AD NUMBER:	AD0477202
CLASSIFICATION CHANGES	
TO:	Unclassified
FROM:	Confidential
LIMITATION CHANGES	
TO:	Approved for public release; distribution is unlimited.
FROM:	Distribution authorized to U.S. Government Agencies and their Contractors; Administrative/Operational Use; 1 Jun 1959. Other requests shall be referred to David W. Taylor Naval Ship Research and Development Center Washington, DC 20376
AUTHORITY	
	U per DoDD 5200.1-R dtd 1 Jun 1971; ST-A per DWT NSRDC ltr dtd 7 Oct 1980

UNCLASSIFIED

AD. AD-477202

477202

DEFENSE DOCUMENTATION CENTER

FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION ALEXANDRIA. VIRGINIA

AD No. ______

DDC FILE COPY

UNCLASSIFIED

NOTICE
This document has been withdrawn from the DDC bulk storage. It is the responsibility of the recipient to promptly mark it to indicate the reclassification action shown hereon.

[redacted] UNCLASSIFIED

Unclassified

REPORT C-1074
AERO [redacted] 955

NAVY DEPARTMENT

THE DAVID W. TAYLOR MODEL BASIN

AERODYNAMICS LABORATORY

WASHINGTON 7, D.C.

(6) WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS,

PART III - TESTS OF THE ATTACK CARRIER CVA 64,

([redacted])

(10) Herbert E. White,

Classification changed to Unclassified

By authority of Ser 442-46

by A. Taylor

Bureau of Ships Technical Library

(16) NS-715-103

(14) Aero-955 - pt-3

(18) DTMB (19) C-1074

AD-417202

~~This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.~~

~~Reproduction of this document in any form by other than naval activities is not authorized except by special approval of the Secretary of the Navy or the Chief of Naval Operations as appropriate.~~

(11) June [redacted]59, (12) 19p.

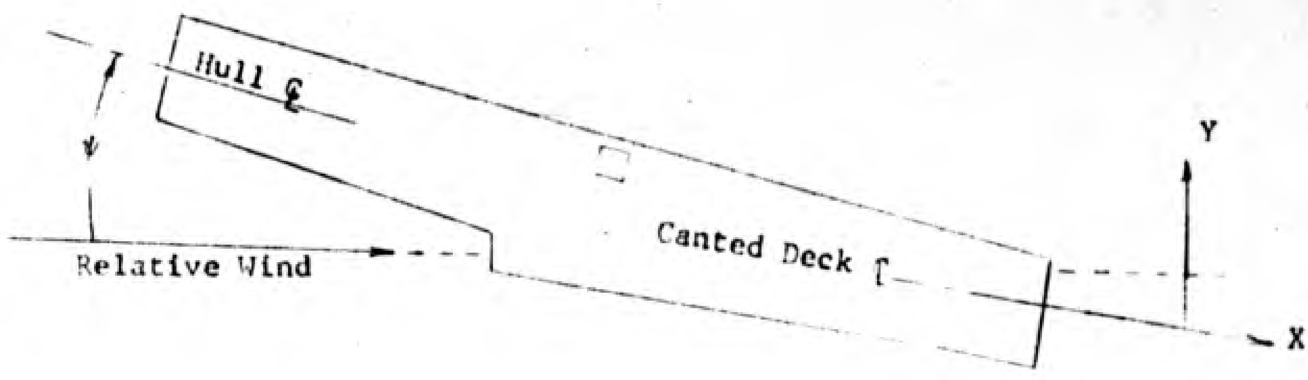
Encl. (2) to BUSHIPS ltr. Ser ... 77

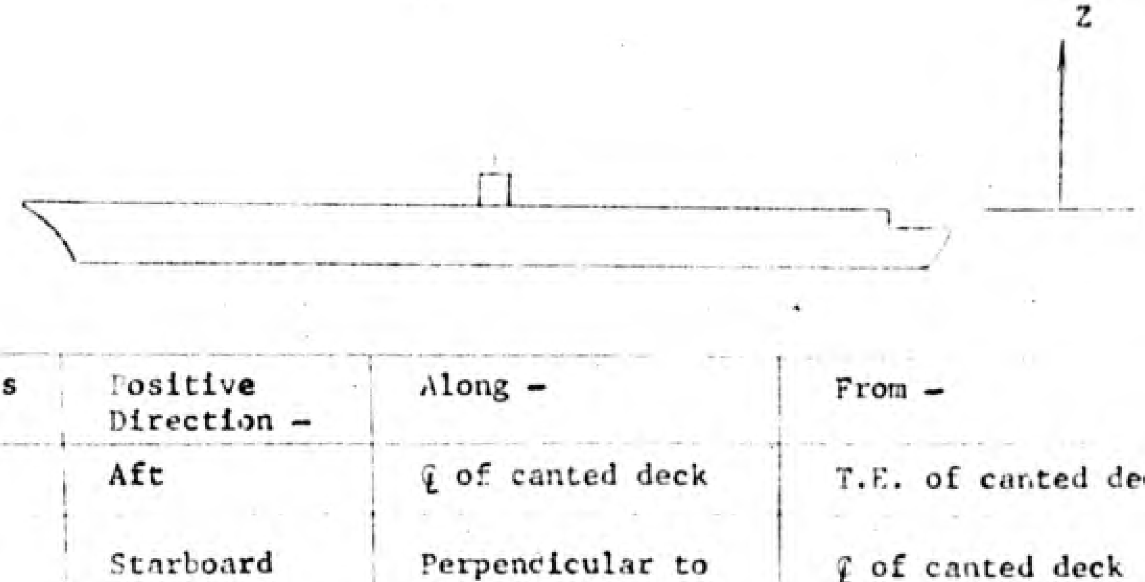
7241138-59

UNCLASSIFIED [redacted] Unclassified

NOTATION

Arrows indicate positive directions of coordinates
and yaw angle





Axis	Positive Direction –	Along –	From –
X	Aft	℄ of canted deck	T.E. of canted deck
Y	Starboard	Perpendicular to relative wind	℄ of canted deck
Z	Up	Vertical line	Deck level

UNCLASSIFIED

[redacted]

Symbols

q/q_r	dynamic pressure ratio
q	local dynamic pressure ($\rho V^2/2$) in pounds per square foot
q_r	reference (free stream) dynamic pressure ($\rho V_r^2/2$) in pounds per square foot
q_a	local dynamic pressure referred to airplane
q_o	initial airplane dynamic pressure at approach airspeed
V	local airspeed at any point in feet per second
V_r	reference (free stream) airspeed in feet per second
ρ	mass density of air in slugs per cubic foot
R	Reynolds number ($\rho V_r \ell/\mu$)
ℓ	length of flight deck in feet
μ	absolute coefficient of viscosity in pound-second per square foot
ψ	angle of yaw in degrees (angle between relative wind vector and the hull axial center line)

[redacted]

UNCLASSIFIED

TABLE OF CONTENTS

AERODYNAMICS LABORATORY
DAVID TAYLOR MODEL BASIN
UNITED STATES NAVY
WASHINGTON, D. C.

WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS

PART III - TESTS OF THE ATTACK CARRIER CVA 64

by

Herbert E. White

SUMMARY

Wind-tunnel tests of a 1/144-scale model CVA 64 carrier were conducted to determine the distribution of dynamic pressure in the area traversed by landing aircraft.

The local dynamic pressures in the air wake were surveyed at three carrier angles of yaw: 0°, 10°, and 20°. Results are presented as ratios of local dynamic pressure to free-stream dynamic pressure at various locations in the wake. In addition, a plot is presented showing the dynamic pressures encountered by an airplane approaching on a 4° glide path at one set of conditions of wind-over-deck and airplane airspeed.

From a dynamic pressure distribution standpoint, a ship yaw angle of zero is the most desirable.

INTRODUCTION

Turbulence, wind changes, and reduced dynamic pressures downwind of aircraft carriers have posed problems to pilots approaching for landing. The hull, flight deck, and island are all responsible for these conditions.

In designing the three carriers covered by this report, the CVA 65 (Reference 1), CVA 62 (Reference 2), and the CVA 64, the Bureau of Ships anticipated this problem, and requested the wind-tunnel tests (Reference 3), to define the extent of the problem.

The results are presented in the form of ratios of local dynamic pressure downwind of the carrier to free-stream dynamic pressure. An isometric plot is presented showing the dynamic pressures encountered by an airplane approaching under one set of conditions.

The data are helpful in determining those areas most severely affected, and might be of benefit in determining the nature of modifications of the carrier form. Tests were conducted at the Taylor Model Basin in May 1957.

MODEL AND APPARATUS

A 1/144-scale waterline model of the CVA 64 was constructed at the TMB. Its general arrangement and principal dimensions are shown in Figure 1. Photographs are shown in Figures 2 and 3. A mirror image (mirror on the waterline) model of the first or "real" model was constructed to the same scale. The two models were attached to each other at their waterlines. Both models included sufficient details to assure a reasonable simulation of full-scale flow conditions.

A rake consisting of forty-two pitot-static tubes and a reference pitot-static tube was used to measure the local dynamic pressure ratios in the air wake of the carrier. The reference tube measured the free-stream dynamic pressure which was used as a reference for the local dynamic pressures. The rake was mounted on tracks, permitting fast and accurate positioning on the three reference axes. Figures 4 and 5 show the rake setup.

The pressures were applied to the tubes of two multiple tube manometer boards which were photographed by Recordak cameras.

TEST CONDITIONS AND PROCEDURES

Tests were conducted in the Aerodynamics Laboratory 8- by 10-Foot Atmospheric Wind Tunnel 1. The model was supported from the ceiling of the tunnel on a streamlined strut. The "real" model was inverted and the image was erect.

The mirror image model was used because it provides simulation of the water surface without requiring a very large ground board in the test section. This facilitates model installation and adjustments of model and survey rake.

With the model fixed at a certain relative wind angle, a dynamic pressure of six inches of alcohol was generated in the tunnel. The pressures on the various tubes of the rake were then recorded. By repeating this procedure for predetermined rake positions, model in and out, the flow over and behind the carrier was determined. Using this method eliminates the need for calibrating each pitot tube, and minimizes the effects of air-flow variation in the tunnel.

The surveys were made with the relative wind directly over the bow, and 10° and 20° to port. The test conditions yielded a Reynolds number of 5.87×10^6, resulting from an average airspeed of 84 knots, a model hull length of 6.81 feet, and standard air conditions.

RESULTS

The basic results of the tests are presented in Figure 6 as ratios of local to free-stream dynamic pressure. Dynamic pressure ratios are used in preference to velocity ratios because the aerodynamic forces vary directly with the dynamic pressure. Figure 7 presents the dynamic pressures encountered by an airplane approaching under one set of conditions. In this instance, dynamic pressure ratios are referred to that encountered by the airplane in free stream.

Symbols, notation, and orientation of axes are given in the preface.

Some areas of data show considerable scatter. Because of the volume of data involved, checking was done only on those areas considered significant.

DISCUSSION

In analyzing the dynamic pressure ratios referred to the carrier (as presented in Figure 6) in terms of the effect on an airplane approaching to land, it is important to remember that the airspeed of the airplane is much greater than that of the carrier.

Suppose, for example, that the carrier is moving at an airspeed of 30 knots and that at some point in the approach path the local airspeed is 15 knots. This will be a loss in airspeed of 50 percent. (The loss in q/q_r will be 75 percent.) Now suppose that an airplane approaches the carrier at an airspeed of 130 knots. As the airplane enters that portion of the wake where the local airspeed is 15 knots lower, it will experience a loss of airspeed of 15 knots, but this will be a loss of only 12 percent. The corresponding loss in q_a/q_o will be 23 percent. It will be seen that a given decrease, in either airspeed or dynamic pressure, is much less, in percentage, for the airplane than for the carrier. The factor that makes this relatively small decrease in airspeed so important is, of course, the fact that the airplane is already at a speed not very far above the stall.

A simple formula has been developed by which one may go from the form of dynamic pressure ratio q/q_r, in which the data are presented, to the more significant dynamic pressure ratio q_a/q_o. The results of this equation (given below) are presented for a set of assumed approach conditions in Figure 7. For airplane airspeeds greater than the carrier airspeed:

$$\frac{q_a}{q_o} = \left[1 - \frac{V_r}{V_a} \left(1 - \sqrt{\frac{q}{q_r}} \right) \right]^2$$

Figure 7 is derived from the data presented in Figure 6b. Comparing these two figures may help the reader in gaining an understanding of the effect of the difference between airplane and carrier airspeed. In general, this discussion will be confined to the glide path area. At zero yaw, Figure 6, two major depressions in q/q_o are seen in the wake. Close to the trailing edge of the deck, there is a large depression centered about 60 feet to starboard of the center line of the canted deck. Another, smaller, depression is centered about 140 feet to port. Between these two lows exists an area of high dynamic pressure. The gradient between the starboard low and the high encroaches on the glide path at 16 feet aft of the trailing edge. Going back along the center line, the large depression moves to port with respect to the approach center line. At 1000 feet aft, it is beyond the area of concern.

At a yaw angle of 10°, the wind is approximately aligned with the center line of the canted deck. At this angle, there are depressions in q/q_o at 120 feet to port and 70 feet to starboard, near the trailing edge. Between these two large depressions, there is an area of high q/q_o at about 80 feet to port, a small depression at 20 to 40 feet to port, and a rise of q/q_o slightly to starboard of the center line. Roughly, this pattern is in evidence as far back as 231 feet aft. Beyond that distance, there is a general mild depression which shifts slowly to port going aft.

At a yaw angle of 20°, there is an area of high q/q_o at the center line and a depression immediately to starboard of the center line near the trailing edge. Farther aft, this depression moves to starboard. However, a depression centered approximately 100 feet to port at the trailing edge also moves to starboard, and at 544 feet it crosses the approach center line. This low remains in evidence out to the end of the surveyed area.

Of the three angles of yaw investigated, zero yielded the most desirable distribution of dynamic pressure. As is apparent from Figures 6b and 7, 10° of yaw yields a rather rough approach zone.

Aerodynamics Laboratory
David Taylor Model Basin
Washington, D. C.
June 1959

REFERENCES

1. White, Herbert E. Wind-Tunnel Tests To Determine the Air-Flow Characteristics in the Wakes of Three Aircraft Models. Part I - Tests of the Attack Carrier CVA 65 (Title Unclassified). Wash., May 1959. 23 l. incl. illus. (David Taylor Model Basin. Aero Rpt 955, Pt. 1) CONFIDENTIAL
2. White, Herbert E. Wind-Tunnel Tests To Determine the Air-Flow Characteristics in the Wakes of Three Aircraft Models. Part II - Tests of the Attack Carrier CVA 62 (Title Unclassified). Wash., June 1959. 19 l. incl. illus. (David Taylor Model Basin. Aero Rpt 955, Pt. 2) CONFIDENTIAL
3. BUSHIPS CONF ltr C-A11/NS-715-103 Ser 420-0179 of 30 Jul 1956

Table 1

Altitudes at the Fore and Aft Stations
for One Set of Approach Conditions

Carrier Yaw Angle, degrees	Survey Station	Distance Aft of T.E. of Deck, feet	Distance Aft of Touchdown, feet	Altitude Above Deck, feet
	1	-21	129	15
	2	16	166	18
	3	126	276	25
0	4	236	386	33
	5	530	680	54
	6	1044	1194	89
	7	1558	1708	125
	1	-21	129	15
	2	15	165	18
	3	123	273	25
10	4	231	381	33
	5	519	669	53
	6	1024	1174	88
	7	1528	1678	123
	1	-4	146	16
	2	32	182	19
	3	142	292	26
20	4	252	402	34
	5	544	694	55
	6	1055	1205	90
	7	1566	1716	126

Conditions:

Approach path angle = 4°

Touchdown, 150 feet forward of flight deck trailing edge

Wing plane 6 feet above deck at touchdown

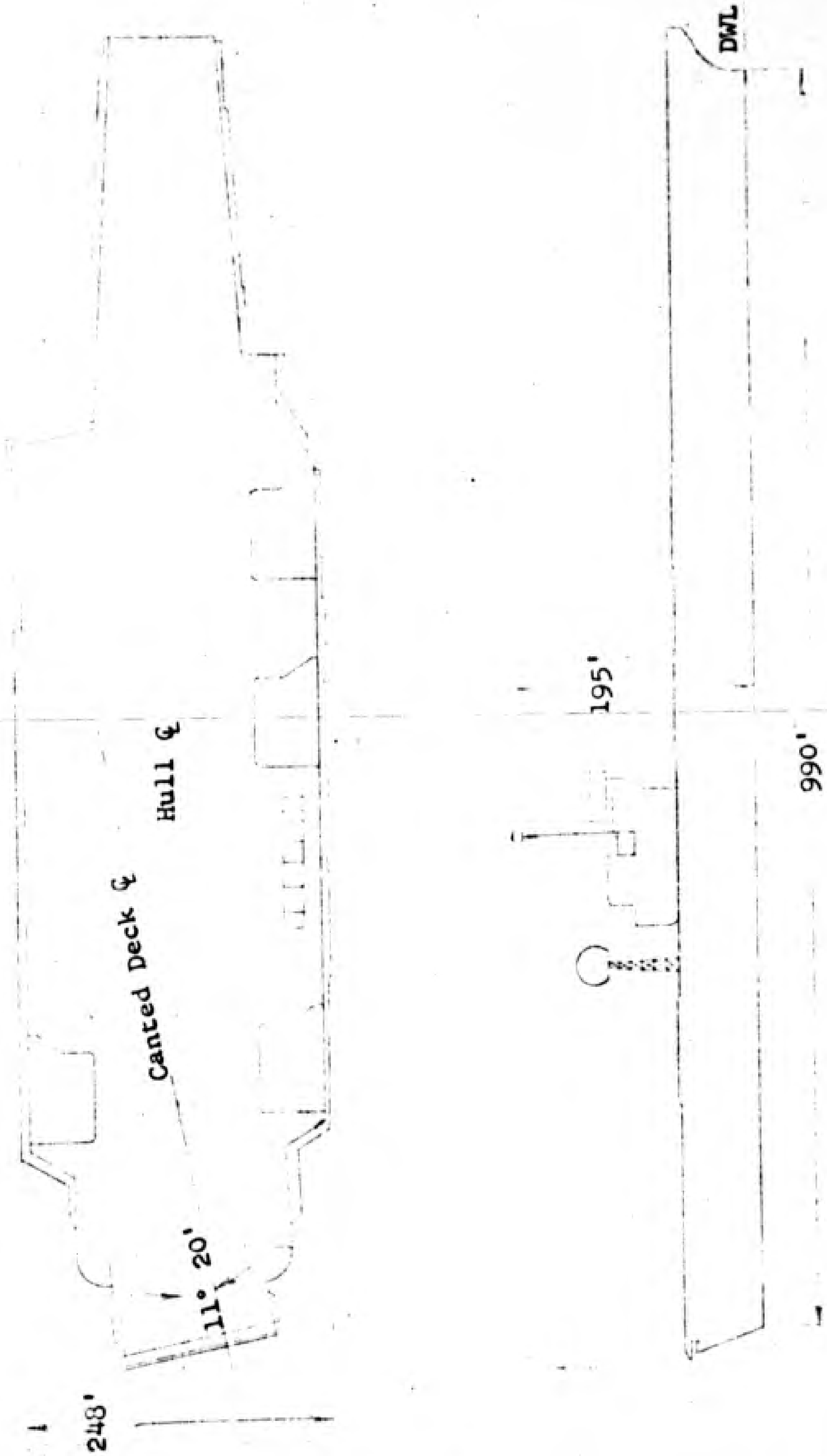


Figure 1 - General Arrangement and Principal Dimensions of the CVA 64 Aircraft Carrier

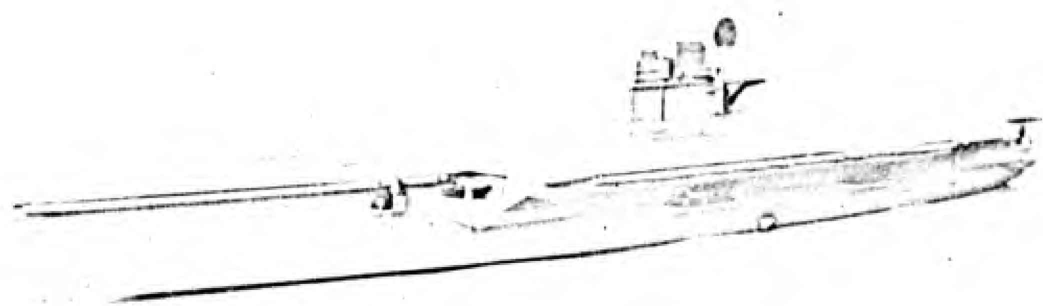


Figure 2 - Three-Quarter Front View of the "Real" Model CVA 64

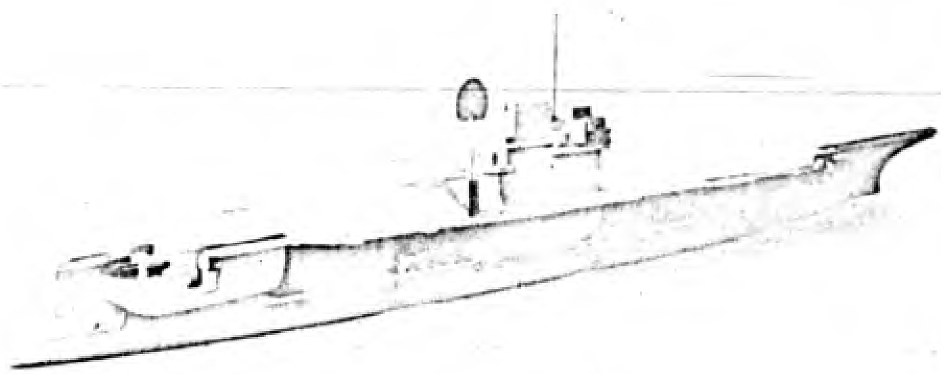


Figure 3 - Three- Quarter Rear View of the "Real" Model CVA 64

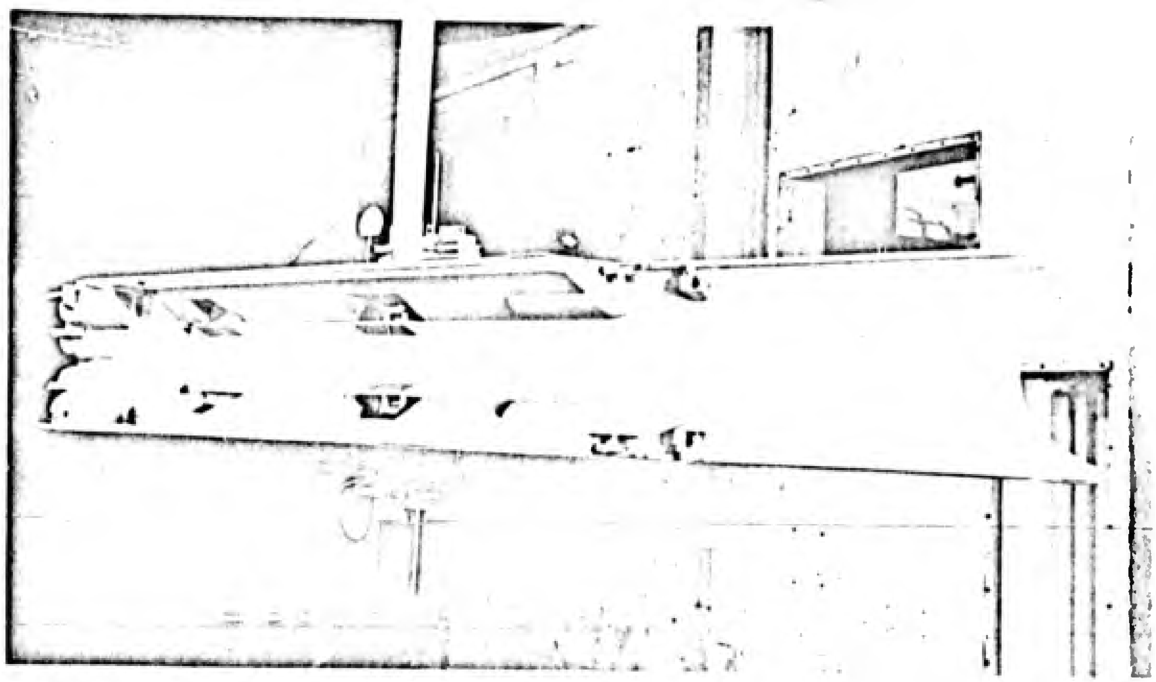


Figure 4 - Three-Quarter Front View of the Survey Rake Installed in the Wind Tunnel With the Model CVA 64

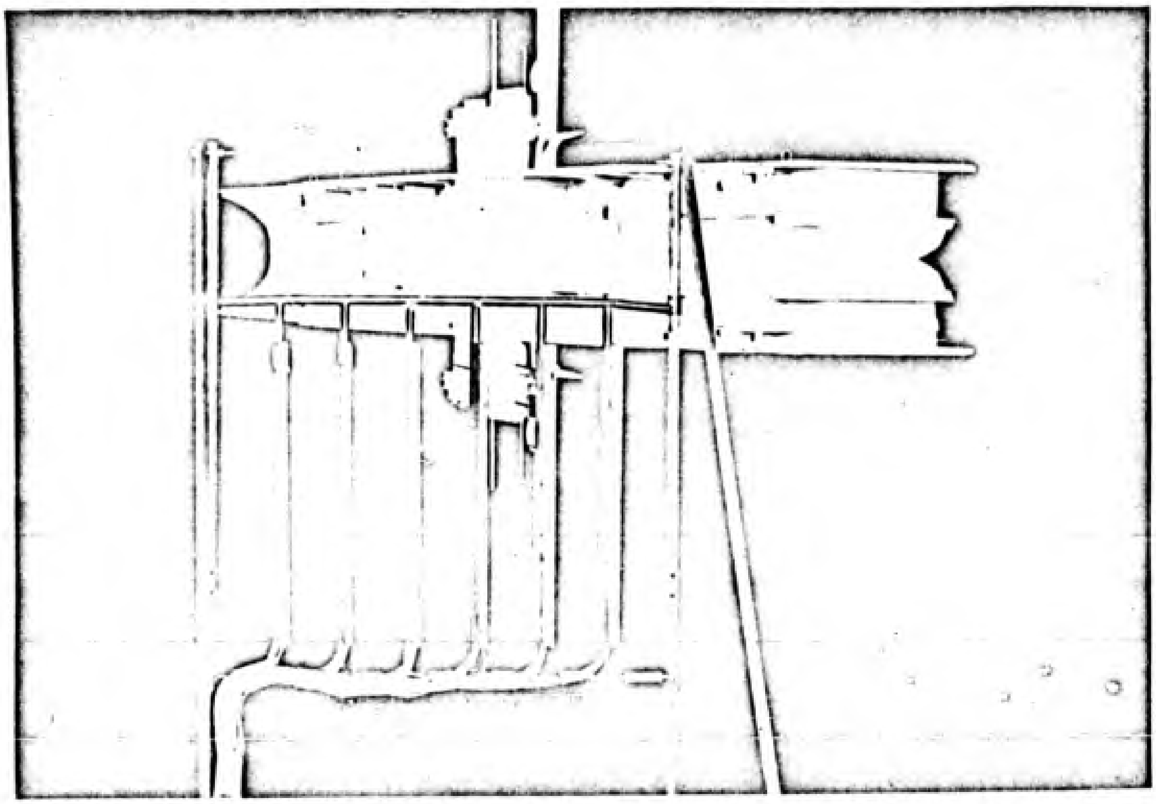
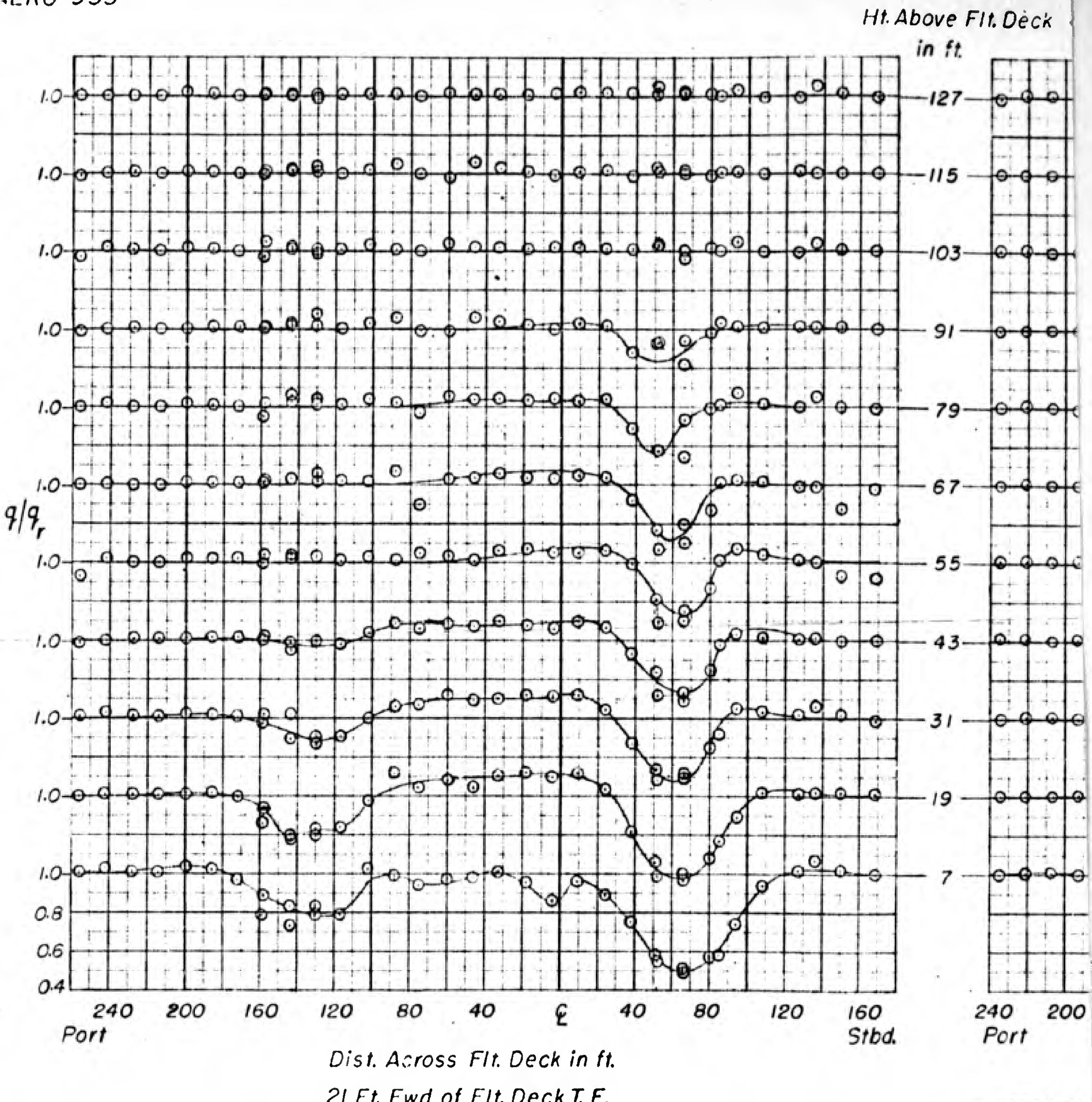


Figure 5 - Three-Quarter Rear View of the Survey Rake Installed in the Wind Tunnel With the Model CVA 64

PSD-68247 May 7, 1957

AERO 955



L LW 15 Dec.'58

1

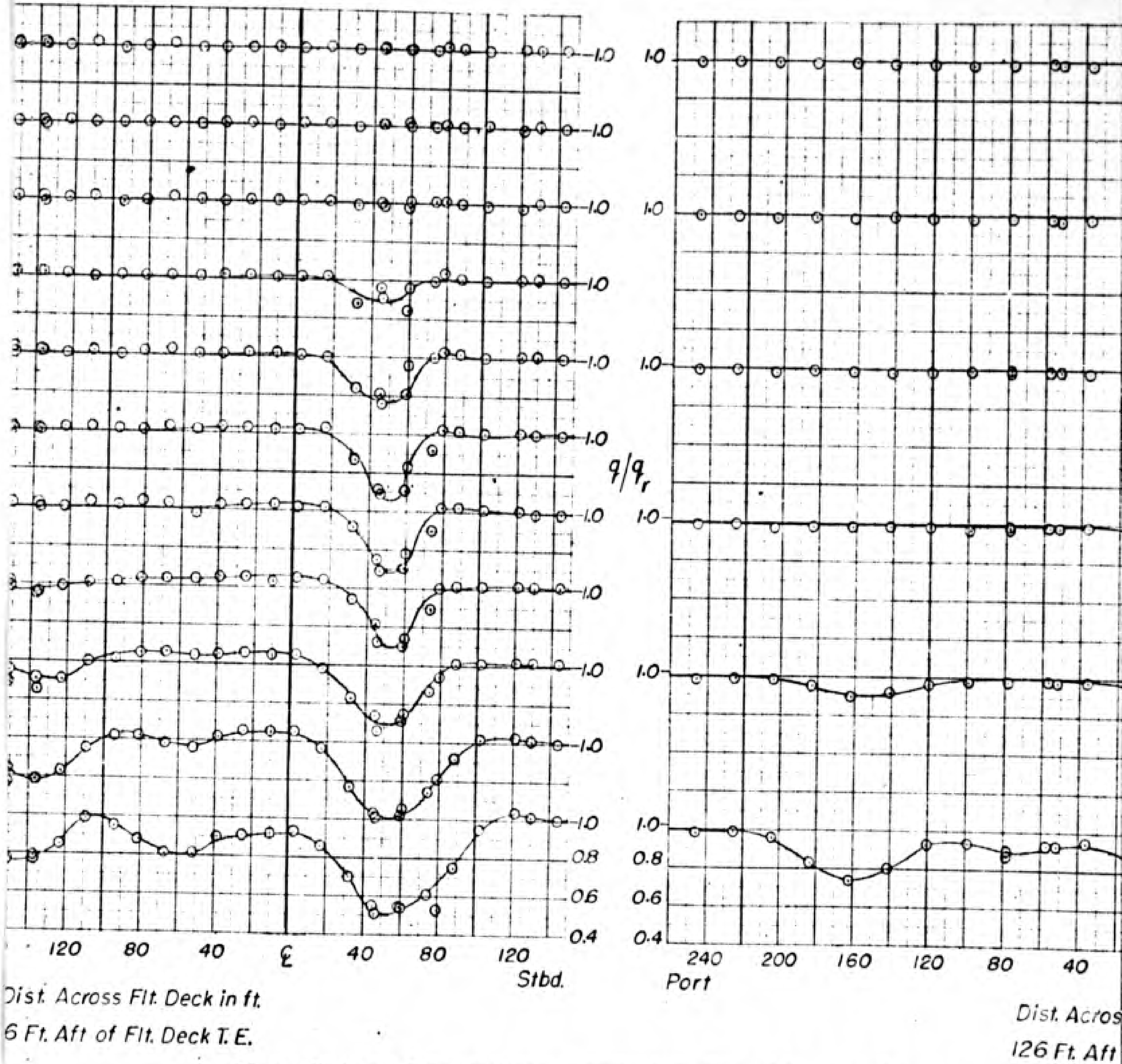
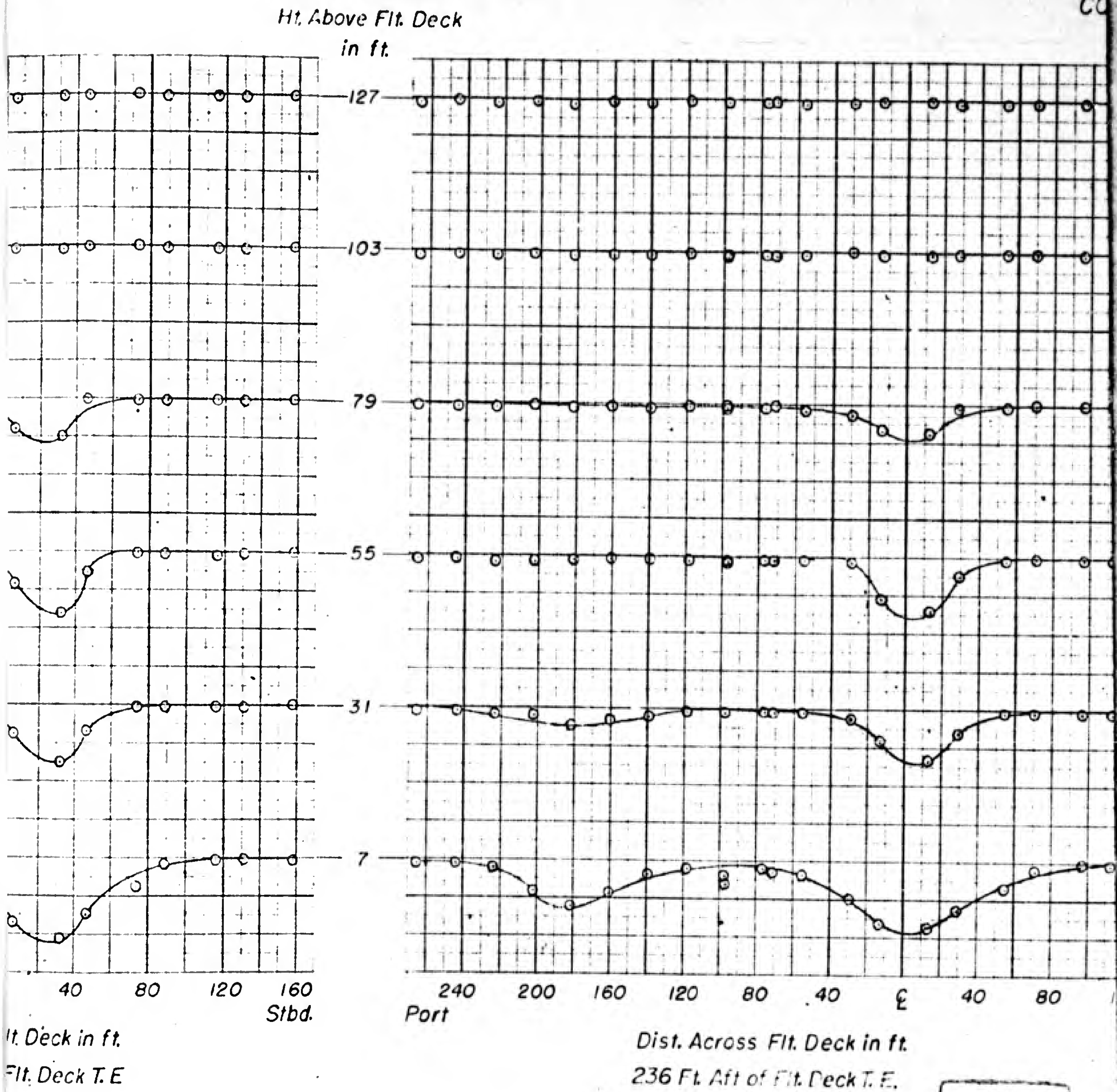


Figure 6—Local Dynamic Pressure Ratios in the Wake of the CVA 64 Model

(a) $\psi = 0°$

CONFIDENTIAL

2


Ht. Above Flt. Deck in ft.
127
103
79
55
31
7
40
80
120
160
Stbd.
240
200
160
120
80
40
℄
40
80
Port
lt. Deck in ft.
Flt. Deck T. E
Dist. Across Flt. Deck in ft.
236 Ft. Aft of Flt. Deck T. E.

CO

3

F

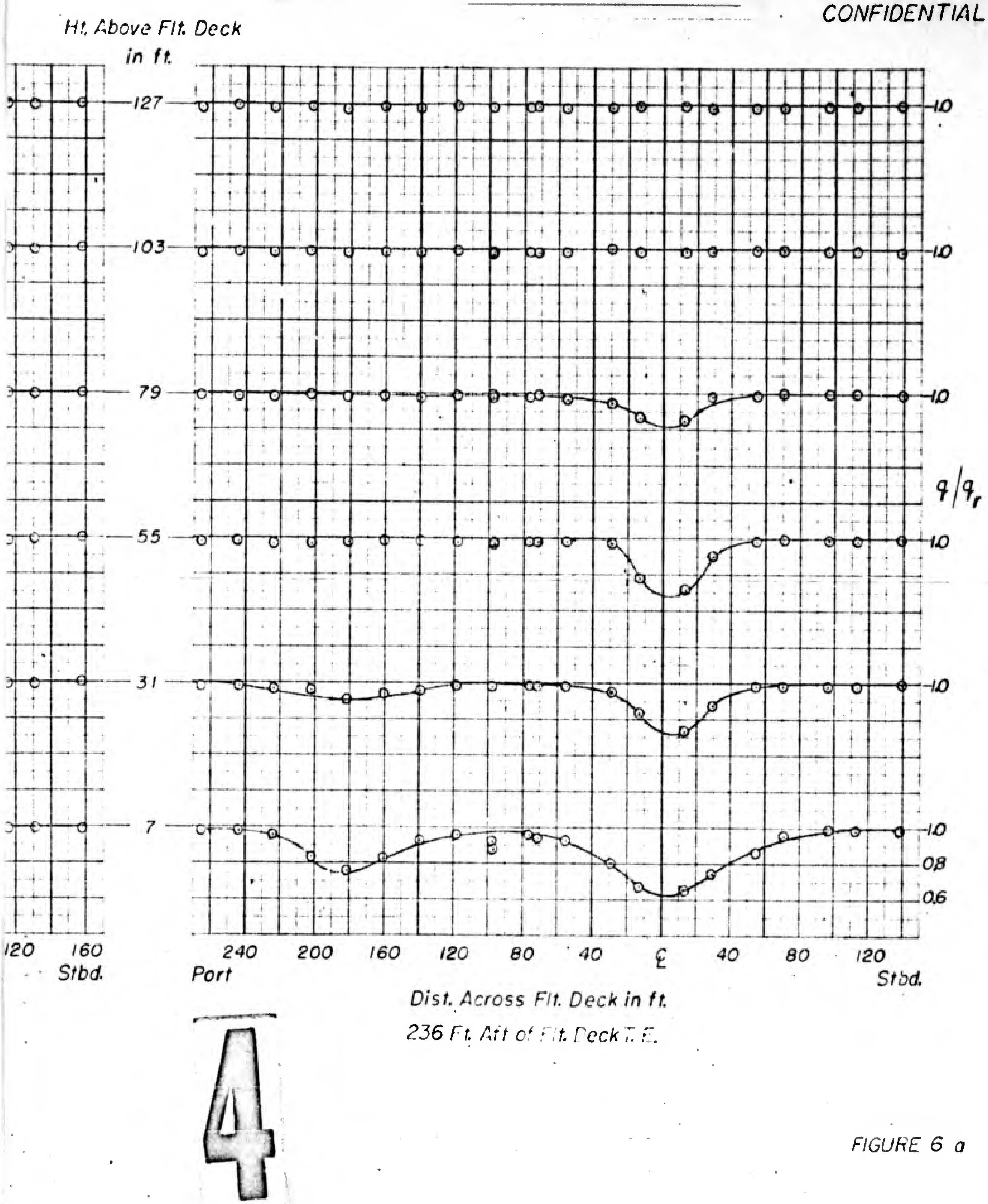
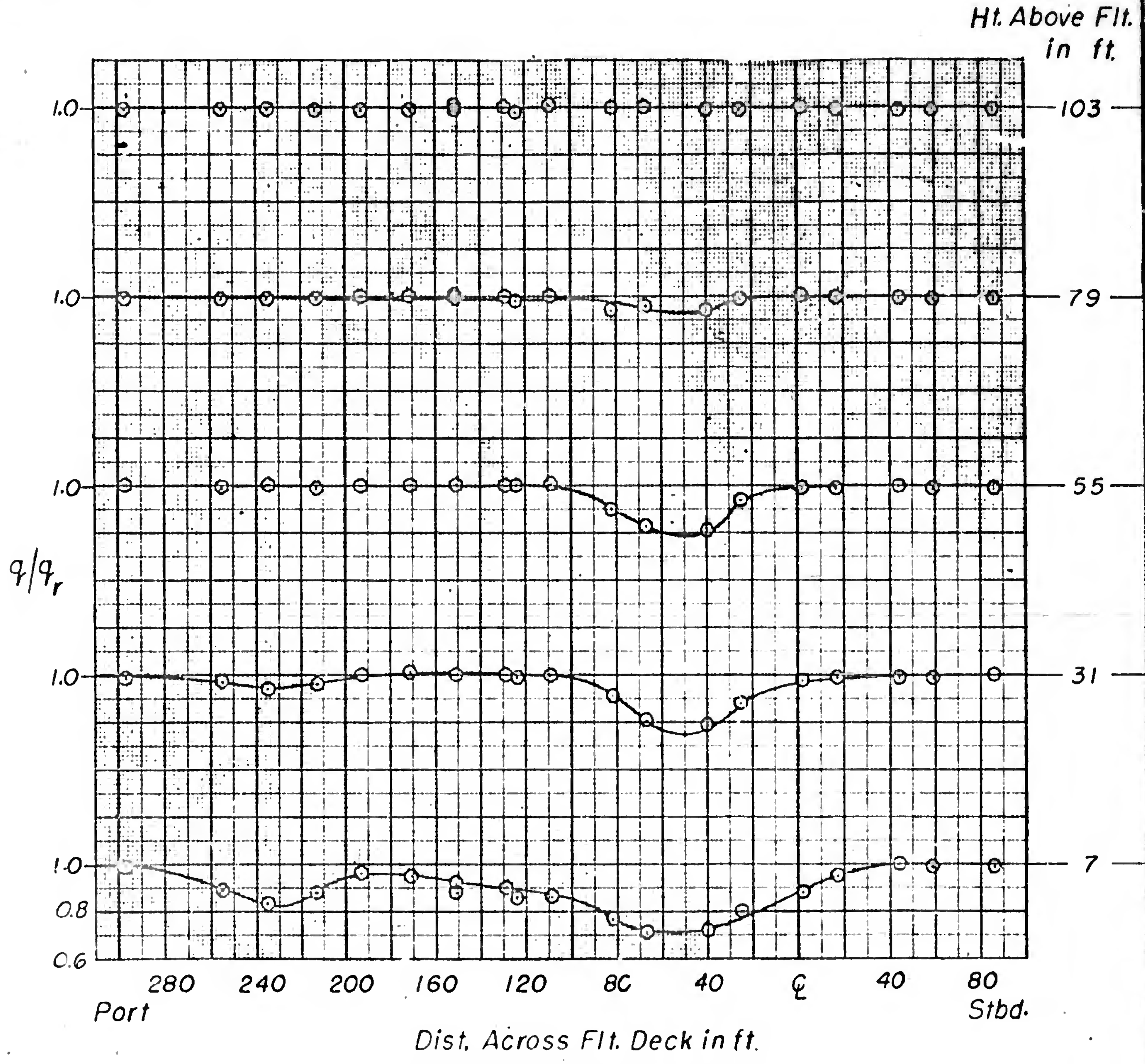

Ht. Above Flt. Deck
in ft.
127
103
79
55
31
7
1.0
0.8
0.6
q/q_r
120
160
Stbd.
240
200
160
120
80
40
℄
40
80
120
Port
Stbd.
Dist. Across Flt. Deck in ft.
236 Ft. Aft of Flt. Deck T. E.
4

FIGURE 6 a

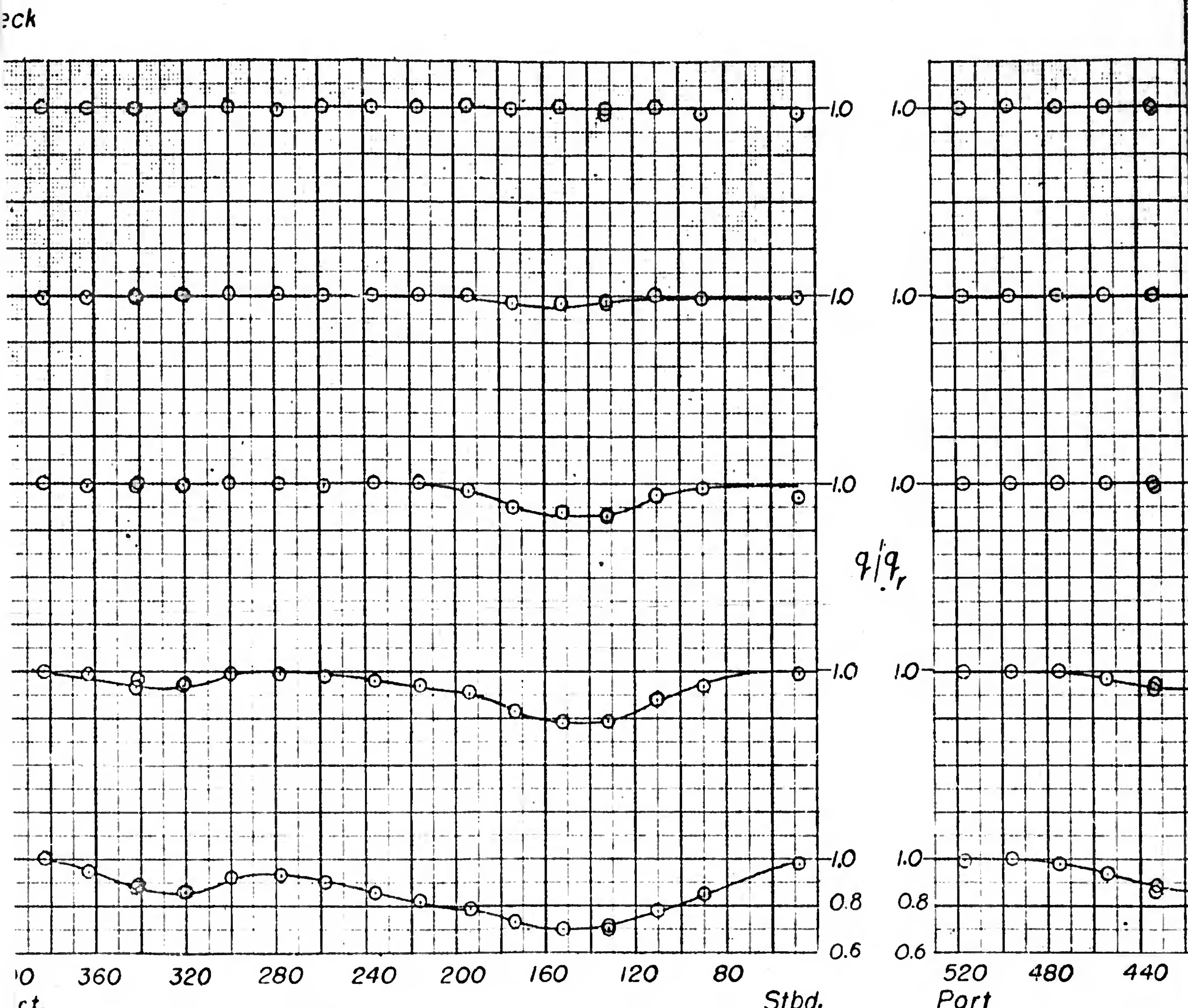
AERO 955



530 Ft. Aft of Flt. Deck T.E.

LLW 12 Dec '58

1



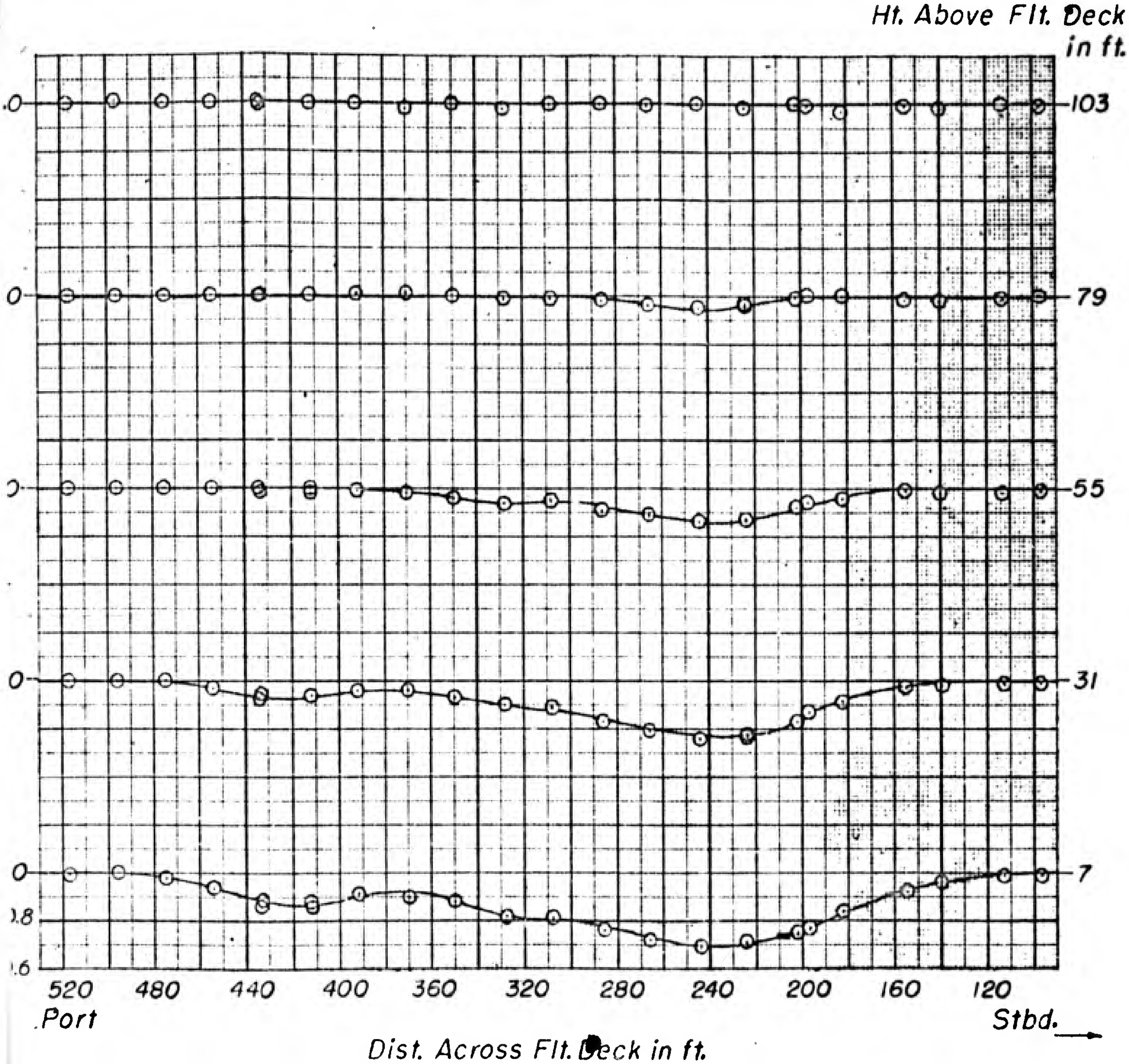
Dist. Across Flt. Deck in ft.

1044 Ft. Aft of Flt. Deck T. E.

Figure 6 (Continued)

(a) Concluded

2

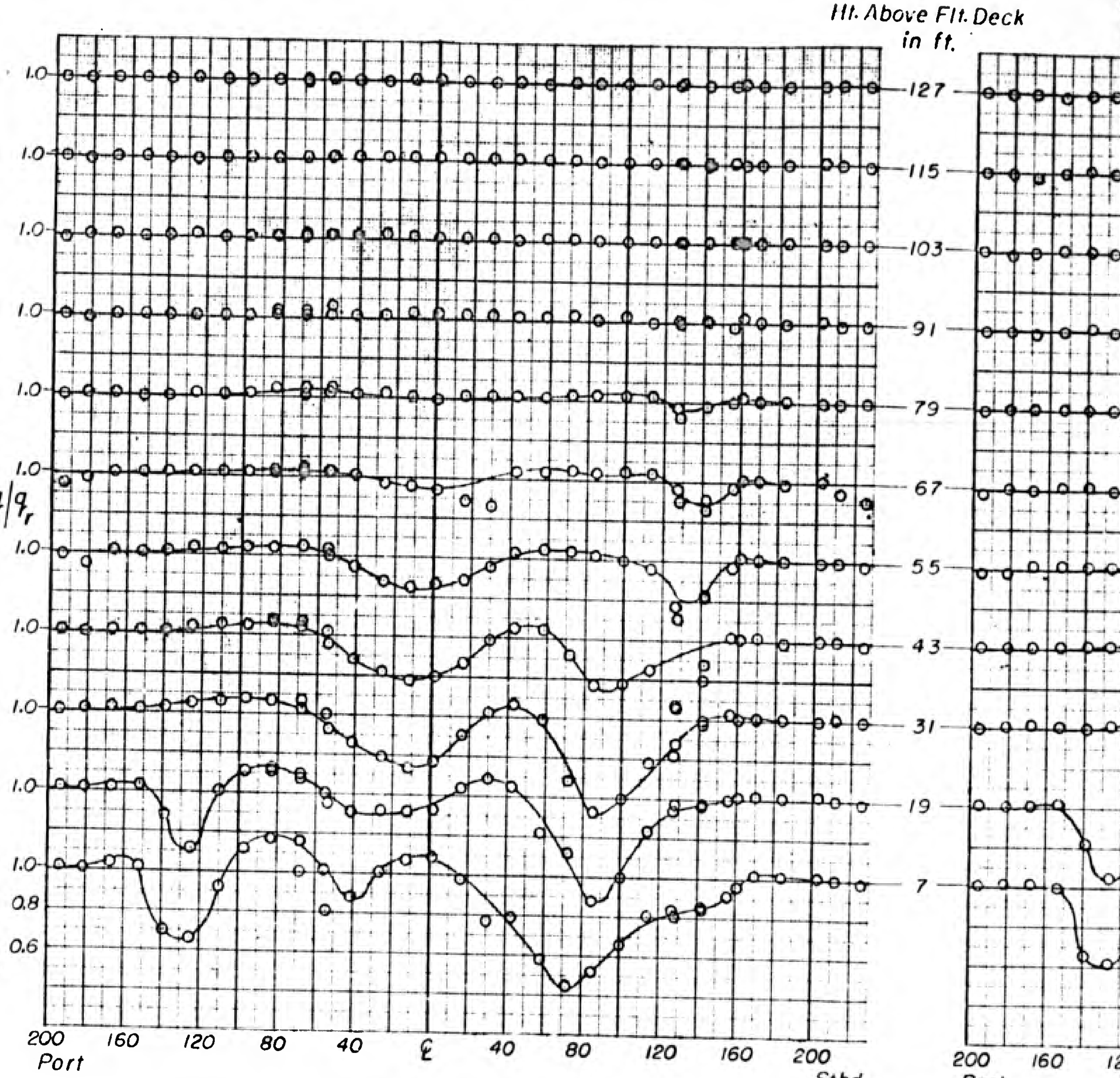


1558 Ft. Aft of Flt. Deck T.E.

3

FIGURE 6 a (concl)

AERO 955

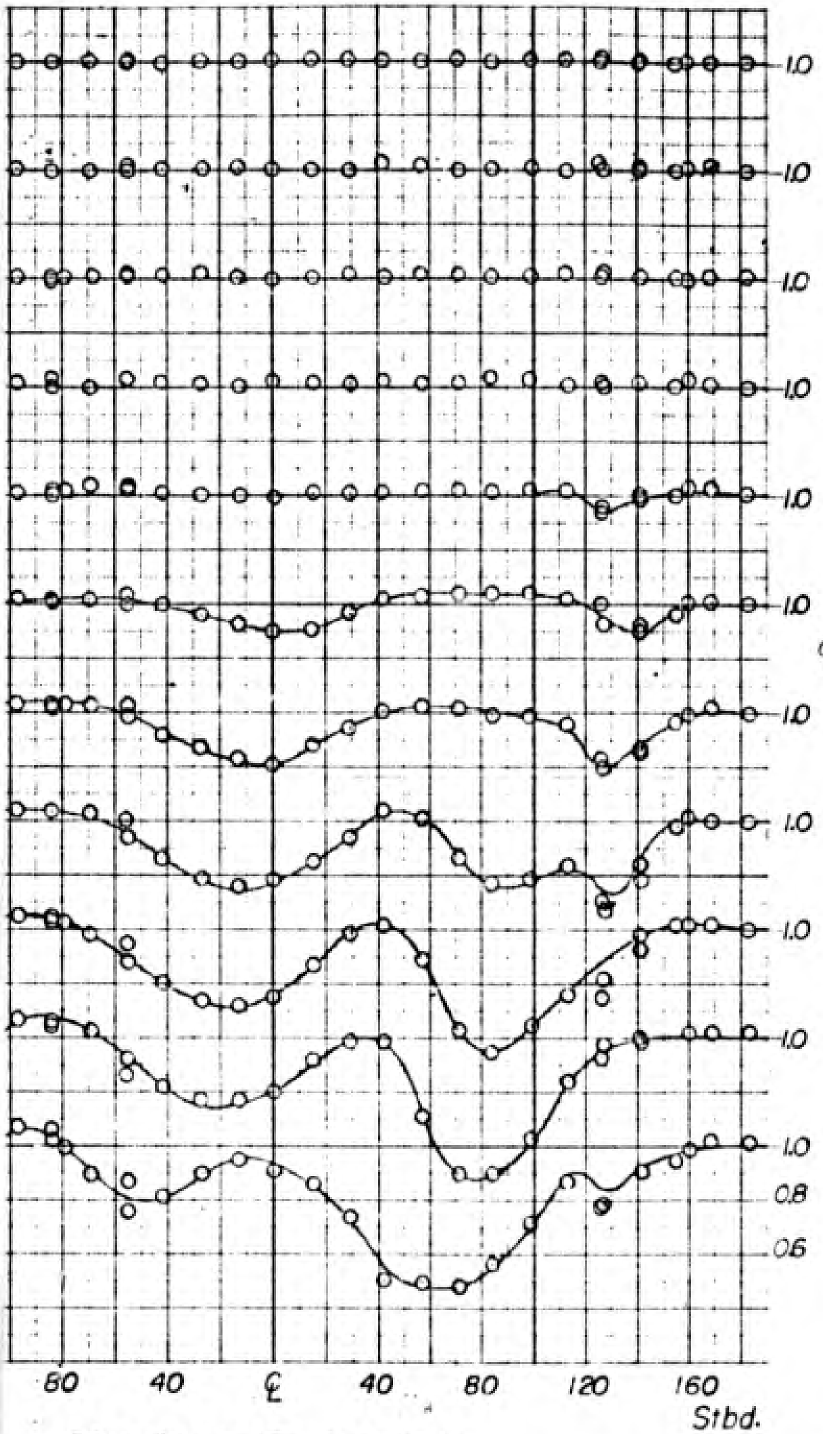


Dist. Across Flt. Deck in ft.

21 Ft. Fwd of Flt. Deck T. E.

JKM 13 Jan '58

1



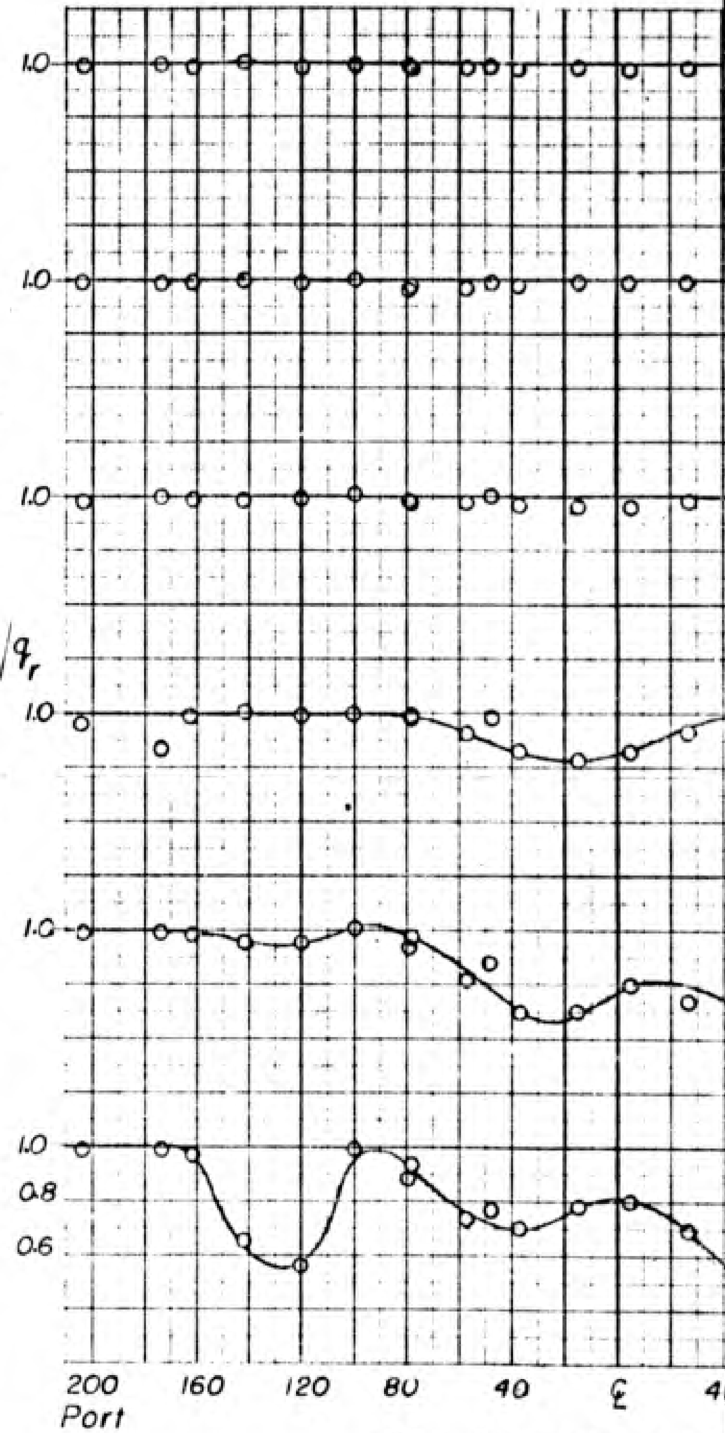
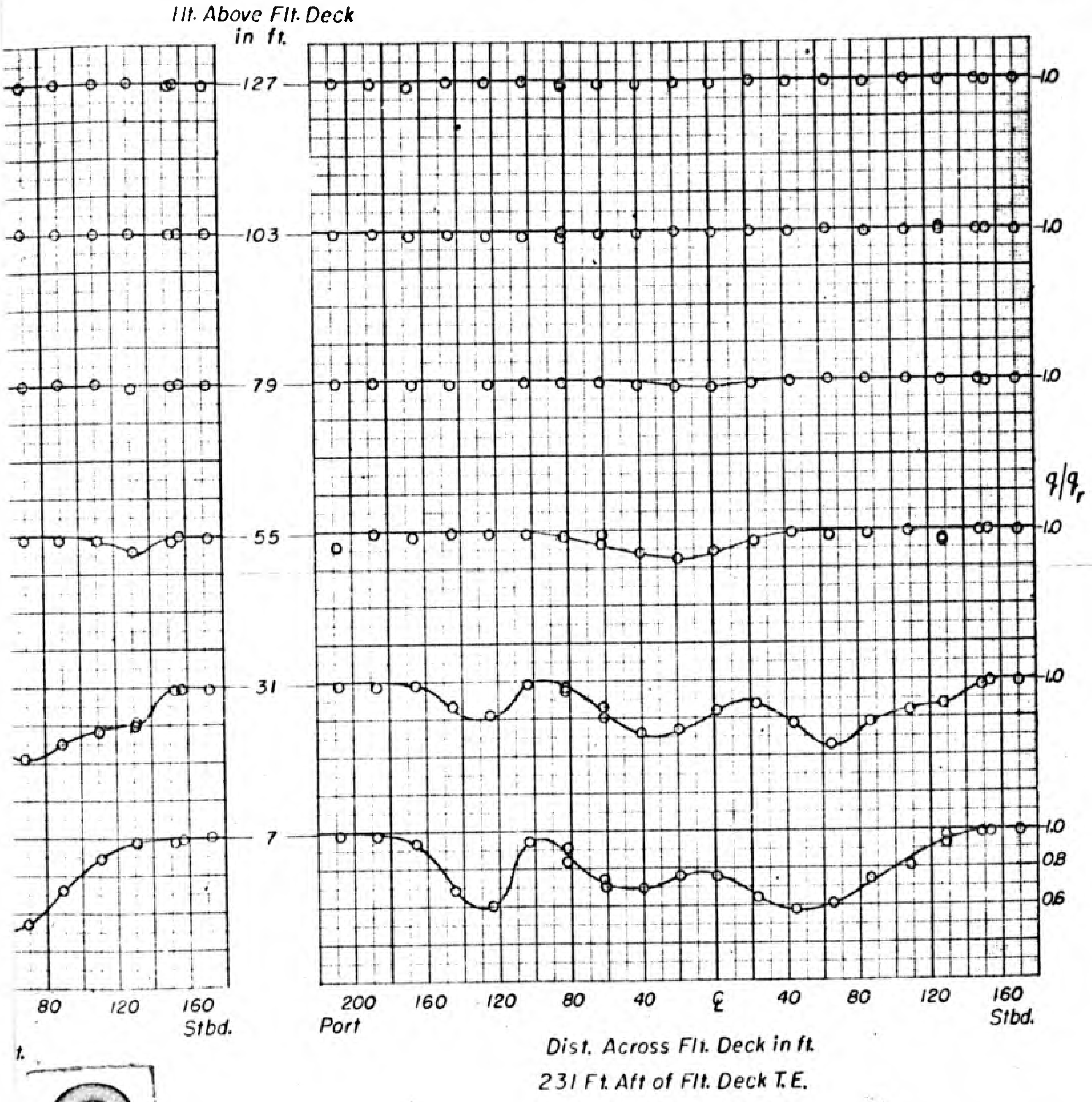


Figure 6 (Continued)

(b) $\psi = 10°$

2

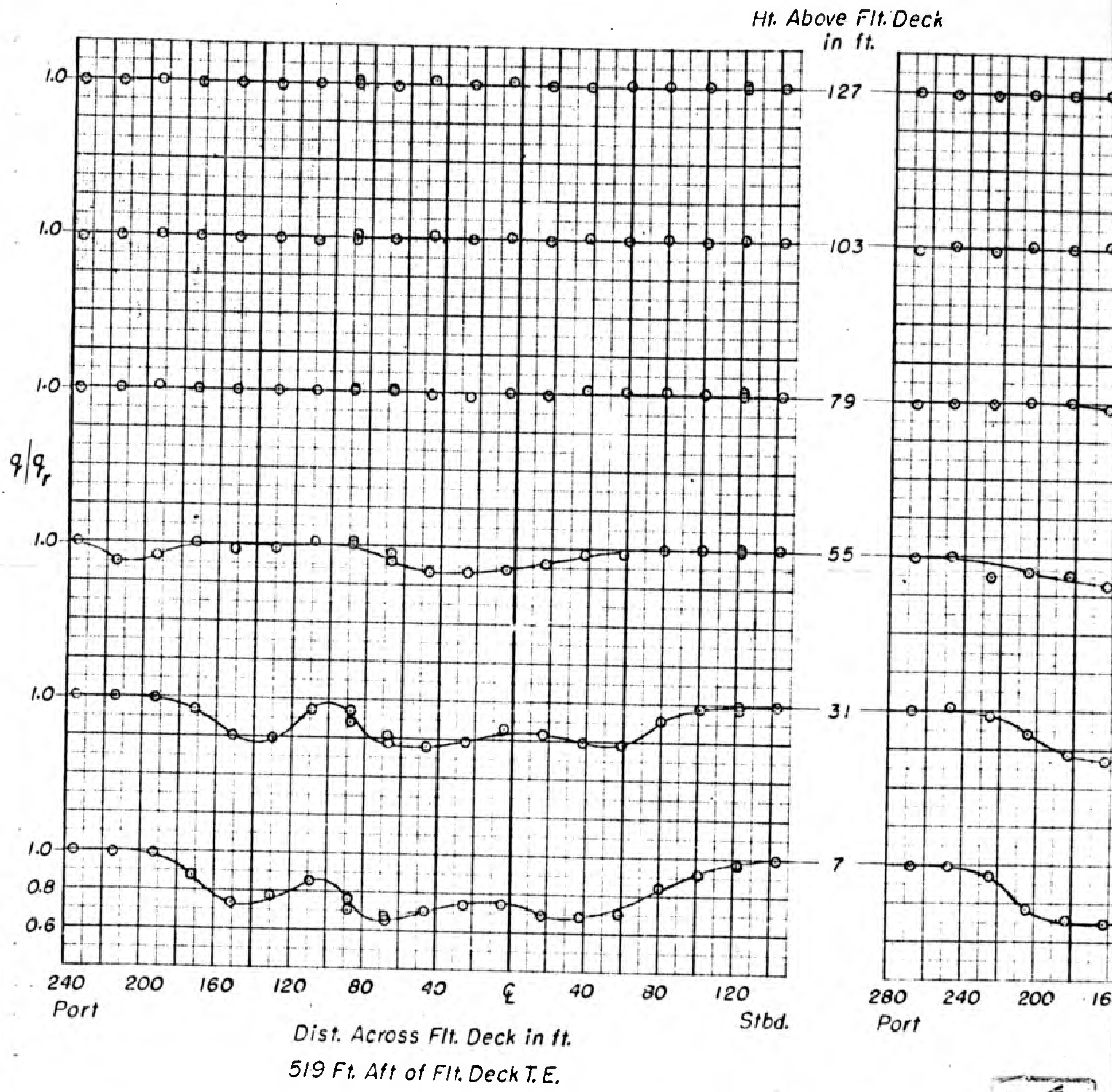
CONFIDENTIAL


Ht. Above Flt. Deck in ft.
127
103
79
55
31
7
1.0
0.8
0.6
q/q_r
80 120 160 Stbd.
200 Port 160 120 80 40 ℄ 40 80 120 160 Stbd.
Dist. Across Flt. Deck in ft.
231 Ft. Aft of Flt. Deck T.E.
t.

3

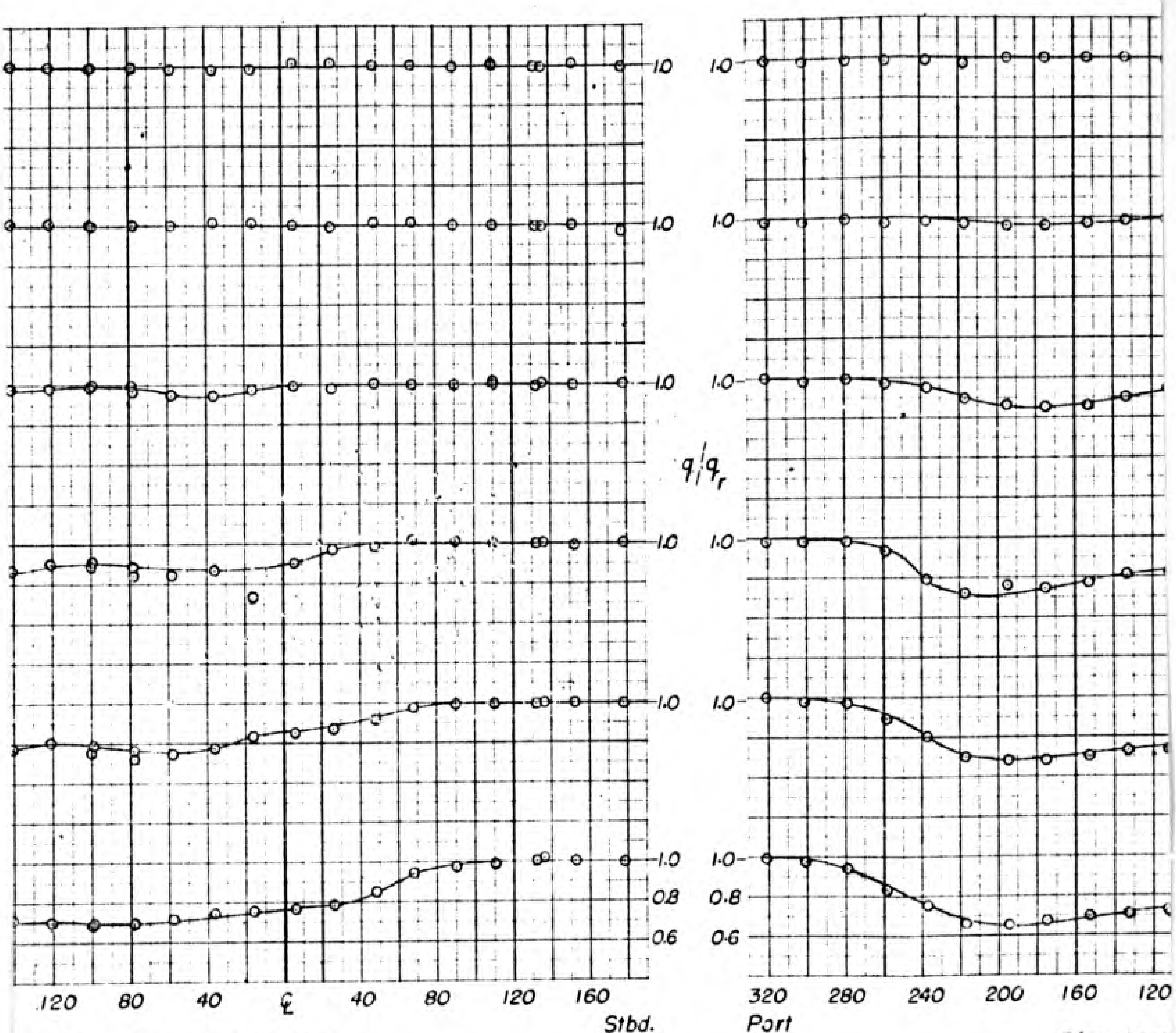
FIGURE 6b

AERO 955



1CA 13 Jan '58

1



Dist. Across Flt. Deck in ft.

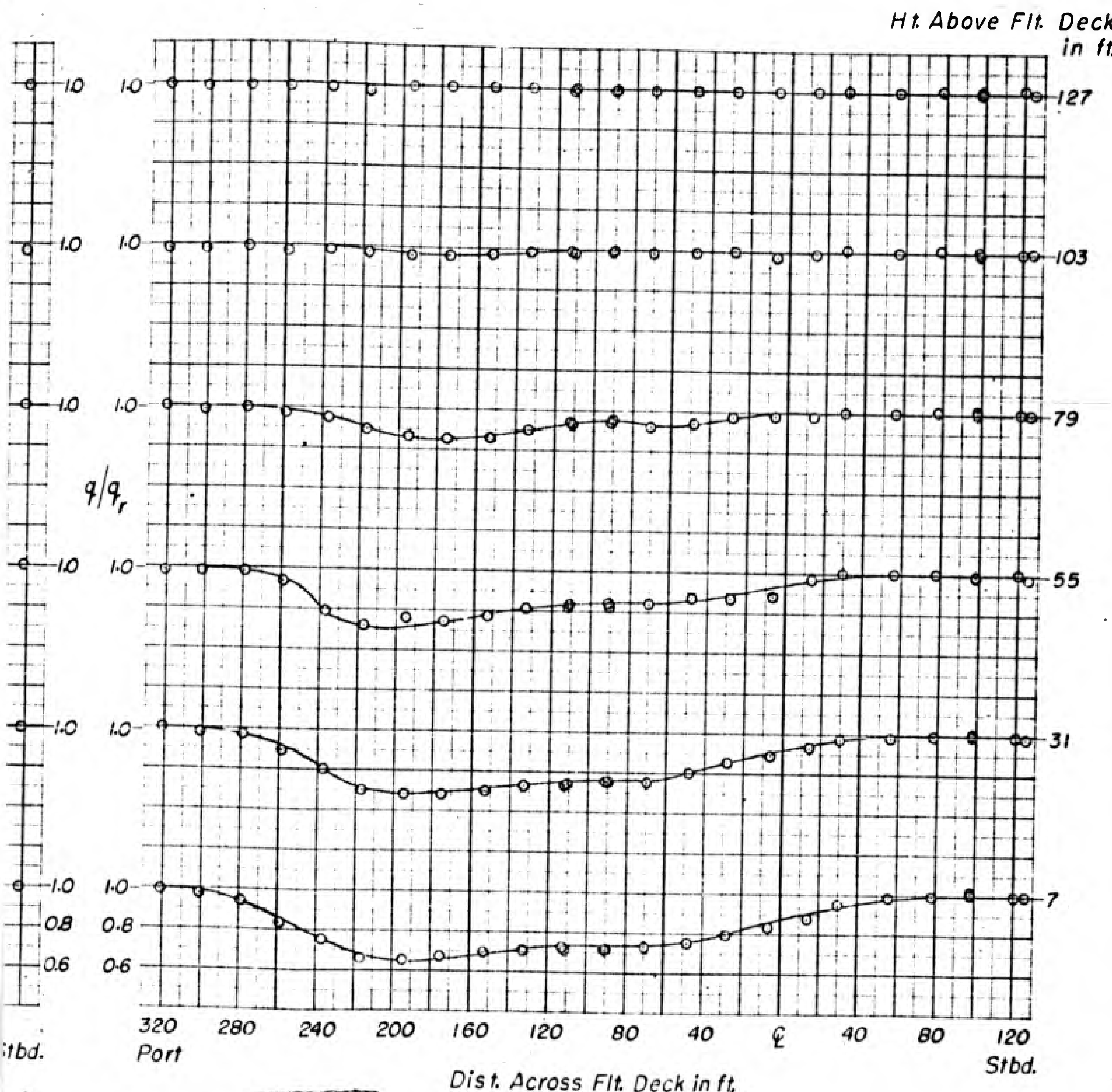
1024 Ft. Aft of Flt. Deck T.E.

Dist. Acro

1528 Ft. Aft

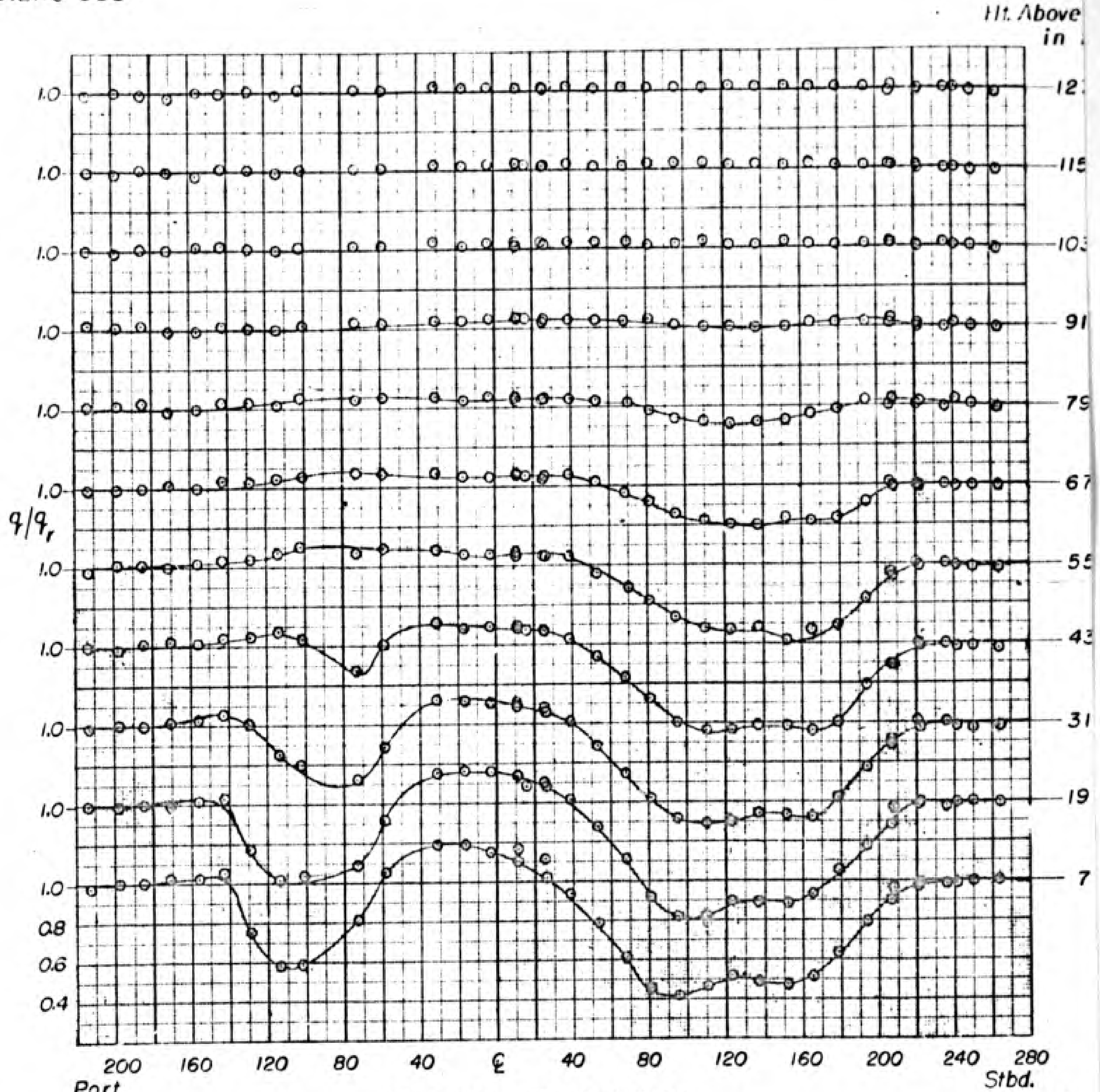
Figure 6 (Continued)
(b) Concluded

CONFIDENTIAL



3

FIGURE 6 b (c cl)

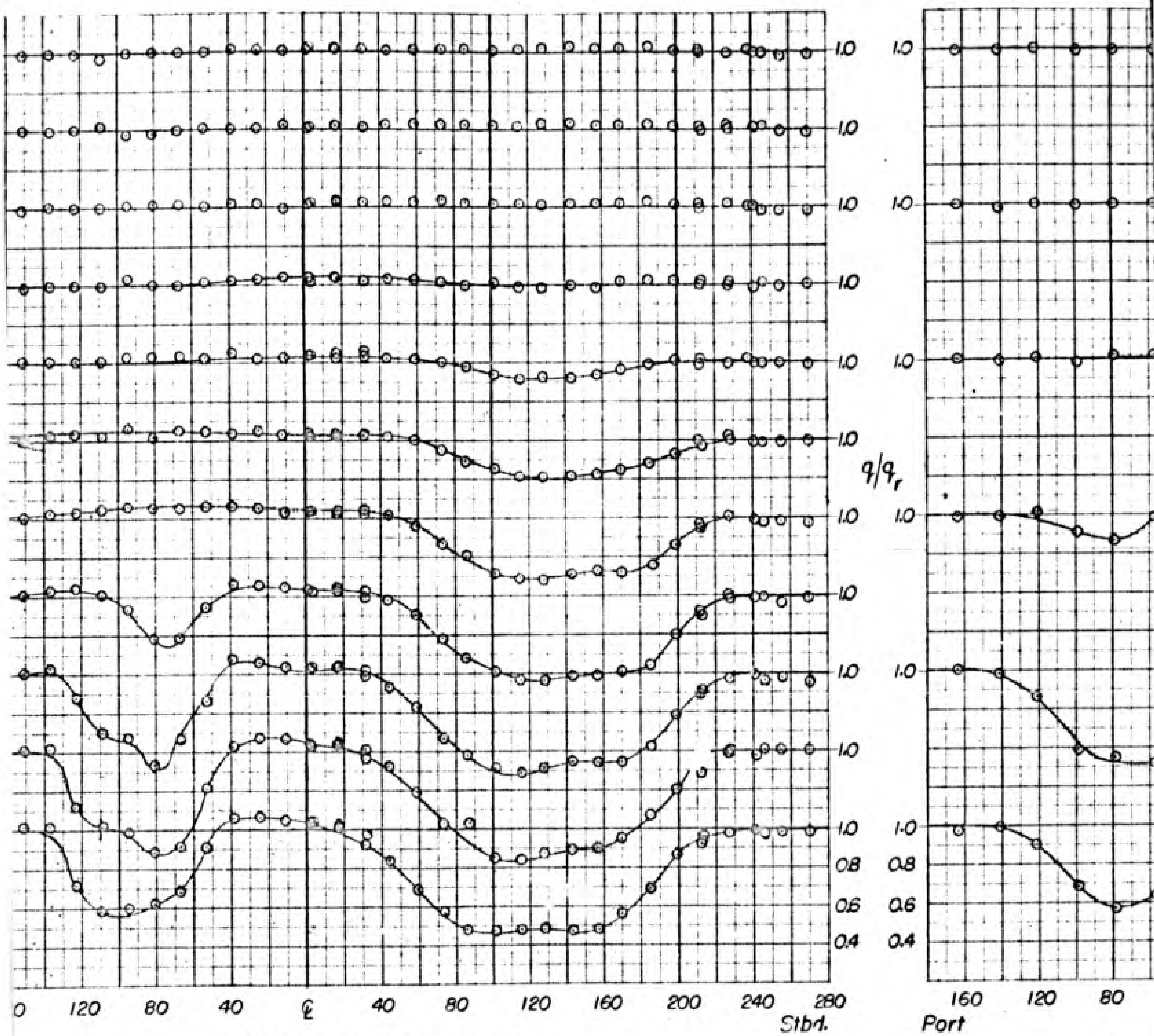


Dist. Across Flt. Deck in ft.
4 Ft. Fwd of Flt. Deck T. E.

MCA 29 Dec'58

1

ck



Dist. Across Flt. Deck in ft.

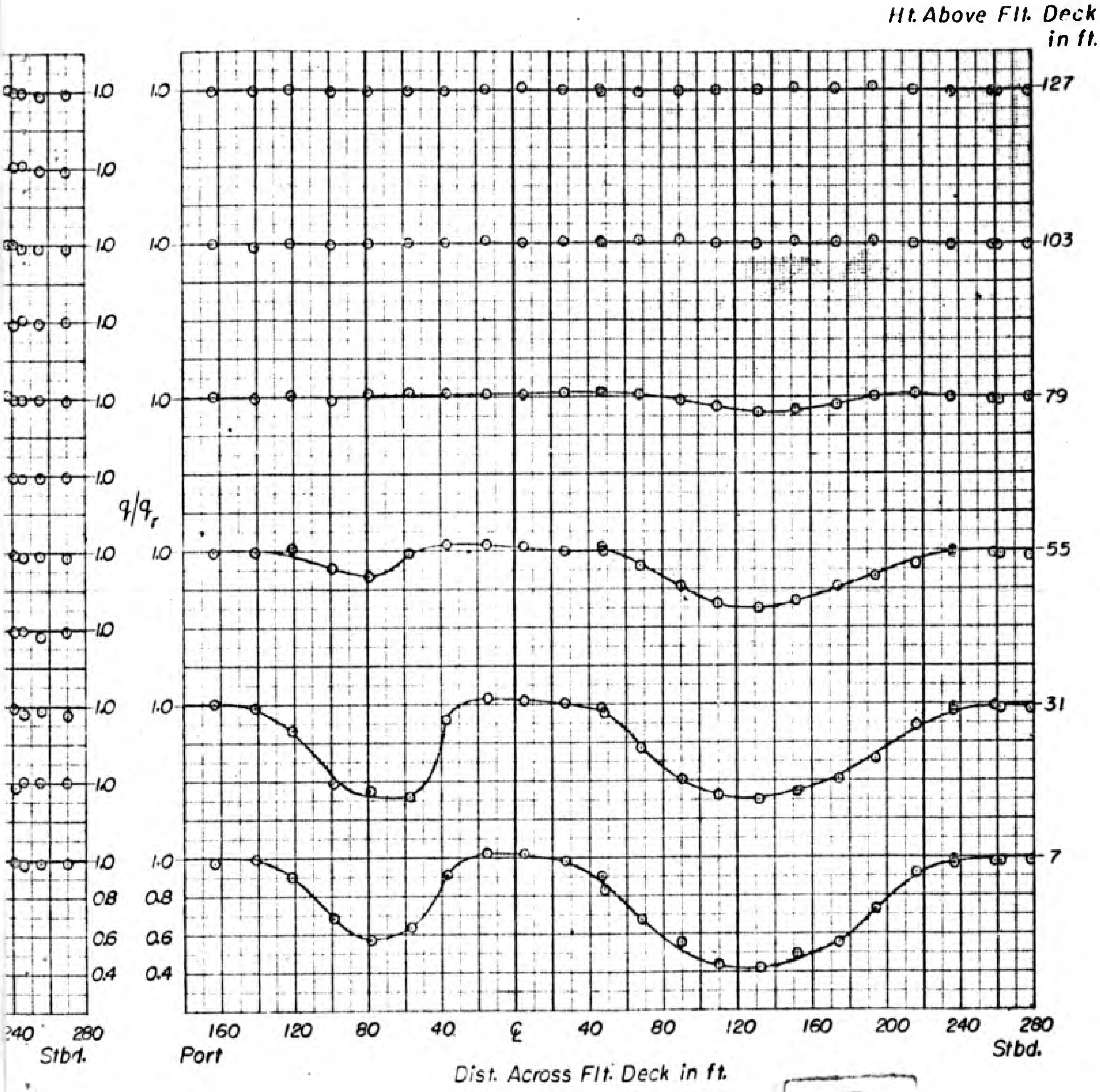
32 Ft. Aft of Flt. Deck T. E.

Figure 6 (Continued)

(c) $\psi = 20°$

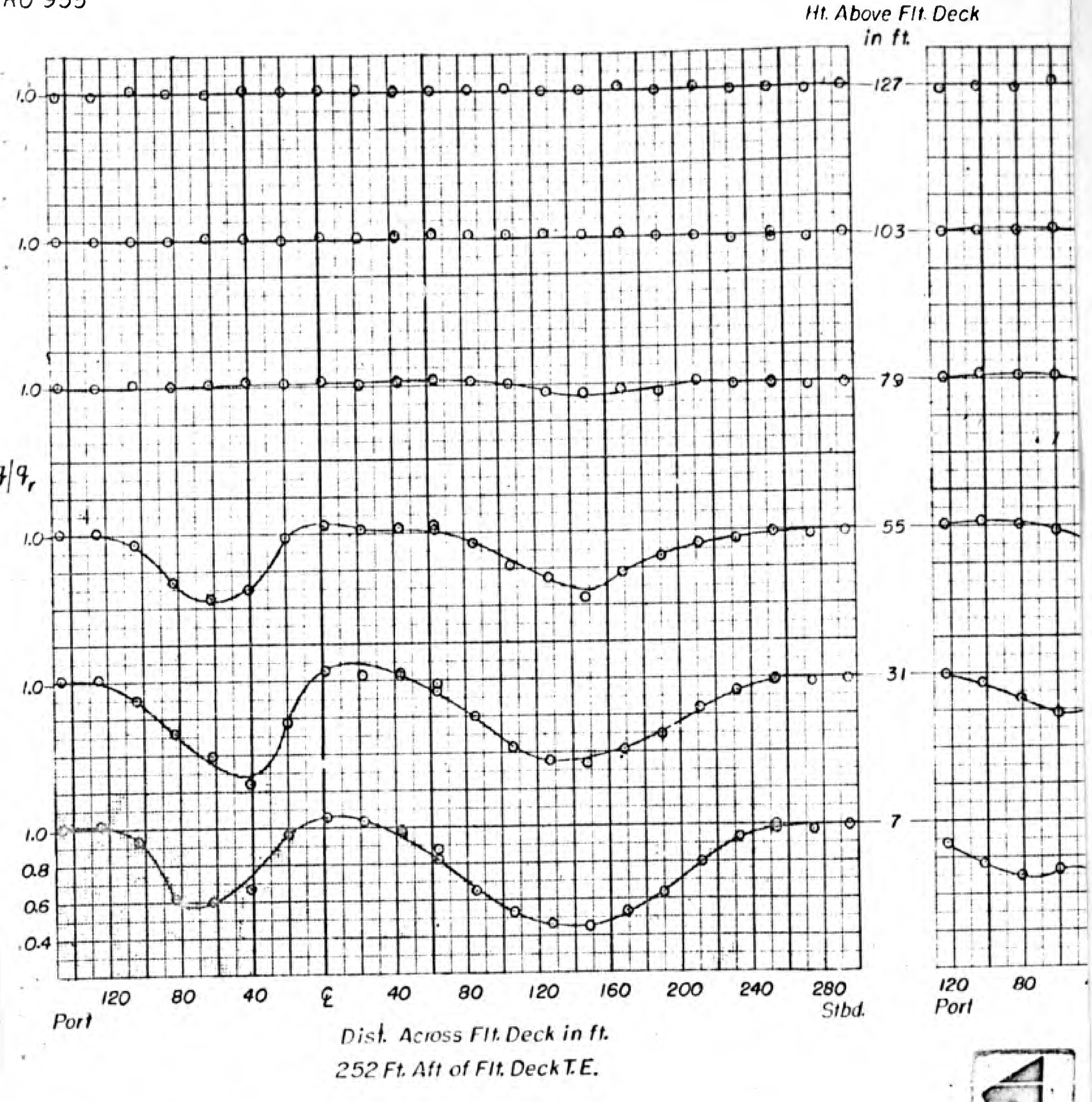
CONFIDENTIAL

2


Ht. Above Flt. Deck in ft.
127
103
79
55
31
7
1.0
0.8
0.6
0.4
q/q_r
240
280
Stbd.
160
120
80
40
℄
40
80
120
160
200
240
280
Port
Stbd.
Dist. Across Flt. Deck in ft.
142 Ft. Aft of Flt. Deck T.E.

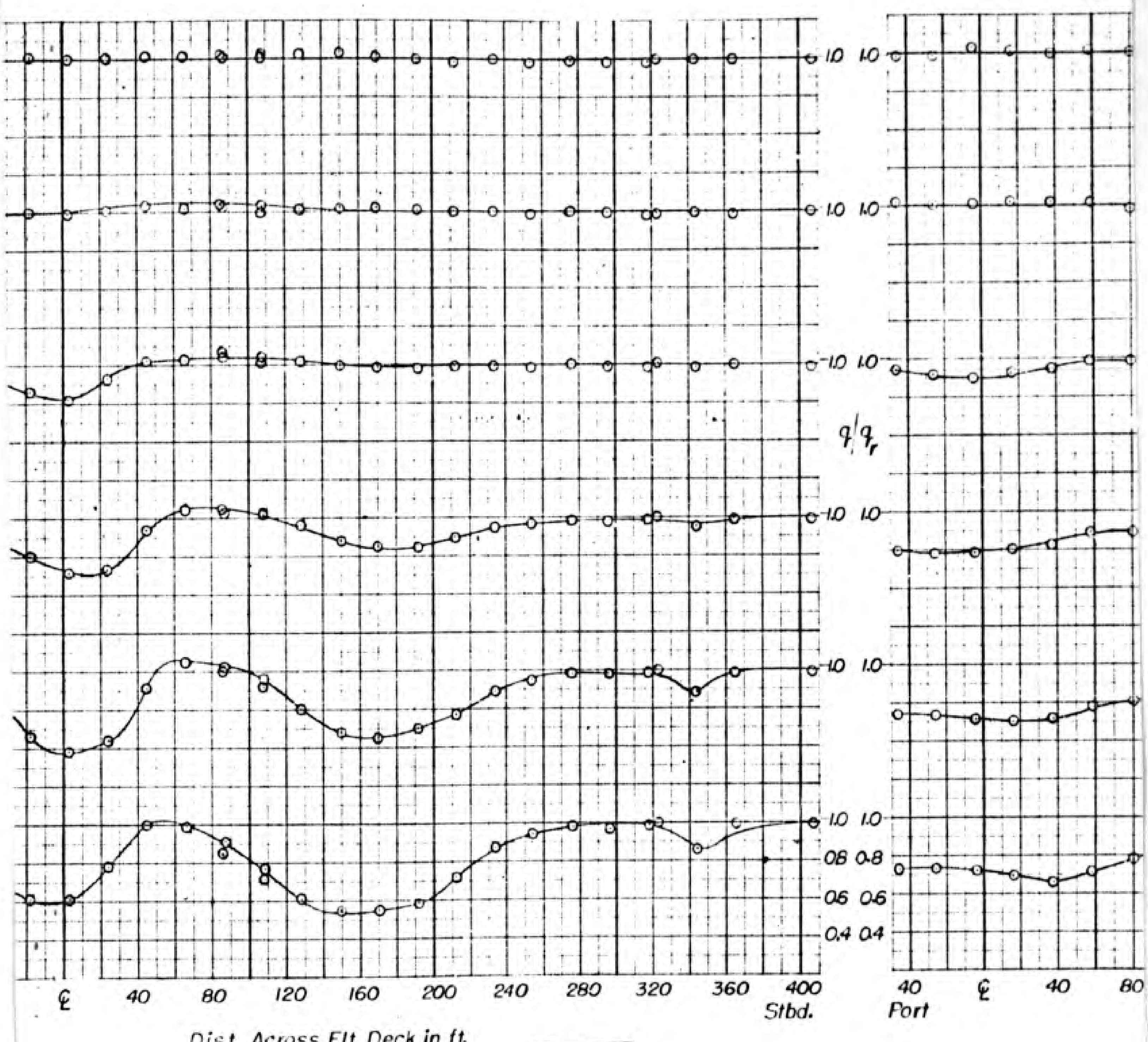
3

FIGURE 6c


Ht. Above Flt. Deck in ft.
127
103
79
55
31
7
q/q_r
1.0
0.8
0.6
0.4
120
80
40
℄
160
200
240
280
Port
Stbd.
Dist. Across Flt. Deck in ft.
252 Ft. Aft of Flt. Deck T.E.

1

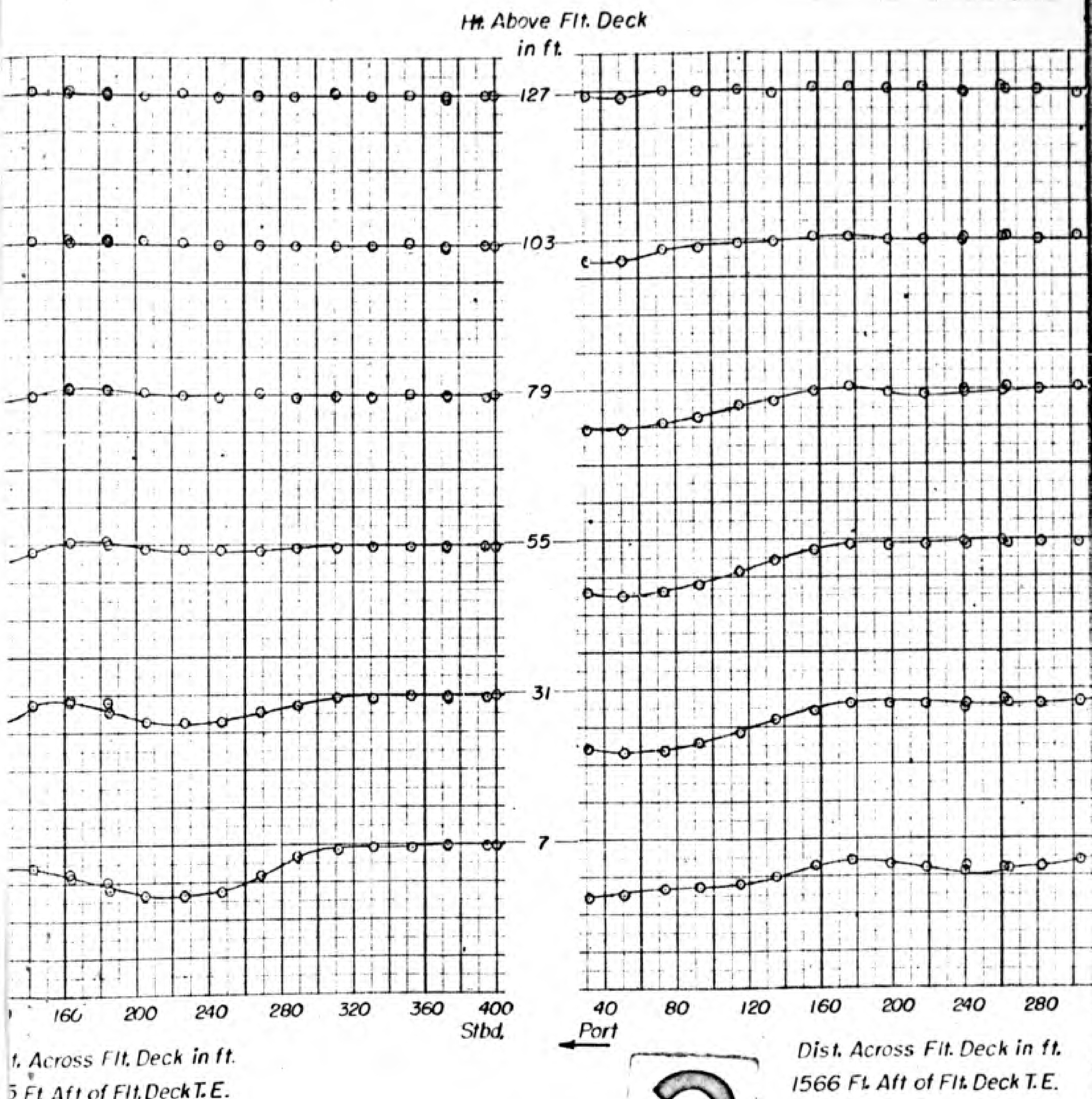
CA 23 Dec.'58



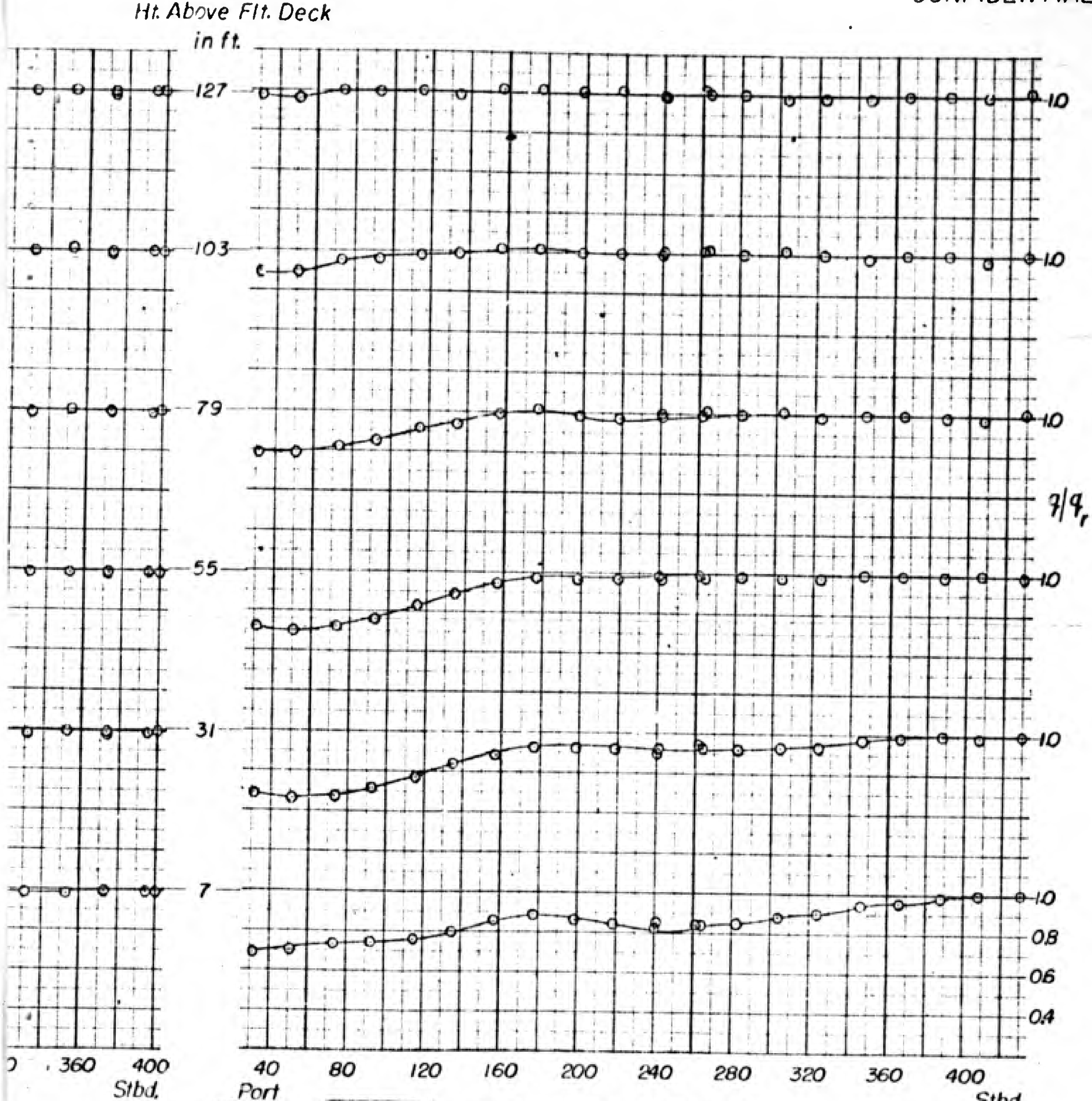
2

Figure 6 (Concluded)
(c) Concluded

CONFIDENTIAL


Ht. Above Flt. Deck in ft.
127
103
79
55
31
7
160 200 240 280 320 360 400
Stbd.
40 80 120 160 200 240 280
Port
t. Across Flt. Deck in ft.
5 Ft. Aft of Flt. Deck T.E.
Dist. Across Flt. Deck in ft.
1566 Ft. Aft of Flt. Deck T.E.

3



Dist. Across Flt. Deck in ft.
1566 Ft. Aft of Flt. Deck T. E.

4

FIGURE 6 c (concl)

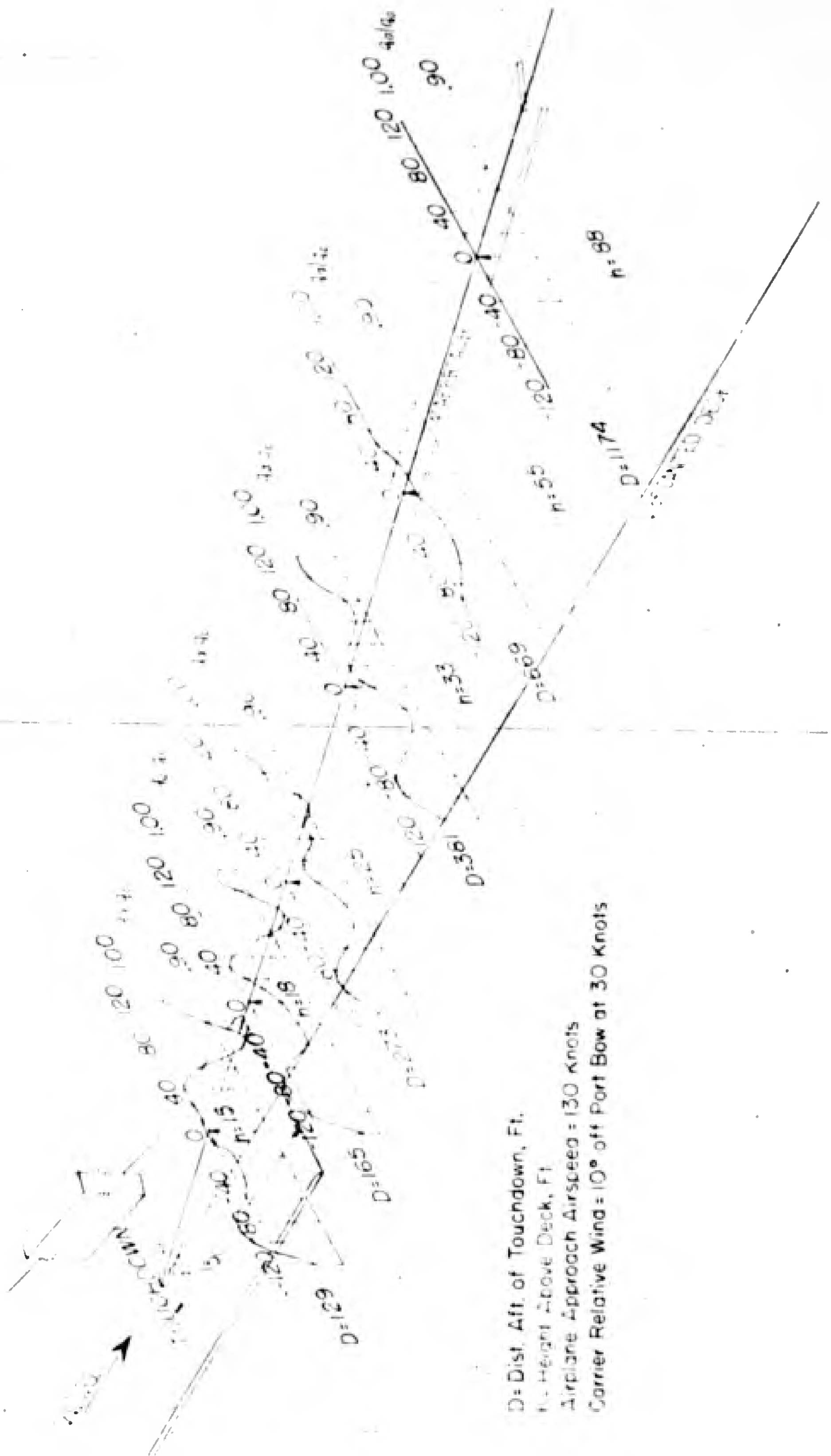


Figure 7- Local Dynamic Pressure Ratios Encountered by an Airplane Approaching for a Landing on the CVA 64 Along a Four-Degree Glide Pattern

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aft-most station surveyed was at 1566 ft. In general, discussion confined to glide path area.

CONFIDENTIAL

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aft-most station surveyed was at 1566 ft. In general, discussion confined to glide path area.

CONFIDENTIAL

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aft-most station surveyed was at 1566 ft. In general discussion confined to glide path area.

CONFIDENTIAL

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aft-most station surveyed was at 1566 ft. In general discussion confined to glide path area.

CONFIDENTIAL

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

UNCLASSIFIED

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general, discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE
I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general, discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE
I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE
I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074
WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE
I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

UNCLASSIFIED

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074

WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general, discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074

WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general, discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074

WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 630-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3

DTMB Aero Rpt 955 Pt. 3

David Taylor Model Basin. Rpt C-1074

WIND-TUNNEL TESTS TO DETERMINE THE AIR-FLOW CHARACTERISTICS IN THE WAKES OF THREE AIRCRAFT CARRIER MODELS. PT. 3: TESTS OF THE ATTACK CARRIER CVA 64 (Title Unclassified), by Herbert E. White. Wash., Jun 1959. [2]19 l. incl. illus. 3 refs. (Aerodynamics Lab. Aero Rpt 955 Pt. 3. Aero Problem 650-400). CONFIDENTIAL

BuShips Project NS 715-103.

1/144-scale waterline model and "mirror image" was tested at yaw angles of 0°, 10° and 20°. Aftmost station surveyed was at 1566 ft. In general discussion confined to glide path area.

[redacted]

1. AIRCRAFT CARRIERS--AIRFLOW
2. AIRCRAFT CARRIERS (CVA 64)
3. AIRCRAFT CARRIERS--WAKE
4. AIRCRAFT CARRIERS--DECKS, CANTED
5. DECK FLYING
6. WIND TUNNEL TESTS--IMAGE SYSTEMS
7. FLIGHT PATHS, GLIDE

I. White, Herbert E.
II. DTMB Aero Rpt 955 Pt.3