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TABLING

Two tests were performed to study the qualitative effects of gold and silver recovery by gravity concentration on a Wilfley # 13 laboratory concentrating table. The results of these tests are shown in table T-1.

The materials for these tests were prepared by making three passes of each sample through a Keene jaw crusher & rolls combination. The product size was comparable to that which is stated in table S-1.

During the tabling of the first sample (110' shaft) a considerable amount of carbon floated off on the surface of the water. In an attempt to capture the carbon a muslin filter was fitted to the feed end of the tailings launder during the tabling of the second sample (north vein). The material caught in the filter consisted mostly of slimes but a good sample of carbon was obtained by skimming the surface of the water in the tailings container. A fire assay (table T-1) of these two products indicate that a substantial tailings loss of the gold would occur in a gravity concentrating circuit where flotation is not employed.

Table T-1

Assays - Table Products

<u>Location</u>	<u>Product</u>	<u>Au</u> <u>oz/ton</u>	<u>Ag</u> <u>oz/ton</u>
110' Shaft	Head ore	0.09	0.02
	Concentrates	1.85	0.35
	Middlings	tr	-
	Taillings	0.05	0.01
North Vein	Head ore	0.20	0.03
	Carbon	34.99	7.21
	Slimes	4.39	0.91
	Concentrates	9.30	1.65
	Middlings	0.07	0.01
	Taillings	tr	-

SCREENING

All screening tests were conducted in Tyler 8" dia. stainless steel nested screens, shaken by hand for 30 min. and reported in mesh size rather than screen number.

Approximately twenty five pounds of ore from the 100' level of the north vein was crushed by passing the material three times through a Keene jaw crusher & rolls combination. 2000 grams of this product was then screened as previously stated and the material retained on each screen was weighed and assayed separately. The results from this test are listed in table S-1 below.

Table S-1

Screen Analysis

Tyler Mesh	% Retained		% Passing	Assays, oz/ton		Distribution %	
	Individual	Cumulative	Cumulative	Au	Ag	Au	Ag
+ 45	42.5	42.5	57.5	0.58	0.12	62.7	64.2
60	15.3	57.8	42.2	0.17	0.03	6.7	5.8
80	11.4	69.2	30.8	0.33	0.07	9.6	10.1
100	4.5	73.7	26.3	0.29	0.06	3.3	3.4
150	8.0	81.7	18.3	0.27	0.05	5.5	5.0
200	13.8	95.5	4.5	0.21	0.04	7.4	7.0
200	4.5	100.0		0.42	0.08	4.8	4.5
Head(calc):				0.393	0.0794	100.0	100.0

Two samples weighing 2000 grams each and two samples weighing 1000 grams each were split from the above material. Each of these samples was then pulverized through a Denver 6" disc laboratory pulverizer.

One of the 1000 gram samples was screened as previously stated and then combined with the other 1000 gram sample to be used in flotation testing. The results of this screen test are listed in table S-2.

Table S-1 shows the gold and silver values reporting to all mesh sizes with the majority being reported to the + 45 mesh size where 42.5% of the material contains 62.7% and 64.2% of the gold and silver values respectively. Meanwhile, the - 45 + 60 mesh representing 15.3% of the material contains 6.7% and 5.8% of the gold and silver values respectively which is the lowest of all the other sizes. This indicates a potential liberation of the mineral from the gangue at a grind of - 60 mesh.

Table S-2

Grind Product Size Analysis

<u>Tyler Mesh</u>	<u>% Retained</u>		<u>% Passing Cumulative</u>
	<u>Individual</u>	<u>Cumulative</u>	
+ 45	0.1	0.1	99.9
60	0.7	0.8	99.2
80	3.1	3.9	96.1
100	15.0	18.9	81.1
150	52.6	71.5	28.5
200	20.8	92.3	7.7
+ 325	7.2	99.5	0.5
- 325	0.5	100.0	

ORE FLOTATION

These tests were conducted to study the recoveries of gold and silver directly from the ore by flotation. The objective was to obtain the maximum recoveries of gold and silver but under the most selective conditions. The variables investigated in these tests were reagent addition, conditioning time and Ph. The fineness of grind for these tests was constant at 99.2% passing 60 mesh as shown in table S-2.

The reagent ballance, conditioning time and flotation time are all shown in table F-1. The test results are shown in table F-2.

Discussion of results

Test Number F-1:

This test was conducted to study the recoveries of gold and silver from the ore in an acid flotation circuit. A ten minute conditioning time was chosen and since the water already had a Ph of 5.5 no regulation was necessary.

The ore was floated for ten minutes then the Ph was raised to 11.5 with caustic soda and lowered back to 7.8 with sulfuric acid which acts as a depressant for slimes. The ore was then floated for another ten minutes during which additional flotation reagents were added as required to complete the test.

This test yielded a calculated 7.57 pounds of concentrates per ton of ore which contained gold and silver values of 94.7% and 95.1% respectively.

Table F-1

Reagent Ballance - Flotation Tests

Equipment:

Grinding - Keene crusher & rolls combination
Denver 6" disc pulverizer

Flotation - Galliger agitair LA 500 with 2000 gram cell at
1200 rpm 35% solids in rougher flotation, air
flow approximately 14 l/min.

Reagents:

<u>Type</u>	<u>Description</u>	<u>Function</u>	<u>Supplier</u>
Aero 350	potassium amyl xanthate	sulfides gold/silver collector	American Cyanamid
AF 208	sodium dithio-phosphate	gold/silver promoter	same
AF 25	aryl dithio-phosphoric acid	gold/silver promoter frother	same
Pine Oil	pine oil	frother	same

<u>Test</u>	<u>Stage</u>	<u>Reagents Added pounds/ton ore</u>				<u>Time, minutes</u>		
		<u>Aero 350</u>	<u>AF 208</u>	<u>AF 25</u>	<u>pine oil</u>	<u>condition</u>	<u>froth</u>	<u>Ph</u>
F 1	conditioner	.18	.13	.05	-	10	10	5.5
	rougher	.05	.03	.02	-	-	10	7.8
F 2	conditioner	.10	.05	.03	-	5	10	7.8
	rougher 1	.25	.10	.05	-	-	10	7.8
	scavng 2	-	-	-	.05	-	5	7.8
F 3	conditioner	.10	.05	.03	-	1	10	7.8
	rougher	.05	.03	.02	-	-	10	7.8

Table F-2

Flotation Test Results

Test No.	Product	Weight %	Assays, oz/ton		Distribution %	
			Au	Ag	Au	Ag
F 1	rougher cons	0.3785	119.3	23.37	94.7	95.1
	rougher tails	<u>99.6215</u>	<u>0.025</u>	<u>0.005</u>	<u>5.3</u>	<u>4.9</u>
	Head(calc)	100.00	0.477	0.093	100.0	100.0
F 2	rougher cons 1	0.835	44.76	8.77	89.0	89.3
	scavngr cons 2	0.350	5.91	1.16	5.0	5.0
	rougher tails	<u>98.815</u>	<u>0.025</u>	<u>0.005</u>	<u>6.0</u>	<u>6.0</u>
	Head(calc)	100.00	0.420	0.082	100.0	100.3
F 3	rougher cons	0.56	45.20	8.93	62.8	62.5
	rougher tails	<u>99.44</u>	<u>0.15</u>	<u>0.03</u>	<u>37.2</u>	<u>37.5</u>
	Head(calc)	100.00	0.403	0.08	100.0	100.0

Test Number F-2:

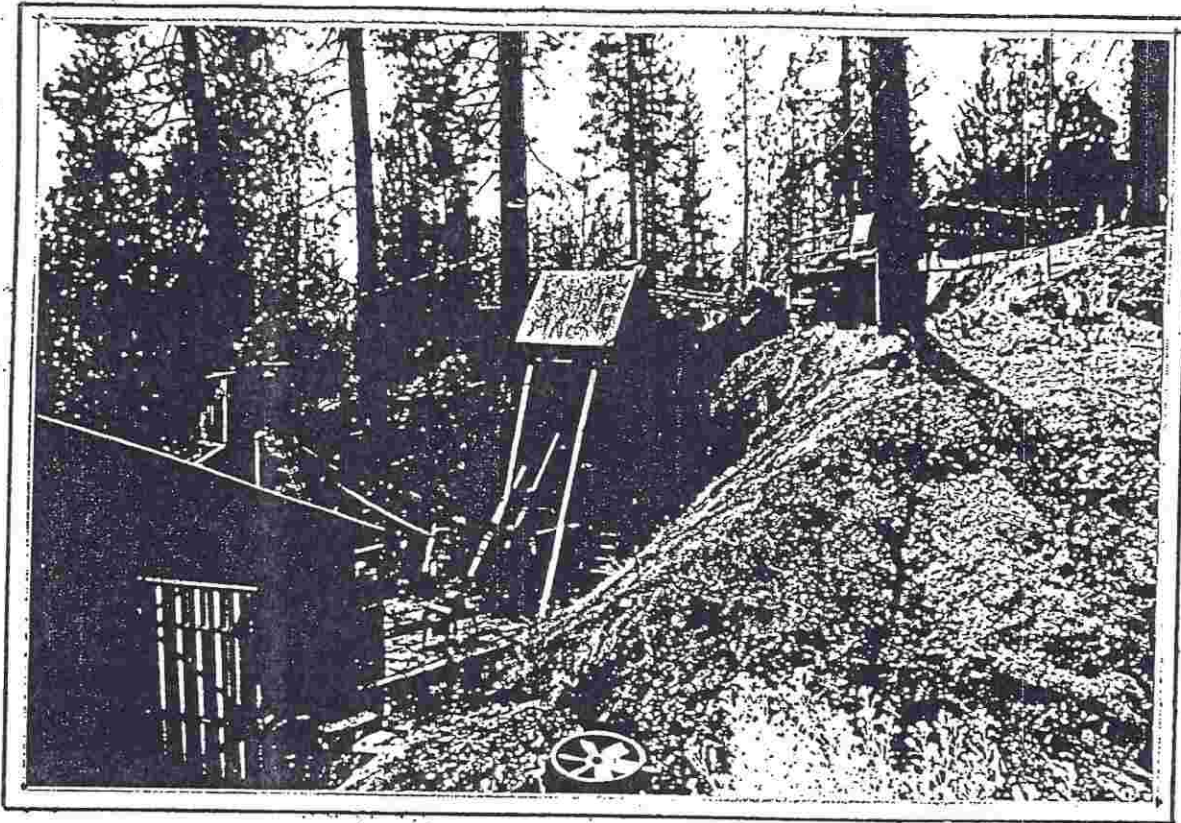
This test was designed to study the effects of pine oil on the recoveries of gold and silver from the ore after flotation with an excess of conventional flotation reagents. In this test two rougher concentrates were produced which were assayed individually.

This test showed a 5% increase in the recovery of both gold and silver after the addition of pine oil and an increase of gangue slimes reporting to the concentrates. Calculated yields 23.7 pounds of concentrates per ton of ore containing gold and silver values of 94% and 94.3% respectively.

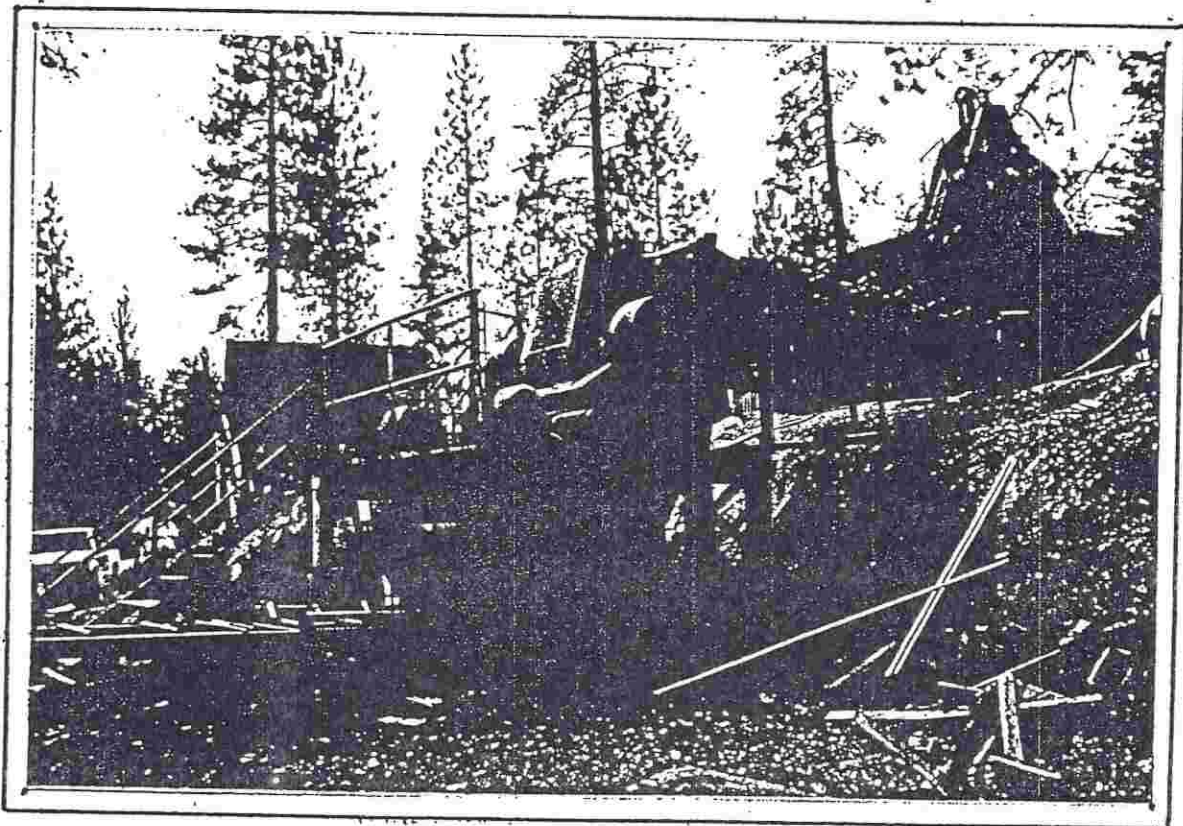
Test Number F-3:

This was a conventional test allowing only one minute of conditioning time and minimum reagent additions. The results of this test are shown in tables F-1 and F-2.

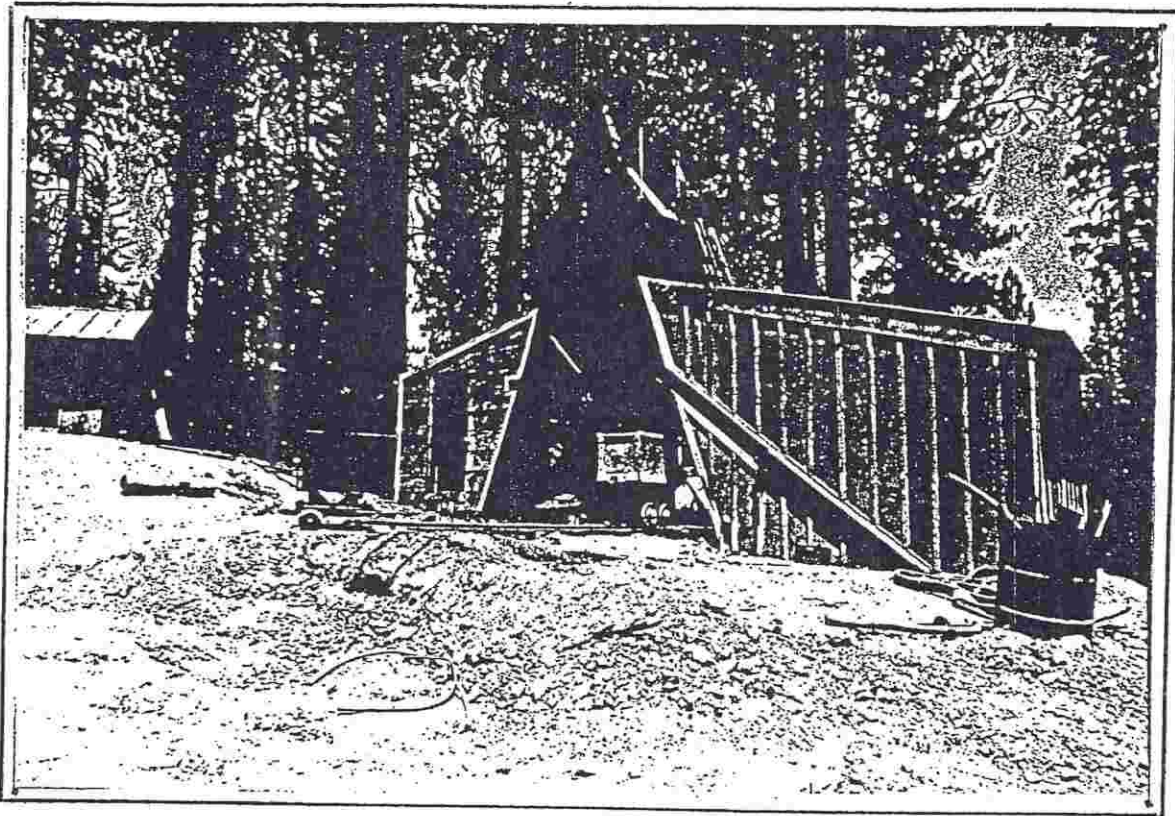
Of the three tests number F-1 was the most amenable to concentration by froth flotation. This will require two stage reagent addition with conditioning between the rougher and the scavenger.



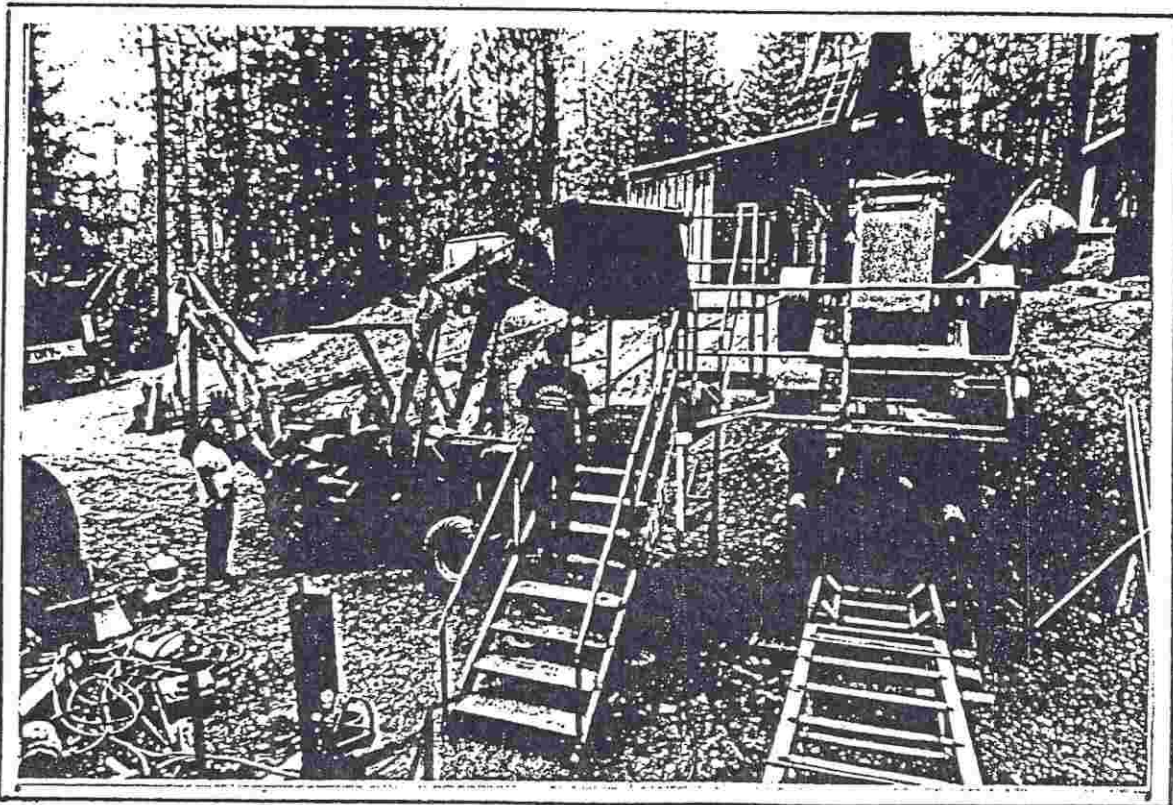
THE COMPLETE MILL CIRCUIT SHOWS HEAD FRAME
(UPPER RIGHT) TO MILL BUILDING (BOTTOM LEFT)



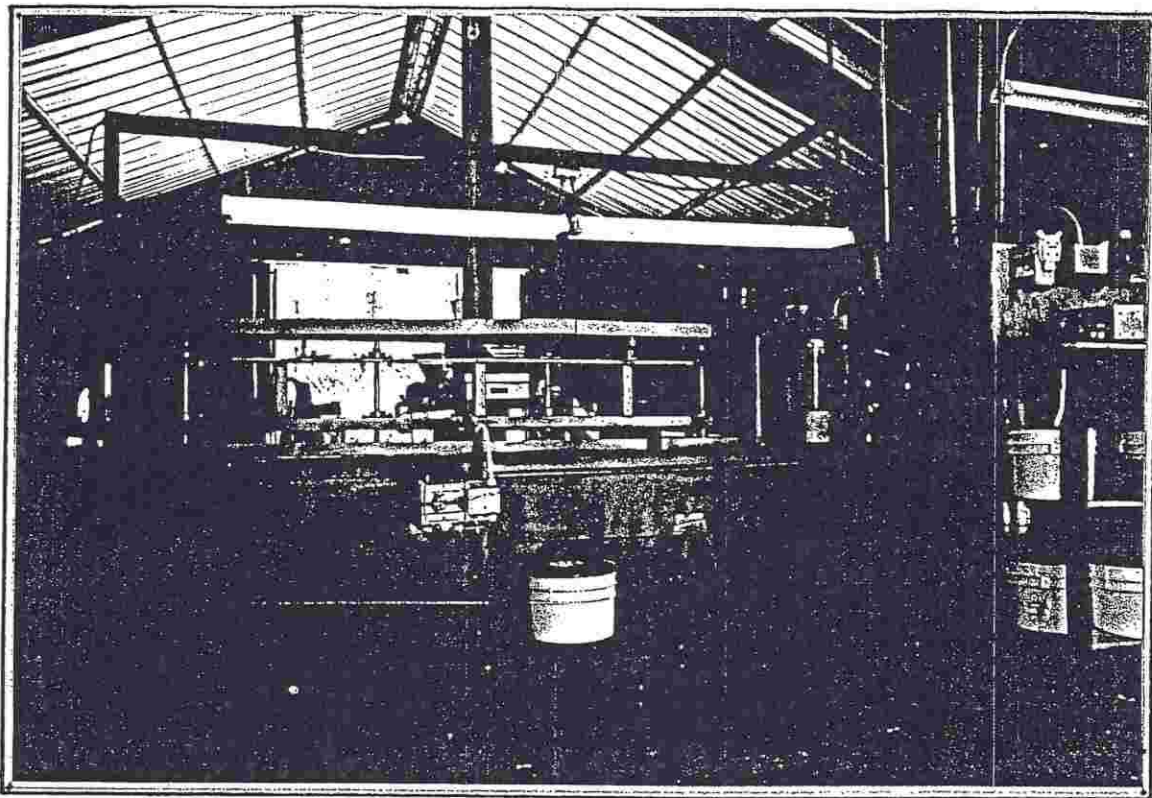
THE 12X36 JAW CRUSHER AND ROLLER CRUSHER



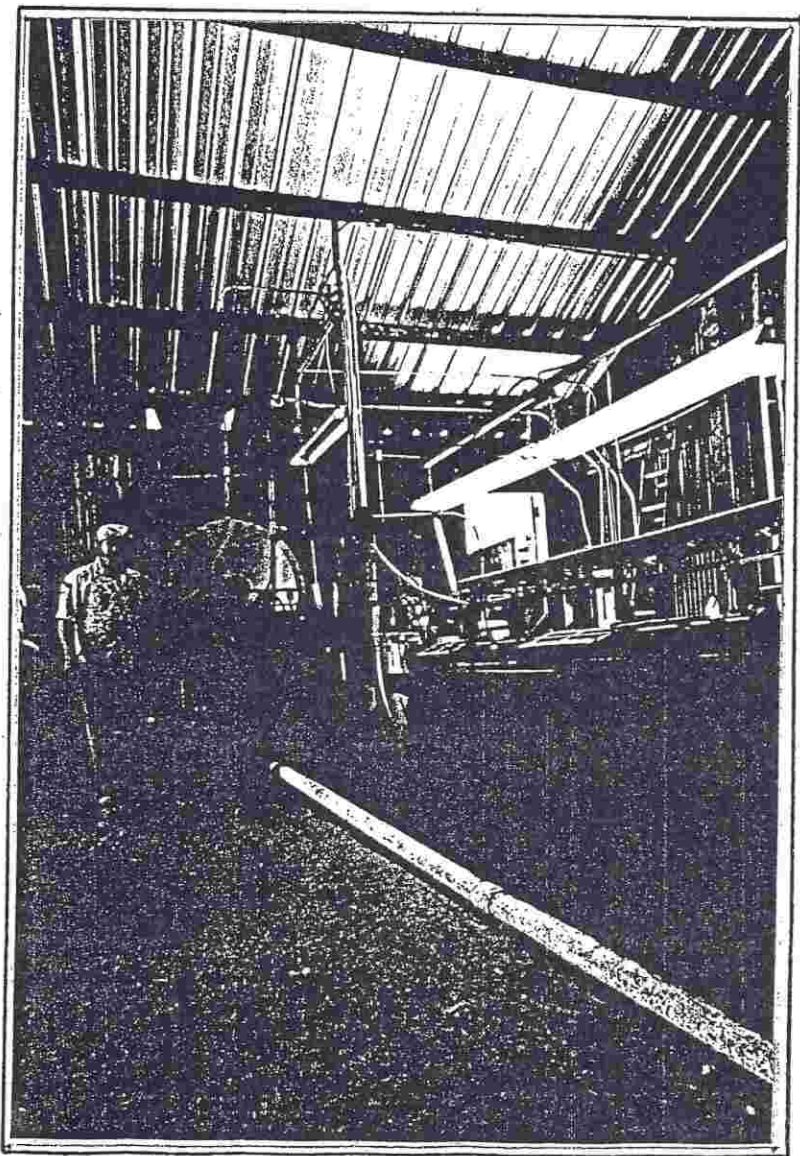
THE HEAD FRAME
AND ORE CAR



THE WORK IN PROGRESS
INSTALLING THE JAW
AND ROLLER CRUSHERS



THE FLOATATION CELLS
FOR FINE GOLD RECOVERY



THE BALL MILL, JIG
AND FLOATATION CELLS
IN CIRCUIT