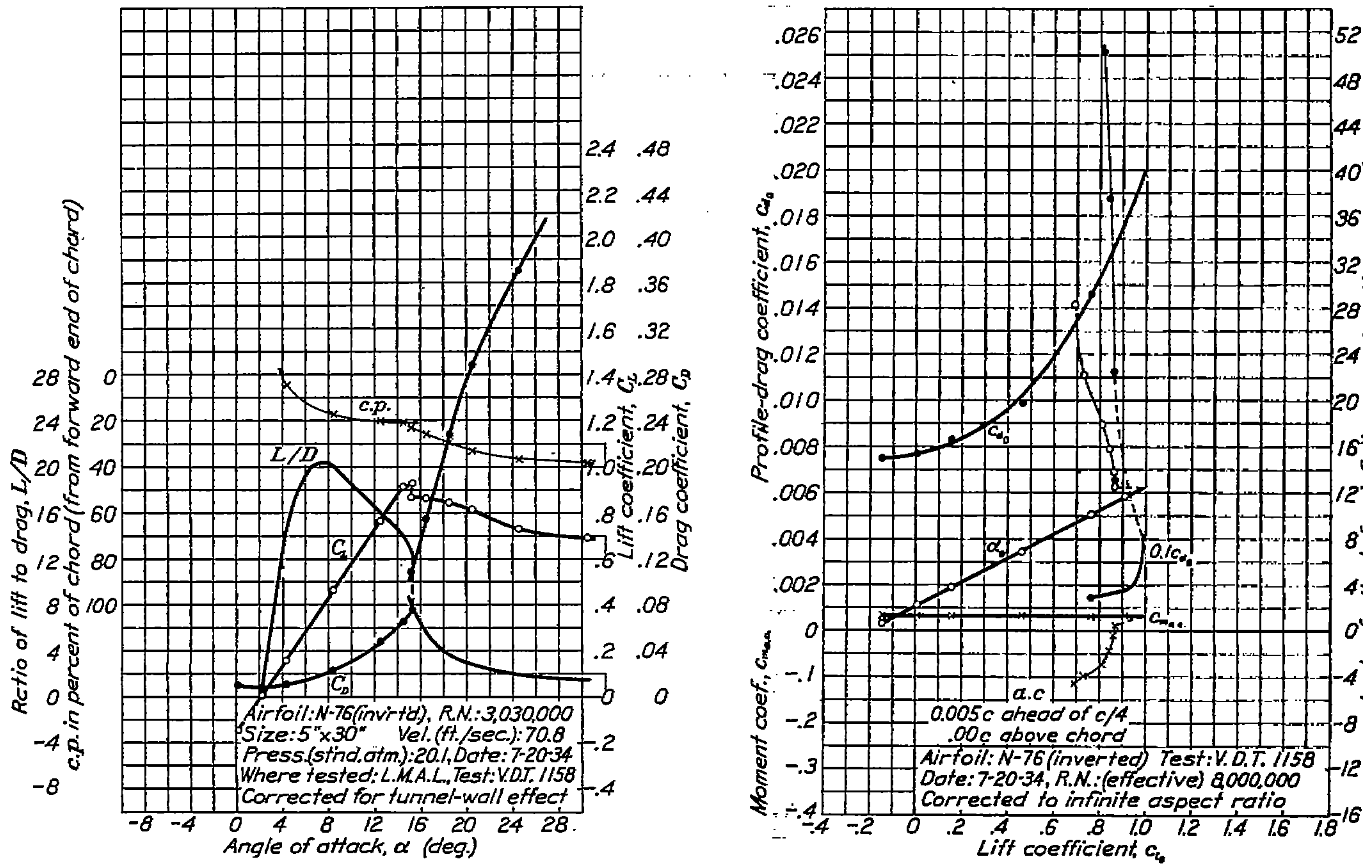
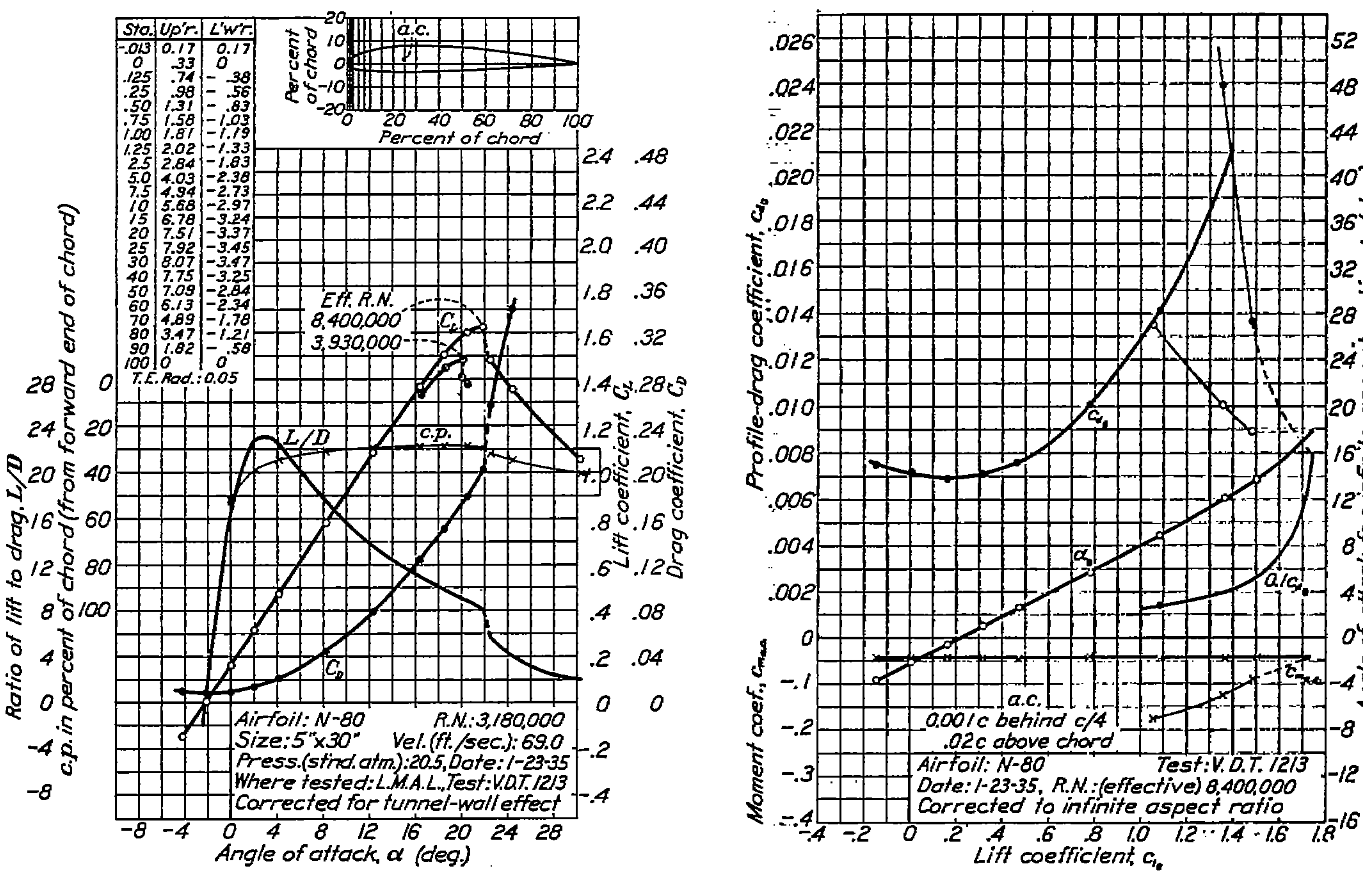



FIGURE 39.—N-76 airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| -.013 | 0.17 | 0.17 |
| 0 | .33 | 0 |
| .125 | .74 | - .38 |
| .25 | .98 | - .56 |
| .50 | 1.31 | - .83 |
| .75 | 1.58 | -1.03 |
| 1.00 | 1.81 | -1.19 |
| 1.25 | 2.02 | -1.33 |
| 2.5 | 2.84 | -1.83 |
| 5.0 | 4.03 | -2.38 |
| 7.5 | 4.94 | -2.73 |
| 10 | 5.68 | -2.97 |
| 15 | 6.78 | -3.24 |
| 20 | 7.51 | -3.37 |
| 25 | 7.92 | -3.45 |
| 30 | 8.07 | -3.47 |
| 40 | 7.75 | -3.25 |
| 50 | 7.09 | -2.84 |
| 60 | 6.13 | -2.34 |
| 70 | 4.89 | -1.78 |
| 80 | 3.47 | -1.21 |
| 90 | 1.82 | - .58 |
| 100 | 0 | 0 |

T.E. Rad.: 0.05

FIGURE 40.—N-80 airfoil.

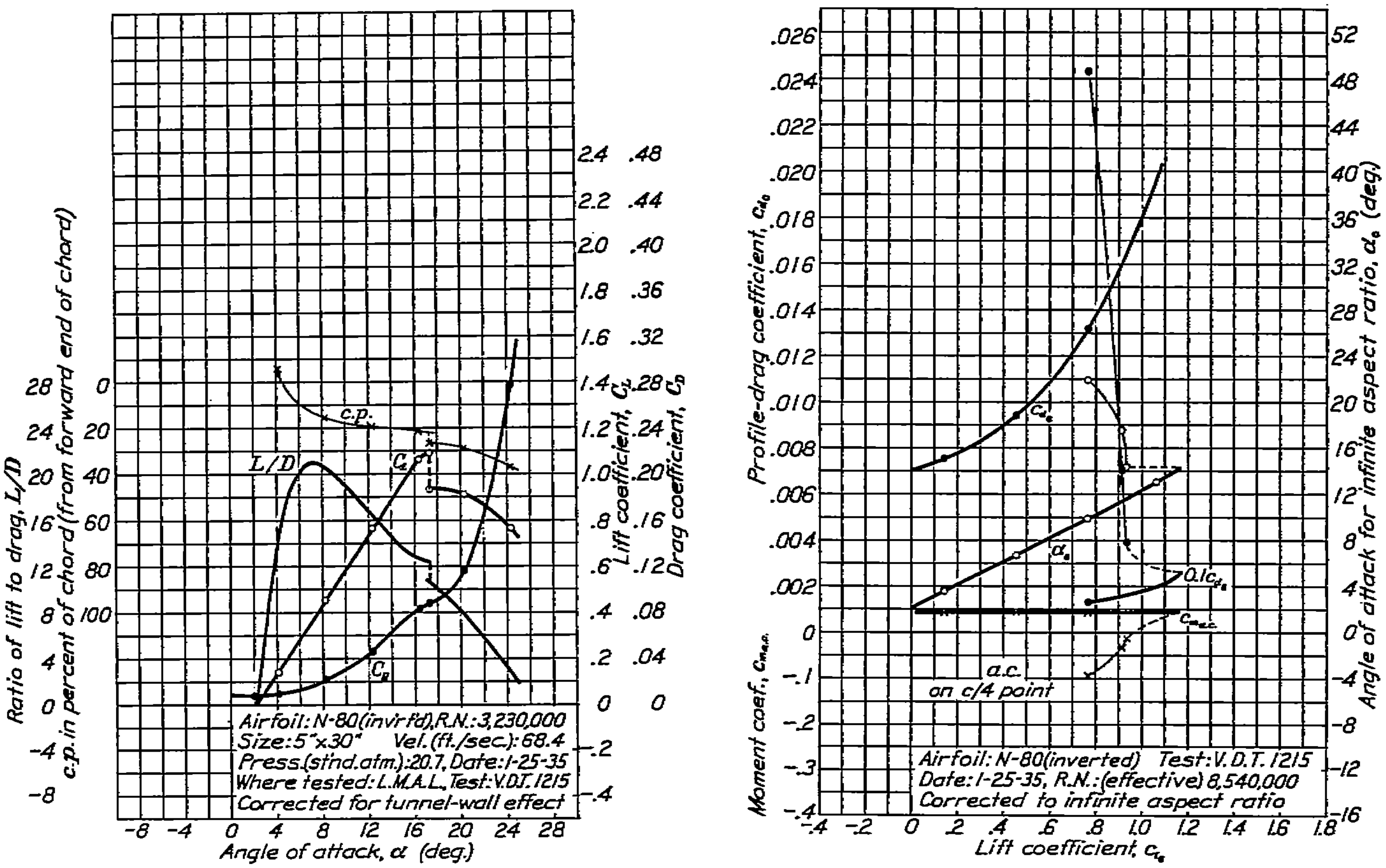



FIGURE 41.—N-80 airfoil (inverted)

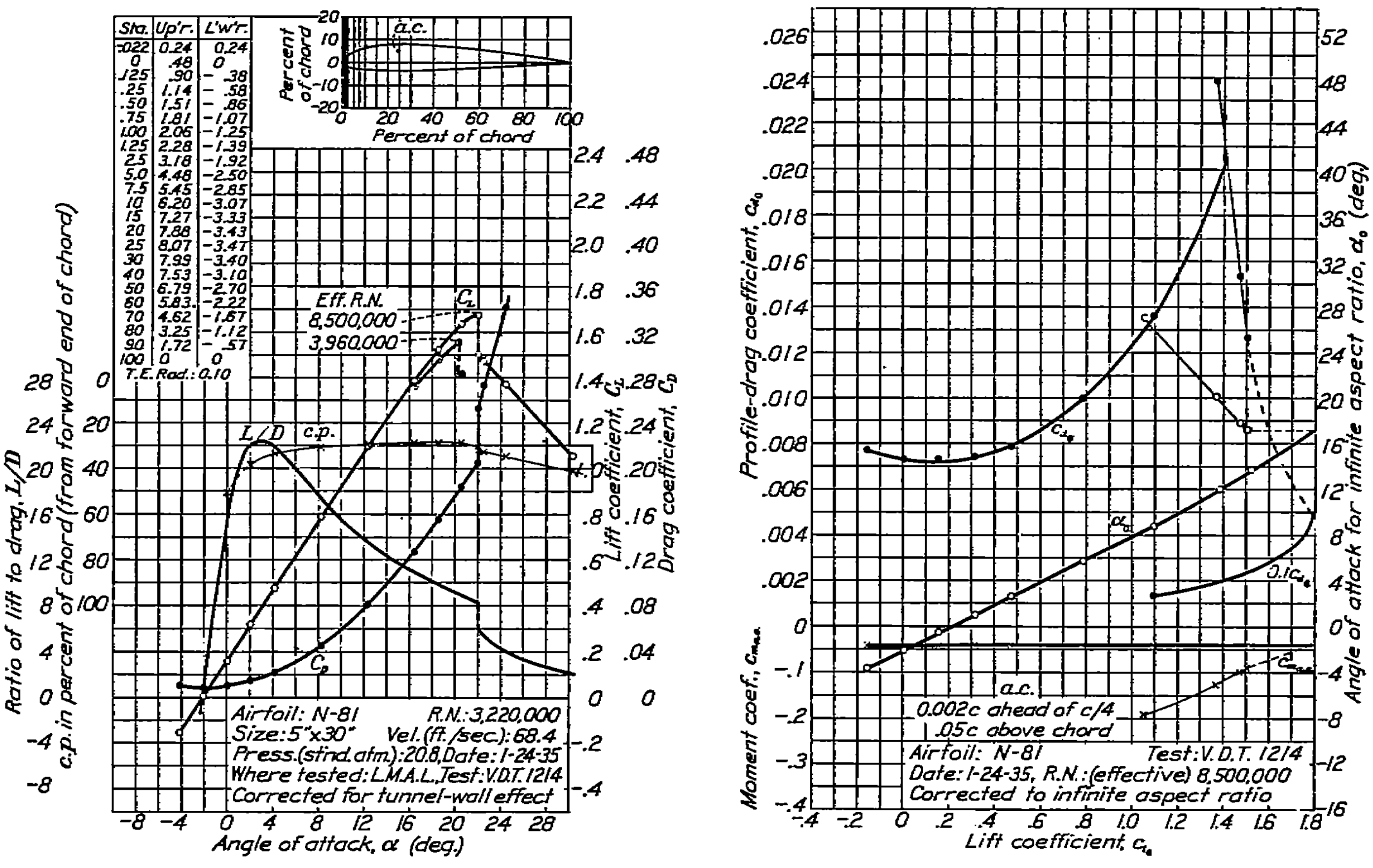



FIGURE 42.—N-81 airfoil.

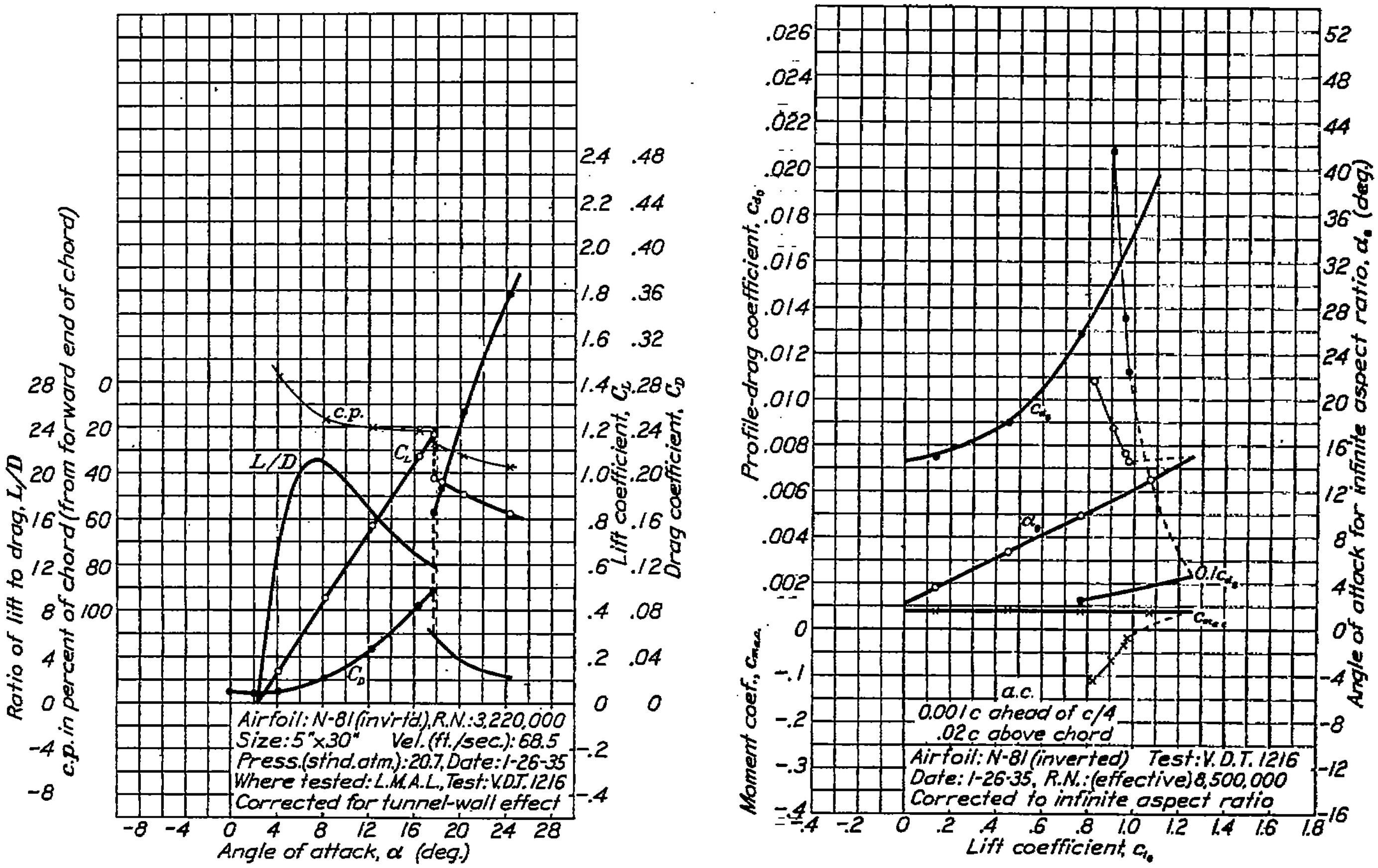
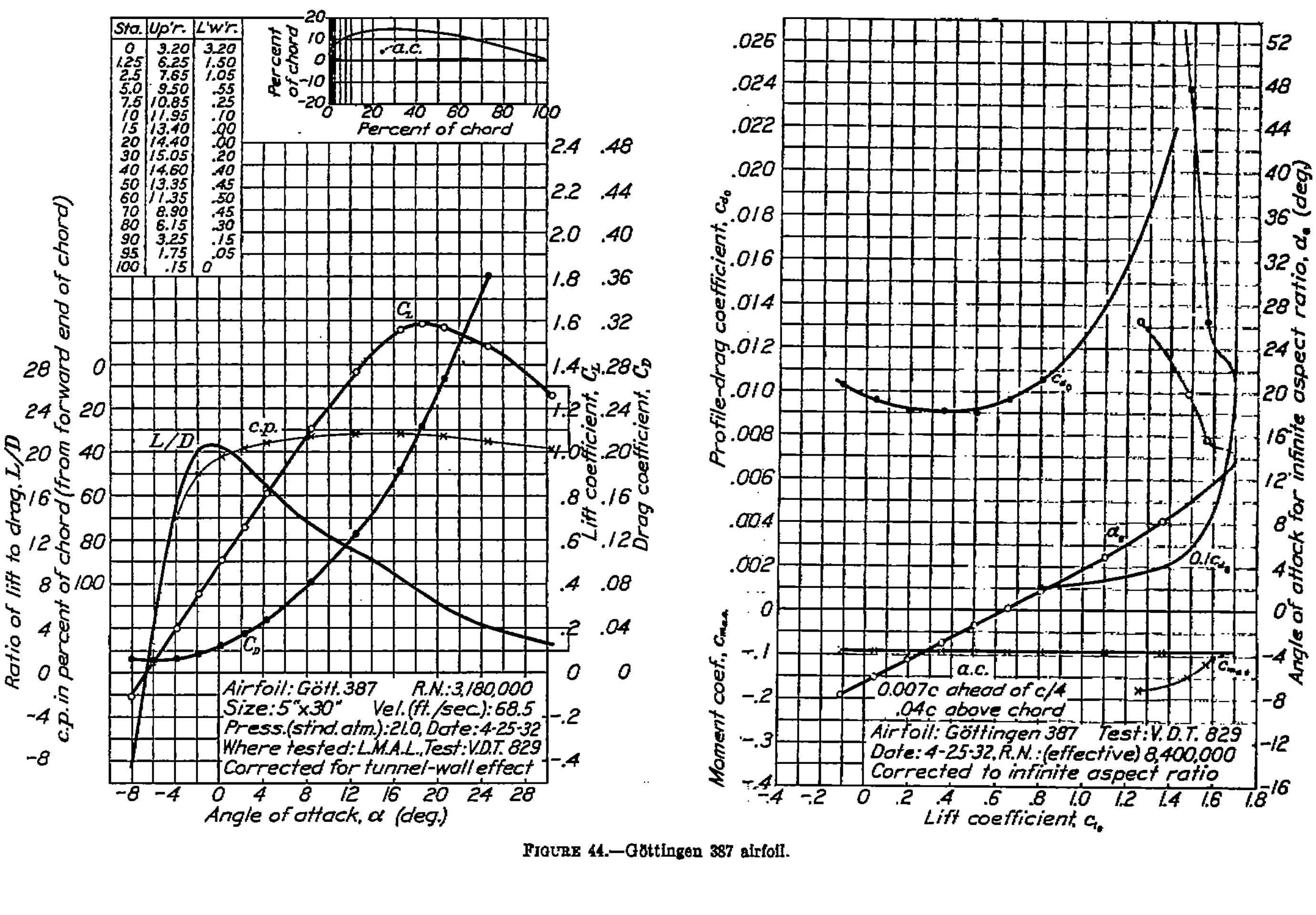
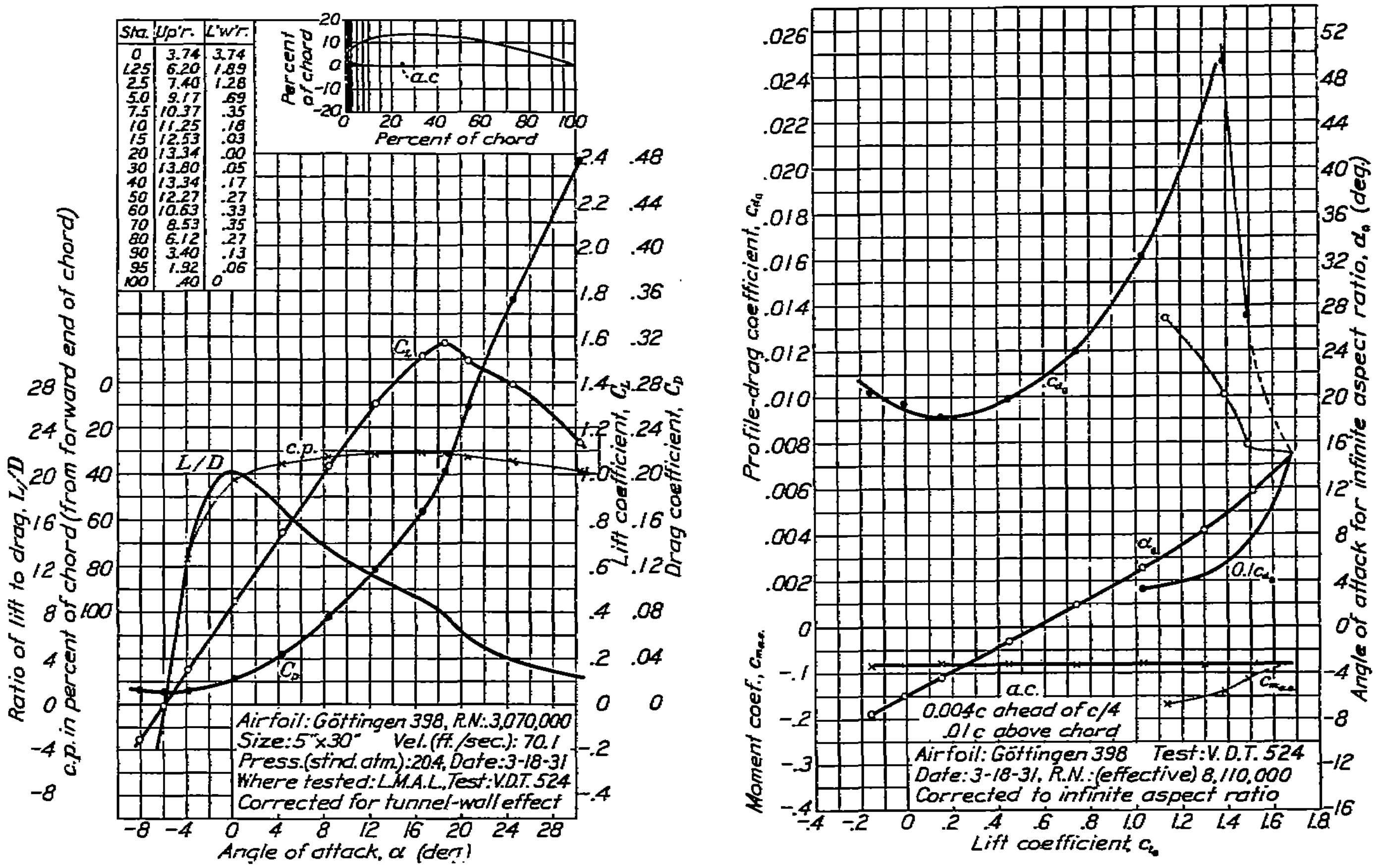



FIGURE 43.—N-81 airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 3.20 | 3.20 |
| 1.25 | 6.25 | 1.50 |
| 2.5 | 7.65 | 1.05 |
| 5.0 | 9.50 | .55 |
| 7.5 | 10.85 | .25 |
| 10 | 11.95 | .10 |
| 15 | 13.40 | .00 |
| 20 | 14.40 | .00 |
| 30 | 15.05 | .20 |
| 40 | 14.60 | .40 |
| 50 | 13.35 | .45 |
| 60 | 11.35 | .50 |
| 70 | 8.90 | .45 |
| 80 | 6.15 | .30 |
| 90 | 3.25 | .15 |
| 95 | 1.75 | .05 |
| 100 | .15 | 0 |

FIGURE 44.—Göttingen 387 airfoil.




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 3.74 | 3.74 |
| 1.25 | 6.20 | 1.89 |
| 2.5 | 7.40 | 1.28 |
| 5.0 | 9.17 | .69 |
| 7.5 | 10.37 | .35 |
| 10 | 11.25 | .18 |
| 15 | 12.53 | .03 |
| 20 | 13.34 | .00 |
| 30 | 13.80 | .05 |
| 40 | 13.34 | .17 |
| 50 | 12.27 | .27 |
| 60 | 10.63 | .33 |
| 70 | 8.53 | .35 |
| 80 | 6.12 | .27 |
| 90 | 3.40 | .13 |
| 95 | 1.92 | .06 |
| 100 | .40 | 0 |

FIGURE 45.—Göttingen 398 airfoil.

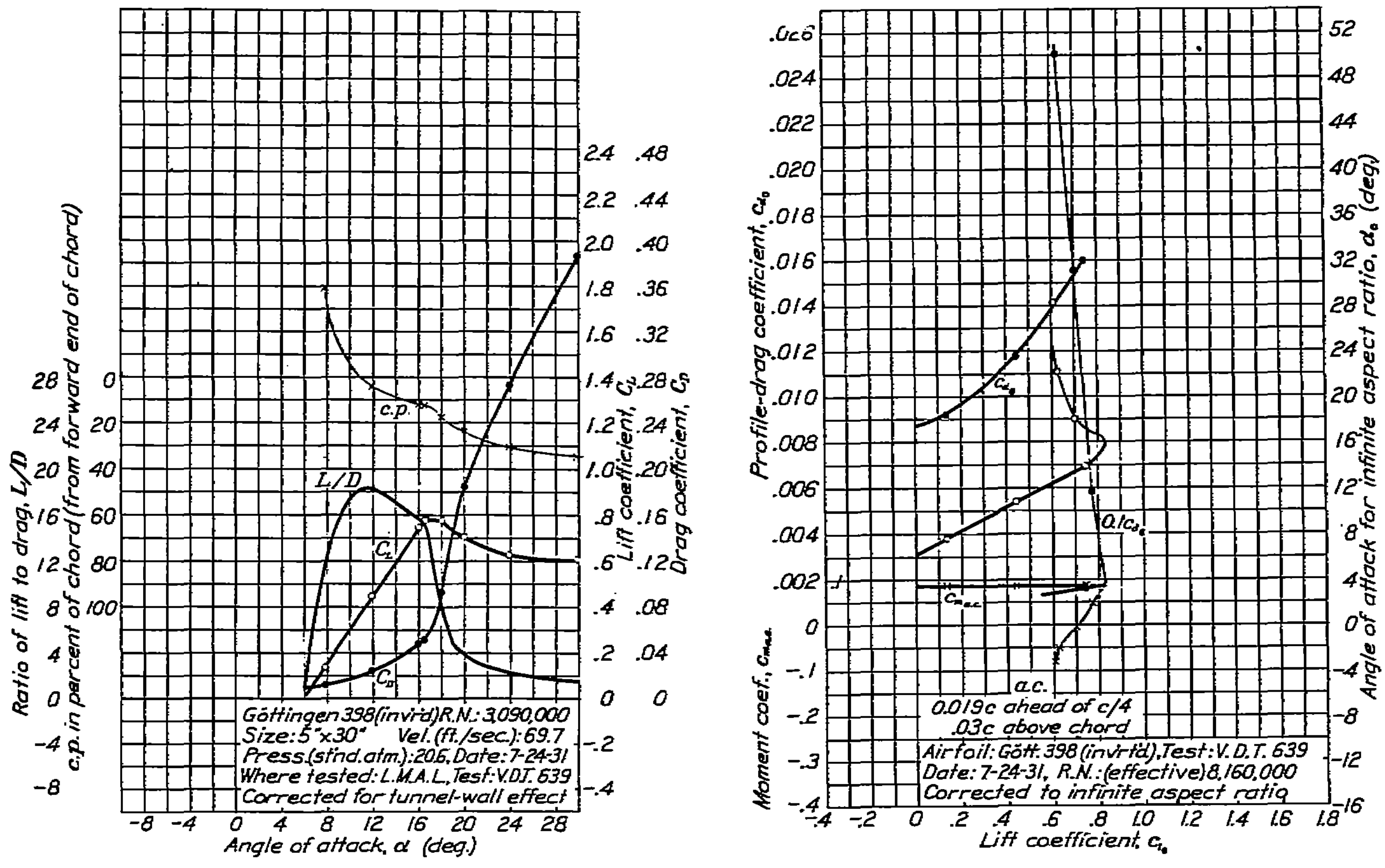
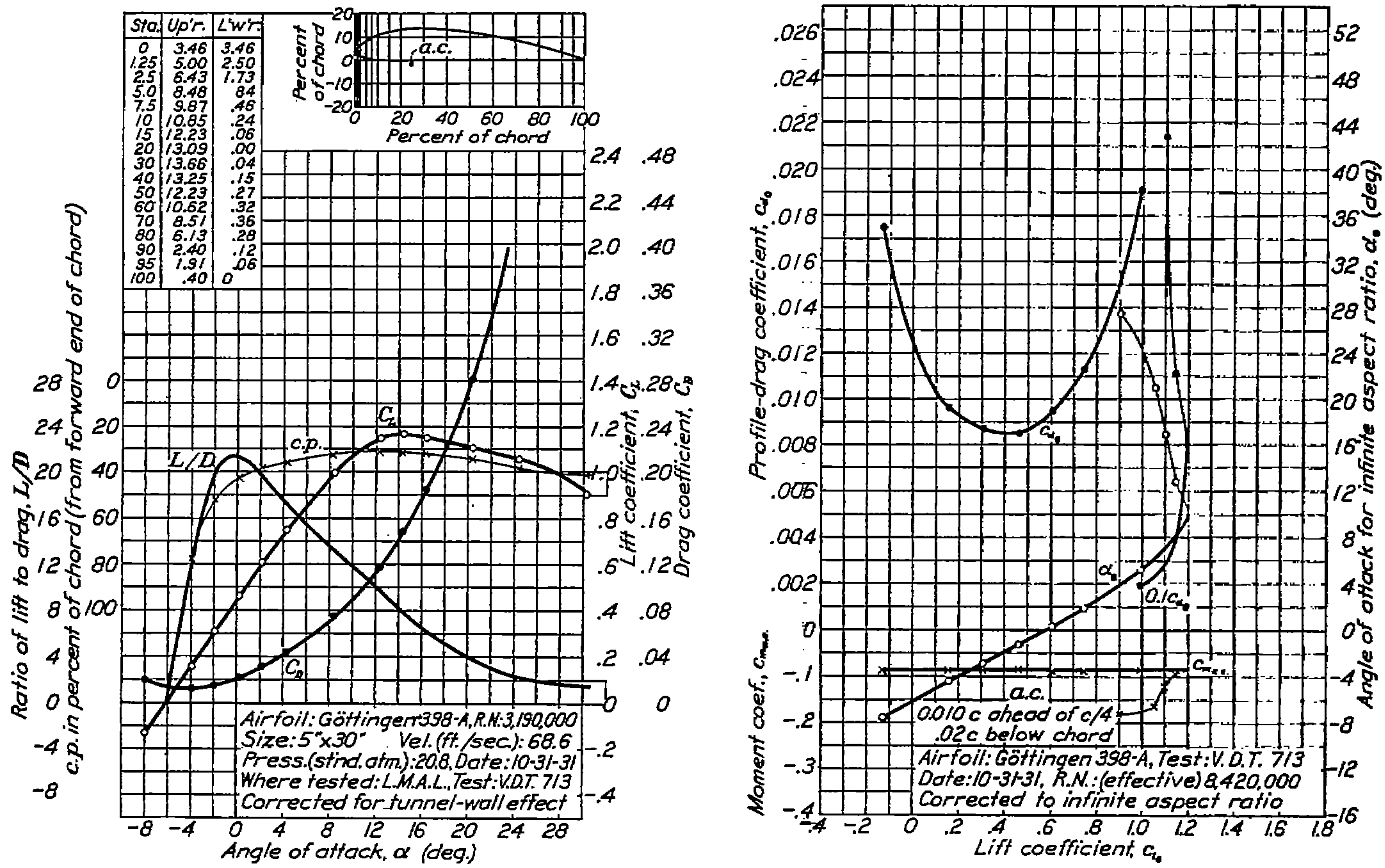
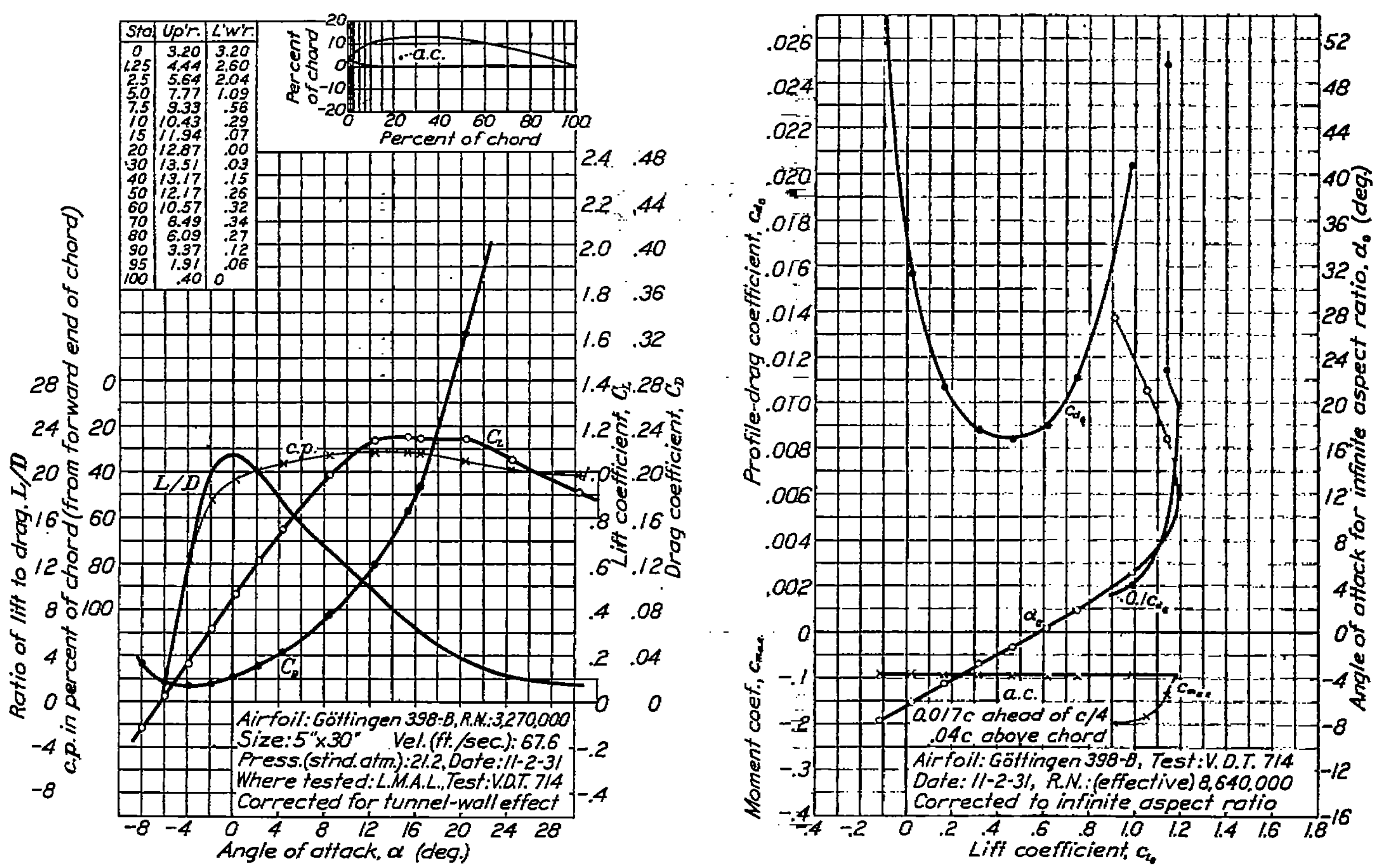



FIGURE 46.—Göttingen 398 airfoil (inverted).



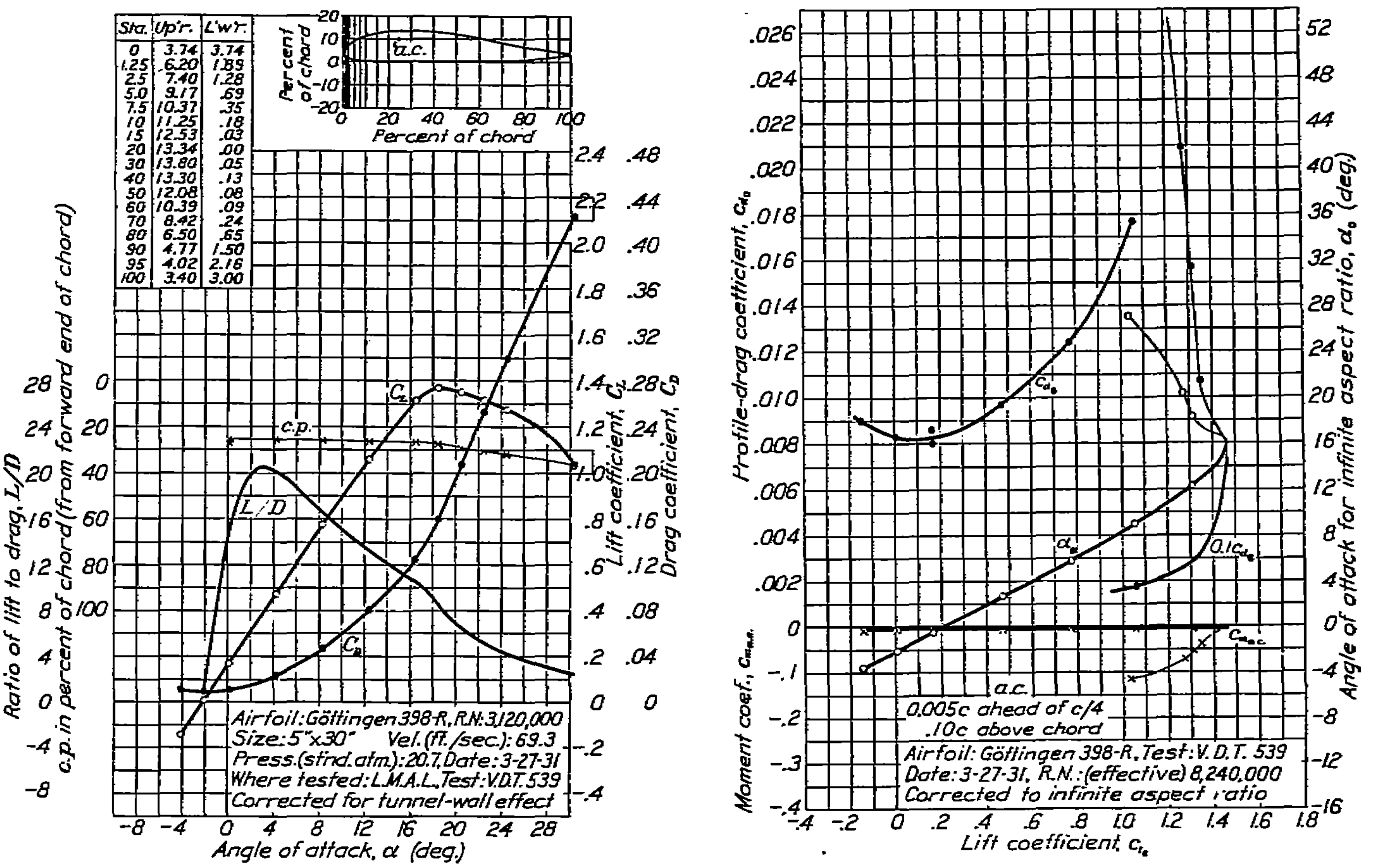

| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 3.46 | 3.46 |
| 1.25 | 5.00 | 2.50 |
| 2.5 | 6.43 | 1.73 |
| 5.0 | 8.48 | .84 |
| 7.5 | 9.87 | .46 |
| 10 | 10.85 | .24 |
| 15 | 12.23 | .06 |
| 20 | 13.09 | .00 |
| 30 | 13.66 | .04 |
| 40 | 13.25 | .15 |
| 50 | 12.23 | .27 |
| 60 | 10.62 | .32 |
| 70 | 8.51 | .36 |
| 80 | 6.13 | .28 |
| 90 | 2.40 | .12 |
| 95 | 1.91 | .06 |
| 100 | .40 | 0 |

FIGURE 47.—Göttingen 398-A airfoil.



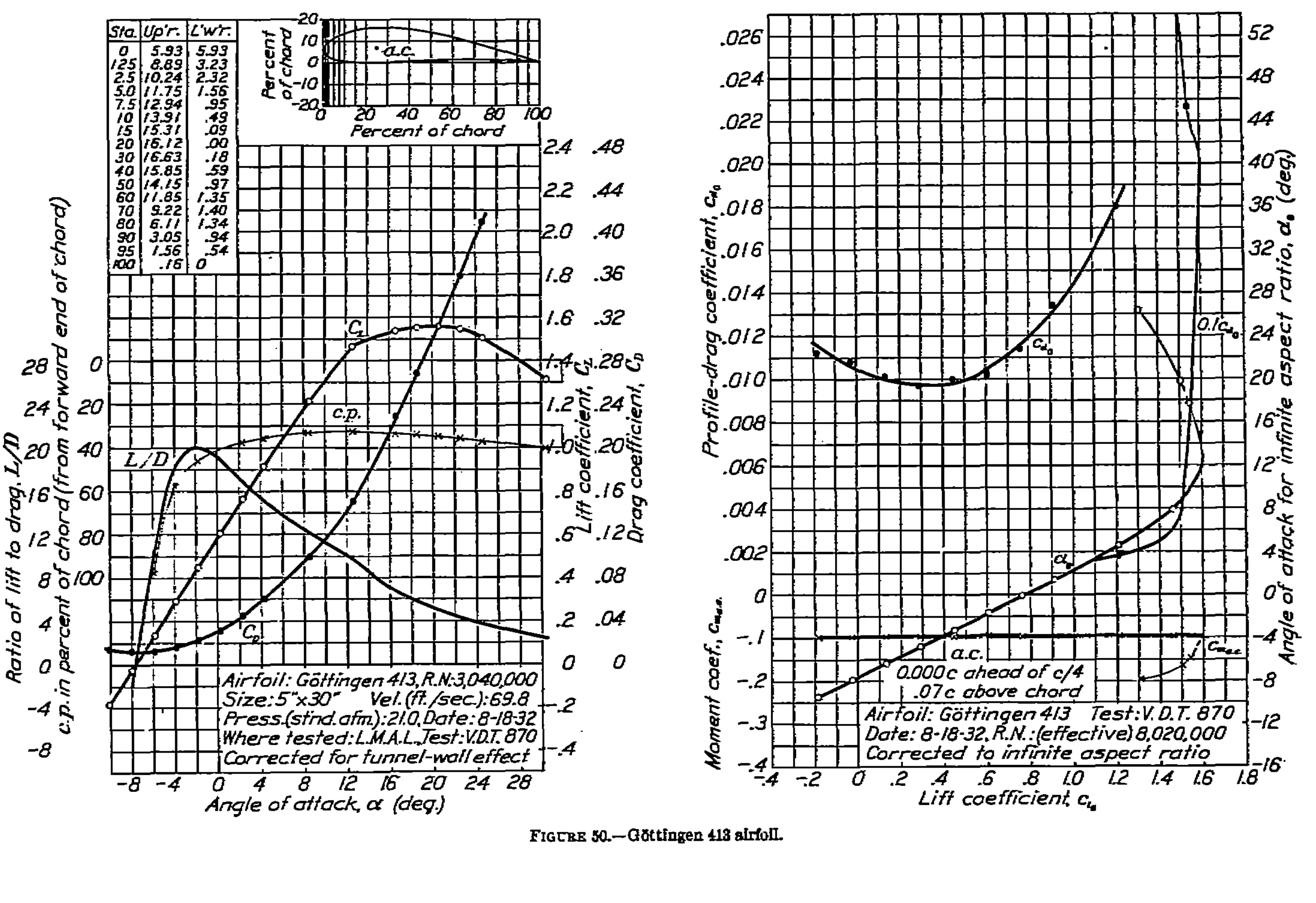

| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 3.20 | 3.20 |
| 1.25 | 4.44 | 2.60 |
| 2.5 | 5.64 | 2.04 |
| 5.0 | 7.77 | 1.09 |
| 7.5 | 9.33 | .56 |
| 10 | 10.43 | .29 |
| 15 | 11.94 | .07 |
| 20 | 12.87 | .00 |
| 30 | 13.51 | .03 |
| 40 | 13.17 | .15 |
| 50 | 12.17 | .26 |
| 60 | 10.57 | .32 |
| 70 | 8.49 | .34 |
| 80 | 6.09 | .27 |
| 90 | 3.37 | .12 |
| 95 | 1.91 | .06 |
| 100 | .40 | 0 |

FIGURE 48.—Göttingen 398-B airfoil.



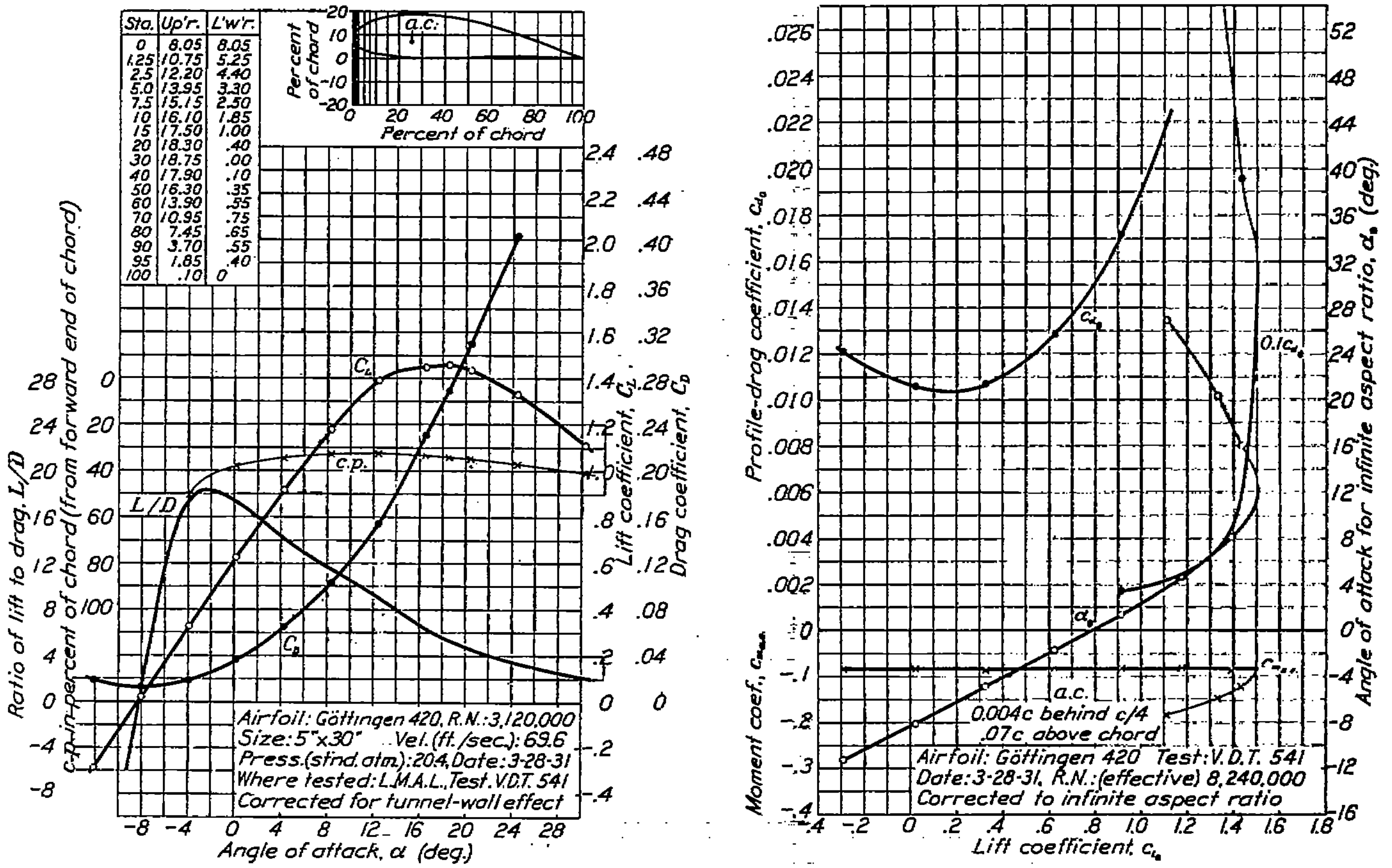

| Sta. | Up'r. | L'wr. |
|---|---|---|
| 0 | 3.74 | 3.74 |
| 1.25 | 6.20 | 1.89 |
| 2.5 | 7.40 | 1.28 |
| 5.0 | 9.17 | .69 |
| 7.5 | 10.37 | .35 |
| 10 | 11.25 | .18 |
| 15 | 12.53 | .03 |
| 20 | 13.34 | .00 |
| 30 | 13.80 | .05 |
| 40 | 13.30 | .13 |
| 50 | 12.08 | .06 |
| 60 | 10.39 | .09 |
| 70 | 8.42 | .24 |
| 80 | 6.50 | .65 |
| 90 | 4.77 | 1.50 |
| 95 | 4.02 | 2.16 |
| 100 | 3.40 | 3.00 |

FIGURE 49.—Göttingen 398-R airfoil.




| Sta. | Up'r. | L'wr. |
|---|---|---|
| 0 | 5.93 | 5.93 |
| 1.25 | 8.89 | 3.23 |
| 2.5 | 10.24 | 2.32 |
| 5.0 | 11.75 | 1.56 |
| 7.5 | 12.94 | .95 |
| 10 | 13.91 | .49 |
| 15 | 15.31 | .09 |
| 20 | 16.12 | .00 |
| 30 | 16.63 | .18 |
| 40 | 15.85 | .59 |
| 50 | 14.15 | .97 |
| 60 | 11.85 | 1.35 |
| 70 | 9.22 | 1.40 |
| 80 | 6.11 | 1.34 |
| 90 | 3.05 | .94 |
| 95 | 1.56 | .54 |
| 100 | .16 | 0 |

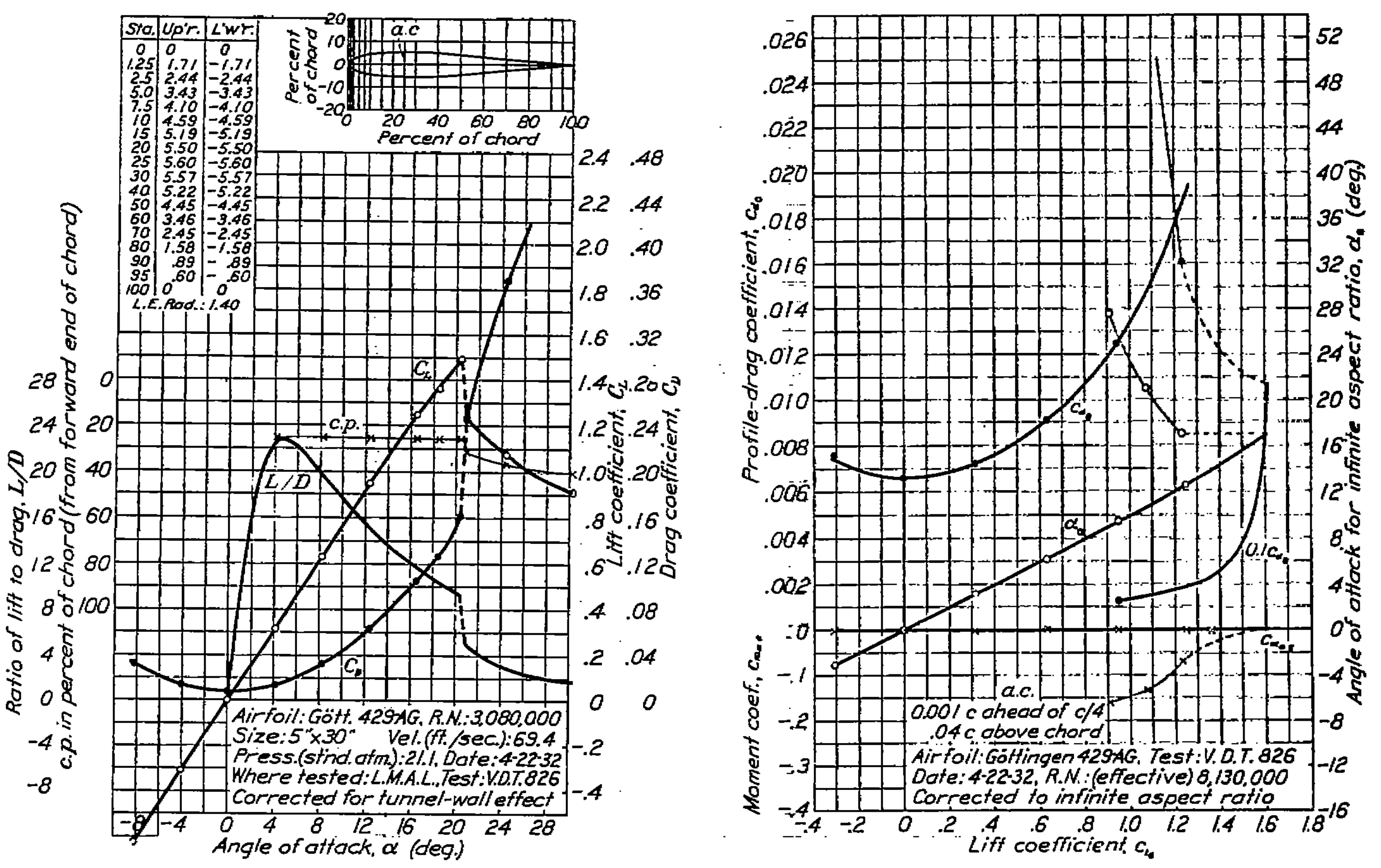
FIGURE 50.—Göttingen 413 airfoil.



| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 8.05 | 8.05 |
| 1.25 | 10.75 | 5.25 |
| 2.5 | 12.20 | 4.40 |
| 5.0 | 13.95 | 3.30 |
| 7.5 | 15.15 | 2.50 |
| 10 | 16.10 | 1.85 |
| 15 | 17.50 | 1.00 |
| 20 | 18.30 | .40 |
| 30 | 18.75 | .00 |
| 40 | 17.90 | .10 |
| 50 | 16.30 | .35 |
| 60 | 13.90 | .55 |
| 70 | 10.95 | .75 |
| 80 | 7.45 | .65 |
| 90 | 3.70 | .55 |
| 95 | 1.85 | .40 |
| 100 | .10 | 0 |



FIGURE 51.—Göttingen 420 airfoil.



| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 0 | 0 |
| 1.25 | 1.71 | -1.71 |
| 2.5 | 2.44 | -2.44 |
| 5.0 | 3.43 | -3.43 |
| 7.5 | 4.10 | -4.10 |
| 10 | 4.59 | -4.59 |
| 15 | 5.19 | -5.19 |
| 20 | 5.50 | -5.50 |
| 25 | 5.60 | -5.60 |
| 30 | 5.57 | -5.57 |
| 40 | 5.22 | -5.22 |
| 50 | 4.45 | -4.45 |
| 60 | 3.46 | -3.46 |
| 70 | 2.45 | -2.45 |
| 80 | 1.58 | -1.58 |
| 90 | .89 | - .89 |
| 95 | .60 | - .60 |
| 100 | 0 | 0 |

L.E. Rad.: 1.40



FIGURE 52.—Göttingen 429-AG airfoil.

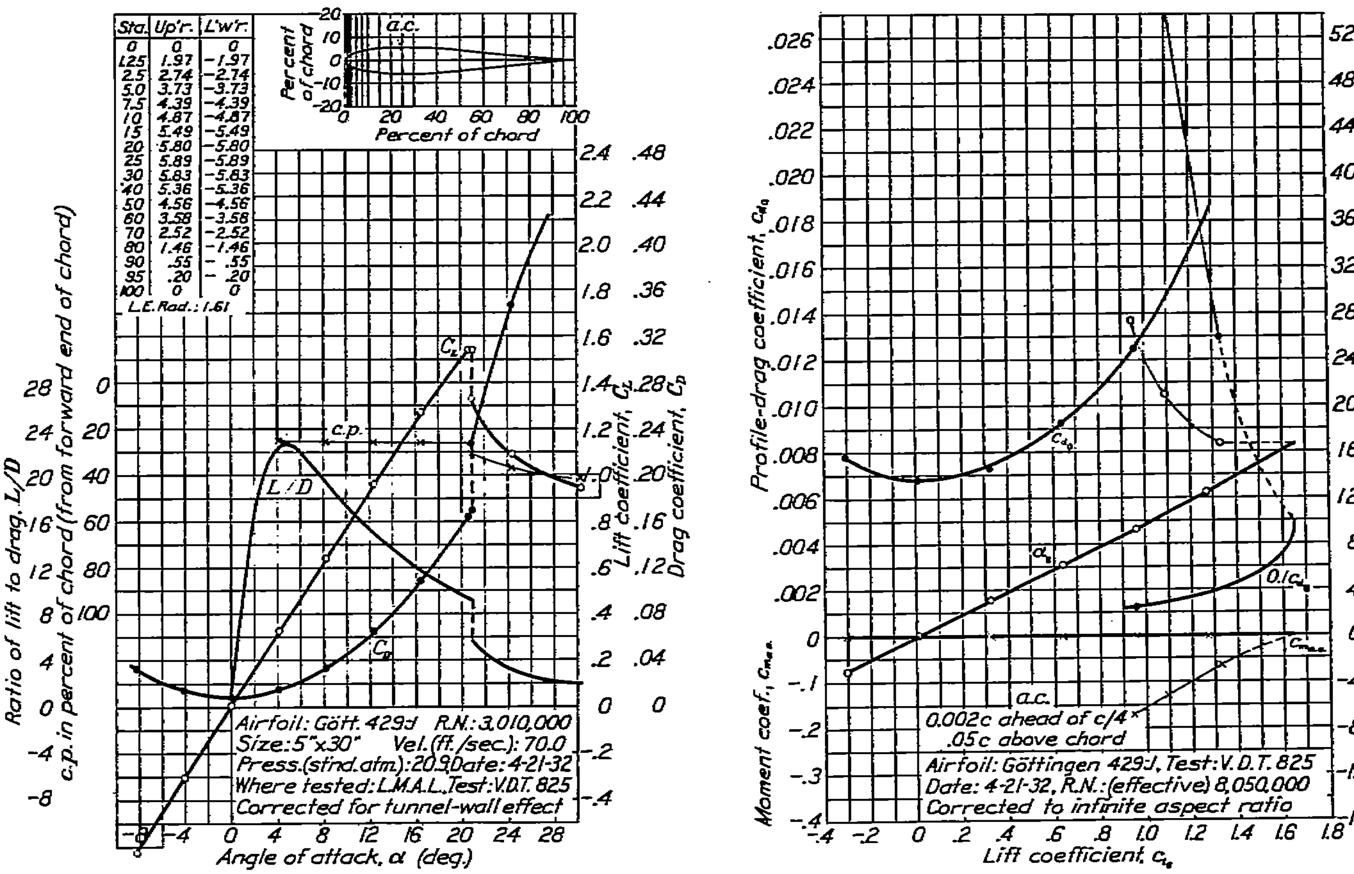



FIGURE 53.—Göttingen 429-J airfoil.

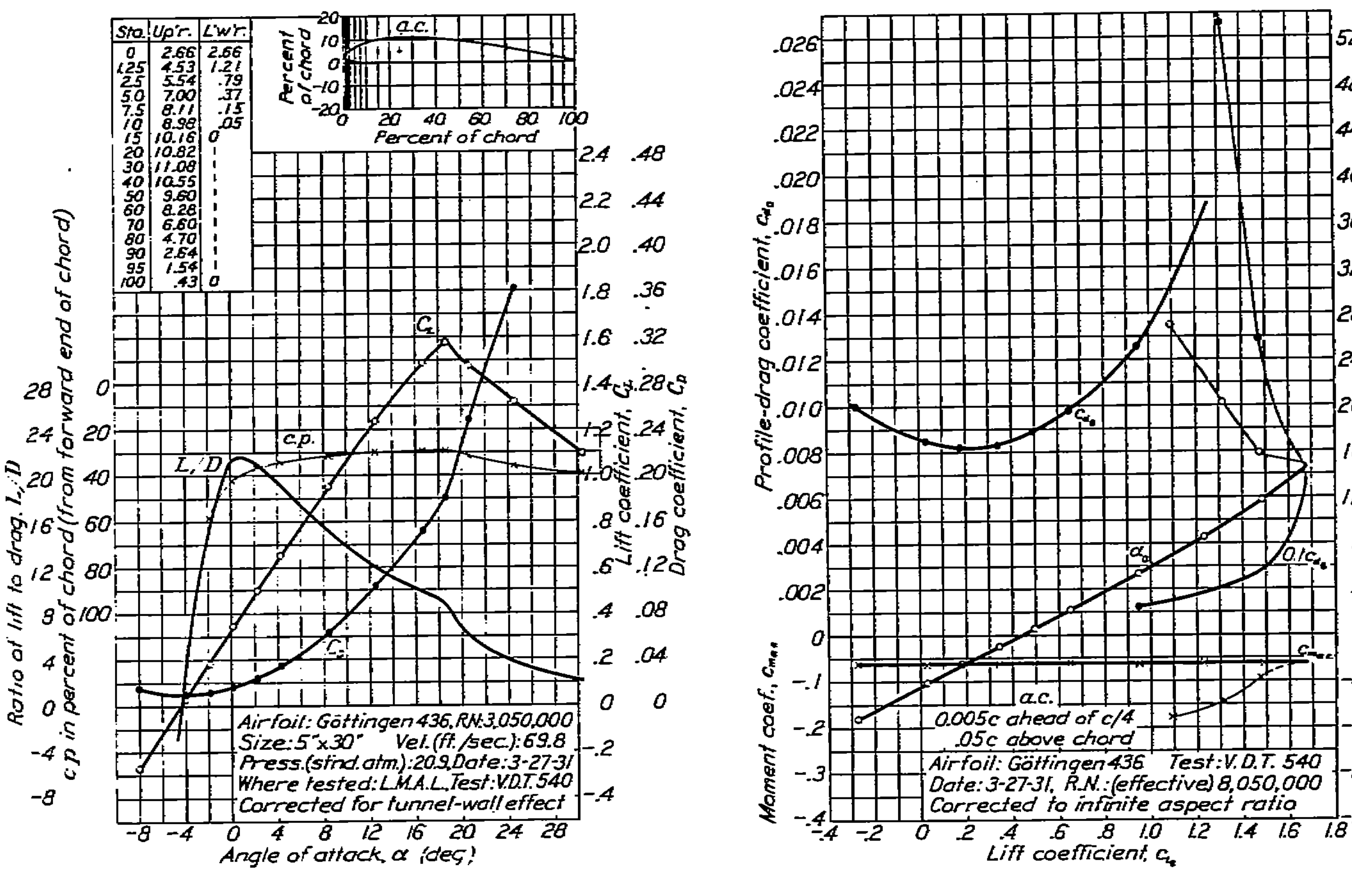



FIGURE 54.—Göttingen 436 airfoil.

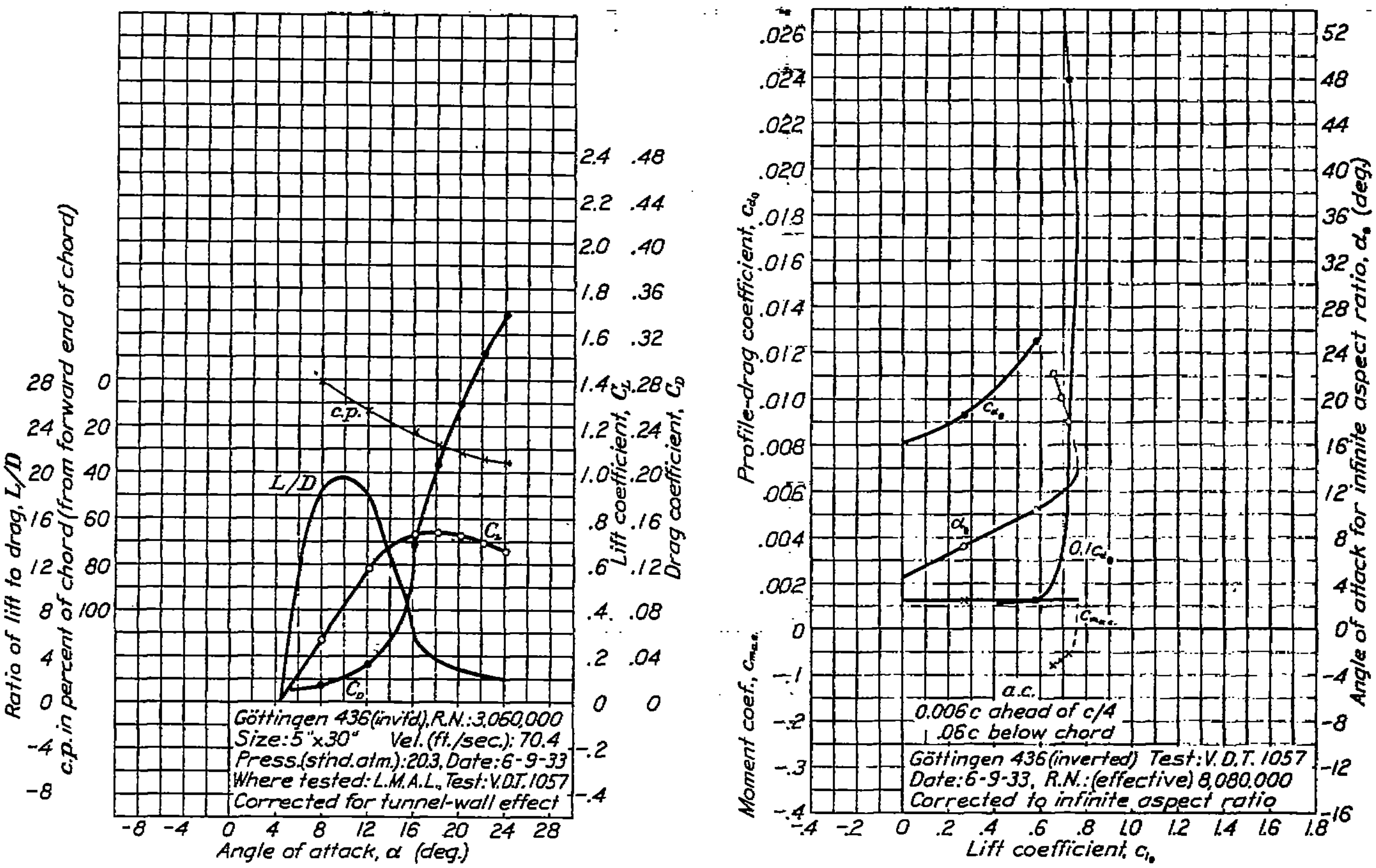
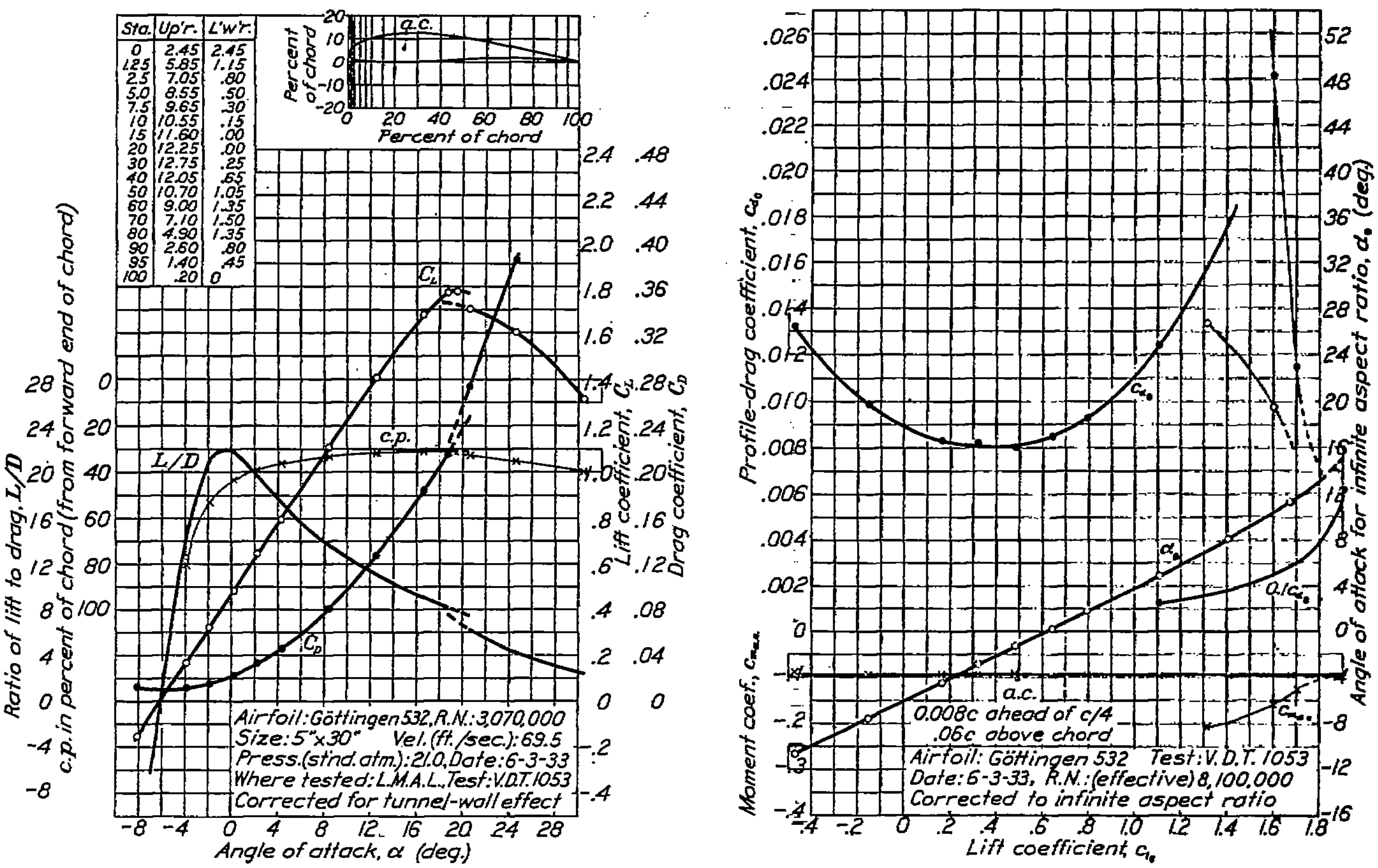



FIGURE 55.—Göttingen 436 airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 2.45 | 2.45 |
| 1.25 | 5.85 | 1.15 |
| 2.5 | 7.05 | .80 |
| 5.0 | 8.55 | .50 |
| 7.5 | 9.65 | .30 |
| 10 | 10.55 | .15 |
| 15 | 11.60 | .00 |
| 20 | 12.25 | .00 |
| 30 | 12.75 | .25 |
| 40 | 12.05 | .65 |
| 50 | 10.70 | 1.05 |
| 60 | 9.00 | 1.35 |
| 70 | 7.10 | 1.50 |
| 80 | 4.90 | 1.35 |
| 90 | 2.60 | .80 |
| 95 | 1.40 | .45 |
| 100 | .20 | 0 |

FIGURE 56.—Göttingen 532 airfoil.

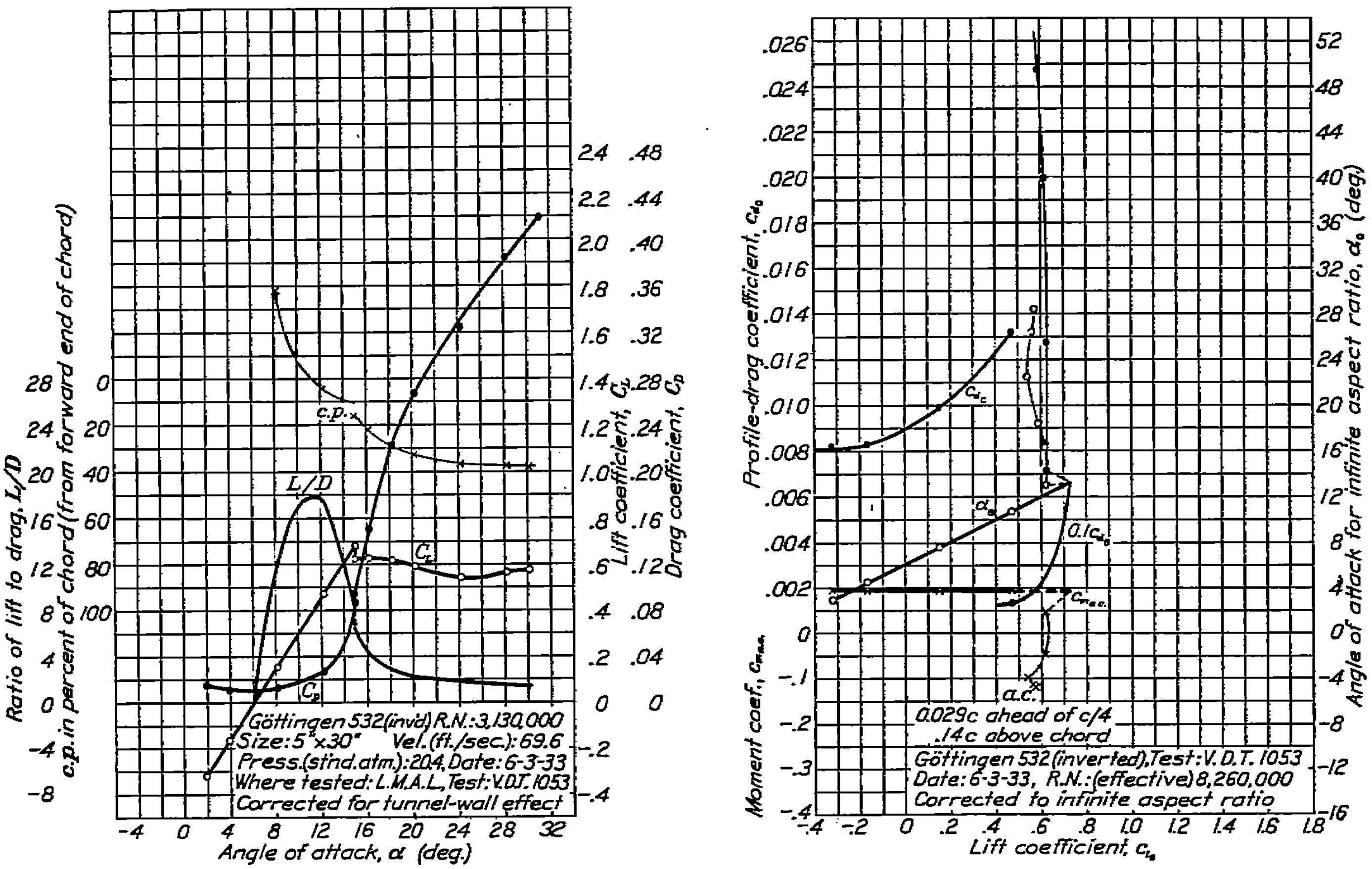
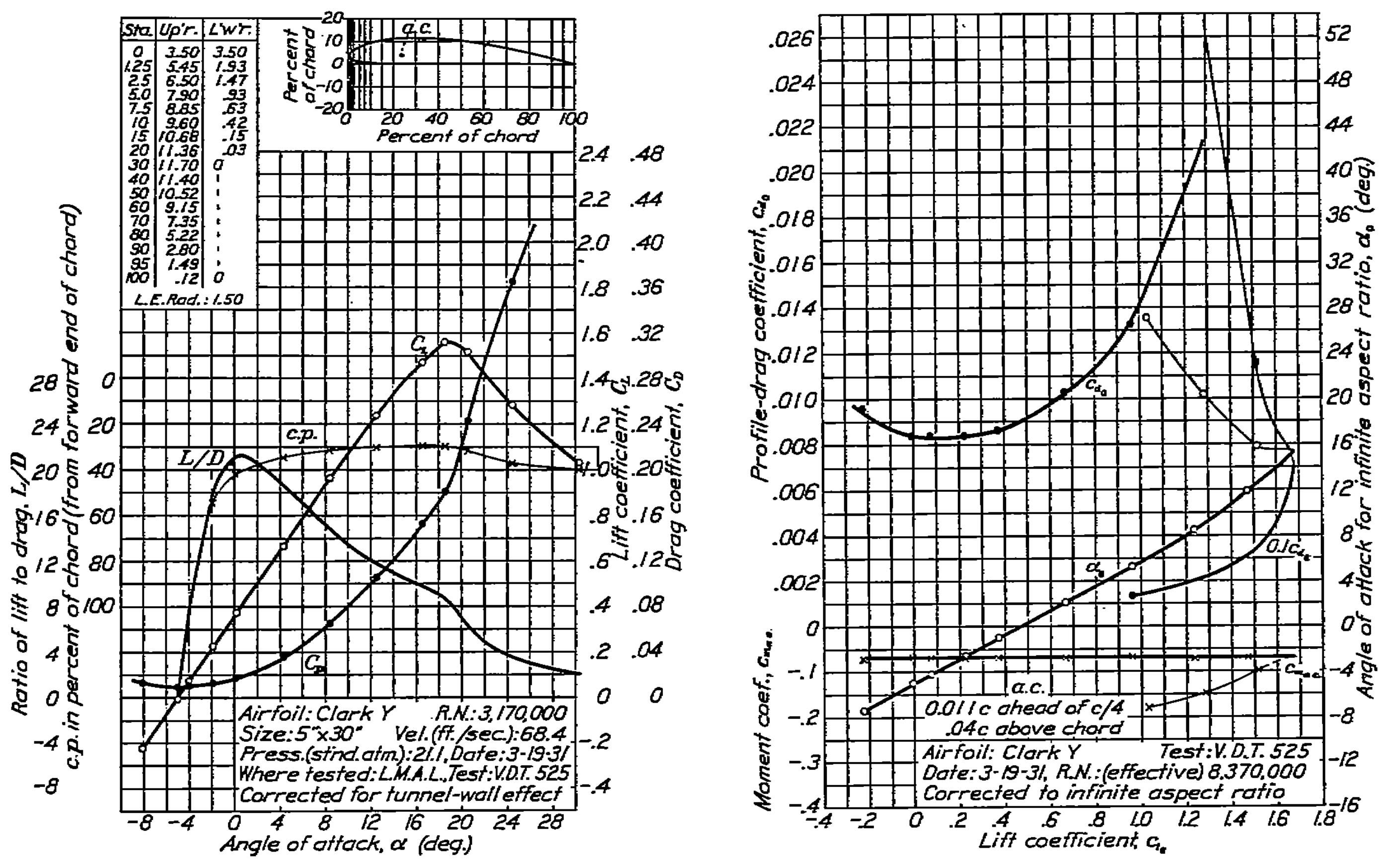



FIGURE 57.—Göttingen 532 airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 3.50 | 3.50 |
| 1.25 | 5.45 | 1.93 |
| 2.5 | 6.50 | 1.47 |
| 5.0 | 7.90 | .93 |
| 7.5 | 8.85 | .63 |
| 10 | 9.60 | .42 |
| 15 | 10.68 | .15 |
| 20 | 11.36 | .03 |
| 30 | 11.70 | 0 |
| 40 | 11.40 | |
| 50 | 10.52 | |
| 60 | 9.15 | |
| 70 | 7.35 | |
| 80 | 5.22 | |
| 90 | 2.80 | |
| 95 | 1.49 | |
| 100 | .12 | 0 |

L.E.Rad.: 1.50

FIGURE 58.—Clark Y airfoil.

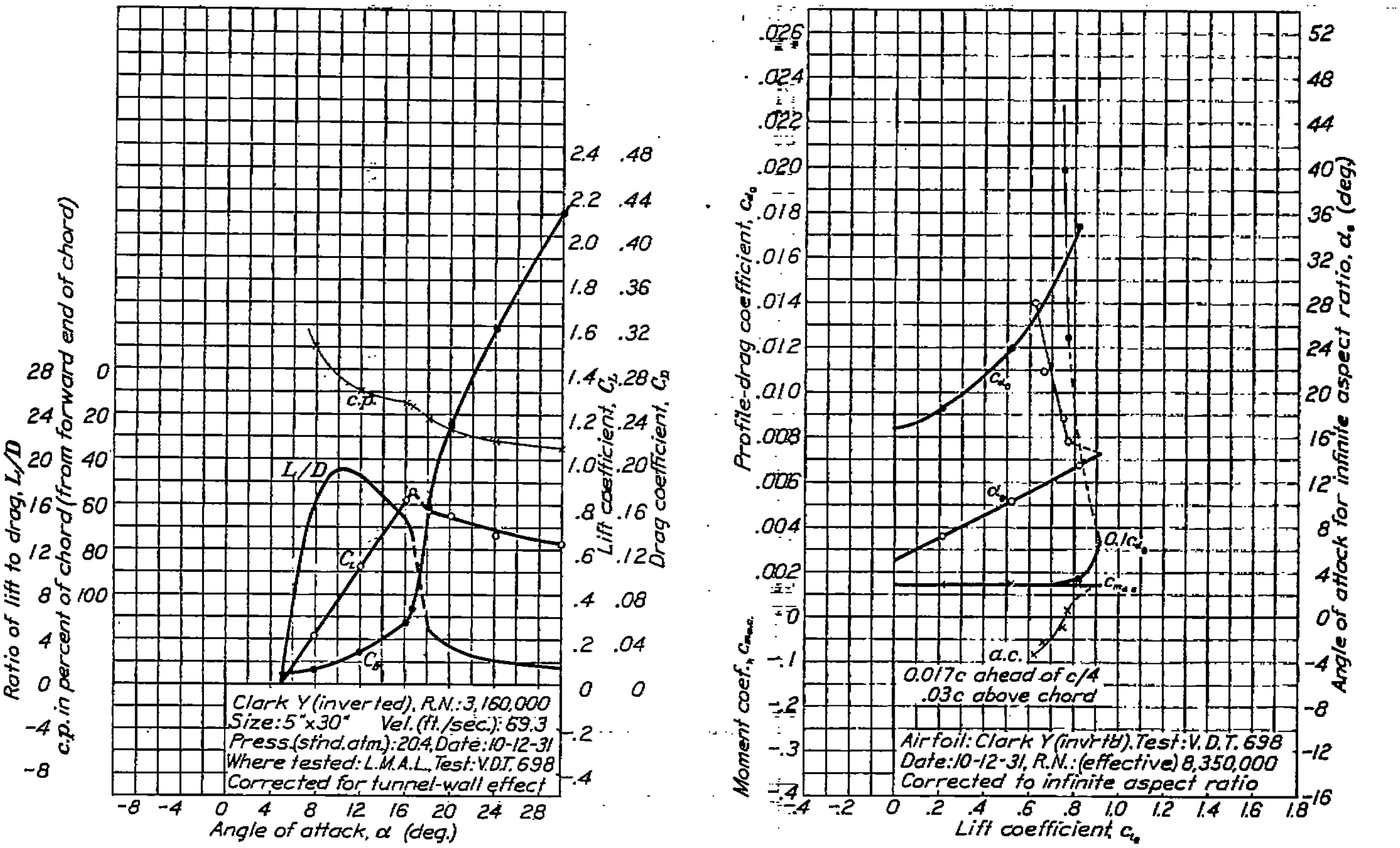



FIGURE 59.—Clark Y airfoil (inverted).

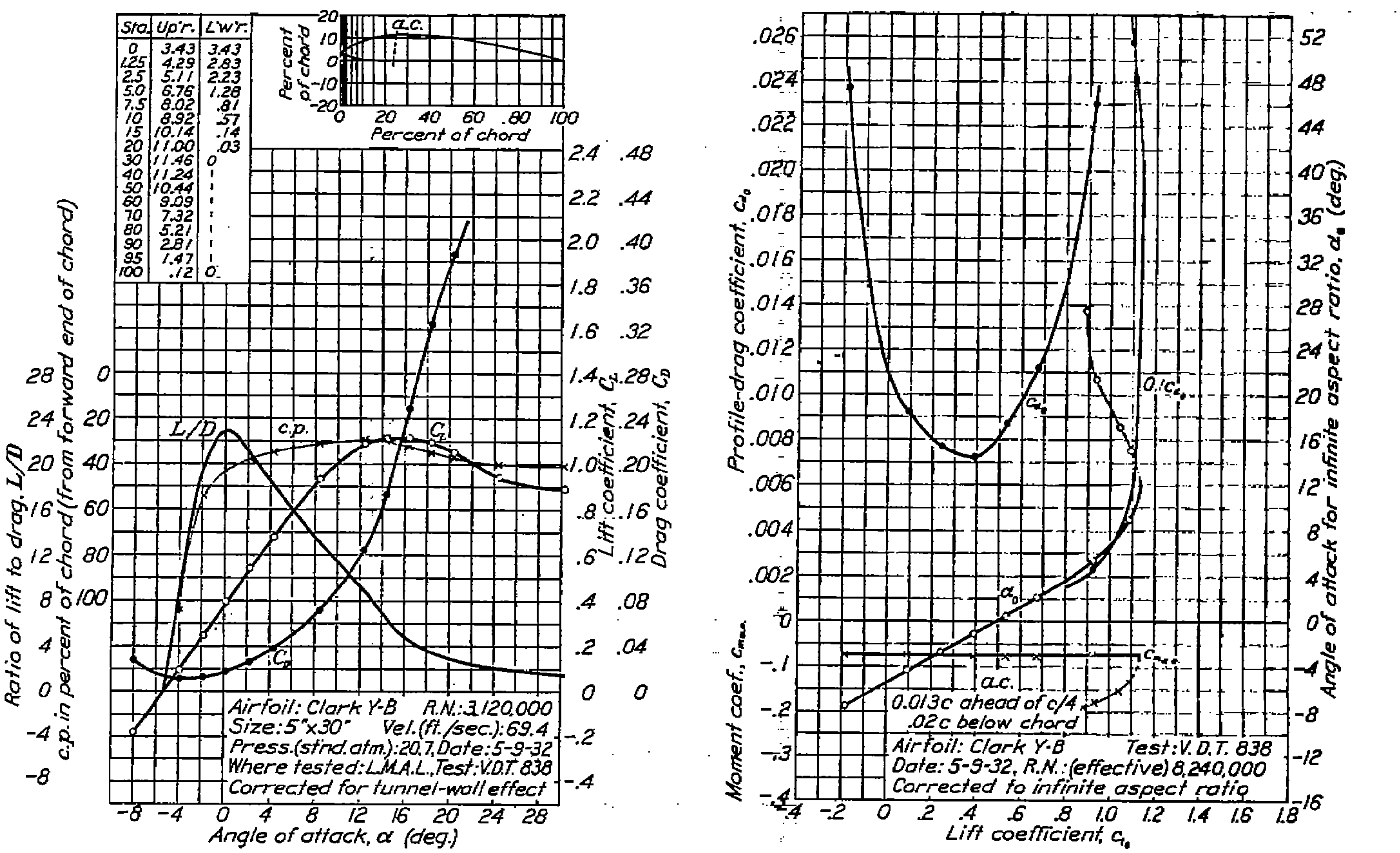



FIGURE 60.—Clark Y-B airfoil.

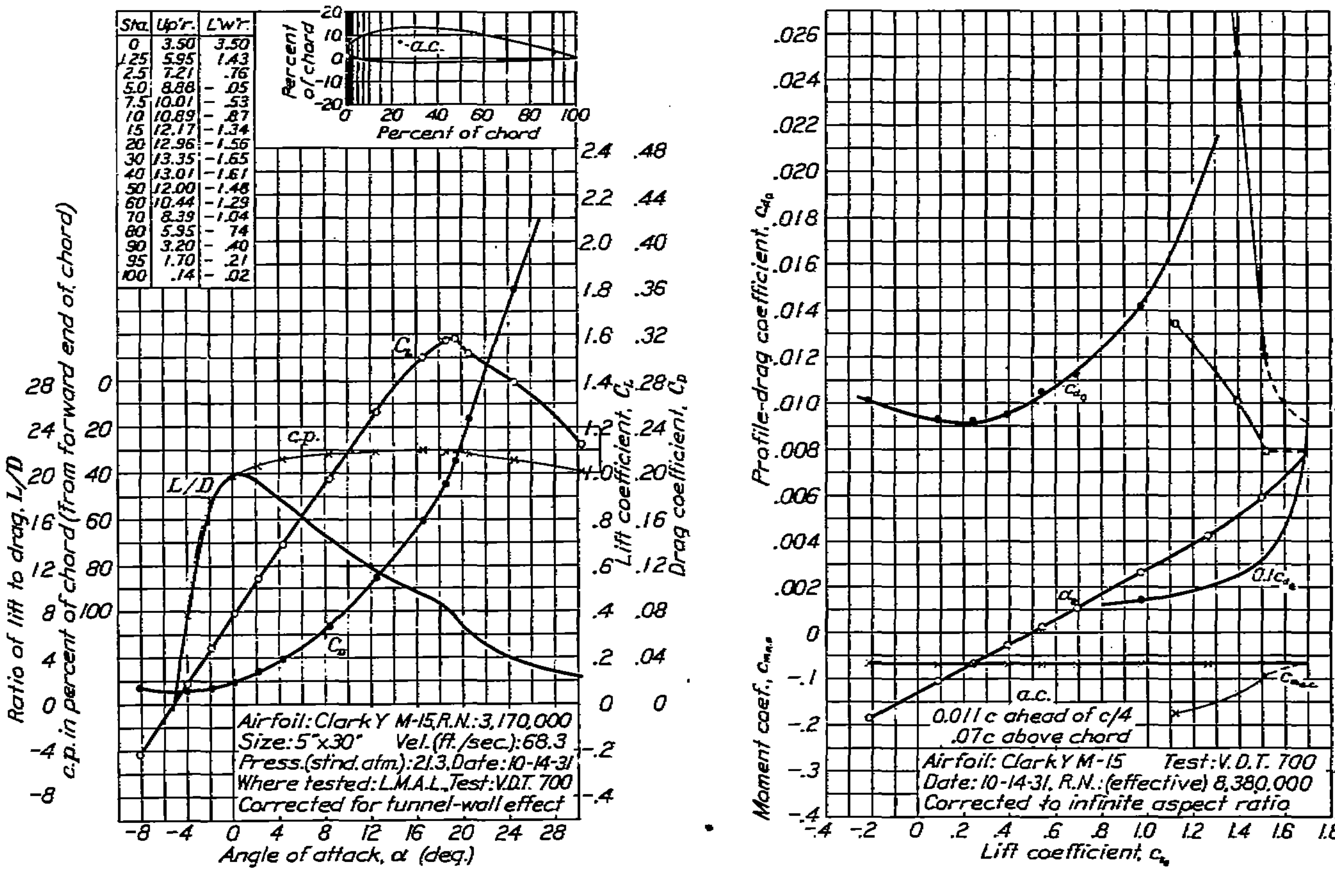



FIGURE 61.—Clark Y M-15 airfoil.

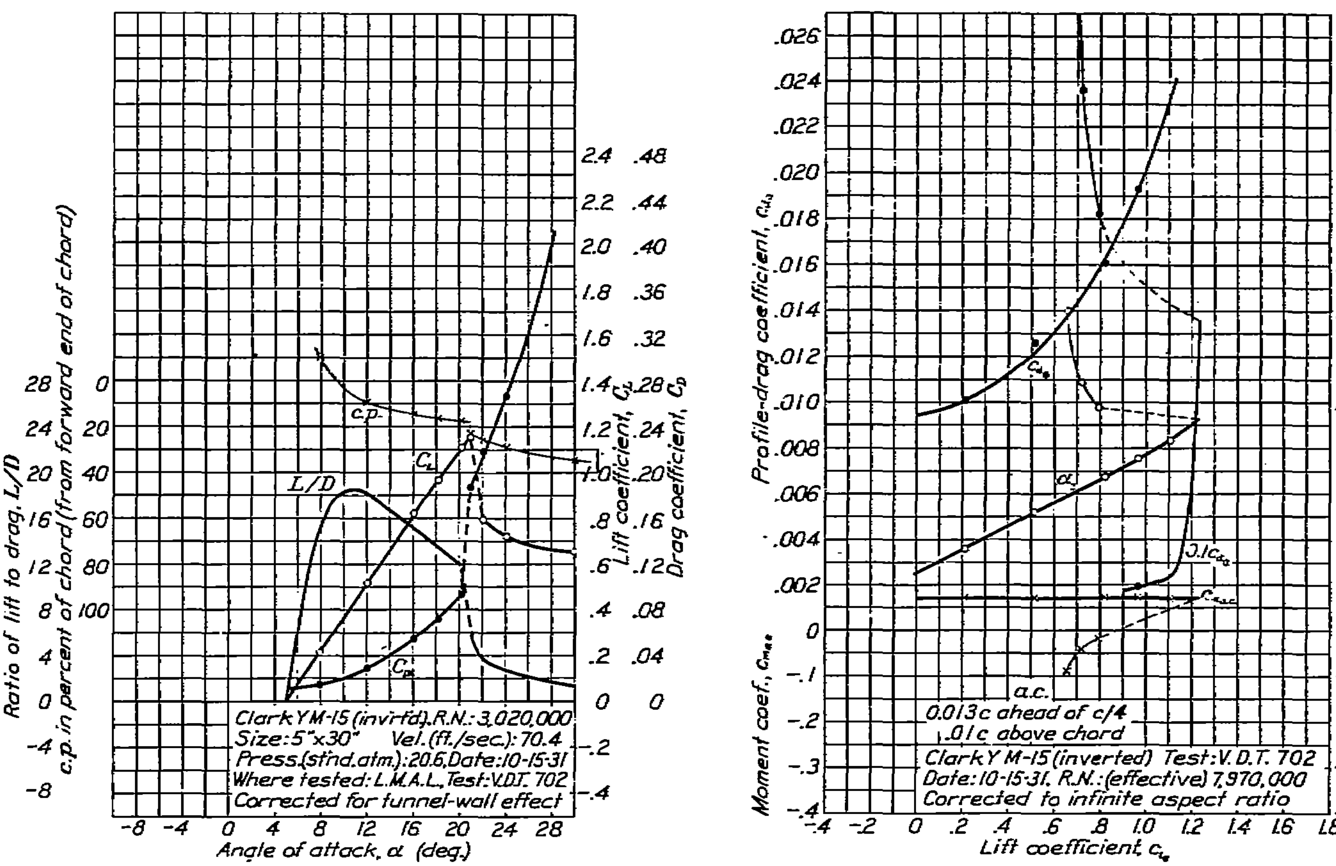
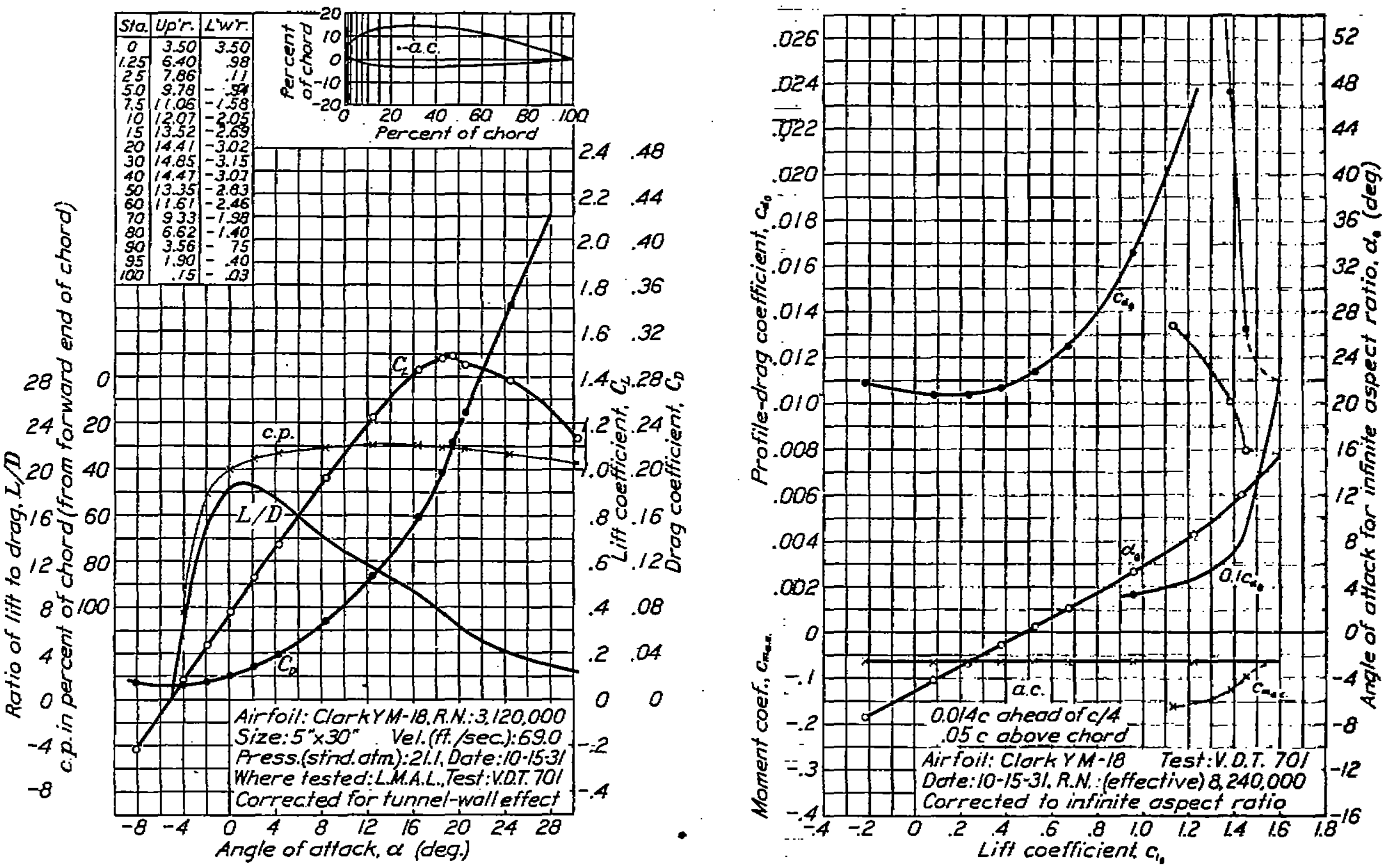



FIGURE 62.—Clark Y M-15 airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
| --- | --- | --- |
| 0 | 3.50 | 3.50 |
| 1.25 | 6.40 | .98 |
| 2.5 | 7.86 | .11 |
| 5.0 | 9.78 | -.94 |
| 7.5 | 11.06 | -1.58 |
| 10 | 12.07 | -2.05 |
| 15 | 13.52 | -2.69 |
| 20 | 14.41 | -3.02 |
| 30 | 14.85 | -3.15 |
| 40 | 14.47 | -3.07 |
| 50 | 13.35 | -2.83 |
| 60 | 11.61 | -2.46 |
| 70 | 9.33 | -1.98 |
| 80 | 6.62 | -1.40 |
| 90 | 3.56 | -.75 |
| 95 | 1.90 | -.40 |
| 100 | .15 | -.03 |

FIGURE 63.—Clark Y M-18 airfoil.

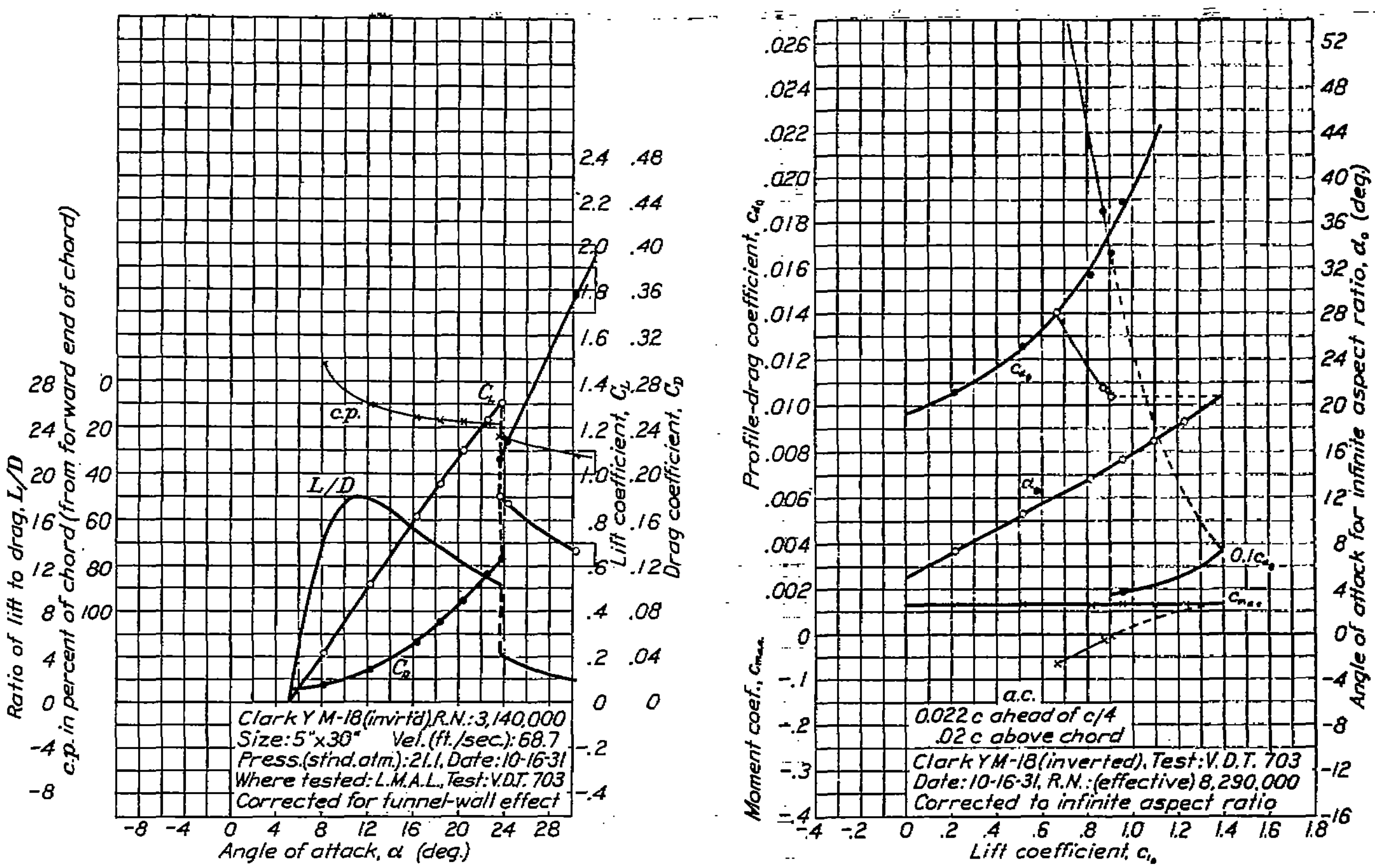



FIGURE 64.—Clark Y M-18 airfoil (inverted).

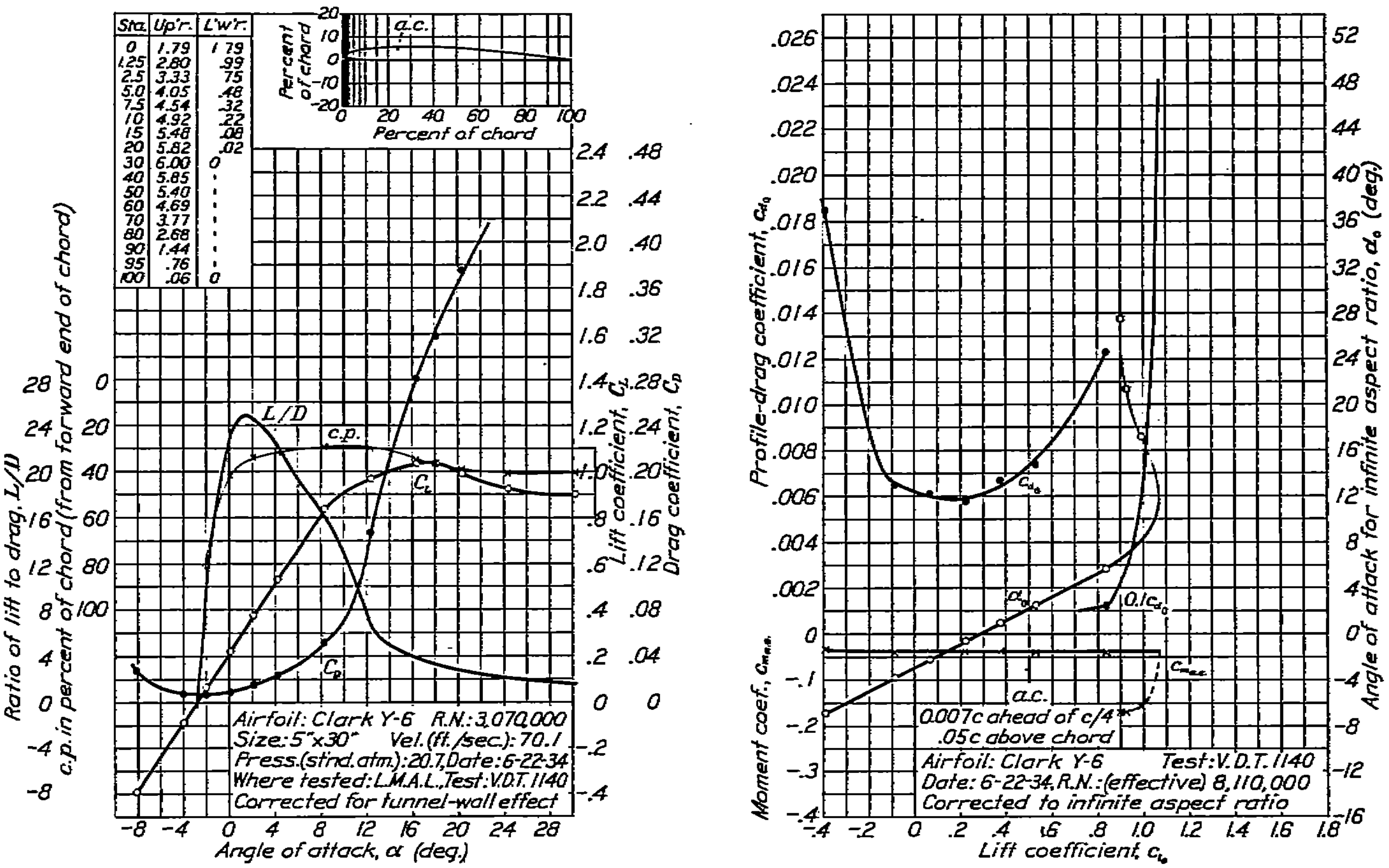



FIGURE 65.—Clark Y-6 airfoil.

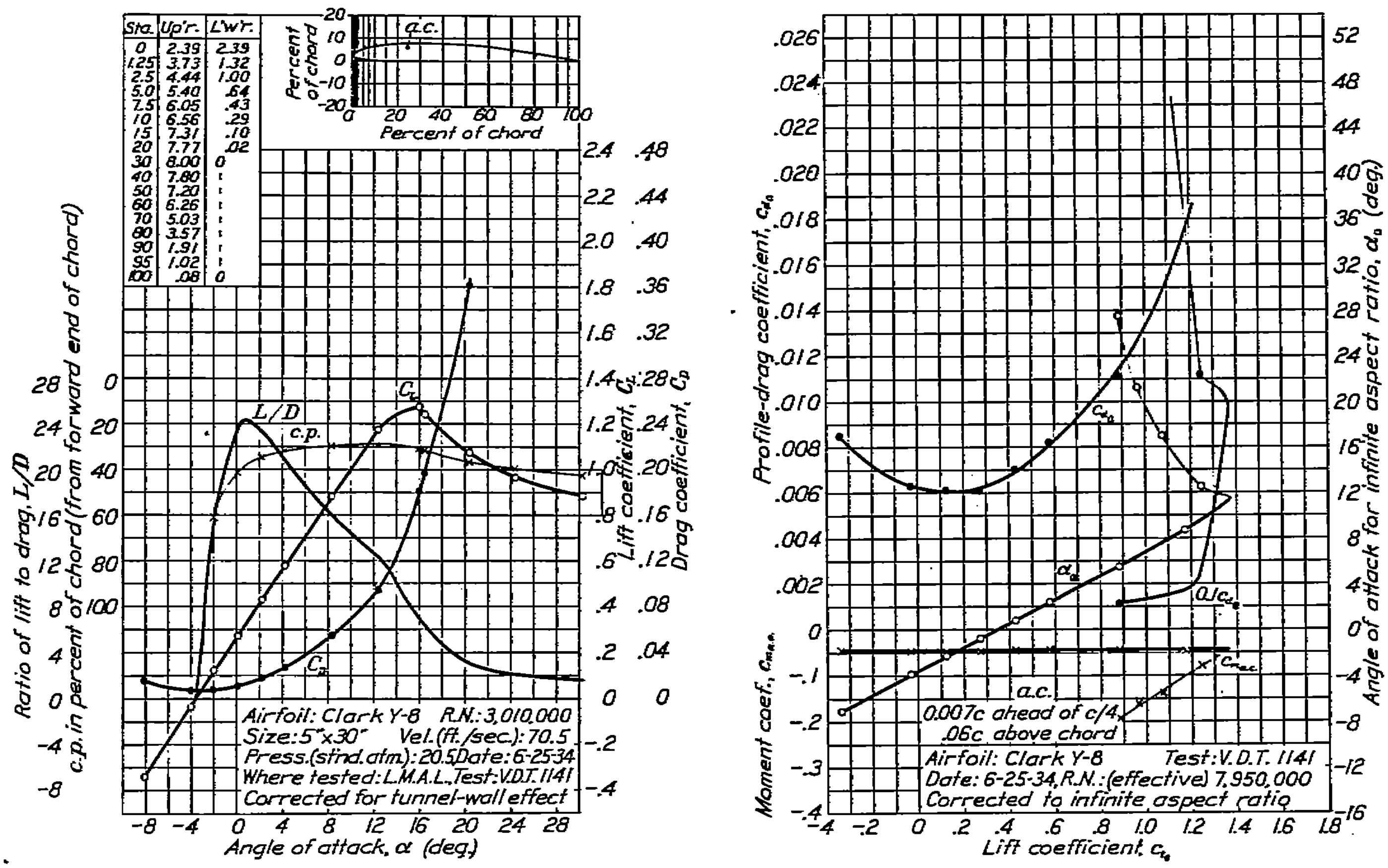



FIGURE 66.—Clark Y-8 airfoil.

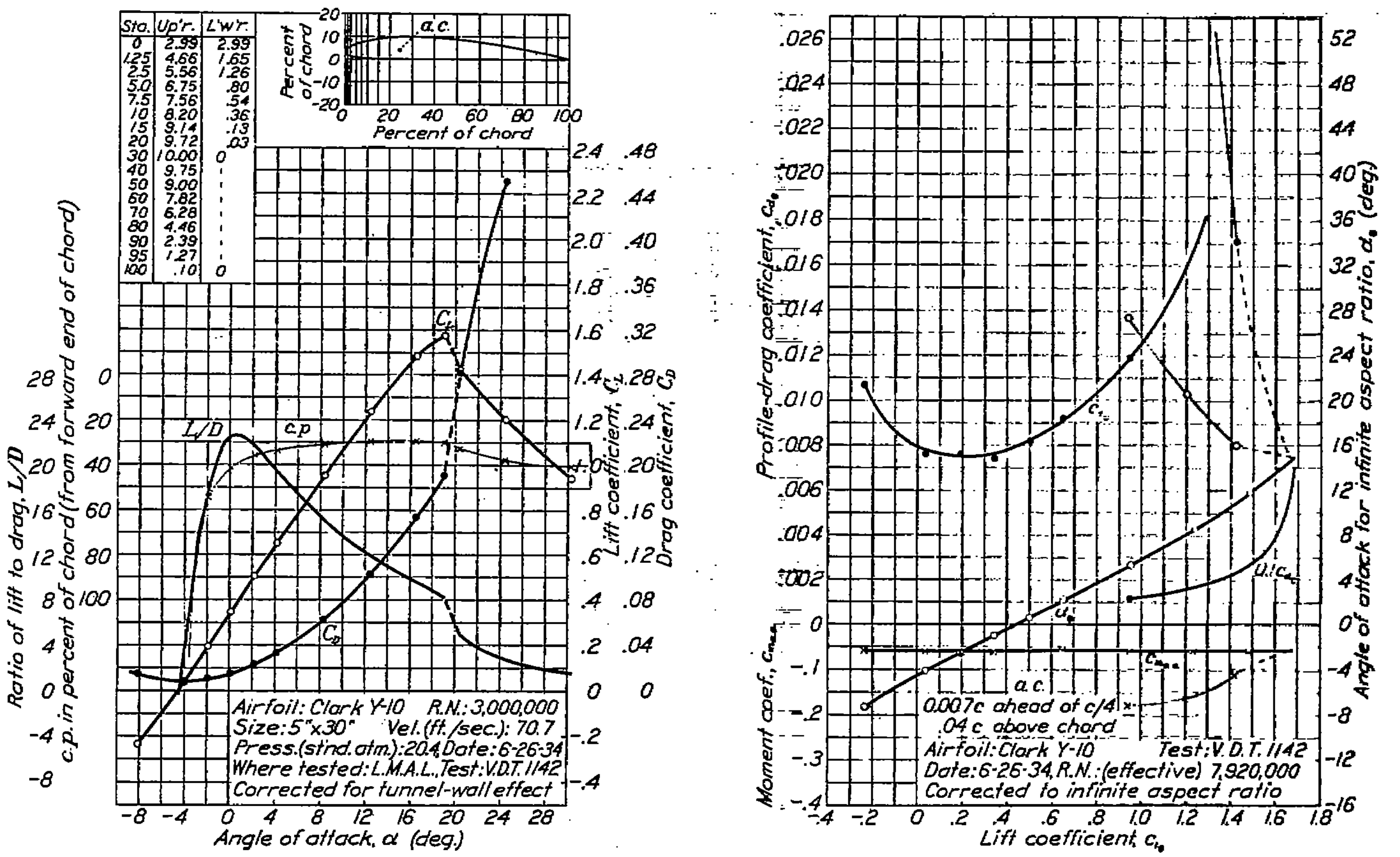



FIGURE 67.—Clark Y-10 airfoil.

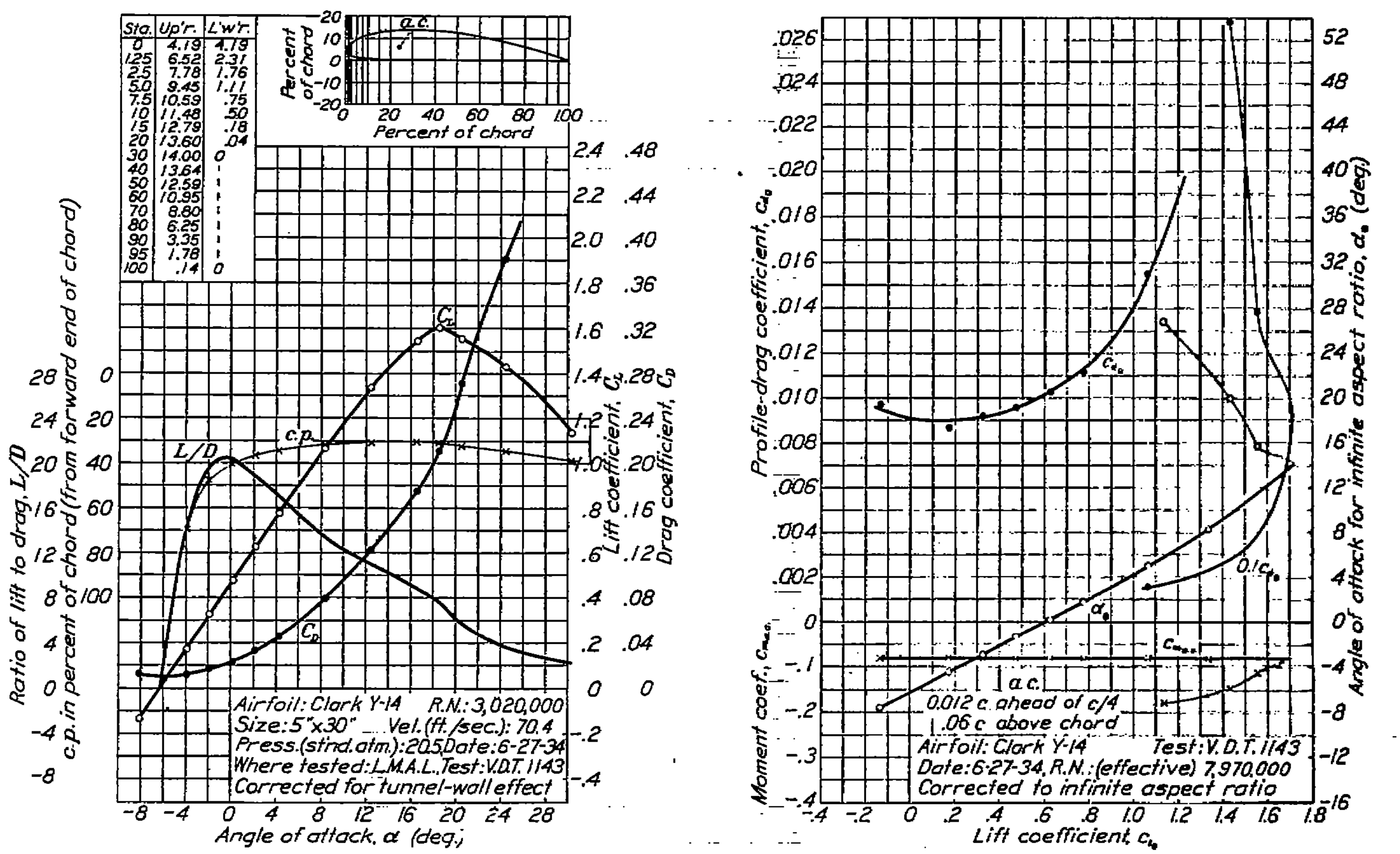



FIGURE 68.—Clark Y-14 airfoil.

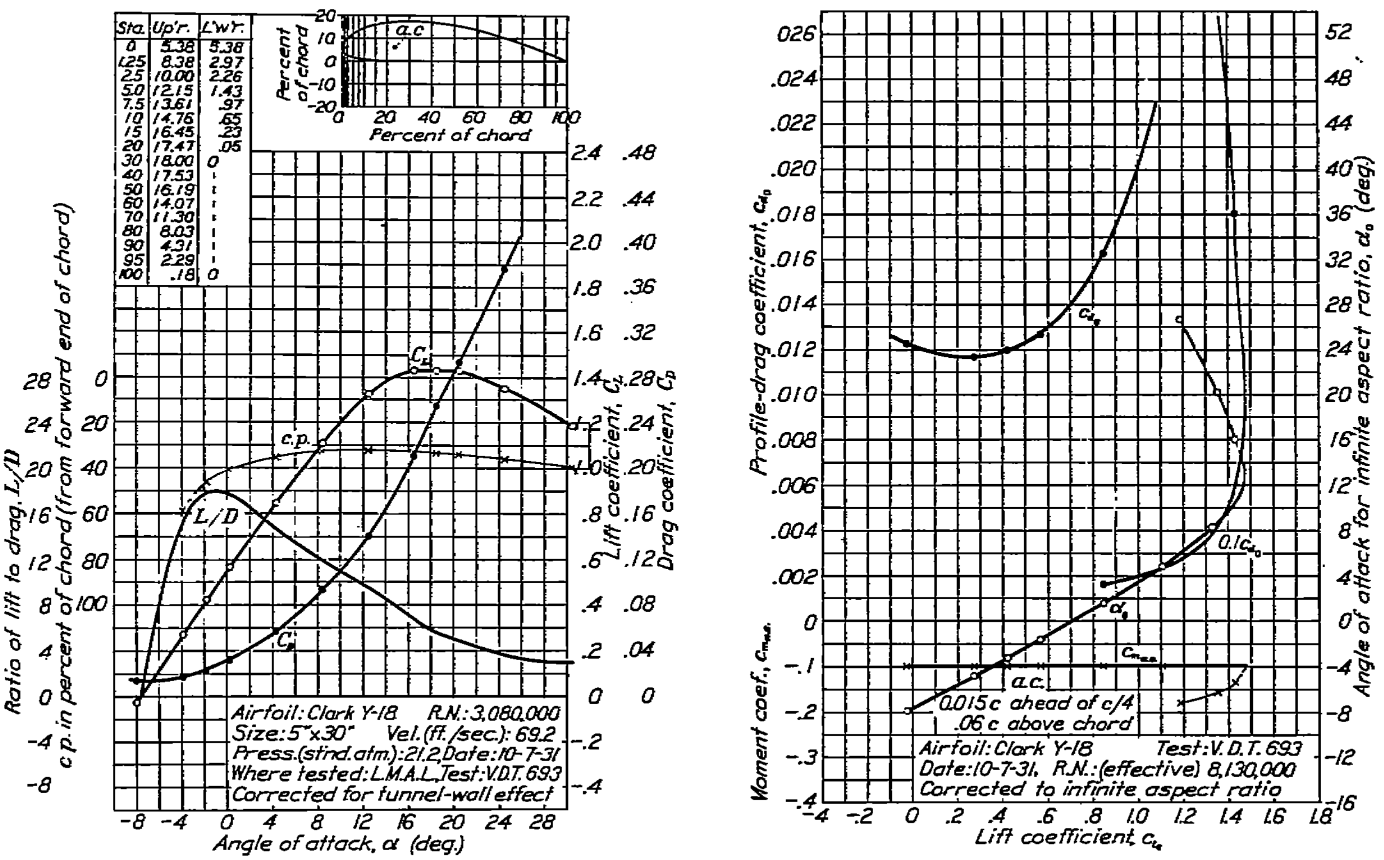



FIGURE 69.—Clark Y-18 airfoil.

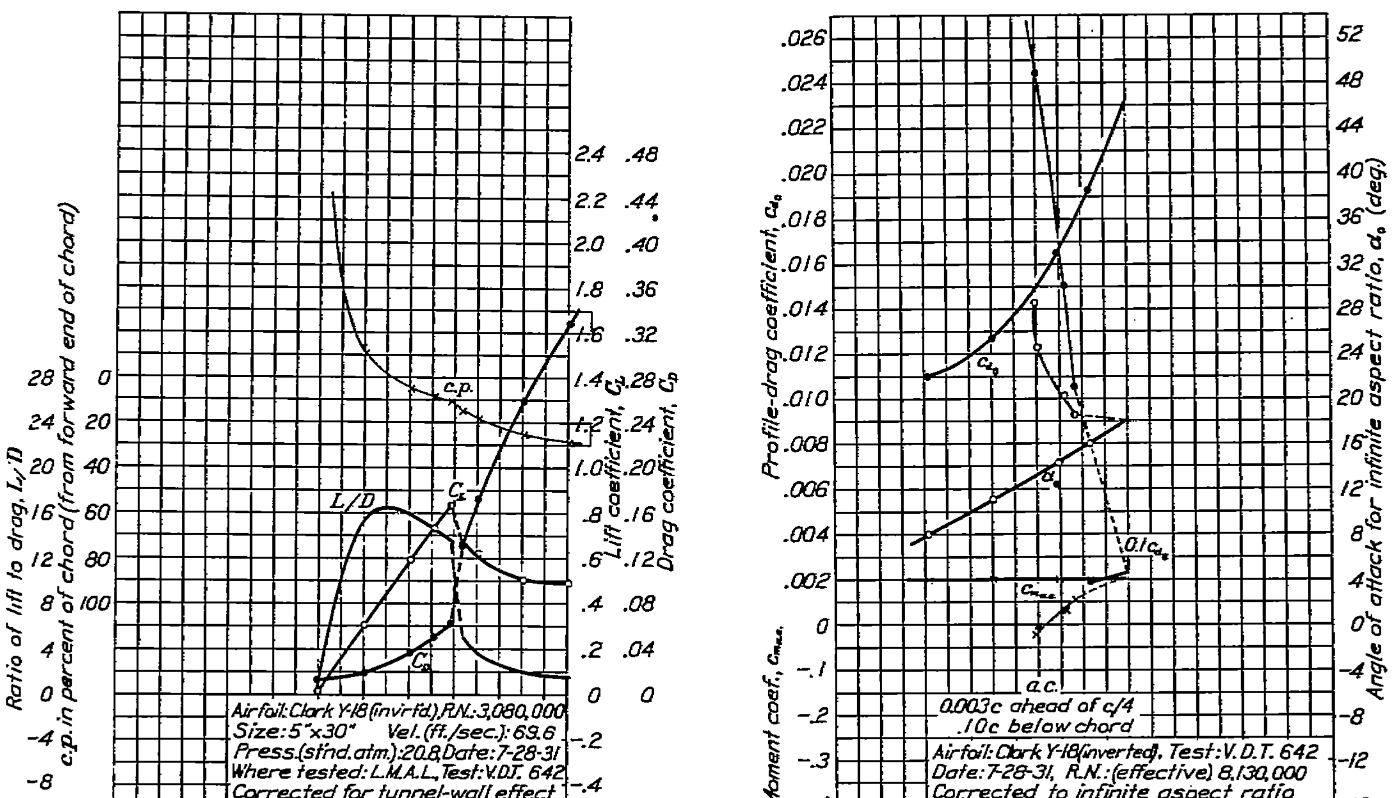



FIGURE 70.—Clark Y-18 airfoil (Inverted).

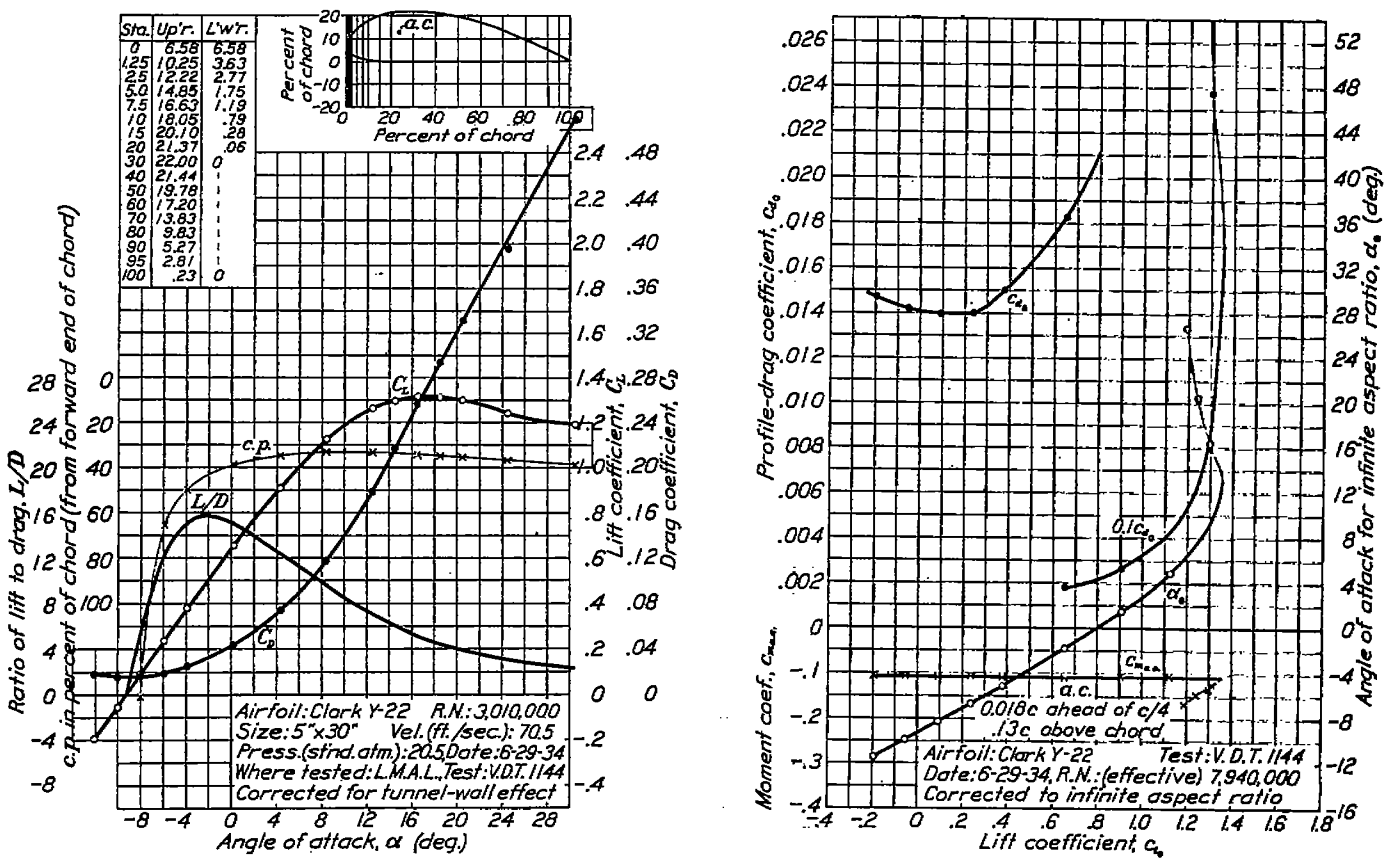



FIGURE 71.—Clark Y-22 airfoil.

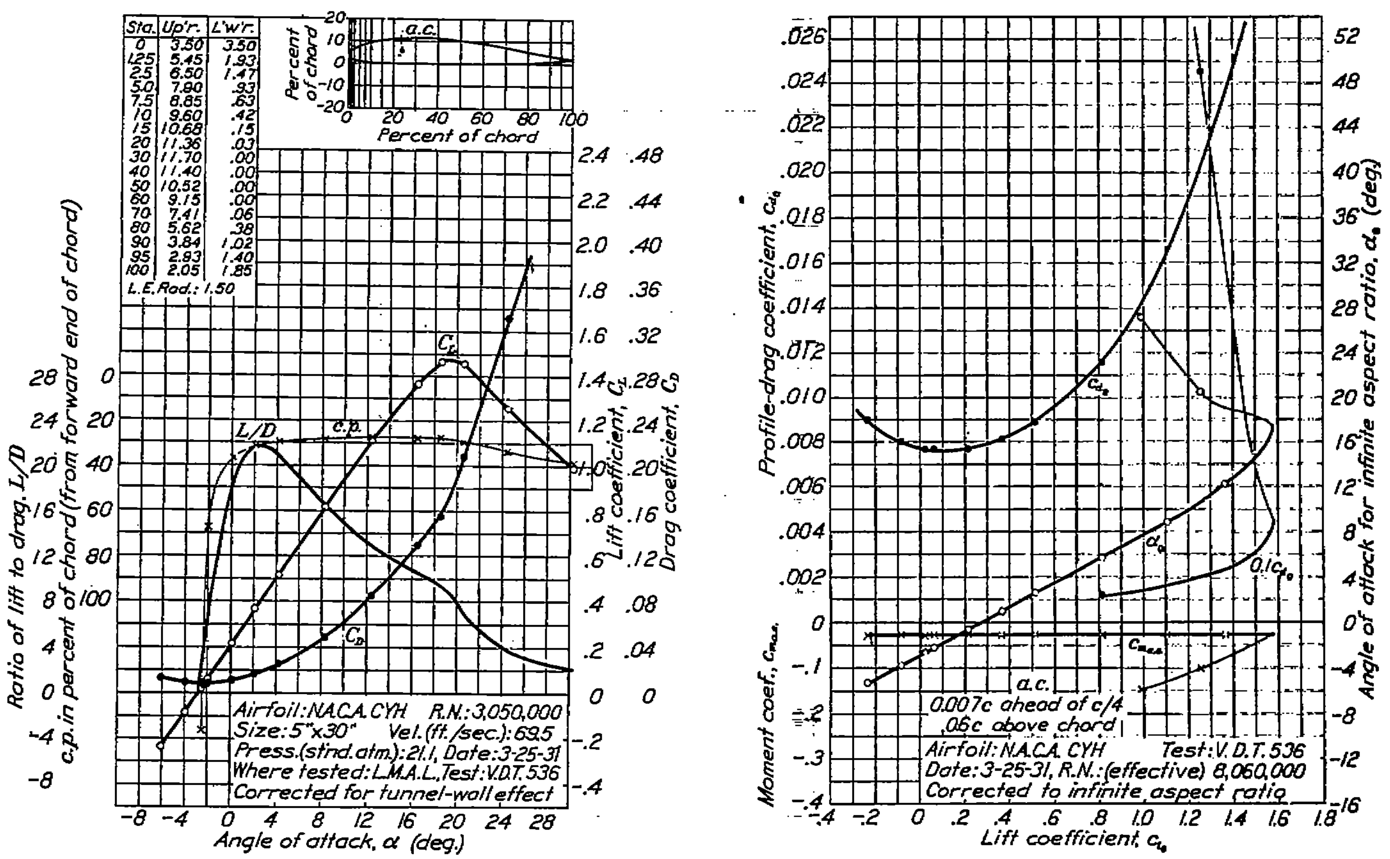



FIGURE 72.—N. A. C. A. CYH airfoil.

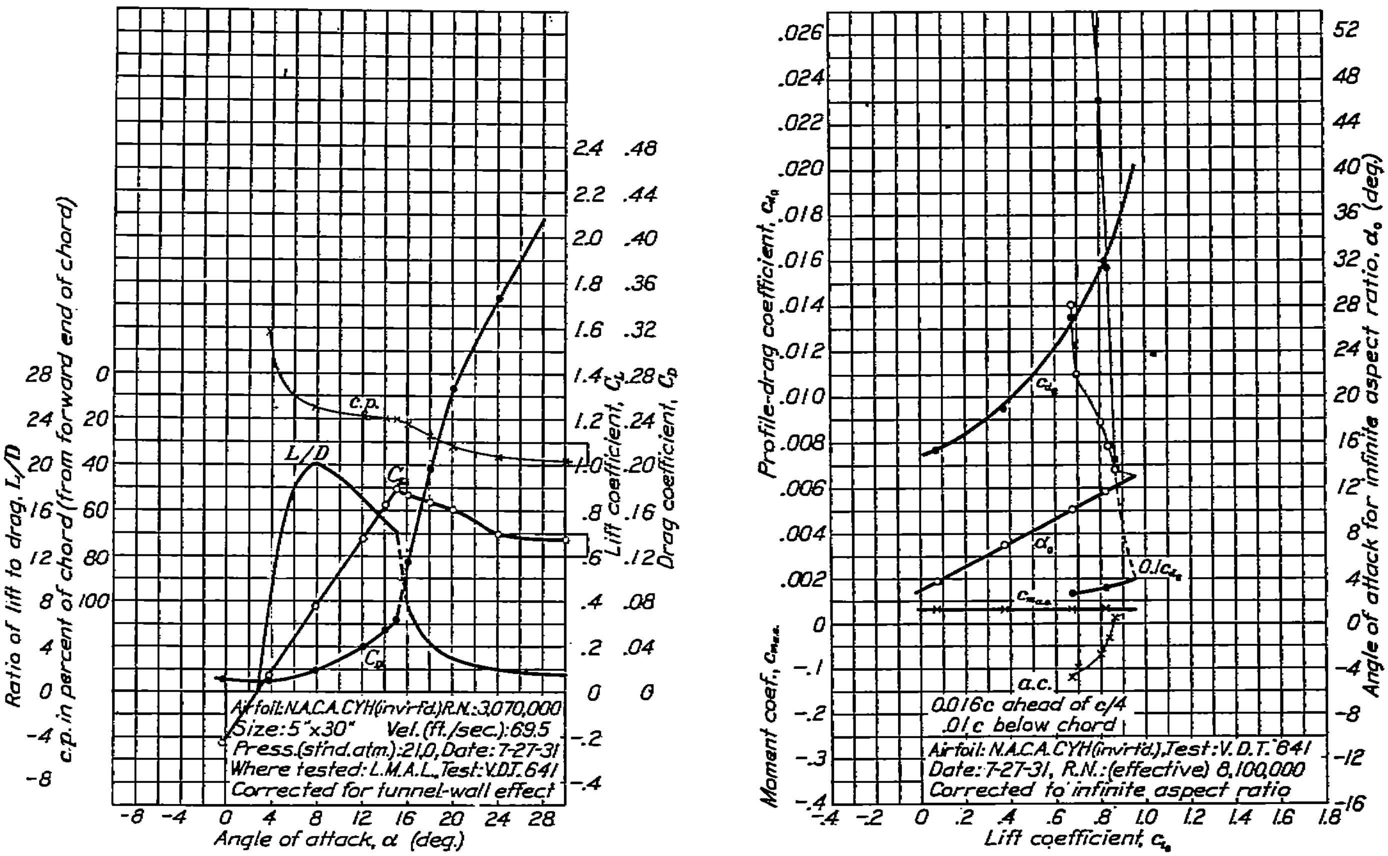
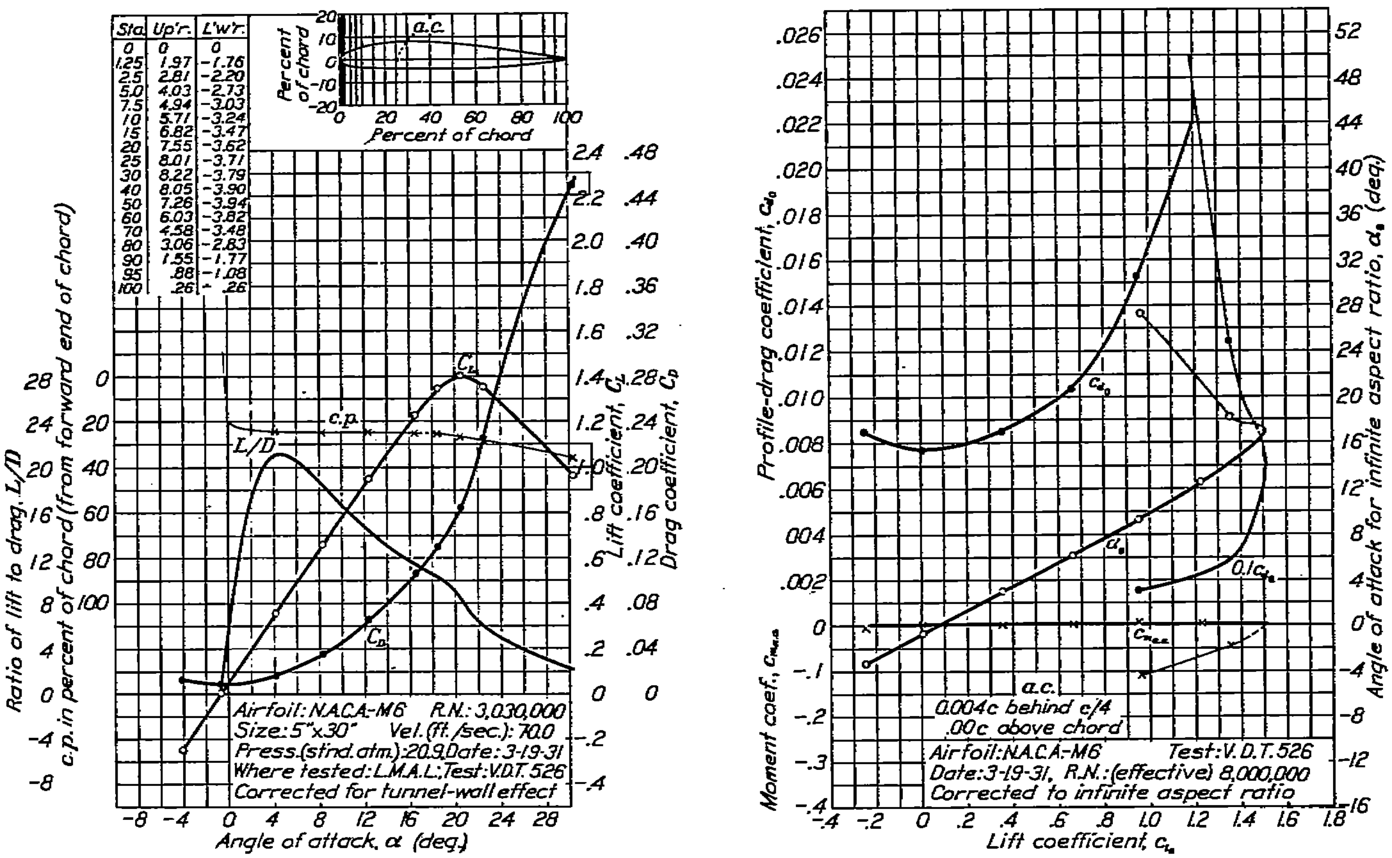



FIGURE 73.—N. A. C. A. CYH airfoil (inverted).




| Sta. | Up'r. | L'w'r. |
|---|---|---|
| 0 | 0 | 0 |
| 1.25 | 1.97 | -1.76 |
| 2.5 | 2.81 | -2.20 |
| 5.0 | 4.03 | -2.73 |
| 7.5 | 4.94 | -3.03 |
| 10 | 5.71 | -3.24 |
| 15 | 6.82 | -3.47 |
| 20 | 7.55 | -3.62 |
| 25 | 8.01 | -3.71 |
| 30 | 8.22 | -3.79 |
| 40 | 8.05 | -3.90 |
| 50 | 7.26 | -3.94 |
| 60 | 6.03 | -3.82 |
| 70 | 4.58 | -3.48 |
| 80 | 3.06 | -2.83 |
| 90 | 1.55 | -1.77 |
| 95 | .88 | -1.08 |
| 100 | .26 | - .26 |

FIGURE 74.—N. A. C. A.—M6 airfoil.

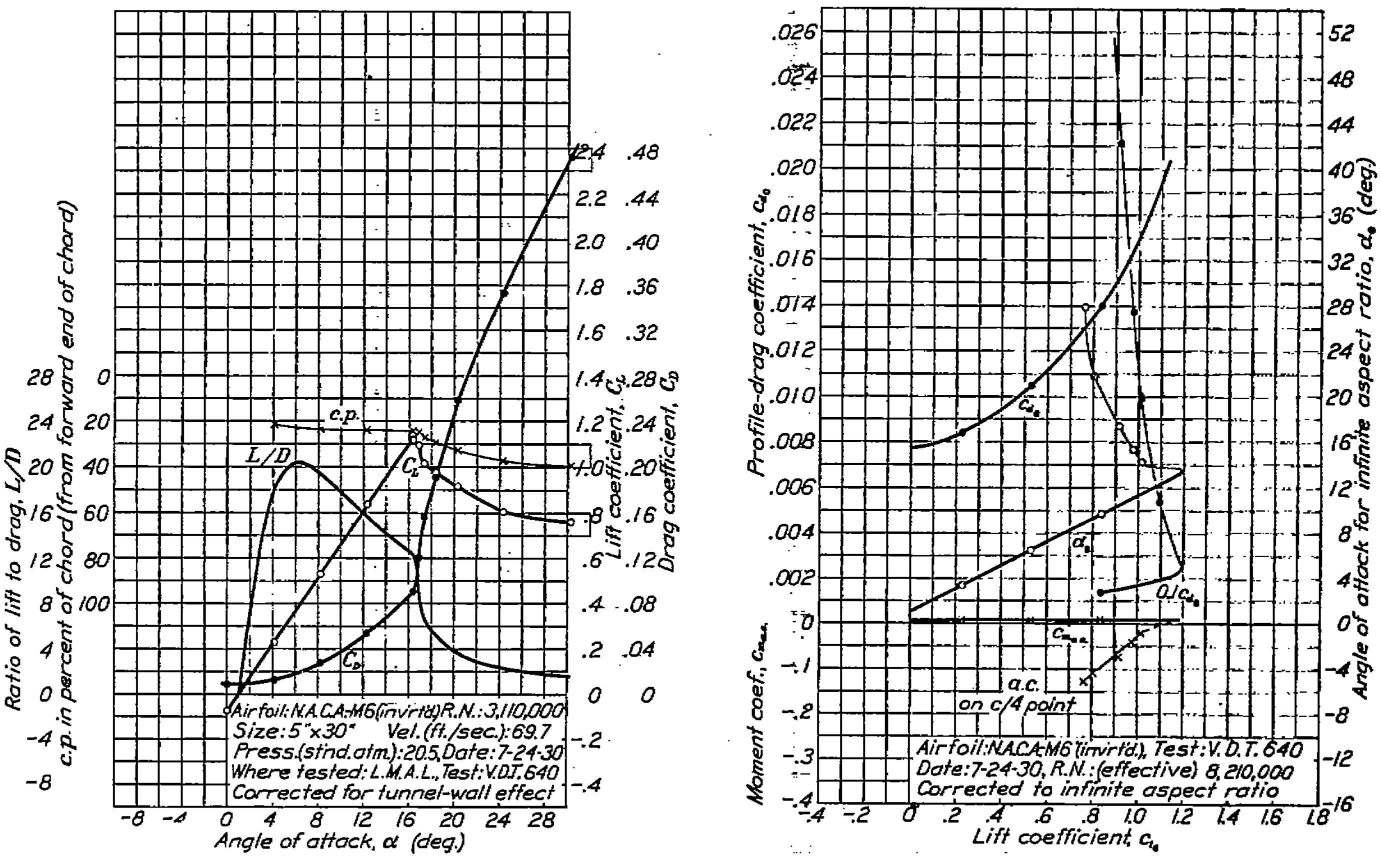



FIGURE 75.—N. A. C. A. —M6 airfoil (inverted).

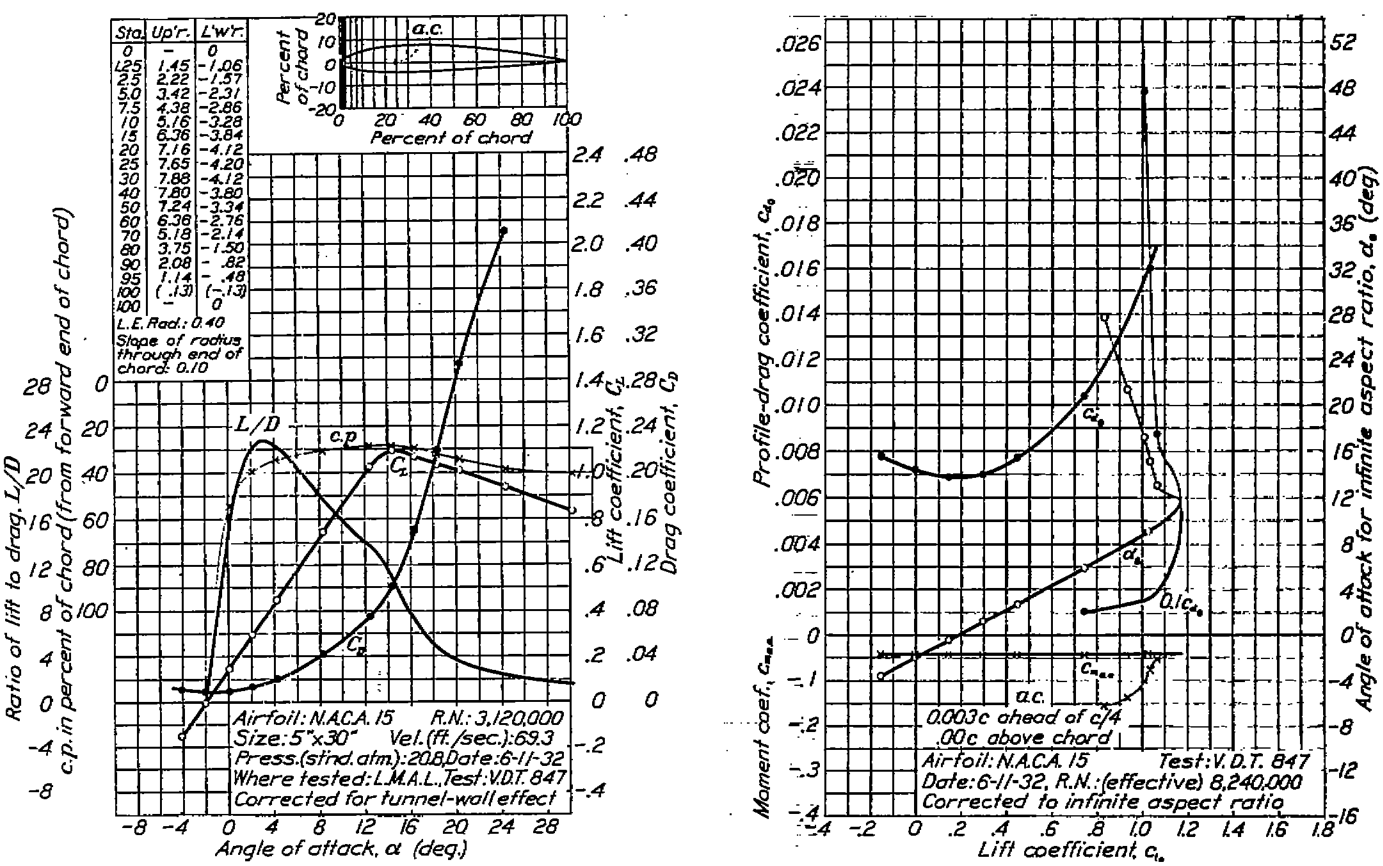



FIGURE 76.—N. A. C. A. 15 airfoil.

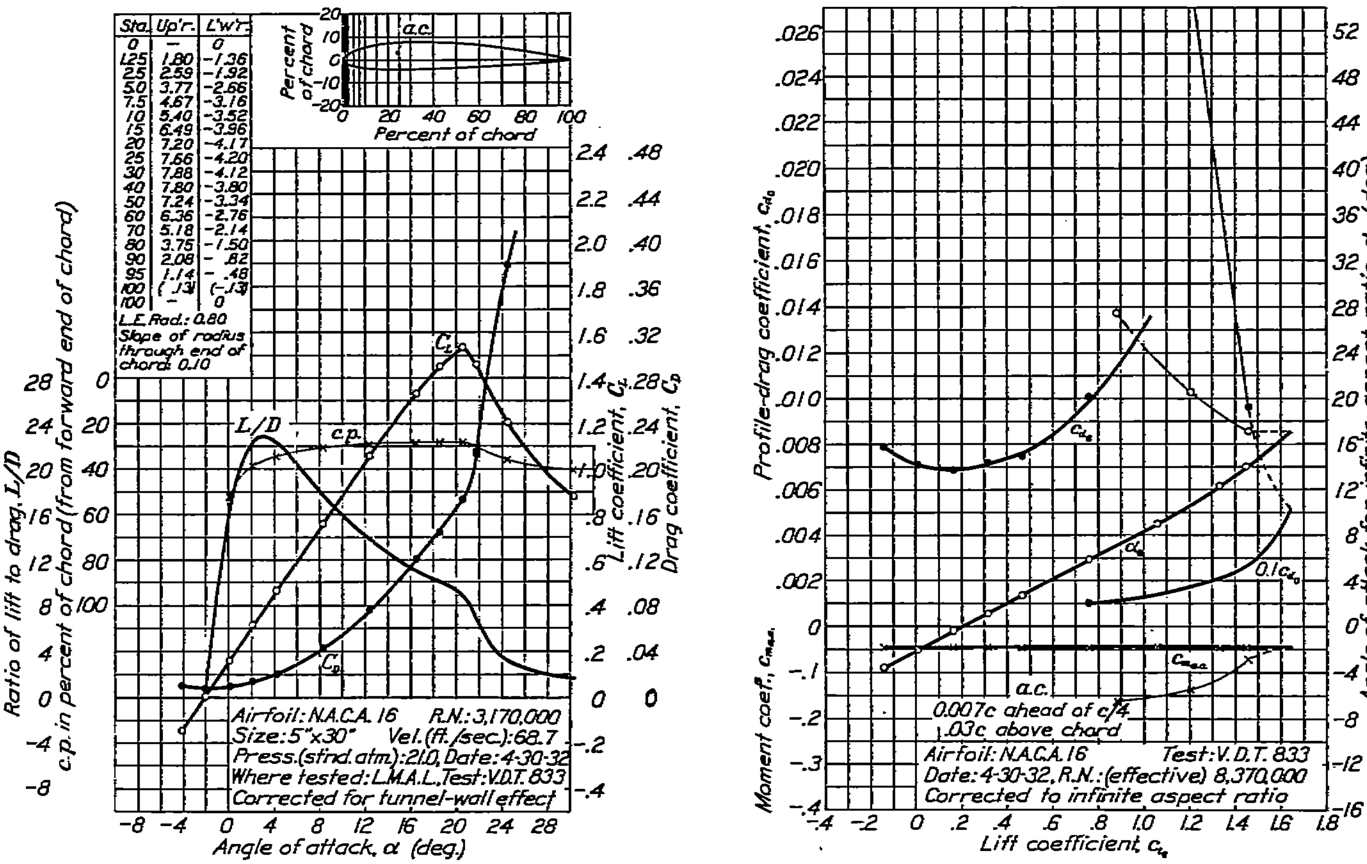



FIGURE 77.—N. A. C. A. 16 airfoil.

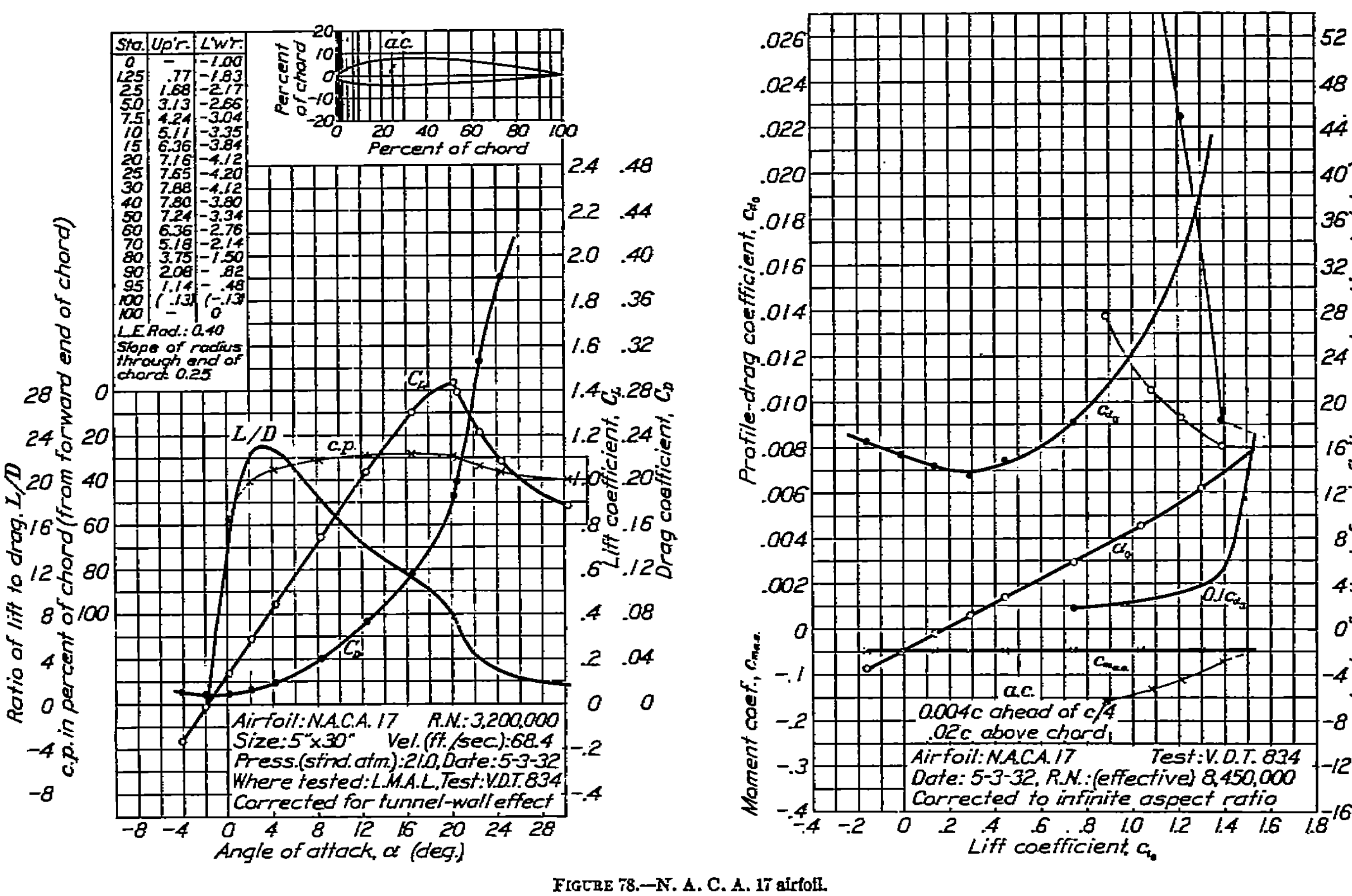



FIGURE 78.—N. A. C. A. 17 airfoil.

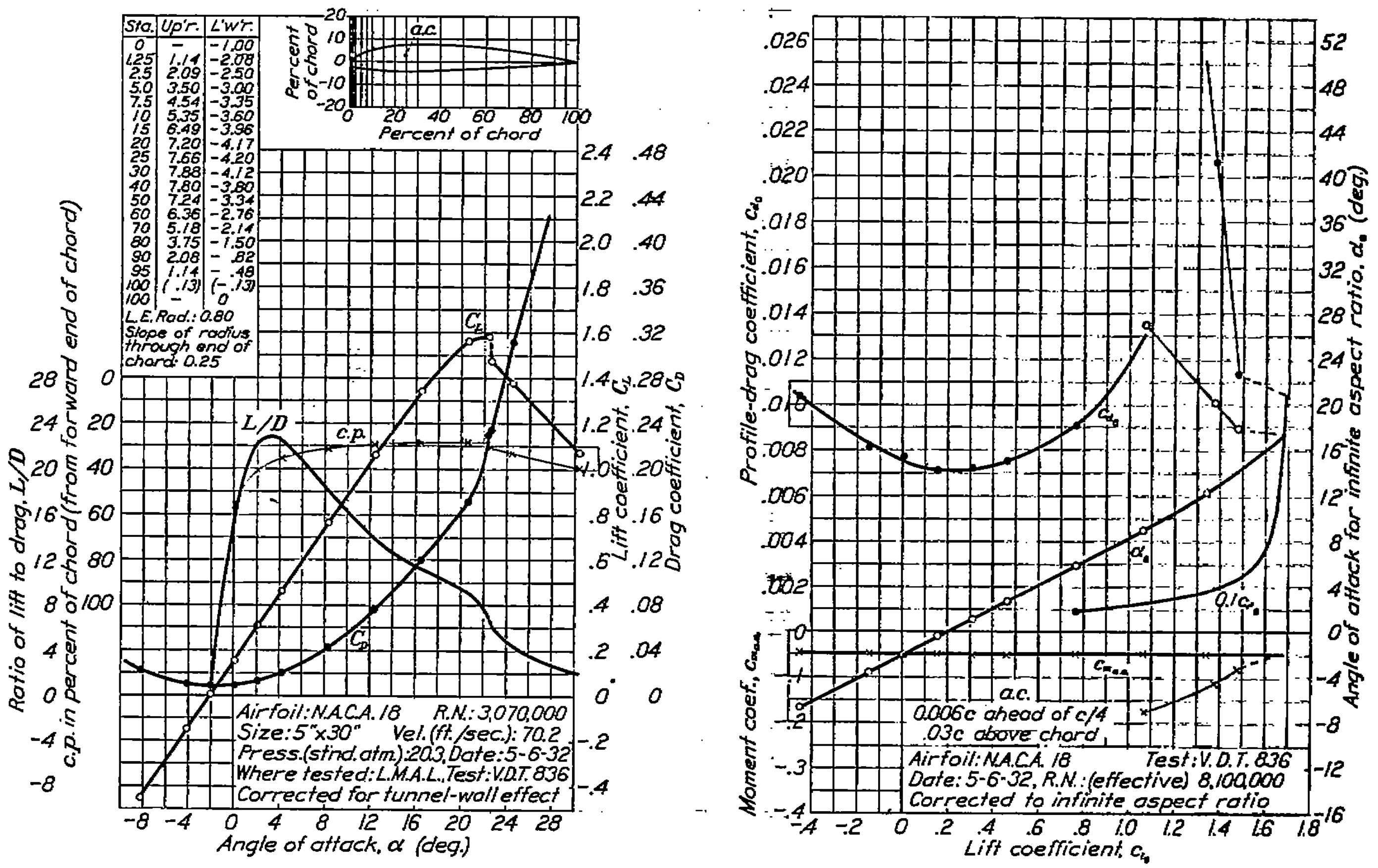



FIGURE 79.—N. A. C. A. 18 airfoil.

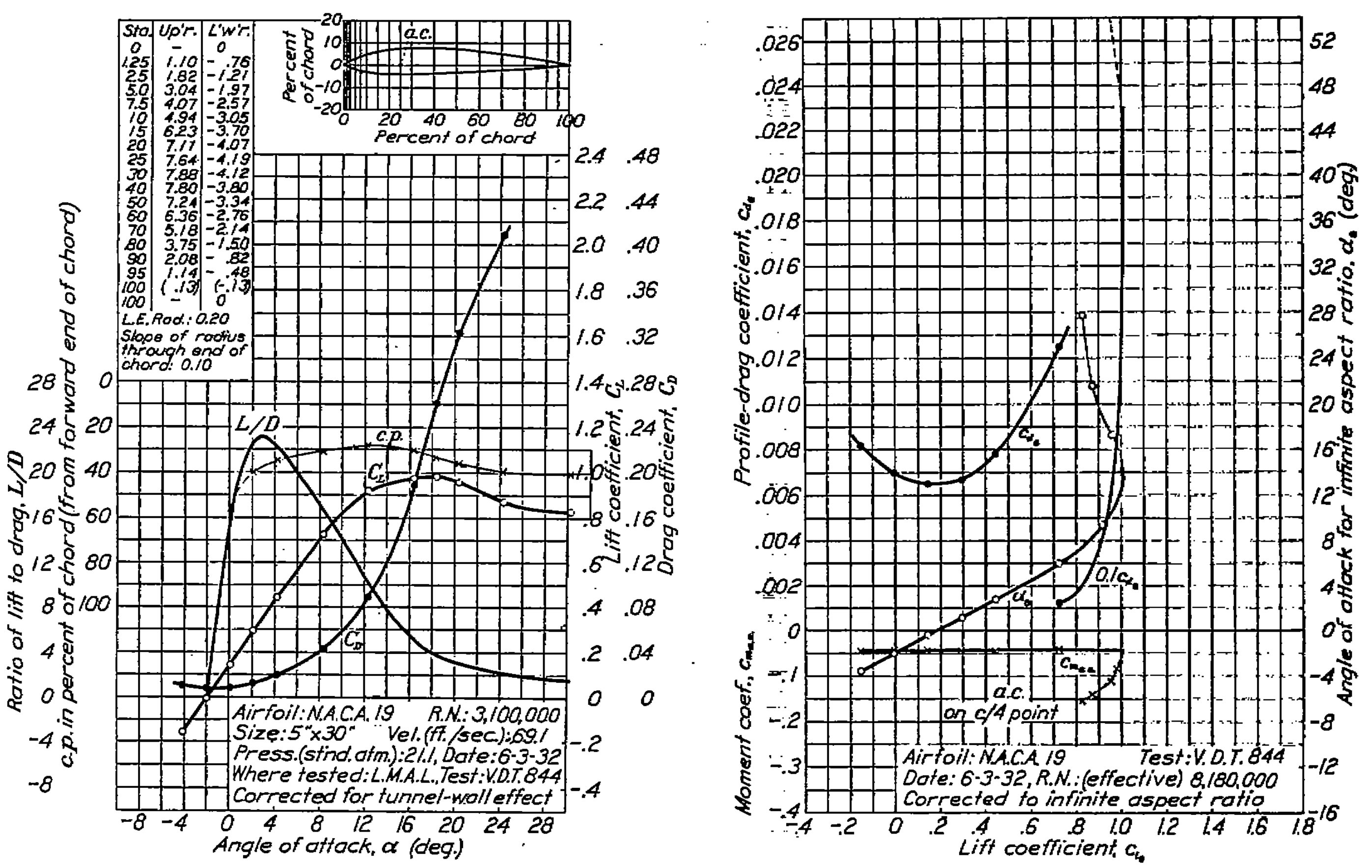



FIGURE 80.—N. A. C. A. 19 airfoil.

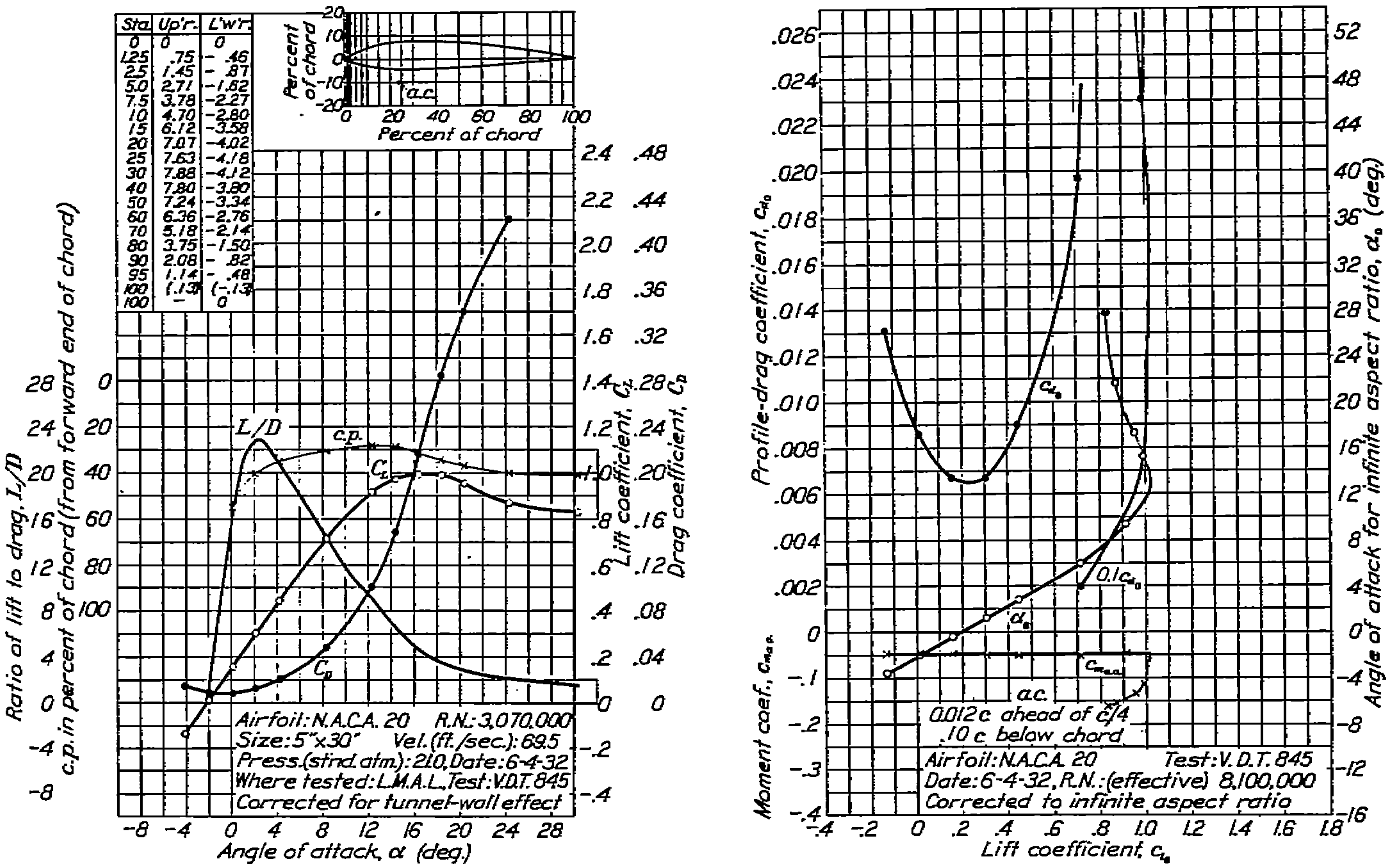



FIGURE 81.—N. A. C. A. 20 airfoil.

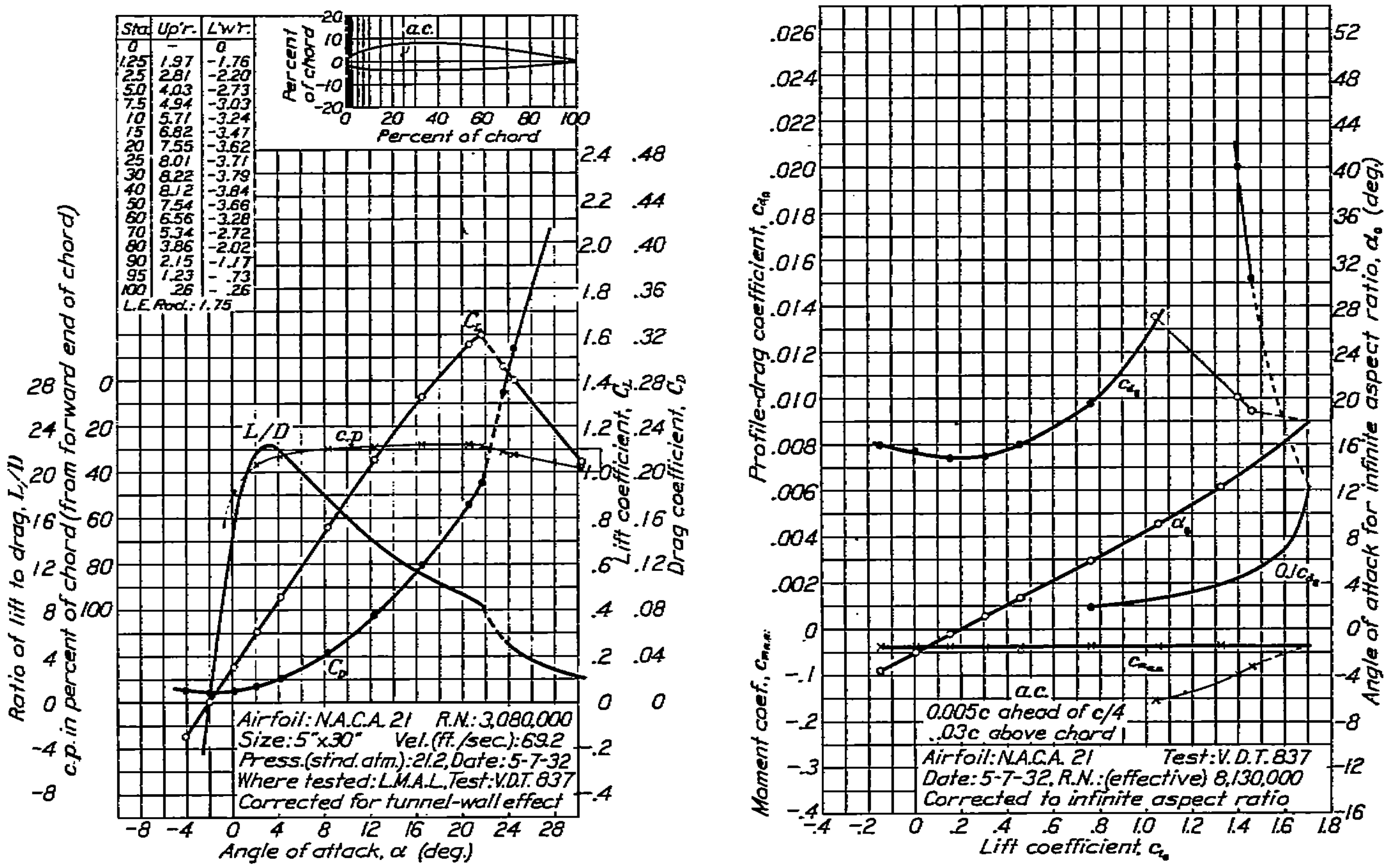



FIGURE 82.—N. A. C. A. 21 airfoil.

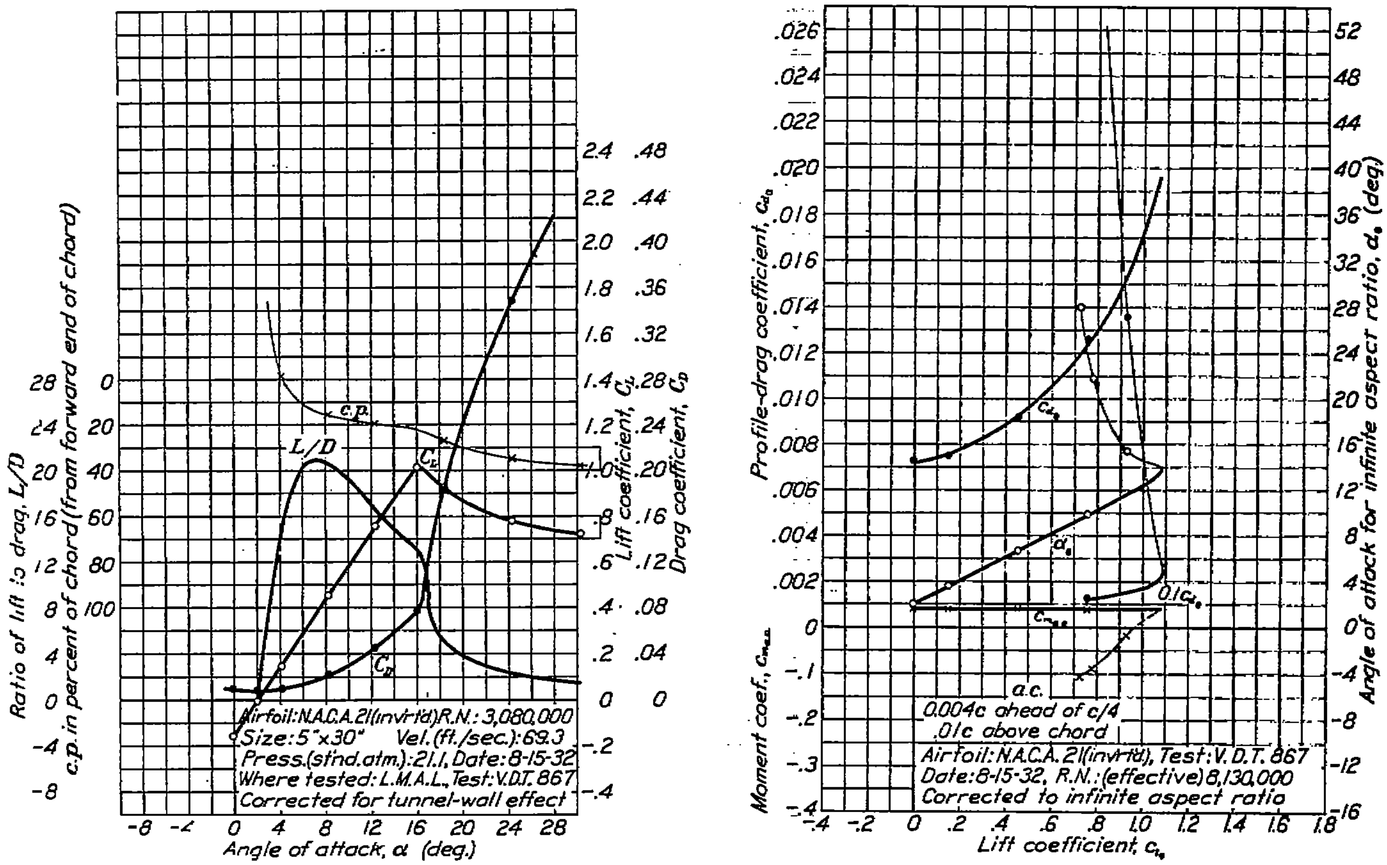
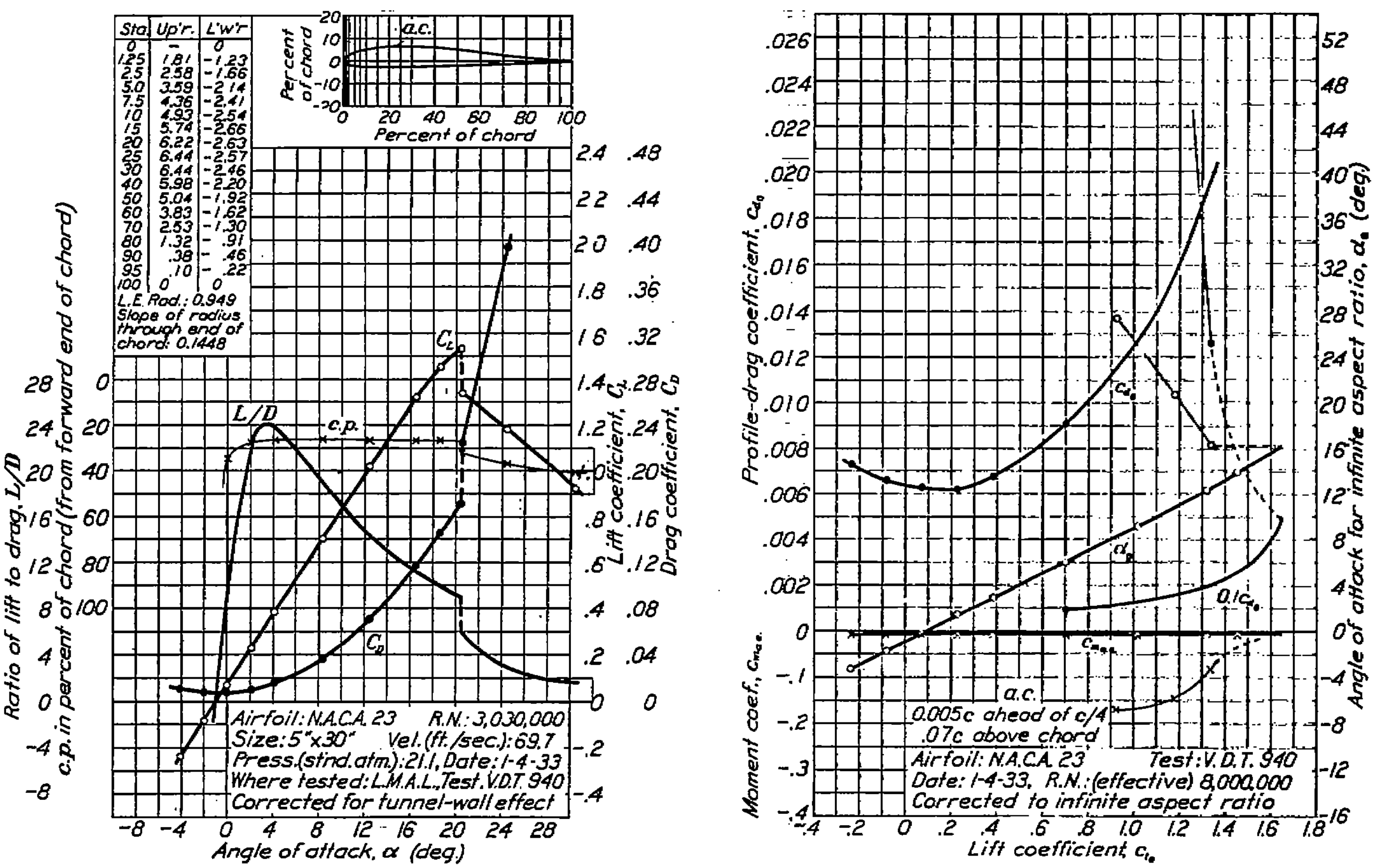



FIGURE 83.—N. A. C. A. 21 airfoil (inverted).




| Sta. | Up'r. | L'w'r |
|---|---|---|
| 0 | – | 0 |
| 1.25 | 1.81 | −1.23 |
| 2.5 | 2.58 | −1.66 |
| 5.0 | 3.59 | −2.14 |
| 7.5 | 4.36 | −2.41 |
| 10 | 4.93 | −2.54 |
| 15 | 5.74 | −2.66 |
| 20 | 6.22 | −2.63 |
| 25 | 6.44 | −2.57 |
| 30 | 6.44 | −2.46 |
| 40 | 5.98 | −2.20 |
| 50 | 5.04 | −1.92 |
| 60 | 3.83 | −1.62 |
| 70 | 2.53 | −1.30 |
| 80 | 1.32 | − .91 |
| 90 | .38 | − .46 |
| 95 | .10 | − .22 |
| 100 | 0 | 0 |

L.E. Rad.: 0.949
Slope of radius through end of chord: 0.1448

FIGURE 84.—N. A. C. A. 23 airfoil.

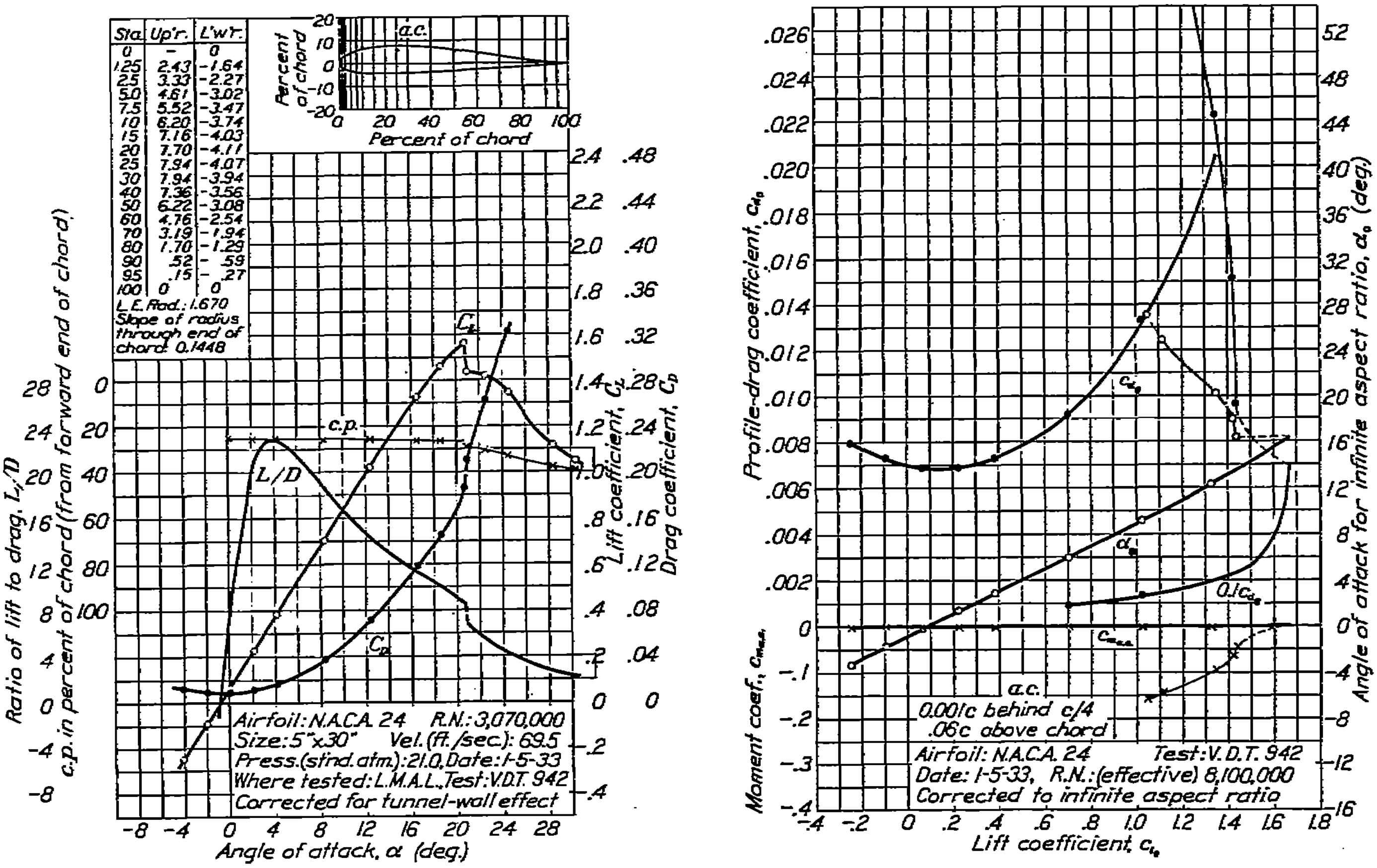



FIGURE 85.—N. A. C. A. 24 airfoil.

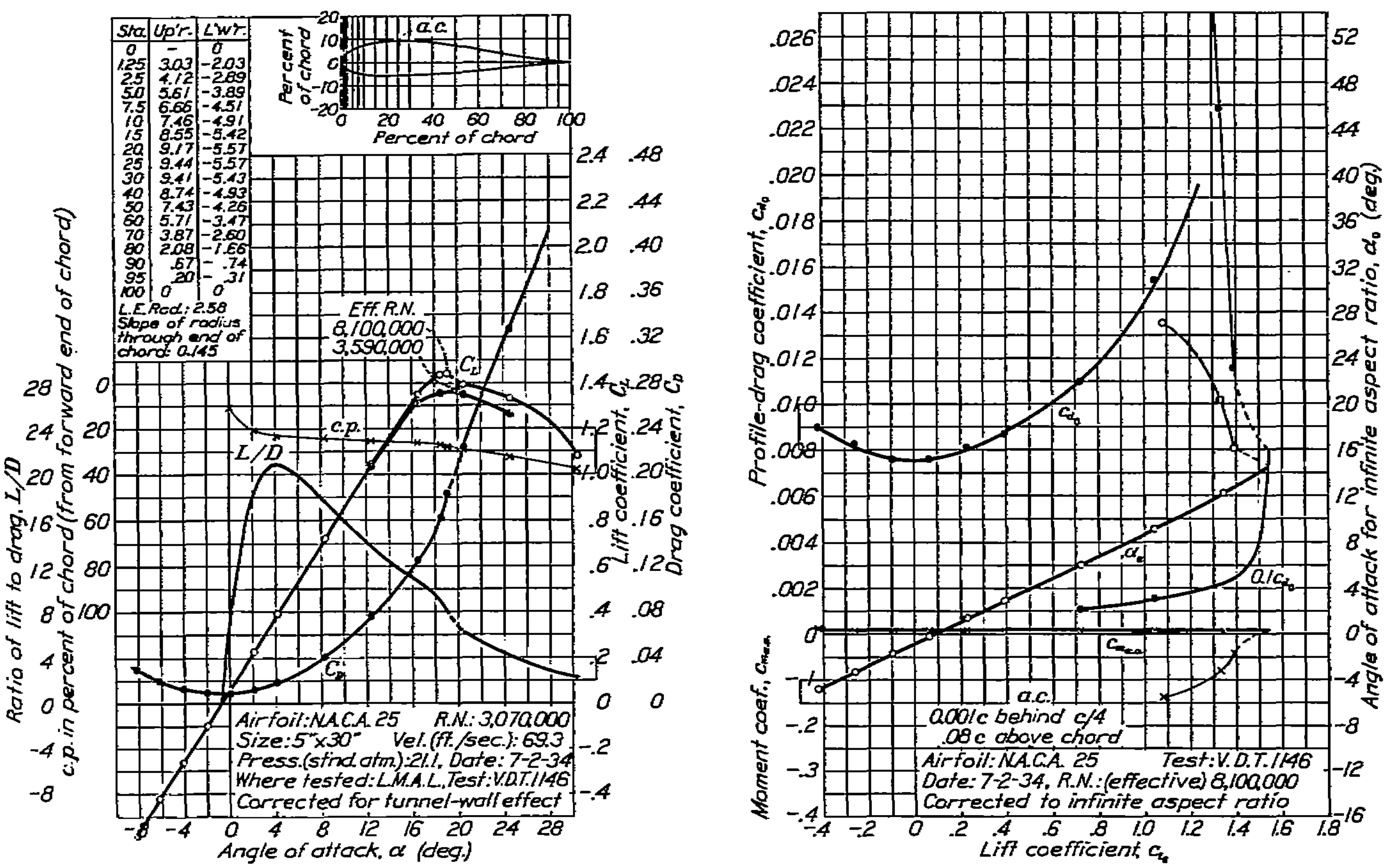



FIGURE 86.—N. A. C. A. 25 airfoil.

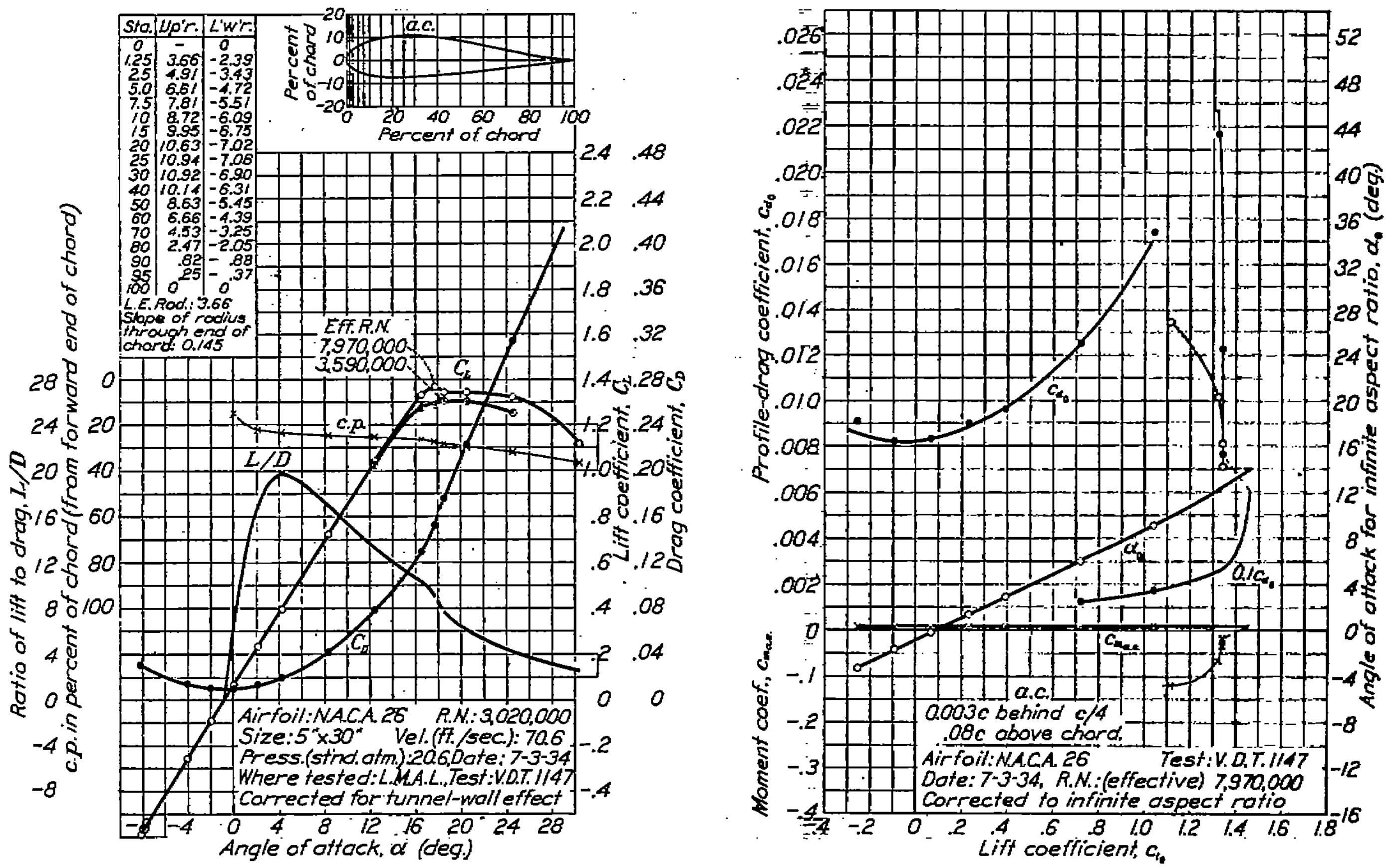



FIGURE 87.—N. A. C. A. 26 airfoil.

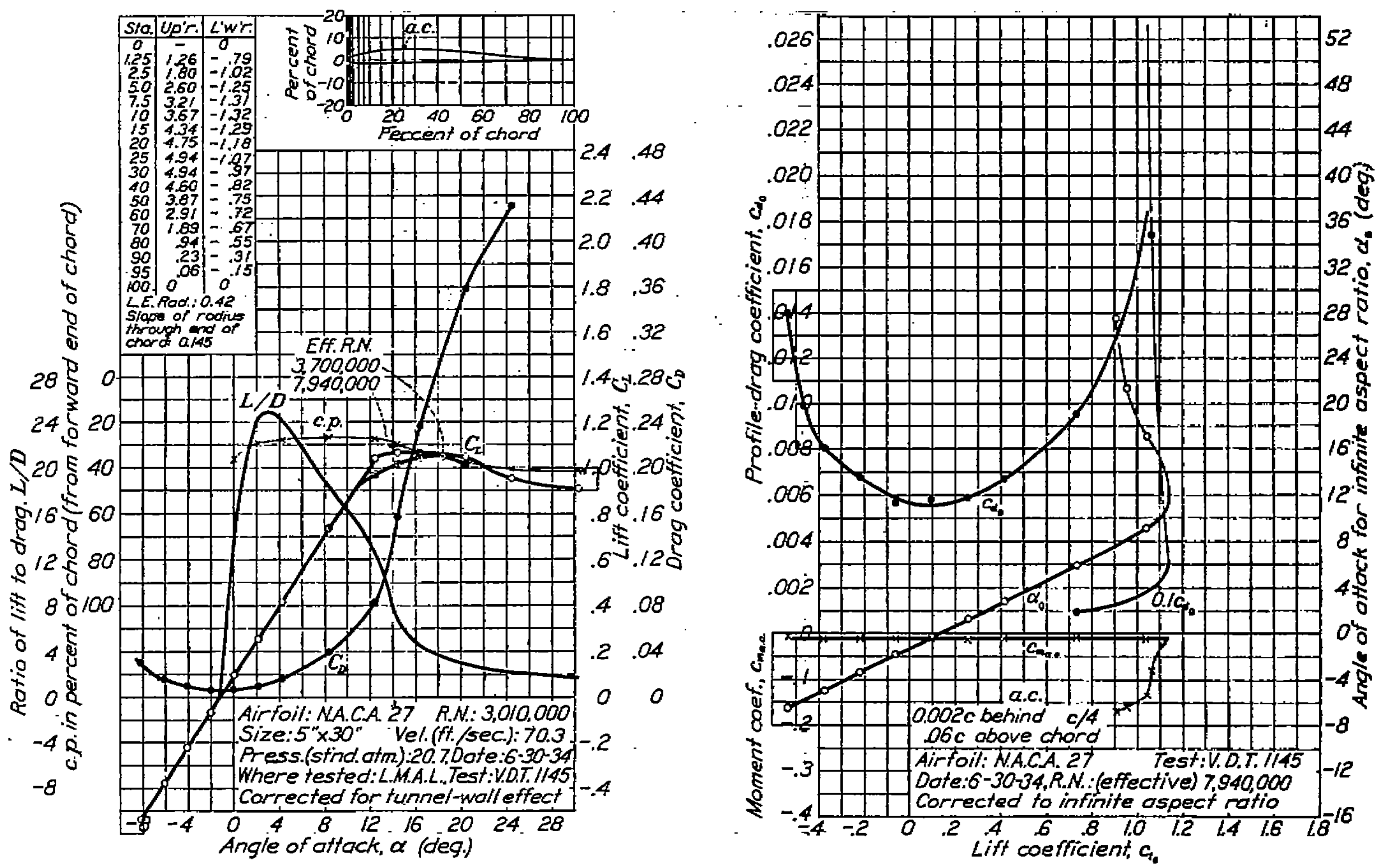



FIGURE 88.—N. A. C. A. 27 airfoil.

## TABLE I.—CHARACTERISTICS OF RELATED N. A. C. A. AIRFOILS REPORTED IN REFERENCE 1

| Airfoil | Classification: Chord | PD | SE | $C_{L_{max}}$ | Effective Reynolds Number (millions) | Fundamental section characteristics: $c_{l_{max}}$ | $\alpha_{l_0}$ (deg.) | $a_0$ (per deg.) | $c_{l_{opt}}$ | $c_{d_{0_{min}}}$ | $c_{m_{a.c.}}$ | a. c. (percent c from c/4): Ahead | Above | Derived and additional characteristics that may be used for structural design: $\frac{c_{l_{max}}}{c_{d_{0_{min}}}}$ | c. p. at $C_{L_{max}}$ (percent c) | Wing characteristics $A=6$; round tips: $m_s$ (per radian) | $C_{D_{min}}$ | Thickness at—: 0.15c (percent c) | 0.65c (percent c) | Maximum (percent c) | Camber (percent c) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N. A. C. A.: | (1) | (2) | (3) | (4) | (5) | (6) | | (6) | (6) | (6) | | | | | | | | | | | |
| 0006 | A | A10 | A | D | 8.5 | 0.91 | 0 | 0.098 | 0 | 0.0054 | 0 | 0.7 | 2 | 169 | 35 | 4.28 | 0.0054 | 5.35 | 4.13 | 6 | 0 |
| 0009 | A | B10 | B0 | A | 8.3 | 1.39 | 0 | .098 | 0 | .0064 | 0 | 1.0 | 5 | 217 | 26 | 4.28 | .0064 | 8.02 | 6.20 | 9 | 0 |
| 0012 | A | C10 | C0 | A | 8.4 | 1.66 | 0 | .099 | 0 | .0069 | 0 | .6 | 3 | 241 | 26 | 4.32 | .0069 | 10.69 | 8.27 | 12 | 0 |
| 0015 | A | D10 | D0 | A | 8.6 | 1.66 | 0 | .097 | 0 | .0077 | 0 | 1.2 | 4 | 216 | 25 | 4.24 | .0077 | 13.36 | 10.33 | 15 | 0 |
| 0018 | A | E10 | E0 | A | 7.8 | 1.53 | 0 | .096 | 0 | .0088 | 0 | 1.7 | 4 | 174 | 25 | 4.20 | .0088 | 16.04 | 12.40 | 18 | 0 |
| 0021 | A | F10 | E1 | A | 8.3 | 1.48 | 0 | .093 | 0 | .0100 | 0 | 3.0 | 6 | 148 | 24 | 4.11 | .0100 | 18.71 | 14.46 | 21 | 0 |
| 0025 | A | ------ | E2 | B | 8.5 | 1.28 | 0 | .085 | 0 | .0119 | 0 | 2.7 | 5 | 108 | 25 | 3.82 | .0119 | 22.27 | 17.22 | 25 | 0 |
| 2212 | A | C12 | C3 | B | 8.4 | 1.72 | −1.8 | .099 | .12 | .0072 | −.029 | .9 | 5 | 238 | 27 | 4.31 | .0073 | 10.69 | 8.25 | 12 | 2 |
| 2306 | A | A10 | A | D | 8.1 | 1.11 | −1.8 | .100 | .14 | .0063 | −.036 | .4 | 4 | 176 | 29 | 4.34 | .0064 | 5.36 | 4.14 | 6 | 2 |
| 2309 | A | B10 | B2 | A | 7.8 | 1.62 | −2.0 | .099 | .14 | .0070 | −.037 | .8 | 5 | 239 | 29 | 4.31 | .0072 | 8.04 | 6.21 | 9 | 2 |
| 2312 | A | C10 | C2 | B | 8.2 | 1.72 | −1.9 | .097 | .12 | .0074 | −.039 | 1.2 | 4 | 232 | 27 | 4.24 | .0075 | 10.71 | 8.27 | 12 | 2 |
| 2315 | A | D10 | D2 | B | 8.0 | 1.65 | −1.7 | .098 | .08 | .0083 | −.034 | .9 | 3 | 199 | 28 | 4.28 | .0084 | 13.38 | 10.36 | 15 | 2 |
| 2406 | A | A10 | A | D | 8.2 | 1.04 | −1.7 | .099 | .18 | .0060 | −.039 | .4 | 4 | 173 | 34 | 4.31 | .0063 | 5.34 | 4.14 | 6 | 2 |
| 2409 | A | B10 | B2 | B | 8.1 | 1.62 | −1.7 | .099 | .08 | .0067 | −.044 | .7 | 4 | 242 | 28 | 4.31 | .0069 | 8.02 | 6.20 | 9 | 2 |
| 2412 | A | C10 | C2 | B | 8.2 | 1.72 | −2.0 | .098 | .14 | .0071 | −.043 | .5 | 3 | 242 | 28 | 4.28 | .0072 | 10.71 | 8.27 | 12 | 2 |
| 2415 | A | D10 | D2 | C | 8.0 | 1.66 | −1.7 | .097 | .10 | .0082 | −.040 | 1.4 | 5 | 201 | 28 | 4.24 | .0083 | 13.39 | 10.34 | 15 | 2 |
| 2418 | A | E10 | E2 | C | 8.0 | 1.53 | −1.9 | .094 | .06 | .0093 | −.038 | 1.1 | 2 | 165 | 27 | 4.14 | .0094 | 16.08 | 12.39 | 18 | 2 |
| 2421 | A | F10 | E3 | D | 7.9 | 1.44 | −1.7 | .093 | .06 | .0106 | −.035 | 1.4 | 2 | 136 | 28 | 4.11 | .0106 | 18.75 | 14.46 | 21 | 2 |
| 2506 | A | A10 | A | D | 8.1 | 1.06 | −2.0 | .099 | .14 | .0062 | −.048 | 0 | 0 | 171 | 37 | 4.31 | .0064 | 5.36 | 4.13 | 6 | 2 |
| 2509 | A | B10 | B2 | D | 8.0 | 1.48 | −2.0 | .098 | .18 | .0068 | −.051 | .8 | 2 | 218 | 29 | 4.28 | .0069 | 8.04 | 6.21 | 9 | 2 |
| 2512 | A | C10 | C2 | B | 8.1 | 1.73 | −2.1 | .098 | .18 | .0074 | −.054 | 1.0 | 2 | 234 | 28 | 4.28 | .0076 | 10.70 | 8.27 | 12 | 2 |
| 2515 | A | D10 | D2 | B | 8.1 | 1.64 | −2.0 | .095 | .09 | .0085 | −.050 | .9 | 2 | 193 | 28 | 4.18 | .0087 | 13.38 | 10.33 | 15 | 2 |
| 2518 | A | E10 | E2 | D | 8.1 | 1.58 | −2.0 | .092 | .06 | .0093 | −.047 | 1.1 | 2 | 170 | 28 | 4.07 | .0093 | 16.07 | 12.41 | 18 | 2 |
| 2521 | A | F10 | E3 | B | 8.2 | 1.48 | −1.8 | .091 | .02 | .0105 | −.044 | 2.3 | 4 | 141 | 28 | 4.04 | .0105 | 18.72 | 14.47 | 21 | 2 |
| 2612 | A | C10 | C1 | B | 8.4 | 1.78 | −2.3 | .096 | .16 | .0075 | −.062 | 1.4 | 2 | 237 | 28 | 4.20 | .0076 | 10.70 | 8.26 | 12 | 2 |
| 2712 | A | C10 | C0 | B | 8.0 | 1.80 | −2.6 | .096 | .16 | .0076 | −.075 | 1.0 | 1 | 237 | 29 | 4.20 | .0079 | 10.69 | 8.25 | 12 | 2 |
| 4212 | A | C10 | C5 | A | 8.5 | 1.83 | −3.4 | .098 | .28 | .0078 | −.060 | .6 | 2 | 235 | 29 | 4.28 | .0084 | 10.70 | 8.27 | 12 | 4 |
| 4306 | A | A10 | A | D | 8.1 | 1.28 | −3.8 | .099 | .28 | .0071 | −.075 | .5 | 2 | 180 | 31 | 4.31 | .0079 | 5.40 | 4.14 | 6 | 4 |
| 4309 | A | B10 | B5 | B | 8.1 | 1.71 | −3.6 | .099 | .24 | .0077 | −.073 | .7 | 3 | 222 | 29 | 4.31 | .0080 | 8.09 | 6.21 | 9 | 4 |
| 4312 | A | C10 | C5 | B | 8.3 | 1.74 | −3.9 | .096 | .27 | .0080 | −.076 | .9 | 3 | 218 | 30 | 4.20 | .0085 | 10.77 | 8.27 | 12 | 4 |
| 4315 | A | D10 | D4 | B | 8.2 | 1.67 | −3.6 | .099 | .10 | .0090 | −.069 | 1.2 | 4 | 186 | 29 | 4.31 | .0091 | 13.47 | 10.34 | 15 | 4 |
| 4318 | A | E10 | E4 | B | 8.1 | 1.56 | −3.5 | .095 | .16 | .0101 | −.065 | 1.3 | 3 | 154 | 29 | 4.18 | .0103 | 16.14 | 12.41 | 18 | 4 |
| 4321 | A | F10 | E5 | D | 8.2 | 1.38 | −3.6 | .091 | .04 | .0113 | −.068 | 1.8 | 3 | 122 | 31 | 4.04 | .0113 | 18.81 | 14.46 | 21 | 4 |
| 4406 | A | A10 | A | D | 8.1 | 1.32 | −3.9 | .100 | .32 | .0067 | −.087 | .4 | 0 | 197 | 32 | 4.34 | .0077 | 5.40 | 4.16 | 6 | 4 |
| 4409 | A | B10 | B4 | A | 8.1 | 1.77 | −3.9 | .096 | .26 | .0073 | −.088 | .6 | 2 | 242 | 31 | 4.20 | .0077 | 8.07 | 6.21 | 9 | 4 |
| 4412 | A | C10 | C4 | D | 7.9 | 1.74 | −4.0 | .098 | .32 | .0082 | −.088 | .8 | 2 | 212 | 31 | 4.28 | .0084 | 10.77 | 8.28 | 12 | 4 |
| 4415 | A | D10 | D4 | C | 7.9 | 1.72 | −4.0 | .097 | .22 | .0090 | −.085 | 1.0 | 1 | 191 | 31 | 4.24 | .0092 | 13.45 | 10.34 | 15 | 4 |
| 4418 | A | E10 | E4 | D | 8.1 | 1.57 | −3.7 | .092 | .13 | .0097 | −.078 | 1.4 | 1 | 162 | 31 | 4.07 | .0100 | 16.15 | 12.40 | 18 | 4 |
| 4421 | A | F10 | E5 | D | 8.2 | 1.41 | −3.4 | .089 | .08 | .0111 | −.071 | 1.9 | 2 | 127 | 32 | 3.96 | .0112 | 18.79 | 14.48 | 21 | 4 |
| 4506 | A | A10 | A | D | 8.0 | 1.18 | −4.3 | .100 | .34 | .0078 | −.110 | .5 | −1 | 151 | 36 | 4.34 | .0088 | 5.38 | 4.14 | 6 | 4 |
| 4509 | A | B10 | B3 | D | 8.2 | 1.67 | −4.1 | .099 | .27 | .0081 | −.106 | .3 | 0 | 206 | 31 | 4.31 | .0086 | 8.08 | 6.21 | 9 | 4 |
| 4512 | A | C10 | C3 | B | 8.4 | 1.81 | −4.2 | .093 | .21 | .0081 | −.106 | 1.1 | 0 | 223 | 31 | 4.11 | .0085 | 10.74 | 8.28 | 12 | 4 |
| 4515 | A | D10 | D3 | D | 8.0 | 1.73 | −4.1 | .097 | .17 | .0097 | −.097 | .9 | 0 | 178 | 31 | 4.24 | .0099 | 13.44 | 10.35 | 15 | 4 |
| 4518 | A | E10 | E3 | D | 8.2 | 1.65 | −3.9 | .092 | .13 | .0106 | −.093 | 1.4 | 2 | 156 | 31 | 4.07 | .0107 | 16.14 | 12.41 | 18 | 4 |
| 4521 | A | F10 | E4 | D | 8.2 | 1.50 | −3.4 | .091 | .06 | .0117 | −.082 | 1.6 | 2 | 128 | 32 | 4.04 | .0117 | 18.80 | 14.47 | 21 | 4 |
| 4612 | A | C10 | C2 | B | 8.3 | 1.88 | −4.6 | .094 | .24 | .0086 | −.124 | 1.0 | 0 | 219 | 31 | 4.14 | .0090 | 10.73 | 8.27 | 12 | 4 |
| 4712 | A | C10 | C1 | A | 8.2 | 1.95 | −5.0 | .093 | .26 | .0091 | −.143 | 1.2 | 0 | 214 | 33 | 4.11 | .0095 | 10.74 | 8.26 | 12 | 4 |
| 6212 | A | C10 | C7 | A | 8.5 | 1.87 | −5.2 | .096 | .45 | .0090 | −.089 | .8 | 4 | 208 | 30 | 4.20 | .0101 | 10.78 | 8.29 | 12 | 6 |
| 6306 | A | A10 | B0 | D | 8.1 | 1.65 | [7]−5.2 | .101 | .57 | .0086 | −.109 | −.4 | 0 | 192 | 32 | 4.37 | .0179 | 5.47 | 4.15 | 6 | 6 |
| 6309 | A | B10 | B6 | B | 8.2 | 1.78 | −5.4 | .100 | .27 | .0090 | −.112 | .6 | 3 | 198 | 32 | 4.34 | .0103 | 8.18 | 6.28 | 9 | 6 |
| 6312 | A | C10 | C6 | B | 8.4 | 1.78 | −5.5 | .097 | .35 | .0090 | −.111 | .7 | 1 | 198 | 31 | 4.24 | .0100 | 10.86 | 8.29 | 12 | 6 |
| 6315 | A | D10 | D6 | B | 8.1 | 1.66 | −5.4 | .097 | .22 | .0104 | −.105 | .7 | 2 | 160 | 32 | 4.24 | .0107 | 13.58 | 10.37 | 15 | 6 |
| 6318 | A | E10 | E6 | D | 8.1 | 1.53 | −5.2 | .094 | .15 | .0112 | −.098 | 1.3 | 1 | 137 | 32 | 4.14 | .0113 | 16.27 | 12.44 | 18 | 6 |
| 6321 | A | F10 | E7 | D | 8.2 | 1.41 | −5.2 | .092 | .10 | .0123 | −.090 | 1.5 | 2 | 115 | 33 | 4.07 | .0124 | 18.92 | 14.51 | 21 | 6 |
| 6406 | A | A10 | B0 | D | 8.1 | 1.53 | −5.6 | .100 | .50 | .0080 | −.129 | −.7 | 0 | 191 | 34 | 4.34 | .0119 | 5.42 | 4.15 | 6 | 6 |
| 6409 | A | B10 | B6 | D | 8.0 | 1.80 | −5.9 | .097 | .48 | .0085 | −.133 | 0 | −2 | 212 | 33 | 4.24 | .0100 | 8.14 | 6.21 | 9 | 6 |
| 6412 | A | C10 | C6 | D | 8.2 | 1.82 | −5.9 | .098 | .33 | .0091 | −.133 | .9 | 1 | 200 | 33 | 4.28 | .0103 | 10.85 | 8.29 | 12 | 6 |
| 6415 | A | D10 | D6 | D | 8.0 | 1.70 | −5.7 | .095 | .25 | .0104 | −.125 | .7 | −2 | 163 | 34 | 4.18 | .0109 | 13.55 | 10.36 | 15 | 6 |
| 6418 | A | E10 | E6 | D | 8.1 | 1.62 | −5.7 | .095 | .25 | .0114 | −.118 | 1.3 | 0 | 142 | 34 | 4.18 | .0119 | 16.28 | 12.43 | 18 | 6 |
| 6421 | A | F10 | E7 | D | 8.0 | 1.51 | −5.2 | .092 | .10 | .0125 | −.110 | 1.7 | 0 | 121 | 34 | 4.07 | .0126 | 18.96 | 14.50 | 21 | 6 |
| 6506 | A | A10 | A | D | 8.3 | 1.38 | [7]−6.3 | .097 | .40 | .0088 | −.159 | 0 | 0 | 157 | 35 | 4.24 | .0109 | 5.41 | 4.14 | 6 | 6 |
| 6509 | A | B10 | B4 | D | 8.2 | 1.83 | −6.3 | .099 | .48 | .0091 | −.158 | .1 | −3 | 201 | 34 | 4.31 | .0106 | 8.14 | 6.21 | 9 | 6 |
| 6512 | A | C10 | C5 | D | 8.4 | 1.87 | −6.2 | .097 | .40 | .0094 | −.155 | .8 | −3 | 199 | 33 | 4.24 | .0103 | 10.84 | 8.30 | 12 | 6 |
| 6515 | A | D10 | D6 | D | 8.1 | 1.79 | −6.0 | .095 | .25 | .0112 | −.147 | 1.0 | −2 | 160 | 33 | 4.18 | .0115 | 13.53 | 10.36 | 15 | 6 |
| 6518 | A | E10 | E6 | D | 8.1 | 1.72 | −5.7 | .091 | .10 | .0122 | −.139 | 1.6 | −2 | 141 | 34 | 4.04 | .0123 | 16.22 | 12.44 | 18 | 6 |
| 6521 | A | F10 | E7 | D | 8.1 | 1.60 | −5.3 | .090 | .10 | .0133 | −.129 | 1.8 | 3 | 120 | 34 | 4.00 | .0134 | 18.92 | 14.49 | 21 | 6 |
| 6612 | A | C10 | C4 | D | 8.5 | 1.96 | −6.6 | .095 | .25 | .0102 | −.185 | 1.7 | −2 | 192 | 34 | 4.18 | .0109 | 10.80 | 8.28 | 12 | 6 |
| 6712 | A | C10 | C3 | A | 8.1 | 2.05 | −7.3 | .096 | .35 | .0115 | −.199 | 1.2 | −2 | 178 | 34 | 4.20 | .0119 | 10.76 | 8.27 | 12 | 6 |
| 0006T | A | A10 | A | D | 8.4 | .91 | 0 | .096 | 0 | .0058 | 0 | 1.0 | 9 | 157 | 36 | 4.20 | .0058 | 5.09 | 3.84 | 6 | 0 |
| 0006B | A | B10 | B0 | D | 8.1 | 1.13 | 0 | .100 | 0 | .0065 | 0 | .6 | 2 | 174 | 25 | 4.34 | .0065 | 5.74 | 4.57 | 6 | 0 |
| 0012T | A | B10 | B0 | D | 8.2 | 1.10 | 0 | .095 | 0 | .0067 | 0 | .6 | 4 | 164 | 25 | 4.18 | .0067 | 10.19 | 7.68 | 12 | 0 |
| 0012B | A | D10 | D0 | A | 8.1 | 1.60 | 0 | .097 | 0 | .0080 | 0 | 2.0 | 6 | 200 | 25 | 4.24 | .0080 | 11.48 | 9.13 | 12 | 0 |
| 0018T | A | D10 | D0 | D | 8.3 | 1.38 | 0 | .094 | 0 | .0083 | 0 | .8 | 3 | 166 | 26 | 4.14 | .0083 | 15.28 | 11.52 | 18 | 0 |
| 0018B | A | F10 | E2 | A | 8.3 | 1.50 | 0 | .093 | 0 | .0103 | 0 | 2.5 | 3 | 146 | 23 | 4.11 | .0103 | 17.23 | 13.70 | 18 | 0 |
| 2R$_1$12 | A | C11 | C3 | B | 8.6 | 1.64 | −1.5 | .097 | .15 | .0068 | −.020 | 1.1 | 5 | 241 | 26 | 4.24 | .0071 | 10.70 | 8.26 | 12 | 2 |
| 2R$_2$12 | A | C11 | C2 | B | 8.4 | 1.61 | −.6 | .098 | .10 | .0073 | .005 | 1.0 | 7 | 221 | 26 | 4.28 | .0072 | 10.71 | 8.26 | 12 | 2 |
| 0012F$_4$ | | ------ | C0 | A | 8.5 | 1.64 | −.2 | .107 | 0 | .0089 | 0 | 0 | 8 | 184 | 27 | 4.57 | .0089 | 10.70 | ------ | 12 | 0 |
| 0012F$_1$ | ------ | ------ | C0 | A | 8.5 | 2.19 | −11.7 | .095 | .66 | .0130 | −.126 | −1.5 | −16 | 168 | 34 | 4.18 | .0170 | 10.70 | ------ | 12 | 6 |

[1] Type of chord. See reference 10.
[2] Type of pressure distribution. See reference 10.
[3] Type of scale effect on maximum lift. A signifies practically no scale effect.
For other designations see reference 9, fig. 44.

[4] See footnote 4, table II.
[5] Turbulence factor is 2.64.
[6] These data have been corrected for tip effect.
[7] Based on straight portion of lift curve extended.

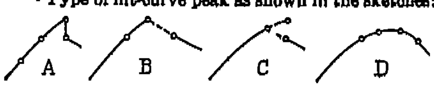
## TABLE II.—CHARACTERISTICS OF MISCELLANEOUS AIRFOILS

[An inverted airfoil is considered as another distinct section]

| Airfoil | Figure No. | N. A. C. A. reference, R=report, N=note | Classification: Chord | Classification: PD | Classification: SE | Classification: $C_{L_{max}}$ | Effective Reynolds Number (millions) | Fundamental section characteristics: $c_{l_{max}}$ | $\alpha_{l_0}$ (deg.) | $a_0$ (per deg.) | $c_{l_{opt}}$ | $c_{d_{0_{min}}}$ | $c_{m_{a.c.}}$ | a. c. (percent c from c/4): Ahead | a. c. (percent c from c/4): Above | Derived and additional characteristics that may be used for structural design: $\frac{c_{l_{max}}}{c_{d_{0_{min}}}}$ | c. p. at $c_{l_{max}}$ (percent c) | Wing characteristics A=6; round tips: $m_s$ (per radian) | Wing characteristics A=6; round tips: $C_{D_{min}}$ | Thickness at 0.15c (percent c) | Thickness at 0.65c (percent c) | Thickness at Maximum (percent c) | Camber (percent c) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (1) | (2) | (3) | (4) | (5) | (6) | | (6) | (6) | (6) | | | | | | | | | | | |
| Boeing 103 | 1 | N 412 | B | C10 | C4 | B | 8.0 | 1.76 | −4.8 | 0.097 | 0.15 | 0.0088 | −0.065 | 0.6 | 7 | 200 | 30 | 4.24 | 0.0089 | 11.21 | 9.14 | 12.68 | 4.2 |
| Boeing 103 (inv.) | 2 | N 412 | | | | B | 8.6 | .96 | | .098 | | | .069 | .9 | −2 | | 16 | 4.28 | | | | | |
| Boeing 103A | 3 | N 412 | B | B10 | C3 | A | 8.4 | 1.74 | −3.8 | .098 | .17 | .0075 | −.053 | .5 | 5 | 232 | 29 | 4.28 | .0077 | 9.18 | 7.52 | 10.38 | 3.2 |
| Boeing 103A (inv.) | 4 | N 412 | | | | D | 8.4 | .85 | | .100 | | | .058 | .8 | 0 | | 20 | 4.34 | | | | | |
| Boeing 106 | 5 | N 412 | C | C10 | B4 | D | 8.4 | 1.64 | −4.4 | .094 | .14 | .0081 | −.052 | .8 | 5 | 202 | 29 | 4.14 | .0082 | 11.26 | 9.26 | 13.06 | 3.5 |
| Boeing 106 (inv.) | 6 | N 412 | | | | B | 8.1 | .88 | | .093 | | | .057 | 1.4 | 2 | | 17 | 4.11 | | | | | |
| Boeing 106R | 7 | N 388 | C | C11 | B3 | D | 8.3 | 1.48 | −1.1 | .095 | .05 | .0077 | −.001 | .3 | 4 | 192 | 27 | 4.18 | .0077 | 11.26 | 9.29 | 13.06 | 2.0 |
| Boeing 111 | 8 | | A | C10 | D3 | A | 7.8 | 1.68 | −2.1 | .096 | .17 | .0071 | −.033 | 1.3 | 6 | 137 | 28 | 4.20 | .0073 | 9.92 | 8.14 | 11.50 | 3.0 |
| Boeing 111 (inv.) | 9 | | | | | A | 8.1 | .89 | | .096 | | | .033 | .9 | 2 | | 21 | 4.20 | | | | | |
| Boeing 112 | 10 | | A | C10 | D2 | C | 8.2 | 1.69 | −2.0 | .096 | .20 | .0071 | −.023 | .7 | 5 | 238 | 28 | 4.20 | .0074 | 9.92 | 8.12 | 11.50 | 2.8 |
| Boeing 112 (inv.) | 11 | | | | | D | 8.3 | .70 | | .096 | | | .023 | .7 | −5 | | 34 | 4.20 | | | | | |
| Sikorsky GS–M | 12 | | B | D10 | D6 | D | 8.1 | 1.69 | −7.9 | .099 | .30 | .0096 | −.105 | .1 | 6 | 176 | 34 | 4.31 | .0101 | 15.29 | 9.11 | 16.05 | 5.5 |
| Sikorsky GS–M (inv.) | 13 | | | | | A | 8.3 | .89 | | .101 | | | .105 | 1.1 | 1 | | 12 | 4.37 | | | | | |
| Sikorsky GS–I | 14 | | B | D10 | D4 | D | 8.3 | 1.78 | −6.8 | .097 | .25 | .0082 | −.094 | .4 | 4 | 217 | 32 | 4.24 | .0086 | 12.84 | 8.31 | 13.98 | 4.5 |
| Sikorsky GS–I (inv.) | 15 | | | | | A | 8.5 | 1.16 | | .100 | | | .093 | 1.2 | 2 | | 16 | 4.34 | | | | | |
| S. T. Aé. 27A | 16 | | B | F10 | E8 | D | 8.0 | 1.72 | −10.2 | .100 | .40 | .0127 | −.177 | 0 | 0 | 135 | 36 | 4.34 | .0137 | 15.96 | 8.20 | 19.80 | 8.0 |
| R. A. F. 34 | 17 | | A | C11 | C1 | C | 8.0 | 1.58 | −.8 | .098 | .20 | .0071 | −.006 | .4 | 5 | 222 | 27 | 4.28 | .0072 | 10.88 | 8.55 | 12.64 | 1.8 |
| U. S. A. 27 | 18 | N 412 | B | C10 | C6 | B | 8.1 | 1.71 | −4.7 | .094 | .30 | .0086 | −.078 | 1.8 | 5 | 199 | 30 | 4.14 | .0098 | 10.40 | 8.70 | 11.12 | 5.6 |
| U. S. A. 27 (inv.) | 19 | N 412 | | | | D | 8.1 | .52 | | .094 | | | .080 | 1.9 | 0 | | 29 | 4.14 | | | | | |
| U. S. A. 35–A | 20 | | B | E10 | E6 | D | 8.4 | 1.52 | −8.0 | .095 | .38 | .0116 | −.111 | .8 | 5 | 131 | 34 | 4.18 | .0121 | 16.60 | 11.90 | 18.18 | 7.3 |
| U. S. A. 35–B | 21 | N 412 | B | C10 | C5 | B | 8.3 | 1.81 | −5.2 | .099 | .35 | .0083 | −.076 | .5 | 5 | 218 | 30 | 4.31 | .0087 | 10.56 | 7.54 | 11.61 | 4.6 |
| U. S. A. 35–B (inv.) | 22 | N 412 | | | | D | 8.3 | .81 | | .102 | | | .081 | 1.3 | 5 | | 24 | 4.41 | | | | | |
| C–62 | 23 | | A | D10 | A | D | 8.4 | 1.06 | −1.8 | .095 | .15 | .0065 | −.038 | .6 | 4 | 163 | 34 | 4.18 | .0067 | 7.09 | 5.72 | 8.04 | 1.9 |
| C–72 | 24 | N 412 | B | C10 | C4 | D | 8.0 | 1.74 | −5.6 | .095 | .23 | .0083 | −.084 | 1.0 | 3 | 210 | 30 | 4.18 | .0087 | 10.53 | 7.39 | 11.73 | 4.0 |
| C–72 (inv.) | 25 | N 412 | | | | D | 8.1 | .83 | | .096 | | | .085 | 1.0 | −1 | | 19 | 4.20 | | | | | |
| C–80 | 26 | | A | B10 | A | D | 8.2 | 1.24 | −1.0 | .098 | .05 | .0064 | −.015 | .2 | 4 | 194 | 29 | 4.28 | .0064 | 7.91 | 5.77 | 8.58 | 1.3 |
| C–80 (inv.) | 27 | | | | | D | 8.1 | .81 | | .100 | | | .018 | .4 | 2 | | 36 | 4.34 | | | | | |
| N–22 | 28 | N 412 | B | C10 | C4 | D | 8.1 | 1.72 | −5.4 | .096 | .17 | .0087 | −.075 | .6 | 4 | 198 | 30 | 4.20 | .0089 | 11.25 | 8.86 | 12.37 | 4.3 |
| N–22 (inv.) | 29 | N 412 | | | | B | 8.1 | .84 | | .098 | | | .082 | .8 | 0 | | 14 | 4.28 | | | | | |
| N–60 | 30 | N 388 | B | C10 | C4 | D | 8.1 | 1.73 | −5.5 | .097 | .30 | .0086 | −.078 | 0 | 0 | 201 | 31 | 4.24 | .0090 | 11.17 | 7.88 | 12.37 | 4.0 |
| N–60 R | 31 | N 388 | B | C11 | C3 | D | 8.3 | 1.50 | −1.5 | .098 | .09 | .0077 | −.001 | −.1 | 6 | 195 | 27 | 4.28 | .0078 | 11.17 | 7.88 | 12.37 | 2.8 |
| N–68 | 32 | | A | B10 | A | D | 8.1 | .96 | 0 | .097 | 0 | .0060 | 0 | .7 | 5 | 160 | 25 | 4.24 | .0061 | 6.90 | 5.76 | 8.00 | 0 |
| N–69 | 33 | | A | B10 | A | D | 8.1 | 1.00 | 0 | .098 | 0 | .0066 | 0 | .8 | 4 | 152 | 25 | 4.11 | .0066 | 8.46 | 8.22 | 10.94 | 0 |
| N–71 | 34 | | C | C10 | C2 | D | 8.3 | 1.67 | −2.0 | .099 | .18 | .0066 | −.029 | .7 | 6 | 253 | 28 | 4.31 | .0068 | 9.99 | 7.52 | 11.54 | 2.0 |
| N–71 (inv.) | 35 | | | | | A | 8.3 | 1.24 | | .099 | | | .030 | 0 | 1 | | 23 | 4.31 | | | | | |
| N–75 | 36 | | C | C10 | C2 | B | 7.9 | 1.68 | −2.2 | .097 | .15 | .0075 | −.045 | .9 | 3 | 224 | 28 | 4.24 | .0077 | 9.99 | 8.69 | 11.50 | 2.0 |
| N–75 (inv.) | 37 | | | | | A | 8.2 | 1.09 | | .096 | | | .046 | .7 | 2 | | 20 | 4.20 | | | | | |
| N–76 | 38 | | C | C10 | C3 | D | 8.2 | 1.63 | −2.1 | .096 | .19 | .0078 | −.032 | .7 | 4 | 209 | 28 | 4.20 | .0081 | 10.00 | 8.69 | 11.50 | 2.7 |
| N–76 (inv.) | 39 | | | | | A | 8.0 | .99 | | .095 | | | .032 | .5 | 0 | | 21 | 4.18 | | | | | |
| N–80 | 40 | | C | C10 | C2 | B | 8.4 | 1.74 | −2.2 | .098 | .16 | .0069 | −.044 | −.1 | 2 | 252 | 29 | 4.28 | .0071 | 10.02 | 7.59 | 11.54 | 2.0 |
| N–80 (inv.) | 41 | | | | | A | 8.5 | 1.17 | | .100 | | | .043 | 0 | 0 | | 22 | 4.34 | | | | | |
| N–81 | 42 | | C | C10 | C2 | A | 8.5 | 1.79 | −2.3 | .100 | .14 | .0072 | −.041 | .2 | 5 | 249 | 29 | 4.34 | .0073 | 10.60 | 7.18 | 11.54 | 2.0 |
| N–81 (inv.) | 43 | | | | | A | 8.5 | 1.26 | | .101 | | | .038 | .1 | 2 | | 22 | 4.37 | | | | | |
| Gött. 387 | 44 | N 428 | B | D10 | D6 | D | 8.4 | 1.70 | −6.6 | .097 | .30 | .0091 | −.098 | .7 | 4 | 187 | 32 | 4.24 | .0097 | 13.40 | 9.69 | 14.85 | 5.9 |
| Gött. 398 | 45 | N 412 | B | D10 | D5 | D | 8.1 | 1.68 | −6.0 | .094 | .15 | .0091 | −.081 | .4 | 1 | 185 | 31 | 4.14 | .0094 | 12.50 | 9.27 | 13.75 | 4.9 |
| Gött. 398 (inv.) | 46 | N 412 | | | | D | 8.2 | .83 | | .097 | | | .066 | 1.9 | 3 | | 12 | 4.24 | | | | | |
| Gött. 398–A | 47 | N 416 | B | C10 | A | D | 8.4 | 1.20 | −6.1 | .095 | .40 | .0085 | −.086 | 1.0 | −2 | 141 | 31 | 4.18 | .0108 | 12.17 | 9.25 | 13.62 | 4.5 |
| Gött. 398–B | 48 | N 416 | B | C10 | A | D | 8.6 | 1.19 | −6.4 | .090 | .45 | .0084 | −.093 | 1.7 | 4 | 142 | 31 | 4.00 | .0122 | 11.87 | 9.24 | 13.48 | 4.5 |
| Gött. 398–R | 49 | N 388 | B | D11 | D4 | D | 8.2 | 1.46 | −2.2 | .098 | .10 | .0082 | −.005 | .5 | 10 | 178 | 28 | 4.28 | .0083 | 12.50 | 9.27 | 13.75 | 3.5 |
| Gött. 413 | 50 | | B | D10 | D5 | D | 8.0 | 1.61 | −7.7 | .101 | .35 | .0097 | −.096 | 0 | 7 | 166 | 35 | 4.37 | .0104 | 15.22 | 9.21 | 16.45 | 5.0 |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gött. 420 | 51 | | B | E10 | E4 | D | 8.2 | 1.51 | −8.3 | .095 | .18 | .0101 | −.084 | −.4 | 7 | 145 | 34 | 4.18 | .0107 | 16.50 | 11.84 | 18.75 | 4.5 |
| Gött. 429-AG | 52 | | A | C10 | C0 | A | 8.1 | 1.61 | 0 | .100 | 0 | .0066 | 0 | .1 | 4 | 244 | 26 | 4.34 | .0066 | 10.38 | 5.90 | 11.20 | 0 |
| Gött. 429-J | 53 | | A | C10 | C0 | A | 8.0 | 1.65 | 0 | .102 | 0 | .0068 | 0 | .2 | 5 | 248 | 27 | 4.41 | .0068 | 10.98 | 6.10 | 11.78 | 0 |
| Gött. 436 | 54 | | B | C10 | C4 | D | 8.0 | 1.68 | −4.4 | .098 | .22 | .0082 | −.061 | .5 | 5 | 205 | 30 | 4.28 | .0085 | 10.16 | 7.47 | 11.10 | 3.9 |
| Gött. 436 (inv.) | 55 | | | | | D | 8.1 | .76 | | .099 | | | .062 | .6 | −6 | | 28 | 4.31 | | | | | |
| Gött. 532 | 56 | | B | C10 | C5 | C | 8.1 | 1.91 | −6.1 | .101 | .37 | .0080 | −.095 | .8 | 6 | 239 | 31 | 4.37 | .0088 | 11.60 | 6.68 | 13.00 | 4.8 |
| Gött. 532 (inv.) | 57 | | | | | A | 8.3 | .73 | | .101 | | | .095 | 2.9 | 14 | | 10 | 4.87 | | | | | |
| Clark Y | 58 | N 412 | B | C10 | C4 | D | 8.4 | 1.68 | −5.0 | .092 | .12 | .0088 | −.069 | 1.1 | 4 | 202 | 29 | 4.07 | .0085 | 10.53 | 8.30 | 11.70 | 3.9 |
| Clark Y (inv.) | 59 | N 412 | | | | B | 8.4 | .92 | | .098 | | | .072 | 1.7 | 3 | | 16 | 4.28 | | | | | |
| Clark Y-B | 60 | N 447 | B | C10 | A | D | 8.2 | 1.14 | −5.4 | .089 | .35 | .0072 | −.075 | 1.3 | −2 | 158 | 30 | 3.96 | .0096 | 10.00 | 8.26 | 11.46 | 3.3 |
| Clark Y M-15 | 61 | N 412 | C | D10 | D4 | C | 8.4 | 1.70 | −5.2 | .094 | .10 | .0091 | −.068 | 1.1 | 7 | 187 | 30 | 4.14 | .0098 | 13.51 | 10.63 | 15.00 | 4.0 |
| Clark Y M-15 (inv.) | 62 | N 412 | | | | B | 8.0 | 1.23 | | .097 | | | .071 | 1.3 | 1 | | 18 | 4.24 | | | | | |
| Clark Y M-18 | 63 | N 412 | C | E10 | E4 | C | 8.2 | 1.60 | −5.1 | .091 | .07 | .0104 | −.004 | 1.4 | 5 | 154 | 30 | 4.04 | .0104 | 16.21 | 12.72 | 18.00 | 4.0 |
| Clark Y M-18 (inv.) | 64 | N 412 | | | | A | 8.3 | 1.39 | | .094 | | | .065 | 2.2 | 2 | | 18 | 4.14 | | | | | |
| Clark Y-6 | 65 | | B | A10 | A | D | 8.1 | 1.07 | −2.9 | .098 | .15 | .0059 | −.038 | .7 | 5 | 181 | 37 | 4.28 | .0062 | 5.40 | 4.24 | 6.00 | 1.9 |
| Clark Y-8 | 66 | | B | B10 | B3 | D | 8.0 | 1.37 | −3.6 | .096 | .14 | .0060 | −.045 | .7 | 6 | 228 | 30 | 4.20 | .0062 | 7.21 | 5.68 | 8.00 | 2.6 |
| Clark Y-10 | 67 | | B | B10 | C3 | B | 7.9 | 1.68 | −4.5 | .098 | .23 | .0075 | −.059 | .7 | 4 | 224 | 30 | 4.28 | .0078 | 9.01 | 7.08 | 10.00 | 3.2 |
| Clark Y-14 | 68 | | B | D10 | D4 | D | 8.0 | 1.72 | −6.2 | .096 | .15 | .0090 | −.080 | 1.2 | 6 | 191 | 31 | 4.20 | .0091 | 12.61 | 9.93 | 14.00 | 4.6 |
| Clark Y-18 | 69 | N 412 | B | E10 | E6 | D | 8.1 | 1.48 | −7.6 | .092 | .23 | .0117 | −.098 | 1.5 | 6 | 126 | 33 | 4.07 | .0121 | 16.22 | 12.74 | 18.00 | 6.3 |
| Clark Y-18 (inv.) | 70 | N 412 | | | | B | 8.1 | .89 | | .089 | | | .101 | .3 | −10 | | 10 | 3.96 | | | | | |
| Clark Y-22 | 71 | | B | F10 | E8 | D | 7.9 | 1.36 | −9.3 | .088 | .15 | .0140 | −.107 | 1.8 | 18 | 97 | 34 | 3.93 | .0141 | 19.82 | 15.53 | 22.00 | 8.0 |
| N. A. C. A.: | | | | | | | | | | | | | | | | | | | | | | | |
| CYH | 72 | N 412 | B | C11 | C3 | D | 8.1 | 1.58 | −2.9 | .095 | .08 | .0076 | −.027 | .7 | 0 | 208 | 28 | 4.18 | .0077 | 10.53 | 8.30 | 11.70 | 3.1 |
| CYH (inv.) | 73 | N 412 | | | | B | 8.1 | .96 | | .095 | | | .032 | 1.6 | −1 | | 20 | 4.18 | | | | | |
| -M6 | 74 | N 412 | A | C11 | C3 | D | 8.0 | 1.51 | −.8 | .095 | .03 | .0077 | .002 | −.4 | 0 | 196 | 26 | 4.18 | .0077 | 10.29 | 9.00 | 12.01 | 2.4 |
| -M6 (inv.) | 75 | N 412 | | | | D | 8.2 | 1.19 | | .097 | | | .007 | 0 | 0 | | 24 | 4.24 | | | | | |
| 15 | 76 | | A | C10 | A | D | 8.2 | 1.17 | −2.0 | .094 | .15 | .0069 | −.043 | .3 | 0 | 170 | 29 | 4.14 | .0071 | 10.20 | 8.27 | 12.00 | 2.0 |
| 16 | 77 | | A | C10 | B4 | D | 8.4 | 1.64 | −2.1 | .095 | .17 | .0069 | −.045 | .7 | 3 | 238 | 28 | 4.18 | .0071 | 10.45 | 8.27 | 12.00 | 2.0 |
| 17 | 78 | | C | C10 | B4 | B | 8.4 | 1.53 | −1.9 | .095 | .25 | .0069 | −.047 | .4 | 2 | 222 | 29 | 4.18 | .0076 | 10.20 | 8.27 | 12.00 | 2.6 |
| 18 | 79 | | C | C10 | C2 | A | 8.1 | 1.69 | −2.0 | .096 | .25 | .0071 | −.049 | .6 | 3 | 238 | 28 | 4.20 | .0074 | 10.45 | 8.27 | 12.00 | 2.6 |
| 19 | 80 | | A | B10 | A | D | 8.2 | 1.01 | −1.9 | .098 | .17 | .0065 | −.044 | 0 | 0 | 155 | 33 | 4.11 | .0068 | 9.93 | 8.27 | 12.00 | 2.0 |
| 20 | 81 | | A | B10 | A | D | 8.1 | 1.02 | −2.2 | .090 | .24 | .0065 | −.048 | 1.2 | −10 | 157 | 31 | 4.00 | .0078 | 9.70 | 8.27 | 12.00 | 2.0 |
| 21 | 82 | | A | C11 | C2 | B | 8.1 | 1.71 | −2.1 | .096 | .20 | .0074 | −.038 | .5 | 3 | 231 | 28 | 4.20 | .0077 | 10.29 | 8.96 | 12.00 | 2.4 |
| 21 (inv.) | 83 | | | | | D | 8.1 | 1.08 | | .097 | | | .040 | .4 | 1 | | 22 | 4.24 | | | | | |
| 23 | 84 | | A | B11 | B2 | A | 8.0 | 1.65 | −1.0 | .100 | .18 | .0062 | −.007 | .5 | 7 | 266 | 27 | 4.34 | .0064 | 8.40 | 4.67 | 9.00 | 2.0 |
| 24 | 85 | | A | C11 | C2 | A | 8.1 | 1.67 | −.8 | .103 | .15 | .0068 | 0 | −.1 | 6 | 246 | 27 | 4.44 | .0070 | 11.19 | 6.21 | 12.00 | 2.0 |
| 25 | 86 | | A | D11 | D2 | B | 8.1 | 1.54 | −.8 | .105 | 0 | .0075 | .008 | −.1 | 8 | 205 | 27 | 4.51 | .0075 | 13.97 | 7.79 | 15.00 | 2.0 |
| 26 | 87 | | A | E11 | E2 | D | 8.0 | 1.46 | −.9 | .104 | −.05 | .0082 | .008 | −.3 | 8 | 178 | 27 | 4.47 | .0082 | 16.70 | 9.38 | 18.00 | 2.0 |
| 27 | 88 | | A | A11 | A | D | 7.9 | 1.14 | −1.3 | .102 | .10 | .0056 | −.010 | −.2 | 6 | 204 | 30 | 4.41 | .0057 | 5.63 | 3.10 | 6.00 | 2.0 |
| 22112 | | R 587 | A | C11 | D2 | B | 8.5 | 1.64 | −.8 | .100 | .06 | .0072 | .001 | 1.0 | 5 | 228 | 25 | 4.34 | .0073 | 10.69 | 8.27 | 12.00 | 1.6 |
| 23112 | | R 587 | A | C11 | D2 | A | 8.2 | 1.73 | −.8 | .100 | .08 | .0074 | .002 | 1.5 | 8 | 234 | 25 | 4.34 | .0075 | 10.69 | 8.28 | 12.00 | 2.1 |
| 24112 | | R 587 | A | C11 | C3 | A | 8.0 | 1.67 | −.9 | .100 | .10 | .0074 | 0 | 1.4 | 8 | 226 | 26 | 4.34 | .0074 | 10.71 | 8.26 | 12.00 | 2.4 |
| 25112 | | R 587 | A | C11 | C3 | B | 8.2 | 1.62 | −1.2 | .100 | .08 | .0074 | −.002 | 1.3 | 7 | 219 | 25 | 4.34 | .0075 | 10.78 | 8.28 | 12.00 | 2.7 |

[1] Type of chord. See reference 10.
[2] Type of pressure distribution. See reference 10.
[3] Type of scale effect on maximum lift. A signifies practically no scale effect. For other designations see reference 9, fig. 44.
[4] Type of lift-curve peak as shown in the sketches:




[5] Turbulence factor is 2.64.
[6] These data have been corrected for tip effect.