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Title

Recent Sediments of the Central California Continental Shelf, Pillar Point to Pigeon Point:
Part A -- Introduction and Grain Size Analysis

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RECENT SEDIMENTS OF
THE CENTRAL CALIFORNIA
CONTINENTAL SHELF

PILLAR POINT TO PIGEON POINT

PART A. INTRODUCTION AND
GRAIN SIZE DATA

by

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UNIVERSITY OF CALIFORNIA
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RECENT SEDIMENTS OF THE CENTRAL CALIFORNIA
CONTINENTAL SHELF
PILLAR POINT TO PIGEON POINT

PART A - INTRODUCTION AND GRAIN SIZE ANALYSIS

by

T. Yancey, C. Isselhardt, L. Osuch, J. Lee, and
P. Wilde

Berkeley, California

July 1970

Introduction

The following work is part of a continuing study of the sediments and sedimentary processes of the continental shelf of central California done in cooperation between the University of California, Berkeley and the Coastal Engineering Research Center, U.S. Army Corps of Engineers. Sediment analyses of the samples 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 this study will be presented in three separate reports:

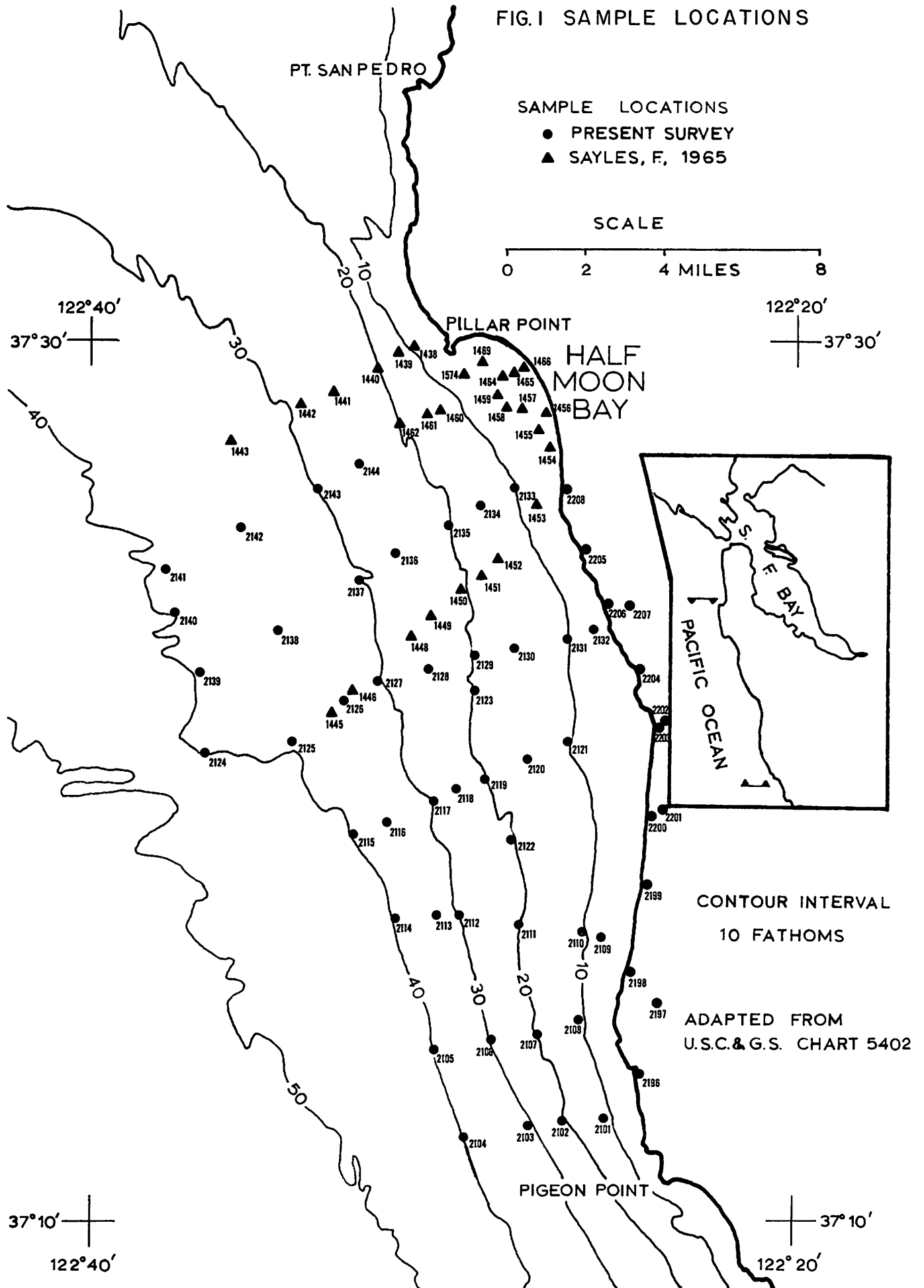
Part A Introduction and Grain Size Data (this volume)

Part B Mineralogical Data

Part C Interpretation and Summary of Results.

The first two reports, Parts A and B, raw data will be presented with little or no interpretation. In Part C the authors' interpretation of the data plus background information and previous work in the study area will be given.

FIG. I SAMPLE LOCATIONS



Sample Collection

Samples studied in this report include 43 marine samples, and 9 intertidal beach samples taken specifically for this project; and 28 marine samples from a previous study by Sayles (1965). Marine bottom samples were obtained with an orange peel grab sampler from the converted fishing boat San Michele, August 1968. Participants in the marine sampling program were Ralf Carter, Courtney Isselhardt, Lawrence Osuch, Eugene Silva, and Pat Wilde. Marine samples were obtained from the shoreline to 240 feet below sea level. The sample density is approximately uniform within the study area (see Fig. 1). Intertidal beach samples were obtained in April 1970 by James Lee and Thomas Yancey.

Figure 1 shows the location of the sampling stations (numbers refer to Hydraulic Engineering Laboratory Sediment Collection numbers, U.C. Berkeley) plotted on U.S. Coast and Geodetic Chart 5402. Location of each sample was obtained by Decca radar bearings on shore landmarks. Station depths were obtained by echo sounding with a Raytheon depth sounder.

The orange peel bottom sampler took approximately 15 centimeters of the surface material. About one liter by volume of sample was saved from each station. This portion of the sample was placed in a polyethylene bag and stored in a moist condition in cylindrical cardboard containers until analysis. Samples obtained by Sayles (1965) were stored dry in the U.C. Hydraulic Engineering Laboratory Collection.

Grain Size Analysis

The samples were analyzed at half phi intervals (Krumbein and Pettijohn, 1938, p. 84) through the entire range of the sediment grain size spread. The sediments contain a wide spread of grain sizes, so for the finer grained samples sieving was supplemented by pipette analysis (Folk, 1965, pp. 37-40) for the silt and clay fraction of the sample. For sediment of sand size the sample was wet sieved through a nest of nylon screens using running sea water. Particles in the silt and clay size range were washed into a reservoir of sea water, and recovered and stored wet in sea water. This procedure enables one to separate clays from coarser particles in a non-destructive manner, i.e., the original composition and particle size of the finer sediments is not changed by treatment with distilled water and drying. The weight of the sample was determined using the wet weighing method of Wilde and others (1970).

The pipette analysis was made at half phi intervals, and carried to a lower limit of 7ϕ (0.0078 mm.). 7ϕ is a convenient lower limit to use in pipette analysis, and in no case was there more than 5% of the sample finer than this size. Data from this method was proportionately recalculated to fit the sieving data and the size frequency curve and cumulative curve were assembled from these two methods. Each size fraction of the sieving and pipette analysis were weighted on an analytical balance to 0.001 gram and a weight percent value was calculated for each fraction.

The samples were sized through the following sieves:

<u>U.S. Standard Mesh Number</u>	<u>Nominal Opening</u>	<u>Phi Units</u>
5	3.962 mm	- 2.0
8	2.362 mm	- 1.5
10	1.981 mm	- 1.0
14	1.397 mm	- 0.5
18	0.991 mm	0
25	0.701 mm	+ 0.5
25	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

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

<u>Parameter</u>	<u>Grain Size at</u>
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

The above calculated statistical parameters plus median size are plotted uncontrored on the basemap as follows - Fig. 2: Median Size; Fig. 3: Sorting Coefficient; Fig. 4: Skewness; Fig. 5: Kurtosis. Unfortunately the statistical parameters for Sayles (1965) samples are not plotted because the samples only included the sand size range and not the entire size range.

FIG. 2 MEDIAN GRAIN SIZE

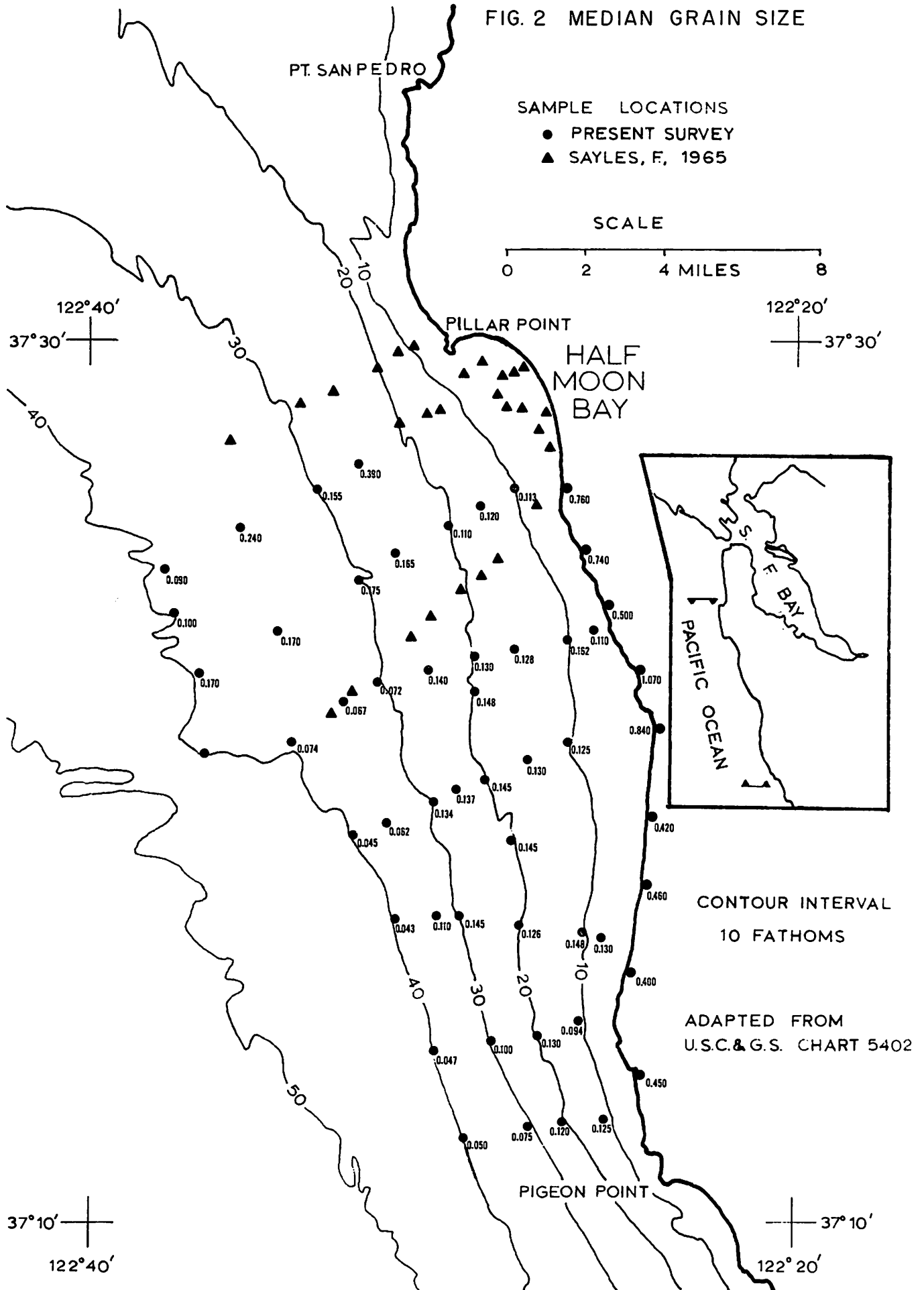


FIG. 3 SORTING COEFFICIENT

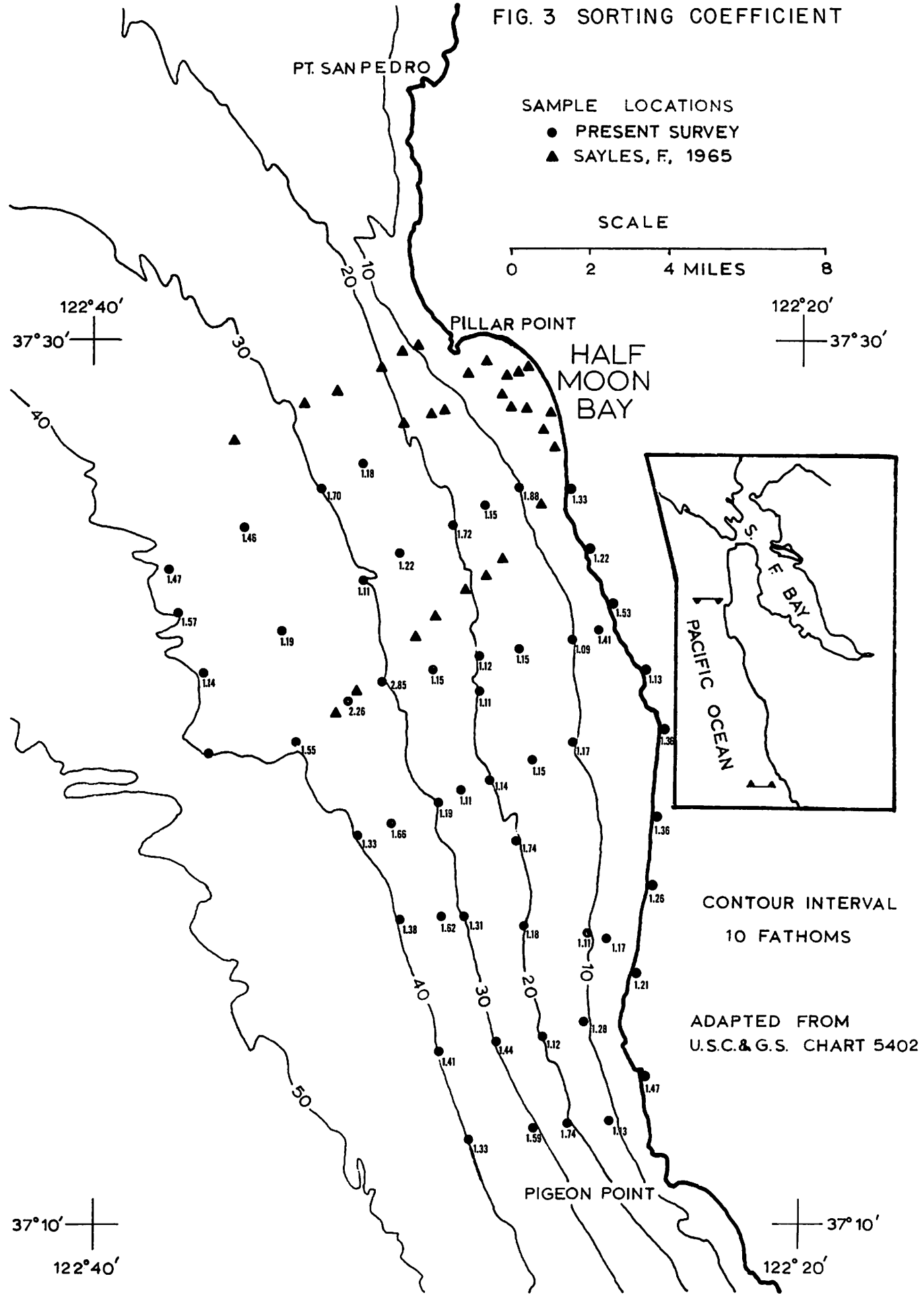
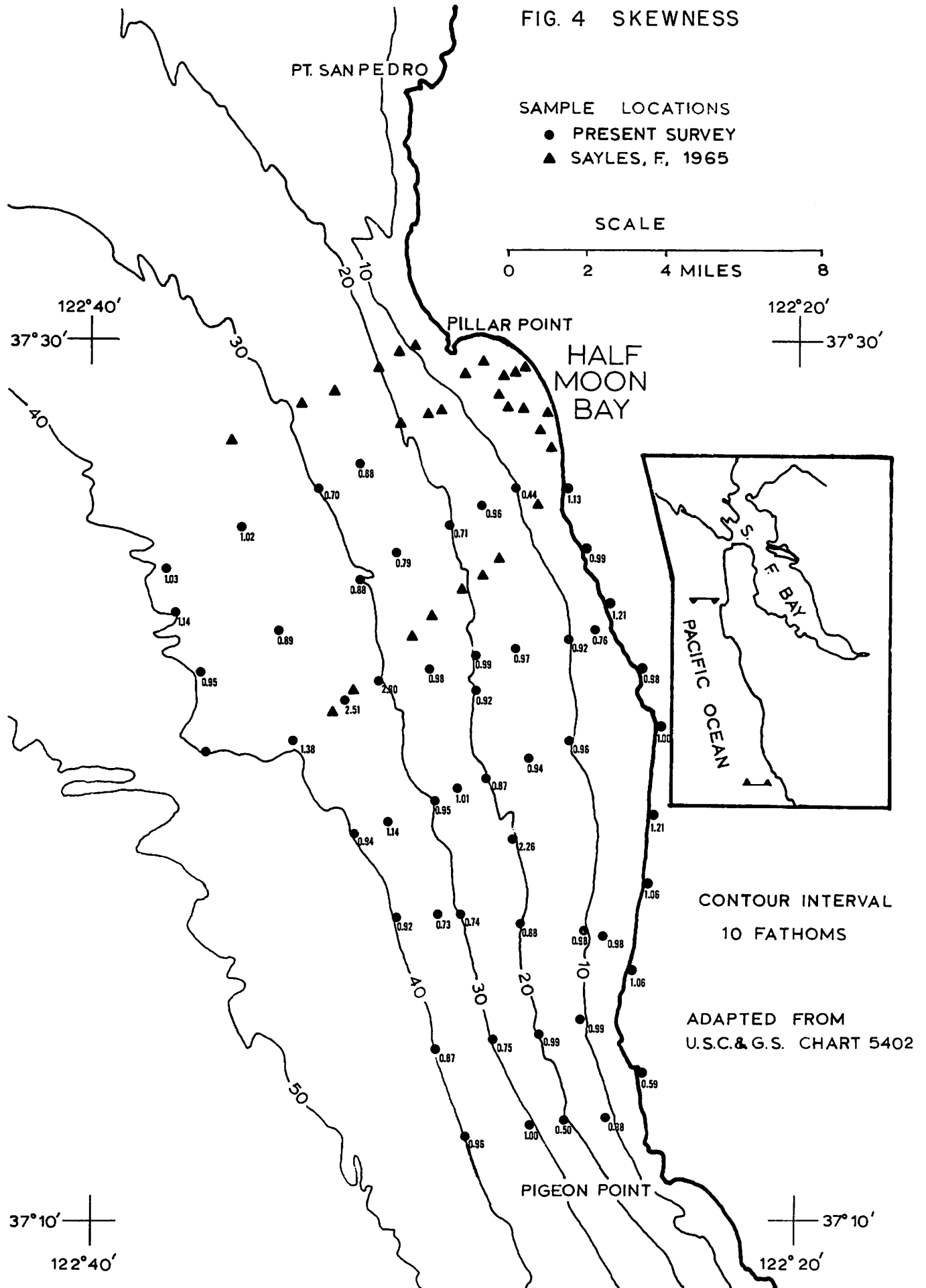


FIG. 4 SKEWNESS



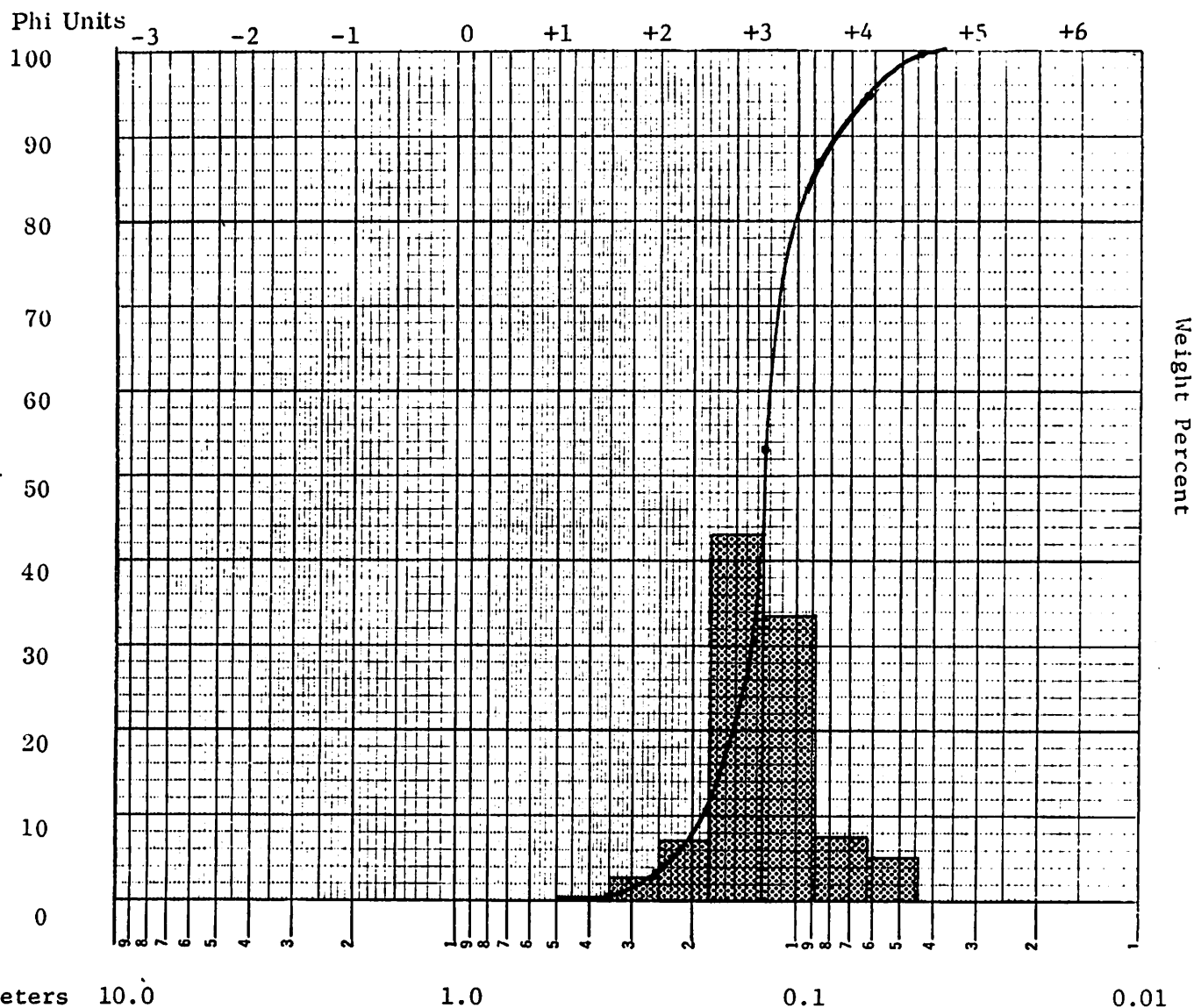
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- Sayles, F. L., 1965, Coastal Sedimentation: Point San Pedro to Miramontes Point, California: University of California Berkeley, Hyd. Eng. Lab., HEL-2-15, 105 p.
- Trask, P. D., 1932, Origin and Environment of Source Sediments of Petroleum: Houston, Gulf Publishing Co., 67 p.
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SIZE ANALYSIS

Sample 2101
 Lat. 37° 12.5' Long. 122° 25.6'
 Depth 10.0 Fathoms
18.3 Meters
60.0 Feet

Sample description Gray, fine grained
sand with minor amounts of large mica
flakes and shell fragments.
 Sample Weight 206.4 gm.

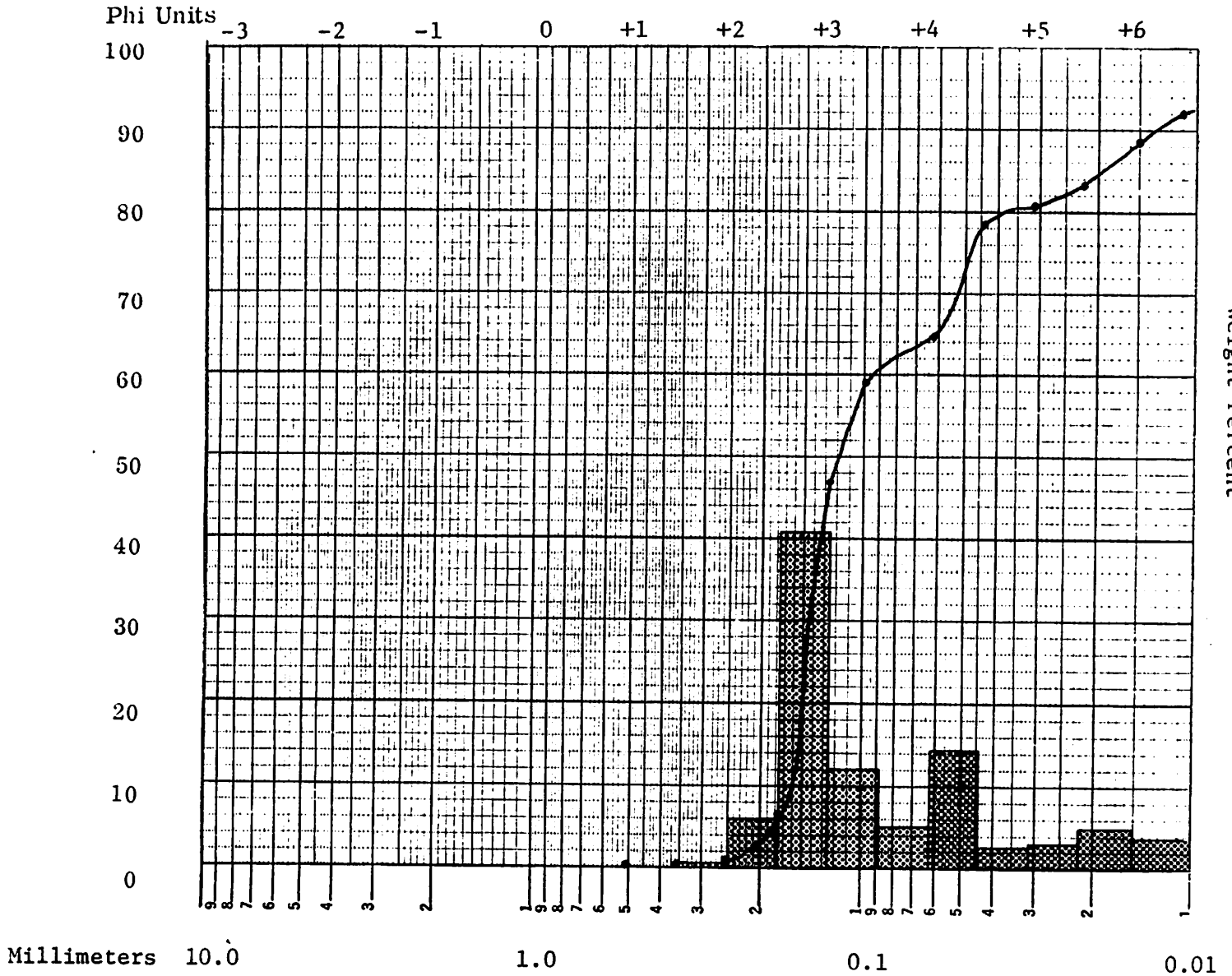
SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.140 mm Sorting Coef. 1.13
 2nd Mode _____ Median: Q_{50} 0.125 mm Skewness 0.98
 3rd Mode _____ Q_{75} 0.110 mm Kurtosis 0.15

SIZE ANALYSIS

Sample 2102
 Lat. 37° 12.5' Long. 122° 26.6'
 Depth 20.0 Fathoms
36.7 Meters
120.0 Feet

Sample description gray
colored silty sand
 Sample Weight 79.8 gm



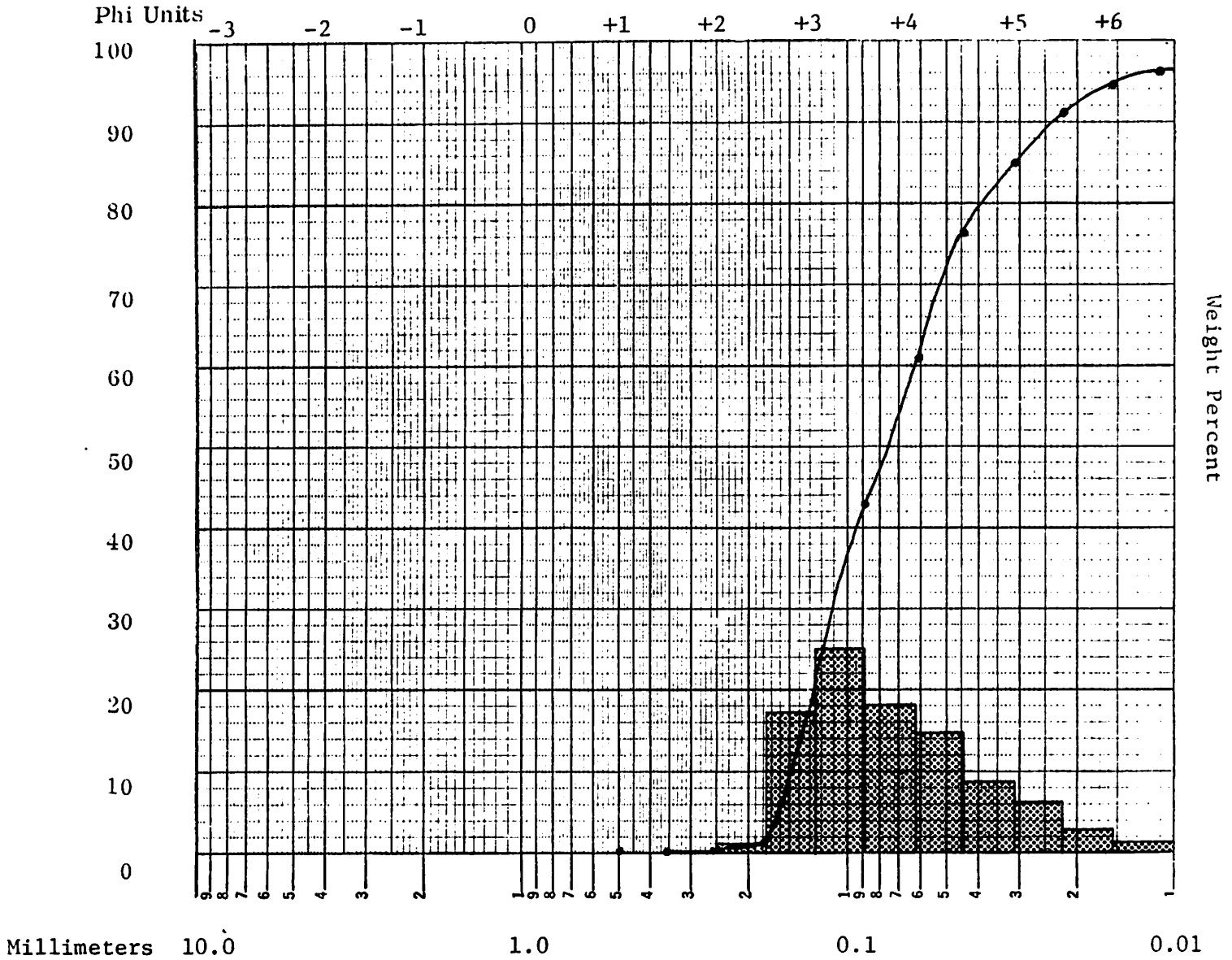
SIZE PARAMETERS

1st Mode <u>0.125 - 0.177 mm</u>	Q ₂₅ <u>0.148 mm</u>	Sorting Coef. <u>1.74</u>
2nd Mode <u>0.044 - 0.062 mm</u>	Median: Q ₅₀ <u>0.120 mm</u>	Skewness <u>0.50</u>
3rd Mode <u>0.016 - 0.022 mm</u>	Q ₇₅ <u>0.049 mm</u>	Kurtosis <u>0.36</u>

SIZE ANALYSIS

Sample 2103
 Lat. 37° 12.3' Long. 122° 27.5'
 Depth 30.0 Fathoms
54.9 Meters
180.0 Feet

Sample description gray
colored very fine grained silty
sand.
 Sample Weight 56.6 gm.



SIZE PARAMETERS

1st Mode 0.088 - 0.125 mm Q_{25} 0.120 mm Sorting Coef. 1.59
 2nd Mode _____ Median: Q_{50} 0.075 mm Skewness 1.00
 3rd Mode _____ Q_{75} 0.047 mm Kurtosis 0.29

SIZE ANALYSIS

Sample 2104

Sample description greenish

Lat. 37° 12.1' Long. 122° 29.4'

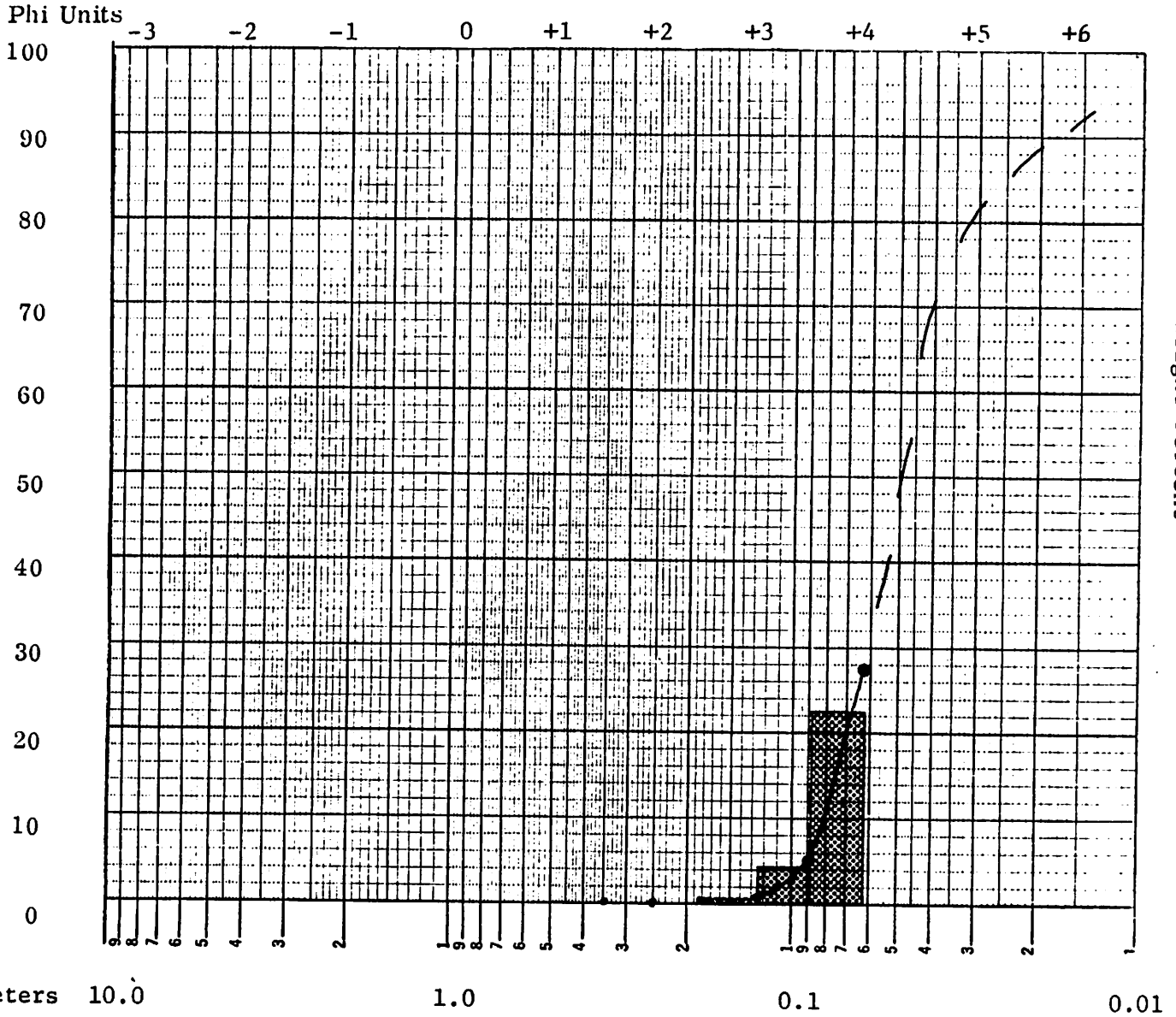
gray very fine grained sandy silt

Depth 41.0 Fathoms

75.1 Meters

246.0 Feet

Sample Weight 52.6 gm.



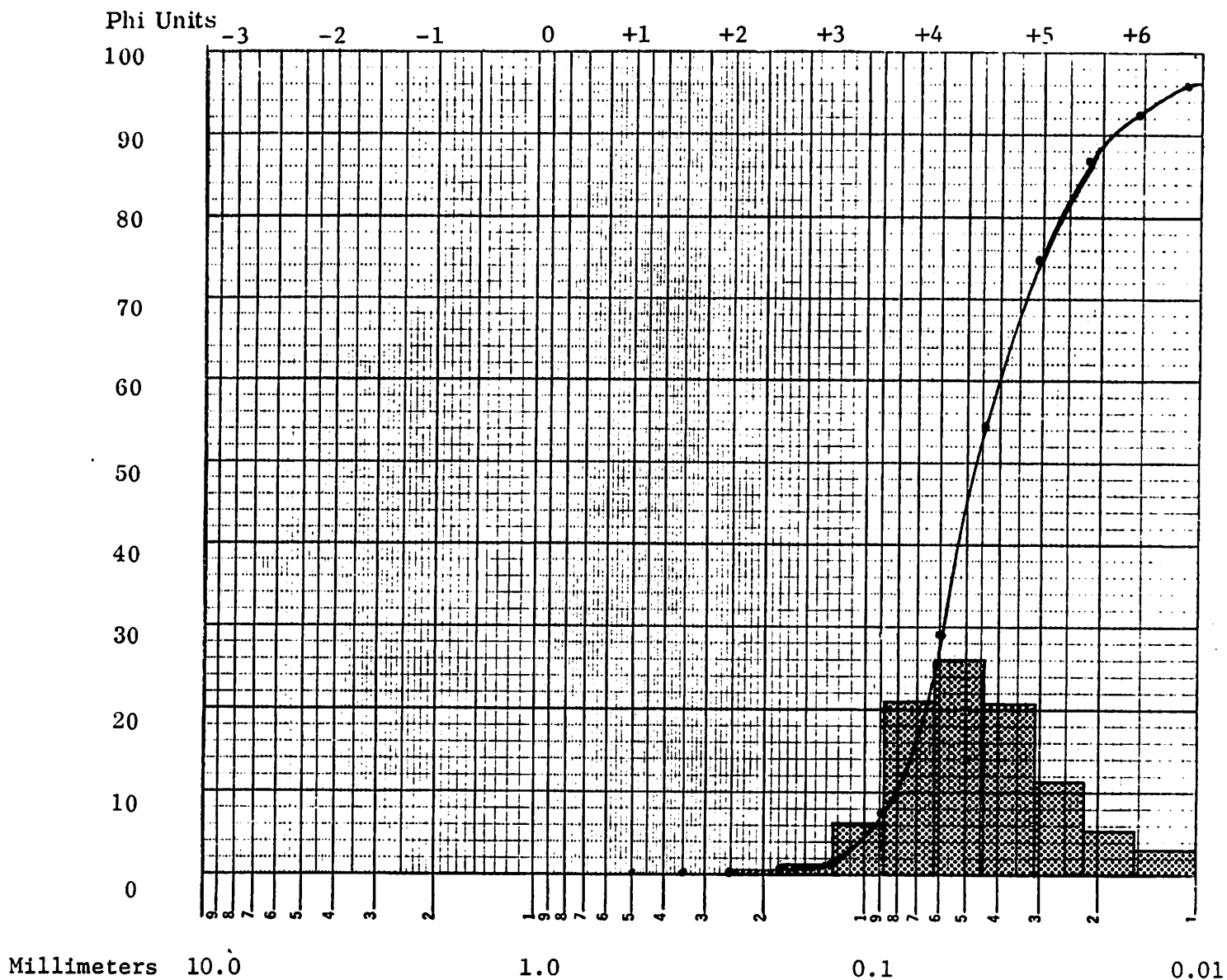
SIZE PARAMETERS

1st Mode <u>0.044 - 0.062 mm</u>	Q_{25} <u>0.065 mm</u>	Sorting Coef. <u>1.33</u>
2nd Mode _____	Median: Q_{50} <u>0.050 mm</u>	Skewness <u>0.96</u>
3rd Mode _____	Q_{75} <u>0.037 mm</u>	Kurtosis <u>0.23</u>

SIZE ANALYSIS

Sample 2105
 Lat. 37° 14.0' Long. 122° 30.2'
 Depth 40.0 Fathoms
73.2 Meters
240.0 Feet

Sample description greenish gray
very fine grained sandy silt
 Sample Weight 70.3 gm.



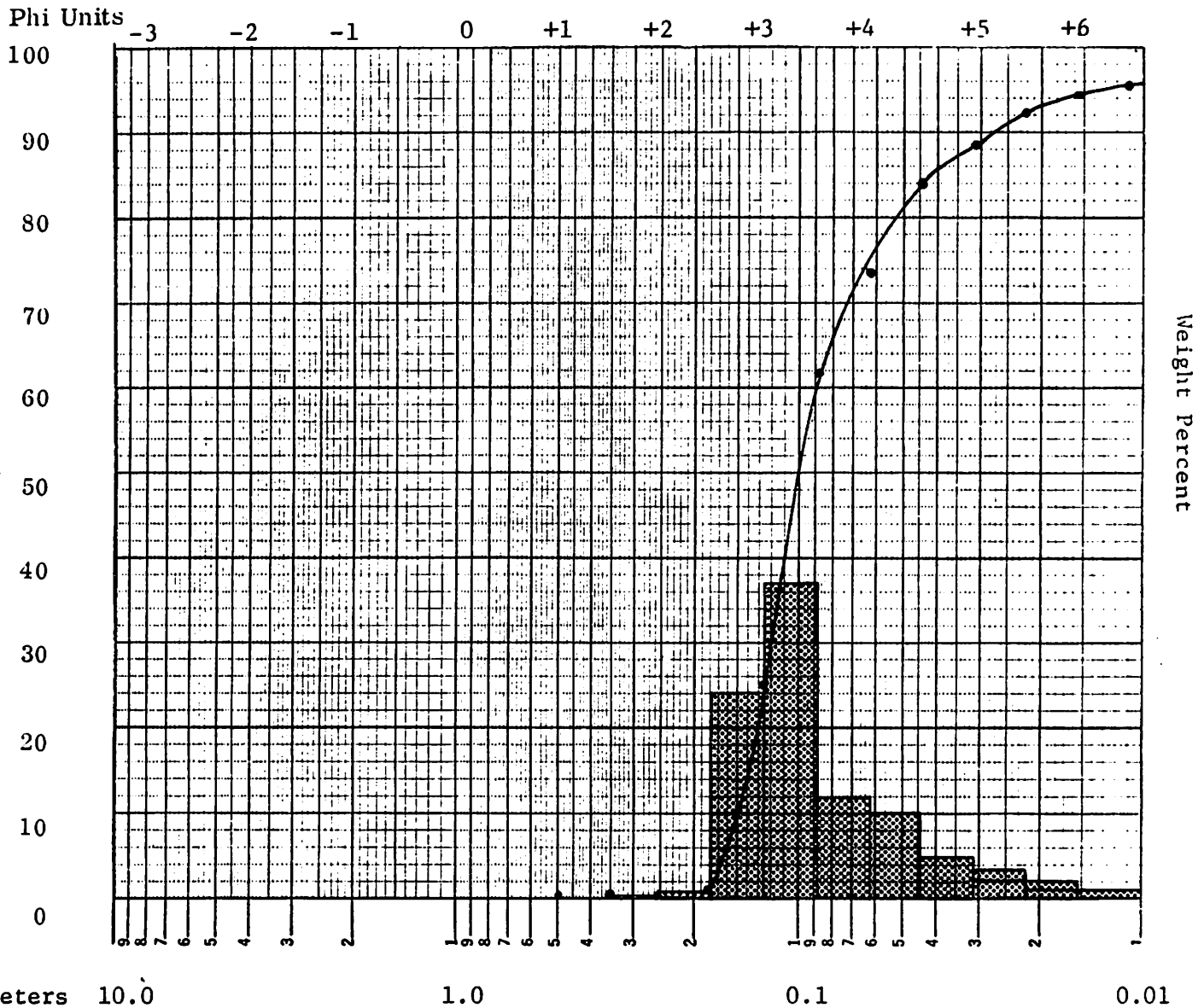
SIZE PARAMETERS

1st Mode 0.044 - 0.062 mm Q_{25} 0.062 mm Sorting Coef. 1.41
 2nd Mode _____ Median: Q_{50} 0.047 mm Skewness 0.87
 3rd Mode _____ Q_{75} 0.031 mm Kurtosis 0.25

SIZE ANALYSIS

Sample 2106
 Lat. 37° 14.3' Long. 122° 28.6'
 Depth 30.0 Fathoms
54.9 Meters
180.0 Feet

Sample description greenish gray
fine grained silty sand
 Sample Weight 82.5 gm.



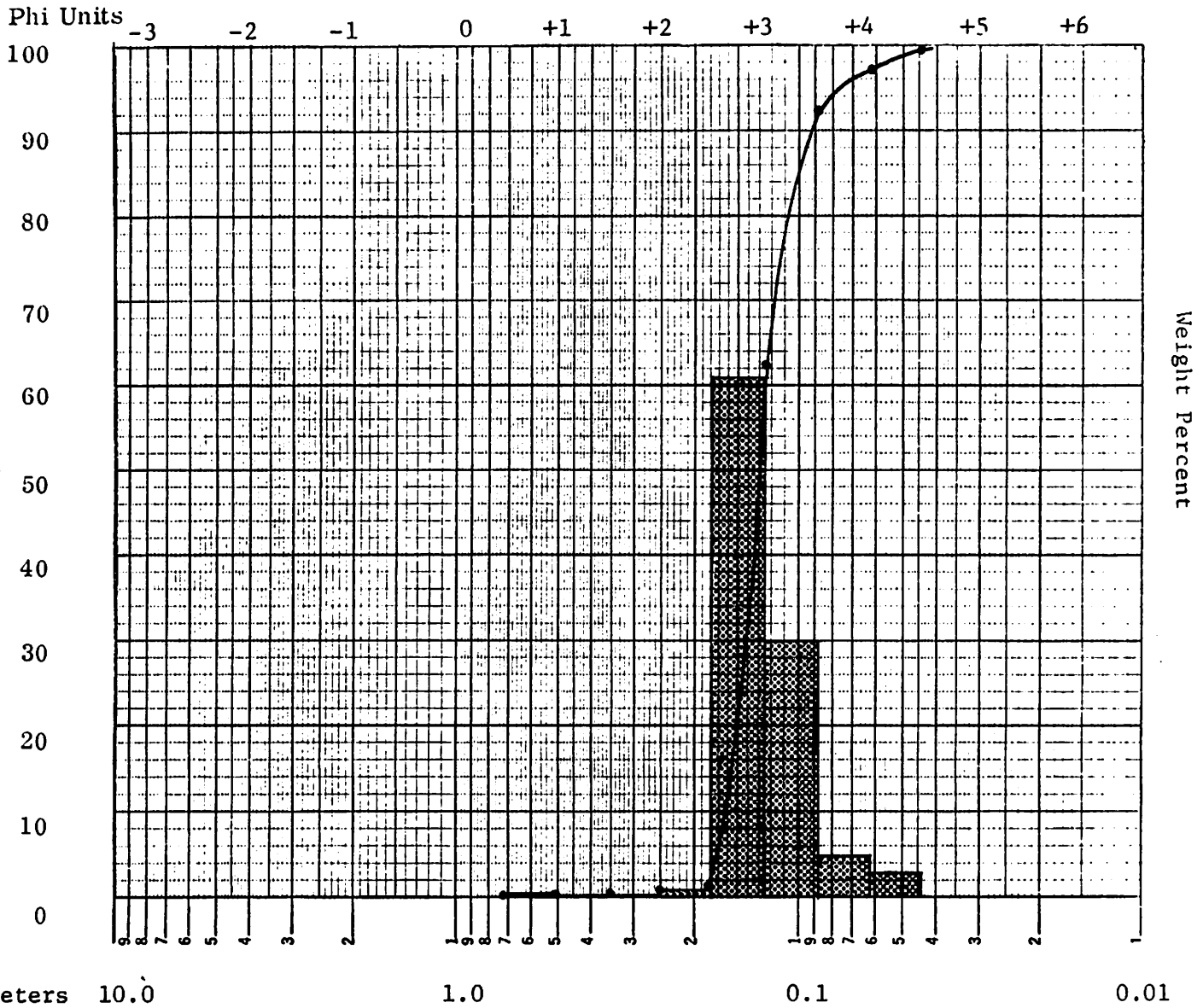
SIZE PARAMETERS

1st Mode 0.088 - 0.125 mm Q_{25} 0.125 mm Sorting Coef. 1.44
 2nd Mode _____ Median: Q_{50} 0.100 mm Skewness 0.75
 3rd Mode _____ Q_{75} 0.060 mm Kurtosis 0.27

SIZE ANALYSIS

Sample 2107
 Lat. 37° 14.6' Long. 122° 27.4'
 Depth 20.0 Fathoms
36.7 Meters
120.0 Feet

Sample description gray colored
fine grained sand with small
amounts of shell fragments
 Sample Weight 54.7 gm.



SIZE PARAMETERS

1st Mode 0.500 - 0.701 mm Q_{25} 0.145 mm Sorting Coef. 1.12
 2nd Mode 0.125 - 0.177 mm Median: Q_{50} 0.130 mm Skewness 0.99
 3rd Mode _____ Q_{75} 0.115 mm Kurtosis 0.22

SIZE ANALYSIS

Sample 2108

Sample description gray colored

Lat. 37° 14.8' Long. 122° 25.4'

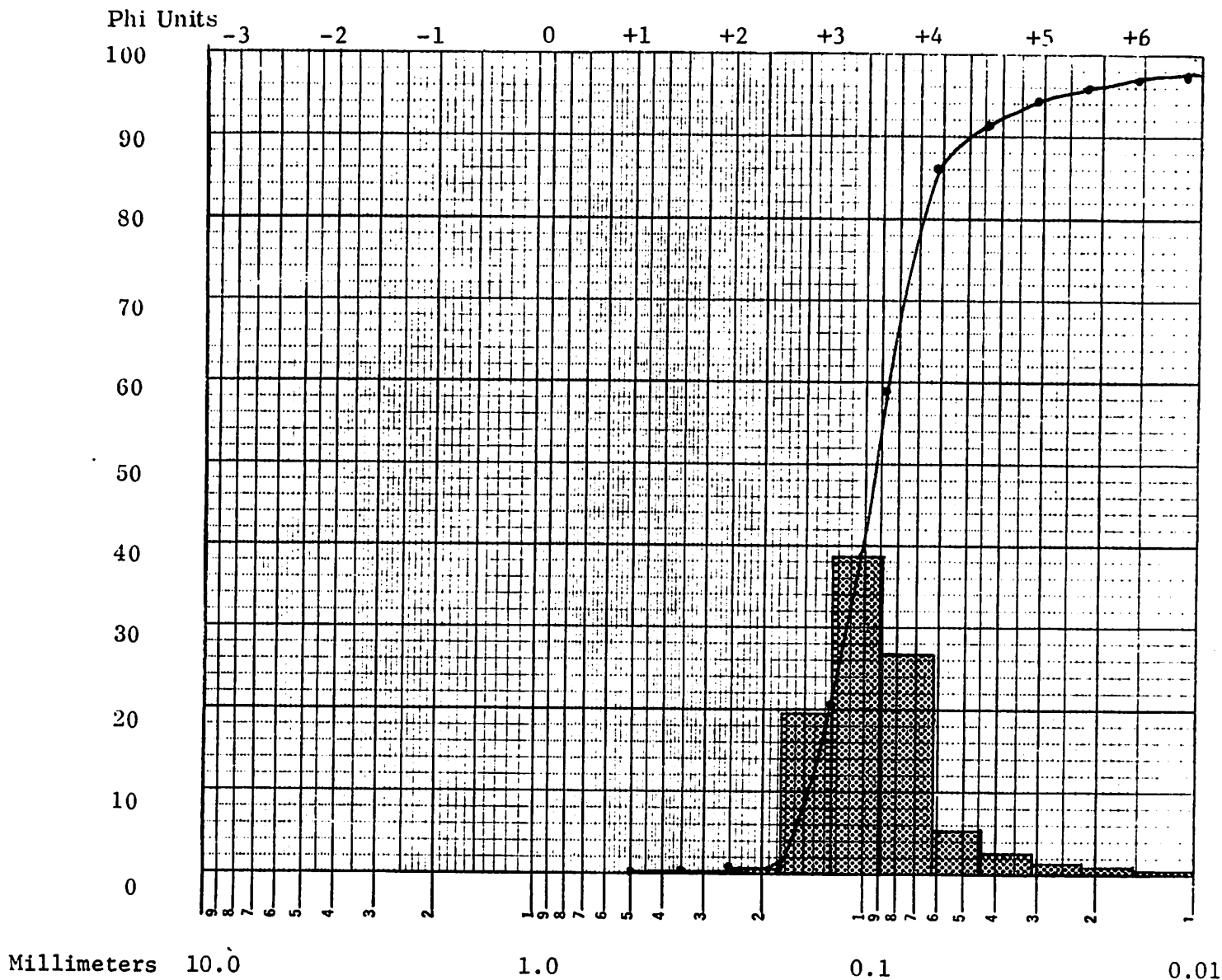
fine grained sand

Depth 11.0 Fathoms

20.1 Meters

66.0 Feet

Sample Weight 31.5 gm

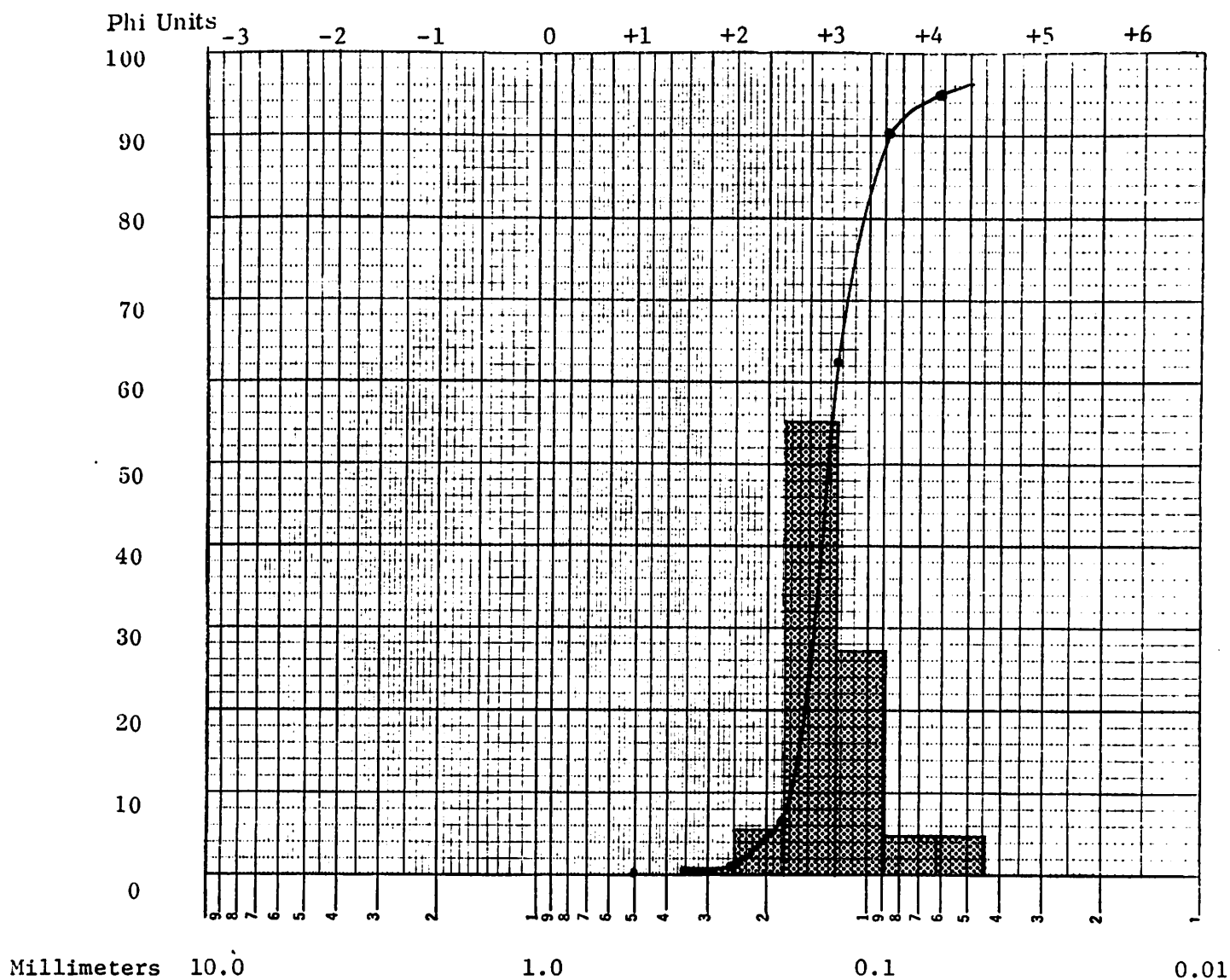


SIZE PARAMETERS

1st Mode <u>0.088 - 0.125 mm</u>	Q_{25} <u>0.120 mm</u>	Sorting Coef. <u>1.28</u>
2nd Mode _____	Median: Q_{50} <u>0.094 mm</u>	Skewness <u>0.99</u>
3rd Mode _____	Q_{75} <u>0.073 mm</u>	Kurtosis <u>0.25</u>

SIZE ANALYSIS

Sample 2109 Sample description gray colored
 Lat. 37° 16.7' Long. 122° 25.5' fine grained sand
 Depth 5.0 Fathoms _____
9.1 Meters _____
30.0 Feet Sample Weight 45.9 gm.



SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.150 mm Sorting Coef. 1.17
 2nd Mode _____ Median: Q_{50} 0.130 mm Skewness 0.98
 3rd Mode _____ Q_{75} 0.110 mm Kurtosis 0.25

SIZE ANALYSIS

Sample 2110

Sample description gray colored

Lat. 37° 16.8' Long. 122° 26.0'

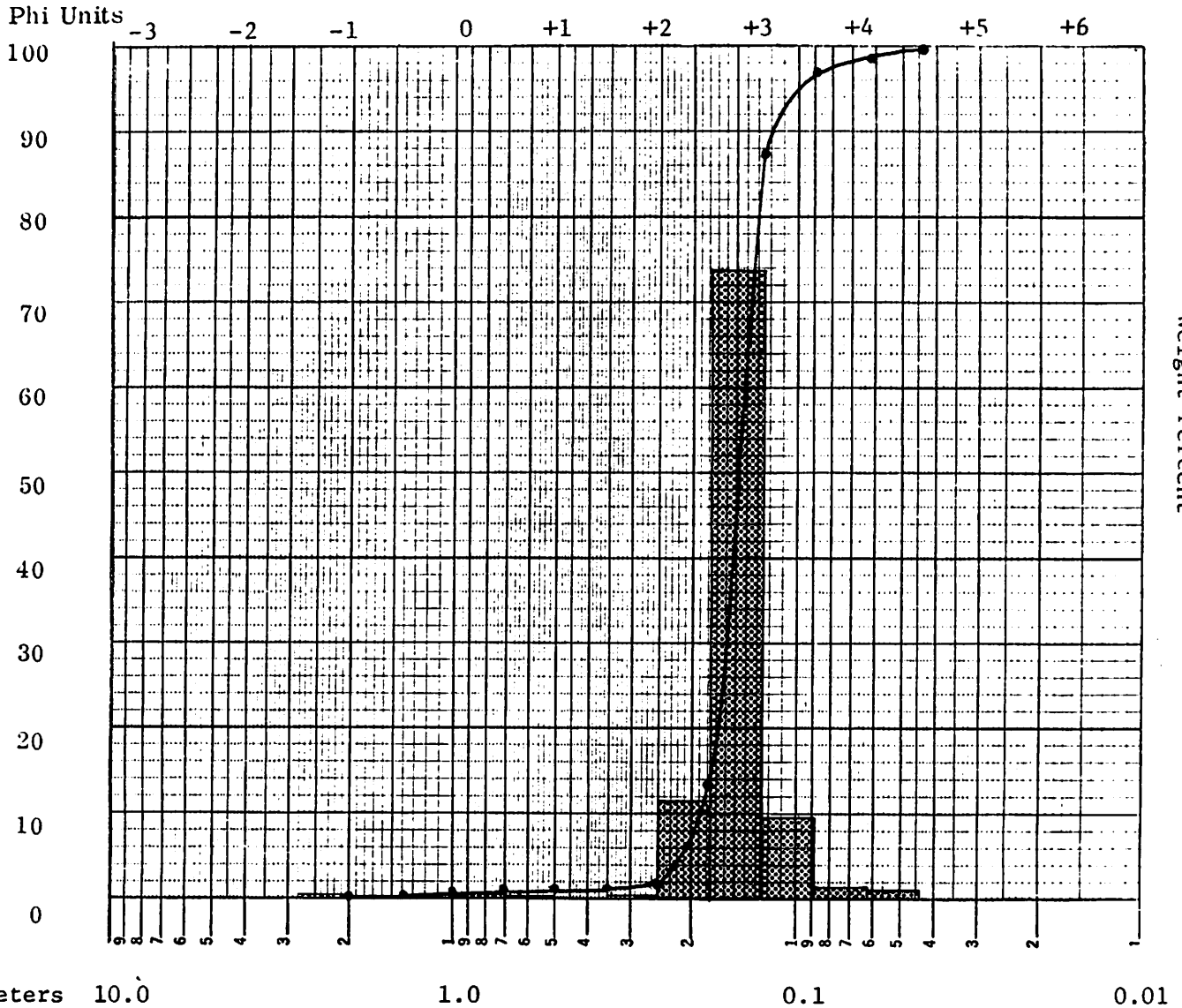
fine grained sand

Depth 10.0 Fathoms

18.3 Meters

60.0 Feet

Sample Weight 60.0 gm.



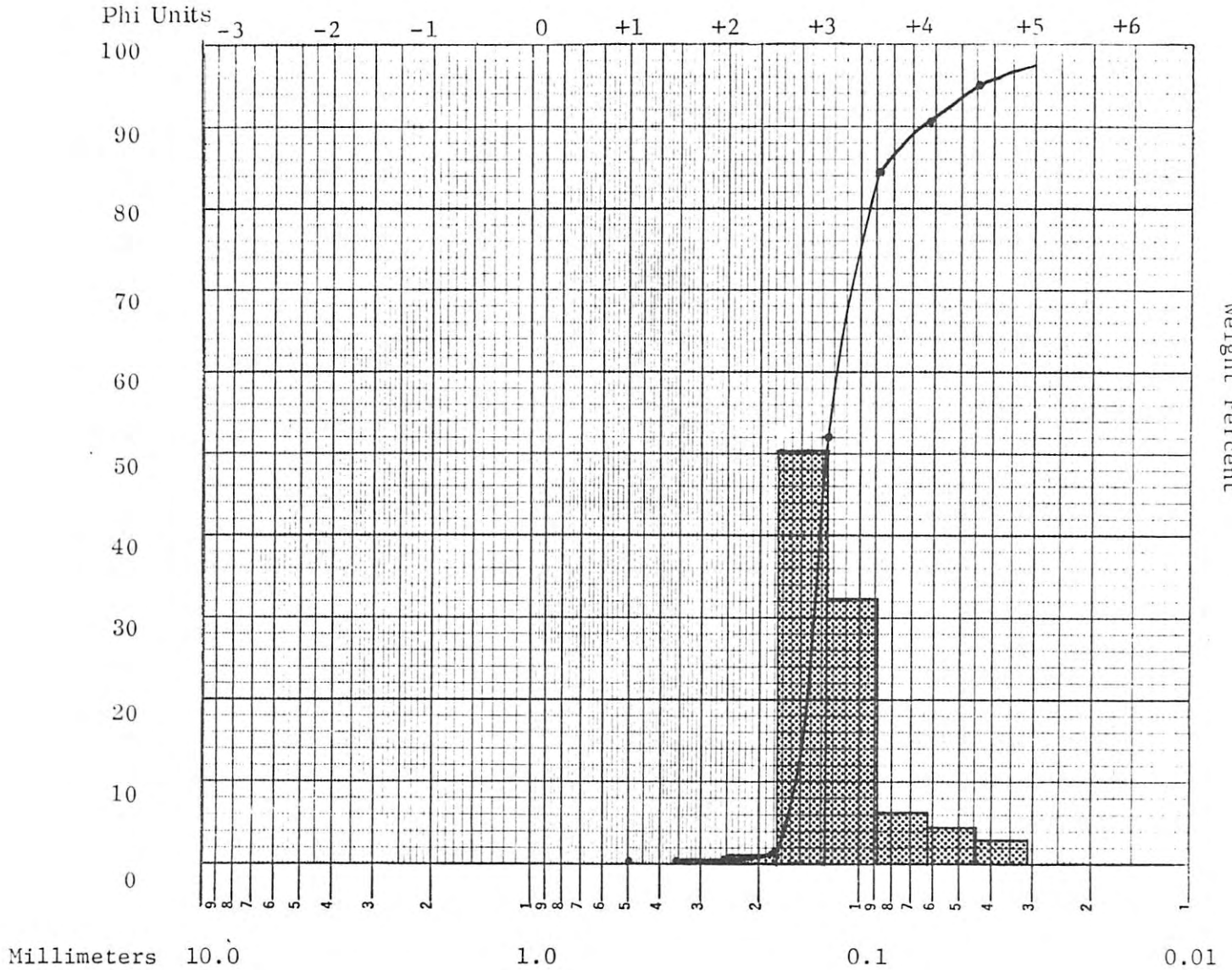
SIZE PARAMETERS

1st Mode <u>0.701 - 0.991 mm</u>	Q ₂₅ <u>0.163 mm</u>	Sorting Coef. <u>1.11</u>
2nd Mode <u>0.125 - 0.177 mm</u>	Median: Q ₅₀ <u>0.148 mm</u>	Skewness <u>0.98</u>
3rd Mode _____	Q ₇₅ <u>0.132 mm</u>	Kurtosis <u>0.22</u>

SIZE ANALYSIS

Sample 2111
 Lat. 37° 16.8' Long. 122° 27.9'
 Depth 20.0 Fathoms
36.7 Meters
120.0 Feet

Sample description gray colored
fine grained sand with small
amounts of shell fragments
 Sample Weight 57.8 gm.



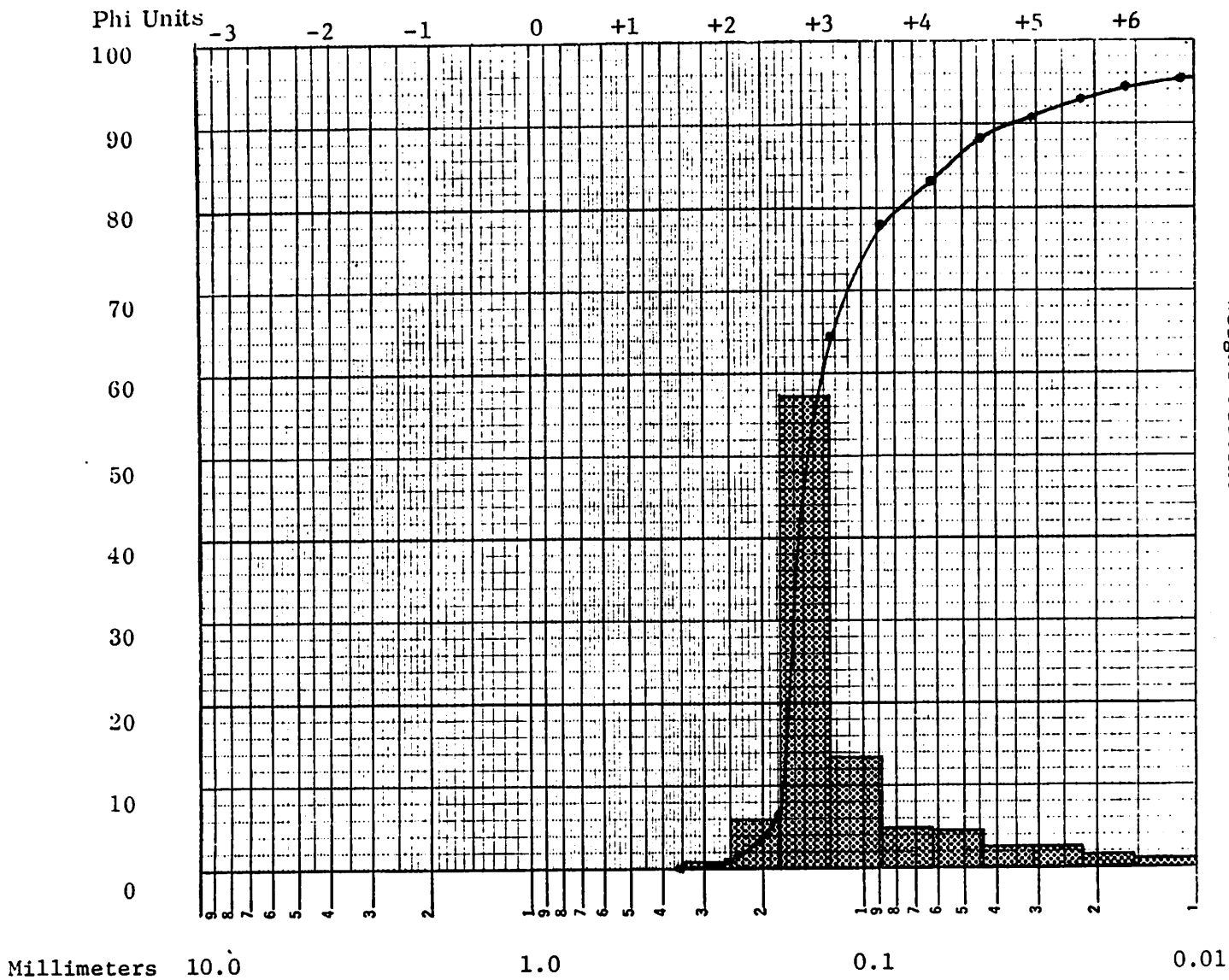
SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.140 mm Sorting Coef. 1.18
 2nd Mode _____ Median: Q_{50} 0.126 mm Skewness 0.88
 3rd Mode _____ Q_{75} 0.100 mm Kurtosis 0.22

SIZE ANALYSIS

Sample 2112
 Lat. 37° 17.1' Long. 122° 29.7'
 Depth 30.0 Fathoms
54.9 Meters
180.0 Feet

Sample description greenish gray
fine grained silty sand
 Sample Weight 42.8 gm.



SIZE PARAMETERS

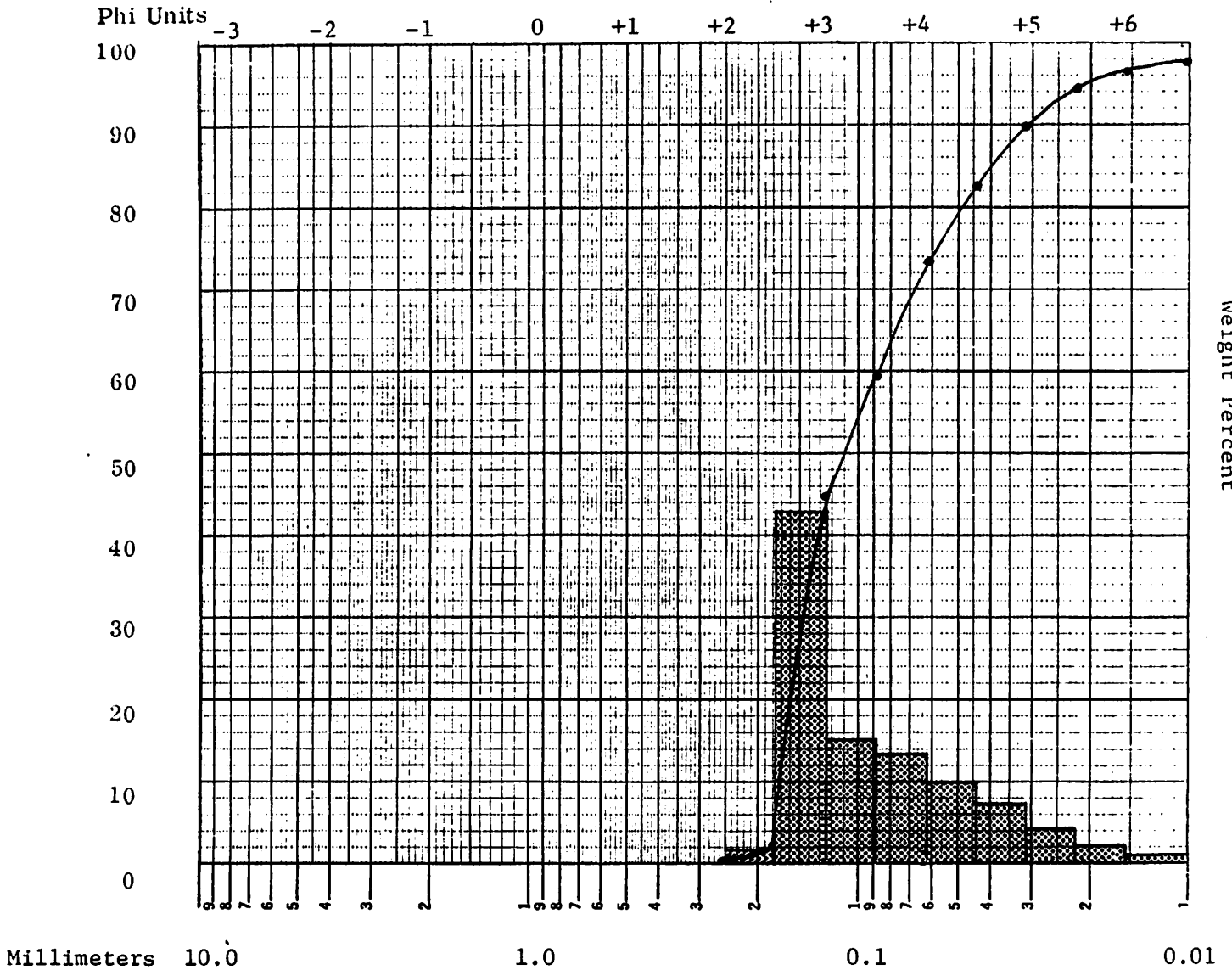
1st Mode 0.125 - 0.177 mm Q_{25} 0.163 mm Sorting Coef. 1.31
 2nd Mode _____ Median: Q_{50} 0.145 mm Skewness 0.74
 3rd Mode _____ Q_{75} 0.095 mm Kurtosis 0.24

SIZE ANALYSIS

25

Sample 2113
 Lat. 37° 17.2' Long. 122° 30.1'
 Depth 35.0 Fathoms
64.0 Meters
200.0 Feet

Sample description greenish gray
fine grained silty sand
 Sample Weight 34.4 gm.



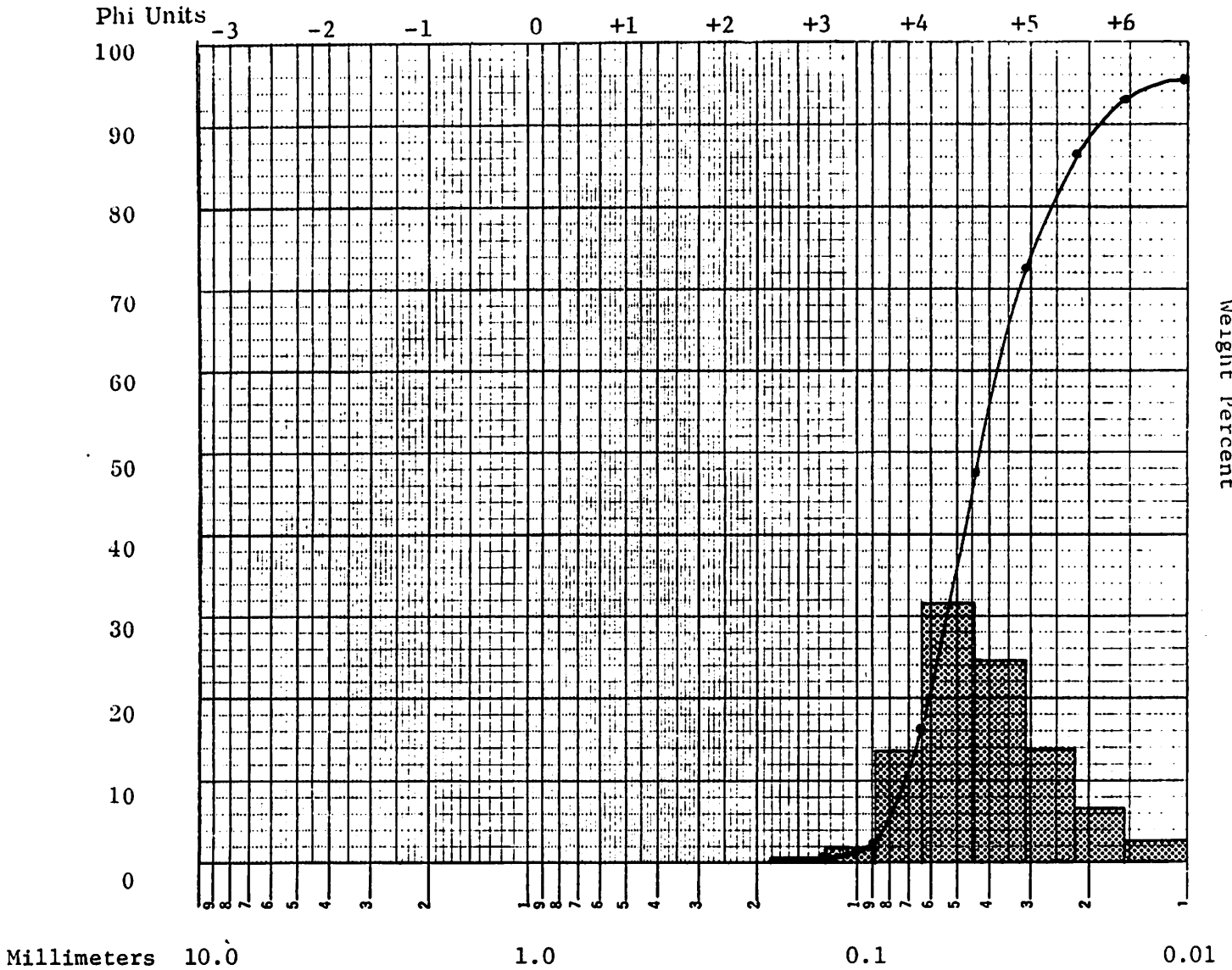
SIZE PARAMETERS

1st Mode <u>0.125 - 0.177 mm</u>	Q_{25} <u>0.153 mm</u>	Sorting Coef. <u>1.62</u>
2nd Mode _____	Median: Q_{50} <u>0.110 mm</u>	Skewness <u>0.73</u>
3rd Mode _____	Q_{75} <u>0.058 mm</u>	Kurtosis <u>0.36</u>

SIZE ANALYSIS

Sample 2114
 Lat. 37° 17.0' Long. 122° 31.4'
 Depth 41.0 Fathoms
75.0 Meters
246.0 Feet

Sample description greenish gray
very fine grained sandy silt
 Sample Weight 42.1 gm.



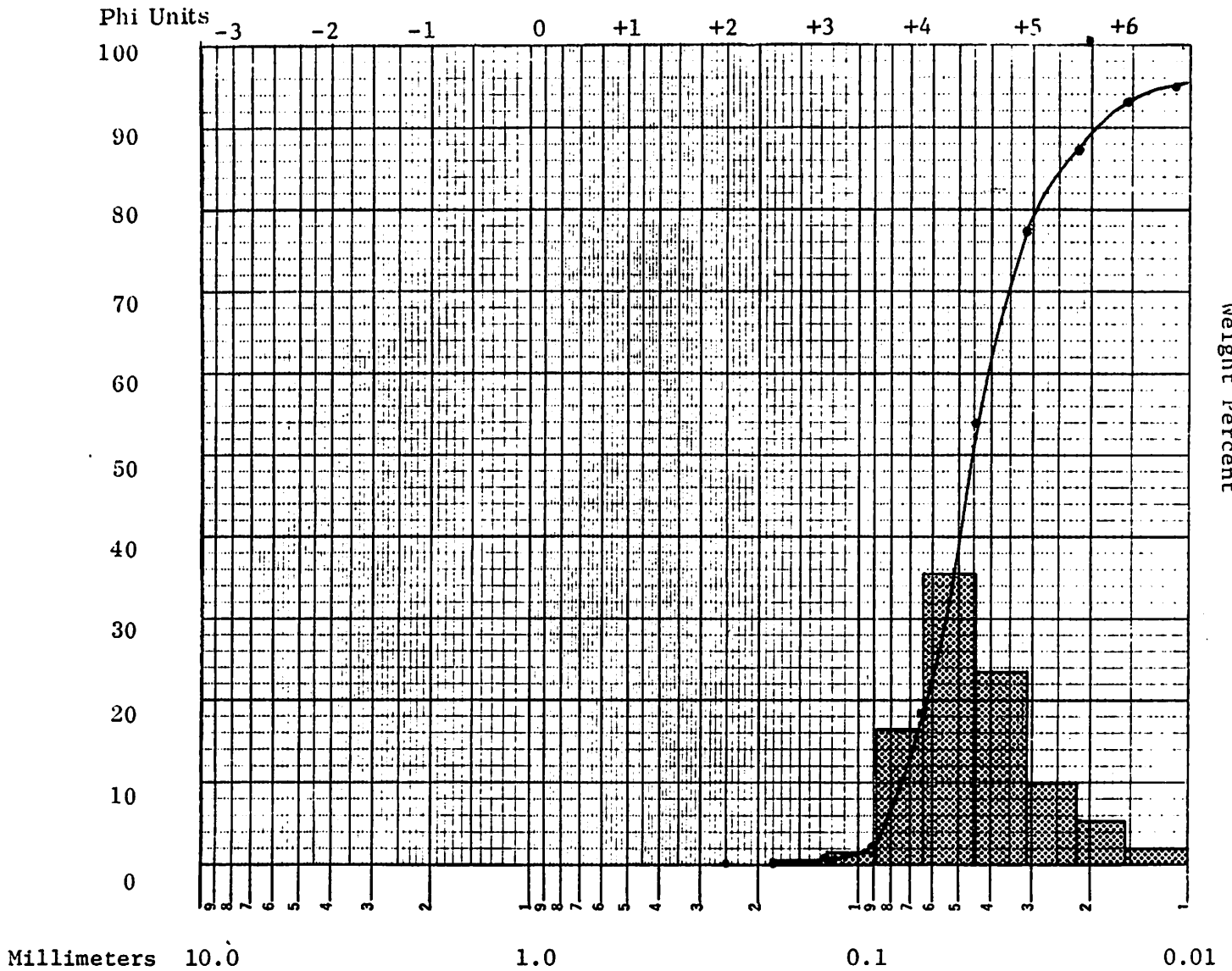
SIZE PARAMETERS

1st Mode 0.044 - 0.062 mm Q_{25} 0.057 mm Sorting Coef. 1.38
 2nd Mode _____ Median: Q_{50} 0.043 mm Skewness 0.92
 3rd Mode _____ Q_{75} 0.030 mm Kurtosis 0.25

SIZE ANALYSIS

Sample 2115
 Lat. 37° 18.8' Long. 122° 32.5'
 Depth 40.0 Fathoms
73.2 Meters
240.0 Feet

Sample description greenish gray
very fine grained sandy silt
 Sample Weight 41.2 gm.



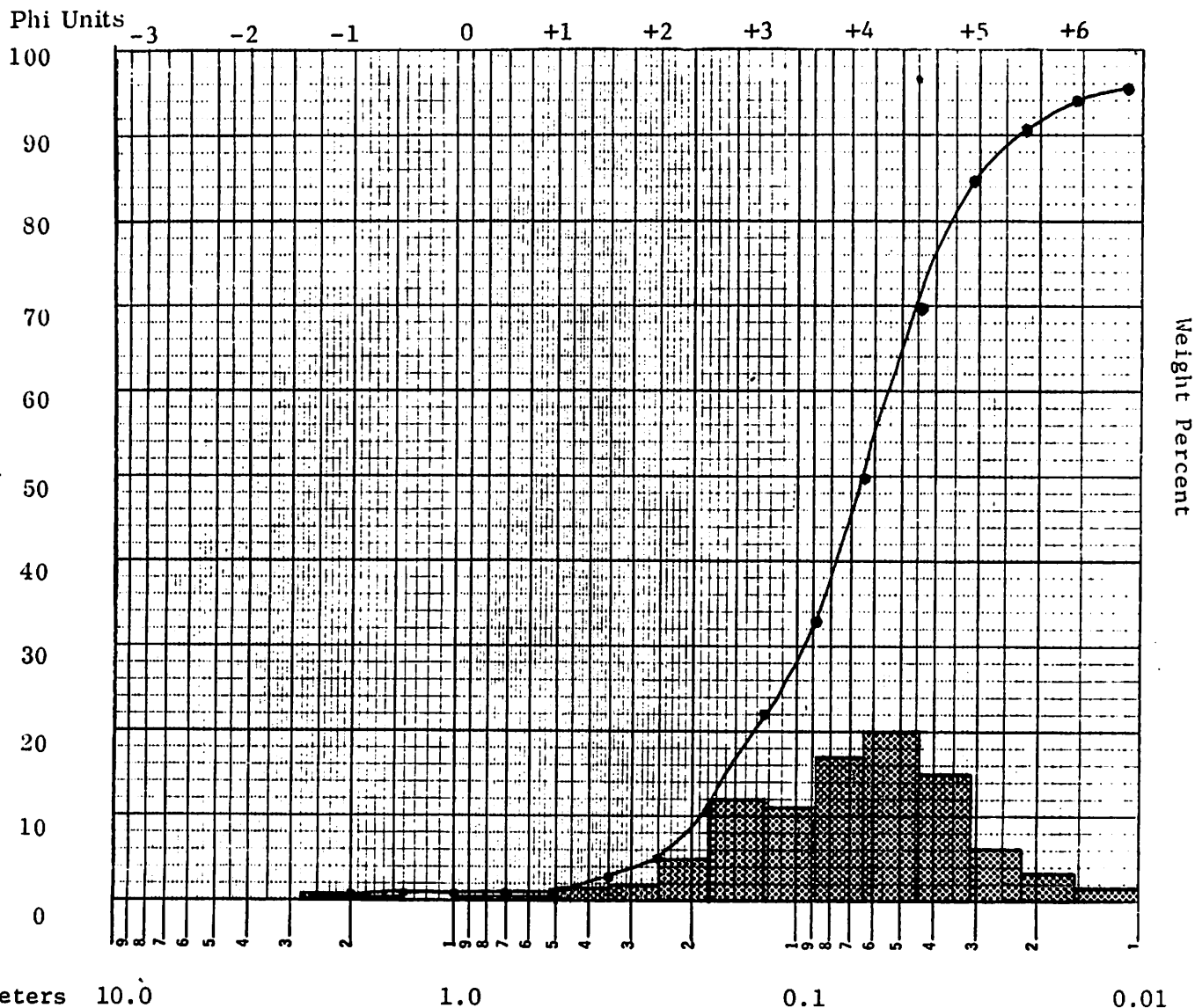
SIZE PARAMETERS

1st Mode 0.044 - 0.062 mm Q_{25} 0.058 mm Sorting Coef. 1.33
 2nd Mode _____ Median: Q_{50} 0.045 mm Skewness 0.94
 3rd Mode _____ Q_{75} 0.033 mm Kurtosis 0.23

SIZE ANALYSIS

Sample 2116
 Lat. 37° 19.2' Long. 122° 31.6'
 Depth 35.0 Fathoms
64.0 Meters
200.0 Feet

Sample description greenish gray
fine grained silty sand with small
amounts of shell fragments.
 Sample Weight 49.2 gm.



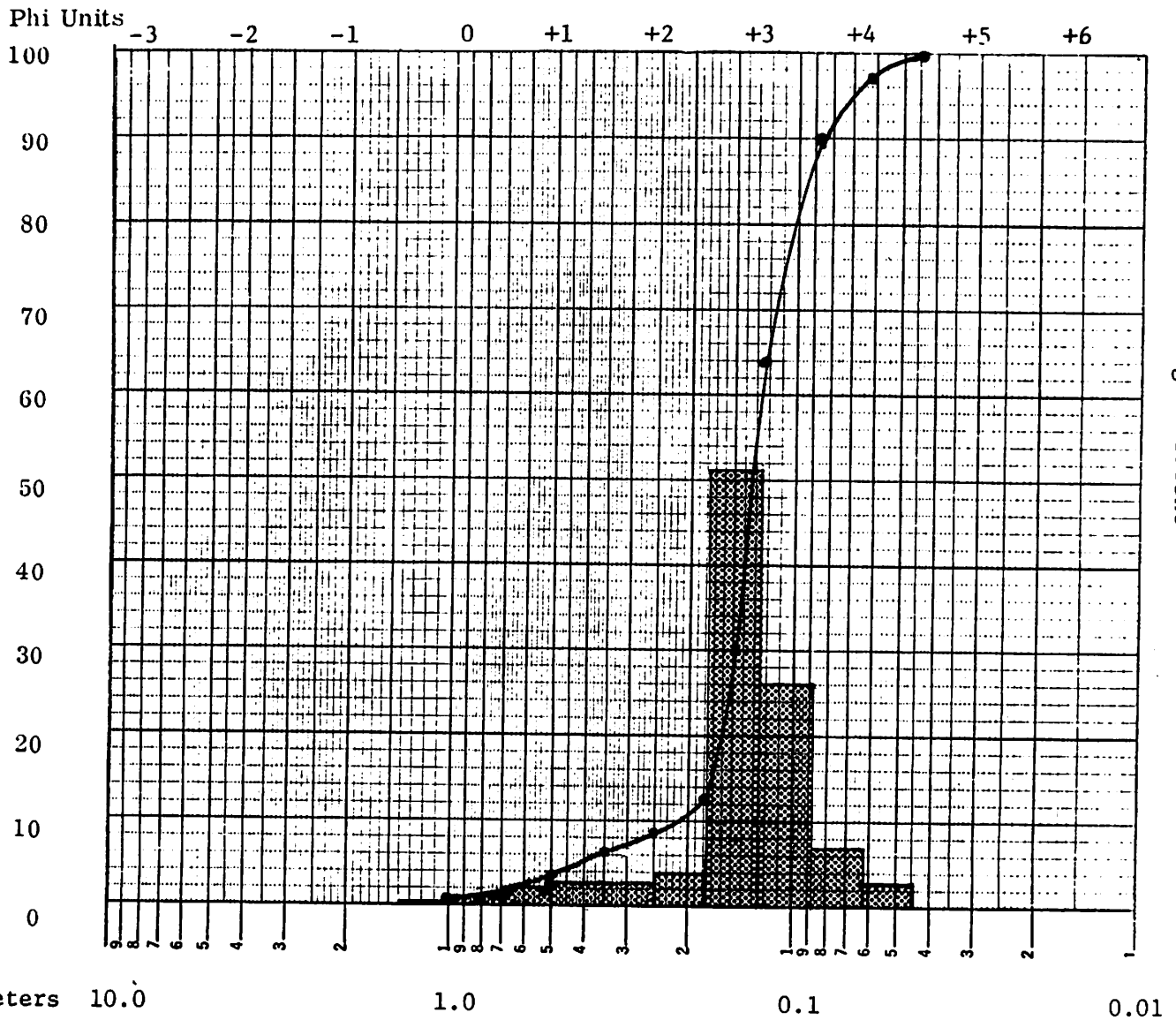
SIZE PARAMETERS

1st Mode <u>1.981 - 2.800 mm</u>	Q ₂₅ <u>0.110 mm</u>	Sorting Coef. <u>1.66</u>
2nd Mode <u>0.125 - 0.177 mm</u>	Median: Q ₅₀ <u>0.062 mm</u>	Skewness <u>1.14</u>
3rd Mode <u>0.044 - 0.062 mm</u>	Q ₇₅ <u>0.040 mm</u>	Kurtosis <u>0.22</u>

SIZE ANALYSIS

Sample 2117
 Lat. 37° 19.7' Long. 122° 30.3'
 Depth 30.0 Fathoms
54.9 Meters
180.0 Feet

Sample description greenish gray
fine grained sand with a small
amount of coarse sand grains
 Sample Weight 42.1 gm.



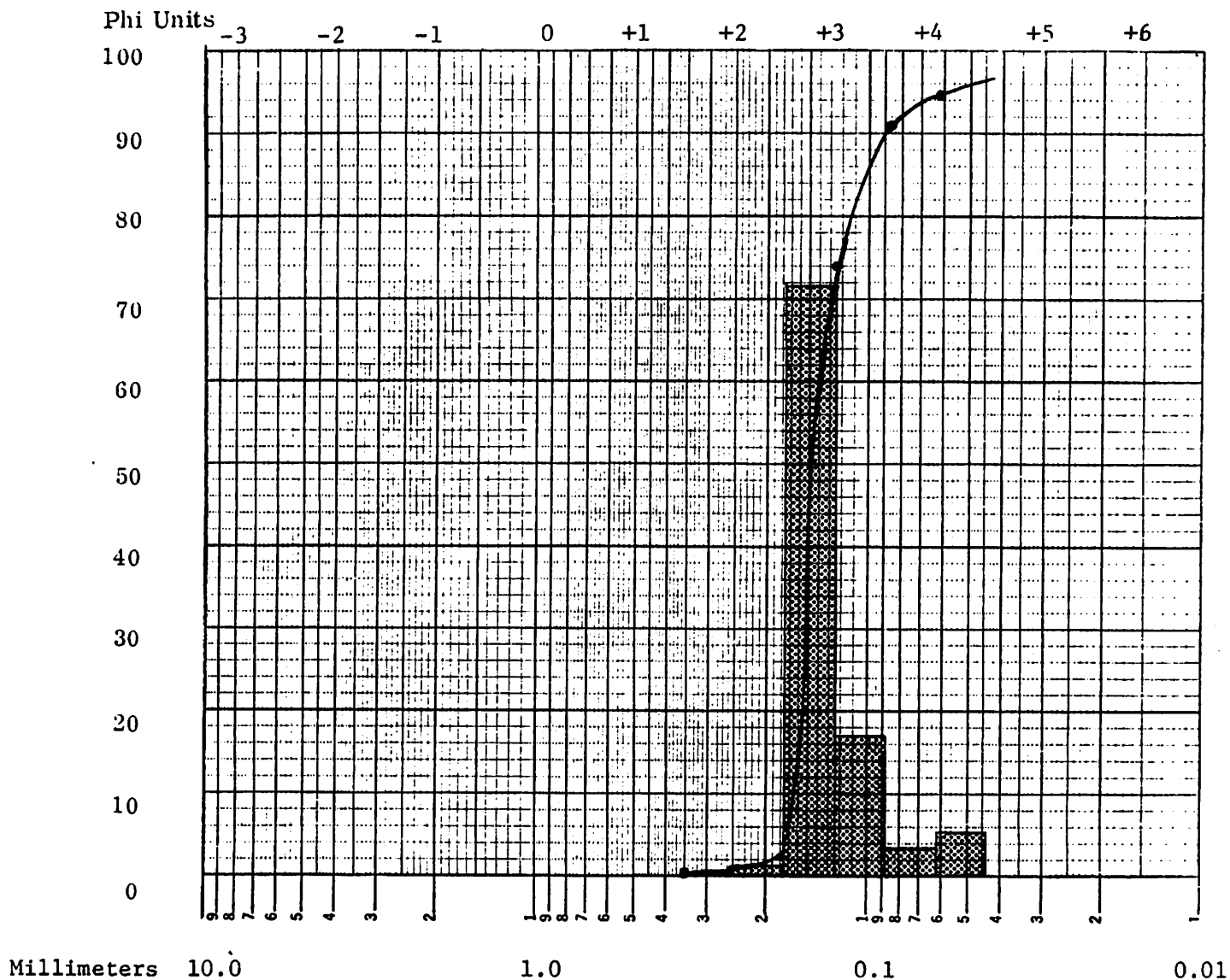
SIZE PARAMETERS

1st Mode <u>0.125 - 0.177 mm</u>	Q ₂₅ <u>0.155 mm</u>	Sorting Coef. <u>1.19</u>
2nd Mode _____	Median: Q ₅₀ <u>0.134 mm</u>	Skewness <u>0.95</u>
3rd Mode _____	Q ₇₅ <u>0.110 mm</u>	Kurtosis <u>0.18</u>

SIZE ANALYSIS

30

Sample <u>2118</u>	Sample description <u>greenish gray</u>
Lat. <u>37° 19.9'</u> Long. <u>122° 29.6'</u>	<u>fine grained sand</u>
Depth <u>25.0</u> Fathoms	
<u>45.7</u> Meters	
<u>150.0</u> Feet	Sample Weight <u>51.3 gm.</u>

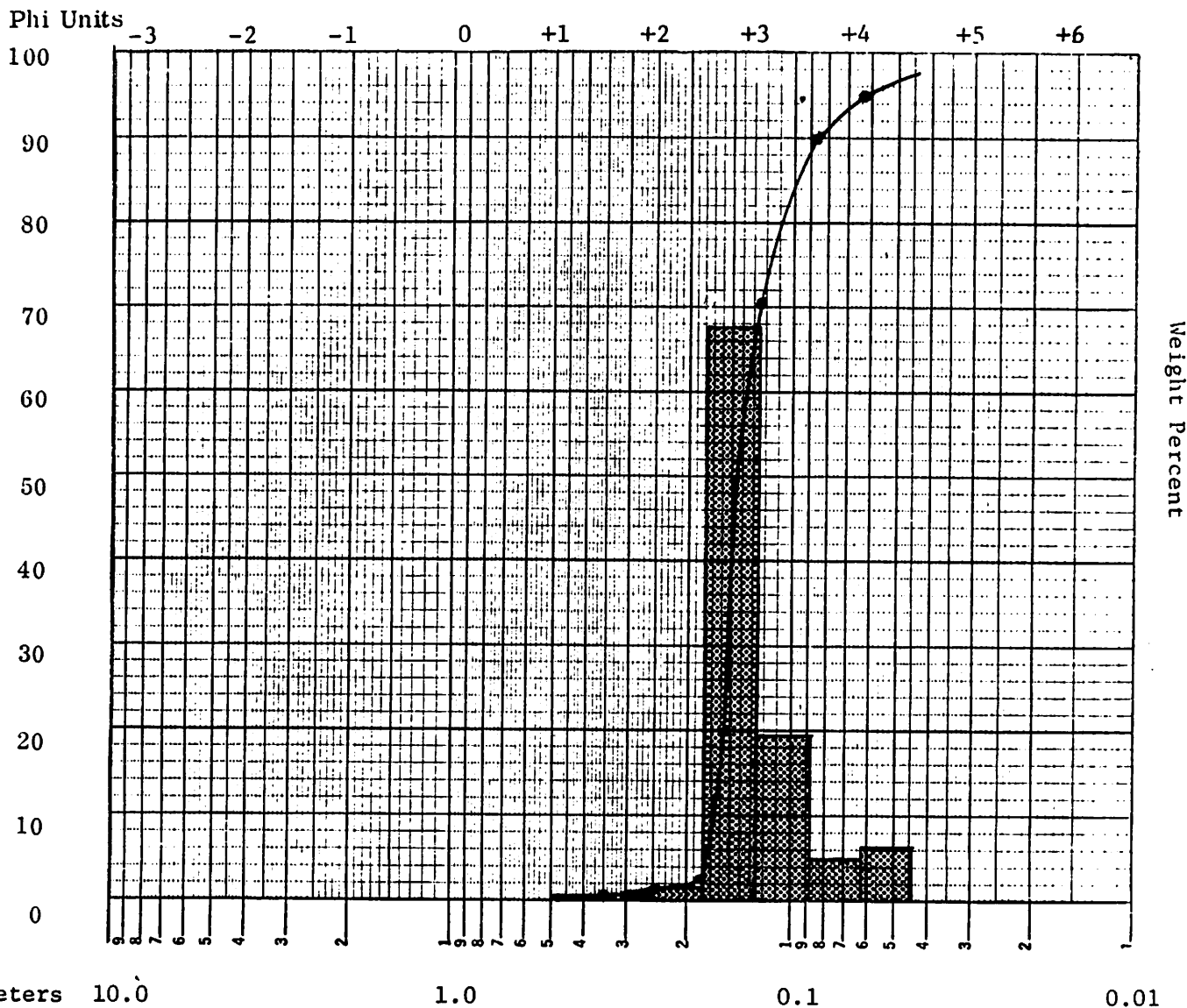


SIZE PARAMETERS

1st Mode <u>0.125 - 0.177 mm</u>	Q ₂₅ <u>0.153 mm</u>	Sorting Coef. <u>1.11</u>
2nd Mode _____	Median: Q ₅₀ <u>0.137 mm</u>	Skewness <u>1.01</u>
3rd Mode _____	Q ₇₅ <u>0.124 mm</u>	Kurtosis <u>0.19</u>

SIZE ANALYSIS

Sample <u>2119</u>	Sample description <u>gray colored</u>
Lat. <u>37° 20.3'</u> Long. <u>122° 28.9'</u>	<u>fine grained sand</u>
Depth <u>20.0</u> Fathoms	
<u>36.7</u> Meters	
<u>120.0</u> Feet	Sample Weight <u>60.2 gm</u>

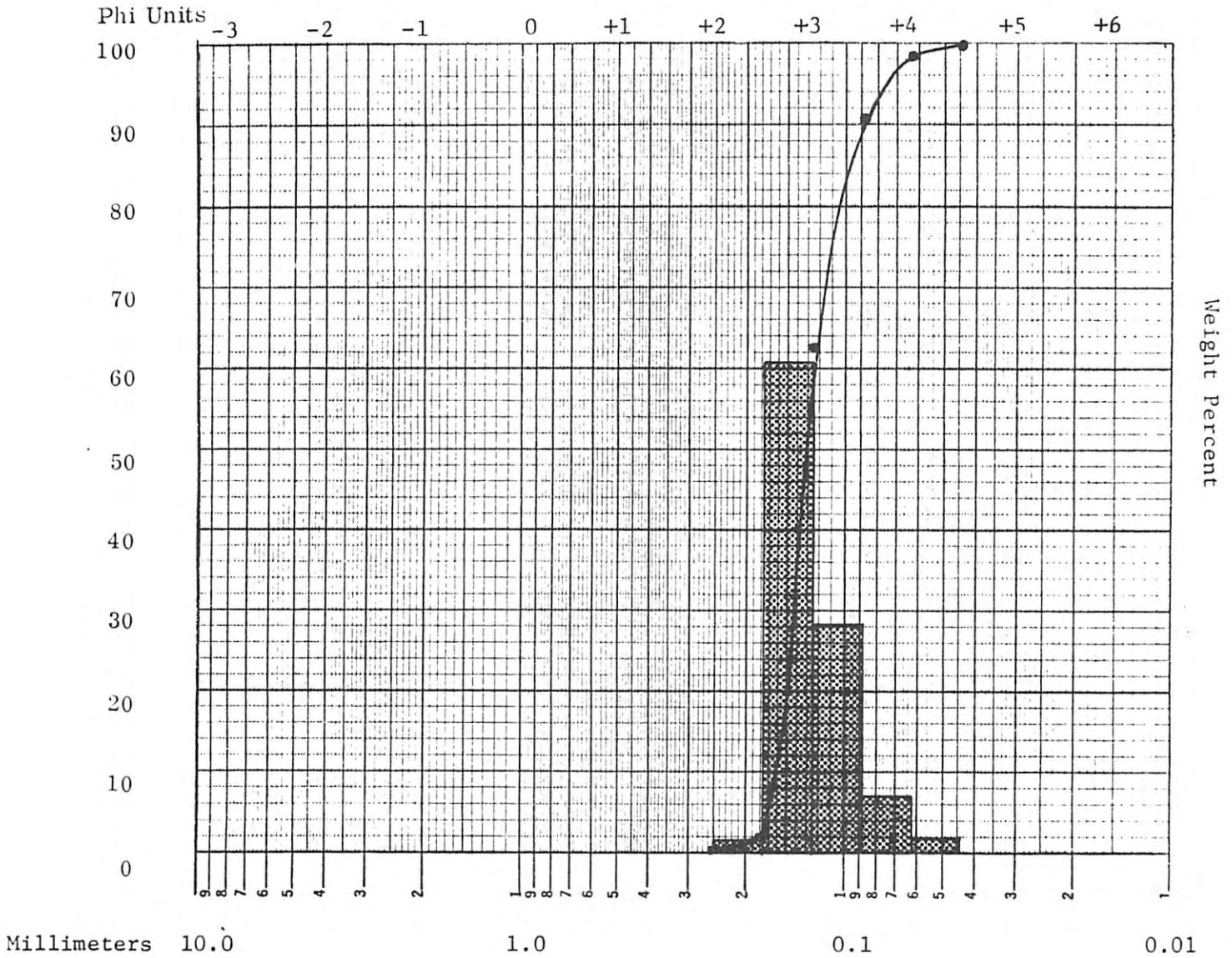


SIZE PARAMETERS

1st Mode <u>0.125 - 0.177 mm</u>	Q_{25} <u>0.155 mm</u>	Sorting Coef. <u>1.14</u>
2nd Mode _____	Median: Q_{50} <u>0.145 mm</u>	Skewness <u>0.87</u>
3rd Mode _____	Q_{75} <u>0.118 mm</u>	Kurtosis <u>0.24</u>

SIZE ANALYSIS

Sample 2120 Sample description gray colored
 Lat. 37° 20.7' Long. 122° 27.6' fine grained sand
 Depth 15.0 Fathoms _____
27.4 Meters _____
90.0 Feet _____ Sample Weight 55.9 gm



SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.145 mm Sorting Coef. 1.15
 2nd Mode _____ Median: Q_{50} 0.130 mm Skewness 0.94
 3rd Mode _____ Q_{75} 0.110 mm Kurtosis 0.25

SIZE ANALYSIS

Sample 2121

Sample description fine grained sand

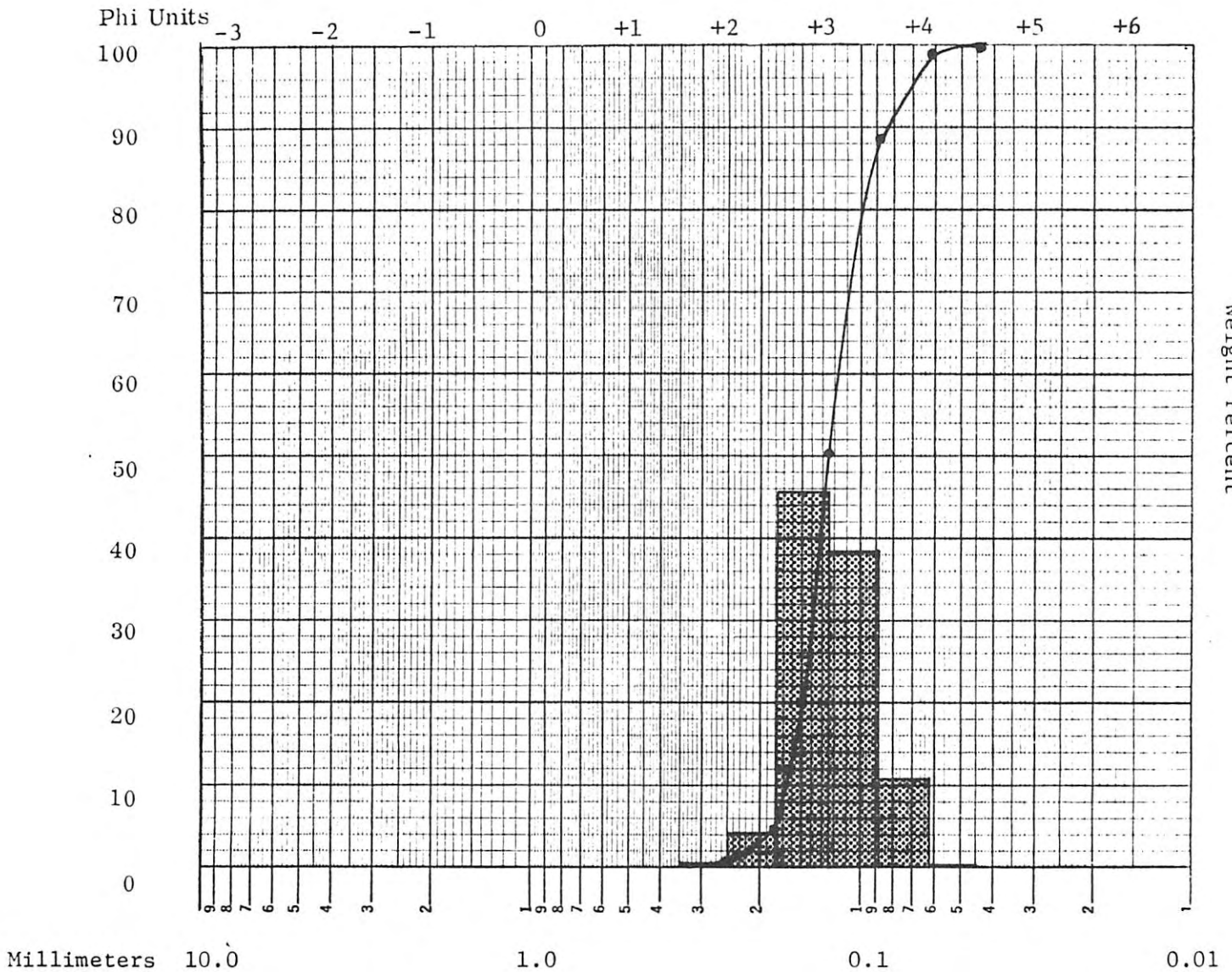
Lat. 37° 21.0' Long. 122° 26.4'

Depth 10.0 Fathoms

18.3 Meters

60.0 Feet

Sample Weight 17.2 gm



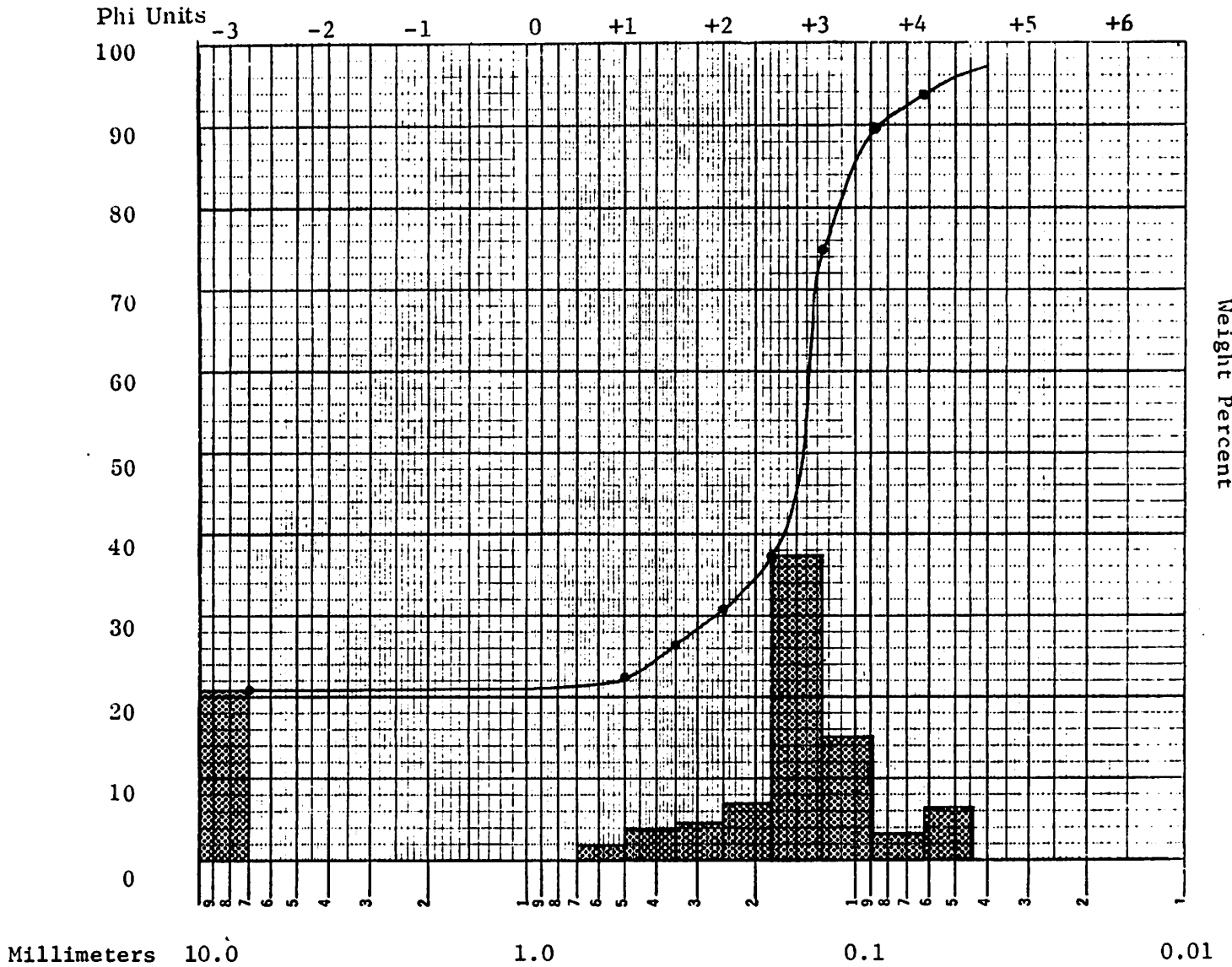
SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.143 mm Sorting Coef. 1.17
 2nd Mode _____ Median: Q_{50} 0.125 mm Skewness 0.96
 3rd Mode _____ Q_{75} 0.105 mm Kurtosis 0.23

SIZE ANALYSIS

Sample 2122
 Lat. 37° 18.8' Long. 122° 28.1'
 Depth 20.0 Fathoms
36.7 Meters
120.0 Feet

Sample description fine grained
sand with some pebbles
 Sample Weight 18.2 gm



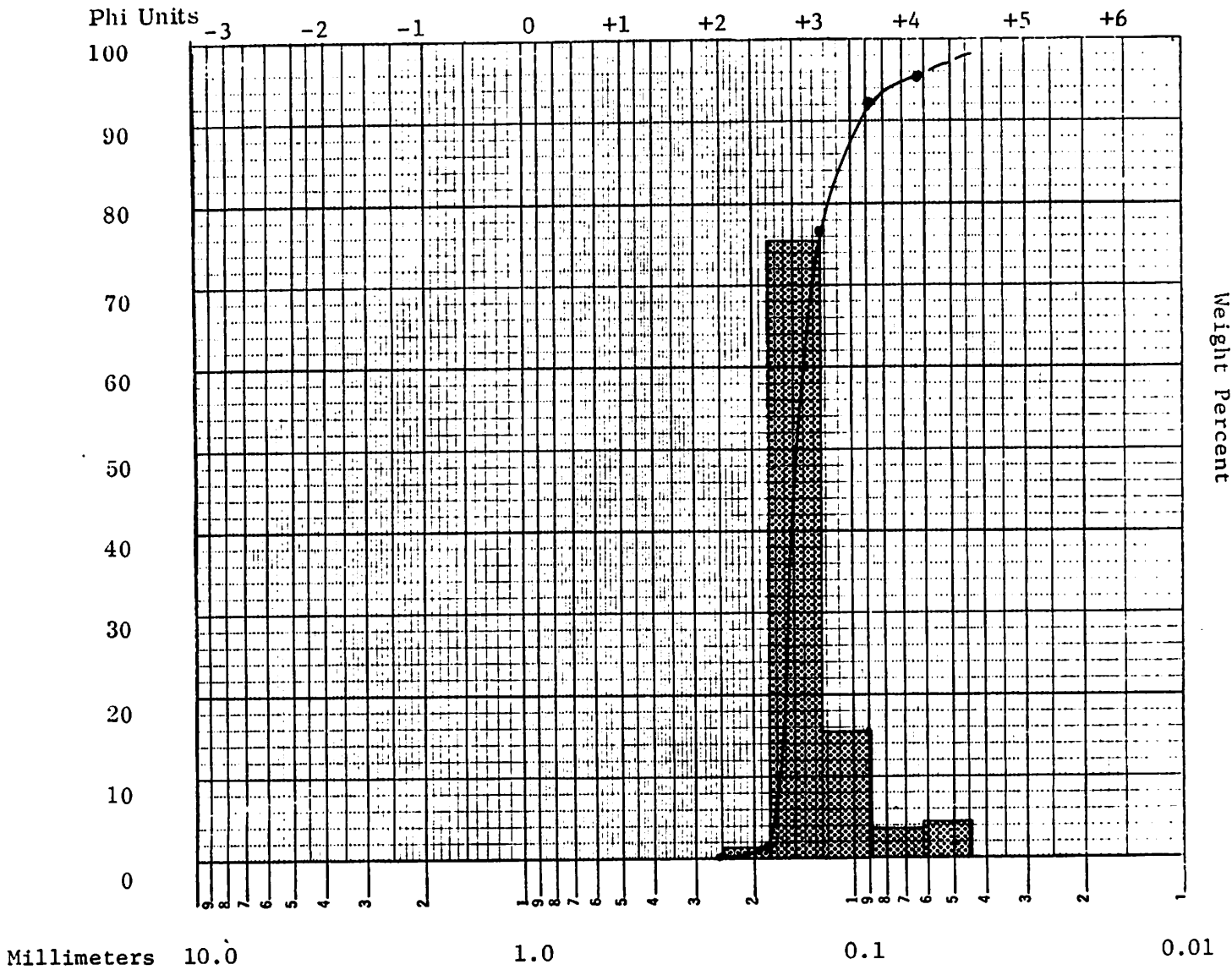
SIZE PARAMETERS

1st Mode	<u>> 7.000 mm</u>	Q ₂₅	<u>0.380 mm</u>	Sorting Coef.	<u>1.74</u>
2nd Mode	<u>0.125 - 0.177 mm</u>	Median: Q ₅₀	<u>0.145 mm</u>	Skewness	<u>2.26</u>
3rd Mode	<u></u>	Q ₇₅	<u>0.125 mm</u>	Kurtosis	<u>0.13</u>

SIZE ANALYSIS

Sample 2123
 Lat. 37° 22.3' Long. 122^{\circ} 29.0'
 Depth 20.0 Fathoms
 36.7 Meters
 120.0 Feet

Sample description greenish gray
fine grained sand
 Sample Weight 59.3 gm



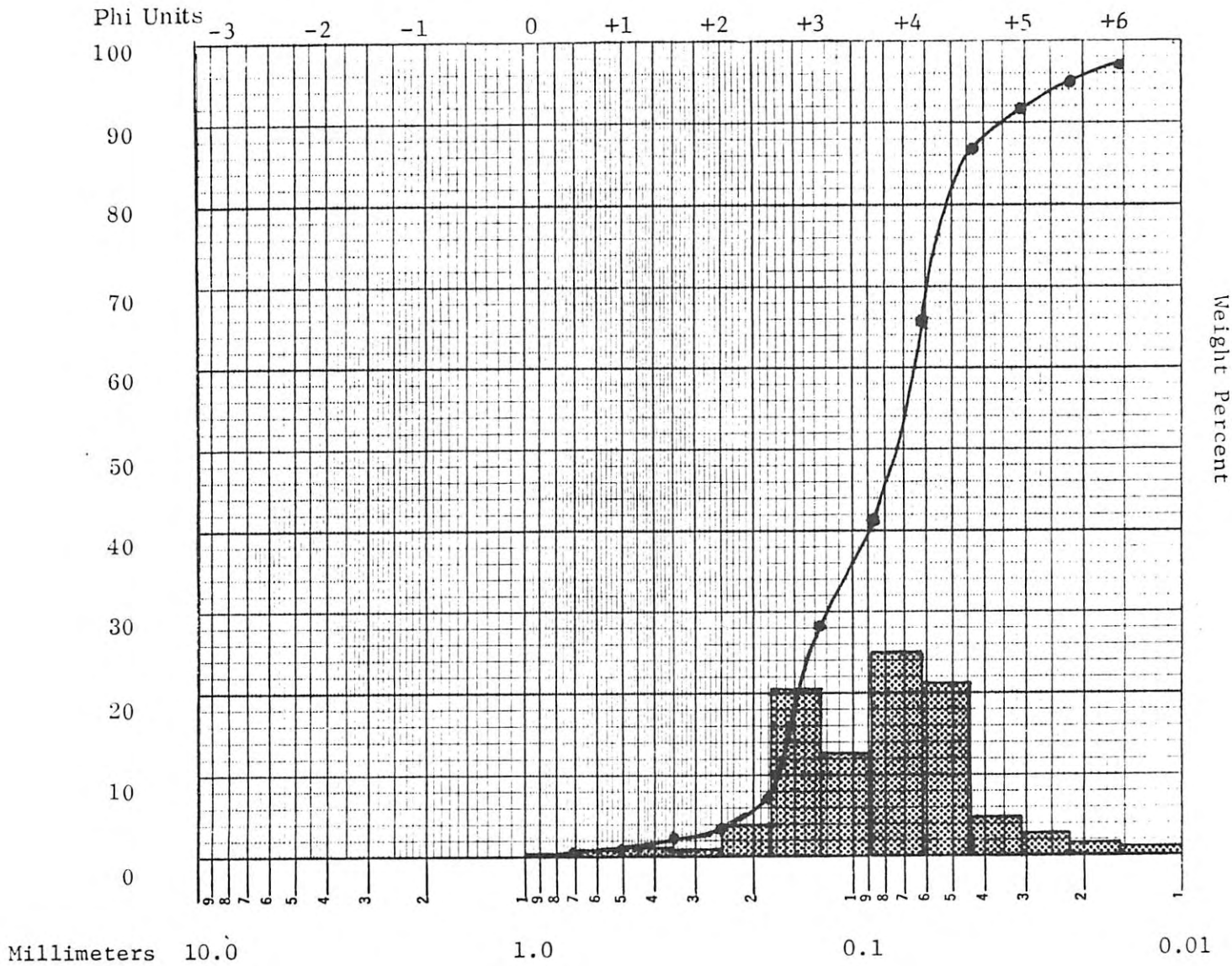
SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.158 mm Sorting Coef. 1.11
 2nd Mode _____ Median: Q_{50} 0.148 mm Skewness 0.92
 3rd Mode _____ Q_{75} 0.128 mm Kurtosis 0.21

SIZE ANALYSIS

Sample 2125
 Lat. 37° 20.9' Long. 122° 34.3'
 Depth 38.3 Fathoms
 88.4 Meters
 229.8 Feet

Sample description greenish gray
very fine grained silty sand with
some large well rounded pebbles
 Sample Weight 49.4 gm.



SIZE PARAMETERS

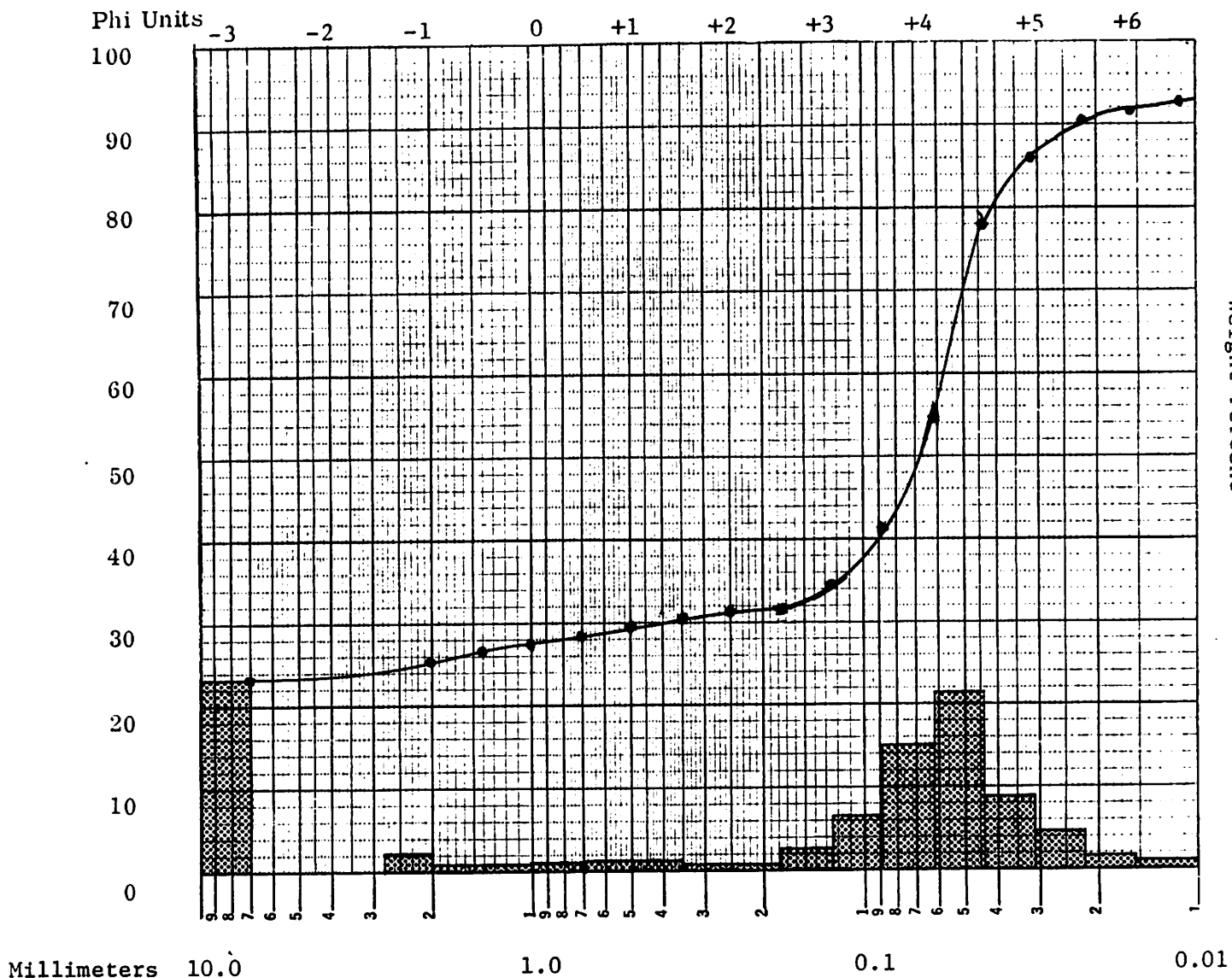
1st Mode <u>0.350 - 0.500 mm</u>	Q ₂₅ <u>0.135 mm</u>	Sorting Coef. <u>1.55</u>
2nd Mode <u>0.125 - 0.177 mm</u>	Median: Q ₅₀ <u>0.074 mm</u>	Skewness <u>1.38</u>
3rd Mode <u>0.062 - 0.088 mm</u>	Q ₇₅ <u>0.056 mm</u>	Kurtosis <u>0.30</u>

SIZE ANALYSIS

37

Sample 2126
 Lat. 37° 22.0' Long. 122° 32.9'
 Depth 35.0 Fathoms
 64.0 Meters
 200.0 Feet

Sample description greenish gray
fine grained silty sand containing
many well rounded pebbles
 Sample Weight 70.9 gm.

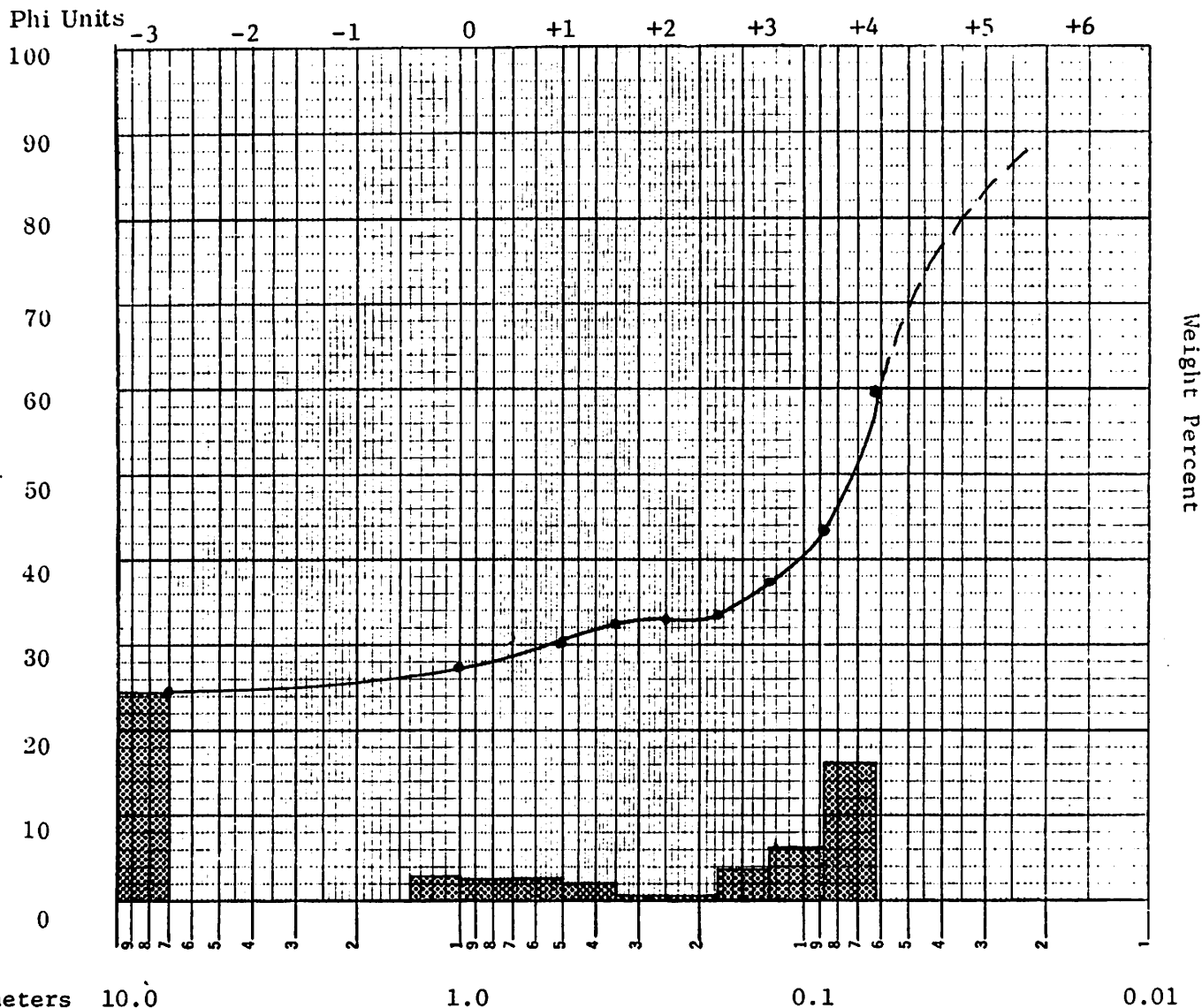


SIZE PARAMETERS

1st Mode	<u>> 7.000 mm</u>	Q ₂₅	<u>2.400 mm</u>	Sorting Coef.	<u>2.26</u>
2nd Mode	<u>0.350 - 0.500 mm</u>	Median: Q ₅₀	<u>0.067 mm</u>	Skewness	<u>2.51</u>
3rd Mode	<u>0.044 - 0.062 mm</u>	Q ₇₅	<u>0.047 mm</u>	Kurtosis	<u>0.17</u>

SIZE ANALYSIS

Sample <u>2127</u> Lat. <u>37° 22.3'</u> Long. <u>122° 31.9'</u> Depth <u>31.0</u> Fathoms <u>56.7</u> Meters <u>186.0</u> Feet	Sample description <u>very fine grained</u> <u>sandy silt, with some pebbles</u> Sample Weight <u>31.5 gm</u>
---	---



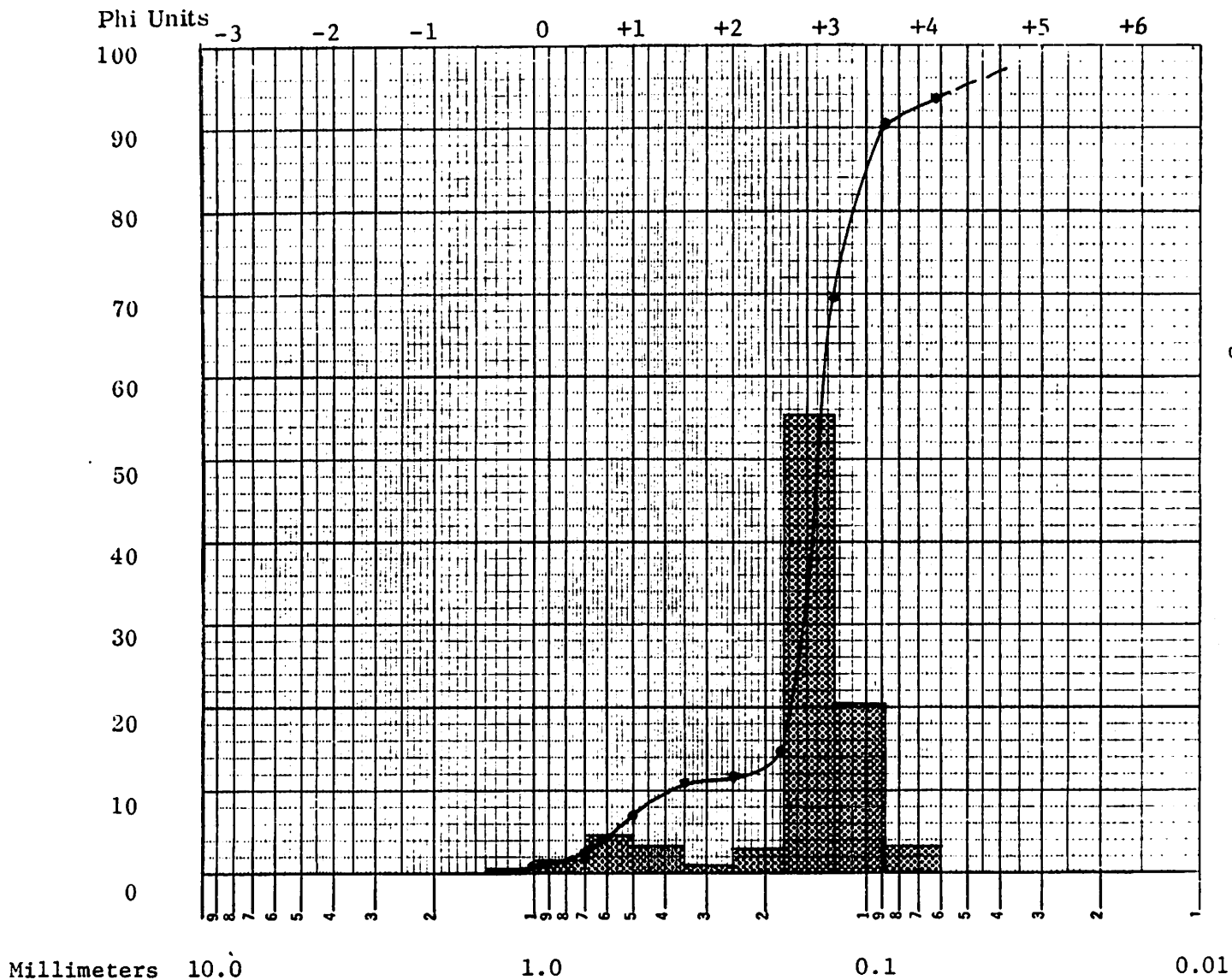
SIZE PARAMETERS

1st Mode <u>> 7.000 mm</u>	Q ₂₅ <u>3.500 mm</u>	Sorting Coef. <u>2.85</u>
2nd Mode <u>0.991 - 1.397 mm</u>	Median: Q ₅₀ <u>0.072 mm</u>	Skewness <u>2.90</u>
3rd Mode <u>0.044 - 0.062 mm</u>	Q ₇₅ <u>0.043 mm</u>	Kurtosis <u>0.25</u>

SIZE ANALYSIS

39

Sample <u>2128</u>	Sample description <u>greenish gray</u>
Lat. <u>37° 22.7'</u> Long. <u>122° 30.4'</u>	<u>fine grained sand</u>
Depth <u>25.0</u> Fathoms	
<u>45.7</u> Meters	
<u>150.0</u> Feet	Sample Weight <u>69.4 gm.</u>



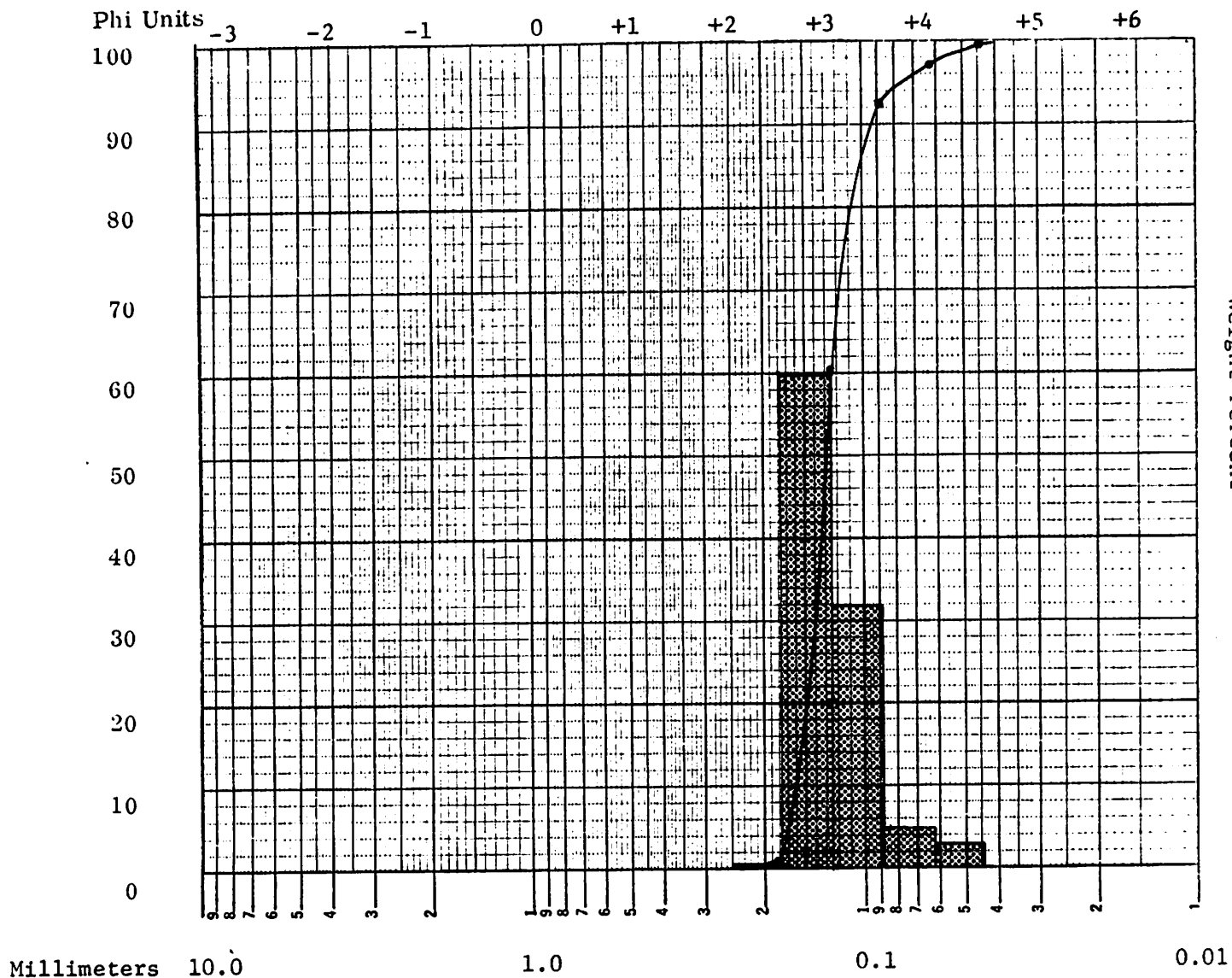
SIZE PARAMETERS

1st Mode <u>0.500 - 0.701 mm</u>	Q ₂₅ <u>0.160 mm</u>	Sorting Coef. <u>1.15</u>
2nd Mode <u>0.125 - 0.177 mm</u>	Median: Q ₅₀ <u>0.140 mm</u>	Skewness <u>0.98</u>
3rd Mode _____	Q ₇₅ <u>0.120 mm</u>	Kurtosis <u>0.06</u>

SIZE ANALYSIS

Sample 2129
 Lat. 37° 22.9' Long. 122° 29.0'
 Depth 20.0 Fathoms
36.7 Meters
120.0 Feet

Sample description fine grained
sand
 Sample Weight 63.0 gm



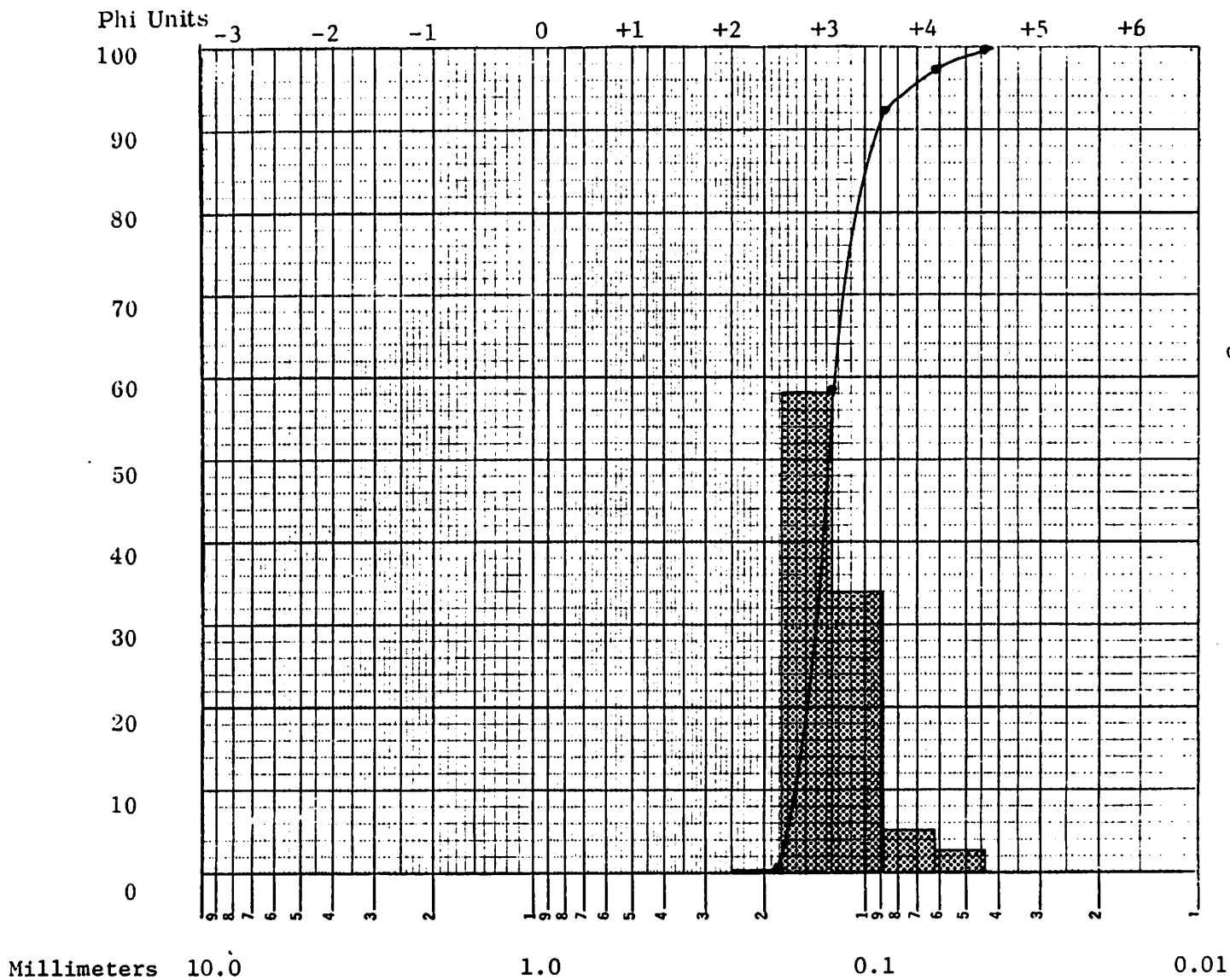
SIZE PARAMETERS

1st Mode 0.125 mm - 0.177 mm Q_{25} 0.145 mm Sorting Coef. 1.12
 2nd Mode _____ Median: Q_{50} 0.130 mm Skewness 0.99
 3rd Mode _____ Q_{75} 0.115 mm Kurtosis 0.23

SIZE ANALYSIS

Sample 2130
 Lat. 37° 23.2' Long. 122° 28.0'
 Depth 15.0 Fathoms
27.4 Meters
90.0 Feet

Sample description greenish gray
fine grained sand
 Sample Weight 45.7 gm



SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.145 mm Sorting Coef. 1.15
 2nd Mode _____ Median: Q_{50} 0.128 mm Skewness 0.97
 3rd Mode _____ Q_{75} 0.110 mm Kurtosis 0.26

SIZE ANALYSIS

Sample 2131

Sample description gray colored

Lat. 37° 23.3' Long. 122° 26.5'

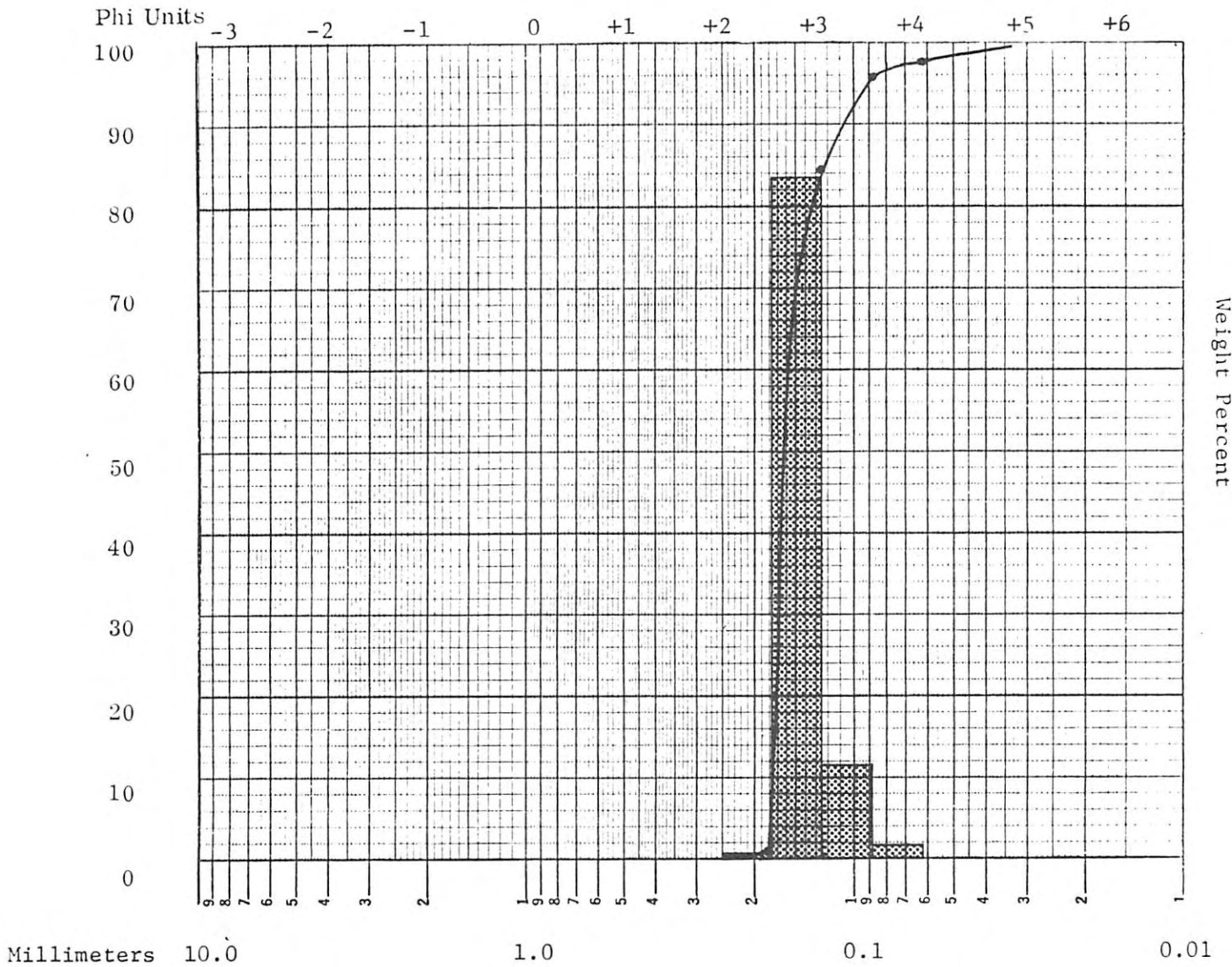
fine grained sand

Depth 10.0 Fathoms

18.3 Meters

60.0 Feet

Sample Weight 80.7 gm



SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.170 mm Sorting Coef. 1.09

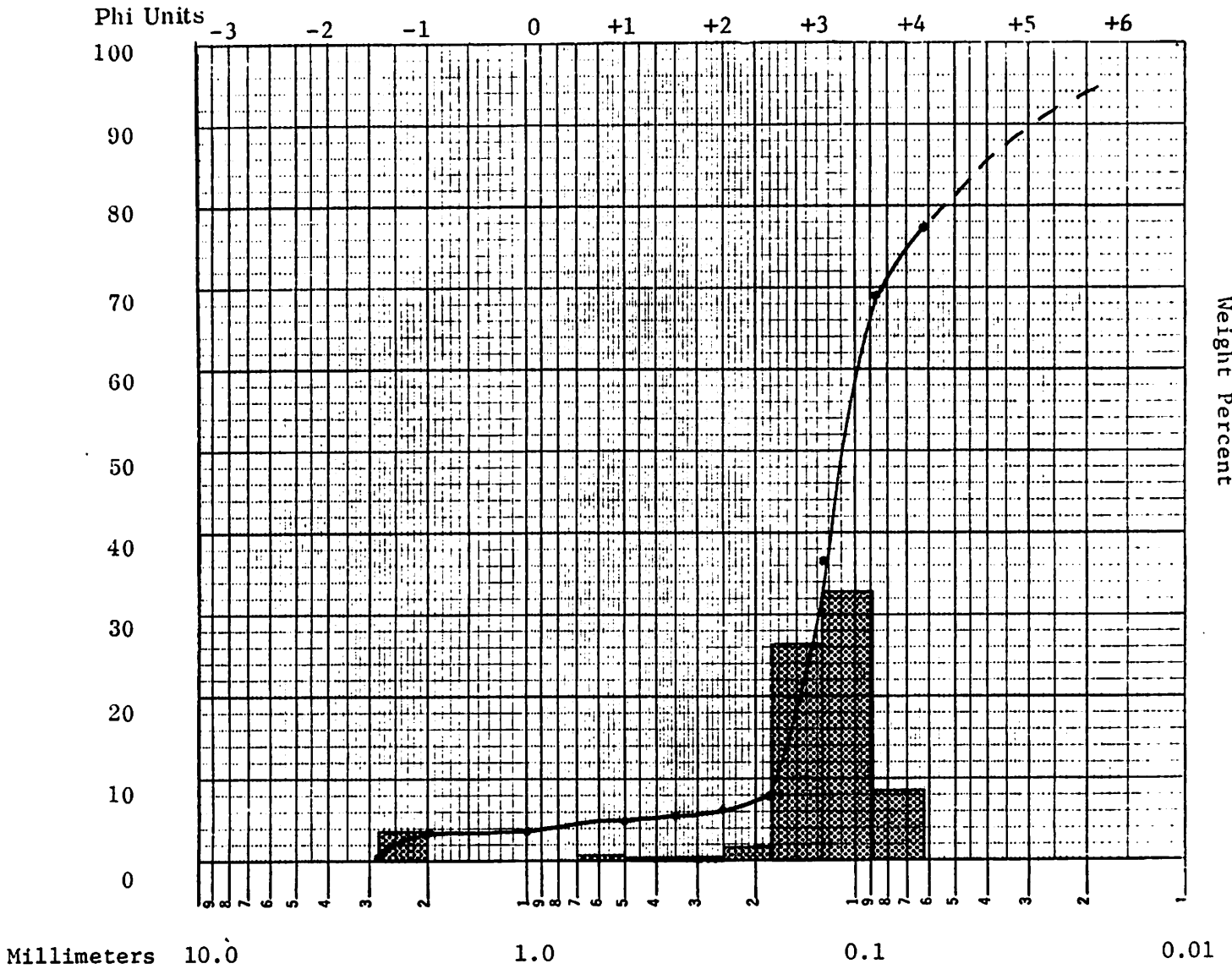
2nd Mode _____ Median: Q_{50} 0.162 mm Skewness 0.92

3rd Mode _____ Q_{75} 0.142 mm Kurtosis 0.21

SIZE ANALYSIS

Sample 2132
 Lat. 37° 23.5' Long. 122° 25.7'
 Depth 5.0 Fathoms
9.1 Meters
30.0 Feet

Sample description very fine grained
silty sand, with some shell
fragments
 Sample Weight 2.6 gm



SIZE PARAMETERS

1st Mode	<u>2.000 - 2.800 mm</u>	Q ₂₅	<u>0.136 mm</u>	Sorting Coef.	<u>1.41</u>
2nd Mode	<u>0.500 - 0.701 mm</u>	Median: Q ₅₀	<u>0.110 mm</u>	Skewness	<u>0.76</u>
3rd Mode	<u>0.088 - 0.125 mm</u>	Q ₇₅	<u>0.068 mm</u>	Kurtosis	<u>0.23</u>

SIZE ANALYSIS

Sample 2133

Sample description fine grained

Lat. 370° 26.8' Long. 122° 27.9'

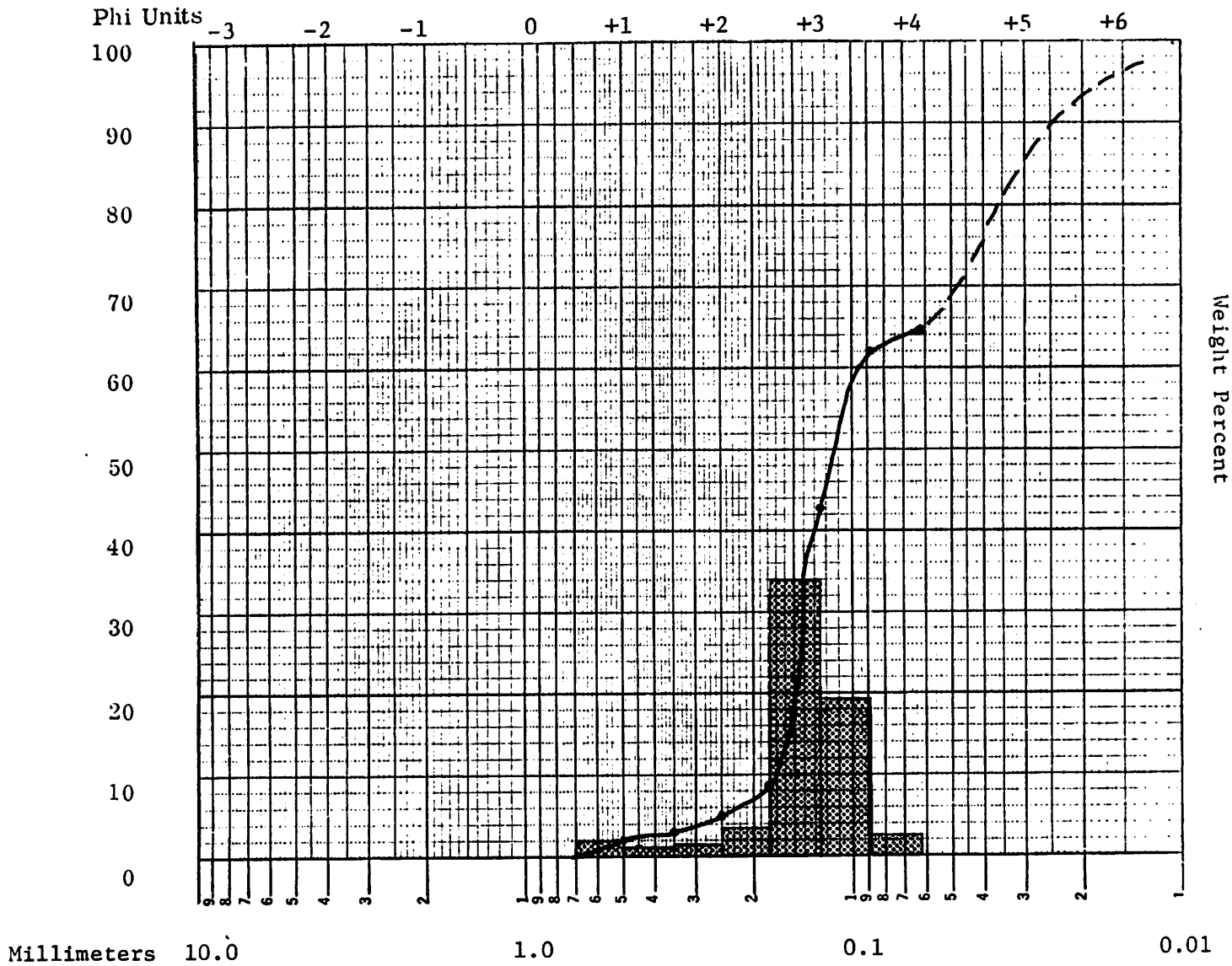
silty sand

Depth 10.0 Fathoms

18.3 Meters

60.0 Feet

Sample Weight 7.5 gm

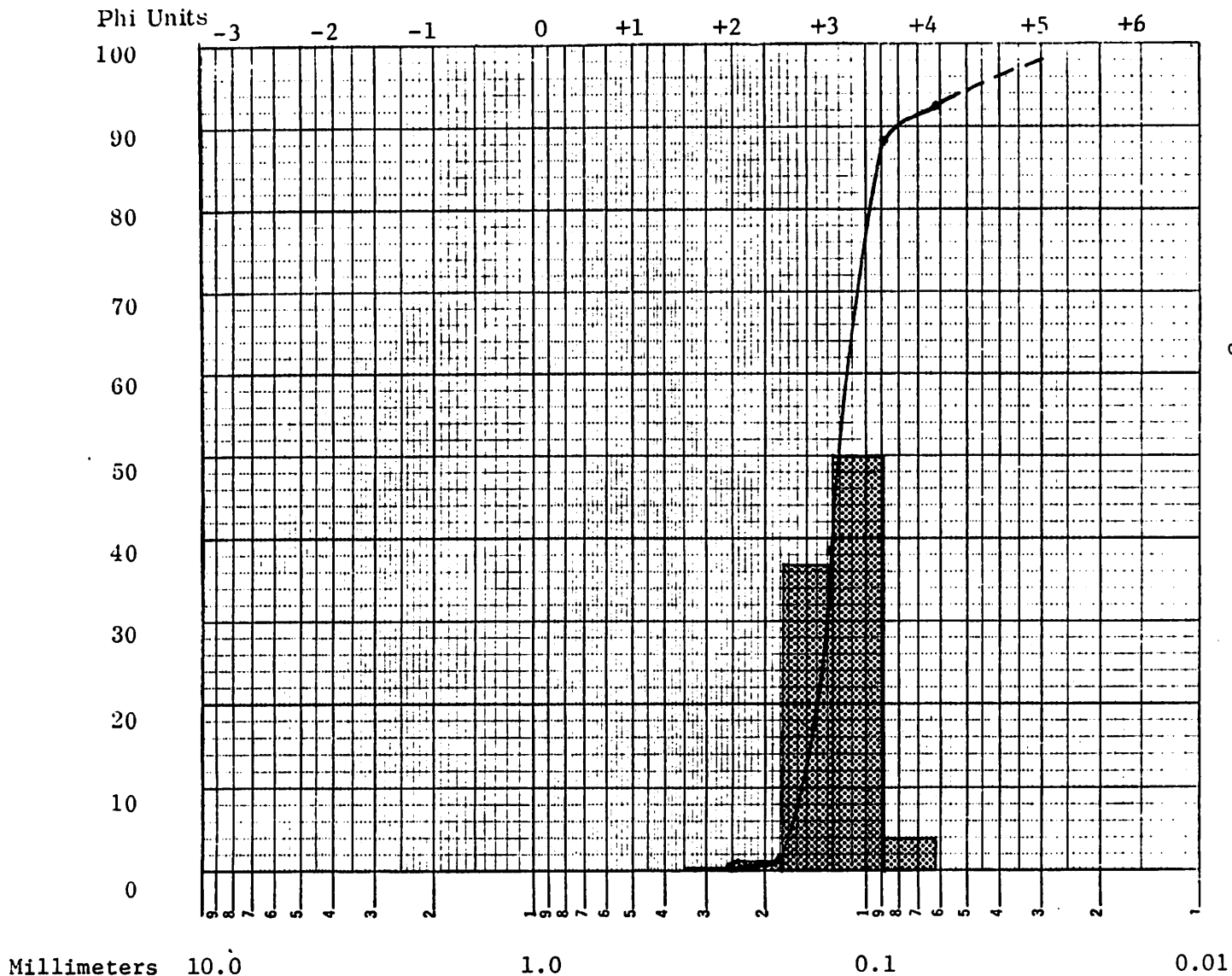


SIZE PARAMETERS

1st Mode	<u>0.500 - 0.701 mm</u>	Q ₂₅	<u>0.142 mm</u>	Sorting Coef.	<u>1.88</u>
2nd Mode	<u>0.125 - 0.177 mm</u>	Median: Q ₅₀	<u>0.113 mm</u>	Skewness	<u>0.44</u>
3rd Mode	<u></u>	Q ₇₅	<u>0.040</u>	Kurtosis	<u>0.35</u>

SIZE ANALYSIS

Sample 2134 Sample description gray colored
 Lat. 37° 26.4' Long. 122° 28.9' fine grained sand
 Depth 15.0 Fathoms _____
27.4 Meters _____
90.0 Feet _____ Sample Weight 154.7 gm



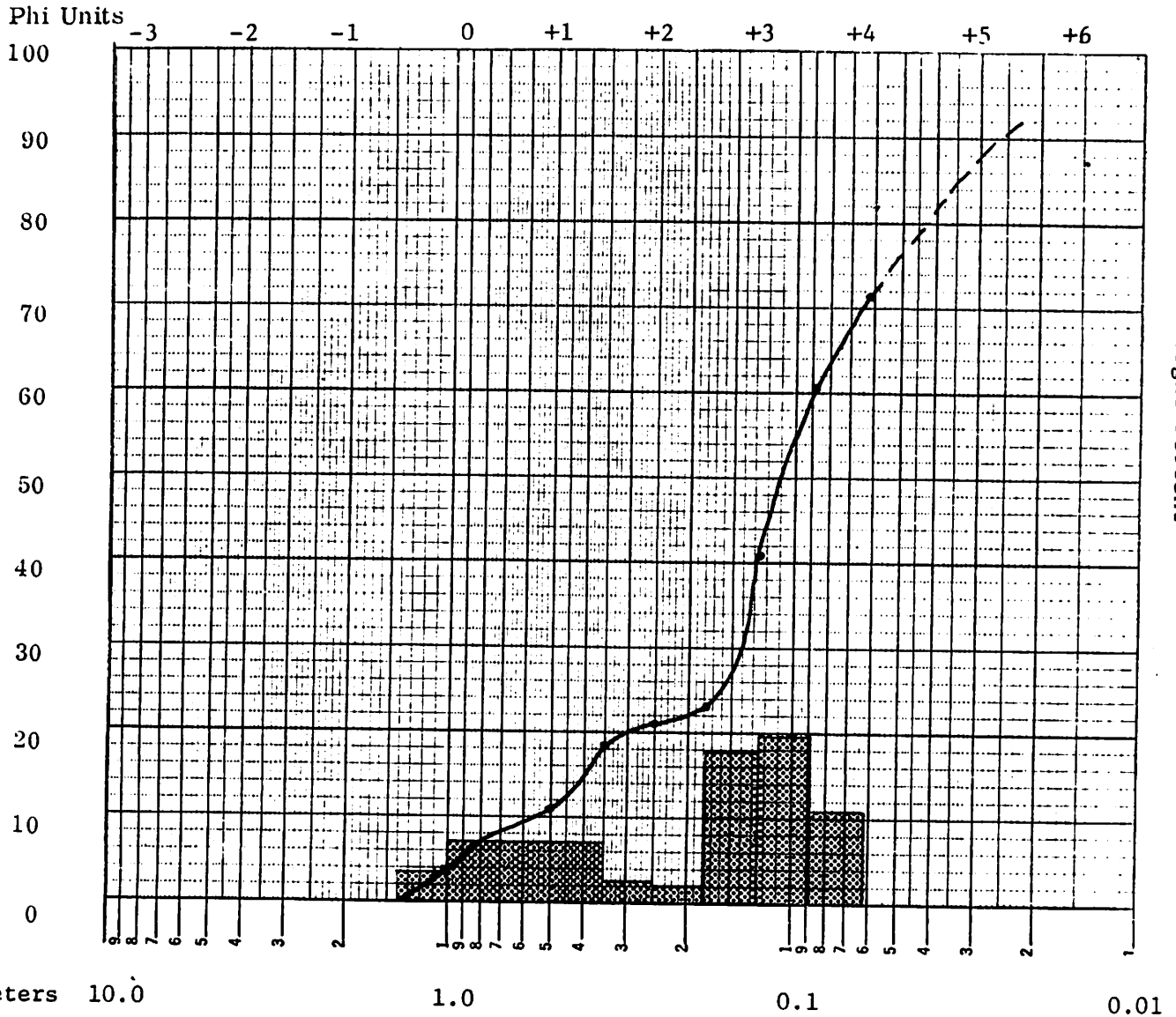
SIZE PARAMETERS

1st Mode 0.088 - 0.125 mm Q_{25} 0.135 mm Sorting Coef. 1.15
 2nd Mode _____ Median: Q_{50} 0.120 mm Skewness 0.96
 3rd Mode _____ Q_{75} 0.102 mm Kurtosis 0.22

SIZE ANALYSIS

Sample 2135
 Lat. 37° 25.9' Long. 122° 29.8'
 Depth 20.0 Fathoms
36.7 Meters
120.0 Feet

Sample description fine grained
sand containing some large
pebbles.
 Sample Weight 59.6 gm

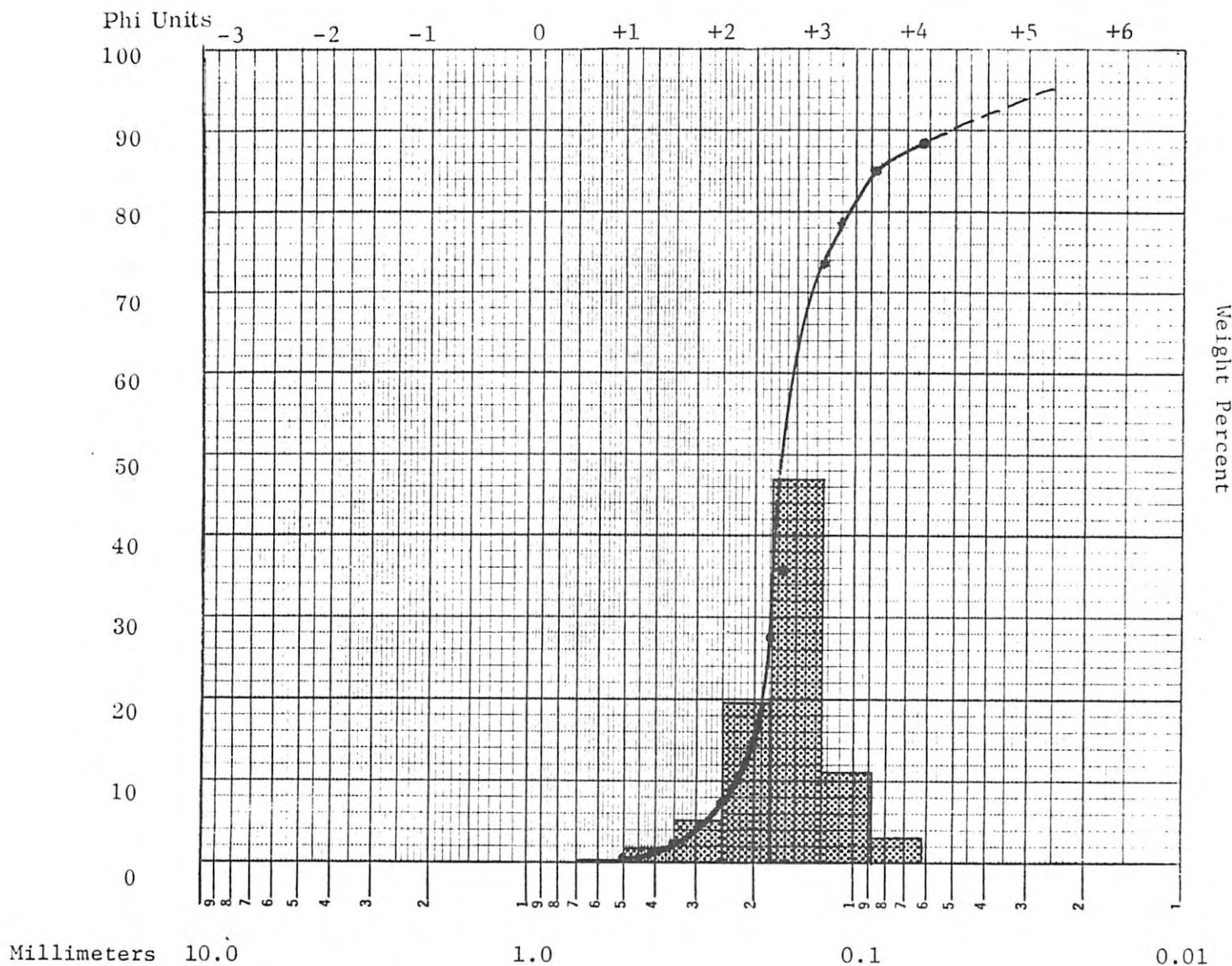


SIZE PARAMETERS

1st Mode	<u>0.350 - 0.500 mm</u>	Q ₂₅	<u>0.160 mm</u>	Sorting Coef.	<u>1.72</u>
2nd Mode	<u>0.088 - 0.125 mm</u>	Median: Q ₅₀	<u>0.110 mm</u>	Skewness	<u>0.71</u>
3rd Mode	<u> </u>	Q ₇₅	<u>0.054 mm</u>	Kurtosis	<u>0.10</u>

SIZE ANALYSIS

Sample 2136 Sample description gray colored
 Lat. 37° 25.3' Long. 122° 31.4' fine grained sand
 Depth 25.0 Fathoms _____
45.7 Meters _____
150.0 Feet _____ Sample Weight 56.4 gm

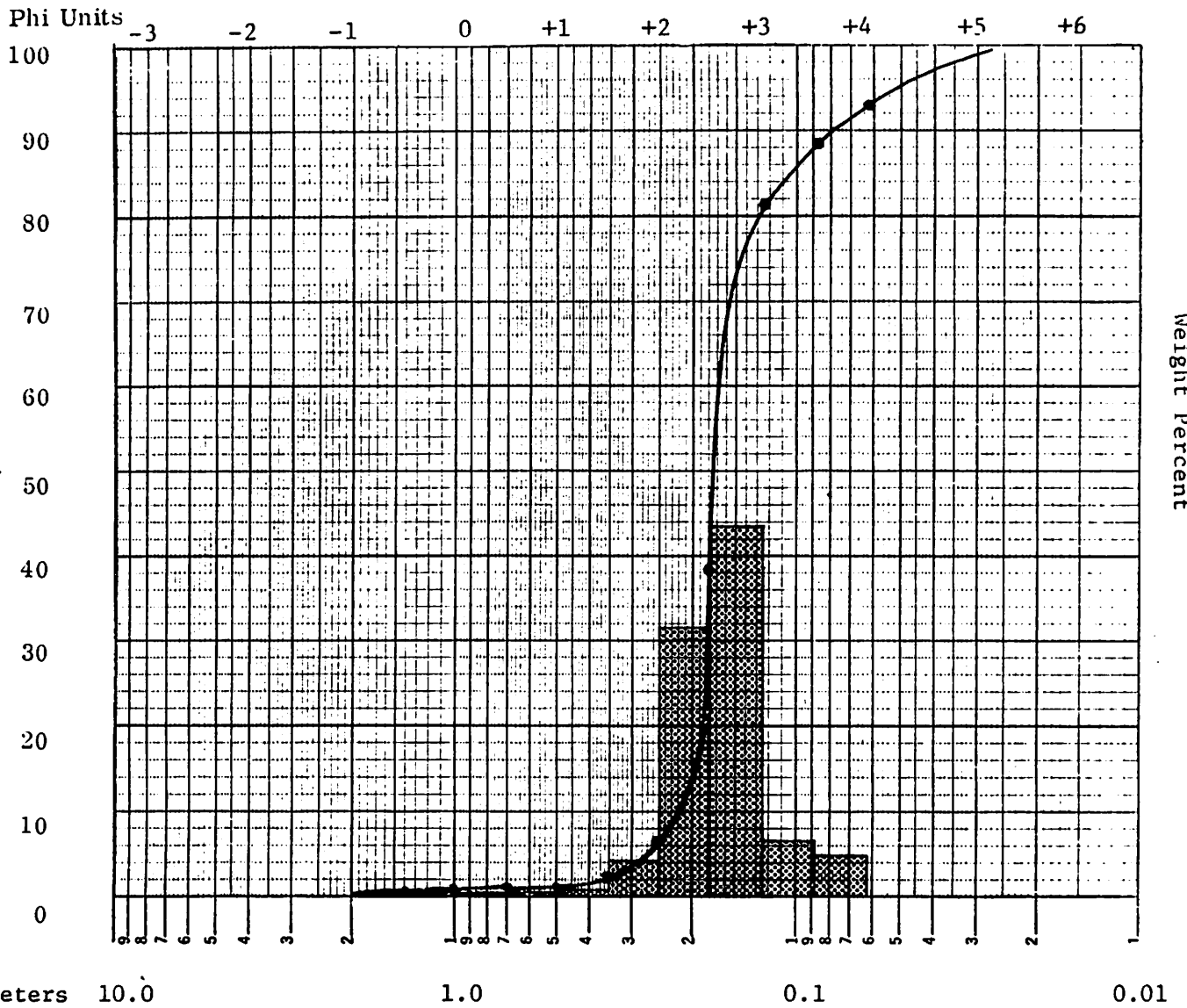


SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.180 mm Sorting Coef. 1.22
 2nd Mode _____ Median: Q_{50} 0.165 mm Skewness 0.79
 3rd Mode _____ Q_{75} 0.120 mm Kurtosis 0.17

SIZE ANALYSIS

Sample <u>2137</u>	Sample description <u>greenish</u>
Lat. <u>37° 24.6'</u> Long. <u>122° 32.4'</u>	<u>gray fine grained sand</u>
Depth <u>30.0</u> Fathoms	
<u>54.9</u> Meters	
<u>180.0</u> Feet	Sample Weight <u>57.5 gm.</u>



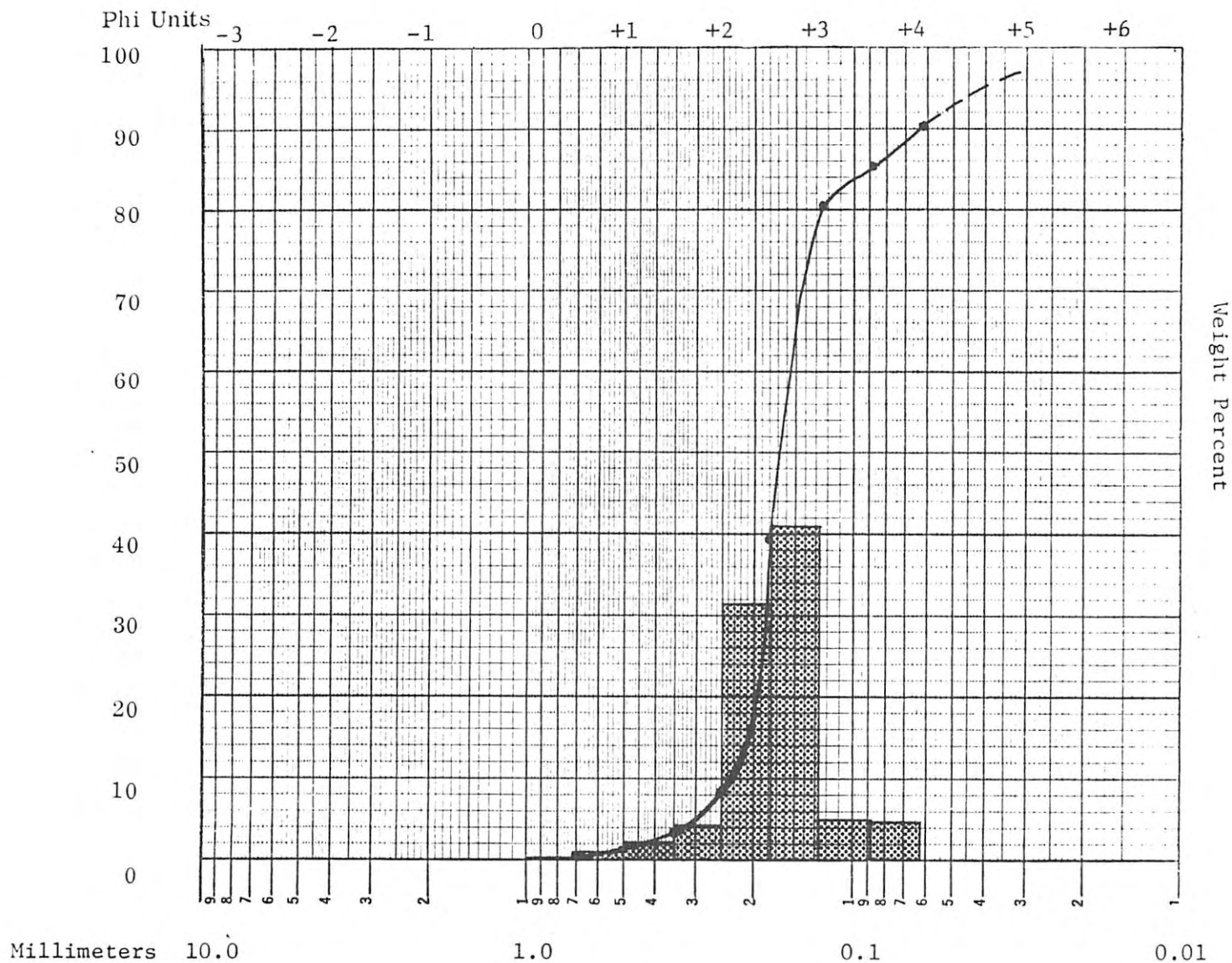
SIZE PARAMETERS

1st Mode <u>0.701 - 0.991 mm</u>	Q ₂₅ <u>0.182 mm</u>	Sorting Coef. <u>1.11</u>
2nd Mode <u>0.125 - 0.177 mm</u>	Median:Q ₅₀ <u>0.175 mm</u>	Skewness <u>0.88</u>
3rd Mode _____	Q ₇₅ <u>0.148 mm</u>	Kurtosis <u>0.12</u>

SIZE ANALYSIS

49

Sample <u>2138</u>	Sample description <u>greenish</u>
Lat. <u>37° 23.5'</u> Long. <u>122° 34.7'</u>	<u>gray fine grained sand.</u>
Depth <u>33.0</u> Fathoms	
<u>60.4</u> Meters	
<u>198.0</u> Feet	Sample Weight <u>72.7 gm.</u>



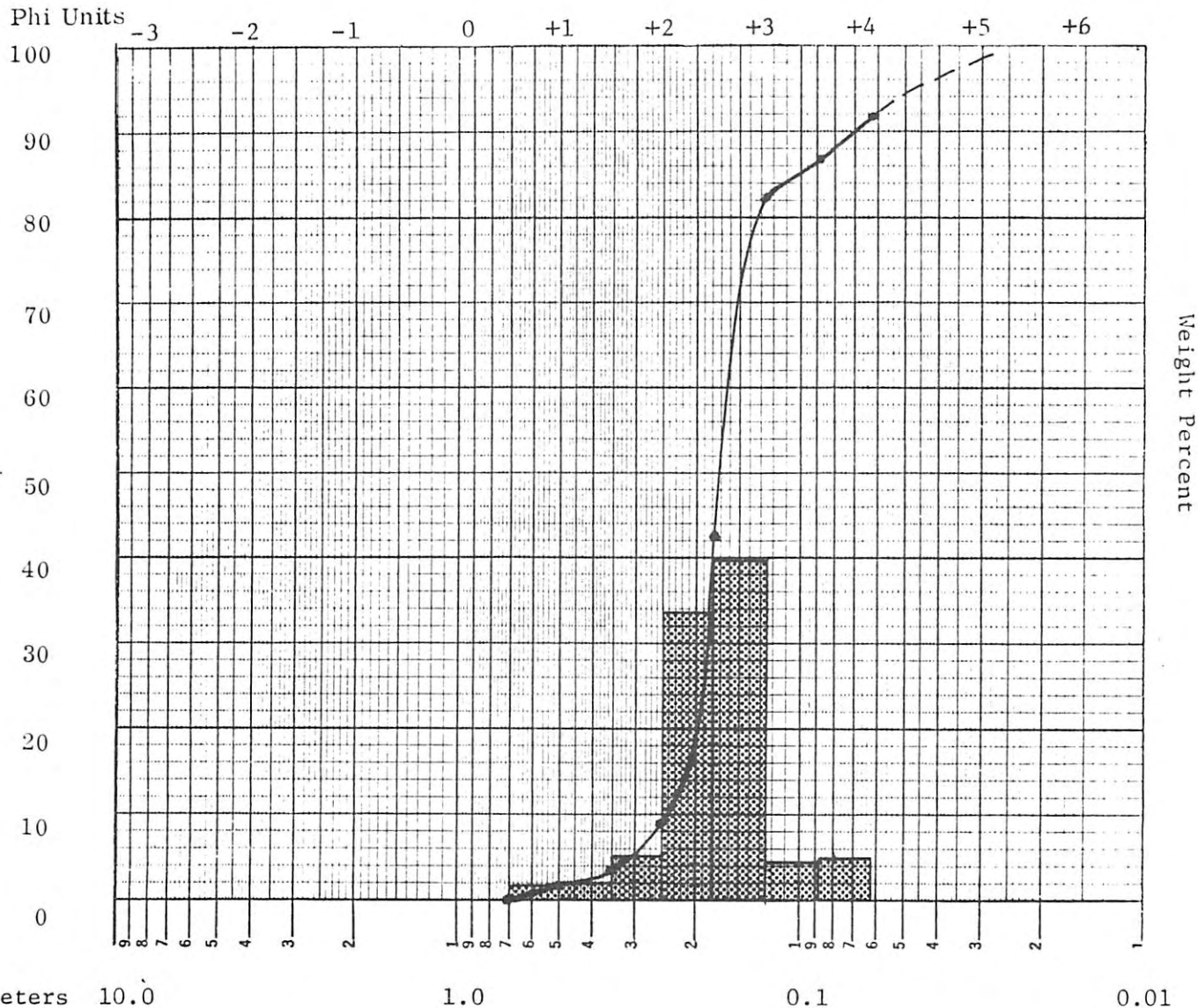
SIZE PARAMETERS

1st Mode <u>0.125 - 0.177 mm</u>	Q_{25} <u>0.190 mm.</u>	Sorting Coef. <u>1.19</u>
2nd Mode _____	Median: Q_{50} <u>0.170 mm</u>	Skewness <u>0.89</u>
3rd Mode _____	Q_{75} <u>0.135 mm.</u>	Kurtosis <u>0.15</u>

SIZE ANALYSIS

Sample 2139
 Lat. 37° 22.5' Long. 122° 36.9'
 Depth 40.0 Fathoms
73.2 Meters
240.0 Feet

Sample description medium grained
sand with some coarse sand and
few large pebbles.
 Sample Weight 14.2 gm.



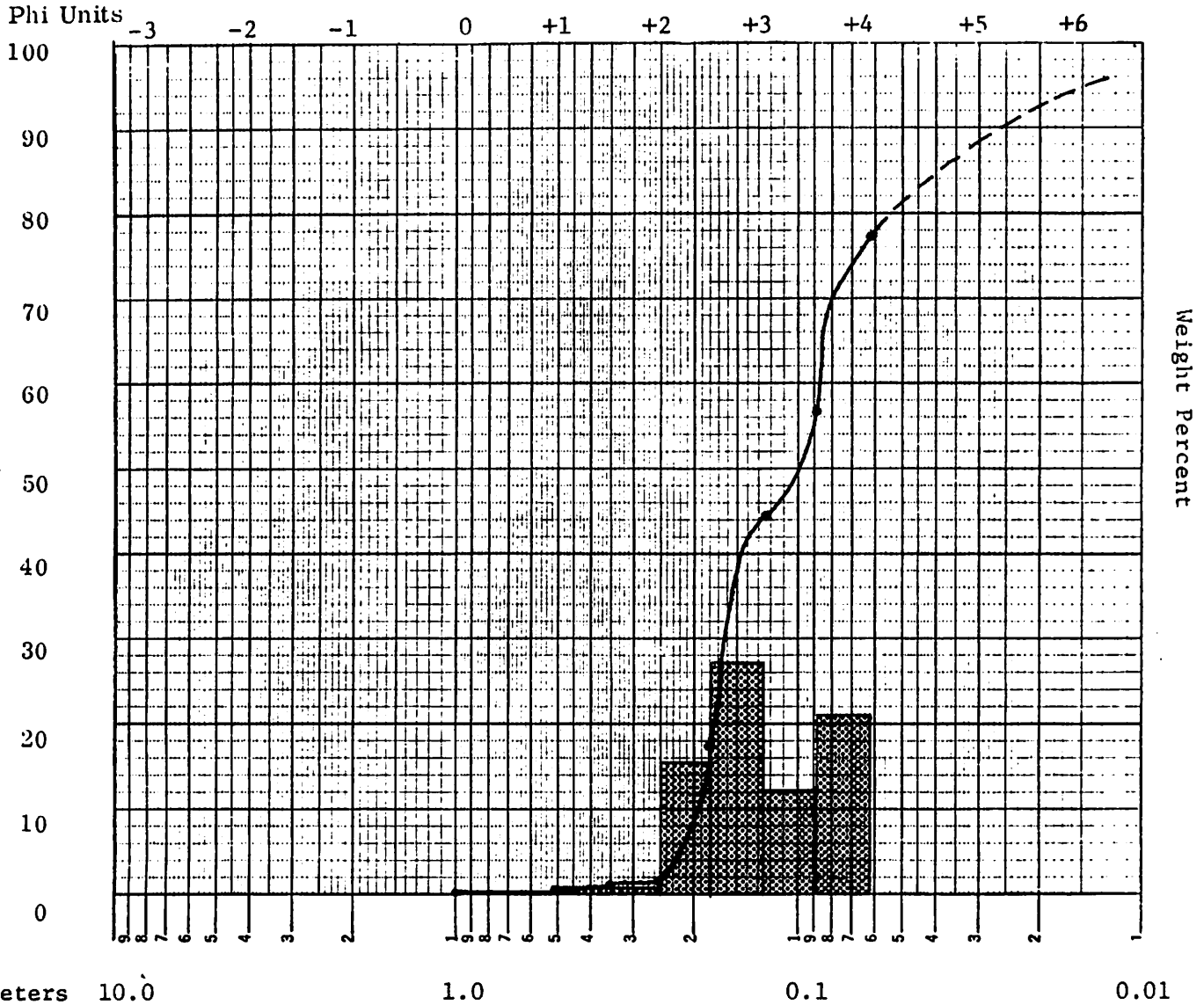
SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm Q_{25} 0.190 mm Sorting Coef. 1.14
 2nd Mode 0.062 - 0.088 mm Median: Q_{50} 0.170 mm Skewness 0.95
 3rd Mode _____ Q_{75} 0.145 mm Kurtosis 0.13

SIZE ANALYSIS

Sample 2140
 Lat. 37° 23.9' Long. 122° 37.7'
 Depth 40.0 Fathoms
73.2 Meters
240.0 Feet

Sample description greenish gray
fine grained silty sand.
 Sample Weight 55.8 gm.



SIZE PARAMETERS

1st Mode 0.125 - 0.177 mm. Q₂₅ 0.168 mm Sorting Coef. 1.57
 2nd Mode 0.062 - 0.088 mm Median:Q₅₀ 0.100 mm Skewness 1.14
 3rd Mode _____ Q₇₅ 0.068 mm Kurtosis 0.29

SIZE ANALYSIS

Sample 2141

Sample description greenish

Lat. 37° 24.9' Long. 122° 37.8'

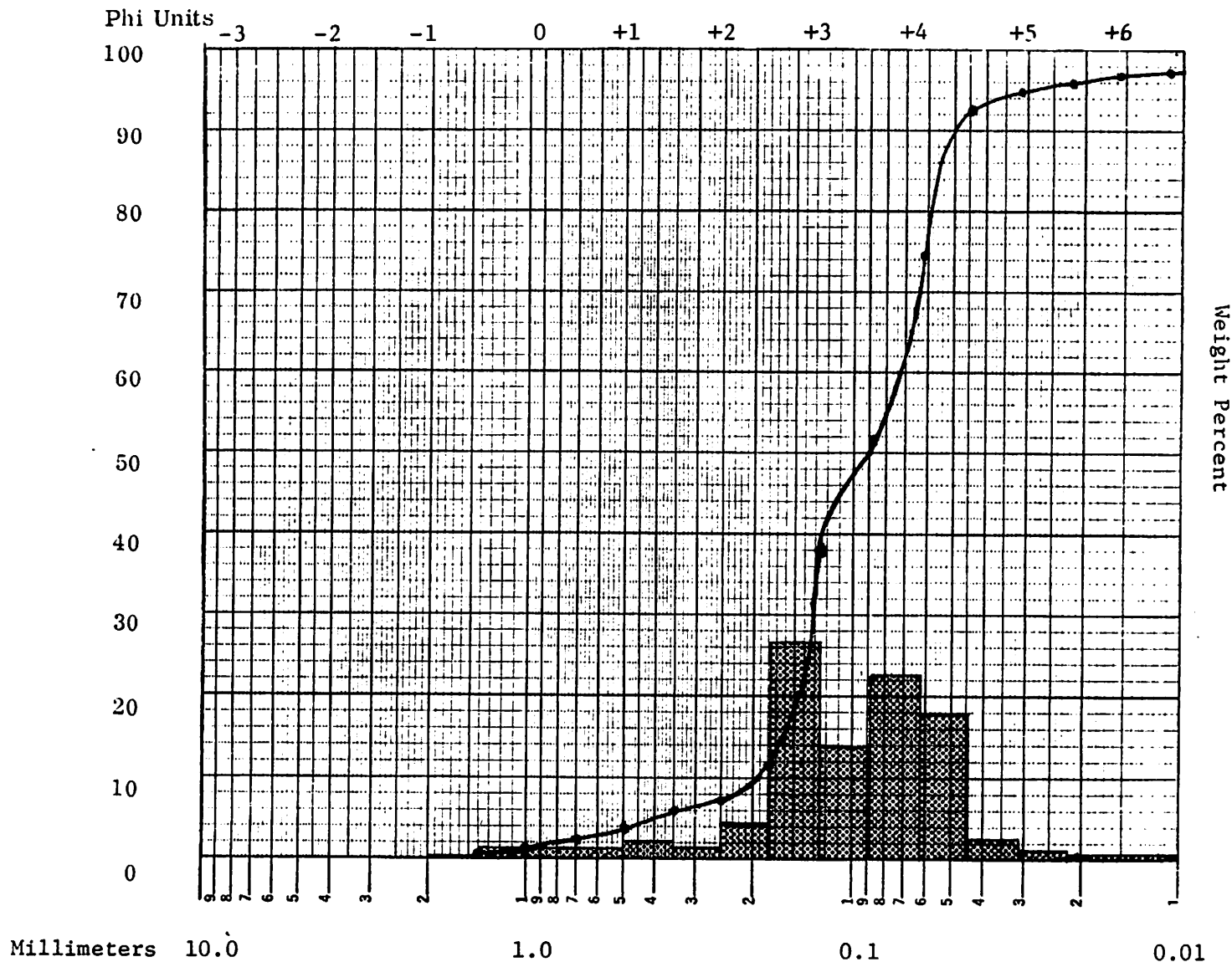
gray fine grained silty sand.

Depth 40.0 Fathoms

73.2 Meters

240.0 Feet

Sample Weight 45.8 gm.

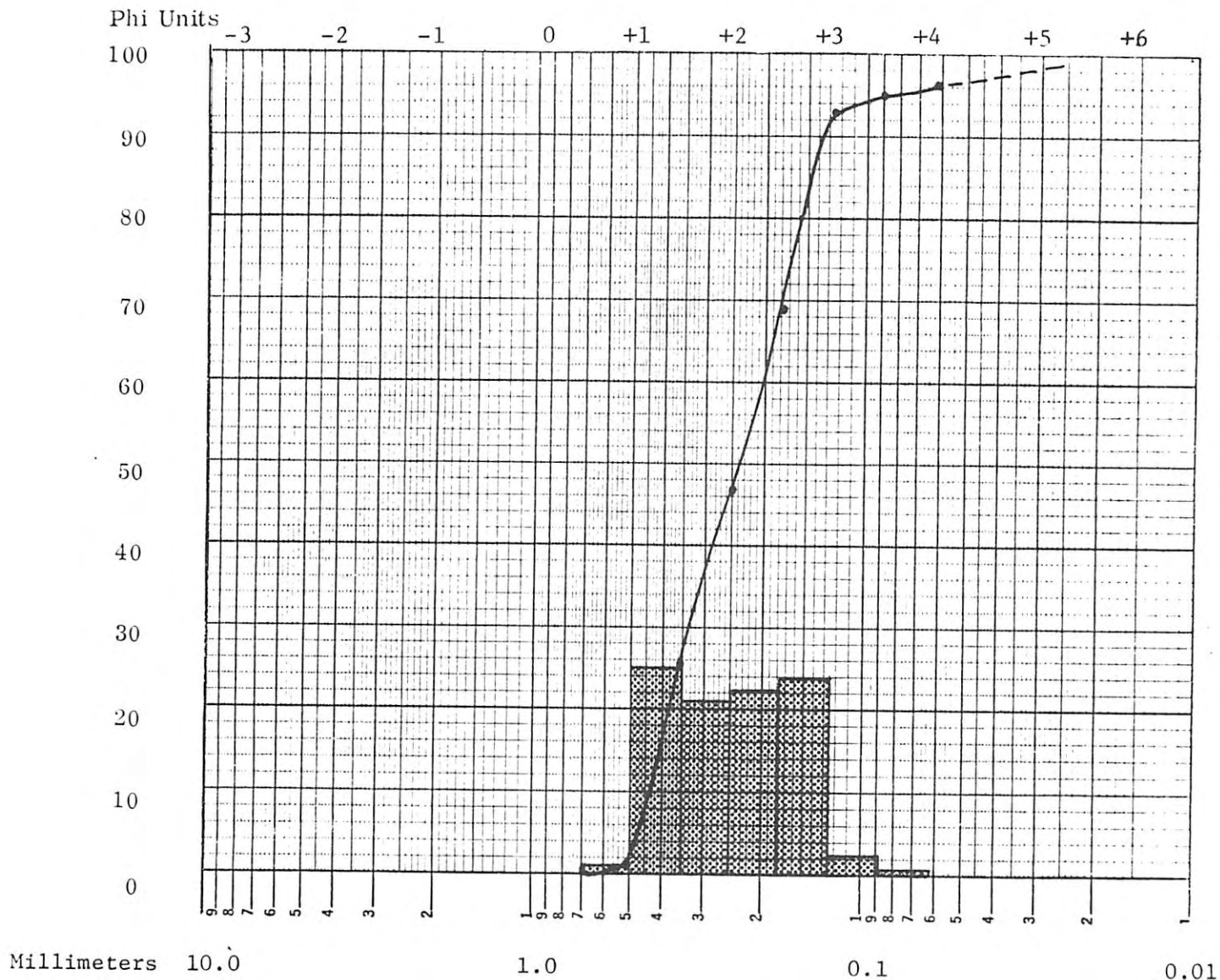


SIZE PARAMETERS

1st Mode <u>0.350 - 0.500 mm</u>	Q_{25} <u>0.135 mm</u>	Sorting Coef. <u>1.47</u>
2nd Mode <u>0.125 - 0.177 mm</u>	Median: Q_{50} <u>0.090 mm</u>	Skewness <u>1.03</u>
3rd Mode <u>0.062 - 0.088 mm</u>	Q_{75} <u>0.062 mm</u>	Kurtosis <u>0.26</u>

SIZE ANALYSIS

Sample 2142 Sample description greenish gray
 Lat. 37° 25.8' Long. 122° 35.7' fine to medium grained sand.
 Depth 34.0 Fathoms _____
62.2 Meters _____
204.0 Feet _____ Sample Weight 78.9 gm.

SIZE PARAMETERS

1st Mode 0.350 - 0.500 mm Q_{25} 0.355 mm Sorting Coef. 1.46
 2nd Mode 0.125 - 0.177 mm Median: Q_{50} 0.240 mm Skewness 1.02
 3rd Mode _____ Q_{75} 0.165 mm Kurtosis 0.31

SIZE ANALYSIS

Sample 2143

Sample description greenish gray

Lat. 37° 267' Long. 122° 33.6'

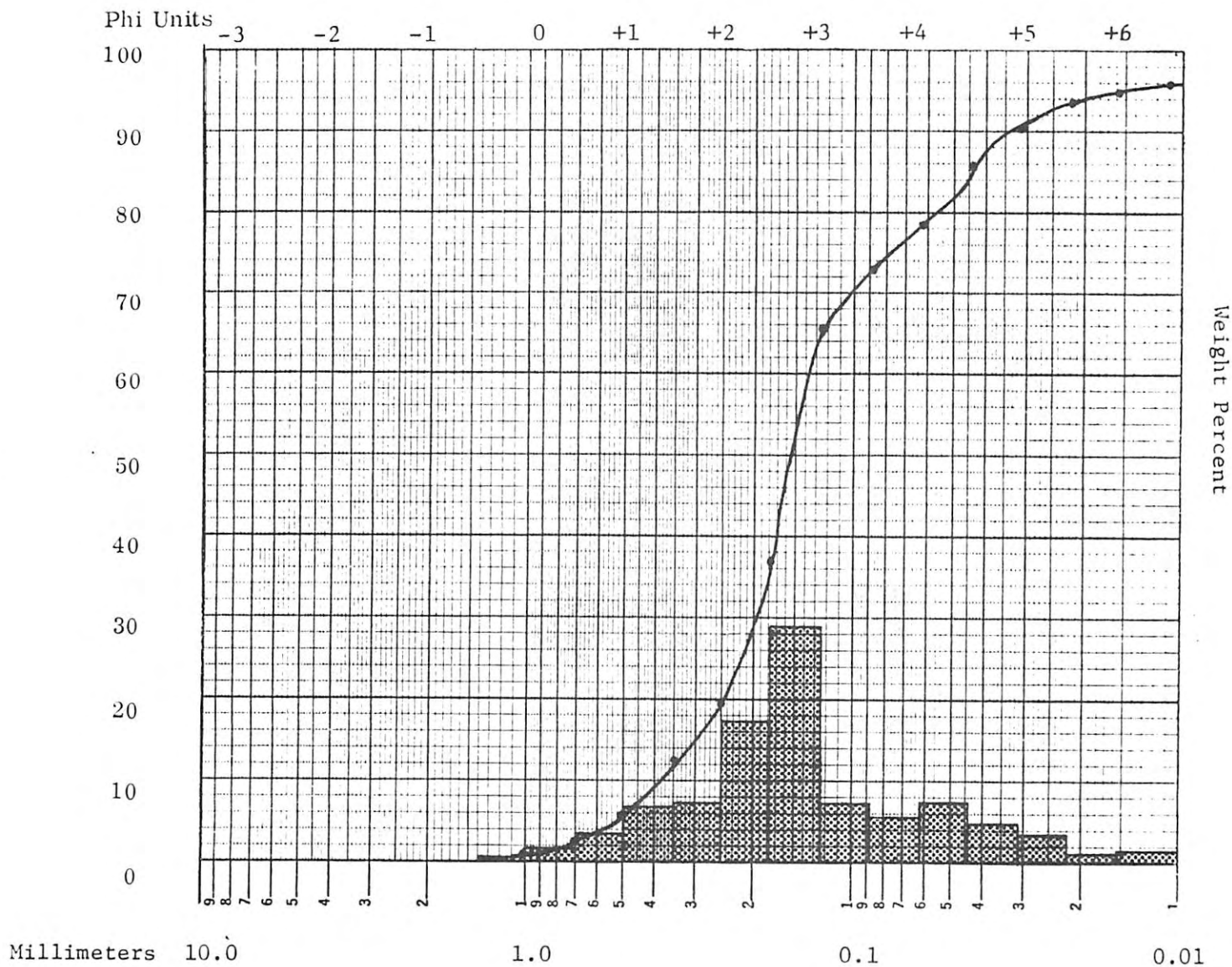
fine grained silty sand.

Depth 30.0 Fathoms

54.9 Meters

180.0 Feet

Sample Weight 54.1 gm.

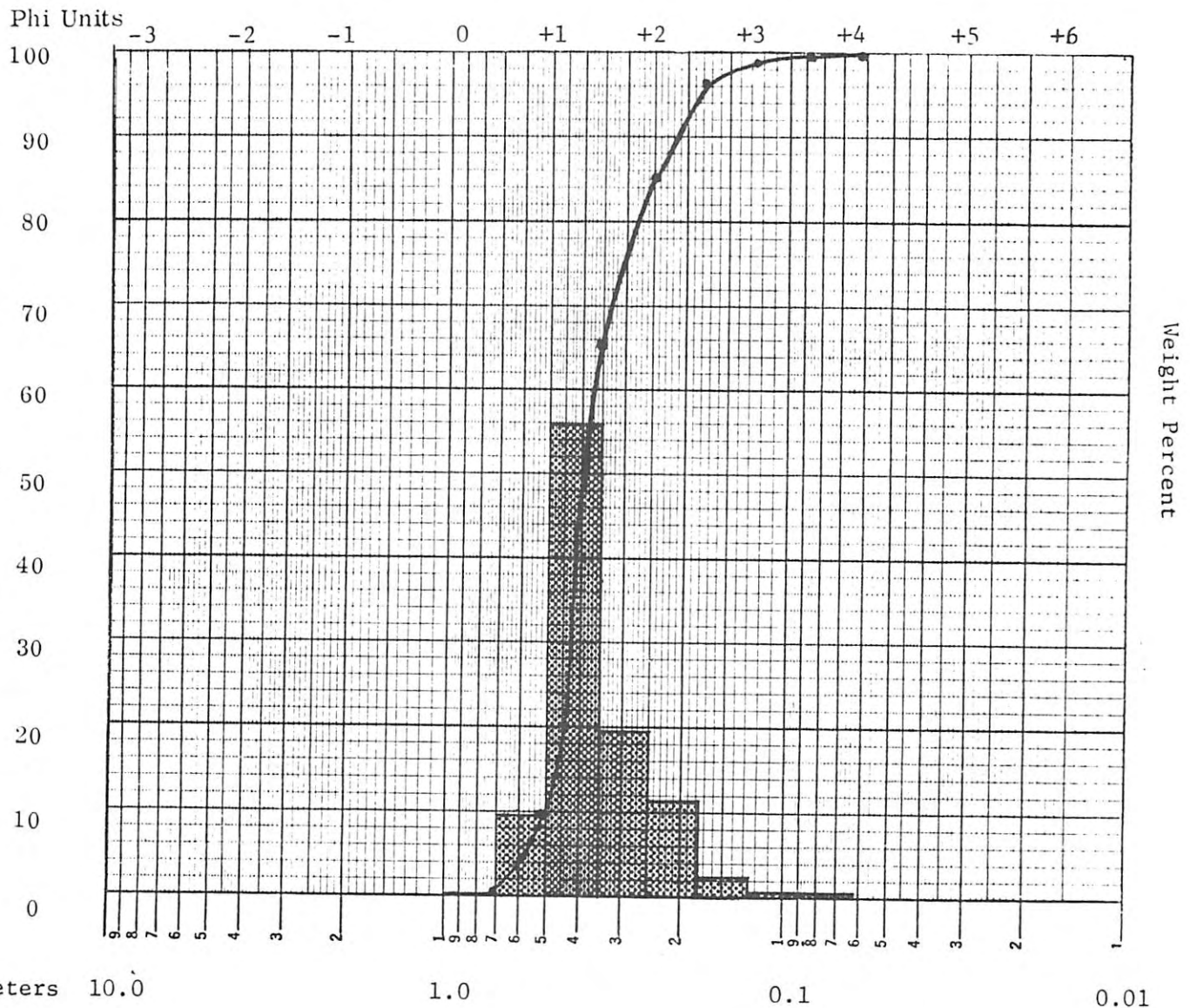


SIZE PARAMETERS

1st Mode	<u>0.125 - 0.177 mm</u>	Q ₂₅	<u>0.220 mm</u>	Sorting Coef.	<u>1.70</u>
2nd Mode	<u>0.044 - 0.062 mm</u>	Median: Q ₅₀	<u>0.155 mm</u>	Skewness	<u>0.70</u>
3rd Mode	<u></u>	Q ₇₅	<u>0.076 mm</u>	Kurtosis	<u>0.20</u>

SIZE ANALYSIS

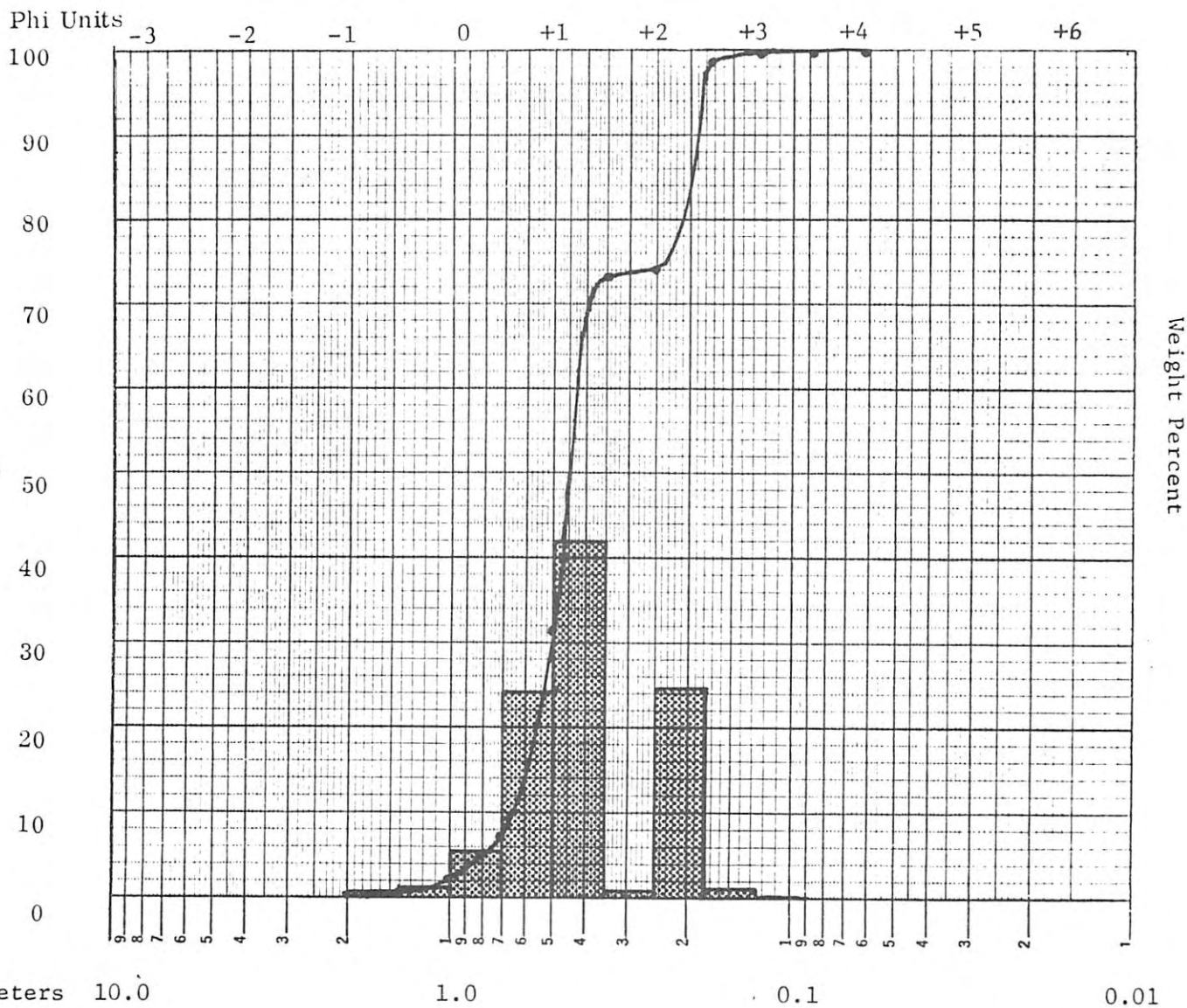
Sample 2144 Sample description gray brown
 Lat. 37° 27.3' Long. 122° 32.4' medium grained sand.
 Depth 25.0 Fathoms _____
45.7 Meters _____
150.0 Feet Sample Weight 87.0 gm.

SIZE PARAMETERS

1st Mode 0.350 - 0.500 mm Q_{25} 0.430 mm Sorting Coef. 1.18
 2nd Mode _____ Median: Q_{50} 0.390 mm Skewness 0.88
 3rd Mode _____ Q_{75} 0.310 mm Kurtosis 0.21

SIZE ANALYSIS

Sample 2196 Sample description beach sand
 Lat. 37° 13.5' Long. 122° 24.4'
 Depth intertidal Fathoms _____
 " Meters _____
 " Feet _____ Sample Weight 104.3 gm.

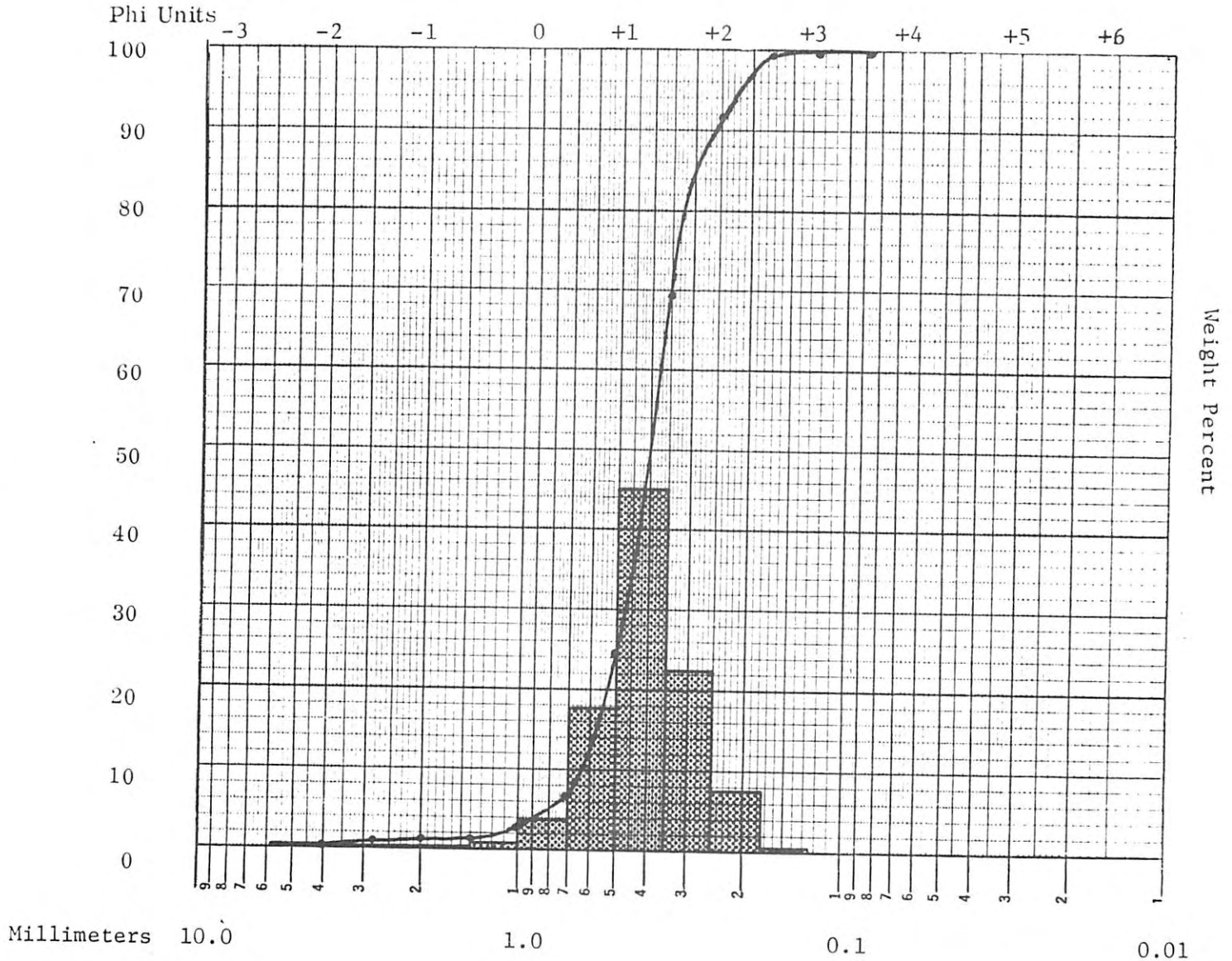


SIZE PARAMETERS

1st Mode 0.351 - 0.495 mm Q_{25} 0.510 mm Sorting Coef. 1.47
 2nd Mode 0.175 - 0.246 mm Median: Q_{50} 0.450 mm Skewness 0.59
 3rd Mode _____ Q_{75} 0.235 mm Kurtosis 0.32

SIZE ANALYSIS

Sample 2198 Sample description beach sand
 Lat. 37° 15.6' Long. 122° 24.8'
 Depth intertidal Fathoms
 " Meters
 " Feet
 Sample Weight 254.6 gm.



SIZE PARAMETERS

1st Mode 3.962 - 5.800 mm Q_{25} 0.500 mm Sorting Coef. 1.21
 2nd Mode 0.351 - 0.495 mm Median: Q_{50} 0.400 mm Skewness 1.06
 3rd Mode _____ Q_{75} 0.340 mm Kurtosis 0.22

SIZE ANALYSIS

Sample 2199

Sample description beach sand

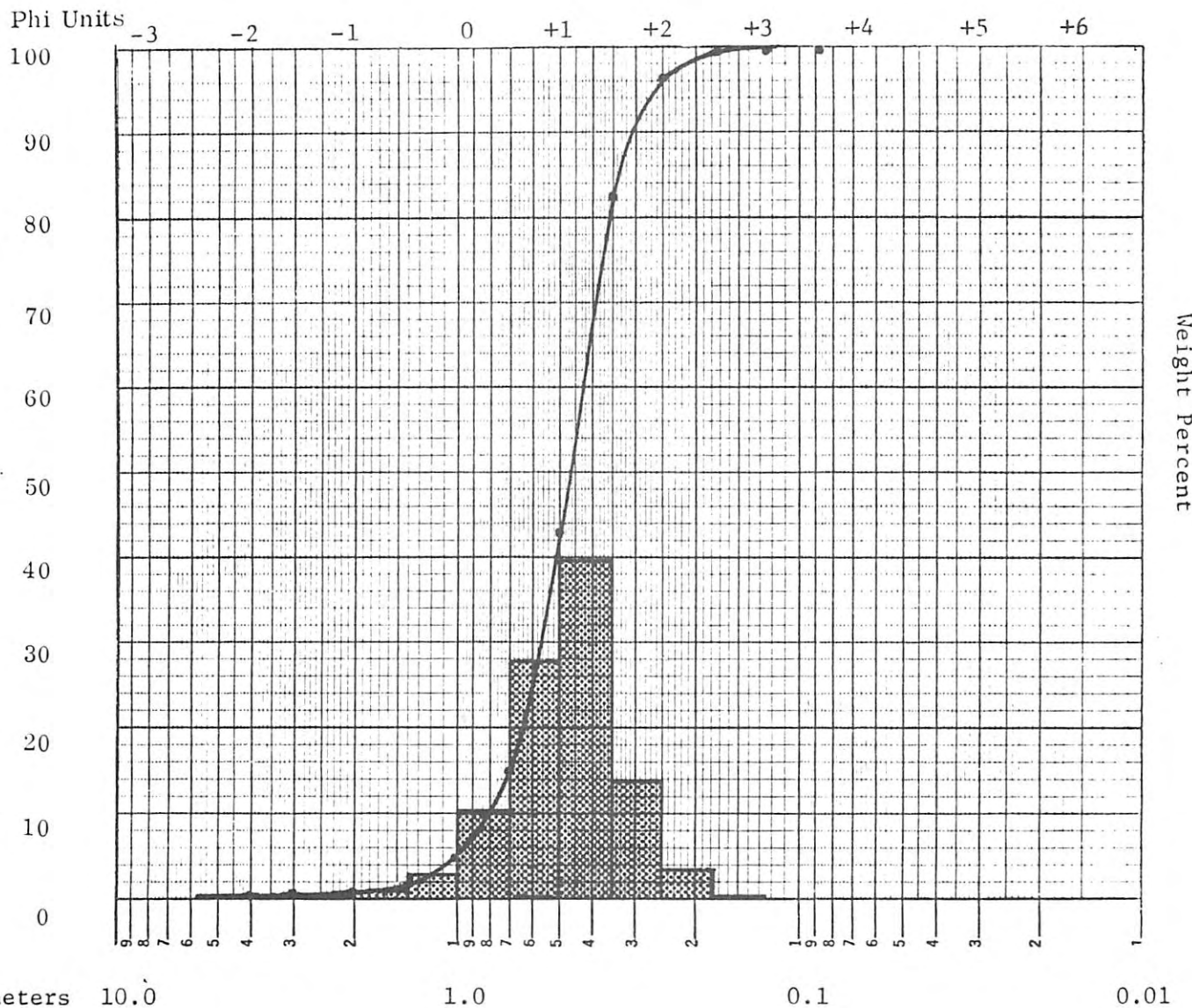
Lat. 37° 17.9' Long. 122° 24.4'

Depth intertidal Fathoms

" Meters

" Feet

Sample Weight 166.9 gm.



SIZE PARAMETERS

1st Mode 0.351 - 0.495 mm Q_{25} 0.600 mm Sorting Coef. 1.26

2nd Mode _____ Median: Q_{50} 0.460 mm Skewness 1.06

3rd Mode _____ Q_{75} 0.375 mm Kurtosis 0.23

SIZE ANALYSIS

Sample 2200

Sample description beach sand

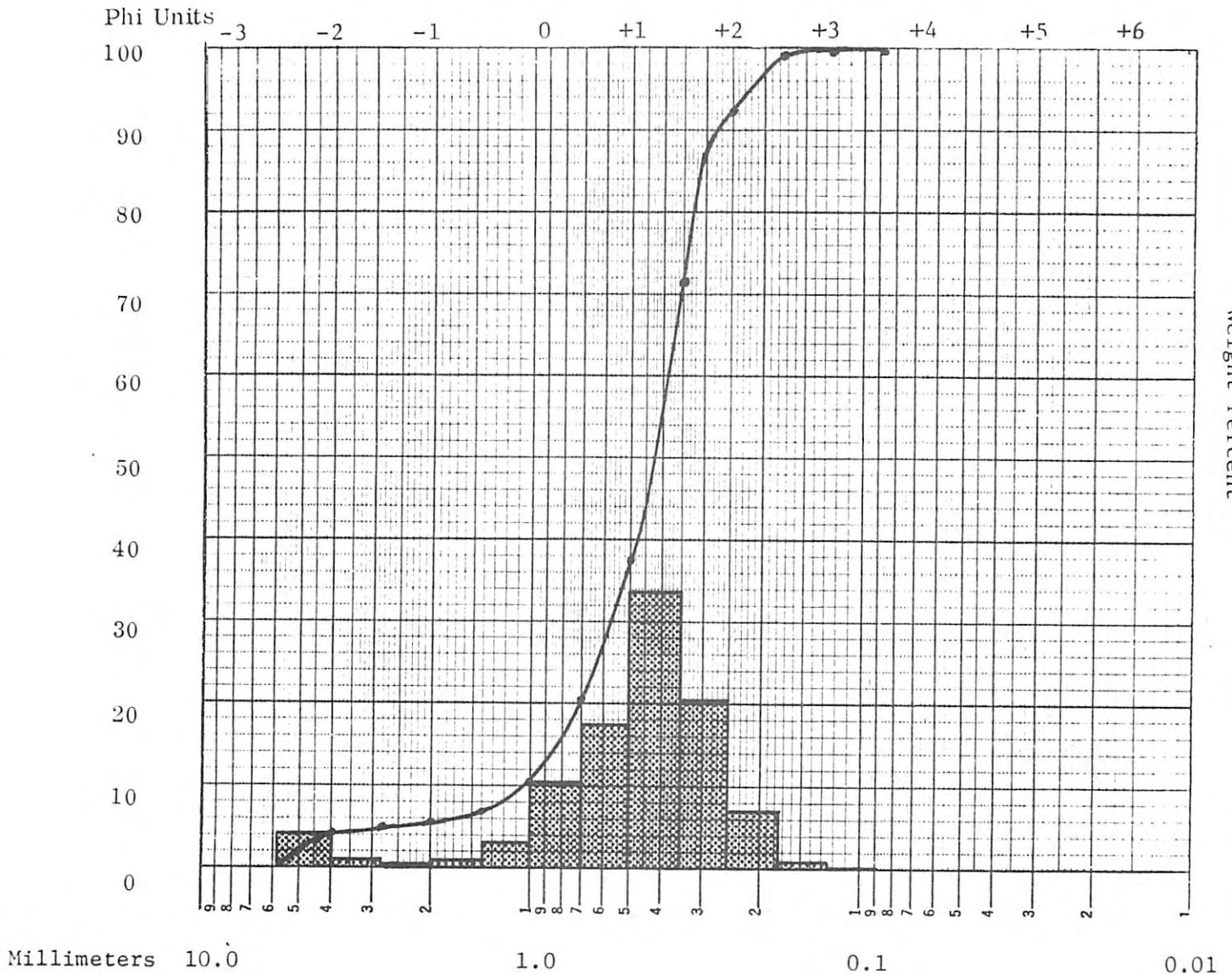
Lat. 37° 19.3' Long. 122° 24.1'

Depth intertidal Fathoms

" Meters

" Feet

Sample Weight 127.3 gm.



SIZE PARAMETERS

1st Mode <u>3.962 - 5.800 mm</u>	Q_{25} <u>0.630 mm</u>	Sorting Coef. <u>1.36</u>
2nd Mode <u>0.351 - 0.495 mm</u>	Median: Q_{50} <u>0.420 mm</u>	Skewness <u>1.21</u>
3rd Mode _____	Q_{75} <u>0.340 mm</u>	Kurtosis <u>0.19</u>

SIZE ANALYSIS

Sample 2203

Sample description coarse beach

Lat. 37° 21.4' Long. 122° 23.8'

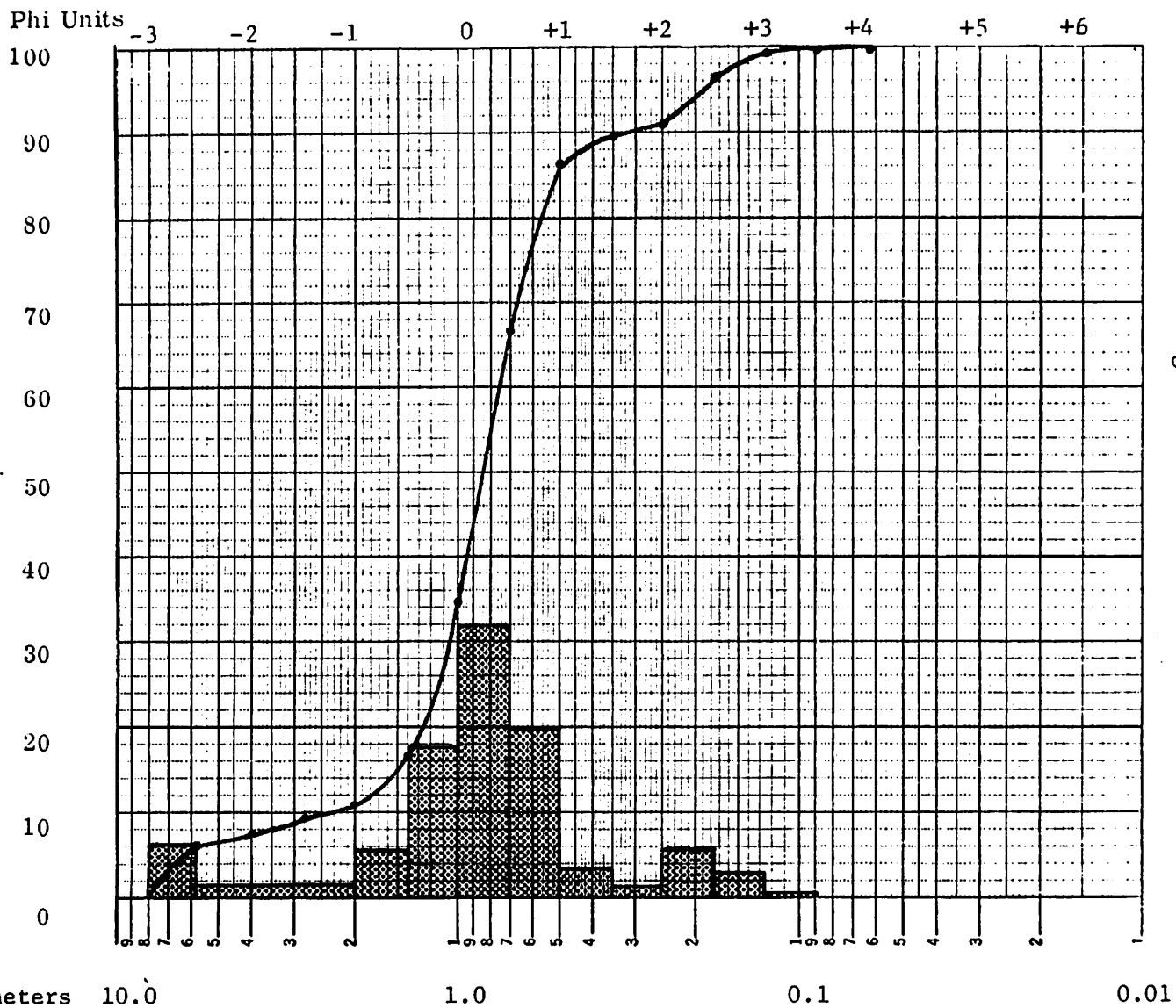
sand with many pebbles.

Depth intertidal Fathoms

" Meters

" Feet

Sample Weight 215.7 gm.



SIZE PARAMETERS

1st Mode 5.800 - 8.000 mm Q_{25} 1.140 mm Sorting Coef. 1.36

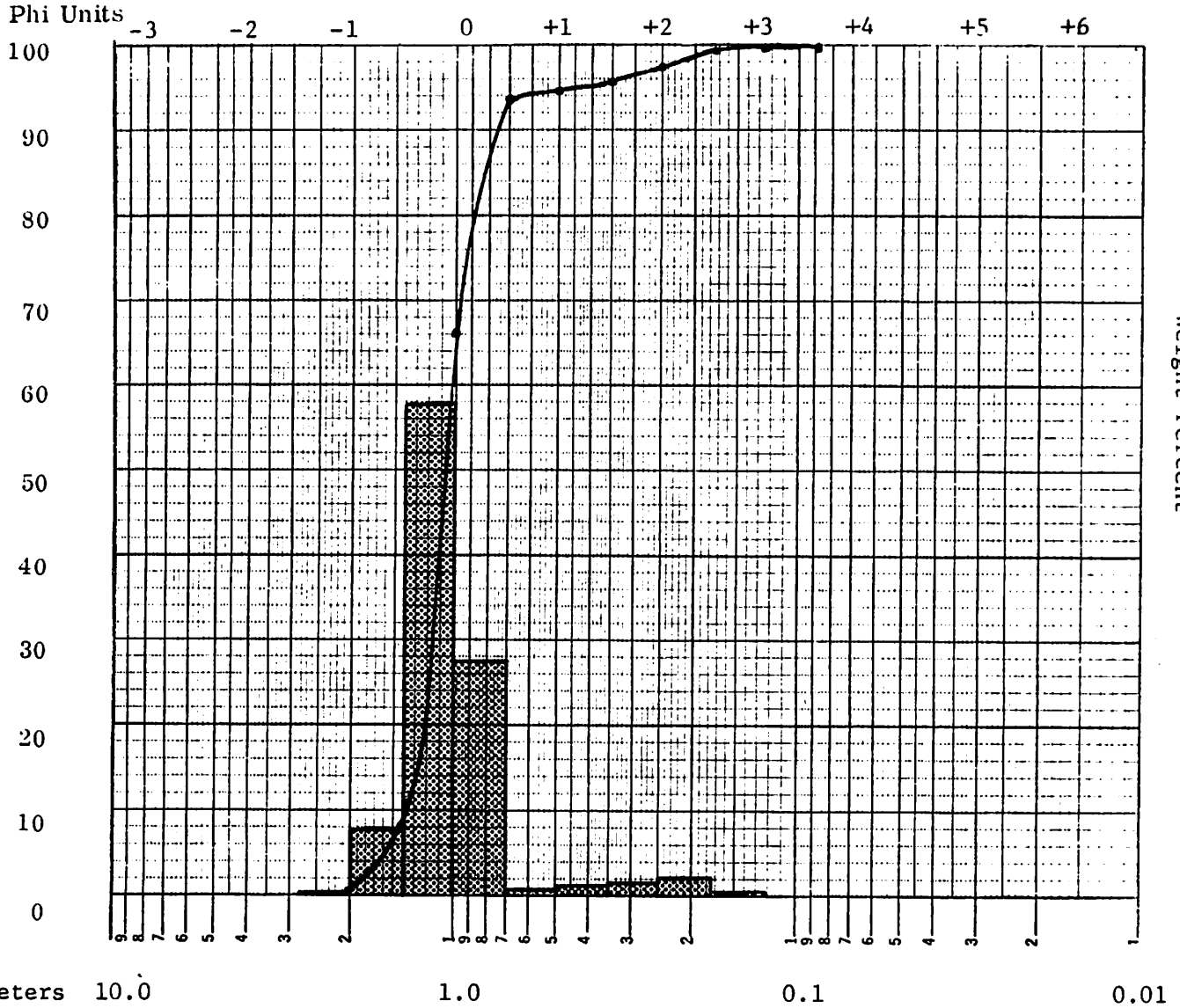
2nd Mode 0.701 - 0.991 mm Median: Q_{50} 0.840 mm Skewness 1.00

3rd Mode 0.175 - 0.246 mm Q_{75} 0.620 mm Kurtosis 0.12

SIZE ANALYSIS

Sample 2204
 Lat. 37° 22.5' Long. 122° 24.5'
 Depth intertidal Fathoms
 " Meters
 " Feet

Sample description medium coarse
beach sand of granitic mineral
grains
 Sample Weight 138.2 gm.



SIZE PARAMETERS

1st Mode 0.991 - 1.397 mm Q_{25} 1.190 mm Sorting Coef. 1.13
 2nd Mode 0.175 - 0.246 mm Median: Q_{50} 1.070 mm Skewness 0.98
 3rd Mode _____ Q_{75} 0.940 mm Kurtosis 0.17

SIZE ANALYSIS

Sample 2205

Sample description beach sand

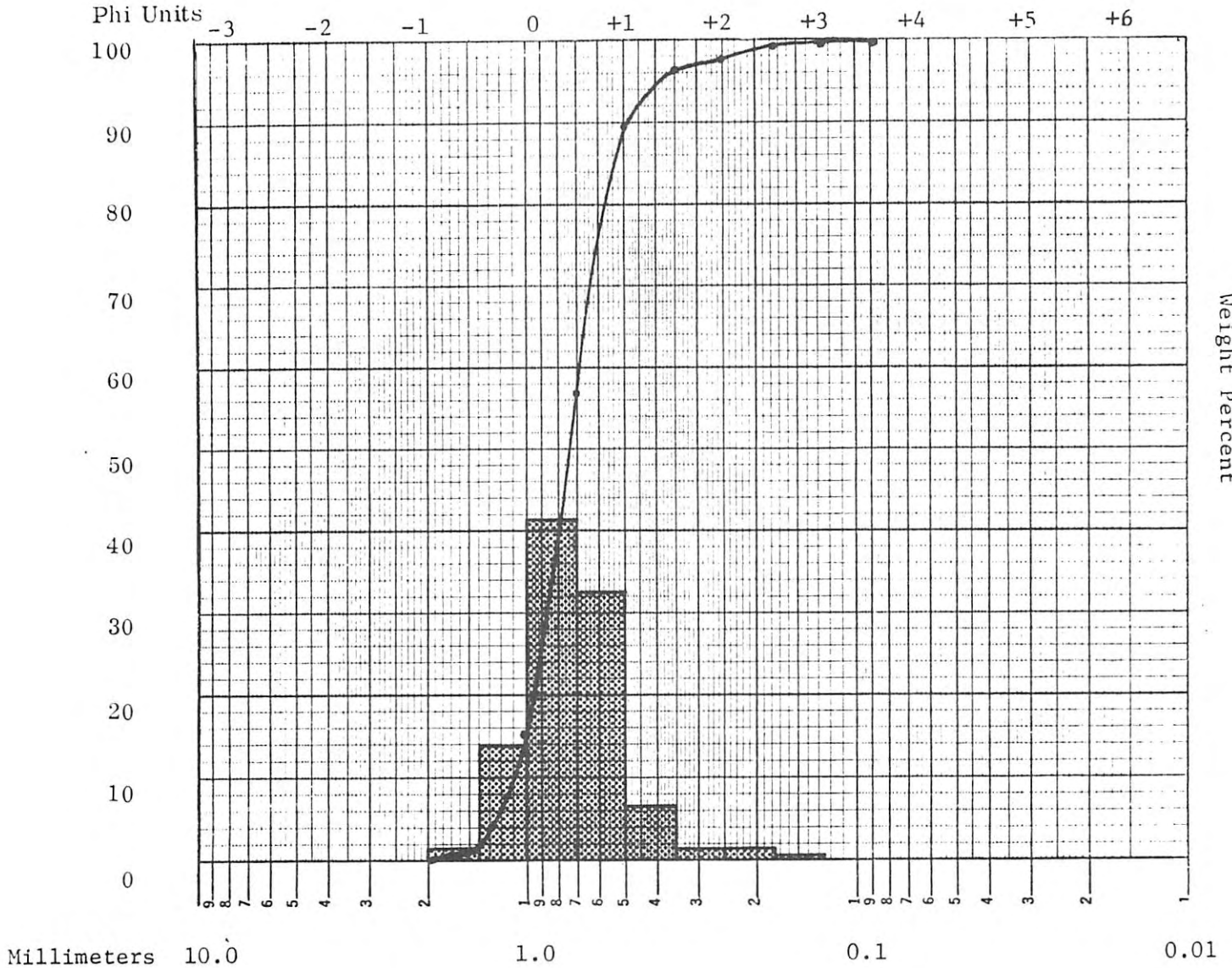
Lat. 37° 25.1' Long. 122° 26.0'

Depth intertidal Fathoms

" Meters

" Feet

Sample Weight 178.4 gm.



SIZE PARAMETERS

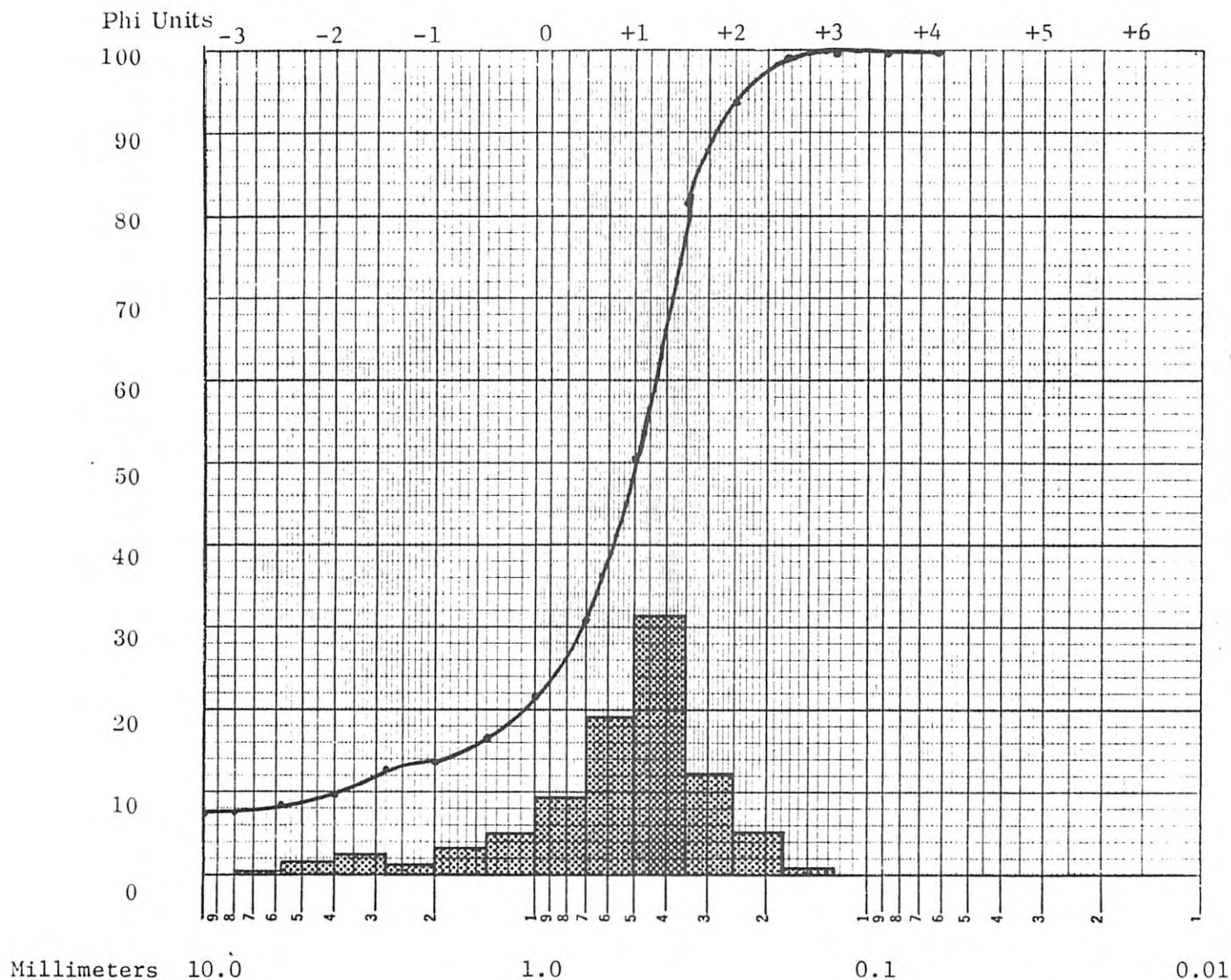
1st Mode 0.701 - 0.991 mm Q_{25} 0.900 mm Sorting Coef. 1.22

2nd Mode _____ Median: Q_{50} 0.740 mm Skewness 0.99

3rd Mode _____ Q_{75} 0.605 mm Kurtosis 0.25

SIZE ANALYSIS

Sample 2206 Sample description beach sand
 Lat. 37° 24.2' Long. 122° 25.5' with gravel stringers
 Depth intertidal Fathoms _____
 " _____ Meters _____
 " _____ Feet _____ Sample Weight 147.8 gm.

SIZE PARAMETERS

1st Mode 16.000 - 22.500 mm Q_{25} 0.840 mm Sorting Coef. 1.53
 2nd Mode 2.800 - 3.962 mm Median: Q_{50} 0.500 mm Skewness 1.21
 3rd Mode 0.351 - 0.495 mm Q_{75} 0.360 mm Kurtosis 0.07

SIZE ANALYSIS

Sample 2208

Sample description coarse beach

Lat. 37° 27.3' Long. 122° 26.6'

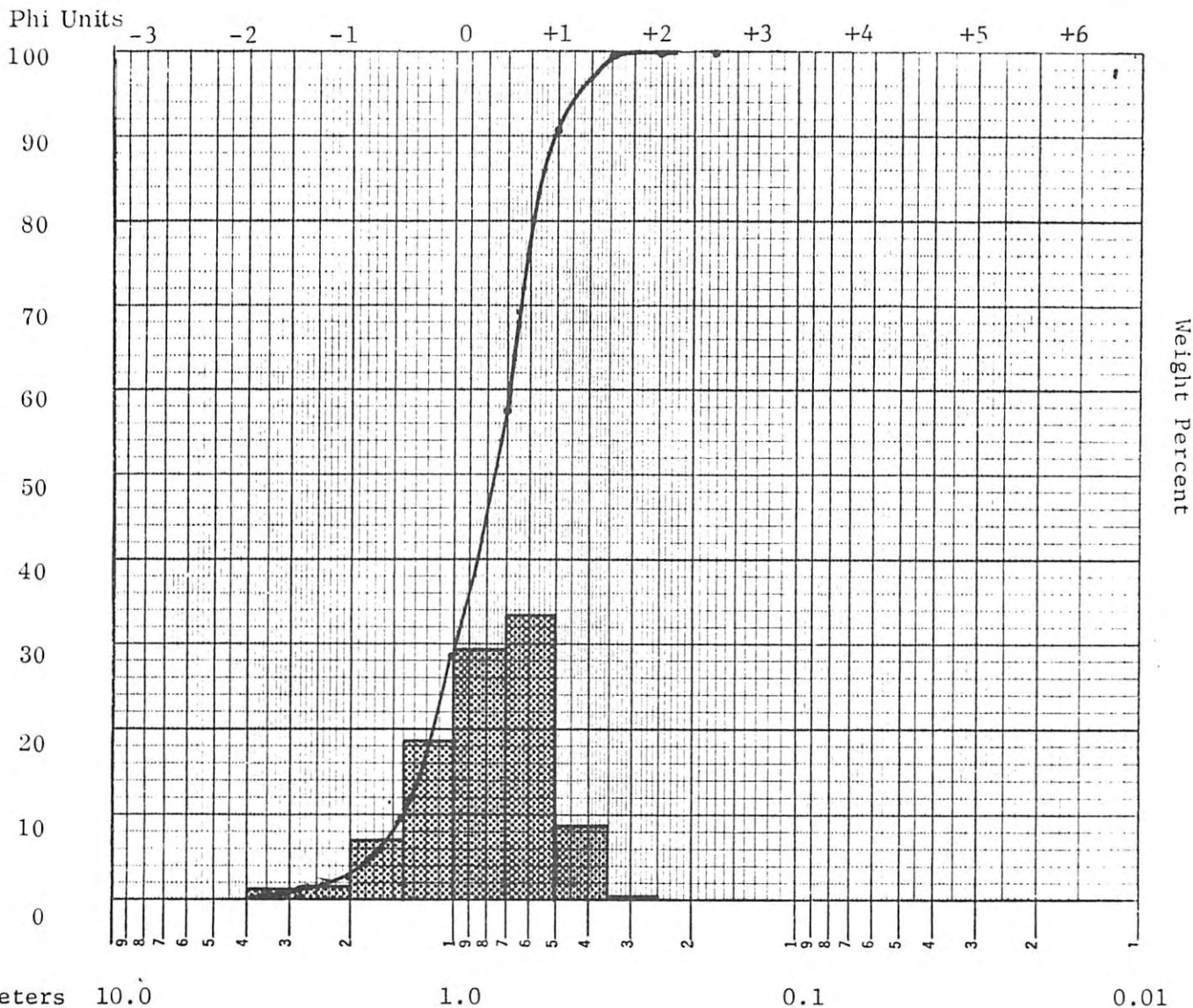
sand of granitic rock grains

Depth intertidal Fathoms

" Meters

" Feet

Sample Weight 174.1 gm.



SIZE PARAMETERS

1st Mode 0.495 - 0.701 mm Q_{25} 1.070 mm Sorting Coef. 1.33

2nd Mode _____ Median: Q_{50} 0.760 mm Skewness 1.13

3rd Mode _____ Q_{75} 0.610 mm Kurtosis 0.26