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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS

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GOLD CONTENT OF ROCKS IN THE FAIRBANKS MINING DISTRICT, ALASKA

By
D.B. Hawkins

STATE OF ALASKA
Department of Natural Resources
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GOLD CONTENT OF ROCKS OF THE FAIRBANKS MINING DISTRICT, ALASKA

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ABSTRACT

Mean (±1 standard deviation) gold contents of the Cleary Standard vein quartz, vein quartz (district wide), schist, and quartz diorite are: 0.342 ± 0.20 ppm, 5.65 ± 1.54 ppm, 0.361 ± 0.119 ppm, and 3.73 ± 0.682 ppm respectively. These values were obtained from 2,441 gold analyses of rocks in the Fairbanks mining district as part of the joint University of Alaska - U.S. Geological Survey Heavy Metals Project. The geochemical sampling constant of Ingamells and Switzer (1973), coupled with computer sampling experiments, were used to derive these values. This approach was necessitated by the Poisson distribution followed by gold in these rocks. Mean gold values for other rock types are also reported, but the number of samples was insufficient to provide a useful measure of the standard error of the mean.

The commonly used atomic absorption (AA) analytical method, with aqua-regia digestion gives results for gold in good agreement with the fire assay method. Both methods gave values that were higher than those returned by the AA method with $HBr-Br_2$ digestion.

Possible trace element associations among the transition metals (B, Ba, Zr; Sr, Y; Au, Sb; Hg, Pb) are suggested by principal components analysis. These associations are tentative because of the serious sampling problems inherent in this study.

INTRODUCTION

This work is an outgrowth of the joint Department of Geological Sciences, University of Alaska - U.S. Geological Survey Heavy Metals Project conducted in the Fairbanks mining district from 1967 to 1970. The results of this project were published in Forbes and others (1968), Pilkington and others (1969), Stevens and others (1969), and Hawkins and Forbes (1971). The data used in this study are from these reports and from Chapman and Foster (1969).

The purpose of this study is to present---in a more condensed and refined form---information on the gold content of various rocks in the district sampled during the Heavy Metals Project. This study is particularly concerned with the statistical reliability of the estimated gold content of the different rocks. Therefore, the geochemical sampling constant of Ingamells and Switzer (1973) has been used. Predictions based on this constant have been tested with a few computer sampling experiments. The data are for gold determined on 10-g samples using aqua-regia digestion, MIBK extraction, and determination by atomic absorption spectrometry (AA). Results are also reported for the fire-assay method and for $HBr-Br_2$ digestion followed by MIBK extraction and atomic absorption analysis. Details of these methods are described in the aforementioned references. The conclusions of comparison (by regression analysis) of the results of the analytical methods employed are included here.

Rock-type categories used in this study are based on field identification by various geologists. Because different rock types may be placed in the same category by different geologists, blurring of the classification may occur. For example, some samples of segregation quartz may be called vein quartz (and vice versa) and be erroneously included in the vein-quartz category. This classification problem is mentioned to emphasize the broad and imprecise classifications used. Table 1 classifies samples according to category. Segregation quartz refers to quartz veinlets and pods formed as a result of regional metamorphic recrystallization, and is distinct from the vein quartz commonly associated with gold mineralization in the district. Although the lack of distinction between schist and quartz-mica schist probably reflects the preference of the geologist in naming the rock and does not imply the existence of any mineralogical distinction, I have chosen to keep the groups separate.

Table 1. Sample classification, number, and mean gold content.

Classification	Number		Gold content (ppm) *
Vein quartz	365		5.94
Segregation quartz	139		0.530
Quartz-mica schist	819		0.570
Micaceous quartzite	92		2.92
Shear	11		0.146
Gouge	75		3.30
Quartzite	71		1.43
Stibnite	6		7.54
Quartz monzonite	174		1.13
Quartz diorite	197		3.71
Sulfide	20		2.48
Calc-schist	34		0.085
Breccia	22		0.397
Quartz porphyry	41		0.140
Quartz stibnite	1		0.300
Schist	210		0.366
Quartz stringer	9		0.634
Gneiss	19		0.258
Gabbro	3		0.023
Marble	17		0.129
Amphibolite	36		0.049
Argillite	1		0.130
Galena	11		15.7
Granite	15		0.414
Miscellaneous	32		0.196
Unidentified	21		2.08
Total	2441	Grand mean	1.95

* Atomic absorption spectrometry, aqua-regia digestion.

RESULTS

Statistical analyses were computed using an HP-9845 computer. Summary statistics of gold content of 2441 samples (by rock type) are shown in table 1 and appendix I. In appendix I, gold values are separated on the basis of analytical method. To compare the results of analyses by different analytical methods, regression equations (appendix II) can be used.

DISCUSSION

Sampling Constant

Geochemical-sampling constants (Ingamells and Switzer, 1973) were calculated from results of the aqua-regia digestion methods for several different rock types. These calculated constants (table 2) were used as a guide in subsequent computer sampling experiments, the results of which are shown in the tables accompanying figures 1-8. An important component of this study is the detailed analysis of the vein-quartz sample labeled the 'Cleary Standard,' which I collected from a small quartz vein exposed in a road cut of the Steese Highway at Cleary Summit. The 35-kg sample from this vein was reduced to pass a 200-mesh sieve, and 10-g subsamples were used as working standards and control samples for gold analysis during the project. A split of this sample has also been used for similar purposes by the Mineral Laboratory of the Alaska Division of Geological and Geophysical Surveys (DGGS)(D.R. Stein, personal commun.).

Common features of the results (fig. 9; appendix I) are the large variance and extreme skewness of the gold distribution in different rock types that are a consequence of the particulate nature of gold in these samples. Unlike many elements, gold does not substitute for the major elements in the crystal structure of the common minerals. Rather, gold forms discrete microscopic and macroscopic particles that are included at mineral-grain boundaries or engulfed in major minerals such as quartz. Because these particles are not uniformly distributed throughout the sample, it is possible to obtain samples with only a few, if any, discrete gold particles. Conversely, from one to six or more -200-mesh gold particles in a 10-g rock sample can profoundly affect the reported analytical gold values. The effect becomes more pronounced in smaller samples. This extreme inhomogeneity on the analyzed scale causes the large observed variance and skewness, and is also a problem that must be overcome to give reliable estimates of the mean gold content of rocks in the Fairbanks district.

In the histograms in appendix I, the gold is neither normally nor log-normally distributed; rather it follows a Poisson distribution as emphasized by Ingamells and Switzer (1973). A log transformation was used to obtain a better graphical display of the gold content, because the gold content of a given sample class can range through at least four orders of magnitude (e.g., 0.02 to 200 ppm).

According to Ingamells and Switzer (1973), the most probable result for determination of an element in a rock or mineral is not independent of the weight of the analyzed sample. The relative standard deviation (R, percent)

of the results, when the laboratory sample has been prepared in a particular way to pass a specific mesh size, can be expressed in terms of a sampling constant (K_s) by $R = (K_s)w^{-\frac{1}{2}}$, where w is the weight of the subsample. The sampling constant for a particular constituent can be estimated from a series of subsample determinations by

$$\hat{K}_s = \hat{R}^2 w = 10^4 w \frac{\sum (x_i - \bar{x})^2}{(M - 1)\bar{x}^2}$$

where $\bar{x}$ is the arithmetic mean of M determinations. The relative standard deviation for the same constituent in a subsample of weight w_f is estimated by

Table 2. Results of geochemical-sampling-constant calculations

Sample type	Sampling constant	Required sample weight (g)	Number of required subsamples (10 g)	Subsamples* sufficient to estimate standard error(?)
Cleary Standard	1.27×10^4	30	3	yes
Vein quartz	1.66×10^6	1000	100	yes
Segregation quartz	4.02×10^6	2600	260	no
Quartz-mica schist	2×10^7	12840	1284	no
Schist	1.74×10^6	1170	117	yes
Calc-schist	5.88×10^5	605	61	no
Quartz monzonite	4.47×10^6	2190	219	no
Quartz diorite	5.75×10^5	350	35	yes
Marble	9.45×10^5	800	80	no
Amphibolite	3.90×10^5	650	65	no
Remaining	---	--	--	no

*Compare required number with number available (table 1).

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	100	0	36.12967	.36130

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	.01427	.11944	.48477	-.27781

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	33.05806	.01194	.33759	.38500

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	.70673	.12687	.57987	.41680

	TUKEY'S HINGES		
VARIABLE	MEDIAN	25-th %-ile	75-th %-ile
AU	.34617	.27047	.43687

	TUKEY'S MIDDLEMEANS		
VARIABLE	MIDMEAN	TRIMEAN	MIDSPREAD
AU	.35015	.34992	.16640

AU-SCHIST

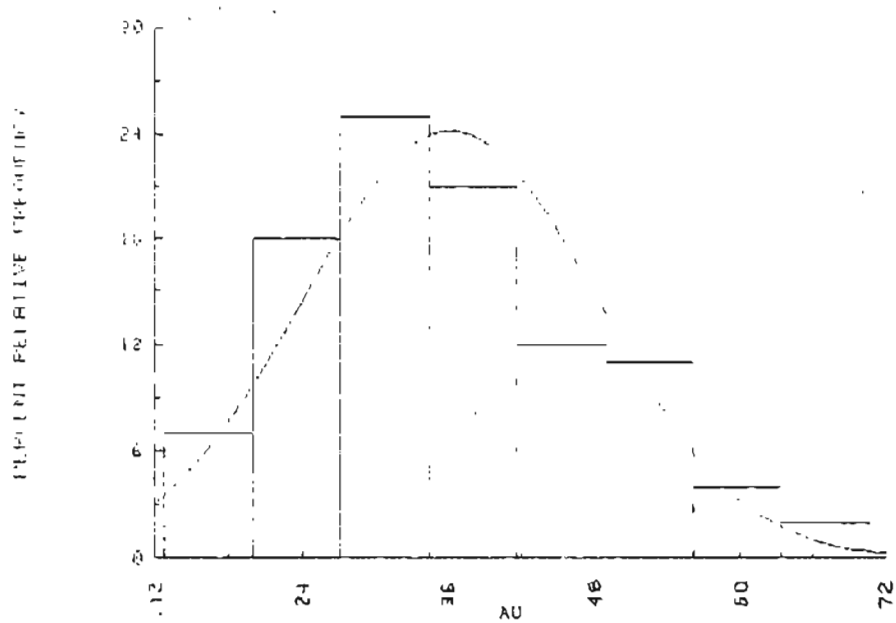

Figure 1. Summary statistics and histogram for set of 100 samples of size 150 from the schist group, Fairbanks mining district, Alaska.

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	100	0	372.61040	3.72610

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	.46555	.68231	.08897	.43809

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	18.31169	.06823	3.59069	3.86152

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	5.90727	1.98700	3.92027	3.94713

VARIABLE	TUKEY'S HINGES MEDIAN	25-th %-ile	75-th %-ile
AU	3.75613	3.31617	4.19083

VARIABLE	TUKEY'S MIDDLEMEANS MIDMEAN	TRIMEAN	MIDSPREAD
AU	3.73995	3.75482	.87467

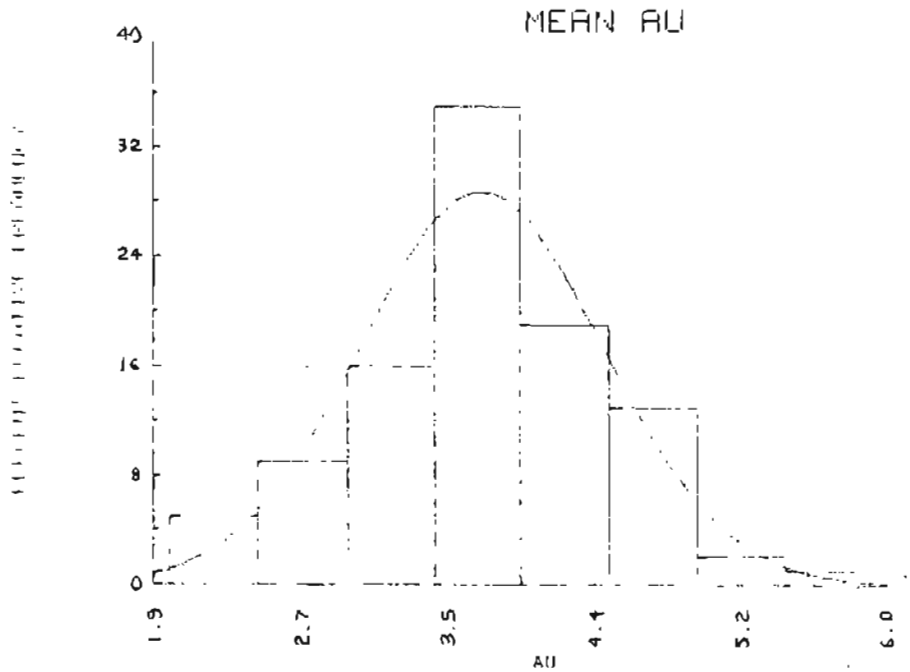

Figure 2. Summary statistics and histograms for set of 100 samples of size 150 from the quartz diorite group, Fairbanks mining district, Alaska.

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	59	0	20.09000	.34051

VARIABLE	VARIANCE	STANDARD DE .	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.01473	.12113	1.87757	3.71916

N VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	.95 % CONFIDENCE INTERVAL ON MEA LOWER LIMIT	UPPER LIMIT
AU-AR	35.64595	.01580	.34032	.34070

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	.78000	.18000	.60000	.48000

VARIABLE	MEDIAN	TUKEY'S HINGES 25-th %-ile	75-th %-ile
AU-AR	.30000	.26000	.37000

VARIABLE	MIDMEAN	TUKEY'S MIDDLEMEANS TRIMEAN	MIDSPREAD
AU-AR	.30968	.30750	.11000

AU - CLEARY STD.- VEIN QUARTZ

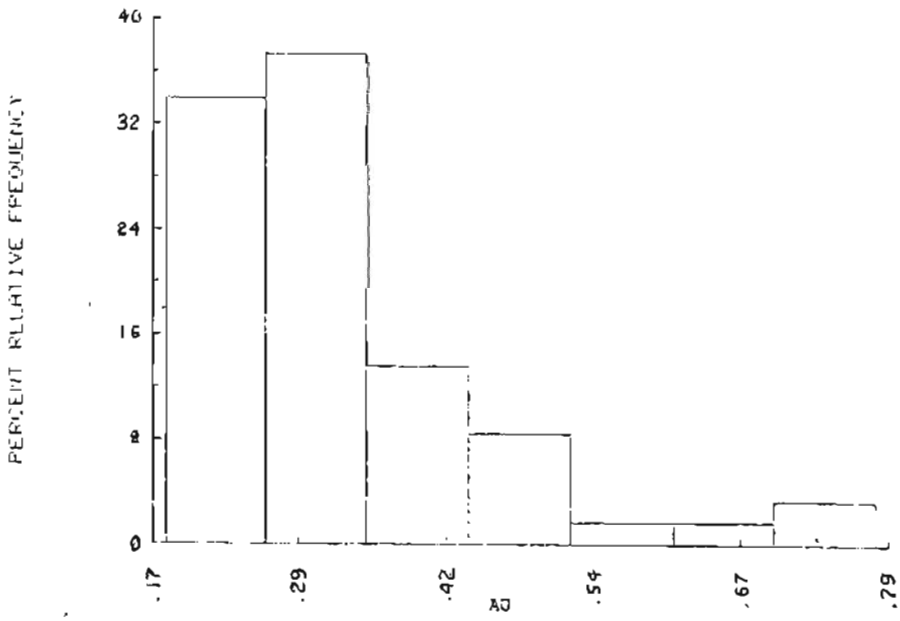

Figure 3. Summary statistics and histogram of raw data for Cleary Standard, Fairbanks mining district, Alaska.

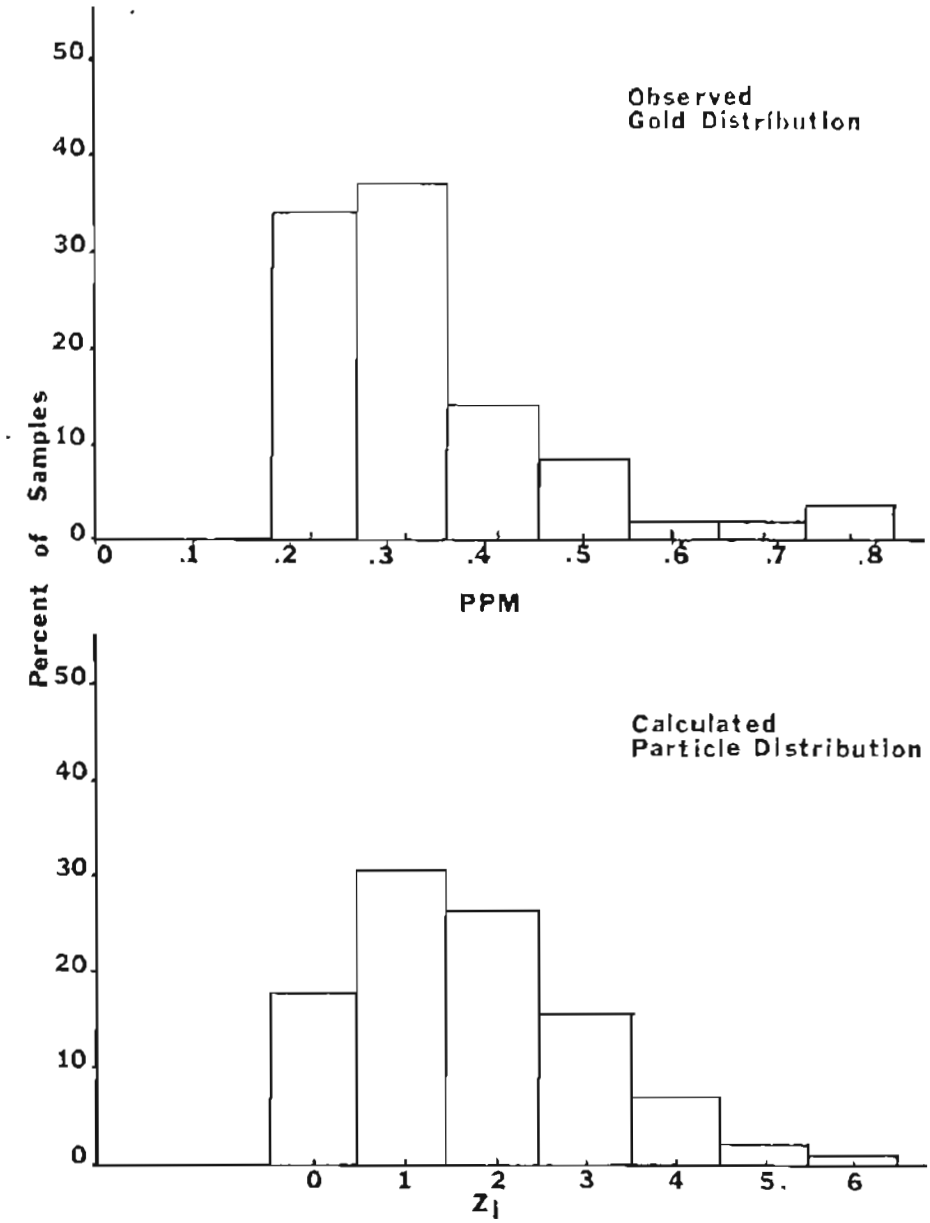

Figure 4. Observed gold concentration and calculated gold-particle distribution for Cleary Standard, Fairbanks mining district, Alaska.

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	100	0	35.00333	.35003

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	.00607	.07793	1.16288	1.78707

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	22.26273	.00779	.33457	.36550

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	.66667	.20667	.46000	.43667

TUKEY'S HINGES

VARIABLE	MEDIAN	25-th %-ile	75-th %-ile
AU	.33167	.29500	.39500

TUKEY'S MIDDLEMEANS

VARIABLE	MIDMEAN	TRIMEAN	MIDSPREAD
AU	.33440	.33833	.10000

CLEARY STANDARD MEANS

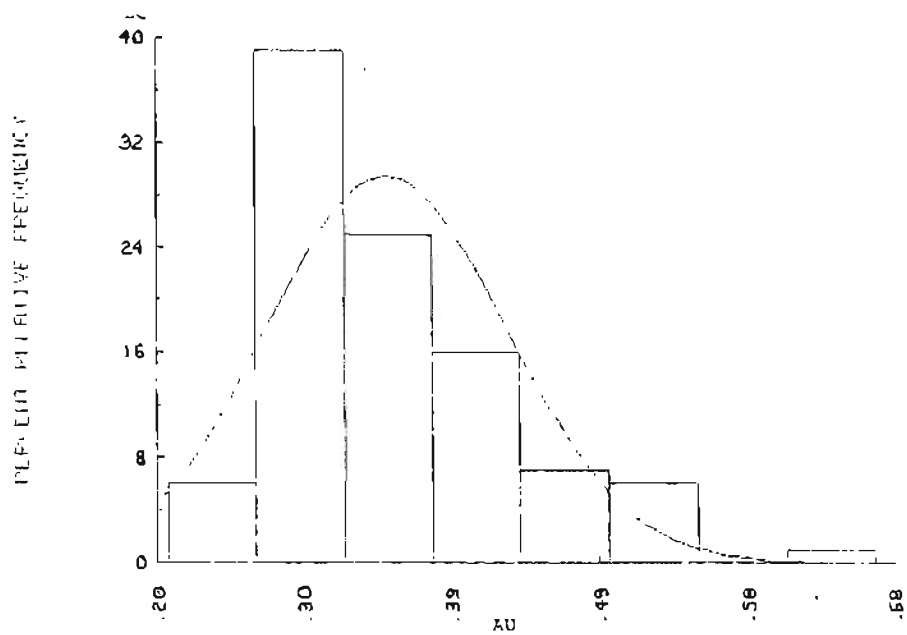

Figure 5. Summary statistics and histogram for set of 100 samples of size 3 for Cleary Standard, Fairbanks mining district, Alaska.

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	1000	0	342.01000	.34201

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	.00382	.06178	.89076	.83849

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	18.06240	.00195	.33818	.34584

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	.64500	.22500	.42000	.43500

VARIABLE	MEDIAN	TUKEY'S HINGES 25-th %-ile	75-th %-ile
AU	.32750	.29500	.38250

VARIABLE	TUKEY'S MIDDLEMEANS MIDMEAN	TRIMEAN	MIDSPREAD
AU	.33145	.33313	.08750

CLEARY STANDARD MEANS

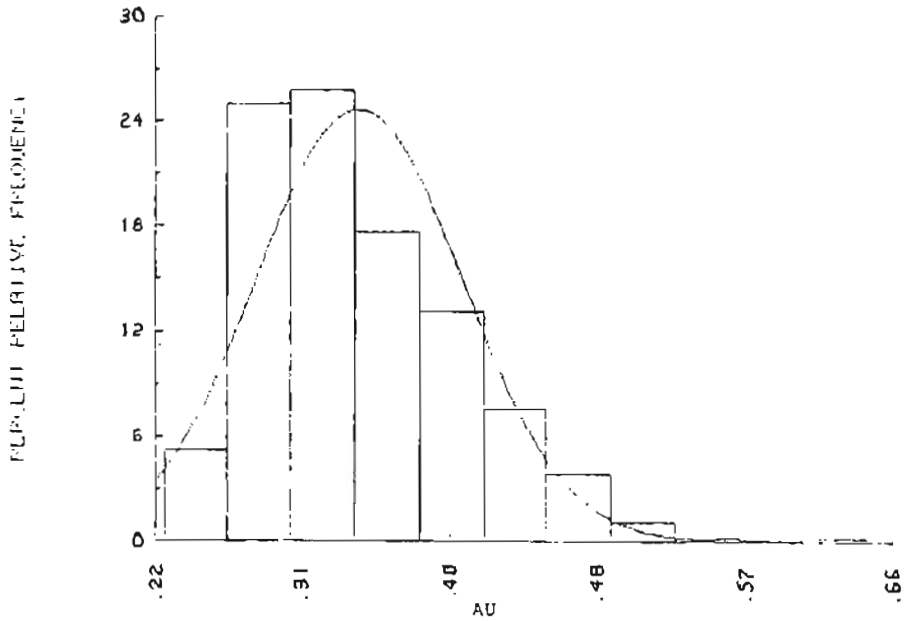

Figure 6. Summary statistics and histogram for set of 1000 samples of size 3 for Cleary Standard, Fairbanks mining district, Alaska.

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	100	0	34.77400	.34774

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	.00150	.03867	.31774	-.21951

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	11.12149	.03387	.34006	.35541

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	.46200	.26800	.19400	.36500

VARIABLE	TUKEY'S HINGES MEDIAN	25-th %-ile	75-th %-ile
AU	.34550	.31250	.37500

VARIABLE	TUKEY'S MIDDLEMEANS MIDMEAN	TRIMEAN	MIDSPREAD
AU	.34604	.34738	.05150

CLEAR; STANDARD MEANS

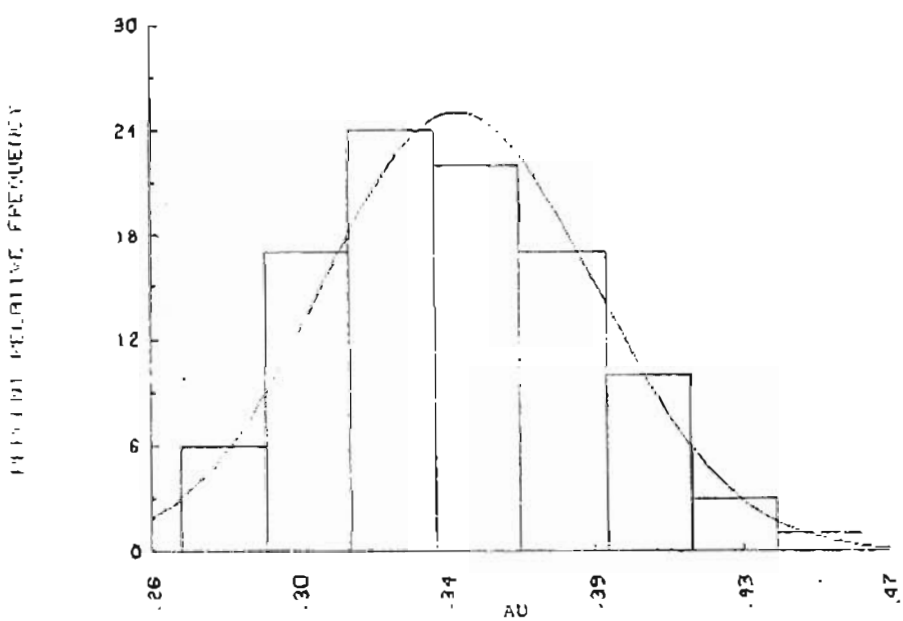

Figure 7. Summary statistics and histogram for set of 100 samples of size 10 for Cleary Standard, Fairbanks mining district, Alaska.

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	100	0	34.71200	.34712

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	.00083	.02882	.44553	.61410

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	8.30220	.00288	.34140	.35284

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	.43200	.28950	.14250	.36075

VARIABLE	MEDIAN	TUKEY'S HINGES 25-th %-ile	75-th %-ile
AU	.34875	.32900	.36150

VARIABLE	MIDMEAN	TUKEY'S MIDDLEMEANS TRIMEAN	MIDSPREAD
AU	.34677	.34700	.03250

CLEARY STANDARD MEANS

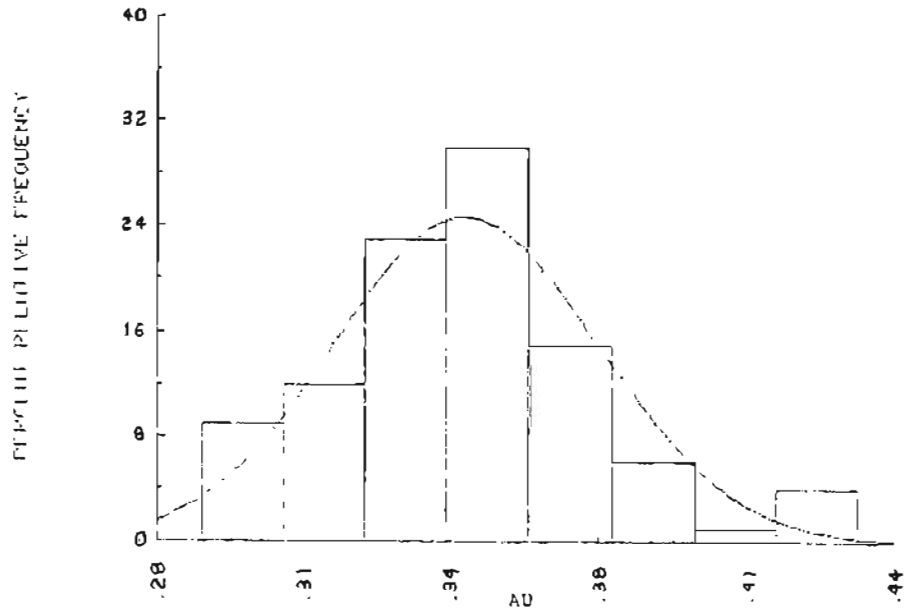

Figure 8. Summary statistics and histogram for set of 100 samples of size 20 for Cleary Standard, Fairbanks mining district, Alaska.

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	100	0	34.20100	.34201

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	.00041	.02013	.02587	-.54119

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	5.88596	.00201	.33801	.34601

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	.38500	.29800	.08700	.34150

VARIABLE	MEDIAN	TUKEY'S HINGES 25-th %-ile	75-th %-ile
AU	.34238	.32738	.35700

VARIABLE	MIDMEAN	TUKEY'S MIDDLEMEANS TRIMEAN	MIDSPREAD
AU	.34204	.34228	.02963

CLEARY STANDARD MEANS

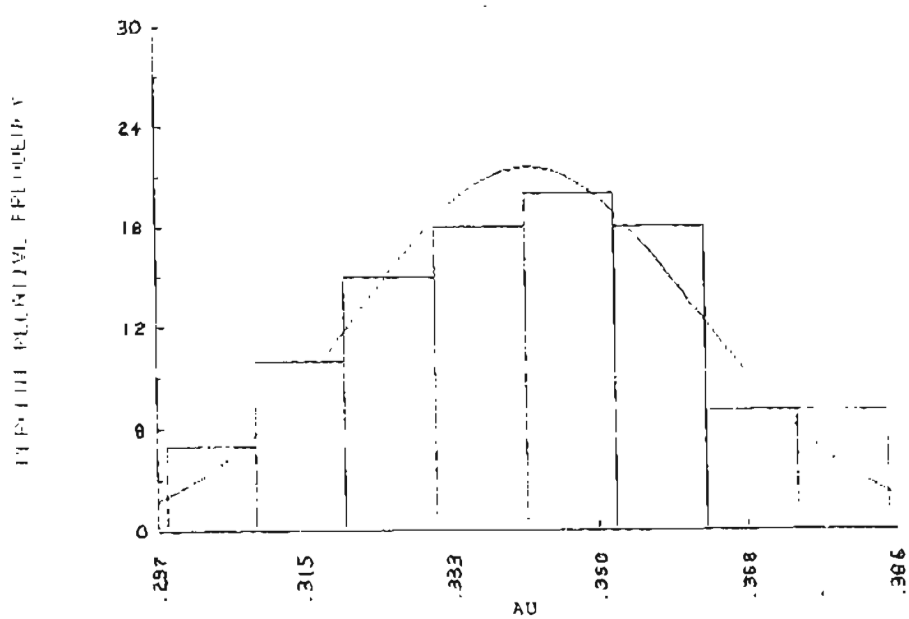

Figure 9. Summary statistics and histogram for set of 100 samples of size 40 for Cleary Standard, Fairbanks mining district, Alaska.

$$\hat{R}_f = (\hat{K}_s/w_f)^{\frac{1}{2}}$$

If, as is usually the case, the analytical error is less than one-third of the sampling error, the probability is about 0.95 that a future subsample will yield a different value from the mean value by less than $2R_f$ percent. Restated, the value $\pm 2R_f$ percent establishes a 95-percent confidence interval for the value of the subsample.

This interpretation is correct except when a constituent is concentrated in a few mineral grains. This condition, which applies to the gold concentrations in the rocks studied here, leads to a Poisson distribution. When the number of discrete gold grains (special grains) is less than about five or six per sample, the Poisson distribution has a marked asymmetry; low values occur more frequently than high values. An average of results from too few subsamples will probably be erroneously low. According to this model, a single analytical result will have the value

$$x_i = H + cz_i$$

where H is the concentration of the element in the gangue or matrix, cz_i is the contribution of z_i 'special' grains to the results, and c is the concentration of the element in the z 'special' grains. An estimate of the contribution of a single grain to an analytical result is

$$\hat{c} = \frac{s^2}{\bar{x} - H}$$

where s^2 is the variance of the results of M determinations (M large). Thus, the series average $\bar{x}$ is an estimate of H + cz, and the series variance is an estimate of c^2z. When z is small and M sufficiently large, it is likely that the smallest determined value in a series x_{min} will have z = 0, thus providing an estimate of H. Under these conditions, the probability of obtaining a subsample free of 'special' grains is

$$Pr_{(z_i = 0)} = 1 - (1 - 3^{-\hat{z}})^M,$$

where

$$\hat{z} = (\bar{x} - x_{min})^2/s^2.$$

From these relations, histograms can be calculated and compared with the observed histograms. For the Cleary Standard (fig. 10), the calculated distribution of particles reasonably approximates the observed gold values.

A very important result of these considerations is that Gaussian statistics (normal distribution) and the previously discussed confidence interval provide an appropriate approximation only if z_i is greater than six. Hence, for use of Gaussian statistics, the subsample weight must be increased by the appropriate factor to yield a z_i greater than six, or the determinations must be grouped in multiples to give the required weight for which z_i is greater than six. In this case, the grouping must be done according to the central-limit theorem.

This information tells us how large our sample must be if we are to reliably estimate the mean value of gold in a particular sample. If we have not analyzed a large enough sample, or if we haven't enough subsamples when grouped together to yield the requisite sample size, we are unable to estimate the standard error of the mean from our data. Restated, the inhomogeneity exists on a scale larger than our total combined subsamples and results in a skewed distribution. A symmetrical distribution can result from application of the central limit theorem only by increasing the number of subsamples or by increasing the sample weight. For the data in the present study, the requisite sample size or groups of samples for the different rock types are shown in table 2. From this table, we see that only the Cleary Standard, vein quartz, schist, and quartz diorite were adequately sampled to permit a reliable estimate of the standard error of the mean gold content.

Using the results of table 2 as a guide, 100 samples of the size dictated by the values reported in table 2 (column 3) were randomly selected and summary statistics were calculated and histograms prepared. The results of these computer-sampling experiments are shown in the tables accompanying figures 1-8. The results for the Cleary Standard (figs. 1-5) are particularly instructive. In this simulation, 100 sets of samples of size 3 (i.e., three analytical results pooled) were randomly selected from the 59 available subsample results. The means of these samples were calculated and the summary statistics for these results were calculated and graphed. Results are shown in figure 1. Note that based on a subset of three samples, the skewness in the original data is still evident. Although we might expect to remove this skewness by taking more samples (e.g., 1000) of size 3, this is not required by the central limit theorem, as emphasized by the results of figure 2. I include these results to stress that if the inhomogeneity exists on a scale greater than the total mass of the subsamples available, it is not possible to generate a symmetrical distribution from the data. In the case of the Cleary Standard, sufficient subsamples existed so that the sample size could be increased. One hundred samples of size 10, 20, and 40 were taken, and the results are shown in figures 3-5. Based on these results, samples of at least size 20 (200 g) are needed to obtain a reasonably symmetrical sampling distribution. These results suggest that the sampling size calculated from the sampling constant will probably be too small.

I suggest estimating the number of samples from sampling-constant considerations and computer-sampling simulations to refine the estimate of the requisite sample size. Using this procedure, I obtained the estimates for the mean gold content and associated standard error (shown in the tables accompanying figs. 6-8), which provide the best estimate of the mean and standard error of the mean gold content for the Cleary Standard, vein quartz, schist, and quartz diorite.

Regression Equations

A comparison of the results obtained by the different analytical methods used in this study shows that the variance due to analytical method is much less than the sampling variance discussed above. In general, the aqua-regia-digestion method and the fire-assay method give comparable results. Both yield higher values than the $HBr-Br_2$ method. Summary statistics, regression

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU	100	0	565.19215	5.65192

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU	2.36332	1.53731	.29007	.57100

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU	27.19974	.15373	5.34682	5.95703

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU	10.48505	2.52640	7.95865	6.50573

	TUKEY'S HINGES		
VARIABLE	MEDIAN	25-th %-ile	75-th %-ile
AU	5.59750	4.68920	6.77818

	TUKEY'S MIDDLEMEANS		
VARIABLE	MIDMEAN	TRIMEAN	MIDSPREAD
AU	5.67604	5.66559	2.08898

MEAN AU-200 VEIN-QTZ. SUBSAMPLES

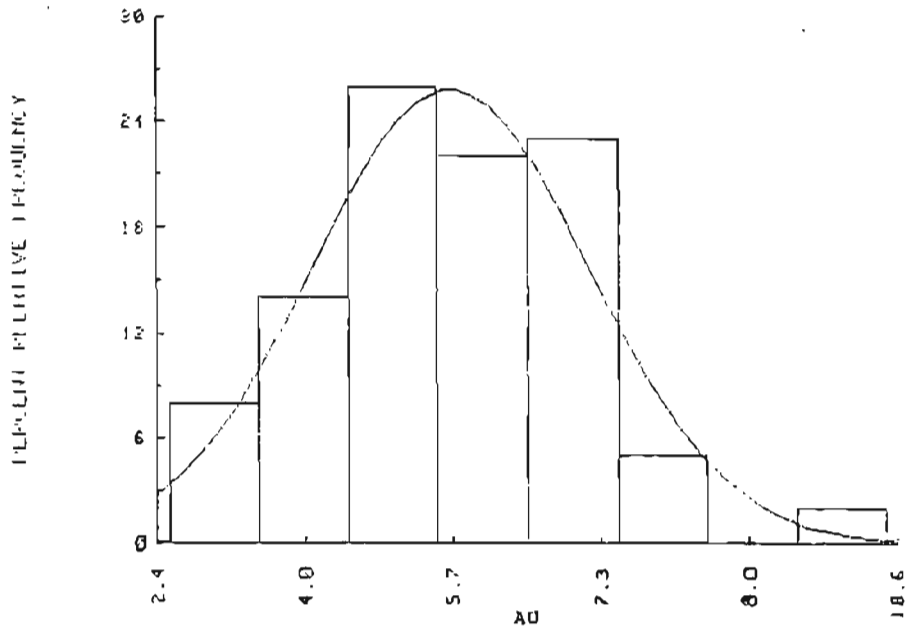

Figure 10. Summary statistics and histogram for set of 100 samples of size 200 from vein-quartz group, Fairbanks mining district, Alaska.

equations, scatter plots, and residual plots for the various methods are shown in appendix II. Regression equations are derived with the fire-assay values as the dependent variable, that is, these equations permit an estimate of the fire-assay value from the aqua-regia or $HBr-Br_2$ value. Also included is a regression of $HBr-Br_2$ on the aqua-regia values, which shows that the $HBr-Br_2$ method tends to return lower values than the aqua-regia method, especially for samples with high gold concentrations. This leads to the nonlinear relation of the results of the two methods.

Principal Components Analysis

A principal-components analysis (Joreskog and others, 1976) of the trace-element data for 81 samples from the Fox-Olnes traverse (Hawkins and Forbes, 1971) was completed using the elements for which the results were above the detection limit in the standard U.S. Geological Survey 30-element emission spectrographic procedure. Mercury was determined by the cold-vapor-detection method using an atomic absorption spectrometer, antimony was determined by atomic absorption spectroscopy and flame excitation, and gold values were determined by aqua-regia digestion. The correlation matrix for the 81 samples and 17 elements is shown in table 3. Six principal components that account for 78 percent of the variance of the data set were derived. The varimax factor matrix for these principal components is shown in table 4, where we see that manganese, cobalt, chromium, copper, nickel, scandium, and vanadium are loaded on the first factor, which implies a similarity of behavior among these elements. These are all transition-metal ions and can occur in octahedral coordination in layer silicates. This group may reflect the mica-chlorite mineralization in the schist. Because factor 2 consists of boron, barium, lead, vanadium, and zirconium, a common behavior is suggested among these elements. These are large or exotic ions and this factor <u>may</u> map the 'misfit' ions. Factor 3 consists only of strontium and yttrium, which suggests a common relation between the two. These are large ions whose distribution may be controlled by the availability of 12-fold coordinator sites found in the micas, chlorites, and amphiboles. Factor 4 consists of a gold-antimony affiliation and <u>may</u> suggest a possible relation between these elements. Factor 5 maps the common variability of mercury and lead and may be a 'sulfide' factor. Factor 6 consists only of molybdenum and suggests that it behaves independently from the other determined elements. The major result of this analysis is that the dimension of the data set can be reduced from 17 to six condensed variables, thus achieving an economy of description.

With the possible exception of the Factor 1 group of elements, I have considerable reservation about these correlations because of the sampling problems (previously discussed) that result in severe violations of the conditions under which a principal-components analysis is valid. I think, however, that these results may be used a guide for the interpretation of the trace-element data collected in the present Fairbanks mining district study. I suggest that sampling constants be calculated and sampling simulations performed on the analytical results of the current study. Subsequently, techniques such as principal-components analysis can be used to investigate relations among the elements determined. In this way, anomalous values can be reliably identified and exploration targets can be defined with confidence.

Table 3. Correlation matrix of 17 trace elements in 81 samples from the Fox-Olnes traverse.

	Hg	Mn	Au	B	Ba	Co	Cr	Cu	Mo	Ni	Pb	Sb	Sc	Sr	V	Y	Zr
Hg	1.0	-0.05	-0.02	-0.21	-0.18	-0.19	-0.12	-0.08	-0.06	-0.14	0.19	0.05	-0.27	-0.16	-0.20	-0.06	-0.27
Mn	-0.05	1.0	0.07	0.15	0.09	0.52	0.56	0.43	0.04	0.49	0.07	0.01	0.50	-0.04	0.41	0.41	0.25
Au	-0.02	0.07	1.0	0.08	0.07	0.18	0.12	0.15	-0.01	0.24	-0.03	0.24	0.01	0.11	0.20	0.24	0.14
B	-0.21	0.15	0.08	1.0	0.61	0.39	0.48	0.40	0.13	0.48	0.32	0.25	0.28	0.08	0.54	0.23	0.66
Ba	-0.18	0.09	0.07	0.61	1.0	0.32	0.43	0.39	0.01	0.53	0.36	0.11	0.28	0.02	0.58	0.22	0.82
Co	-0.19	0.52	0.18	0.39	0.32	1.0	0.82	0.71	0.03	0.75	-0.01	-0.07	0.69	0.25	0.73	0.45	0.60
Cr	-0.12	0.56	0.12	0.48	0.43	0.82	1.0	0.75	0.09	0.83	0.10	0.02	0.71	0.16	0.83	0.41	0.66
Cu	0.08	0.43	0.15	0.40	0.39	0.71	0.75	1.0	-0.06	0.71	0.13	0.14	0.51	-0.02	0.71	0.17	0.51
Mo	-0.06	0.04	-0.00	0.13	0.01	0.03	0.09	-0.06	1.0	0.09	-0.12	0.05	0.07	0.15	0.06	0.17	0.11
Ni	-0.14	0.49	0.24	0.48	0.53	0.75	0.83	0.71	0.09	1.0	0.14	0.05	0.59	0.21	0.91	0.40	0.75
Pb	0.19	0.07	-0.03	0.32	0.36	-0.01	0.10	0.13	-0.12	0.14	1.0	0.13	-0.02	-0.13	0.18	0.03	0.27
Sb	0.05	0.01	0.24	0.25	0.11	-0.07	0.02	0.14	0.05	0.05	0.13	1.0	-0.07	-0.10	0.04	-0.12	0.06
Sc	-0.27	0.50	0.01	0.28	0.28	0.69	0.71	0.51	0.07	0.59	-0.02	-0.07	1.0	0.09	0.62	0.35	0.53
Sr	-0.16	-0.04	0.11	0.08	0.02	0.25	0.16	-0.02	0.15	0.21	-0.13	-0.10	0.09	1.0	0.20	0.39	0.16
V	-0.20	0.41	0.20	0.54	0.58	0.73	0.83	0.71	0.06	0.91	0.18	0.04	0.62	0.20	1.0	0.36	0.85
Y	-0.06	0.41	0.24	0.23	0.22	0.45	0.41	0.17	0.17	0.40	0.03	-0.12	0.35	0.39	0.36	1.0	0.36
Zr	-0.27	0.25	0.14	0.66	0.82	0.60	0.66	0.51	0.11	0.75	0.27	0.06	0.53	0.16	0.85	0.36	1.0

Table 4. Simplified varimax factors that account for 78 percent of total variance.

Element	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Hg	-	-	-	-	0.83	-
Mn	-0.76	-	-	-	-	-
Au	-	-	-	-0.80	-	-
B	-	0.76	-	-	-	-
Ba	-	0.87	-	-	-	-
Co	-0.85	-	-	-	-	-
Cr	-0.87	-	-	-	-	-
Cu	-0.78	-	-	-	-	-
Mo	-	-	-	-	-	0.92
Ni	-0.77	0.43	-	-	-	-
Pb	-	0.58	-	-	0.59	-
Sb	-	-	-	-0.74	-	-
Sc	-0.79	-	-	-	-	-
Sr	-	-	0.80	-	-	-
V	-0.73	0.53	-	-	-	-
Y	-	-	0.71	-	-	-
Zr	-0.45	0.78	-	-	-	-

ACKNOWLEDGMENTS

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APPENDIX I

Summary statistics and histograms for gold in the different sample classifications

Summary statistics for a given classification are given first, followed by histograms for that classification. Histogram titles are abbreviated to coincide with a 10-character constraint imposed by the computer program.

Subfile: VEIN QTZ

BASIC STATISTICS

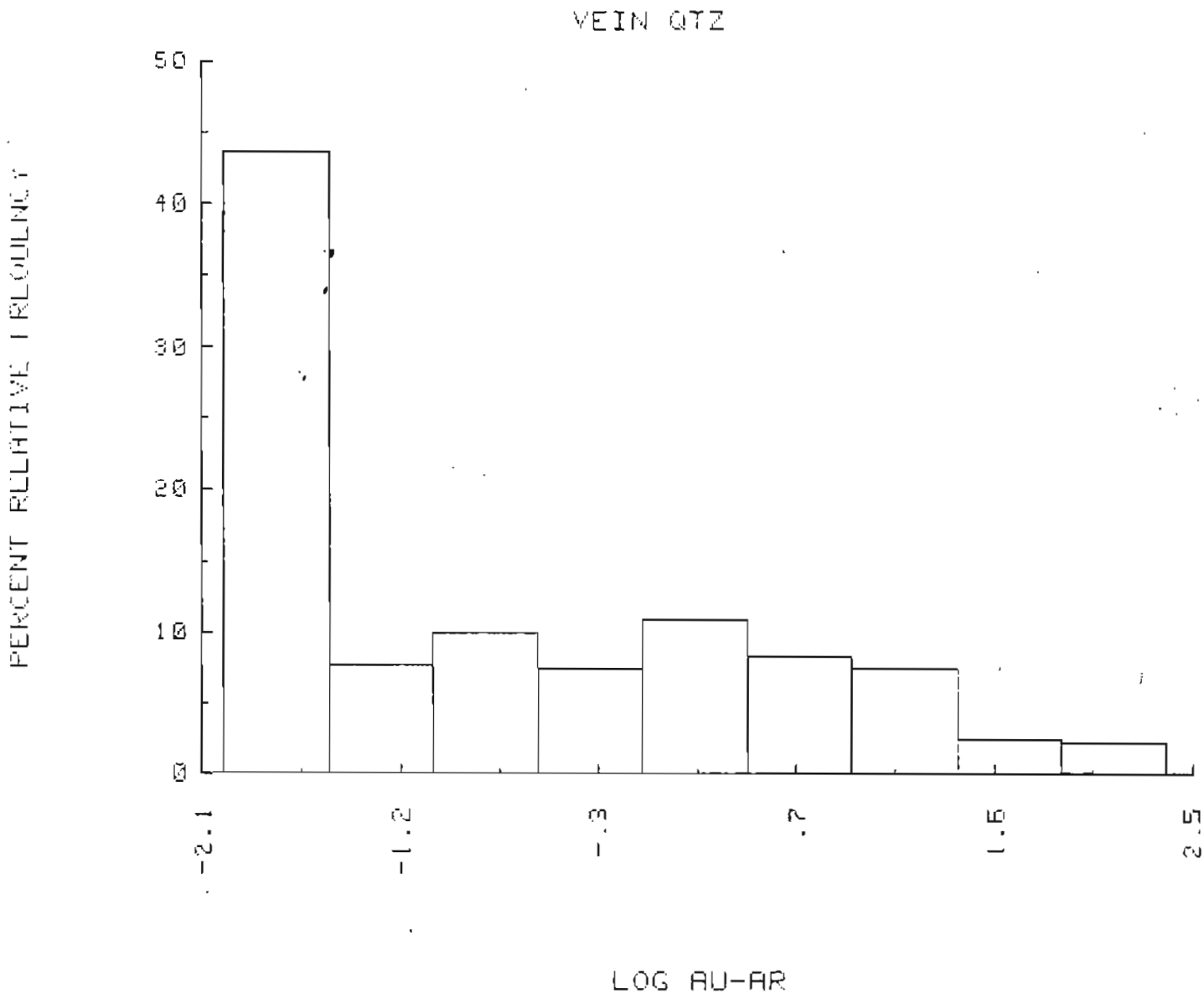
VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	323	42	1918.39000	5.93926
AU-HBR	69	296	426.70000	6.18406
AU-FA	4	361	3.07000	.76750
LOG AU-AR	323	42	-223.60842	-.69229
LOG AU-HBR	69	296	-28.64631	-.41517
LOG AU-FA	4	361	-1.53272	-.38318

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	586.79464	24.22384	6.50190	45.88521
AU-HBR	1193.42085	34.54592	7.95552	62.15430
AU-FA	.43329	.65825	.13352	-1.37762
LOG AU-AR	1.26832	1.12620	.76031	-.65310
LOG AU-HBR	.98362	.99177	.38267	-.54326
LOG AU-FA	.50392	.70987	-.85768	-.91328

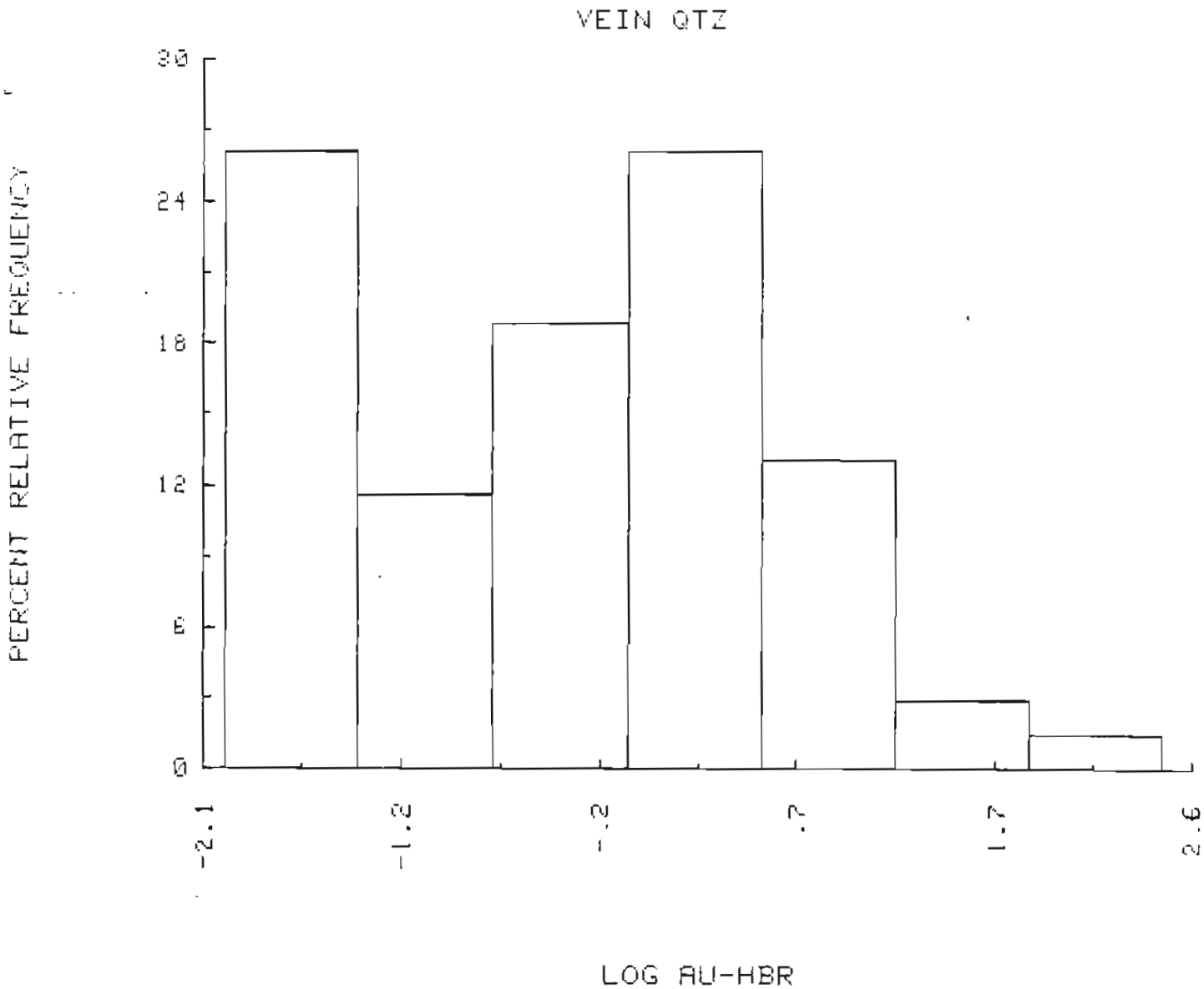
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	407.85985	1.34785	3.28696	8.59155
AU-HBR	558.62872	4.15884	-2.11606	14.48477
AU-FA	85.76533	.32912	-.27909	1.81409
LOG AU-AR	162.67791	.06266	-.81539	-.56898
LOG AU-HBR	238.88311	.11940	-.65348	-.17687
LOG AU-FA	185.25795	.35494	-1.51185	.74549

ORDER STATISTICS

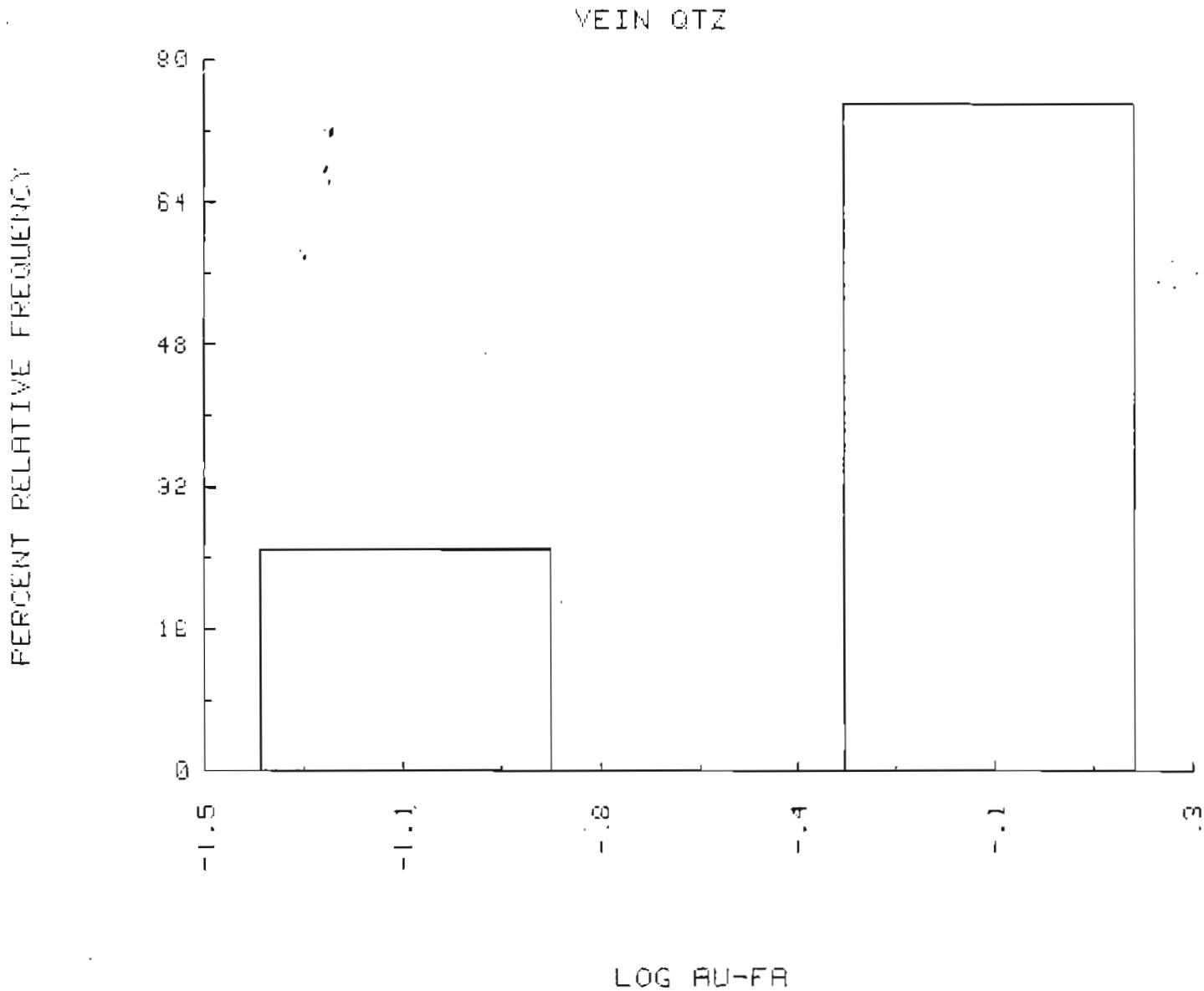
VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	238.00000	.01000	237.99000	119.00500
AU-HBR	287.00000	.01000	286.99000	143.50500
AU-FA	1.56000	.04000	1.52000	.80000
LOG AU-AR	2.37658	-2.00000	4.37658	.18829
LOG AU-HBR	2.45788	-2.00000	4.45788	.22894
LOG AU-FA	.19312	-1.39794	1.59106	-.60241


VEIN QTZ
PERCENT RELATIVE FREQUENCY
50
40
30
20
10
0
-2.1
-1.2
-.3
.2
1.6
2.5
LOG AU-AR

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-2.000	-1.363	18
2	-1.363	-.726	8
3	-.726	-.089	13
4	-.089	.547	18
5	.547	1.184	9
6	1.184	1.821	2
7	1.821	2.458	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.398	-.868	1
2	-.868	-.337	0
3	-.337	.193	3



Subfile: SEG.DTZ

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	131	3	69.39000	.51969
AU-HBR	9	133	9.81000	1.09000
AU-FA	0	133	0.00000	0.00000
LOG AU-AR	131	3	-186.35908	-1.42259
LOG AU-HBR	9	133	-8.43923	-.93769
LOG AU-FA	0	133	0.00000	0.00000

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	11.26944	3.35703	7.86803	61.56568
AU-HBR	6.01345	2.45213	2.19612	3.19886
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.33207	.57625	2.98466	9.68987
LOG AU-HBR	.86891	.93215	1.02652	-.36613
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	633.76105	.29333	-.05070	1.11009
AU-HBR	224.97557	.81741	-.79546	2.97546
AU-FA	----------	.81741	-1.88546	1.88546
LOG AU-AR	40.50745	.05035	-1.52222	-1.32296
LOG AU-HBR	99.40944	.31071	-1.65440	-.22098
LOG AU-FA	----------	.31072	-.71671	.71671

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	30.00000	.02000	29.98000	15.01000
AU-HBR	7.40000	.01000	7.38000	3.71000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	1.47712	-1.69897	3.17609	-.11092
LOG AU-HBR	.86923	-1.69897	2.56820	-.41487
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.302	99
2	-1.302	-.905	12
3	-.905	-.508	11
4	-.508	-.111	2
5	-.111	.286	3
6	.286	.683	2
7	.683	1.080	0
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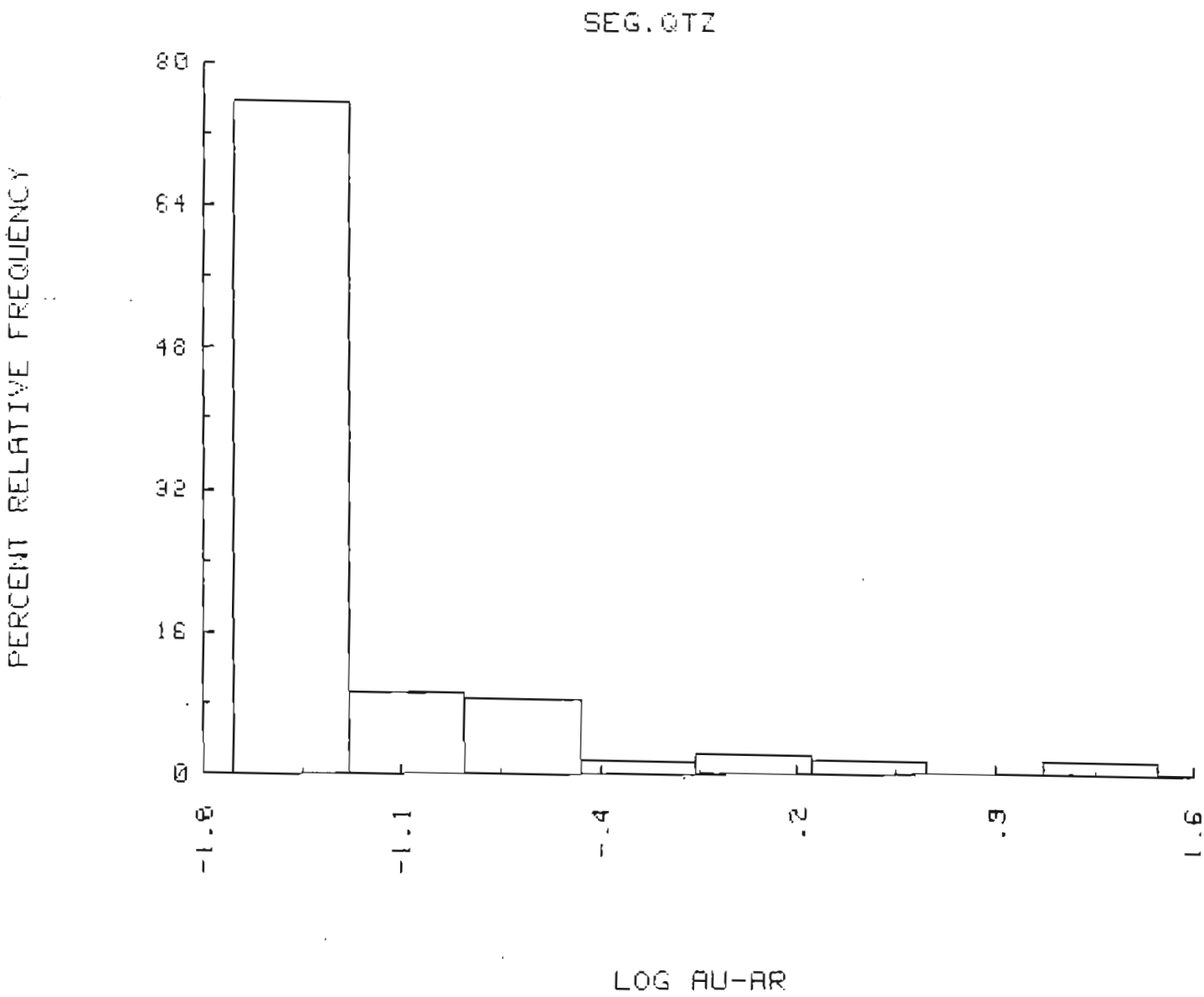
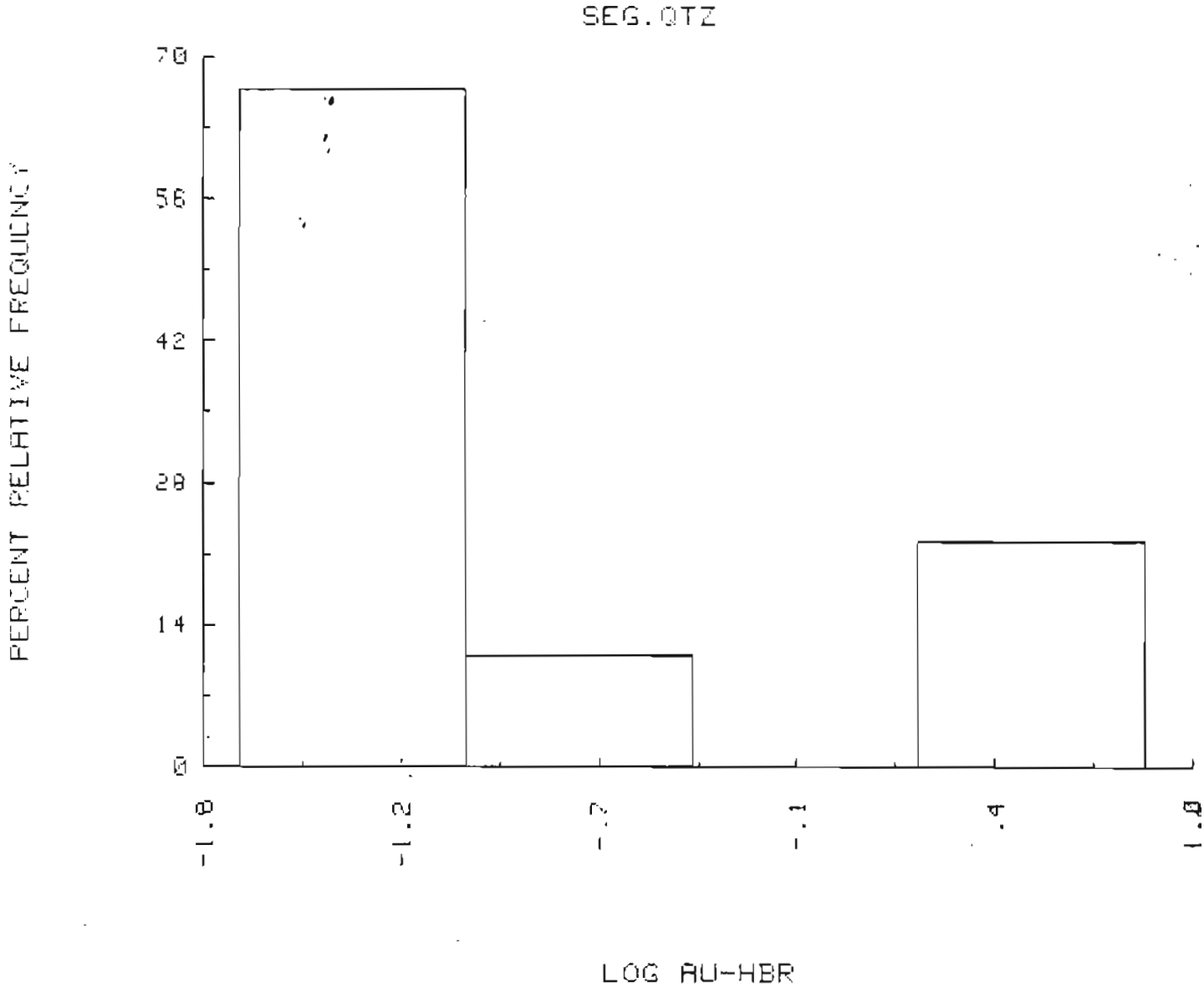


CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.057	6
2	-1.057	-.415	1
3	-.415	.227	0
4	.227	.869	2



Subfile: OTZ-MC SCH

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	710	109	404.68000	.56997
AU-HBR	92	727	19.05000	.20707
AU-FA	45	774	26.84700	.59660
LOG AU-AR	710	109	-988.71316	-1.39255
LOG AU-HBR	91	728	-119.16861	-1.30955
LOG AU-FA	45	774	-23.78102	-.52847

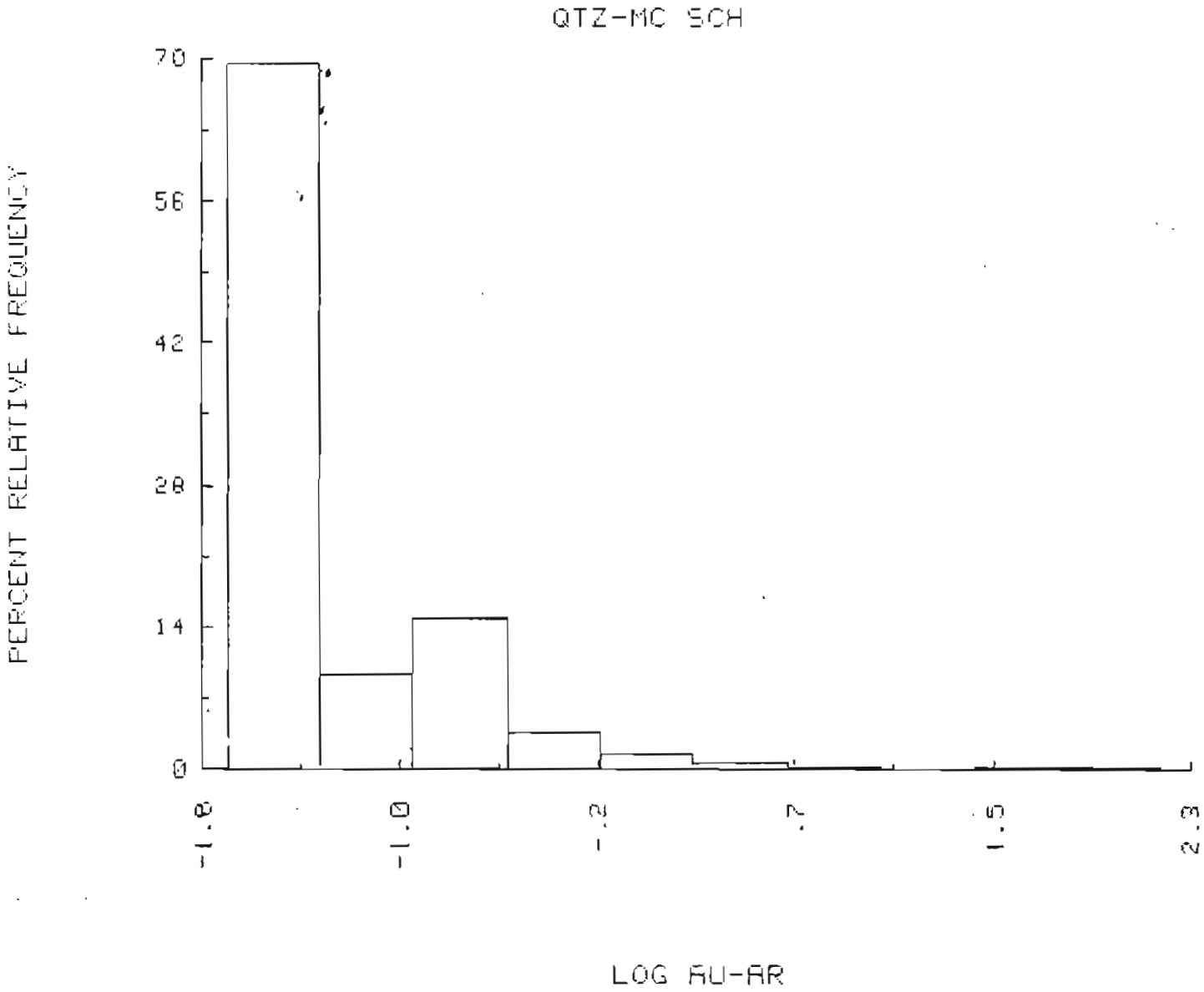
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	64.71214	8.04439	18.17806	333.66742
AU-HBR	.74957	.86577	8.14151	70.04149
AU-FA	.86300	.92898	2.81083	7.42375
LOG AU-AR	.25872	.50865	2.39973	8.80043
LOG AU-HBR	.29208	.54045	1.77007	3.10304
LOG AU-FA	.24300	.49295	.39810	.11555

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	1411.36547	.30190	-.02288	1.16283
AU-HBR	418.11697	.09026	.02773	.38640
AU-FA	155.71216	.13848	.31744	.87576
LOG AU-AR	36.52643	.01909	-1.43004	-1.35507
LOG AU-HBR	41.26979	.05665	-1.42212	-1.19697
LOG AU-FA	93.27866	.07348	-.67660	-.38034

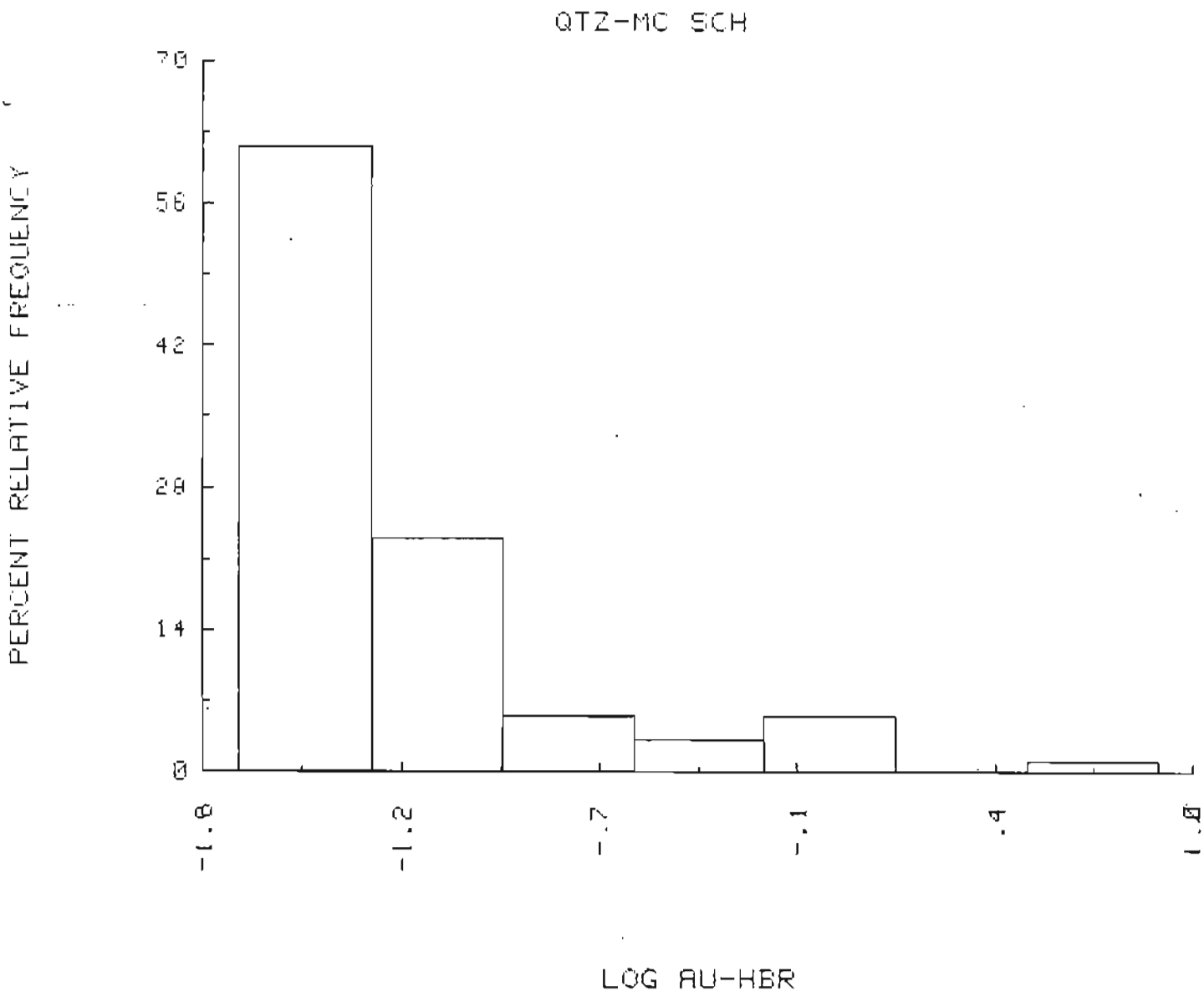
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	150.00000	.02000	149.98000	75.01000
AU-HBR	8.00000	0.00000	8.00000	4.00000
AU-FA	4.43000	.04000	4.39000	2.23500
LOG AU-AR	2.17509	-1.69897	3.87506	.23856
LOG AU-HBR	.90309	-1.69897	2.60206	-.39794
LOG AU-FA	.64540	-1.39794	2.04434	-.37577

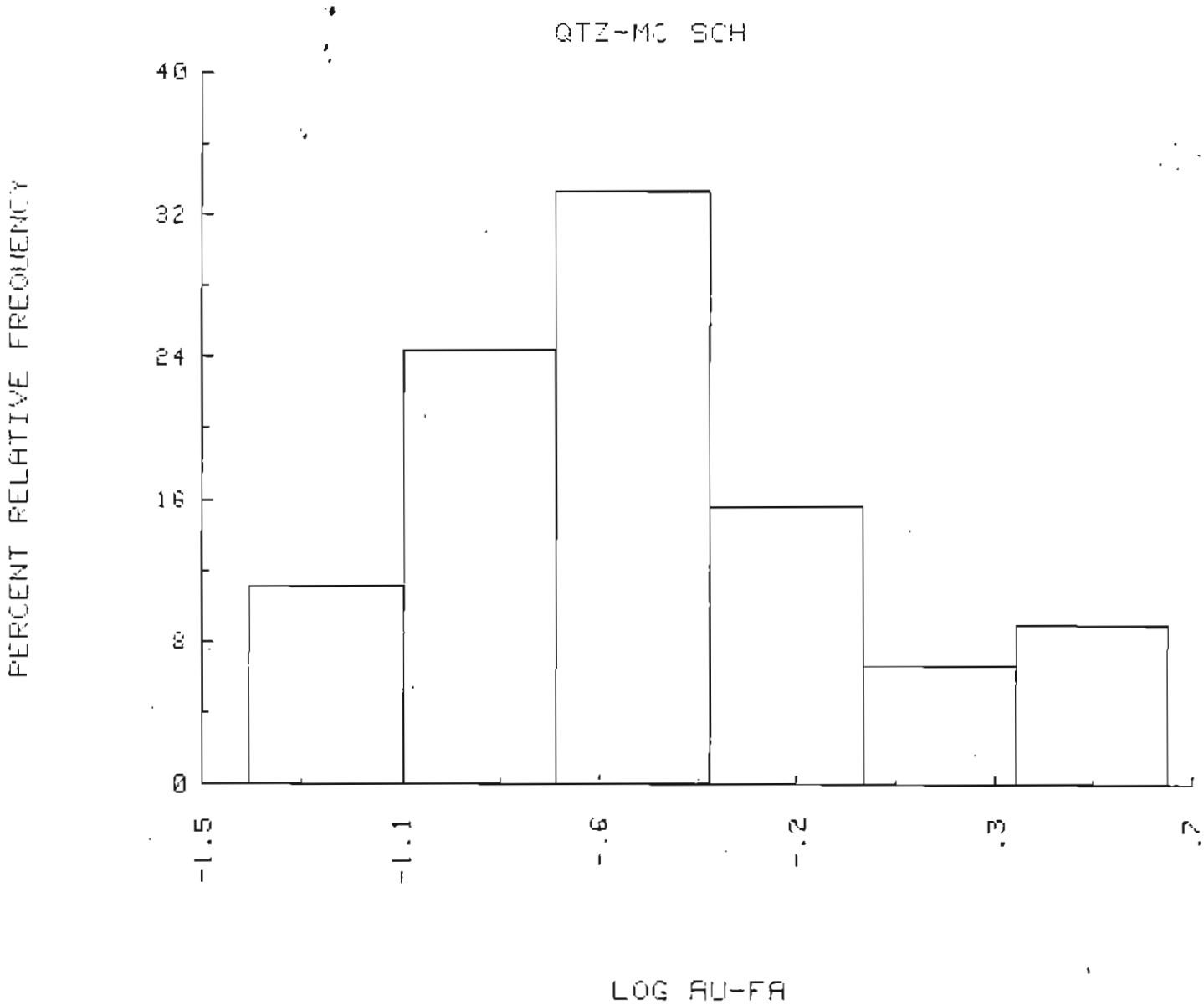
CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.311	494
2	-1.311	-.924	66
3	-.924	-.536	105
4	-.536	-.149	26
5	-.149	.239	10
6	.239	.626	5
7	.626	1.014	1
8	1.014	1.401	0
9	1.401	1.789	1
10	1.789	2.176	2



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.327	56
2	-1.327	-.956	21
3	-.956	-.584	5
4	-.584	-.212	3
5	-.212	.160	5
6	.160	.531	0
7	.531	.903	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.398	-1.057	5
2	-1.057	-.716	11
3	-.716	-.376	15
4	-.376	-.035	7
5	-.035	.306	3
6	.306	.646	4



Subfile: MICA-QTZTE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	81	11	236.85000	2.92457
AU-HBR	4	88	1.70000	.42500
AU-FA	4	88	1.49000	.37250
LOG AU-AR	81	11	-110.02268	-1.35830
LOG AU-HBR	4	88	-4.41567	-1.10392
LOG AU-FA	4	88	-2.38179	-.59545

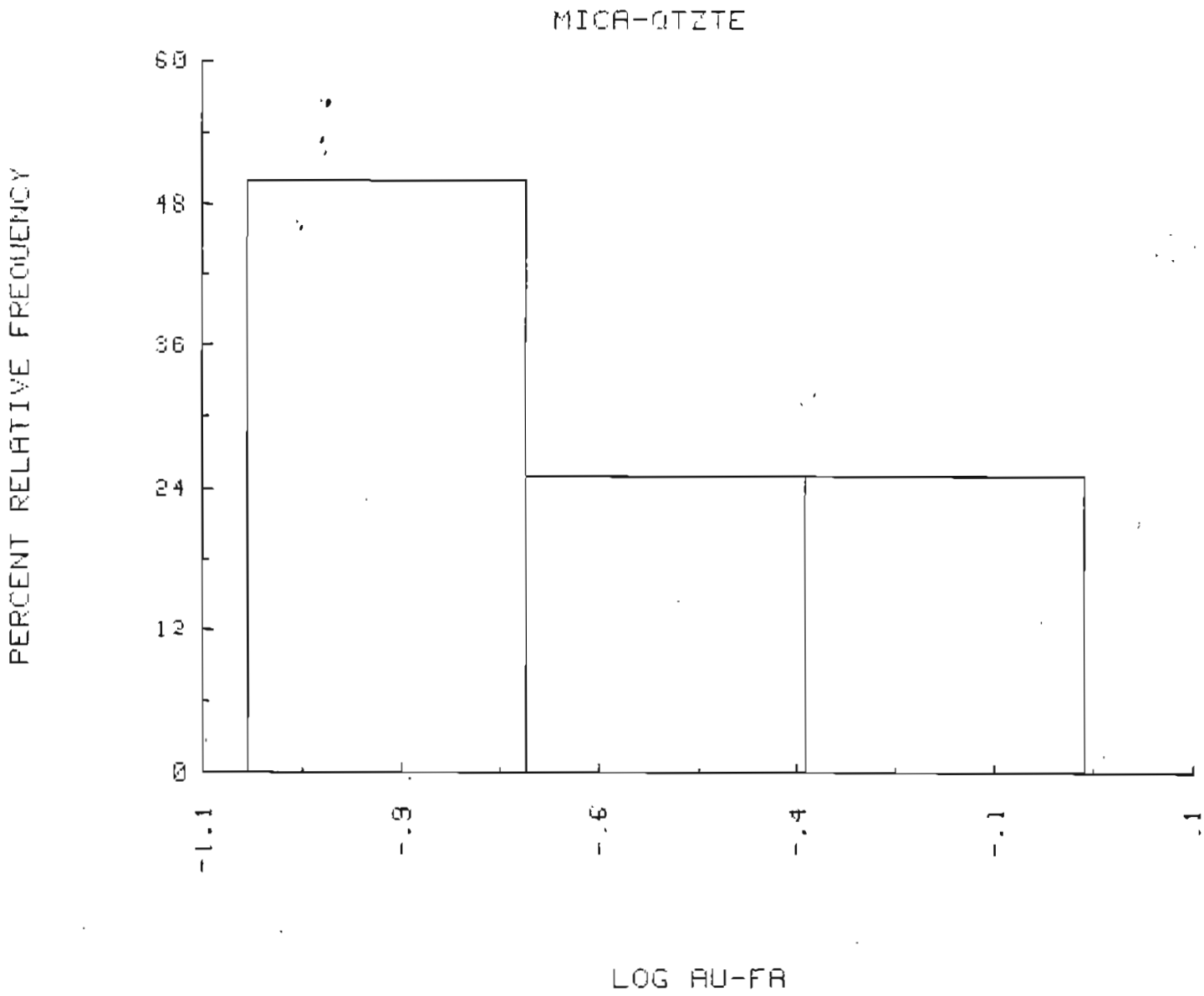
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	652.62857	25.54660	8.83182	76.00496
AU-HBR	.61397	.78356	1.15271	-.66824
AU-FA	.14656	.38283	.96652	-.82688
LOG AU-AR	.37119	.60925	3.32717	15.68448
LOG AU-HBR	.81101	.90056	.95647	-.85237
LOG AU-FA	.18950	.43532	.37620	-1.21874

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	873.51694	2.83851	-2.72552	8.57466
AU-HBR	184.36712	.39178	-.82083	1.67083
AU-FA	102.77299	.19141	-.23618	.98118
LOG AU-AR	44.85367	.06769	-1.49305	-1.22356
LOG AU-HBR	81.57892	.45028	-2.53578	.32794
LOG AU-FA	73.10764	.21766	-1.28759	.09669

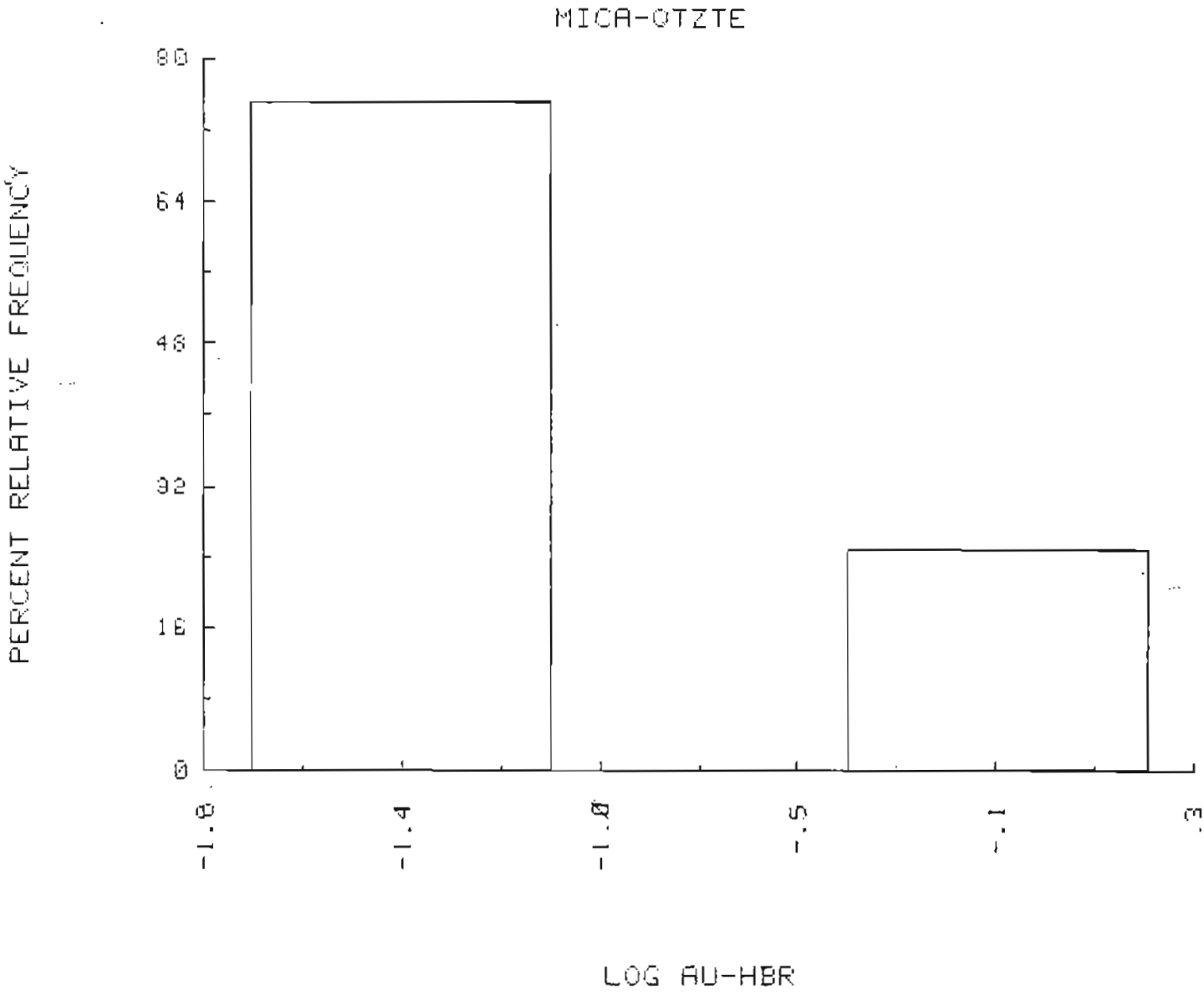
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	230.00000	.02000	229.98000	115.01000
AU-HBR	1.60000	.02000	1.58000	.81000
AU-FA	.93000	.09000	.84000	.51000
LOG AU-AR	2.36173	-1.69897	4.06070	.33138
LOG AU-HBR	.20412	-1.69897	1.90309	-.74743
LOG AU-FA	-.03152	-1.04576	1.01424	-.53864

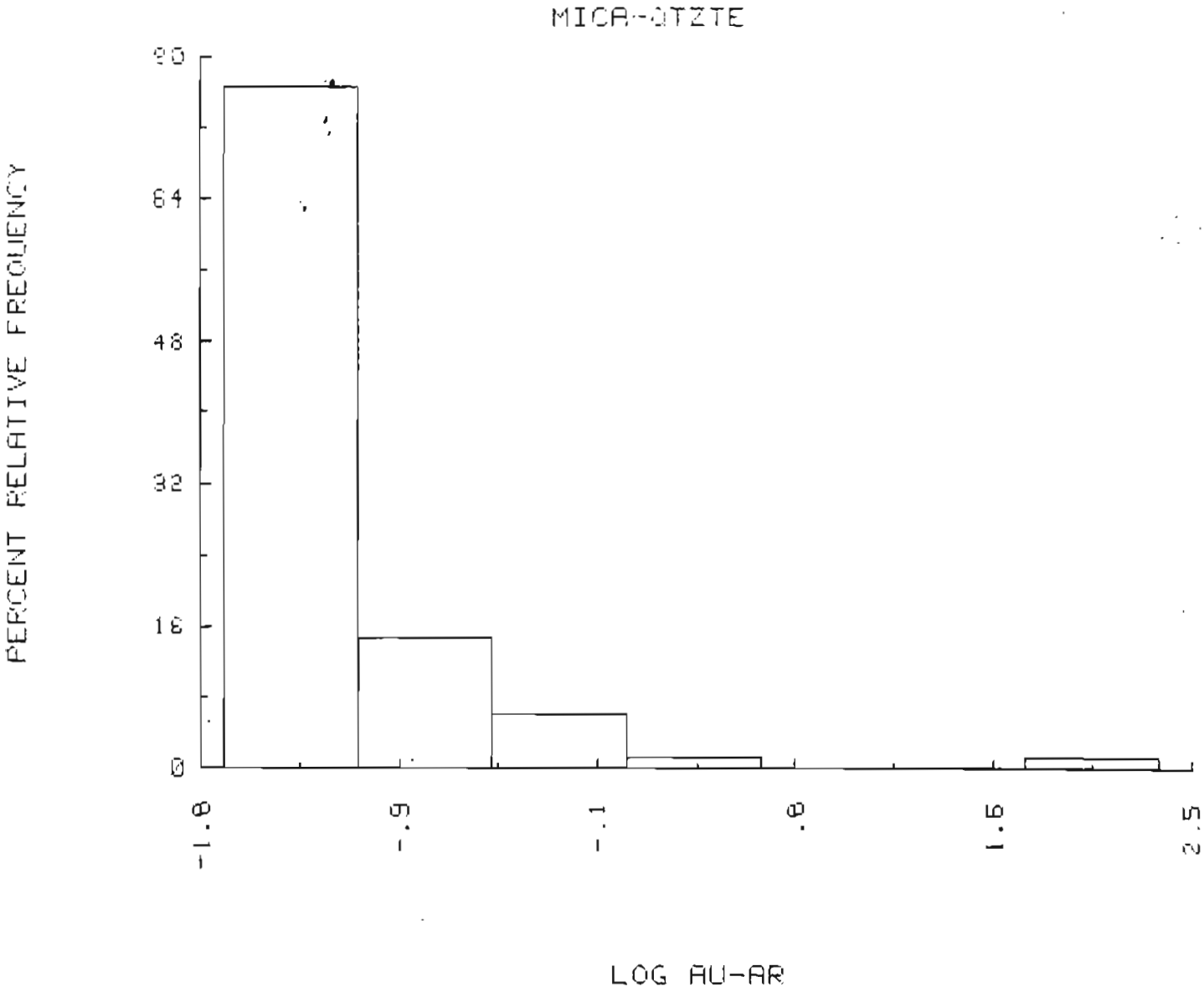
CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.046	-.708	2
2	-.708	-.370	1
3	-.370	-.032	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.065	3
2	-1.065	-.430	0
3	-.430	.204	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.119	62
2	-1.119	-.539	12
3	-.539	.041	5
4	.041	.621	1
5	.621	1.202	0
6	1.202	1.782	0
7	1.782	2.362	1



Subfile: SHEAR

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	7	4	1.02000	.14571
AU-HBR	4	7	1.52000	.38000
AU-FA	2	9	.78000	.39000
LOG AU-AR	7	4	-8.83624	-1.26232
LOG AU-HBR	4	7	-3.09691	-.77423
LOG AU-FA	2	9	-1.00349	-.50174

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.07203	.26838	1.98175	2.03305
AU-HBR	.19760	.44452	.74374	-1.05691
AU-FA	.10580	.32527	0.00000	-2.00000
LOG AU-AR	.33789	.58128	1.12209	.05132
LOG AU-HBR	.54905	.74098	-.26957	-1.35871
LOG AU-FA	.17303	.41597	-.00000	-2.00000

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	184.18331	.10144	-.10256	.39399
AU-HBR	116.97953	.22226	-.32677	1.08677
AU-FA	83.40234	.23000	-2.21132	2.99132
LOG AU-AR	46.04850	.21970	-1.80005	-.72459
LOG AU-HBR	95.70538	.37049	-1.95235	.40390
LOG AU-FA	82.90498	.29414	-3.82844	2.82496

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	.75000	.02000	.73000	.38500
AU-HBR	1.00000	.02000	.98000	.51000
AU-FA	.62000	.16000	.46000	.39000
LOG AU-AR	-.12494	-1.69897	1.57403	-.91195
LOG AU-HBR	0.00000	-1.69897	1.69897	-.84949
LOG AU-FA	-.20761	-.79588	.58827	-.50174

Subfile: SHEAR

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	7	4	1.02000	.14571
AU-HBR	4	7	1.52000	.38000
AU-FA	2	9	.78000	.39000
LOG AU-AR	7	4	-8.83624	-1.26232
LOG AU-HBR	4	7	-3.09691	-.77423
LOG AU-FA	2	9	-1.00349	-.50174

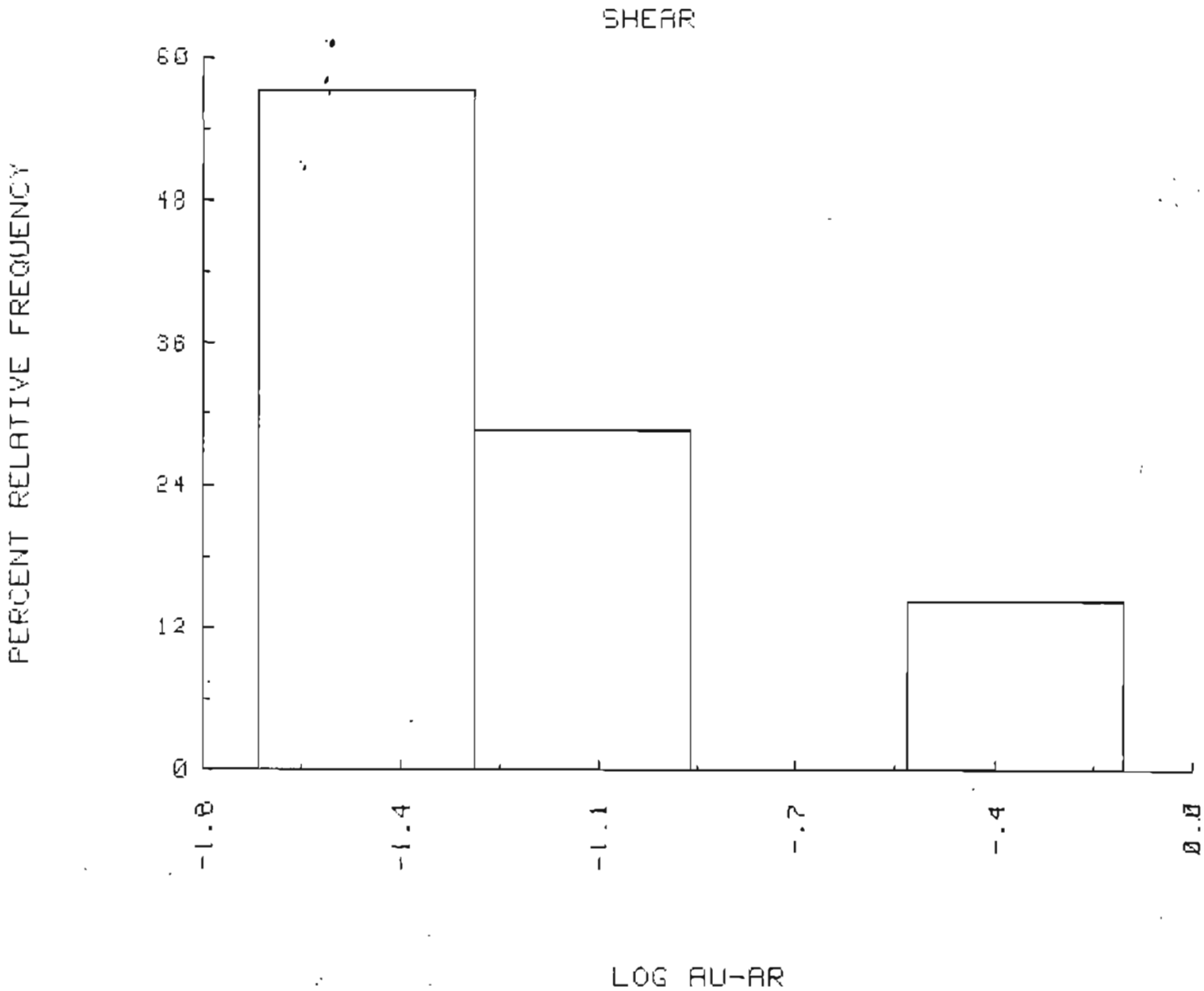
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.07203	.26838	1.98175	2.03305
AU-HBR	.19760	.44452	.74374	-1.05691
AU-FA	.10580	.32527	0.00000	-2.00000
LOG AU-AR	.33789	.58128	1.12209	.05132
LOG AU-HBR	.54905	.74098	-.26957	-1.35871
LOG AU-FA	.17303	.41597	-.00000	-2.00000

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	184.18331	.10144	-.10256	.39399
AU-HBR	116.97953	.22226	-.32677	1.08677
AU-FA	83.40234	.23000	-2.21132	2.99132
LOG AU-AR	46.04850	.21970	-1.80005	-.72459
LOG AU-HBR	95.70538	.37049	-1.95235	.40390
LOG AU-FA	82.90498	.29414	-3.82844	2.82496

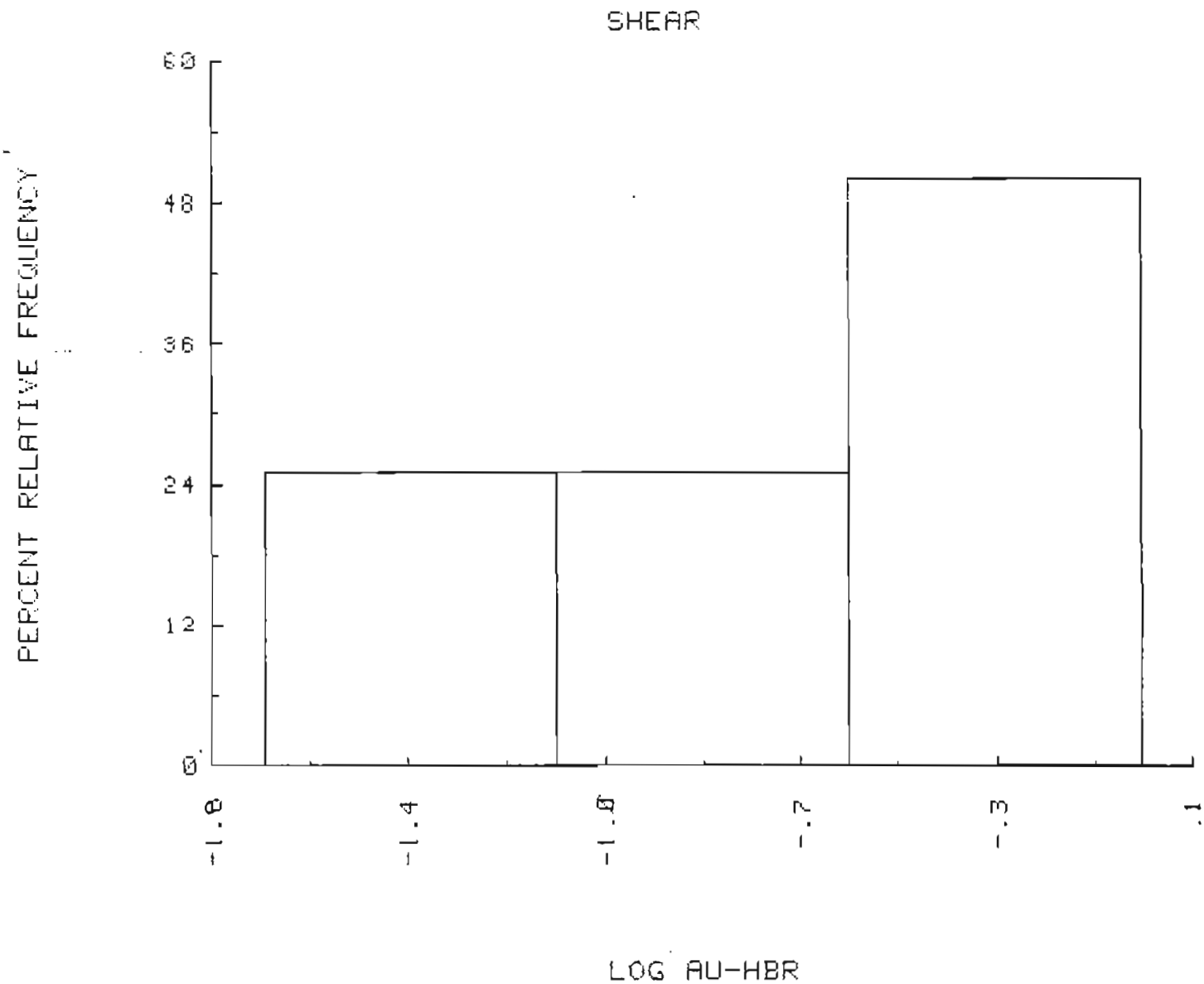
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	.75000	.02000	.73000	.38500
AU-HBR	1.00000	.02000	.98000	.51000
AU-FA	.62000	.16000	.46000	.39000
LOG AU-AR	-.12494	-1.69897	1.57403	-.91195
LOG AU-HBR	0.00000	-1.69897	1.69897	-.84949
LOG AU-FA	-.20761	-.79588	.58827	-.50174

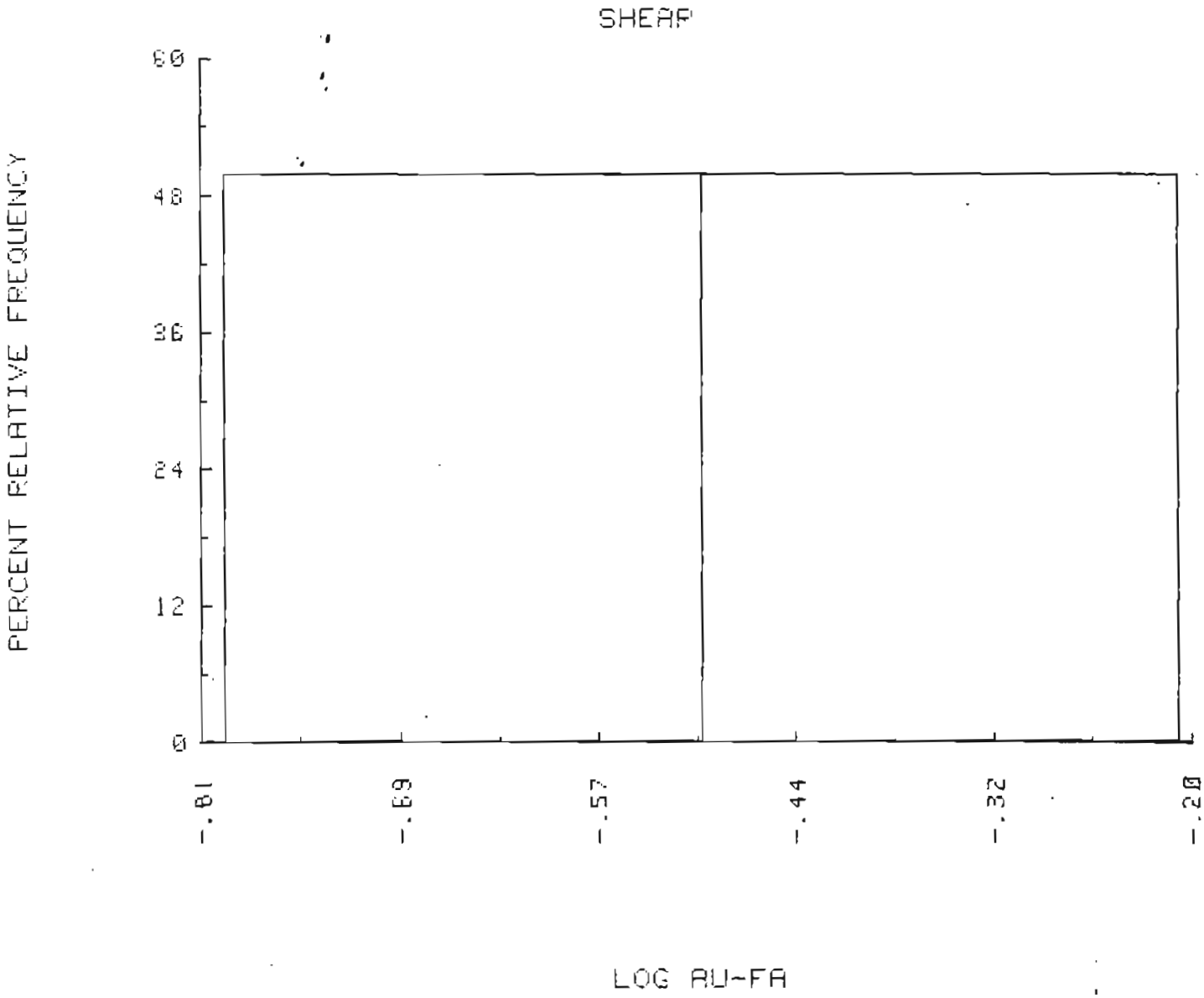
CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.305	4
2	-1.305	-.912	2
3	-.912	-.518	0
4	-.518	-.125	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.133	1
2	-1.133	-.566	1
3	-.566	0.000	2



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-.796	-.502	1
2	-.502	-.208	1



Subfile: GOUGE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	60	15	198.10000	3.30167
AU-HBR	21	54	21.09000	1.00429
AU-FA	2	73	.97000	.48500
LOG AU-AR	60	15	-44.71595	-.74527
LOG AU-HBR	21	54	-11.90901	-.56710
LOG AU-FA	2	73	-.66354	-.33177

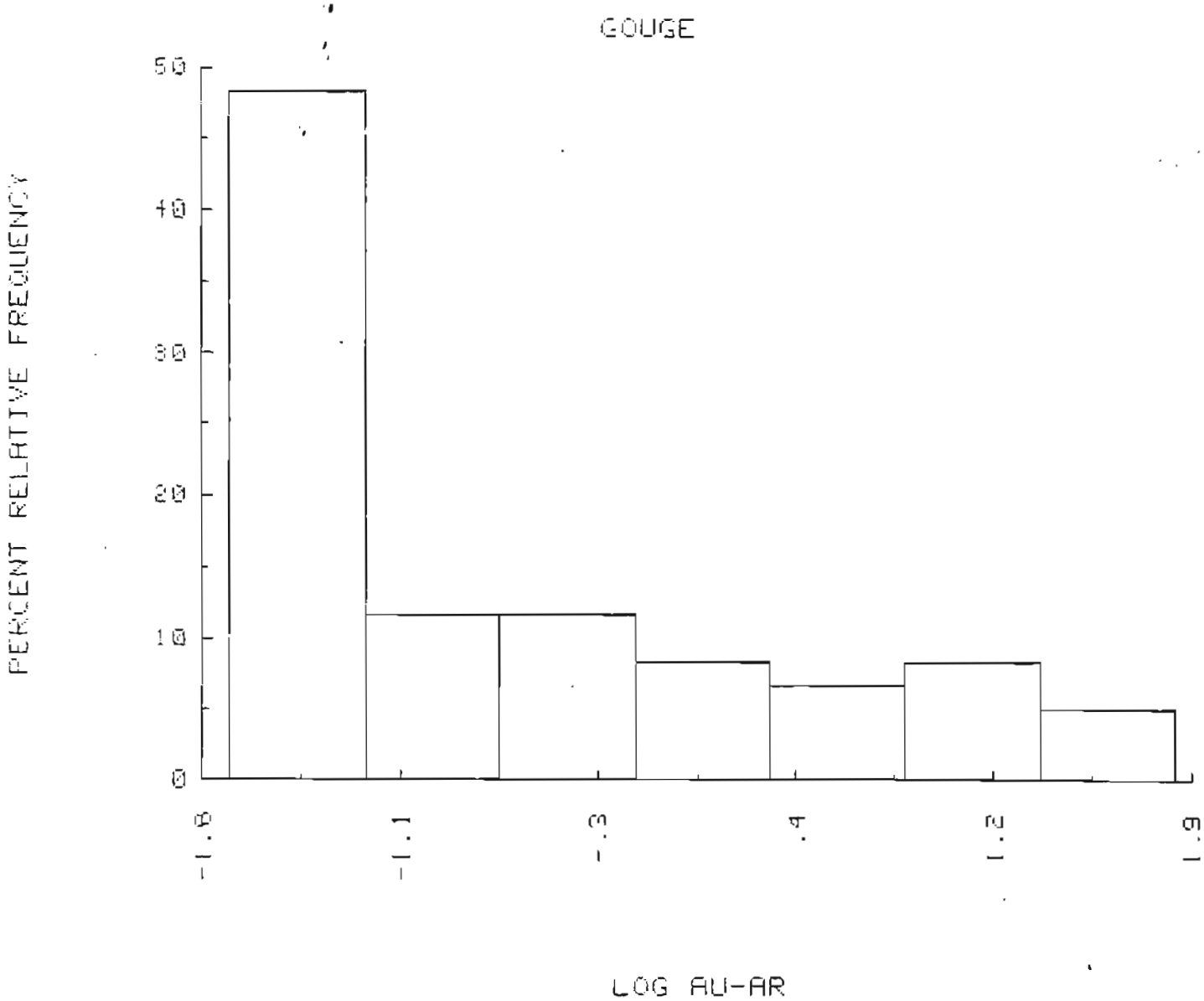
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	104.15196	10.20549	4.92258	27.31618
AU-HBR	3.87347	1.96811	2.44705	4.51977
AU-FA	.03645	.19092	0.00000	-2.00000
LOG AU-AR	1.08259	1.04048	.82910	-.51477
LOG AU-HBR	.48801	.69858	.47572	-.28936
LOG AU-FA	.03083	.17559	.00000	-2.00000

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	309.10107	1.31752	.66471	5.93862
AU-HBR	195.97134	.42948	.10319	1.90038
AU-FA	39.36471	.13500	-1.04166	2.01186
LOG AU-AR	139.61167	.13433	-1.01411	-.47642
LOG AU-HBR	123.18532	.15244	-.88516	-.24903
LOG AU-FA	52.92560	.12416	-1.73605	1.07251

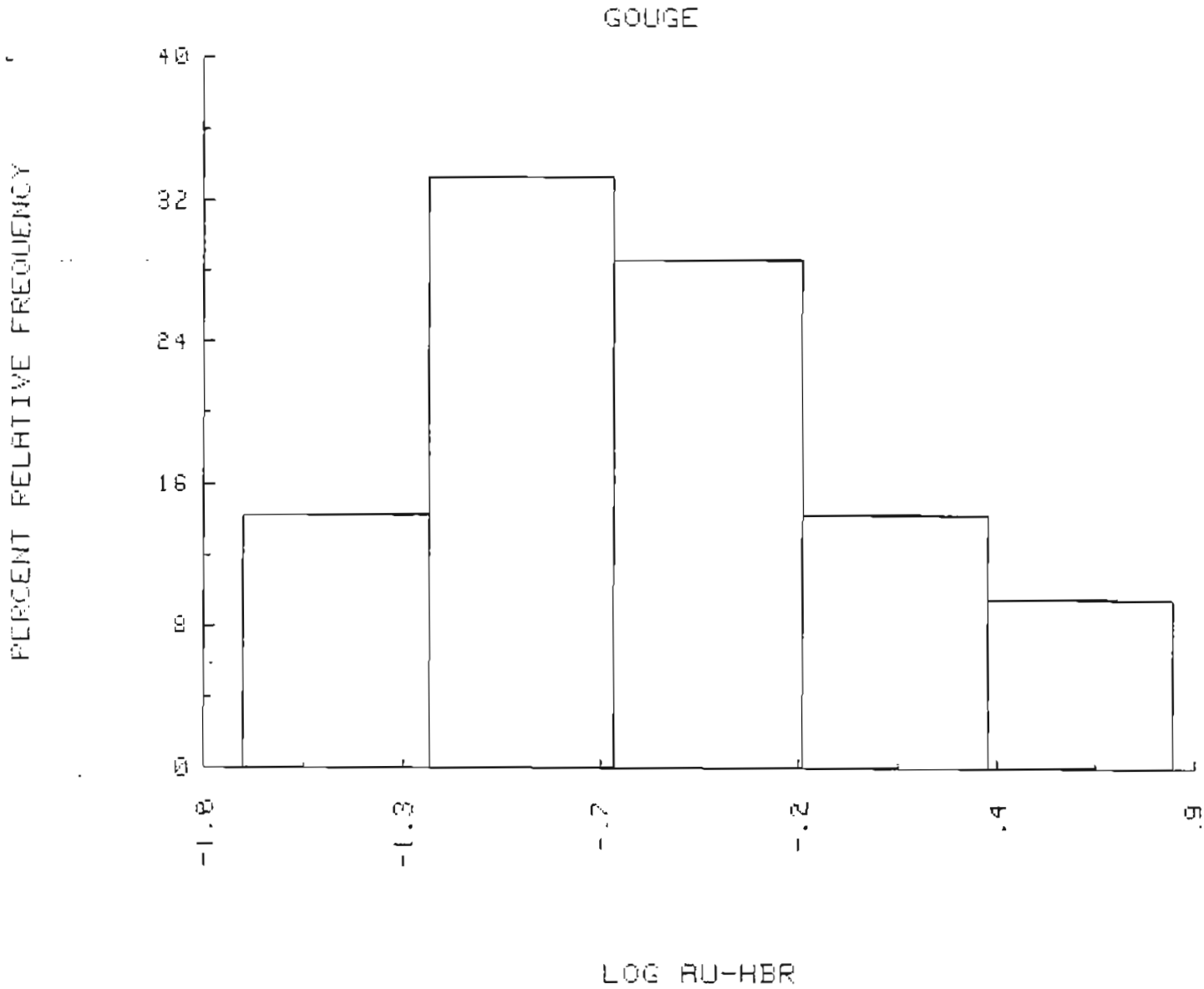
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	69.00000	.02000	68.98000	34.51000
AU-HBR	7.00000	.02000	6.98000	3.51000
AU-FA	.62000	.35000	.27000	.48500
LOG AU-AR	1.83885	-1.69897	3.53782	.06994
LOG AU-HBR	.84510	-1.69897	2.54407	-.42694
LOG AU-FA	-.20761	-.45593	.24832	-.33177

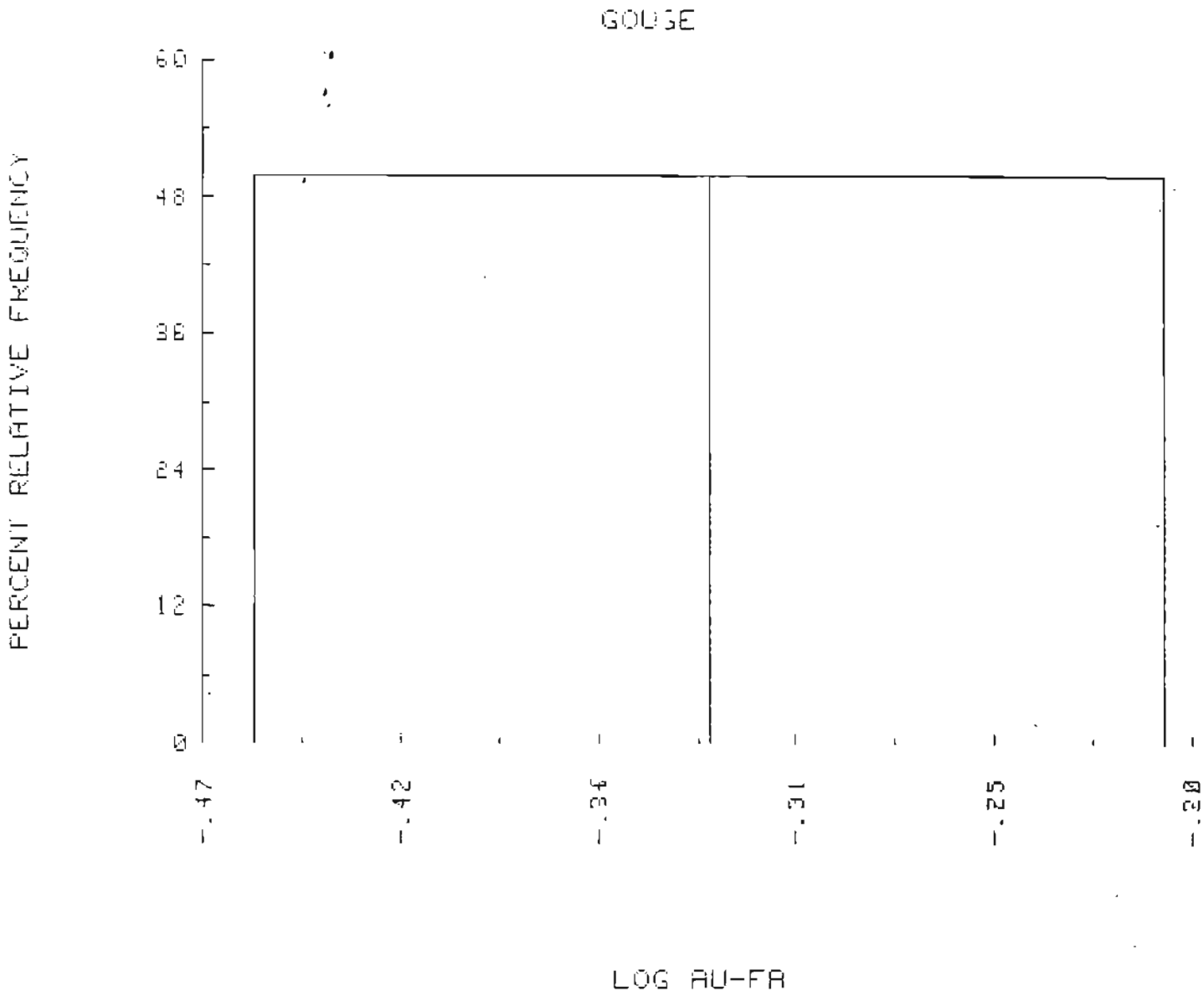
CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.194	29
2	-1.194	-.688	7
3	-.688	-.183	7
4	-.183	.323	5
5	.323	.828	4
6	.828	1.333	5
7	1.333	1.839	3



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.190	3
2	-1.190	-.681	7
3	-.681	-.173	6
4	-.173	.336	3
5	.336	.845	2



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-.456	-.332	1
2	-.332	-.208	1



Subfile: QUARTZITE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	60	11	85.60000	1.42667
AU-HBR	12	59	19.36000	1.61333
AU-FA	0	71	0.00000	0.00000
LOG AU-AR	60	11	-77.78698	-1.29612
LOG AU-HBR	12	59	-8.06511	-.67209
LOG AU-FA	0	71	0.00000	0.00000

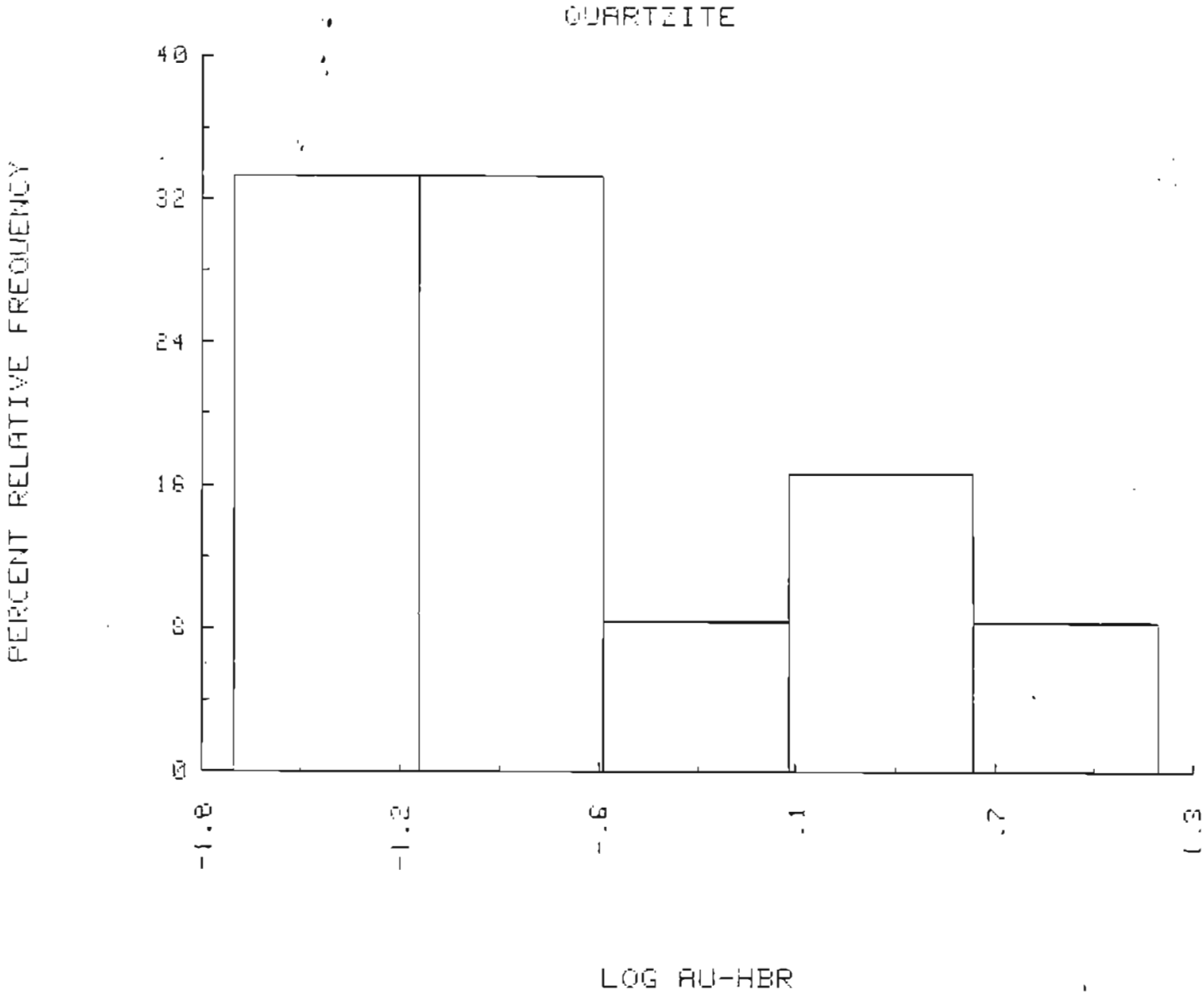
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	93.95356	9.68780	7.48530	54.33705
AU-HBR	19.38244	4.40255	1.94598	6.82989
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.42727	.65366	1.71164	8.87114
LOG AU-HBR	.66461	.81523	.98219	.27421
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	679.05174	1.25069	-1.07653	3.92986
AU-HBR	272.88530	1.27091	-1.18464	4.41131
AU-FA	----------	1.27091	-1.79797	2.79797
LOG AU-AR	50.43201	.08439	-1.46501	-1.12722
LOG AU-HBR	121.29775	.23534	-1.19020	-.15398
LOG AU-FA	----------	.23534	-.51811	.51811

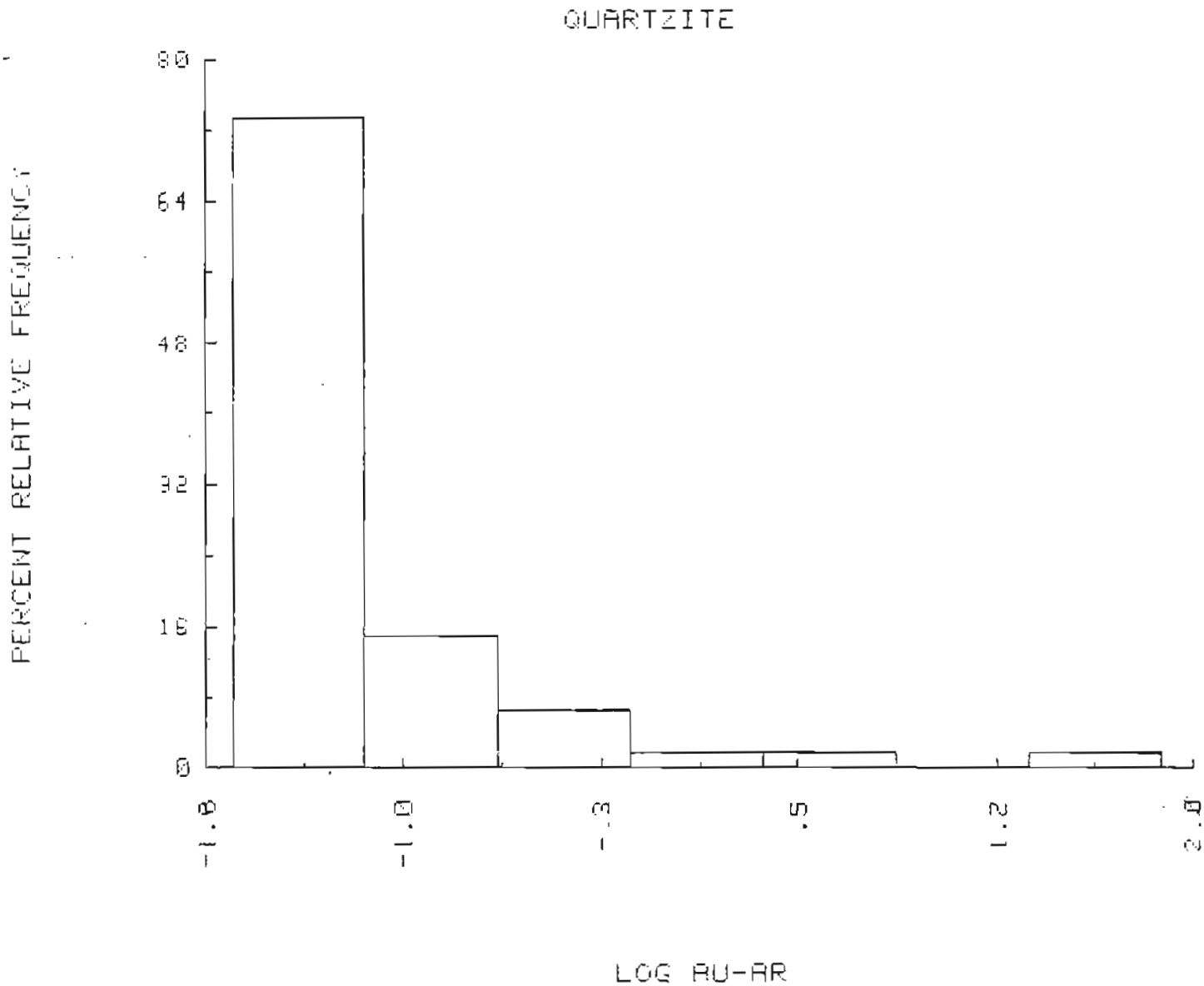
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	75.00000	.02000	74.98000	37.51000
AU-HBR	15.50000	.02000	15.48000	7.76000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	1.87506	-1.69897	3.57403	.08805
LOG AU-HBR	1.19033	-1.69897	2.88930	-.25432
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.121	4
2	-1.121	-.543	4
3	-.543	.035	1
4	.035	.612	2
5	.612	1.190	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.188	44
2	-1.188	-.678	9
3	-.678	-.167	4
4	-.167	.343	1
5	.343	.854	1
6	.854	1.364	0
7	1.364	1.875	1



Subfile: STIBNITE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	4	2	30.16000	7.54000
AU-HBR	3	3	20.82000	6.94000
AU-FA	0	6	0.00000	0.00000
LOG AU-AR	4	2	.63357	.15839
LOG AU-HBR	3	3	-.49485	-.16495
LOG AU-FA	0	6	0.00000	0.00000

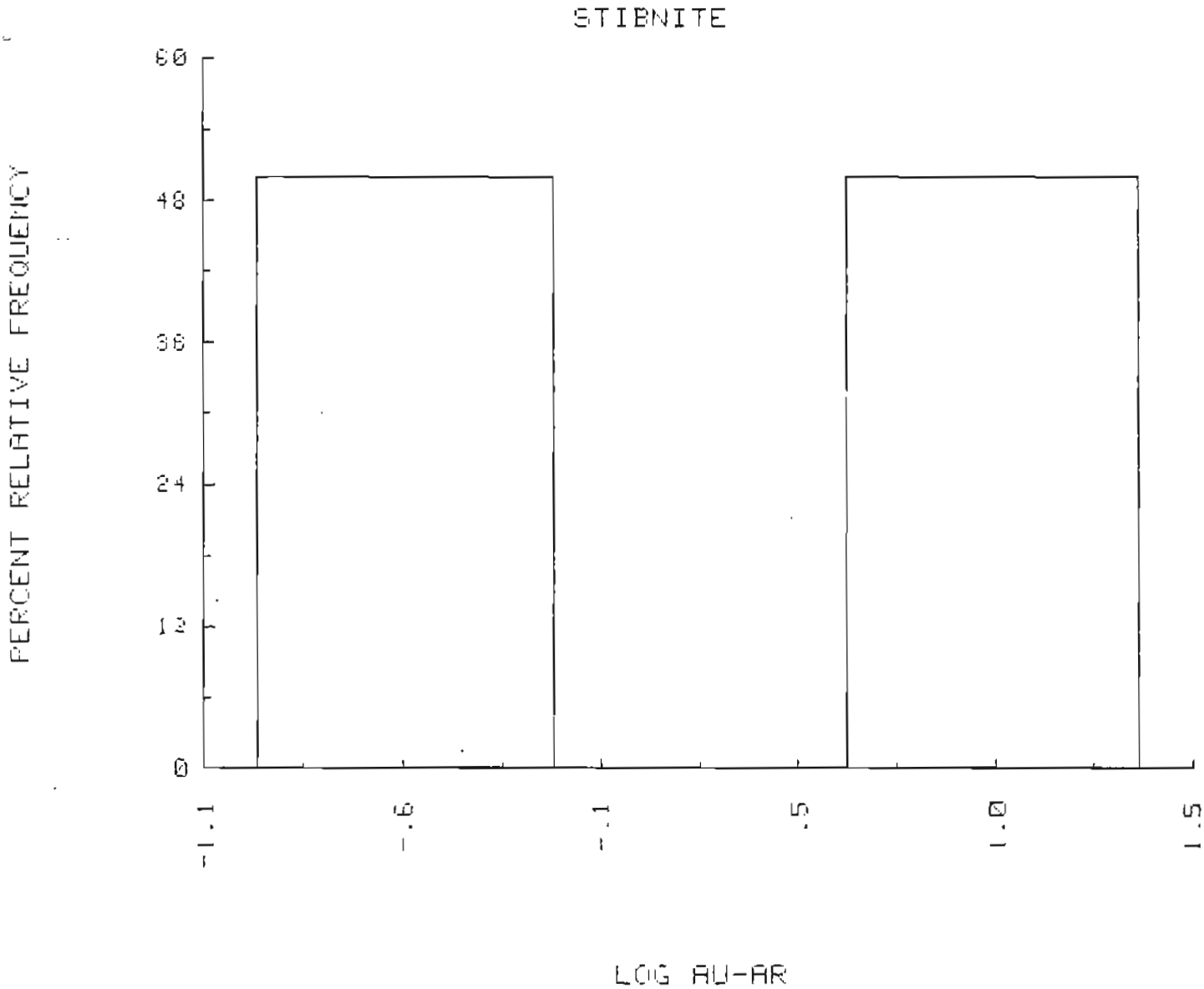
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	115.96940	10.72891	.89289	-.91809
AU-HBR	128.07480	11.31701	.70333	-1.50000
Variance is zero,remaining calculations can't be done				
LOG AU-AR	1.24281	1.11481	.05983	-1.79308
LOG AU-HBR	2.25347	1.50116	-.08310	-1.50000
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	142.82373	5.38445	-9.58215	24.66215
AU-HBR	163.06956	6.52363	-20.97817	34.85817
AU-FA	----------	6.53383	-27.91817	27.91817
LOG AU-AR	703.83016	.55741	-1.61412	1.93090
LOG AU-HBR	910.06791	.86563	-3.86818	3.53828
LOG AU-FA	----------	.86663	-3.70323	3.70323

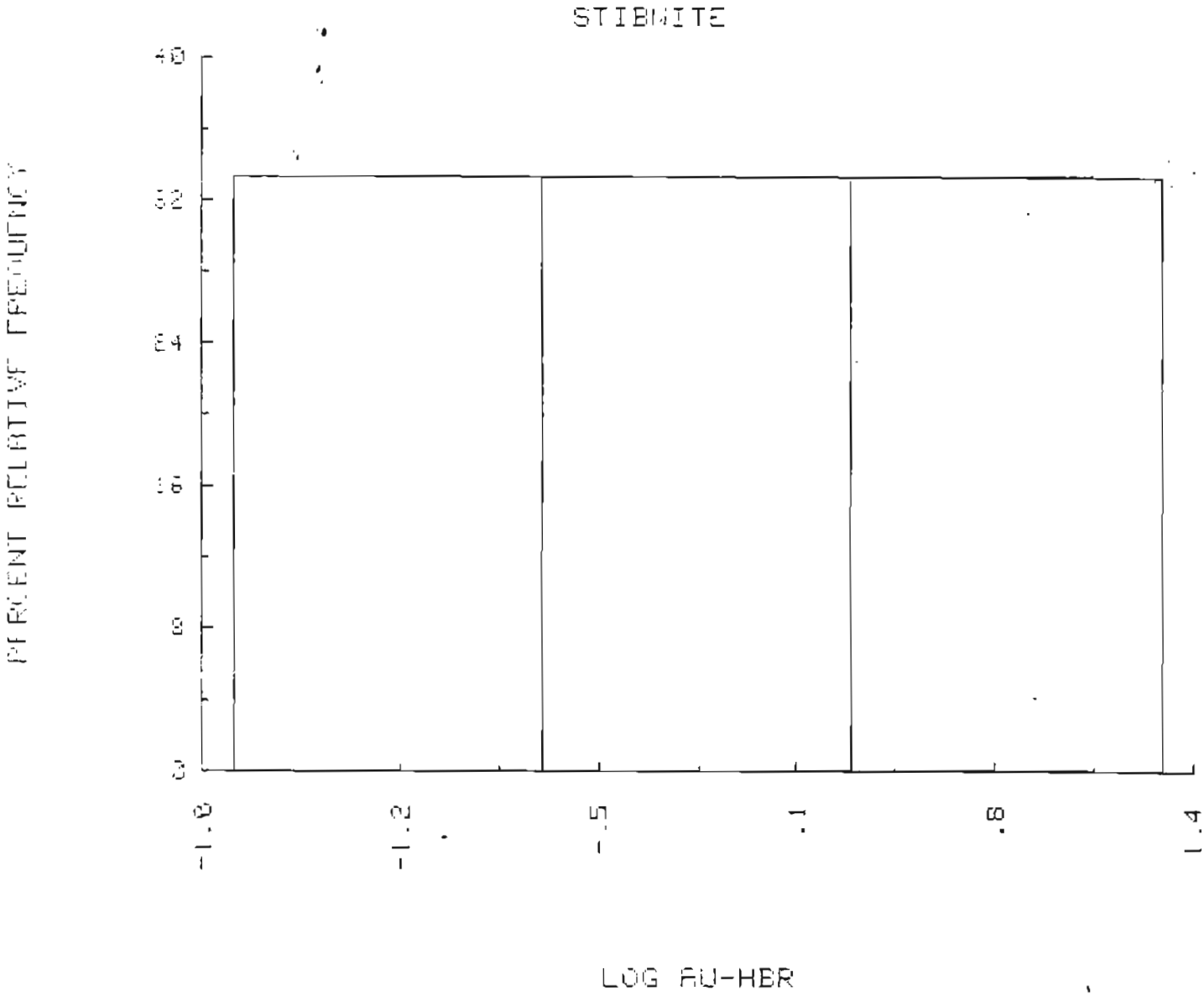
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	23.00000	.11000	22.89000	11.55500
AU-HBR	20.00000	.02000	19.98000	10.01000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	1.36173	-.95861	2.32034	.20156
LOG AU-HBR	1.30103	-1.69897	3.00000	-.19897
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-.959	-.185	2
2	-.185	.588	0
3	.588	1.362	2



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-.699	1
2	-.699	.301	1
3	.301	1.301	1



Subfile: STI MNZTE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	102	72	114.79000	1.12539
AU-HBR	59	115	4.12000	.06983
AU-FA	0	174	0.00000	0.00000
LOG AU-AR	102	72	-109.69993	-1.07545
LOG AU-HBR	59	115	-89.54364	-1.51769
LOG AU-FA	0	174	0.00000	0.00000

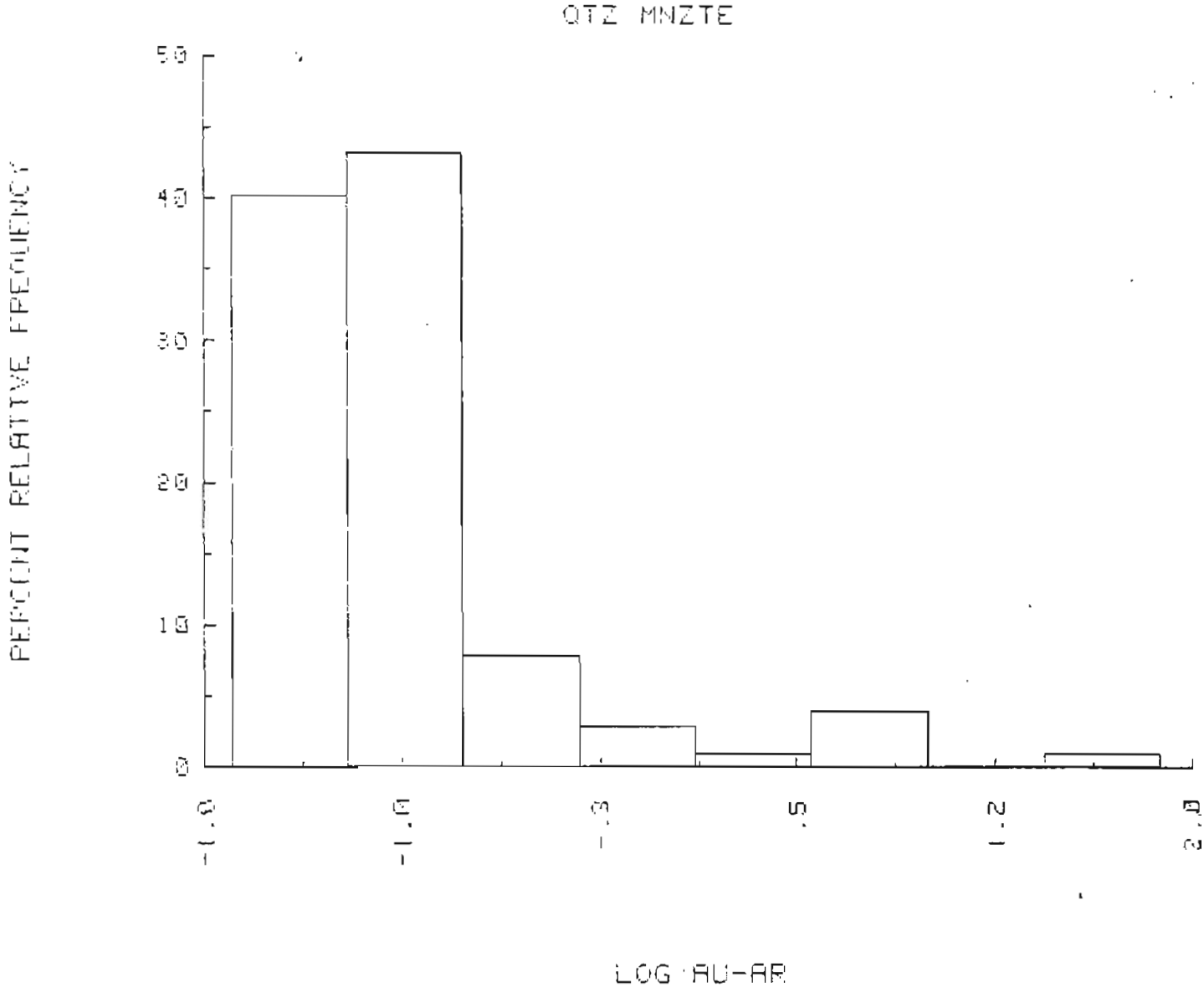
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	56.59197	7.52276	9.44599	90.01381
AU-HBR	.03997	.19994	5.66287	33.10132
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.44506	.66713	1.67822	4.07850
LOG AU-HBR	.15284	.39095	2.51933	6.30433
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	668.45705	.74486	-.35255	2.60333
AU-HBR	286.31506	.02603	.01772	.12195
AU-FA	----------	.02603	-.05212	.05212
LOG AU-AR	62.03256	.06606	-1.20652	-.94438
LOG AU-HBR	25.75963	.05090	-1.61959	-1.41578
LOG AU-FA	----------	.05090	-.10191	.10191

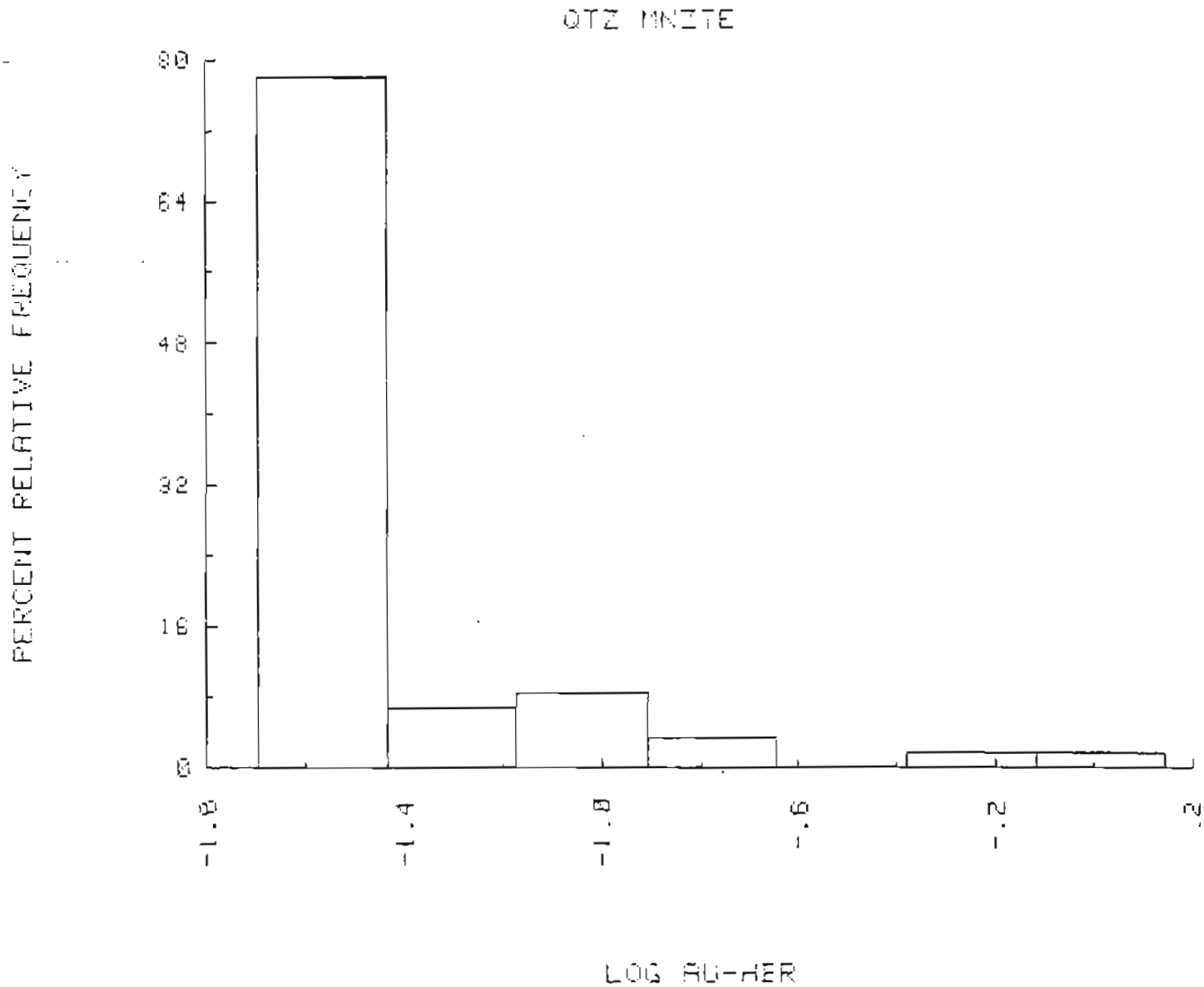
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	75.00000	.02000	74.98000	37.51000
AU-HBR	1.40000	.02000	1.38000	.71000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	1.87506	-1.69897	3.57403	.08805
LOG AU-HBR	.14613	-1.69897	1.84510	-.77642
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.252	41
2	-1.252	-.805	44
3	-.805	-.359	8
4	-.359	.086	3
5	.086	.535	1
6	.535	.982	4
7	.982	1.428	0
8	1.428	1.875	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.435	46
2	-1.435	-1.172	4
3	-1.172	-.908	5
4	-.908	-.645	2
5	-.645	-.381	0
6	-.381	-.117	1
7	-.117	.146	1



Subfile: OTC DIORTE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	152	44	563.00000	3.71142
AU-HER	37	162	26.00000	.70270
AU-FA	2	195	0.00000	0.00000
LOG AU-AR	153	44	-101.89955	-.66601
LOG AU-HER	37	162	-54.60662	-1.47585
LOG AU-FA	2	195	11.00000	5.50000

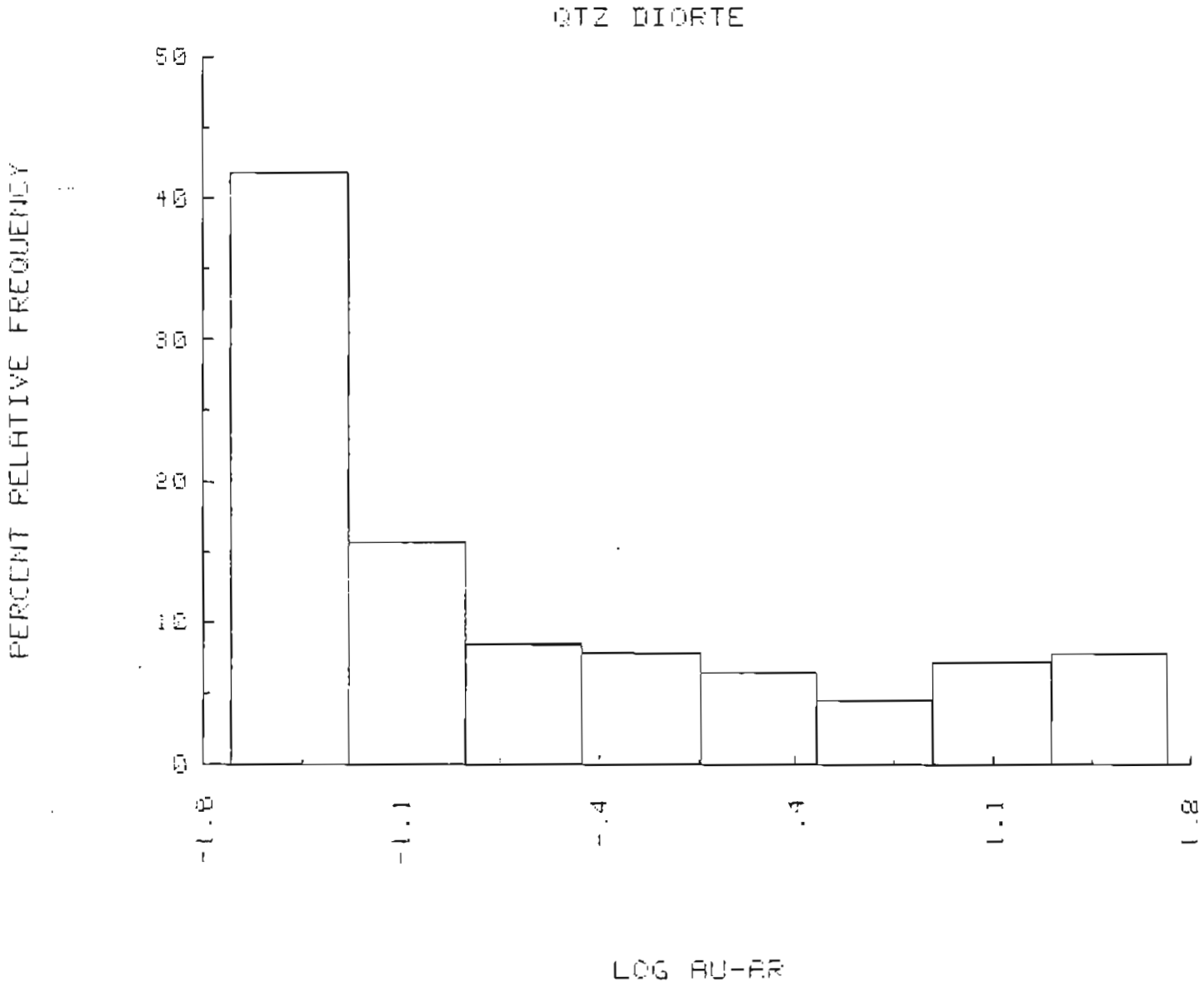
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	79.17701	8.89815	3.05002	9.61435
AU-HER	15.51323	3.93863	5.82300	31.94320
Variance is zero,remaining calculations can't be done				
LOG AU-AR	1.15324	1.07389	.74882	-.75945
LOG AU-HER	.36041	.60034	3.46841	12.60675
LOG AU-FA	40.50000	6.36395	0.00000	-2.00000

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	239.68599	.71937	2.29084	5.13399
AU-HER	560.50503	.64752	-.61082	2.01423
LOG AU-AR	161.24254	.08682	-.83758	-.49444
LOG AU-HER	40.67733	.09873	-1.67606	-1.27565
LOG AU-FA	115.70838	4.50000	-45.39536	56.39536

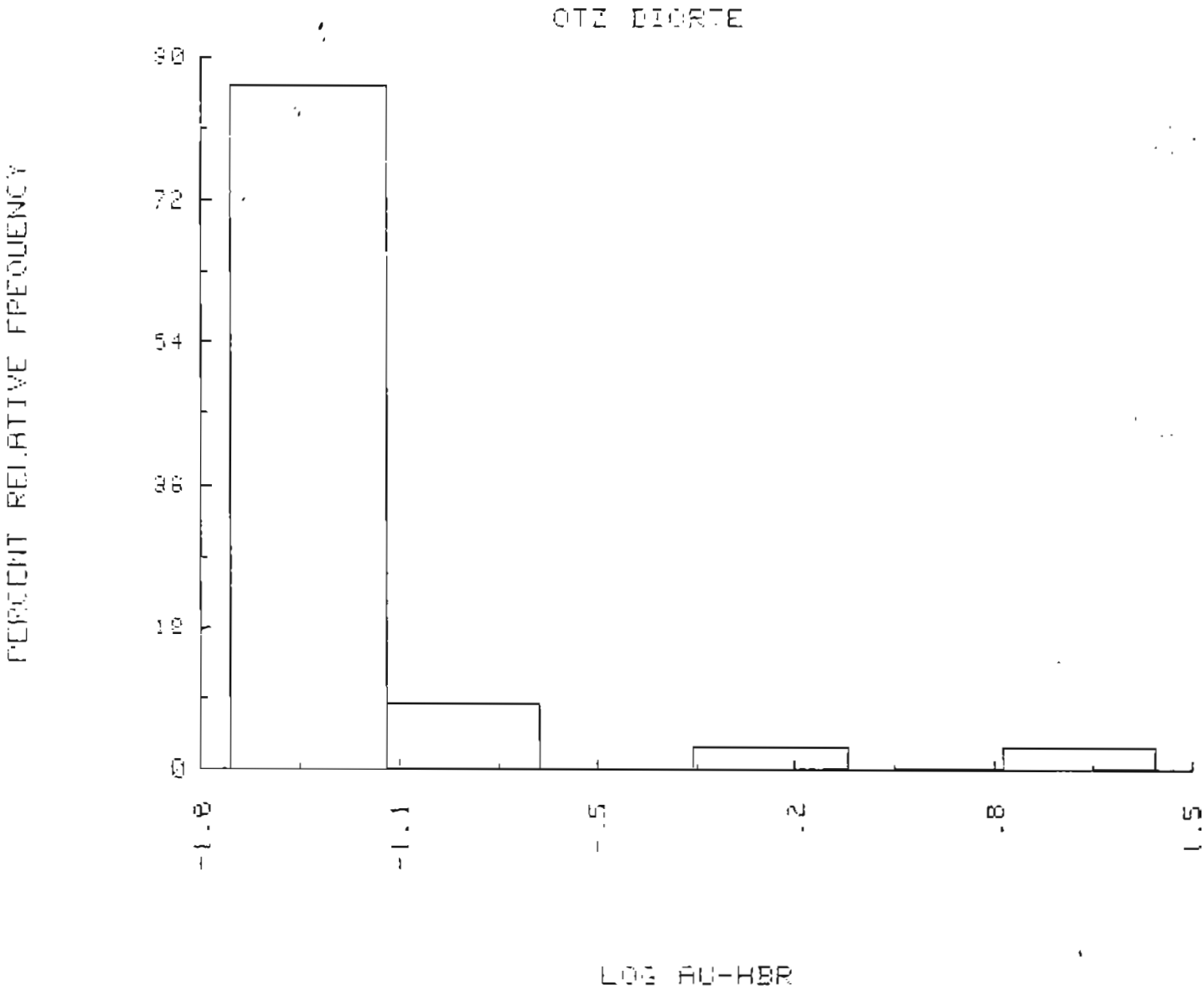
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	52.00000	.00000	51.98000	26.01000
AU-HER	24.00000	.00000	23.98000	12.01000
AU-FA	0.00000	0.00000	0.00000	0.00000
LOG AU-AR	1.71600	-1.69897	3.41497	.00352
LOG AU-HER	1.38021	-1.69897	3.07918	-.15936
LOG AU-FA	10.00000	1.00000	9.00000	5.50000

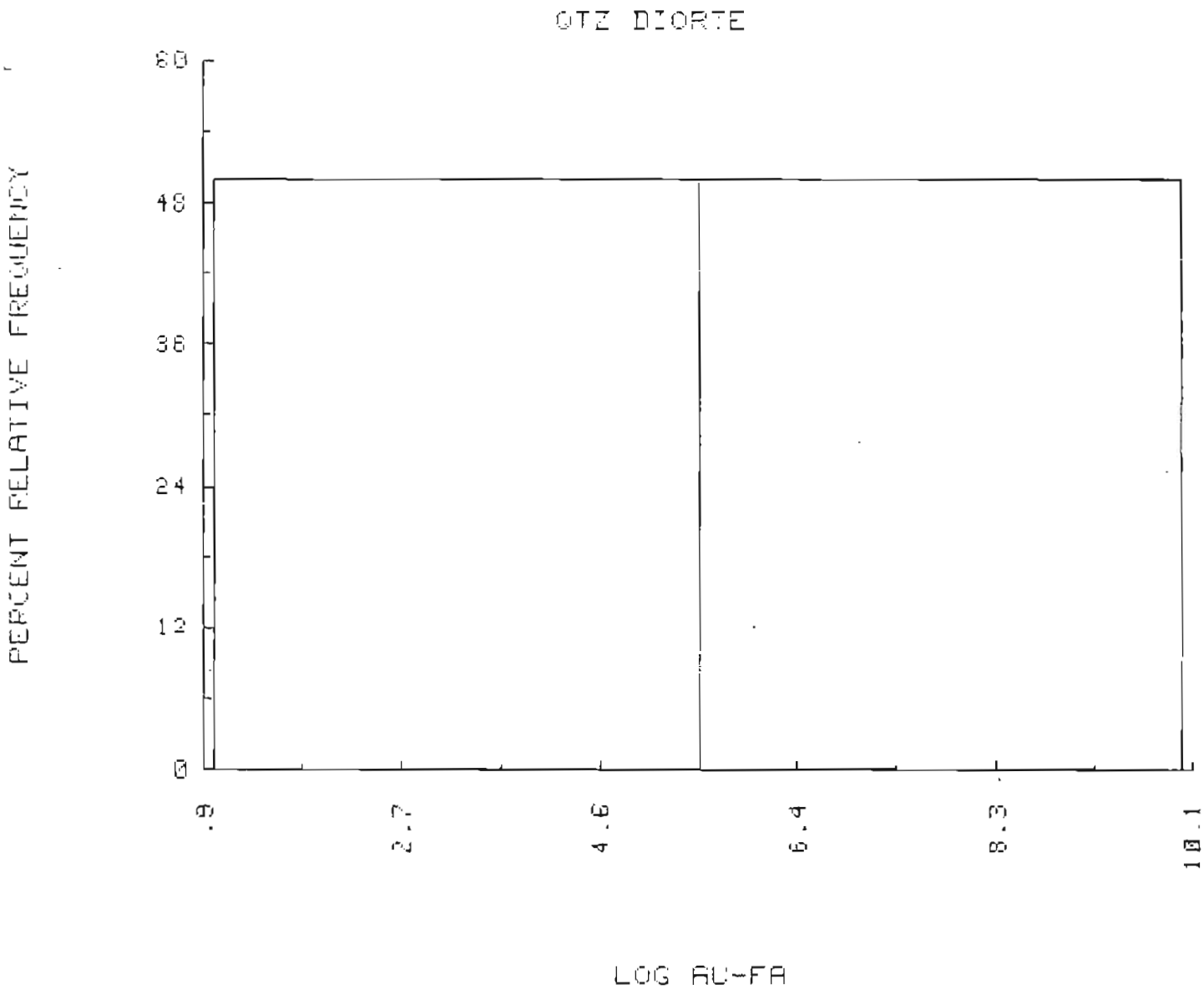
CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.272	64
2	-1.272	-.845	24
3	-.845	-.418	13
4	-.418	.009	12
5	.009	.435	10
6	.435	.862	7
7	.862	1.289	11
8	1.289	1.716	12



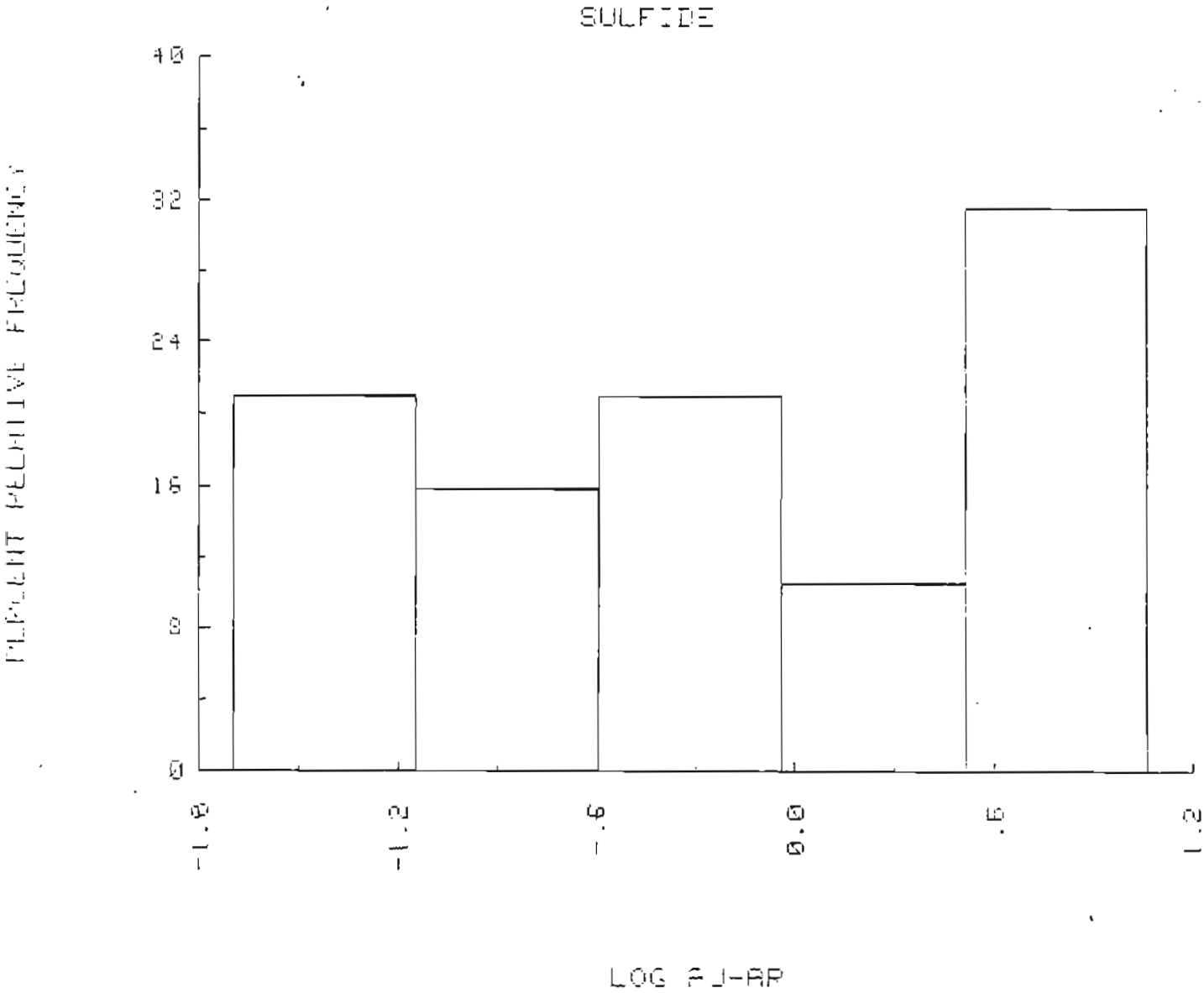
CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.186	32
2	-1.186	-.673	3
3	-.673	-.159	0
4	-.159	.354	1
5	.354	.867	0
6	.867	1.380	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	1.000	5.500	1
2	5.500	10.000	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.146	4
2	-1.146	-.594	3
3	-.594	-.041	4
4	-.041	.512	2
5	.512	1.064	6



Subfile: SULFIDE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	19	1	47.07000	2.47737
AU-HBR	1	19	.60000	.60000
AU-FA	0	20	0.00000	0.00000
LOG AU-AR	19	1	-4.88551	-.25713
LOG AU-HBR	1	19	-.22185	-.22185
LOG AU-FA	0	20	0.00000	0.00000

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	12.11141	3.48015	1.44558	.96551
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.87555	.93571	-.19120	-1.21798
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	140.47749	.79840	.79958	4.15515
AU-FA	----------	3.93868	-8.27689	8.27689
LOG AU-AR	363.90243	.21467	-.70824	.19398
LOG AU-FA	----------	.60034	-1.26157	1.26157

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	11.60000	.02000	11.58000	5.81000
AU-HBR	.60000	.60000	0.00000	.60000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	1.06446	-1.69897	2.76343	-.31726
LOG AU-HBR	-.22185	-.22185	0.00000	-.22185
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

SUBFILE: CALC SCHST

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	33	1	2.79000	.08455
AU--BR	1	33	.03000	.03000
AU-FA	1	33	.61000	.61000
LOG AU-AR	33	1	-48.71543	-1.47623
LOG AU-HBR	1	33	-1.52288	-1.52288
LOG AU-FA	1	33	-.21467	-.21467

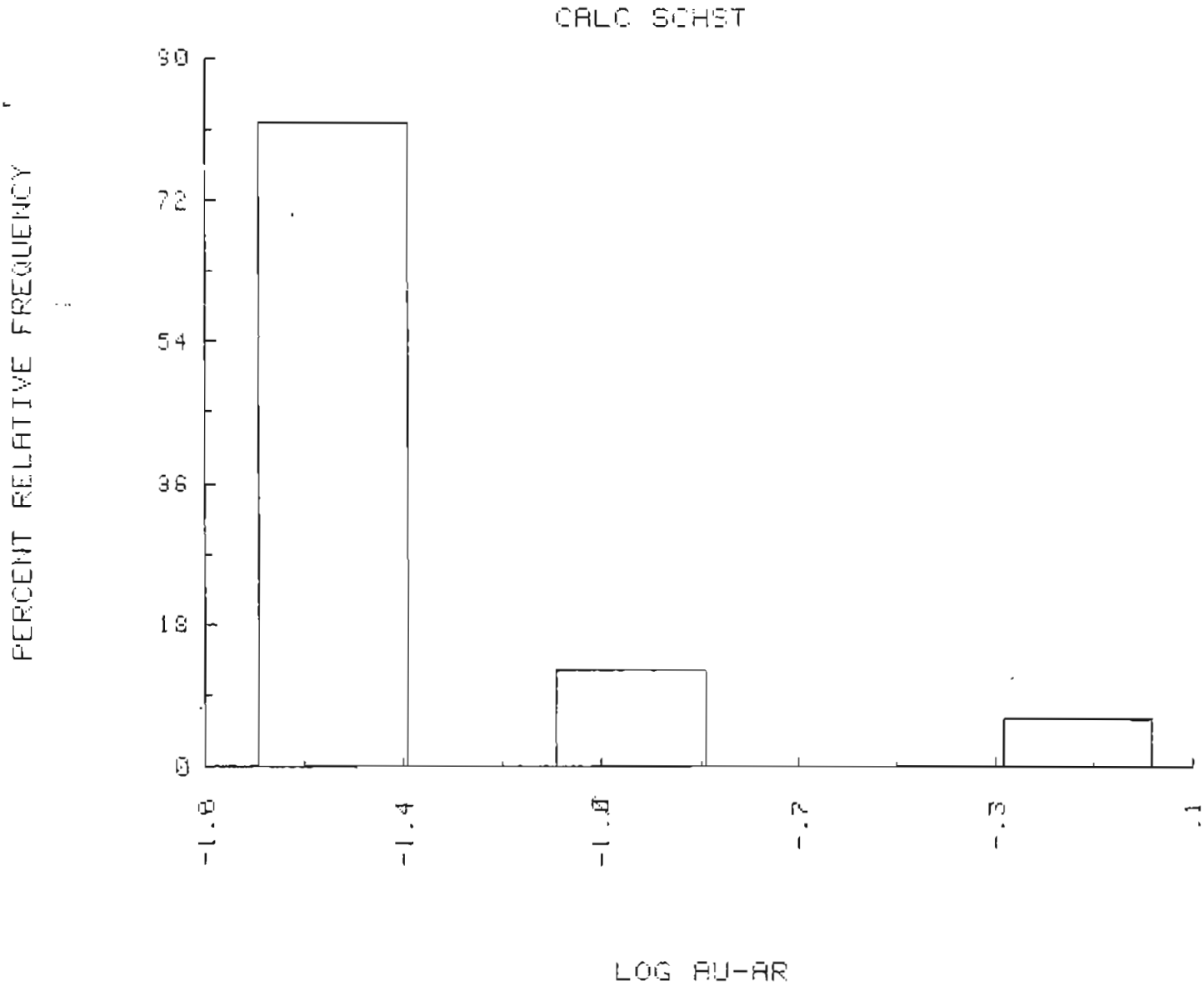
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.04201	.20497	3.89091	14.48677
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.19890	.44599	2.15058	3.69123
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	242.43889	.03568	.01185	.15724
LOG AU-AR	30.21129	.07764	-1.63440	-1.31805

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	1.05000	.02000	1.03000	.53500
AU--BR	.03000	.03000	0.00000	.03000
AU-FA	.61000	.61000	0.00000	.61000
LOG AU-AR	.02119	-1.69897	1.72016	-.83889
LOG AU-HBR	-1.52288	-1.52288	0.00000	-1.52288
LOG AU-FA	-.21467	-.21467	0.00000	-.21467

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.412	27
2	-1.412	-1.126	0
3	-1.126	-.839	4
4	-.839	-.552	0
5	-.552	-.266	0
6	-.266	.021	2



Subfile: BRESCIA

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	21	1	8.33000	.39667
AU-HBR	1	21	.02000	.02000
AU-FA	0	22	0.00000	0.00000
LOG AU-AR	21	1	-17.08905	-.81376
LOG AU-HBR	1	21	-1.69897	-1.69897
LOG AU-FA	0	22	0.00000	0.00000

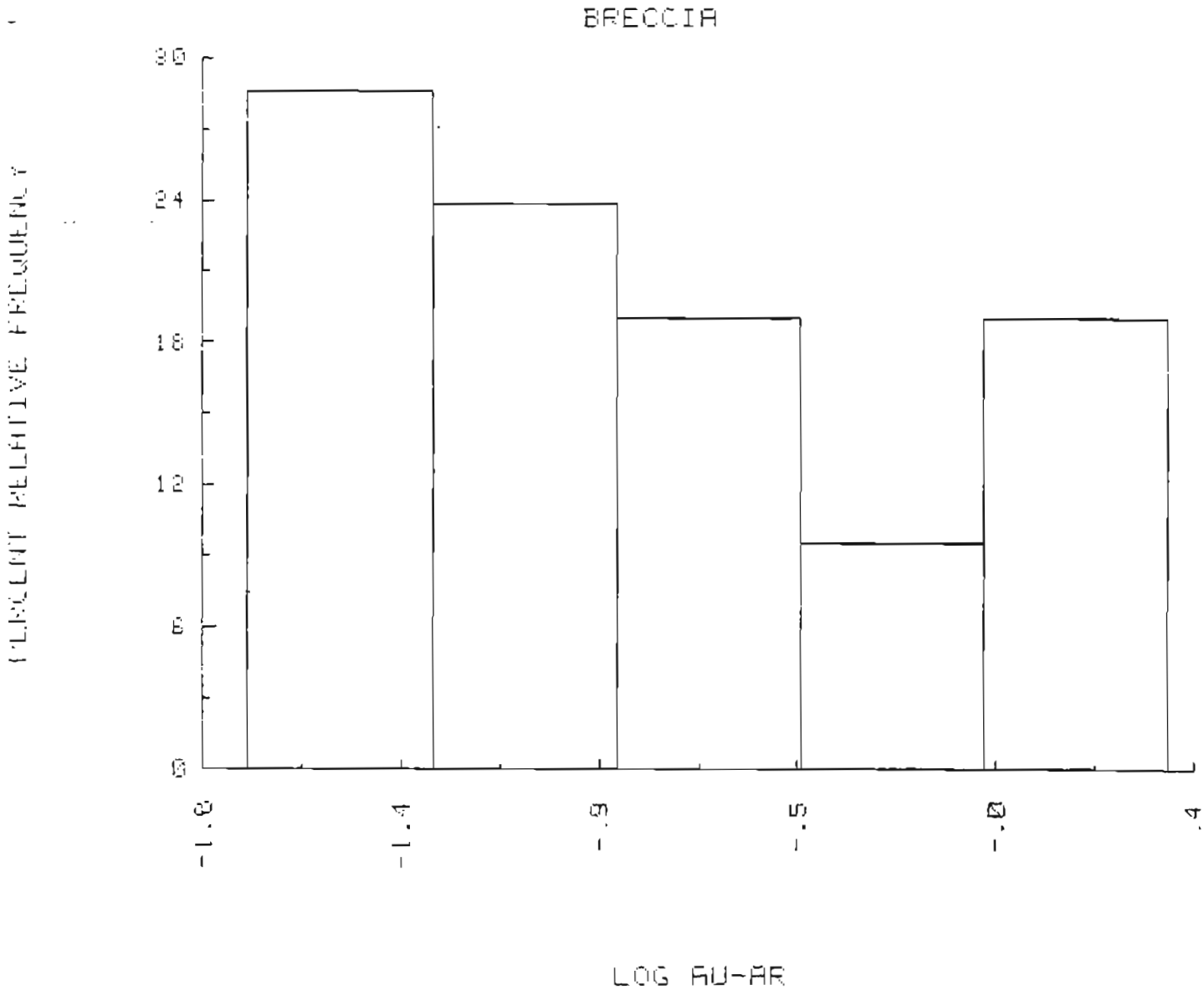
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.32947	.57400	1.93485	2.90532
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.42051	.64845	.05810	-.94208
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	144.78560	.12525	.13532	.65801
AU-FA	----------	3.36868	-8.21794	8.21794
LOG AU-AR	79.68701	.14151	-1.10901	-.51852
LOG AU-FA	----------	.60004	-1.25259	1.25259

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	2.20000	.02000	2.18000	1.11000
AU-HBR	.02000	.02000	0.00000	.02000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	.34242	-1.69897	2.04139	-.67827
LOG AU-HBR	-1.69897	-1.69897	0.00000	-1.69897
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.599	-1.291	6
2	-1.291	-.982	5
3	-.982	-.674	4
4	-.674	-.366	2
5	-.366	.342	4



SUBFile: OTZ PRPHY

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	41	0	5.76000	.14049
AU-HBR	3	38	.30000	.10000
AU-FA	0	41	0.00000	0.00000
LOG AU-AR	41	0	-45.75369	-1.11594
LOG AU-HBR	3	38	-3.49485	-1.16495
LOG AU-FA	0	41	0.00000	0.00000

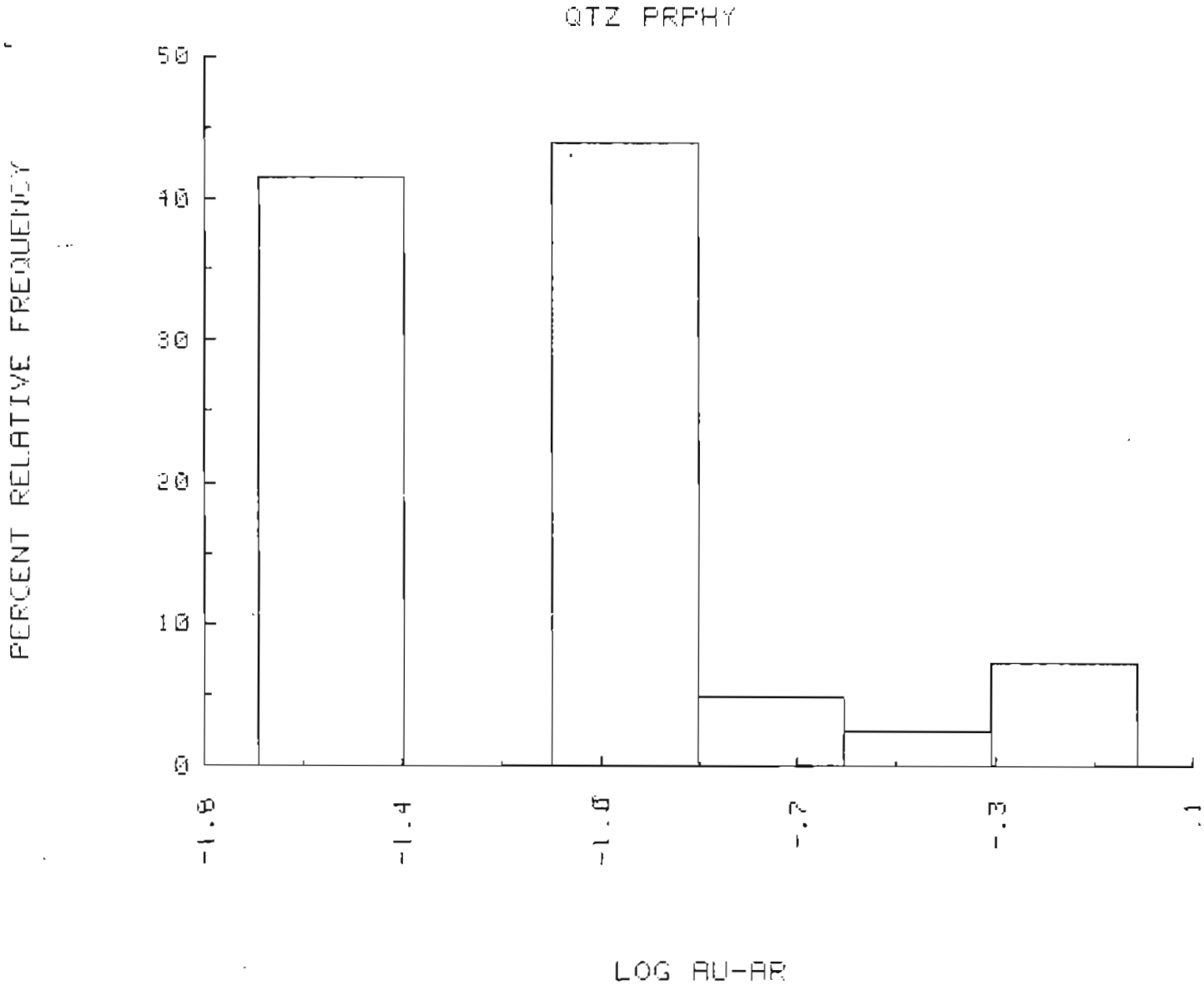
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.01704	.13246	2.85032	8.29833
AU-HBR	.00940	.09145	.38180	-1.50000
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.22582	.47520	.30248	-.71916
LOG AU-HBR	.25347	.50346	-.24374	-1.50000
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	136.99207	.03006	.07973	.20125
AU-HBR	91.65151	.05292	-.12610	.32610
AU-FA	----------	.05292	-.22610	.22610
LOG AU-AR	42.58320	.07421	-1.26597	-.96592
LOG AU-HBR	43.21731	.29067	-2.40695	.07705
LOG AU-FA	----------	.29067	-1.24200	1.24200

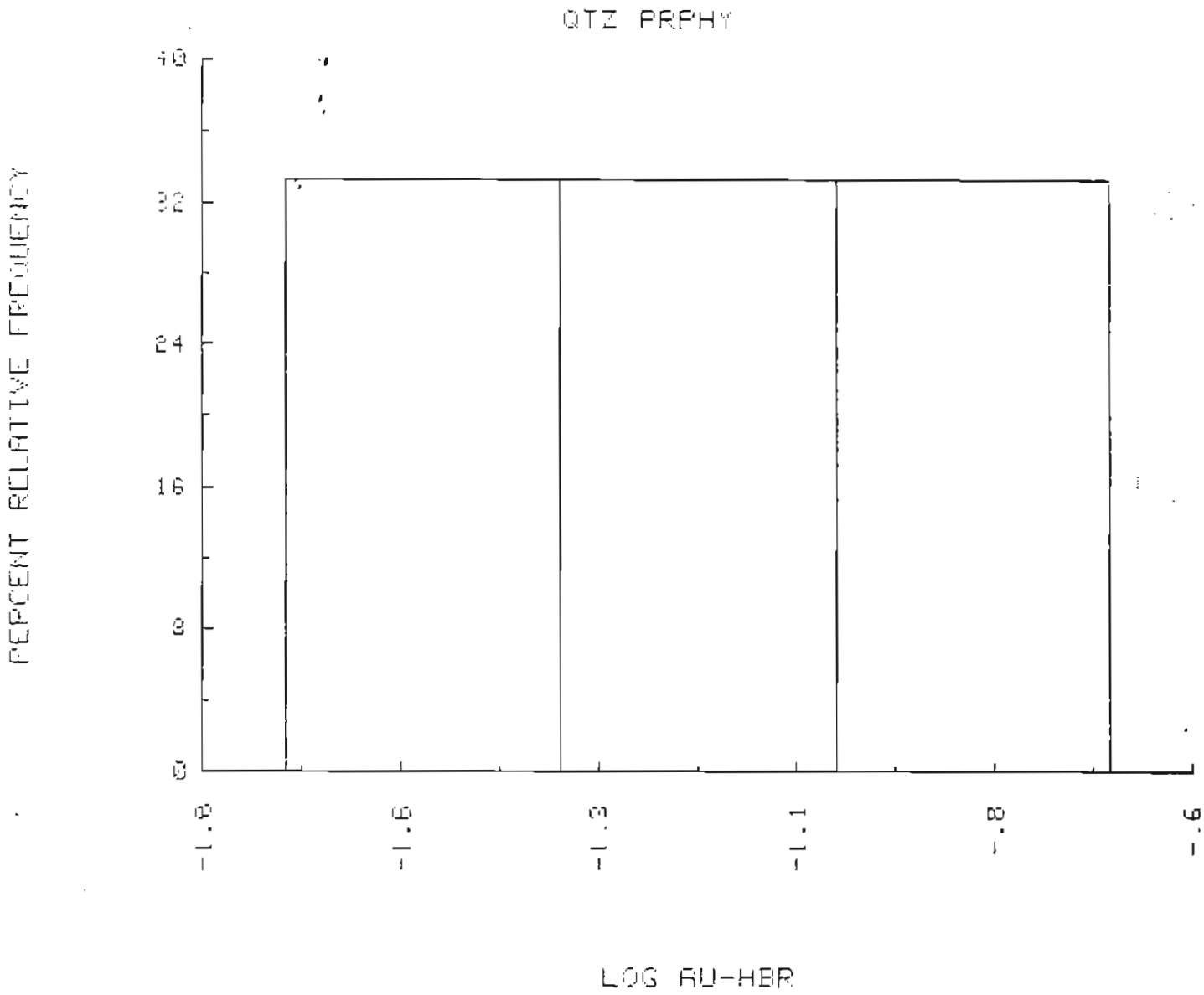
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	.98000	.02000	.96000	.50000
AU-HBR	.20000	.02000	.18000	.11000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	-.00877	-1.69897	1.69020	-.85387
LOG AU-HBR	-.69897	-1.69897	1.00000	-1.19897
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.417	17
2	-1.417	-1.136	0
3	-1.136	-.854	18
4	-.854	-.572	2
5	-.572	-.290	1
6	-.290	-.009	3



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.366	1
2	-1.366	-1.032	1
3	-1.032	-.699	1



Subfile: OTC STBNTE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	0	1	0.00000	0.00000
AU-HBR	1	0	.30000	.30000
AU-FA	0	1	0.00000	0.00000
LOG AU-AR	0	1	0.00000	0.00000
LOG AU-HBR	1	0	-.52288	-.52288
LOG AU-FA	0	1	0.00000	0.00000

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	----------	.29067	-1.24200	1.24200
AU-FA	----------	.09165	-.39161	.39161
LOG AU-AR	----------	.09165	-.39161	.39161
LOG AU-FA	----------	.50346	-2.15120	2.15120

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
AU-HBR	.30000	.30000	0.00000	.30000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-HBR	-.52288	-.52288	0.00000	-.52288
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

Subfile: SCHIST

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	183	27	67.07000	.36650
AU-HBR	39	171	16.64000	.42667
AU-FA	11	199	3.17000	.28818
LOG AU-AR	183	27	-210.37923	-1.14961
LOG AU-HBR	39	171	-31.72721	-.81352
LOG AU-FA	11	199	-7.79774	-.70889

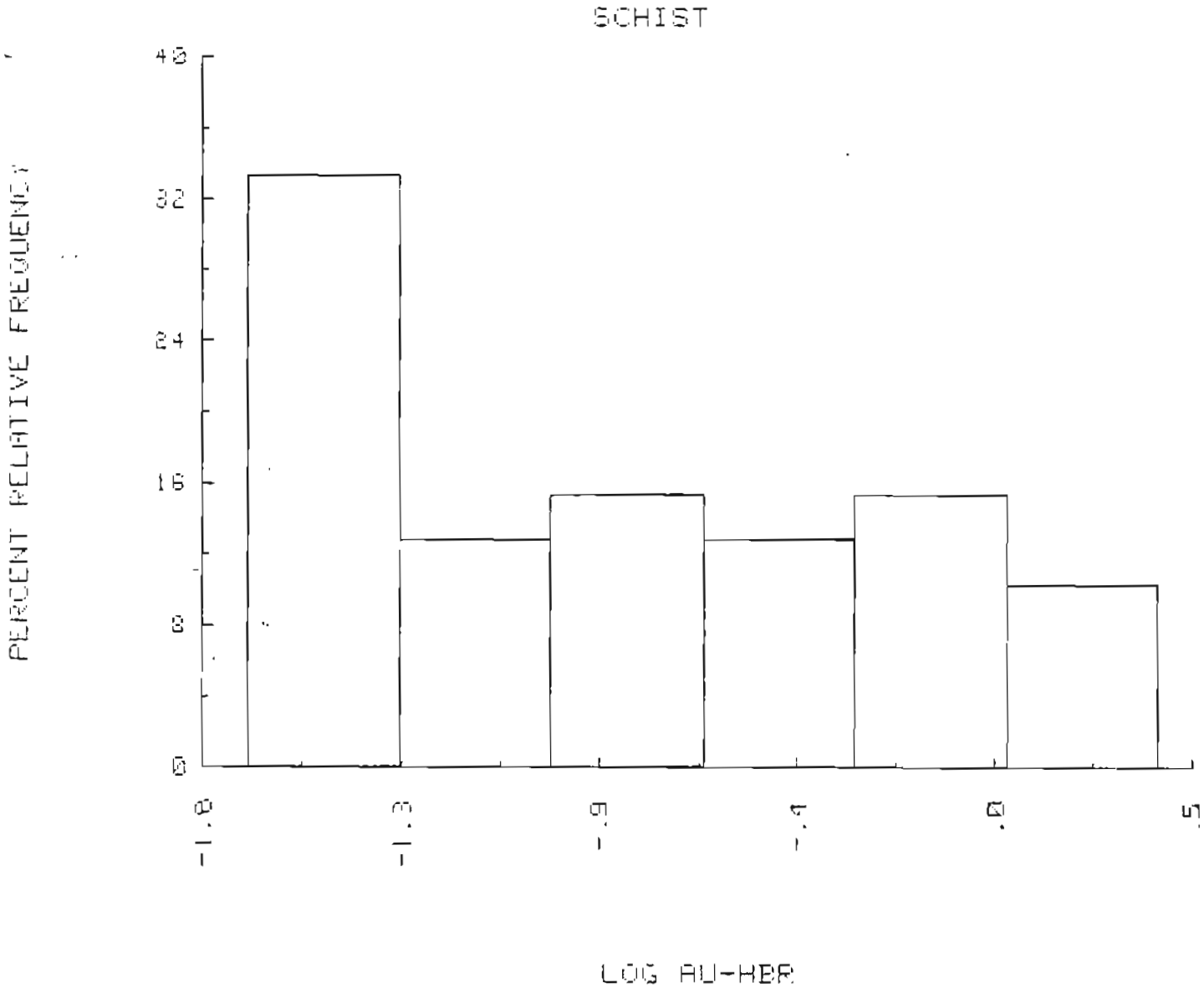
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	2.34249	1.53062	9.37884	99.12130
AU-HBR	.39718	.63022	2.26085	4.73939
AU-FA	.07156	.26750	1.43566	1.09224
LOG AU-AR	.41323	.64283	1.16585	.82958
LOG AU-HBR	.44793	.66927	.13193	-1.22030
LOG AU-FA	.17993	.42418	-.27080	-.52013

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	417.60092	.11314	.14322	.58979
AU-HBR	147.70845	.10092	.22232	.63101
AU-FA	92.82342	.06065	.10843	.45794
LOG AU-AR	55.91736	.04752	-1.24339	-1.05583
LOG AU-HBR	82.26915	.10717	-1.03052	-.59651
LOG AU-FA	59.83706	.12789	-.99393	-.42385

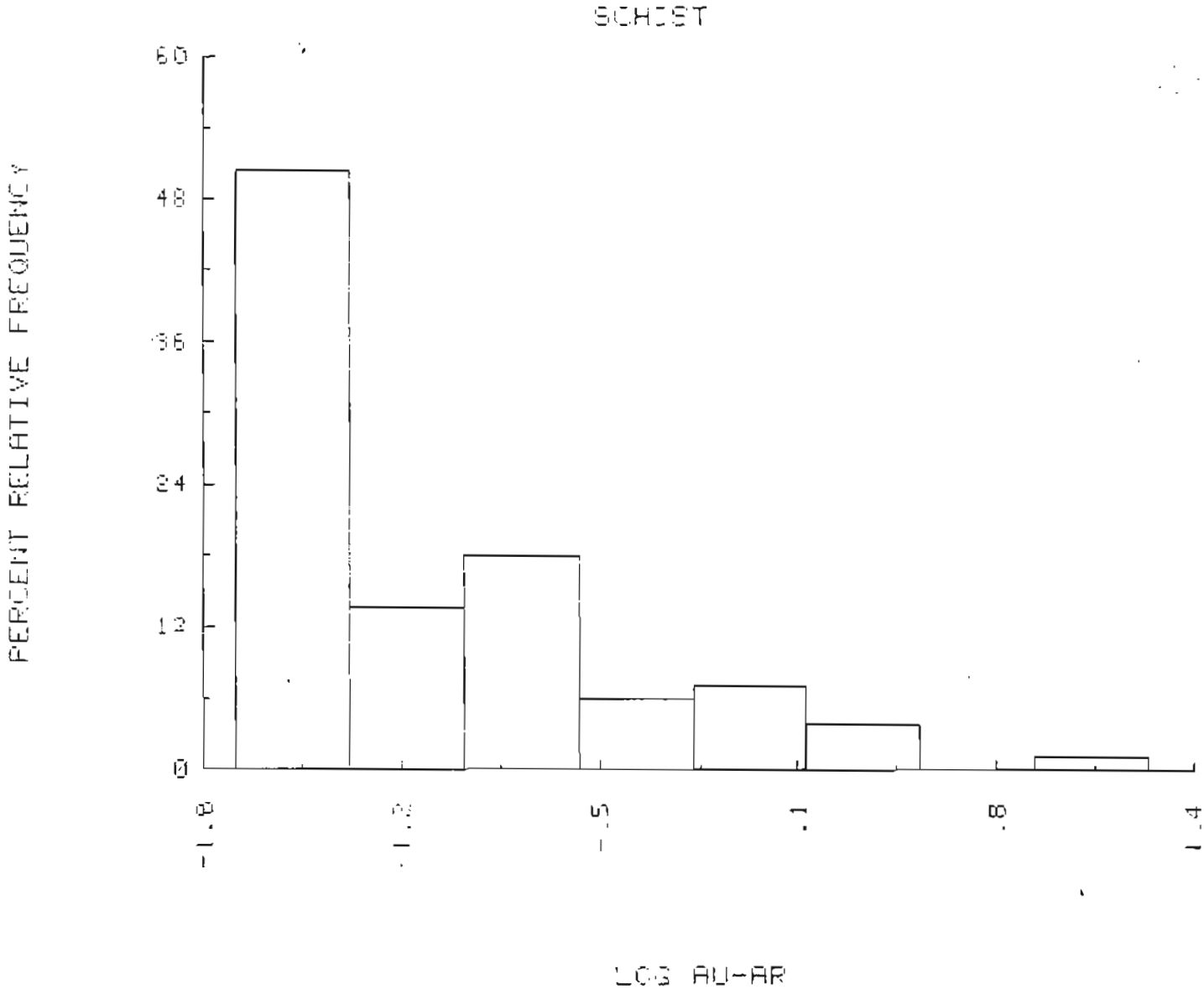
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	18.00000	.02000	17.98000	9.01000
AU-HBR	2.64000	.02000	2.62000	1.33000
AU-FA	.93000	.04000	.89000	.48500
LOG AU-AR	1.25527	-1.69897	2.95424	-.22185
LOG AU-HBR	.42160	-1.69897	2.12057	-.63868
LOG AU-FA	-.03152	-1.39794	1.36642	-.71473

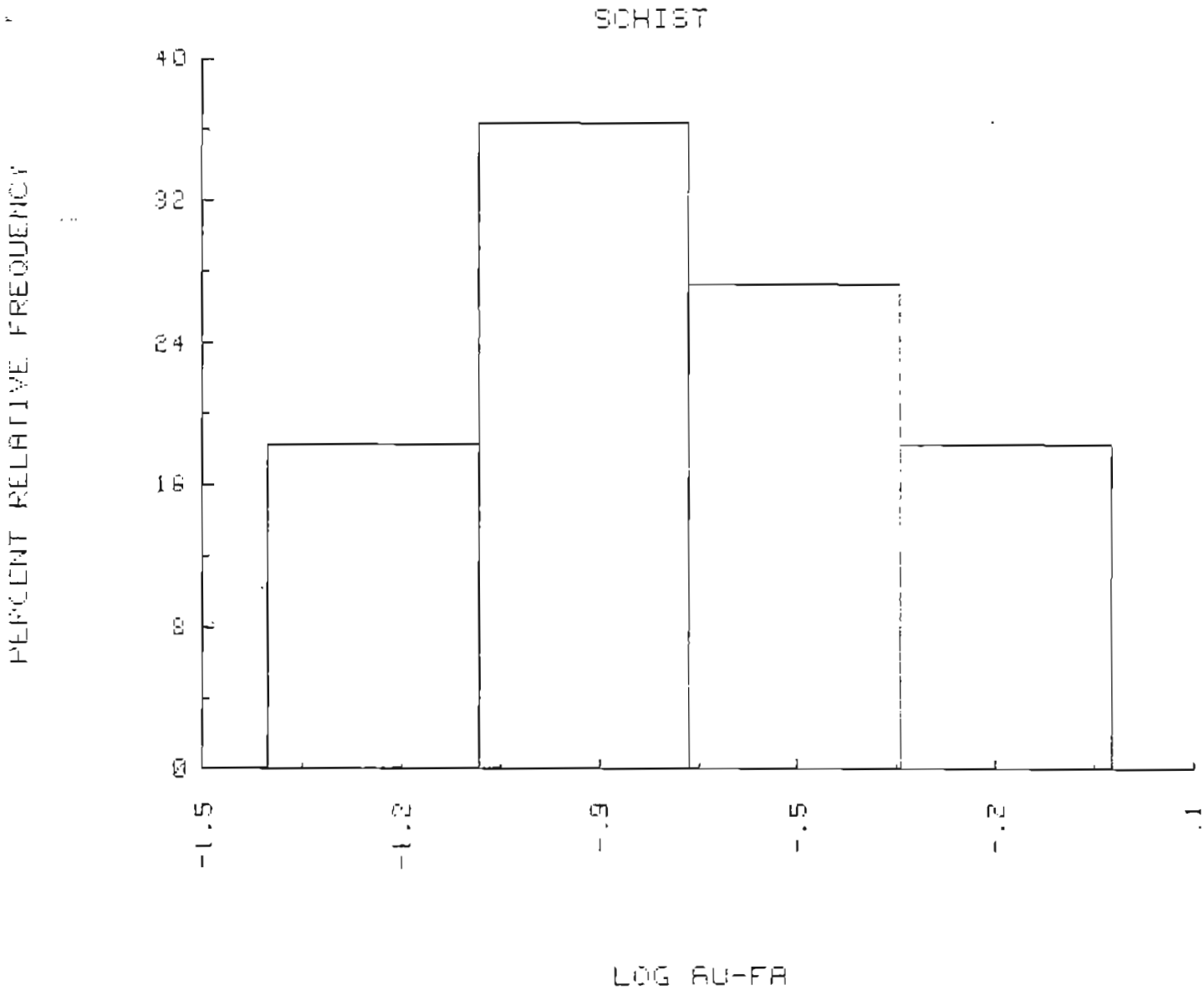
CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.346	13
2	-1.346	-.992	5
3	-.992	-.639	6
4	-.639	-.285	5
5	-.285	.068	6
6	.068	.422	4



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.330	92
2	-1.330	-.960	25
3	-.960	-.591	33
4	-.591	-.222	11
5	-.222	.147	13
6	.147	.517	7
7	.517	.886	0
8	.886	1.255	2



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.398	-1.056	2
2	-1.056	-.715	4
3	-.715	-.373	3
4	-.373	-.032	2



Subfile: CTI STRAGP

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	7	2	4.44000	.63429
AU-HBR	3	6	20.80000	6.93333
AU-FA	0	9	0.00000	0.00000
LOG AU-AR	7	2	-8.91232	-1.27317
LOG AU-HBR	3	6	1.68771	.56257
LOG AU-FA	0	9	0.00000	0.00000

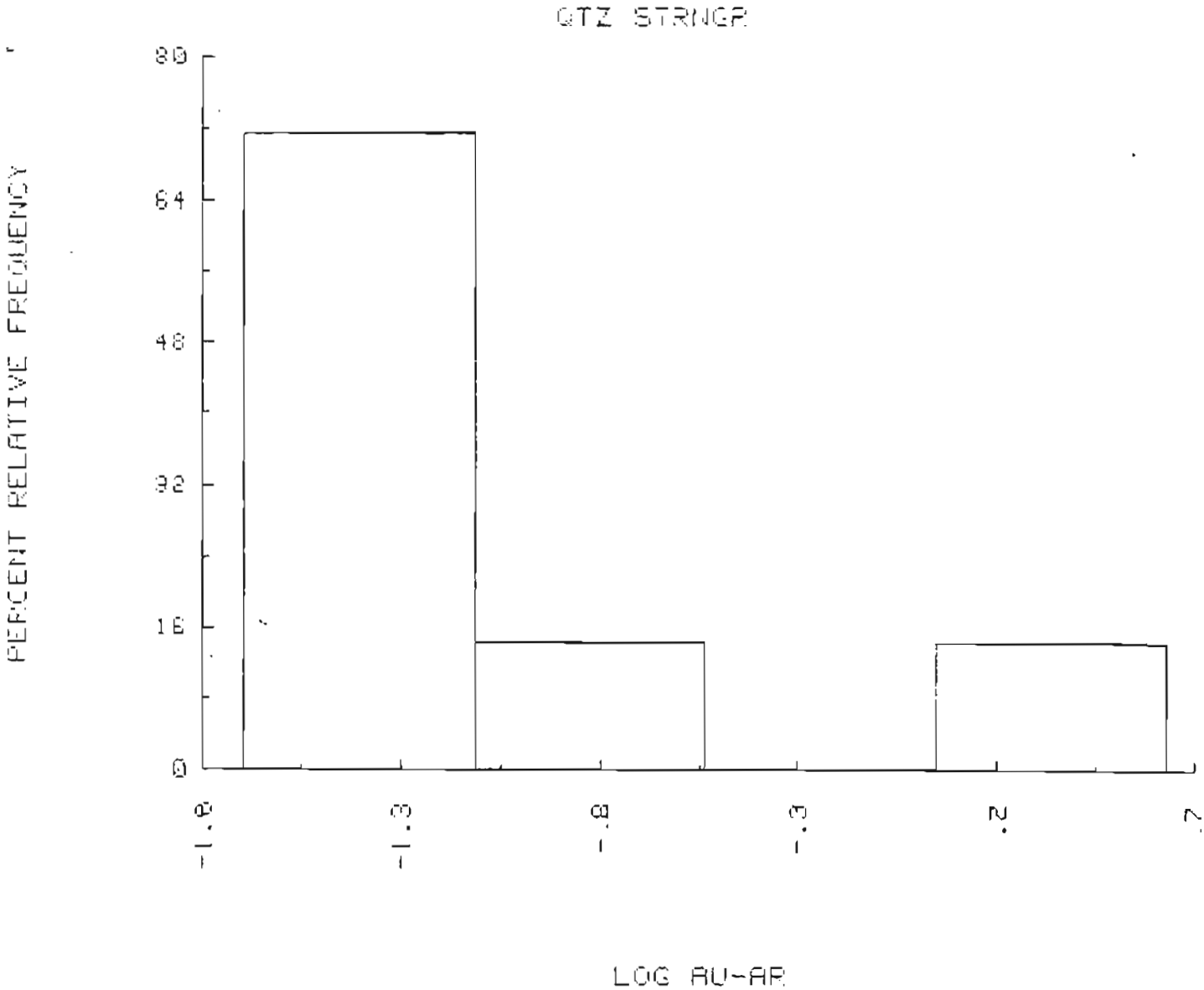
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	2.54273	1.59459	2.04010	2.16416
AU-HBR	82.25313	9.06936	.70363	-1.50000
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.76236	.87313	1.75835	1.43026
LOG AU-HBR	.35074	.59223	.65308	-1.50000
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	251.39938	.60270	-.84085	2.10942
AU-HBR	130.82611	5.23620	-15.44006	29.30673
AU-FA	----------	5.23620	-22.37339	22.37339
LOG AU-AR	68.57928	.33001	-2.08090	-.46545
LOG AU-HBR	105.27217	.34193	-.89843	2.02356
LOG AU-FA	----------	.34193	-1.46099	1.46099

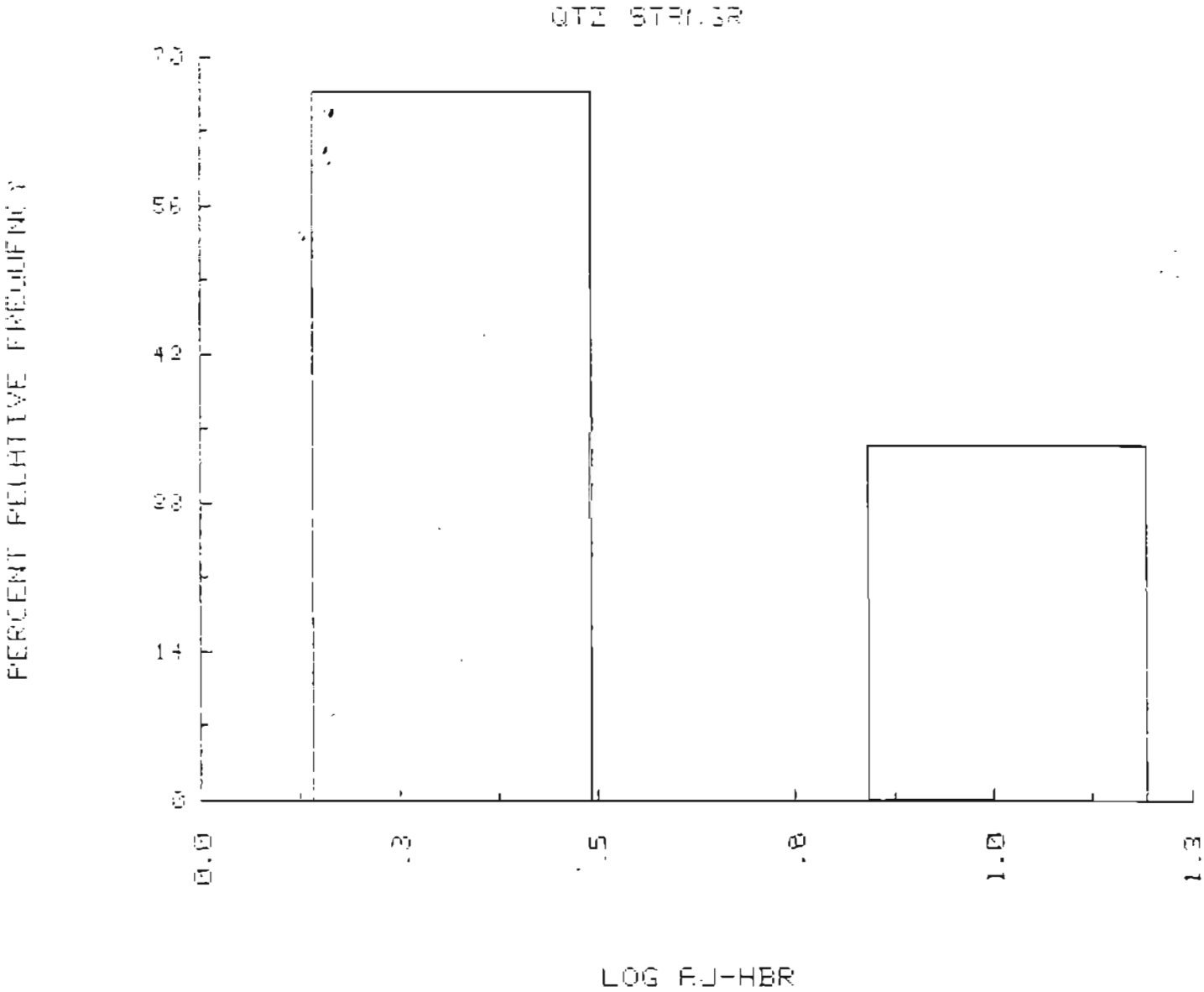
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	4.25000	.02000	4.23000	2.13500
AU-HBR	17.40000	1.40000	16.00000	9.40000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	.62839	-1.69897	2.32736	-.53529
LOG AU-HBR	1.24055	.14613	1.09442	.69334
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.117	5
2	-1.117	-.535	1
3	-.535	.047	0
4	.047	.628	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	.146	.511	2
2	.511	.876	0
3	.876	1.241	1



Subfile: GNEISS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	17	2	4.29000	.25224
AU-HBR	1	18	.02000	.02000
AU-FA	0	19	0.00000	0.00000
LOG AU-AR	17	2	-21.81566	-1.28127
LOG AU-HBR	1	18	-1.69897	-1.69897
LOG AU-FA	0	19	0.00000	0.00000

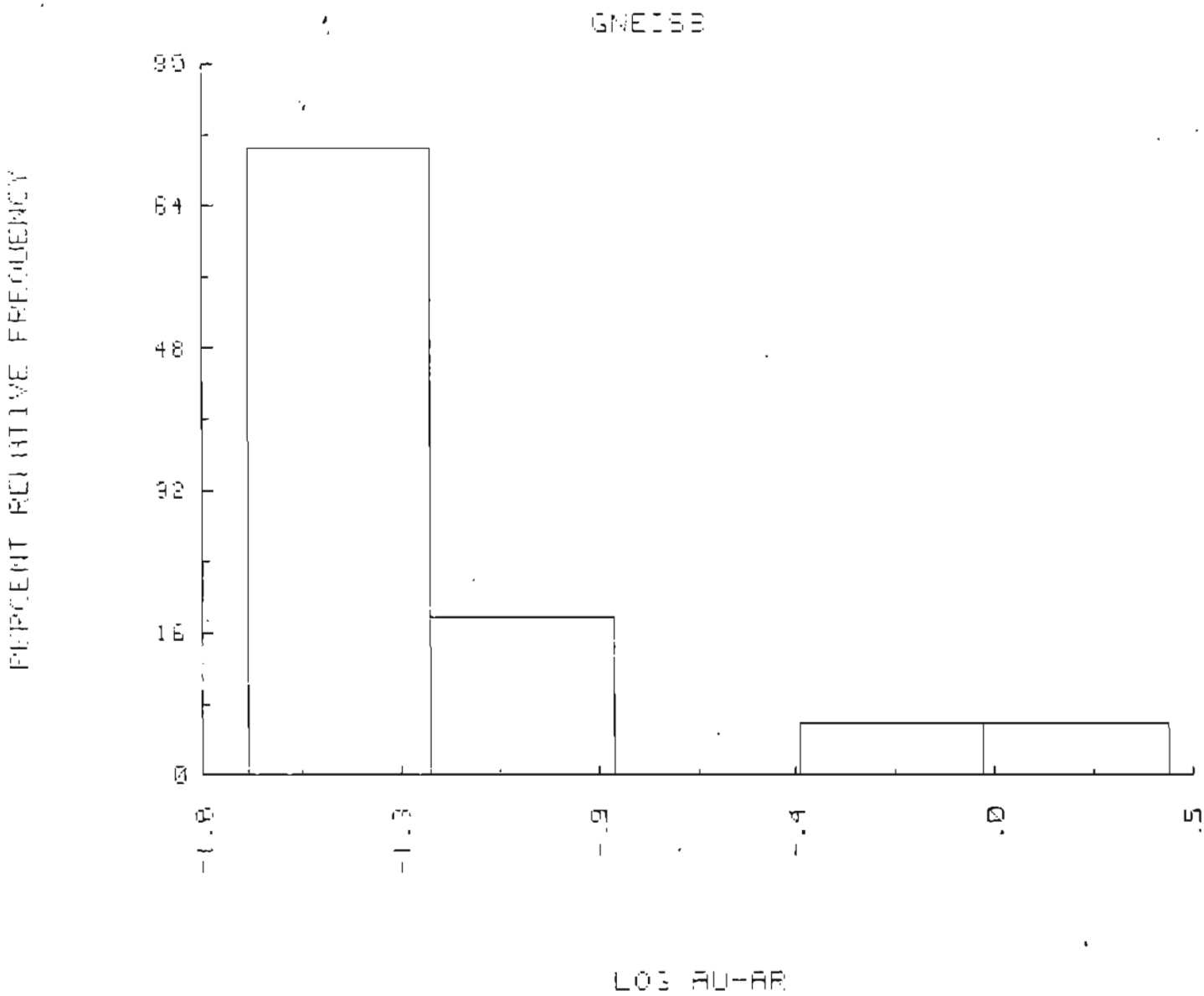
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.47940	.69239	3.16634	8.79101
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.38476	.62029	1.84665	2.35065
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	258.12342	.16793	-.09785	.61432
AU-FA	----------	9.06936	-19.23095	19.23095
LOG AU-AR	48.33638	.15044	-1.60228	-.96427
LOG AU-FA	----------	.59223	-1.25579	1.25579

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	2.79000	.02000	2.76000	1.40500
AU-HBR	.02000	.02000	0.00000	.02000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	.44404	-1.69897	2.14301	-.62746
LOG AU-HBR	-1.69897	-1.69897	0.00000	-1.69897
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.270	12
2	-1.270	-.842	0
3	-.842	-.413	0
4	-.413	.015	1
5	.015	.444	1



Subfile: GABIRO

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	3	0	.07000	.02333
AU-HBR	0	3	0.00000	0.00000
AU-FA	0	3	0.00000	0.00000
LOG AU-AR	3	0	-4.92082	-1.64027
LOG AU-HBR	0	3	0.00000	0.00000
LOG AU-FA	0	3	0.00000	0.00000

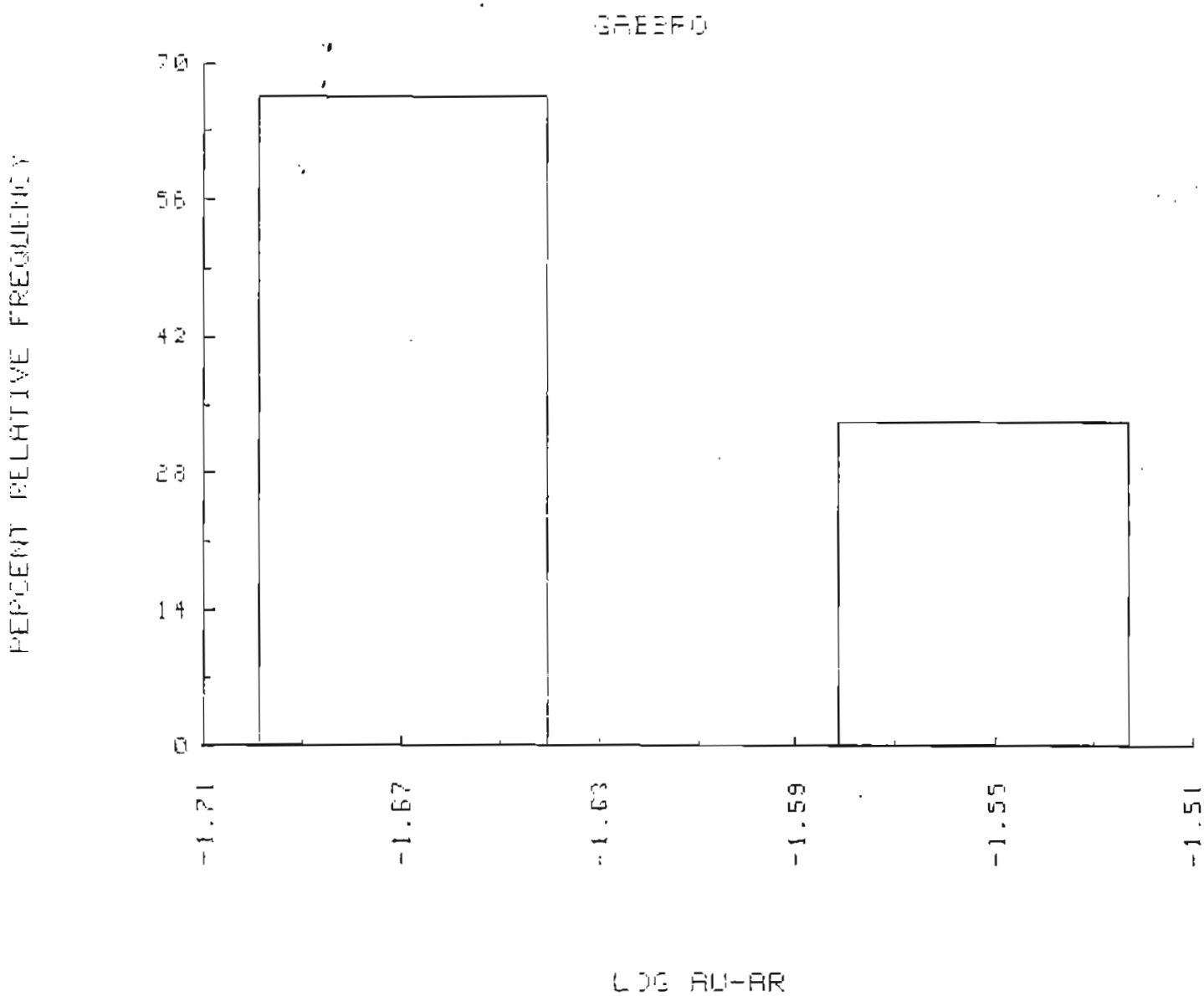
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.00003	.00577	.70711	-1.50000
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.01034	.10167	.70711	-1.50000
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	24.74358	.00333	.00909	.03758
AU-HBR	----------	.00333	-.01424	.01424
AU-FA	----------	.00333	-.01424	.01424
LOG AU-AR	6.19814	.05870	-1.89108	-1.38947
LOG AU-HBR	----------	.05870	-.25080	.25080
LOG AU-FA	----------	.05870	-.25080	.25080

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	.03000	.02000	.01000	.02500
AU-HBR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	-1.52288	-1.69897	.17609	-1.61092
LOG AU-HBR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.640	1
2	-1.640	-1.582	0
3	-1.582	-1.523	1



Subfile: MARBLE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	14	3	1.81000	.12929
AU-HBR	3	14	2.04000	.68000
AU-FA	0	17	0.00000	0.00000
LOG AU-AR	14	3	-21.43051	-1.53075
LOG AU-HBR	3	14	-3.09691	-1.03230
LOG AU-FA	0	17	0.00000	0.00000

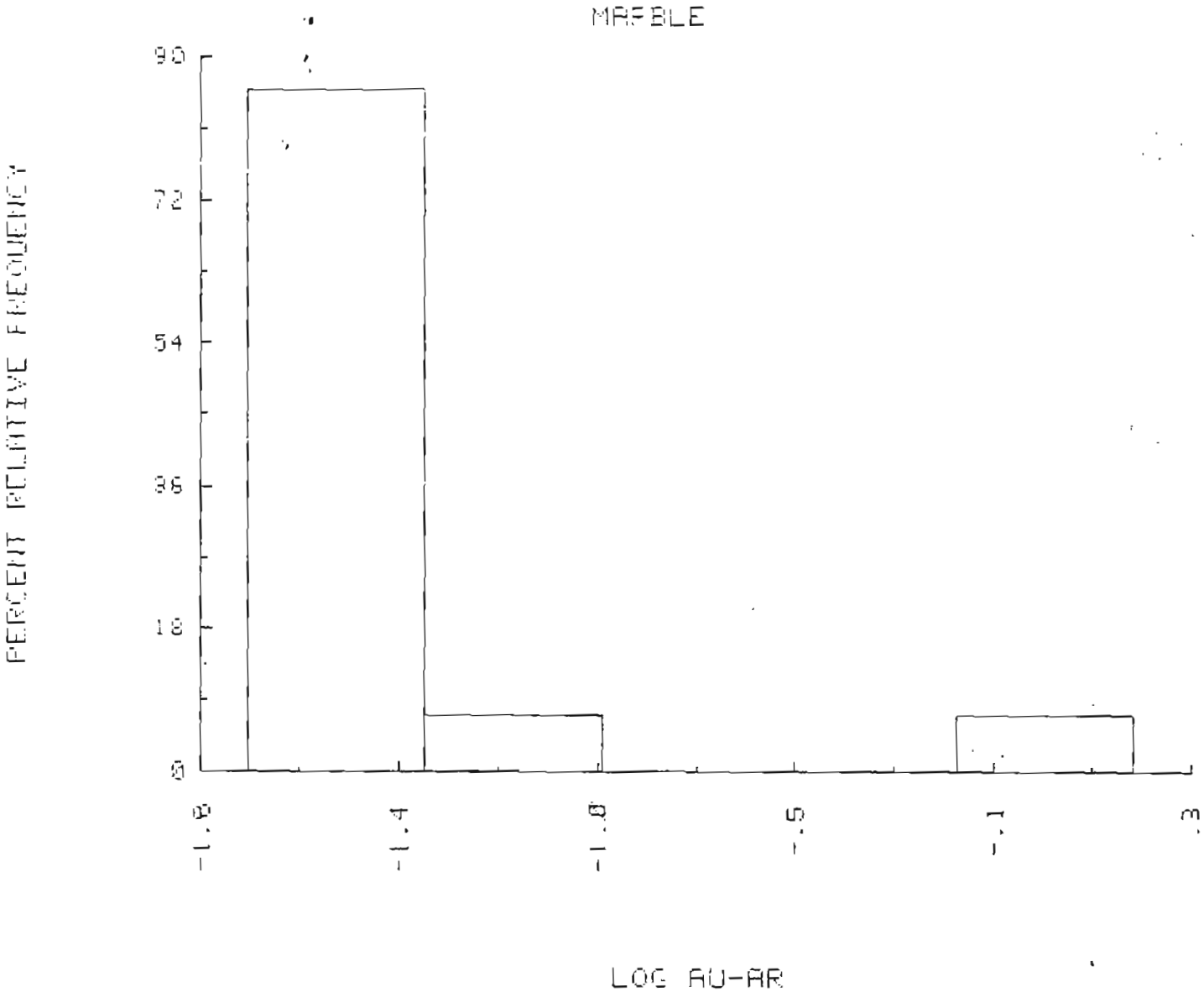
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.15804	.39754	3.32408	9.05983
AU-HBR	1.30680	1.14315	.70711	-1.50000
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.25833	.50825	3.02192	7.63121
LOG AU-HBR	1.33333	1.15470	.70711	-1.50000
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	307.48937	.10625	-.10031	.35883
AU-HBR	168.11081	.66000	-2.14007	3.50007
AU-FA	----------	.66000	-2.82007	2.82007
LOG AU-AR	33.20279	.13584	-1.82428	-1.23722
LOG AU-HBR	111.85671	.66667	-3.88086	1.81625
LOG AU-FA	----------	.66667	-2.84855	2.84855

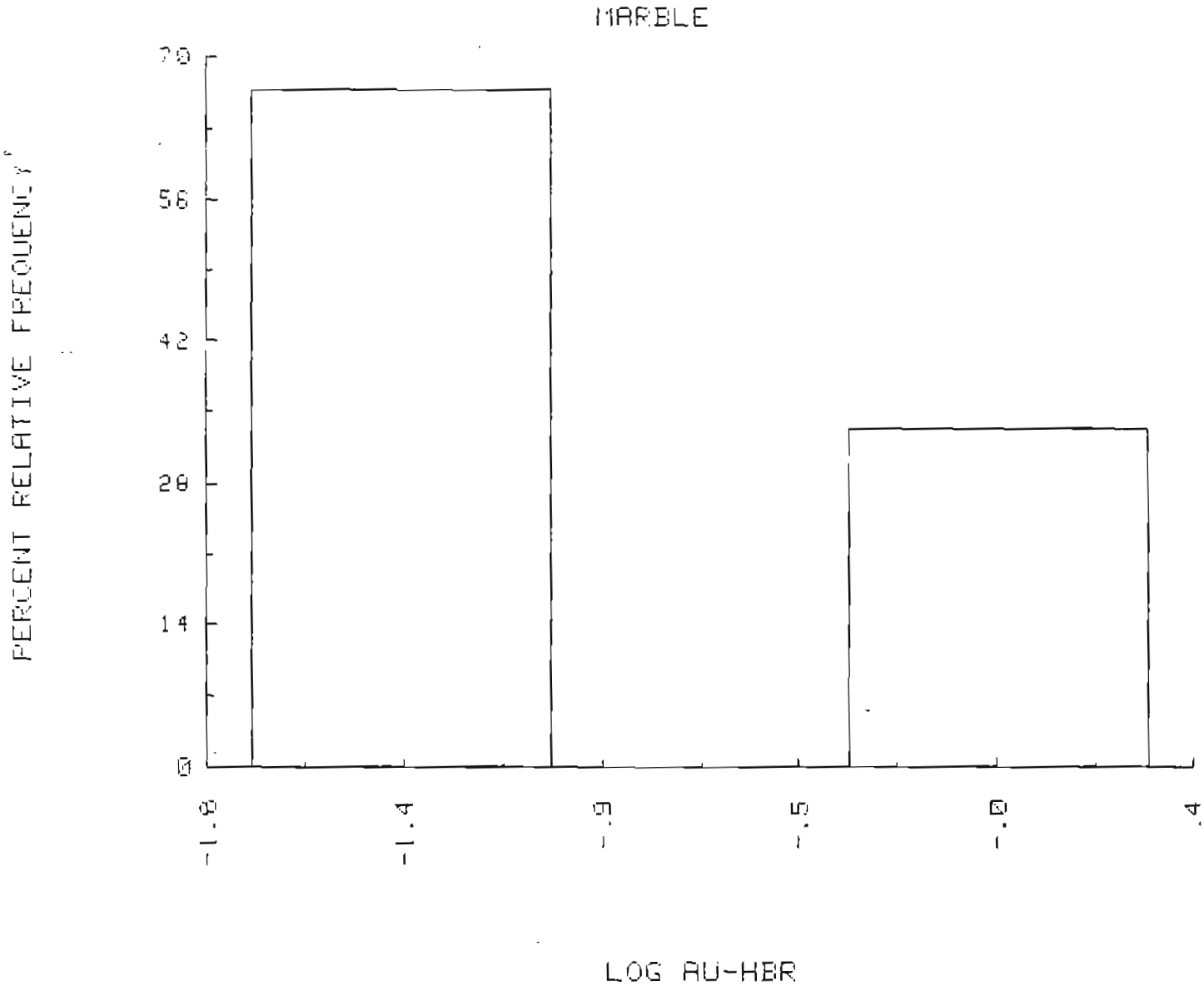
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	1.51000	.02000	1.49000	.76500
AU-HBR	2.00000	.02000	1.98000	1.01000
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	.17898	-1.69897	1.87795	-.76000
LOG AU-HBR	.30103	-1.69897	2.00000	-.69897
LOG AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.323	12
2	-1.323	-.948	1
3	-.948	-.572	0
4	-.572	-.197	0
5	-.197	.179	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.032	2
2	-1.032	-.366	0
3	-.366	.301	1



Subfile: UNIDENTFD

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	16	3	37.61000	2.08944
AU-HBR	1	20	.05000	.05000
AU-FA	3	18	.94000	.31333
LOG AU-AR	18	3	-9.37267	-.52072
LOG AU-HBR	1	20	-1.30103	-1.30103
LOG AU-FA	3	18	-1.63242	-.54414

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	15.24633	3.90466	2.30666	4.74719
Variance is zero,remaining calculations can't be done				
AU-FA	.02403	.15503	.03948	-1.50000
LOG AU-AR	.93851	.96876	.31558	-1.20539
Variance is zero,remaining calculations can't be done				
LOG AU-FA	.05570	.23600	-.27011	-1.50000

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	186.87530	.92034	.14723	4.03166
AU-FA	49.47666	.08950	-.06911	.69577
LOG AU-AR	186.04503	.22834	-1.00259	-.03884
LOG AU-FA	43.37122	.13625	-1.12633	.03005

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	15.00000	.02000	14.98000	7.51000
AU-HBR	.05000	.05000	0.00000	.05000
AU-FA	.47000	.16000	.31000	.31500
LOG AU-AR	1.17609	-1.69897	2.87506	-.26144
LOG AU-HBR	-1.30103	-1.30103	0.00000	-1.30103
LOG AU-FA	-.32790	-.79588	.46798	-.56189

Swfile: AMPHIBOLTE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	30	6	1.49500	.04983
AU-HBR	11	25	.28000	.02545
AU-FA	0	36	0.00000	0.00000
LOG AU-AR	30	6	-46.34887	-1.54496
LOG AU-HBR	11	25	-17.89279	-1.62662
LOG AU-FA	3	33	0.00000	0.00000

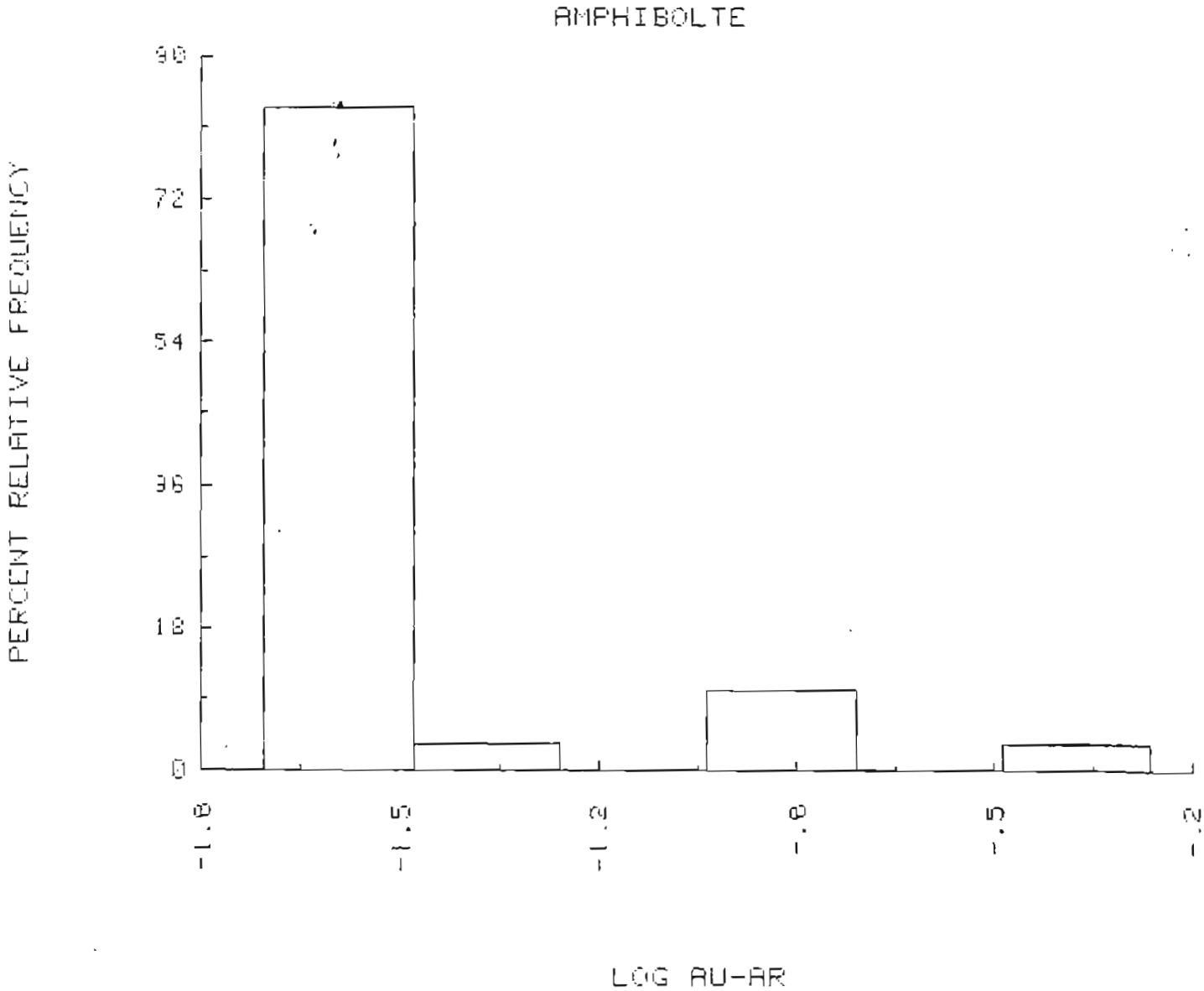
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.00968	.09837	4.37340	19.04517
AU-HBR	.00015	.01214	1.64992	.72222
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.12006	.34650	2.41542	5.01946
LOG AU-HBR	.02591	.16097	1.64992	.72222
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	197.39839	.01796	.01309	.08657
AU-HBR	47.67556	.00366	.01730	.03361
AU-FA	----------	.00366	-.00815	.00815
LOG AU-AR	22.42760	.06326	-1.67438	-1.41555
LOG AU-HBR	9.89528	.04854	-1.73479	-1.51844

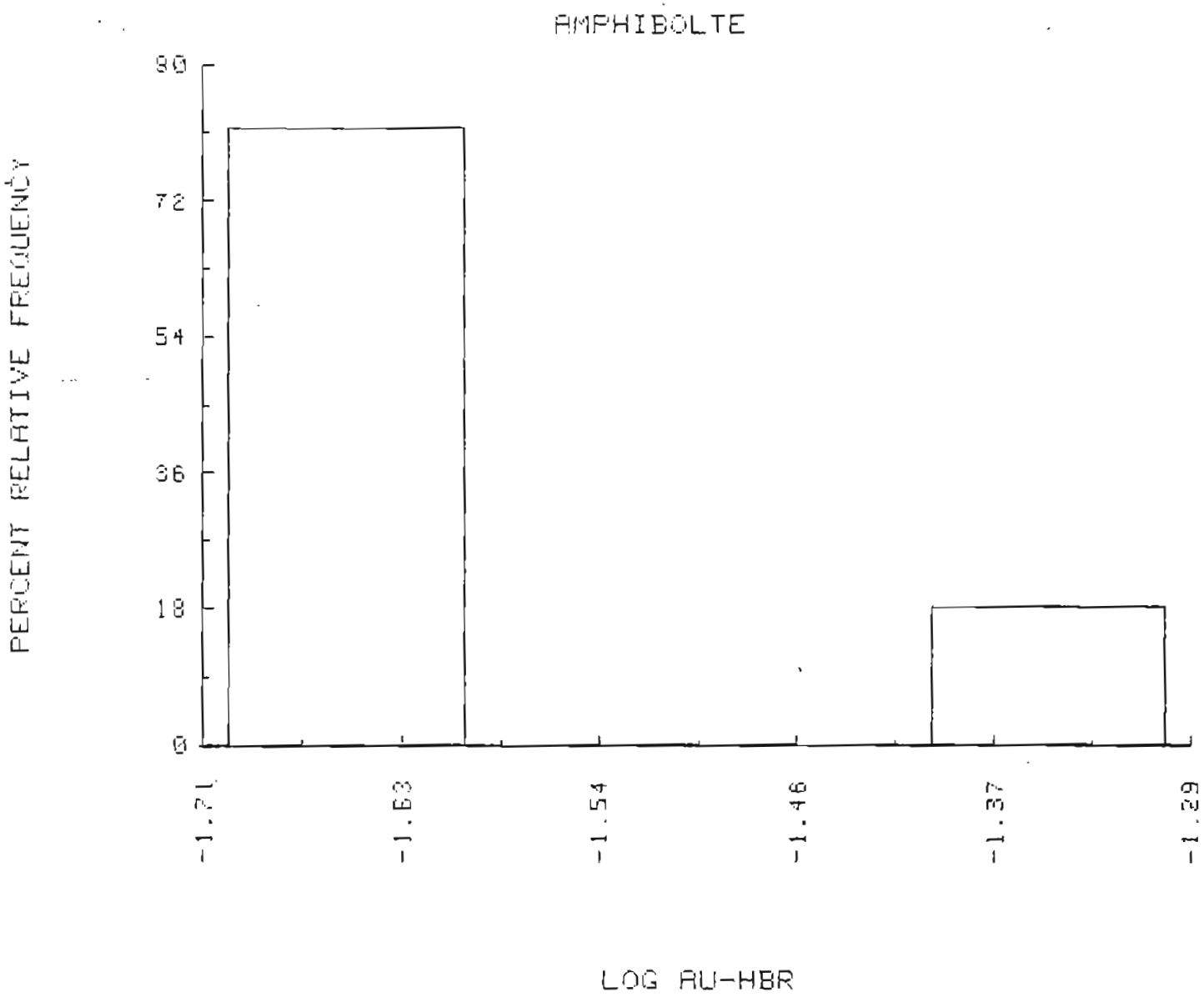
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	.54000	.02000	.52000	.28000
AU-HBR	.05000	.02000	.03000	.03500
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	-.26761	-1.69897	1.43136	-.98329
LOG AU-HBR	-1.30103	-1.69897	.39794	-1.50000
LOG AU-FA	0.00000	0.00000	0.00000	0.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.460	25
2	-1.460	-1.222	1
3	-1.222	-.983	0
4	-.983	-.745	3
5	-.745	-.506	0
6	-.506	-.268	1



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.599	9
2	-1.599	-1.500	0
3	-1.500	-1.401	0
4	-1.401	-1.301	2



Swfile: ARGILLITE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	1	0	.13000	.13000
AU-HBR	0	1	0.00000	0.00000
AU-FA	0	1	0.00000	0.00000
LOG AU-AR	1	0	-.88606	-.88606
LOG AU-HBR	0	1	0.00000	0.00000
LOG AU-FA	1	0	0.00000	0.00000

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-HBR	----------	.14142	-.31519	.31519
AU-FA	----------	.14142	-.31519	.31519
LOG AU-HBR	----------	.14142	-.31519	.31519

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	.13000	.13000	0.00000	.13000
AU-HBR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	-.88606	-.88606	0.00000	-.88606
LOG AU-HBR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-FA	0.00000	0.00000	0.00000	0.00000

Subfile: GALENA

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	7	4	109.82000	15.68857
AU-HBR	4	7	26.64000	6.66000
AU-FA	2	9	25.82000	12.91000
LOG AU-AR	7	4	4.63313	.66188
LOG AU-HBR	4	7	-1.30086	-.32521
LOG AU-FA	11	0	0.00000	0.00000

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	344.69691	18.56602	1.09621	-.21215
AU-HBR	93.34613	9.66158	.88143	-.93028
AU-FA	35.11220	5.92555	0.00000	-2.00000
LOG AU-AR	1.26851	1.12628	-1.42856	.96020
LOG AU-HBR	2.56246	1.60077	.05358	-1.92888

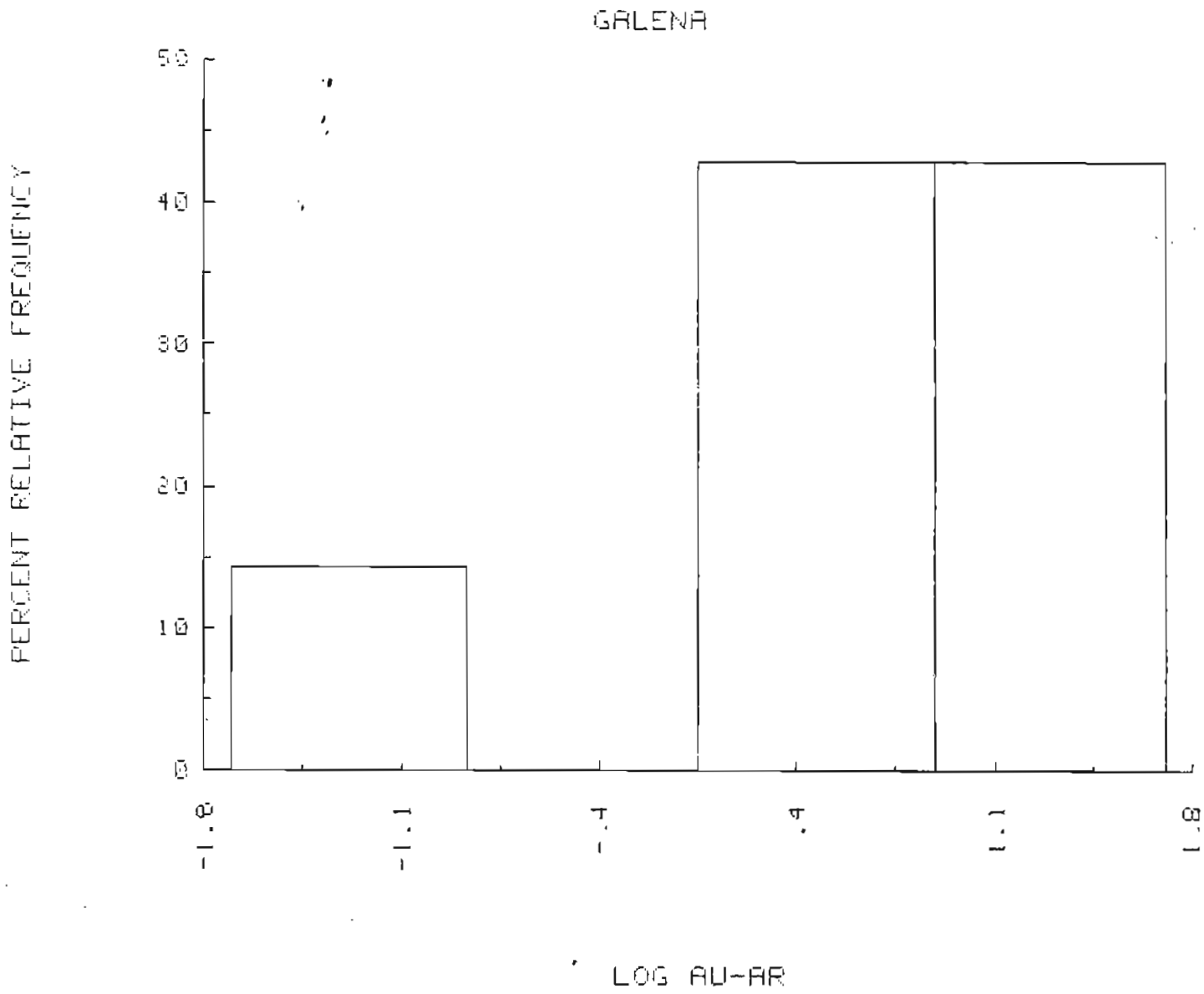
Variance is zero,remaining calculations can't be done

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	118.34102	7.01729	-1.48658	32.86372
AU-HBR	145.06877	4.83079	-8.70154	22.02154
AU-FA	45.99895	4.19000	-34.47923	60.29923
LOG AU-AR	170.16479	.42569	-.38003	1.70378
LOG AU-HBR	492.22003	.80038	-2.87037	2.21995

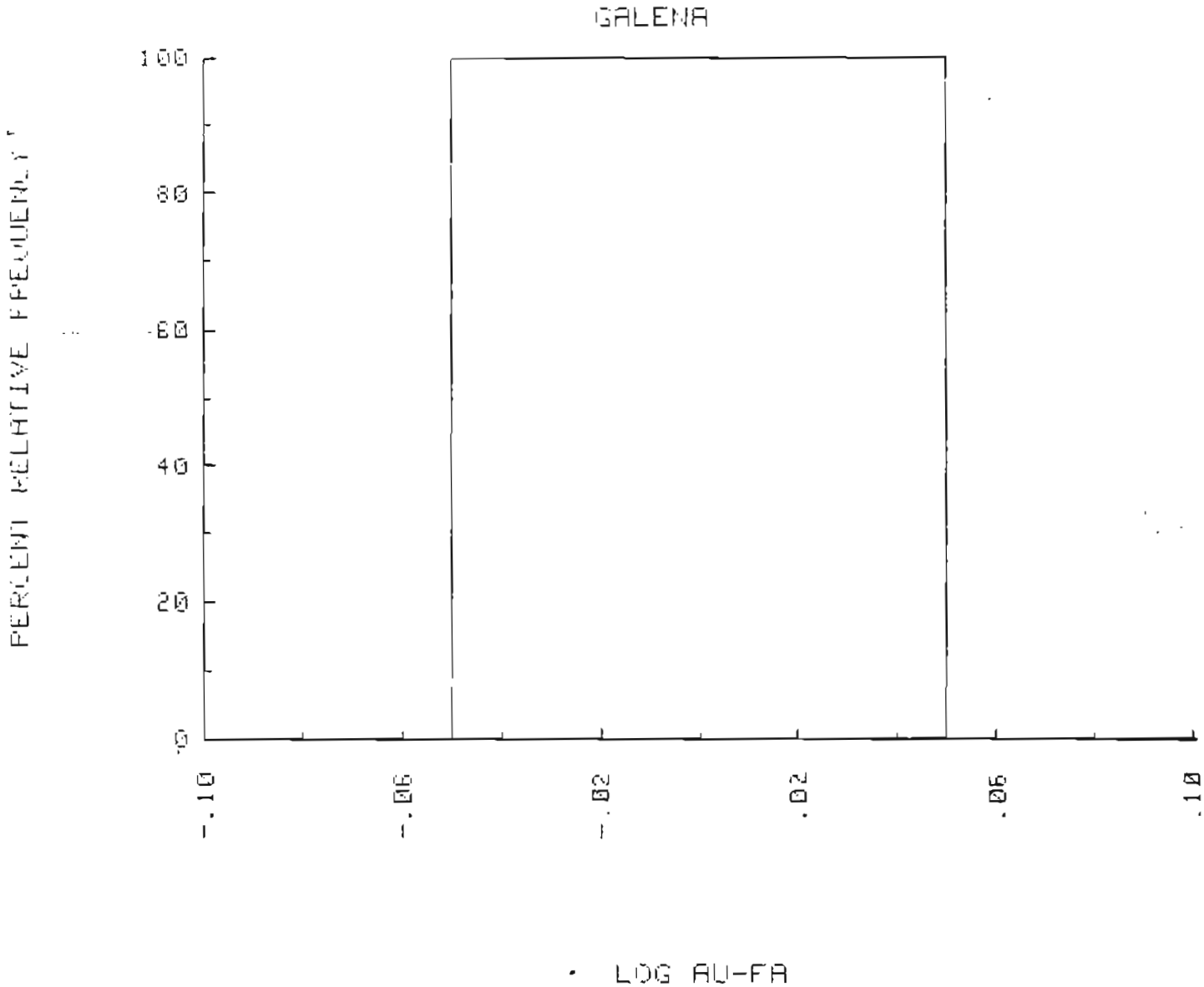
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	51.00000	.02000	50.98000	25.51000
AU-HBR	20.50000	.02000	20.48000	10.26000
AU-FA	17.10000	8.72000	8.38000	12.91000
LOG AU-AR	1.70757	-1.69897	3.40654	.00430
LOG AU-HBR	1.31175	-1.69897	3.01072	-.19361
LOG AU-FA	0.00000	0.00000	0.00000	0.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-.847	1
2	-.847	.004	0
3	.004	.856	3
4	.856	1.708	3



CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-.050	.050	11



Subfile: MISCELLNOS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	28	4	5.49000	.19607
AU-HBR	4	28	.18000	.04500
AU-FA	1	31	0.00000	0.00000
LOG AU-AR	28	4	-37.85805	-1.35207
LOG AU-HBR	4	28	-6.01773	-1.50443
LOG AU-FA	32	0	0.00000	0.00000

VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	.53313	.73016	4.91340	22.43667
AU-HBR	.00250	.05000	1.15470	-.66667
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.26392	.51374	2.32653	5.59341
LOG AU-HBR	.15138	.38908	1.15470	-.66667
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	372.39309	.13799	-.08712	.47926
AU-HBR	111.11111	.02500	-.03450	.12450
LOG AU-AR	37.95612	.09709	-1.55133	-1.15282
LOG AU-HBR	25.85196	.19454	-2.12305	-.88582

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	3.90000	.02000	3.88000	1.96000
AU-HBR	.12000	.02000	.10000	.07000
AU-FA	0.00000	0.00000	0.00000	0.00000
LOG AU-AR	.59106	-1.69897	2.29003	-.55395
LOG AU-HBR	-.92082	-1.69897	.77815	-1.30989
LOG AU-FA	0.00000	0.00000	0.00000	0.00000

Subfile: GRANITE

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
AU-AR	15	0	6.21000	.41400
AU-HBR	0	15	0.00000	0.00000
AU-FA	0	15	0.00000	0.00000
LOG AU-AR	15	0	-19.92285	-1.32819
LOG AU-HBR	0	15	0.00000	0.00000
LOG AU-FA	15	0	0.00000	0.00000

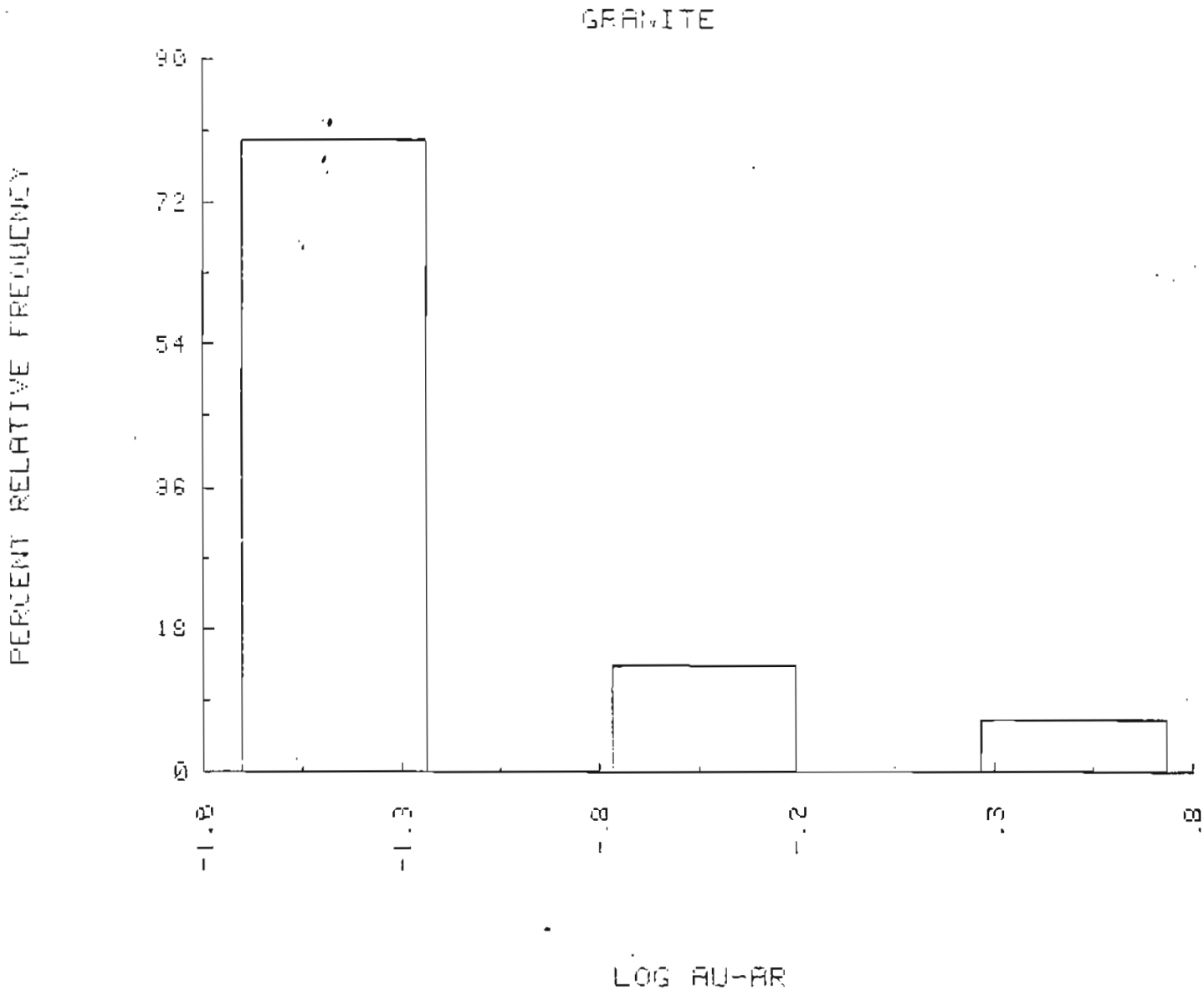
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
AU-AR	1.90920	1.38174	3.45399	9.98185
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				
LOG AU-AR	.47013	.68566	2.07698	3.50187
Variance is zero,remaining calculations can't be done				
Variance is zero,remaining calculations can't be done				

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
AU-AR	333.75290	.35676	-.35137	1.17937
AU-HBR	----------	.35676	-.76537	.76537
AU-FA	----------	.35676	-.76537	.76537
LOG AU-AR	51.62368	.17704	-1.70799	-.94839
LOG AU-HBR	----------	.17704	-.37980	.37980

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
AU-AR	5.40000	.02000	5.38000	2.71000
AU-HBR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
AU-FA				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-AR	.73239	-1.69897	2.43136	-.48329
LOG AU-HBR				
-9.00000000000E+99 M7D.5D				
9.00000000000E+99 M7D.5D				
LOG AU-FA	0.00000	0.00000	0.00000	0.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	-1.699	-1.213	12
2	-1.213	-.726	0
3	-.726	-.240	2
4	-.240	.246	0
5	.246	.732	1



Appendix II

Regression analysis of aqua-regia, $HBr-Br_2$, and fire-assay methods of gold analysis.

VARIABLE	N	MEAN	VARIANCE	STANDARD DEVIATION	COEFFICIENT OF VARIATION
AQUAREGIA	32	.59688	1.35151	1.16254	194.77159
FIRE ASSY	32	.53344	.73617	.85800	160.84372

CORRELATION = .969862285674

Selected degree of regression = 1
R-SQUARED = .940632850178
STANDARD ERROR OF ESTIMATE = .213510775646

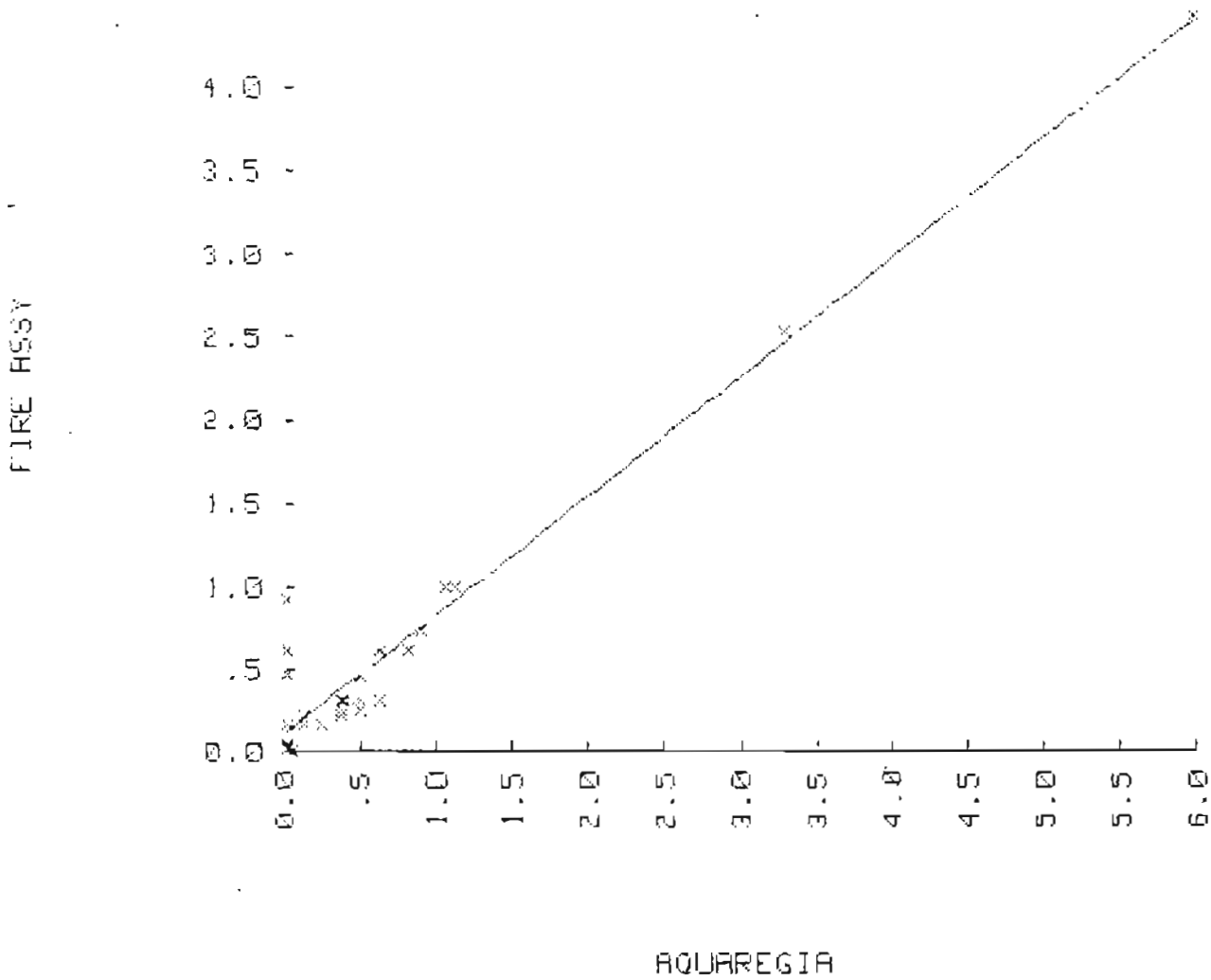
ADV

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F-VALUE
TOTAL	31	22.82112		
REGRESSION	1	21.46630	21.46630	475.33
X^1	1	21.46630	21.46630	475.33
RESIDUAL	30	1.35482	.04516	

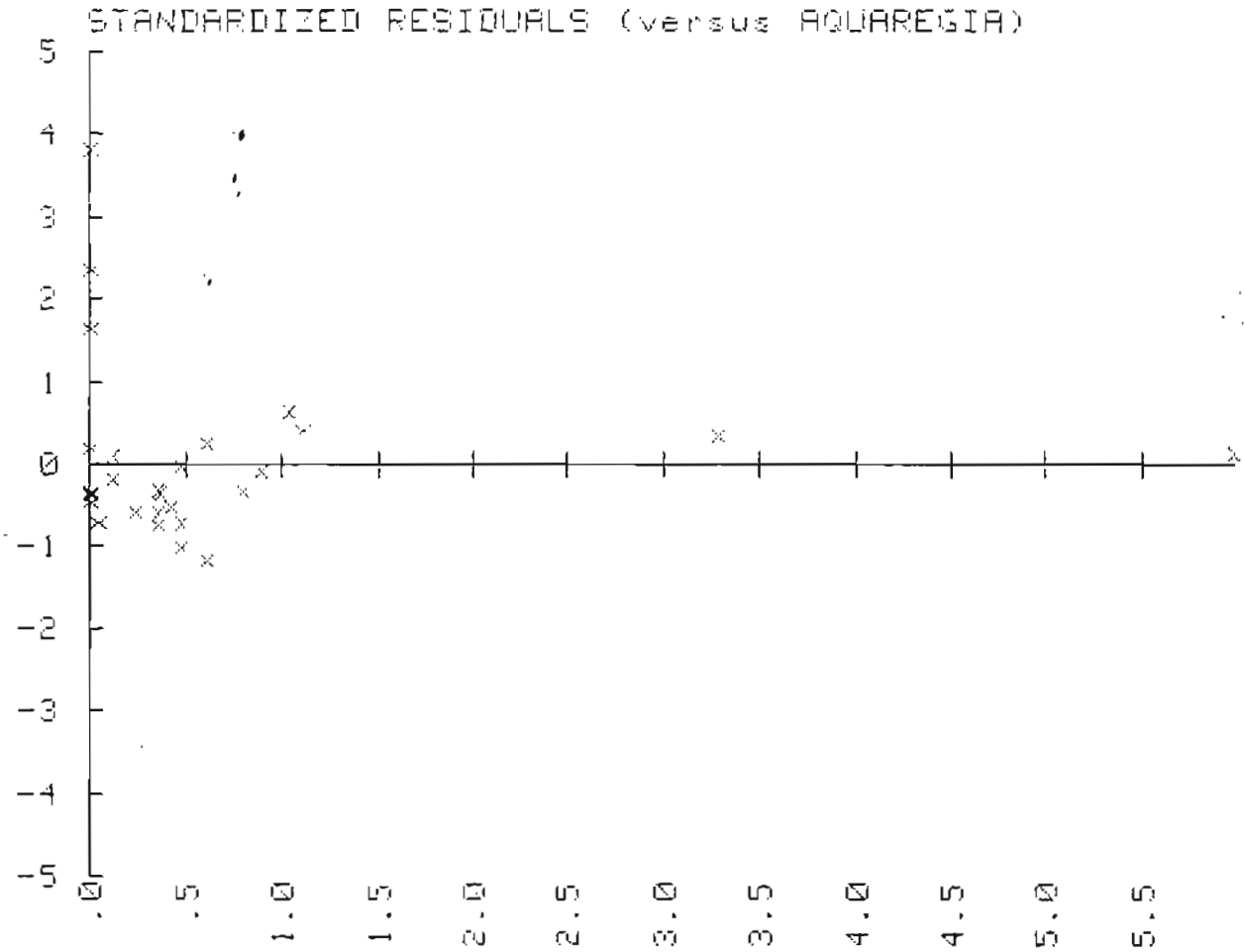
VARIABLE	REGRESSION COEFFICIENTS STD. FORMAT	E-FORMAT	STANDARD ERROR REG. COEFFICIENT	T-VALUE
"CONSTANT"	.10620	.106197297816E+00	.04237	2.51
X^1	.71580	.715795103133E+00	.03283	21.80

	COEFFICIENT	95 % CONFIDENCE INTERVAL LOWER LIMIT	UPPER LIMIT
CONSTANT"	.10620	.01964	.19275
X^1	.71580	.64873	.78286

AU-AQUA REGIA VERSUS FIRE ASSAY



AU-AQUA REGIA VERSUS FIRE ASSAY



VARIABLE	N	MEAN	VARIANCE	STANDARD DEVIATION	COEFFICIENT OF VARIATION
HZR	18	1.66889	24.14779	4.91434	294.44972
FIPE ASSY	18	1.23667	17.98172	4.24049	189.58952

CORRELATION = .973500733138

Selected degree of regression = 1
R-SQUARED = .947703619025
STANDARD ERROR OF ESTIMATE = .999576124633

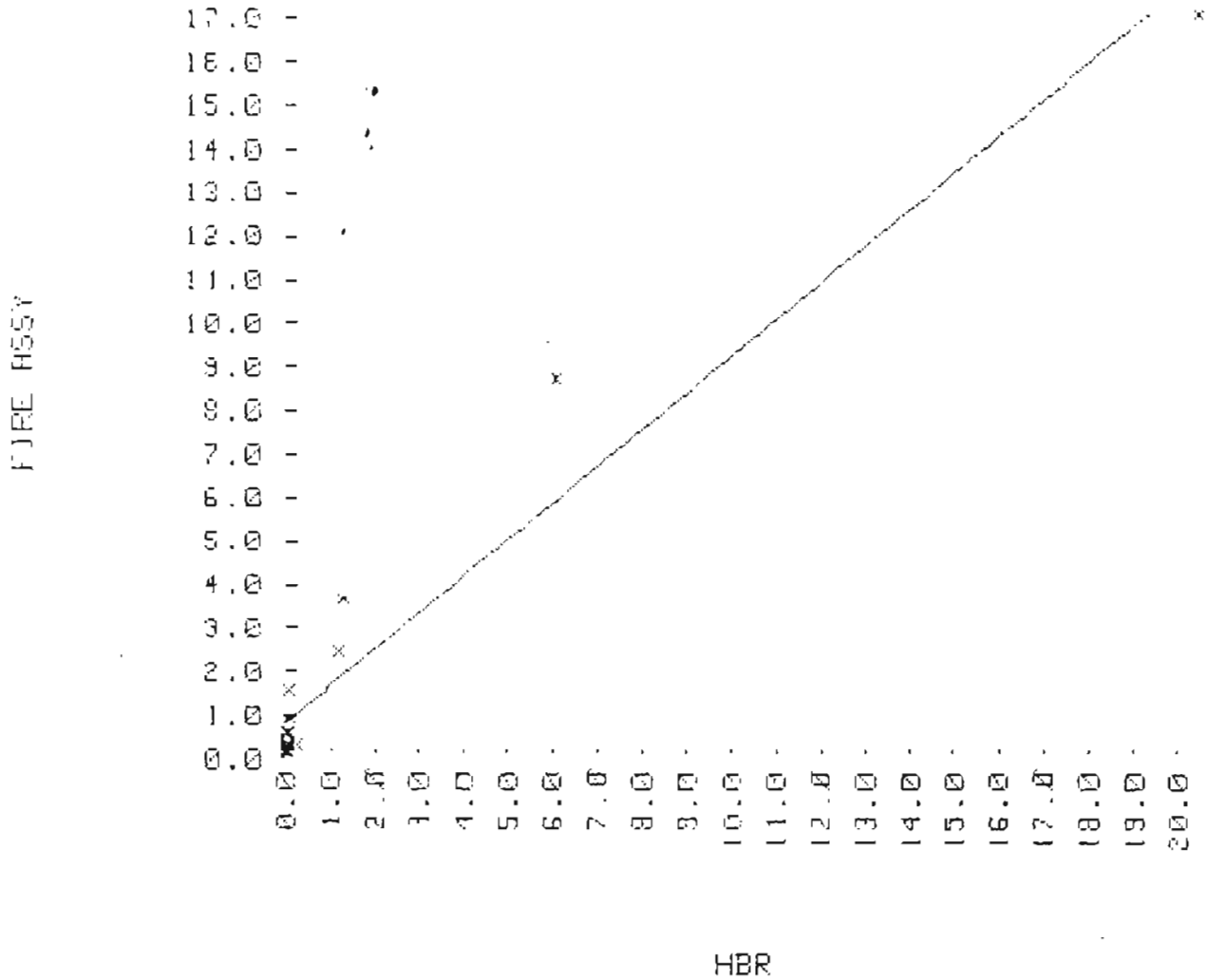
ANOV

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F-VALUE
TOTAL	17	305.68920		
REGRESSION	1	289.70276	289.70276	289.95
X^1	1	289.70276	289.70276	289.95
RESIDUAL	16	15.98644	.99915	

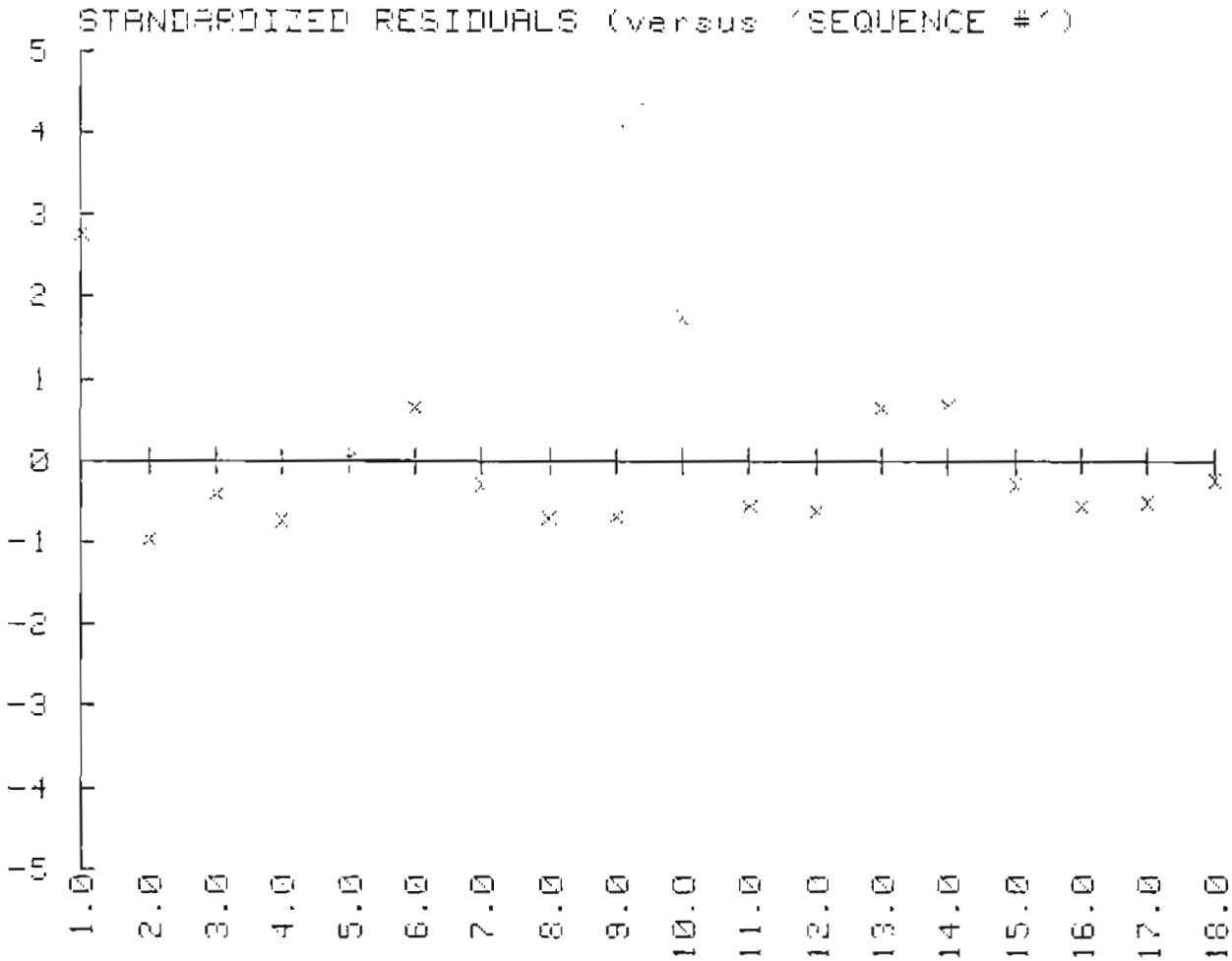
VARIABLE	REGRESSION COEFFICIENTS STD. FORMAT	E-FORMAT	STANDARD ERROR REG. COEFFICIENT	T-VALUE
'CONSTANT'	.83469	.834690218420E+00	.24957	3.34
X^1	.84007	.840065781242E+00	.04933	17.03

	COEFFICIENT	95 % CONFIDENCE INTERVAL LOWER LIMIT	UPPER LIMIT
CONSTANT'	.83469	.30549	1.36390
X^1	.84007	.73545	.94468

AU-HBr VERSUS FIRE ASSAY



AU-KBr VERSUS FIRE ASSAY



Selected degree of regression = 1
R-SQUARED = .646493082425
STANDARD ERROR OF ESTIMATE = 1.93125306259

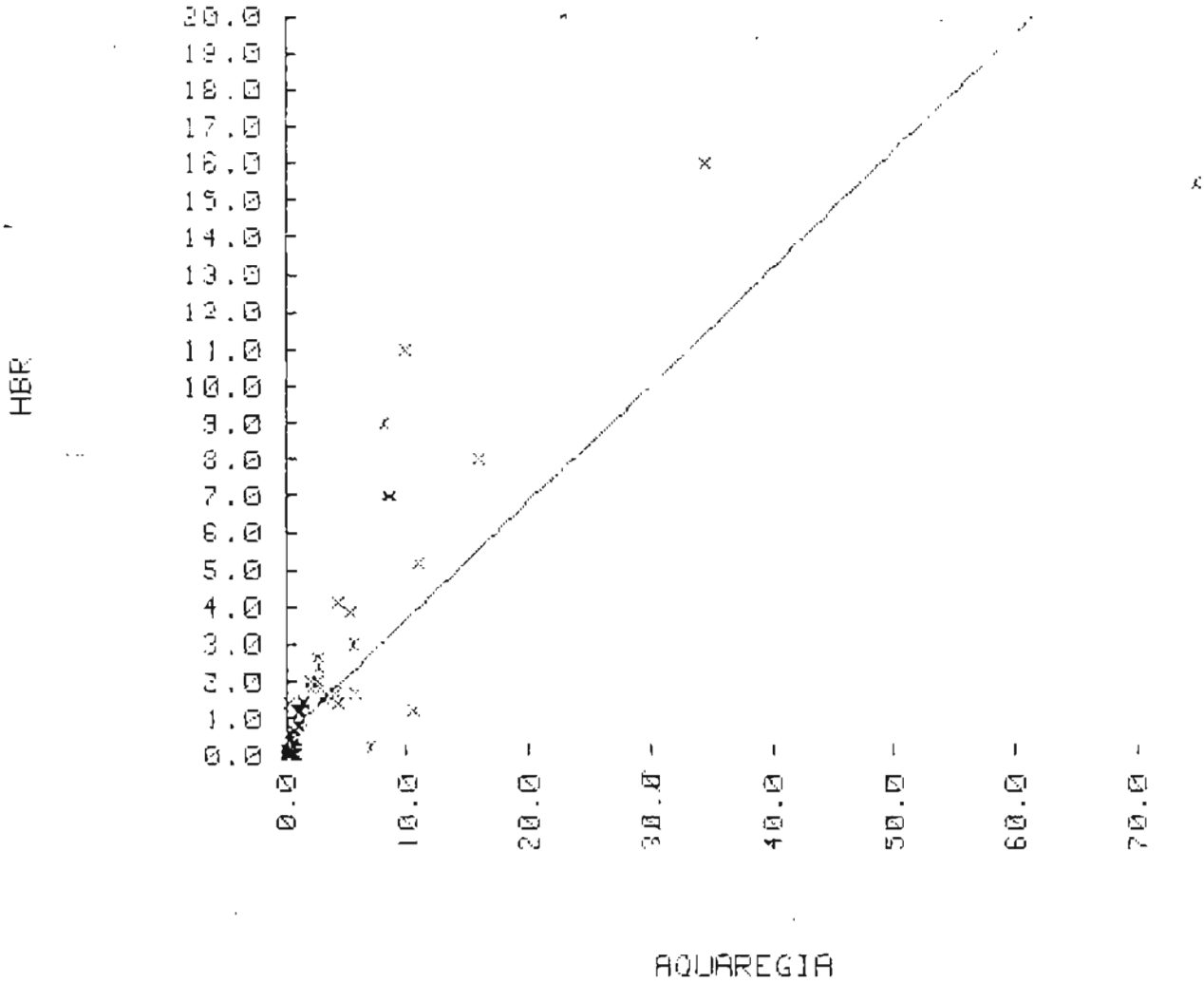
ADV

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F-VALUE
TOTAL	113	1181.67617		
REGRESSION	1	763.94547	763.94547	204.83
X^1	1	763.94547	763.94547	204.83
RESIDUAL	112	417.73070	3.72974	

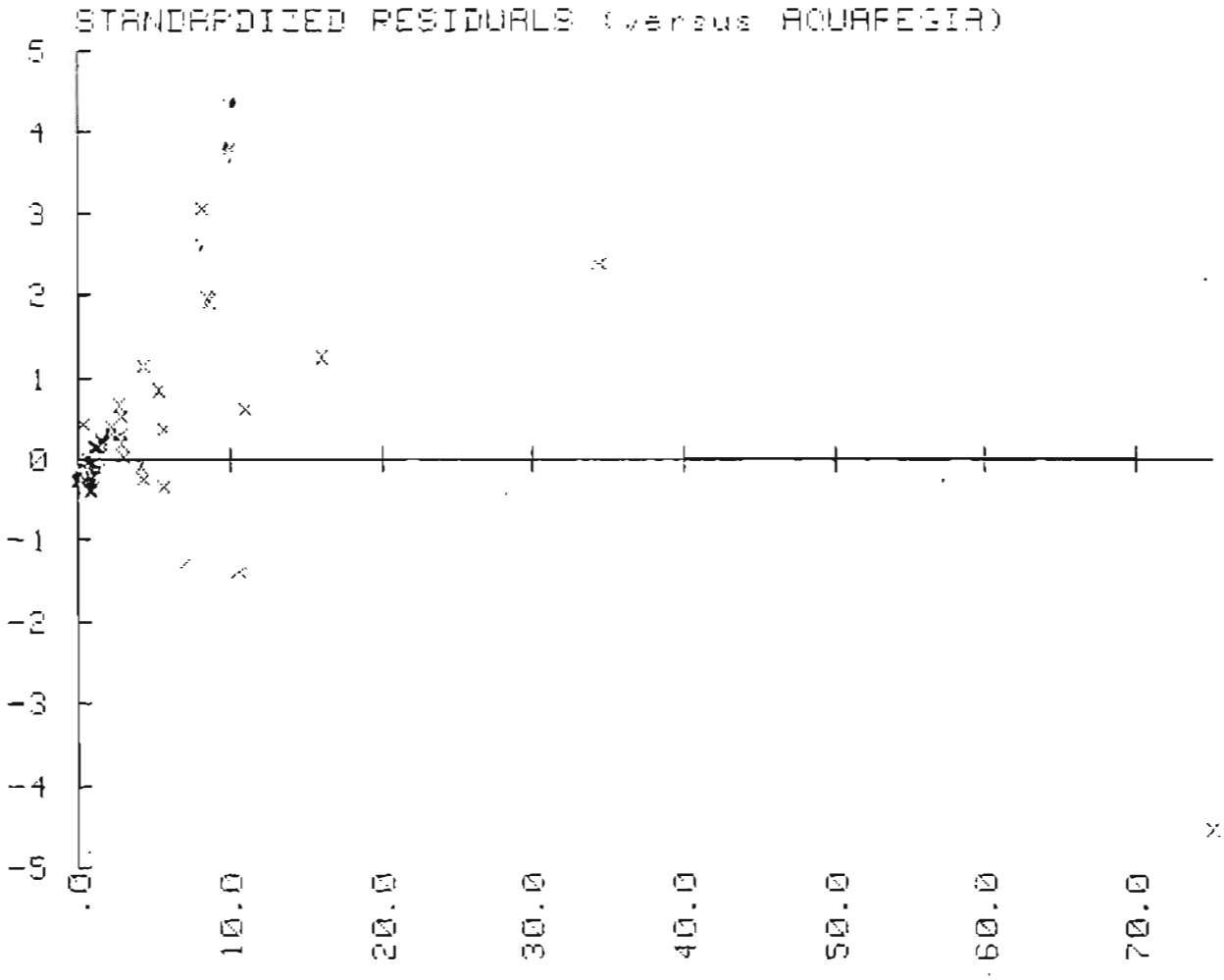
VARIABLE	REGRESSION COEFFICIENTS STD. FORMAT	E-FORMAT	STANDARD ERROR REG. COEFFICIENT	T-VALUE
CONSTANT	.53459	.534593288790E+00	.18965	2.82
X^1	.31582	.315823594588E+00	.02207	14.31

	COEFFICIENT	95 % CONFIDENCE INTERVAL LOWER LIMIT	UPPER LIMIT
CONSTANT	.53459	.15874	.91045
X^1	.31582	.27209	.35956

AU-AQUA REGIA VERSUS HBR



AU-AQUA REGIA VERSUS HBR



```
-----------------------------------------------------------------------------
POLYNOMIAL REGRESSION ON DATA SET:
                          AQ-AQUA REGIA VERSUS HBR
-----------------------------------------------------------------------------

-- Note:  Dependent variable = HBR
          Independent variable = AQUAREGIA
```

VARIABLE	N	MEAN	VARIANCE	STANDARD DEVIATION	COEFFICIENT OF VARIATION
AQUAREGIA	114	2.58251	67.77894	8.23280	318.66726
HBR	114	1.35056	10.45731	3.23378	239.44566

CORRELATION = .804047935402

Selected degree of regression = 2
R-SQUARED = .865118165129
STANDARD ERROR OF ESTIMATE = 1.1982970267

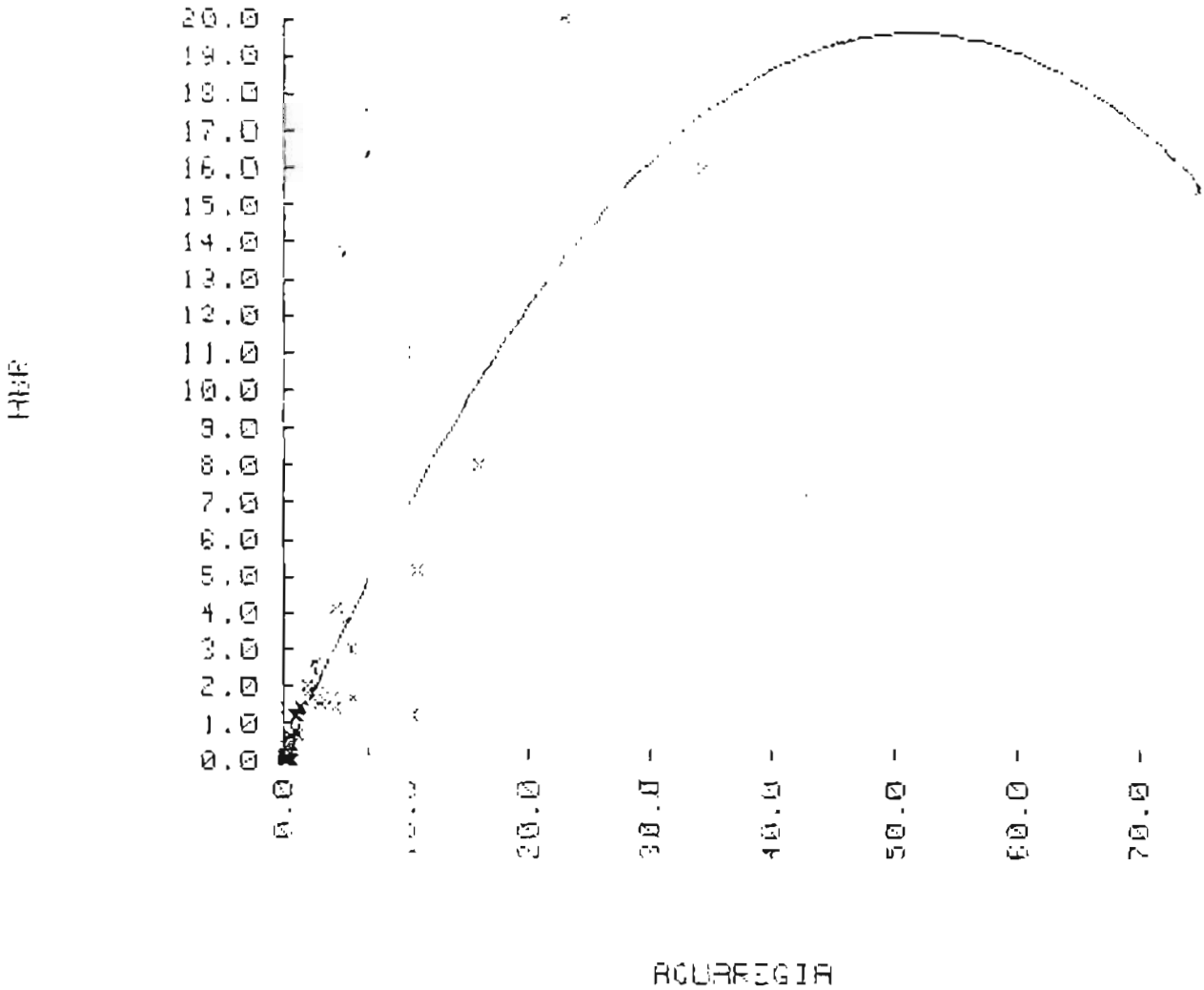
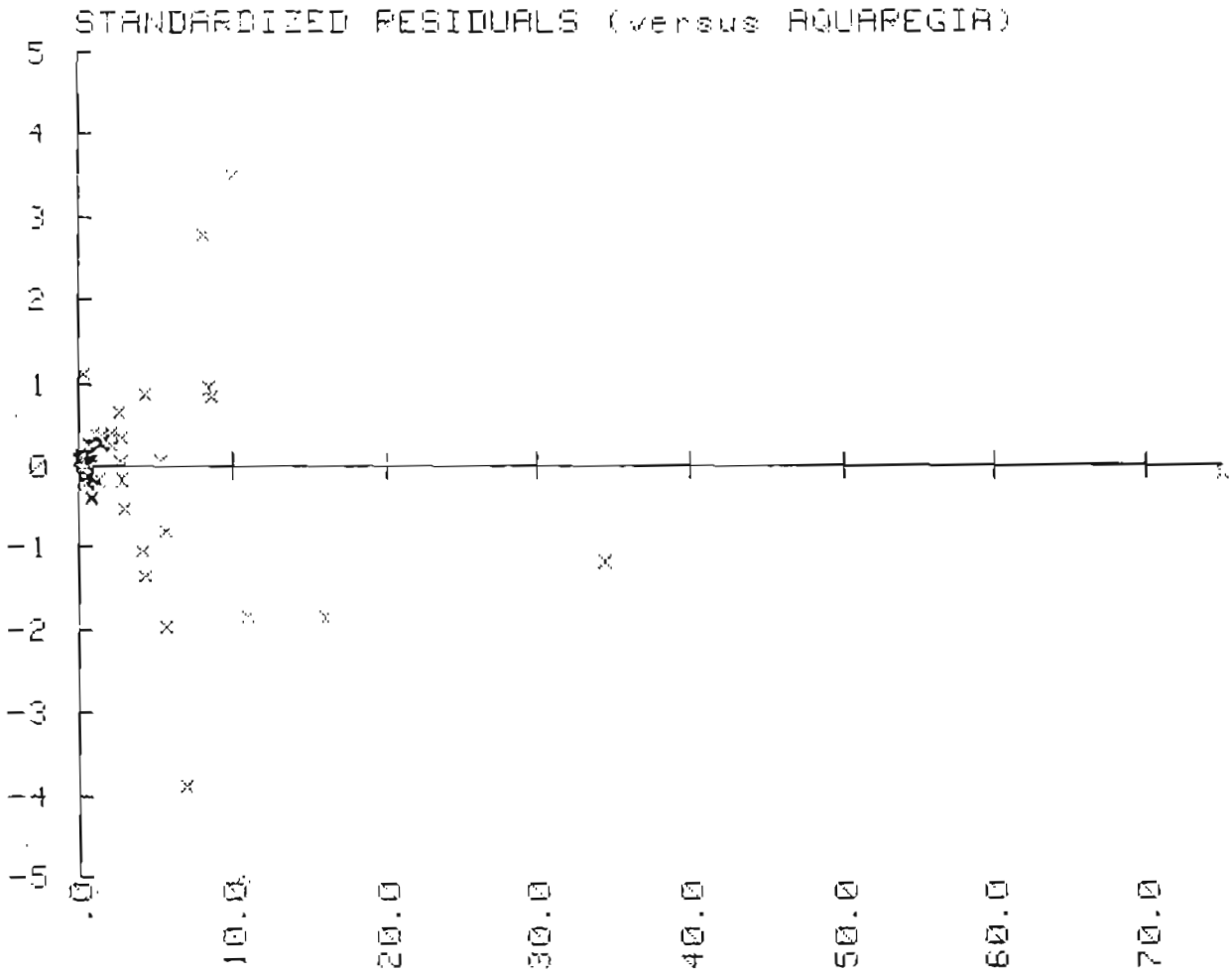
ANOVA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F-VALUE
TOTAL	113	1181.67617		
REGRESSION	2	1022.28952	511.14476	355.97
X 1	1	763.94547	763.94547	532.03
X 2	1	258.34405	258.34405	179.92
RESIDUAL	111	159.38665	1.43592	

VARIABLE	REGRESSION COEFFICIENTS STD. FORMAT	E-FORMAT	STANDARD ERROR REG. COEFFICIENT	T-VALUE
CONSTANT	-.07428	-.742766575190E-01	.12613	-.59
X1	.76235	.762346771808E+00	.03600	21.18
X2	-.00738	-.737523250544E-02	.00055	-13.41

	COEFFICIENT	95 % CONFIDENCE INTERVAL LOWER LIMIT	UPPER LIMIT
CONSTANT	-.07428	-.32426	.17571
X1	.76235	.69100	.83369
X2	-.00738	-.00847	-.00629

AU-AQUA REGIA VERSUS HBR



AU-AQUA REGIA VERSUS HBR