

THE COPPER MINING INDUSTRY 1966-1970

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THE COPPER MINING INDUSTRY 1966 - 1970

The experiences being recorded in the present history of the copper mining industry are very closely paralleling the chronology of events that took place just prior to, during, and after the last prolonged copper mining industry strike which took place in 1959 and 1960. It remains to be seen whether there will be a continuation of the parallels, with 1970 (three years after the beginning of the long strike in 1967) duplicating the curtailments in output and sales that were experienced in 1962, (three years after the beginning of the long strike in 1959).

The 1959 Minerals Yearbook of the Bureau of Mines, Vol. I stated on page 385:

"Although copper production in the United States reached a record rate in the first 6 months of 1959, the year ended with the lowest annual total since 1949. Operations at most of the principal copper mines, smelters, and refineries were halted by the longest strike in history".

In 1959, mine production had dropped to 824,846 tons.

The 1960 Minerals Yearbook of the Bureau of Mines, Vol. I stated on page 403:

"Record production, record exports, a lower consumption rate, and rising stocks characterized the U. S. copper industry in 1960. Strikes that had begun in mid-1959 continued into early 1960. The need for primary source materials at smelters and refineries after settlement of the strikes stimulated production from the domestic mines and caused near-record imports of blister copper. Mine production in the United States was the largest since 1957. Copper recovery from domestic ores set a new record; production at smelters from imported materials more than doubled; and recovery of copper from scrap increased one third.

"Consumption of copper declined considerably in the United States in 1960. However, demand for copper in the rest of the world was unusually great. Stocks at U. S. refineries at the beginning of the year were the lowest since the turn of the century because of the continuing strikes and the relatively high rate of consumption in 1959. Return to work at primary refineries resulted in near capacity output. The brisk export of domestic copper in the more active Western European markets failed to prevent stock additions in April through December.

"Despite labor disputes and political unrest, world copper production was at a record high. Planned production cutbacks by some producers to limit stock buildups and prevent price declines were more than offset by expanded output from other producers and entry of new facilities in the productive stage."

The 1961 Minerals Yearbook of the Bureau of Mines, Vol. 1 p 497 stated:

"Domestic production rose 8 percent to a new record; 1961 output was 6 percent above the former peak of 1,104,000 tons in 1956. The new record in mine production was attributed largely to strike-free operations and to the startup of production ahead of schedule at the Mission project in Arizona."

The 1962 Minerals Yearbook of the Bureau of Mines, Vol. 1 p 483 stated:

"Rates of copper production, which began to accelerate in late 1961, continued to rise through the first 6 months of 1962. Supplies began to exceed requirements, and in mid-July producers here and abroad inaugurated curtailments in output and sales. The price of electrolytic copper in the United States, established at 31 cents per pound on May 19, 1961 was unchanged throughout 1962, and the price on the London Metal Exchange was fairly stable at 29.25 cents."

During that period the domestic electrolytic copper price dropped from 33 cents a pound on November 12, 1959 to 29 cents a pound on January 17, 1961.

In appraising the parallels between 1959, 1960 and 1961 with 1967, 1968 and 1969 respectively with the suggested probability that 1970 will follow the experience of 1962, it is of interest to consider the following similarities.

1967 Although copper production in the United States reached a record in the first six months of 1967 of 757,713 tons, (both Arizona and the United States broke all previous records for a single month's production in March 1967), the year ended with the lowest annual total since 1959. Operations at most of the principal copper mines, smelters, and refineries were halted by the longest strike in history. In 1967 mine production had dropped to 954,064 tons.

1968 The strikes that had begun in mid-1967 continued with few exceptions until the end of March and in some cases into April 1968. The need for primary source materials at smelters and refineries after settlement of the strikes stimulated production from both domestic and foreign mines and from added capacities installed during the strikes which came into operation. New production from the mines on a monthly basis during the post-strike period exceeded the average monthly production prior to the strike. (See Exhibit A). In the United States the average monthly apparent primary consumption, total monthly refined consumption (including scrap) and monthly consumption by fabricators were lower after the strike than before the strike. (see Exhibit A) Stocks of blister in transit and in process, and refined stocks abroad averaged higher than they did before the strike, and refined stocks at domestic fabricators, while averaging slightly less per month than they did during the entire strike period, were greatly in excess of the average carried before the strike build-up.

1969 Records thus far available for the first six months of 1969 reflect all-time record-breaking production^{of}/recoverable copper in ores both in this country and

abroad, especially abroad. While the crude production outside of the United States as reported by the Copper Institute, amounted to 2,534,212 tons in the entire 1966 (an average of 211,184 tons per month), it increased to 2,632,276 tons in 1967, 2,817,320 tons in 1968, and 1,510,280 tons during the first six months of 1969 (an average of 251,713 tons per month) with an all time high of 268,397 tons having been set in May. The foreign production given above does not include the U.S.S.R., Japan, Yugoslavia, Norway, Sweden, Finland, the Messina and the Palabora mines in Africa, and the production of several small producing countries.

Under "Price" and "Future Copper Capacities" these subjects are discussed at length. Predictions offered by those willing to guess are very guarded and are usually confined to short periods. It seems to be the consensus that the current run-up in the London Metal Exchange price was attributed to technical factors such as speculative buying and short covering. But the Engineering and Mining Journal of July 1969, while pointing out that mine production during May rose for the third consecutive month to an all-time high, says, "however, big consumer demand and Communistic Bloc buying have outstripped this production, and consequently copper prices have responded by rising."

On the other hand, Metal Week, in its August 11, 1969 issue does not feel that the run-up was attributed to active business, with a worldwide surplus appearing in the making, which "is expected to bear down on the price". It also states: "Consumers of copper are generally worried about the overall economic climate and are not sure that they will need as much of the metal in the future. On top of this Japan is expected to sell another 10,000-15,000 tons of copper on the world market. So buyers are now using their stock rather than buying at the current price."

A close study of the statistics obtainable, and which are presented in this report, does not support the claims of inventory shortages and lack of sufficient production to fulfill orders.

Perhaps the most likely interpretation of the present situation and of things to come is the statement made by E. L. McL. Tittmann, Chairman, and Charles F. Barber, President, in ASARCO's report to stockholders for the second quarter of 1969.

"Looking ahead to the balance of 1969, wage and material costs are advancing at an ever increasing rate. At present writing, demand and prices for metals are still strong. This strength seems, however, to reflect existing inflationary pressures. Once these pressures are contained, past experience would suggest an easing in demand and prices for metals. With the continuing rise in production costs, a squeeze on the profits of the metal producers may develop."

THE VARIOUS PERIODS IN COPPER MINING IN

1966 - 1969

During the troublesome era beginning with January 1966 and extending through the first quarter of 1969, the industry passed through a number of distinctly different periods, with each of the periods presenting its own problems for study. The

calendar years are not adequate time spans for grouping data which endeavor to present a summary of the industry's experiences during such distinguishable periods.

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Therefore, the purpose of segregating the various periods in order to record the data for each as they contributed to the changing conditions, the entire 1966-1969 era is divided into the following periods:

1. Normal operations - January 1966 thru June 1966.
2. Pre-strike Build-up period - July 1966 through June 1967, during which time the imminence of an industry-wide strike expected to begin about July 1, 1967 was ever before the industry, and preparations were being made to cushion the harmful effects of the possible interruption in production. This was accomplished by producing companies increasing their output to the utmost, and by the fabricating companies augmenting inventories through all purchasing possible of imports even though it seriously contributed to our adverse trade balance, through pressure upon the producers, and through obtaining all ^{possible} merchant copper and even scrap copper at ever increasing prices. (See Department of Mineral Resources reports of September 1967 and October 1968 for details).
3. The Strike period - from July 1967 through March 1968. While the strike started on July 15, 1967 and continued through the latter part of March 1968, the inclusion of July production in the strike-period and of July labor statistics in the pre-strike grouping tend to slightly ameliorate the apparent strike-period effects. This is made necessary by the fact that the Employment Security Commission of Arizona and the U. S. Bureau of Labor Statistics base their reported figures on the "full and part-time wage and salary workers who are employed during the pay-period which includes the 12th of the month". Therefore the July 1967 labor figures represent data corresponding to the period when the mines were in full production, since the strikes did not start until July 15th and the labor sampling for "the pay-period which includes the 12th of the month" fell within the "pre-strike period".
4. Post-strike period - from April 1968 through December 1968 covers the period encompassing the recovery from the strike. During this period the inventory build-up that started in July 1966, a whole year prior to the strike and was not reduced to below the June 1966 level until January 1968, two months before the strike ended, was restored to well-above pre-strike levels. At the end of the post-strike period (December 1968), the inventory build-up by the United States fabricators reached 514,553 tons compared with 446,235 tons in May 1966 (the low point before the pre-strike build-up), 641,083 tons in June 1967 (the high point reached the month before the strikes started), and 424,960 tons in March 1968, at the time the strikes ended.
5. Return to normal operations. Beginning with January 1969 conditions are regarded as again normal, with all properties in the United States running on a full-time basis except Calumet and Hecla in Michigan, which has been shut down by a strike since August 21, 1968 - and by the Quincy Mining Company whose operations at Torch Lake, Michigan came to an end in 1967. The increased production from

capacity increases installed in 1967 and 1968 show up in the figures, and only the normal interruptions because of weather conditions and operating problems have affected production.

The Copper Statistics on an "average tons per month" basis presented on the next page in Exhibit "A" set forth the comparative results allocable to each of the respective five periods covering the span from January 1966 through March 1969.

During the 12-month "pre-strike build-up period", the United States mine production is computed to have been increased by an average of 2992 tons per month (of which Arizona's increase amounted to 176 tons per month) over the prior "normal operations" period, while the world's production outside of the United States (excluding U.S.S. R., Japan, Yugoslavia, Norway, Sweden, Finland, the Messina and Palabora mines in Africa and the production of several small producing countries) increased by almost the same increment (3,223 tons per month).

In the "post-strike period", however, total United States production increased only 508 tons per month - while Arizona's production increased 1,064 tons a month - indicating that Arizona's output was raised by over 12,000 tons per annum while the entire country's output was raised only about 6000 tons per annum. At the same time the production outside of the United States was stepped up from an average 212,654 tons per month to an average 236,800 tons per month, or an added production of approximately 290,000 tons per annum. Output outside of the United States increased far more rapidly than production in the United States and Arizona's increase saved the country from a decrease in production during the comparable periods.

Between the normal operation of 1966 and the return to normal operations in 1969, United States production increased by an average of 4,612 tons per month (approximately 55,000 tons per year) while the rest of the world's production increased from an average 209,431 tons per month to 239,314 tons per month (approximately 360,000 per annum). Arizona's incremental production from expanded operations at existing mines and from incipient operations at new mines averaged 3,384 tons per month - or about 40,000 tons of the total 55,000 tons additional United States mine output.

THE STRIKE PERIOD

Exhibit A gives the production figures for the strike period.

A computation of the tonnage of copper that could have been but was not extracted and processed as a direct result of the strike during the period of the shut down and the time required for the resumption of full operations is determined as follows:

(please continue on page 7)

EXHIBIT A

COPPER STATISTICS

Comparison of Pre-Strike, Strike, and Post-Strike Periods

Average Tons Per Month

Period	From To	Normal Operations	Pre-Strike Build-up	Strike Period	Post- Strike	Return To Normal
		Jan 1966 Jun 1966	July 1966 Jun 1966	July 1967 Mar 1968	Apr 1968 Dec 1968	Jan 1969 Mar 1969
Number of Months		6	12	9	9	3
Crude Production Outside USA (e)		209,431	212,654	226,238	236,800	239,314
U.S. Mine Production (Bureau of Mines)		119,539	122,531	32,033	(c)123,039	124,151
Imports		39,053	51,307	67,125	48,332	29,501
Exports		26,390	20,013	15,907	30,454	17,288
Net Imports		12,663	31,294	51,218	17,878	12,213
Net Primary Copper Into Pipe Line		132,202	153,825	83,251	140,917	136,364
Concentrates Processed Abroad		329	57	11,204	4,344	95
Total Primary Copper Availability		132,531	153,882	94,455	145,261	136,459
<u>Consumption</u>						
Apparent Consumption- Primary		123,383	145,333	79,433	143,889	139,000
Total Refined Con- sumption-Actual (Including Scrap)		198,525	193,519	116,435	173,486	177,925
Consumption by Fab- ricators (d)		197,159	165,042	106,411	150,994	162,372
<u>Stocks</u>						
Blister in Transit and in Process		273,500	279,000	239,444	299,667	266,333
Refined at Refineries		42,900	41,342	31,400	40,322	46,867
Refined at Fabricators		454,672	562,567	502,645	498,790	514,703
Refined Abroad		286,331	294,500	290,438	303,544	301,557
ARIZONA MINE PRODUCTION		62,776	(a) 62,952	18,265	(c) 64,016	66,160
ARIZONA % OF U.S. MINE PRODUCTION		52.5	(b) 51.4	57.0	52.0	53.3

(a) July-December 1966 60,486 (b) July-December 1966 50.9%
 January-June 1967 65,419 January-June 1967 51.8%

(c) November and December Production Reported by Bureau of Mines are Preliminary figures. (USBM) (d) Reported by U.S. Copper Association

(3) From American Bureau of Metal Statistics as reported by members of the Copper Institute. Excludes production of U.S.S.R., Japan, Yugoslavia, Norway, Sweden, Finland, the Messina & Palabora mines in Africa and the production of several small producing countries.

	<u>Arizona</u>	<u>Total United States</u>
<u>Mine Production - Short Tons</u>		
January-June 1967	392,513	757,713
July-December 1968	386,476	746,449
Total 12 months normal operations	778,989	1,504,162
<u>Mine Production during period affected by the strike</u>		
July - December 1967	109,228	196,351
January - June 1968	244,820	452,841
12 months affected by the strike	354,048	649,192
Loss of production caused by the strike	424,941 tons	854,970 tons

The mining, smelting and refining companies incurred a considerable expense in maintaining their plants, equipment, organizations, employees' homes, hospitals, etc. during the entire non-productive periods; merchants and service companies suffered from loss of business; the state, counties, and cities had to forgo community services due to curtailed income from taxes, licenses, and fees; the entire communities in which the mines, mills, smelters and refineries are located, suffered; and the employees lost tremendously in wages not earned.

The approximate amount of earnings lost to the wage earners because of the shut down of the mines for a period extended to over 8 months is summarized in Exhibit B (see pages 8-9) from labor data by monthly averages for the five separate periods from 1966 through the first quarter of 1969.

While both the Employment Security Commission of Arizona and the U. S. Bureau of Labor Statistics furnish monthly data in connection with the earnings of "Production Workers" included in Copper Mining, in order to also include the earnings by Smelting and Refining Workers, data from Arizona copper smelters and refineries have been secured from the Employment Security Commission of Arizona, and for the United States, the information used is that for "Non-Ferrous Metals" in Schedules B₂ and C₂ of "Employment and Earnings" published by the Bureau of Labor Statistics. While the latter figures include the processing of non-ferrous metals other than copper, a number of plant operations that had been shut down during the strike were affected by their inclusion in the Unions' demands for company-wide and coalition bargaining.

It has been computed as shown by Exhibit B that there were an average 10,257 copper miners and copper smeltermen per month not working at the mines and smelters in Arizona during the period of the shutdown, and an average total of 36,429 copper miners and non-ferrous smelter and refinery employees not working at their jobs in the United States during the shut-down months. The wages lost by these employees because of the strike approximated \$59,272,000 in Arizona and \$282,451,000 in the United States. These losses only cover "production workers" as classified by the government and do not include full and part-time salary workers.

Before the strike was called, the Arizona copper miner worked an average of 44.97 hours per week, of which 6.85 hours were overtime, and his average hourly earnings

(please continue on page 10)

EXHIBIT B

COMPARISON OF LABOR DATA

FOR NORMAL, PRE-STRIKE, STRIKE, POST-STRIKE AND RETURN TO NORMAL PERIODS

(MONTHLY AVERAGES)

From to	ARIZONA					UNITED STATES				
	Normal	Pre-	Strike	Post-	Return	Normal	Pre-	Strike	Post-	Return
	Oper- ations Jan 1966 Jun 1966	Strike Build-Up Jul 1966 Jul 1967	Strike Period Aug 1967 Mar 1968	Strike Period Apr 1968 Dec 1968	To Normal Jan 1969 Mar 1969	Oper- ations	Strike Build-up	Strike Period	Strike Period	To Normal
COPPER MINING										
All Employees	14,933	15,500	7,363	16,322	16,900	31,850	32,369	12,063	36,256	37,200
Production Employees	12,459	12,548	4,141	13,259	13,853	26,333	26,735	6,475	28,556	29,700
Average Weekly Hours	44.85	44.97	38.31	45.28	43.74	43.30	43.57	40.41	47.79	46.46
Computed Overtime Incl'd	6.53	6.85	1.75	6.92	5.80	4.96	5.45	2.73	9.61	8.46
Average Hourly Earnings	\$3.283	\$3.352	\$3.251	\$3.550	\$3.607	\$3.185	\$3.266	\$3.185	\$3.463	\$3.480
Average Weekly Earnings	\$147.24	\$150.72	\$124.55	\$160.70	\$157.77	\$137.91	\$142.29	\$128.71	\$165.50	\$161.68
COPPER SMELTING & REFINING (a)						(b)				
All Employees	1,847	1,855	462	1,873	1,935	76,450	80,469	67,725	83,856	85,533
Production Employees	1,536	1,541	158	1,549	1,604	59,250	62,031	49,138	64,889	66,533
Average Weekly Hours	45.31	45.51	35.29	45.69	45.47	42.00	42.16	42.34	42.54	42.27
Computed Overtime Incl'd	6.99	7.39	0.95	7.51	7.54	3.67	4.04	4.63	4.35	4.33
Average Hourly Earnings	\$3.132	\$3.199	\$3.229	\$3.455	\$3.453	\$3.038	\$3.133	\$3.272	\$3.411	\$3.477
Average Weekly Earnings	\$141.90	\$145.59	\$113.95	\$157.86	\$157.01	\$127.60	\$132.07	\$138.54	\$145.10	\$146.97
NON-PRODUCTIVE EMPLOYEES										
Copper Mining	2,474	2,952	3,222	3,063	3,047	5,517	5,634	5,588	7,700	7,500
Smelting & Refining	311	314	304	324	331	17,200	18,438	18,587	18,967	19,000
TOTAL	2,785	3,266	3,526	3,387	3,378	22,717	24,072	24,175	26,667	26,500
PRODUCTIVE EMPLOYEES										
Copper Mining	12,459	12,548	4,141	13,259	13,853	26,333	26,735	6,475	28,556	29,700
Smelting & Refining	1,536	1,541	158	1,549	1,604	59,250	62,031	49,138	64,889	66,533
TOTAL	13,995	14,089	4,299	14,808	15,457	85,583	88,766	55,613	93,445	96,233
TOTAL EMPLOYEES										
Copper Mining	14,933	15,500	7,363	16,322	16,900	31,850	32,369	12,063	36,256	37,200
Smelting & Refining	1,847	1,855	462	1,873	1,935	76,450	80,469	67,725	83,856	85,533
TOTAL	16,780	17,355	7,825	18,195	18,835	108,300	112,838	79,788	120,112	122,733

(a) From Employment Security Commission of Arizona

(b) "Non-Ferrous Metals" workers in Schedules B2 and C2

of "Employment and Earnings" published by the U.S. Bureau of Labor Statistics.

EARNINGS LOST BY PRODUCTION WORKERS BECAUSE OF STRIKE

ARIZONA - FROM EXHIBIT B

	Copper Mining	Copper Smelting	TOTAL
Production Workers - Aug 1967-Mar 1968	33,131	1,264	34,395
Ave. Per Month	4,141	158	4,299
12 Months Normal Operations 1967-1968	156,048	18,619	174,667
Ave. Per Month	13,004	1,552	14,556
Ave. Per Month Unemployed During Strike	8,863	1,394	10,257
Wages Paid - Aug 1967-Mar 1968	\$16,500,445	\$576,967	\$17,077,412
Plus 2 Weeks	1,031,278	36,060	1,067,338
Wages Paid During Strike	\$17,531,723	\$613,027	\$18,144,750
Normal Wages in 8 Months Period	69,321,521	8,094,918	77,416,439
ARIZONA LOST WAGES BECAUSE OF STRIKE	\$51,789,798	\$7,481,891	\$59,271,689

UNITED STATES - FROM EXHIBIT B

	Copper Mining	Non-Ferrous Smelting & Refining	TOTAL
Production Workers - Aug 1967-Mar 1968	51,800	393,100	444,900
Ave. Per Month	6,475	49,138	55,613
12 Months Normal Operations	332,400	772,100	1,104,500
Ave. Per Month	27,700	64,342	92,042
Ave. Per Month Unemployed During Strike	21,225	15,204	36,429
Wages Paid - Aug 1967-Mar 1968	\$26,716,968	\$136,387,384	\$163,104,352
Plus 2 Weeks	1,669,811	8,524,212	10,194,023
Wages Paid During Strike	\$28,386,779	144,911,596	173,298,375
Normal Wages in 8 mos. period	146,053,715	309,696,147	455,749,862
UNITED STATES WAGES LOST BECAUSE OF STRIKE	\$117,666,936	\$164,784,551	\$282,451,487

were \$3.352. His weekly pay averaged \$150.72. The average Arizona copper miner lost wages totalling \$5,843 while the mines were shut down.

During the first quarter of 1969 - which may be regarded as return to normal - he worked an average of 43.74 hours per week, of which 5.80 hours were overtime, and his average hourly earnings were \$3.607. His weekly pay averaged \$157.77 - an increase of \$7.05 per week according to figures derived from the Arizona Employment Security Commission reports. The increase includes the second year wage increases that went into effect at some of the companies in Arizona in January 1969.

In the Phelps Dodge Corporation Annual Report for 1968, Robert G. Page, Chairman of the Board and George B. Munroe, President state:

"The labor settlements which ended the strikes were expensive, representing an average increase in wages and other benefits of about \$1.13 per hour over the 40-month term of the new contracts, which run until mid-1971."

From Exhibit B it will be noted that the average hourly earnings increased from \$3.352 per hour (which included overtime pay on 6.85 hours per week) during the year prior to the strike to an average \$3.550 per hour earnings (which included 6.92 hours of overtime a week for the average worker) for the remainder of 1968 after the settlement of the strikes. It is therefore computed that for the balance of the year after the settlement of the strikes, the payments made for work performed increased an average of 19.8 cents per hour for the Arizona copper mines worker.

While the \$1.13 per hour increase referred to by Messrs. Page and Munroe is to be spread over 40 months, an aliquot part of the 19.8 cents increase in 1968 for all Arizona copper workers ascribable to Phelps Dodge would indicate that approximately one-half of the aggregate increase is represented by wages -- and the balance by fringe benefits. In an article by Raymond W. Pasnik, Public Relations Director, United Steelworkers of America in the September 1968 issue of Mining Magazine, he states that "wage increases ranging from 51 to 57 cents per hour over the new contract periods are provided" and "By the effective date of the last of the wage and increment improvements, the minimum rate paid in the copper operations of the 'big four' chains will be \$2.98 per hour or more. The highest rates at that time will reach \$4.44 for some properties. With few exceptions, the smaller independent producers follow this pattern."

He wrote of improvements made toward equalizing health and welfare coverage at the various properties of the non-ferrous companies; eliminating employee contributions to medical and other insurance programs in almost every chain; increased weekly sickness and accident benefits; revision of income and severance pay programs for laid-off employees; an additional paid holiday in some cases; and some vacation improvements.

Mr. Pasnik stressed the fact that "other than wages, it was in the area of pensions that the most significant contract improvements were achieved". From the figures presented above "wage increases ranging from 51 to 57 cents per hour over the new contract periods" and Phelps Dodge reported "average increase in wages and other

benefits of about \$1.13 per hour over the 40-month term of the new contracts, which run until mid-1971", it appears that over the period of 40 months only one-half of the added cost of labor to the employer will appear in the employees' payroll before deduction for increased taxes. The average wage loss to the average Arizona copper miner for the 8-1/2 months they were out was \$5,843.

Although Mr. Pasnik stressed gains in the area of pensions, Mr. Douglas H. Soutar, Vice President, American Smelting and Refining Co. wrote:

"It is also fair to note that newspaper reports of settlement costs were substantially overstated, too little attention being paid to: (a) the fact that the settlements cover a four year period or more; and (b) the very substantial portions of these settlements represented by pensions, on which there had been no negotiations for five years in the case of three of the companies and six years in the case of Asarco. Obviously the cost catchup required to update pension programs after this relatively long hiatus constituted a very substantial part of the total settlements - a fact not understood by most and which obviously casts the remainder of the package in a different perspective." (Mining Magazine - September 1968)

THE FUTURE

While there is general - but guarded - expression of opinion to the effect that balance of supply and demand may be reached by the end of this year - there is preponderance of opinion that there is a probability of surplus of production over consumption in the early years of the 1970's - with a possible shortage developing after 1975. If this position is subscribed to, thought should be given to further expansions in Arizona to start producing after 1975, but not before then, if possible, except as replacement tonnage - (as where the tonnage to be derived from Phelps Dodge's Metcalf mine will not add to Arizona's present production but will replace the tonnage produced at their Bisbee mines which will become exhausted by 1975.)

Insofar as current production is concerned, Arizona is leading the way in increasing United States production but is just about offsetting the failure of the other states to produce the quantities expected. However, according to figures released by the Copper Institute the rest of the Free World is increasing production by appreciable increments. Between 1960 and 1963, its production averaged 2,369,000 tons per annum. From 1964 to 1967, it averaged 2,567,000 tons per annum with a record for a single month of 238,947 tons in December 1965. In 1968, 2,817,320 tons were produced outside of the United States and in five of the first six months of 1969 (except for the 28-day February) the monthly production exceeded the previous December 1965 record by wide margins, the productions of April and May reaching 262,047 and 268,397 tons respectively.

A review of mine production records over the past 20 years as tabulated in the Yearbooks of the American Bureau of Metal Statistics discloses that in the year 1968, record production of copper was achieved in 14 of the nations of the Free

World, namely Canada, Bolivia, Brazil, Peru, Ireland, Spain, Yugoslavia, Israel, Japan, Philippines, Republic of the Congo, Rhodesia, Republic of South Africa and Zambia.

In spite of droughts, landslides, and strikes Chile's production of 725,559 tons was only 2,227 tons less than the record 727,786 tons produced in 1967. In Sweden, in spite of the shutdown of the Boliden mine, production dropped only 958 tons because of the starting up of the new Aitik mine. Planned increases at other old mines and new production will raise Sweden's production substantially.

As far as the Soviet sphere countries are concerned important production increases were reported by the U.S.S.R., Bulgaria, and Poland, and sustained high production was reported by East Germany and China.

As far as figures from U.S.S.R. are obtainable, the transition of Russia from an importing nation to a self-sustaining and even an exporting nation is indicated by the following data published in the (London) Mining Annual Review of May 1968 as extracted from the Russian Publication "Exploration and Conservation of Natural Resources":

	<u>Imports</u>	<u>Metric tons</u> <u>Exports</u>	<u>Production</u>
	(Primary forms)	(Primary forms)	
1962	106,400	71,300	690,000
1963	88,000	72,000	735,000
1964	9,500	89,500	790,000
1965	700	93,100	845,000
1966	7,400	120,100	900,000
1967	5,000	140,000	960,000

Since there is so much activity in increasing copper production in foreign countries there are indications that the supply-demand balance for the early future may be reached sooner than some of the prognosticators are predicting, especially in view of the fact that there is no way of differentiating between "demand" and "consumption".

As shown in Exhibit A - Average Monthly Refined Stocks are as follows:

	<u>at Fabricators in U.S.A.</u>	<u>Abroad</u>
Normal Operations - Jan-June 1966	454,672 tons	286,331 tons
Pre-Strike Build-Up Jul 1966-Jun 1967	562,567 "	294,500 "
Strike Period Jul 1967-Mar 1968	502,645 "	290,438 "
Post Strike Period Apr 1968-Dec 1968	498,780 "	303,544 "
Return to Normal Jan 1969-Mar 1969	514,713 "	301,557 "

While reports appearing in print repeat the existence of a continued "tight supply", a question now being posed, in view of the inventory figures, is whether the continued demand also contains the elements of a hedge against the possibility or probability of continued fears of inflation.

FOREIGN PRODUCTION

The vast increases in copper production outside of the United States, and the still further gigantic production capacities under construction or contemplation, are largely accounted for by the mines of the Copperbelt in Africa (The Republic of the Congo and Zambia), and to those of Chile and Peru.

As discussed under "Future Copper Capacities" (page 29) these four underdeveloped nations produced 43.2 percent of the Free World's copper in 1968, but consumed very little. However, together they sell about 70% of the copper exported in the world, (Engineering & Mining Journal - Sept. 1968) and each of the four nations is extending its domination over the copper produced in that nation and sold abroad.

COPPERBELT:

In a narrow strip of land extending along the northern boundary of Zambia and along the southern boundary of the Republic of the Congo, in the last five years the following tonnages have been produced in a comparatively small area:

		<u>% of Free World Production</u>
1964	1,114,631 tons	25.3
1965	1,085,104 "	23.7
1966	1,036,272 "	21.8
1967	1,083,931 "	24.3
1968	1,161,834	23.7

(a) Republic of the Congo: "On January 3, 1967, the Union Miniere du Haut Katanga, S.A. (fourth largest copper producer in the world) announced that on December 31, 1966, the Council of Ministers of the Democratic Republic of the Congo confirmed its previously announced decision to dispossess Union Miniere of its mining concessions and of all its assets situated on Congolese territory. The Government decrees became effective on January 1, 1967" (Skinner's Mining Year Book 1968).

The Generale Congolaise de Minerai (government successor to Union Miniere) has increased its copper production to a record 350,000 metric tons annually and plans already being worked on call for a further annual increase of 5 percent each year. In addition, the Congolese Government together with Japanese interests are contemplating the construction of a new mine and plant at the Musoshi deposit which is scheduled to ship to Japan an additional 53,000 metric tons per annum of contained copper beginning in October 1972.

(b) Zambia ranks as the free World's No. 2 copper producer behind the United States. Two companies, the Anglo-American Corp. of South Africa, (third largest copper producer in the world) and the Roan Selection Trust (fifth largest copper producer in the world) produce about 98% of Zambia's copper, or about 12% of the non-Communist world's output. The mines of the two companies account for about two-thirds of Zambia's state revenues, one-half of its gross national product, and about 96% of its exports.

In October 1968 the Zambian government formed a new company which would give it control over the copper sales policies by reviewing sales contracts and generally

overseeing the conditions under which copper is sold and to whom. Negotiations have just been started by the Zambian government seeking to have the two big producers "give a controlling 51% of their shares to the state".

Zambia collects royalties and an export tax on its copper based on the London Metal Exchange price, and also a corporation income tax. Only 50% of the remaining profit may be distributed abroad. In the fiscal year ending June 30, 1968, Zambia's taxes and royalties amounted to 33.4 percent of the total sales intake.

As so large a part of Zambia's state revenues is derived from the mines in the Copperbelt, just as the Republic of the Congo derives a great deal of its income from the Copperbelt, both of these nations are pushing the expansion of copper production by the reopening of old mines previously shut down; development of new mines; increasing of production at existing mines; as well as ^{by} joint exploration projects with Japanese interests and with interests already domiciled in Zambia to find new copper deposits.

In Zambia, the following additional annual tonnages are now being provided for:

	<u>Added Capacity</u>	<u>To Start</u>
Kalewanga - Roan Selection Trust	19,000	1970
Luanshaya "	7,000	1969
Chambishi "	5,000	1970
Bwana Mkubwa - Anglo American	15,000	1970
Bancroft "	12,000	1969
Kansanshi "	15,000	1975
Mufulira Roan Selection Trust	29,000	1971
Baluba "	24,600	1975
River Load Pit (Nchanga) Anglo American	13,500	1969
Mimbula Fitula "	40,000	1969
Nchanga "	17,100	1969

Sir Ronald Prain, Chairman of the Roan Selection Trust replied to Zambian President Kaunda's claim that the major reason for the takeover was the failure of R.S.T. and Anglo American to develop new mining areas, by noting that production has increased to nearly 330,000 tons a year in 1969 (fiscal year) from 270,000 tons in 1964. Sir Ronald said this had been achieved in the face of most adverse conditions following neighboring Rhodesia's unilateral declaration of independence.

The Copperbelt is adequately equipped with smelters and refineries so that there is not an expensive addendum to costs to ship the concentrates from the mine-mill area to a smelter located at a distant point and the resulting blister to a point many hundreds or thousands of miles away to produce the copper in the form in which it is salable to the mills. Copper is shipped to all parts of the world from the Copperbelt in the form that the fabricator wants it (billets, wire bars, ingots, ingot bars, cakes, slabs, cathodes) and at the time he wants it.

Therefore the competition that Arizona must meet from the Copperbelt alone is considerable and is enhanced by the ability of the national governments to tailor prices to command sales.

As pointed out in Exhibit C, page 26, while presently-contemplated copper capacity increases in the United States (including Puerto Rico) through 1975 total only 797,750 tons, the increases presently-contemplated in the remaining Free World nations amount to 2,406,250 tons. In addition to the Congo and Zambia, Chile and Peru exerted pressure to increase the output in their countries so that more income may result.

Chile: On December 22, 1964, President Frei of Chile announced that agreements had been reached with the big U. S. copper companies operating in Chile for a partnership between them and the State. The agreements announced by President Frei, varied from one company to another but, in all, would have enabled copper production to be doubled and refinery capacity to be tripled.

Kennecott's large Braden mine became a new corporation called "Sociedad Minera el Teniente S.A.", in which the Chilean State, through its Copper Department - which in the future will be called "The Chilean Copper Corporation" - would purchase 51 percent of the stock and Kennecott (second largest copper producer in the world) would retain the remaining 49 percent. The \$80 million paid Kennecott for its 51 percent of the stock of Braden would not be withdrawn from Chile but would be re-invested to increase "Teniente" production from 180,000 to 280,000 tons per annum-- (which increase is ahead of schedule with completion now set for late 1970).

The Comtel message of December 22, 1964, in further reporting the agreements announced by President Frei, states:

"In the case of Anaconda (largest copper producer in the world) the mines and companies now in being and under exploitation will not be included in the partnership. But Anaconda has agreed to form a new corporation with a State contribution of 25 percent of stock to operate the new mineral ore body called 'La Exotica'.

"It is also agreed to form another corporation in which the State will own 49 percent of stock to make an exhaustive study of all those other properties owned by Anaconda but still unexploited. Should such exploration work warrant operating any such deposit, new corporations to exploit each will be formed, with the state owning one-third of the stock.

"President Frei also recalled the first agreement, reached even before he came to power, with Cerro Corporation in which the State will own 25 percent of the stock of Sociedad Minera Andina, owner of the Rio Blanco ore body. (State participation was raised to 30% in October 1968)

"The complete results of this new copper policy will be attained by 1970, President Frei said. It will mean an increase to 1,200,000 tons by then from 617,000 now produced, while refined copper output will rise to 700,000 from 274,000 tons.

"The President also said this will mean increased purchase of many goods in Chile with the possibility of planning, 'with a large market in view', many lines of national production.

"It will also mean decisive intervention by the Chilean State in the international market for copper. (underline added)

"The companies, in turn, receive stabilization as far as taxation of profits is concerned and will be assured of non discrimination if new taxes are created. This means that the era of looking at copper companies as possible means of financing various projects will come to an end, the President added."

President Frei originally started out with what was generally termed the "Chileanization" of the copper industry -- a percentage of government ownership in a private company's operation, with assured stabilization of taxation of profits and non-discrimination if new taxes were created.

Notwithstanding the December 22, 1964 covenant which for a period of twenty years was to govern the relationship between the copper companies and the State, "President Frei, as part of his state-of-the-nation address in May, said Chile will seek an ownership interest in the remaining Anaconda mines (Chuquicamata and El Salvador) and a larger earnings share from the copper mining operations of all companies in Chile." (Engineering and Mining Journal - July 1969)

Anaconda has not agreed to such joint ownership and "the agreement finally hammered out by Chilean and Anaconda officials amounts to progressive nationalization of Chuquicamata and El Salvador . . ." "Anaconda later said the nationalization plan did not apply to the Exotica pit now nearing the construction stage." (same Journal)

Provisions of the agreement called for the transfer, effective January 1, 1970 of the assets and liabilities of two subsidiaries of Anaconda to new Chilean mining companies in which 51 percent of the stock will be "purchased" by Chile at a stock value set at \$197 million.

The American Metal Market of August 26 quotes the H. Bache & Co. correspondent in Chile as saying, concerning the takeover of Anaconda Co.'s Chuquicamata and El Salvador properties by the Chilean government, that the government "will commence to operate this mine and plant in September and the political aspirants to well-paid jobs (in dollars) are legion." He added that the Chilean government also "has cast covetous eyes at many mines in the medium-size copper mines bracket."

Peru: While Peru has not as yet indicated an intent to expropriate or nationalize American copper companies she is a member of the CIPEC group and according to the September 6, 1968 issue of the London Mining Journal; "Peru plans to develop its copper production over the next four years to reach almost 400,000 m/tons from the current 197,000 m/tons year. According to the Peruvian Minister of Development, Dr. Carriquiri, revenue from this source will increase by \$473 million between 1968-1972. Looking further ahead, Peru is hoping to invest \$465 million in the copper industry between 1973-1975 to bring production to 635,000 ton/year by 1976" In 1968, Peru produced 235,318 short tons of copper.

Now that Anaconda's Chilean mines are to become nationalized, her expansion of exploration activities, and advancements in the technologies of mining and metallurgy have made it possible ^{for her} to produce increasing tonnages of copper from United States mines. She is about to bring into production the new Twin Buttes mine near Tucson which will initially produce 60,000 tons of copper a year. In the letter to the Stockholders reporting on second quarter 1969 earnings, Mr. C. Jay Parkinson, Chairman of the Board, points out that "This and other Arizona properties could well produce a much larger tonnage of copper."

A promising new orebody is currently under development at Anaconda's Britannia Beach mine in British Columbia, with initial production scheduled for 1971, and two important properties in Montana are available for immediate development - which will justify a copper production between 25,000 and 40,000 tons per year.

Recently announced plans to build a 1,000 ton-per-day mill in conjunction with Cominco Ltd. (who will hold a 25% interest) have been made for Bathurst, New Brunswick.

Mr. Parkinson refers to the Chilean situation thus:

"With these skills we intend to combine the orderly reduction of our participation in Chilean operations with substantial diversification and expansion of domestic and foreign facilities to serve such basic industries of the world as construction, transportation, electric utilities, and the broad spectrum of communications, electronics, and machinery and equipment, in the belief that these markets will grow and expand and that we will retain the capacity to grow and expand with them."

Chile is determined that her copper production will be expanded to over 1,200,000 tons a year by 1972. Her national intake from copper is tremendous but she still is upping her shares of the copper sales prices received by the mining complexes. If the time comes when it will not be necessary to pay exorbitant prices for the comparatively small portion of our copper that must be brought in from abroad - Chile will very drastically reduce her price in order to keep getting dollars from this market -- and there will be keen competition in the United States between copper produced in Chile and copper produced in the United States.

COPPER PRICE

Copper is a world commodity and it should be expected that through the workings of the Law of Supply and Demand, there would be a World Price for copper. However, there is no longer such a price.

The Minerals Yearbook of the United States Department of the Interior, Bureau of Mines (1967 Edition) reports mine production in 53 countries and smelter production in 32 countries. The Yearbook of the American Bureau of Metal Statistics (issued June 1969) reports Refined Copper consumption in 1968 by at least 37 countries.

There is no free price for copper. The price is determined by their own sales by the American producers; by producing companies in four foreign countries (who

produced 43.3 percent of the Free World's 1968 copper, as reported by the American Bureau of Metal Statistics); by the Noranda Mines; by the French copper monopoly; by the London Metal Exchange (known also as the L.M.E.); by the New York Commodity Exchange; by the New York merchant market; by Refiner's No. 1 copper scrap; and by custom smelters.

Prices quoted in the American Metal Market for July 24, 1969 and August 21, 1969 were as follows:

(All prices in cents per pound)		
	July 24	August 21
Domestic Producer's Electrolytic Delivery U.S.		
Wirebar	46.00-46.25	48.00-48.25
Cathode, full plate	45.00-45.87-1/2	47.00-47.87-1/2
Lake (Copper Range)	50.00	50.00
Foreign Electrolytic (U.S. Duty 1.3¢ suspended)		
Chilean Delivery U.S. destinations	66.42	74.89
Outside U.S.	66.42	74.89
Canadian outside U.S. (Noranda Mines)	66.42	74.89
Katanga c.i.f. N.Y. (Societe Generale des Minerais)	66.42	74.89
Zambian outside U.S. (Anglo American & Roan Selection Trust)	66.42	74.89
French Agency GIRM-F.A.S. New York	66.25	73.96
London Metal Exchange		
Electrolytic wirebar (closing) (based on \$2.40 lb. Sterling) Cash (bid)	65.78	75.10
3 mos. (bid)	63.85	71.89
Commodity Exchange Standard Copper		
Sept.	62.20	68.40
Oct.	60.85	67.00
Dec.	58.90	65.55
New York Merchant Market		
Electrolytic market		
Aug.	Nom. 64.50-65.00	70.50-70.75
Sept.	Nom. 64.00-64.25	69.50-69.75
Oct.	Nom. 63.00-63.50	68.50-68.75
Refiners' No. 2 copper scrap	Nom. 50.00	53.00

"These prices reflect present market conditions, but consumers cannot necessarily buy all the copper they desire at the listed producer and scrap prices.

"Furthermore some refiners charge on a formula based on their copper source; foreign or domestic, or outside market (London Metal Exchange, Commodity Exchange, merchant and scrap).

"When scrap prices are not officially issued by custom smelters, they are obtained from industry sources and are listed as nominal. When merchant market quotations are unavailable the prices are estimated and termed nominal."

For a number of years, the important producers of copper throughout the world endeavored to maintain the price of copper at reasonable levels - consistent with the cost

of production including development of new ores; fair return to stockholders; retention of sufficient earnings to reinvest in discovery and development of new ore deposits and in research in order to increase efficiency and treat ores of declining grade; and keeping copper competitive with other metals. Production of copper was tailored to the demand. When inventories rose to unwieldy heights and the financing of the inventory-carry became a matter of high cost, the rate of operations was cut. At times, a sudden pick-up in demand after a period of curtailment, caused an insufficiency in supply until resumed production could "catch up" with the increased demand. Such a situation occurred in 1964 when a mounting number of strikes in Peru, Chile, Zambia, the United States, Australia and other countries, cut into the steady flow of copper supplied by the producers at the "producer's" price. Consumer prices were first bid up on the marginal copper production sold at above the producer's price on the London Metal Exchange. This was followed by pressures by the political powers in Chile and Zambia (and later by the Republic of the Congo and Peru) upon the prime producers in these countries to unrealistically raise their selling price so that these underdeveloped nations could reap an opulent harvest of added income for use on their projects.

In 1964, as the price for marginal copper was bid up, Chile arbitrarily dictated rising prices for the copper produced in Chile. Zambia soon followed suit and their producers were forced to abandon their realistic producer prices and adhere to the arbitrary prices being escalated by the two countries. The producers had no other alternative but to pattern their price on the ever-rising LME.

A historical account of price manipulations is contained in the report on the "Copper Industry" for 1966 issued by the Arizona Department of Mineral Resources in September 1967, pages 8-11.

Until 1940 the United States mined more copper than it consumed and was an exporter of copper on balance (i.e. exports minus imports), except for 1929 and the depression years 1930-1932. Beginning with 1941 it became an importer on balance because its mill demands were in excess of its domestic mine production. Net imports averaged 230,638 tons per annum between 1956 and 1960, 148,050 tons per annum between 1961 and 1965, and 354,683 tons per annum between 1966 and 1968 (which increase was prompted by anticipated and actual requirements during the strike). From the table appearing above, it is noted that on the copper imported from countries where their governments dictate the mining and selling policies of producers, as of July 24th and August 21st, 1969, the prices paid were 66.42 cents and 74.89 cents per pound respectively.

The fabricators in the United States have been and are having a very difficult time getting the entire quantity of copper they desire or need from the producers at the producer's price. The United States producer's 46.00-46.25 cent price (raised to 48.00-48.25 cents on August 4) is the lowest in the world; but the fabricators average cost is quickly escalated by purchase of non-producer copper.

The United States supply of producers' copper is restricted by the current requirement of a "set aside" of 19 percent of their total output (beginning October 1, the set aside will be reduced to 16 percent), as a reserve to fill military requirements, which, according to William A. Meissner, Director of the Business and Defense

Service Administration's Copper Division is roughly 24,000 tons per month (to be reduced to approximately 20,000 tons per month beginning October 1). The government has also ceased supplying the fabricators with any stockpiled copper for defense needs. Mr. Rolle, the material specialist who keeps up with service needs in the Pentagon said he expects "defense contractors will be ordering metals at about the 1969 rate; 450 million pounds of copper and copper base alloys". Defense-rated orders must be based on a price of 46 cents a pound (increased to 48 cents a pound on August 4), not on the average cost of the fabricators' copper purchases.

Copper scrap is an important part of the supply. At the smelters and refineries, secondary copper or copper scrap is retreated and reproduced as refined copper. The Chase National Bank letter of April 1969 states that "in recent years (scrap copper) has accounted for some 19 percent of total refined production". To the extent that scrap copper enters the fabricator's pipe line, the cost to him would now be about 53 cents a pound.

The amount of marginal copper that is not sold at the producer's selling price (or at the price that the nationalistically inclined countries dictate), or sold by smaller producers through custom smelters or metal merchants, is very small and most often is sold on the London Metal Exchange.

Dr. James Boyd, President of Copper Range Co. estimates that "less than one percent of the Free World copper actually passes through that market but over 60 percent of the Free World copper is sold on the basis of the flexible market (The London Metal Exchange)". He also stated that "some small domestic producers have been selling on the open market at prices in the upper 50-cent to 60-cent range".

The 20-cent premium on some 60 percent of the Free World copper adds a decided increment to the price the fabricators must pay since the United States consumes more copper than it produces.

As a result of wage increases, increased costs of materials and supplies, and increased taxes, the United States producers had to increase the price of copper by an additional 2 cents a pound to 46.00-46.25 on May 8 and an additional 2 cents a pound to 48.00-48.25 cents on August 4th.

At the present time the volatile conditions in the copper market draw changing and conflicting statements from the well-informed sources both to why there is a 20¢ per pound difference in the producer's price and the so-called "world price" as represented by the London Metal Exchange price, and as to predictions of the copper price in the near future as well as in the year ahead. As stated in the August 18, 1969 issue of "Metals Week":

"The copper market has been very volatile since the beginning of the year and every bit of bad news about copper -- and there's been a lot of it -- has been successful in driving up the price of the metal."

The May 17, 1969 issue of Business Week summed up the situation as follows:

"An industry source speculates that the new round of increases spells the beginning of the end of the two-price situation that has characterized the Free World copper market ever since 1965. That year the U.S. Government pressured domestic producers to keep their price artificially lower than that prevailing overseas. Most people feel that the two-price system makes no sense. Copper is an international commodity, and the same copper competes in the U. S. and World markets".

Sir Ronald L. Prain, (Chairman of Roan Selection Trust) is quoted as saying:

"I think it fair to say that today's price is rather higher than what the market generally foresaw a year ago. Several factors contributed to the high price level, including re-stocking after the marathon strike in the U.S., some upturn in demand, the effect of the U.S. East Coast dock strike, currency fears which have led to some purchasing of commodities, and, more lately, buying by the United States industry of marginal copper at world prices, as opposed to the U.S. domestic price."

In his report to Stockholders at Kennecott's annual meeting on May 6, 1969, Mr. F. R. Milliken, President said:

"The unusually high price of domestic scrap copper and the even higher prices quoted on the London Metal Exchange for primary copper give rise to questions as to why we have not further increased our domestic prices. While we do not believe that current shortages which give rise to these high prices are apt to be resolved in the immediate future, we do believe that it is in the long range best interests of the company to exercise pricing restraint. But certain market conditions place limitations on what we can achieve. Restraint in our primary copper pricing would cease to accomplish this purpose if prices of the products of our customers - the copper fabricators - were to balloon".

In commenting upon this statement, on May 7th, the American Metal Market stated:

"As far as 'ballooning' of copper fabricators' product prices, virtually all brass mills are now basing their product selling prices on a 'blended' copper cost of 50 cents a pound, copper content.

"At least one mill is now selling commercial and industrial tube on a 53-cent blended copper cost. Most wire makers are now basing their copper magnet wire quotes on 53.50 cent copper.

"The 'blended' cost used by fabricators is based on what they pay U.S. producers and premium prices paid on the outside (non-producer) prices."

After the producers raised their price to 46 cents, the Wall Street Journal on May 12, 1969 stated that "this brings the pricing level to one based on a price of 52 cents reflecting a 'blend' of the price of U. S. produced copper and copper from other sources, which is more expensive to buy than U. S. copper."

As a result of the second increase in producer's price on August 4, and the increased non-producer price the fabricators naturally had to incur an increased "blended" cost on non-rated orders, and such blended cost now exceeds 56 cents a pound.

In a letter issued to Kennecott stockholders in late March, Mr. Milliken said: "The degree of firmness of the primary copper market at this time, almost a full year after the termination of the U.S. strike and in the face of record world copper production rate has been surprising."

China is reported to be buying 2,000 tons of copper a week on the London Metal Exchange (a large tonnage in view of the relatively small tonnage for sale on the Exchange itself), and precautionary and speculative buying that follows in the wake of political and financial uncertainties have been instrumental in sustaining the high price for copper sold on the London Metal Exchange.

In the American Metal Market issue of September 16, 1968, a point stressed throughout the strike by the Arizona Department of Mineral Resources is confirmed as follows:

"Despite constant and repeated alarms, and dire shaking of the heads--there was never a real shortage of copper for both defense and commercial needs--if any consumer was willing to pay the price. On occasion, some fabricating facilities curtailed operations and even were prepared to shut down because of a lack of copper raw materials. But even this lack of copper was caused by extraneous matters -- such as when U.S. stevedores in support of the copper industry's striking unions -- temporarily refused to handle imported copper and forward it to U.S. destinations.

"The biggest mystery of the entire strike, and which has not been fully solved nor is a final solution ever expected to come to light, was the fact that copper continued to be available at a price."

In its April 11, 1969 issue the Mining Journal (London) states:

"Now looking back over the past months, it is seen that far from falling, LME prices have moved ahead by around £100 per ton. The question must therefore be asked, has the supply or demand situation changed so materially over the last months that the whole foundation for earlier arguments that copper prices were too high has been radically undermined? Has the introduction of new primary productive capacity been drastically slowed down? Or, has there been a real surge in consumption either in conventional outlets or in some new field? The answers to these queries must surely be no!

"There are, however, many other influential factors both in production and consumption which can severely distort any appraisal based on such a simple premise. For example, it must be recognised that much of the Free World's copper is produced in countries which are prone, either potentially or as a historical fact, to the vicissitudes of political and/or labour disturbances."

In its December 27, 1968 issue the Mining Journal (London) states:

"Despite these set backs, it still seems that 1968 will be a year in which primary copper production exceeded real consumption perhaps at a year-end rate of as much as 200,000 ton/annum. It is something of

an engima on the copper market that this has yet to be reflected in prices and some informed quarters suggest that the import of the surplus will not be seen until well into 1969"

(Statistics published in the Year Book of the American Bureau of Metal Statistics for 1968 - issued in July 1969 - show Free World Production of the World on a Smelter or Comparable Basis of 5,629,238 tons and Copper consumption of the World of 5,403,317 tons - a production excess of 226,921 tons).

Beginning with early 1969 until quite recently, the knowledgeable copper sources all have been predicting a 1969 surplus of at least 200,000 tons and it is the consensus that the LME price will fall back to around "a minimum of £400 (i.e. 43¢) and within the broad range of £400-£500 (43¢-53.6¢) as expressed by the Mining Journal on April 11, 1969.

The question of adequate supplies is an important one to all segments of the industry, including producers, consumers (mills, foundries, etc.), consumers of semi-fabricated products, and service metal centers which play an important role in distributing mill products. In its April 17, 1969 issue, the American Metal Market states that "with announced and unannounced expansion plans, it could mean a Free World copper surplus of around one million tons by the end of 1973".

Yvonne Levy of the Federal Reserve Bank of San Francisco in "Copper - Red Metal in Flux", states, that "looking ahead to early 1970's, U.S. copper users are counting on ample supplies of the metal --even at reduced prices. Mr. John V. Hall, President of Anaconda in discussing "External Forces that have influenced the Production and Marketing of Copper", at the Minneapolis Society of Mining Engineers, as quoted by the American Metal Market on February 12, 1969, stated: "Government controls, government persuasion, strikes, export quotas, speculative transactions, tariffs, subsidies, taxes, cold wars and hot wars, political instability, sabotage and other non-economic factors -- because of these, the 'invisible hand' has had a most difficult time in this industry."

There is almost unanimity of opinion to the effect that the actual physical shortage of copper (if one really did exist) has already ended or will soon end. It is borne out by: (a) comparison of average monthly inventories shown on 8 and in Exhibit A; (b) excess of production over consumption in 1968, 226,921 tons (see first full paragraph--this page); the cut back or suspension of refined copper shipments from Zambia to Japan; and the permission granted by the Japanese Ministry of Trade and Industry to export from Japan part of the 40,000 tons of refined copper which is stored there and is deemed to be excess inventory.

There is no doubt about an eventual closing of the gap between the foreign (i.e. LME) price and the domestic producers' price. However, while it is reasonably to be expected that there should be a material drop in the LME price, it must be remembered that the Governments of Chile, Zambia, the Republic of the Congo and Peru have dictatorial powers to arbitrarily set the selling price for their copper - and will undoubtedly exercise such power until the time arrives when production from other countries reaches the point when other nations can very well do without the production of Chile, Zambia, the Republic of the Congo and Peru.

In this connection it should be recalled that in 1953, Chile maintained the price for copper at more than 6 cents a pound above the level for United States metal and as a result it accumulated 180,000 tons of copper that it was unable to sell. In order to prevent its dumping on the market the U. S. Government in March 1954 finally agreed to buy 100,000 tons of the metal at the old price of 30 cents a pound for use in the U. S. stockpile.

Mr. George B. Munroe, President of Phelps Dodge Co. has been reluctant to make predictions concerning the domestic producer price trend. However, he has made known a feeling that eventually the 20-cent or so a pound spread between the U. S. producer quote and the Free World market price will narrow or even be eliminated; a hope that a balance in supply and demand may occur by the end of this year; and a refusal to predict when an adequate supply position might develop.

In the years gone by, the United States companies have invested heavily in foreign properties. The average grade of the United States ores mined has been low as compared with the foreign ores. A large tonnage of domestic sub-ore grade could not be treated economically, and investments abroad were necessary to provide sufficient copper for our fabricating units.

Things have changed. The domestic expenditure of vast sums of money on exploration and mine development with vastly improved mining and metallurgical technologies, including the development of modern, gigantic equipment, is bearing fruit. New fields are being developed and very low grade ore is being mined and processed successfully. The United States probably could revert to self-sufficiency in the production of copper - as was the case prior to 1940. From the data presented on page 17, it would not require an unsurmountable increase in our production. Chile might do well to remember her experience with nitrates.

If the United States were self-sufficient in the production of copper, the prices paid by the fabricator would be reasonable and the United States would no longer suffer an exaggerated balance of payments deficit.

Copper prices in the United States, however, must keep pace with built in yearly wage increases with liberal increases in fringe benefits; increases in taxes - local, state and federal; and increasing inflation of other costs; and the industry should not be pressured by the Government to refrain from price increases to do so.

The United States should bear in mind the importance of the copper industry to her welfare and defense, and should adopt a mineral policy in support of it, and other branches of the mineral industry.

PRESENTLY CONTEMPLATED FUTURE COPPER PRODUCTION CAPACITIES

On September 16, 1968, the American Metal Market said:

"Industry quarters estimated that the Free World consumption of copper, if it continues to rise the 'traditional' 4-1/2 percent per annum, will be about 6,173,000 tons annually by the end of 1972."

Presently contemplated copper production capacities as indicated by the various companies of the world will amount to 7,267,880 tons by the end of 1972. Sir Ronald Prain has stated that "many of us have for years worked on projections which

assume a shortfall between capacity and production of 7%, i.e. an operating rate of 93%".

Using the average production rate of 93% of capacity and the Arizona Department of Mineral Resources computation of Free World capacity, production will approximate 6,759,000 tons in 1972, leaving a surplus (if there is no curtailment in that year due to overproduction), of approximately 600,000 tons.

As previously pointed out, in its April 17, 1969 issue American Metal Market stated: "With announced and unannounced expansion plans, it could mean a Free World surplus of around one million tons by the end of 1973".

The presently contemplated copper productive capacities determined by the Arizona Department of Mineral Resources from records appearing in a number of trade statistical sources and announcements appearing in a number of technical, financial, and mining magazines, appear in Exhibit C attached hereto:

contemplated

The future capacities as compared with production in 1966 and 1968 are summarized as follows:

	United States Plus Canada			CIPEC Nations	Other Free World	Total Free World
	United States	Canada	Total			
Production						
1966	1,429,152	508,300	1,937,452	1,932,167	919,867	4,789,486
1968	1,204,621	608,311	1,812,932	2,122,711	978,423	4,914,066
Contemplated Future Capacities						
1969	1,727,700	690,100	2,417,800	2,366,400	1,021,130	5,805,330
1970	1,892,800	827,500	2,720,300	2,589,000	1,174,890	6,484,190
1971	1,954,100	890,600	2,844,700	2,772,500	1,192,940	6,810,140
1972	2,086,400	996,900	3,083,300	2,923,090	1,261,490	7,267,880
1973	2,161,900	1,015,900	3,177,800	3,161,790	1,477,940	7,817,530
1974	2,198,200	1,083,900	3,282,100	3,181,090	1,620,640	8,083,830
1975	* 2,364,500	1,147,900	3,512,400	3,447,990	1,679,140	8,639,530

* Includes Puerto Rico and Minnesota 116,000 tons contemplated production which is more or less problematical.

In studying the future production schedules, distinction is made between (a) that part of the Free World where production is on a free competitive basis, with private mining companies governing their operations to conform with the need for copper and seeking to obtain a reasonable price for their copper without restriction; and (b) that part where very little copper is consumed but where the bounties of nature have been generously heaped upon these underdeveloped nations in the form of gigantic

(please continue on page 29)

EXHIBIT C

PRESENTLY CONTEMPLATED COPPER PRODUCTION CAPACITIES

Short Tons

	PRODUCTION		CONTEMPLATED FUTURE CAPACITIES AT END OF						
	1966	1968	1969	1970	1971	1972	1973	1974	1975
Arizona	739,569	(a)627,961	878,800	980,700	1,026,200	1,032,200	1,086,400	1,122,400	1,122,400
Remainder of U.S. (Incl. Puerto Rico)	689,583	(b)576,660	848,900	912,100	927,900	1,054,200	1,075,500	1,075,800	1,242,100
Total U.S.	1,429,152	1,204,621	1,727,700	1,892,800	1,954,100	2,086,400	2,161,900	2,198,200	2,364,500
Canada	508,300	608,311	690,100	827,500	890,600	996,900	1,015,900	1,083,900	1,147,900
U.S. plus Canada	1,937,452	1,812,932	2,417,800	2,720,300	2,844,700	3,083,300	3,177,800	3,282,100	3,512,400
Chile	701,456	725,559	874,900	1,060,700	1,117,900	1,233,190	1,233,190	1,233,190	1,233,190
Peru	194,439	235,318	247,500	254,500	295,500	300,500	455,500	455,500	663,500
Chile Plus Peru	895,895	960,877	1,122,400	1,315,200	1,413,400	1,533,690	1,688,690	1,688,690	1,896,690
Zambia	687,174	804,134	858,200	868,700	934,700	945,700	951,700	951,700	991,300
Republic of Congo	349,098	357,700	385,800	405,100	424,400	443,700	521,400	540,700	560,000
TOTAL COPPERBELT	1,036,272	1,161,834	1,244,000	1,273,800	1,359,100	1,389,400	1,473,100	1,492,400	1,551,300
TOTAL CIPEC	1,932,167	2,122,711	2,366,400	2,589,000	2,772,500	2,923,090	3,161,790	3,181,090	3,447,990
Australia	116,484	110,980	133,200	161,450	165,450	176,450	176,450	176,450	176,450
Oceania	336	400	900	900	900	900	187,400	247,400	247,400
Free Europe	173,425	215,301	229,900	244,650	251,700	270,450	279,900	279,900	286,900
Remaining Free Nations	629,622	651,742	657,130	767,890	774,890	813,690	834,190	916,890	968,390
Total Other Free Nations	919,867	978,423	1,021,130	1,174,890	1,192,940	1,261,490	1,477,940	1,620,640	1,679,140
TOTAL FREE WORLD	4,789,486	4,914,066	5,805,330	6,484,190	6,810,140	7,267,880	7,817,530	8,083,830	8,639,530

(a) 141,656 Production Lost in 1968 Due to Strike

(b) 151,952 Production Lost in 1968 Due to Strike

EXHIBIT C -1

PRESENTLY CONTEMPLATED CAPACITY INCREASES

	1969	1970	1971	1972	1973	1974	1975	TOTAL
Arizona	63,500	101,900	45,500	6,000	55,200	36,000	-	307,100
Remainder of U.S. (Incl. Puerto Rico)	97,450	63,200	15,800	126,300	21,300	300	166,300	490,650
Total United States	160,950	165,100	61,300	132,300	75,500	36,300	166,300	797,750
Canada	14,200	137,100	63,100	106,300	19,000	68,000	61,000	472,000
United States Plus Canada	175,150	302,500	124,400	238,600	94,500	104,300	230,300	1,269,750
Chile	57,900	185,800	57,200	115,290	-	-	-	416,190
Peru	6,000	7,000	41,000	5,000	155,000	-	208,000	422,000
Chile Plus Peru	63,900	192,800	98,200	120,290	155,000	-	208,000	838,190
Zambia	54,100	10,500	66,000	11,000	6,000	-	39,600	187,200
Republic of Congo	18,300	19,300	19,300	19,300	77,700	19,300	19,300	192,500
Total Copperbelt	72,400	29,800	85,300	30,300	83,700	19,300	58,900	379,700
TOTAL CIPEC	136,300	222,600	183,500	150,590	238,700	19,300	266,900	1,217,890
Australia	4,400	28,250	4,000	11,000	-	-	-	47,650
Oceania	500	-	-	-	186,500	60,000	-	247,000
Free Europe	14,650	14,750	7,050	18,750	9,450	-	7,000	71,650
Remaining Free Nations	38,800	110,760	7,000	38,800	20,500	82,700	51,500	350,060
TOTAL OTHER FREE NATIONS	58,350	153,760	18,050	68,550	216,450	142,700	58,500	716,360
TOTAL FREE WORLD	369,800	678,860	325,950	457,740	549,650	266,300	555,700	3,204,000

ARIZONA

ESTIMATED ANNUAL COPPER PRODUCTIVE CAPACITY
(Estimated by the Arizona Department of Mineral Resources)

	Short		Tons			
	1969	1970	1971	1972	1973	1974-5
ASARCO - Silver Bell	24,800	24,800	24,800	24,800	24,800	24,800
Mission	70,000	70,000	70,000	70,000	70,000	70,000
N. San Xavier	a	a	a	a	a	a
Arizona Ranch & Metal						
Mineral Hill	2,500	2,500	2,500	-	-	-
Anaconda Twin Buttes	10,000	60,000	60,000	60,000	60,000	60,000
Bagdad	20,000	20,000	20,000	20,000	20,000	20,000
Cyprus Old Dick	2,500	2,500	2,500	-	-	-
Pima	64,000	64,000	64,000	64,000	64,000	64,000
Duval Esperanza	26,000	26,000	26,000	26,000	26,000	26,000
Mineral Park	30,000	30,000	30,000	30,000	30,000	30,000
Sierrita	15,000	60,000	81,500	81,500	81,500	81,500
El Paso Natural Gas						
Emerald Isle	2,500	2,500	2,500	2,500	2,500	2,500
Hecla Lakeshore	4,000	4,000	4,000	4,000	35,000	35,000
Inspiration-Inspiration	55,000	55,000	55,000	55,000	55,000	55,000
Christmas	8,000	8,000	9,000	9,000	9,000	9,000
Ox Hide	2,000	6,000	8,000	8,000	8,000	8,000
Red Hill	-	-	-	-	3,000	3,000
Kennecott - Ray	100,000	100,000	100,000	100,000	100,000	100,000
Magma San Manuel	102,000	102,000	127,000	150,000	150,000	150,000
Superior	21,800	21,800	21,800	21,800	57,000	57,000
McAlester Fuel -Zonia	2,200	2,200	2,200	2,200	2,200	2,200
Phelps Dodge						
Morenci	150,000	150,000	150,000	150,000	150,000	150,000
New Cornelia	70,000	70,000	70,000	70,000	70,000	70,000
Lavender Pit	31,000	31,000	23,000	17,000	8,000	5,000
Copper Queen	24,000	24,000	18,000	12,000	6,000	-
Metcalf	-	-	-	-	-	50,000
Ranchers Exploration						
Bluebird	4,500	5,400	5,400	5,400	5,400	5,400
Tennessee Miami	9,000	9,000	9,000	9,000	9,000	9,000
Copper Cities	24,000	24,000	24,000	24,000	24,000	24,000
Castle Dome	2,000	2,000	2,000	2,000	2,000	2,000
Standard Antler	-	2,000	2,000	2,000	2,000	2,000
Miscellaneous - (Small & B.P.)	2,000	2,000	12,000	12,000	12,000	12,000
TOTAL	878,800	980,700	1,026,200	1,032,200	1,086,400	1,127,400

(a) Included in "Miscellaneous"

high-grade copper ore deposits. The nations in part (b) have formed the Council of Intergovernmental Copper Exporting Countries (known as CIPEC). In 1968 Zambia, Chile, the Republic of the Congo, and Peru, the four nations comprising CIPEC, produced 2,122,711 or 43.2% of a Free World total of 4,914,066 tons of copper contained in ore, but, according to figures presented in the American Bureau of Metal Statistics, out of a total of 5,652,400 tons of refined copper (primary and secondary) consumed in the Free World, Chile consumed 25,000 tons and the other three nations didn't consume enough to list separately - but it was no more than an aliquot part of 6,000 tons consumed in "Other America" and 7,700 tons in "Other Africa".

However with the production of 43.2% of the Free World's copper and with only a negligible consumption, the CIPEC is an organization headquartered in Paris with a purpose of increasing production and raising sales prices so that the mines of the four member countries may pay higher taxes and a larger share of their sales proceeds for what the countries regard as the removal of their natural resources.

Of course all of the mines being seized (as in the Republic of the Congo) or "nationalized" (as in Chile) or asked "to donate 51% of their stock" (as in Zambia), have been developed by foreigners entirely with foreign risk capital -- and regardless of the name given to the takeover, no cash is being paid for the property taken over. The hope for the investors in the properties being taken over, is that the payments will be paid out of future dividends accruing to the state.

Late in 1966, the Congo seized the huge mining and processing complex of the Union Miniere du Haut Katanga (UMK). No agreement has been reached yet concerning how much the Congo will pay UMK for the takeover.

Zambia, Chile and the Congo depend heavily on the foreign exchange earned by their copper exports (since they use very little of their copper production themselves), so that they are dedicated to the proposition that the more they can force the foreign companies to produce and export, the more "hard money" will be coming into their tills for home distribution.

From Exhibit C it will be observed that beginning with 1966, a year of previous high production and until 1973, when the forced Chilean and Zambian expansions will have been placed in operation, United States production will be increased in the 7 year period by 51.3 percent, while the CIPEC tonnage will be increased by 63.6 percent.

It will be noted that these increases are well in excess of the traditional 4-1/2 percent per annum increase in copper consumption - in further support of the fears that unless mines are operated at less than capacity beginning shortly - a large surplus of copper will build up again.

In contrast with CIPEC, Japan produces little copper but is a large consumer. The Japanese Ministry of International Trade and Industry has calculated that Japan will consume 1,020,000 metric tons of copper in the year 1975. The production from their own mines cannot be expected to increase to over 170,000 metric tons by then and copper reclaimed from scrap will amount to about 110,000 metric tons, leaving

740,000 metric tons needed from abroad by 1975. She therefore is scouring the earth in search for copper in all forms, - ores, concentrates, blister, and refined. She is anticipating imports from overseas mines developed by Japanese companies of 210,000 tons and has purchased from foreign concerns under long-term contracts thus far an additional 110,000 tons. There is a deficit still to be provided of 420,000 tons per year. The major tonnage of the new production from Oceania (Bougainville, West Irian, Malaya), nearly all of the production from British Columbia, Iran and the Philippines - both present production and future increases - are destined for Japan. Therefore, of the 1973-1975 production increases of the entire Free World, amounting to a total of 1,371,650 tons, Japan will procure 463,000 tons (equivalent to 420,000 metric tons) or over one-third.

The production capacity in Arizona and the United States will increase from 1968 to 1972 by 262,563 tons and 588,171 tons to 1,032,200 tons and 2,086,400 tons respectively (34% and 39% respectively).

Canadian capacity will increase from 1968 to 1972 by 389,000 tons to 996,900 tons or 64% (with the large British Columbia increase destined for Japan).

CIPEC capacity will increase between 1968 and 1972 by 800,379 tons to 2,903,090 or 38%.

For the rest of the Free World capacity will increase between 1968 and 1972 by 283,069 tons to 1,261,490 tons or 29%.

It is thus evident that the planned increases in capacity far exceed the traditional 4-1/2 percent per annum increase in consumption and the CIPEC group of nations who use exceedingly little copper will produce an additional increment of over 800,000 tons, while the United States which according to the World Bureau of Metal Statistics consumed over 33 percent of the Free World's refined copper in 1968, in the four years between 1968 and 1972 will add 588,000 tons to its capacity to produce. That, too, exceeds the 4-1/2 percent increase in consumption rate.

"Copper - Red Metal in Flux" issued by the Federal Reserve Bank of San Francisco, while arriving at practically the same annual production potential of American mines by 1972 as the Arizona Department of Mineral Resources, warns that:

"In view of the fact that capacity moved ahead of consumption during the 1967-1968 strike, growth in consumption at that rate (5.3 percent) over the next four years could still leave the industry well over a million tons excess capacity by 1972; an end to hostilities in Vietnam might increase that surplus even more."

However, after 1972, the picture changes. Between 1973 and 1975, the following incremental capacities have been planned:

	<u>Tons</u>	<u>% of 1972 Capacity</u>
Arizona	90,200	8.7
Remainder of U.S. (excluding Puerto Rico and Minnesota)	71,900	6.8
Canada	151,000 *	15.1
CIPEC	524,900	18.0
Other Free Nations	417,650 *	24.8
Total Free Nations (excluding Puerto Rico & Minnesota)	1,255,650	17.3

* Due to large Japanese commitments in British Columbia, Oceania and Philippines.

The foresightedness of Japan in providing for her future needs is overmatched by the CIPEC group pressuring of producers to increase their production even though sacrifices in price might be necessary in order to dispose of the increase.

In the United States, assuming no increment in the traditional 4-1/2% per annum increase in consumption, the excess production capacity installed through 1972 would be spread out beyond 1972 to absorb the deficiency in planned production between 1972 and 1975 - and unless planned increases in capacity by 1975 are on the boards, the United States will be faced with either a shortage of domestic copper or the forced necessity of buying CIPEC copper.

Arizona and the United States are looking forward to Anaconda's increasing Arizona, Montana, and Canadian copper production to take the place of the Chilean copper which will become nationalized in about seven years.

Sir Ronald Prain has made the interesting point that Roan Selection Trust has encountered three separate mineralized areas containing some 200 million tons of copper content of just under 0.9 percent and "that in many parts of the world such mineral reserves could be regarded as ore bodies, i.e. economically viable deposits. In Zambia, however, the present fiscal conditions are such that the exploitation of such deposits with a high stripping ratio and remote location would not be economically viable. Now with the expectation that there will be a change in the fiscal conditions in Zambia, the company has been encouraged to launch a more detailed examination of the Lumwana deposits, about 150 miles from the Copperbelt".

Ores of 0.9 percent are well above the average grade of current United States production. The 3 to 4.5 percent ores treated in the Copperbelt are "out of sight".

As stated in the Arizona Department of Mineral Resources' Copper Industry report for 1967:

"The need for copper is expected to more than double by 1985. Therefore, Arizona's copper resources are of great importance to the Nation's economy and defense. Her copper mines have been producing more

than half of the copper produced in the United States, the largest producer of copper in the Free World (U.S.S.R. is by far the second largest producer). However, the copper developments in the world all have an affect upon Arizona, because copper has a world market. She has met the challenges of the past with tremendous advances in mining technology, and expects to continue to meet them. However, there has been a noticeable increase in U. S. investment in foreign mines. Capital will go where profit is greatest, and it behooves Arizona and the Nation to look to their mineral policies. Capital, never too available, wants the greatest possible stability of economic conditions, including that provided by protection against excessive imports of low cost, foreign copper. The Nation needs her copper mines and the capital investment necessary to find and develop them."

NOTE:

Tabulations of detailed statistics of Copper Mining and Smelting employment, and of monthly copper statistics, for periods covered by this paper, "The Copper Mining Industry 1966-70", are available in very limited supply, and may be obtained from the Department by those concerned with the industry to whom such detail may be of assistance, as long as the supply lasts.

FRANK P. KNIGHT,
Director.