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GEOCHEMICAL REPORT NO. 9

A Geochemical Investigation Along The Taylor Highway, East-Central Alaska

By

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TABLE OF CONTENTS

ILLUSTRATIONS

A GEOCHEMICAL INVESTIGATION ALONG THE TAYLOR HIGHWAY, EAST-CENTRAL ALASKA

By

R.H. Saunders

INTRODUCTION AND SUMMARY

This report presents information obtained by a geochemical investigation along the Taylor Highway in east-central Alaska during June 24 to July 8, 1965.

That part of Alaska between the Yukon and Tanana Rivers is commonly called the Yukon-Tanana Region. The Taylor Highway traverses the eastern part of this Region, extending northward from Tetlin Junction on the Alaska Highway in the Tanana valley to Eagle on the Yukon River, a distance by road of 158 miles. Ninety-six miles from Tetlin Junction a branch road leading to Dawson links the highway to the road network of the Yukon Territory. Prior to the completion of the Taylor Highway in 1953, the eastern part of the Yukon-Tanana Region north of the Tanana valley was not accessible by road.

In the past, prospecting in the country now served by the highway was primarily the search for placer gold. The cover of soil and vegetation prevalent over the country is a serious obstacle to prospecting, particularly to prospecting for lode deposits. Geochemistry provides a means by which the prospector can overcome to some degree the disadvantage imposed by the scarcity of outcrops. This report is intended to direct prospectors to specific areas in which chances for the occurrence of ore deposits are better than average.

Two hundred seventeen samples were taken during this investigation, and 84 of these contained one or more metals in anomalous amounts. Data on the samples may be subject to more than one interpretation; the results indicate, however, that about 20 separate areas are worthy of special attention by prospectors.

GENERAL FEATURES

The country along the highway is an area of high topographic relief, the altitudes ranging from about 900 feet above sea level at Eagle (Fig. 13) to over 5000 feet at Mount Fairplay (Fig. 3). In the eastern part of the Yukon-Tanana Region, the drainage divide between the Yukon and Tanana Rivers is near the Tanana;therefore, the highway, except for the southernmost ten miles, is in the Yukon River watershed. The principal streams draining the country are the Fortymile River and its tributaries.

The major tributaries to Fortymile River are called "forks". Dennison Fork heads against the Tanana River watershed; it is joined by a large easterly flowing tributary, the West Fork of Dennison Fork, which the highway crosses 50 miles from Tetlin Junction. Near Chicken (Fig. 6) Dennison Fork joins Mosquito Fork to form the South Fork of Fortymile River. A few miles to the north, the South Fork and North Fork join, forming the Fortymile River, which from this confluence flows eastward into Canada and into the Yukon River.

The highway leaves the Fortymile River drainage at the head of King Solomon Creek (Fig. 12), and from this divide it goes northward along American Creek to Eagle. American Creek is a tributary to Mission Creek which flows into the Yukon at the toe of Eagle Bluff (Fig. 13).

GEOLOGY

The geology of the Yukon-Tanana Region has been described by J.B. Mertie, Jr. in U.S. Geological Survey Bulletin 872, THE YUKON-TANANA REGION, ALASKA. The oldest rock unit present is the Birch Creek schist formation, a series of metamorphosed sedimentary and igneous rocks, which Mertie assigned to the pre-Cambrian age. In the country along the highway rocks of this formation constitute the bedrock from lower Logging Cabin Creek to the West Fork of Dennison Fork (Figs. 4-5) and from the South Fork bridge east to Boundary and north almost to the Liberty Fork of O'Brien Creek (Figs. 7-11).

Rocks of Devonian age are found between Chicken and the South Fork bridge (Figs. 6-7) and between Liberty Fork and Eagle (Figs. 11-13). For the most part, these are either non-calcareous rocks of sedimentary origin or basic and ultrabasic intrusives altered to greenstone.

Tertiary lavas - primarily rhyolite and dacite - are present along the highway from the Tanana River divide north to lower Logging Cabin Creek (Figs. 1-3), on Ingle Creek (Fig. 6), and on upper Chicken Creek (fig. 6). Tertiary sedimentary rocks - sandstone, shale, and conglomerate, with some lignite - are present in two small areas, one near lower Chicken Creek and the other near Eagle.

A large granitic intrusive of Mesozoic age forms the bedrock between the West Fork of Dennison Fork and Mosquito Fork (Figs. 5-6). A smaller body of similar rock forms the top of Mt. Fairplay (Fig. 3), and numerous still smaller Mesozoic intrusives are present in the areas where the Birch Creek schist formation is the dominant bedrock.

MINERAL DEPOSITS

Gold was discovered near the mouth of the Fortymile River in Canada in 1886, in the Fortymile drainage in Alaska in 1887, and in the American Creek drainage in 1895. Placer mining has continued in the district since the early-day discoveries. The better known productive streams along the Taylor Highway are Chicken Creek (Fig. 6), South Fork of Fortymile River (Fig. 7), Walker Fork (Figs. 7-9), Wade Creek (Figs. 7-8), Canyon Creek (Fig. 9), Fortymile River (Fig. 10), and American Creek (Figs. 12-13).

The gold mineralization is considered to have been associated with the intrusion of the Mesozoic granitic rocks. Areas in which there are one or more small granitic intrusions are favorable areas in which to prospect for lodes, and streams draining such areas are favorable for placers. In the western part of the Yukon-Tanana Region, a second period of mineralization was associated with Tertiary intrusives. Although Tertiary intrusive rocks have not been found in the eastern part of the Region, cinnabar, a mineral indicative of the Tertiary mineralization, has been found in placer concentrates in the Fortymile District. Other minerals that have been identified in the placer concentrates include cassiterite and scheelite. Narrow veinlets carrying copper minerals have been found in a few places in the Chicken area, and copper and nickel have been found in basic Devonian rocks at Eagle Bluff.

GEOCHEMICAL INVESTIGATION

Two hundred seventeen samples of stream sediments were taken during this investigation. They were tested in the field for cold-extractable heavy metals following the procedure given in University of Alaska Mining Extension Bulletin No. 2, ELEMENTARY GEOCHEMICAL PROSPECTING METHODS, by Leo Mark Anthony. One minor departure from this procedure was made; paint thinner was used in place of white gasoline as a solvent for the dye solution. The samples consisted of clay, silt, sand, or fine gravel taken from beneath running water in the stream beds. Where streams cross the highway, samples were taken upstream from the crossings to avoid possible contamination from culverts, fill material, and discarded metallic objects. The samples were dried and screened, and a minus-80-mesh portion of each sample was sent to Rocky Mountain Geochemical Laboratories of Salt Lake City to be analyzed for trace amounts of copper, lead, zinc, and molybdenum. The decision to have the samples analyzed for these four metals was not based on the assumption that deposits of these metals are more likely to occur in the area than other types of deposits. It was based on the probability that a metallic deposit would contain enough of one or more of these metals to form a traceable dispersion pattern, regardless of what metal constituted the chief value in the deposit.

Results of the field and laboratory tests are shown in Table I. The locations where the samples were taken are shown on Figs. 1 through 13. Frequency distribution graphs showing the numbers of samples containing various concentrations of the metals are included in this report. Samples were considered to contain anomalous amounts of metal if they contained as much as 45 parts per million of copper, 25 parts per million of lead, 120 parts per million of zinc, or 4 parts per million of molybdenum.

RESULTS

An anomalous quantity of metal in a stream sediment sample is not, of course, an infallible sign that an ore deposit exists upstream from the sample site. Anomalies can be caused by mineral deposits below commercial grade or by a type of bedrock containing a higher-than-background amount of metal. Geochemical sampling of stream sediments, however, can indicate areas favorable for mineralization and thereby increase a prospector's chances for success.

The first problem confronting the prospector using information in this type of report is the determination of how best to follow up the indicated anomaly. The solutions to the problem will differ from place to place depending upon the topographic and geologic conditions at each sample site. Probably in every instance some additional stream sediment samples should be taken. If the indicated anomaly is far from the headwaters of the stream being sampled, a large number of additional stream sediment samples may be required. The area containing the source of the metal should be delineated as accurately as possible by sampling upstream from anomalous samples and by sampling other streams in the vicinity. Ideally, stream sediment sampling should be continued upstream until a point is reached where the samples contain only background quantities of metal; the place where the anomalous quantities of metal enter the stream would thus be located. The next step, in most instances, probably would be the collecting and testing of soil samples in the vicinity of this cutoff point. Of course, any outcrops in the vicinity should be examined in detail. After locating the source as closely as possible by geochemical prospecting the prospector normally would turn to other methods, such as trenching and drilling.

Many samples which in this investigation proved to be anomalous when analyzed in the laboratory gave no indication of high metal content in the field test. The field test used probably is as reliable as any test based on the extraction of metal in a cold water solution (laboratory analyses ordinarily involve fusion or acid digestion). Table I shows how the field tests compare to the laboratory tests for the various samples. Where an anomaly is indicated by laboratory analysis but not by field test, any additional samples taken should be sent to a laboratory for analysis. Where the table indicates that an anomaly was detected by both the laboratory test and the field test, the field test alone probably could be used to trace the anomaly, but laboratory analyses should be obtained for at least some of the samples.

Probably any sample found to be anomalous in this investigation is worthy of some follow-up work. Comments on a few of the anomalies are included here, but the anomalies discussed are not necessarily considered to be more important than others shown on the maps.

Mt. Fairplay, Figure 3, Samples 38-46

Samples from streams on the ~~east~~ west slope of Mt. Fairplay contained anomalous amounts of the four metals, especially copper. Field tests on these samples detected anomalous amounts of heavy metals in only one; therefore, in follow-up work, laboratory analyses will be required. The favorable area could be delineated further by additional sampling to trace the anomaly up the west slope of the mountain and by sampling the streams draining the north, east, and south slopes.

Rock is exposed over much of the high part of the mountain. The core of the mountain is a granitic intrusive of Mesozoic age; it is surrounded by Tertiary volcanic flows. The volcanic rocks - mostly rhyolite and dacite - can be distinguished from the intrusive by their finer grain. The relative ages of these rocks tend to make the area unfavorable for ore deposition. The intrusive and any ore deposits that may have been associated with it were emplaced before the volcanic rocks were formed; therefore, the volcanic rocks would not contain any mineral deposits that were contemporaneous with the intrusive. Any deposits formed in the enclosing rocks at the time of intrusion would have been either eroded away or buried under the volcanics. If the possibility of ore deposits buried under the volcanics is eliminated, two other possibilities remain: (1) ore deposits may have been formed within the intrusive core, and (2) ore deposits may have been formed after the volcanic rocks were formed, during a period of mineralization that has not yet been recognized in the eastern Yukon-Tanana Region. Neither of these possibilities is especially attractive. In spite of the unfavorable geology, some additional work on this anomaly seems justified.

Ridge West of Upper Logging Cabin Creek
Figures 3 and 4, Samples 47 - 61

Streams draining the ridge west of upper Logging Cabin Creek carry lead in moderately high, anomalous amounts. The favorable area probably could be delineated further by additonal stream sediment sampling around the ridge. The field tests on the samples compare rather unfavorably with the laboratory analyses; therefore, the prospector should not rely on field tests in initial follow-up work on this anomaly. So far as is known, the ridge consists of Tertiary volcanic flows, hence, the area, in light of present knowledge, is not a particularly favorable one for ore deposition. In spite of the unfavorable geology some additional follow-up work seems justified.

Head of Baby Creek, Figures 8 and 9, Samples 133, 146, and 147

A sample from one of the headwater forks of Baby Creek carried an extremely large amount of zinc, and two samples from tributaries to Walker Fork carried rather large amounts of copper and zinc. The sample from the tributary to Baby Creek gave a strong reaction in the field test. The favorable area thus indicated is less than one square mile. Follow-up work on this anomaly could be largely soil sampling across the crest of the divide, but a few additional stream sediment samples probably would further delimit the area. Bedrock is Birch Creek schist, and small granitic intrusions have been mapped within eight miles of the anomalous area. The geology is favorable for ore deposition. Contamination from the road is possible but not probable.

Camp Creek, Tributary to Canyon Creek, Figure 9, Sample 153

A sample from Camp Creek near its mouth carried a large amount of zinc and a moderately large amount of lead. Because of dilution, even a weakly anomalous sample from a stream this large might be more important than a strongly anomalous sample from a small headwater branch. Additional stream sediment sampling throughout the Camp Creek drainage would be the logical follow-up work on this anomaly. Field tests should not be relied upon. The geology is favorable. Contamination from old placer mine workings is a possibility.

Columbia Creek, Figure 11, Sample 177

A sample from Columbia Creek near its mouth carried weakly anomalous amounts of zinc and molybdenum. Columbia Creek is a large stream draining an area of several tens of square miles, and, because of dilution, a weakly anomalous sample may be important. An extensive program of stream sediment sampling would be required to trace the anomaly. Laboratory analyses should be obtained on all samples. The geology throughout the drainage area is favorable.

Ridge Between King Solomon Creek and Boundary Creek, Figure 12, Samples 189 - 200

Several samples from streams draining the divide between King Solomon Creek and Boundary Creek carried anomalous amounts of metal. A few additional stream sediment samples from streams draining the divide would further delineate the favorable area. For the most part, initial follow-up work on this anomaly probably would best be soil sampling in the favorable area indicated by the stream sediment samples. Large amounts of quartz in some of the stream sediments indicate that quartz veins have been formed in the ridge.

Discovery Fork of American Creek, Figure 13, Samples 205 - 213

Several samples from Discovery Fork carried anomalous amounts of copper; and, other samples, although containing lesser amounts, carried copper in near anomalous quantities. Basic and ultrabasic igneous rocks commonly contain more copper than most other rock types. Basic igneous rocks - altered to greenstone - are found in this area. Possibly this anomaly is caused by these rocks rather than by any ore deposits; however, no greenstone was noted in the float where samples 205, 206, and 207 were taken. Initial follow-up work here probably would best be the taking of stream sediment and soil samples upstream from samples 206 and 209.

TABLE I
RESULTS OF ANALYSES

Map No.	Field No.	Parts per million Copper	Lead	Zinc	Molybdenum	Field Test Milliliters	Fig. No.
1	5H32	30	10	60	3	1	1
2	33*	35	10	75	2	1	1
3	34	35	15	60	2	7	1
4	36	25	10	60	2	4	1
5	35	25	10	70	2	10	1
6	39	20	15	60	2	12	1
7	38	25	15	75	2	15	1
8	40	25	10	50	2	5	1
9	41	20	10	90	2	1	1
10	42	20	10	60	2	10	1
11	43	30	20	80	2	7	1
12	44	40	35	120	3	1	1
13	45	35	25	90	2	2	1
14	46	20	10	50	2	7	1
15	47	20	10	50	2	7	1
16	48	30	10	95	2	1	1
17	50	25	20	60	2	7	2
18	51	30	15	50	2	5	2
19	53	15	10	40	2	7	2
20	52	25	10	50	2	6	2
21	54	20	10	50	2	8	2
22	55	35	10	50	4	5	2
23	57	25	10	50	3	7	2
24	56	30	10	50	3	12	2
25	59	55	10	60	3	7	2
26	60	25	15	75	4	7	2
27	61	25	10	50	4	7	2
28	63	20	15	50	3	8	2
29	62	35	35	80	5	3	2
30	64	15	20	65	3	9	2

*All samples were marked in the field with the prefix "5H".

Table I (Continued)

Map No.	Field No.	Copper	Lead	Zinc	Molybdenum	Field Test Milliliters	Fig. No.
		Parts per million					
31	65	20	5	40	3	6	2
32	66	15	10	50	3	7	2
33	67	15	15	60	2	4	2
34	68	15	10	65	2	1	2
35	70	35	10	115	3	9	3
36	71	20	10	60	2	1	3
37	72	25	10	90	3	2	3
38	73	35	45	135	3	3	3
39	74	60	50	115	4	1	3
40	75	75	50	110	4	3	3
41	76	55	20	130	3	3	3
42	77	55	20	100	3	1	3
43	78	45	45	130	4	1	3
44	79	105	15	35	4	8	3
45	80	45	95	235	4	10	3
46	81	25	60	135	2	2	3
47	82	55	85	190	3	5	3
48	83	20	30	85	3	9	3
49	84	20	30	75	2	4	3
50	85	25	25	90	2	3	3
51	88	25	35	110	3	9	3
52	87	15	20	65	3	3	3
53	86	30	30	90	2	7	3
54	90	25	20	80	2	5	4
55	91	30	30	100	2	7	4
56	92	30	30	100	3	7	4
57	94	25	35	115	2	7	4
58	93	20	30	110	2	8	4
59	95	30	25	90	2	2	4
60	96	20	30	70	2	3	4
61	98	20	25	70	2	7	4
62	99	20	10	65	2	2	4
63	100	20	10	70	2	9	4
64	101	35	10	95	2	9	4
65	103	20	10	65	2	1	4

Table I (Continued)

Map No.	Field Test	Parts per Million Copper	Lead	Zinc	Molybdenum	Field Test Milliliters	Fig. No.
66	102	20	15	90	2	5	4
67	104	25	20	90	3	7	4
68	105	15	10	70	2	3	4
69	106	15	10	65	2	3	4
70	107	45	30	135	2	1	4
71	108	35	10	80	2	10	4
72	110	20	10	80	2	7	5
73	111	25	10	80	3	3	5
74	112	20	5	75	3	3	5
75	113	25	10	80	3	3	5
76	114	35	15	95	3	5	5
77	115	20	5	60	2	3	5
78	116	40	15	150	3	3	5
79	121	15	10	80	4	1	6
80	122	35	10	75	2	1	6
81	123	30	5	70	2	1	6
82	124	30	10	85	3	1	6
83	119	20	10	80	3	1	6
84	120	20	5	80	2	1	6
85	117	10	5	50	3	1	6
86	125	15	15	95	2	1	6
87	126	20	10	80	3	7	6
88	128	20	10	85	3	1	6
89	127	20	5	75	3	5	6
90	267	10	5	25	3	1	6
91	266	20	20	75	3	6	6
92	130	25	25	330	3	17	6
93	131	40	20	105	3	5	6
94	132	30	20	110	3	1	6
95	133	40	20	130	3	1	6
96	134	20	5	75	3	2	7
97	135	30	10	90	3	1	7
98	136	35	10	90	3	1	7
99	137	40	5	100	3	1	7
100	139	35	10	90	2	2	7

Table I (Continued)

Map. No.	Field Test	Copper	Lead	Zinc	Molybdenum	Field Test Milliliters	Fig. No.
		Parts per Million					
101	140	45	10	85	3	1	7
102	141	30	10	100	4	5	7
103	143	20	5	105	3	7	7
104	142	55	10	130	3	10	7
105	144	20	10	85	2	1	7
106	145	20	10	95	2	1	7
107	146	20	5	45	3	1	7
108	147	35	20	95	3	1	7
109	149	30	5	100	2	1	7
110	150	20	10	95	2	1	7
111	151	25	10	115	3	1	7
112	152	20	5	85	2	1	7
113	153	20	5	105	3	1	7
114	154	20	5	90	2	1	7
115	155	20	10	105	2	1	7
116	156	35	10	115	3	4	7
117	159	20	10	90	2	3	7
118	157	30	10	120	3	2	7
119	160	25	10	130	3	1	7
120	162	20	10	105	3	1	7
121	161	35	10	125	2	3	7
122	163	10	5	60	2	3	8
123	164	25	10	120	3	1	8
124	165	20	5	85	3	1	8
125	166	20	5	80	3	1	8
126	167	20	5	85	3	1	8
127	168	25	10	85	3	1	8
128	169	25	10	100	4	1	8
129	170	25	10	80	3	1	8
130	190	15	10	60	3	4	8
131	189	30	10	85	3	1	8
132	188	25	10	70	3	1	8
133	187	50	15	130	2	1	8
134	191	35	15	110	3	2	8
135	192	30	20	95	3	2	8

Table I (Continued)

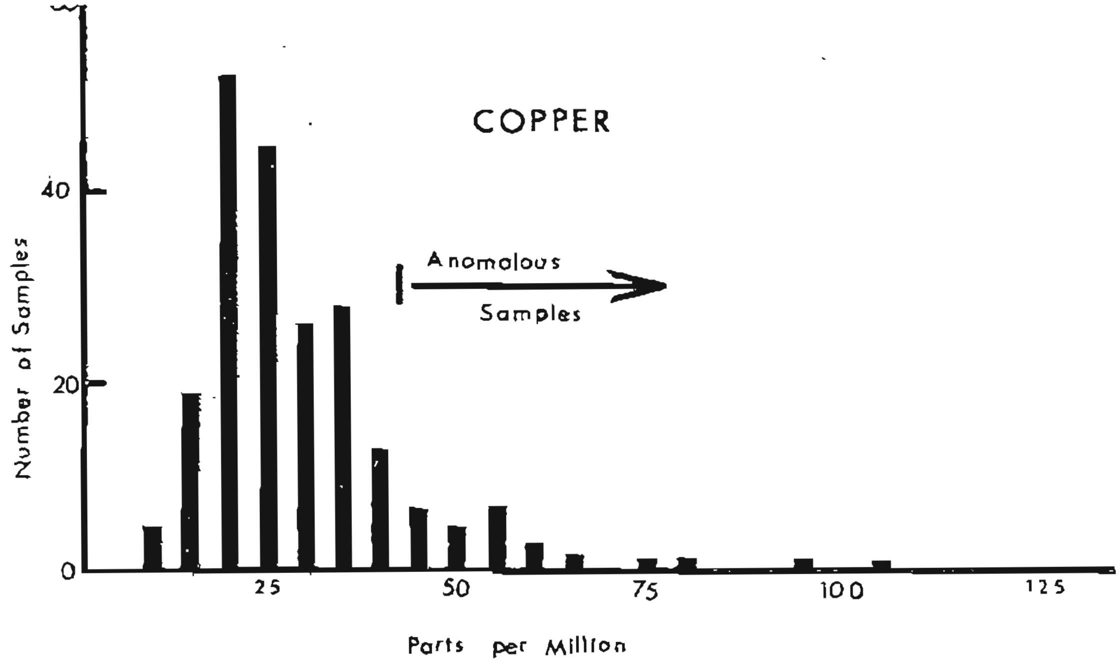
Map No.	Field Test	Parts per Million Copper	Lead	Zinc	Molybdenum	Field Test Milliliters	Fig. No.
136	193	25	10	70	2	1	8
137	194	15	10	35	3	1	8
138	195	10	10	40	2	1	8
139	196	35	25	175	3	5	8
140	199	25	15	165	3	1	8
141	200	15	15	75	3	1	8
142	198	15	20	110	2	1	8
143	201	10	10	80	3	2	8
144	202	20	10	95	4	1	8
145	203	50	10	60	3	1	8
146	185	50	10	135	3	2	9
147	186	25	20	645	2	17	9
148	184	35	10	100	2	1	9
149	183	35	10	115	2	1	9
150	182	15	10	65	2	1	9
151	181	25	15	100	2	1	9
152	171	20	10	105	4	1	9
153	172	40	25	245	3	3	9
154	173	20	5	90	3	1	9
155	174	35	5	80	2	1	9
156	175	25	5	80	3	1	9
157	176	55	10	115	3	1	9
158	180	25	10	75	2	7	9
159	177	40	10	145	4	1	9
160	178	40	15	185	2	1	9
161	179	35	15	130	3	1	9
162	204	20	10	80	2	3	10
163	205	25	10	70	3	1	10
164	206	15	10	60	3	2	10
165	207	25	10	80	3	1	10
166	209	25	10	60	3	1	10
167	210	25	10	60	3	1	10
168	212	30	15	75	2	5	10
169	211	15	10	70	3	7	10
170	213	25	10	105	4	1	10

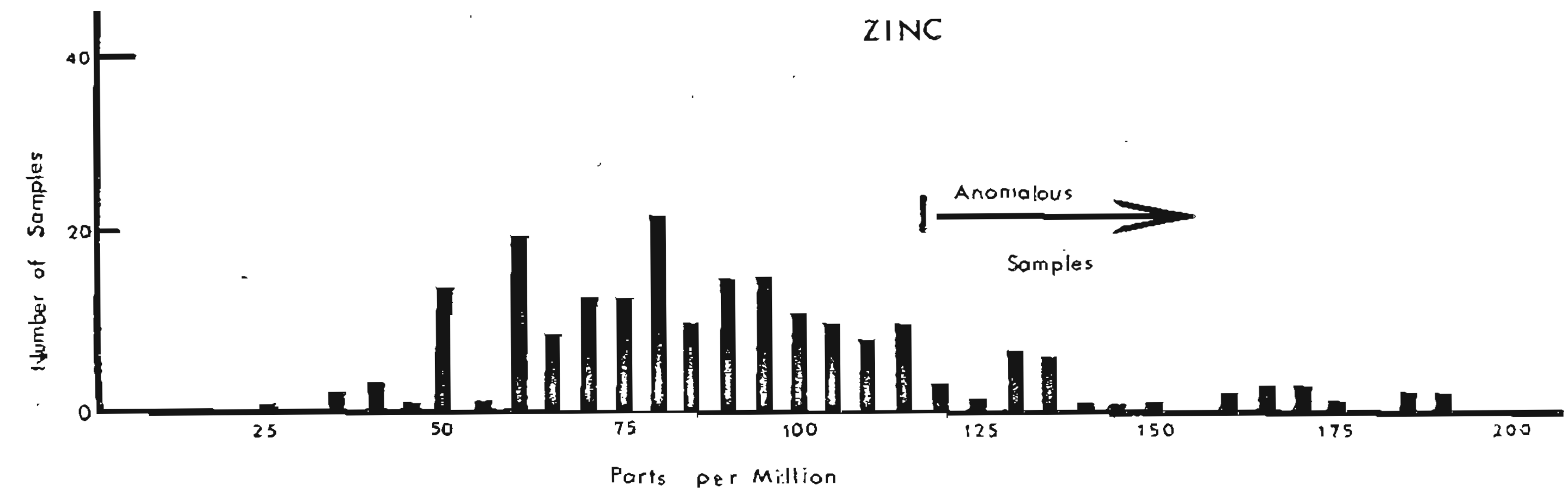
Table I (Continued)

Map No.	Field Test	Copper	Lead	Zinc	Molybdenum	Field Test Milliliters	Fig. No.
		Parts per Million					
171	214	25	5	60	2	7	10
172	215	35	10	70	2	6	11
173	216	95	10	90	3	5	11
174	217	30	10	105	2	1	11
175	219	40	20	95	3	9	11
176	220	20	15	80	3	7	11
177	221	35	20	135	4	1	11
178	222	30	20	[illegible]	2	5	11
179	223	40	25	190	3	6	11
180	224	40	15	115	2	1	11
181	225	45	30	110	3	4	11
182	226	25	10	90	2	4	11
183	227	25	15	115	2	5	11
184	228	20	10	80	2	5	11
185	230	30	15	80	2	2	11
186	231	20	20	65	2	4	12
187	232	25	20	110	2	5	12
188	233	15	15	70	2	3	12
189	234	50	15	95	4	2	12
190	235	60	5	105	3	1	12
191	236	55	15	135	3	9	12
192	238	80	10	170	2	9	12
193	237	65	10	90	3	1	12
194	243	30	10	170	3	1	12
195	240	25	10	70	2	1	12
196	241	25	10	170	2	2	12
197	242	25	15	160	2	1	12
198	244	20	25	165	2	1	12
199	245	40	10	165	2	1	12
200	246	45	15	185	2	1	12
201	247	30	15	160	3	1	12
202	251	20	10	75	3	1	12
203	249	30	10	60	2	2	12
204	250	25	10	65	4	1	12
205	253	35	10	95	2	1	13

Table I (Continued)

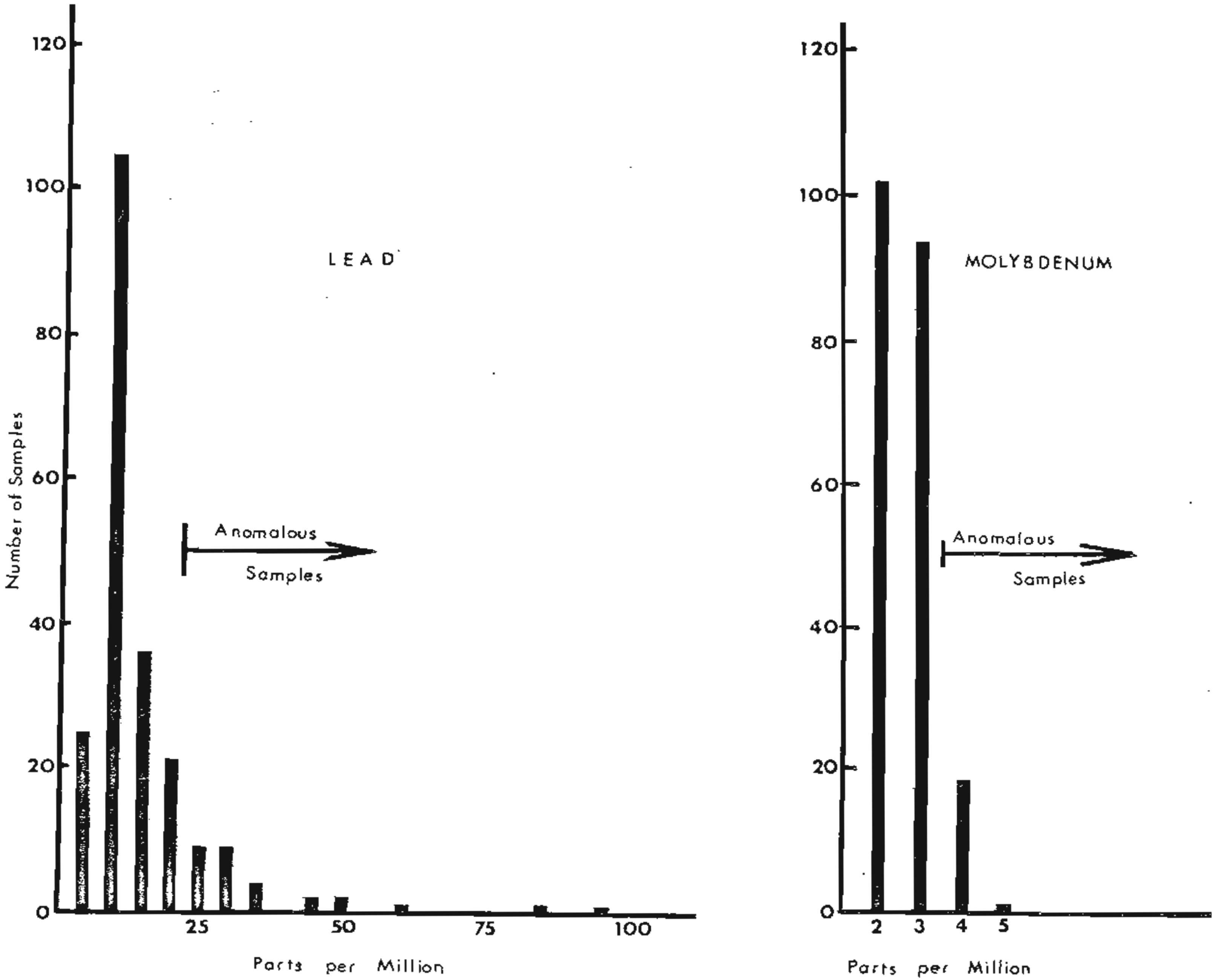
Map No.	Field Test	Copper	Lead	Zinc	Molybdenum	Field Test Milliliters	Fig. No.
		Parts per Million					
206	252	<u>60</u>	10	95	2	1	13
207	254	35	10	95	2	1	13
208	255	40	15	100	<u>4</u>	1	13
209	256	<u>65</u>	15	<u>140</u>	3	1	13
210	257	35	15	105	2	1	13
211	258	<u>45</u>	10	100	3	1	13
212	260	35	15	95	2	1	13
213	261	<u>50</u>	15	80	2	1	13
214	262	25	10	60	2	1	13
215	263	30	15	55	2	1	13
216	264	15	10	50	2	1	13
217	265	25	15	65	3	1	13





NOTE: Four samples containing more than 200 ppm are not shown.

FREQUENCY DISTRIBUTION GRAPHS FOR COPPER AND ZINC.



FREQUENCY DISTRIBUTION GRAPHS FOR LEAD AND MOLYBDENUM

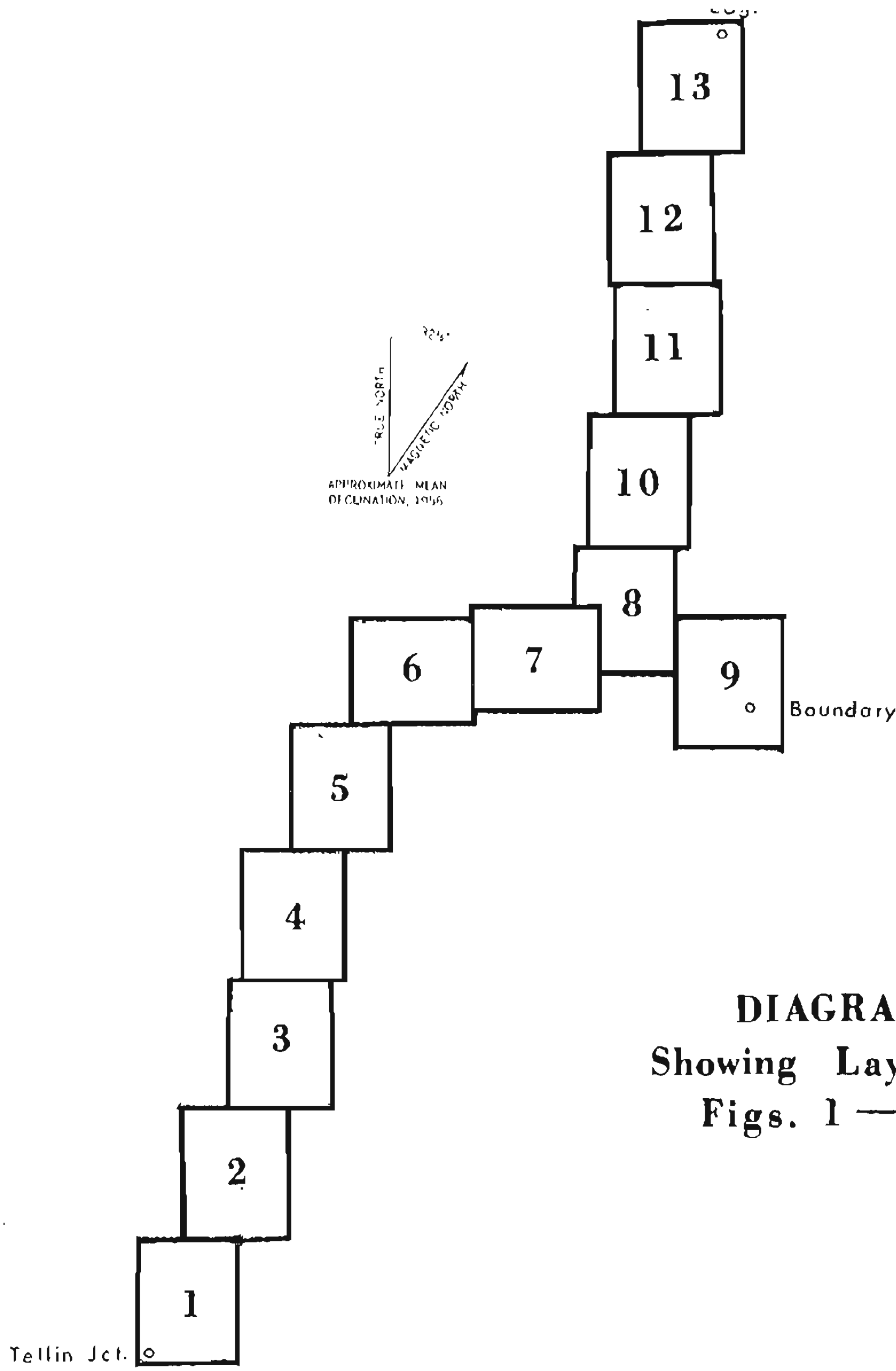


DIAGRAM
Showing Layout of
Figs. 1 — 13

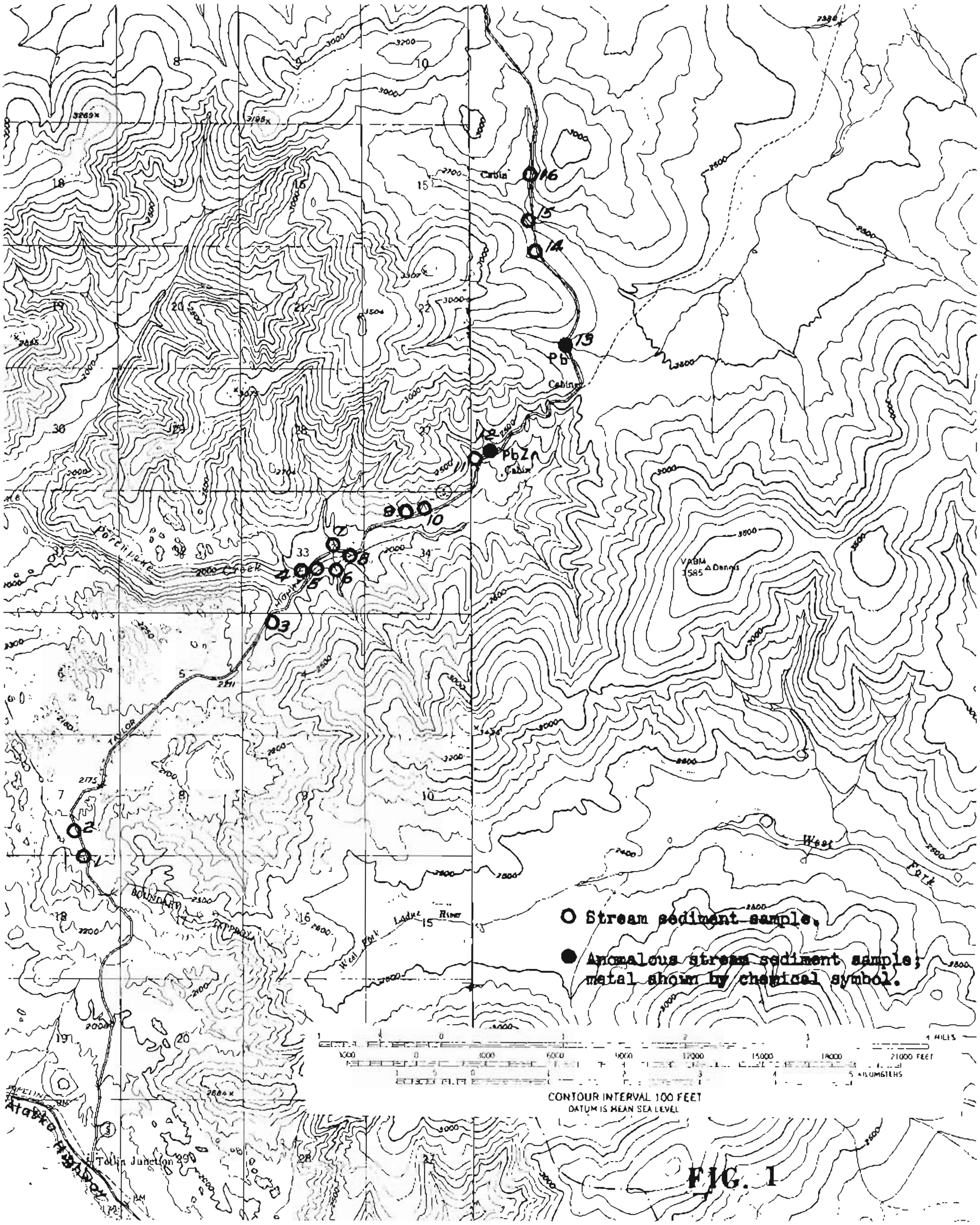
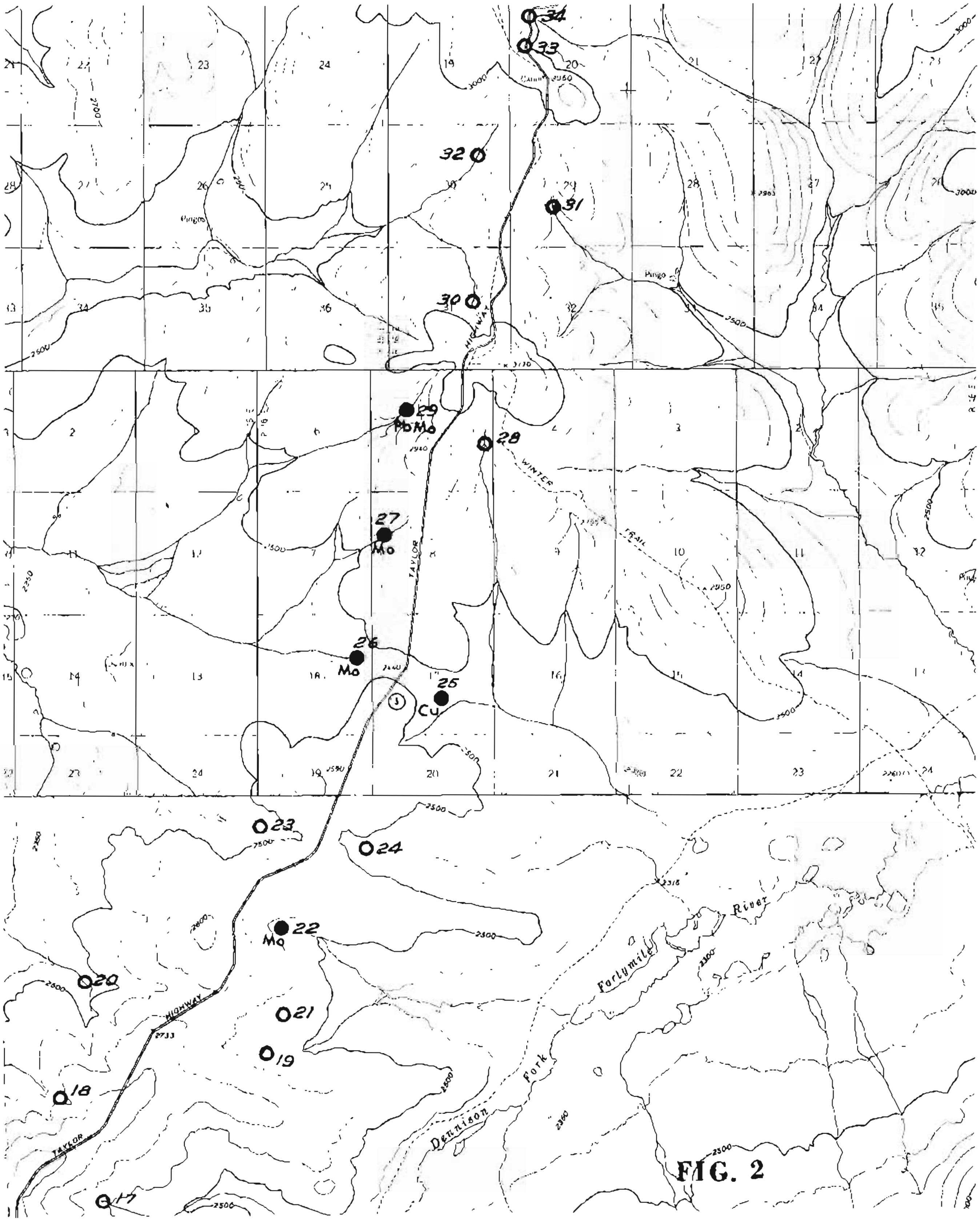

O Stream sediment sample.
● Anomalous stream sediment sample; metal shown by chemical symbol.
CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL
Porcupine Creek
West Fork
VABM 3585 Dennis
Cabin
Tetlin Junction
Alaska Highway

FIG. 1



34
33
32
31
30
29
PbMo
28
27
Mo
26
Mo
25
Cu
23
24
22
Mo
20
21
19
18
17
TAYLOR
HIGHWAY
WINTER
TRAIL
Pingo
Fortymile
River
Dennison
Fork

FIG. 2

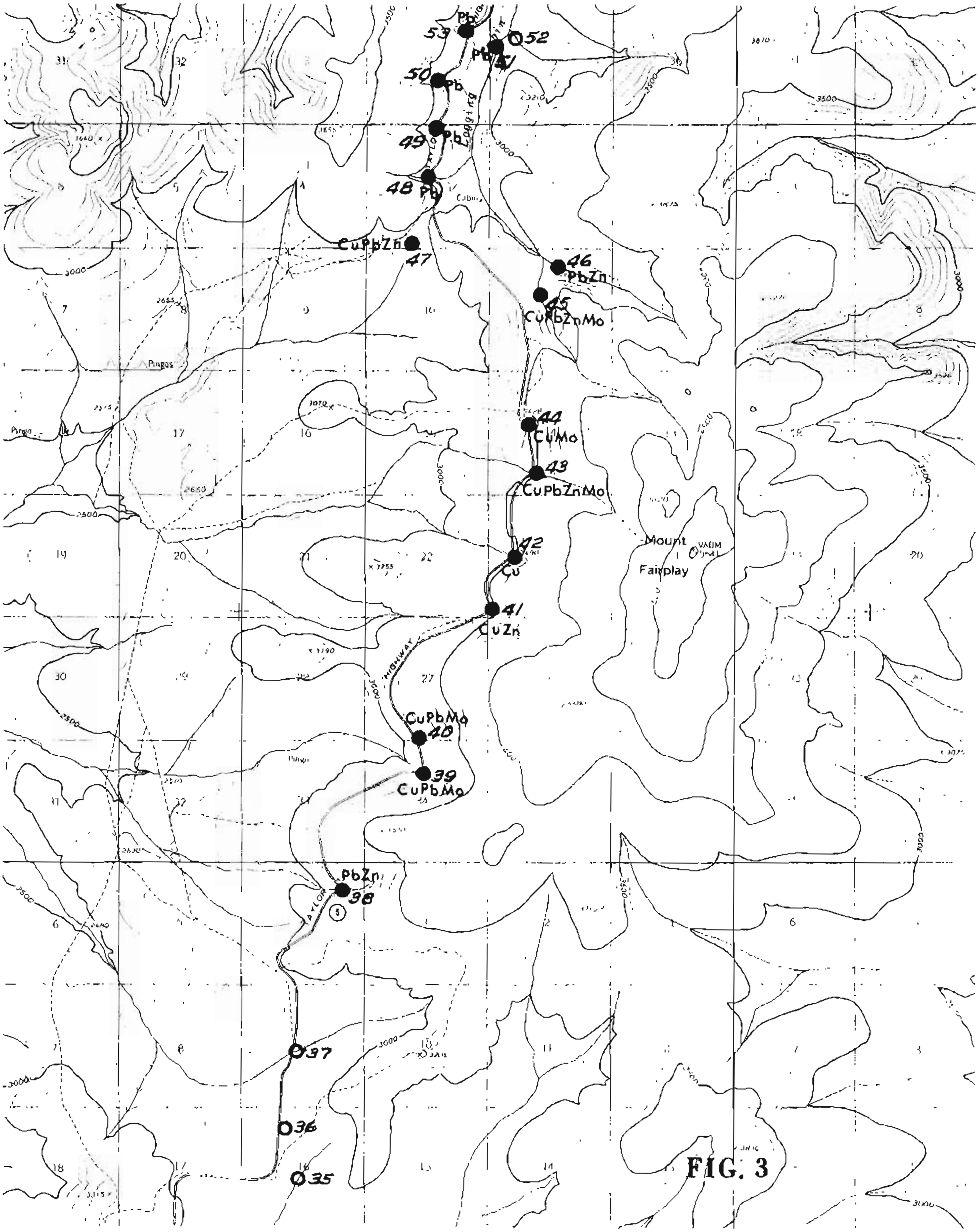
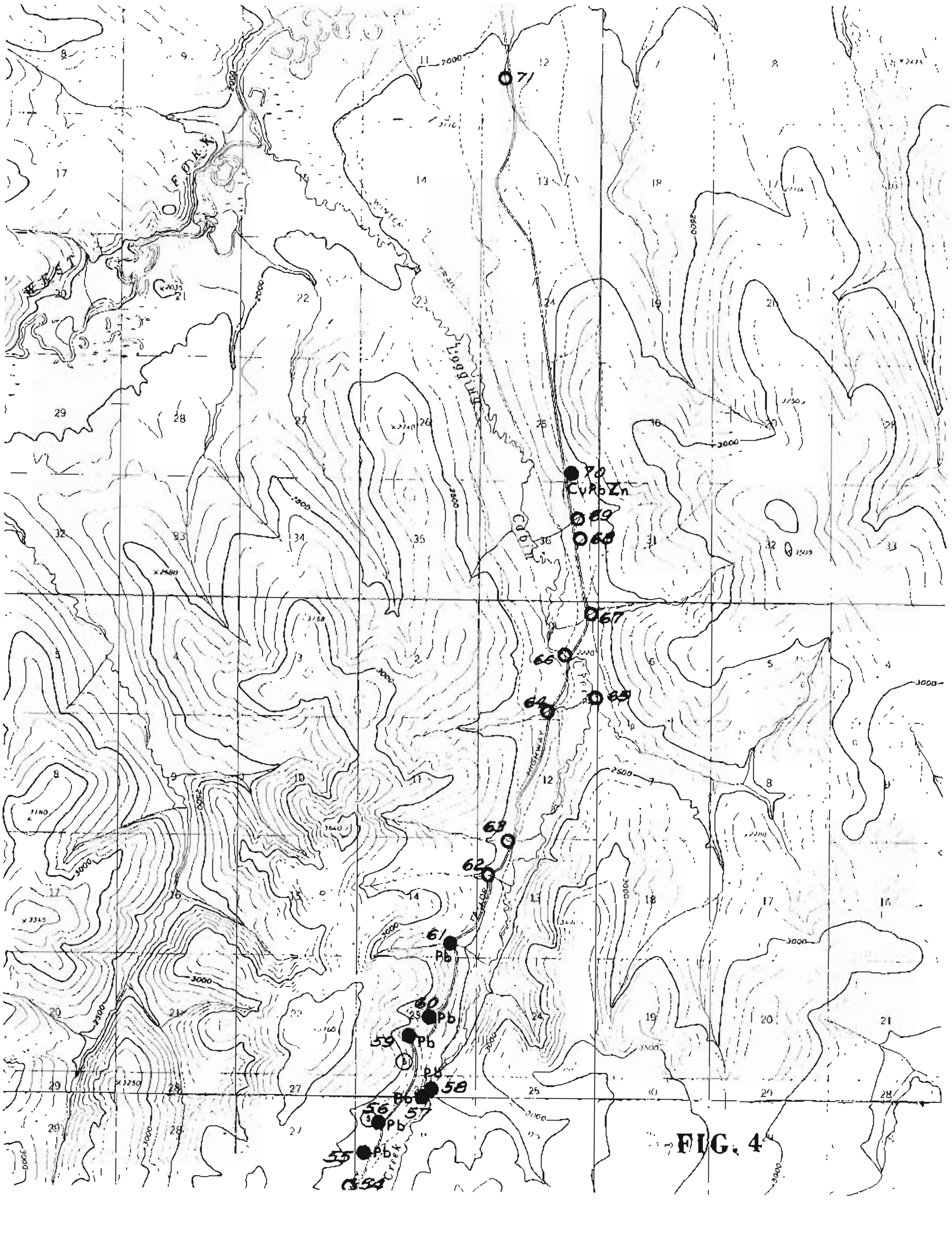
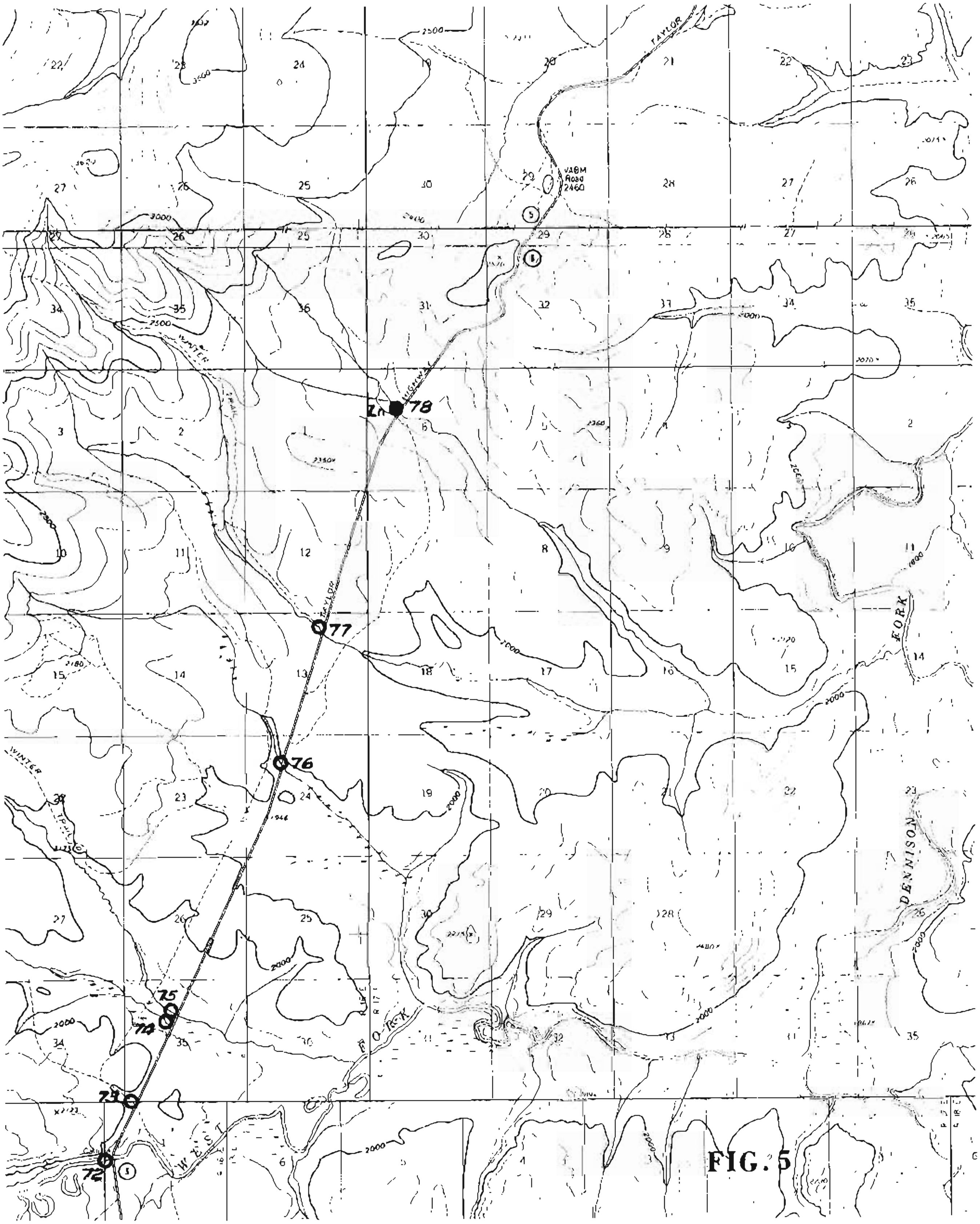

53 Pb
52
Pb 51
50 Pb
49 Pb
48 Pb
CuPbZn 47
46 PbZn
45 CuPbZnMo
44 CuMo
43 CuPbZnMo
42 Cu
41 CuZn
Mount Fairplay
HIGHWAY
CuPbMo 40
39 CuPbMo
PbZn 38
37
36
35
Pingos
Logging

FIG. 3



71
70
CuPbZn
69
68
67
66
65
64
63
62
61
Pb
60
Pb
59
Pb
58
Pb
57
56
Pb
55
Pb
54
WEST FORK
Logging
Cabin
Creek
2000
2500
3000

FIG. 4



TAYLOR
VABM
Road
2460
WINTER
TRAIL
HIGHWAY
TAYLOR
78
77
76
75
74
73
72
FORK
DENNISON
WEST
FORK

FIG. 5

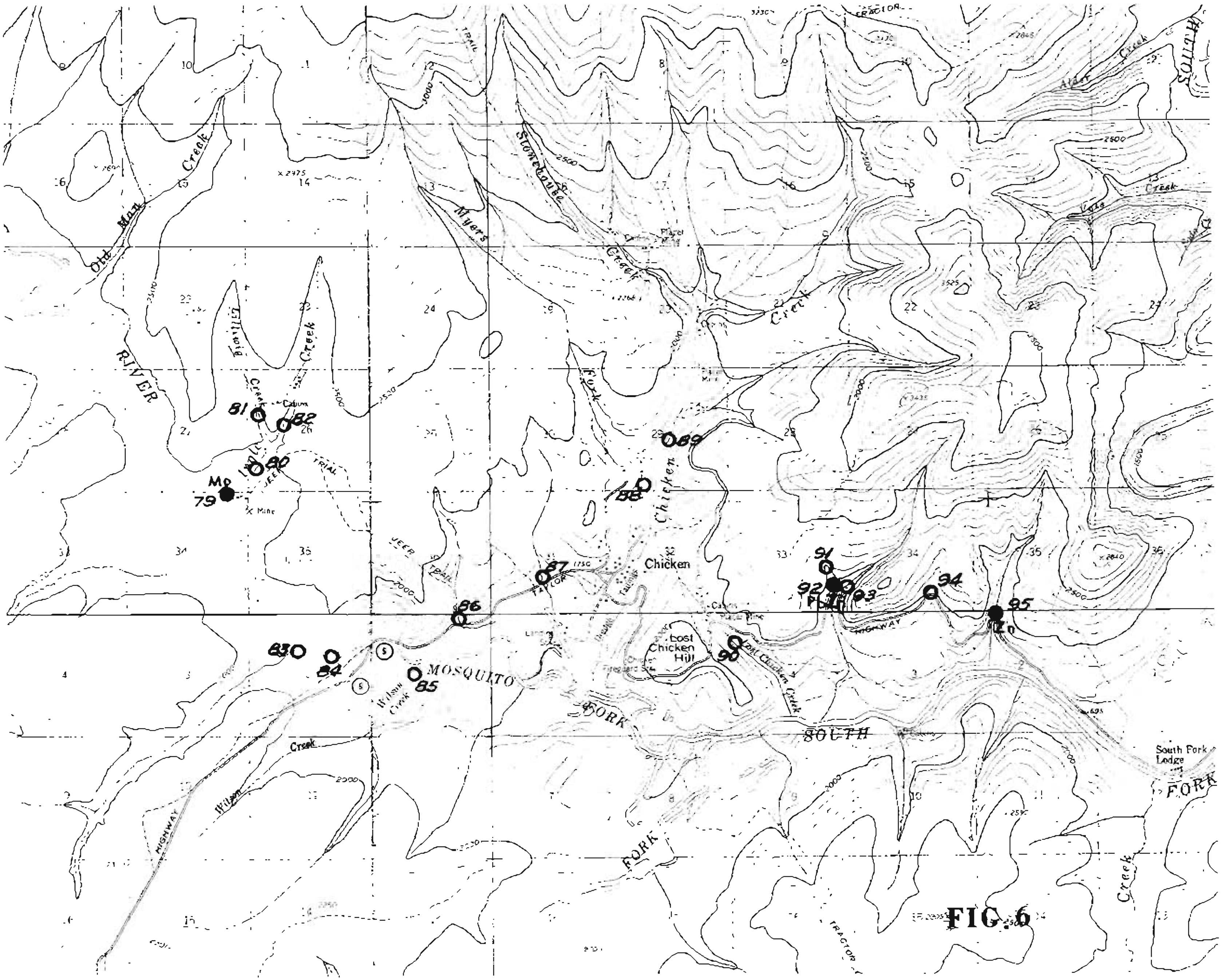
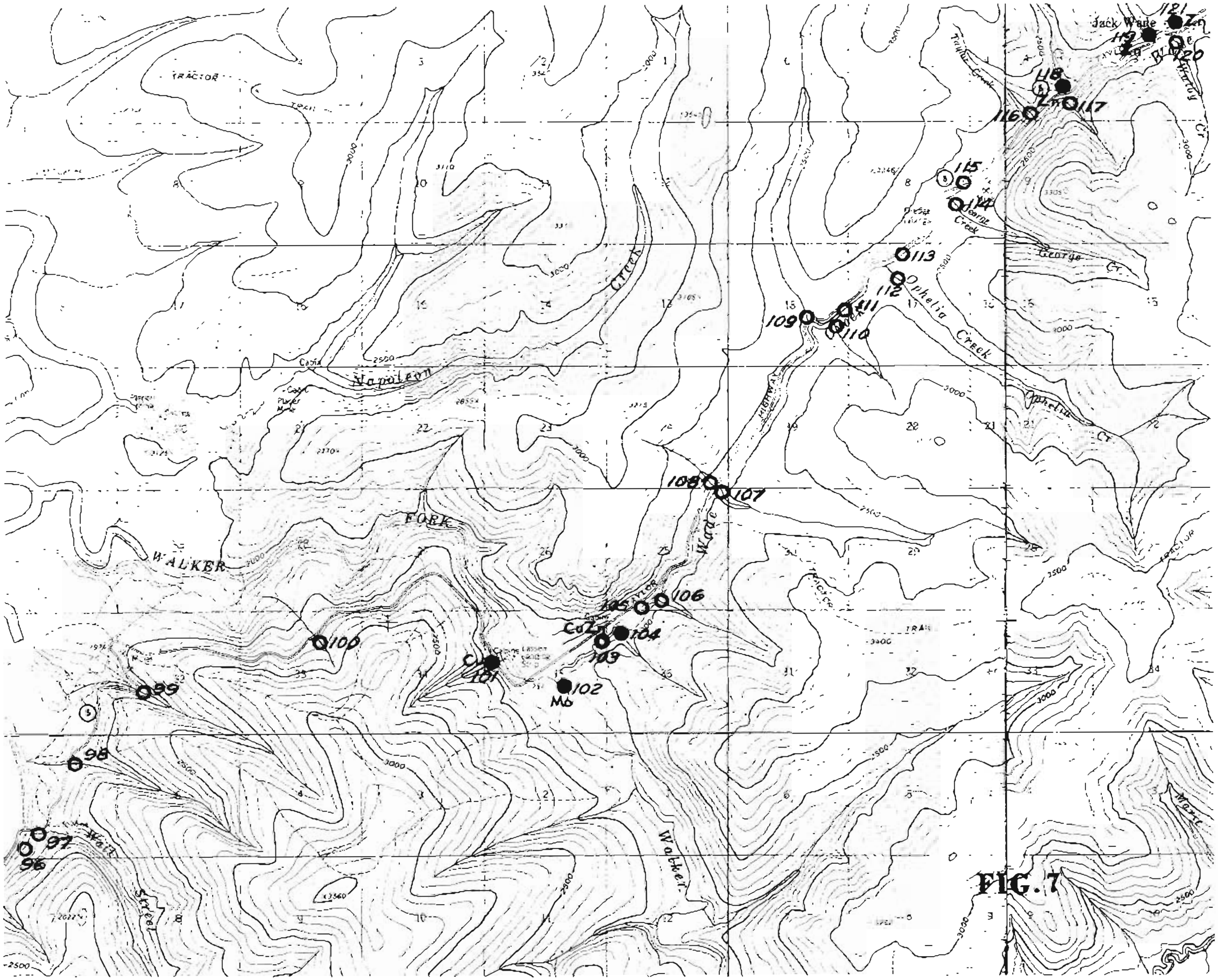
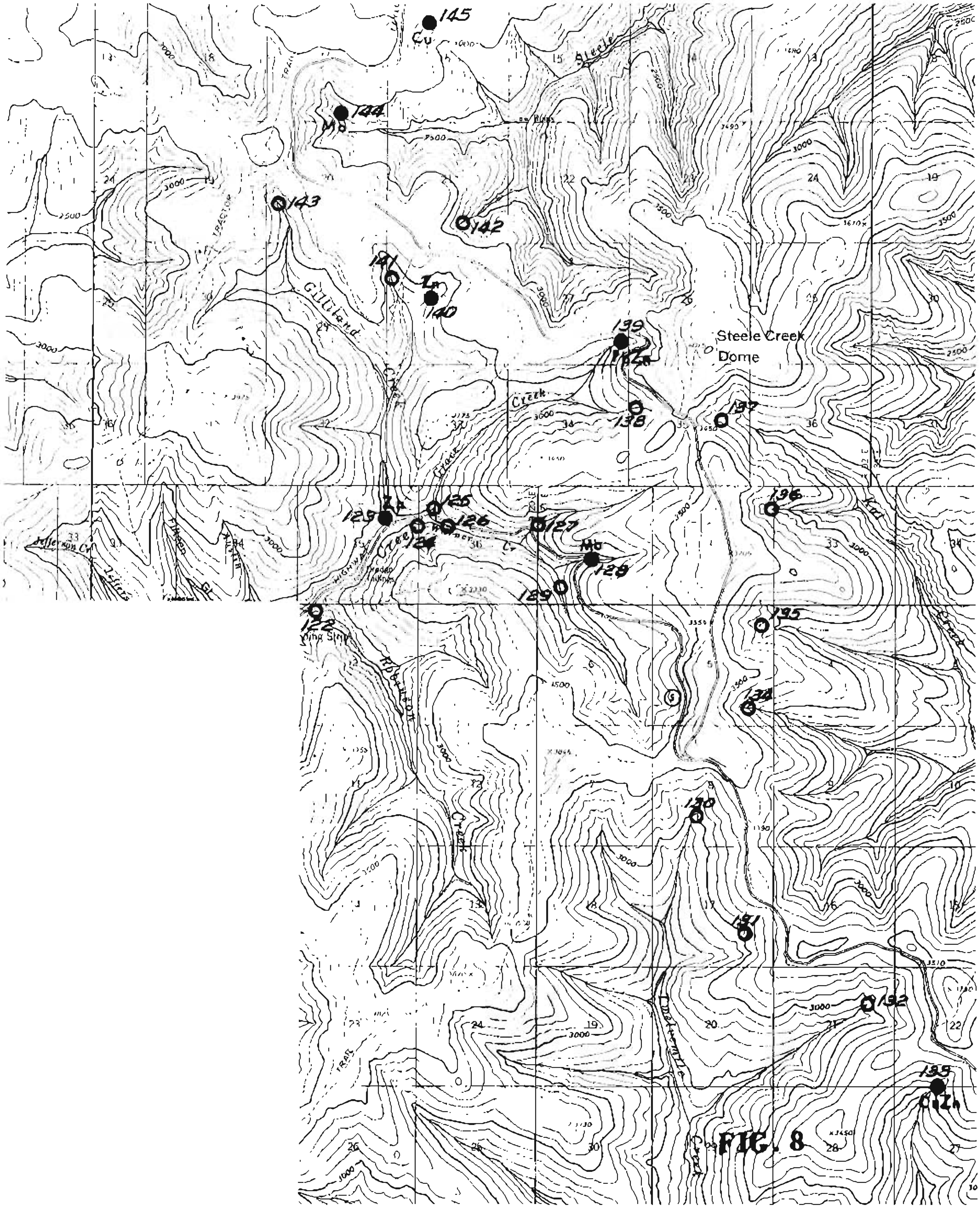

Old Man Creek
RIVER
Lillywig Creek
Creek
Cabin
Mine
Myers
Stonehouse Creek
Fork
Chicken
Chicken
Lost Chicken Hill
Lost Chicken Creek
MOSQUITO
FORK
SOUTH
FORK
Wilson Creek
Creek
HIGHWAY
JEEP TRAIL
TAYLOR
Alder Creek
South Fork Lodge
TRACTOR
TRAIL
Mo
Zn
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95

FIG. 6


Jack Wade
Taylor Creek
George Creek
George Cr
Ophelia Creek
Napoleon Creek
WALKER FORK
Wade
Walker
Walt Street
Marie
TRACTOR TRAIL
Mo
Cu
Cd Zn
Zn
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
FIG. 7



145
Cu
144
Mo
143
142
141
Zn
140
Gilliland
Steele
139
PbZn
Steele Creek
Dome
Creek
138
137
136
Jefferson Cr
125
129
Zn
126
124
127
Mo
128
139
122
195
134
130
131
132
133
CuZn

FIG. 8

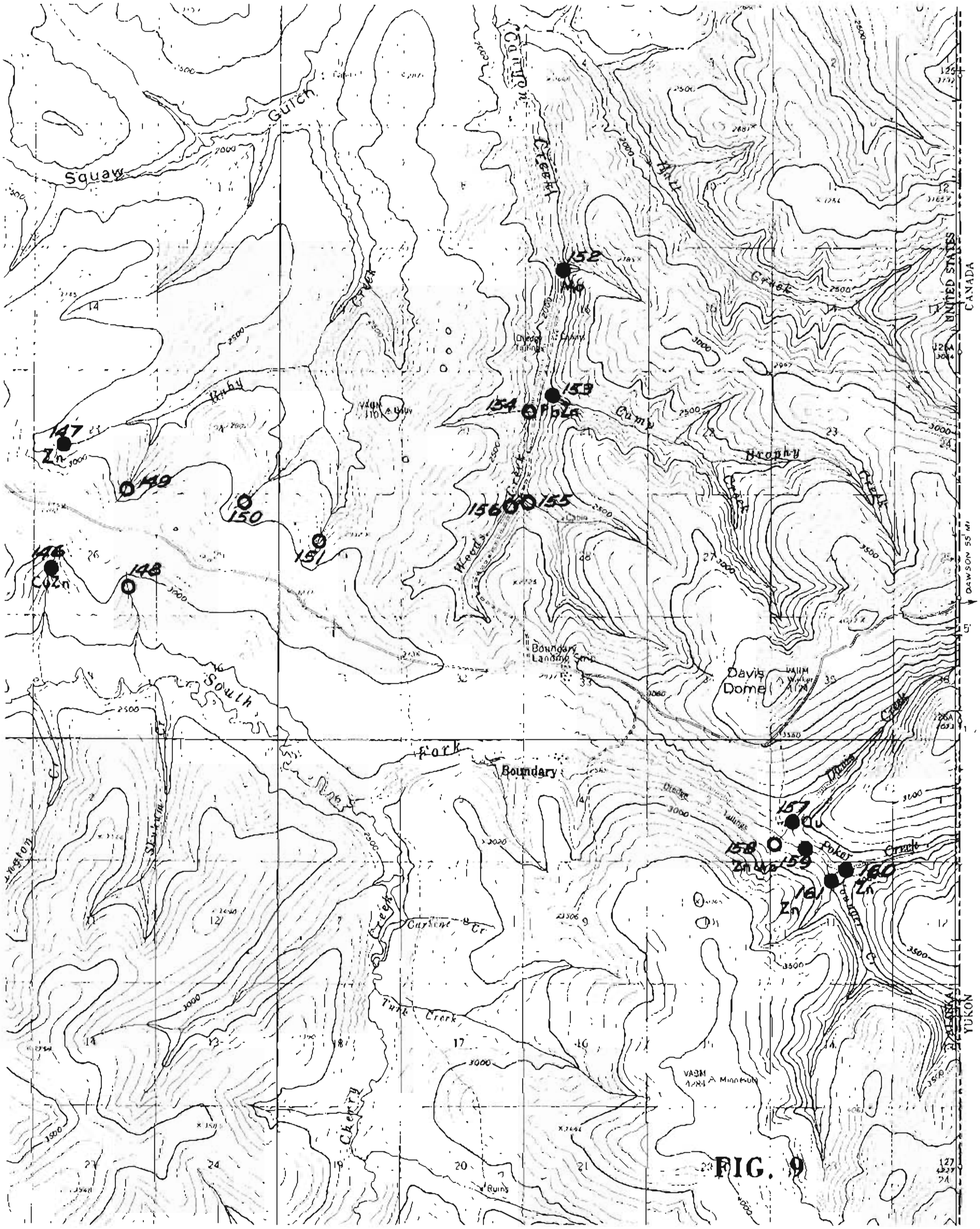

Squaw
Gulch
Canyon
Creek
Ruby
Camp
Brophy
Creek
Woods
Boundary
Landing Strip
Davis
Dome
South
Fork
Boundary
Poker
Creek
Cherry
Creek
Turk Creek
UNITED STATES
CANADA
ALASKA
YUKON
147
Zn
146
CuZn
148
149
150
151
152
153
154
PbZn
155
156
157
158
159
160
Zn
161
Zn

FIG. 9

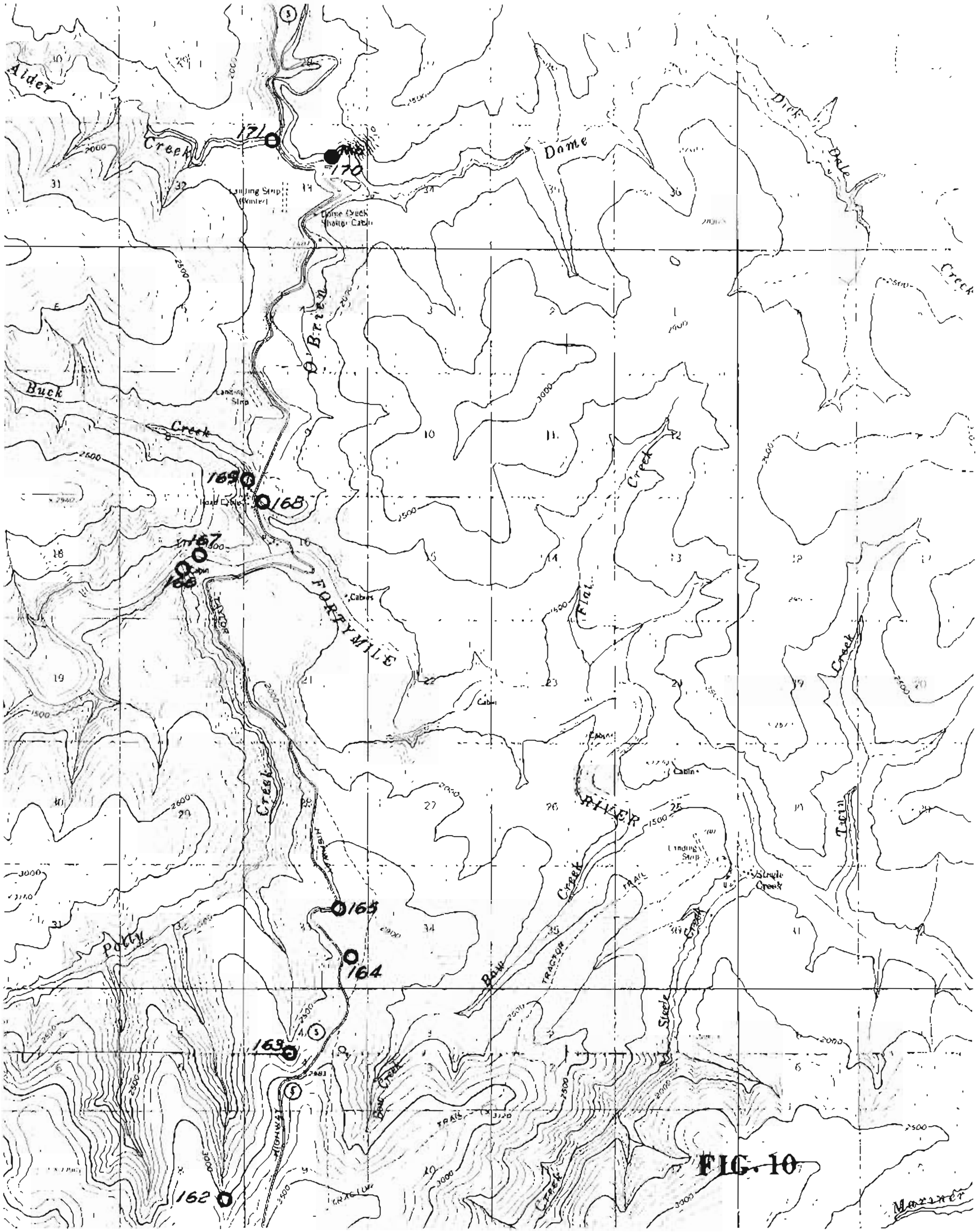
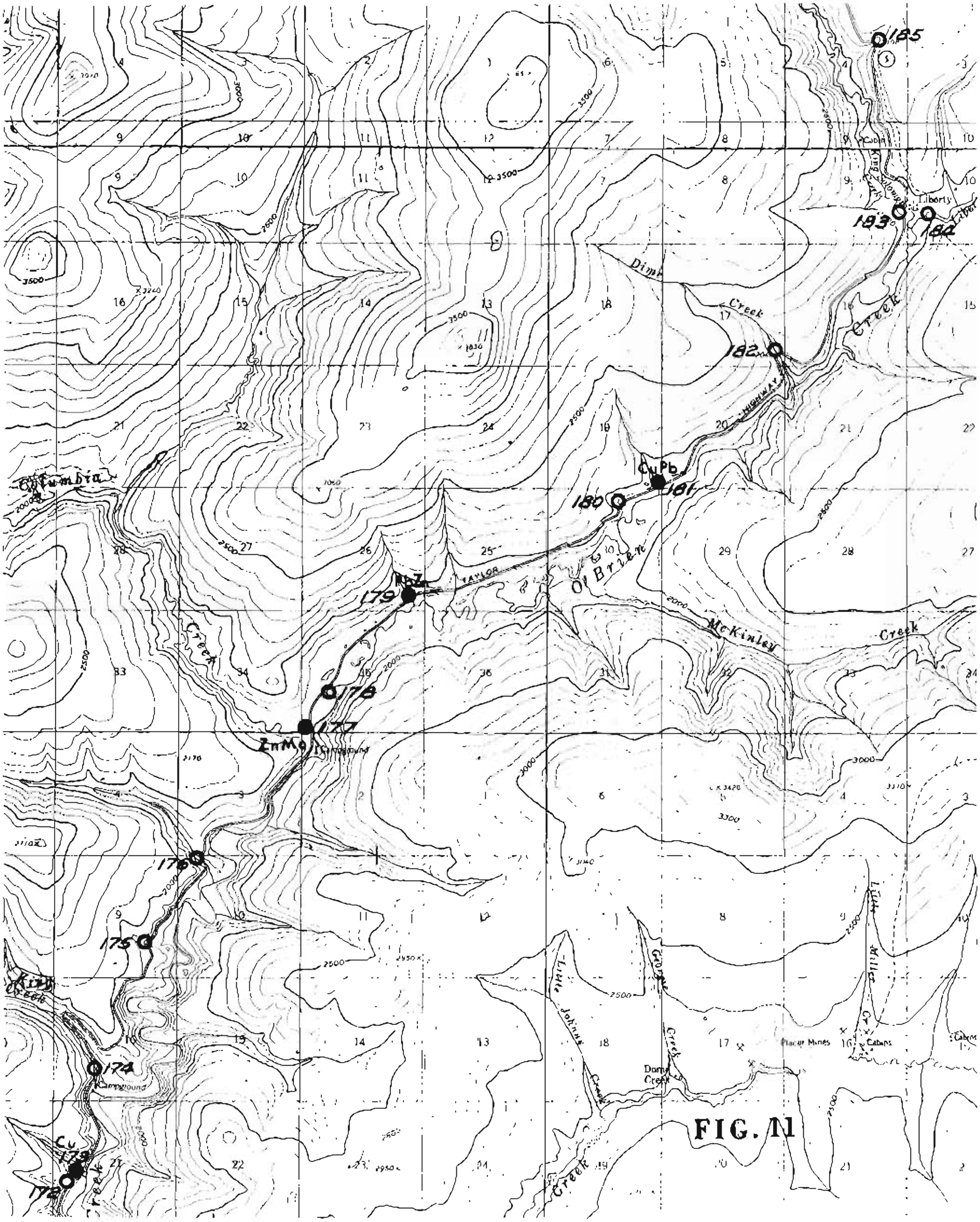
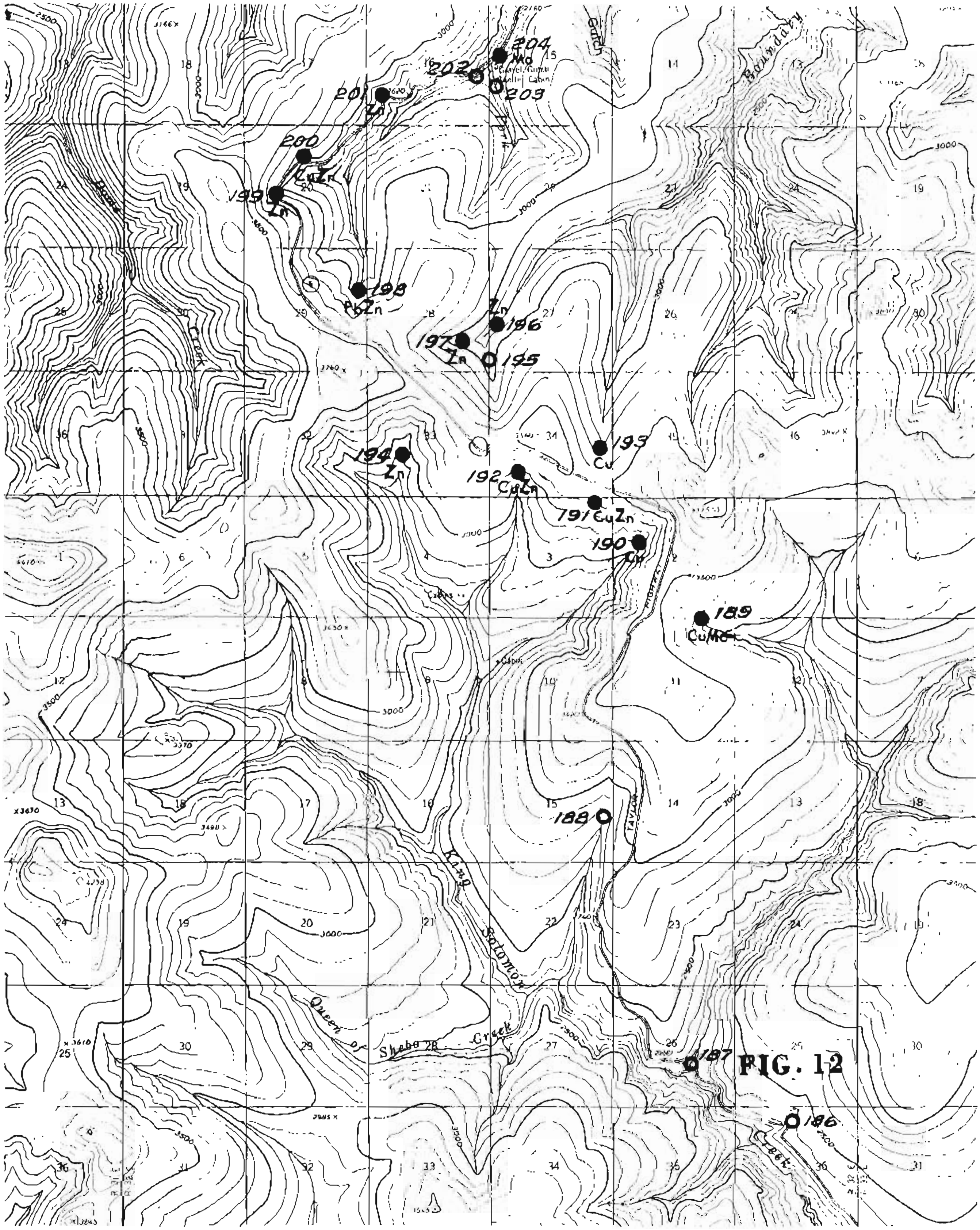

Alder
Creek
171
170
Dome
Dick
Landing Strip (Winter)
Dome Creek Shelter Cabin
O'Brien
Buck
Creek
169
168
167
166
FORTYMILE
Flat
Creek
Creek
Cabin
Landing Strip
Steele Creek
RIVER
Creek
Polly
165
164
163
162
HIGHWAY
Bow
Creek
Steele
Creek
Twin
Creek
Mosquito

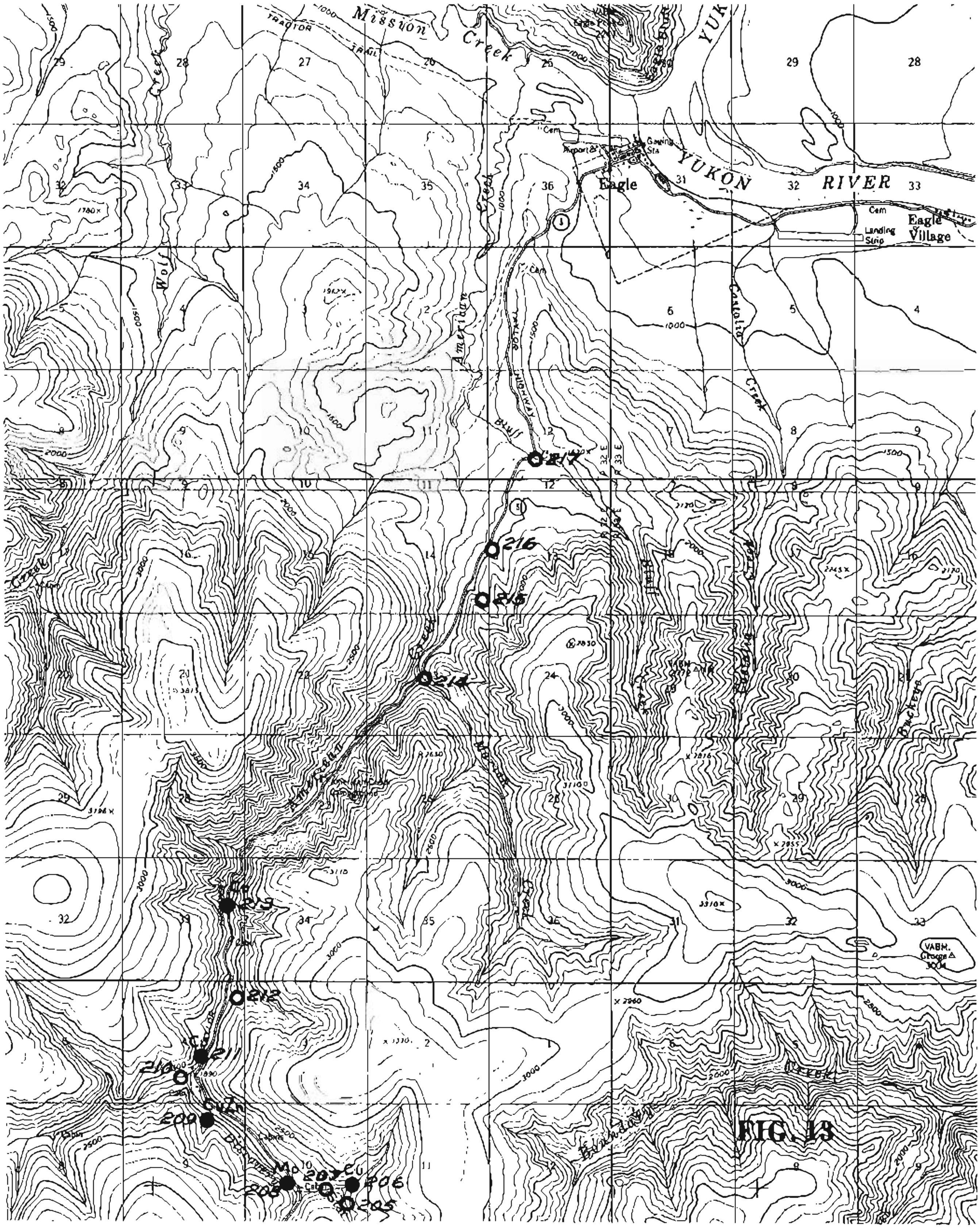
FIG. 10



185
Liberty
183
184
Dime
Creek
182
Creek
HIGHWAY
Cu Pb
181
180
Columbia
TAYLOR
O'Brien
Mo Zn
179
McKinley
Creek
Creek
178
177
Zn Mo
Campground
176
175
King
Creek
174
Campground
Cu
173
172
Creek
Little
Johnny
Creek
George
Creek
Placer Mines
Cabins
Little
Miller
Cr
Dome
Creek
Creek

FIG. 11


204
Mo
202
203
201
Zn
200
CuZn
199
Zn
198
PbZn
Zn
196
197
Zn
195
193
Cu
194
Zn
192
CuZn
191 CuZn
190
Cu
189
CuMo
188
187
186
Boundary
Creek
Queen of Sheba 28 Creek
Solomon
Taylor
Creek
FIG. 12



Mission Creek
TRACTOR TRAIL
YUKON RIVER
Airport
Gaging Sta
Eagle
Cem
Landing Strip
Eagle Village
Wolf Creek
American Creek
TAYLOR HIGHWAY
Bluff
Creek
Buckeye
217
216
215
214
213
212
211
210
209
208
207
206
205

FIG. 13