JANUARY 1958 SECRET

UNCLASSIFIED

ARROW 2

PERIODIC PERFORMANCE REPORT

'NUMBER 13'

ANALYZED

AVRO AIRCRAFT LIMITED

X-13

JANUARY 1958

SECRET

UNCLASSIFIED

ANALYZED

PERFORMANCE

APPENDIX I

ARROW 2

PERIODIC PERFORMANCE REPORT

NUMBER 13

Classification cancelled/changed to .....

by authority of .....(date).....

Signature .....Rank.....

Copy No. .....35.....

Issued to .....R.C.A.F.....

Date of Issue .....February 14, 1958.....

Prepared by .....T. Roberts & C. Hollenbury.....

Recommended for Approval by .....
Chief of Performance Evaluation

Approved by .....
Chief of Technical Design

Approved for Issue by .....
Arrow Project Engineering Manager

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PERFORMANCE

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PERIODIC PERFORMANCE REPORT NO. 13

INTRODUCTION

There is no new input to the performance data of Periodic Performance Report No. 12, other than weight changes. Furthermore it is not anticipsted that sny changas of input data will ba made until such tima that Flight Tast Dats becomaa available, either to confirm tha presant astimate or indicate what chsngea are neceaasry.

This report therefore departs from the form of previous reports. The primary purposa of this raport baing to ahow the affact of change in O.W.E on the pertinent performance charactariatica.

The O.W.E. is dafined as the sircraft waight including armamant lesa uaabla fuel, and the Combat Waight sa the O.W.E. plus half fuel for the 200 N.M. high spaed misaion. The relavant miaaion profilas are given Pariodic Parformanca Report No. 12.

4° up aileron wss used sbova 45,000 ft. and tha I.C.A.O. Standard Atmosphere was saaumad.

Due to an arithmatical error in tha Overload Ranga Misaion aa given in Performsnce Report No. 12, a amall discrepancy is praaant between thia snd the dsts givan in thia report, raaulting in sn increaae in range of 26 N.M. st tha O.W.E. of Raport No. 12.

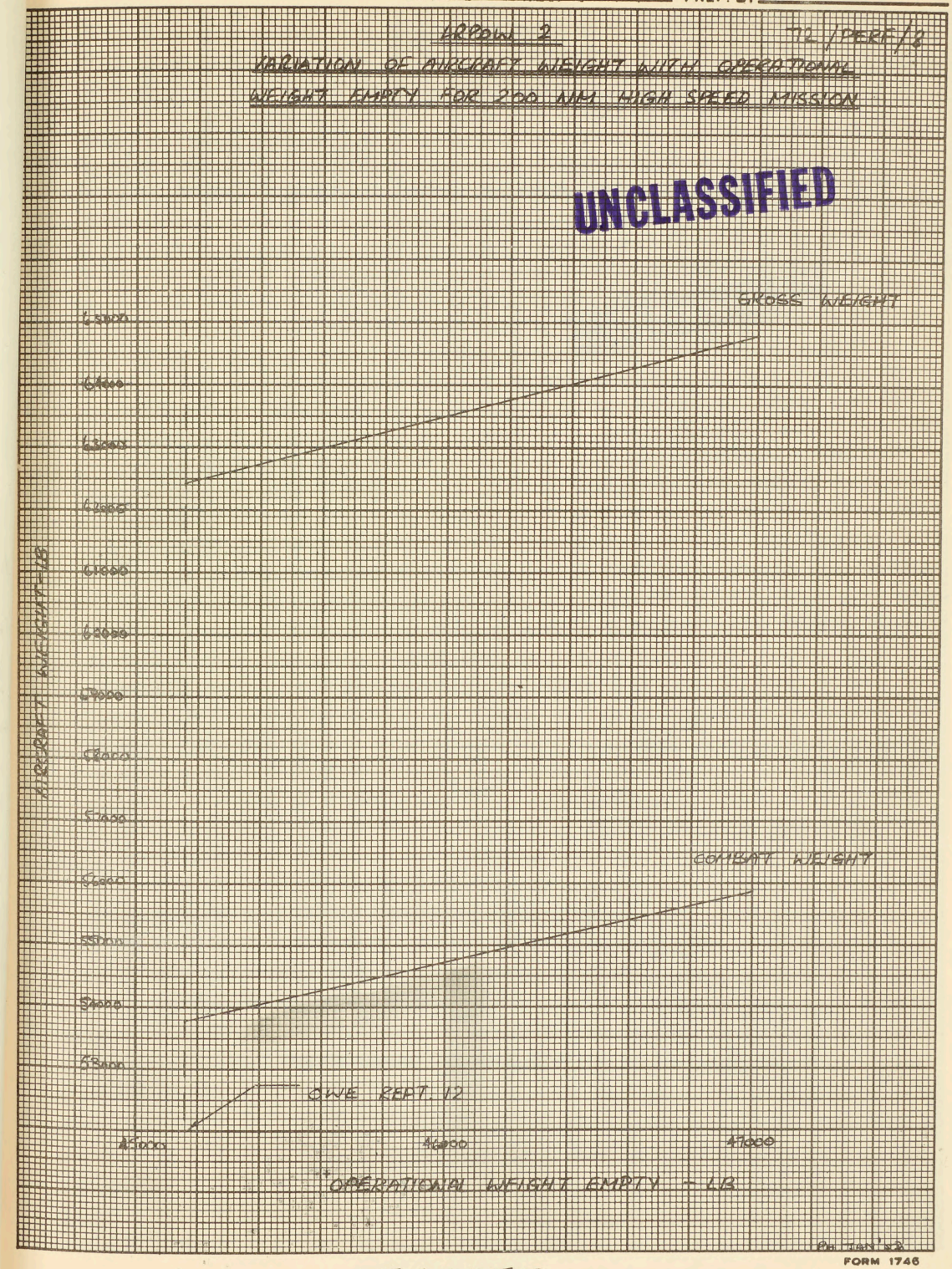
FT COMPONENT SHEET No. REPORT No.

DATE PREP. BY

ARROW 2 72/PERT/12

VARIATION OF AIRCRAFT WEIGHT WITH OPERATIONAL WEIGHT EMPTY FOR 200 NM HIGH SPEED MISSION

UNCLASSIFIED



FORM 1746

SECRET

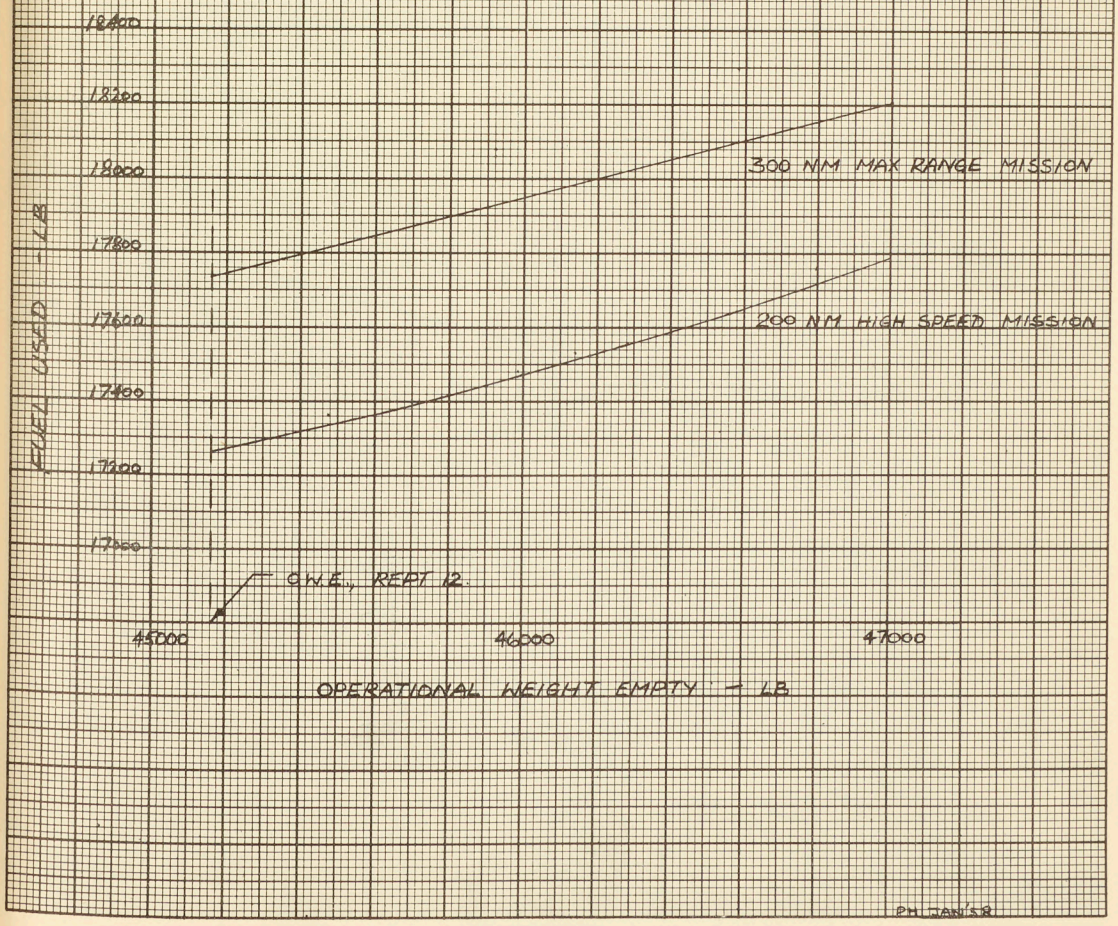
APPENDIX I

Fig. 1

ARROW 2

FUEL FOR 200 AND 300 NM MISSION AS DEFINED IN AIR 7-4

SEE DETAILED MISSION PROFILE IN PERF REPT 12 FOR OWE = 45161 LB.



SECRET

Fig. 2

ARROW 2

OVERLOAD MISSION

SEE DETAILED MISSION PROFILE IN PERE REPT 12 FOR O.W.E = 45,161 LB

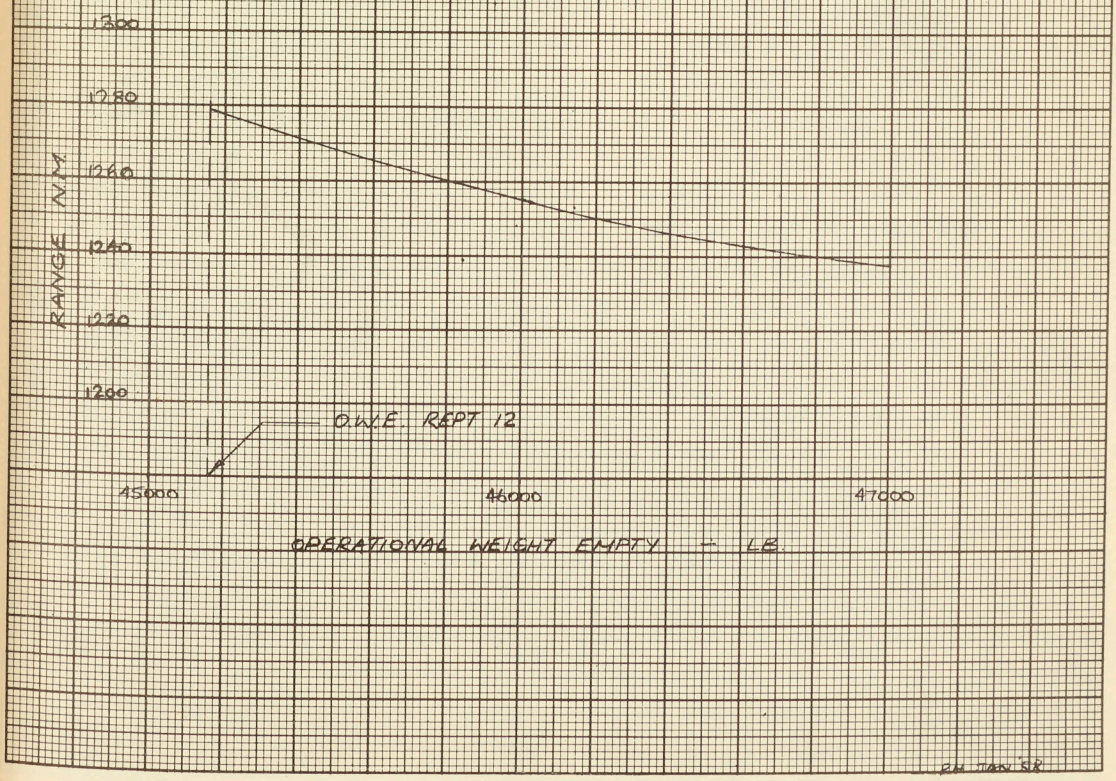
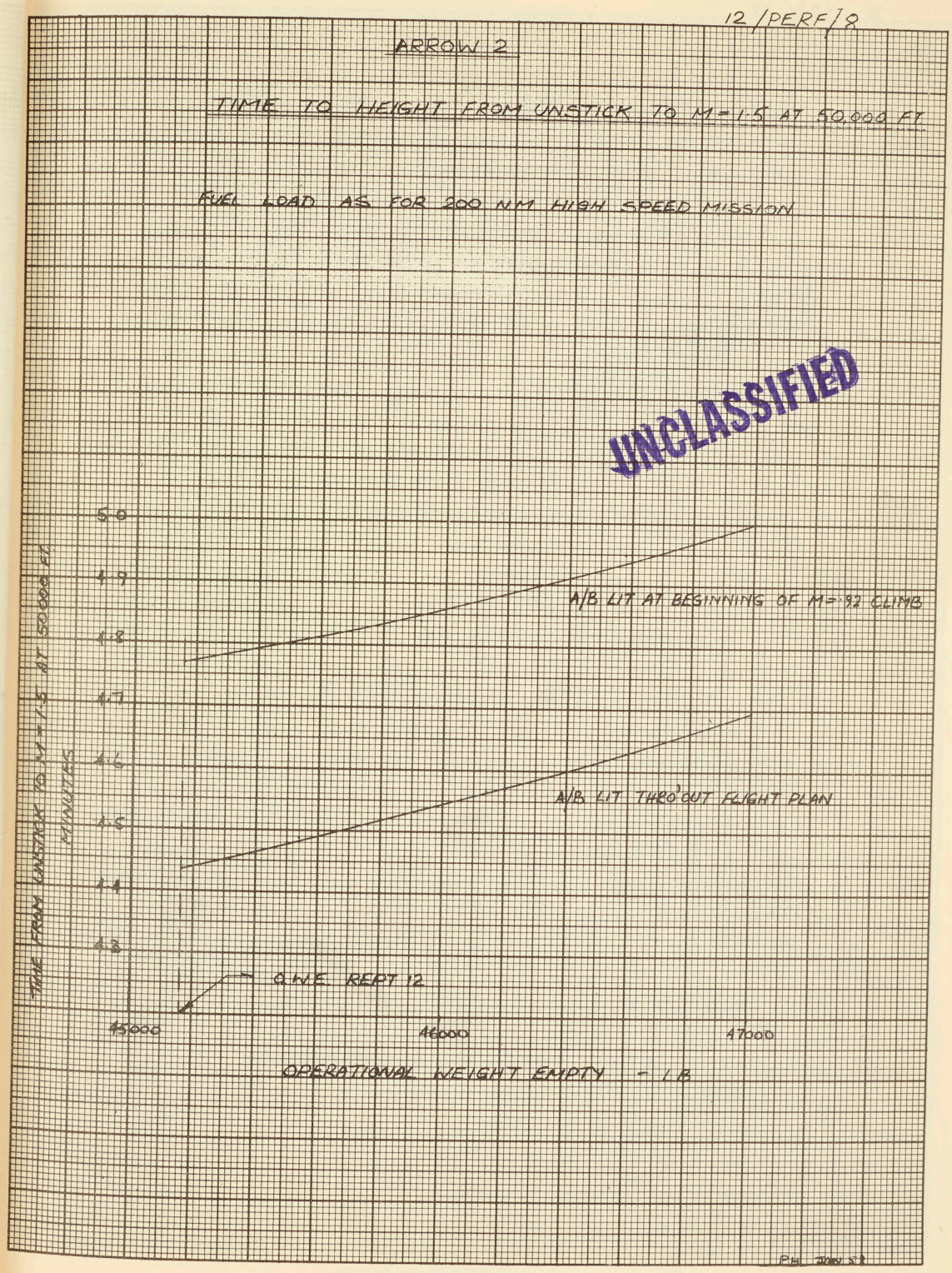


Fig. 3



SECRET

Fig. 4

APPENDIX I

72/PERF/8

ARROW 2

POWER LIMITED "g" AT M = 1.5, 50,000 FT.

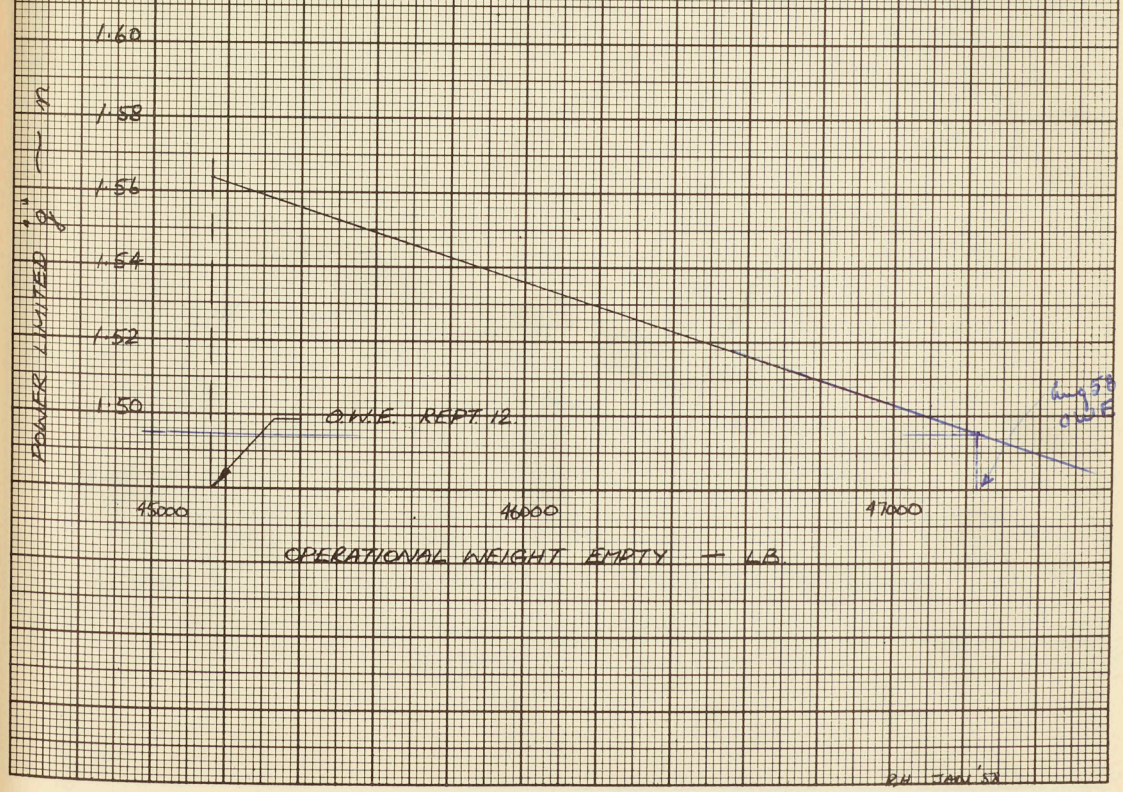


Fig. 5

APPENDIX I

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APPENDIX I

The following are working performance curves of the Arrow 2, given in as general a form as possible, to enable the user to calculate additional mission profiles.

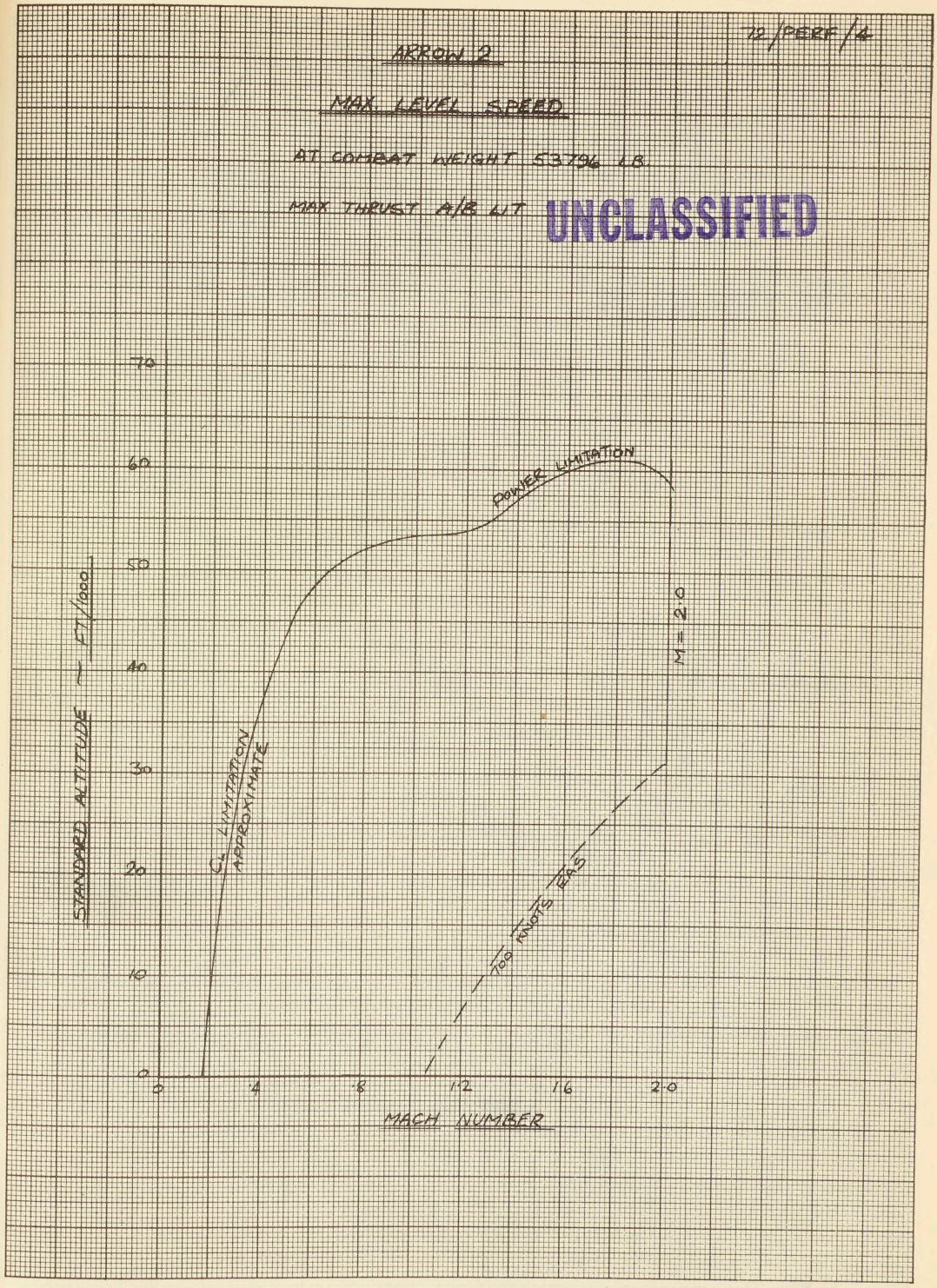

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Fig. I-1

ARROW 2

COMBAT CEILING

500 FT/MIN ROC

MAX. THRUST A/B LIT

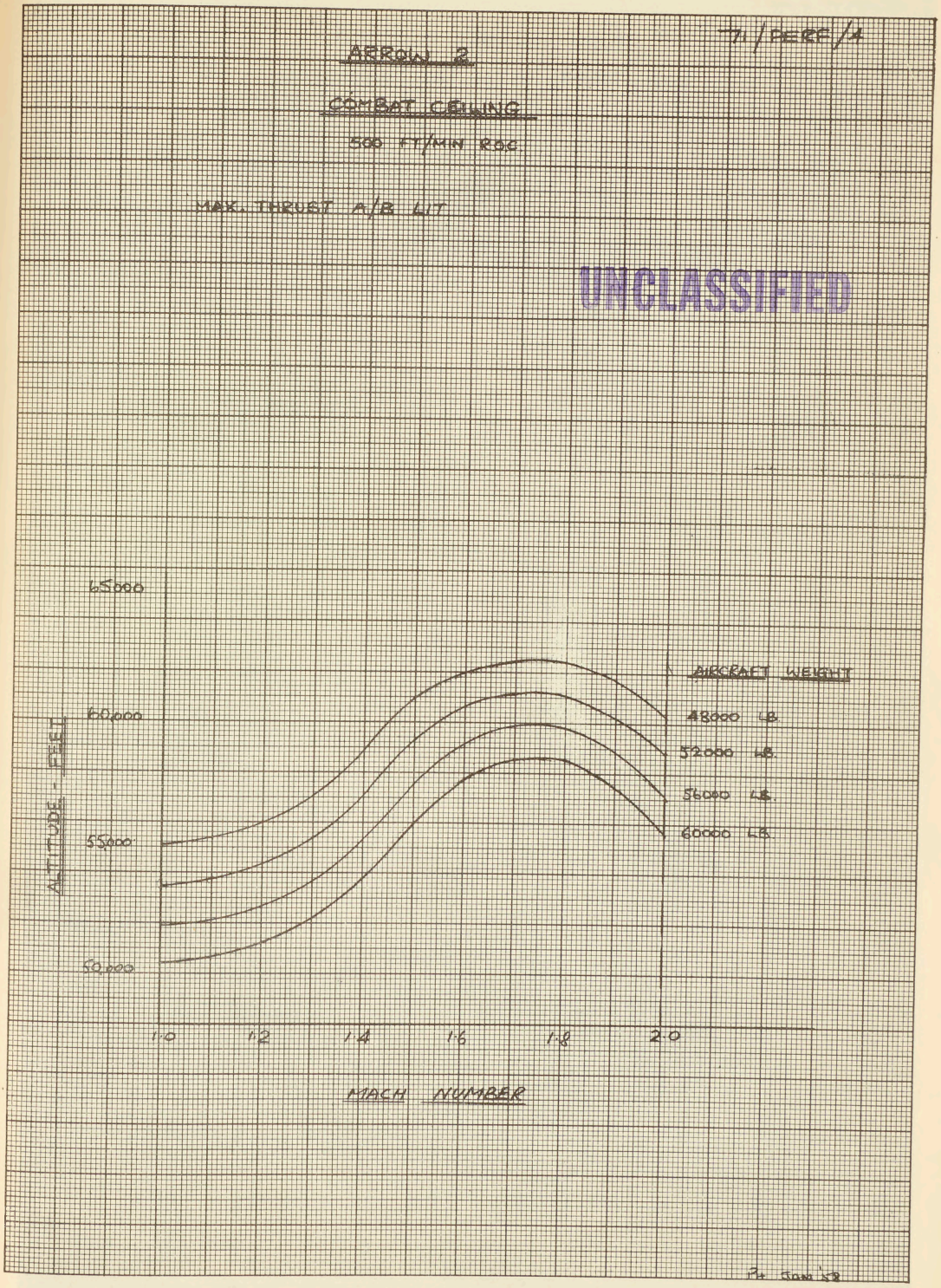

Fig. I-2

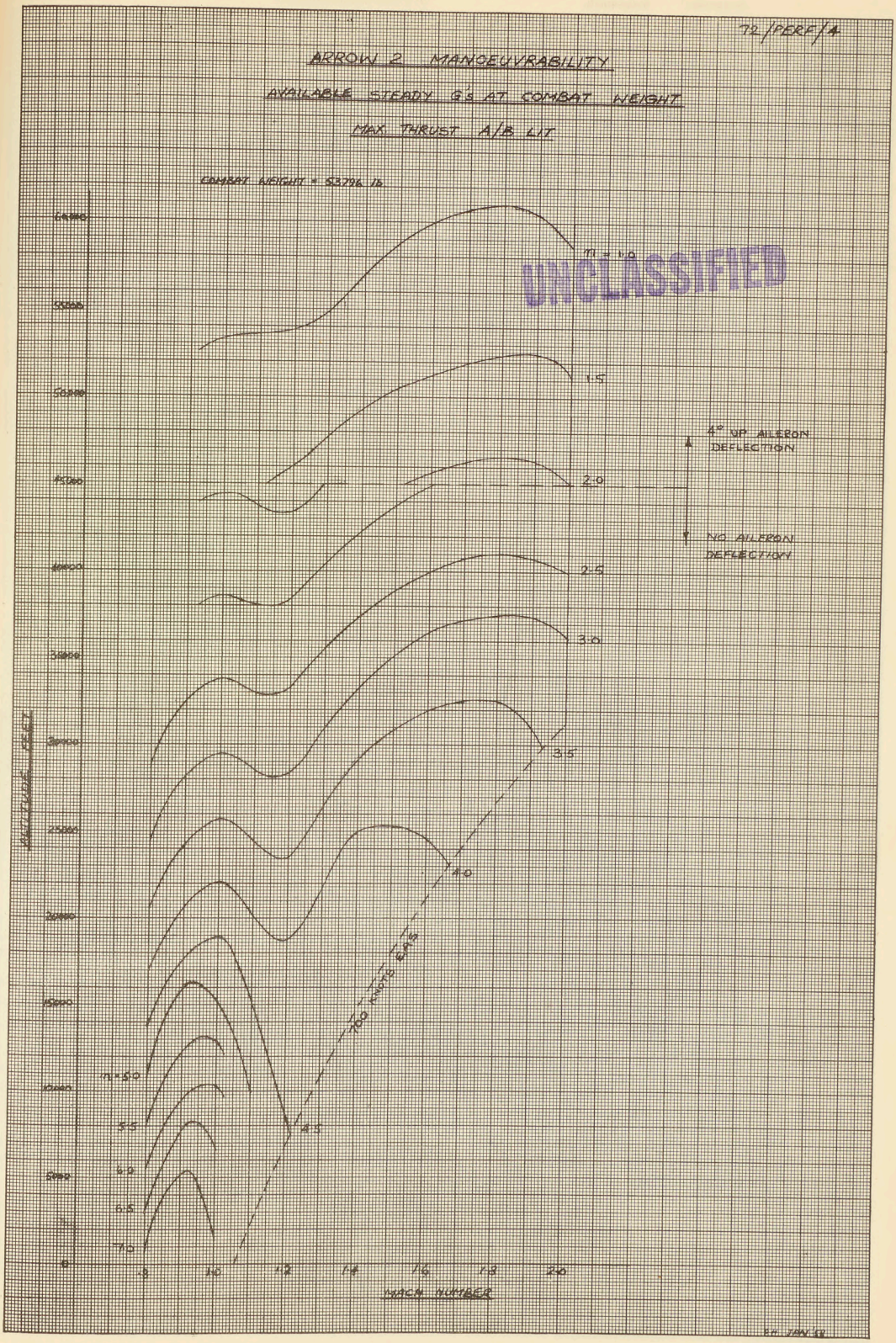

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Fig. I-3

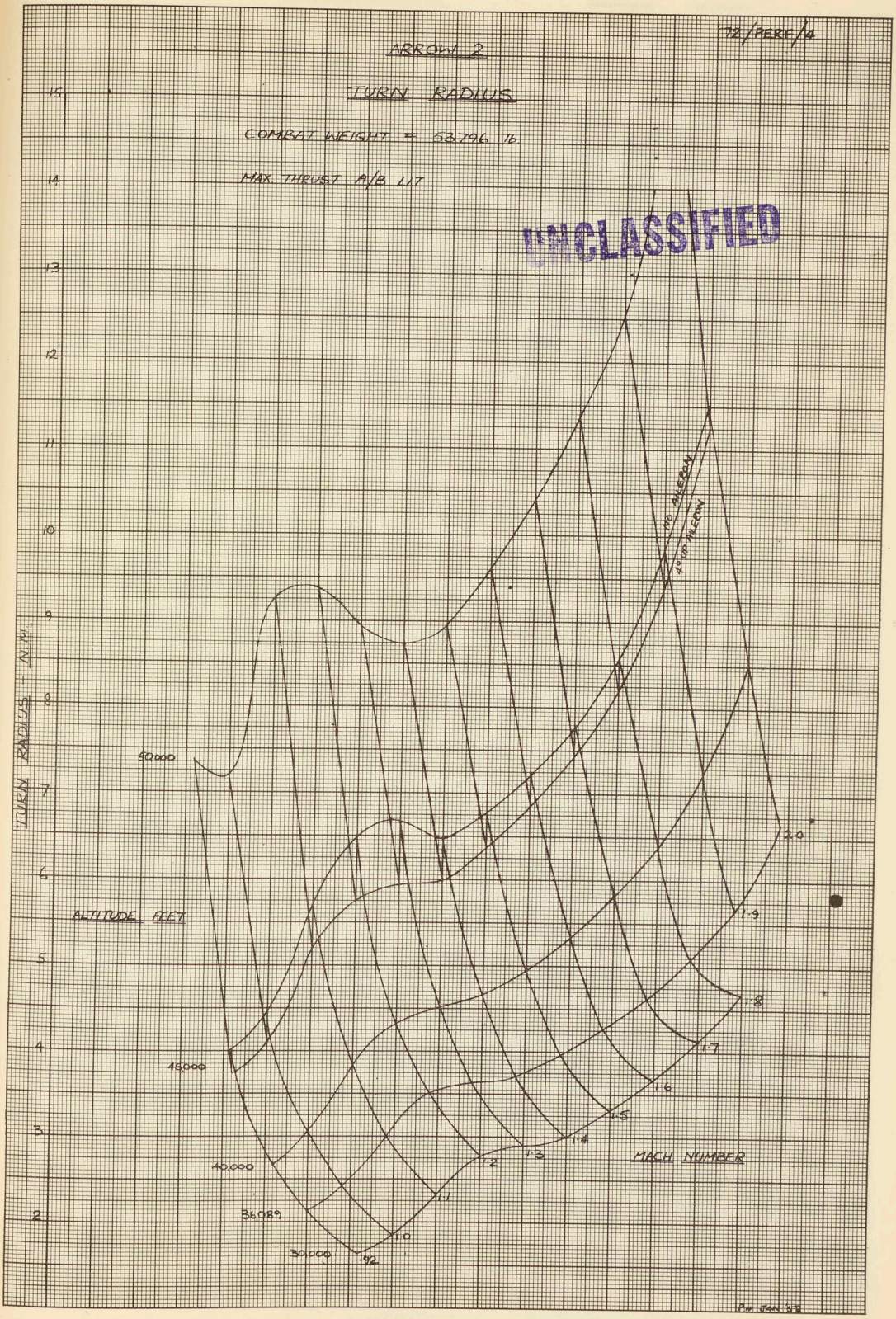

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Fig. I-4

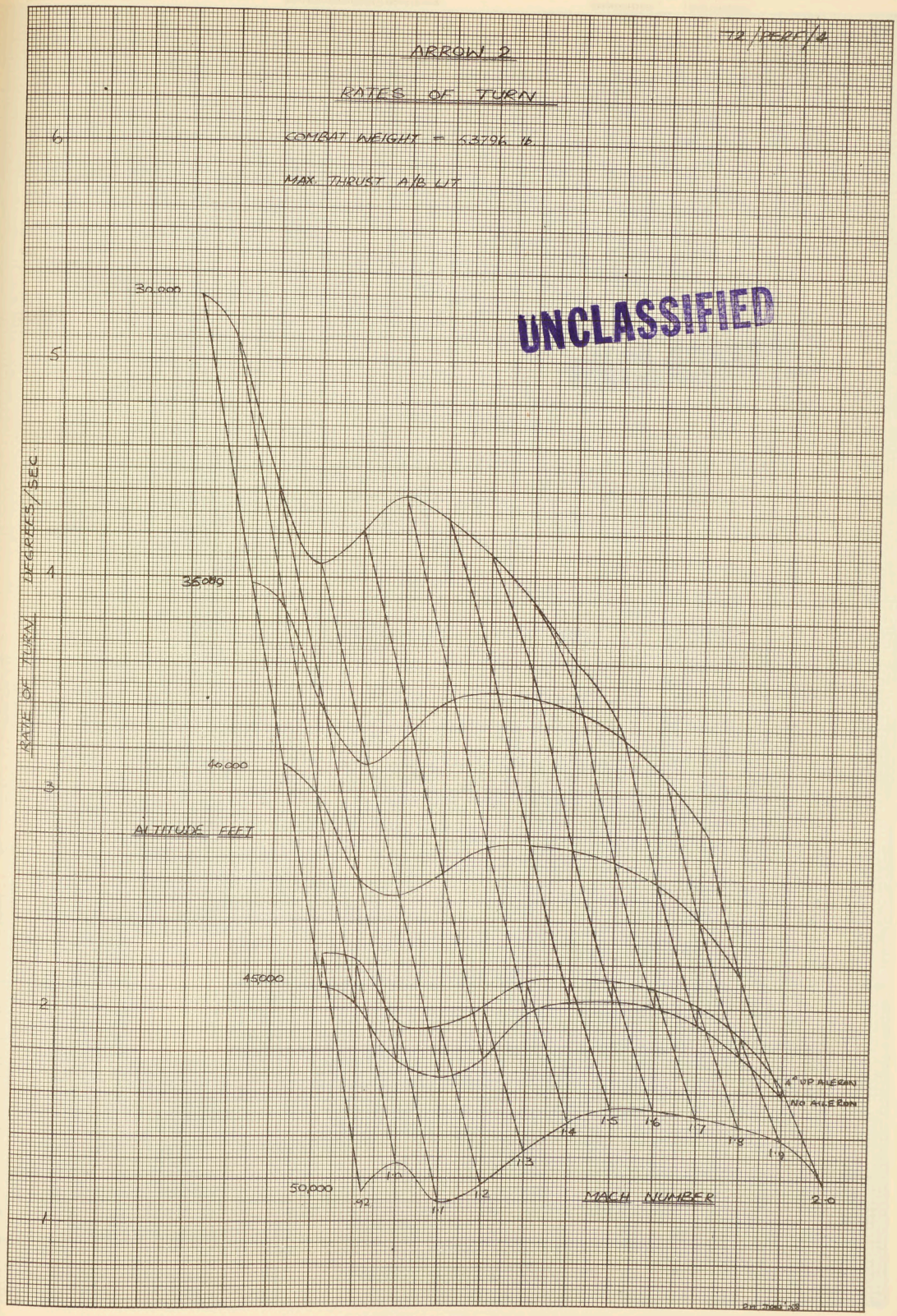

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Fig. I-5

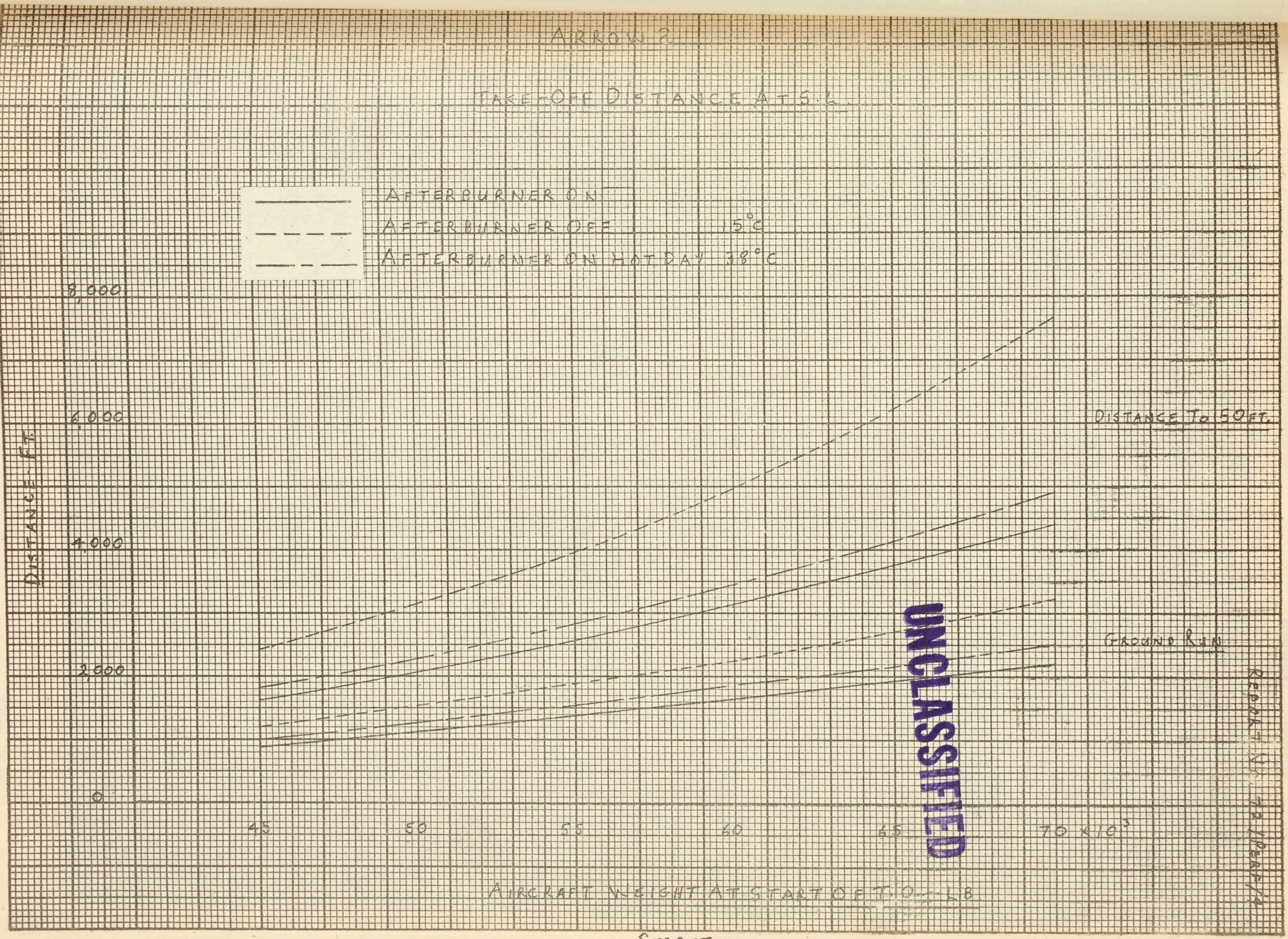

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Fig. I-6

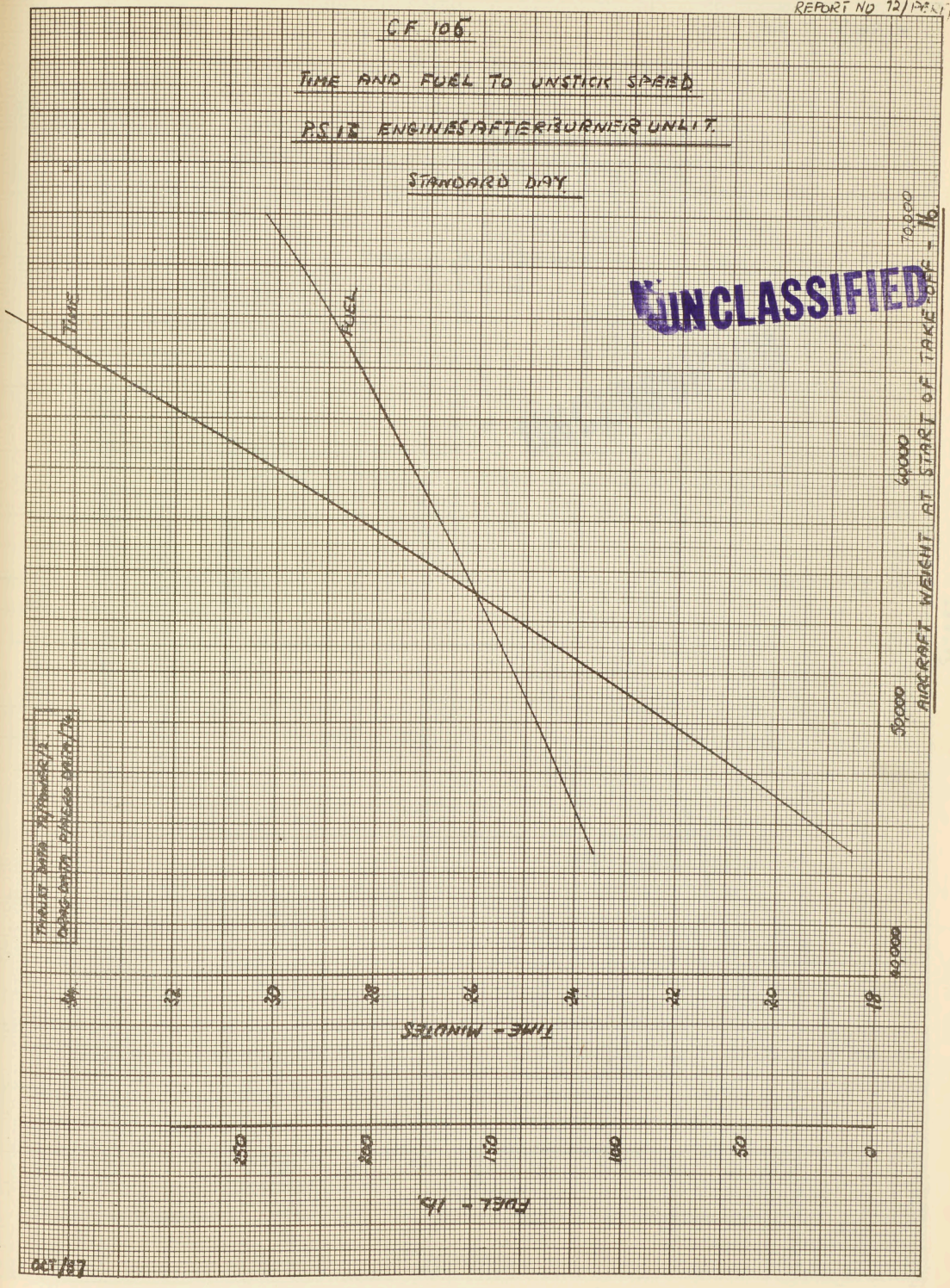

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Fig. I-7

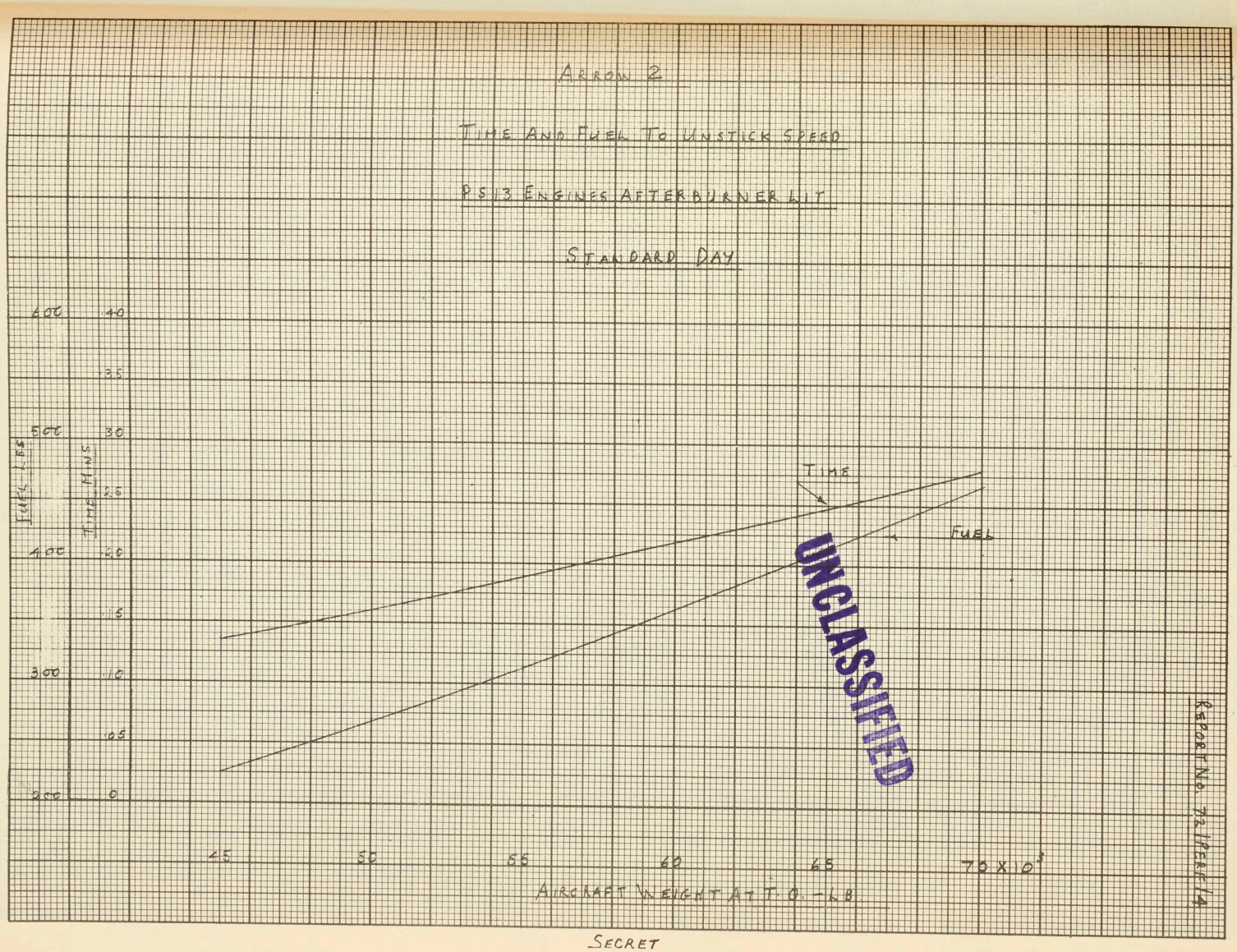

ARROW 2
TIME AND FUEL TO UNSTICK SPEED
P&W ENGINES AFTERBURNER LIT
STANDARD DAY
TIME
FUEL
FUEL LBS
TIME MINS
AIRCRAFT WEIGHT AT T.O. - LB
70 X 10³
REPORT NO. 72/PERF/14
UNCLASSIFIED

Fig. I-8

ARROW 3 MAX. R.P.M. A/B UNLIT
TIME FUEL AND DISTANCE TO ACCELERATE
FROM UNSTICK TO 527 KNOTS AT SEA LEVEL

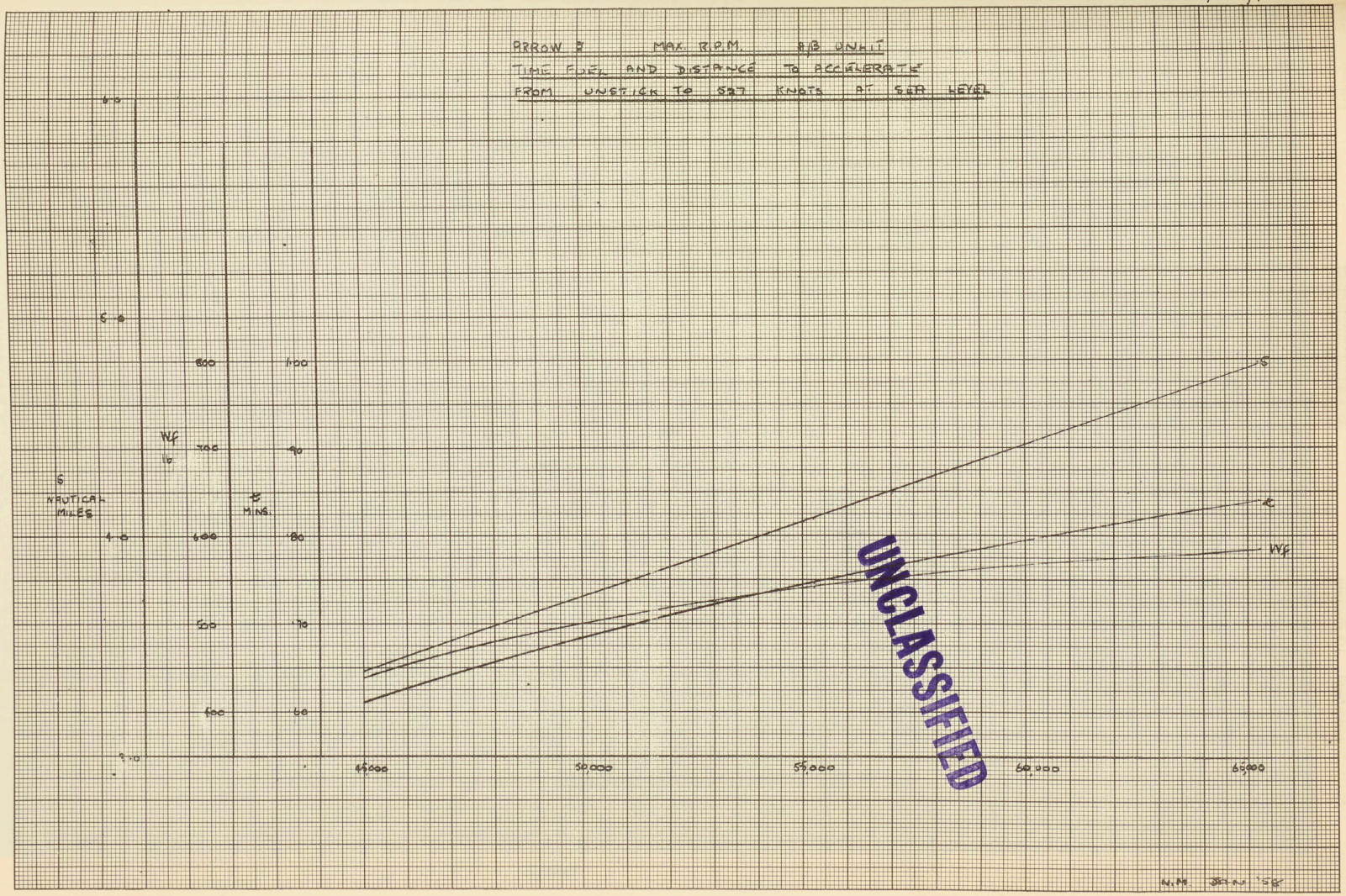


Fig. I-9

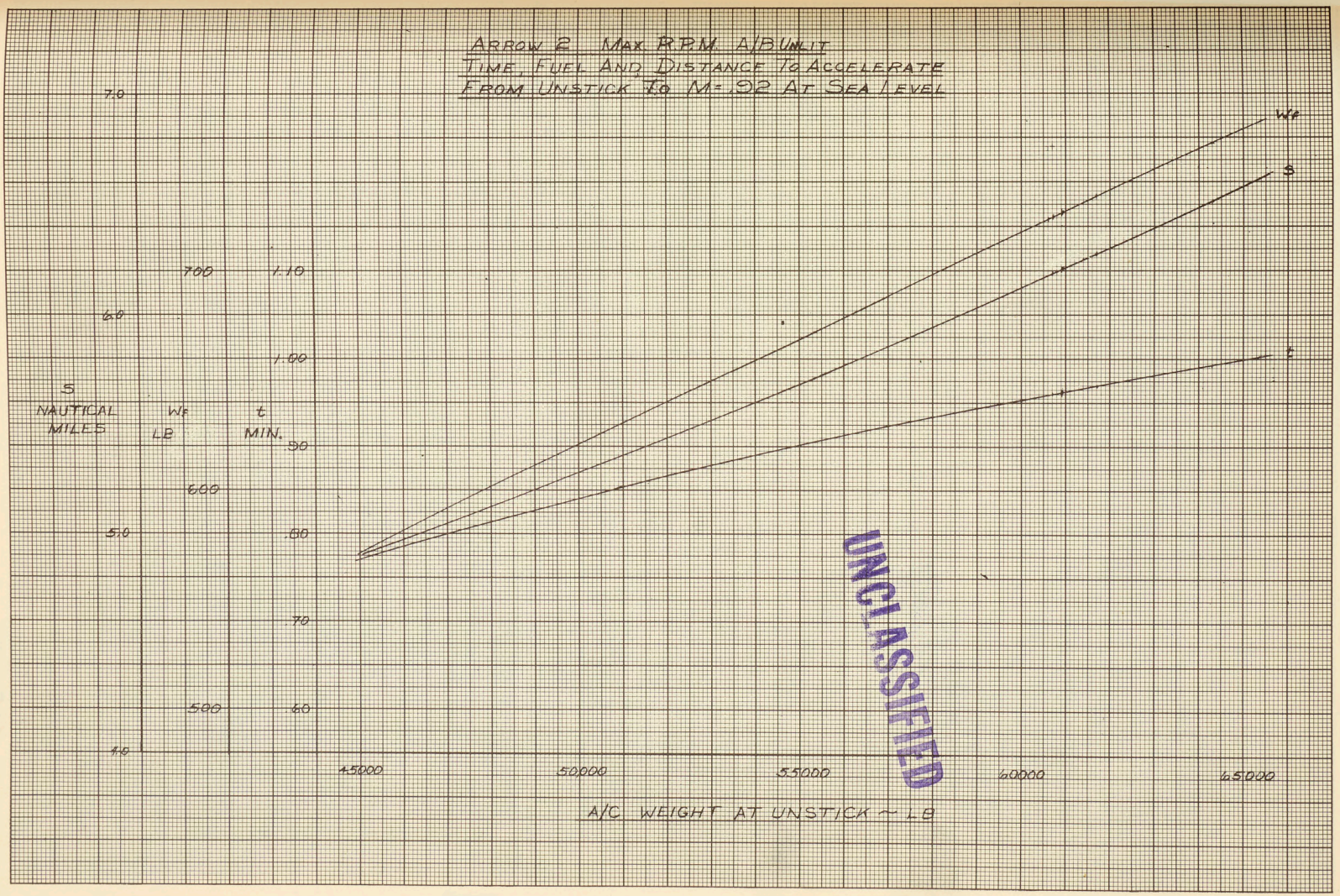


Fig. I-10

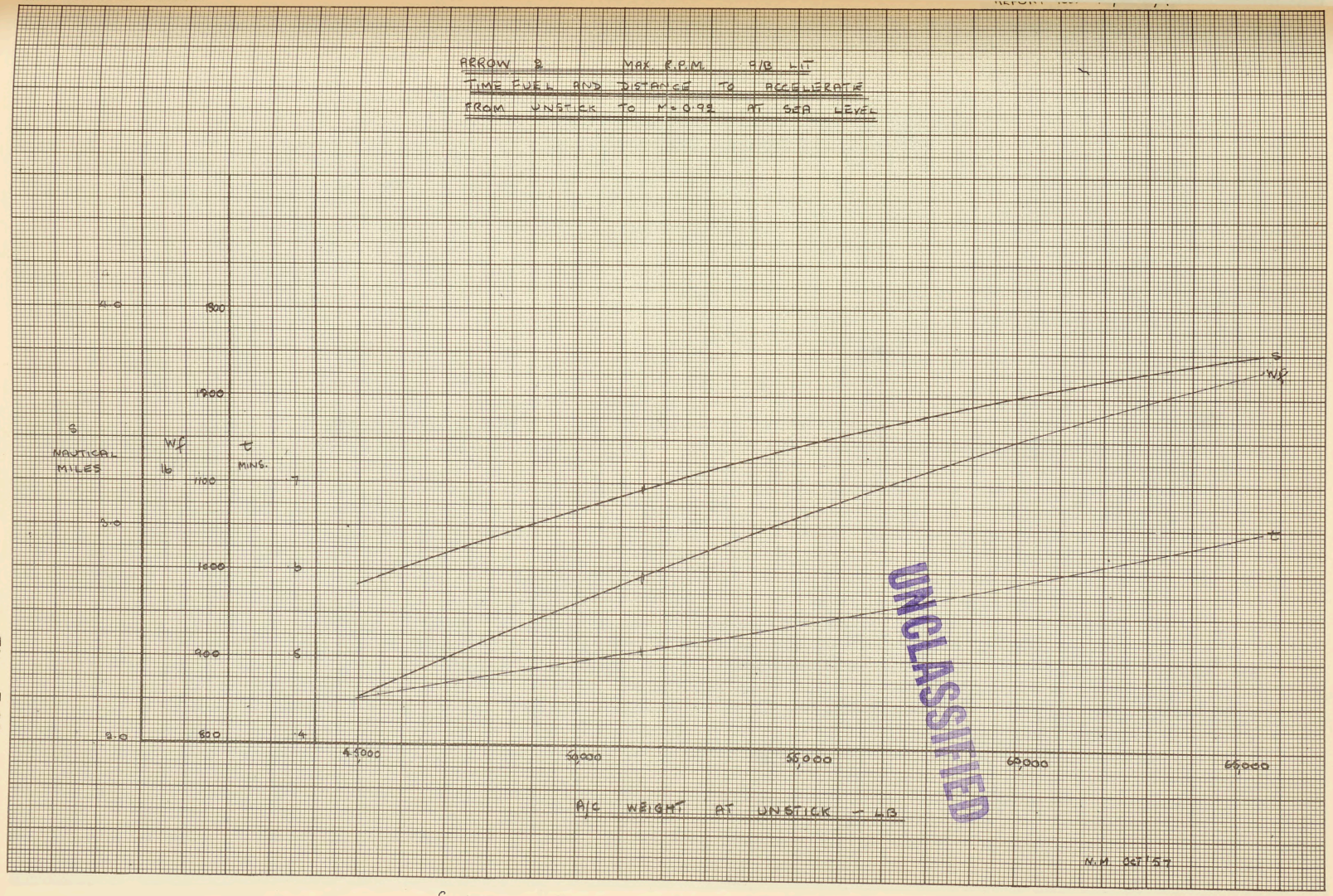


Fig. I-11

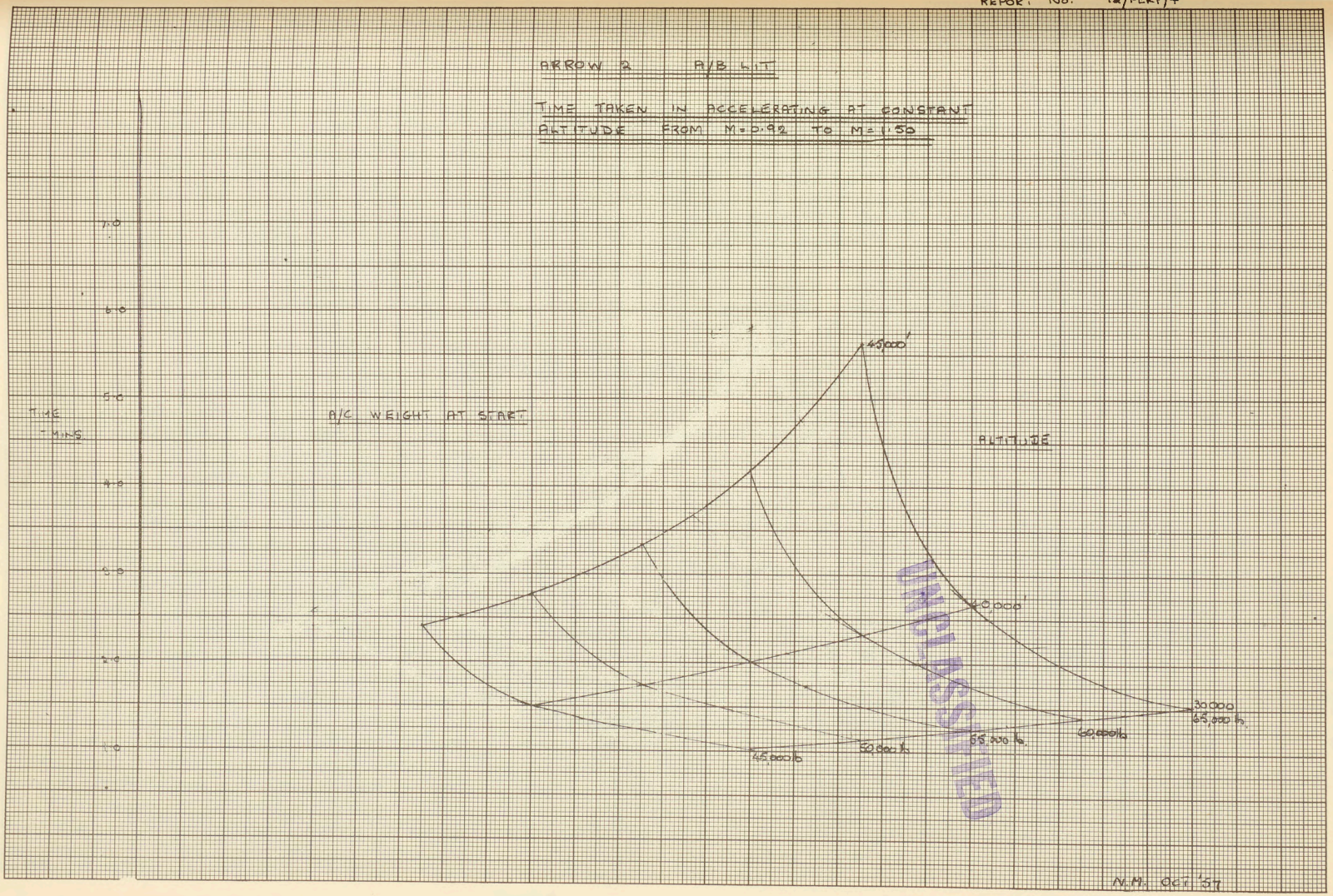


Fig. I-12

ARROW 2 A/3 LIT

FUEL USED IN ACCELERATING AT CONSTANT ALTITUDE FROM M = 0·92 TO M = 1·50

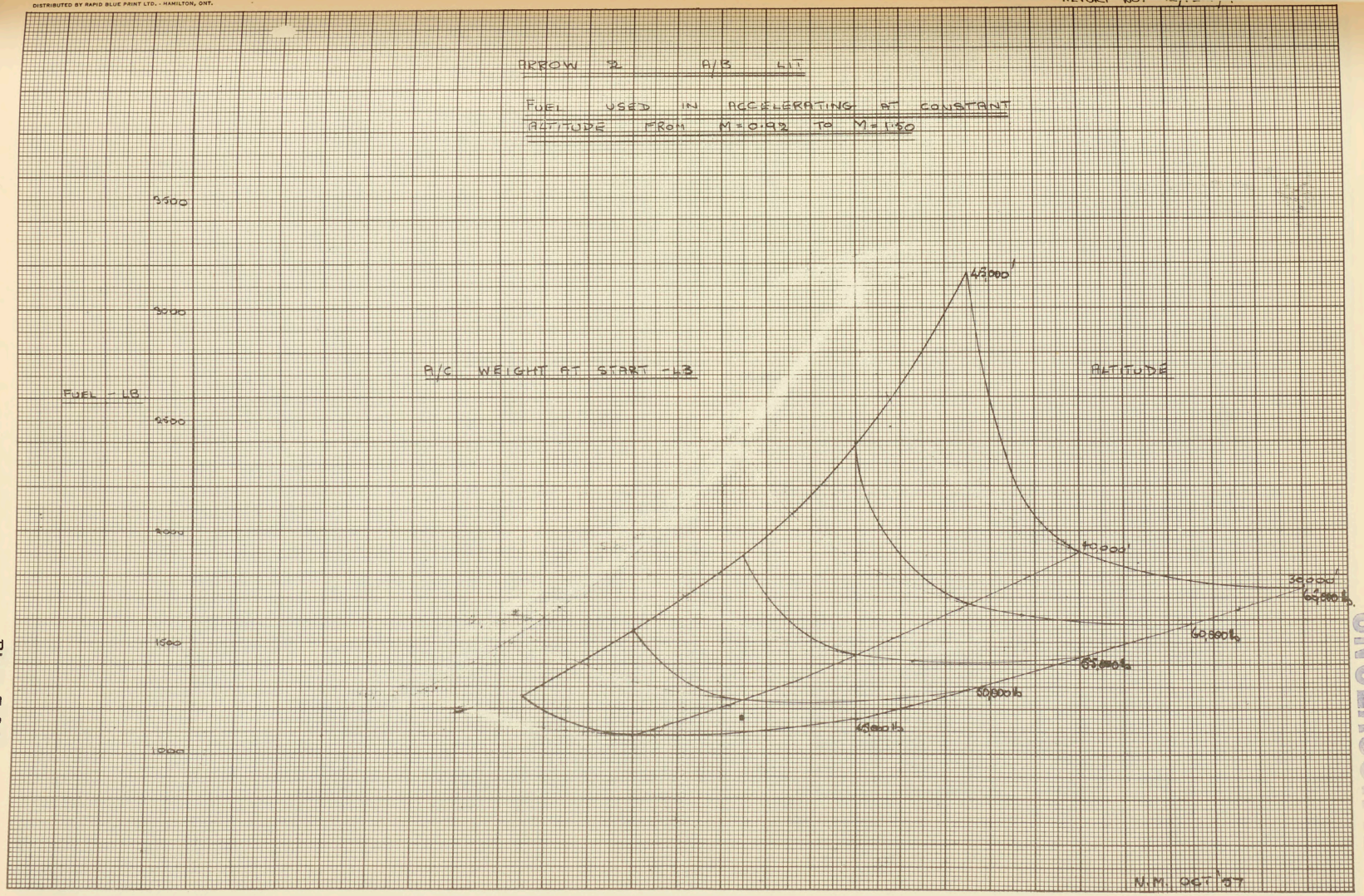


Fig. I-13

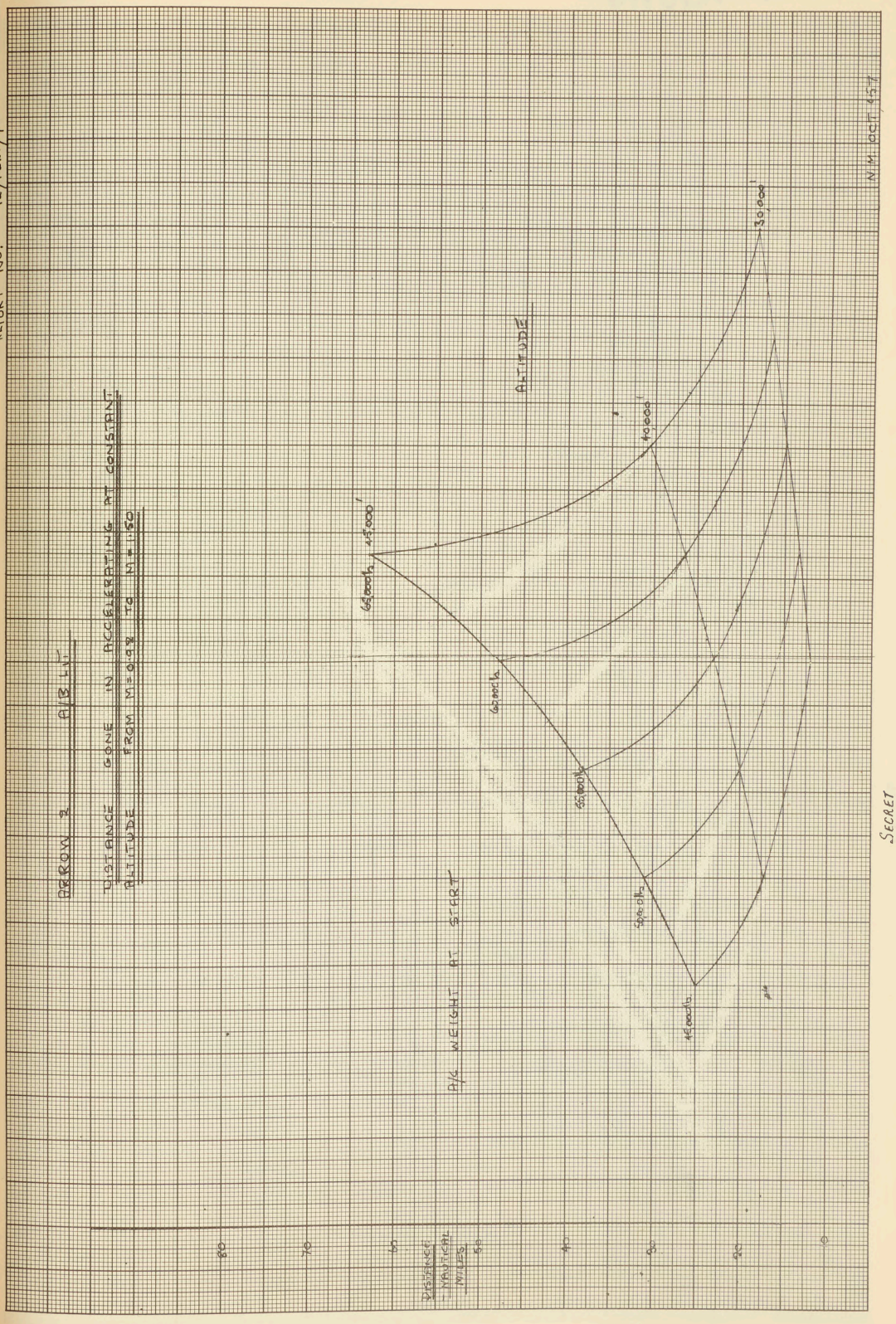


Fig. I-14

ARROW 2

TIME TAKEN TO ACCELERATE FROM M=.92 TO M=2.0 AT CONSTANT ALTITUDE MAX RPM A/B LIT

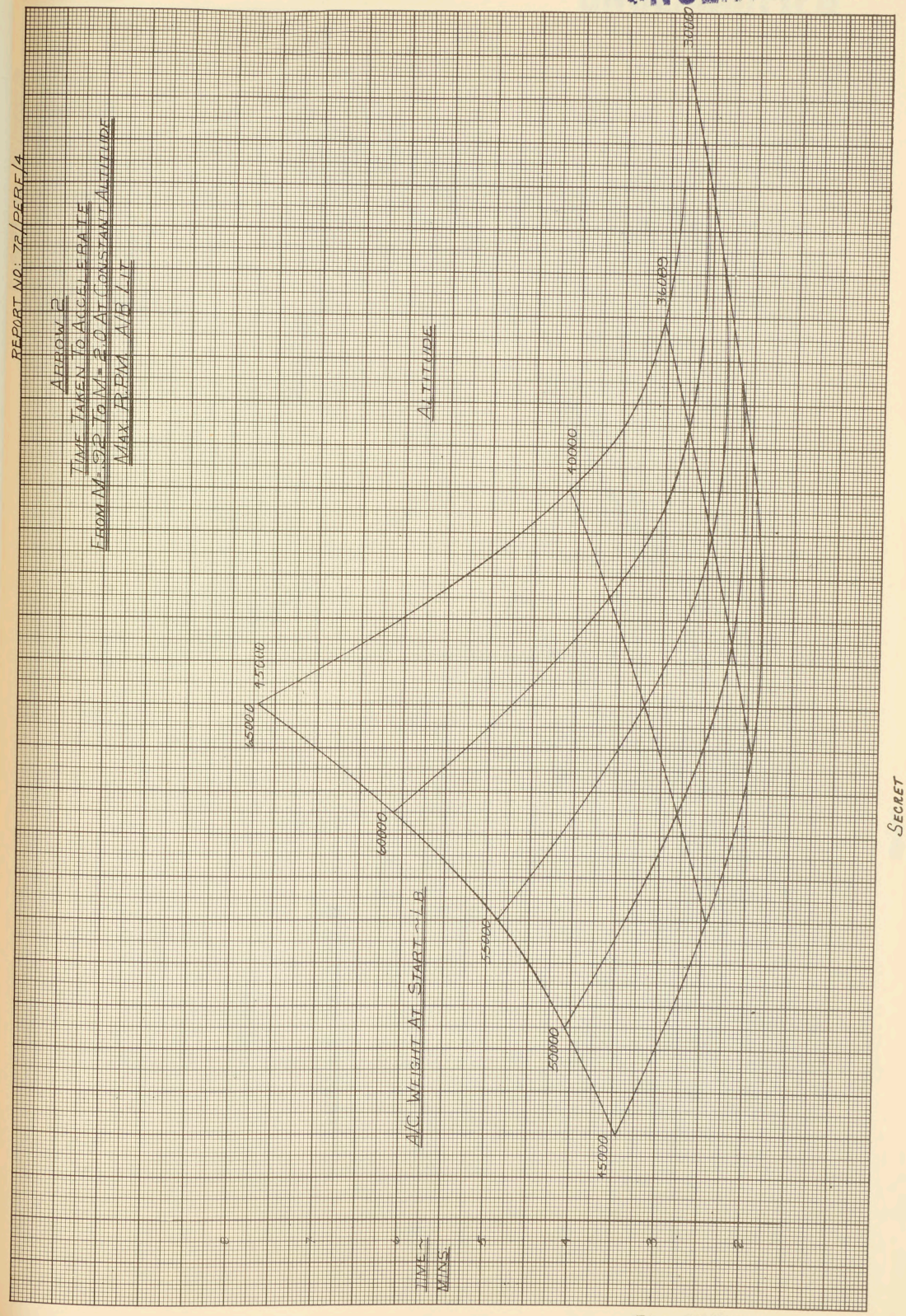


Fig. I-15

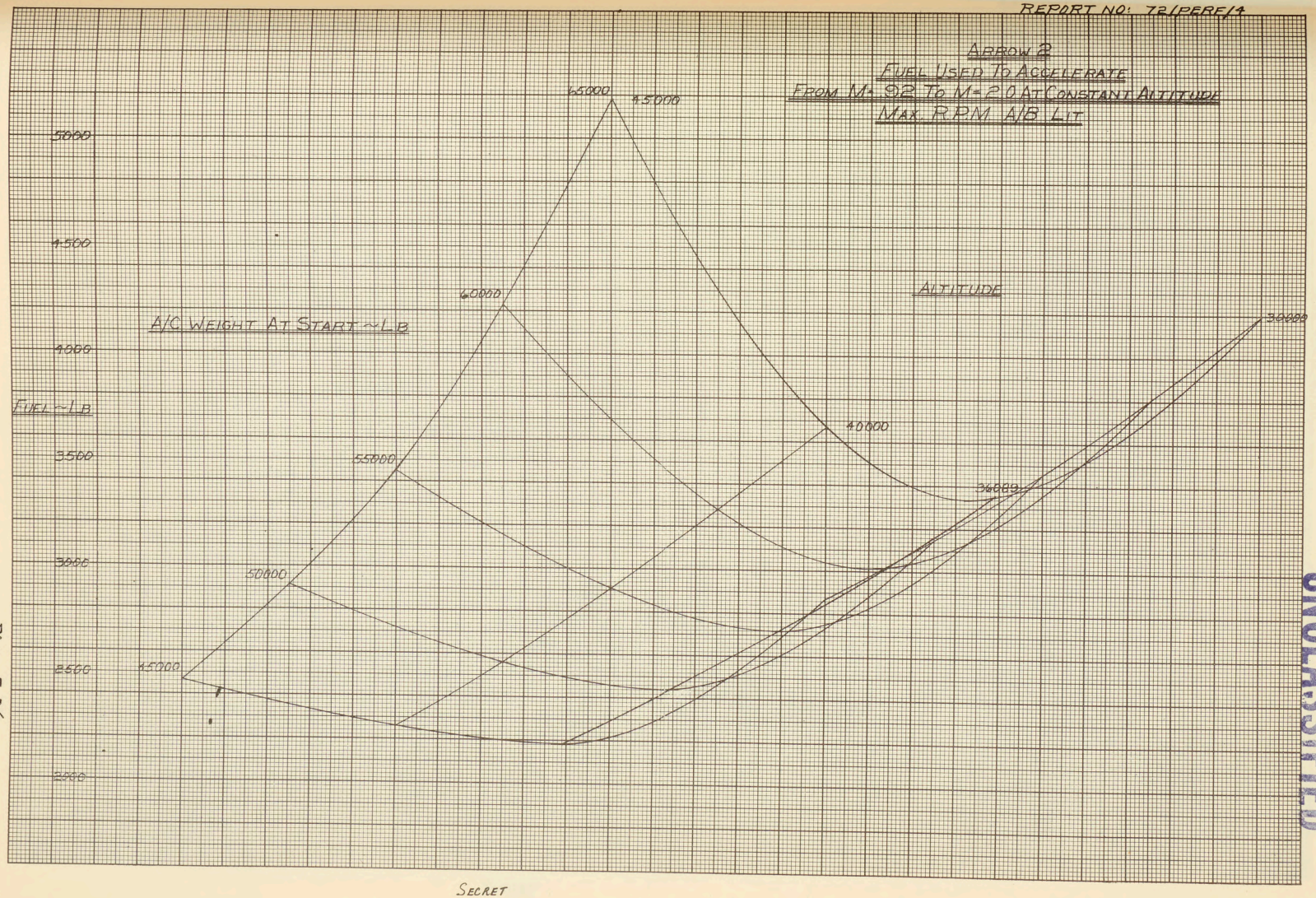


Fig. I-16

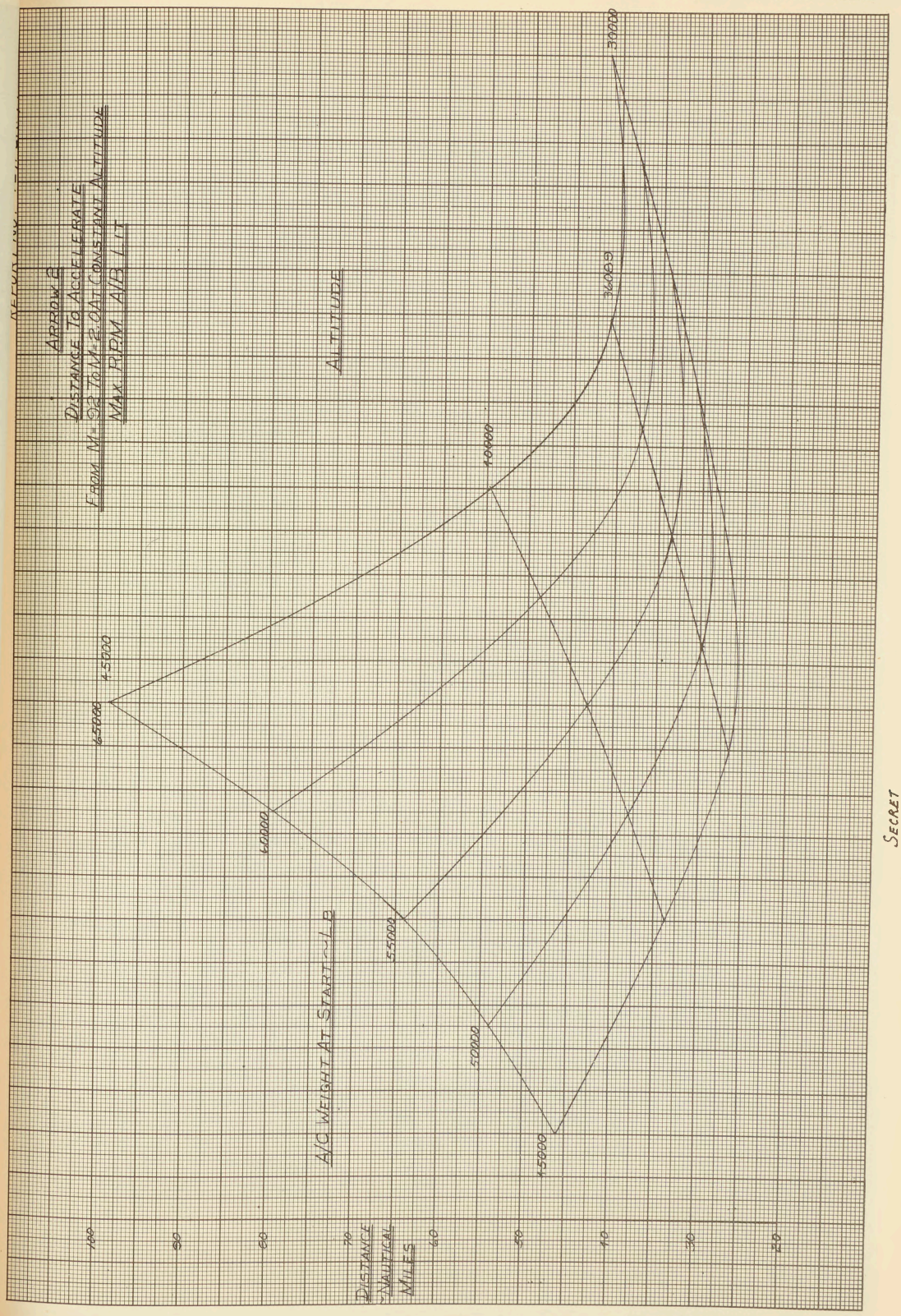


Fig. I-17

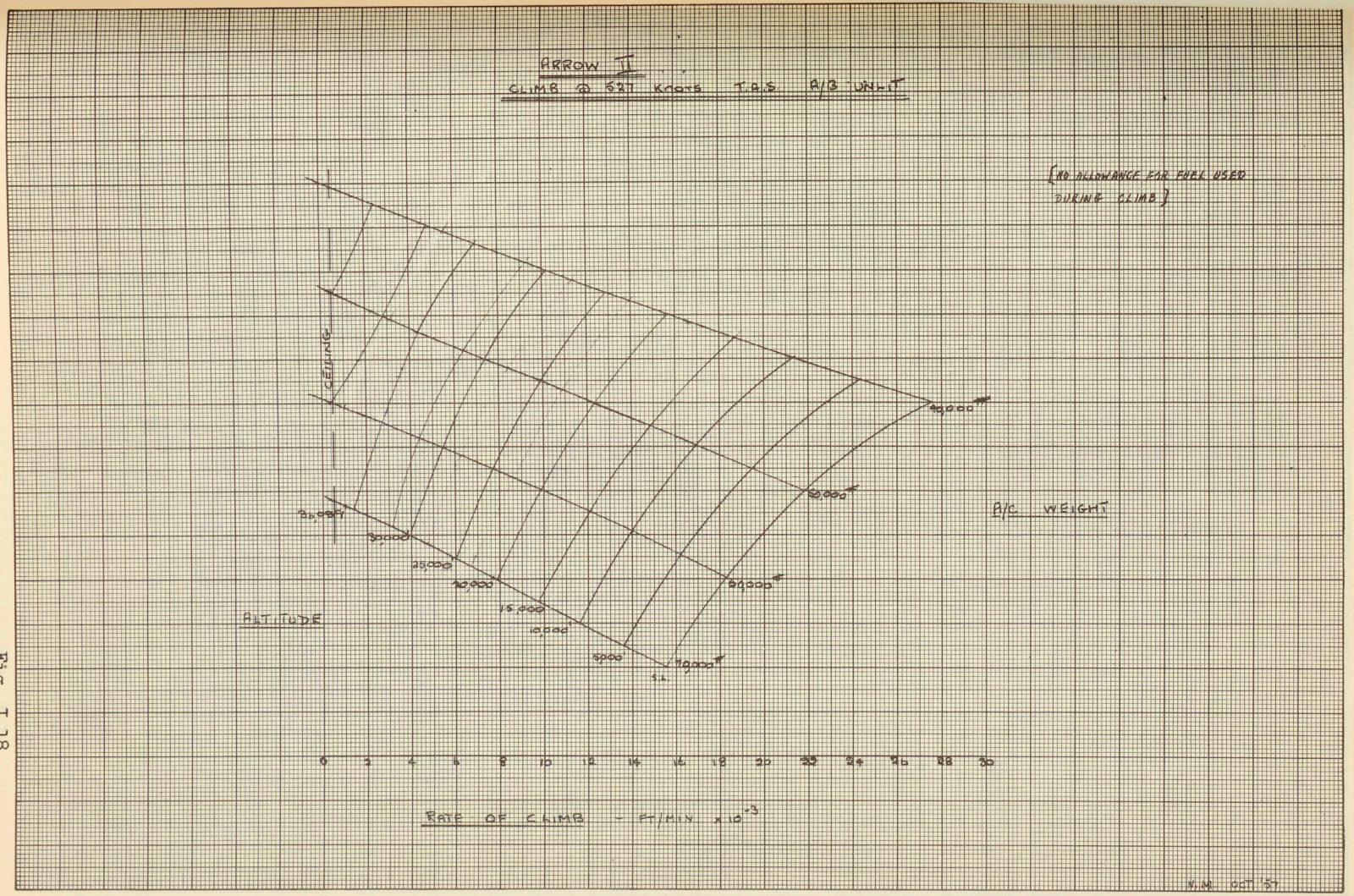


Fig. I-18

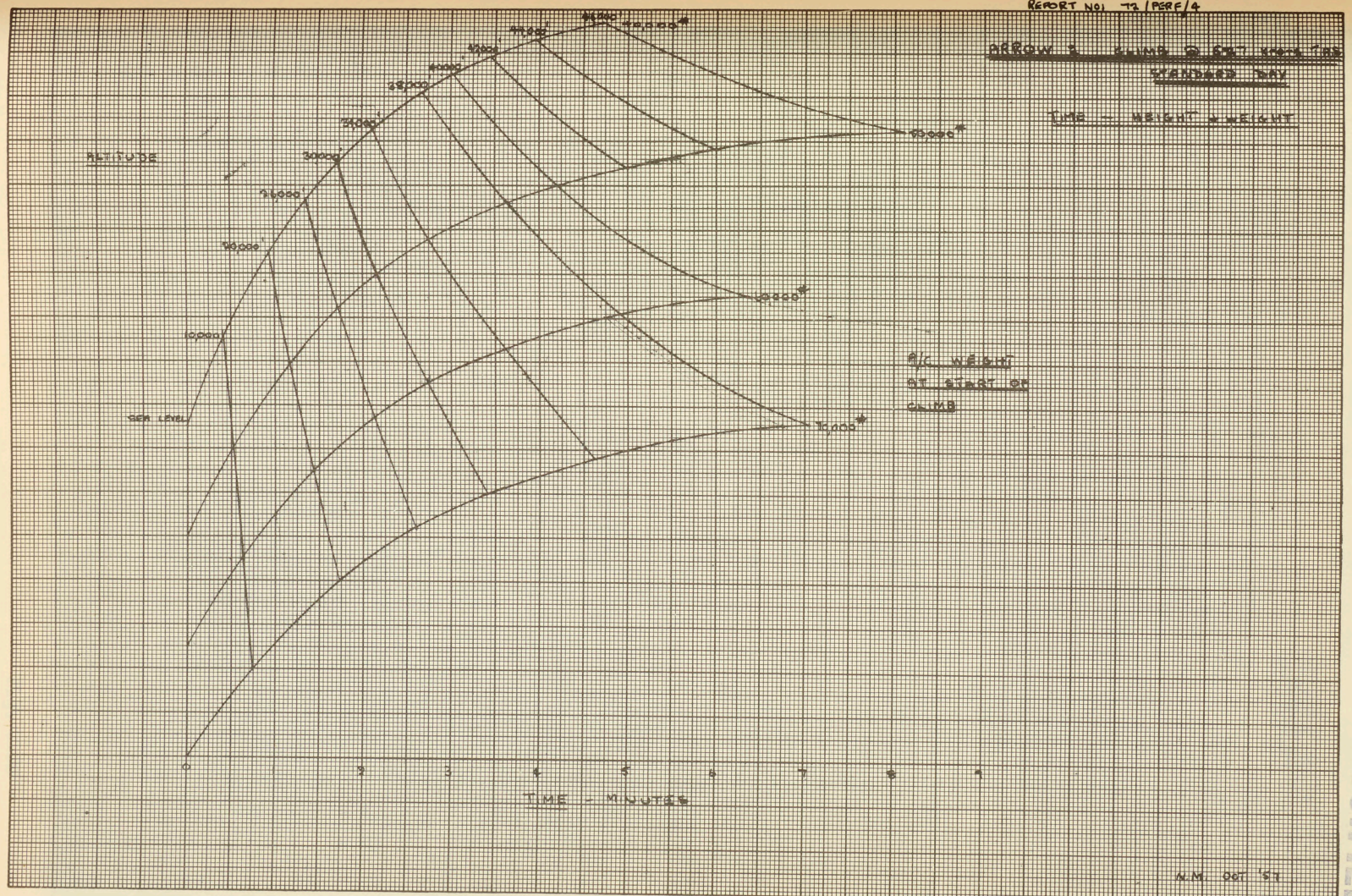


Fig. I-19

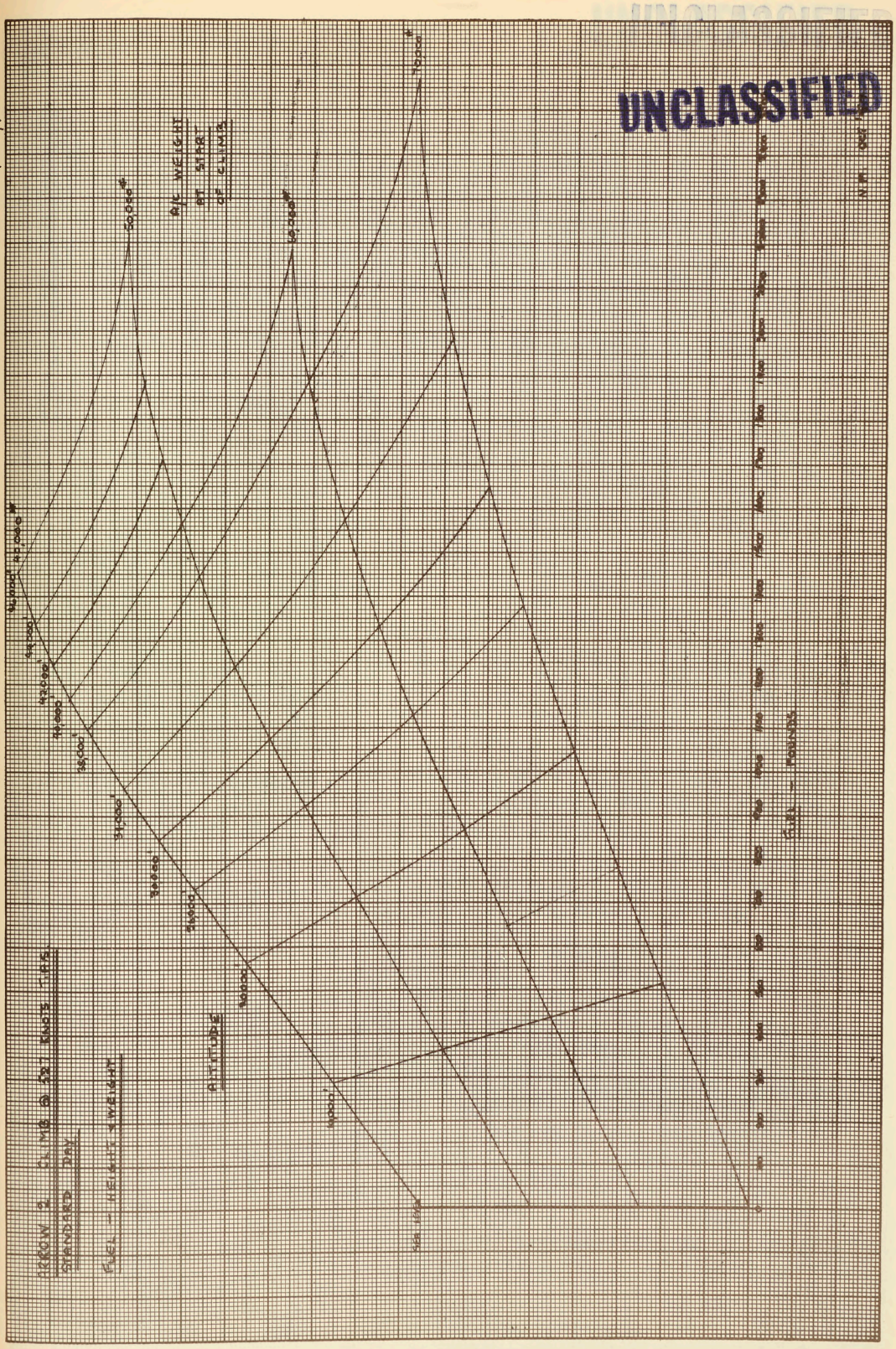


Fig. I-20

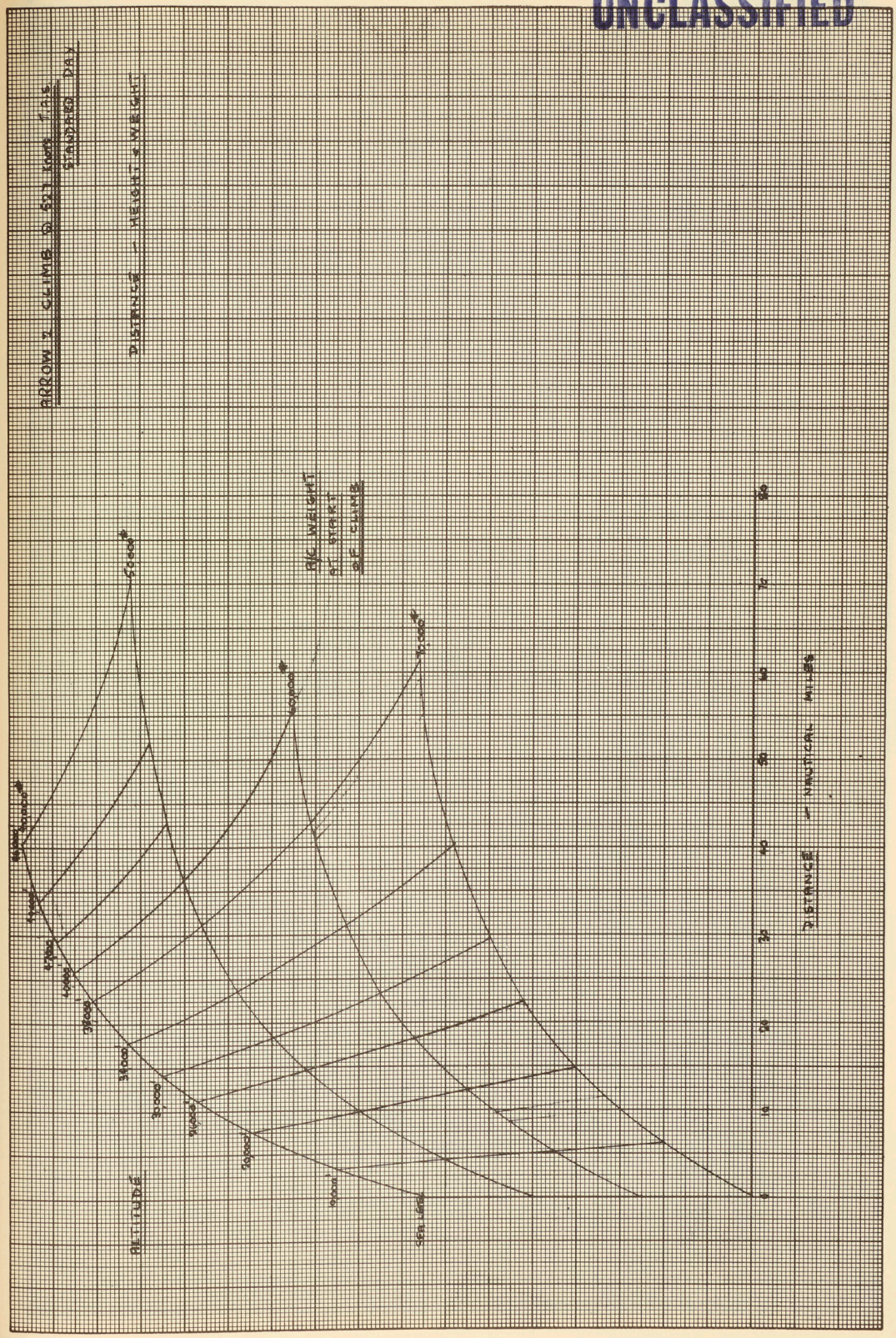


Fig. I-21

C.F 105

RATE OF CLIMB AT CONSTANT MACH NUMBER OF 0·92

PS 13 ENGINES WITH MAXIMUM AFTERBURNER

(NO ALLOWANCE FOR FUEL USED DURING CLIMB)

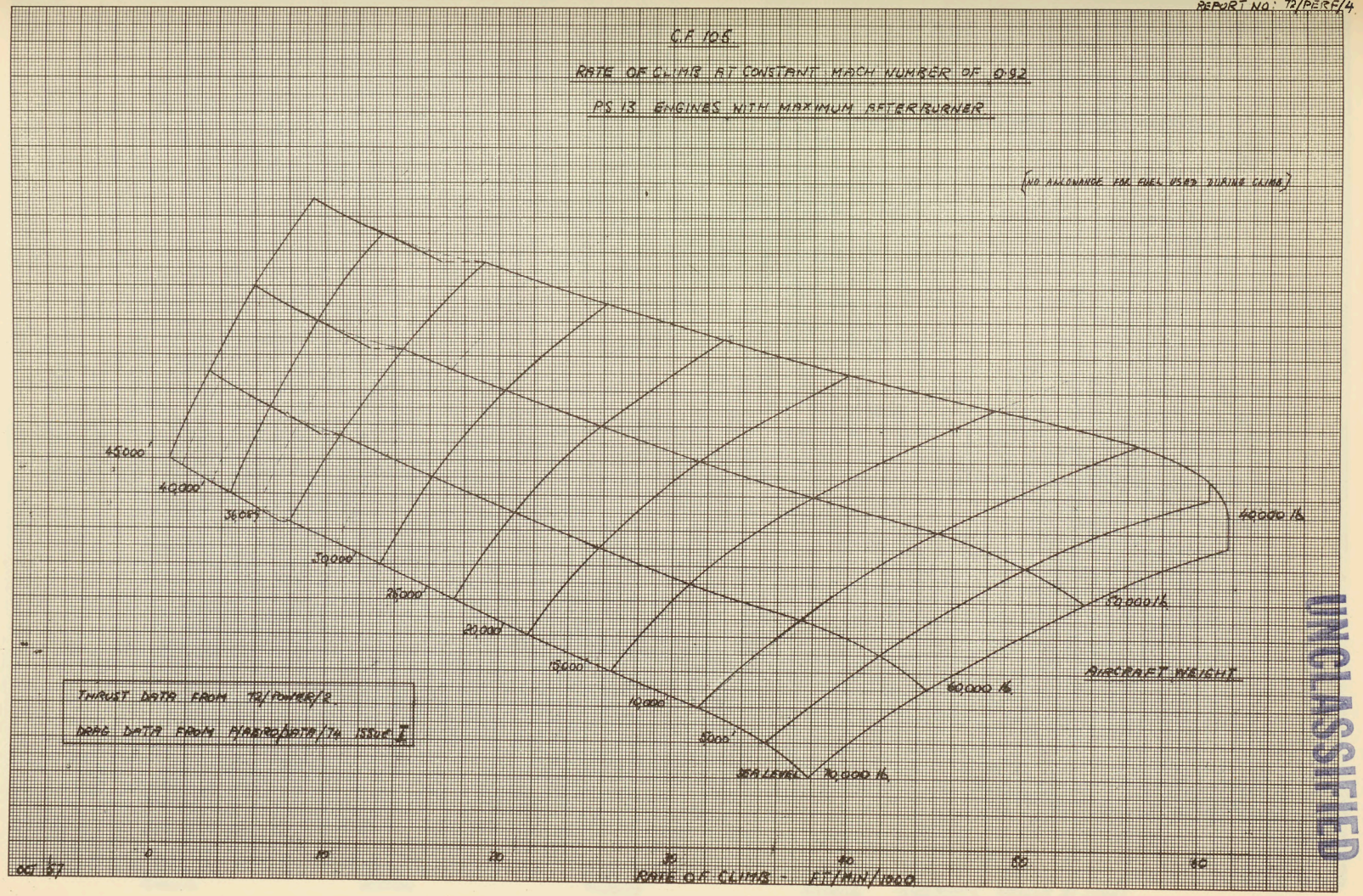


Fig. I-22

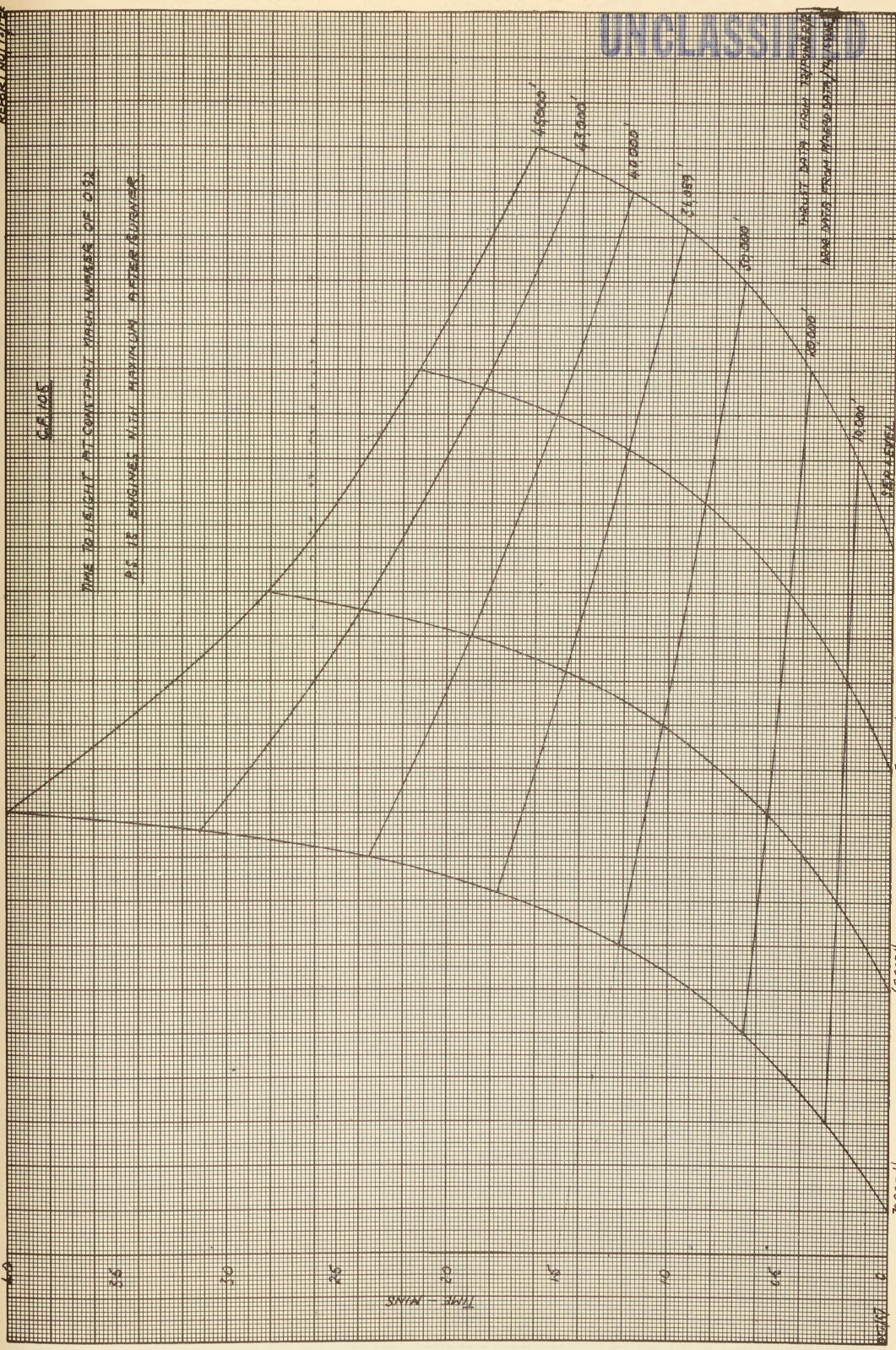
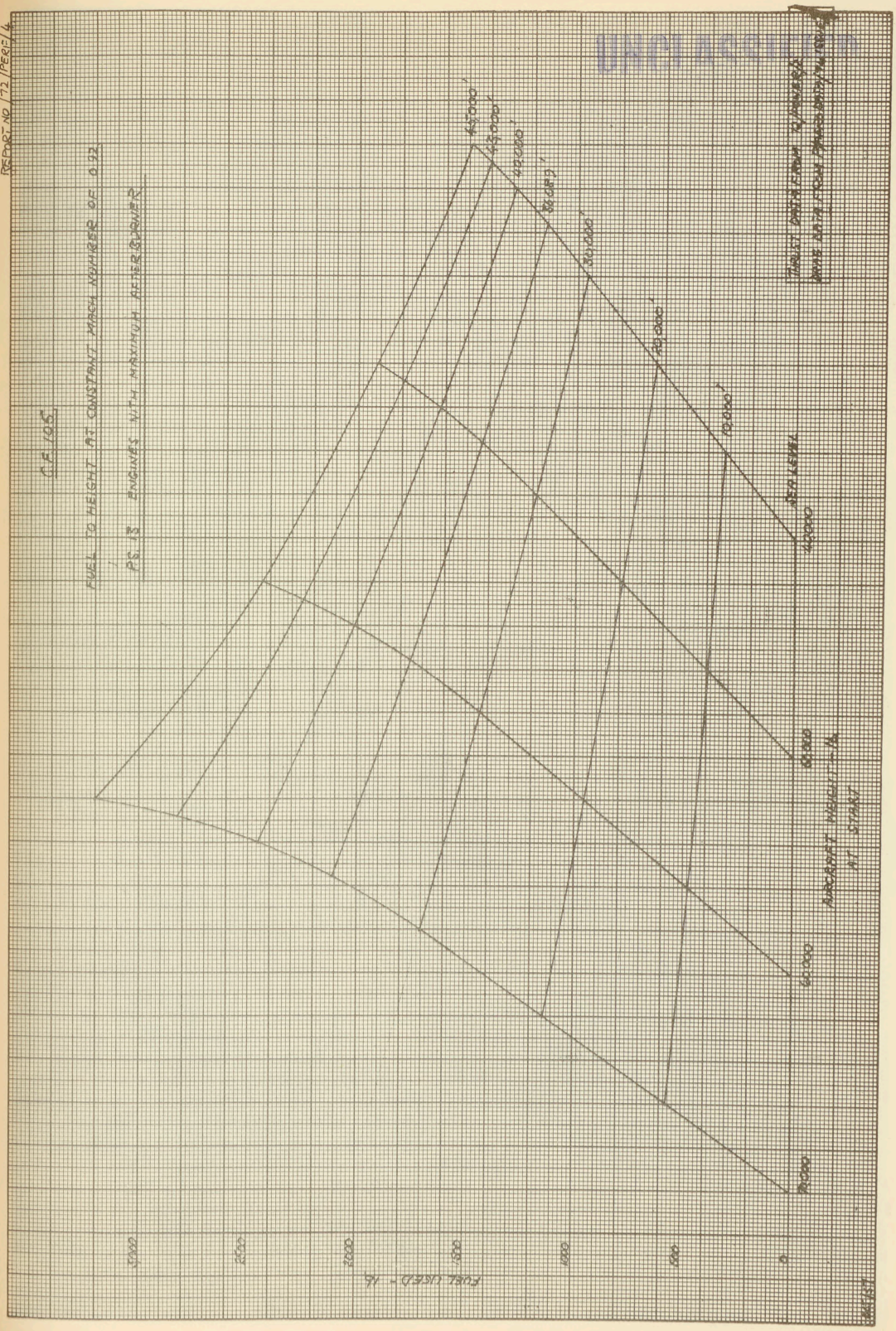


Fig. I-23



SECRET

Fig. I-24

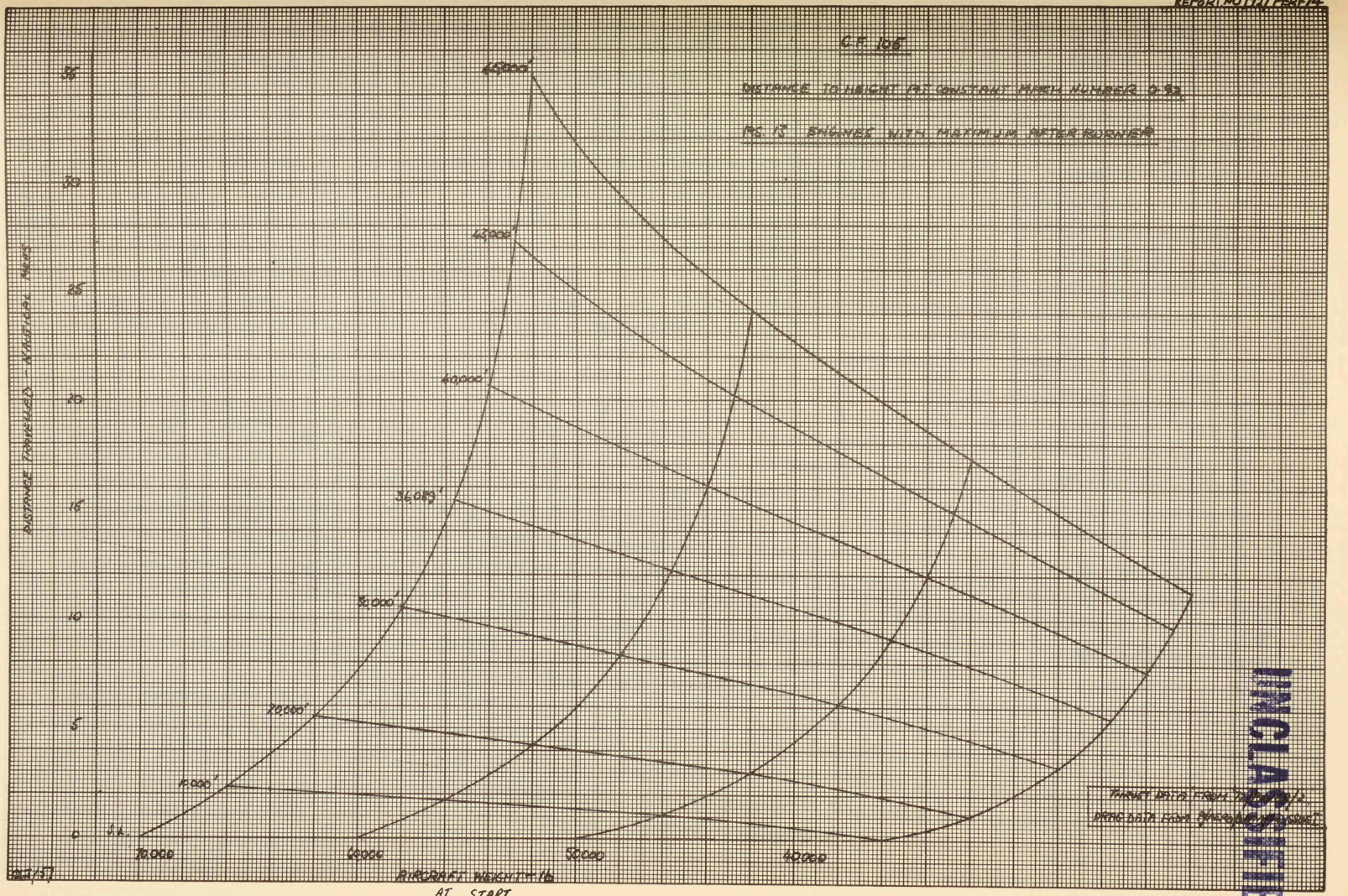


Fig. I-25

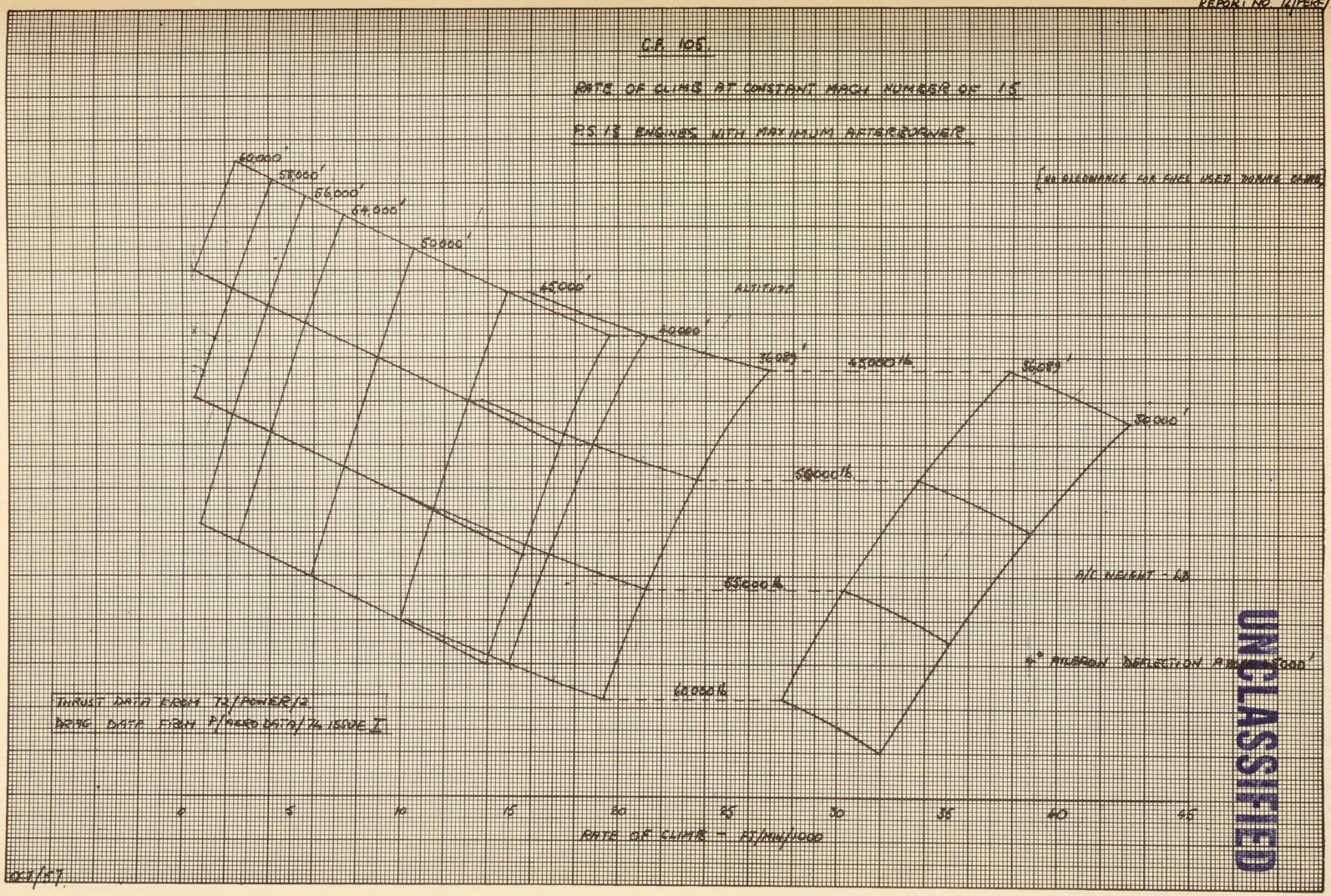

C.R. 105.
RATE OF CLIMB AT CONSTANT MACH NUMBER OF 1.5
R.S.1.8 ENGINES WITH MAXIMUM AFTERBURNER
NO ALLOWANCE FOR FUEL USED DURING CLIMB
60,000'
58,000'
56,000'
54,000'
52,000'
50,000'
48,000'
46,000'
44,000'
42,000'
40,000'
38,000'
36,000'
ALTITUDE
34,000'
55,000 lb.
60,000 lb.
65,000 lb.
70,000 lb.
A/C WEIGHT - lb
4° AILERON DEFLECTION AT 5,000'
THRUST DATA FROM 72/POWER/2
DRAG DATA FROM P/MISC DATA/74 ISSUE I
0
5
10
15
20
25
30
35
40
45
RATE OF CLIMB - FT/MIN/1000
UNCLASSIFIED

Fig. I-26

C.F. 105

TIME TO HEIGHT AT CONSTANT MACH NUMBER OF 1·5

RS 18 ENGINES WITH MAXIMUM AFTERBURNER

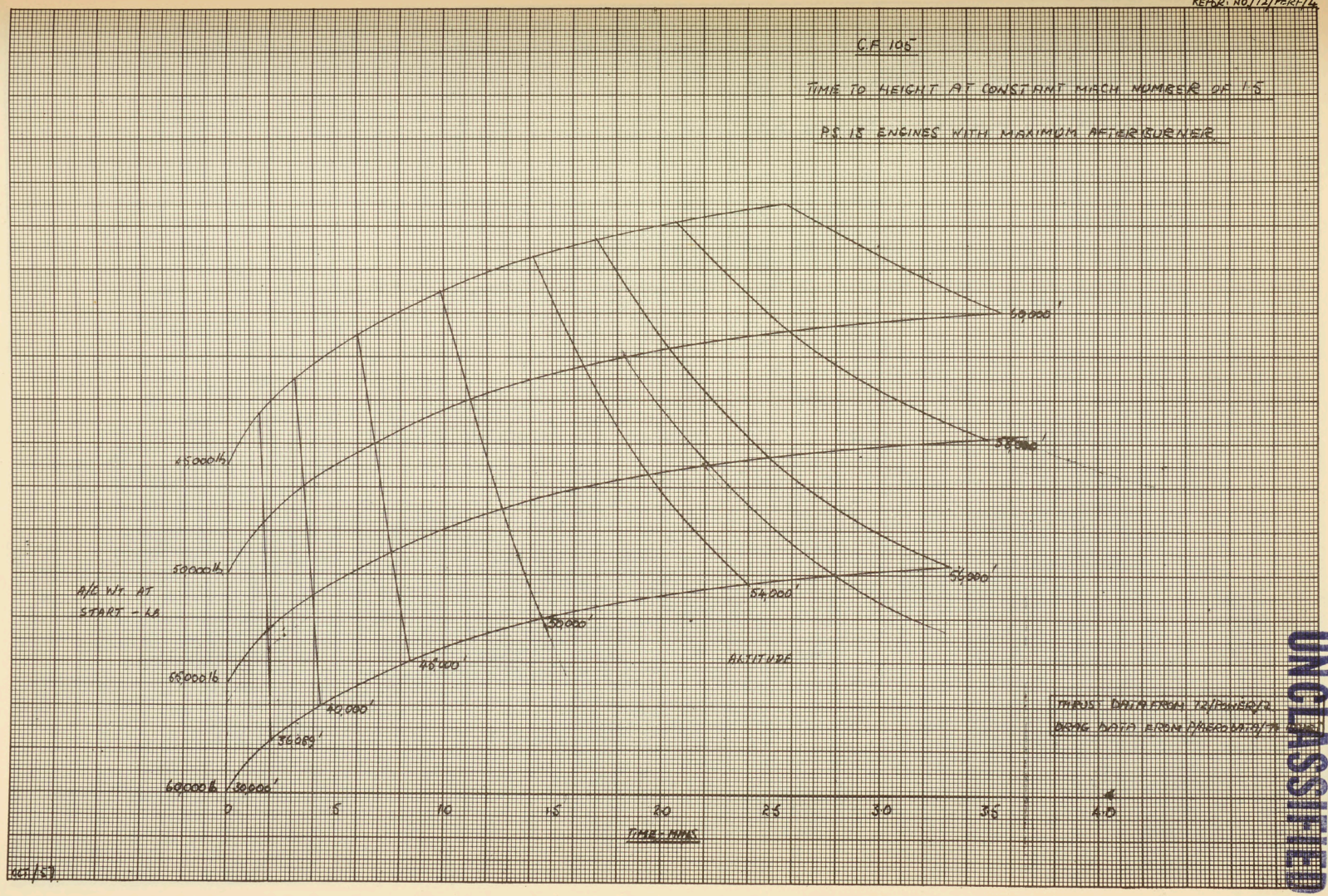


Fig. I-27

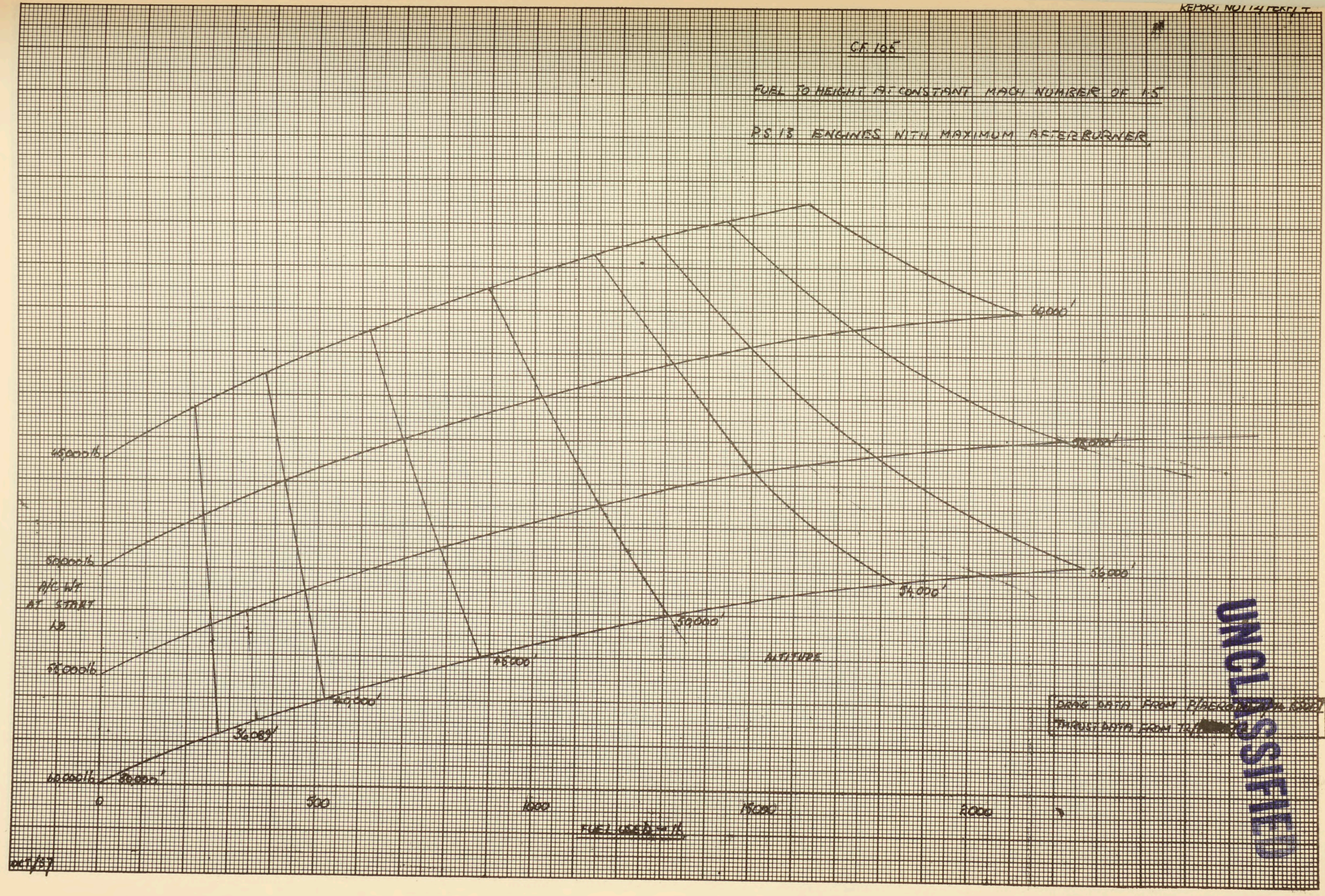


Fig. I-28

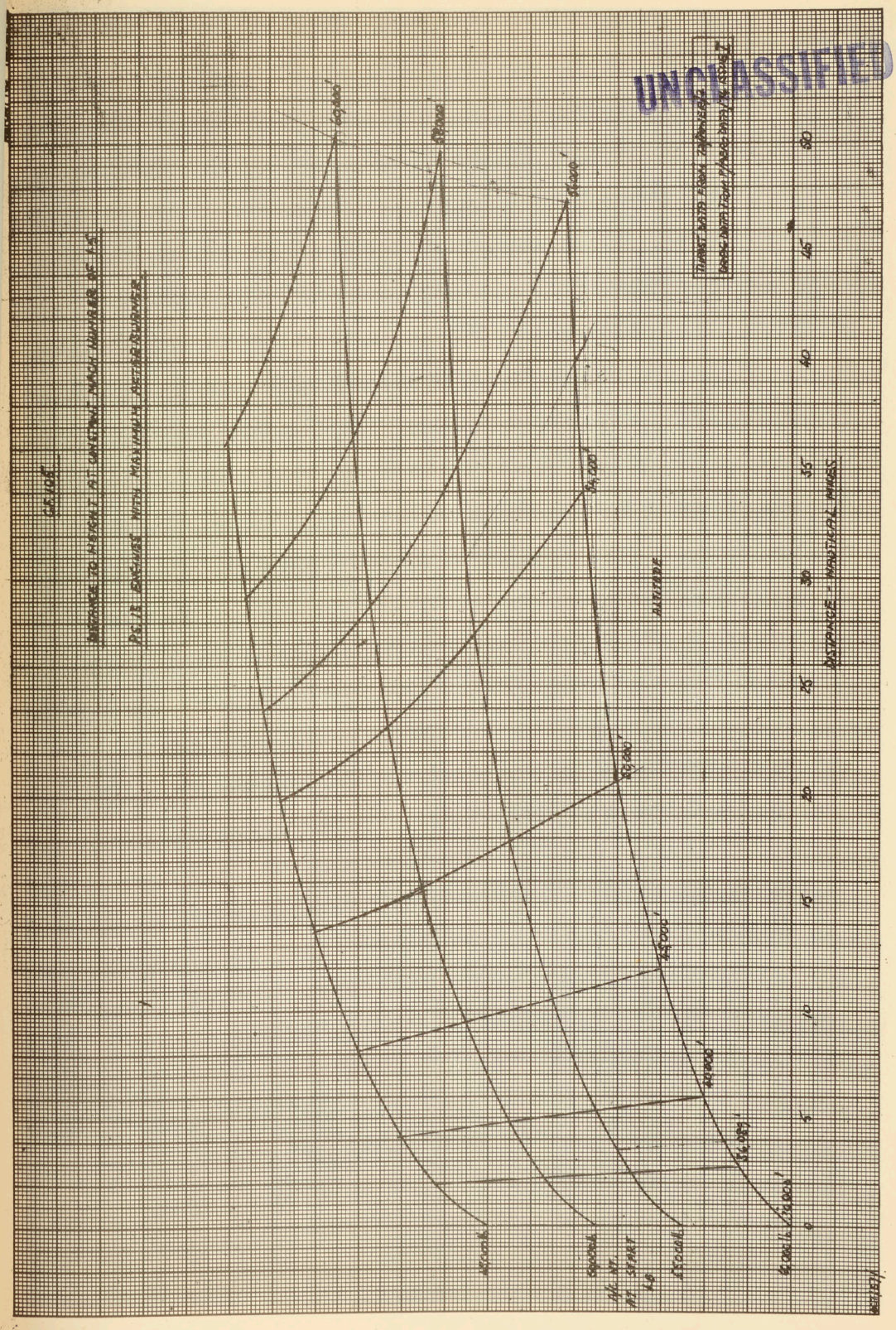


Fig. I-29

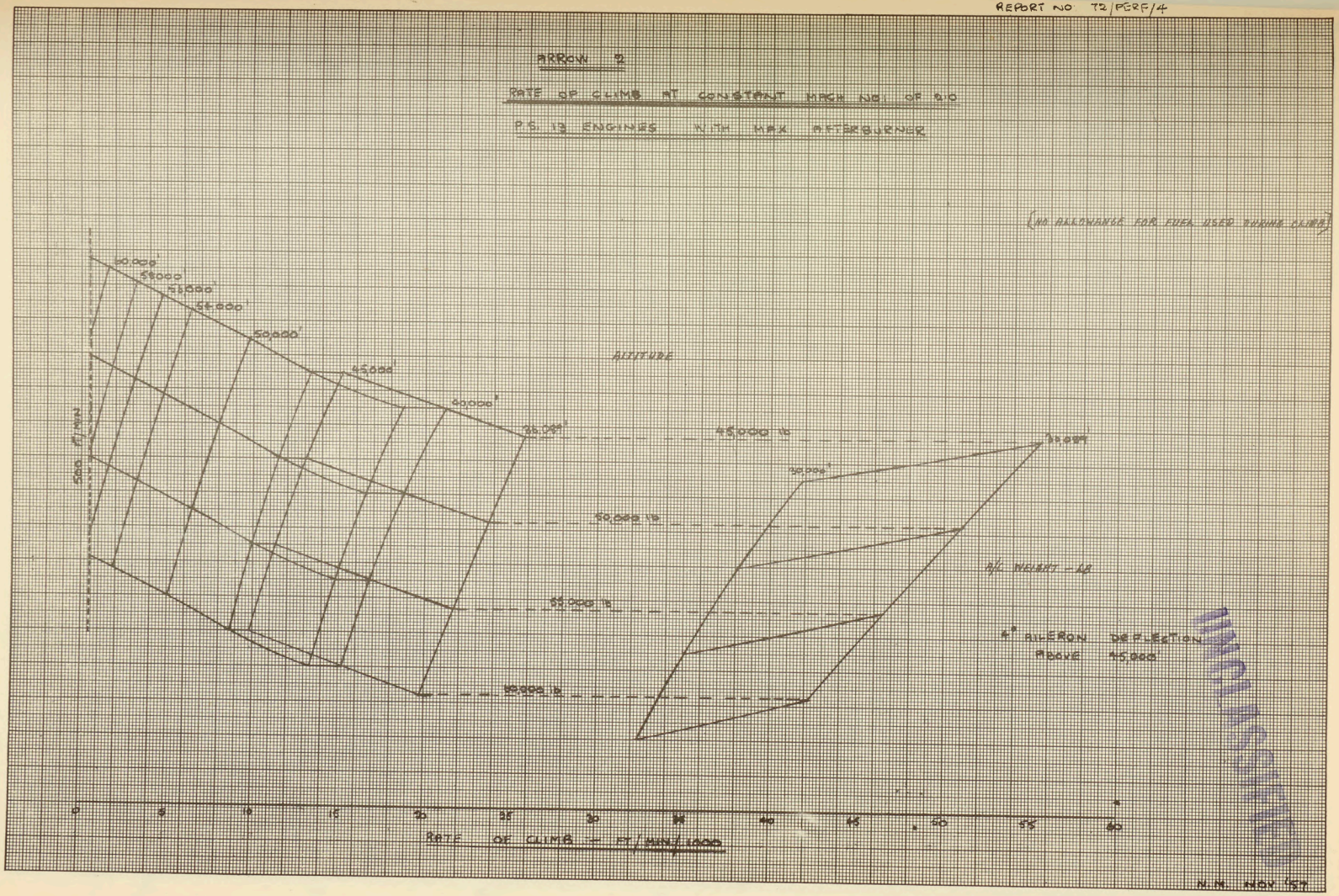


Fig. I-30

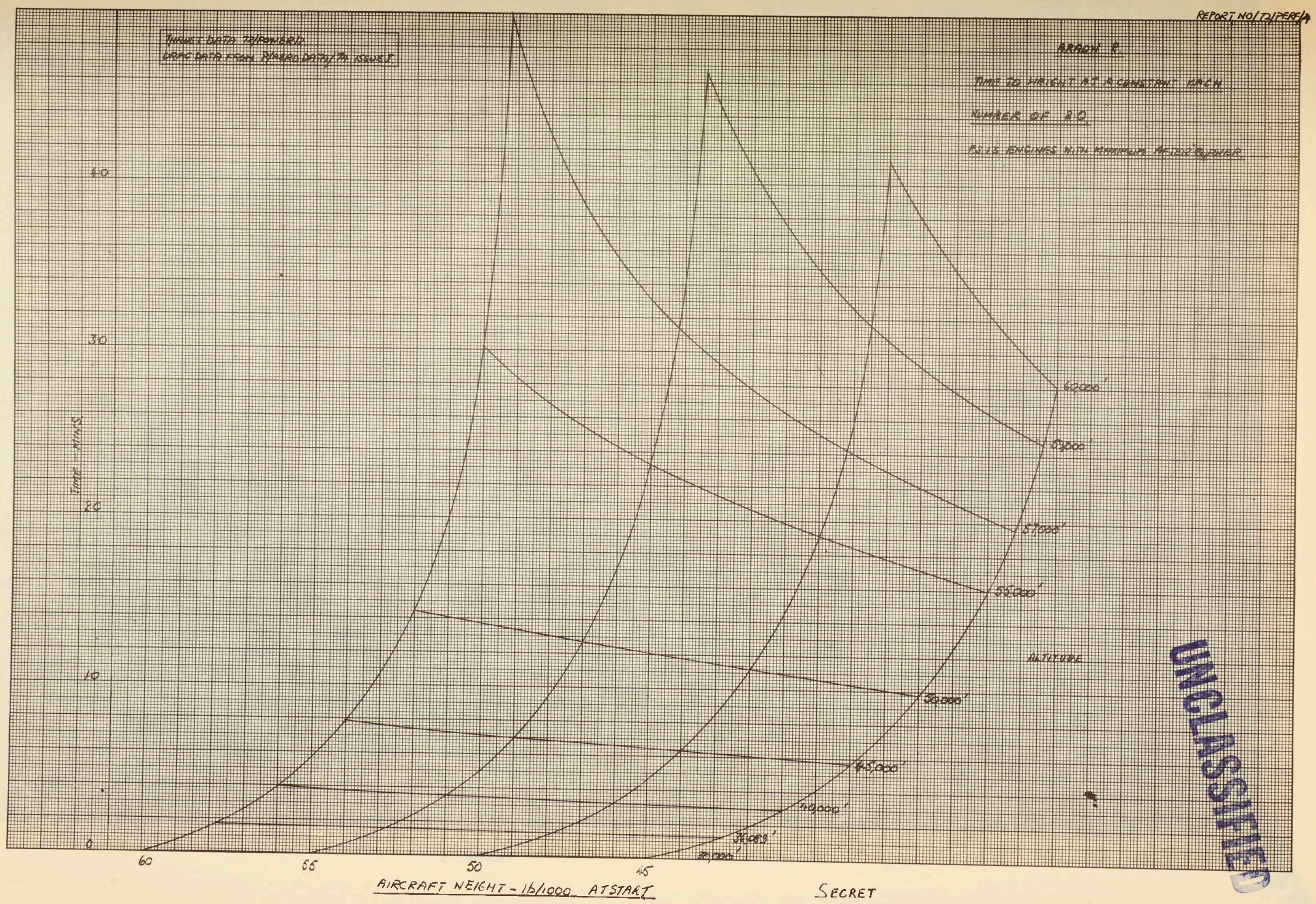


Fig. I-31

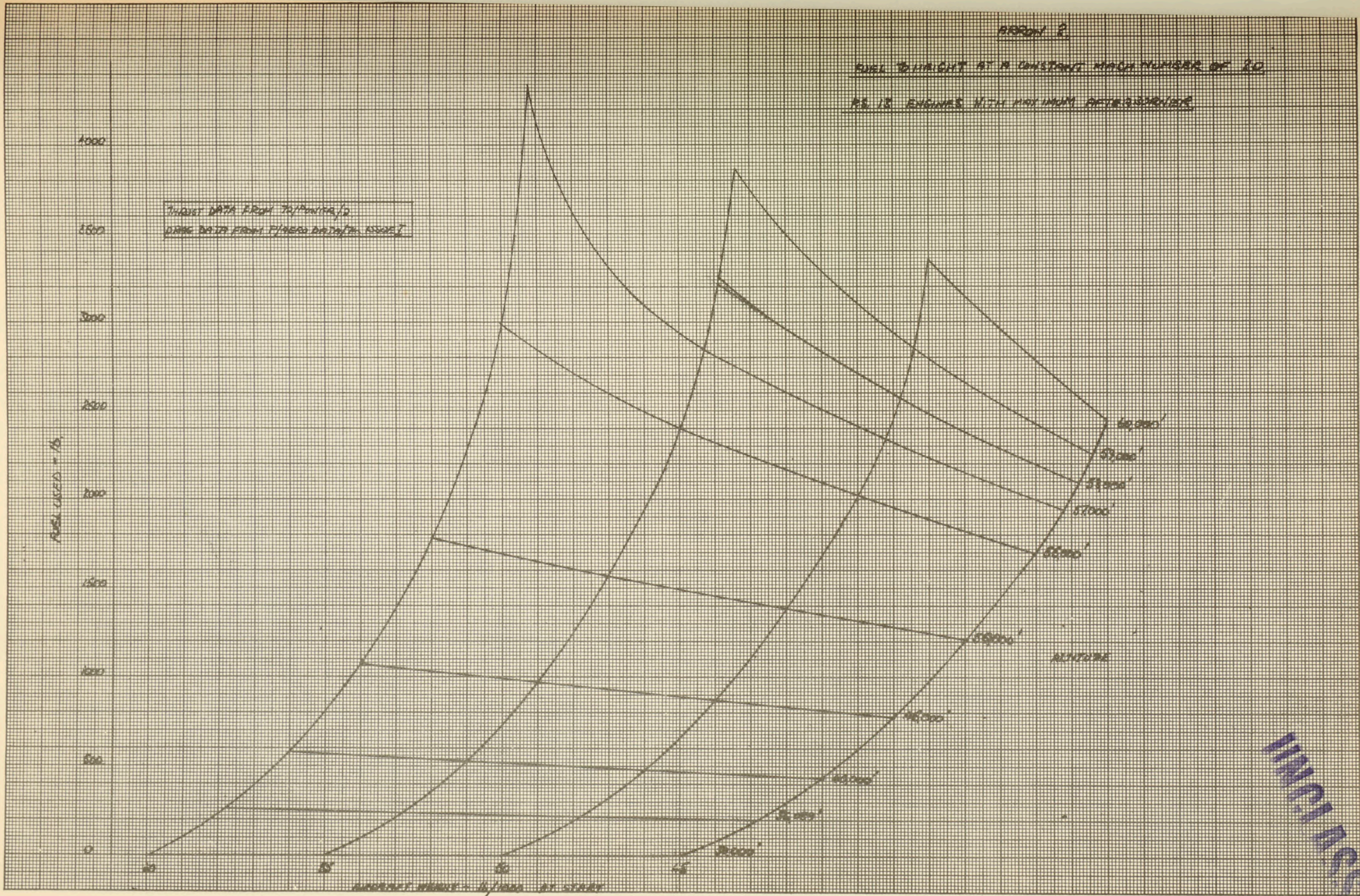


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Fig. I-32

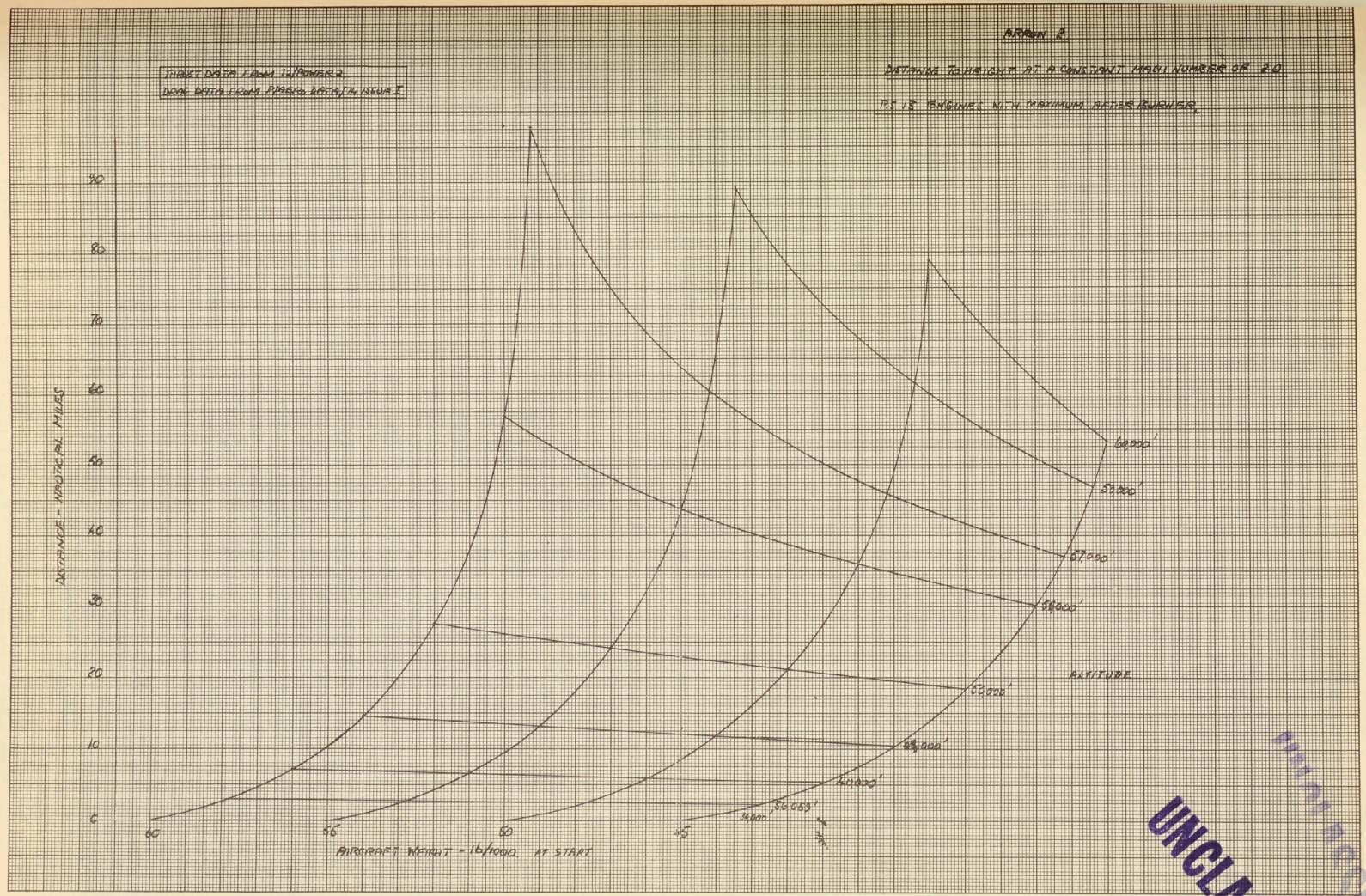

Fig. I-33

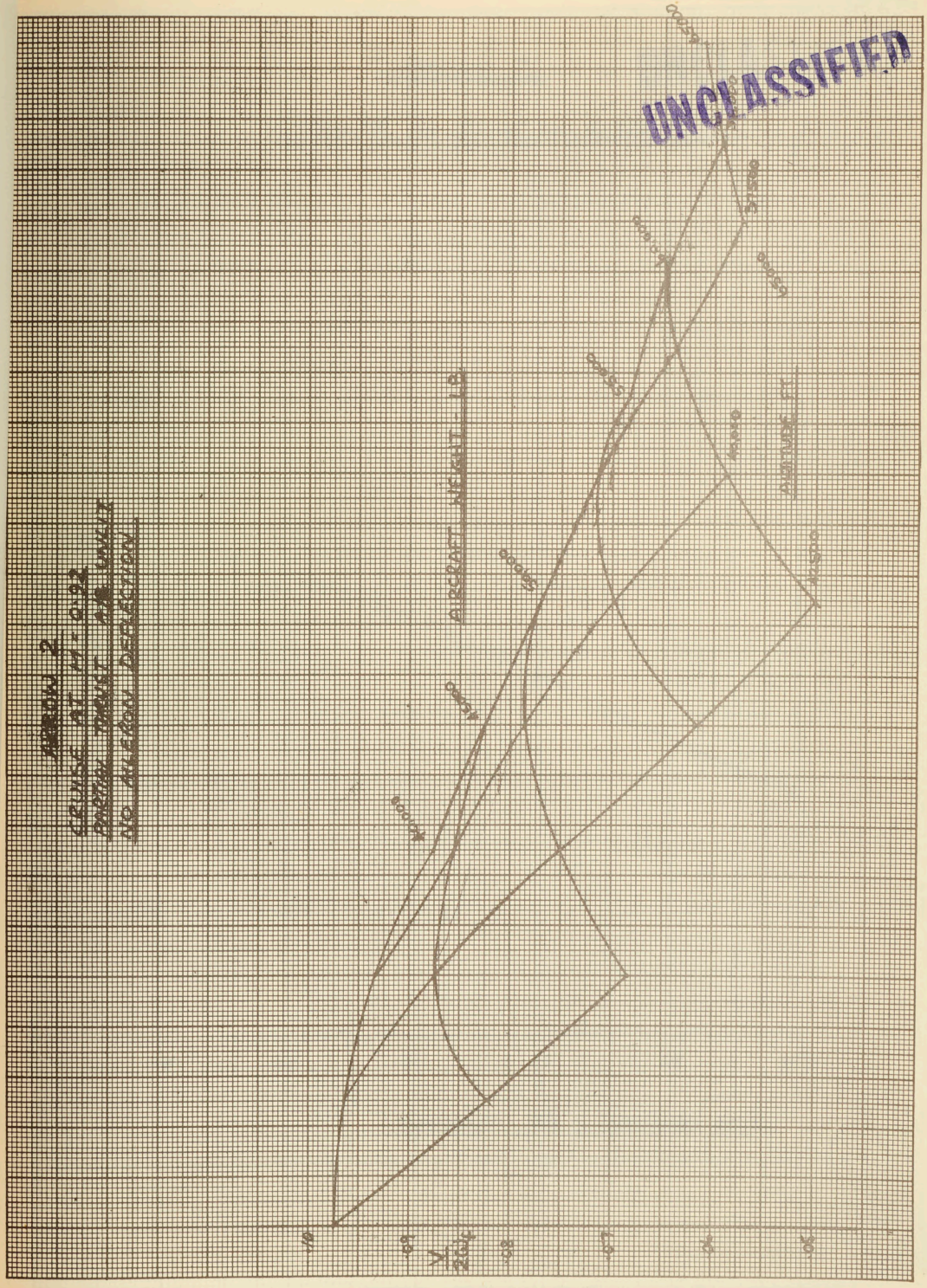

Fig. I-34

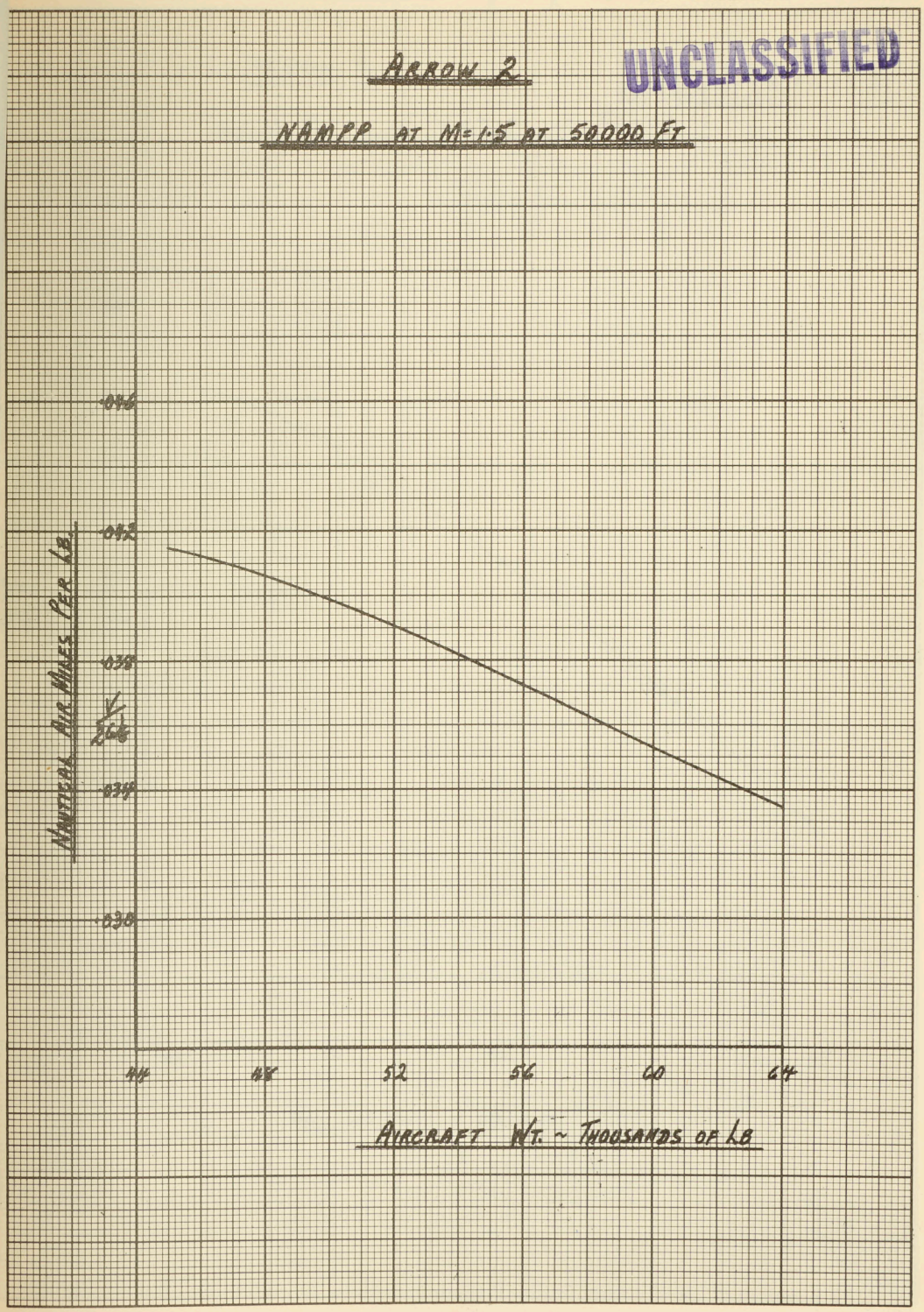

Fig. I-35

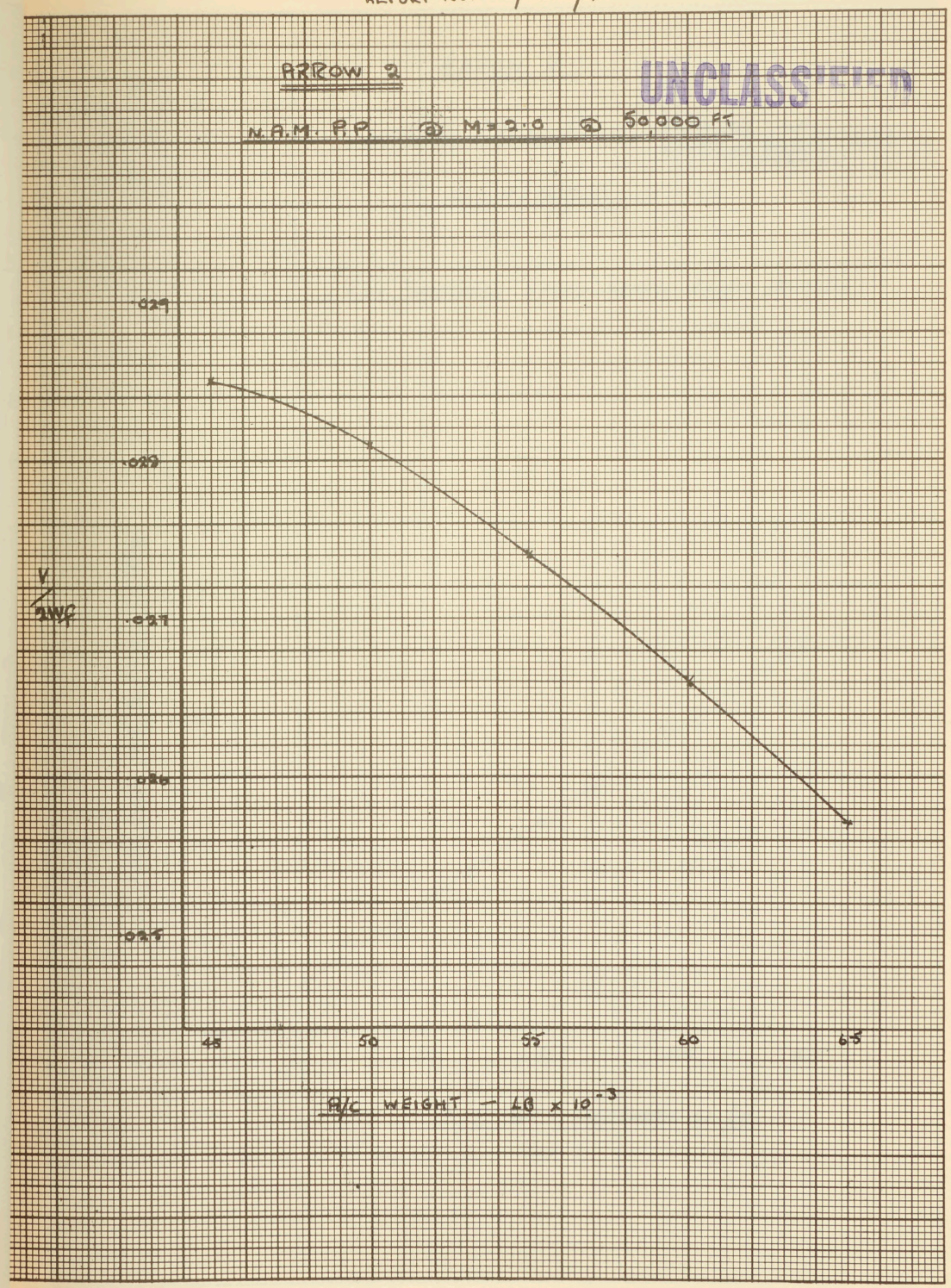
ARROW 2
N.A.M. P.P. @ M = 2·0 @ 50,000 FT
UNCLASSIFIED
·029
·028
·027
·026
·025
V/√(W/S)
45
50
55
60
65
A/C WEIGHT — LB x 10⁻³

Fig. I-36

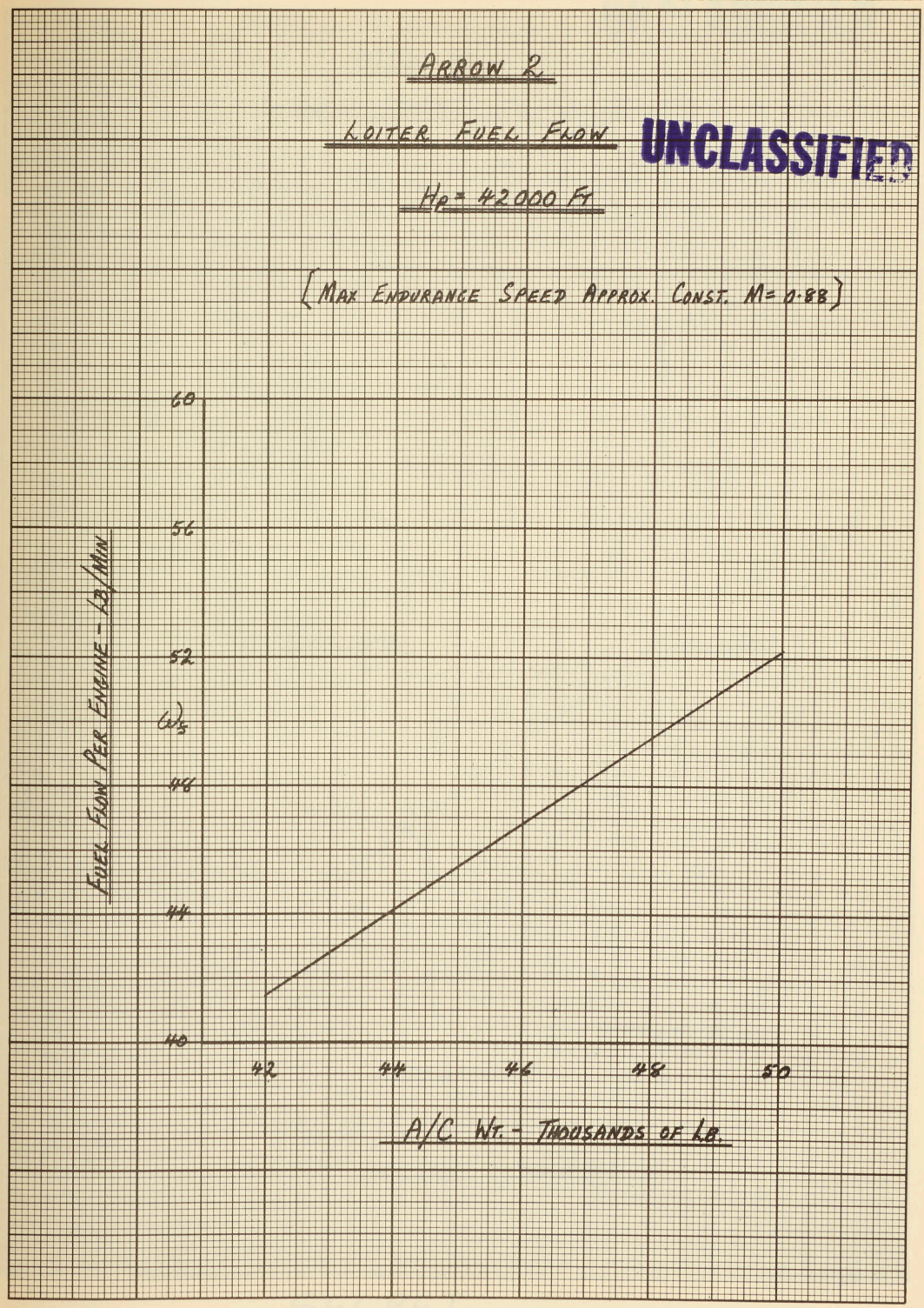

Fig. I-37

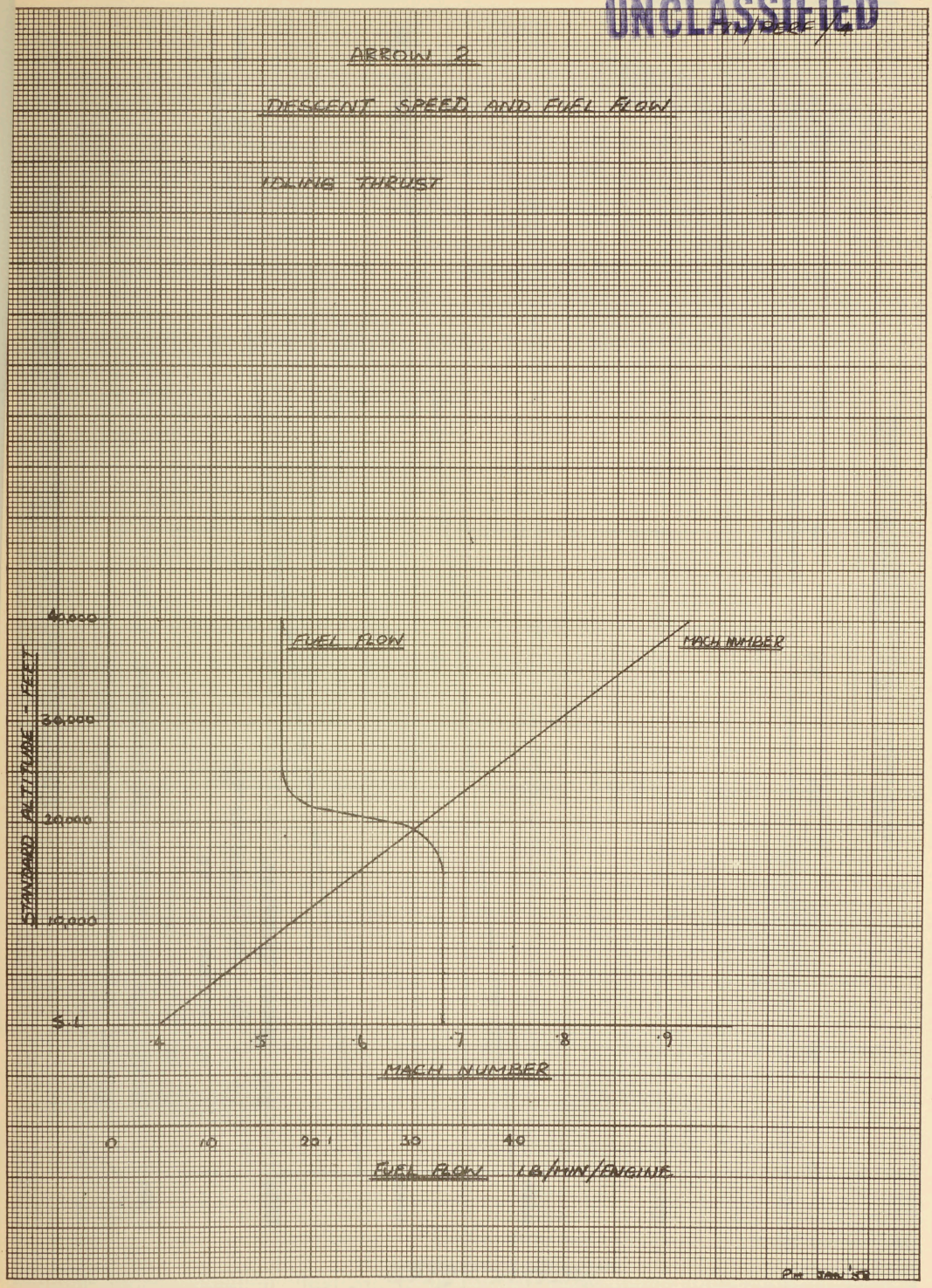

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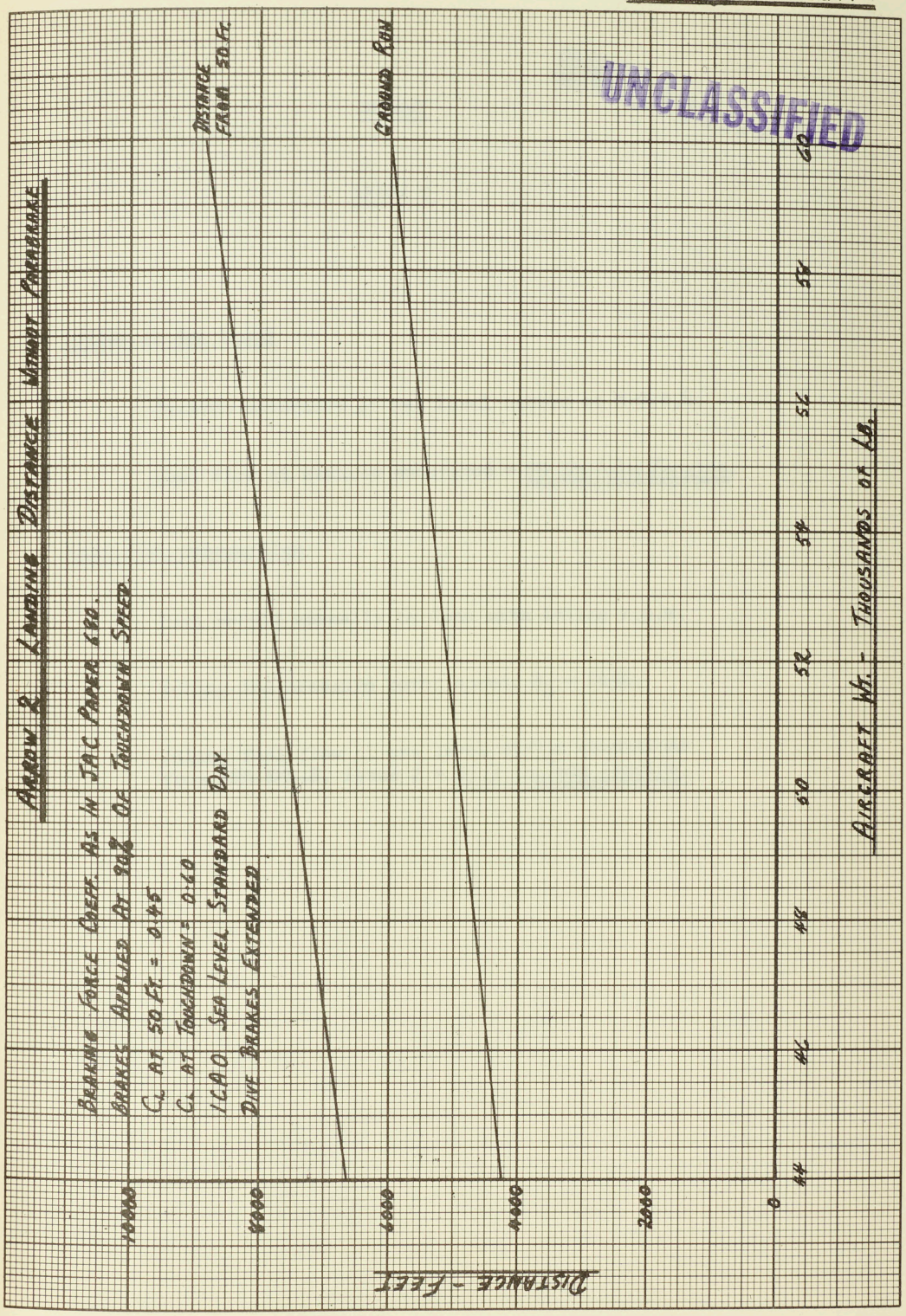
Fig. I-38



SECRET

Fig. I-39

ARROW 2

Loiter at Sea Level

Maximum endurance at sea level occurs at M ≃ 0.4.

Fuel flow at maximum endurance = 70 lb./min./engine.

Taxi fuel consumption

Taxi should normally be done with idling r.p.m.

Idling low pressure rotor speed, N_L = 2150.

Idling fuel flow at sea level static conditions from AVR-EMS-8, Issue 2 = 33.3 lb./min./engine.