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RECENT SEDIMENTS OF BOLINAS BAY CALIFORNIA

PART A. INTRODUCTION AND GRAIN SIZE ANALYSIS

by

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Part A -- Introduction and Grain Size Analysis

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C. Isselhardt, L. Osuch, and P. Wilde

Berkeley, California

November 1968

INTRODUCTION

The following work is part of a long term study of sediment transport on the Continental Shelf of Central California. In particular, it is hoped that the data presented here will be useful also to the general study of the factors that influence the natural environment of Bolinas Lagoon now being conducted as a cooperative effort involving the University of California, Berkeley; the U. S. Corps of Engineers; the U.S. Geological Survey; the Department of Agriculture, Soil Conservation Service; and consultants for the Bolinas Harbor District.

The analyses of the marine sediments of Bolinas Bay were done at the University of California, Berkeley, utilizing the facilities of the Departments of Civil Engineering and Geology and the Institute of Marine Resources. The results of the marine study will be presented in three separate volumes:

Part A -- Introduction and Grain Size Data

Part B -- Mineralogical Data

Part C -- Interpretation and Summary of Results

Sample Collection

Three types of samples are examined in this report: (a) 6 rock samples from the cliffs on the north shore of Bolinas Bay, (b) 12 beach samples, and (c) 44 marine rock and sediment samples from Bolinas Bay. Rock samples are from surface out crops. Beach samples were scooped from the surface at low tide. Marine samples were obtained on 26 - 27 March 1968 from the converted fishing boat San Michele. Bottom samples were obtained by an orange-peel grab and thus were representative of approximately the upper 15 centimeters of sediment. About one liter by volume of sample was saved from each station, placed in a polyethylene bag, and stored until treatment in a one quart cardboard container.

Figure 1 shows the marine station locations which were obtained by radar bearings on shore landmarks. Station depths were obtained by echo sounding with a Raytheon fathometer. The bathymetric base map used in this study was contoured by C. Isselhardt from original U.S. Coast and Geodetic Survey sounding sheets. Participants in the marine sampling were Ralf Carter, Courtney Isselhardt, Eugene Silva, and Pat Wilde.

Sample Treatment

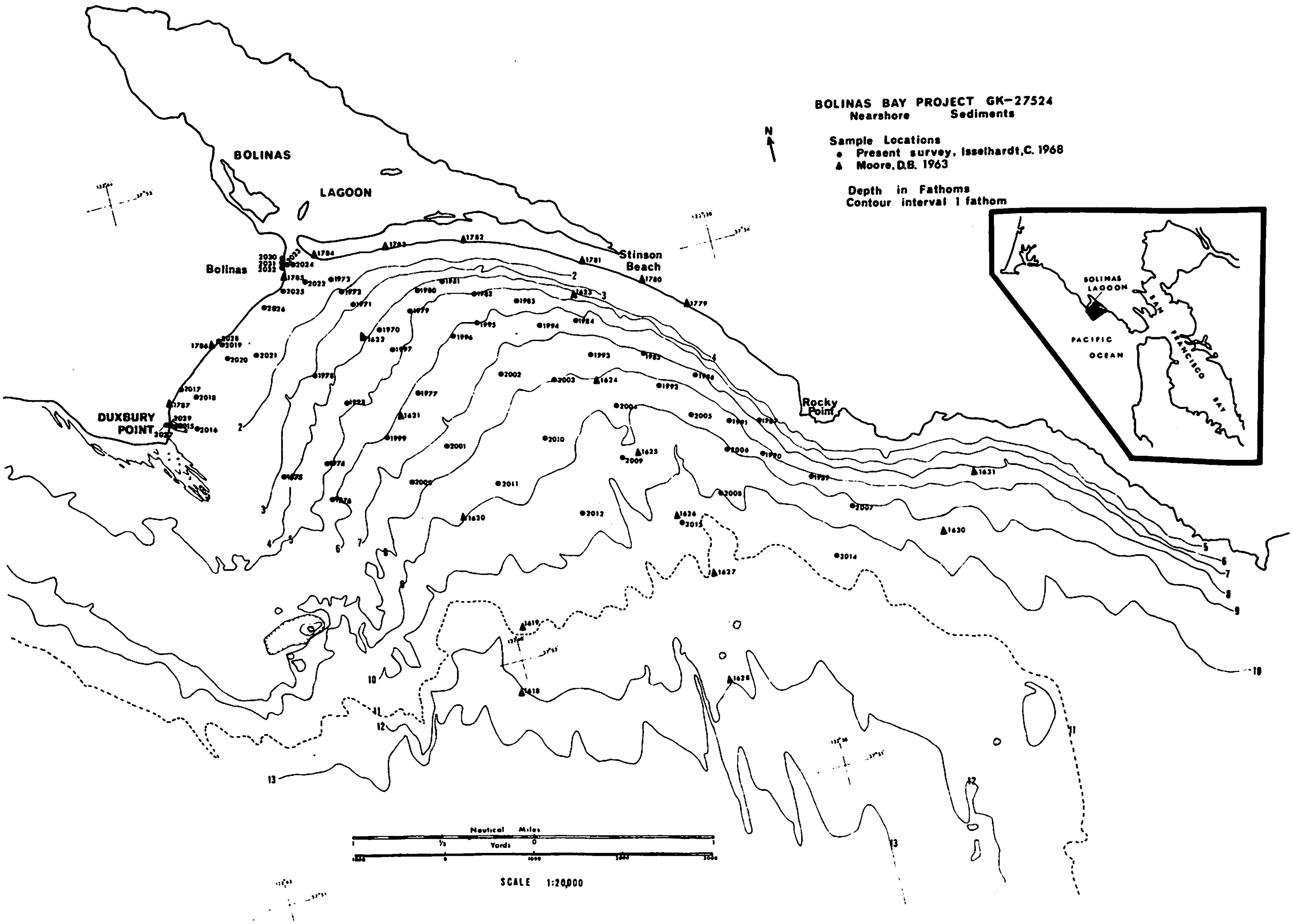
Initially all samples were washed with fresh water to eliminate dried sea salt and then were placed in a drying oven at 100° C until dry. The dry sample was split in a Jones sample splitter into four fractions:

(1) weighed and sieved for mineralogical analysis

(2) to John Holden for paleontological analysis

(3) archive

(4) reserve



BOLINAS BAY PROJECT GK-27524
Nearshore Sediments
Sample Locations
● Present survey, Isselhardt, C. 1968
▲ Moore, D.B. 1963
Depth in Fathoms
Contour interval 1 fathom
N
BOLINAS
LAGOON
Bolinas
Stinson Beach
Rocky Point
DUXBURY POINT
PACIFIC OCEAN
SAN FRANCISCO BAY
BOLINAS LAGOON
Nautical Miles
Yards
SCALE 1:20,000

GRAIN SIZE ANALYSIS

The sample was size separated in a Ro-Tap using nine sieves:

U.S. Standard Mesh Number	Nominal Opening	PHI Units
5	4.000 mm	- 2.0
10	1.981 mm	- 1.0
18	0.991 mm	0
35	0.495 mm	+ 1.0
45	0.351 mm	+ 1.5
60	0.246 mm	+ 2.0
80	0.175 mm	+ 2.5
120	0.124 mm	+ 3.0
170	0.088 mm	+ 3.5
230	0.061 mm	+ 4.0

The intervals from medium sand to very fine sand (0.500 - 0.062 mm) were monitored at half PHI intervals as the primary mode of most of the samples is in that size interval.

After sieving, each size fraction was weighed on an analytical balance to 0.001 grams and a weight percent value calculated for each fraction.

Data Format

The grain size information for each sample is presented in the following pages graphically as (1) a histogram where the width of each bar represents the size range considered and the height of the bar represents the weight percent of that size range; and (2) a cumulative frequency curve, which is a smooth curve drawn between points determined by adding weight percent values in successively smaller grain size classes. Points connected by dashed lines are symmetrically extrapolated values and do not represent measured values.

Modes, or the order of frequency, are determined visually from the histogram, with the first mode being the size class with largest weight percent value.

Quartile and percentile values or grain size values at a given weight percent are determined visually from the cumulative curves and are used for calculating statistical measures below. The percentile and quartile subscripts given here indicate the percentage of the distribution coarser than the corresponding grain size value. For example, P_{10} refers to the grain size at which 10% of the distribution is coarser. This procedure does not conform to standard statistical usage but is less ambiguous for grain size work where by convention the cumulative curve is plotted in order of decreasing grain size, which is the reverse of statistical practice.

Graphically Determined

Parameter	Grain Size at
P_{10}	10^{th} percentile
Q_{25}	25^{th} percentile (3^{rd} quartile)
Q_{50}	50^{th} percentile (2^{nd} quartile) MEDIAN
Q_{75}	75^{th} percentile (1^{st} quartile)
P_{90}	90^{th} percentile

Calculated

$$S_0 = \sqrt{Q_{25}/Q_{75}}$$

SORTING COEFFICIENT:
(Trask, 1932)

Degree of Scatter

$$S_k = \frac{Q_{25}\ Q_{75}}{(Q_{50})^2}$$

QUARTILE SKEWNESS:
(Trask, 1932)

Symmetry of Distribution

$$K = \frac{Q_{25} - Q_{75}}{2\,(P_{10} - P_{90})}$$

KURTOSIS:
(Krumbein and Pettijohn, 1938, p. 238)

Comparison of Central Portion of Curve to Spread of Whole Curve

REFERENCES

Krumbein, W. C. and Pettijohn, F. J., 1938, Manual of Sedimentary Petrography: New York, Appleton-Century-Crofts, 549 p.

Trask, P. D., 1932, Origin and Environment of Source Sediments of Petroleum: Houston, Gulf Publishing Co., 67 p.

Sample 1970

Lat. 37°53'53" Long. 122°40'27"

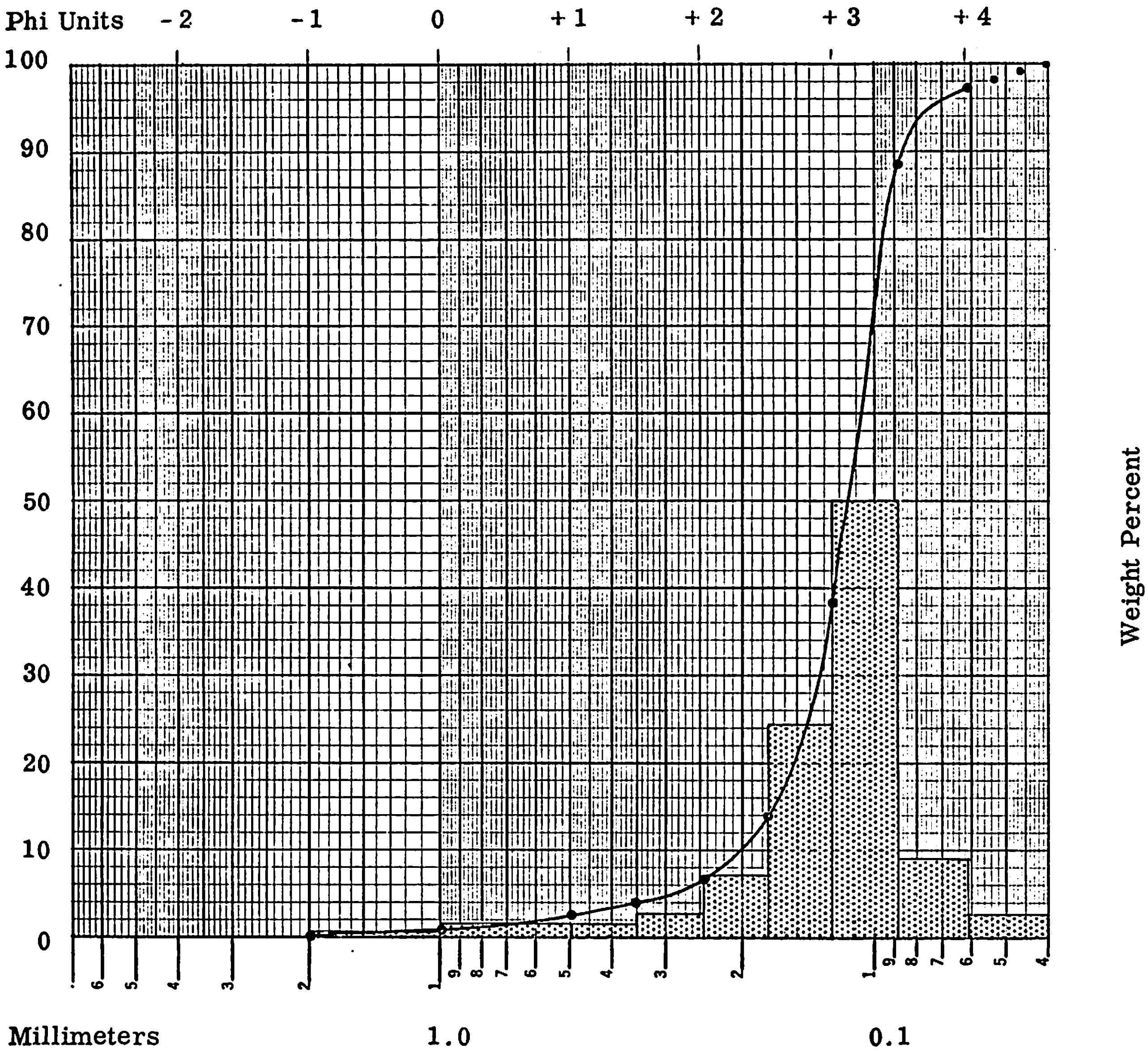
Depth 4.16 Fathoms

7.62 Meters

25.00 Feet

Sample description Very fine, gray sand with 5% shell fragments and a few small dark pebbles

Sample Weight 123.88 gms



SIZE PARAMETERS

1st Mode 0.124-0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.14 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.10 mm

Sorting Coef. 1.18

Skewness 1.15

Kurtosis 0.17

SIZE ANALYSIS

Sample 1971

Lat. 37°54' Long. 122°40'31"

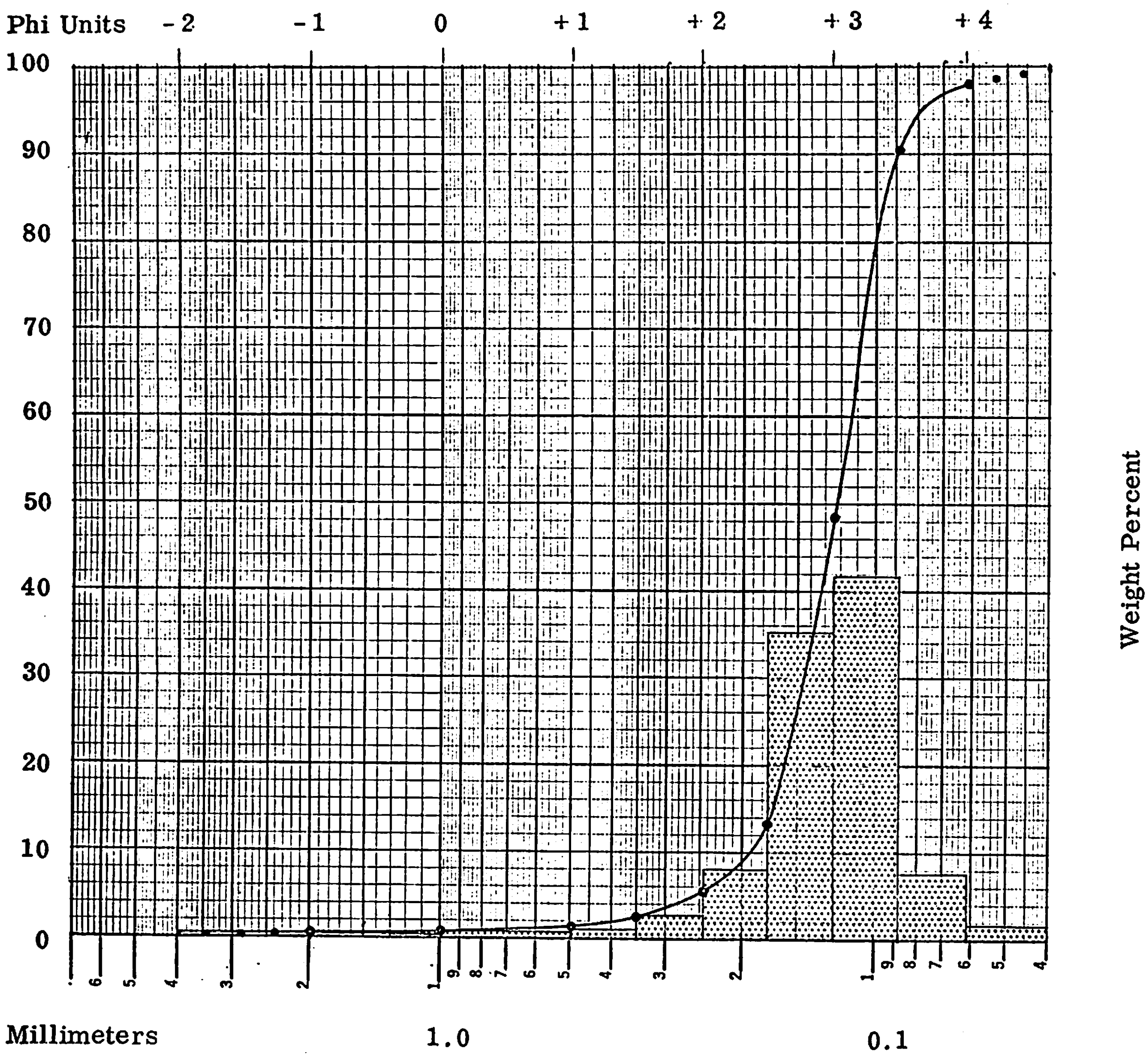
Depth 2.83 Fathoms

5.28 Meters

17.00 Feet

Sample description Very fine, gray sand with 10% shell fragments

Sample Weight 228.34 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.15 mm

Median: Q_{50} 0.12 mm

Q_{75} 0.11 mm

Sorting Coef. 1.17

Skewness 1.06

Kurtosis 0.19

Sample 1972

Lat. 37°54'6" Long. 122°40'34"

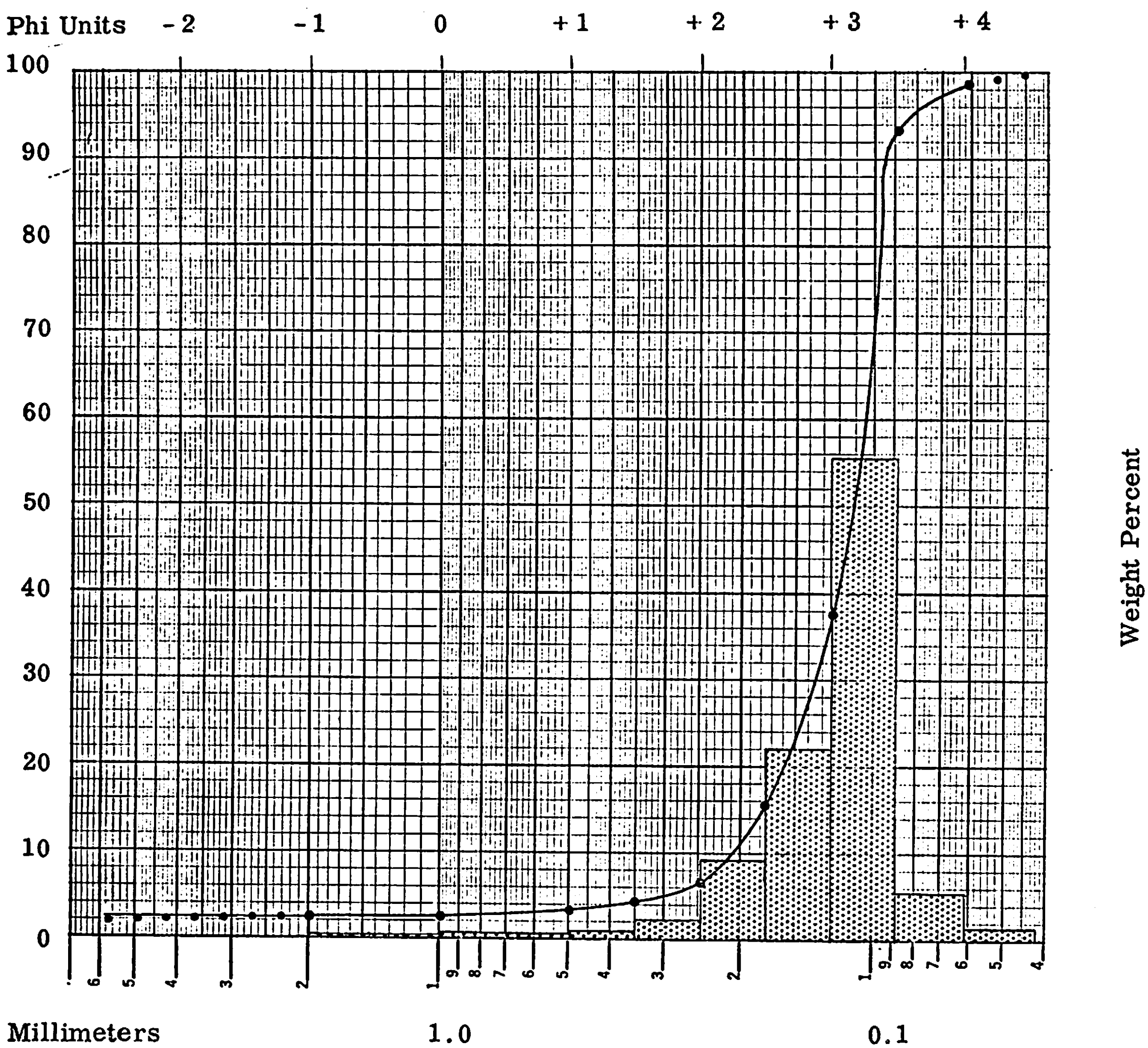
Depth 2.33 Fathoms

4.27 Meters

14.00 Feet

Sample description Very fine, gray sand with 5-10% shell fragments and a few small dark pebbles

Sample Weight 223.82 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.15 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.10 mm

Sorting Coef. 1.17

Skewness 1.18

Kurtosis 0.18

Sample 1973

Lat. 37°54'11" Long. 122°40'38"

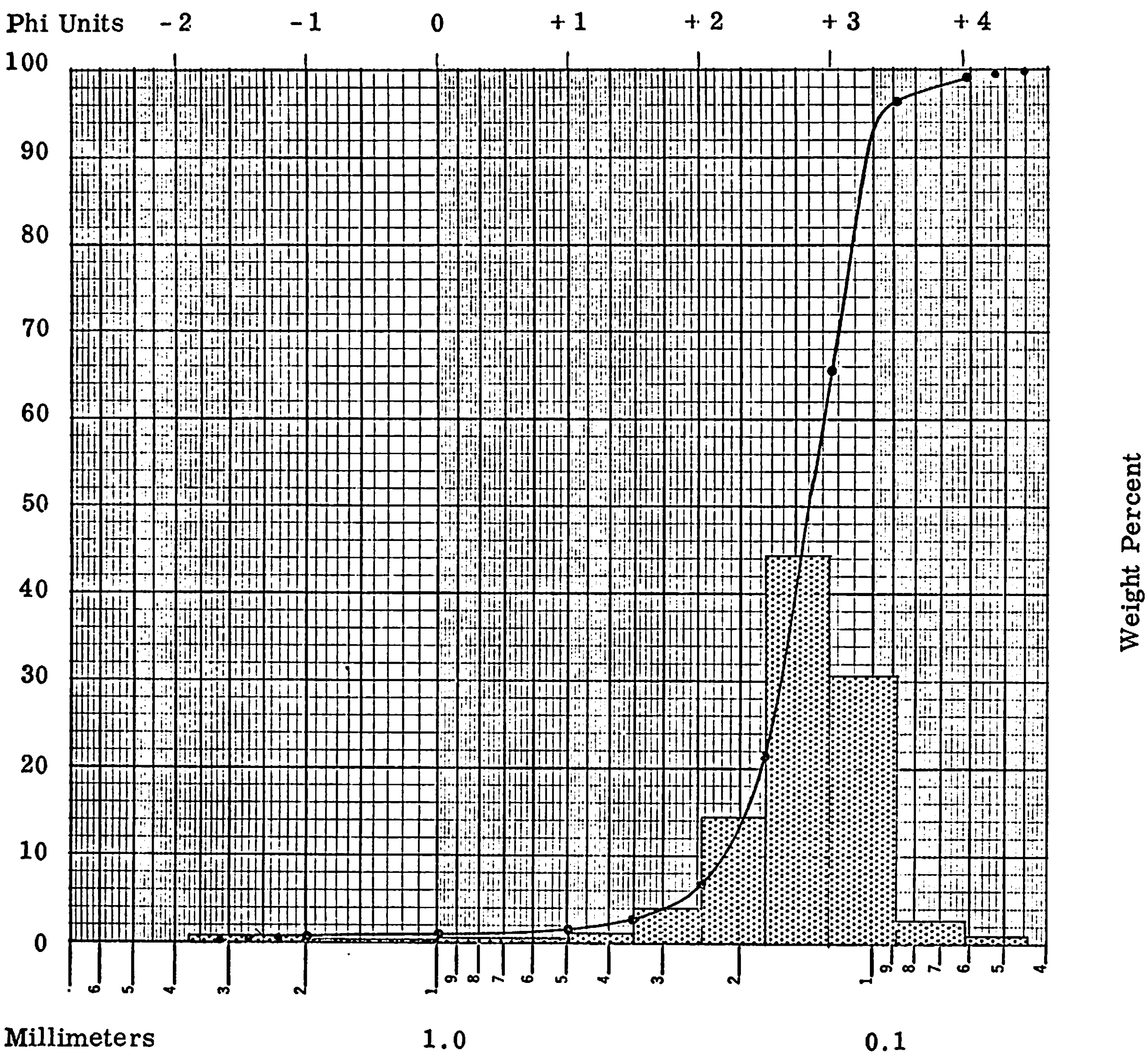
Depth 2.00 Fathoms

3.66 Meters

12.00 Feet

Sample description Fine, gray sand with some very coarse pebbles and 5% shell fragments

Sample Weight 295.87 gms



SIZE PARAMETERS

1st Mode 0.175 - 0.124 mm

2nd Mode >1.981 - 1.981 mm

3rd Mode

Q_{25} 0.17 mm

Median: Q_{50} 0.14 mm

Q_{75} 0.12 mm

Sorting Coef. 1.20

Skewness 0.99

Kurtosis 0.22

Sample 1978

Lat. 37°53'45" Long. 122°40'55"

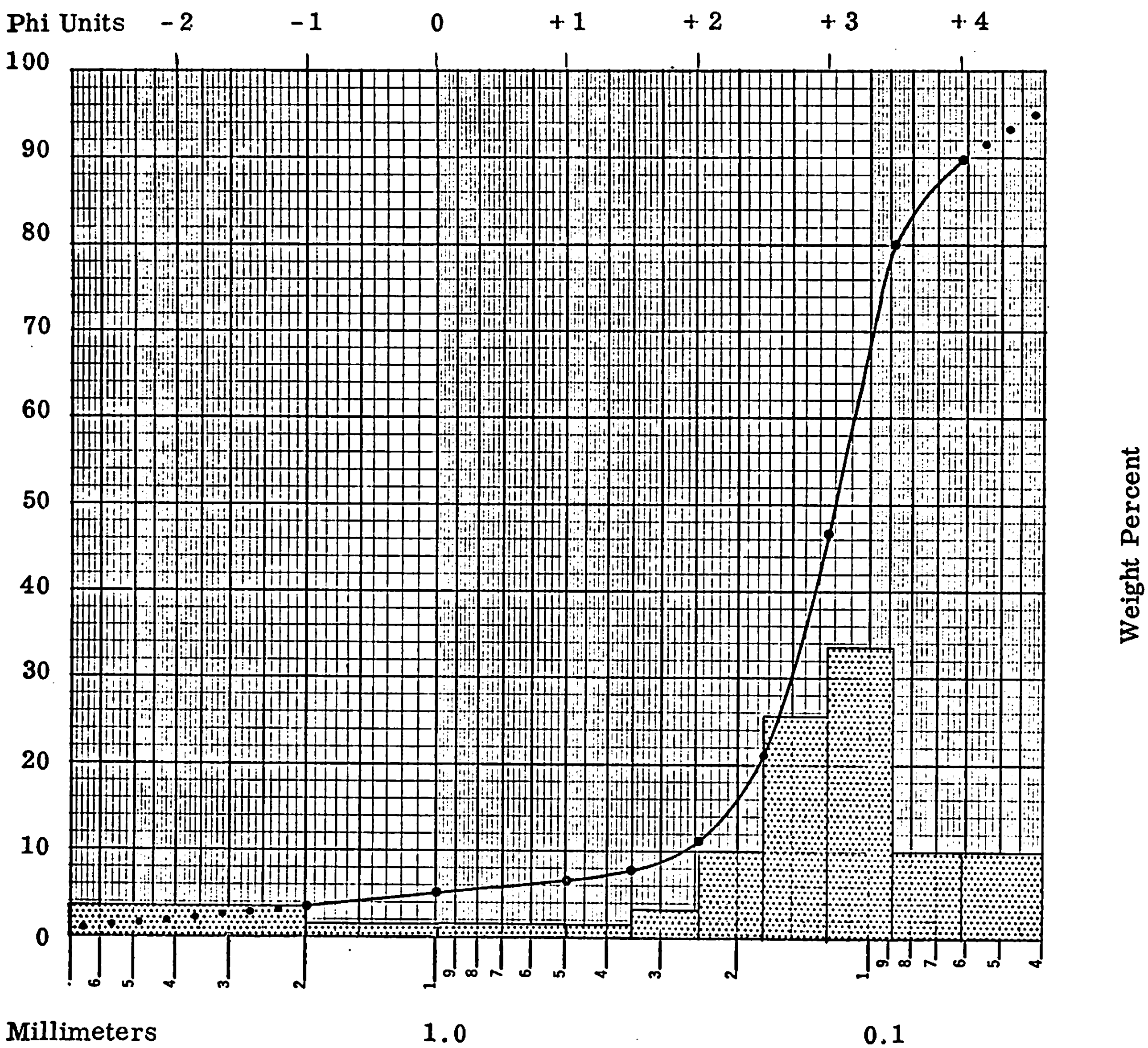
Depth 3.17 Fathoms

5.79 Meters

19.00 Feet

Sample description Very fine, gray silty sand with some coarse pebbles and 5-10% shell fragments

Sample Weight 189.87 gms



SIZE PARAMETERS

1st Mode	0.124 - 0.088 mm	Q_{25}	0.16 mm	Sorting Coef.	1.28
2nd Mode	>1.981 - 1.981 mm	Median: Q_{50}	0.12 mm	Skewness	1.04
3rd Mode		Q_{75}	0.10 mm	Kurtosis	0.15

Sample 1979

Lat. 37°53'57" Long. 122°40'9"

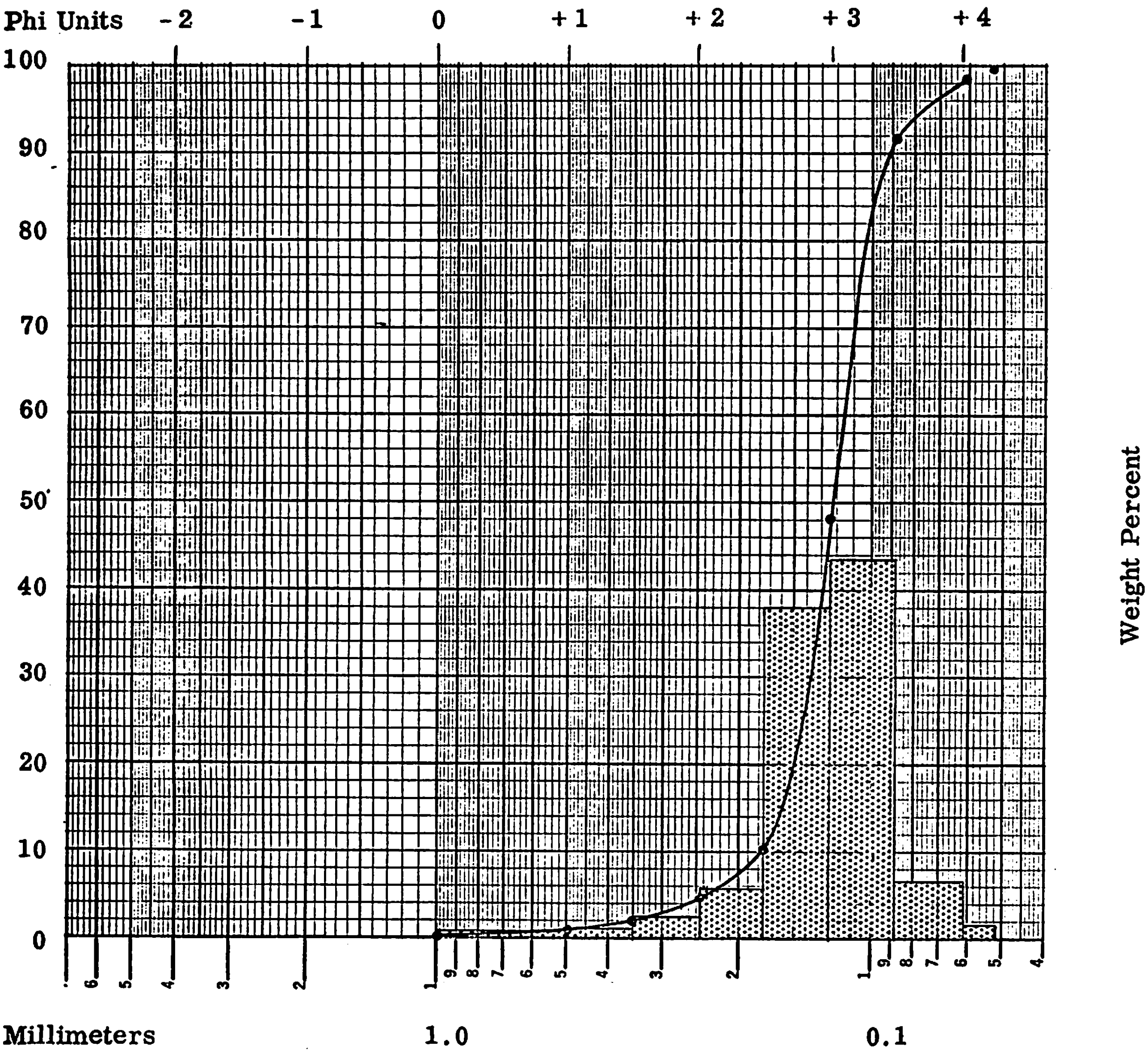
Depth 3.83 Fathoms

6.00 Meters

23.00 Feet

Sample description Very fine, gray tan sand with 5% shell fragments

Sample Weight 164.40 gms



SIZE PARAMETERS.

1st Mode	0.124 - 0.088 mm	Q_{25}	0.14 mm	Sorting Coef.	1.16
2nd Mode		Median: Q_{50}	0.12 mm	Skewness	0.95
3rd Mode		Q_{75}	0.10 mm	Kurtosis	0.19

Sample 1980

Lat. 37°54'2" Long. 122°40'6"

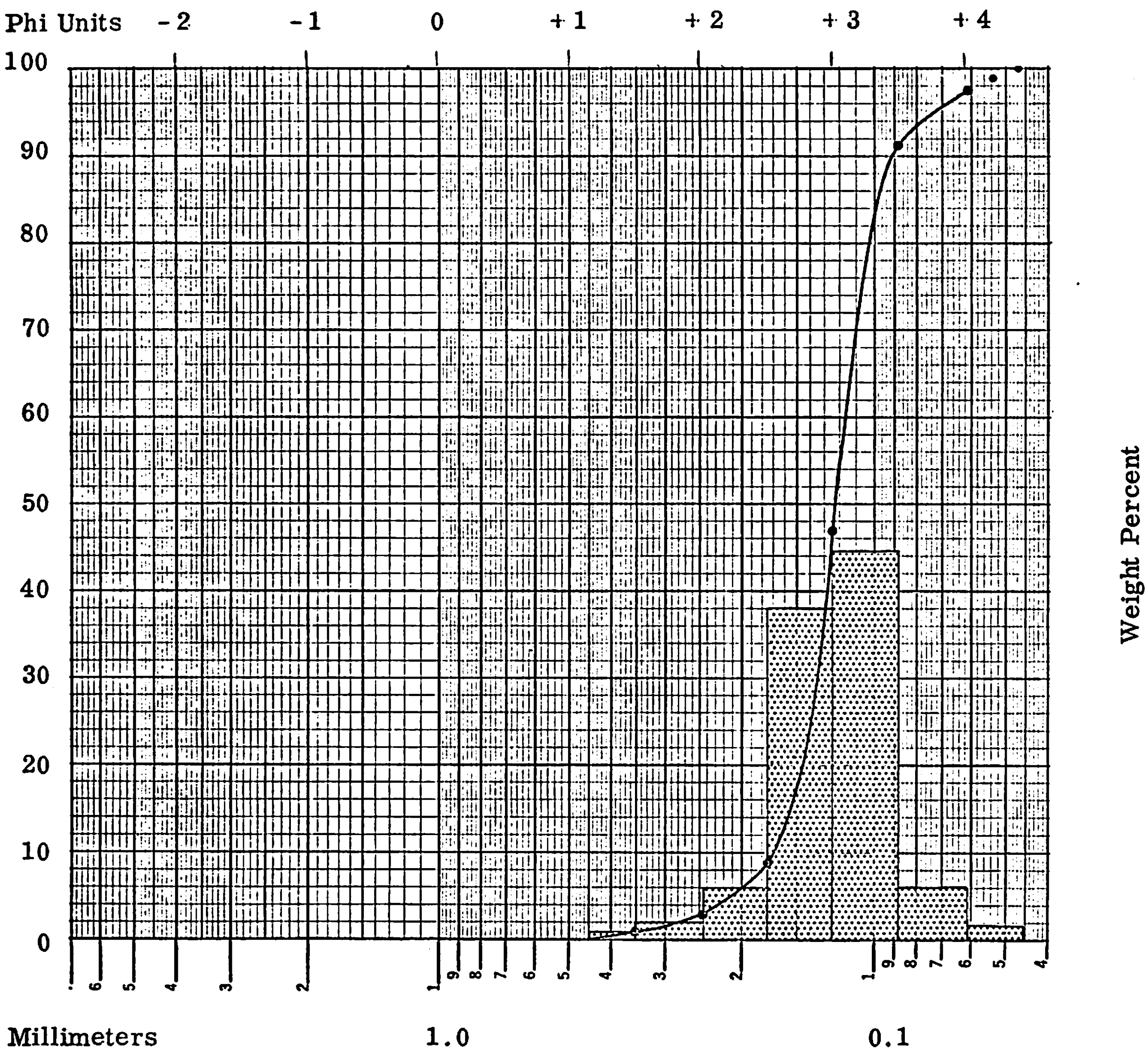
Depth 3.67 Fathoms

6.71 Meters

22.00 Feet

Sample description Very fine, gray sand with <5% shell fragments

Sample Weight 263.24 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.14 mm

Median: Q_{50} 0.12 mm

Q_{75} 0.11 mm

Sorting Coef. 1.12

Skewness 0.99

Kurtosis 0.18

Sample 1981

Lat. 37°54'7" Long. 122°39'56"

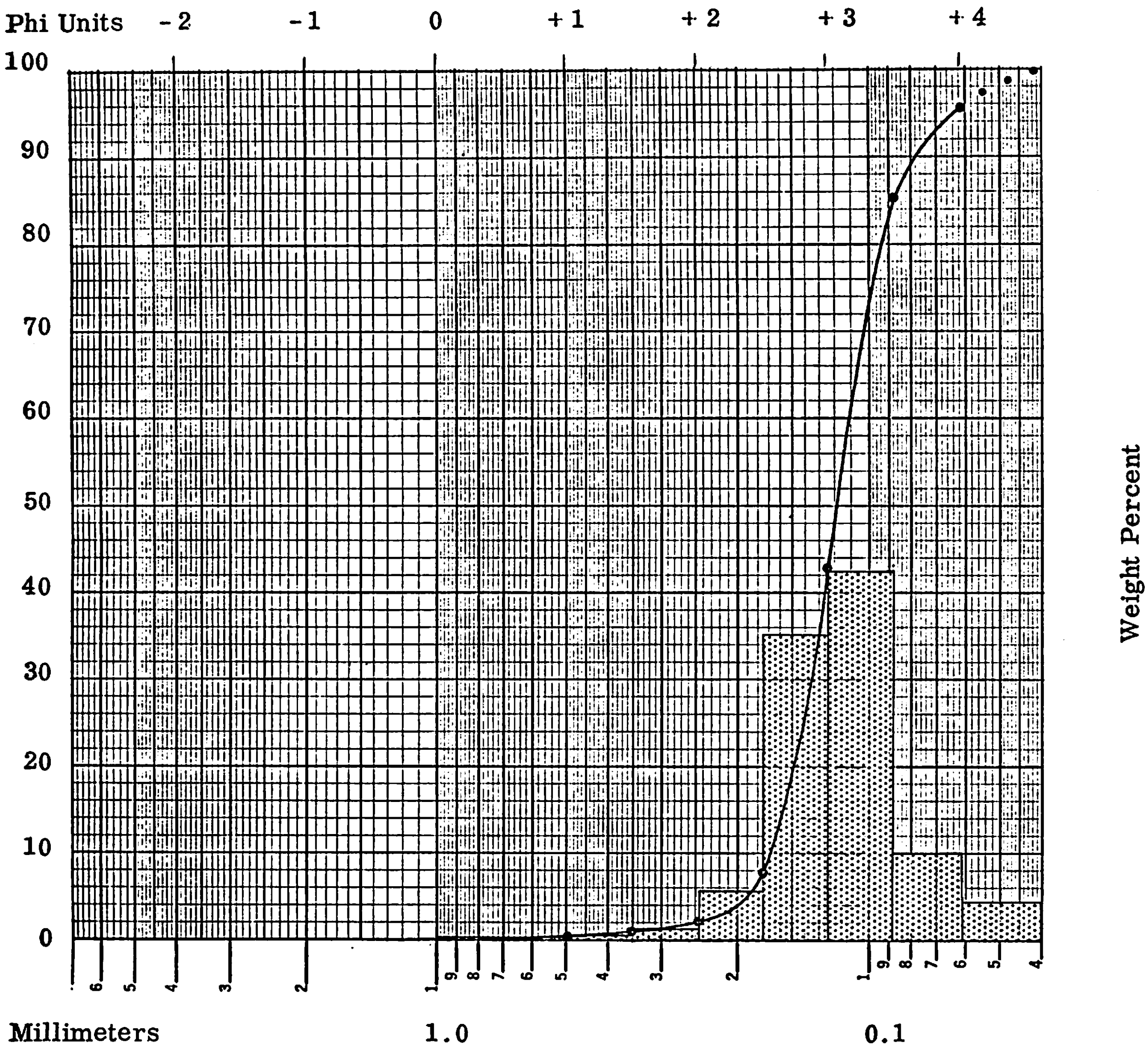
Depth 4.17 Fathoms

7.62 Meters

25.00 Feet

Sample description Very fine, gray brown sand with 5-10% shell fragments

Sample Weight 157.08 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.14 mm

Median: Q_{50} 0.12 mm

Q_{75} 0.10 mm

Sorting Coef. 1.18

Skewness 0.96

Kurtosis 0.22

Sample 1982

Lat. 37°54' Long. 122°39'43"

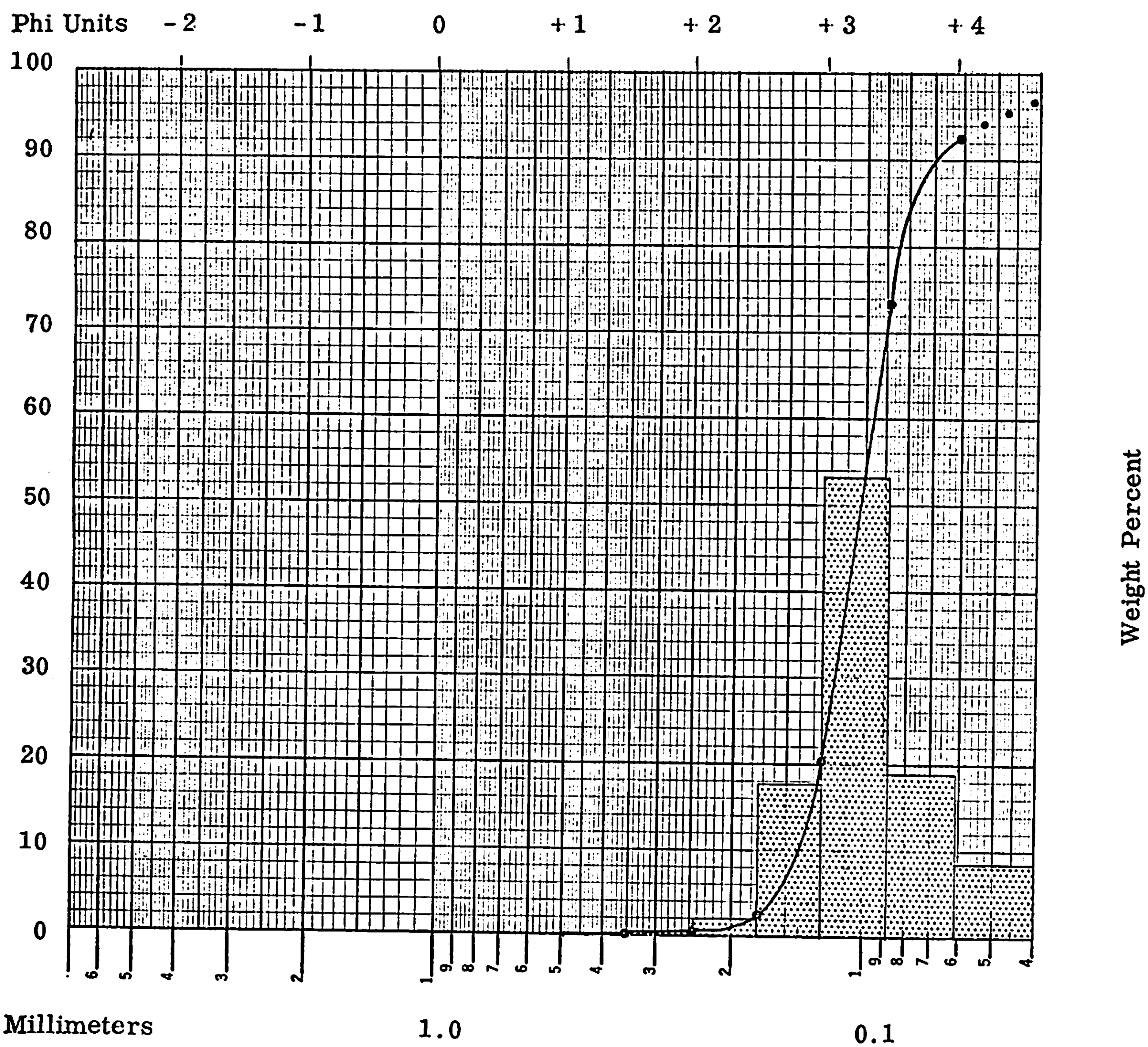
Depth 4.83 Fathoms

8.84 Meters

29.00 Feet

Sample description Very fine, gray brown silty sand with 5% shell fragments

Sample Weight 196.92 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.09 mm

Sorting Coef. 1.18

Skewness 1.00

Kurtosis 0.25

Sample 1983

Lat. 37°53'51" Long. 122°39'25"

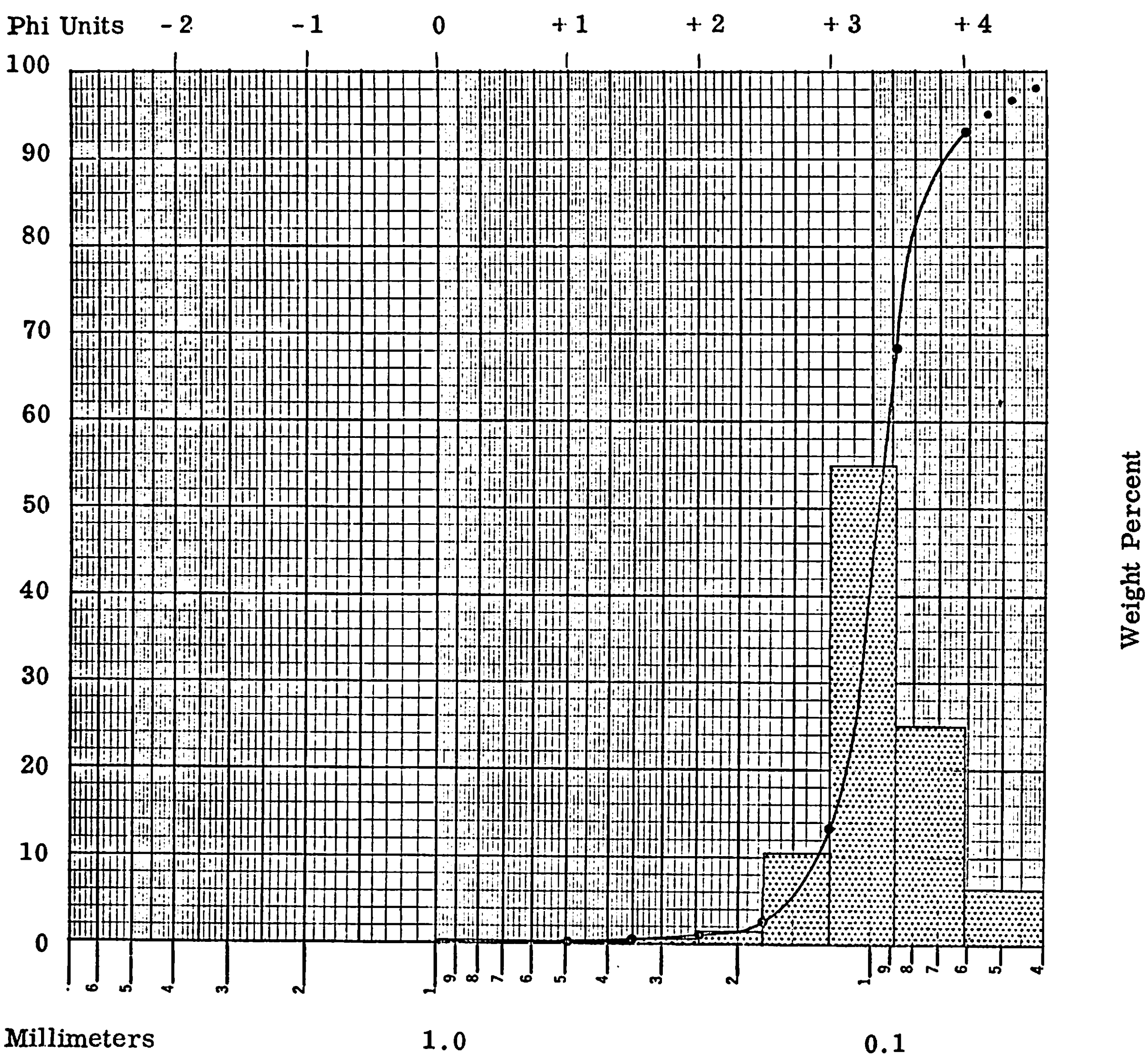
Depth 5.33 Fathoms

9.75 Meters

32.00 Feet

Sample description Very fine, gray silty sand, few shell fragments

Sample Weight 94.07 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.11 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.08 mm

Sorting Coef. 1.15

Skewness 0.93

Kurtosis 0.21

Sample 1984

Lat. 37°53'42" Long. 122°39'3"

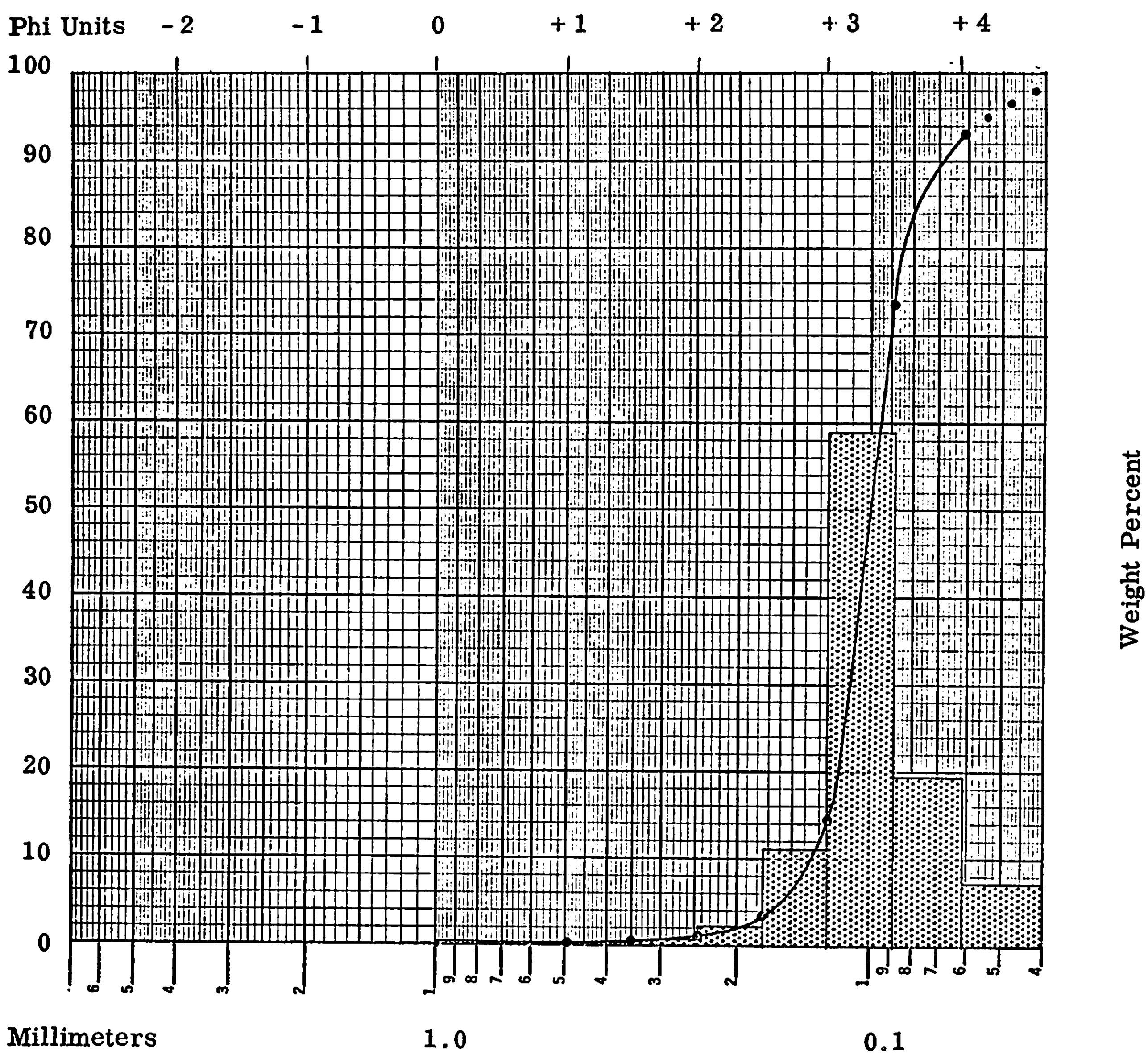
Depth 6.33 Fathoms

11.58 Meters

38.00 Feet

Sample description Very fine, gray brown silty sand

Sample Weight 114.88 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088

2nd Mode

3rd Mode

Q_{25} 0.11 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.09 mm

Sorting Coef. 1.14

Skewness 0.93

Kurtosis 0.19

SIZE ANALYSIS

Sample 1985

Lat. 37°53'25" Long. 122°38'44"

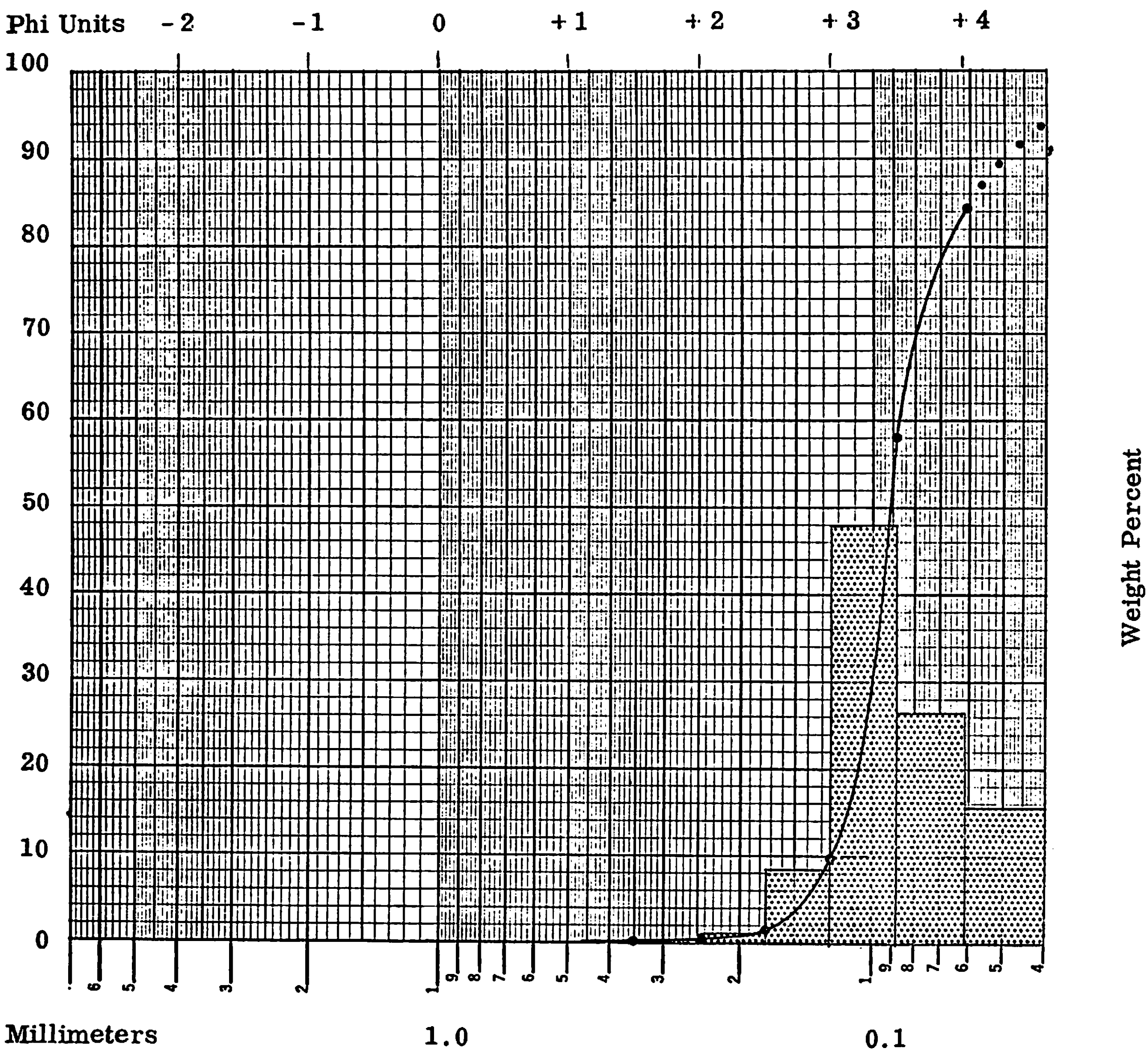
Depth 7.00 Fathoms

12.80 Meters

42.00 Feet

Sample description Very fine, gray-tan silty sand

Sample Weight 70.01 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.10 mm

Median: Q_{50} 0.09 mm

Q_{75} 0.07 mm

Sorting Coef. 1.19

Skewness 0.87

Kurtosis 0.20

Sample 1986

Sample description Very fine, gray sand

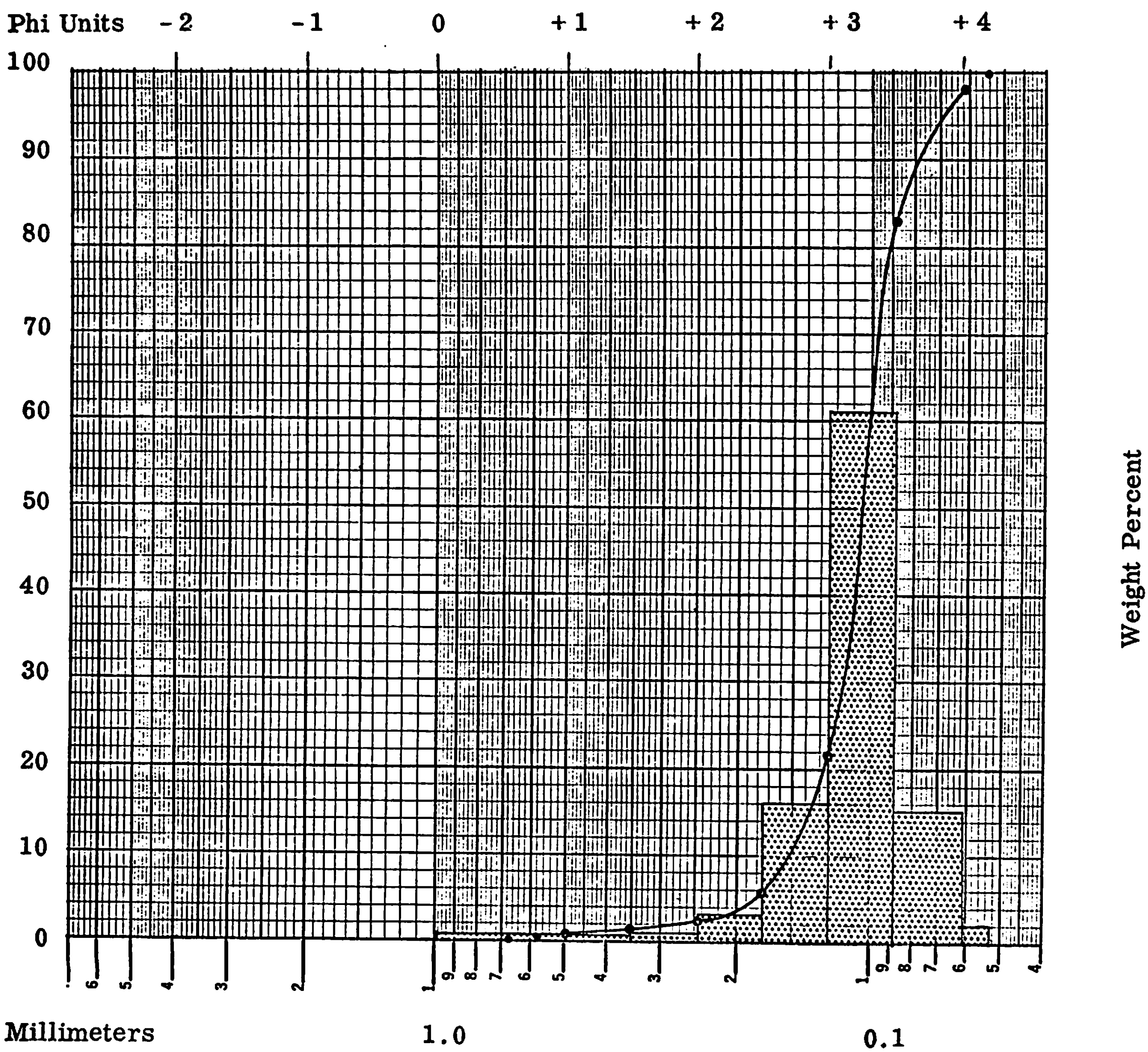
Lat. 37°53'10" Long. 122°38'13"

Depth 7.00 Fathoms

12.80 Meters

42.00 Feet

Sample Weight 24.73 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.09 mm

Sorting Coef. 1.13

Skewness 1.01

Kurtosis 0.19

Sample 1987

Lat. 37°52'58" Long. 122°37'58"

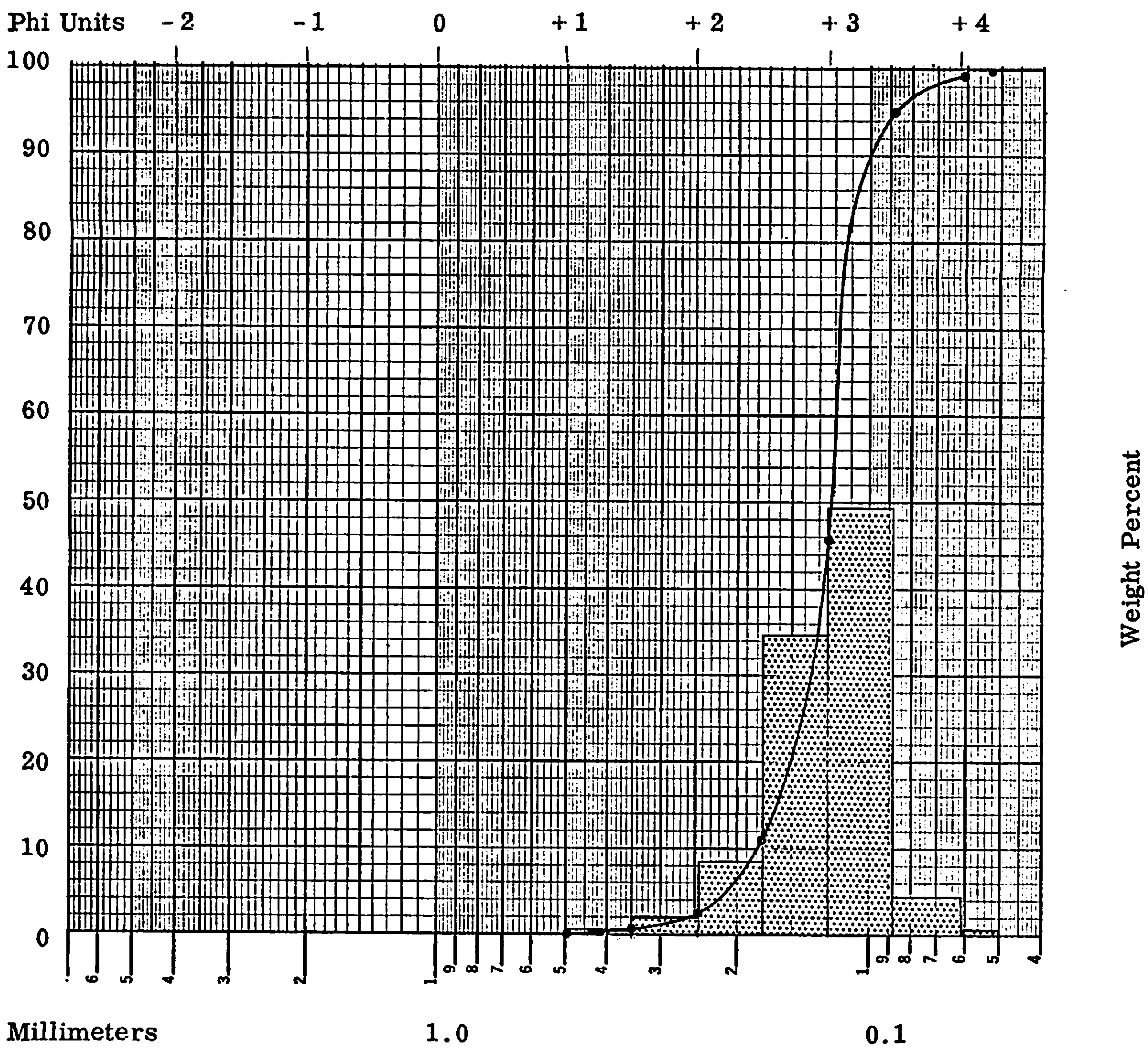
Depth 6.83 Fathoms

12.50 Meters

41.00 Feet

Sample description Very fine, gray sand, with 5-10% shell fragments

Sample Weight 82.71 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.14 mm

Median: Q_{50} 0.12 mm

Q_{75} 0.12 mm

Sorting Coef. 1.10

Skewness 1.06

Kurtosis 0.16

Sample 1989

Lat. 37°52'33" Long. 122°37'44"

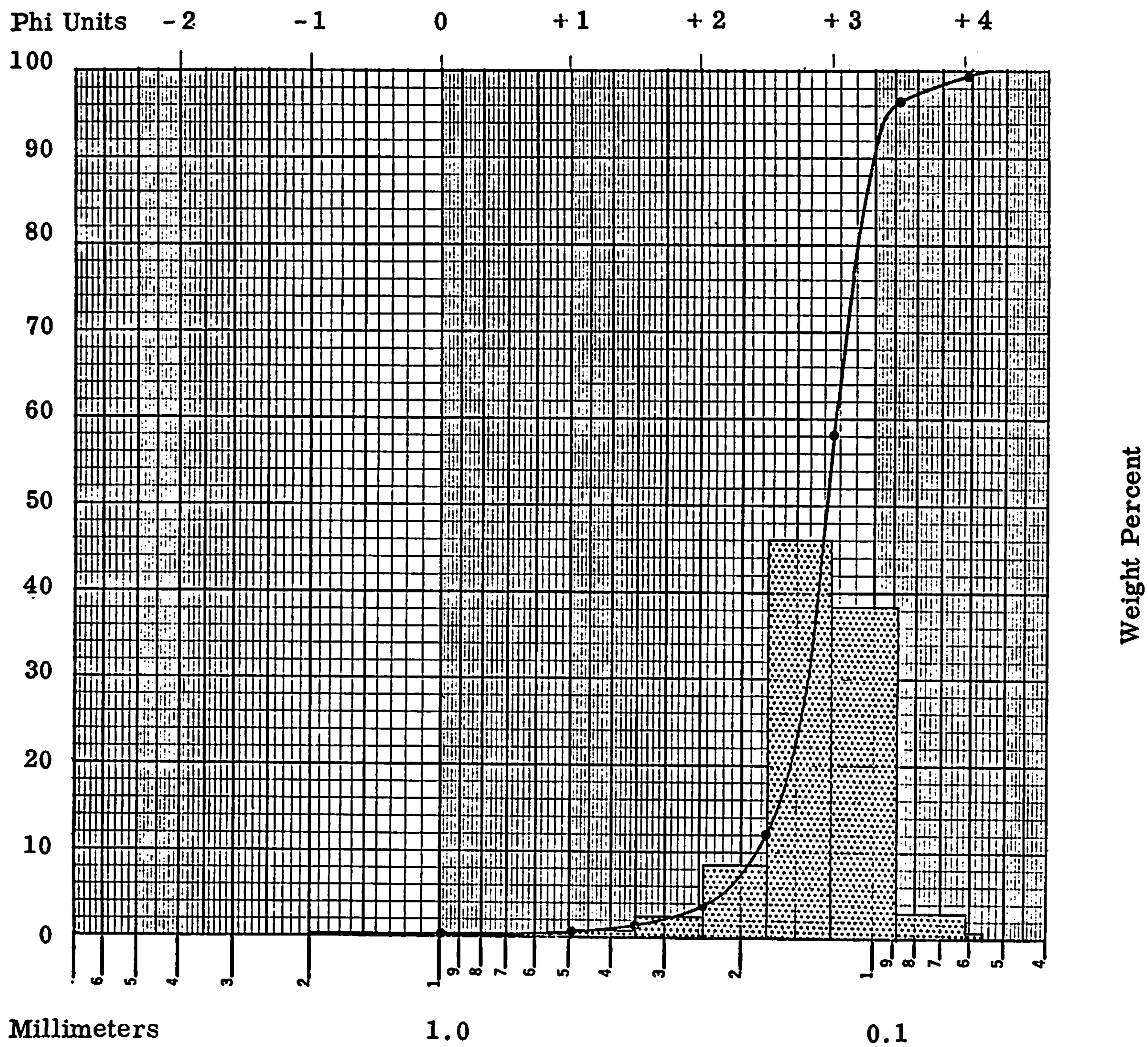
Depth 8.50 Fathoms

15.53 Meters

51.00 Feet

Sample description Fine, light gray-tan sand with 5-10% shell fragments

Sample Weight 148.36 gms



SIZE PARAMETERS

1st Mode 0.175 - 0.124 mm

2nd Mode

3rd Mode

Q_{25} 0.15 mm

Median: Q_{50} 0.13 mm

Q_{75} 0.11 mm

Sorting Coef. 1.13

Skewness 1.03

Kurtosis 0.19

Sample 1990

Lat. 37°52'45" Long. 122°37'57"

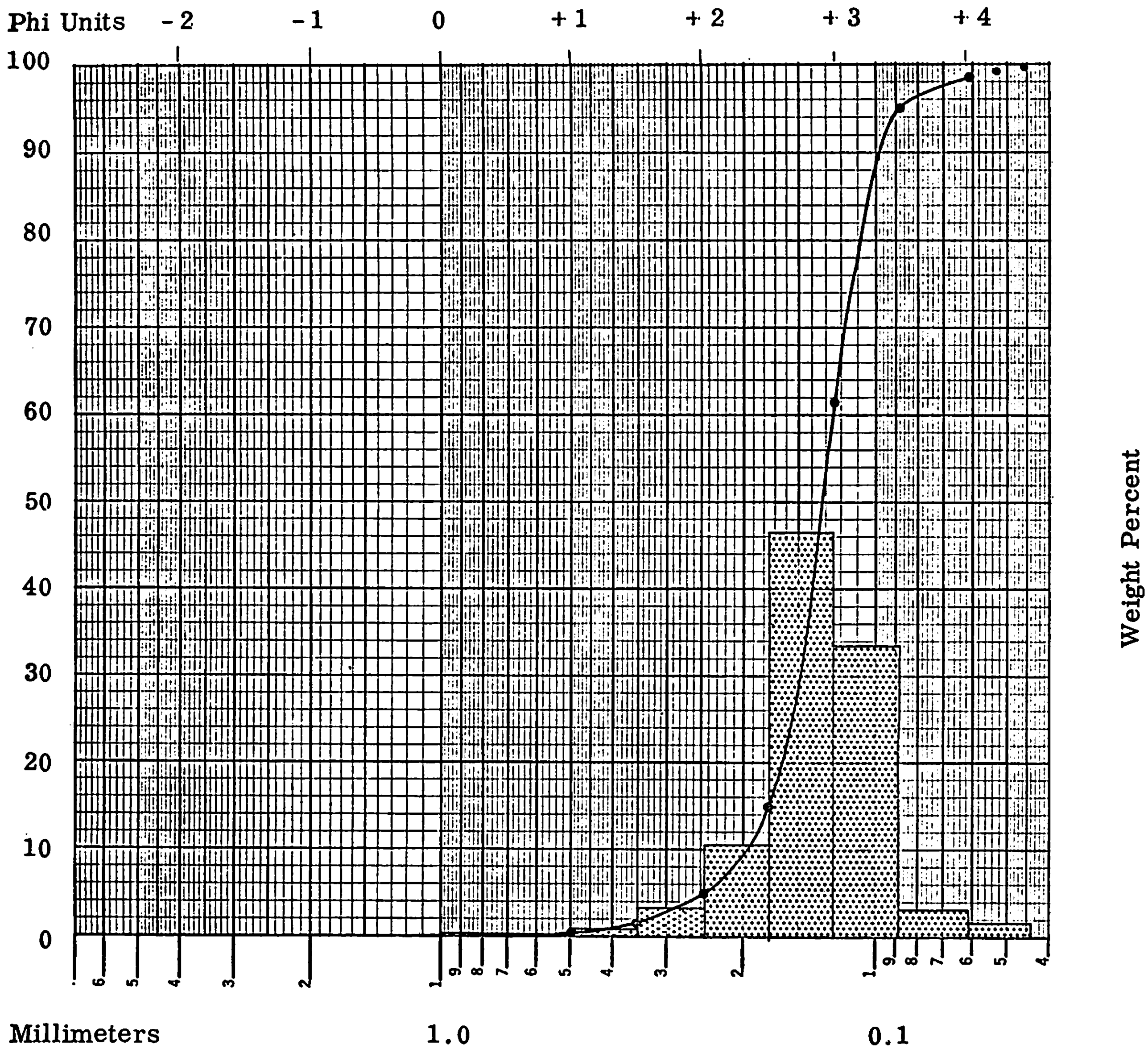
Depth 8.33 Fathoms

15.22 Meters

50.00 Feet

Sample description Fine, gray sand with 5-10% shell fragments

Sample Weight 140.29 gms



SIZE PARAMETERS

1st Mode 0.175 - 0.124 mm

2nd Mode

3rd Mode

Q_{25} 0.15 mm

Median: Q_{50} 0.13 mm

Q_{75} 0.11 mm

Sorting Coef. 1.15

Skewness 1.01

Kurtosis 0.18

Sample 1991

Lat. 37°53' Long. 122°38'12"

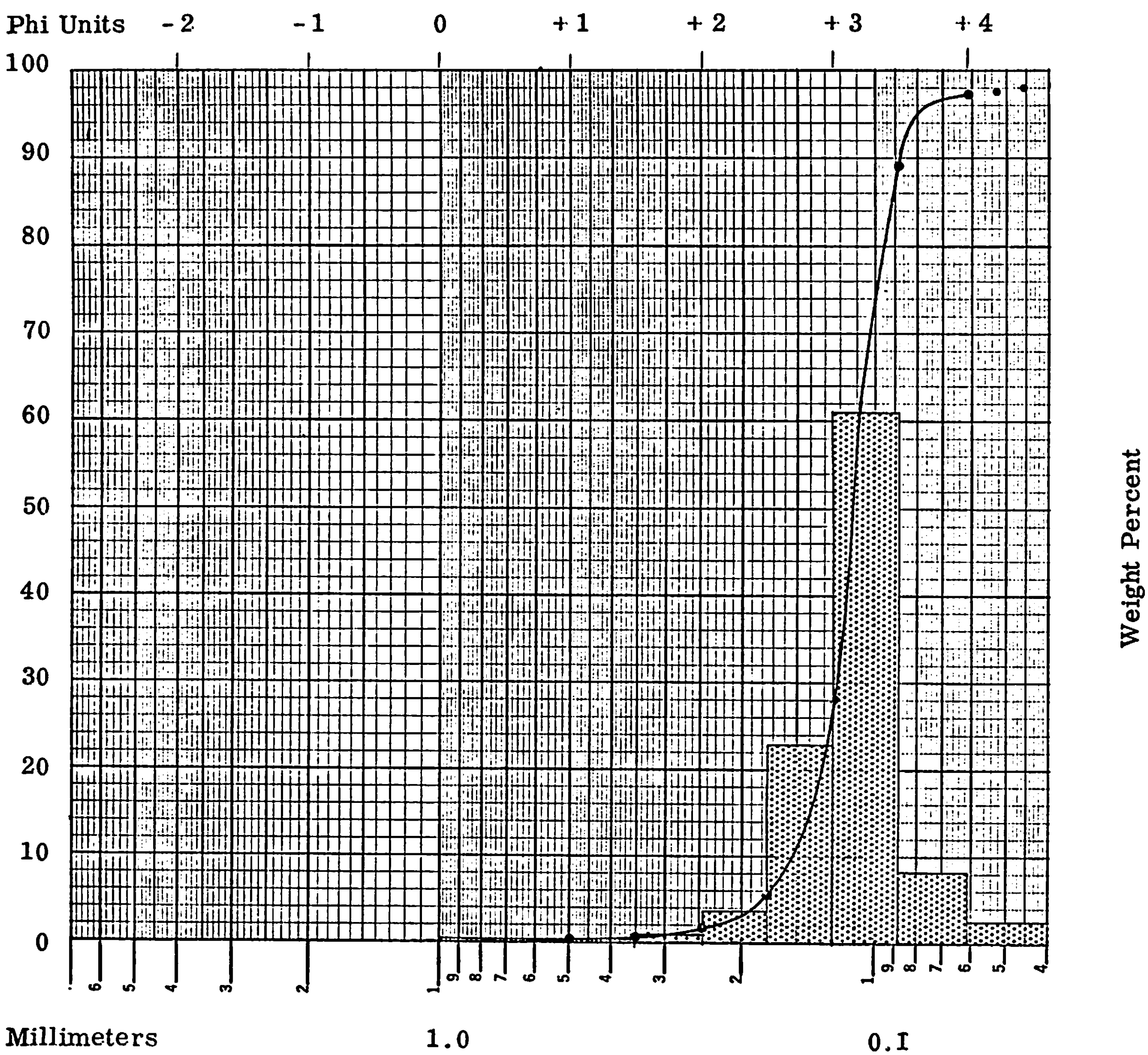
Depth 8.33 Fathoms

15.22 Meters

50.00 Feet

Sample description Very fine gray-brown sand

Sample Weight 98.59 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.13 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.10 mm

Sorting Coef. 1.16

Skewness 1.02

Kurtosis 0.24

Sample 1992

Lat. 37°53'12" Long. 122°38'31"

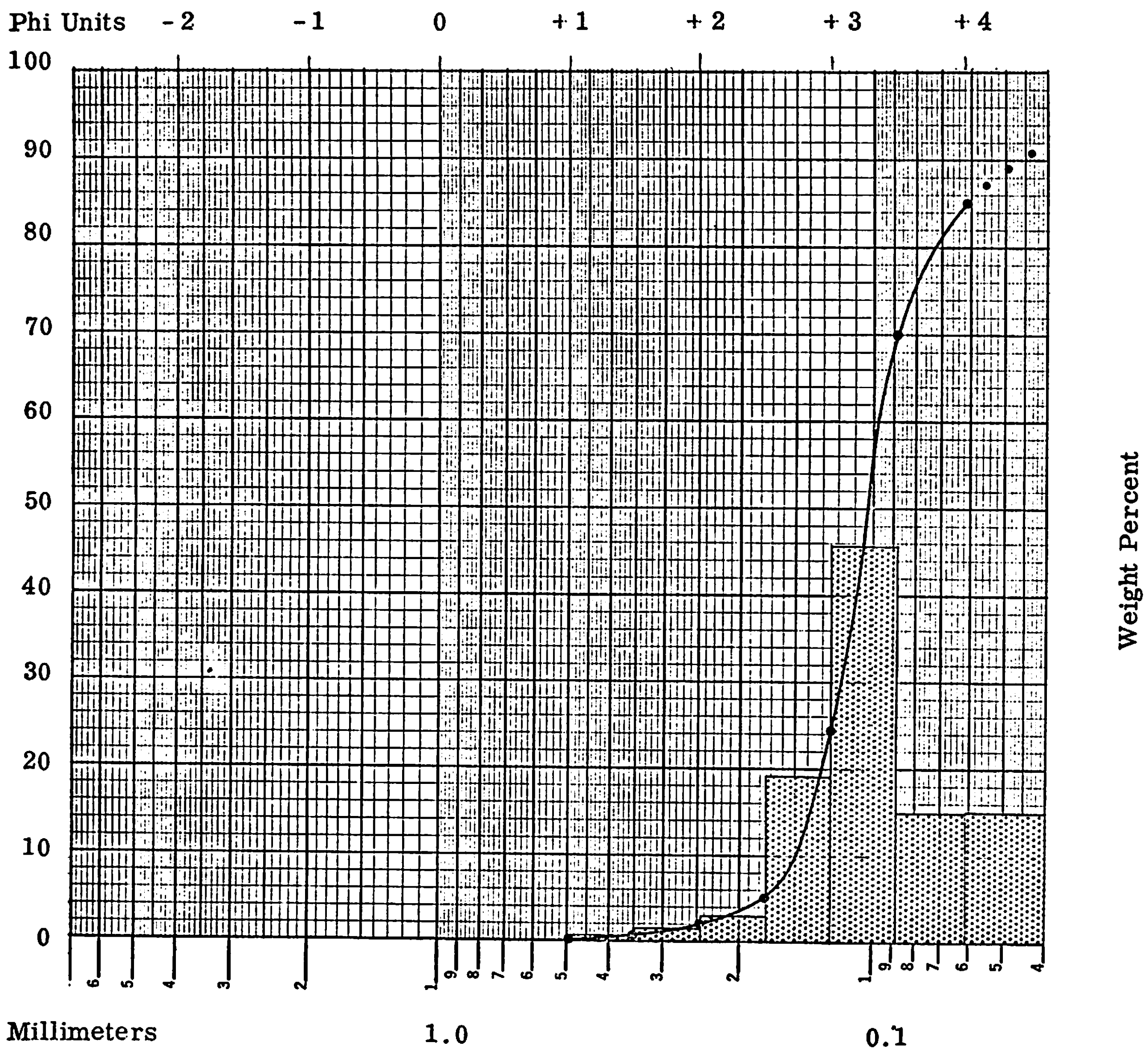
Depth 8.17 Fathoms

14.93 Meters

49.00 Feet

Sample description Very fine, dark gray silty sand

Sample Weight 167.27 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.09 mm

Sorting Coef. 1.17

Skewness 1.02

Kurtosis 0.16

Sample 1993

Lat. 37°53'29" Long. 122°39'

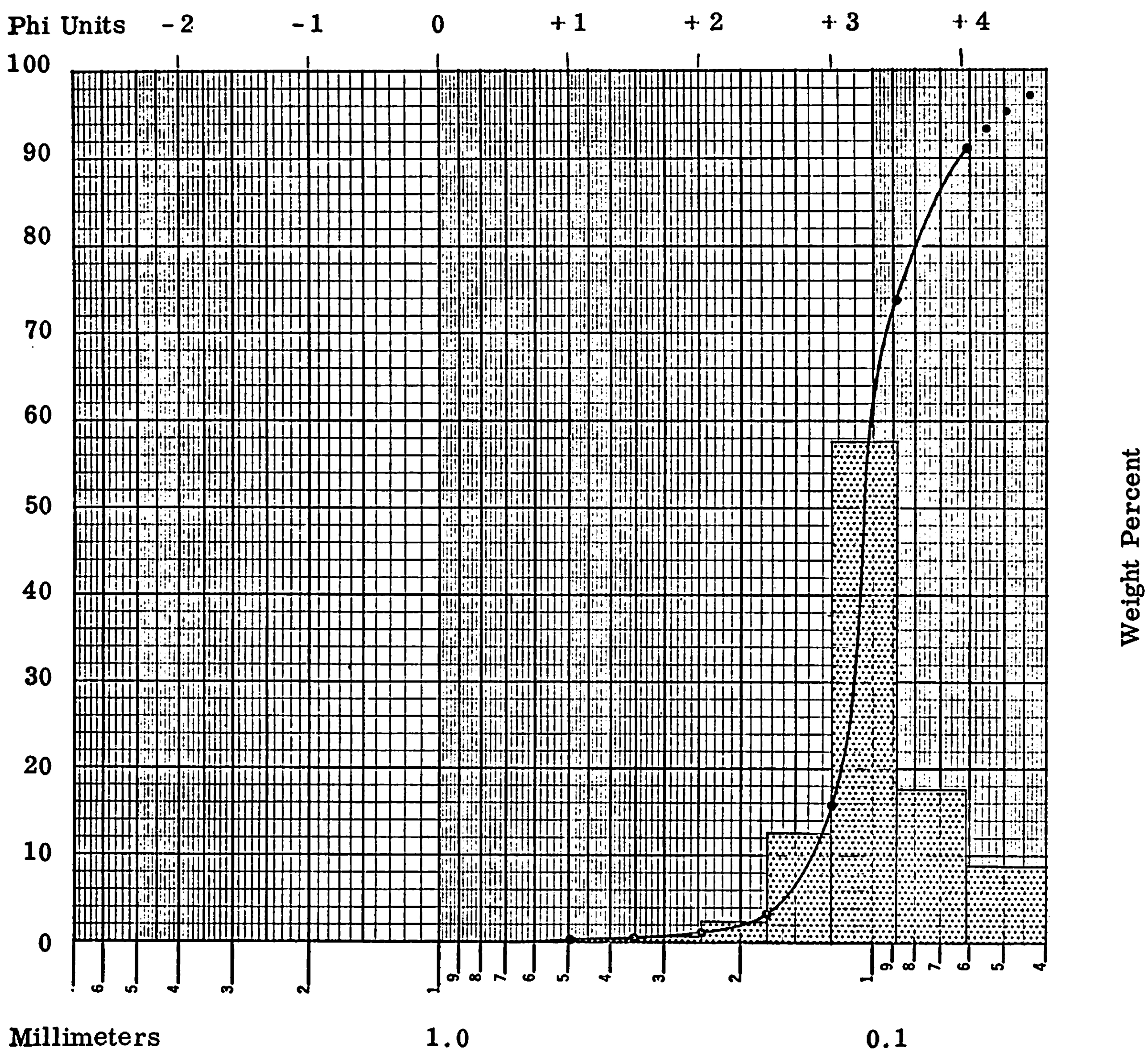
Depth 7.33 Fathoms

13.41 Meters

44.00 Feet

Sample description Very fine, silty dark gray sand

Sample Weight 100.40 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.11 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.09 mm

Sorting Coef. 1.15

Skewness 0.91

Kurtosis 0.19

Sample 1994

Lat. 37°53'41" Long. 122°39'21"

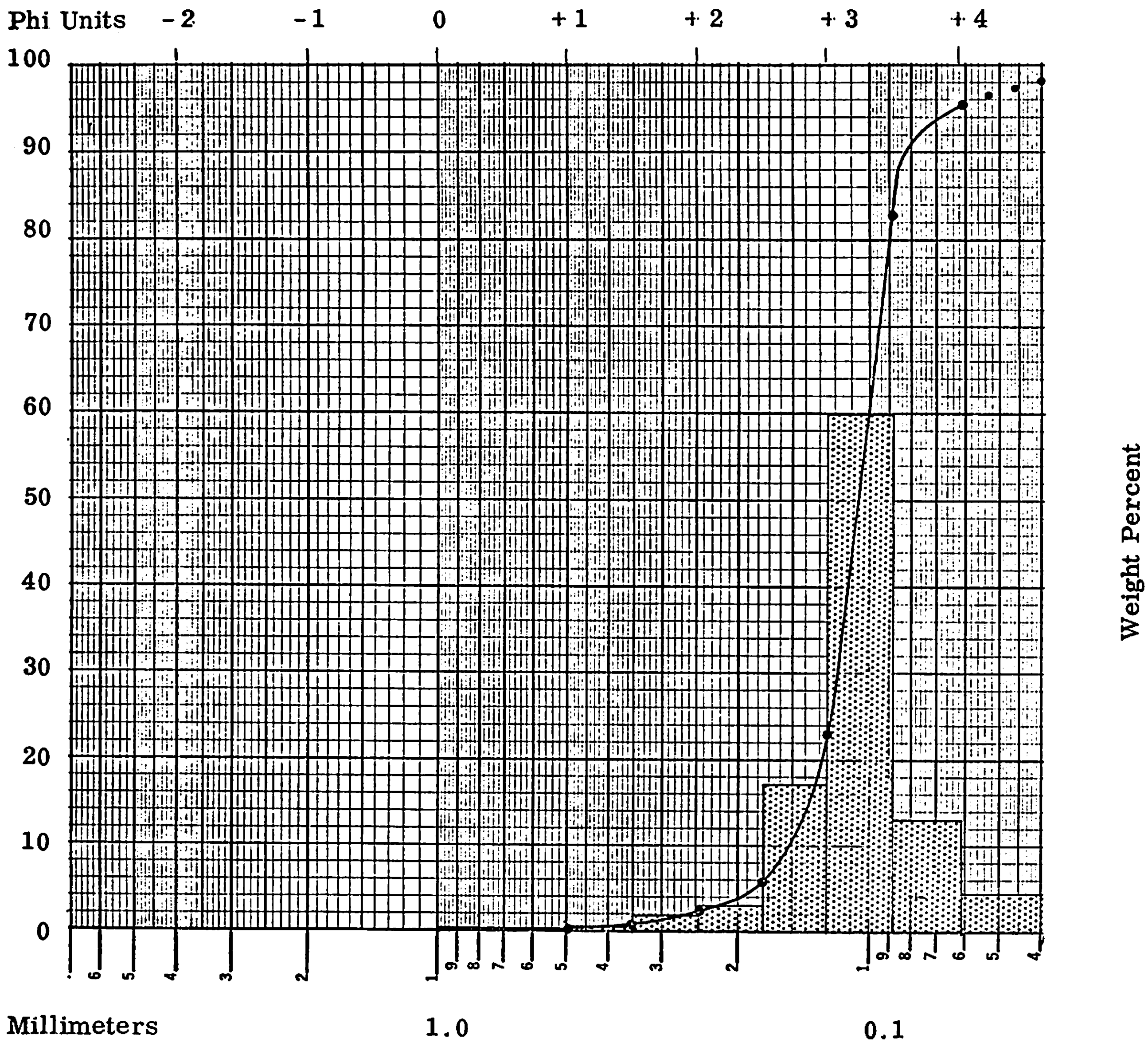
Depth 6.50 Fathoms

11.88 Meters

39.00 Feet

Sample description Very fine, gray sand

Sample Weight 235.11 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.09 mm

Sorting Coef. 1.15

Skewness 1.00

Kurtosis 0.21

Sample 1995

Lat. 37°53'47" Long. 122°39'41"

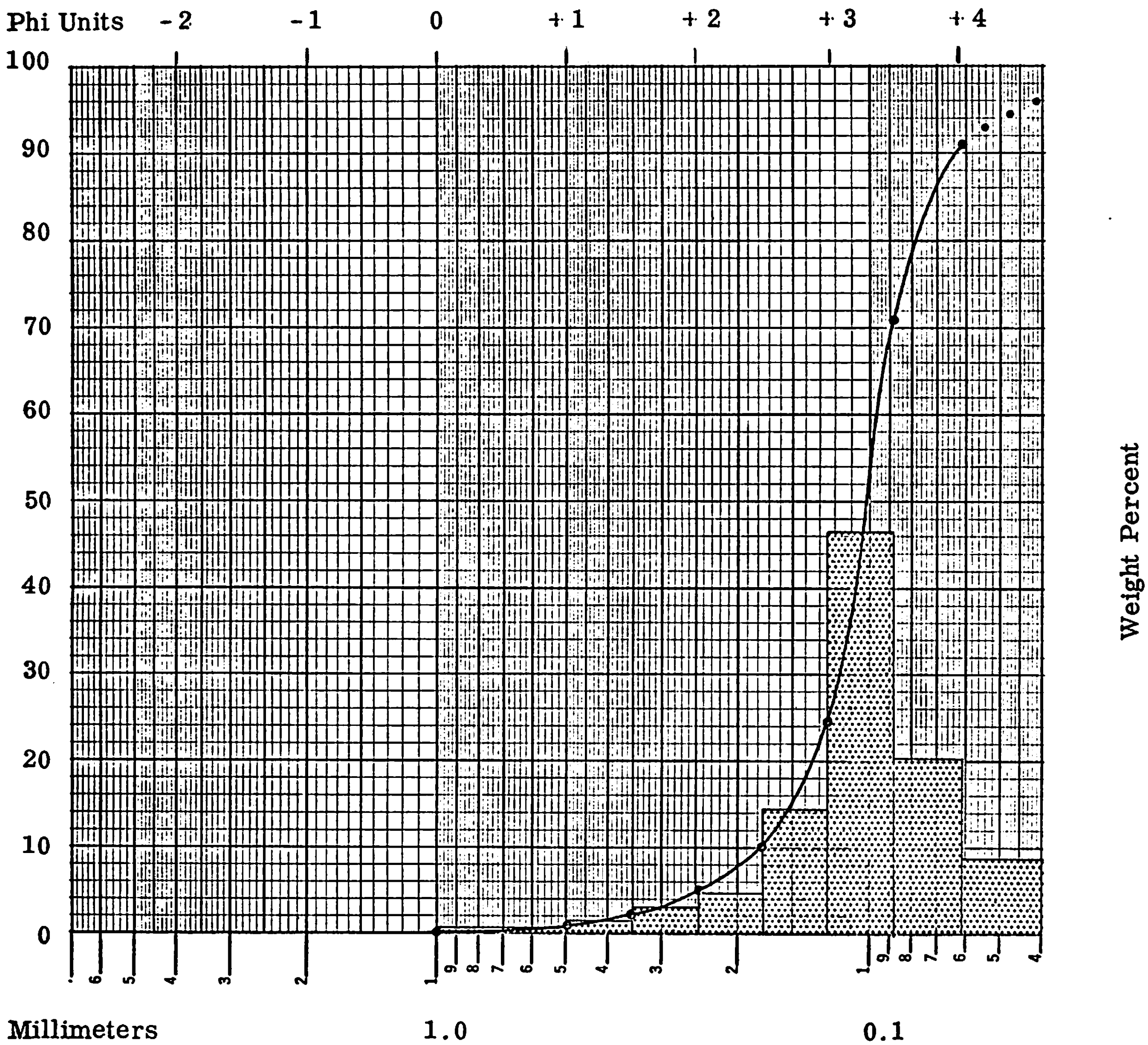
Depth 6.00 Fathoms

10.98 Meters

36.00 Feet

Sample description Very fine, silty gray sand with 10% shell fragments

Sample Weight 146.81 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.09 mm

Sorting Coef. 1.19

Skewness 1.09

Kurtosis 0.16

Sample 1996

Lat. 37°53'44" Long. 122°39'53"

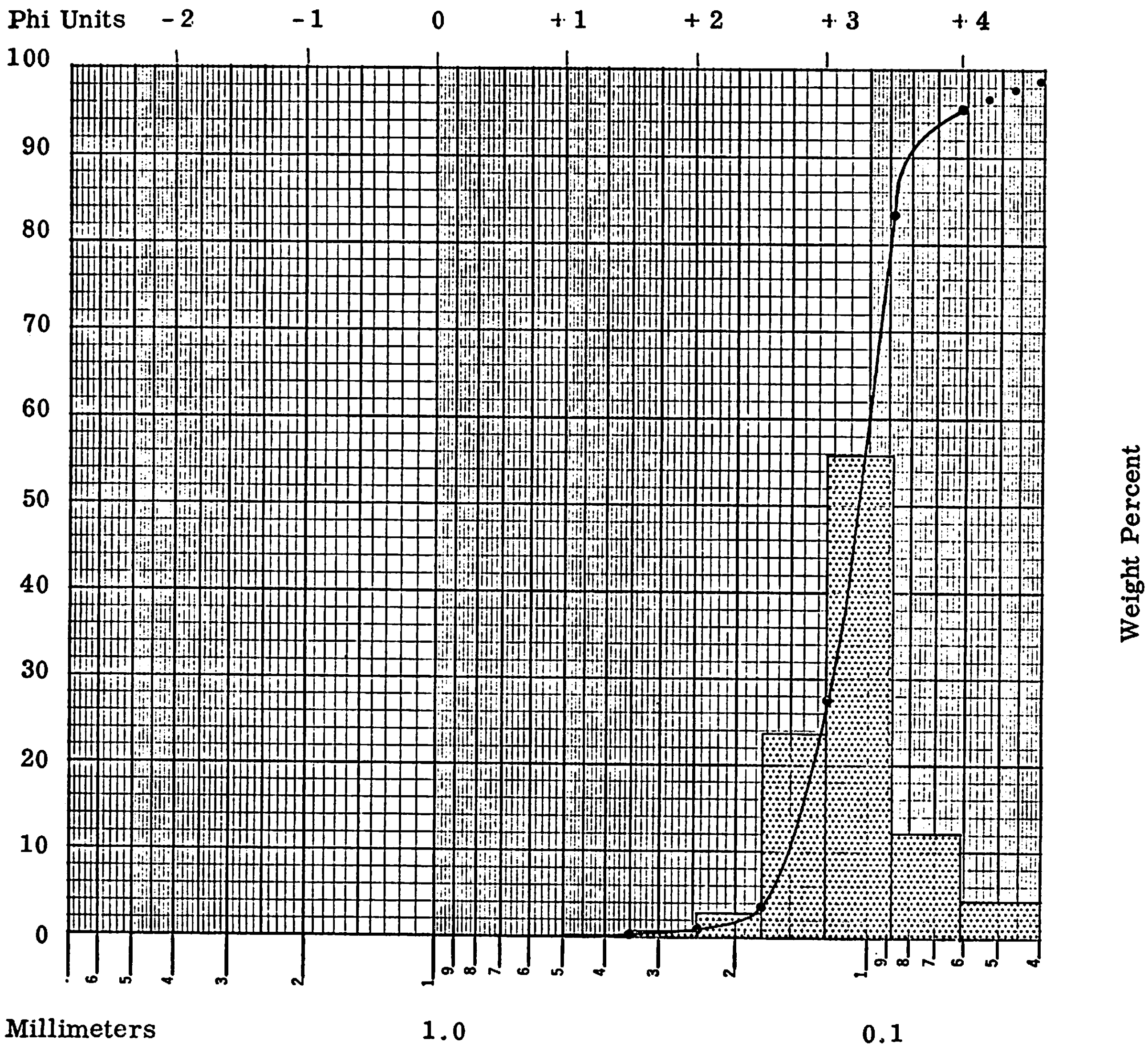
Depth 6.00 Fathoms

10.98 Meters

36.00 Feet

Sample description Very fine gray sand with 5% shell fragments

Sample Weight 260.99 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm | Q_{25} 0.13 mm | Sorting Coef. 1.17

2nd Mode | Median: Q_{50} 0.11 mm | Skewness 0.99

3rd Mode | Q_{75} 0.09 mm | Kurtosis 0.25

Sample 1997

Lat. 37°53'45" Long. 122°40'20"

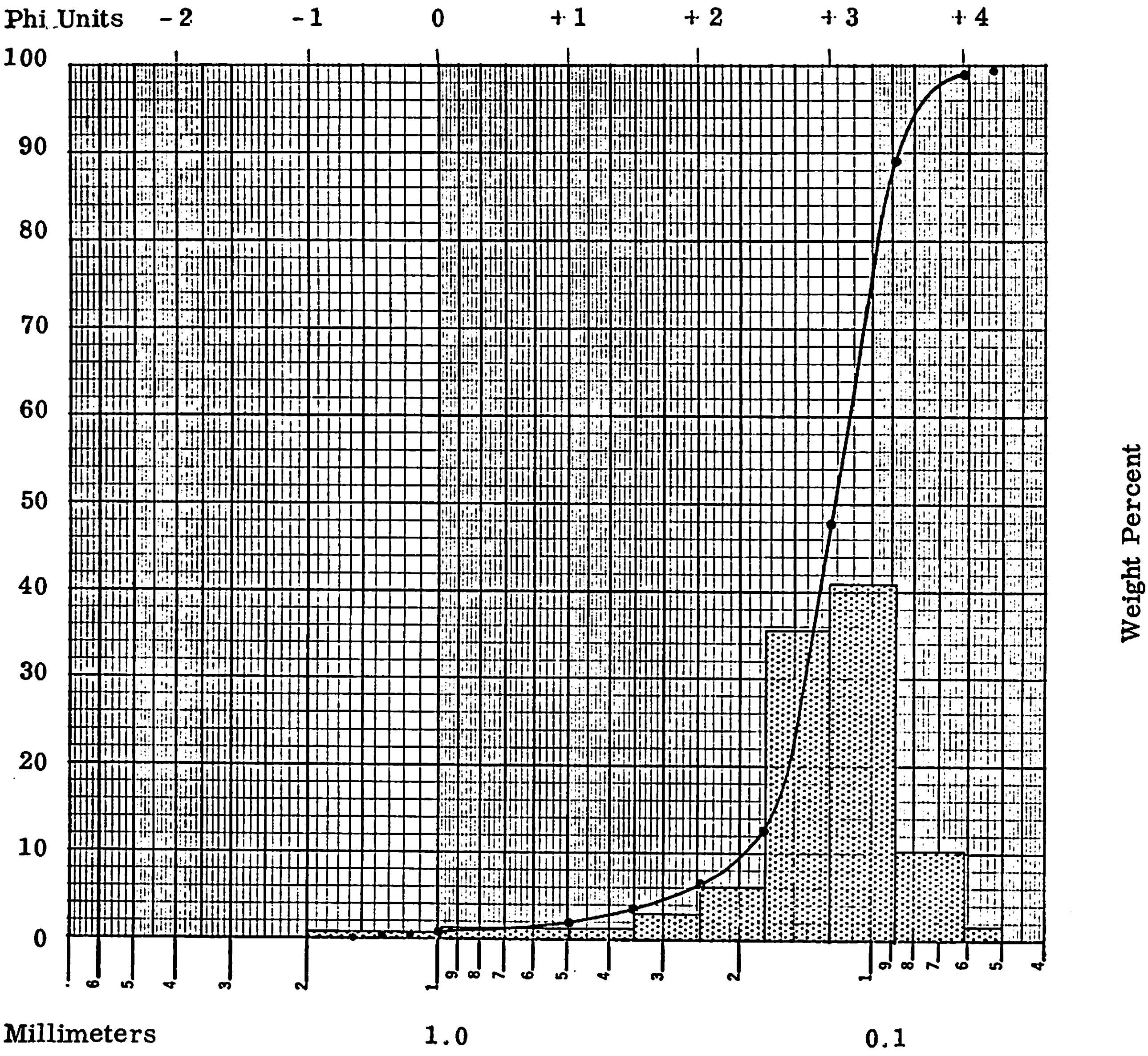
Depth 4.33 Fathoms

7.93 Meters

26.00 Feet

Sample description Very fine gray-tan sand with small dark pebbles and 10% shell fragments

Sample Weight 144.97 gms



SIZE PARAMETERS

1st Mode	0.124 - 0.088 mm	Q_{25}	0.14 mm	Sorting Coef.	1.17
2nd Mode		Median: Q_{50}	0.12 mm	Skewness	0.99
3rd Mode		Q_{75}	0.10 mm	Kurtosis	0.17

Sample 1999

Lat. 37°53'19" Long. 122°40'32"

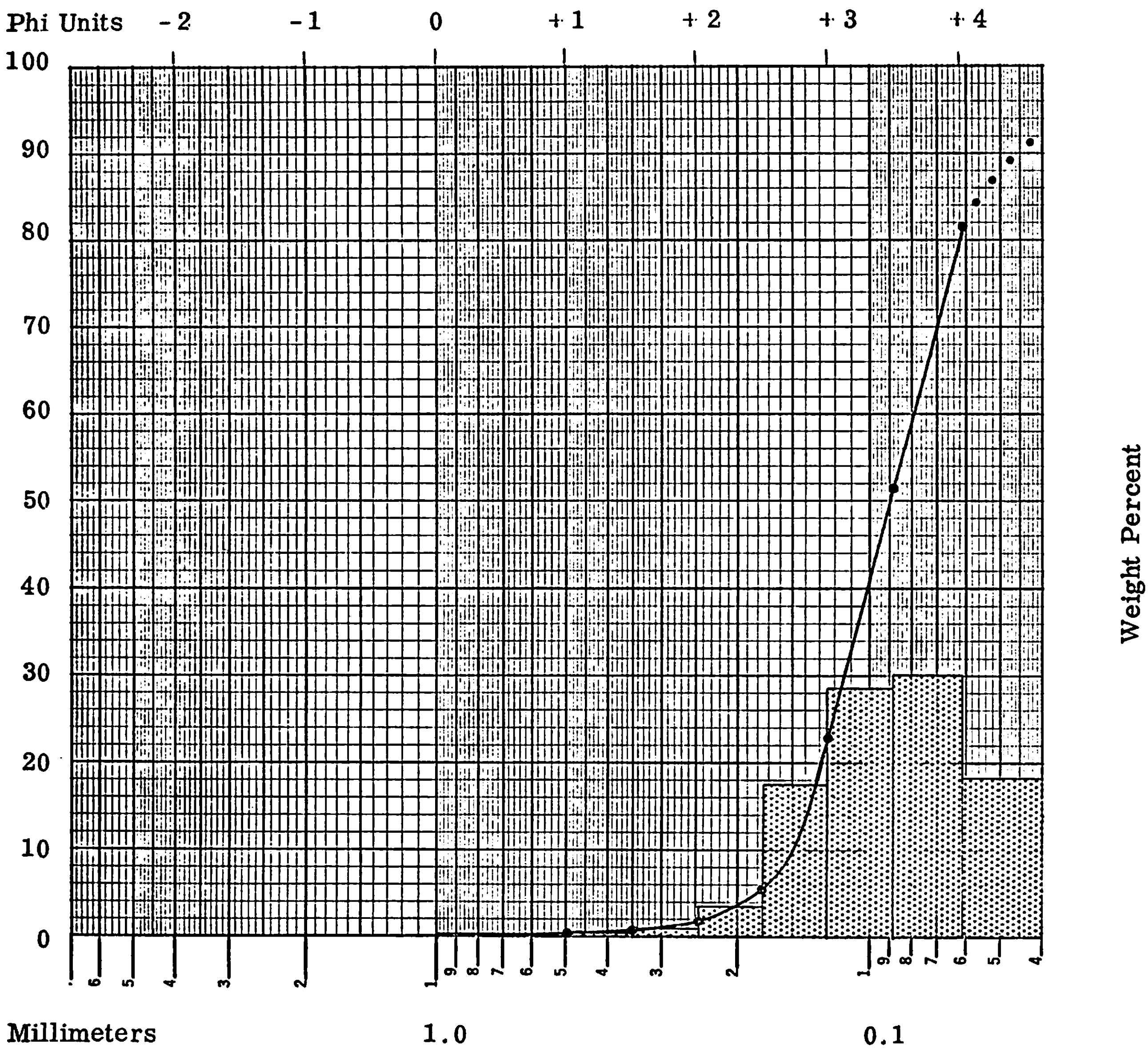
Depth 6.00 Fathoms

10.98 Meters

36.00 Feet

Sample description Very fine, silty gray-tan sand with a few pebbles

Sample Weight 98.48 gms



SIZE PARAMETERS

1st Mode 0.088 - 0.061 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.09 mm

Q_{75} 0.07 mm

Sorting Coef. 1.37

Skewness 1.00

Kurtosis 0.26

Sample 2001

Lat. 37°53'13" Long. 122°40'8"

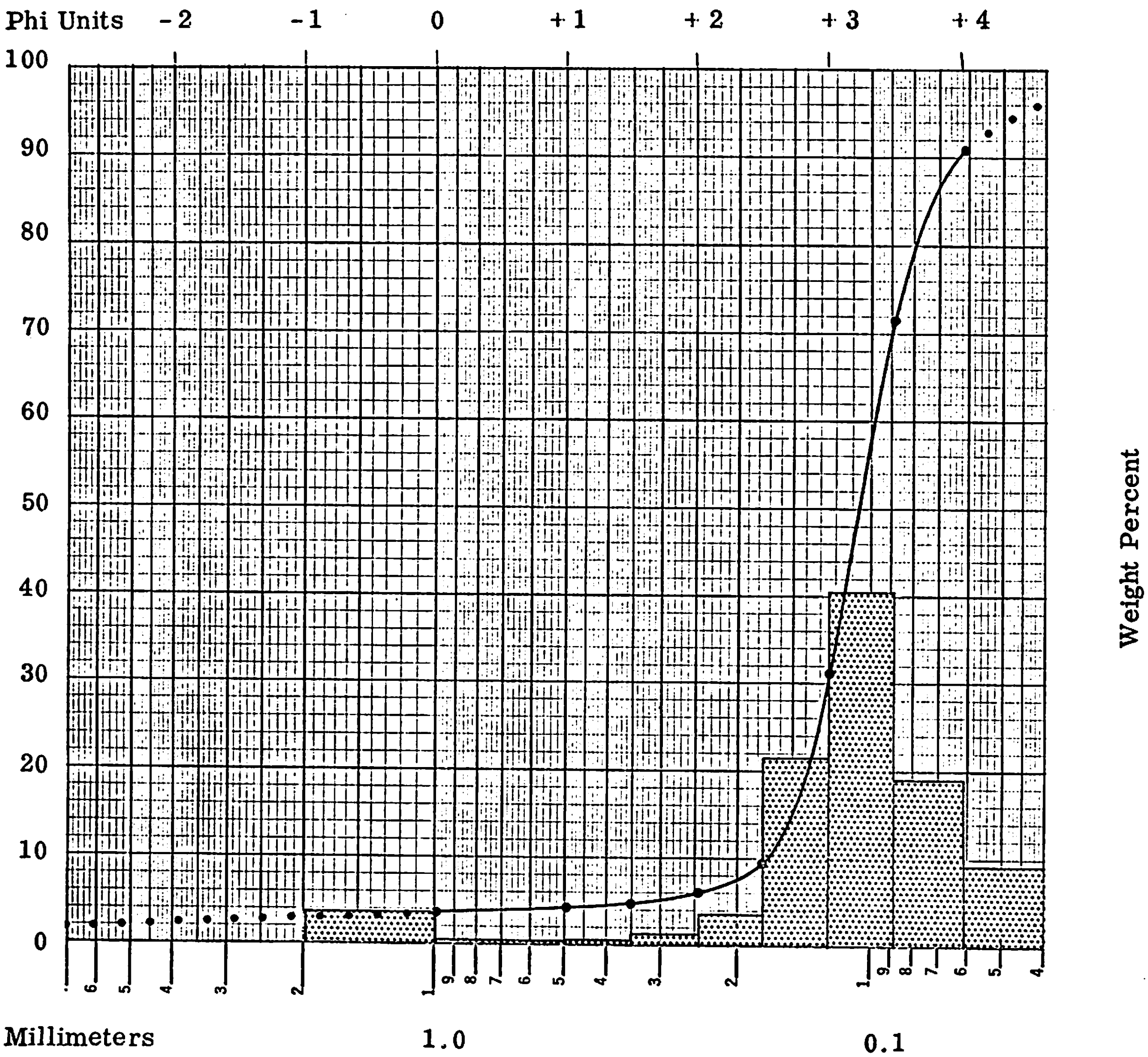
Depth 7.33 Fathoms

13.41 Meters

44.00 Feet

Sample description Very fine, silty gray sand with a few pebbles

Sample Weight 256.28 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode >1.981 - 1.981 mm

3rd Mode

Q_{25} 0.13 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.09 mm

Sorting Coef. 1.25

Skewness 0.98

Kurtosis 0.22

Sample 2002

Lat. 37°53'31" Long. 122°39'39"

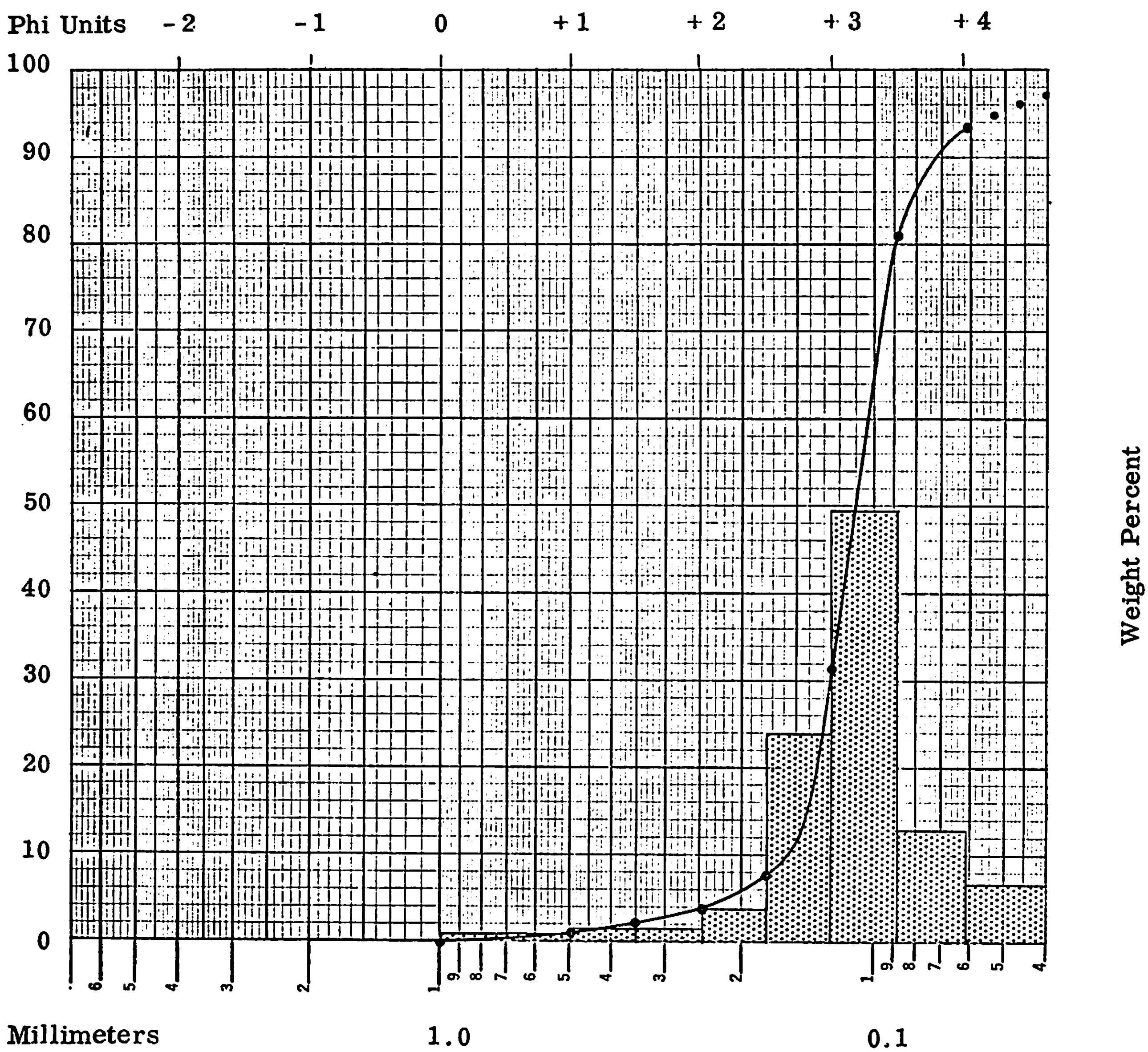
Depth 6.67 Fathoms

12.20 Meters

40.00 Feet

Sample description Very fine, silty gray-brown sand, <5% shell fragments

Sample Weight 238.41 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.13 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.09 mm

Sorting Coef. 1.20

Skewness 1.05

Kurtosis 0.22

SIZE ANALYSIS

Sample 2003

Lat. 37°53'25" Long. 122°39'18"

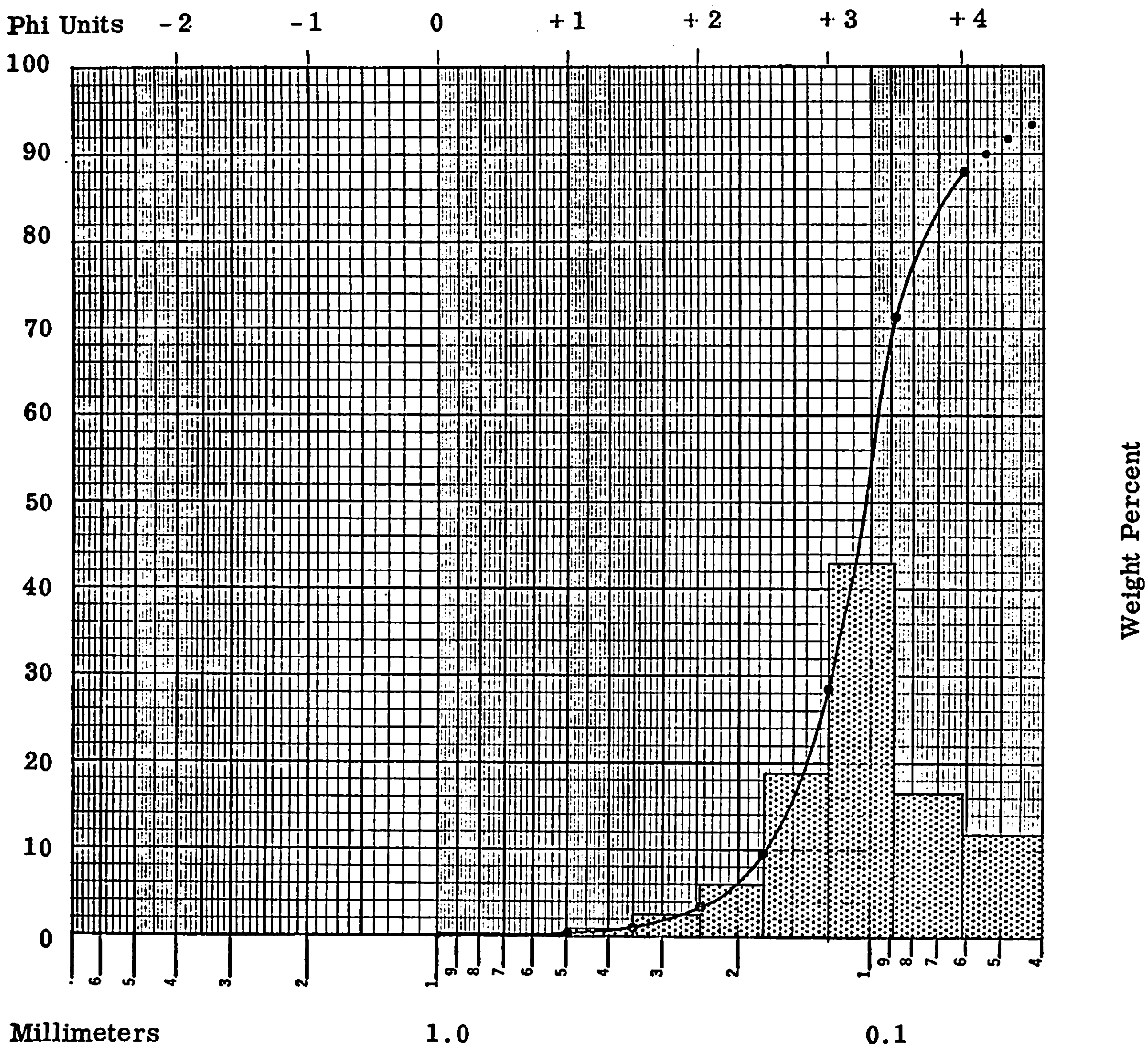
Depth 7.50 Fathoms

13.72 Meters

45.00 Feet

Sample description Very fine, silty gray sand

Sample Weight 219.76 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.13 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.09 mm

Sorting Coef. 1.24

Skewness 1.11

Kurtosis 0.18

Sample 2004

Lat. 37°53'13" Long. 122°38'55"

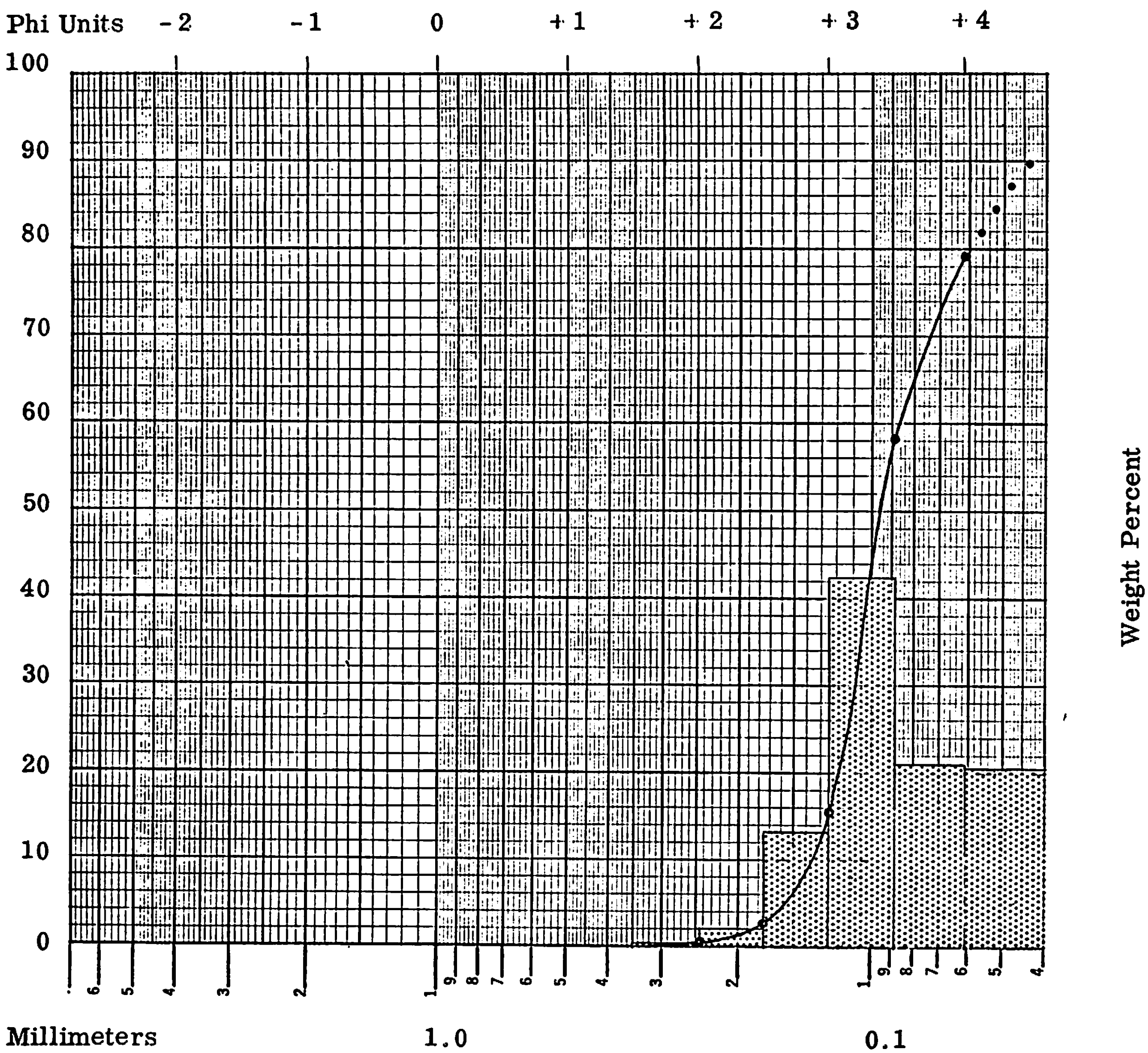
Depth 8.00 Fathoms

14.64 Meters

48.00 Feet

Sample description Very fine, silty gray sand

Sample Weight 223.01 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.11 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.07 mm

Sorting Coef. 1.29

Skewness 0.83

Kurtosis 0.24

Sample 2005

Lat. 37°53'2" Long. 122°38'27"

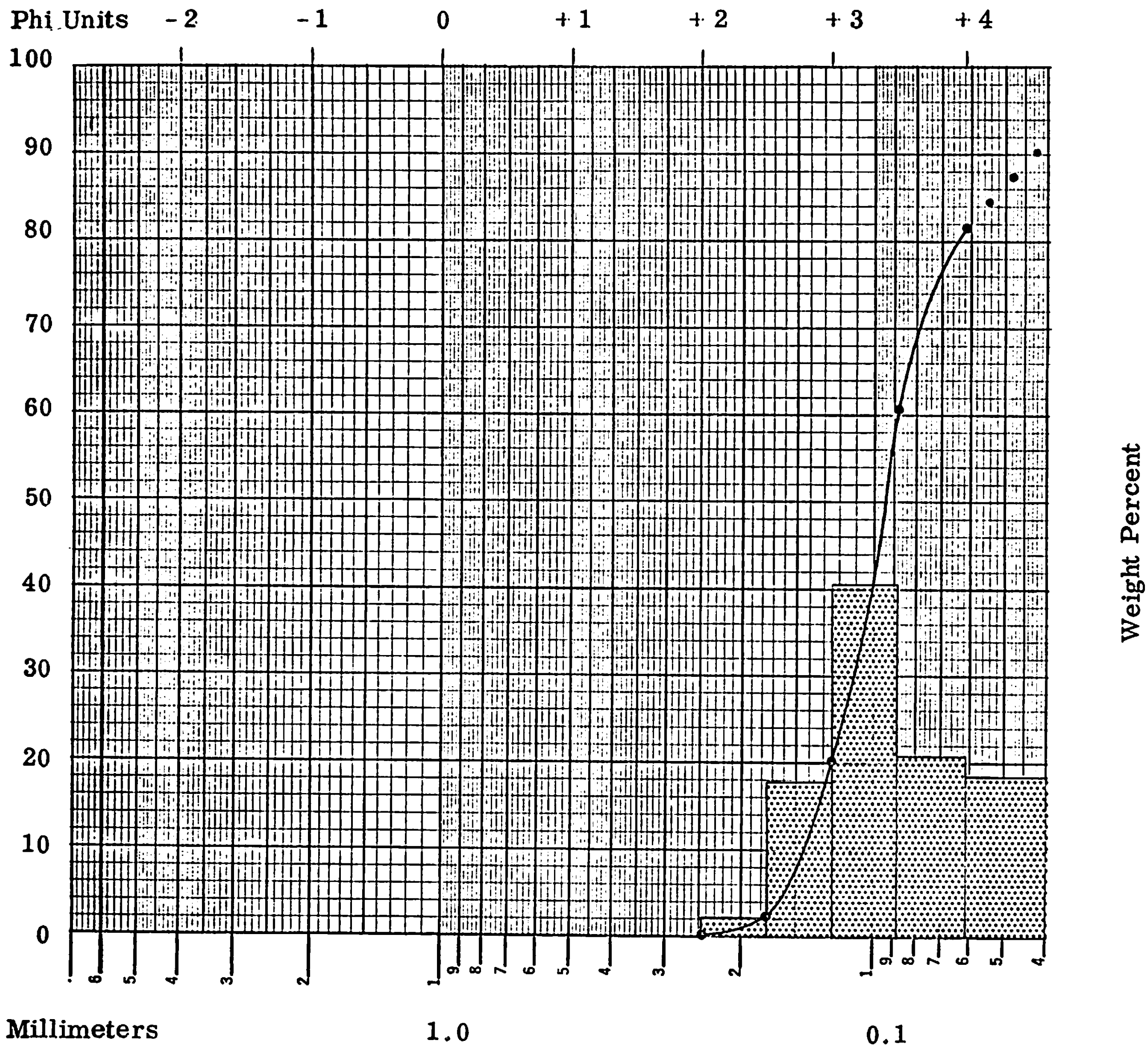
Depth 8.67 Fathoms

15.86 Meters

52.00 Feet

Sample description Very fine, silty gray sand

Sample Weight 206.01 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.07 mm

Sorting Coef. 1.28

Skewness 0.94

Kurtosis 0.23

Sample 2006

Lat. 37°52'48" Long. 122°38'13"

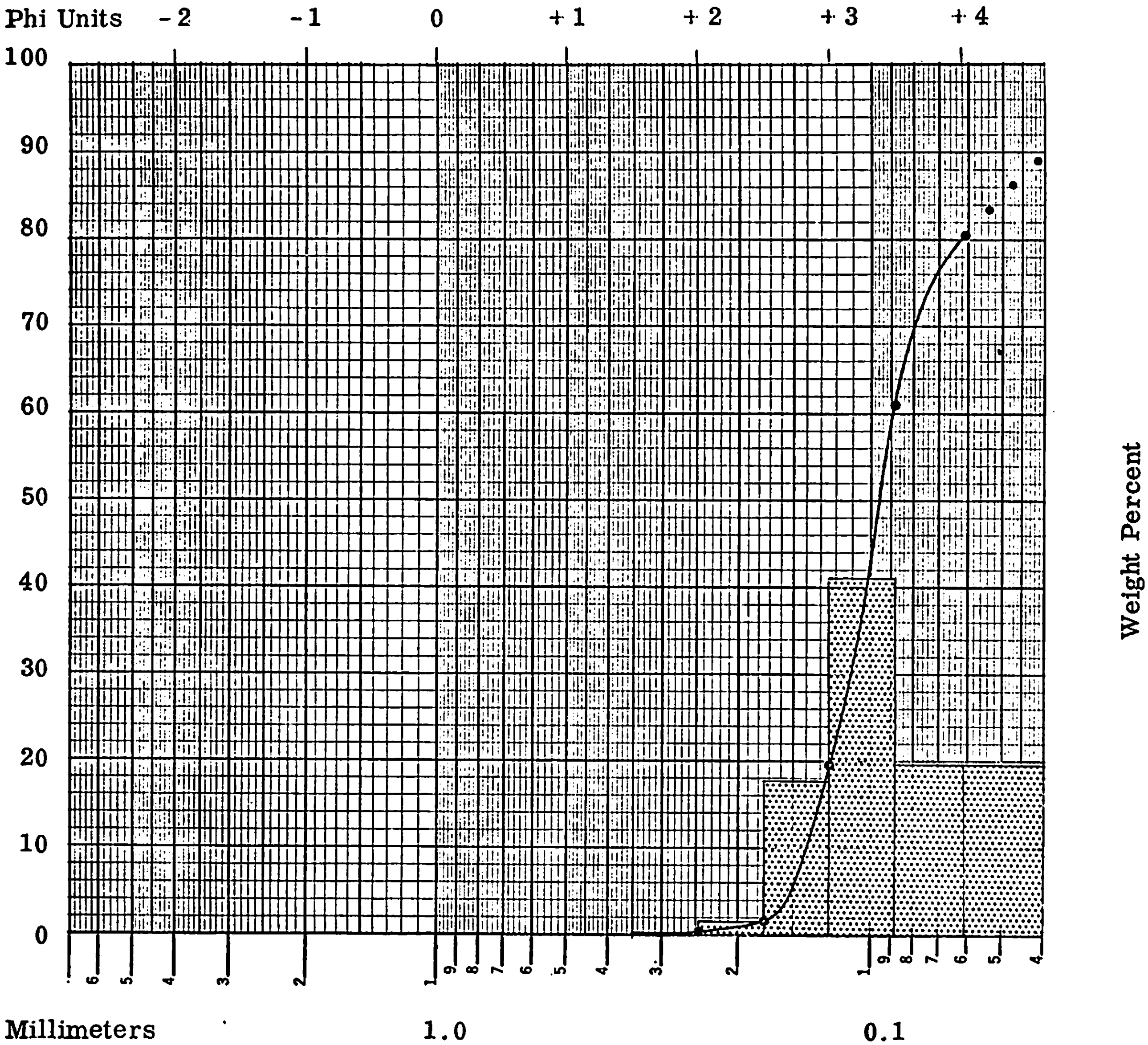
Depth 9.00 Fathoms

16.48 Meters

54.00 Feet

Sample description Very fine, gray silty sand

Sample Weight 77.73 gms



SIZE PARAMETERS

1st Mode	0.124 - 0.088 mm	Q_{25}	0.12 mm	Sorting Coef.	1.29
2nd Mode		Median: Q_{50}	0.10 mm	Skewness	0.91
3rd Mode		Q_{75}	0.07 mm	Kurtosis	0.24

Sample 2008

Lat. 37°52'33" Long. 122°38'24"

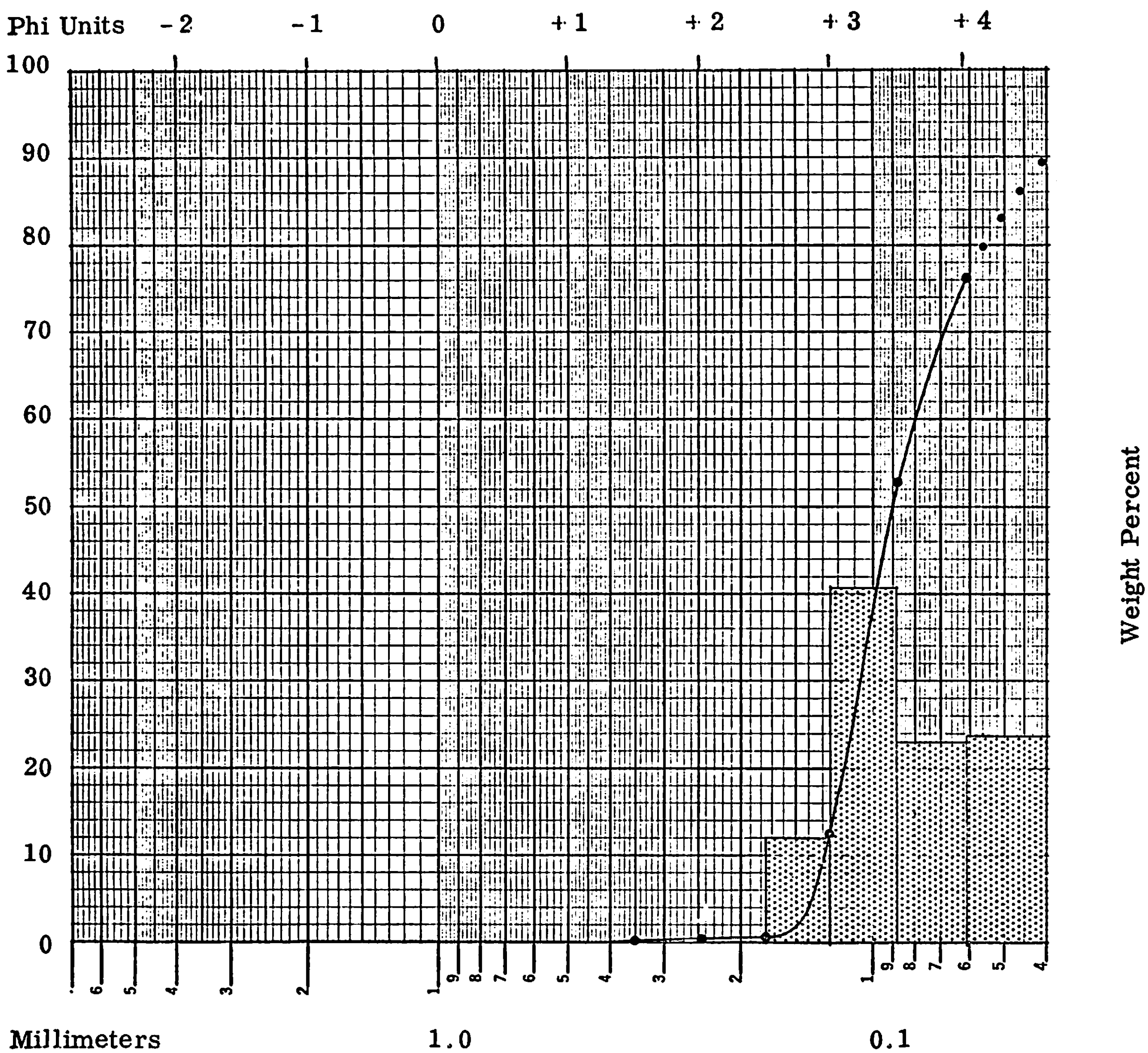
Depth 9.50 Fathoms

17.38 Meters

57.00 Feet

Sample description Very fine, silty gray sand

Sample Weight 197.55 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.11 mm

Median: Q_{50} 0.09 mm

Q_{75} 0.06 mm

Sorting Coef. 1.34

Skewness 0.83

Kurtosis 0.28

Sample 2009

Lat. 37°52'53" Long. 122°38'59"

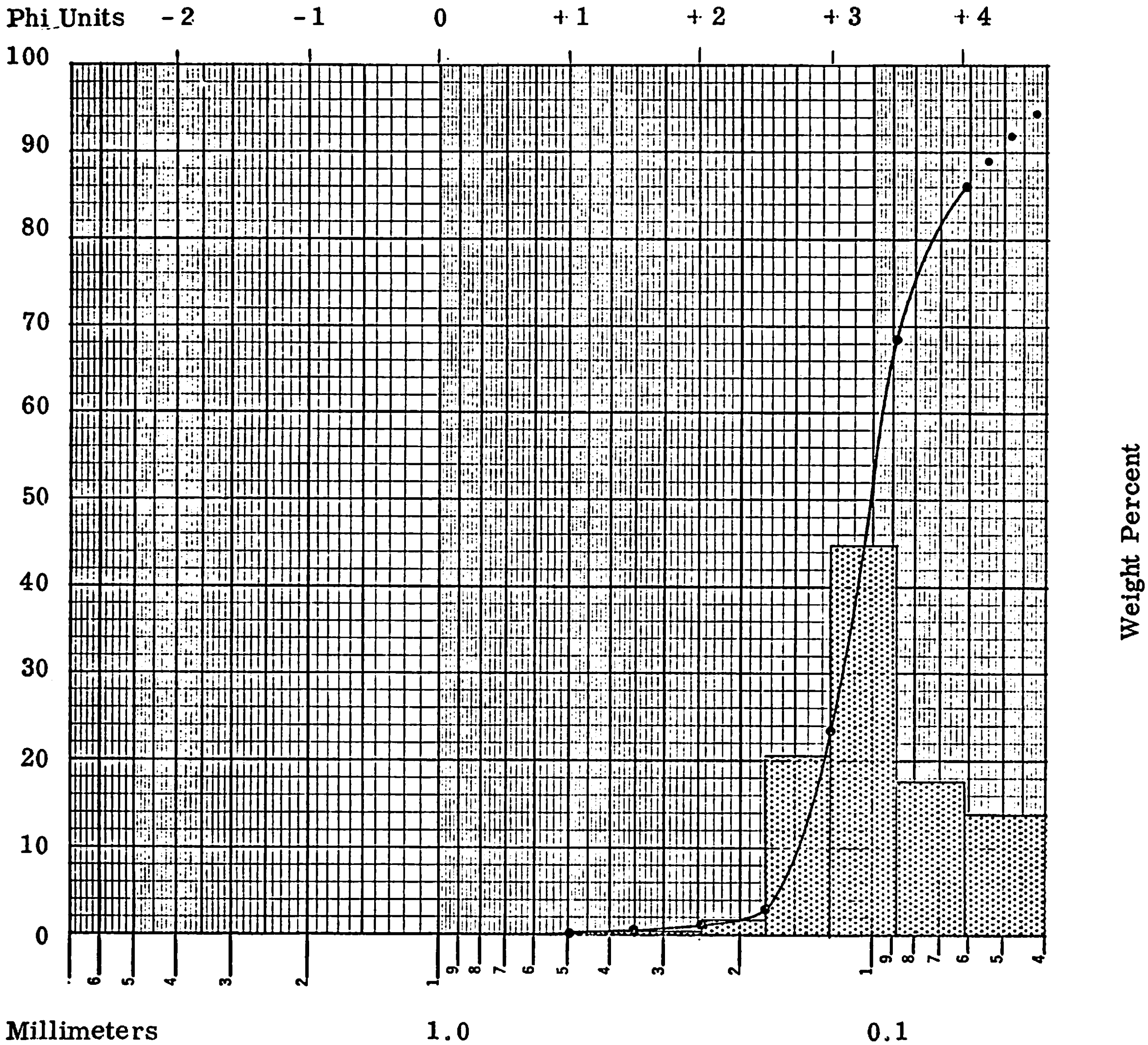
Depth 9.17 Fathoms

16.77 Meters

55.00 Feet

Sample description Very fine, silty gray sand

Sample Weight 232.54 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.08 mm

Sorting Coef. 1.24

Skewness 0.89

Kurtosis 0.23

Sample 2010

Lat. 37°53'8" Long. 122°39'29"

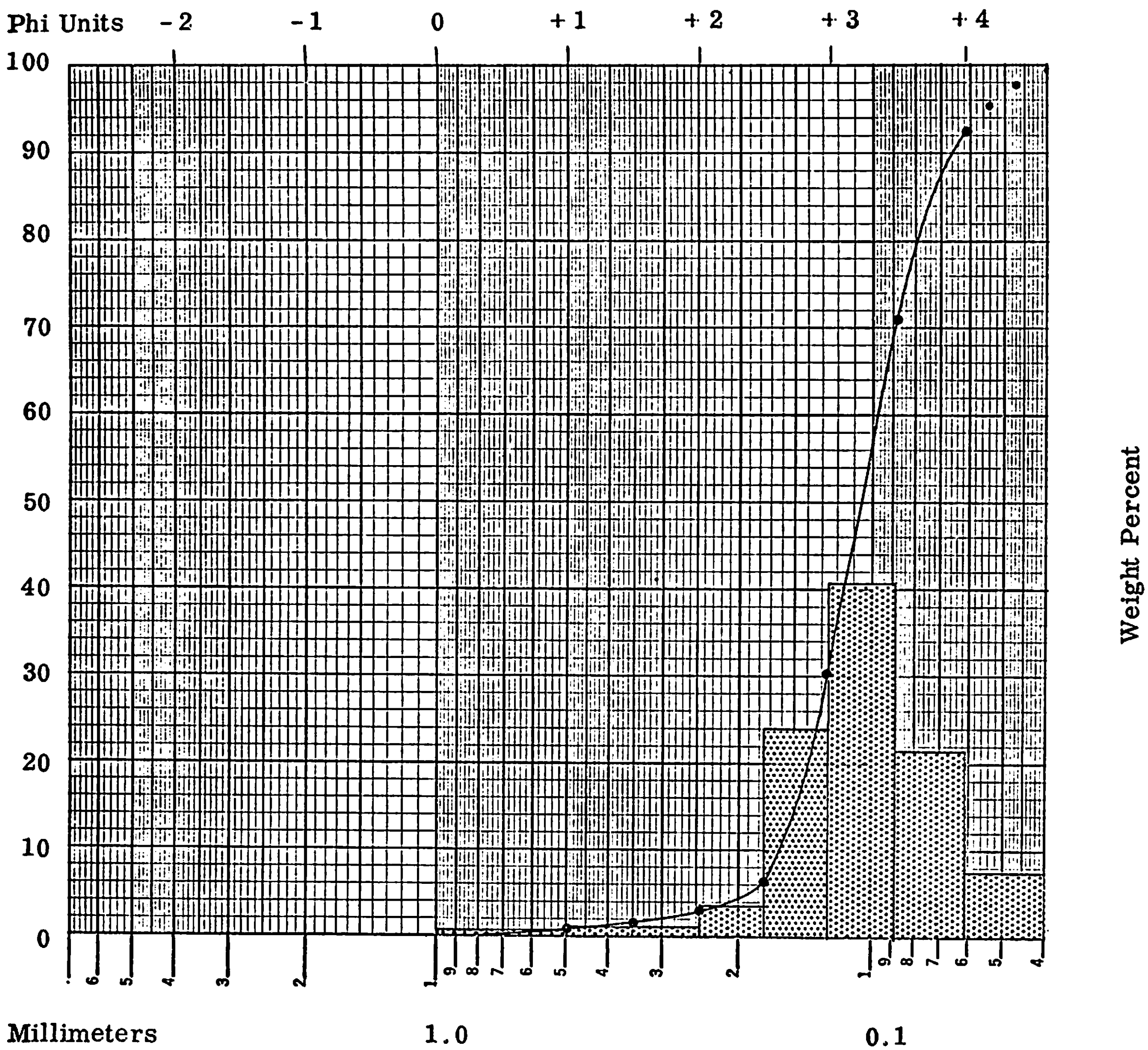
Depth 8.00 Fathoms

14.63 Meters

48.00 Feet

Sample description Very fine, gray sand

Sample Weight 123.14 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.13 mm

Median: Q_{50} 0.11 mm

Q_{75} 0.09 mm

Sorting Coef. 1.25

Skewness 1.00

Kurtosis 0.24

SIZE ANALYSIS

Sample 2011

Sample description Very fine, silty gray sand

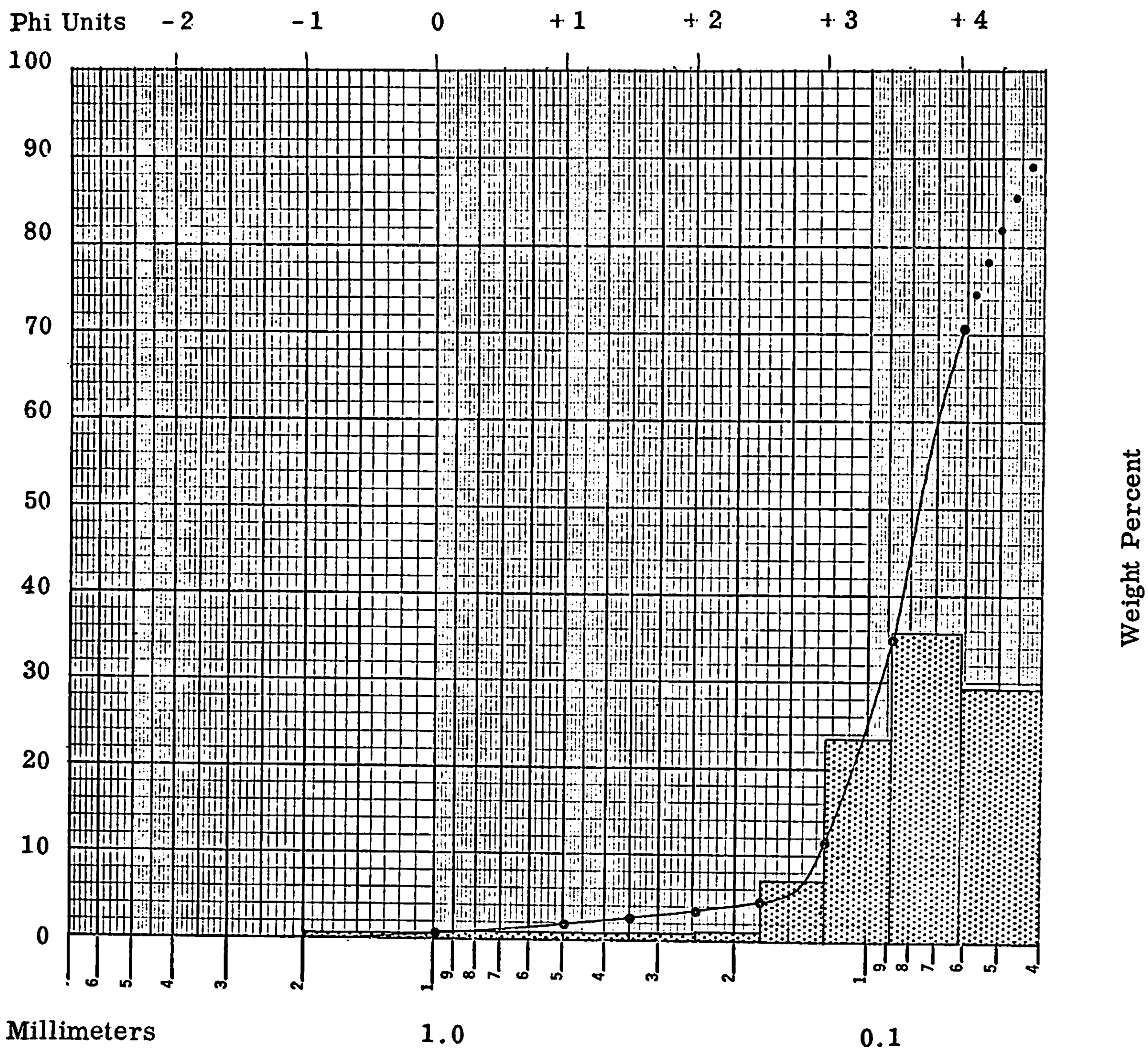
Lat. 37°52'56" Long. 122°39'52"

Depth 7.50 Fathoms

13.72 Meters

45.00 Feet

Sample Weight 121.21 gms



SIZE PARAMETERS

1st Mode	0.088 - 0.061	Q_{25}	0.10 mm	Sorting Coef.	1.34
2nd Mode		Median: Q_{50}	0.07 mm	Skewness	1.02
3rd Mode		Q_{75}	0.06 mm	Kurtosis	0.26

Sample 2012

Sample description Very fine, silty gray sand

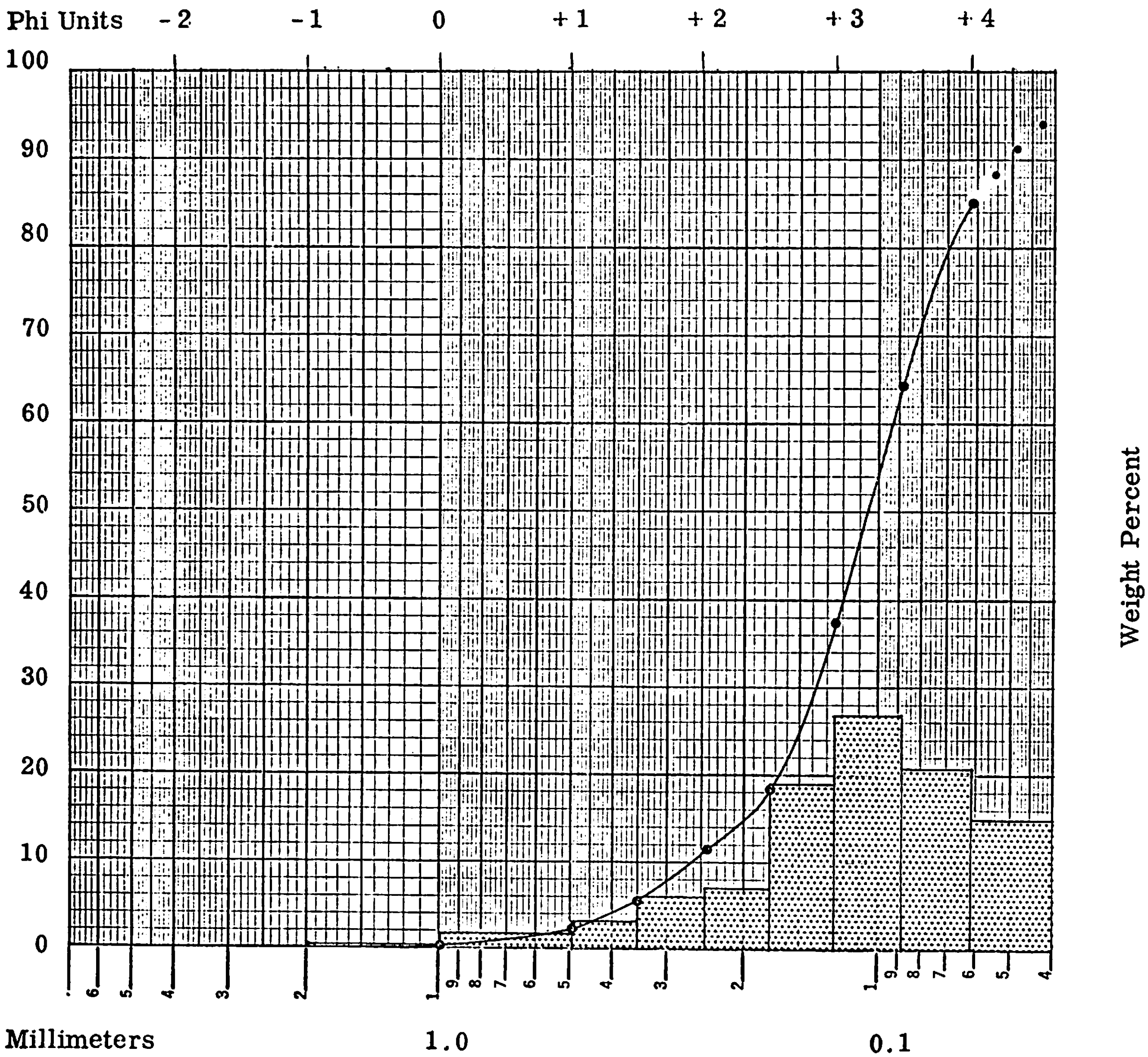
Lat. 37°52'39" Long. 122°39'20"

Depth 9.00 Fathoms

16.47 Meters

54.00 Feet

Sample Weight 124.20 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.15 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.08 mm

Sorting Coef. 1.41

Skewness 1.10

Kurtosis 0.18

Sample 2013

Lat. 37°52'28" Long. 122°38'42"

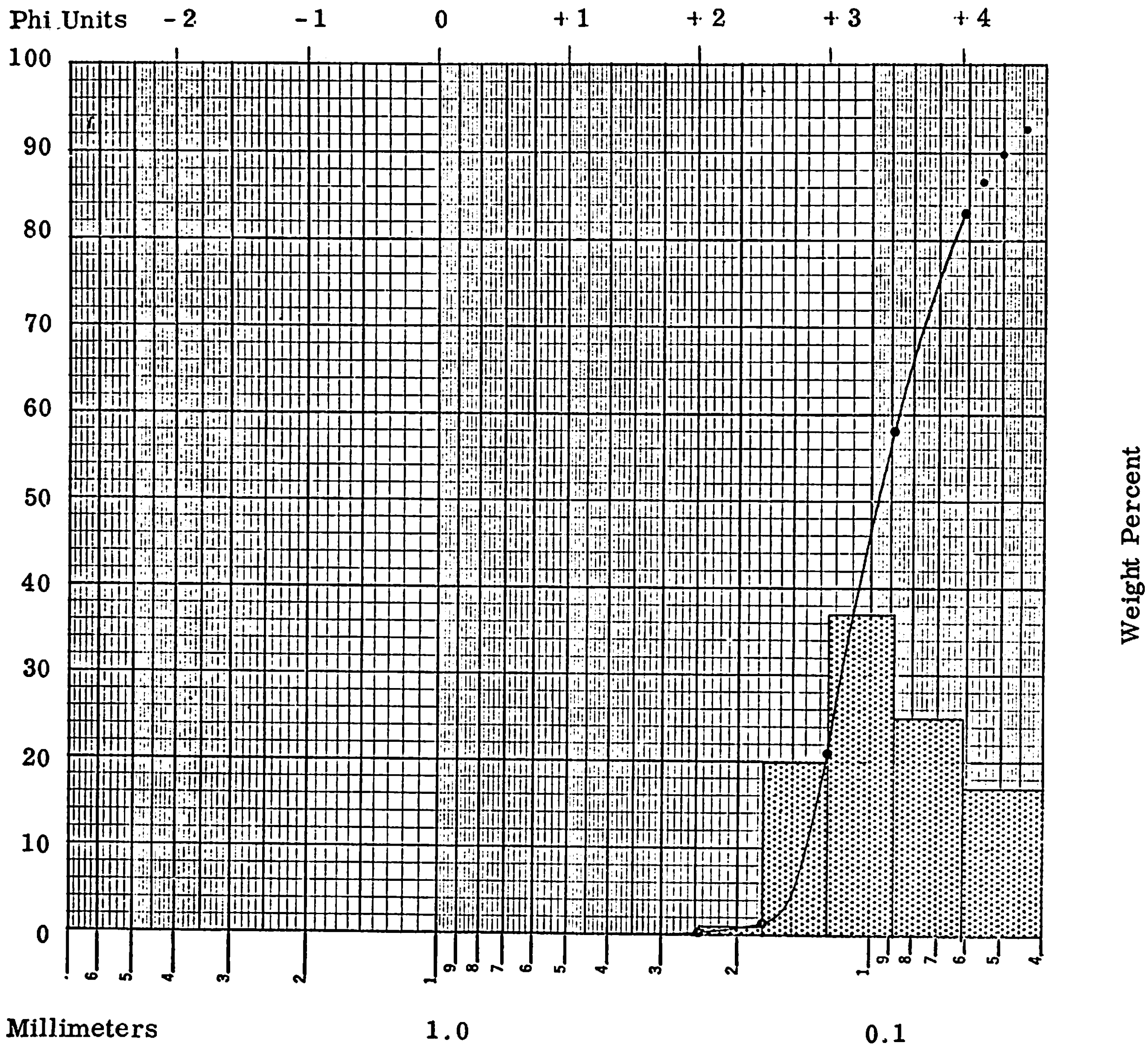
Depth 9.67 Fathoms

17.69 Meters

58.00 Feet

Sample description Very fine, silty gray sand

Sample Weight 104.54 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.07 mm

Sorting Coef. 1.31

Skewness 0.89

Kurtosis 0.28

Sample 2014

Lat. 37°52'4" Long. 122°37'40"

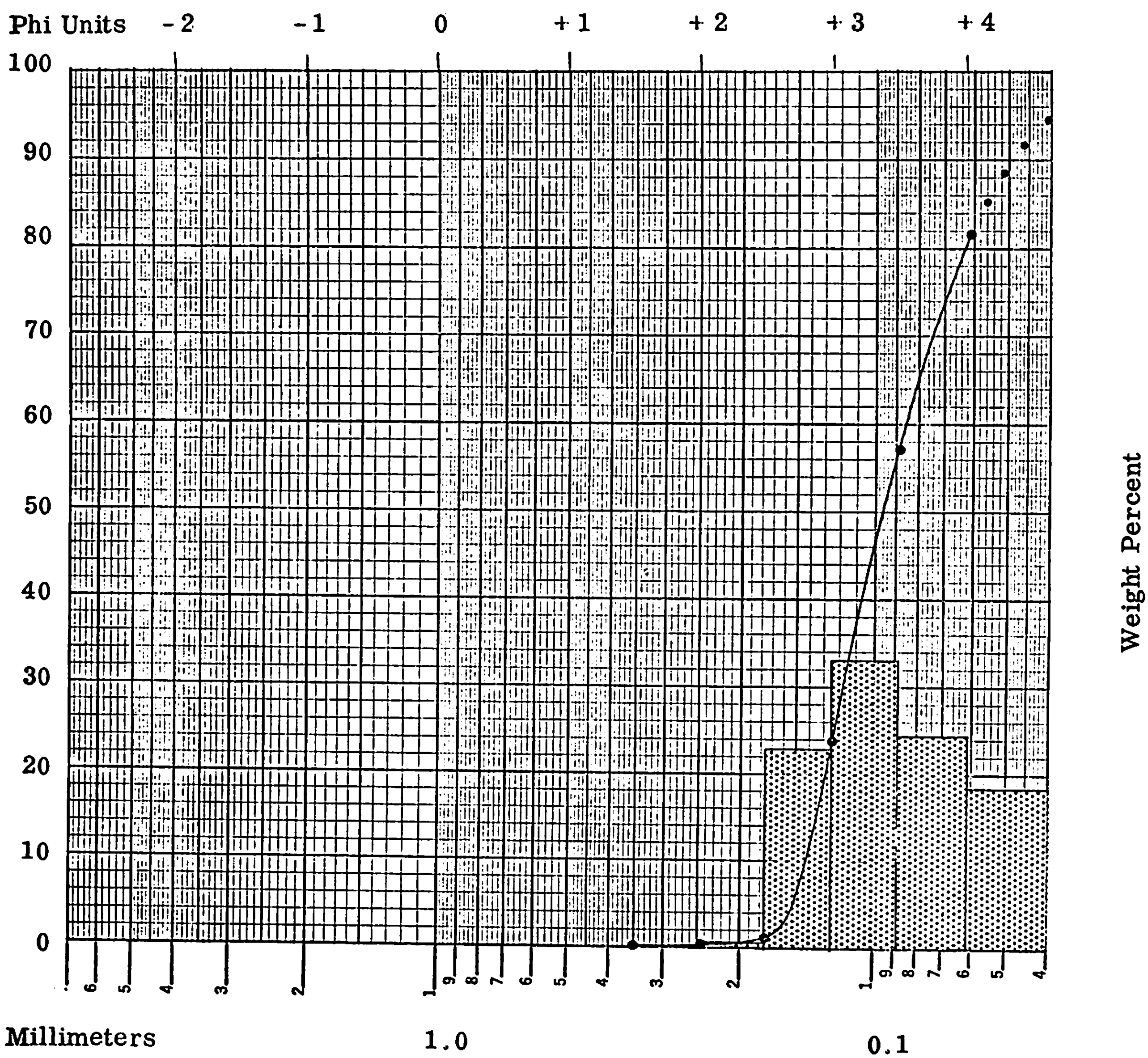
Depth 9.83 Fathoms

18.00 Meters

59.00 Feet

Sample description Very fine, silty gray sand

Sample Weight 119.95 gms



SIZE PARAMETERS

1st Mode 0.124 - 0.088 mm

2nd Mode

3rd Mode

Q_{25} 0.12 mm

Median: Q_{50} 0.10 mm

Q_{75} 0.07 mm

Sorting Coef. 1.35

Skewness 0.92

Kurtosis 0.32

Sample 2015

Lat. 37° 53' 40" Long. 122° 41' 58"

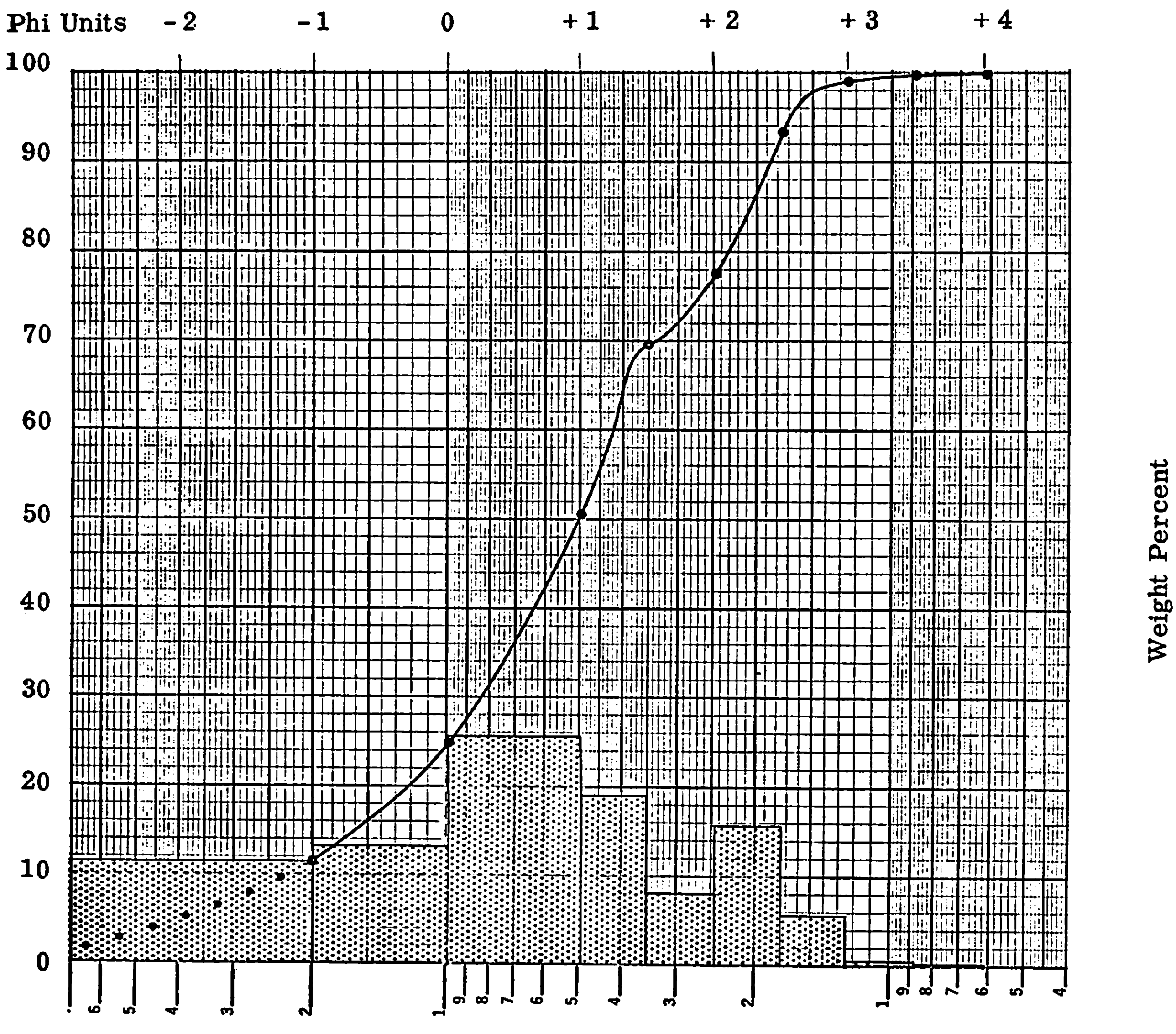
Depth Mean high tide level Fathoms

Meters

Feet

Sample description Coarse, brown, pebbly sand with 20% shell fragments

Sample Weight 199.42 gms.



SIZE PARAMETERS

1st Mode 0.991 - 0.495 mm

2nd Mode 0.246 - 0.175 mm

3rd Mode

Q_{25} 0.99 mm

Median: Q_{50} 0.5 mm

Q_{75} 0.27 mm

Sorting Coef. 1.94

Skewness 1.59

Kurtosis 0.18

Sample 2016

Lat. 37° 53' 39" Long. 122° 41' 58"

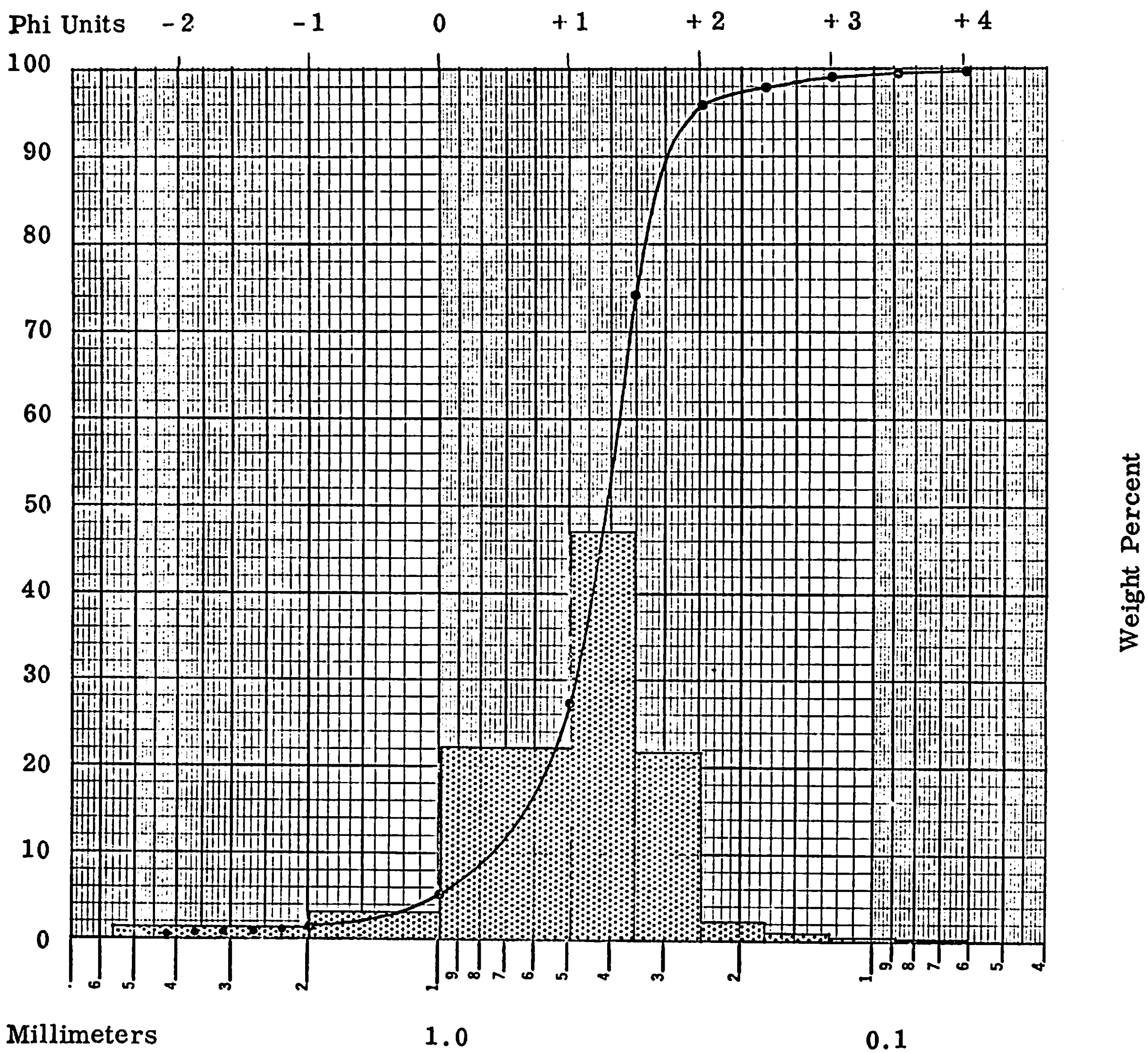
Depth Mean low tide level Fathoms

Meters

Feet

Sample description Medium brown sand with 25% shell fragments. Also a few small pebbles.

Sample Weight 172.47 gms.



SIZE PARAMETERS

1st Mode	0.495 - 0.351 mm	Q_{25}	0.52 mm	Sorting Coef.	1.22
2nd Mode		Median: Q_{50}	0.41 mm	Skewness	1.11
3rd Mode		Q_{75}	0.35 mm	Kurtosis	0.17

Sample 2017

Lat. 37° 53' 47" Long. 122° 41' 54"

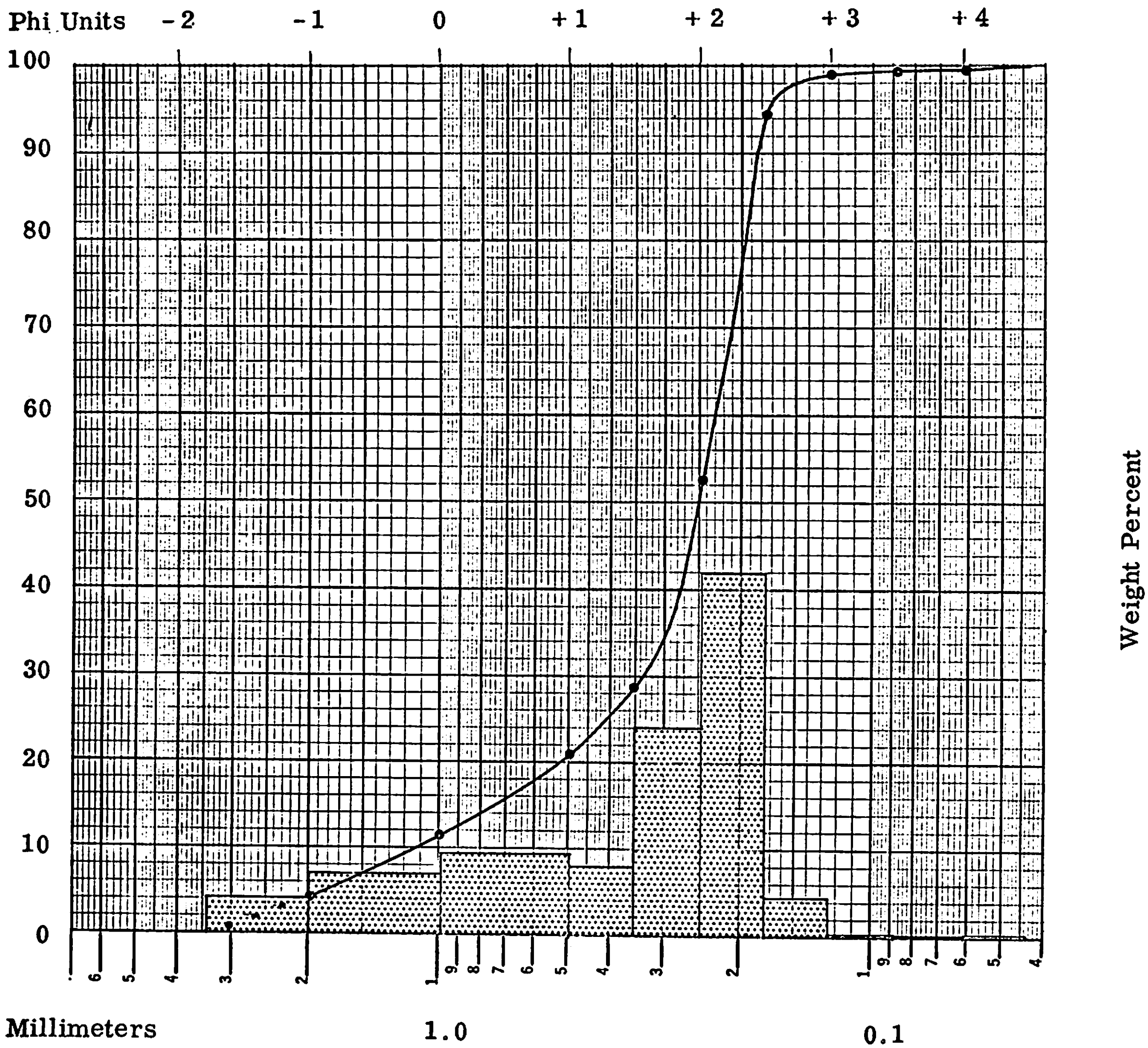
Depth High tide level Fathoms

Meters

Feet

Sample description Medium-fine, tan pebbly sand with 10% coarse shell fragments and some coarse rock fragments.

Sample Weight 222.74 gms.



SIZE PARAMETERS

1st Mode	0.246 - 0.175 mm	Q_{25}	0.40 mm	Sorting Coef.	1.36
2nd Mode		Median: Q_{50}	0.26 mm	Skewness	1.32
3rd Mode		Q_{75}	0.22 mm	Kurtosis	0.10

Sample 2018

Lat. 37° 53' 45" Long. 122° 41' 46"

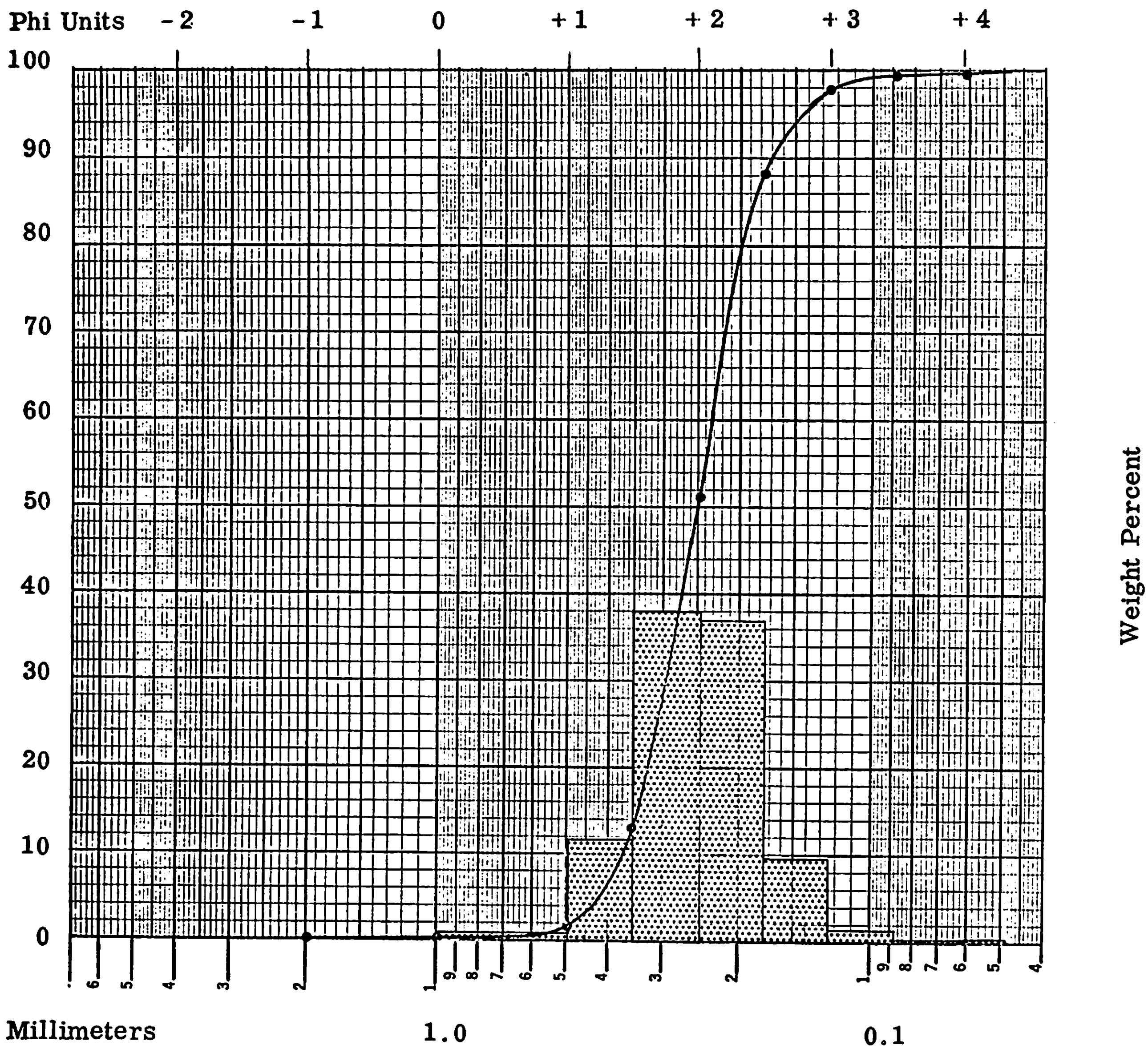
Depth Low tide level Fathoms

Meters

Feet

Sample description Fine brown sand with 10 - 15% shell fragments.

Sample Weight 176.06 gms



SIZE PARAMETERS

1st Mode 0.351 - 0.175 mm

2nd Mode

3rd Mode

Q_{25} 0.31 mm

Median: Q_{50} 0.25 mm

Q_{75} 0.21 mm

Sorting Coef. 1.23

Skewness 1.02

Kurtosis 0.26

Sample 2019

Lat. 37° 54' 7" Long. 122° 41' 28"

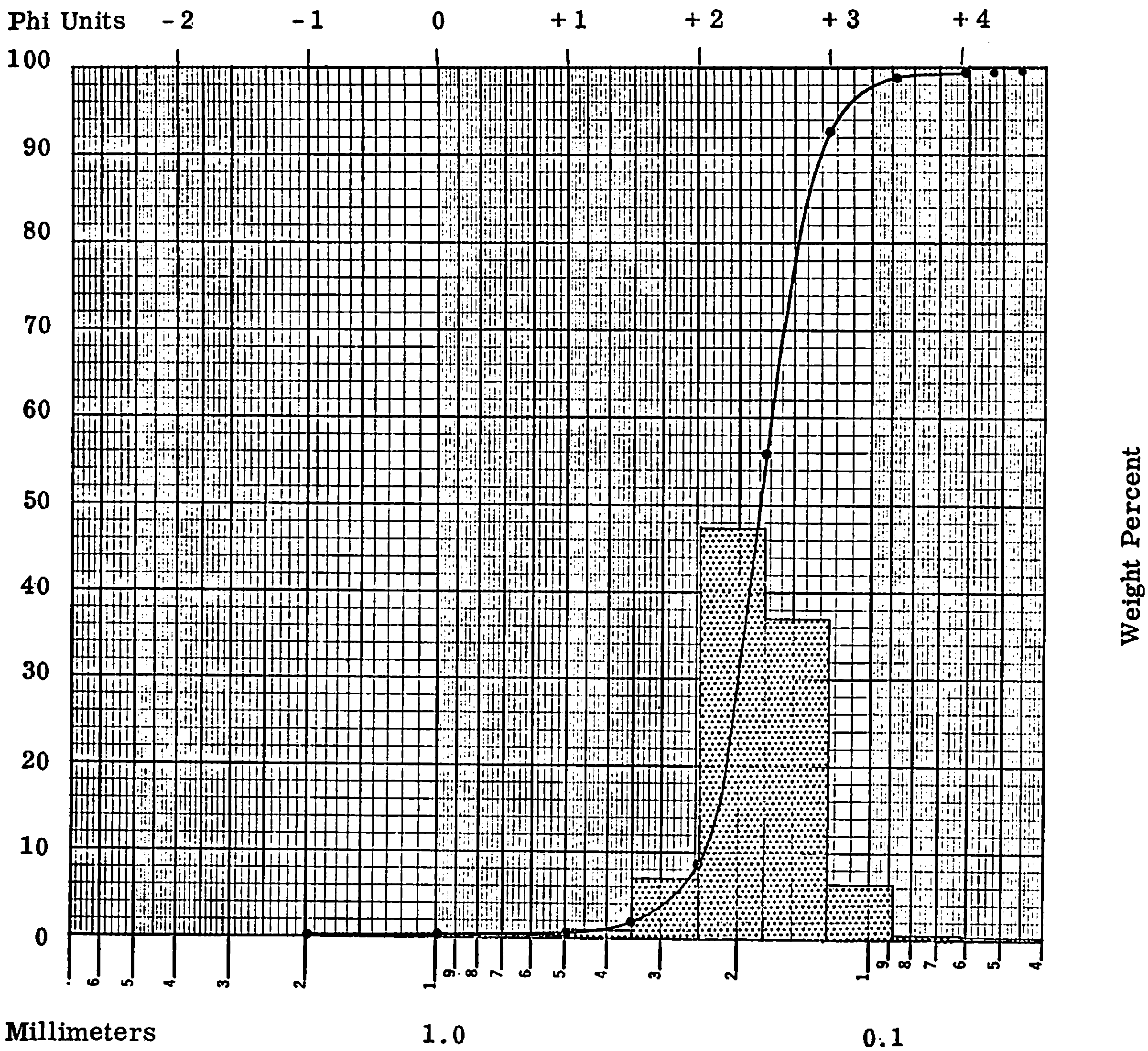
Depth High tide level Fathoms

Meters

Feet

Sample description Fine brown sand with some small pebbles and 10 - 15% shell fragments.

Sample Weight 242.09 gms.



SIZE PARAMETERS

1st Mode 0.246 - 0.175 mm

2nd Mode

3rd Mode

Q_{25} 0.22 mm

Median: Q_{50} 0.18 mm

Q_{75} 0.15mm

Sorting Coef. 1.21

Skewness 0.97

Kurtosis 0.57

Sample 2020

Lat. 37° 54' 4" Long. 122° 41' 27"

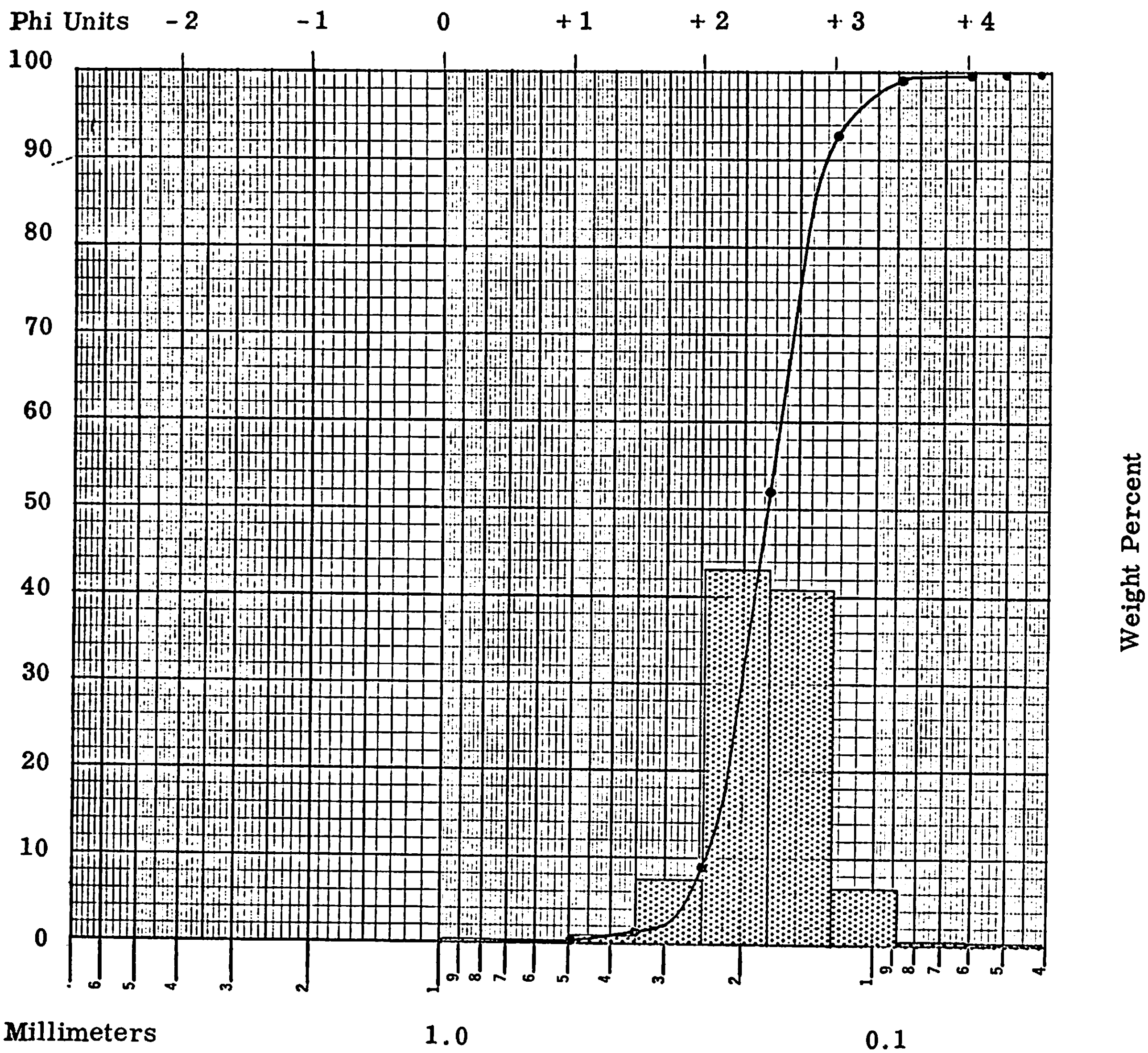
Depth Low tide level Fathoms

Meters

Feet

Sample description Fine tan sand with 10 - 15% shell fragments.

Sample Weight 259.54 gms



SIZE PARAMETERS

1st Mode 0.246 - 0.124 mm

2nd Mode

3rd Mode

Q_{25} 0.22 mm

Median: Q_{50} 0.18 mm

Q_{75} 0.15 mm

Sorting Coef. 1.21

Skewness 1.03

Kurtosis 0.31

Sample 2021

Lat. 37° 54' 8" Long. 122° 41' 15"

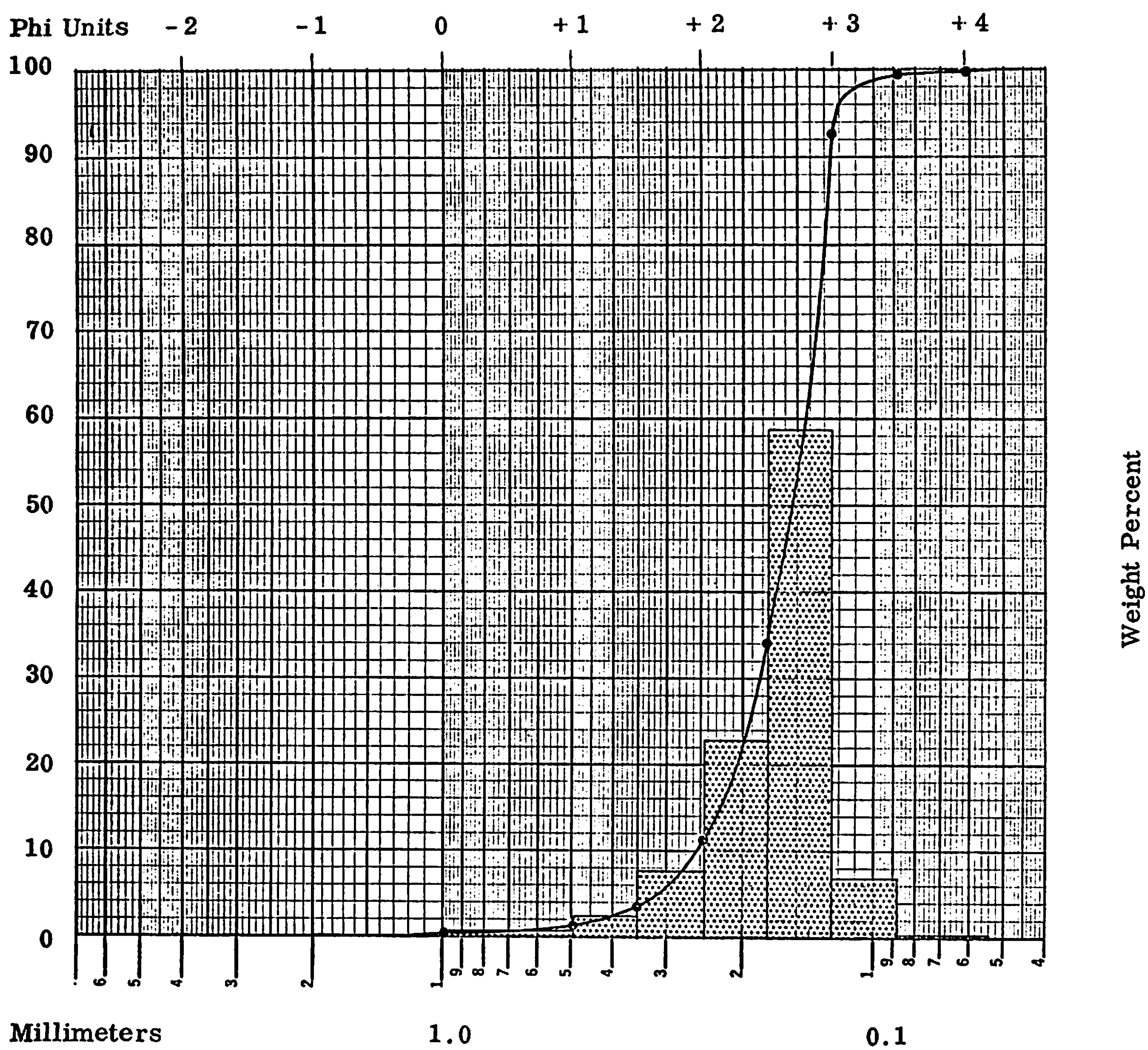
Depth Mean tide level Fathoms

Meters

Feet

Sample description Fine dark gray to tan sand with 10 - 15% shell fragments.

Sample Weight 225.80 gms



SIZE PARAMETERS

1st Mode 0.175 - 0.124 mm

2nd Mode

3rd Mode

Q_{25} 0.20 mm

Median: Q_{50} 0.15 mm

Q_{75} 0.14 mm

Sorting Coef. 1.20

Skewness 1.13

Kurtosis 0.23

Sample 2022

Lat. 37° 54' 20" Long. 122° 40' 47"

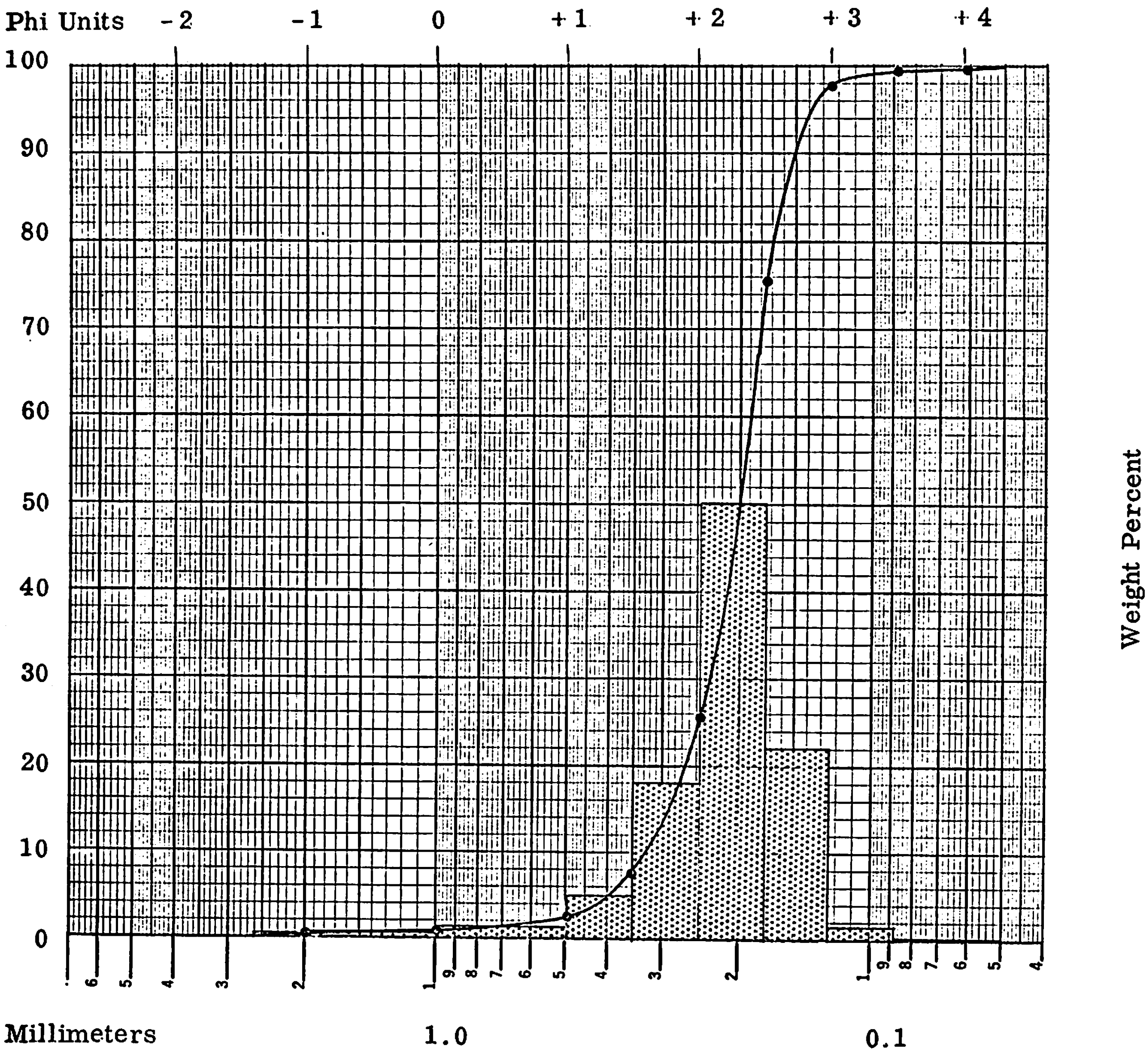
Depth Low tide level Fathoms

Meters

Feet

Sample description Fine light gray to tan sand with small dark pebbles and 5% shell fragments.

Sample Weight 293.67 gms



SIZE PARAMETERS

1st Mode 0.246 - 0.175 mm

2nd Mode

3rd Mode

Q_{25} 0.25 mm

Median: Q_{50} 0.20 mm

Q_{75} 0.18 mm

Sorting Coef. 1.18

Skewness 1.07

Kurtosis 0.21

Sample 2023

Lat. 37° 54' 28" Long. 122° 40' 52"

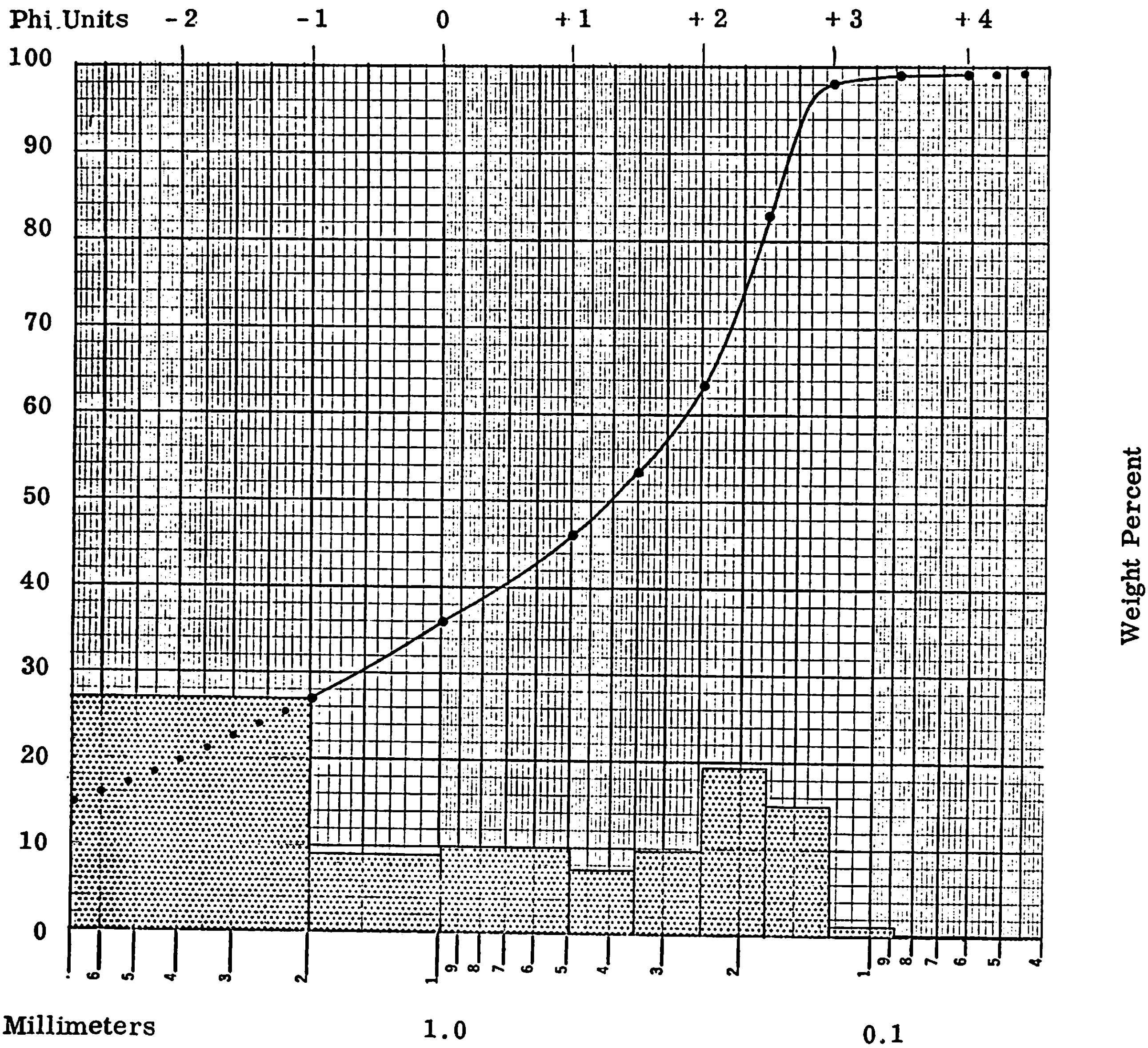
Depth Mean tide level Fathoms

Meters

Feet

Sample description Medium gray pebbly sand with some large pebbles and 5 - 10% shell fragments.

Sample Weight 180.24 gms



SIZE PARAMETERS

1st Mode > 1.981 - 1.981 mm

2nd Mode 0.246 - 0.175 mm

3rd Mode

Q_{25} 2.50 mm

Median: Q_{50} 0.40 mm

Q_{75} 0.20 mm

Sorting Coef. 3.35

Skewness 3.12

Kurtosis 0.09

Sample 2024

Lat. 37° 54' 27" Long. 122° 40' 49"

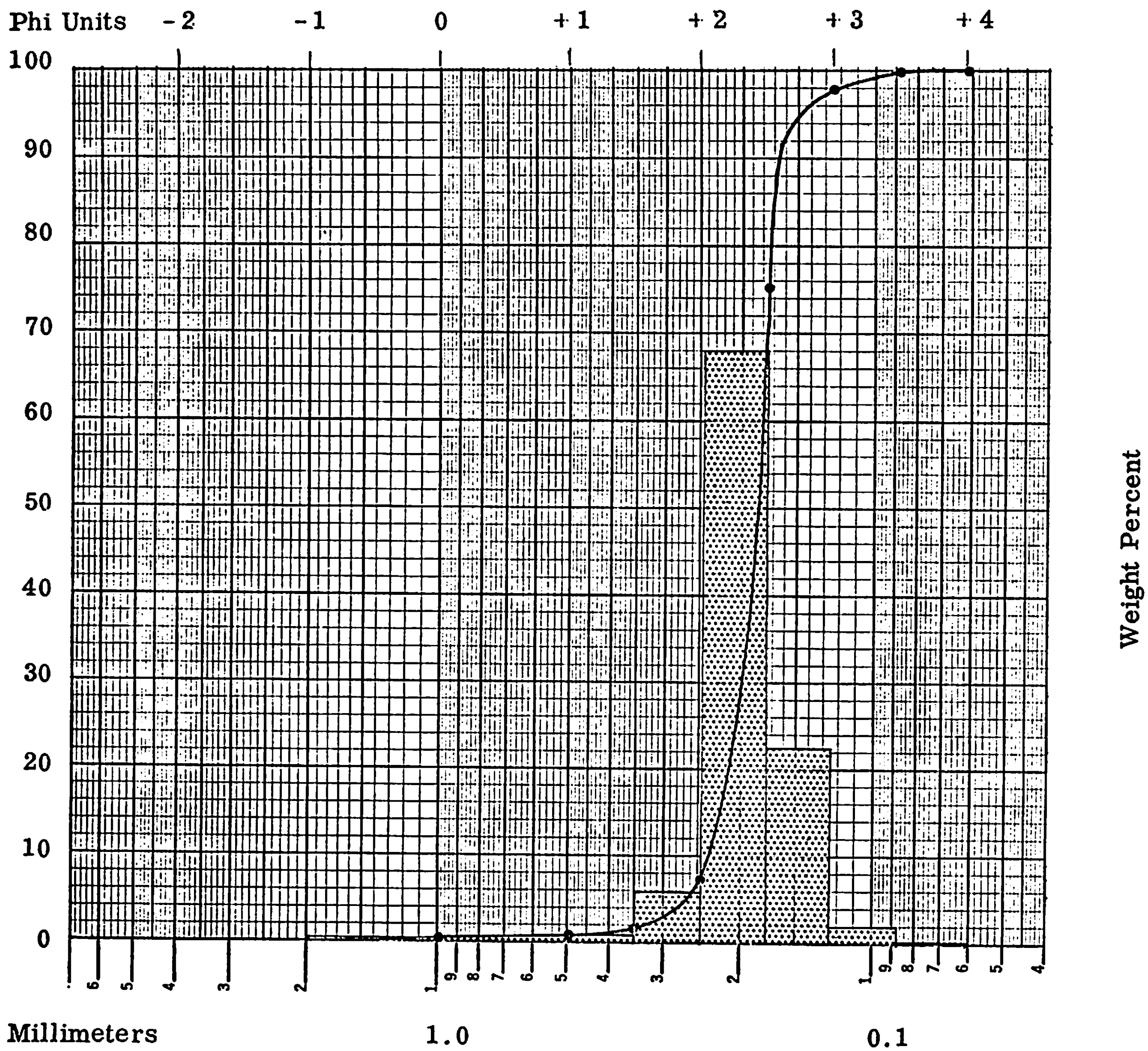
Depth Low tide level Fathoms

Meters

Feet

Sample description Fine gray sand with 5% shell fragments and a few small dark pebbles

Sample Weight 282.75 gms.



SIZE PARAMETERS

1st Mode	0.246 - 0.175 mm	Q_{25}	0.19 mm	Sorting Coef.	1.03
2nd Mode		Median: Q_{50}	0.18 mm	Skewness	1.01
3rd Mode		Q_{75}	0.17 mm	Kurtosis	0.09

Sample 2025

Lat. 37° 54' 23" Long. 122° 40' 55"

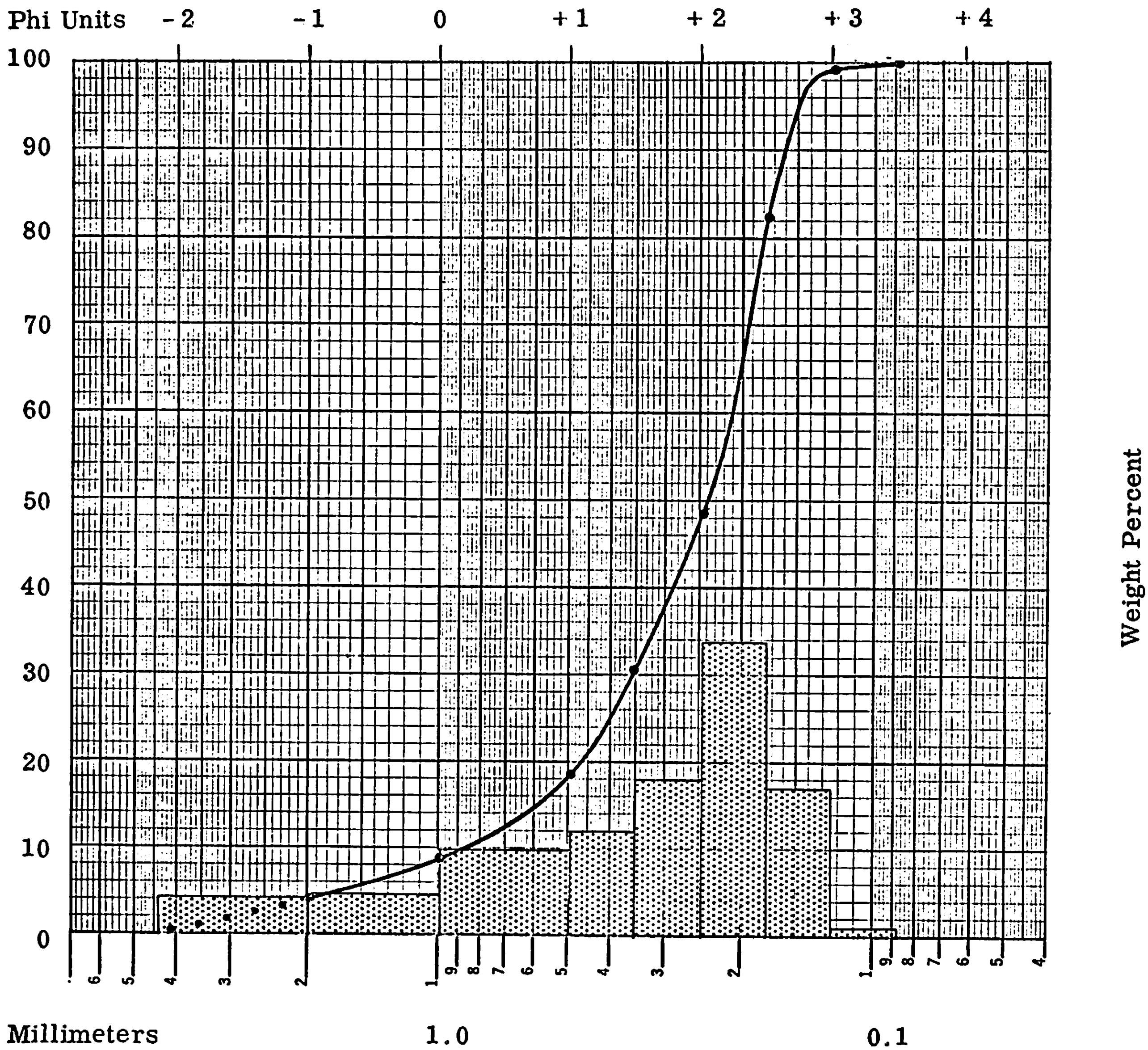
Depth High tide level Fathoms

Meters

Feet

Sample description Fine gray sand with dark gray pebbles and 10 - 15% shell fragments.

Sample Weight 235.79 gms



SIZE PARAMETERS

1st Mode 0.246 - 0.175 mm

2nd Mode

3rd Mode

Q_{25} 0.40 mm

Median: Q_{50} 0.24 mm

Q_{75} 0.19 mm

Sorting Coef. 1.47

Skewness 1.29

Kurtosis 0.15

Sample 2026

Lat. 37° 54' 17" Long. 122° 41' 3"

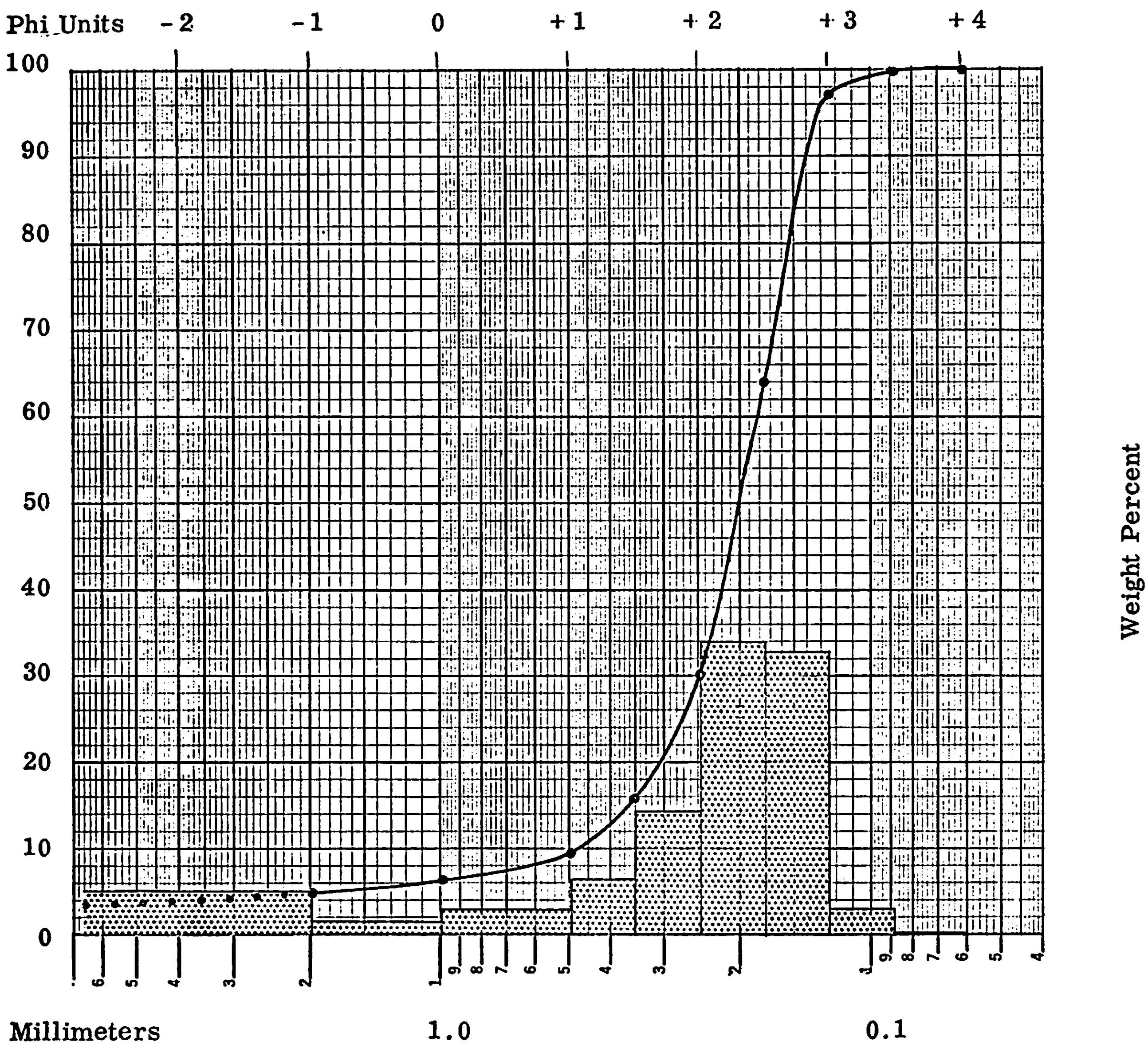
Depth Mean tide level Fathoms

Meters

Feet

Sample description Fine gray sand with some pebbles and 5 - 10% shell fragments.

Sample Weight 219.79 gms



SIZE PARAMETERS

1st Mode > 1.981 - 1.981 mm

Q_{25} 0.27 mm

Sorting Coef. 1.28

2nd Mode 0.246 - 0.124 mm

Median: Q_{50} 0.20 mm

Skewness 1.17

3rd Mode

Q_{75} 0.17 mm

Kurtosis 0.14