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A STATISTICAL ANALYSIS OF ROCK SAMPLES FROM
THE DIVIDE MINING DISTRICT, TONOPAH, NEVADA

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Business 208
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A STATISTICAL ANALYSIS OF ROCK SAMPLES FROM THE DIVIDE MINING DISTRICT

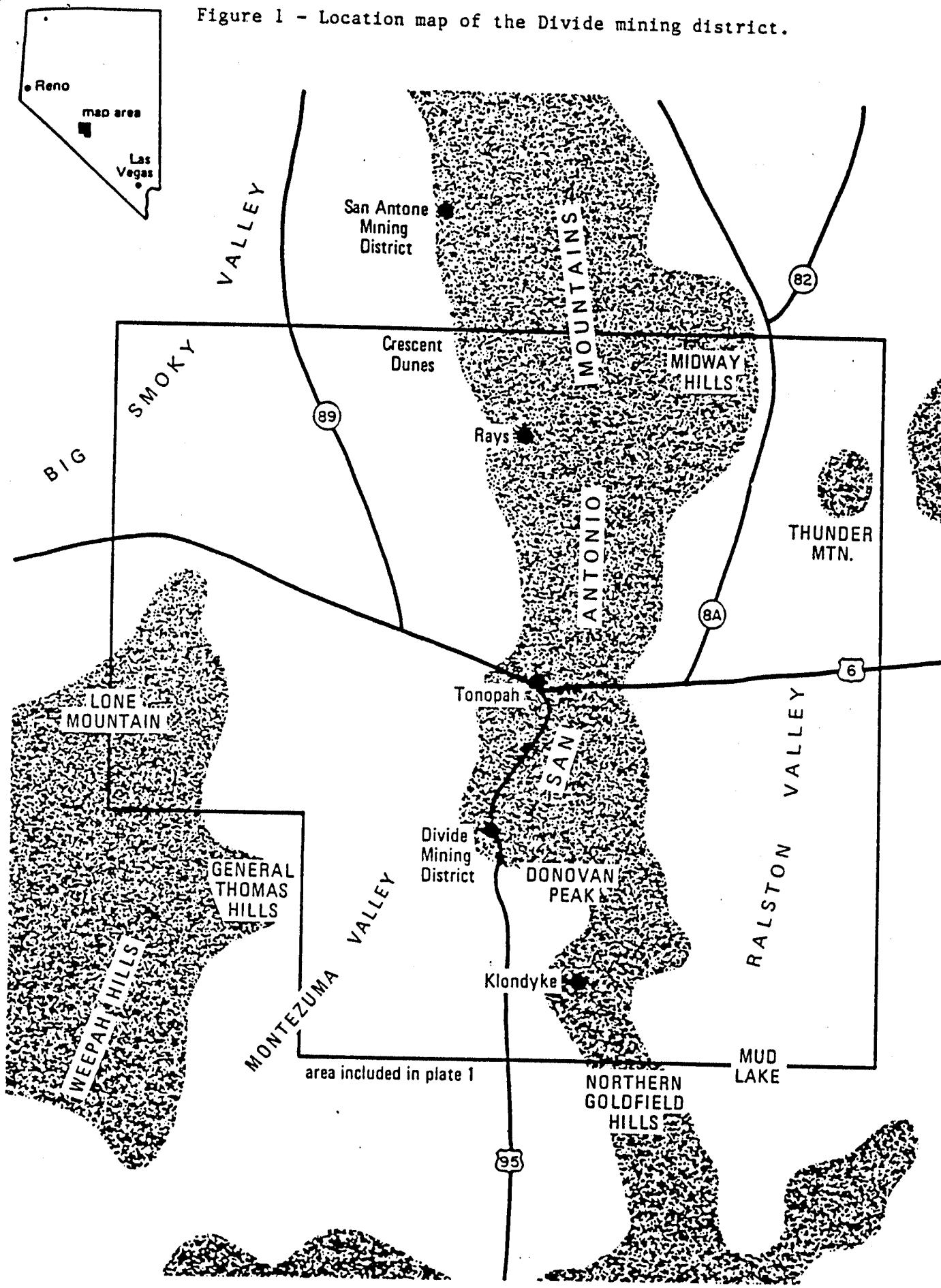
INTRODUCTION

The discovery of ore in the Divide mining district near the town of Tonopah, triggered one of the last major silver rushes in Nevada (Fig. 1). Between 1911 and 1940, the district produced more than 32,000 oz. of gold and 3 million oz. of silver, worth approximately \$ 33.5 million at today's prices (Bonham and Garside, 1979). The Divide district lay idle for many years, but exploration activity was renewed in the 1970's when the price of precious metals rose. Silver deposits are presently uneconomic to mine, but gold or gold-silver deposits may be profitable. Even though the district was extensively mined, there is reason to believe that additional deposits may be found. This project attempts to locate potential gold deposits by statistically analyzing geochemical samples of rocks from the Divide district.

Geochemical Exploration Methods

The geochemical analysis of rock samples is an effective, inexpensive method used to help locate potentially ore-bearing, mineralized areas. Once a favorable area is identified through a reconnaissance study, a more detailed geochemical survey is made to precisely delineate the most mineralized zones. The detailed geochemical study is followed by more expensive exploration techniques, such as trenching, drilling and underground exploration.

Figure 1 - Location map of the Divide mining district.



In a rock geochemical survey, each sample is analyzed for the target metal and any possible "pathfinder" elements that are known to be associated with the target metal in a particular geologic environment. Since "pathfinders" may be more or less mobile than the target metal, they can be used to find the target metal in environments where the target metal may not be readily detected alone.

THE STUDY

The Samples

In 1984, Meridian Land and Mineral Co. geochemically analyzed 143 rock samples taken from an area surrounding the main open-pit silver mine in the Divide mining district (Appendix I). The samples were collected from outcrops and mine tailings during two different sampling periods for the purpose of delineating areas of high gold content. The first set of 86 samples was analyzed for gold, silver, arsenic, antimony, and mercury, while the second set was analyzed only for gold and silver. Assays are quoted in parts per million (ppm) (Appendix II). The locations and assay values of these samples were loaned to me by the Tonopah Divide Mining Company for use in this study.

Statistical Analyses

In this study, I first statistically described the geochemical samples using a statistical computing system called Minitab (Appendix II). I determined the mean gold value of the samples to be 1.107 ppm (.032 oz/ton) with a maximum value of 29 ppm (.85 oz/ton). The mean silver value is 26.09 ppm (.761 oz/ton) with a maximum value of 450.0 ppm (13.12 oz/ton).

Then, in order to determine if areas with anomalously high gold values can be delineated statistically, I analyzed the values of gold and its "pathfinder" elements using the analysis of variance (ANOVA) test and the simple linear regression test. I used ANOVA to determine whether one area shows a greater potential for a gold deposit than any other area in the sampled region, and the simple linear regression model to determine if any "pathfinder" elements could be used to help detect gold. Each of the tests is discussed below.

The ANOVA Statistical Test

Before running the ANOVA test, I divided the sampled region into 6 areas (treatments) oriented parallel to a suspected east trending mineralized zone (Plate 1). Each of the 6 areas contained at least 5 samples. To test whether any of the treatments have greater potential for gold than the others, two hypotheses were proposed. The null hypothesis was "The mean value of a particular element in the samples from each treatment are equal." The alternative hypotheses was, "The mean values of a selected element in at least two treatments differ." If a particular treatment contains a significantly higher mean element value, the null hypothesis should be rejected.

An analysis of variance was performed on each of the elements (Appendix III). The F-statistic test using a 95% confidence interval was used to compare the sources of variability--variability due to differences between the area (treatment) means, and variability due to within-sample differences. A large F-statistic (from ANOVA) would cause the null hypothesis to be rejected, indicating that the treatment means differ. The

F-values from the F-tables (using a 95% confidence level) are shown with each ANOVA test in Appendix III.

Results:

At the confidence interval of 95%, the null hypothesis was not rejected for gold, silver, and arsenic, but was rejected for antimony and mercury. Since gold and silver are the target metals, the areas with the highest mean values of gold and silver were re-divided into smaller areas and the ANOVA test repeated. In all, the region was divided and tested three times until the minimum number of samples in each area was reached, but the null hypothesis for gold or silver could never be rejected (Appendix III, Plate 1).

Discussion:

Because the null hypothesis for gold and silver values could not be rejected, it can not be concluded that there is a significant difference between the treatment mean values of these elements. Therefore, if there are areas having higher gold values, they could not be delineated through an analysis of variance. This may be because the entire region sampled has a high average gold value (.032 oz/ton) making it difficult to detect higher values within a particular treatment.

In contrast, the null hypothesis was rejected for the antimony and mercury tests. Interestingly, the area which showed the highest mean value for antimony and mercury (Area 3), also showed the highest mean gold value. This would be significant if there was a strong gold-antimony or gold-mercury correlation but, as will be demonstrated below, gold shows the weakest correlation with antimony and mercury in this region.

The Simple Linear Regression Test

The simple linear regression test was used to assess whether there is a statistical correlation between any of the 4 non-target elements and gold. Appendix IV shows the computer analyses of the test; the results are summarized in Table 1.

Results: The elements with the strongest correlation to gold in decreasing order are: arsenic, silver, mercury, and antimony. Arsenic has a very strong relationship with gold ($r = .883$). The utility test (t-ratio) of the arsenic-gold hypothesized model also strongly suggests that arsenic contributes information for the prediction of gold (see Table 1).

CONCLUSION

Areas having significantly higher gold values could not be identified in the sampled region using the analysis of variance test. The anomalously high mean values for gold and silver throughout the region may explain these results. The ANOVA tests did show that mean values of antimony and mercury differed in the treatment areas. However, although there is a positive correlation between the area having the highest mean value of antimony and that having the highest mean value of gold (Area 3), the significance of this correlation could not be determined because the overall correlation coefficient between antimony and gold is weak ($r=.30$).

The simple linear regression analyses indicates that of the elements analyzed, arsenic has the strongest relationship with gold, followed by silver, mercury, and antimony. This suggests that arsenic may be used as a detector for gold in this area. There are however, many geologic factors which must be taken into consideration before a useful understanding of the

relationship between gold and these elements, particularly arsenic, can be made. For instance, the rock types, geochemical alterations, geologic structures, and zones of mineralization (especially around an orebody) in the sampled region must be taken into account. Each of these factors could individually and collectively affect the relationship of "pathfinder" elements to gold.

TABLE 1: Statistical relationships between gold and its "pathfinder" elements. (Summary of Appendix III).

	Regression Equation	Correlation Coefficient	t-ratio	T-Statistic (99% C.I.)*	Relationship w/ gold
Ag	y=.379 + .0318Ag	r=.637	7.59	2.576	strong relationship
As	y=-1.112 + .0494As	r=.883	17.26	2.576	very strong relationship
Sb	y=1.26 + .0216Sb	r=.30	0.89	2.576	very weak relationship
Hg	y=-0.169 + 2.49Hg	r=.58	6.58	2.576	good relationship

Au = Silver

As = Arsenic

Sb = Antimony

Hg = Mercury

* The Student t-test was used to test $H_0 : B = 0$. Only the antimony-gold regression equation model could not be rejected. The most useful model for predicting gold values is the simple linear regression equation using arsenic as the variable.

REFERENCES

- Bonham, H. F. and Garside, L. J., 1979, Geology of the Tonopah, Lone Mountain, Klondike, and Northern Mud Lake Quadrangles, Nevada: Nevada Bureau of Mines and Geology Buletin 92, p. 121-128.
- 1982, Geochemical Reconnaissance of the Tonopah, Lone Mountain, Klondike, and Northern Mud Lake Quadrangles, Nevada: Bulletin 96, Nevada Bureau of Mines and Geology, 68 p.
- Nash, J. T., Siems, D. F., and Budge, S., 1985, Geochemical Signature of the Divide Silver-Gold District, Esmeralda County, Nevada: U. S. Geological Survey Open-File Report 85-535, 28 p.

APPENDIX I - Assay values and descriptions of 143 samples
from the Divide mining district, Nevada, taken
by the Meridian Land & Mineral Co.

Meridian GEOCHEM CODING SHEET
Land & Mineral Co.

PROJECT: Diorite GEOLOGY

GEOLOGIST: Bill Schumacher

FILE NAME: Double / False Expl. STATE: N.C. CO: N.Y. DATE: 10/84

PROJECT: 1D, 2D, 3D MINING DIST.: 1D, 2D, 3D
GEOLOGY

Mr. Schumacher

SAMPLE DATA		ROCK DATA		ALTERATION		METALS		ELEMENTS ANALYZED (PPM)								
SAMPLE NUMBER	LOCATION	COLOR				S %						Au PPM	Ag PPM	As PPM	Sb PPM	Hg PPM
0126	Black J. veinlet	S.S.I.?	Fe & lim. cr. fract. & c.	10.1% box	Silicate	6.34	10.5	6.6	10	0.48						
0127	Black box	S.S.I. lith.	Streak of soil	FeO in Hf silicate	silicate	6.37	36.6	88	28	1.89						
0128	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.03	4.3	18	3	0.11						
0129	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.02	1.4	29	2	0.05						
0130	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.02	6.8	22	3	0.06						
0131	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.07	1.9	27	4	0.04						
0132	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.02	0.3	10	2	0.06						
0133	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.11	12.2	144	5	0.07						
0134	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.02	4.2	26	5	0.48						
0135	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.02	2.1	35	4	0.12						
0136	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.15	7.4	71	6	0.28						
0137	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.09	2.5	21	5	0.17						
0138	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.06	3.8	89	7	0.21						
0139	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.35	107	42	7	0.35						
0140	Black	mineral	Wk lim.	Fe & lim. c.	silicate	.05	8.1	16	150	0.17						

Meridian Land & Mineral Co. GEOCHEM CODING SHEET

PROJECT: Divide GEOLOGIST: Schumak QUAD: _____ STATE: Nebraska Co: Myre
FILE NAME: Divide / Fulcon MINING DIST.: D.W.D. DATE: 1/184

SAMPLE DATA		ROCK DATA		ALTERATION		ELEMENTS ANALYZED (PPM)							
SAMPLE NUMBER	TYPE	LOCATION	COLOR	MINERALOGY	STRUCTURE	S%			Au	Ag	As	Sb	Hg
0144	J	Hydrothermal veinlet along quartz veinlets	Intense siliceous reaction zone around veinlets.	Leached zone from silica reaction zone.	Pyrite	.27 ppm			5.64	480	112	49	2.24
0145	J	Po. of silicate leached veinlets crossed by open spaces	po. of silicate leached veinlets crossed by open spaces	Widely wet silicified silicate veinlets.	Quartz veinlets with silicate veinlets.	.11			.07	11.1	17	2	1.3
0146	J	—	—	Intense silicification around veinlets.	Intense silicification around veinlets.	.11							
0147	J	—	—	Intense silicification around veinlets.	Intense silicification around veinlets.	.10							
0148	J	—	—	Intense silicification around veinlets.	Intense silicification around veinlets.	.10							
0149	R	Intense silicification around veinlets.	Intense silicification around veinlets.	Intense silicification around veinlets.	Intense silicification around veinlets.	.07							
0150	R	—	—	—	—	—							

Meridian GEOCHEM CODING SHEET
Land & Mineral Co.

Meridian Land & Mineral Co.

PROJECT: VIVIEN

GEOLOGIST: *Geotimes*

卷之三

FILE NAME: _____

SAMPLE DATA		ROCK DATA		ALTERATION		METALS		ELEMENTS ANALYZED (PPM)					
SAMPLE NUMBER	Y P E	LOCATION	COLOR	TYPE	ALTERATION	S%	Au	Ag	As	Sb	Hg	PPM	
0 250	P	—	grey-green, highly weathered, siliceous	mod. to strong hydrothermal breccia	mod. + mod. silicification	greenish yellow veins veins mod. to strong silicification	.22	10.7	30	2	1.16	→	
0 251	I	—	—	mod. to strong hydrothermal breccia	mod. to strong silicification	mod. to strong silicification	.80	15.7	64	3	.89	→	
0 252	F	—	—	mod. to strong silicification	mod. to strong silicification	mod. to strong silicification	.06	2.2	15	3	.22	→	
0 253	—	Tr. 1950	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified mod. to strong silicification	.04	2.3	20	3	.10	→	
0 254	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified mod. to strong silicification	.02	3.7	31	8	.26	→	
0 255	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	.24	5.8	47	6	1.2	→	
0 256	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	2.49	10.1	94	5	1.9	→	
0 257	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	17.8	30.9	315	4	.44	→	
0 258	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	.04	2.0	18	4	.23	→	
0 259	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	.02	1.1	25	3	.11	→	
0 260	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	.02	1.1	68	10	.13	→	
0 261	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	.28	6.0	62	67	.22	→	
0 262	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	2.21	19.0	91	9	.26	→	
0 263	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	.13	3.3	45	2	.12	→	
0 264	—	—	mod. grey silicate	mod. arg., slightly silicified	mod. arg., slightly silicified	mod. arg., slightly silicified	.28	15.1	44	6	.35	→	

Meridian GEOCHEM CODING SHEET
Land & Mineral Co.

PROJECT: Divide GEOLOGIST: Gustav QUAD: _____ STATE: N.V.

MINING DIST.: _____ FILE NAME: _____

DATE: / /

Meridian Minerals Co.

GEOCHEM CODING SHEET

PROJECT: D.12.2

GEOLOGIST: Bret Schumuck

STATE: _____ CO: _____

MINING DIST.: _____

FILE NAME:

DATE: _____

SAMPLE NUMBER	SAMPLE DATA		ROCK DATA	ALTERATION	METALS	NOTES	ELEMENTS ANALYZED (PPM)				
	T	P	LOCATION	COLOR	S%	Au	Ag	As	Bi	SB	Hg
280	-	-	1.0m E of Vug - 1.0m S of 281	Very light grey light tan at top grey-green grey-green	20% Contact with talc 10% talc	.02	0.8				
281	-	-	1.0m E of Vug - 1.0m S of 280	Grey-green grey-green grey-green	2%						
282	-	-	1.0m E of Vug - 1.0m S of 281	Light tan grey-green grey-green	1%	Fraction 7-46	.09	7.1			
283	-	-	1.0m E of Vug - 1.0m S of 282	Light tan grey-green grey-green	1%	High grade talc					
284	-	-	1.0m E of Vug - 1.0m S of 283	Light tan grey-green grey-green	1%	Light tan grey-green grey-green					
285	-	-	1.0m E of Vug - 1.0m S of 284	Light tan grey-green grey-green	1%						
286	-	-	1.0m E of Vug - 1.0m S of 285	Light tan grey-green grey-green	1%	Light tan grey-green grey-green	.41	6.1			
287	-	-	1.0m E of Vug - 1.0m S of 286	Light tan grey-green grey-green	~3						
288	-	-	1.0m E of Vug - 1.0m S of 287	Light tan grey-green grey-green	1%	Light tan grey-green grey-green	.02	4.4			
289	-	-	1.0m E of Vug - 1.0m S of 288	Light tan grey-green grey-green	1%	Light tan grey-green grey-green	.15	5.8			
290	-	-	1.0m E of Vug - 1.0m S of 289	Light tan grey-green grey-green	1%	Light tan grey-green grey-green	.02	1.0			
291	-	-	1.0m E of Vug - 1.0m S of 290	Light tan grey-green grey-green	1%	Light tan grey-green grey-green	.02	0.6			
292	-	-	1.0m E of Vug - 1.0m S of 291	Light tan grey-green grey-green	1%	Light tan grey-green grey-green	.02	1.0			
293	-	-	1.0m E of Vug - 1.0m S of 292	Light tan grey-green grey-green	1%	Light tan grey-green grey-green	.15	15.7			

Meridian Minerals Co.

GEOCHEM CODING SHEET

PROJECT: DIVIDE GEOLOGIST: GREG COX STATE: NV. CO: FENNER

MINING DIST.: DIVIDE QUAD: FILE NAME: DIVIDE - FALCON EXP. DATE: 09-26-84

SAMPLE DATA			ROCK DATA		ALTERATION		METALS		NOTES		ELEMENTS ANALYZED (PPM)					
SAMPLE NUMBER	Y	E	LOCATION		COLOR		%		%		Au	As	Bi	As	Se	Hg
C-1001	H	-	CONFIDENTIAL	TUFFAC. SED.	SIL. ALUMINOS.	GOE	MOD GOE	TR. HEM	.27	5.6	62	18	.94			
C-1002	H	-	CONFIDENTIAL	Fault	SULFIDED	GOE	CONFIDENTIAL	AU ZONE	2.27	41.8	222	15	2.01			
C-1003	H	-	CONFIDENTIAL	CONFIDENTIAL	SULFIDED	GOE	CONFIDENTIAL	CONFIDENTIAL	.19	8.8	56	6	.66			
C-1004	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.38	4.0	20	3	.20			
C-1005	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.08	10.2	38	3	1.52			
C-1006	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.45	7.9	20	5	.94			
C-1007	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.04	6.0	14	2	.54			
C-1008	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.11	13.9	18	-1	.96			
C-1009	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.02	2.8	41	4	.94			
C-1010	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.02	2.2	17	-1	.23			
C-1011	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.02	4.7	30	-1	.14			
C-1012	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	-.02	2.3	12	-1	.05			
C-1013	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.65	27.4	37	12	.24			
C-1014	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.02	11.9	32	3	.11			
C-1015	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.06	21.8	47	3	.24			
C-1016	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.74	29.3	39	7	.27			
C-1017	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.02	6.9	23	3	.16			
C-1018	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.74	24.9	189	15	.26			
C-1019	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	.04	12.5	34	2	.13			
C-1020	H	-	CONFIDENTIAL	CONFIDENTIAL	CONFIDENTIAL	GOE	CONFIDENTIAL	CONFIDENTIAL	-.02	2.2	8	-1	.10			

Meridian Minerals Co.
GEOCHEM CODING SHEET

PROJECT: DIVIDE GEOLOGIST: EREG COX QUAD: _____ STATE: NY. CO: FESMER
MINING DIST.: DIVIDE FILE NAME: DIVIDE-FALCON EXP. DATE: 9-26-84

Meridian Minerals Co.

GEOCHEM CODING SHEET

PROJECT: STEW HAYES GEOLOGIST: STEW HAYES STATE: NEVADA CO: EC-MERALDA
 MINING DIST: LITTLE MAMMIX QUAD: --- FILE NAME: DEVIDE - FAUCON EXP. DATE: 9-26-84

SAMPLE NUMBER	Y	P	E	SAMPLE DATA		COLOR	ROCK DATA	ALTERATION	METALS	NOTES	ELEMENTS ANALYZED (PPM)								
				T	E						Au	Ag	As	Se	Hg	Ppm	Ppm	Ppm	
1101	1	1	1	WT. BN. LAVASTONE FH.YL. FORTINITE CIT. ETL. LUDWIGITE FH.YL.	LT. GRAY. GREEN. GRAY. WHT. GREEN. GREEN. LT. GRAY. GREEN. LT. GRAY. GREEN.	OFF. Y.	F-H-YL. INTRUS.	29.0	32.5	54.3	11	4.8	-	-	-	-	-		
1102	1	1	1	WT. BN. LAVASTONE FH.YL.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	-	.02	9.0	17	1	3.3	-	-	-	-	-	
1103	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP. WHT. GRAY. MAMMIX	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCT. N. TYP. I	8.2	15.1	81	9	5.0	-	-	-	-	-
1104	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP. WHT. GRAY. MAMMIX	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	2	STRUCTURE A ₂ C. 1102	3.94	19.6	49	10	3.2	-	-	-	-	-
1105	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	10.0	6	-1	.32	-	-	-	-	-
1106	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	7.6	13	2	.34	-	-	-	-	-
1107	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	6.1	16	1	.28	-	-	-	-	-
1108	1	1	1	WT. BN. LAVASTONE FH.YL.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	5	3	.21	-	-	-	-	-	-
1109	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	7.6	25	2	.50	-	-	-	-	-
1110	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	1.3	47.8	80	6	2.5	-	-	-	-
1111	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.03	3.7	19	4	.64	-	-	-	-	-
1112	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	9.5	27	6	.48	-	-	-	-	-
1113	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	4.1	32	1	.29	-	-	-	-	-
1114	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	1.1	18	1	.20	-	-	-	-	-
1115	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	2.5	19	-1	.01	-	-	-	-	-
1116	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.25	21.4	81	4	.55	-	-	-	-	-
1117	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	1.6	13	1	.08	-	-	-	-	-
1118	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.04	0.5	10.2	4	.18	-	-	-	-	-
1119	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	-.2	16	2	.10	-	-	-	-	-
1120	1	1	1	WT. BN. LAVASTONE FH.YL. FAUCON EXP.	LT. GRAY. GREEN. LT. GRAY. GREEN.	LT. GRAY. GREEN.	WT. EGO.	1	STRUCTURE A ₂ C. 1102	.02	.3	1	-1	.03	-	-	-	-	-

Meridian Minerals Co.
GEOCHEM CODING SHEET

PROJECT: Stew's Harvey

GEOLOGIST: ESMIE RADER

STATE: Nebraska

CO: ESMIE RADER

MINING DIST.: DIVIDE

QUAD: #

FILE NAME: DIVIDE - Au Mountain

DATE: 10-10-84

SAMPLE NUMBER	SAMPLE DATA		ROCK DATA	ALTERATION	METALS	NOTES	ELEMENTS ANALYZED (PPM)							
	T	P	E	COLOR	S*	**	AU	Ag	I	As	SB	Hg		
C-1149	P	-	-	U. & C. UMIC A.F.	Wk chl. q KAO	-	Fraction	-	.02	0.2				
C-1150	P	-	-	-	SR. ARZ VN SR. ARZ SiO ₂	SR. ARZ VN	"		.01	48.5				
C-1151	P	-	-	-	SR. EXIM. VEN + GNEISS	Py (ore)	"HETHERADE"		.25.4	13.9				
C-1152	OJ	-	-	Wk Br. road rock	Wk per. kaol.	Wk. E.L.	"DEAD"	-	.02	1.0				
C-1153	OJ	-	-	Br. E.D.	SR. ARZ VN + Per. SiO ₂	TR. PY			.67	66.1				
C-1154	OJ	-	-	Wk per. P.M.T.O	Wk ARZ und.	TR. E.L.			.13	6.3				
C-1155	OJ	-	-	-	S.A. 1154	-			-	.02	1.7			
C-1156	OJ	-	-	U. S.Y. S.A. 1154	-					-	.02	1.7		
C-1157	OJ	-	-	mod. hyscr. seds	V. SR. SiO ₂ BED.	SR. E.L.					.08	16.8		
C-1158	OJ	-	-	-	S.A. 1154	Wk ARZ VEN.	MOD E.L.				-	.02	8.0	
C-1159	OJ	-	-	Wk. P.M.T.O P.M.T.O	mod. QTR. VEN.	mod. E.L.						.03	5.7	
C-1160	OJ	-	-	Wt. AS & UACST. SEDS	mod. KAO.	V. Wk. E.L.						.38	1.1	
C-1161	OJ	-	-	S.A. 1160	-	-						-	.02	0.5

Meridian Minerals Co.

GEOCHEM CODING SHEET

PROJECT: ELVIA [APRIED] GEOLOGIST: ELVIA [APRIED] STATE: NEVADA QUAD: ESPIRALD/L

MINING DIST.: ELVIA - ANSEBLOCK FILE NAME: ELVIA - ELVIA EXP DATE: 9-26-84

SAMPLE NUMBER	SAMPLE DATA		ROCK DATA	ALTERATION	METALS	NOTES	ELEMENTS ANALYZED (PPM)						
	Y	P	LOCATION	COLOR			S%	As	Ag	As	Ag	Sn	Hg
1121	0	-	Mt. Ag. F.H.O. like. A. 1120	INALTERED	-	NB O.E., E.O. & E.	-	.02	.2	1	-1	.02	
1122	L	-	Ag. F.H.O. & Qtz. VN.	ST. F.R. S.O. - Qtz. VN.	IF. E.L.K. UNL. S.D.I.	-	-	.02	1.6	24	3	.10	
1123	U	-	Ag. Ag. F.A.V. - Qtz. VN.	ST. F.R. EAO.	WE. UNL. C.L. (H.F.G.)	"ELVIA"	-	.02	.2	1	-1	.02	
1132	C	-	Ag. Ag. I.M. & C.L. F.H.O. like.	Ag. F.R. EAO. I.M. & C.L.	WE. + CO.	DIVERGENT F.M.	-	.02	0.4				
1133	C	-	Ag. Ag. I.M. & F.H.O. like.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	-	.25	10.4					
1134	C	-	Ag. Ag. I.M. & C.L.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	.06	2.4					
1135	C	-	Ag. Ag. I.M. & C.L.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	-	.02	3.1					
1136	C	-	Ag. Ag. I.M. & C.L.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	.06	2.0					
1137	C	-	Ag. Ag. I.M. & C.L.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	.04	1.0					
1138	C	-	Ag. Ag. I.M. & C.L.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	.24	29.0					
1139	C	-	Ag. Ag. I.M. & C.L.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	.02	2.3					
1140	C	-	Ag. Ag. I.M. & C.L.	Ag. F.R. EAO. I.M. & C.L.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	-.02	7.7					
1141	C	-	SAME AS 1140	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	.01	7.0					
1142	C	-	SAME AS 1140	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	-.02	3.5					
1143	C	-	WT. BF. FRACTION	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	FRACTION?	.02	2.5				
1144	C	-	BF.GY. SANDSTONE 3. G.L.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	-.02	4.0					
1145	C	-	6.5' BF. SANDSTONE + LACUS. SEIS.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	.02	3.0					
1146	C	-	WE. B.R. VOLCANIC 6.5' TUFF	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	FRACTION?	-.02	3.0				
1147	D	-	6.5' TUFF	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	FRACTION	-.02	2				
1148	D	-	WE. BF. B.R.D.	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	WE. F.O. (C.L.B.)	-.02	4.2					

**APPENDIX II - Descriptive Statistics of the 143 samples
from the Divide mining district, Nevada.**

APPENDIX II: Assay values and descriptive statistics of the 143 samples
from the Divide mining district, Nevada.

ROW	SAMPLE	AU	AG	ARSENIC	ANTIMONY	MERCURY	GOLD	SILVER
1	126	0.340	10.5	66	10	0.48	0.340	10.5
2	127	6.370	366.0	88	28	1.89	6.370	366.0
3	128	0.030	4.3	18	3	0.11	0.030	4.3
4	129	0.020	1.4	29	2	0.05	0.020	1.4
5	130	0.020	6.8	22	3	0.06	0.020	6.8
6	131	0.070	1.9	27	4	0.04	0.070	1.9
7	132	0.020	0.3	10	2	0.06	0.020	0.3
8	133	0.110	12.2	144	5	0.07	0.110	12.2
9	134	0.020	4.2	26	5	0.48	0.020	4.2
10	135	0.000	2.1	35	4	0.12	0.000	2.1
11	136	0.150	7.4	71	6	0.28	0.150	7.4
12	137	0.090	2.5	21	5	0.17	0.090	2.5
13	138	0.060	3.8	89	7	0.21	0.060	3.8
14	139	0.350	107.0	42	7	0.35	0.350	107.0
15	140	0.050	8.1	16	150	0.17	0.050	8.1
16	141	5.640	450.0	112	49	2.24	5.640	450.0
17	142	0.070	11.1	17	2	1.30	0.070	11.1
18	143	0.520	7.0	18	16	0.19	0.520	7.0
19	144	0.090	2.4	33	4	0.22	0.090	2.4
20	145	1.230	15.5	45	3	1.18	1.230	15.5
21	250	0.220	10.7	30	2	1.16	0.220	10.7
22	251	0.800	15.7	64	3	0.89	0.800	15.7
23	252	0.060	2.2	15	3	0.22	0.060	2.2
24	253	0.040	2.3	20	3	0.10	0.040	2.3
25	254	0.020	3.7	31	8	0.26	0.020	3.7
26	255	0.240	5.8	47	6	1.20	0.240	5.8
27	256	2.490	10.1	94	5	1.90	2.490	10.1
28	257	17.800	30.9	315	4	0.44	17.800	30.9
29	258	0.069	2.0	18	4	0.23	0.069	2.0
30	259	0.020	1.1	25	3	0.11	0.020	1.1
31	260	0.000	1.1	68	10	0.13	0.000	1.1
32	261	0.280	6.0	62	67	0.22	0.280	6.0
33	262	2.210	19.0	91	9	0.36	2.210	19.0
34	263	0.130	3.3	45	2	0.12	0.130	3.3
35	264	0.280	15.1	44	6	0.35	0.280	15.1
36	265	1.960	37.0	14	5	0.66	1.960	37.0
37	266	9.800	107.0	144	16	1.80	9.800	107.0
38	267	0.610	19.5	34	13	0.33	0.610	19.5
39	268	0.320	22.5	14	3	0.15	0.320	22.5
40	269	8.190	295.0	82	22	0.27	8.190	295.0
41	270	0.060	12.5	18	7	0.25	0.060	12.5
42	271	1.320	106.0	54	13	0.25	1.320	106.0
43	1001	0.270	5.6	62	18	0.94	0.270	5.6

44	1002	2.270	41.8	222	15	2.01	2.270	41.8
45	1003	0.190	8.8	56	6	0.66	0.190	8.8
46	1004	0.380	4.0.	20	3	0.26	0.380	4.0
47	1005	0.080	10.2	38	3	1.52	0.080	10.2
48	1006	0.450	7.9	20	5	0.96	0.450	7.9
49	1007	0.040	6.0	14	2	0.54	0.040	6.0
50	1008	0.110	13.9	18	0	0.96	0.110	13.9
51	1009	0.020	2.2	41	4	0.94	0.020	2.2
52	1010	0.020	2.2	17	0	0.23	0.020	2.2
53	1011	0.020	4.7	30	0	0.14	0.020	4.7
54	1012	0.000	2.3	12	0	0.05	0.000	2.3
55	1013	0.650	29.6	37	12	0.24	0.650	29.6
56	1014	0.020	11.9	32	3	0.11	0.020	11.9
57	1015	0.060	21.8	47	3	0.24	0.060	21.8
58	1016	0.740	29.3	39	7	0.27	0.740	29.3
59	1017	0.020	6.9	23	3	0.16	0.020	6.9
60	1018	7.240	249.0	189	15	0.26	7.240	249.0
61	1019	0.090	12.5	34	2	0.43	0.090	12.5
62	1020	0.000	0.0	8	0	0.10	0.000	0.0
63	1021	0.150	11.6	54	5	0.15	0.150	11.6
64	1101	29.000	325.0	543	11	4.80	29.000	325.0
65	1102	0.000	9.0	17	1	3.30	0.000	9.0
66	1103	8.200	151.0	81	9	5.00	8.200	151.0
67	1104	3.940	19.6	49	10	3.20	3.940	19.6
68	1105	0.020	10.0	6	0	0.32	0.020	10.0
69	1106	0.000	7.6	13	2	0.34	0.000	7.6
70	1107	0.000	6.1	16	1	0.28	0.000	6.1
71	1108	0.000	0.0	5	3	0.21	0.000	0.0
72	1109	0.020	7.6	25	2	0.50	0.020	7.6
73	1110	2.130	47.8	80	6	2.50	2.130	47.8
74	1111	0.030	3.7	19	4	0.66	0.030	3.7
75	1112	5.020	9.5	27	6	0.48	5.020	9.5
76	1113	0.000	4.1	32	1	0.29	0.000	4.1
77	1114	0.020	1.1	18	1	0.20	0.020	1.1
78	1115	0.000	2.5	19	0	0.07	0.000	2.5
79	1116	0.250	21.4	81	4	0.55	0.250	21.4
80	1117	0.020	1.6	13	1	0.08	0.020	1.6
81	1118	0.040	0.5	102	4	0.12	0.040	0.5
82	1119	0.000	0.0	16	2	0.10	0.000	0.0
83	1120	0.000	0.3	1	0	0.03	0.000	0.3
84	1121	0.000	0.0	1	0	0.02	0.000	0.0
85	1122	0.000	1.6	24	3	0.10	0.000	1.6
86	1123	0.000	0.0	1	0	0.02	0.000	0.0
87	146	0.030	3.6					
88	147	0.230	11.0					
89	148	0.210	5.1					

90	149	0.040	3.8
91	150	0.050	10.0
92	272	0.300	1.0
93	273	0.080	4.8
94	274	0.000	0.6
95	275	0.410	2.8
96	276	0.230	6.2
97	277	0.000	0.9
98	278	0.000	0.7
99	279	0.020	1.4
100	280	0.000	0.8
101	281	0.260	1.6
102	282	0.090	7.1
103	283	3.850	378.0
104	284	0.000	0.8
105	285	0.060	4.3
106	286	0.410	6.1
107	287	0.020	3.8
108	288	0.020	4.4
109	289	0.150	5.8
110	290	0.020	1.0
111	291	0.020	0.6
112	292	0.000	1.0
113	293	0.150	15.7
114	1132	0.000	0.4
115	1133	0.250	10.4
116	1134	0.060	2.6
117	1135	0.020	3.1
118	1136	0.060	2.0
119	1137	0.040	1.0
120	1138	0.240	29.0
121	1139	0.020	2.3
122	1140	0.000	7.7
123	1141	0.070	7.0
124	1142	0.000	3.5
125	1143	0.020	2.5
126	1144	0.000	4.0
127	1145	0.000	3.0
128	1146	0.000	3.0
129	1147	0.000	0.0
130	1148	0.000	4.2
131	1149	0.000	0.2
132	1150	0.870	48.5
133	1151	25.400	139.0
134	1152	0.000	1.0
135	1153	0.670	66.1

136	1154	0.130	6.3
137	1155	0.000	1.9
138	1156	0.000	1.7
139	1157	0.080	16.3
140	1158	0.000	8.0
141	1159	0.030	5.7
142	1160	0.380	1.1
143	1161	0.000	0.5

APPENDIX II: Descriptive Statistics of the 143 samples from the Divide district, Nevada.

	N	MEAN	MEDIAN	TMEAN	STDEV	SEMEAN
AU	143	1.107	0.660	0.409	3.320	0.319
AG	143	26.09	5.10	11.76	71.39	6.02
ARSENIC	86	51.84	30.50	40.73	72.72	7.34
ANTIMONY	86	8.27	4.00	5.35	13.23	1.97
MERCURY	86	0.645	0.260	0.501	0.953	0.103

	MIN	MAX	Q1	Q3
AU	0.000	29.000	0.000	0.280
AG	0.00	450.00	2.00	11.90
ARSENIC	1.00	543.00	17.75	62.00
ANTIMONY	0.00	150.00	2.00	7.00
MERCURY	0.020	5.000	0.137	0.650

APPENDIX III - ANOVA tests of the 143 samples from the
Divide mining district, Nevada.

Test 1: 6 treatment areas (1, 2, 3, 4, 5, 6).
See Plate 1 for location of areas.

ANOVA TEST 1 - 6 treatment areas (see Plate 1) using the F statistic
test at the 95% Confidence Level.

MTB > ONEWAY C2 C21

ANALYSIS OF VARIANCE ON AU

SOURCE	DF	SS	MS	F	F-statistic
AREA1	5	33.2	16.6	1.15	2.21 - do not reject H_0
ERROR	137	1988.7	14.5		
TOTAL	142	2071.9			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	(-----+-----+-----)
1	8	0.087	0.152	(-----+-----+-----)
2	20	0.299	1.114	(-----+-----+-----)
3	38	2.060	5.224	(-----+-----+-----)
4	48	1.398	4.475	(-----+-----+-----)
5	18	0.297	0.895	(-----+-----+-----)
6	11	0.087	0.196	(-----+-----+-----)

POOLED STDEV = 3.810

-1.6 -0.0 1.6

MTB > ONEWAY C3 C21

ANALYSIS OF VARIANCE ON AG

SOURCE	DF	SS	MS	F	F-statistic
AREA1	5	26702	5340	1.03	2.21 - do not reject H_0
ERROR	137	709299	5177		
TOTAL	142	736001			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	(-----+-----+-----)
1	8	2.47	2.00	(-----+-----+-----)
2	20	4.65	5.14	(-----+-----+-----)
3	38	40.56	88.29	(-----+-----+-----)
4	48	32.22	77.71	(-----+-----+-----)
5	18	23.97	88.39	(-----+-----+-----)
6	11	9.02	19.27	(-----+-----+-----)

POOLED STDEV = 71.95

-32 0 32 64

MTB > ONEWAY C4 C22

ANALYSIS OF VARIANCE ON ARSENIC

SOURCE	DF	SS	MS	F	F-statistic
AREA1A	4	11158	2789	0.52	2.53 - do not reject H_0
ERROR	81	438282	5411		
TOTAL	85	449440			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	(-----+-----+-----)
2	12	29.08	30.63	(-----+-----+-----)
3	21	61.14	67.91	(-----+-----+-----)
4	41	56.71	89.29	(-----+-----+-----)
5	4	54.00	31.43	(-----+-----+-----)
6	8	35.50	44.52	(-----+-----+-----)

POOLED STDEV = 73.56

0 40 80 120

ANOVA TEST 2 - 8 treatment areas (see Plate 1) using the F statistic test at the 95% confidence Level.

136	6
137	42
138	42
139	42
140	42
141	42
142	32
143	5
144	5

MTB > ONEWAY C2-C31

ANALYSIS OF VARIANCE ON GOLD

SOURCE	DF	SS	MS	F	F-statistic
C31	7	143.9	20.6	1.45	2.01 - do not reject H ₀
ERROR	136	1928.9	14.2		
TOTAL	143	2072.8			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV					
1	8	0.087	0.152	(-----*	-----)			
2	20	0.299	1.114	(-----*	-----)			
5	19	0.289	0.371	(-----*	-----)			
6	11	0.087	0.196	(-----*	-----)			
31	13	3.428	8.216	(-----*	-----)			
32	26	1.298	2.564	(-----*	-----)			
41	18	0.547	1.124	(-----*	-----)			
42	29	1.974	5.654	(-----*	-----)			

POOLED STDEV = 3.766

MTB > ONEWAY C3 C31

ANALYSIS OF VARIANCE ON SILVER

SOURCE	DF	SS	MS	F	F-statistic
C31	7	49988	7141	1.41	2.01 - do not reject H ₀
ERROR	136	686422	5047		
TOTAL	143	736410			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV					
1	8	2.47	2.00	(-----*	-----)			
2	20	4.65	5.14	(-----*	-----)			
5	19	23.01	86.00	(-----*	-----)			
6	11	9.02	19.27	(-----*	-----)			
31	13	19.55	38.59	(-----*	-----)			
32	26	49.73	102.73	(-----*	-----)			
41	18	9.54	12.14	(-----*	-----)			
42	29	47.21	97.26	(-----*	-----)			

POOLED STDEV = 71.04

-40 0 40 80

Test 2: 8 treatment areas (1, 2, 31, 32, 41, 42, 5, 6).

MTB > ONEWAY C4 C32

ANALYSIS OF VARIANCE ON ARSENIC

SOURCE	DF	SS	MS	F	F-statistic
C32	6	58108	9685	1.96	2.17 - do not reject H_0
ERROR	79	391331	4954		
TOTAL	85	449440			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	
2	12	29.08	30.63	(-----*)
5	4	54.00	31.43	(-----*)
6	8	35.50	44.52	(-----*)
31	2	165.50	210.01	(-----*)
32	19	50.05	36.19	(-----*)
41	18	30.28	25.15	(-----*)
42	23	77.39	113.97	(-----*)

POOLED STDEV = 70.38 0 80 160 240

MTB > ONEWAY C5 C32

ANALYSIS OF VARIANCE ON ANTIMCNY

SOURCE	DF	SS	MS	F	F-statistic
C32	6	4532	755	2.51	2.17 - reject H_0
ERROR	79	23729	300		
TOTAL	85	28261			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	
2	12	2.25	1.91	(-----*)
5	4	5.50	1.29	(-----*)
6	8	3.00	1.69	(-----*)
31	2	4.00	0.00	(-----*)
32	19	21.53	35.32	(-----*)
41	18	3.39	3.05	(-----*)
42	23	6.96	6.91	(-----*)

POOLED STDEV = 17.33 -14 0 14 28

MTB > ONEWAY C6 C32

ANALYSIS OF VARIANCE ON MERCURY

SOURCE	DF	SS	MS	F	F-statistic
C32	6	10.627	1.771	2.10	2.17 - do not reject H_0
ERROR	79	66.576	0.843		
TOTAL	85	77.204			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	
2	12	0.2600	0.2040	(-----*)
5	4	0.1950	0.0675	(-----*)
6	8	0.1212	0.1469	(-----*)
31	2	0.3350	0.1485	(-----*)
32	19	0.5547	0.6158	(-----*)
41	18	0.7511	0.9132	(-----*)
42	23	1.1248	1.4291	(-----*)

POOLED STDEV = 0.9180 -0.75 -0.00 0.75 1.50

Test 3: 12 treatment areas (1, 2, 311, 312, 321, 322,
411, 412, 421, 422, 5, 6),

ANOVA TEST 3 - 12 treatment areas (see Plate 1) using the F statistic
test at the 95% Confidence Level.

MTB > ONEWAY C2 C41

ANALYSIS OF VARIANCE ON AU

SOURCE	DF	SS	MS	F	F-statistic
AREA3	11	180.0	16.4	1.13	1.80 - do not reject H_0
ERROR	131	1891.8	14.4		
TOTAL	142	2071.9			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	(-----*)-----
1	8	0.087	0.152	(-----*)-----
2	21	0.386	1.157	(-----*)-----
5	18	0.297	0.895	(-----*)-----
6	11	0.087	0.196	(-----*)-----
311	10	2.667	7.992	(-----*)-----
312	3	5.963	10.251	(-----*)-----
321	10	0.821	1.734	(-----*)-----
322	16	1.596	2.984	(-----*)-----
411	9	0.757	1.442	(-----*)-----
412	8	0.114	0.256	(-----*)-----
421	18	2.359	6.922	(-----*)-----
422	11	1.343	2.714	(-----*)-----

POOLED STDEV = 3.800 0.0 4.0 8.0

MTB > ONEWAY C3 C41

ANALYSIS OF VARIANCE ON AG

SOURCE	DF	SS	MS	F	F-statistic
AREA3	11	58641	5331	1.03	1.80 - do not reject H_0
ERROR	131	677360	5171		
TOTAL	142	736001			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	(-----*)-----
1	9	2.47	2.00	(-----*)-----
2	21	6.70	10.67	(-----*)-----
5	18	23.97	88.39	(-----*)-----
6	11	9.02	19.27	(-----*)-----
311	10	21.89	43.57	(-----*)-----
312	3	11.73	16.60	(-----*)-----
321	10	61.12	140.29	(-----*)-----
322	16	42.61	75.10	(-----*)-----
411	9	7.36	5.55	(-----*)-----
412	8	7.21	10.06	(-----*)-----
421	18	35.39	80.02	(-----*)-----
422	11	66.55	122.21	(-----*)-----

POOLED STDEV = 71.91 -50 0 50 100

MTB > ONEWAY C12 C42

ANALYSIS OF VARIANCE ON GOLD				(using the 83 samples only)	
SOURCE	DF	SS	MS	F	F-statistic
AREA3A	9	211.9	23.5	1.50	2.00 - do not reject H_0
ERROR	76	1195.3	15.7		
TOTAL	85	1407.3			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	-----+-----+-----+-----
2	13	0.578	1.457	(-----+-----)
5	4	0.075	0.062	(-----+-----*)
6	8	0.036	0.036	(-----+-----*)
312	2	3.934	12.538	(-----+-----*)
321	7	1.136	2.029	(-----+-----*)
322	12	2.097	3.323	(-----+-----*)
411	9	0.757	1.442	(-----+-----*)
412	8	0.114	0.256	(-----+-----*)
421	13	3.251	8.048	(-----+-----*)
422	10	1.462	2.930	(-----+-----*)
-----+-----+-----+-----				
POOLED STDEV = 3.966				0.0 5.0 10.0

MTB > ONEWAY C13 C42

ANALYSIS OF VARIANCE ON SILVER

SOURCE	DF	SS	MS	F	F-statistic
AREA3A	9	72275	8031	1.23	2.00 - do not reject H_0
ERROR	76	494302	6504		
TOTAL	85	566576			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	-----+-----+-----+-----
2	13	7.56	13.44	(-----+-----*)
5	4	3.95	2.41	(-----+-----*)
6	8	3.89	4.07	(-----+-----*)
312	2	16.45	20.44	(-----+-----*)
321	7	85.87	164.73	(-----+-----*)
322	12	53.67	84.31	(-----+-----*)
411	9	7.36	5.55	(-----+-----*)
412	8	7.21	10.06	(-----+-----*)
421	13	46.34	92.69	(-----+-----*)
422	10	71.63	127.59	(-----+-----*)
-----+-----+-----+-----				
POOLED STDEV = 80.65				-75 0 75 150

MTB > ONEWAY C4 C42

ANALYSIS OF VARIANCE ON ARSENIC

SOURCE	DF	SS	MS	F	F-statistic
AREA3A	9	69208	7690	1.54	2.00 - do not reject H ₀
ERROR	76	380231	5003		
TOTAL	85	449440			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	
2	13	33.00	32.55	(-----★-----)
5	4	54.00	31.43	(-----★-----)
6	8	35.50	44.52	(-----★-----)
312	2	156.50	210.01	(-----★-----)
321	7	40.43	33.79	(-----★-----)
322	12	55.67	37.78	(-----★-----)
411	9	33.22	27.16	(-----★-----)
412	8	20.75	14.99	(-----★-----)
421	13	94.92	145.10	(-----★-----)
422	10	54.60	51.53	(-----★-----)

BOOKED STDEV = 70.73

0 80 160 240

MTB -> ONE WAY C5-C42

ANALYSIS OF VARIANCE ON ANTIMONY

SOURCE	DF	SS	MS	F	F-statistic
AREA3A	9	6008	668	2.28	2.00 - reject H ₀
ERROR	76	22252	293		
TOTAL	85	28261			

INDIVIDUAL 95 PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	
2	13	2.54	2.11	(-----*)
5	4	5.50	1.29	(-----*-----)
6	8	3.00	1.69	(-----*-----)
312	2	4.00	0.00	(-----*-----)
321	7	33.00	54.18	(-----*-----)
322	12	14.83	17.54	(-----*-----)
411	9	4.33	3.20	(-----*-----)
412	8	2.00	2.55	(-----*-----)
421	13	6.35	5.35	(-----*-----)
422	10	7.10	8.85	(-----*-----)
POCLED STDEV = 17.11				
-20 0 20 40				

MTB > ONEWAY C6 C42

ANALYSIS OF VARIANCE ON MERCURY

SOURCE	DF	SS	MS	F	F-statistic
AREA3A	9	21.177	2.353	3.19	2.00 - reject H ₀
ERROR	76	56.027	0.737		
TOTAL	85	77.204			

INDIVIDUAL 95-PCT CI'S FOR MEAN
BASED ON POOLED STDEV

LEVEL	N	MEAN	STDEV	
2	13	0.4323	0.6513	(-----*)-----)
5	4	0.1950	0.0676	(-----*-----)
6	8	0.1212	0.1469	(-----*-----)
312	2	0.3350	0.1485	(-----*-----)
321	7	0.8071	0.7933	(-----*-----)
322	12	0.4075	0.4616	(-----*-----)
411	9	0.8856	1.0507	(-----*-----)
412	8	0.3812	0.3535	(-----*-----)
421	13	1.7077	1.6354	(-----*-----)
422	10	0.3670	0.5452	(-----*-----)

POOLED STDEV = 0.3586 0.0 1.0 2.0

MTB > DESCRIBE C12-C42

	N	MEAN	MEDIAN	TRMEAN	STDEV	SEMEAN
GOLD	86	1.438	0.075	0.755	4.969	0.439
AREA3A	86	273.5	322.0	279.8	178.0	19.2

	MIN	MAX	Q1	Q3
GOLD	0.000	29.000	0.020	0.542
AREA3A	2.0	422.0	6.0	421.0

MTB > NOOUT

APPENDIX IV - Simple linear regression analyses between gold
and its "pathfinder" elements (silver, arsenic,
antimony and mercury).

40	295	8.190	9.753	1.148	-1.563	-0.53 X
60	249	7.240	8.292	0.965	-1.052	-0.35 X
64	325	29.000	10.707	1.268	18.293	6.34RX

R denotes an obs. with a large st. resid.

X denotes an obs. whose X value gives it large influence.

MTB > REGRESS C12-C13-C42-C43

The regression equation is

$$GOLD = 0.379 + 0.0318 SILVER$$

Predictor	Coef	Stdev	t-ratio
Constant	0.3792	0.3676	1.03
SILVER	0.031776	0.004189	7.59

$$s = 3.153 \quad R-sq = 40.7\% \quad R-sq(adj) = 39.9\%$$

Analysis of Variance

SOURCE	DF	SS	MS
Regression	1	572.09	572.09
Error	84	835.17	9.94
Total	85	1407.26	

Unusual Observations

Obs.	SILVER	GOLD	Fit	Stdev.Fit	Residual	St.Resid
2	366	6.370	12.009	1.434	-5.639	-2.01RX
16	450	5.640	14.679	1.773	-9.039	-3.47RX
28	31	17.800	1.361	0.340	16.439	5.24R
40	295	8.190	9.753	1.148	-1.563	-0.53 X
60	249	7.240	8.292	0.965	-1.052	-0.35 X
64	325	29.000	10.707	1.268	18.293	6.34RX

R denotes an obs. with a large st. resid.

X denotes an obs. whose X value gives it large influence.

MTB > REGRESS C2-C3-C52-C53

* ERROR * ARGUMENT IS A COLUMN OR MATRIX, BUT A CONSTANT WAS EXPECTED
 * ERROR * THE NUMBER OF PREDICTOR COLUMNS MUST BE SPECIFIED

MTB > REGRESS C2 1 C3 C52 C53

The regression equation is
AU = 0.289 + 0.0314 AG

Predictor	Coeff	StDev	t-ratio
Constant	0.2888	0.2751	1.05
AG	0.031377	0.003603	8.71

s = 3.091 R-sq = 35.0% R-sq(adj) = 34.5%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	1	724.58	724.58
Error	141	1347.27	9.56
Total	142	2071.85	

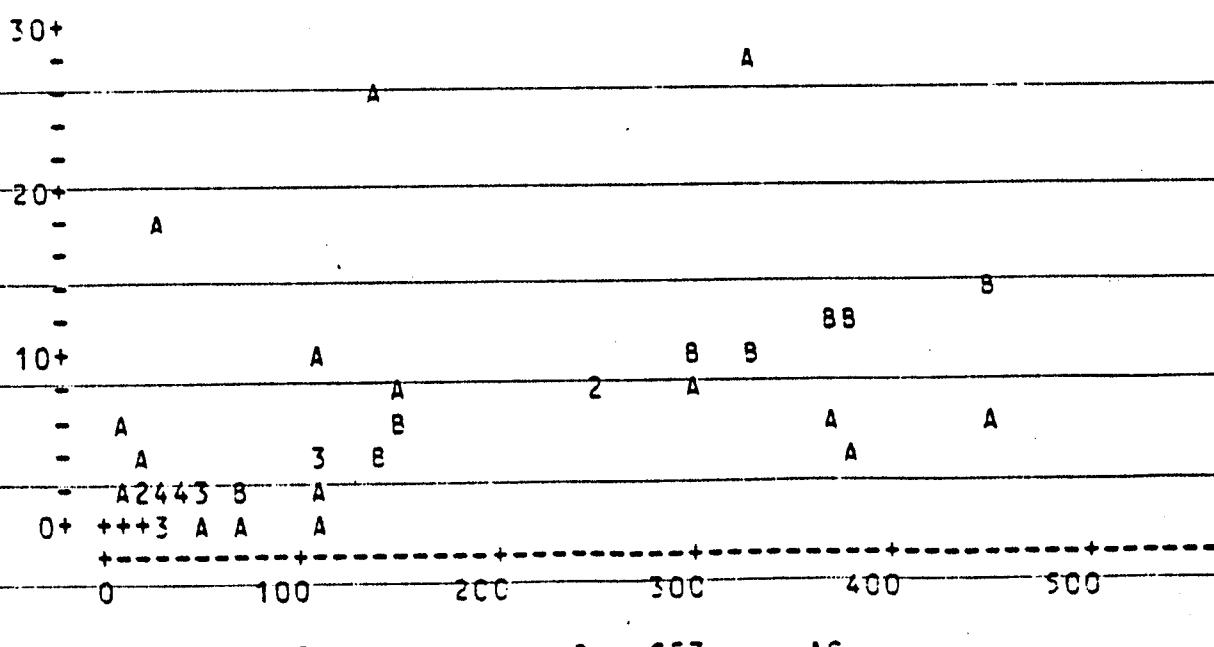
Unusual Observations

Cbs.	AG	AU	Fit	StDev.Fit	Residual	St.Resid
2	366	6.370	11.773	1.252	-5.403	-1.91 X
15	450	5.640	14.408	1.549	-8.768	-3.28 RX
23	31	17.800	1.258	0.259	16.542	5.37 R
37	107	9.800	3.646	0.390	6.154	2.01 R
40	295	3.190	9.545	1.003	-1.355	-0.46 X
60	249	7.240	8.102	0.944	0.962	0.29 X
64	325	29.000	10.486	1.103	18.514	6.42 RX
103	378	3.850	12.149	1.294	-8.299	-2.96 RX
133	139	25.400	4.650	0.482	20.750	6.80 R

R denotes an obs. with a large st. resid.

X denotes an obs. whose X value gives it large influence.

MTB > MPLOT C2 C3 C53 C3



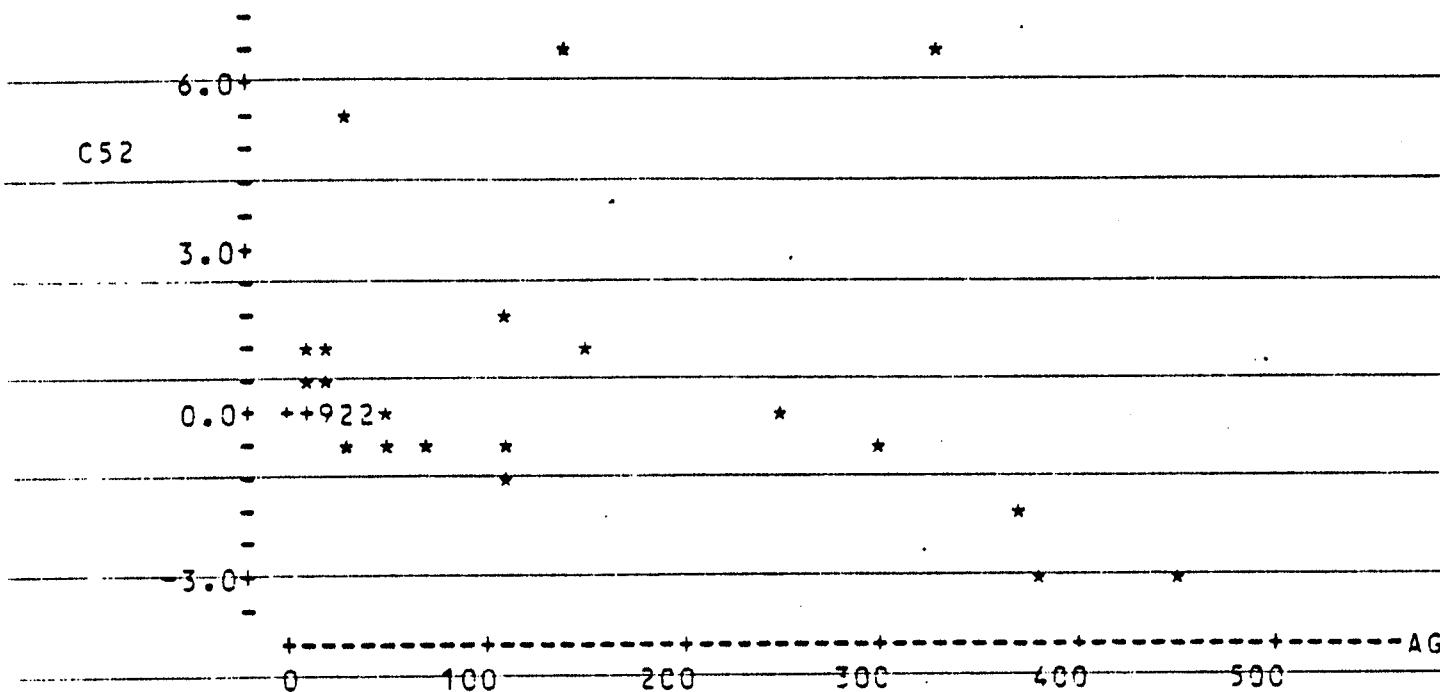
A = All vs. AG

B = C53 vs. AG

MTB > MPLOT C52 C3

* ERROR * 2 IS AN ILLEGAL NUMBER OF ARGUMENTS

MTB > PLOT C52 C3



MTB > REGRESS C12 C1 C52 C53

* ERROR * ARGUMENT IS A COLUMN OR MATRIX, BUT A CONSTANT WAS EXPECTED
* ERROR * THE NUMBER OF PREDICTOR COLUMNS MUST BE SPECIFIED

MTB > REGRESS C12 1 C4 C52 C53

The regression equation is
GOLD = - 1.12 + 0.0494 ARSENIC

Predictor	Coeff	StDev	t-ratio
Constant	-1.1238	0.2547	-4.41
ARSENIC	0.049422	0.002863	17.26

s = 1.919 R-sq = 78.0% R-sq(adj) = 77.7%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	1	1097.8	1097.8
Error	84	309.5	3.7
Total	85	1407.3	

Unusual Observations

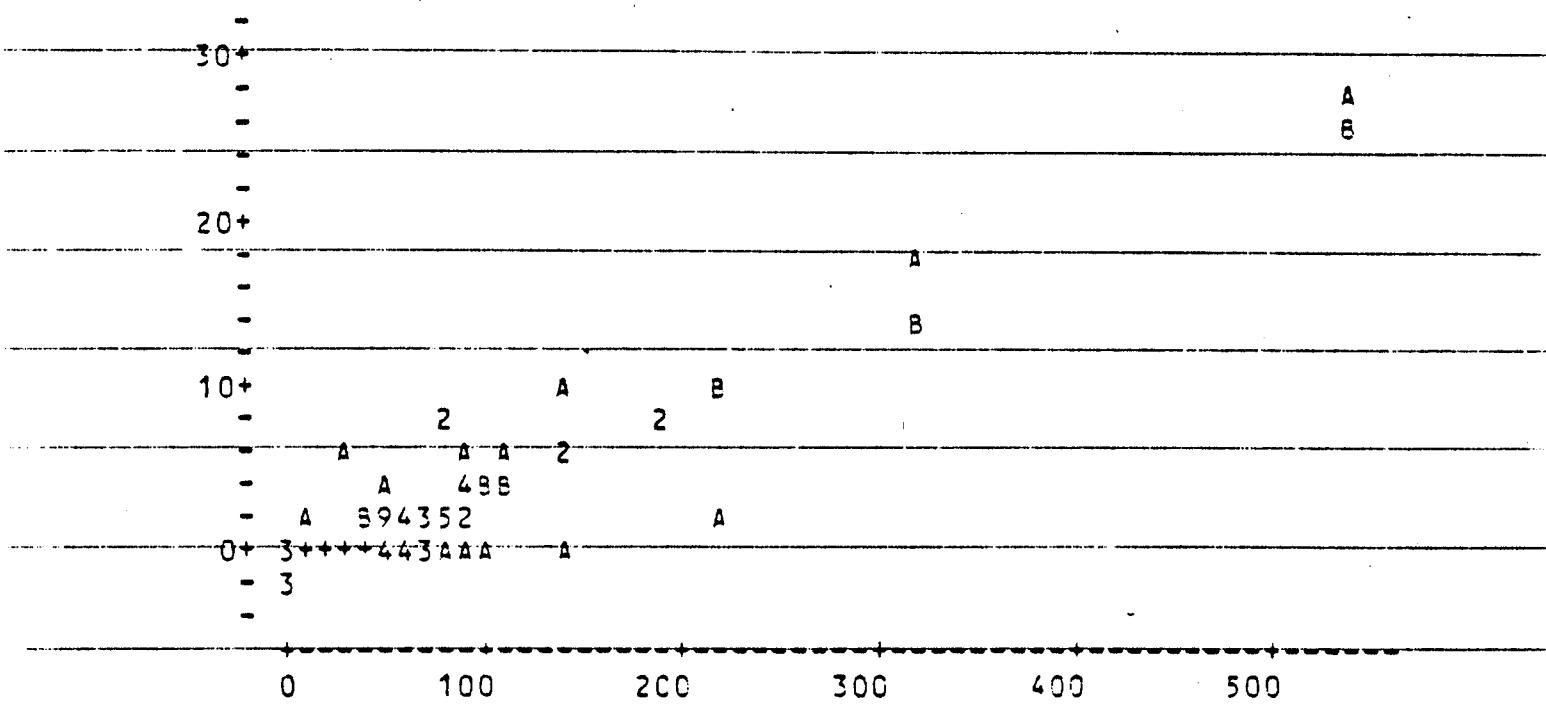
Obs.	ARSENIC	GOLD	Fit	StDev.Fit	Residual	St.Resid
8	144	0.110	5.993	0.335	-5.883	-3.11R
28	315	17.800	14.444	0.781	3.356	1.91 X
37	144	9.800	5.993	0.335	3.907	2.01R

40	82	8.190	2.929	0.224	5.261	2.76R
44	222	2.270	9.848	0.529	-7.578	-4.11RX
64	543	29.000	25.712	1.421	3.238	2.55RX
66	81	8.200	2.879	0.223	5.321	2.79R
75	27	5.020	0.211	0.219	4.809	2.52R
81	102	0.040	3.917	0.252	-3.877	-2.04R

R denotes an obs. with a large st. resid.

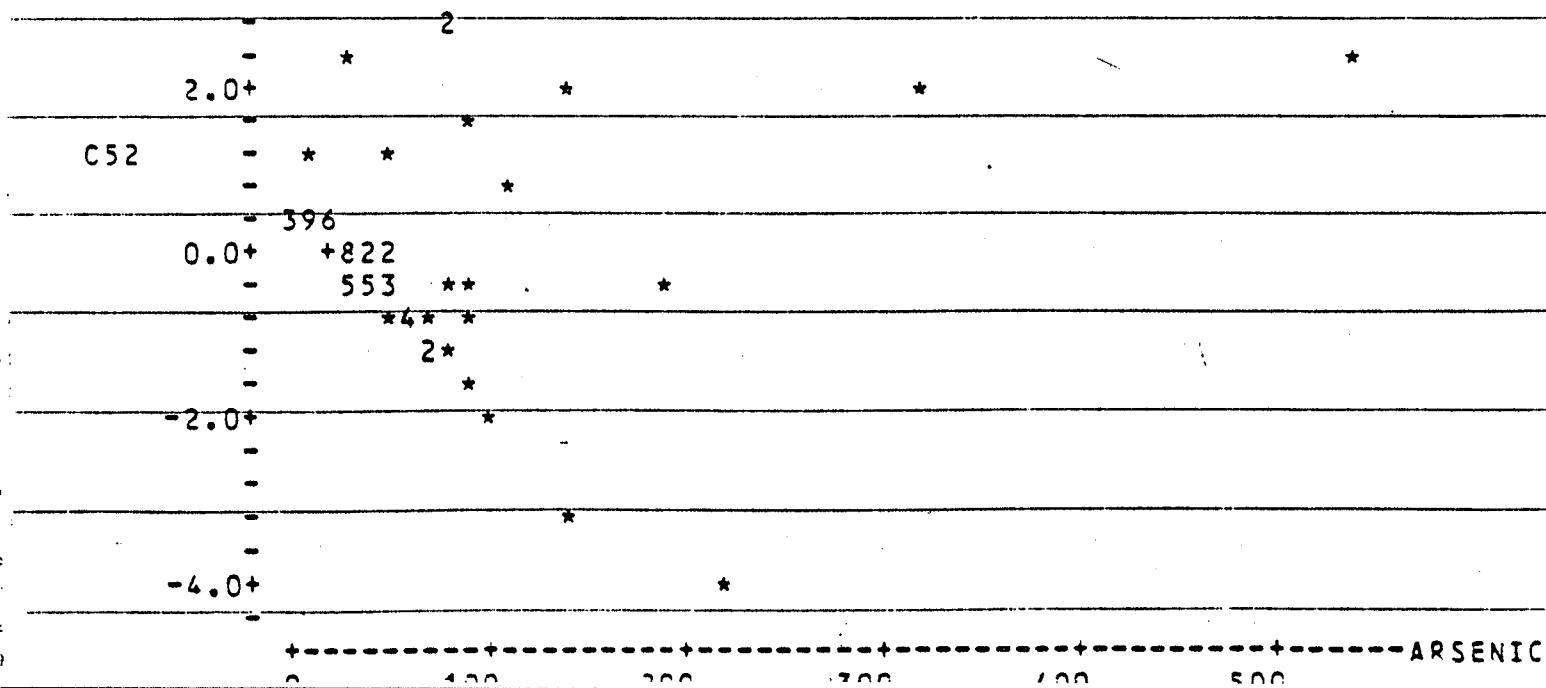
X denotes an obs. whose X value gives it large influence.

MTB > MPLOT C12 C4 C53 C4



A = GOLD vs. ARSENIC S = C53 vs. ARSENIC

MTB > PLOT C52 C4



MTB > NAME C52 "RESIDUAL"

MTB > NAME C53 "PREDICT"

MTB > REGRESS C12 1 C5

The regression equation is

$$\text{GOLD} = 1.26 + 0.0216 \text{ ANTIMONY}$$

Predictor	Coef	Stdev	t-ratio
Constant	1.2598	0.4828	2.61
ANTIMONY	0.02157	0.02423	0.89

$$s = 4.074 \quad R-\text{sq} = 0.9\% \quad R-\text{sq}(\text{adj}) = 0.0\%$$

Analysis of Variance

SOURCE	DF	SS	MS
Regression	1	13.15	13.15
Error	84	1394.11	16.60
Total	85	1407.26	

Unusual Observations

Obs.	ANTIMONY	GOLD	Fit	Stdev.Fit	Residual	St.Resid
15	150	0.050	4.496	3.463	-4.446	-2.07RX
16	49	5.640	2.317	1.080	3.323	0.85 X
28	4	17.800	1.346	0.451	16.454	4.06R
32	67	0.280	2.705	1.490	-2.425	-0.64 X
37	16	9.800	1.605	0.478	8.195	2.03R
64	11	29.000	1.497	0.444	27.503	6.79R

R denotes an obs. with a large st. resid.

X denotes an obs. whose X value gives it large influence.

MTB > REGRESS C12 1 C5 C52 C53

The regression equation is

$$\text{GOLD} = 1.26 + 0.0216 \text{ ANTIMONY}$$

Predictor	Coef	Stdev	t-ratio
Constant	1.2598	0.4828	2.61
ANTIMONY	0.02157	0.02423	0.89

$$s = 4.074 \quad R-\text{sq} = 0.9\% \quad R-\text{sq}(\text{adj}) = 0.0\%$$

Analysis of Variance

SOURCE	DF	SS	MS
Regression	1	13.15	13.15
Error	84	1394.11	16.60
Total	85	1407.26	

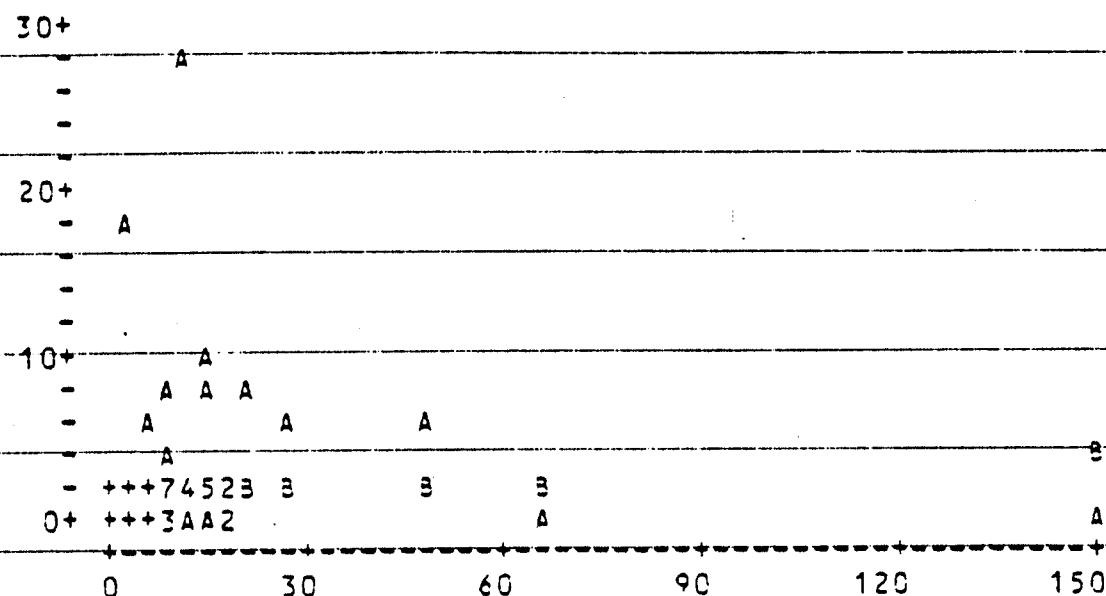
Unusual Observations

Obs.	ANTIMONY	GOLD	Fit	Stdev.Fit	Residual	St.Resid
15	150	0.050	4.496	3.463	-4.446	-2.07RX
16	49	5.640	2.317	1.080	3.323	0.85 X
28	4	17.800	1.346	0.451	16.454	4.06R

32	67	0.280	2.705	1.490	-2.425	-0.64 X
37	16	9.800	1.605	0.478	8.195	2.03R
64	11	29.000	1.497	0.444	27.503	6.79R

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

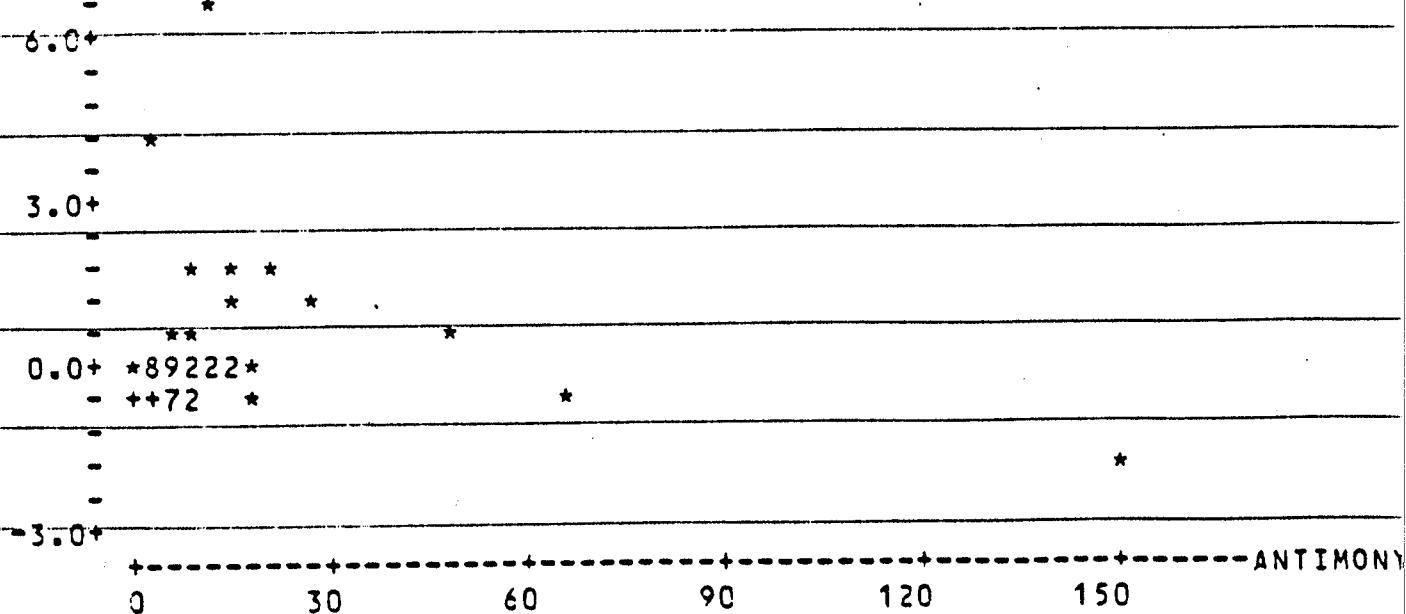
4T3 → XPLOT C12 C5 C53 C5



A = GC10 VS. ANTIMONY B = PREDICT VS. ANTIMONY

4TE > PLOT CS2 CS

RESIDUAL



MTB > REGRESS C12 1 C6 C52 C53

The regression equation is
GOLD = - 0.169 + 2.49 MERCURY

Predictor	Coef	Stdev	t-ratio
Constant	-0.1686	0.4336	-0.39
MERCURY	2.4910	0.3723	6.58

s = 3.324 R-sq = 34.0% R-sq(adj) = 33.3%

Analysis of Variance

SOURCE	DF	SS	MS
Regression	1	479.07	479.07
Error	84	928.20	11.05
Total	85	1407.26	

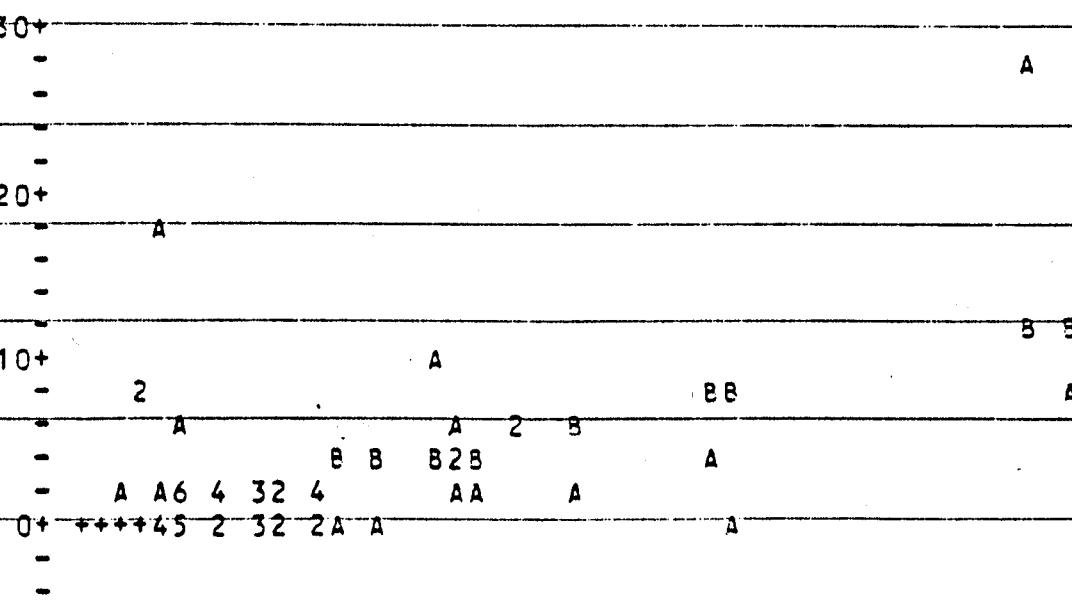
Unusual Observations

Obs.	MERCURY	GOLD	Fit	StDev.Fit	Residual	St.Resid
28	0.44	17.800	0.927	0.367	16.873	5.11R
40	0.27	3.190	0.504	0.336	7.686	2.33R
60	0.26	7.240	0.479	0.397	6.761	2.05R
64	4.80	29.000	11.783	1.612	17.212	5.92RX
65	3.30	0.000	8.052	1.066	-8.052	-2.56RX
66	5.00	8.200	12.287	1.686	-4.087	-1.43X
67	3.20	3.940	7.803	1.031	-3.863	-1.22 X

R denotes an obs. with a large st. resid.

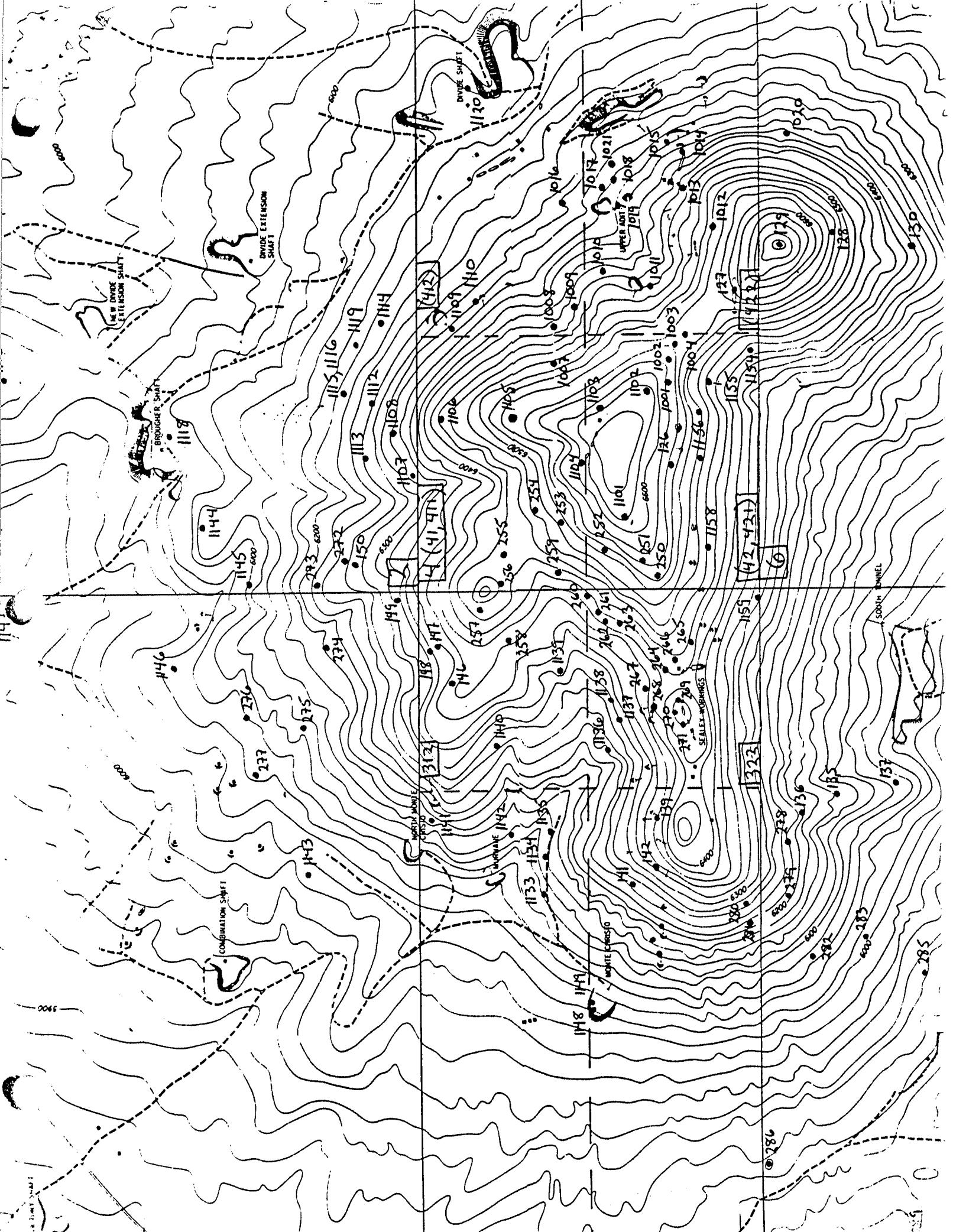
X denotes an obs. whose X value gives it large influence.

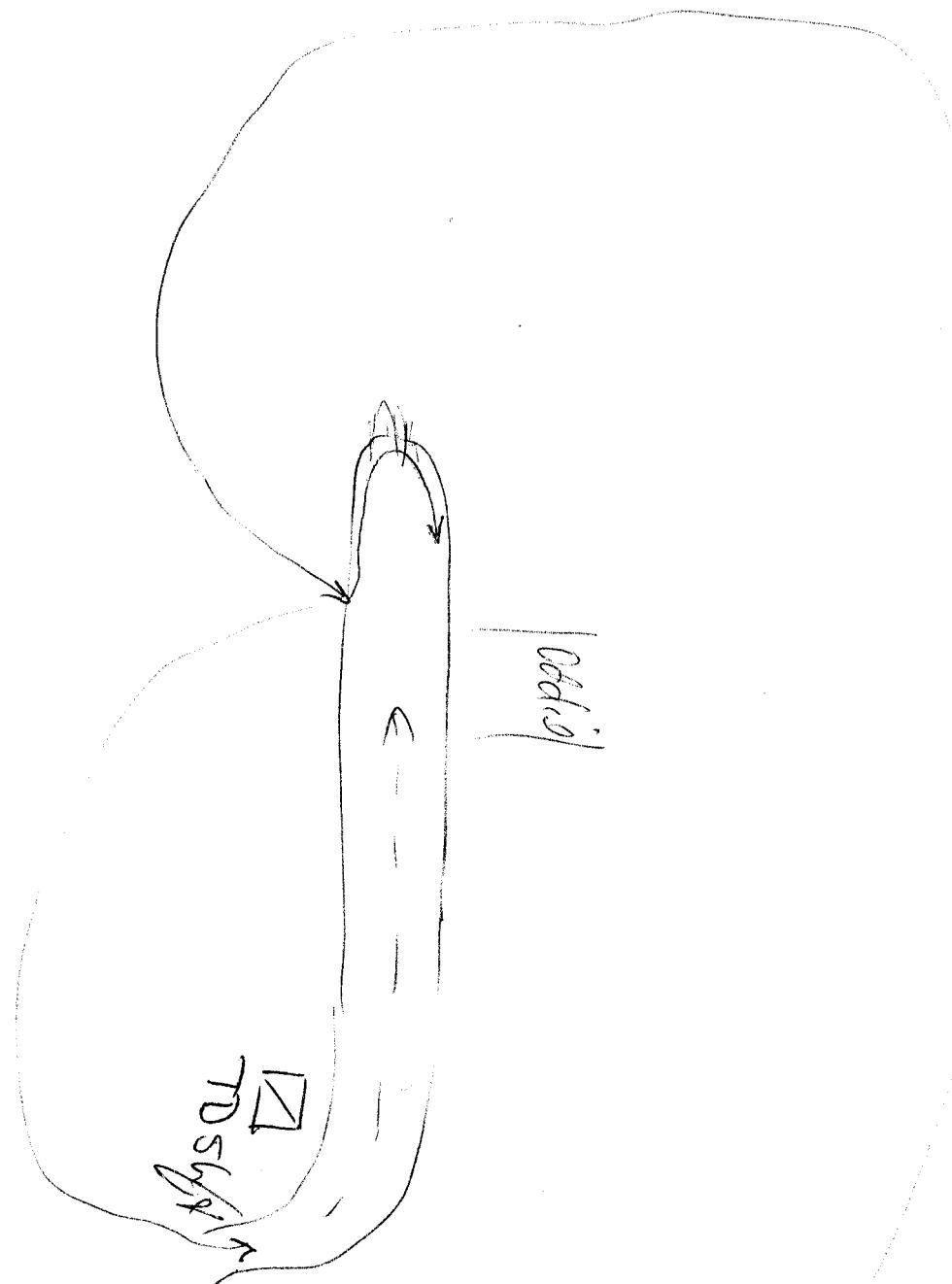
MTB > MPLOT C12-C6-C53-C6



A = GOLD vs. MERCURY

B = PREDICT vs. MERCURY





(2)