# SIGNIFICANT FACTS

### IN 1951

The mining industry payroll in Arizona totaled over \$52,000,000, or a million dollars each and every week of the year. Statistics show that the average weekly earnings of those employed in the Arizona mines are higher than those of any other industry in the state and higher than the national average for non-ferrous metals mines.

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Arizona mines spent over \$18,000,000 in Arizona for Arizona grown or manufactured supplies and equipment, thus contributing substantially to the industrial life of the state and the economy of the larger cities where supply and machinery headquarters are located. Most large national manufacturers maintain Arizona offices because of the mining business.

The mining industry is Arizona's largest taxpayer. Over \$11,000,000 was paid for taxes within the state in 1951. No other industry contributes as much in taxes. Mining carries about 28 per cent of the total tax load; an amount which is materially in excess of its dollar value proportion of the total production of all industries in the state.

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The Mining Industry has a vital and far reaching effect on the economy of the whole state of Arizona and on every industry and community within its borders.

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## MINING IS THE ONLY INDUSTRY WHICH CREATES NEW AND INDESTRUCTIBLE WEALTH

DEPARTMENT OF MINERAL RESOURCES STATE OF ARIZONA PHOENIX, ARIZONA

R. I. C. MANNING, DIRECTOR



# MINING'S PART in ARIZONA'S ECONOMY

frank j. tuck



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sources, history has shown that the industry actually has created resources where none previously existed.

Mines are made, not found. It has been almost forty years since a "bonanza" has been "discovered". All the producing mines in Arizona nowadays are the product of venture capital in large amounts, the use of engineering skill in the invention and construction of labor-saving machinery and processes, and, finally, the business acumen of seeing into the future. A great industry has been developed, and, with proper understanding and equitable treatment, still has tremendous potentialities of remaining vital to the state's economy indefinitely into the future.

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> <sup>ву</sup> frank j. tuck **1952**

try) we get an average of 13.5 persons (including the miner himself) dependent upon each mine employee.

This figure of 13.5 persons per mining employee compares with 14.1 persons in Utah reported twenty years ago by Rolland A. Vandegrift and Associates, specialists in economic and governmental research. These economists made an exhaustive study of the "economic dependence of the population of Utah."

More recently, Miles P. Romney of the Utah Mining Association was quoted as follows in "Western Mineral Survey" of April 25, 1952:

"For every man employed in basic industry there are five people supported in services and professions."

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If we use his figures in Arizona's 1950 case, we might get the following:

13,900 mining industry employees times 3 per family 41,700 69,500 service industry employee's times 2\* per

family 139,000 Total dependent upon the mining industry 180,700

This comes very close to the 187,397 arrived at by our own method of calculation.

\*This proportion was used because of the large number of families where both husband and wife work.

Thus it is demonstrated that the mining industry plays a vital and important part in Arizona's economy. Its ramifications extend in every direction. Contrary to the "popular" belief that the mining industry is exhausting the state's natural re-



Asbestos mill in Arizona 15



#### **Barite Concentrator**

who derive their income from trade with and services for the miner, millman and smelterman, and their families. We know that the foundries of Phoenix are almost one hundred percent dependent on the mining districts for their business. We know that the miner is the highest paid wage-earner in the State, and that he spends practically all of his earnings within the State. We know that the railroads get large revenue from the mines and smelters in the form of freight on ores, concentrate and blister copper. We also know that power and telephone utilities derive much revenue from the mines. Many state and federal employees in Arizona are paid out of the taxes which the mining companies pay. The wholesale and retail stores in Phoenix and Tucson get considerable business from both the mining companies and their employees in the mining districts. The farmer and stockmen raise food for the miners.

In view of the impossibility of determining just how many persons in Arizona depend upon the mining and smelting industry, perhaps the best criterion is the assessed valuation and the taxes paid. This leads to the conclusion that between twenty-five and thirty percent of the population depend upon the mining economy. At any rate, the mining industry produces close to one quarter of the wealth of the State, had an assessed valuation in 1950 of 25.74% of the total assessed property valuation, and paid 28.1% of the grand total of state, county, city and school taxes.

Using 25% as mining's part in Arizona's economy, we find that 187,397 persons (25% of 749,587) would be involved. Dividing 187,397 by 13,900 (the Employment Security Commission's reported employed in the mining and smelting indus-

#### MINING'S PART IN ARIZONA'S ECONOMY

The purpose of this study is to determine the part the Mining and Smelting Industry plays in Arizona's economy. United States Census figures, reports of the Employment Security Commission of Arizona and Arizona Tax Commission Reports will be used in painting this picture.

Many towns in Arizona exist today because of the discovery of copper. Such towns as Bisbee and Douglas, Clifton and Morenci, Ray and Hayden, Jerome and Clarkdale, Globe and Miami, Ajo, and Superior are the principal examples. They depend upon the mining industry for their economic existence. So long as these communities are producing exportable surpluses of metals to balance their trade, they thrive. As soon as their exportable excess productions cease they cannot support themselves; their populations will drift away, leaving ghost towns as monuments to the necessity of excess production in their community maintenance and development.

Economists divide industry into two general classes, primary industry and service industry. A primary industry is one which produces exportable products, and a service industry is one which produces for the use and benefit of those employed by the primary industry and their dependents. Expressing it in another way, if the products of an industry are consumed outside the State, the industry is primary in character. If the products are consumed within the State, the industry is service in character, and as a service industry, is in turn dependent upon some primary industry for its existence.

Copper mining is one hundred percent primary in character as it exports all of its product, and its income supports a large section of Arizona's population. Although Agriculture is a primary industry, it is also a service industry. Exportable products consist of cotton, meat and meat products, cantaloupe, lettuce, and citrus products. A portion of these products, except cotton, is, of course, consumed within the State. Taken separately, cotton farming would be a hundred percent primary industry. In Manufacturing, Arizona has both primary and service industries. For example, the aircraft and aluminum industries are primary, while air-conditioning and foundries are service industries. Most foundry products, such as grinding balls and pump castings, are consumed within the State by the mining industry. It follows, therefore, that practically all of those employed in the production of these foundry products are economically dependent upon the metal mining industry guite as much as though they were employed directly by the metal mines or smelters of the State.

While the railroad industry is both primary and service in nature, it is largely dependent upon the mining industry for its existence. In fact, practically every branch line in the State was originally built for the purpose of serving some mining area and would be totally useless if mining activities were stopped. The story of every large mine in the State is linked with the building of a railroad, frequently by the mining company itself.

The business of the bus and air transportation companies, the telephone and telegraph companies is both primary and service in nature. Arizona's climatic conditions are such that it has become an important health center as well as a resort for winter tourists. This business may well be classed as primary. It might be said that we export climate.

Wholesale and retail establishments are all dependent upon the primary industries for their economic existence. Services, such as provided by doctors, lawyers, garages, service stations, laundries, bakeries, drug-stores, grocery stores, schools, banks, public utility companies, etc., etc., all share in the wealth created by the primary industries.



Aerial view of open pit copper mine

\$50,795,535 in taxes, paid to the state, counties, cities and school districts.

The production tax paid by the mining industry is called a sales tax and is in addition to the ordinary sales taxes which the mining industry and its employees pay on purchases in Arizona. As the mining product is sold outside the state where Arizona's mines are competing with other producers, the Arizona producers are not able to add the sales tax to the price they charge. The indirect sales tax is usually passed on to the consumer. The direct sales, or production tax, is actually a severance tax, wherein the producer pays the State for the privilege of removing a natural product from the earth, to reimburse the State for the depletion of its natural resources. To be sure, most of the mines have been located on federally owned land, and the product before its removal from the earth has been so much worthless rock which required the work of man to convert it into real wealth.

Summing up the tax picture as it bears on the part played by the mining industry in the State's economy, we find that in property valuation the mining industry was assessed in 1950 at 25.74% of the total state valuation, and paid 28.1% of the total taxes, including state, county, city, school and excise taxes.

#### Conclusion

Statistics are not available to show exactly how many persons outside the mining districts are dependent upon the mining industry for their livelihood. We know that there are many industries and professions in the large cities of Phoenix and Tucson



A large open pit copper mine
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Large mines were once small mines or prospects

years. Zinc production has increased from 3870 tons per year to 44,443 tons per year for the same periods. Manganese, molybdenum, asbestos, barite, lime, gypsum, and perlite have become substantial factors in Arizona's economy. Like the porphyry coppers, which were worthless rock until capital, science, and business acumen made them into mines, none of these products was of the bonanza type deposit, and much money and brains were required to convert them into profitable enterprises.

#### Taxation

In 1950, according to the State Tax Commission, the assessed net mining property valuation was \$194,680,500 or 25.74% of the total state property valuation of \$756,219,540. In the same year, the state mining property taxes were \$3,017,548, the production (or sales) taxes were \$2,155,165 and State mining income taxes were \$2,386,680 or a total of \$7,559,393, which was 37.34% of the grand total state property, income and production taxes of \$19,968,163.

In 1950, the six mining counties (Greenlee, Gila, Pima, Pinal, Cochise and Yavapai) paid \$19,549,749 in state, county, city and school taxes on a valuation of \$399,844,084, or at a rate of \$4.99 per \$100 valuation. The mining industry's proportion paid was \$9,714,557 on a mining property valuation of \$194,680,500. Adding the state mining income taxes of \$2,386,680 and the state production tax of \$2,155,165, we get a total state, county, city and school property taxes, state mining income taxes and state mining production taxes, amounting to \$14,265,402, which is 28.1% of the grand total of

## Population

According to the U. S. Census, the population of Arizona was as follows:

910	204,35
920	334,16
930	435,57
940	499,26
950	749,58

The population of the towns and cities of Arizona which are strong mining centers was as follows for the year 1950:

Douglas	9442
Morenci	6541
Globe	6419
Ajo	5817
Miami	4329
Superior	4300*
Bisbee	3801
R'ay-Sonora	2700*
Warren	2610
Clarkdale	1609
Hayden	1494
Jerome	1233
_owell	1136
Tombstone	910
Patagonia	700
Winkelman	548

Total population of mining towns......53,589

\*Not given in census report—estimated.

The following table is taken from page 68 of the Summary Edition, December, 1951, Report of Unemployment Insurance Costs in Arizona, Employment Security Commission of Arizona.

This distribution differs somewhat from the regular monthly bulletins issued by the Employment Security Commission, and used by this department (Arizona Department of Mineral Resources) in its reports covering wages of covered employees in the various industries other than Agriculture. The table given below was based on U. S. Census reports, and not on Employment Securty Commission reports, and differs because of the classification methods employed by both Commissions. For example, in 1950, the Security Commission removed smelter employees from the mining industry and included them with the manufacturing industry. Other differences were due to similar changes in classification methods.

THE SIZE AND	DISTRIBU	TION OF T	HE ARIZO	NA LABOR	FORCE 1,	
	By Industr	ies for the [	Decades 191	0-1950		
Maior			D E C	A D F S		
Industry			)	1	Fiscal	
Groups	1910	1920	1930	1940	1950,	Estimated 2/
Agriculture	22,416	36,199	39.232	33,134	49,200	
Mining	15,568	15,437	13,982	12,994	13,900	
Manufacturing &				12,784	20,300	
Construction	18,294	24,055	34,704	8,954	17,800	
Trans - Utilities.	8,698	11,589	13,872	11,455	22,800	
Trade	6,230	11,314	19,809	27,893	51,200	
Financial				3,018	6,300	
Services	12,148	17,380	29,490	32,705	40,000	
Clerical	2,916	6,252	9,267	, 1	. 1	
Government	1,555	8,353	4,940	7,236	14,300	
Unclassified				(2,067) 3	- /8	
Unemployed 4/	ı	,	•	30,074	16,000	
TOTALS	87,825	130,579	165,296	180,247	251,800	
Source: U. S. Census Reports						
Footnotes:						
1/ Instead of labor force, the	term "gai	nfully emplo	yed" was u	sed prior to	the census	of 1940. The
two terms are not exactly	the same	narticularly	in that the	nemplover	are stated	senarately in

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available upon request. <u>s</u> Method of estimating

census were not classified by occupation in 1940 workers ,067 These 2, Nm 4

e totals of the gainfully employed included most of the unemployed since people their regular occupation was, rather than whether they had worked the precedthe Prior to 1940, the were asked what week ing

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The fact that only 6% of Arizona's labor force was engaged in mining understates the economic importance of the mining industry. In 1950, mining payrolls amounted to about 15% of the total wages in covered employment. In 1950, the value of the production of the five chief minerals in Arizona was \$201,034,000. This was almost as much as the value of farm crops and livestock in that year, although the agricultural labor force was more than three times as large.

Since a tariff on copper has a direct bearing on the domestic price of copper, changes in this tariff have a direct bearing on the labor force in copper mining and in the service industries of the mining communities.

The bill (H.R. 3336) suspending the 2-cent excise tax on copper from April 1, 1951, to February 15, 1953, or to the termination of the national emergency, whichever is first, was signed by the President on May 22, 1951. The law provides that the Tariff Commission must notify the President within 15 days after the end of any month in which the price drops below 24 cents a pound, delivered Conn. Valley, and within 20 days thereafter the President must revoke the suspension.

With copper in short supply and with no surplus to export.

there is at the present time no need of the tariff, especially while



the above guarantee is in force. Although copper constitutes the chief product of Arizona's mining industry, many other metals and non-metallics play an important part in the economy of the State. Lead production has increased from an average of 7,500 tons per year for the

> A typical moderate sized Arizona zinc mining operation 11

This decline is not due to decrease in mineral output but rather is due to the increased mechanization of mining. About ninetenths of all mining in Arizona is copper mining. At the present time most of the large copper mines are of the open-pit type which requires more machinery but fewer workmen than underground mining required. The ores now being worked do not have as high an average copper content as was the case in former years, but technological improvements in mining and metallurgy have managed to make possible the use of less rich ores. The following table may be of interest in showing how the metal content of Arizona copper ore has decreased in the past four decades. The wide fluctuations in metal prices, also shown, indicate one of the important hazards of the mining industry. Note the high grade ore necessary to be mined during the depression period 1932-1936, when the price of copper was below nine cents per pound.

Source: Mineral Yearbook,	U.S.B.M.;	also, E	Bul. N	lo. 1	40,	Ariz.
Bureau of Mines						

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	Copper Price			Copper Price
Year % Coppe	er Lb.	Year	% Copp	er Lb.
1910     4.07       1911     3.57       1912     2.79       1913     2.69       1914     2.60       1915     2.51       1916     2.18       1917     2.33       1918     2.05       1919     2.01       1920     1.92       1921     1.78       1922     1.91       1923     1.87       1924     1.73       1925     1.72       1926     1.63       1927     1.56       1928     1.59       1929     1.59	12.7c 12.5 16.5 15.5 13.3 17.5 24.6 27.3 24.7 18.6 18.4 12.9 13.5 14.7 13.1 14.2 14.0 13.1 14.2 14.0	1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1945 1946 1947 1948 1949 1950	1.44 2.09 6.36 3.11 2.28 1.63 1.38 1.49 1.29 1.27 1.13 1.06 .98 .89 .91 .94 .93 .91	er ED. 9.1c 6.3 6.4 8.0 8.3 9.2 12.1 9.8 10.4 11.3 11.8 12.1 13.0 13.5 16.2 21.0 21.7 19.7 20.8
1950 1.45	13.0	1901	.97	24.5

In 1910, Arizona mines produced 3,914,969 tons of ore; in 1918, 19,038,486 tons; in 1941, 25,491,794 tons; and in 1950, 42,709,272 tons. While increased mechanization represents a fundamental cause of the downward trend in Arizona mining labor force, war demand for copper exerts a powerful and different influence upon the mining industry.

	tistics.	Annual Wage Index nually 1940-100	553.60 100.0	941.60 283.3	316.00 261.0		1951	3474.12	4248.40	3211.00	2938.00	4316.00
, 1950 AND 1951	Bureau of Labor Sta	igs Per Employee — Monthly An	\$137.80 \$1,6	328.47 3,9	359.67 4,3		1950	3256.76	3813.16	2967.12	2620.80	3941.60
-YEARS 1940	on and U. S. I	Average Earnir Weekly	\$31.80	75.80	83.00		1940	\$1313.44	1323.93	1346.09	1163.68	1653.60
ITY INDEX-	<b>Irity Commissi</b>	Hourly	N.A.*	1.63	1.74			anufacturing	onstruction	rilities	ade	ning
PRODUCTIV	oloyment Secu	Avg. Wkly Hours	N.A.*	46.5	47.7			ayments in M	ayments in Co	ayments in Ut	yments in Tra	avments in Mi
AND	Arizona Em	No, of Employees	12,791	11,275	11,825	vvailable.		nnual Wage P	nnual Wage Pa	nnual Wage P	nnual Wage Pa	nnual Wage Pa
	Source:		1940	1950	1951	*Not A		Avg. A	Avg. A	Avg. A	Avg. A	Avg. A

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A typical copper smelter in Arizona

#### Agriculture

The 1950 labor force in agriculture, shown on the above table, was estimated at 49,200 and included people in farming, ranching and logging. The figure of 49,200 is the estimated average monthly labor force. In the late fall and early winter months, the farm labor force is normally greatly increased by many migratory workers principally in picking cotton and harvesting truck crops.

Through the Salt River project, water is supplied to a rich agricultural area, the water being controlled by a series of dams on the Salt and Verde Rivers. A large amount of hydroelectric power is generated by the dams, and the sale of this by-product power makes possible the delivery of water to the valley at a cost that permits the raising of crops on a commercial basis on the valley's farms. If it were not for the power sales, the cost of water would be prohibitive and the mines provided the necessary revenue to permit the delivery of cheap water to the valley's farms. Needless to say, the mines also provide an important market for the state's agricultural products, as well as the products of the lumber industry.

#### Manufacturing

Prior to 1940, smelting was about the only really large type of manufacturing enterprise that could give the state any appearance of a factory economy. Since 1940, World War II brought to Arizona some relatively large manufacturing enterprises connected with aviation. In the spring of 1945, four large companies together employed more than 15,000 workers, a figure that exceeded the state's entire 1940 manufacturing labor force of 12,784. Large cutbacks in the government orders for aircraft after the war caused a decline in the manufacturing labor force. High freight rates have prevented Arizona Manufacturers from reaching distant markets on an economical basis. The total value of manufacturing production in Arizona (excluding smelter operations and non-taxable war-contracts) grew from 30 million dollars in 1940 to over 130 million dollars in 1950.

As stated before, manufactured products such as grinding balls and pump castings are used extensively in the mining industry. Air conditioning equipment is another manufactured product that the mining industry spends much money on. The larger mines buy enormous quantities of mining supplies in Arizona, and practically all of the small mines get their equipment and supplies inside the state.

#### Mining

It is to be noted in the table that mining was the one industry in Arizona which shows a decline in the size of its labor force.



Open pit mining operations in Arizona 9