

N 62 52362

CASE FILE
COPY

TECHNICAL NOTES

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 362

LIFT AND DRAG CHARACTERISTICS OF A CABIN MONOPLANE
DETERMINED IN FLIGHT

By F. L. Thompson and P. H. Keister
Langley Memorial Aeronautical Laboratory

Washington
January, 1931

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

TECHNICAL NOTE NO. 362

LIFT AND DRAG CHARACTERISTICS OF A CABIN MONOPLANE
DETERMINED IN FLIGHT

By F. L. Thompson and P. H. Keister

Summary

The results of flight tests conducted by the National Advisory Committee for Aeronautics to determine the lift and drag characteristics of a full-scale airplane are given herein. A Fairchild FC-2W2 cabin monoplane having a Göttingen 387 wing section was used for the tests.

The maximum lift coefficient for the airplane is compared with that obtained for the Göttingen 387 airfoil in recent tests in the Variable Density Tunnel. The maximum lift coefficient for the airplane was found to be 1.50 and that for the airfoil 1.56. Although the flight tests were confined chiefly to glides with the propeller locked horizontally, data obtained with the propeller operating at zero thrust for a few angles of attack are also included. The most important feature of a comparison between the results obtained with the propeller locked and propeller rotating is that the difference in overall drag agrees very well with that found for the locked propeller in tests with the airplane mounted in the Propeller Research Tunnel.

Introduction

Measurements of the lift and drag characteristics of a full scale cabin monoplane have been completed recently at the Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics, Langley Field, Va. An airfoil of the section used on the airplane has been tested recently in the Variable Density Wind Tunnel, and it is possible to compare the maximum lift coefficient obtained for the airfoil with that obtained in flight for the complete airplane.

Lift, drag, and angle of attack were determined by direct measurements of the gliding angle, dynamic pressure, and attitude of the airplane in steady glides (Reference 1). The lift and drag characteristics were established for angles of attack between -2° and $+21^{\circ}$ with the propeller locked in a horizontal position. The data obtained are tabulated, and are also shown by means of the usual polar diagram and curves of lift and drag coefficients versus angle of attack.

In addition to tests with the propeller locked, glides at angles of attack of -1° , 5° , and 11° were made with the propeller operating at approximately zero thrust. The reason for making these additional tests was that, in connection with the use of this latter method in previous tests, some doubt has been expressed regarding the exactness with which the effect of the propeller is eliminated by this method. An essential phase

of this part of the program was a determination of the drag of the locked propeller and the propeller thrust characteristics by means of tests with the complete airplane mounted in the Propeller Research Tunnel. Although the results obtained with the propeller rotating are strictly secondary in importance, they are believed to be sufficiently important to warrant inclusion herein.

Apparatus and Method

The airplane used for these tests (the Fairchild FC-2W2) is shown in Figures 1, 2, and 3. It is a closed-cabin high-wing monoplane having a gross weight of approximately 4700 lb. as flown in these tests. It has a Göttingen 387 wing section with tips rounded and slightly tapered, as shown in Figures 2 and 3. The wing span is 50 feet; chord, 7 feet; area, 336 square feet; and aspect ratio ($\frac{\text{span}^2}{\text{area}}$), 7.4. The area includes the area between the wing roots that is assumed by the fuselage. The angle of incidence of the wings is $+2.6^\circ$ with respect to the thrust axis.

Propeller locked.— Dynamic pressure and gliding angle were recorded with the N.A.C.A. flight-path-angle and air-speed recorder (Reference 2), which was suspended about 90 feet below the airplane. The angle of the wing chord was recorded with an N.A.C.A. recording pendulum inclinometer. The positions of the three control surfaces were recorded with an N.A.C.A. control

position recorder (Reference 3).

Glides, with the propeller locked in a horizontal position, were made at altitudes between 10,000 and 4,000 feet. Records of 30 seconds duration were obtained at various indicated air speeds from the stalling speed of 60 m.p.h. to 140 m.p.h. The glides were made with the horizontal stabilizer in one position (angle of incidence with respect to thrust axis = $+9^{\circ}$). Control at and beyond maximum lift was obtained by installing a large fin and rudder, shown in comparison with the standard surfaces in Figure 4. Tests were made that established the fact that no appreciable increase in drag accompanied the installation of this additional tail structure. The drag of the suspended recording instrument was established by direct measurements in glides with the suspension cable attached to a spring balance and angle indicator.

The lift and drag coefficients for the airplane were found by use of the expressions

$$C_L = \frac{W \cos \gamma}{q S}$$

and

$$C_D = \frac{W \sin \gamma - d}{q S}$$

where W is the total weight of the airplane during a glide,

γ the recorded gliding angle,

q the recorded dynamic pressure,

S the total wing area of 336 square feet,

and d the drag of the suspended instrument.

The angle of attack, α , is given by

$$\alpha = \lambda - \gamma$$

where λ is the recorded attitude angle of the wing measured from the horizontal.

Propeller operating at zero thrust.— Before any flight tests were made, the drag of the propeller locked horizontally and a portion of the thrust curve for the propeller were determined with the complete airplane mounted in the Propeller Research Tunnel. The propeller drag was determined by the difference in over-all drag with and without the propeller in place. The thrust curve was established for values of V/nD near that for zero thrust. The tunnel tests were made with the thrust axis parallel to the air stream; thus the angle of attack of the wings was 2.6° .

The procedure followed in gliding was essentially the same as that employed with the propeller locked except that it was necessary to adjust the propeller speed to approximately the proper value for zero thrust for each gliding speed and to obtain additional data from which the actual V/nD attained could be calculated. The actual thrust developed in flight was calculated from the known dynamic pressure, V/nD , and thrust characteristics. It was added algebraically to the apparent drag of the airplane calculated from the weight and gliding angle.

I In addition to the dynamic pressure, the data required for a determination of V/nD and thrust were air temperature, static pressure, and propeller r.p.s. The air temperature was measured with a stem thermometer attached to a wing strut. The static air pressure was determined with an N.A.C.A. recording altimeter, which is a recording aneroid unit, or by means of visual observations of the indicating altimeter with which the airplane was regularly equipped. The propeller r.p.s. was determined from visual observations of the engine tachometer. All of these instruments were calibrated.

Accuracy

The accuracy of the flight-path-angle and air-speed recorder was investigated in flight. The alignment of this instrument with respect to the relative wind, which establishes a reference for the inclinometer element, was determined within limits of $\pm .1^\circ$ by means of level flight runs. The accuracy of the air-speed element was checked by means of timed flights over a measured course. The accuracy with which true dynamic pressure was established in these flights was within about ± 1 per cent. The air-speed element was found to be accurate within these limits. The above values refer only to the consistent errors in the instrument, however, and not to the accidental errors which are indicated by a dispersion of experimental points. The

other important instrument, the inclinometer used to record the attitude of the airplane, is believed to be subject only to accidental errors.

It should be mentioned that the effect of downwash on the alignment of the flight-path-angle and air-speed recorder was investigated. Calculations show that at the probable position of that instrument when the airplane was developing maximum lift, the downwash angle was about 0.2° . Further calculations show, however, that variations in downwash angle with lift coefficient were nearly compensated by variations of instrument position with air speed. Therefore, since the actual alignment of the instrument was established for the conditions covered in level flight trials (lift coefficients of approximately .62 and .47), and since there appeared to be no appreciable difference in the alignment for those conditions, it is concluded that errors caused by downwash angles at all angles of attack can be neglected.

In addition to the above mentioned sources of error, the weight and, with the propeller rotating, the calculated thrust should also be considered. The weight for each glide (the initial weight minus an estimated weight of fuel consumed) is probably in error by less than ± 1 per cent. The total thrust corrections were so small that the effect of errors in calculated thrust can be neglected.

Accidental errors in dynamic pressure and angles are probably the chief cause of the dispersion of points on the curves. It is evident from the manner in which the lift and drag coefficients are calculated that errors in dynamic pressure affect both coefficients equally, but that errors in gliding angle affect only the drag coefficient appreciably. Angles of attack are subject to the sum, in degrees, of errors in flight path and attitude angles. Although the dispersion of points indicates that the accidental errors are fairly large, their effect on the faired curves is believed to be nearly eliminated by reason of the large number of experimental points obtained. The probable limits of accuracy of the faired curves are believed to be as follows: lift coefficient, ± 2 per cent; drag coefficient, ± 3 per cent; angles of attack, $\pm .3^\circ$.

Elevator angles, values for which are tabulated herein, are probably accurate within $\pm 1^\circ$.

Results

Propeller locked.— The data obtained with the propeller locked are given in Table I. Lift and drag coefficients versus angle of attack are shown in Figure 5. The curve of L/D shown in the same figure was obtained from the faired C_L and C_D curves. The polar diagram is shown in Figure 6.

Figure 5 shows a maximum lift coefficient of 1.50 at an angle of attack of approximately 16° . The slope of the lift curve varies slightly throughout. The data of Table I show that the increase in angle of attack beyond that for maximum lift was accompanied by a sharp increase in flight-path angle without an appreciable change in attitude. An example of the manner in which the airplane responds to a step-by-step increase in elevator deflection at maximum lift is shown by runs 251a, b, and c at the end of Table I. It is worthy of note that all the experimental points for angles of attack greater than approximately 13° were obtained with the aid of the large fin and rudder.

In Figure 7, the lift curve for the airplane is shown in comparison with that obtained for the Göttingen 387 airfoil at full-scale Reynolds Number. The airfoil tests were made recently in the new Variable Density Wind Tunnel with a polished airfoil of rectangular form and aspect ratio 6 (Reference 4). The maximum coefficient for the airfoil is about 4 per cent higher than that for the complete airplane. Calculations show that at maximum lift there is probably a down load on the tail of the airplane equal to about 1 per cent of the total weight. It is possible, therefore, that the maximum lift coefficient for the airplane wing is slightly greater than that for the complete airplane, and that the actual difference between the maximum lift coefficients for the airfoil and actual airplane wing is

less than 4 per cent.

Propeller rotating.— The results obtained with the propeller rotating are shown in Table II and Figures 8 and 9. Curves obtained with the propeller locked are included in these figures for comparison. Figure 8 shows that in addition to the difference in drag for the two conditions, there is also an appreciable difference in lift. It is possible that the difference shown is at least partially due to experimental inaccuracy, particularly at 4.5° angle of attack. However, it should be noted that the difference shown at 10.5° angle of attack was verified by check runs that were made for both conditions after the difference in results was first observed. Since lift and drag are both affected, the difference in drag shown by the polar diagrams appears to be greater than that shown by the curves of drag coefficient versus angle of attack, except at low angles of attack.

In the wind tunnel, with the wing at an angle of attack of 2.6° , the drag of the propeller was found to be equivalent to a drag coefficient of .0124, whereas the difference between the two drag curves determined in flight is .0105 at this angle of attack. The discrepancy is small compared with the total drag coefficient (about 2.5 per cent), and can probably be attributed to experimental inaccuracies. It is concluded,

therefore, that the effect of the propeller was practically eliminated in the tests conducted with the propeller rotating.

Langley Memorial Aeronautical Laboratory,
National Advisory Committee for Aeronautics,
Langley Field, Va., January 13, 1931.

References

1. Green, M. W. : Determination of the Lift and Drag Characteristics of an Airplane in Flight. N.A.C.A. Technical Note No. 223. August, 1925.
2. Coleman, Donald G. : N.A.C.A. Flight-Path-Angle and Air-Speed Recorder. N.A.C.A. Technical Note No. 233. April, 1926.
3. Ronan, K. M. : An Instrument for Recording the Position of Airplane Control Surfaces. N.A.C.A. Technical Note No. 154. August, 1923.
4. Ward, Kenneth E. : The Effect of Small Variations in Profile of Airfoils. N.A.C.A. Technical Note No. 361. January, 1931.

TABLE I
FAIRCHILD GLIDE TESTS
(propeller locked)

| Run No. | Attitude angle λ | Gliding angle γ | Angle of attack α | Cos γ | Sin γ | Weight before flight | Fuel used till run | Weight during run W | Lift L | Dyn-amic press. q | Ap-parent drag | Drag of sus-pended instru-ment, d | True drag D | Lift coef. C_L | Drag coef. C_D | Elev-ator position δ_e | Remarks |
|---------|--------------------------|------------------------|--------------------------|--------------|--------------|----------------------|--------------------|-----------------------|----------|---------------------|----------------|-------------------------------------|---------------|------------------|------------------|-------------------------------|---------|
| | deg. | deg. | deg. | | | lb. | lb. | lb. | lb. | lb./sq.ft. | lb. | lb. | lb. | | | deg. from stab. | |
| 35 | + 0.8 | - 6.6 | + 7.4 | .9934 | .1149 | 4742 | 46 | 4696 | 4660 | 13.3 | 534 | 17 | 517 | 1.042 | .1158 | + 7 | |
| 37 | - 2.0 | - 6.7 | + 4.7 | .9932 | .1167 | 4742 | 46 | 4696 | 4660 | 16.6 | 548 | 19 | 529 | .835 | .0944 | + 3 | |
| 38 | - 4.0 | - 7.1 | + 3.1 | .9923 | .1236 | 4742 | 46 | 4696 | 4660 | 19.9 | 581 | 20 | 561 | .696 | .0838 | + 2 | |
| 40 | - 7.6 | - 8.4 | + .8 | .9893 | .1461 | 4742 | 92 | 4650 | 4600 | 28.5 | 680 | 21 | 659 | .517 | .0739 | 0 | |
| 42 | +12.9 | -11.7 | - 1.2 | .9792 | .2028 | 4742 | 132 | 4610 | 4515 | 38.8 | 935 | 22 | 913 | .346 | .0700 | - 2 | |
| 53 | -15.9 | -13.9 | - 2.0 | .9707 | .2402 | 4732 | 200 | 4532 | 4400 | 46.9 | 1090 | 22 | 1068 | .280 | .0679 | - 4 | |
| 54 | + 2.6 | - 6.9 | + 9.5 | .9928 | .1201 | 4732 | 68 | 4664 | 4631 | 12.2 | 560 | 17 | 543 | 1.130 | .1323 | + 9 | |
| 55 | + 2.8 | - 7.0 | + 9.8 | .9925 | .1219 | 4732 | 68 | 4664 | 4629 | 12.3 | 568 | 17 | 549 | 1.120 | .1327 | + 8 | |
| 56 | + 1.1 | - 6.7 | + 7.8 | .9932 | .1167 | 4732 | 68 | 4664 | 4632 | 13.5 | 544 | 18 | 526 | 1.020 | .1158 | + 5 | |
| 57 | - .1 | - 6.7 | + 6.6 | .9932 | .1167 | 4732 | 68 | 4664 | 4632 | 14.7 | 544 | 19 | 525 | .938 | .1062 | + 5 | |
| 58 | - 1.9 | - 3.7 | + 4.8 | .9932 | .1167 | 4732 | 68 | 4664 | 4632 | 16.6 | 541 | 19 | 522 | .830 | .0935 | + 4 | |
| 59 | - 3.0 | - 6.9 | + 3.9 | .9928 | .1201 | 4732 | 68 | 4664 | 4630 | 18.2 | 580 | 20 | 540 | .757 | .0882 | + 2 | |
| 61 | -12.8 | -11.7 | - 1.1 | .9792 | .2028 | 4732 | 113 | 4619 | 4522 | 39.8 | 936 | 22 | 914 | .338 | .0683 | - 1 | |
| 73 | + 5.4 | - 7.7 | +13.1 | .9910 | .1340 | 4728 | 89 | 4639 | 4605 | 9.9 | 621 | 15 | 606 | 1.391 | .1620 | +14 | |
| 75 | + 3.1 | - 7.0 | +10.1 | .9925 | .1219 | 4728 | 89 | 4639 | 4605 | 11.8 | 565 | 16 | 549 | 1.162 | .1385 | +10 | |
| 78 | + .5 | - 6.7 | + 7.2 | .9932 | .1167 | 4728 | 89 | 4639 | 4605 | 13.6 | 542 | 17 | 525 | 1.007 | .1149 | + 6 | |
| 79 | - .1 | - 6.6 | + 6.5 | .9934 | .1149 | 4728 | 130 | 4598 | 4565 | 14.6 | 530 | 18 | 512 | .930 | .1043 | + 6 | |
| 83 | + 5.4 | - 7.4 | +12.8 | .9917 | .1288 | 4742 | 74 | 4675 | 4630 | 10.4 | 602 | 16 | 586 | 1.325 | .1675 | +14 | |
| 86 | + 3.5 | - 6.9 | + 9.4 | .9928 | .1201 | 4749 | 74 | 4675 | 4640 | 12.3 | 562 | 17 | 545 | 1.096 | .1286 | + 9 | |
| 89 | - 1.7 | - 6.7 | + 5.0 | .9932 | .1167 | 4749 | 74 | 4675 | 4645 | 16.6 | 545 | 19 | 526 | .832 | .0942 | + 3 | |
| 103 | + 4.7 | - 6.9 | +11.6 | .9928 | .1201 | 4731 | 57 | 4674 | 4640 | 10.6 | 582 | 15 | 547 | 1.303 | .1535 | +12 | |
| 104 | + 4.1 | - 6.9 | +11.0 | .9928 | .1201 | 4731 | 57 | 4674 | 4640 | 10.9 | 582 | 15 | 547 | 1.267 | .1494 | +11 | |
| 106 | + 2.2 | - 7.0 | + 9.2 | .9925 | .1219 | 4731 | 57 | 4674 | 4640 | 12.5 | 570 | 16 | 554 | 1.105 | .1319 | + 7 | |
| 108 | - 1.4 | - 6.7 | + 5.3 | .9932 | .1167 | 4731 | 57 | 4674 | 4645 | 16.1 | 546 | 19 | 527 | .857 | .0976 | + 3 | |
| 109 | - 5.0 | - 7.5 | + 2.5 | .9914 | .1305 | 4731 | 85 | 4646 | 4605 | 21.5 | 606 | 20 | 586 | .637 | .0910 | + 2 | |
| 112 | + 5.5 | - 7.7 | +13.2 | .9910 | .1340 | 4739 | 68 | 4671 | 4630 | 9.8 | 626 | 15 | 611 | 1.420 | .1875 | +14 | |
| 113 | + 4.9 | - 7.4 | +12.3 | .9917 | .1288 | 4739 | 68 | 4671 | 4630 | 10.1 | 602 | 15 | 597 | 1.365 | .1730 | +12 | |
| 114 | + 4.0 | - 7.0 | +11.0 | .9925 | .1219 | 4739 | 68 | 4671 | 4635 | 11.2 | 569 | 16 | 553 | 1.232 | .1470 | +11 | |
| 116 | + 5.3 | - 7.4 | +12.7 | .9917 | .1288 | 4739 | 102 | 4637 | 4595 | 10.1 | 597 | 15 | 582 | 1.354 | .1715 | +14 | |
| 117 | + 4.7 | - 7.3 | +12.0 | .9919 | .1271 | 4739 | 102 | 4637 | 4595 | 10.6 | 589 | 15 | 574 | 1.230 | .1612 | +12 | |
| 118 | + 3.6 | - 6.9 | +10.5 | .9928 | .1201 | 4739 | 102 | 4337 | 4605 | 10.9 | 557 | 16 | 541 | 1.257 | .1475 | +10 | |
| 120 | + 2.4 | - 6.9 | + 9.3 | .9928 | .1201 | 4739 | 139 | 4600 | 4565 | 12.2 | 552 | 16 | 536 | 1.113 | .1307 | + 8 | |
| 122 | -12.3 | -11.4 | - .9 | .9803 | .1977 | 4742 | 90 | 4652 | 4560 | 38.4 | 920 | 22 | 896 | .353 | .0696 | - 3 | |
| 123 | -15.6 | -13.8 | - 1.8 | .9711 | .2385 | 4742 | 90 | 4652 | 4520 | 47.7 | 1110 | 22 | 1088 | .282 | .0678 | - 5 | |
| 124 | -12.8 | -11.6 | - 1.2 | .9796 | .2011 | 4742 | 141 | 4601 | 4510 | 39.1 | 925 | 22 | 903 | .343 | .0687 | - 3 | |
| 125 | -16.3 | -14.1 | - 2.2 | .9699 | .2436 | 4742 | 141 | 4601 | 4460 | 48.0 | 1120 | 22 | 1098 | .277 | .0680 | - 5 | |
| 126 | -12.9 | -11.7 | - 1.2 | .9792 | .2028 | 4742 | 200 | 4542 | 4450 | 39.7 | 921 | 22 | 899 | .334 | .0673 | - 3 | |
| 128 | + 5.5 | - 7.5 | +13.0 | .9914 | .1305 | 4739 | 69 | 4670 | 4630 | 10.4 | 609 | 15 | 594 | 1.330 | .1699 | +14 | |
| 129 | + 5.9 | - 7.7 | +13.6 | .9910 | .1340 | 4739 | 69 | 4670 | 4630 | 10.1 | 626 | 15 | 611 | 1.365 | .1800 | +15 | |
| 132 | + 5.3 | - 7.3 | +12.6 | .9919 | .1271 | 4739 | 69 | 4670 | 4630 | 10.5 | 594 | 15 | 579 | 1.312 | .1642 | +13 | |
| 135 | + 5.5 | - 7.6 | +13.1 | .9912 | .1323 | 4739 | 112 | 4627 | 4585 | 10.2 | 612 | 15 | 597 | 1.338 | .1740 | +14 | |
| 136 | + 5.9 | - 7.6 | +13.5 | .9912 | .1323 | 4739 | 112 | 4627 | 4585 | 9.9 | 612 | 15 | 597 | 1.378 | .1795 | +14 | |
| 139 | + 5.5 | - 7.6 | +13.1 | .9912 | .1323 | 4739 | 73 | 4666 | 4625 | 10.3 | 617 | 15 | 602 | 1.335 | .1735 | +14 | |
| 140 | + 3.9 | - 7.1 | +11.0 | .9923 | .1236 | 4739 | 73 | 4666 | 4630 | 11.0 | 577 | 16 | 561 | 1.253 | .1518 | +11 | |
| 141 | + 2.9 | - 6.9 | + 9.8 | .9928 | .1201 | 4739 | 73 | 4666 | 4630 | 11.8 | 560 | 16 | 544 | 1.168 | .1372 | + 9 | |
| 146 | - 6.4 | - 8.3 | + 1.9 | .9895 | .1444 | 4739 | 116 | 4623 | 4575 | 25.2 | 868 | 21 | 847 | .541 | .0764 | 0 | |
| 149 | + 5.1 | - 7.4 | +12.5 | .9917 | .1288 | 4737 | 82 | 4655 | 4615 | 10.5 | 599 | 15 | 584 | 1.308 | .1655 | +13 | |
| 150 | + 4.2 | - 7.3 | +11.5 | .9919 | .1271 | 4737 | 82 | 4655 | 4615 | 11.1 | 592 | 15 | 577 | 1.237 | .1547 | +11 | |
| 152 | + .8 | - 6.7 | + 7.3 | .9932 | .1167 | 4737 | 134 | 4603 | 4570 | 13.6 | 537 | 17 | 520 | 1.000 | .1138 | + 5 | |
| 153 | - .1 | - 6.8 | + 6.5 | .9934 | .1149 | 4737 | 134 | 4603 | 4570 | 15.1 | 529 | 18 | 511 | .900 | .1006 | + 4 | |
| 154 | - 2.0 | - 6.8 | + 4.8 | .9930 | .1184 | 4737 | 134 | 4603 | 4570 | 16.3 | 545 | 19 | 526 | .834 | .0980 | + 2 | |
| 155 | - 3.1 | - 6.9 | + 3.8 | .9928 | .1201 | 4737 | 134 | 4603 | 4570 | 18.2 | 553 | 19 | 534 | .743 | .0872 | + 2 | |
| 158 | - 9.2 | - 9.6 | + .4 | .9858 | .1668 | 4737 | 173 | 4564 | 4500 | 30.2 | 751 | 21 | 730 | .445 | .0718 | - 1 | |
| 159 | -15.9 | -14.3 | - 1.6 | .9692 | .2485 | 4737 | 205 | 4532 | 4395 | 48.2 | 1126 | 22 | 1104 | .272 | .0662 | - 5 | |
| 187 | + 1.8 | - 6.7 | + 8.5 | .9932 | .1167 | 4738 | 113 | 4625 | 4595 | 13.0 | 540 | 17 | 523 | 1.050 | .1196 | + 7 | |
| 188 | - 3.9 | - 7.2 | + 3.3 | .9921 | .1253 | 4738 | 113 | 4625 | 4590 | 19.7 | 579 | 20 | 559 | .693 | .0844 | + 2 | |
| 189 | - 7.6 | - 8.7 | + 1.1 | .9885 | .1513 | 4738 | 113 | 4625 | 4575 | 27.5 | 700 | 21 | 679 | .496 | .0735 | + 0 | |
| 190 | + 1.6 | - 6.6 | + 8.2 | .9934 | .1149 | 4738 | 152 | 4586 | 4555 | 13.0 | 525 | 17 | 508 | 1.042 | .1163 | + 6 | |
| 191 | - 4.1 | - 7.2 | + 3.1 | .9921 | .1253 | 4738 | 152 | 4586 | 4560 | 19.7 | 574 | 20 | 554 | .687 | .0837 | + 2 | |
| 192 | - 7.7 | - 8.8 | + 1.1 | .9882 | .1530 | 4738 | 152 | 4586 | 4535 | 27.5 | 702 | 21 | 681 | .492 | .0737 | 0 | |

(Continuation of Table I)
FAIRHILD GLIDE TESTS
 (propeller locked)

| Run No. | Attitude angle λ | Glide angle γ | Angle of attack α | Cos γ | Sin γ | Weight before flight | Fuel used till run | Weight during run W | Lift L | Dyn-amic press. q | Appar-ent drag | Drag of sus-pended instru-ment, d | True drag D | Lift coef. C _L | Drag coef. C _D | Elev-ator position δ _e | Remarks |
|---------|------------------|---------------|-------------------|-------|-------|----------------------|--------------------|---------------------|--------|-------------------|----------------|-----------------------------------|-------------|---------------------------|---------------------------|-----------------------------------|--------------------------------|
| | deg. | deg. | deg. | | | lb. | lb. | lb. | lb. | lb./sq.ft. | lb. | lb. | lb. | | | deg. | from stab. |
| 217 | + 5.1 | - 7.9 | +13.0 | .9905 | .1374 | 4746 | 105 | 4641 | 4600 | 10.1 | 638 | 15 | 623 | 1.355 | .1835 | +15 | Large fin and rudder installed |
| 218 | + 5.9 | - 8.7 | +14.6 | .9885 | .1513 | 4746 | 105 | 4641 | 4590 | 9.6 | 702 | 15 | 667 | 1.423 | .2130 | +18 | |
| 220 | + 4.2 | - 7.3 | +11.5 | .9919 | .1271 | 4746 | 167 | 4579 | 4540 | 10.3 | 582 | 15 | 567 | 1.310 | .1638 | +13 | |
| 222 | + 6.2 | - 8.3 | +14.5 | .9889 | .1444 | 4746 | 167 | 4579 | 4530 | 9.9 | 660 | 15 | 645 | 1.362 | .1989 | +18 | |
| 223 | + 6.2 | - 8.8 | +15.0 | .9879 | .1530 | 4746 | 167 | 4579 | 4520 | 9.0 | 692 | 14 | 678 | 1.405 | .2242 | +19 | |
| 227 | - 5.0 | - 7.7 | + 2.7 | .9910 | .1340 | 4746 | 99 | 4647 | 4605 | 21.3 | 622 | 20 | 602 | .843 | .0841 | - | |
| 228 | - 1.6 | - 6.9 | + 5.3 | .9928 | .1201 | 4746 | 99 | 4647 | 4610 | 16.6 | 558 | 19 | 539 | .625 | .0966 | - | |
| 229 | + 5.0 | - 7.8 | +12.8 | .9907 | .1357 | 4746 | 99 | 4647 | 4600 | 10.1 | 630 | 15 | 615 | 1.356 | .1810 | - | |
| 231 | + 6.0 | - 8.5 | +14.5 | .9890 | .1478 | 4746 | 99 | 4647 | 4595 | 9.5 | 686 | 14 | 672 | 1.440 | .2105 | - | |
| 232 | + 6.4 | - 9.9 | +16.3 | .9851 | .1719 | 4746 | 99 | 4647 | 4575 | 9.2 | 798 | 14 | 784 | 1.485 | .2535 | - | |
| 233 | + 4.8 | - 7.8 | +12.6 | .9907 | .1357 | 4746 | 165 | 4581 | 4540 | 10.1 | 622 | 15 | 607 | 1.338 | .1789 | - | |
| 235 | + 6.3 | - 8.6 | +14.9 | .9888 | .1495 | 4746 | 165 | 4581 | 4530 | 9.5 | 685 | 14 | 671 | 1.420 | .2101 | - | |
| 236 | + 6.3 | - 9.2 | +15.5 | .9871 | .1599 | 4746 | 165 | 4581 | 4520 | 9.2 | 732 | 14 | 718 | 1.468 | .2320 | - | |
| 237 | + 5.0 | - 7.2 | +12.2 | .9921 | .1253 | 4746 | 74 | 4672 | 4635 | 10.1 | 586 | 11 | 575 | 1.370 | .1694 | +12 | |
| 238 | + 6.9 | -10.1 | +17.0 | .9845 | .1754 | 4746 | 74 | 4672 | 4600 | 9.6 | 820 | 11 | 809 | 1.425 | .2508 | +23 | |
| 239 | + 7.0 | -10.7 | +17.7 | .9826 | .1851 | 4746 | 74 | 4672 | 4590 | 9.7 | 885 | 11 | 854 | 1.415 | .2620 | +25 | |
| 240 | + 6.4 | - 7.7 | +14.1 | .9910 | .1340 | 4746 | 74 | 4672 | 4630 | 9.4 | 626 | 11 | 615 | 1.472 | .1945 | +16 | |
| 241 | + 6.6 | - 7.4 | +14.0 | .9917 | .1288 | 4746 | 74 | 4672 | 4635 | 9.4 | 602 | 11 | 591 | 1.472 | .1870 | +15 | |
| 242 | + 6.0 | - 7.3 | +13.3 | .9919 | .1371 | 4746 | 109 | 4637 | 4600 | 9.4 | 589 | 11 | 578 | 1.462 | .1950 | +15 | |
| 243 | + 6.1 | - 7.4 | +13.5 | .9917 | .1288 | 4746 | 109 | 4637 | 4595 | 9.4 | 597 | 11 | 586 | 1.459 | .1855 | +15 | |
| 245 | + 7.3 | - 8.6 | +15.9 | .9888 | .1495 | 4746 | 109 | 4637 | 4585 | 9.1 | 693 | 11 | 682 | 1.505 | .2230 | +17 | |
| 246 | + 7.1 | - 8.8 | +15.9 | .9882 | .1530 | 4746 | 109 | 4637 | 4580 | 9.1 | 710 | 11 | 699 | 1.504 | .2283 | +17 | |
| 248 | + 5.3 | - 7.0 | +12.3 | .9925 | .1219 | 4750 | 88 | 4662 | 4630 | 10.1 | 568 | 11 | 577 | 1.365 | .1641 | +12 | |
| 249 | + 6.7 | - 7.7 | +14.4 | .9910 | .1340 | 4750 | 88 | 4662 | 4620 | 9.4 | 626 | 11 | 614 | 1.469 | .1934 | +15 | |
| 252 | + 6.9 | -10.8 | +17.7 | .9823 | .1874 | 4750 | 88 | 4662 | 4580 | 9.8 | 873 | 11 | 852 | 1.390 | .2620 | +21 | |
| 253 | + 6.2 | - 7.5 | +13.7 | .9914 | .1305 | 4750 | 131 | 4618 | 4575 | 9.4 | 602 | 11 | 591 | 1.448 | .1871 | +12 | |
| 255 | + 7.1 | - 8.5 | +15.6 | .9890 | .1478 | 4750 | 131 | 4618 | 4570 | 9.1 | 682 | 11 | 671 | 1.495 | .2194 | +17 | |
| 259 | + 7.1 | -11.3 | +18.4 | .9806 | .1959 | 4750 | 95 | 4655 | 4560 | 9.4 | 912 | 11 | 901 | 1.445 | .2851 | +25 | |
| 260 | + 7.1 | -11.2 | +18.3 | .9810 | .1942 | 4750 | 95 | 4655 | 4565 | 9.4 | 904 | 11 | 893 | 1.445 | .2825 | +25 | |
| 261 | + 7.2 | -11.6 | +18.8 | .9796 | .2011 | 4750 | 95 | 4655 | 4560 | 9.8 | 936 | 11 | 925 | 1.390 | .2809 | +25 | |
| 262 | + 7.3 | -12.1 | +19.4 | .9778 | .2096 | 4750 | 95 | 4655 | 4550 | 9.8 | 975 | 11 | 964 | 1.365 | .2927 | +25 | |
| 263 | + 7.2 | -13.8 | +21.0 | .9711 | .2385 | 4750 | 148 | 4602 | 4470 | 10.1 | 1098 | 11 | 1087 | 1.317 | .3200 | +22 | |
| 264 | + 7.1 | -13.8 | +20.9 | .9711 | .2385 | 4750 | 148 | 4602 | 4470 | 10.3 | 1097 | 11 | 1086 | 1.295 | .3139 | +23 | |
| 266 | + 7.3 | -13.2 | +20.5 | .9736 | .2248 | 4750 | 148 | 4602 | 4480 | 10.1 | 1034 | 11 | 1023 | 1.320 | .3030 | +23 | |
| 269 | + 4.6 | - 6.8 | +11.4 | .9930 | .1184 | 4748 | 89 | 4659 | 4630 | 10.4 | 552 | 11 | 541 | 1.330 | .1548 | + 9 | |
| 293 | - 2.5 | - 6.7 | + 4.2 | .9932 | .1167 | 4748 | 89 | 4659 | 4630 | 18.5 | 544 | 15 | 529 | .744 | .0850 | + 1 | |
| 294 | -12.6 | -11.9 | - 7 | .9785 | .2062 | 4748 | 89 | 4659 | 4560 | 40.4 | 961 | 17 | 944 | .335 | .0695 | - 6 | |
| 296 | -13.6 | -12.3 | - 1.3 | .9770 | .2130 | 4748 | 144 | 4604 | 4500 | 41.7 | 981 | 17 | 964 | .320 | .0688 | - 5 | |
| 297 | - 3.0 | - 7.0 | + 4.0 | .9925 | .1219 | 4748 | 144 | 4604 | 4570 | 18.5 | 581 | 15 | 546 | .734 | .0878 | 0 | |
| 336 | + 3.6 | - 6.7 | +10.3 | .9932 | .1167 | 4727 | 137 | 4690 | 4654 | 10.9 | 548 | 15 | 533 | 1.270 | .1455 | +11 | |
| 337 | + 4.1 | - 6.7 | +10.8 | .9932 | .1167 | 4727 | 137 | 4690 | 4654 | 10.7 | 548 | 15 | 533 | 1.295 | .1473 | +13 | |
| 338 | + 4.0 | - 6.6 | +10.6 | .9934 | .1149 | 4727 | 137 | 4690 | 4654 | 10.9 | 540 | 15 | 525 | 1.270 | .1433 | +12 | |
| 339 | - 1.4 | - 6.4 | + 5.0 | .9938 | .1115 | 4727 | 137 | 4690 | 4660 | 16.0 | 523 | 17 | 506 | .868 | .0942 | + 4 | |
| 340 | - 1.2 | - 6.5 | + 5.3 | .9936 | .1132 | 4727 | 137 | 4690 | 4660 | 15.7 | 531 | 17 | 514 | .884 | .0974 | + 4 | |
| 341 | - 1.6 | - 6.4 | + 4.8 | .9938 | .1115 | 4727 | 137 | 4690 | 4660 | 16.0 | 523 | 17 | 506 | .868 | .0942 | + 4 | |
| 342 | -11.7 | -10.8 | - .9 | .9823 | .1874 | 4727 | 218 | 4509 | 4430 | 36.5 | 946 | 20 | 926 | .361 | .0673 | - 6 | |
| 343 | -11.9 | -10.9 | - 1.0 | .9820 | .1891 | 4727 | 218 | 4509 | 4430 | 37.0 | 854 | 20 | 834 | .358 | .0670 | - 6 | |
| 344 | -11.8 | -11.0 | - .8 | .9818 | .1908 | 4727 | 218 | 4509 | 4425 | 36.7 | 861 | 20 | 841 | .359 | .0682 | - 6 | |
| 345 | + 4.3 | - 7.0 | +11.3 | .9925 | .1219 | 4750 | 96 | 4654 | 4620 | 10.6 | 566 | 15 | 551 | 1.295 | .1547 | - | |
| 346 | + 4.8 | - 6.9 | +11.5 | .9928 | .1201 | 4750 | 96 | 4654 | 4625 | 10.6 | 559 | 15 | 544 | 1.298 | .1527 | - | |
| 347 | + 4.6 | - 6.8 | +11.4 | .9930 | .1184 | 4750 | 96 | 4654 | 4625 | 10.6 | 551 | 15 | 536 | 1.298 | .1506 | - | |
| 348 | - 1.5 | - 6.2 | + 4.7 | .9942 | .1080 | 4750 | 96 | 4654 | 4625 | 16.6 | 502 | 17 | 485 | .628 | .0866 | - | |
| 349 | - 1.3 | - 6.2 | + 4.9 | .9948 | .1080 | 4750 | 96 | 4654 | 4630 | 15.6 | 502 | 17 | 485 | .622 | .0925 | - | |
| 350 | - 1.4 | - 6.3 | + 4.9 | .9940 | .1097 | 4750 | 96 | 4654 | 4630 | 15.9 | 510 | 17 | 493 | .664 | .0922 | - | |
| 351 | -11.7 | -10.4 | - 1.3 | .9836 | .1805 | 4750 | 96 | 4654 | 4575 | 37.3 | 840 | 20 | 820 | .365 | .0654 | - | |
| 352 | -11.0 | -10.4 | - .6 | .9836 | .1805 | 4750 | 96 | 4654 | 4575 | 35.5 | 840 | 20 | 820 | .384 | .0687 | - | |
| 353 | -11.8 | -10.6 | - 1.0 | .9829 | .1840 | 4750 | 141 | 4609 | 4540 | 36.8 | 849 | 20 | 829 | .367 | .0670 | - | |
| 354 | -11.8 | -10.8 | - 1.0 | .9823 | .1874 | 4750 | 141 | 4609 | 4530 | 37.3 | 855 | 20 | 845 | .361 | .0675 | - | |
| 355 | -11.7 | -10.7 | - 1.0 | .9826 | .1857 | 4750 | 141 | 4609 | 4540 | 37.3 | 865 | 20 | 835 | .362 | .0666 | - | |
| 356 | + 4.5 | - 6.9 | +11.4 | .9928 | .1201 | 4750 | 87 | 4663 | 4630 | 10.6 | 560 | 15 | 545 | 1.300 | .1530 | - | |
| 357 | + 4.6 | - 6.9 | +11.5 | .9928 | .1201 | 4750 | 87 | 4663 | 4630 | 10.6 | 560 | 15 | 545 | 1.300 | .1530 | - | |
| 358 | + 4.6 | - 6.9 | +11.5 | .9928 | .1201 | 4750 | 87 | 4663 | 4630 | 10.6 | 560 | 15 | 545 | 1.300 | .1530 | - | |
| 359 | - 1.3 | - 6.2 | + 4.9 | .9942 | .1080 | 4750 | 87 | 4663 | 4640 | 15.6 | 504 | 17 | 487 | .884 | .0928 | - | |
| 360 | - 1.2 | - 6.2 | + 5.0 | .9942 | .1080 | 4750 | 87 | 4663 | 4640 | 15.6 | 504 | 17 | 487 | .884 | .0928 | - | |
| 361 | - 1.3 | - 6.3 | + 5.0 | .9940 | .1097 | 4750 | 87 | 4663 | 4635 | 15.8 | 511 | 17 | 494 | .884 | .0941 | - | |
| 362 | -11.8 | -10.4 | - 1.4 | .9836 | .1805 | 4750 | 135 | 4615 | 4540 | 36.4 | 832 | 20 | 812 | .371 | .0664 | - | |
| 363 | -11.8 | -10.8 | - 1.0 | .9823 | .1874 | 4750 | 135 | 4615 | 4535 | 37.1 | 864 | 20 | 844 | .364 | .0677 | - | |
| 364 | -11.9 | -10.8 | - 1.1 | .9823 | .1874 | 4750 | 135 | 4615 | 4535 | 37.1 | 864 | 20 | 844 | .364 | .0677 | - | |
| 365 | -12.0 | -10.8 | - 1.2 | .9823 | .1874 | 4750 | 135 | 4615 | 4535 | 37.6 | 864 | 20 | 844 | .359 | .0668 | - | |
| 376 | - 1.1 | - 6.4 | + 5.3 | .9938 | .1115 | 4725 | 63 | 4662 | 4630 | 15.4 | 520 | 17 | 503 | .894 | .0972 | - | |
| 378 | - 1.3 | - 6.5 | + 5.2 | .9936 | .1132 | 4725 | 63 | 4662 | 4630 | 15.6 | 528 | 17 | 511 | .883 | .0975 | - | |
| 251a | + 7.2 | - 7.7 | +14.9 | .9910 | .1340 | 4750 | 88 | 4662 | 4620 | 9.1 | 625 | 11 | 614 | 1.518 | .2010 | +17 | |
| 251b | + 7.2 | - 8.3 | +15.5 | .9895 | .1444 | 4750 | 88 | 4662 | 4610 | 9.1 | 673 | 11 | 662 | 1.515 | .2163 | +20 | |
| 251c | + 6.9 | -10.8 | +17.7 | .9823 | .1874 | 4750 | 88 | 4662 | 4580 | 9.8 | 874 | 11 | 863 | 1.391 | .2620 | +22 | |

TABLE II
FAIRCHILD GLIDE TESTS
(propeller operating at zero thrust)

| Run No. | Attitude angle λ | Gliding angle γ | Angle of attack α | Cos γ | Sin γ | Weight before flight | Fuel used till run | Weight during run W | Lift L | Apparent drag | Dynam-ic press. q | Drag of suspended instrument, d |
|---------|--------------------------|------------------------|--------------------------|--------------|--------------|----------------------|--------------------|---------------------|--------|---------------|-------------------|---------------------------------|
| | deg. | deg. | deg. | | | lb. | lb. | lb. | lb. | lb. | lb/sq.ft. | lb. |
| 309 | +4.3 | -6.1 | +10.4 | .9943 | .1083 | 4733 | 92 | 4641 | 4615 | 493 | 10.9 | 15 |
| 310 | +4.3 | -6.1 | +10.4 | .9943 | .1083 | 4733 | 113 | 4630 | 4595 | 491 | 10.7 | 15 |
| 311 | +4.2 | -6.1 | +10.3 | .9943 | .1083 | 4733 | 113 | 4630 | 4595 | 491 | 10.7 | 15 |
| 312 | - .8 | -5.5 | + 4.7 | .9954 | .0958 | 4733 | 142 | 4591 | 4570 | 440 | 15.8 | 17 |
| 313 | - .8 | -5.4 | + 4.6 | .9956 | .0941 | 4733 | 158 | 4575 | 4555 | 431 | 15.8 | 17 |
| 314 | - .8 | -5.5 | + 4.7 | .9954 | .0958 | 4733 | 158 | 4575 | 4555 | 438 | 15.7 | 17 |
| 315 | -10.2 | -9.5 | - .7 | .9863 | .1850 | 4733 | 169 | 4544 | 4485 | 750 | 37.8 | 20 |
| 316 | -9.6 | -9.1 | - .5 | .9874 | .1582 | 4733 | 208 | 4525 | 4485 | 716 | 37.7 | 20 |
| 317 | -10.0 | -9.3 | - .7 | .9869 | .1616 | 4733 | 234 | 4499 | 4440 | 727 | 37.3 | 20 |
| 318 | +4.4 | -6.2 | +10.6 | .9942 | .1080 | 4733 | 97 | 4636 | 4610 | 501 | 10.7 | 15 |
| 319 | +4.2 | -6.2 | +10.4 | .9942 | .1080 | 4733 | 120 | 4613 | 4590 | 498 | 10.7 | 15 |
| 320 | +4.1 | -6.1 | +10.2 | .9943 | .1063 | 4733 | 120 | 4613 | 4590 | 490 | 10.8 | 15 |
| 321 | -1.2 | -5.5 | + 4.3 | .9954 | .0958 | 4733 | 143 | 4590 | 4570 | 440 | 16.0 | 17 |
| 322 | - .9 | -5.5 | + 4.6 | .9954 | .0958 | 4733 | 170 | 4563 | 4540 | 437 | 15.8 | 17 |
| 323 | - .9 | -5.5 | + 4.6 | .9954 | .0958 | 4733 | 170 | 4563 | 4540 | 437 | 15.7 | 17 |
| 324 | -10.1 | -9.1 | - 1.0 | .9874 | .1582 | 4733 | 205 | 4528 | 4470 | 716 | 37.2 | 20 |
| 325 | -10.3 | -9.2 | - 1.1 | .9871 | .1599 | 4733 | 228 | 4505 | 4445 | 720 | 38.0 | 20 |
| 326 | -9.9 | -9.0 | - .9 | .9877 | .1564 | 4733 | 228 | 4505 | 4450 | 704 | 37.7 | 20 |
| 328 | +4.3 | -6.0 | +10.3 | .9945 | .1045 | 4733 | 112 | 4621 | 4595 | 483 | 10.9 | 15 |
| 329 | +4.2 | -6.0 | +10.2 | .9945 | .1045 | 4733 | 112 | 4621 | 4595 | 483 | 10.9 | 15 |
| 330 | +4.6 | -5.9 | +10.5 | .9947 | .1028 | 4733 | 143 | 4590 | 4565 | 472 | 10.7 | 15 |
| 331 | - .8 | -5.6 | + 4.8 | .9952 | .0976 | 4733 | 143 | 4590 | 4570 | 448 | 15.6 | 17 |
| 333 | - .8 | -5.4 | + 4.6 | .9956 | .0941 | 4733 | 168 | 4565 | 4545 | 430 | 15.8 | 17 |
| 334 | -9.8 | -8.8 | - 1.0 | .9882 | .1530 | 4733 | 198 | 4535 | 4480 | 694 | 37.2 | 20 |
| 335 | -9.8 | -8.9 | - .9 | .9880 | .1547 | 4733 | 198 | 4535 | 4480 | 702 | 36.9 | 20 |
| 379 | -1.1 | -5.7 | + 4.6 | .9951 | .0993 | 4725 | 111 | 4614 | 4590 | 458 | 15.6 | 17 |
| 380 | - .9 | -5.7 | + 4.8 | .9951 | .0993 | 4725 | 111 | 4614 | 4590 | 458 | 15.6 | 17 |
| 381 | - .9 | -5.7 | + 4.8 | .9951 | .0993 | 4725 | 111 | 4614 | 4590 | 458 | 15.6 | 17 |
| 382 | +4.3 | -6.1 | +10.4 | .9943 | .1063 | 4725 | 114 | 4611 | 4585 | 490 | 10.6 | 14 |
| 383 | +4.5 | -6.1 | +10.6 | .9943 | .1063 | 4725 | 114 | 4611 | 4585 | 490 | 10.6 | 14 |
| 384 | +4.3 | -6.2 | +10.5 | .9942 | .1080 | 4725 | 114 | 4611 | 4585 | 498 | 10.6 | 14 |
| 385 | +4.3 | -6.1 | +10.4 | .9943 | .1063 | 4725 | 114 | 4611 | 4585 | 490 | 10.6 | 14 |

| Run No. | Baro-metric press. | Air tem-perature | Specific weight of air | True velocity V | Pro-peller speed n | Pitch diam-eter ratio | Thrust coef-ficient C_T | Thrust T | True drag D | Lift coef-ficient C_L | Drag coef-ficient C_D |
|---------|--------------------|------------------|------------------------|-----------------|--------------------|-----------------------|---------------------------|----------|-------------|-------------------------|-------------------------|
| | in.Hg. | deg.F | lb./cu.ft. | ft./sec. | rev./sec. | V/nD | | lb. | lb. | | |
| 309 | 21.5 | 59 | .0550 | 113 | 11.6 | 1.030 | +.0020 | + 4 | 482 | 1.260 | .1316 |
| 310 | 21.5 | 59 | .0550 | 112 | 11.3 | 1.050 | -.0010 | - 2 | 474 | 1.278 | .1318 |
| 311 | 21.8 | 62 | .0550 | 112 | 11.2 | 1.060 | -.0025 | - 4 | 472 | 1.278 | .1313 |
| 312 | 21.5 | 61 | .0548 | 136 | 14.0 | 1.030 | +.0020 | + 5 | 428 | .860 | .0806 |
| 313 | 21.5 | 60 | .0549 | 136 | 13.9 | 1.035 | +.0010 | + 3 | 417 | .858 | .0785 |
| 314 | 22.2 | 64 | .0563 | 134 | 13.8 | 1.025 | +.0025 | + 7 | 428 | .863 | .0811 |
| 315 | 22.1 | 57 | .0568 | 207 | 21.0 | 1.045 | -.0005 | - 3 | 727 | 1.353 | .0572 |
| 316 | 23.0 | 62 | .0586 | 203 | 21.3 | 1.010 | +.0050 | + 31 | 727 | .352 | .0574 |
| 317 | 23.0 | 64 | .0584 | 202 | 20.8 | 1.025 | +.0025 | + 16 | 723 | .354 | .0577 |
| 318 | 21.4 | 60 | .0547 | 112 | 11.5 | 1.030 | +.0020 | + 4 | 490 | 1.281 | .1363 |
| 319 | 21.3 | 59 | .0545 | 112 | 11.3 | 1.050 | -.0010 | - 2 | 481 | 1.276 | .1338 |
| 320 | 21.7 | 61 | .0553 | 112 | 11.2 | 1.060 | -.0025 | - 5 | 470 | 1.265 | .1295 |
| 321 | 21.1 | 60 | .0539 | 138 | 14.3 | 1.020 | +.0035 | + 10 | 433 | .850 | .0805 |
| 322 | 21.0 | 60 | .0536 | 137 | 14.2 | 1.020 | +.0035 | + 10 | 430 | .855 | .0810 |
| 323 | 22.1 | 64 | .0561 | 134 | 13.8 | 1.030 | +.0020 | + 6 | 426 | .860 | .0808 |
| 324 | 21.5 | 60 | .0549 | 209 | 21.3 | 1.040 | .0000 | 0 | 696 | .358 | .0556 |
| 325 | 21.7 | 59 | .0555 | 209 | 21.7 | 1.020 | +.0035 | + 22 | 722 | .348 | .0566 |
| 326 | 22.7 | 64 | .0576 | 203 | 21.5 | 1.000 | +.0060 | + 38 | 722 | .351 | .0570 |
| 328 | 21.4 | 59 | .0548 | 114 | 11.8 | 1.020 | +.0035 | + 7 | 475 | 1.255 | .1296 |
| 329 | 21.8 | 60 | .0557 | 112 | 11.6 | 1.020 | +.0035 | + 5 | 473 | 1.255 | .1292 |
| 330 | 21.2 | 58 | .0543 | 113 | 12.0 | .995 | +.0065 | + 12 | 469 | 1.270 | .1304 |
| 331 | 21.9 | 62 | .0558 | 135 | 14.0 | 1.020 | +.0035 | + 9 | 440 | .861 | .0827 |
| 333 | 21.9 | 64 | .0555 | 135 | 13.7 | 1.045 | -.0005 | - 1 | 412 | .856 | .0776 |
| 334 | 21.5 | 62 | .0547 | 208 | 21.7 | 1.015 | +.0040 | + 25 | 699 | .358 | .0559 |
| 335 | 22.5 | 65 | .0570 | 204 | 21.4 | 1.010 | +.0050 | + 32 | 714 | .361 | .0576 |
| 379 | 22.7 | 36 | .0608 | 128 | 13.0 | 1.040 | .0000 | 0 | 441 | .876 | .0841 |
| 380 | 23.1 | 37 | .0618 | 127 | 13.0 | 1.035 | +.0010 | + 3 | 444 | .876 | .0846 |
| 381 | 23.5 | 38 | .0626 | 126 | 13.0 | 1.025 | +.0025 | + 7 | 448 | .876 | .0854 |
| 382 | 24.9 | 41 | .0660 | 102 | 10.4 | 1.040 | .0000 | 0 | 478 | 1.288 | .1335 |
| 383 | 25.3 | 42 | .0670 | 101 | 10.4 | 1.025 | +.0025 | + 4 | 480 | 1.288 | .1346 |
| 384 | 25.7 | 44 | .0678 | 101 | 10.4 | 1.025 | +.0025 | + 4 | 488 | 1.288 | .1370 |
| 385 | 26.1 | 47 | .0684 | 100 | 10.4 | 1.020 | +.0035 | + 6 | 483 | 1.288 | .1352 |

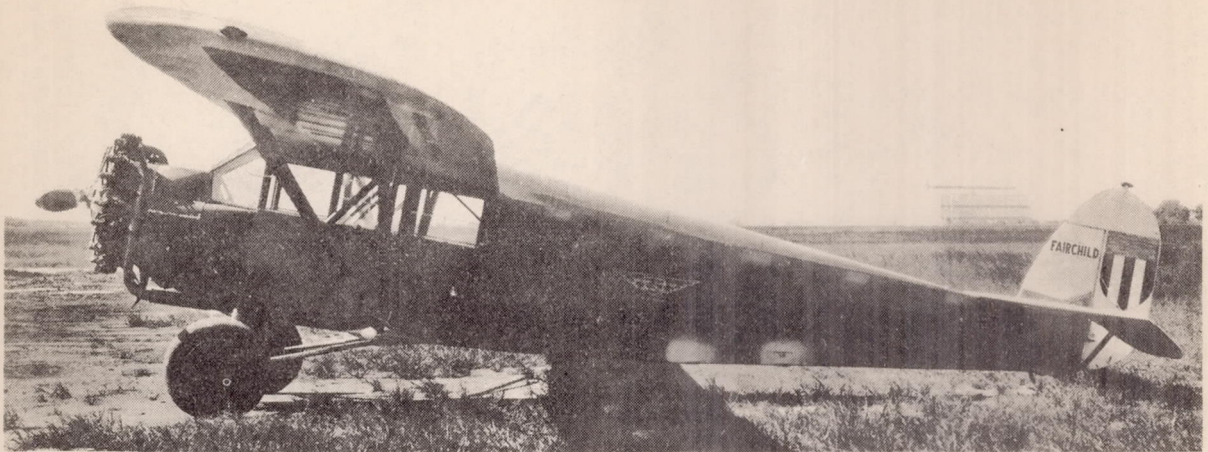


Fig.1 Side view of the Fairchild cabin airplane,FC-2W2.

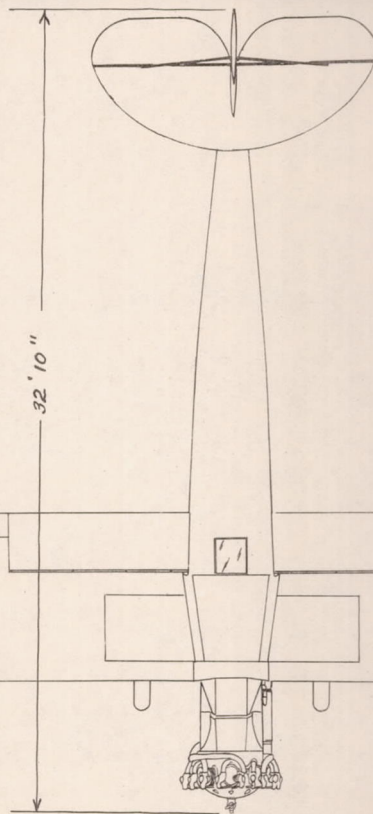


Fig.2 Plan view.

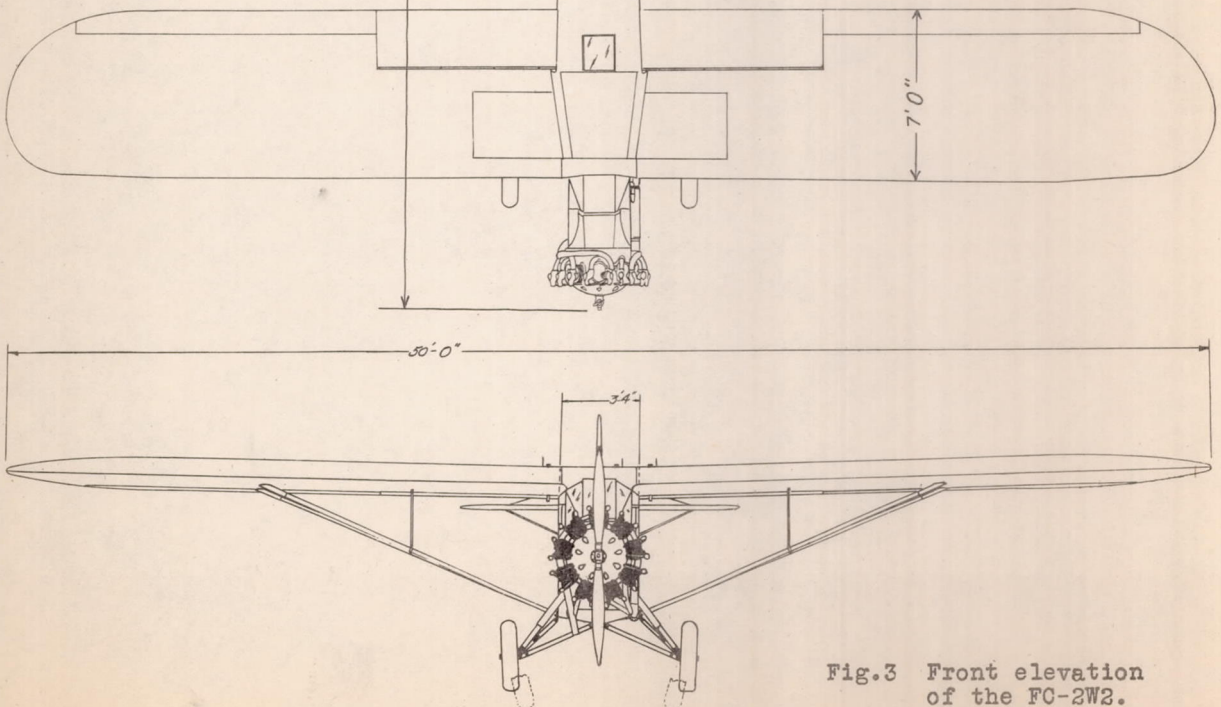
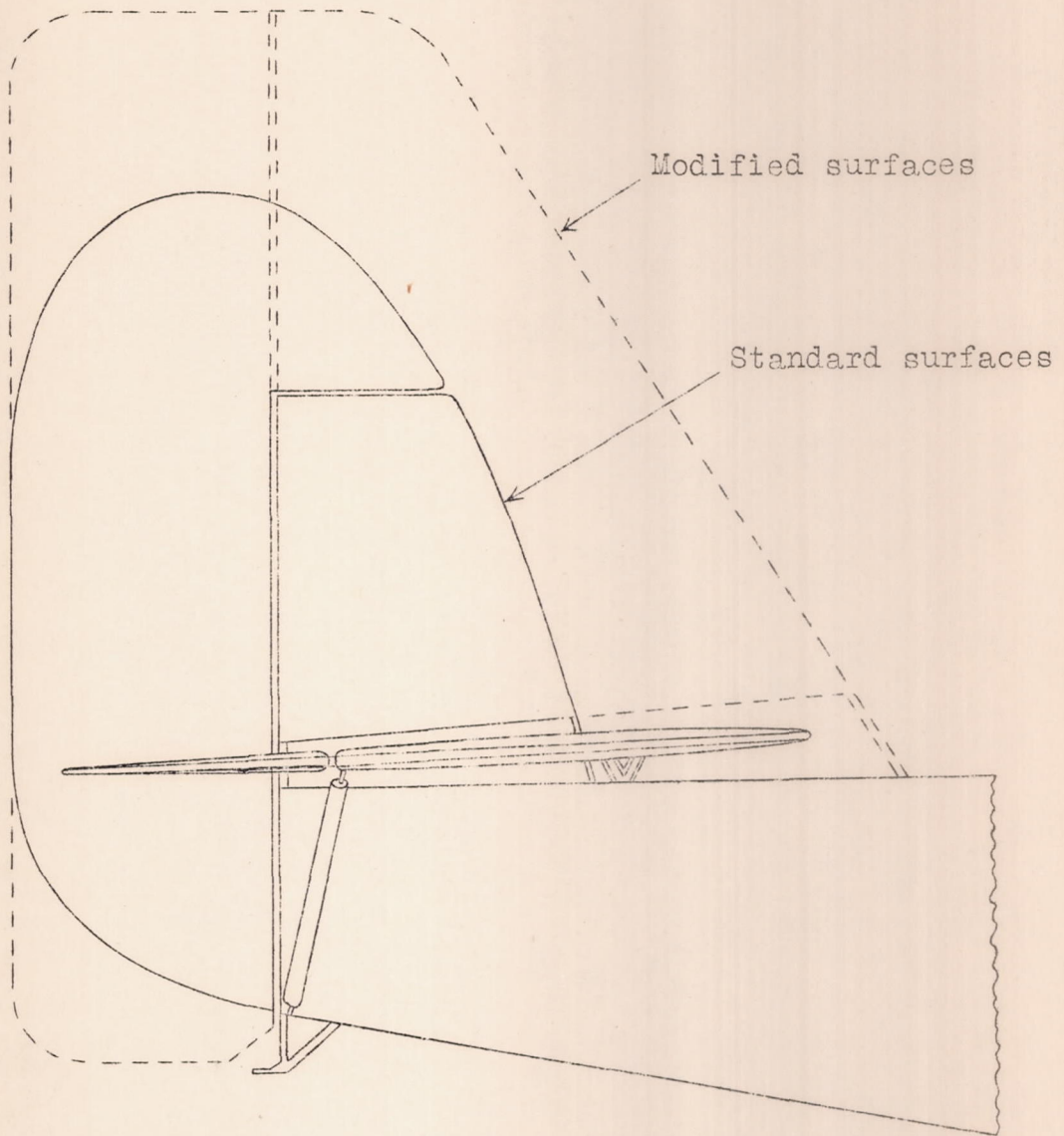


Fig.3 Front elevation of the FC-2W2.



Scale in inches
0 4 8 12

Fig.4 Vertical tail surfaces used on Fairchild (FC-2W2) airplane.

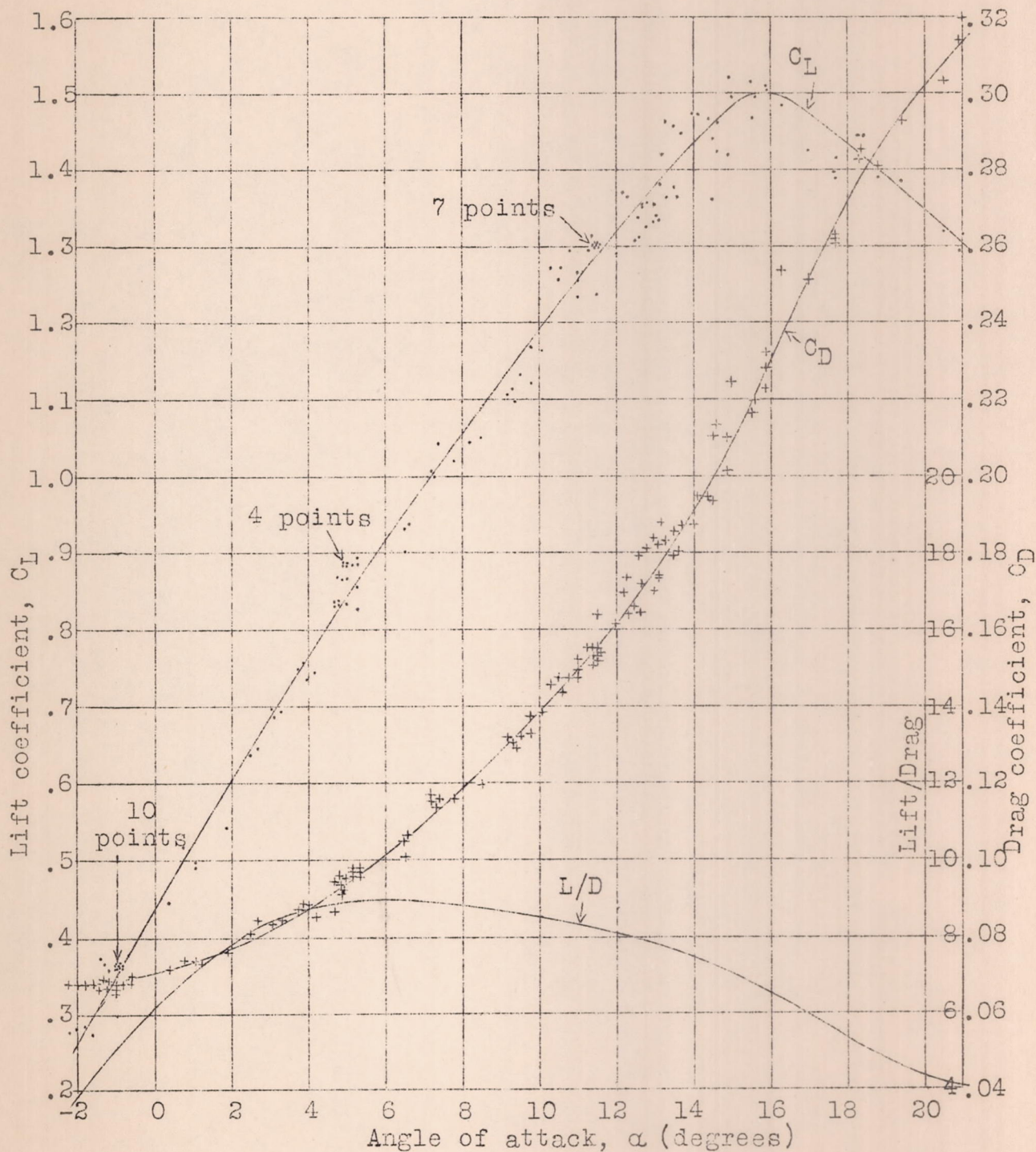


Fig.5 Lift and drag characteristics of Fairchild (FC-2W2) airplane with propeller locked.

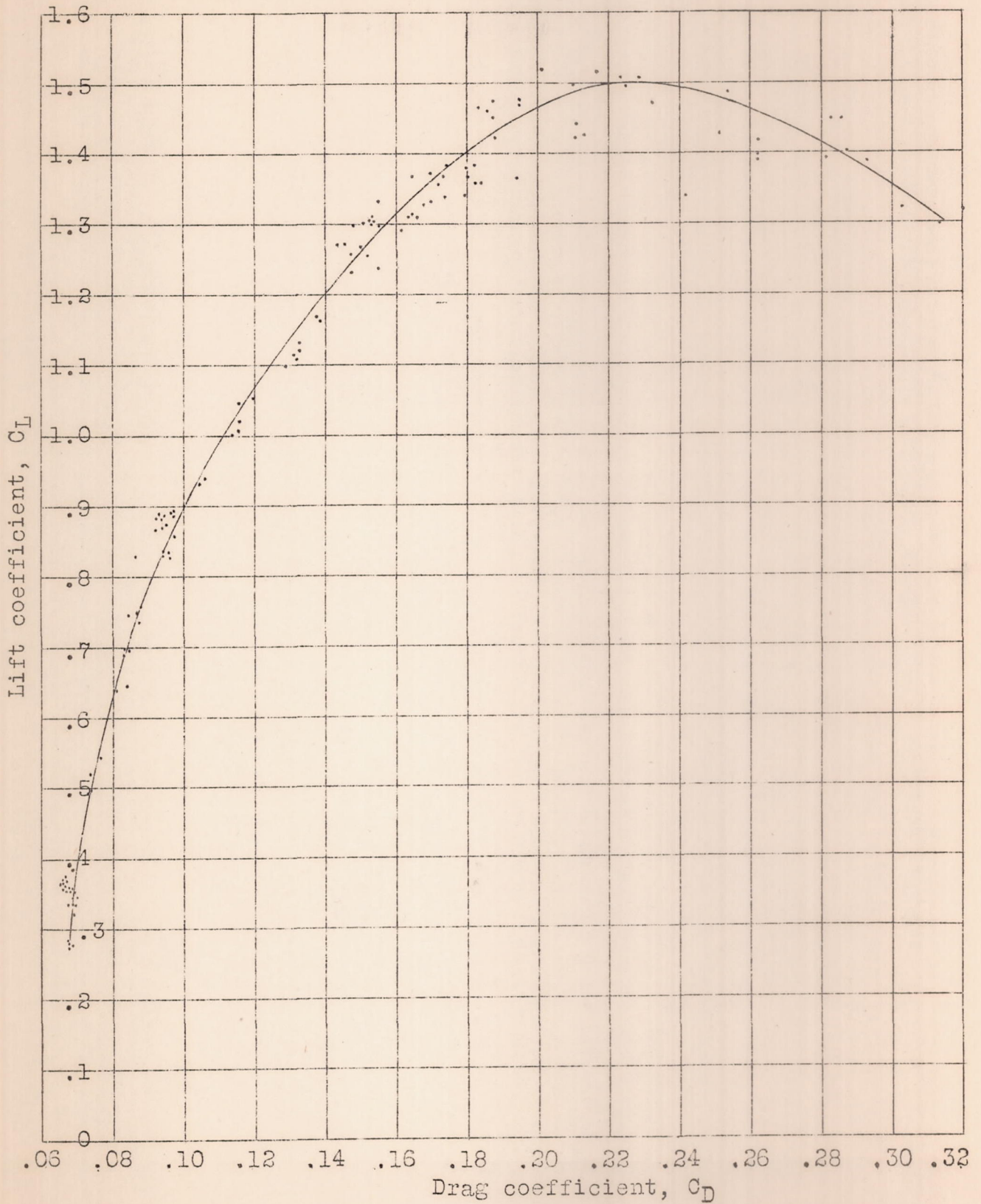


Fig.6 Polar diagram of Fairchild (FC-2W2) airplane with propeller locked.

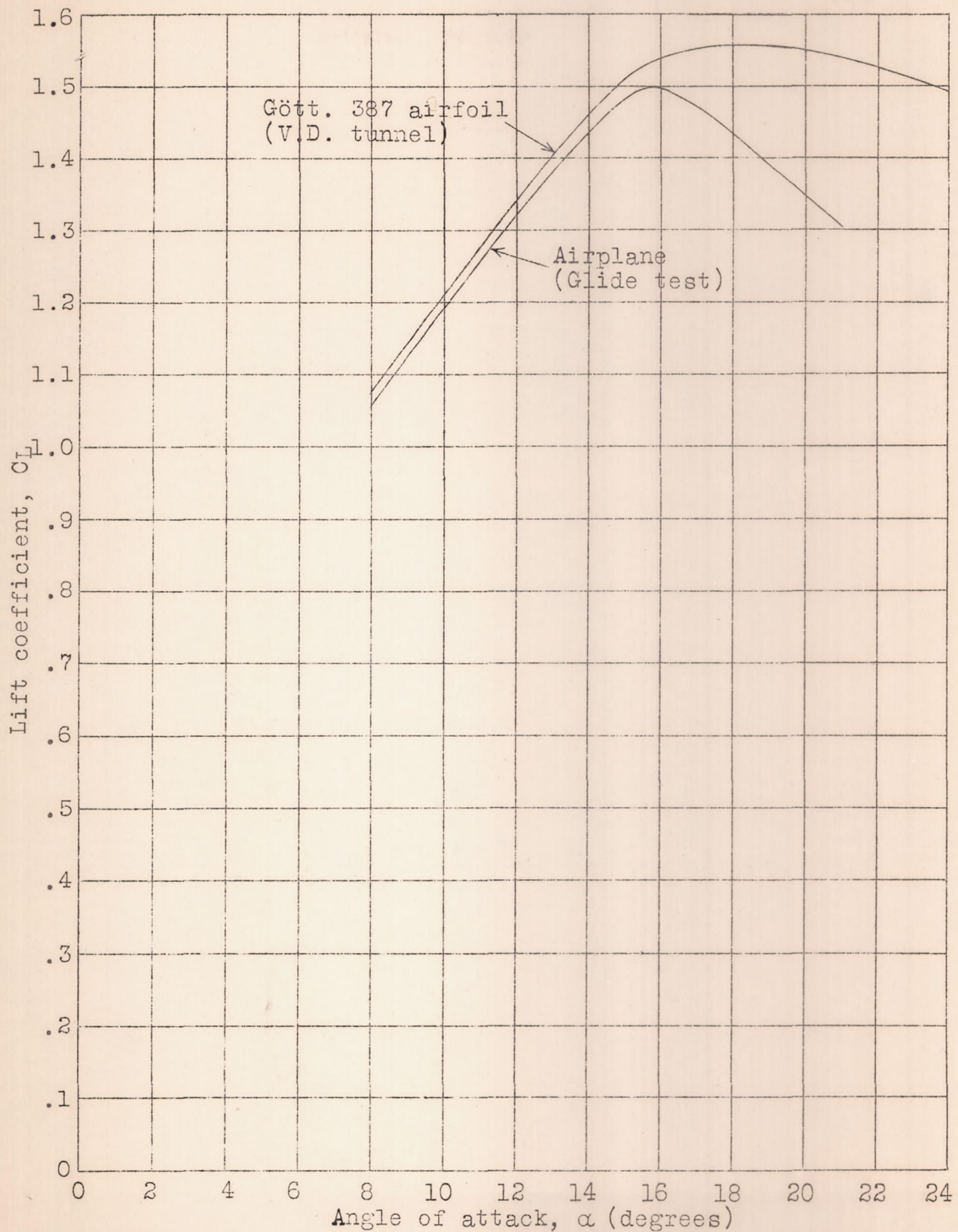


Fig.7 Comparison between lift coefficients for the Fairchild airplane and Göttingen 387 airfoil.

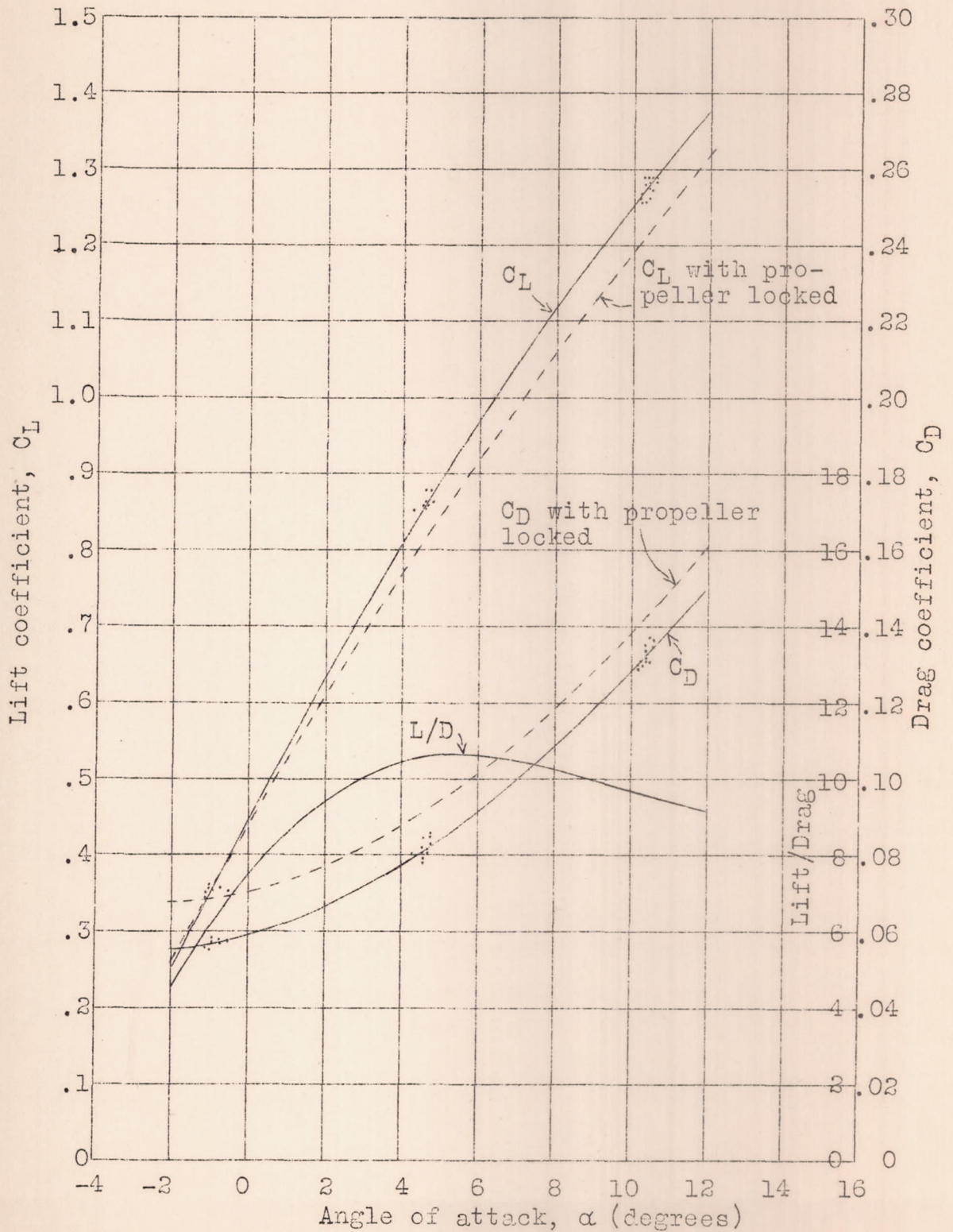


Fig.8 Lift and drag characteristics of Fairchild (FC-2W2) airplane with propeller operating at zero thrust.

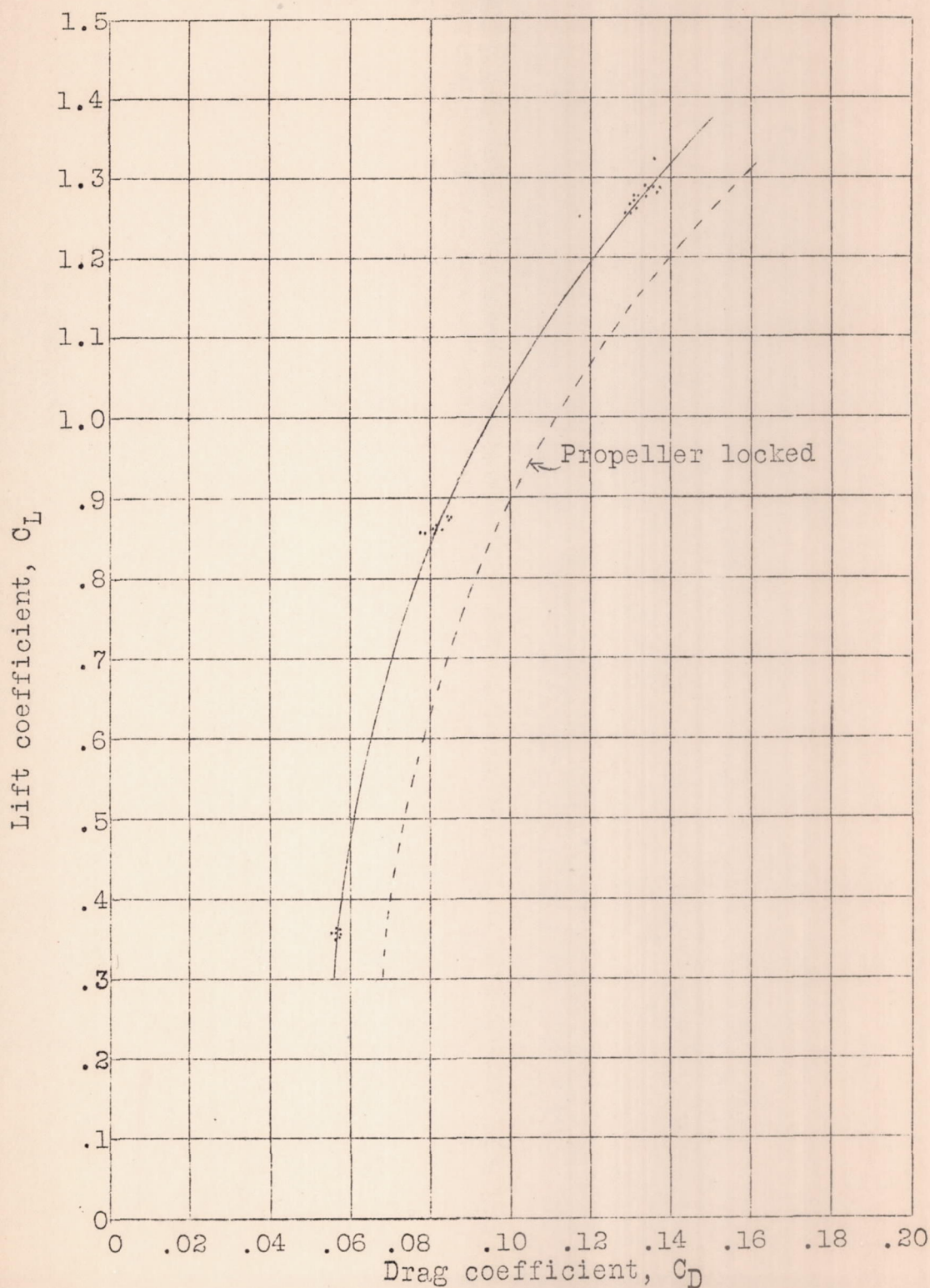


Fig.9 Polar diagram of Fairchild (FC-2W2) airplane with propeller operating at zero thrust.