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River Mouth and Beach Sediments, Yankee Point to Hurricane Point, California: Part A --
Introduction and Grain Size Analysis

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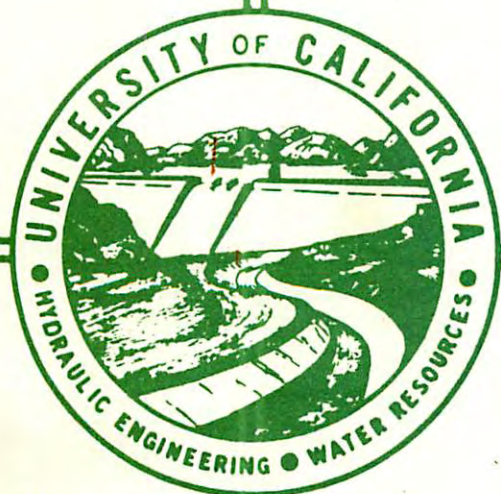
RIVER MOUTH AND BEACH SEDIMENTS-
YANKEE POINT TO
HURRICANE POINT, CALIFORNIA

PART A. INTRODUCTION AND GRAIN SIZE ANALYSES

by

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UNIVERSITY OF CALIFORNIA
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AUGUST, 1972

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PART A - INTRODUCTION AND GRAIN SIZE ANALYSIS

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ABSTRACT

17 of intertidal and stream samples from Monterey Bay - Point Sur Area are analysed for grain size properties. These samples were taken to provide source area information for the study of the offshore sediments of the Central California Continental Shelf. The data are presented graphically as cumulative weight percent curves and histograms with respect to grain size. The statistical parameters median, sorting coefficient, skewness and kurtosis are calculated for each sample.

INTRODUCTION

The following work is part of a continuing study of the sediments and sedimentary processes of the continental shelf of 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, Part A and B, raw data will be presented with little or no interpretation. In Part C the author's interpretation of the data plus background information and previous work in the study area will be given.

SAMPLE COLLECTION

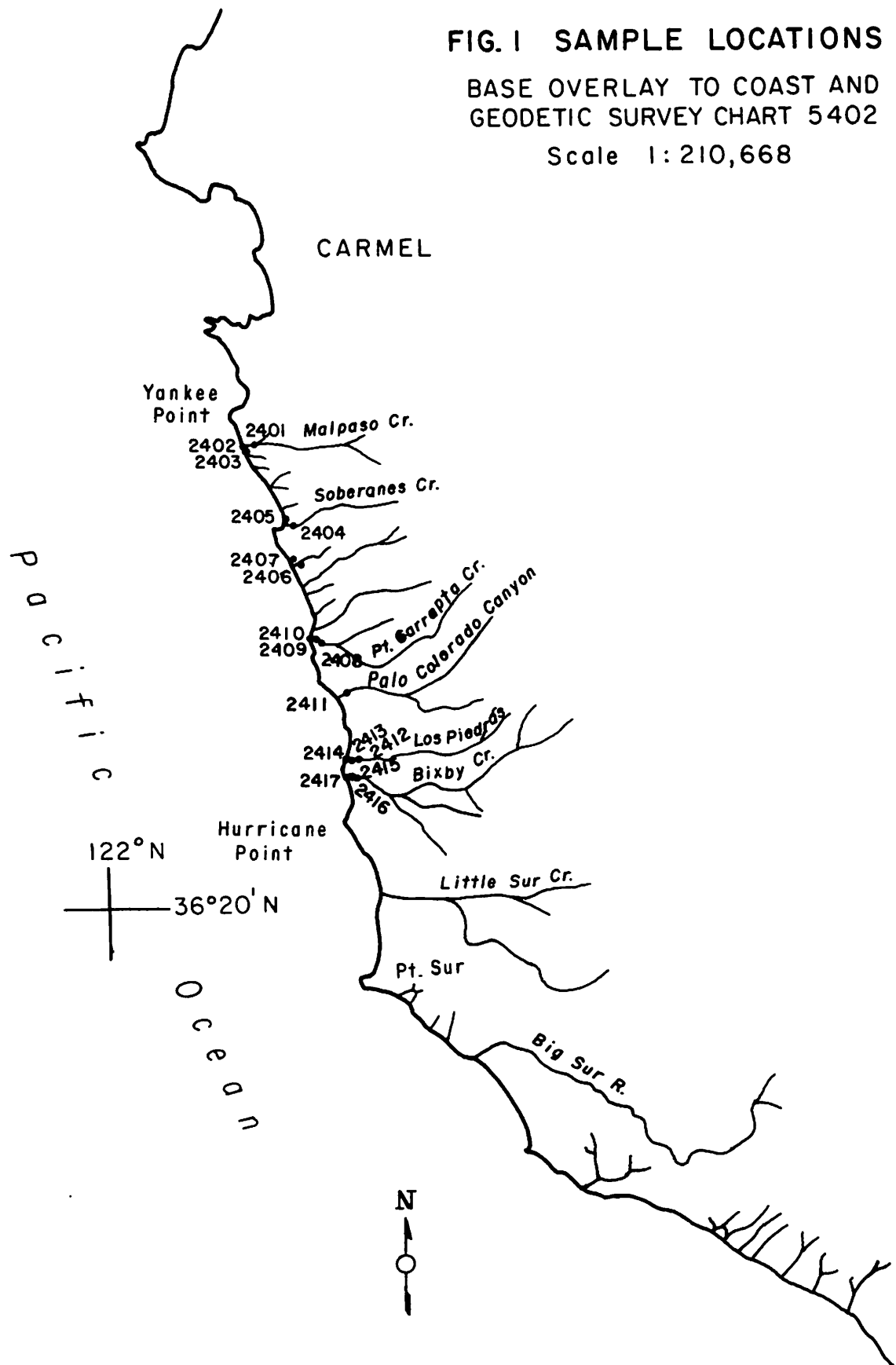
The 17 samples used in this study were collected by P. Henshaw in the Spring of 1971. (See Fig. 1). The major purpose of this study is to provide samples for heavy mineral analyses which will be used to determine heavy mineral source areas; thus no attempt was made to statistically sample for grain size. As Trask (1956) has demonstrated, beach profiles and grain size distribution are seasonal and variable even on the same beach. The grain size data is to be used to determine the weight percent distribution in the most easily transported size, around 2mm, for correlation among samples as the heavy minerals of the sand fraction will be analysed as tracers and indicators of source area.

Approximately 0.5 to 1 liter of material was taken for each sample of which a split of about 200 grams were sieved for grain size analyses.

FIG. I SAMPLE LOCATIONS

BASE OVERLAY TO COAST AND
GEODETIC SURVEY CHART 5402

Scale 1:210,668



Grain Size Analysis

The samples were sized through the following sieves in a Ro-Tap for ten minutes:

<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	-1.25
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

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

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)

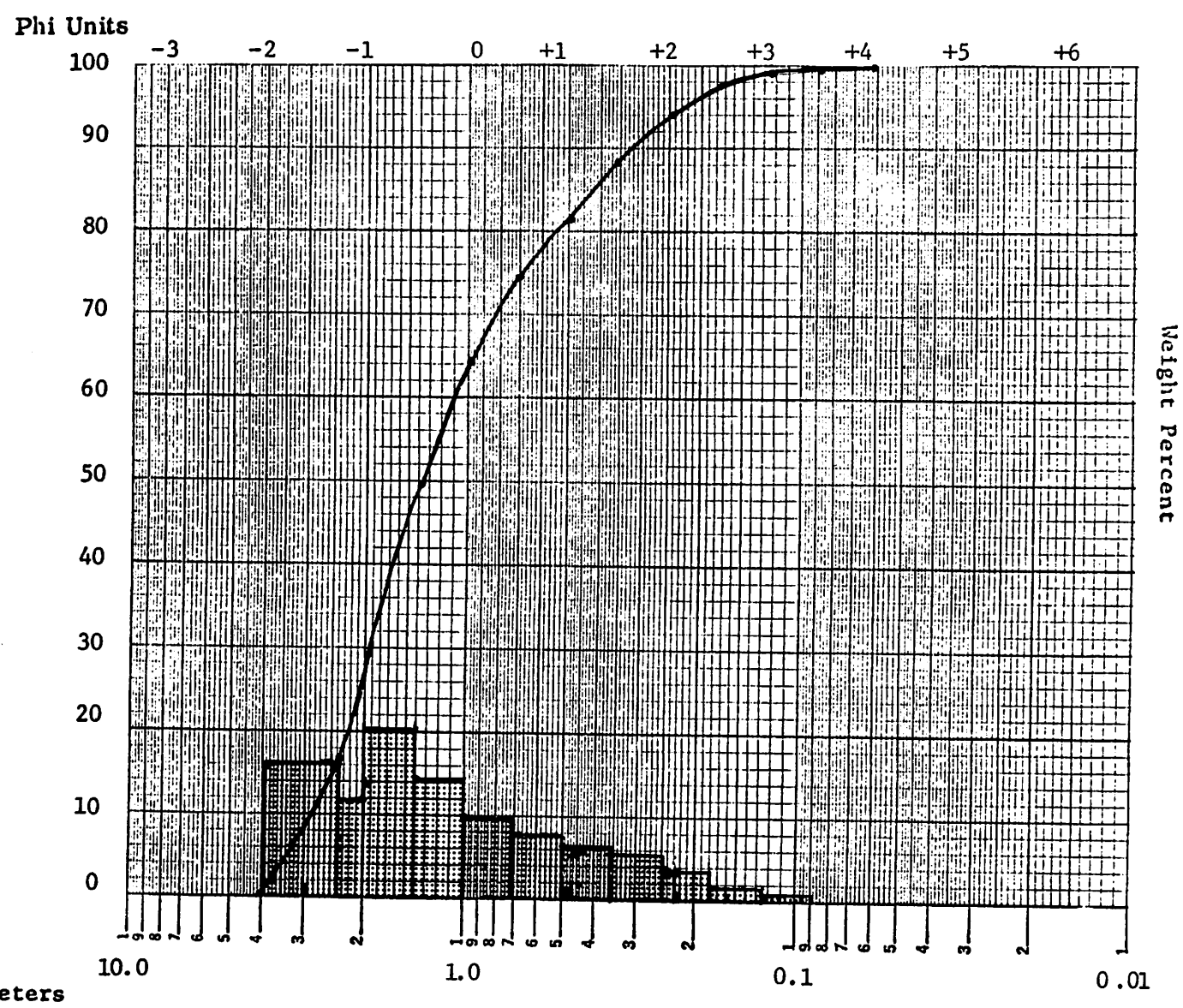
Comparison of Central Portion of
Curve to Spread of Whole Curve

REFERENCES

- Folk, R. L., 1965, Petrology of Sedimentary Rocks: Univ. Texas-Hemphills, Austin, Texas, 159 p.
- 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.
- Trask, P., 1956, Changes in Configuration of Point Reyes Beach, California: Beach Erosion Board Tech. Memo 91, 49 p.

SIZE ANALYSIS

Sample 2401 Sample description coarse grained
 Lat. 36° 28.90' N Long. 121° 56.16' W granitic sand
 Depth stream Fathoms _____
Malpas Creek Meters _____
 _____ Feet Sample Weight 227.1 g

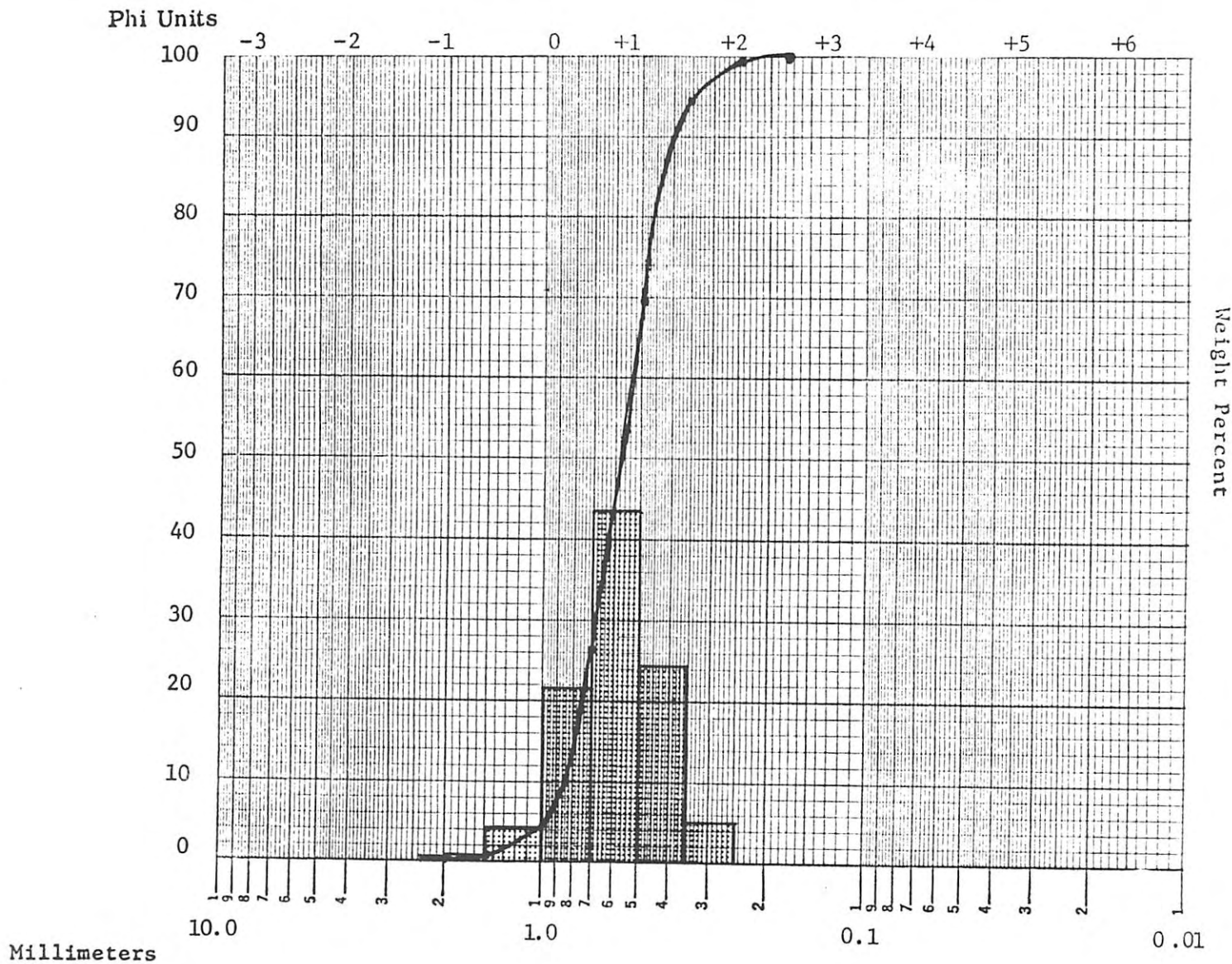


SIZE PARAMETERS

1st Mode	<u>1.397 - 1.981 mm</u>	P ₁₀	<u>2.85</u>	Sorting Coef.	<u>1.736</u>
2nd Mode	<u>2.362 - 3.962 mm</u>	Q ₂₅	<u>2.05 mm</u>	Skewness	<u>.765</u>
3rd Mode	_____	Median: Q ₅₀	<u>1.35 mm</u>	Kurtosis	<u>.271</u>
		Q ₇₅	<u>0.68 mm</u>	Mean	_____
		P ₉₀	<u>.325</u>		

SIZE ANALYSIS

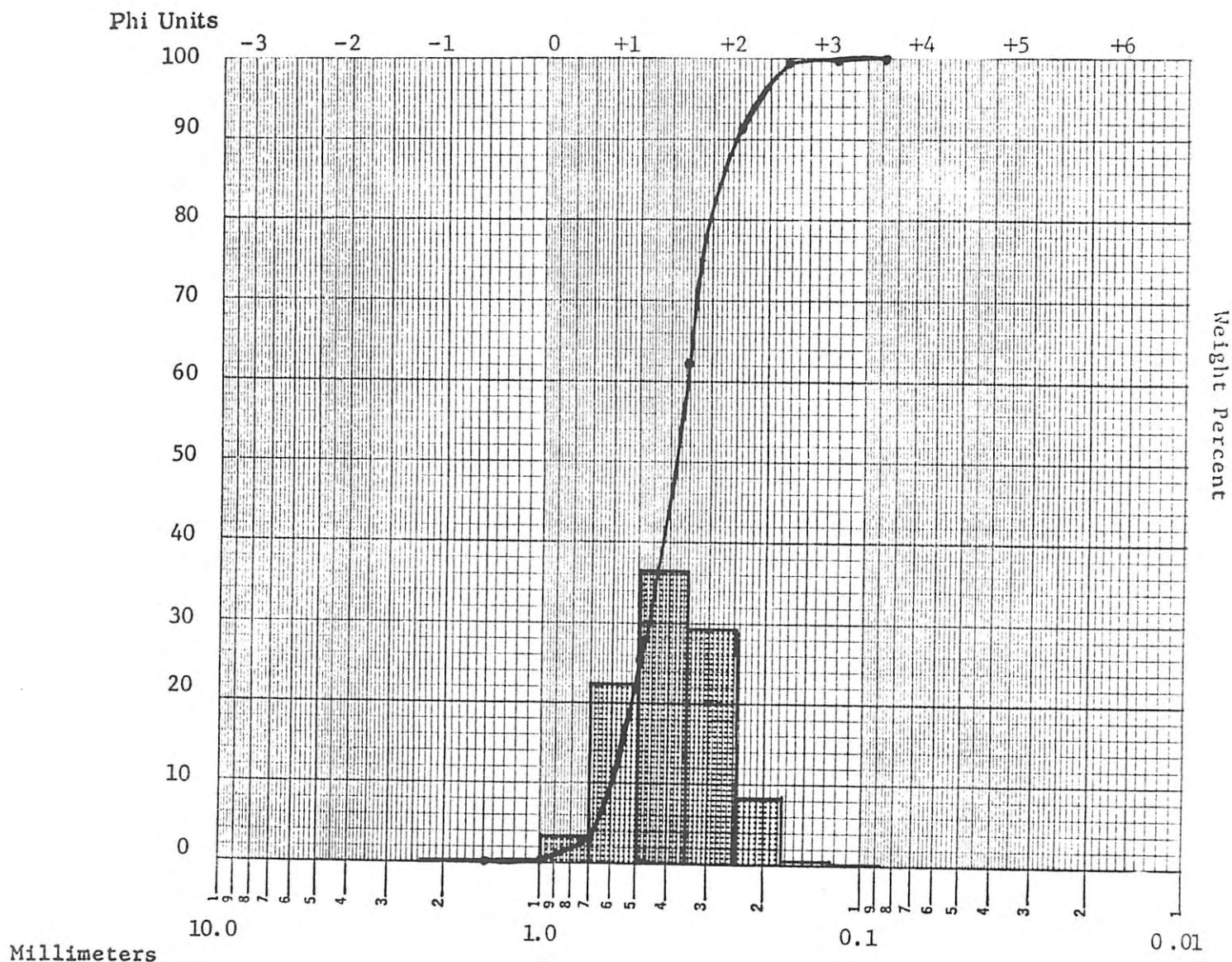
Sample 2402 Sample description medium grained
 Lat. 36° 28.88' N Long. 121° 56.23W granitic sand
 Depth Stream Fathoms _____
Malpaso Creek Meters _____
 _____ Feet Sample Weight 195.6 g

SIZE PARAMETERS

1st Mode <u>0.495 - 0.701 mm</u>	P_{10} <u>.85</u>	
2nd Mode _____	Q_{25} <u>0.72 mm</u>	Sorting Coef. <u>1.231</u>
3rd Mode _____	Median: Q_{50} <u>0.57 mm</u>	Skewness <u>1.053</u>
	Q_{75} <u>0.475 mm</u>	Kurtosis <u>.269</u>
	P_{90} <u>.395</u>	Mean _____

SIZE ANALYSIS

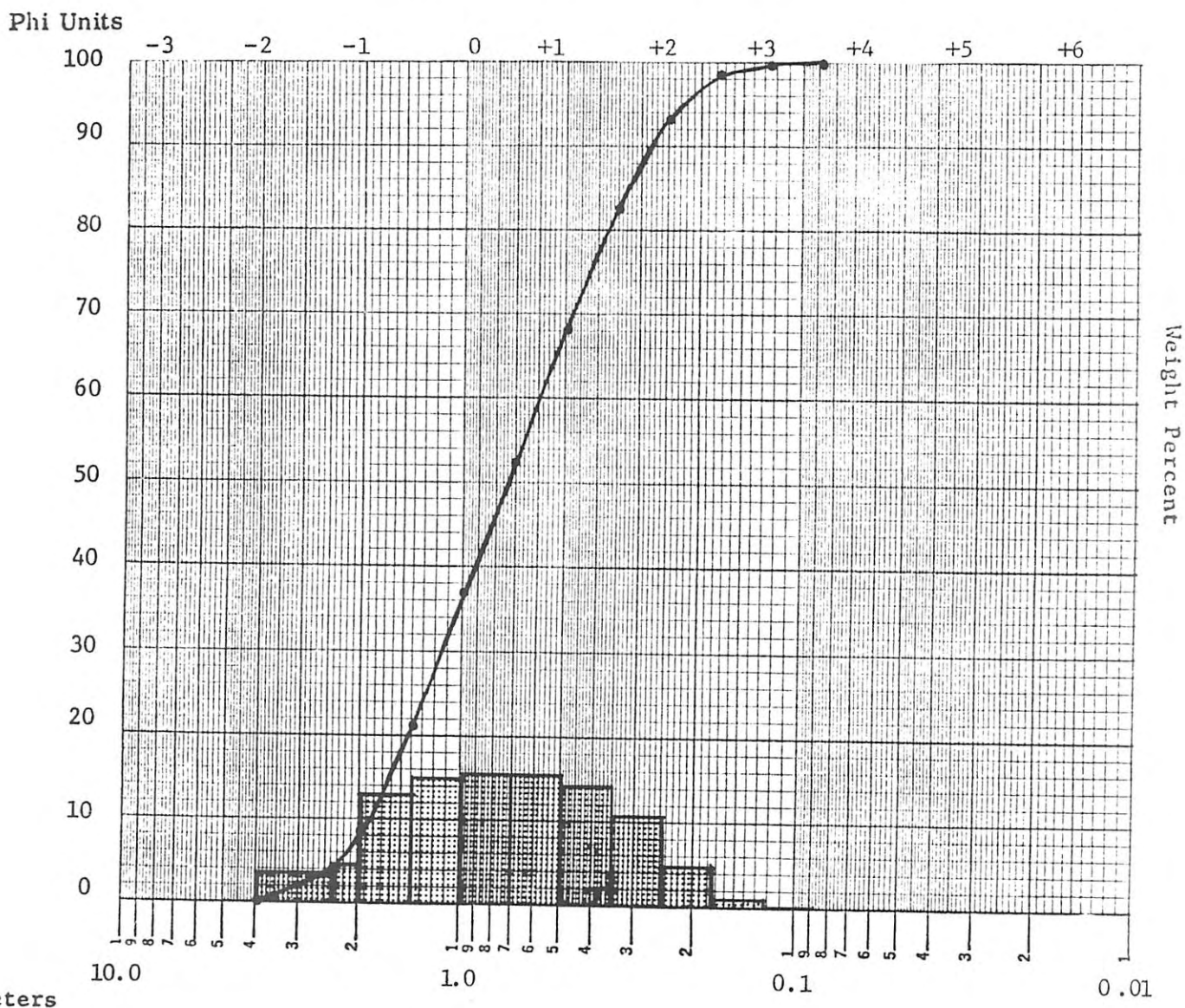
Sample 2403 Sample description fine grained
 Lat. 36° 28.85 N Long. 121° 56.25W granitic sand
 Depth Intertidal Fathoms _____
 _____ Meters _____
 _____ Feet Sample Weight 181.2

SIZE PARAMETERS

	P_{10} <u>.60</u>	
1st Mode <u>0.351 - 0.495 mm</u>	Q_{25} <u>0.501 mm</u>	Sorting Coef. <u>1.251</u>
2nd Mode _____	Median: Q_{50} <u>0.38 mm</u>	Skewness <u>1.110</u>
3rd Mode _____	Q_{75} <u>0.32 mm</u>	Kurtosis <u>.264</u>
	P_{90} <u>.257</u>	Mean _____

SIZE ANALYSIS

Sample 2404 Sample description Medium - coarse
 Lat. 36° 27.40N Long. 121° 55.40W grained granitic sand
 Depth Stream Fathoms _____
Soberanes Creek Meters _____
 _____ Feet Sample Weight 200.2 g

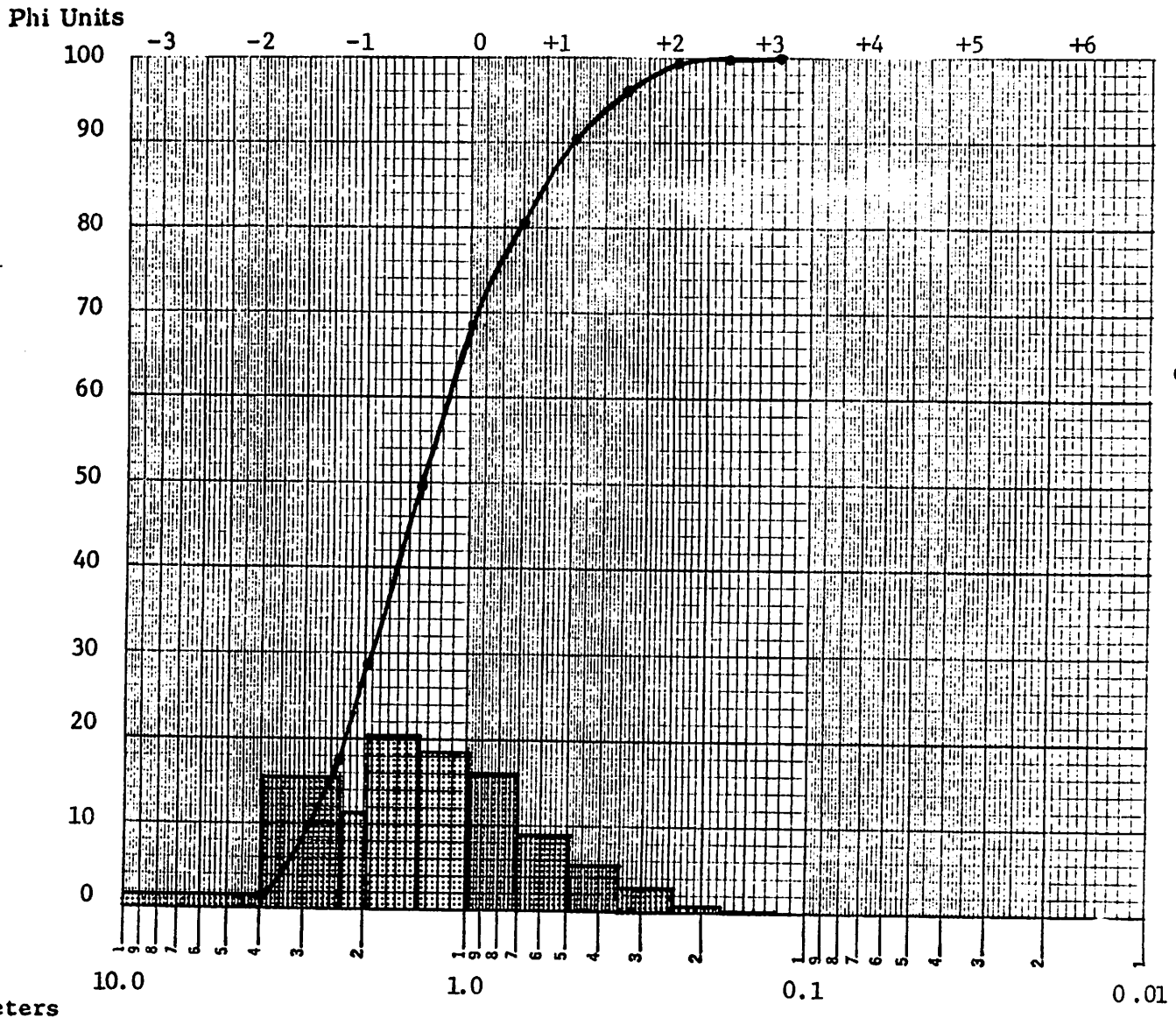


SIZE PARAMETERS

1st Mode <u>0.495 - 0.991 mm</u>	P_{10} <u>1.83</u>	Sorting Coef. <u>1.712</u>
2nd Mode _____	Q_{25} <u>1.29 mm</u>	Skewness <u>1.065</u>
3rd Mode _____	Median: Q_{50} <u>0.73 mm</u>	Kurtosis <u>.274</u>
	Q_{75} <u>0.44 mm</u>	Mean _____
	P_{90} <u>.278</u>	

SIZE ANALYSIS

Sample 2405 Sample description medium grained
 Lat. 36° 27.40N Long. 121° 55.44W granitic sand
 Depth Stream Fathoms _____
Soberanes Creek Meters _____
 _____ Feet Sample Weight 198.8 g

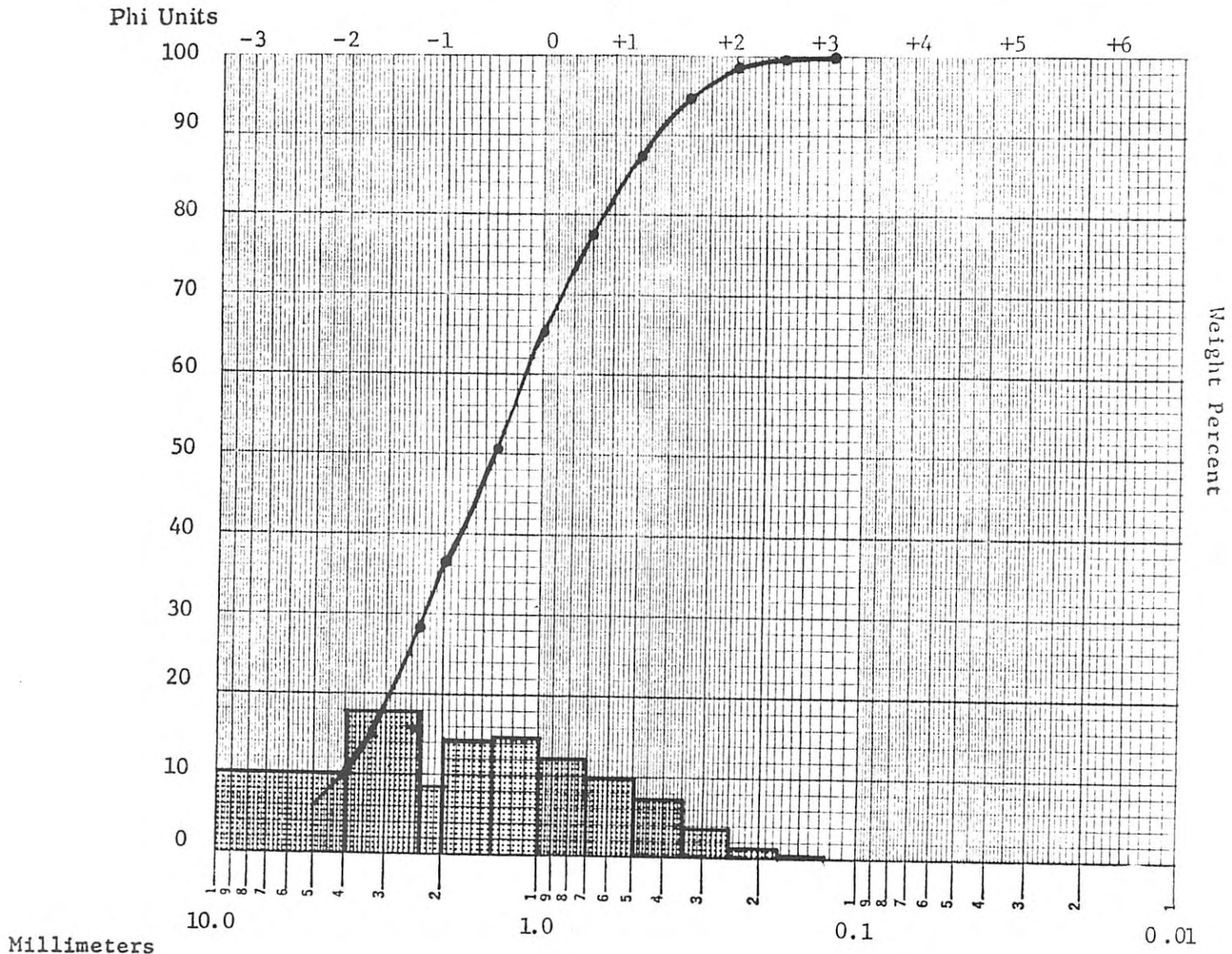


SIZE PARAMETERS

1st Mode <u>1.397 - 1.981 mm</u>	P_{10} <u>2.88</u>	Sorting Coef. <u>1.327</u>
2nd Mode <u>2.362 - 3.962</u>	Q_{25} <u>2.10 mm</u>	Skewness <u>.939</u>
3rd Mode _____	Median: Q_{50} <u>1.37 mm</u>	Kurtosis <u>.265</u>
	Q_{75} <u>0.839 mm</u>	Mean _____
	P_{90} <u>0.5</u>	

SIZE ANALYSIS

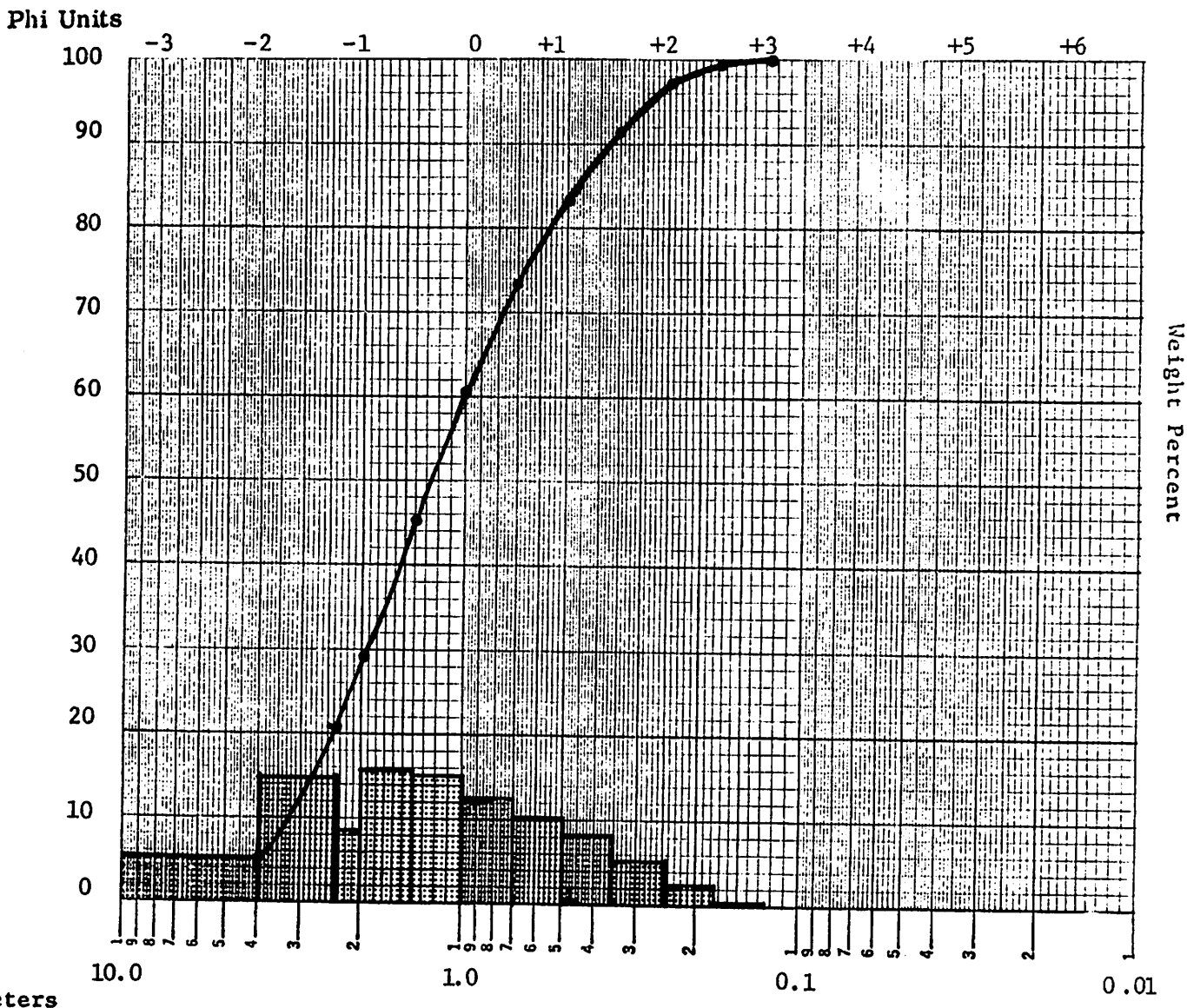
Sample 2406 Sample description fine - coarse
 Lat. 36° 26.51' N Long. 121° 55.30' W granitic sand
 Depth Stream Fathoms
Meters
Feet Sample Weight 224.8 g

SIZE PARAMETERS

1st Mode <u>2.362 - 3.962 mm</u>	P_{10} <u>4.0</u>	Sorting Coef. <u>1.848</u>
2nd Mode <u>.991 - 1.397 mm</u>	Q_{25} <u>2.56 mm</u>	
3rd Mode _____	Median: Q_{50} <u>1.4 mm</u>	Skewness <u>.980</u>
	Q_{75} <u>0.75 mm</u>	Kurtosis <u>.255</u>
	P_{90} <u>.445</u>	Mean _____

SIZE ANALYSIS

Sample 2407 Sample description fine - coarse grained
 Lat. 36° 26.53' N Long. 121° 55.36' W granitic sand
 Depth Stream Fathoms
Meters
Feet Sample Weight 216.3 g

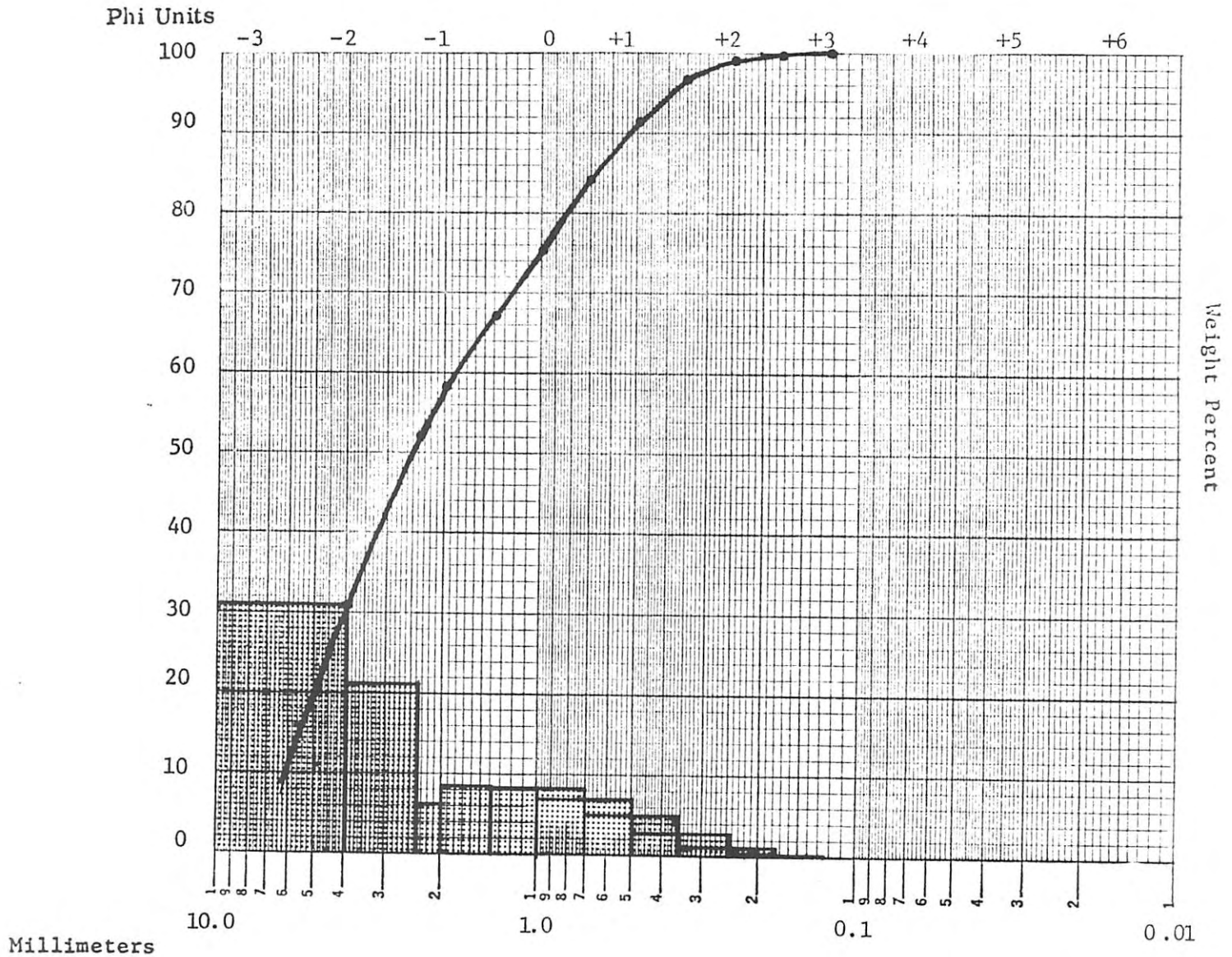


SIZE PARAMETERS

1st Mode 1.397 - 1.981 mm P_{10} 3.23
 2nd Mode 2.362 - 3.962 mm Q_{25} 2.16 mm Sorting Coef. 1.809
 3rd Mode _____ Median: Q_{50} 1.27 mm Skewness .884
 Q_{75} 0.66 mm Kurtosis .262
 P_{90} .365 Mean _____

SIZE ANALYSIS

Sample 2408 Sample description coarse grained
 Lat. 36° 25.04' N Long. 121° 54.73' W granitic sand
 Depth Stream Fathoms
Meters
Feet Sample Weight 146.8 g



SIZE PARAMETERS

1st Mode	<u>23.962 mm</u>	P_{10}	<u>6.0</u>	Sorting Coef.	<u>2.099</u>
2nd Mode	<u>1.397 - 1.981 mm</u>	Q_{25}	<u>4.45 mm</u>	Skewness	<u>.719</u>
3rd Mode	<u></u>	Median: Q_{50}	<u>2.5 mm</u>	Kurtosis	<u>.314</u>
		Q_{75}	<u>1.01 mm</u>	Mean	<u></u>
		P_{90}	<u>.529</u>		

SIZE ANALYSIS

Sample 2410

Sample description medium grained

Lat. 36° 25.06' N Long. 121° 54.84' W

granitic sand

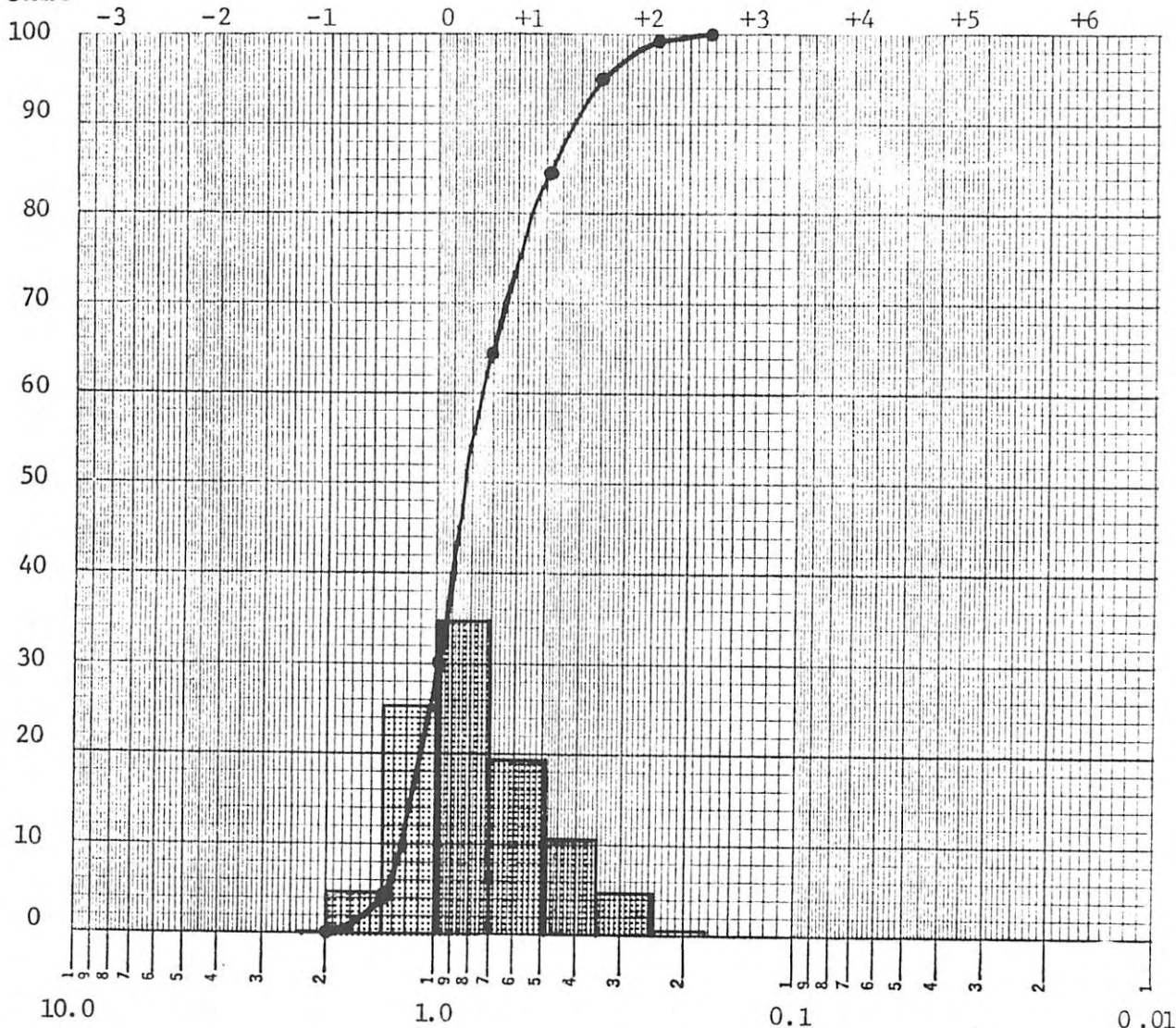
Depth Intertidal Fathoms

Meters

Feet

Sample Weight 246.3 g

Phi Units



Weight Percent

Millimeters

SIZE PARAMETERS

1st Mode 0.701 - 0.991 mm

2nd Mode _____

3rd Mode _____

P₁₀ 1.21

Q₂₅ 1.03 mm

Median: Q₅₀ 0.81 mm

Q₇₅ 0.58 mm

P₉₀ .425 mm

Sorting Coef. 1.333

Skewness .911

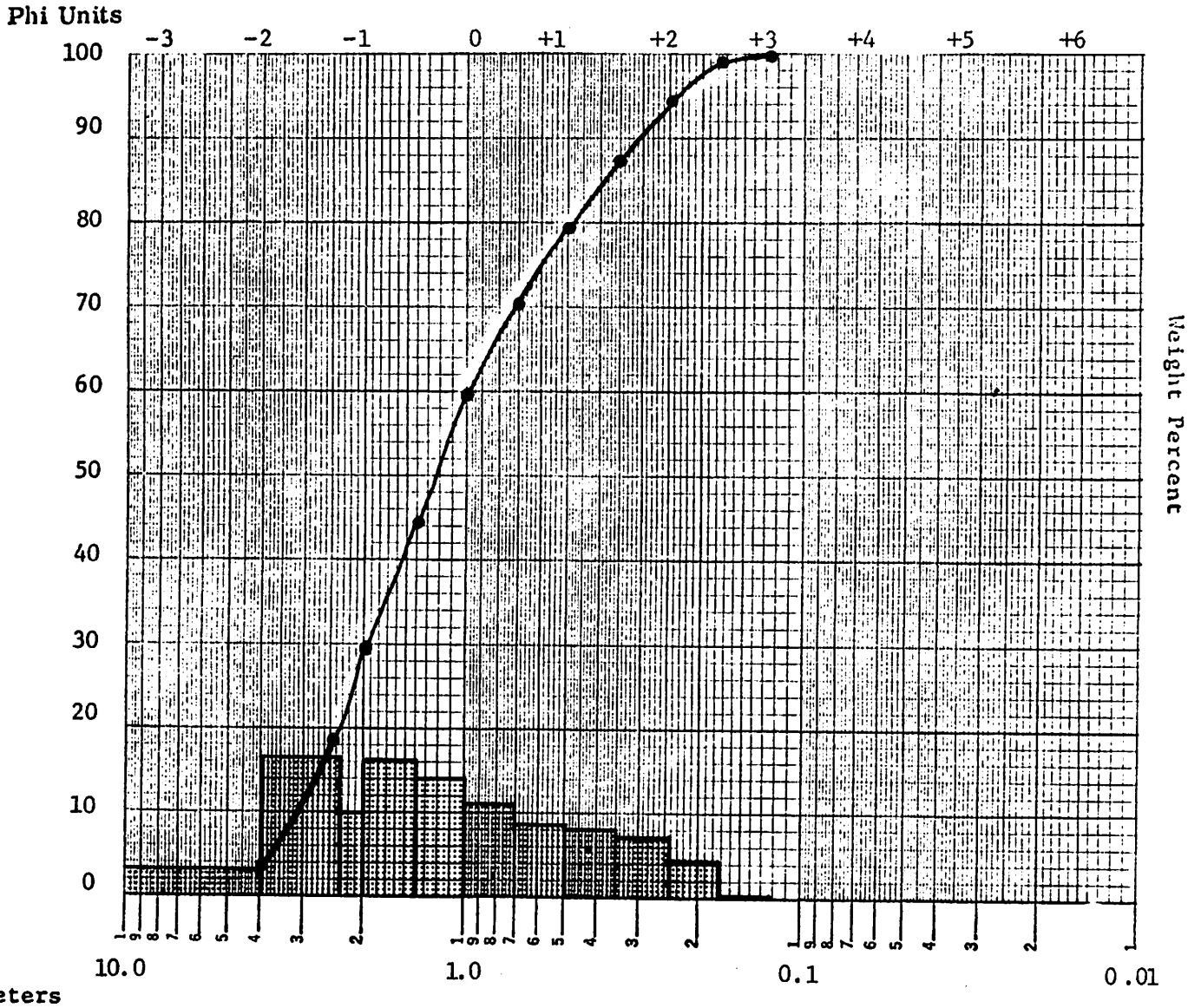
Kurtosis .287

Mean _____

SIZE ANALYSIS

Sample 2411
 Lat. 36° 25.06' N Long. 121° 54.22' W
 Depth Stream Fathoms
Palo Colorado Meters
Canyon Feet

Sample description fine - coarse
grained granitic sand with rock
fragments
 Sample Weight 229.4 g



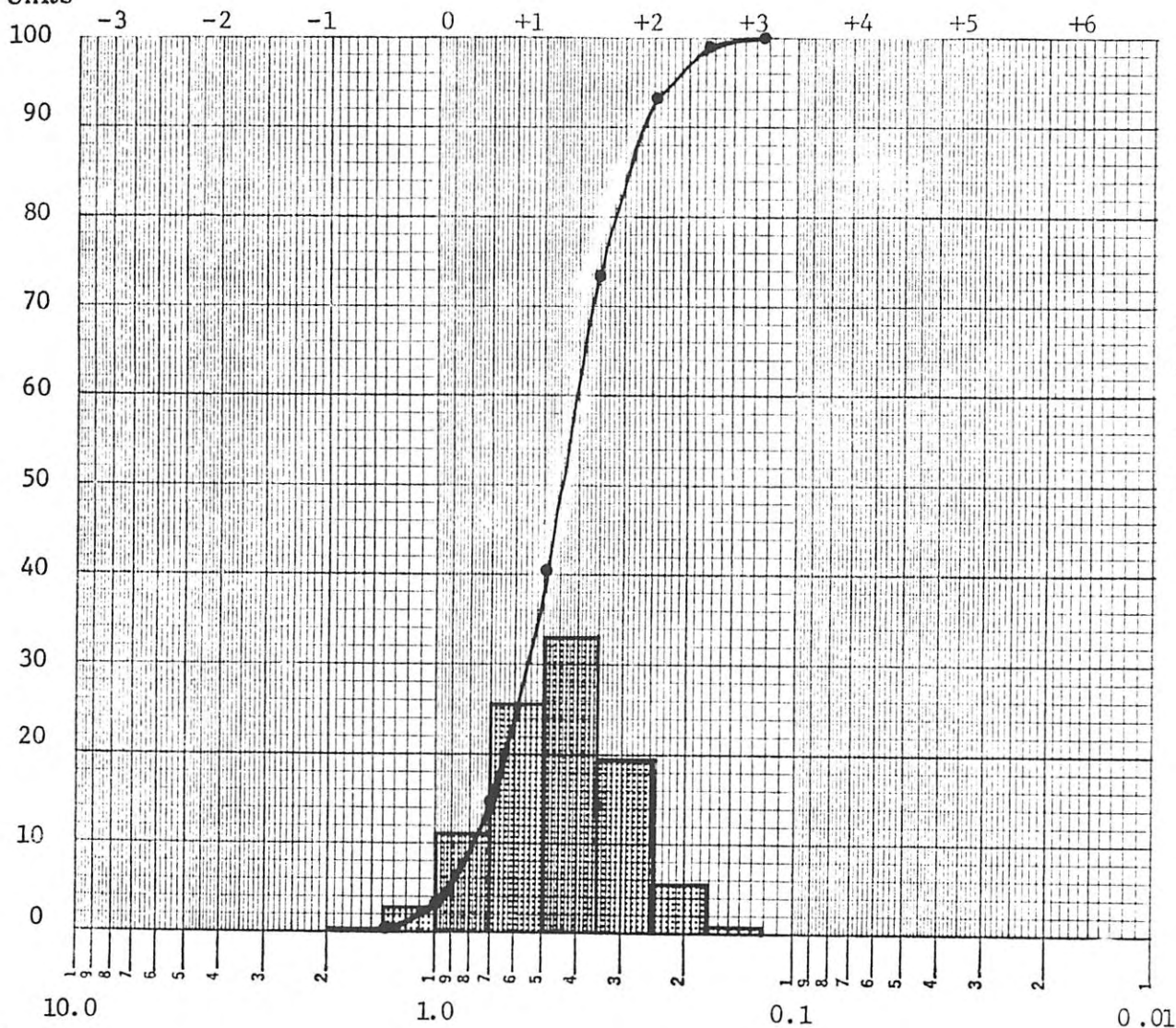
SIZE PARAMETERS

1st Mode	<u>2.362 - 3.962 mm</u>	P_{10}	<u>3.06</u>	Q_{25}	<u>2.11 mm</u>	Sorting Coef.	<u>1.891</u>
2nd Mode	<u>1.397 - 1.981 mm</u>	Median: Q_{50}	<u>1.25 mm</u>	Skewness	<u>.797</u>		
3rd Mode	<u></u>	Q_{75}	<u>0.59 mm</u>	Kurtosis	<u>.276</u>		
		P_{90}	<u>.31</u>	Mean	<u></u>		

SIZE ANALYSIS

Sample 2413Sample description fine - mediumLat. 36° 22.08' N Long. 121° 54.08' Wgrained granitic sandDepth Stream FathomsLas Piedras MetersCreek FeetSample Weight 202.6 g

Phi Units



Millimeters

SIZE PARAMETERS

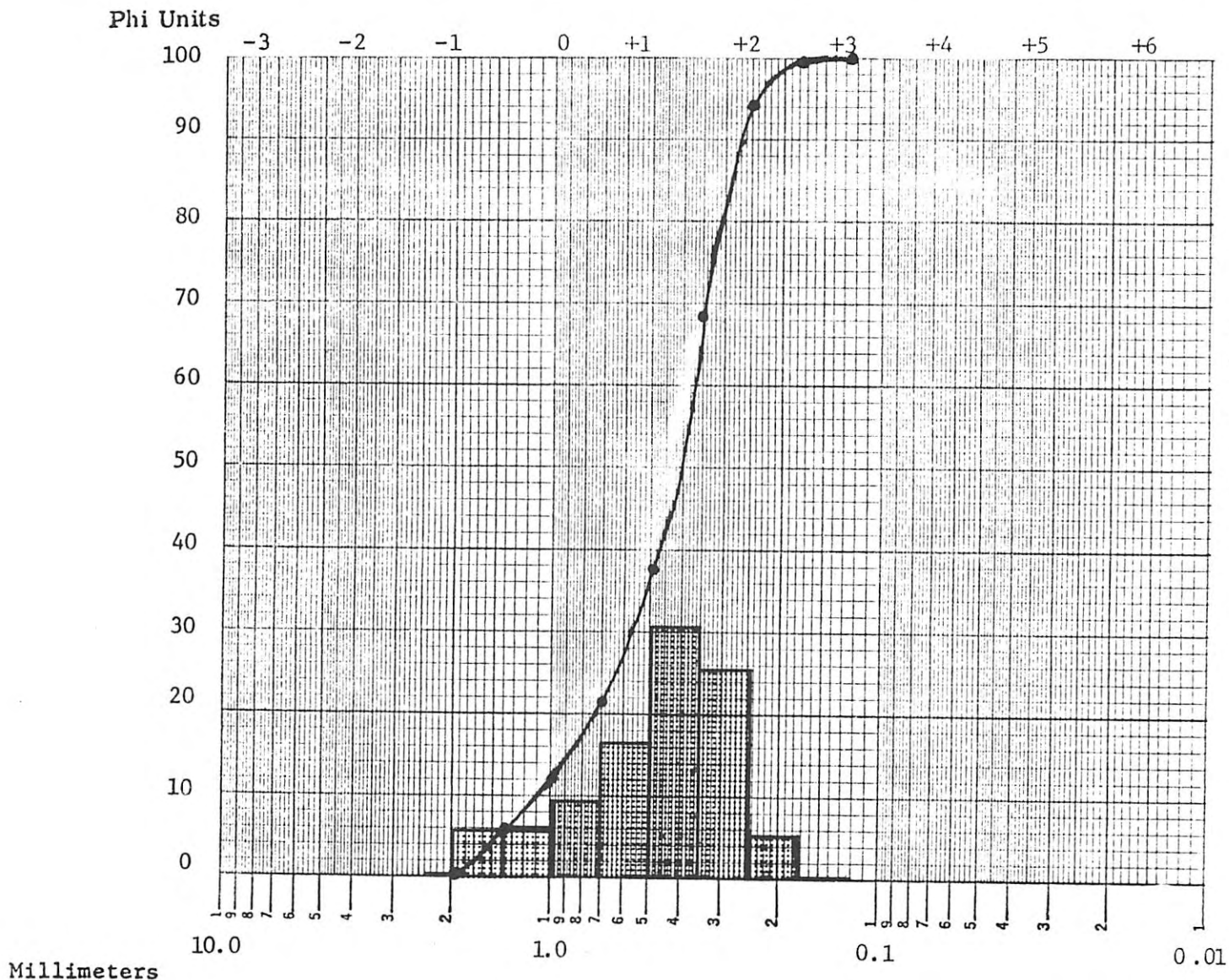
	P_{10} <u>.78</u>	
1st Mode <u>0.351 - 0.495</u>	Q_{25} <u>0.60 mm</u>	Sorting Coef. <u>1.323</u>
2nd Mode _____	Median: Q_{50} <u>0.45 mm</u>	Skewness <u>1.016</u>
3rd Mode _____	Q_{75} <u>0.343 mm</u>	Kurtosis <u>.250</u>
	P_{90} <u>.265</u>	Mean _____

SIZE ANALYSIS

Sample 2414Sample description fine -Lat. 36° 22.81' N Long. 121° 54.09' Wgrained granitic sandDepth Intertidal Fathoms

Meters

Feet

Sample Weight 211.9 gramsSIZE PARAMETERS1st Mode 0.351 - 0.495 mmP₁₀ 1.10Q₂₅ 0.63 mmSorting Coef. 1.371

2nd Mode _____

Median: Q₅₀ .405 mmSkewness 1.287

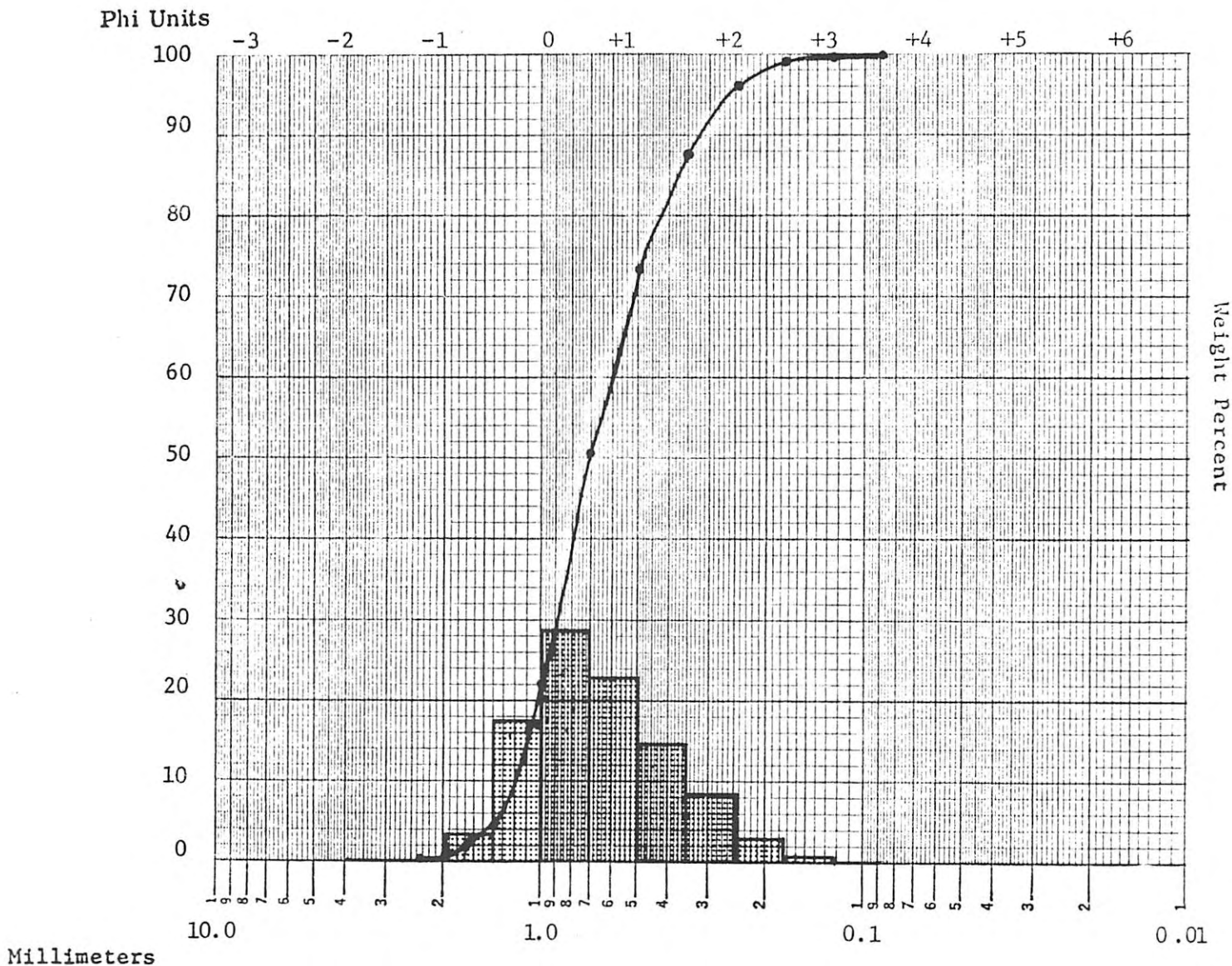
3rd Mode _____

Q₇₅ 0.335 mmKurtosis .188P₉₀ .315

Mean _____

SIZE ANALYSIS

Sample 2415 Sample description Medium grained
 Lat. 36° 22.30' N Long. 121° 54.01W arkosic sand
 Depth Stream Fathoms _____
Bixby Creek Meters _____
 _____ Feet Sample Weight 172.4 g

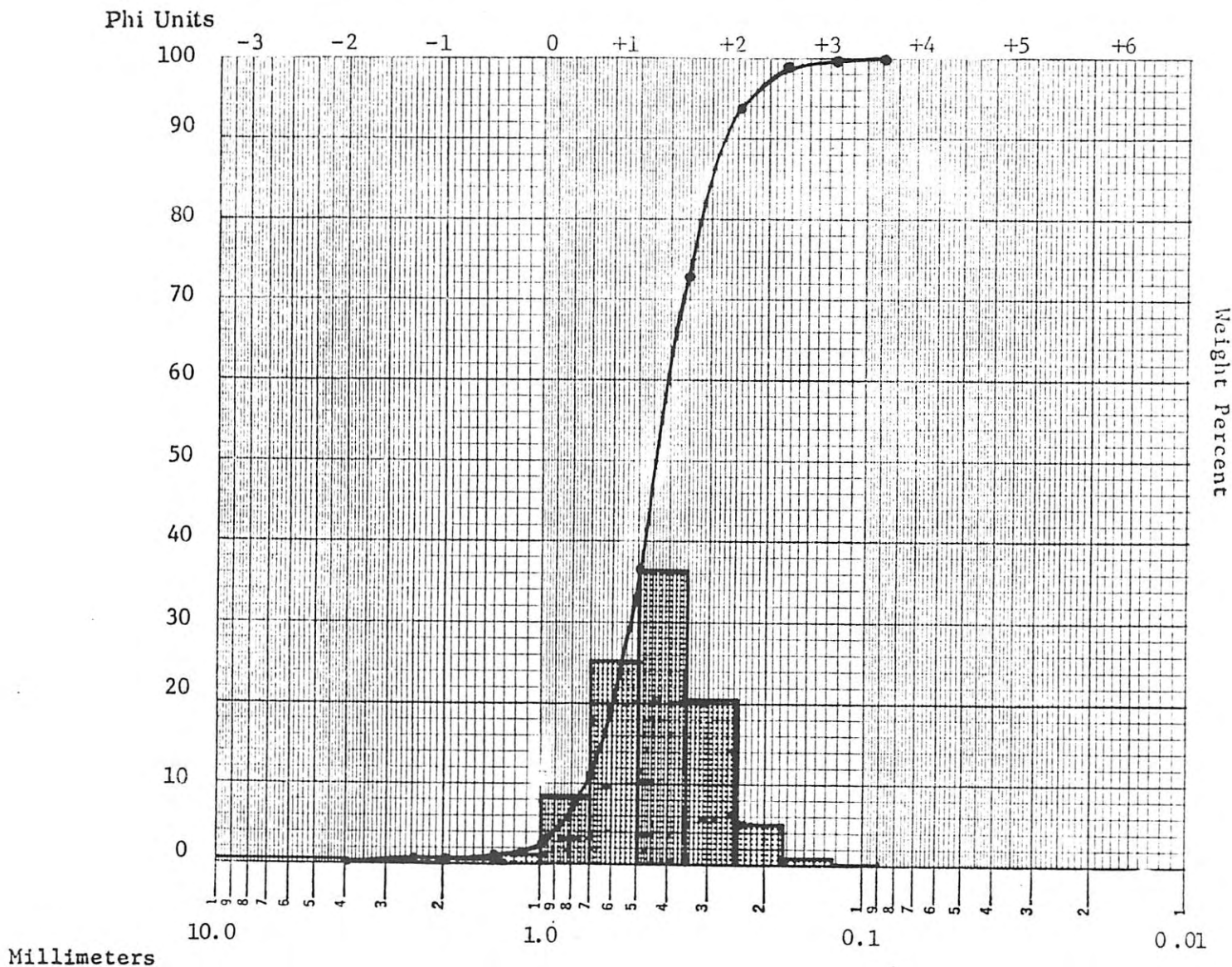


SIZE PARAMETERS

1st Mode <u>0.701 - .991 g</u>	P_{10} <u>1.2</u>	Q_{25} <u>0.95 mm</u>	Sorting Coef. <u>1.414</u>
2nd Mode _____	Median: Q_{50} <u>0.71 mm</u>	Skewness <u>.895</u>	
3rd Mode _____	Q_{75} <u>0.475 mm</u>	Kurtosis <u>.202</u>	
	P_{90} <u>.32</u>	Mean _____	

SIZE ANALYSIS

Sample 2416 Sample description fine - medium
 Lat. 36° 22.29' N Long. 121° 54.08' W grained granitic sand
 Depth Stream Fathoms _____
Bixby Creek Meters _____
 _____ Feet Sample Weight 209.8 g



SIZE PARAMETERS

1st Mode <u>0.351 - 0.495 mm</u>	P_{10} <u>.701</u>	Q_{25} <u>0.56 mm</u>	Sorting Coef. <u>1.283</u>
2nd Mode _____	Median: Q_{50} <u>.445 mm</u>	Q_{75} <u>0.34 mm</u>	Skewness <u>.962</u>
3rd Mode _____	P_{90} <u>.27</u>	Mean _____	Kurtosis <u>.255</u>

