

Total Quantity of Copper Mined in Wyoming in Pounds

1881- first discovery
 1882- 100,000
 1883- 962,468
 1884-1887 none
 1888- 232,819
 1889- 100,000
 1890- none
 1891- "
 1892- "
 1893- "
 1894- "
 1895- "
 1896- "
 1897- "
 1898- 233,044
 1899- 3,104,827
 1900- 4,203,776
 1901- 2,698,712
 1902- 889,228
 1903- 1,023,189
 1904- 3,565,629
 1905- 2,530,531
 1906- 24,000
 1907- 2,257,650
 1908- 2,452,049
 1909- 433,672
 1910- 217,127
 1911- 130,499
 1912- 27,570
 1913- 285,239
 1914- 17,421
 1915- 447,246
 1916- 2,610,622
 1917- 2,027,857
 1918- 852,777
 1919- 139,900
 1920- none
 1921- 12,000
 1922- 4,296
 1923- 111,280
 1924-1927 none
 1928- 2,604
 1929- 4,301
 1930- 11,600
 1931- 9,000
 1932- 397
 1933- none
 1934- 3,500
 1935- 1,000
 1936-1939 none
 1940- 4,000

Total Production of Iron Ore in Wyoming in Long Tons

1892-	5,000
1893-1900-	none
1901-	134,161
1902-	209,272
1903-	214,880
1904-	none
1905-	474,545
1906-	590,201
1907-	558,849
1908-	354,012
1909-	none
1910-	656,629
1911-	479,922
1912-	none
1913-	537,411
1914-	331,192
1915-	434,513
1916-	545,774
1917-	543,846
1918-	447,884
1919-	398,613
1920-	406,501
1921-	234,701
1922-	332,800
1923-	378,747
1924-	363,096
1925-	489,622
1926-	630,387
1927-	602,877
1928-	491,280
1929-	639,477
1930-	320,023
1931-	180,771
1932-	none
1933-	288,640
1934-	116,562
1935-	339,134
1936-	507,278
1937-	707,907
1938-	275,995
1939-	587,892
1940-	831,314

Total Production of Gold in Wyoming in Ounces

1894-	312
1895-	375
1896-	200
1897-	3,300
1898-	5,225
1899-	1,413
1900-	1,655
1901-	614
1902-	1,879
1903-	none
1904-	729
1905-	1,293
1906-	315
1907-	452
1908-	358
1909-	189
1910-	198
1911-	1,030
1912-	1,076
1913-	1,170
1914-	242
1915-	706
1916-	995
1917-	182
1918-	42
1919-	4
1920-	none
1921-	3
1922-	58
1923-	14
1924-1926-	none
1927-	58
1928-	33
1929-	43
1930-	443
1931-	56
1932-	257
1933-	2,200
1934-	4,871
1935-	3,715
1936-	1,964
1937-	1,176
1938-	798
1939-	583
1940-	740

Total Quantity of Mica Produced in Wyoming in Short Tons

1923- 100
1935- 200

Total Production of Lead in Wyoming in Short Tons

1932- 5

1934- 1

1935- 3

Total Production of Sand and Gravel in Wyoming in Short Tons

1911-	784,865
1912-	639,031
1913-	771,139
1914-	718,914
1915-	526,837
1916-	769,739
1917-	none
1918-	505,746
1919-	349,181
1920-	494,432
1921-	212,974
1922-	323,401
1923-	1,377,271
1924-	615,163
1925-	586,450
1926-	941,292
1927-	1,360,475
1928-	1,742,880
1929-1931	none
1932-	1,553,338
1933-	1,353,510
1934-	1,589,156
1935-	1,619,063
1936-	2,046,271
1937-	2,438,367
1938-	1,893,612
1939-	1,675,120
1940-	1,676,954

Total Production of Silver in Wyoming in Ounces

1898-	100
1899-	400
1900-	200
1901-	21,400
1902-	5,000
1903-	none
1904-	4,647
1905-	3,655
1906-	136
1907-	3,715
1908-	3,998
1909-	1,800
1910-	1,500
1911-	700
1912-	265
1913-	957
1914-	161
1915-	5,524
1916-	5,524
1917-	3,415
1918-	965
1919-	151
1920-	none
1921-	111
1922-	57
1923-	254
1924-	none
1925-	none
1926-	none
1927-	5
1928-	53
1929-	26
1930-	122
1931-	17
1932-	195
1933-	260
1934-	710
1935-	1,152
1936-	1,113
1937-	303
1938-	328
1939-	75
1940-	114

Total Quantity of Stone Produced in Wyoming in Short Tons

1919- 118,040
1920- 123,100
1921- 112,340
1922- 104,390
1923- 136,150
1924- 234,620
1925- 133,410
1926- 153,940
1927- 253,320
1928- 280,130
1929- 322,260
1930- 207,320
1931- 167,090
1932- 309,780
1933- 364,270
1934- 655,030
1935- 265,140
1936- 332,360
1937- 342,710
1938- 252,170
1939- 690,860
1940- 405,140

Total Production of Feldspar in Wyoming

1938-	1,168	short tons
1939-	6,726	" "
1940-	7,833	" "

Total Production of Manganese in Wyoming

1917- 30 long tons
1918- 42 " "
1919- none
1920- 40 " "

Total Production of Copper Ore in Wyoming

1928-29	short tons		
1929-38	"	"	
1930-112	"	"	
1931-18	"	"	
1932-	none		
1933-	none		
1934-1935	none		
1940-	30	"	"

Total Production of Gold and Silver Ore in Wyoming

1927-	110	short tons	
1928-	100	"	"
1929-	115	"	"
1930-	1,173	"	"
1931-	5	"	"
1932-	615	"	"
1933-	1,071	"	"
1934-	8,164	"	"
1935-	4,172	"	"
1936-	344	"	"
1937-	17	"	"
1938-	581	"	"
1939-	57	"	"
1940-	783	"	"

Total Production of Lead Ores in Wyoming

1932- 25 short tons

1933- none

1934- 6 short tons

Total Production of Sodium Salts in Wyoming

1931- 6,490 short tons
1932- 2,138 " "
1933- none
1934- none
1935- 1,927 short tons

Total Valuation of Minerals Produced in Wyoming

1905- 8,657,202
1906- 9,063,849
1907- 10,671,574
1908- 9,453,341
1909- 10,532,393
1910- 12,110,286
1911- 11,483,377
1912- 13,374,088
1913- 13,682,091
1914- 12,417,752
;915- 12,708,238
1916- 19,666,988
1917- 29,547,428
1918- 42,595,812
1919- 41,097,209
1920- 82,687,897
1921- 51,365,150
1922- 58,529,284
1923- 77,664,547
1924- 75,494,166
1925- 78,754,915
1926- 78,988,066
1927- 56,166,600
1928- 52,950,875
1929- 51,237,407
1930- 46,735,184
1931- 30,892,663
1932- 27,343,288
1933- 22,025,393
1934- 27,640,293
1935- 30,669,658
1936- 33,977,409
1937- 41,087,908
1938- 37,364,363
1939- 39,413,001
1940- 43,073,533

W.P. Products

WYOMING LEADS THE PROCESSION OF STATES

Among the states, Wyoming is 47th in population. On the other hand, in residents that include the most magnificent species of wild faunal life habitant to the American Continent, Wyoming still eclipses all states in either number or variety.

In the mineral industry the standings of Wyoming are far more impressive. The leading rank that Wyoming commands in this industry among the states is partly included in following tabulation:

RANKING CHART OF WYOMING AMONG THE STATES		
Rank	Item	Amount or Authority
<u>Mineral Reserves</u>		
	Coal	1,076,620,100,000 tons
	Gypsum	Largest and most widely distributed deposits known.
		Tonnage calculations not completed.
First	Titaniferous Iron Ore	U.S. Bureau of Mines Est. 2,500,000 tons
	Tschermigite (Ammonia Alum)	
	Leucite (10% Potash Content)	1,973,000,000 tons
	Bentonite	Largest and most widely distributed deposits are in Wyoming.
<u>Economical and Industrial</u>		
	Mineral Production per capita	\$405.11
	Mineral Royalties Paid To U.S. Treasury	***\$48,748,811.60
	Undeveloped Mineral Wealth	\$151,600,000,000.00
	*Bentonite Production	See Footnote
	Percentage of Coal Mined By Machinery	29.8%
Second	Altitude (Stature)	6,700 feet (Average for State)
	Per Capita Wealth	\$4,961.00
Third	Radium Production (To date)	\$33,857.48
	**Carbon Black Production	6,294,000 lbs.
Fourth	Sodium Salts Production	U.S.G.S. Report
	Phosphate Production	U.S.G.S. Report
Fifth	Chrome Iron Ore Reserves	U.S.G.S. Report
	Phosphate Reserves	115,754,000 tons.
	Oil Shale Reserves	(1,826,400,000 Bbls - Est. of U.S. Oil Conservation Board)
Sixth	Oil Production	21,900,000 Bbls
	By-Product Gasoline from Natural Gas	43,100,000 Gal.

THE MINERAL INDUSTRY OF WYOMING IN 1927.

With the exception of the oil industry the following remarks review all outstanding developments made by the mineral industry in Wyoming during the year of 1927. Due to its importance the oil industry is covered by a separate paper prepared by Frank B. Taylor, State Oil and Gas Inspector, attached to this office.

In most instances the statistical information herein inserted was obtained by direct correspondence with the leading mineral producers of this State. In other instances no replies were received from repeated letters of inquiry. Until all operating companies report their productions it is impossible for this office and the collaborating press to keep the citizens of the State reliably informed in regard to the constant expansion that the mineral industry is now undergoing in Wyoming. By another year the purposes of these annual reviews should be better understood, and for that reason, more complete data will doubtless be forthcoming on future productions. Not employing any field statisticians, the activities of some of the more unresponsive industries had to be severely slighted in this first annual review and outlook of the mineral industry of Wyoming.

STATE MINING AND INDUSTRIAL CONGRESS.

One of the most novel and interesting events that transpired during the year was the State Mining and Industrial Congress that was held in Casper on October 27, 28 and 29, 1927, under the auspices of the newly created Department of Commerce and Industry. Preliminary to the Congress, T. Joe Cahill, the Manager of the new Department, exercised every possible care to see that the leading authority of every mineral and industrial development known to the State would be present. In the proceedings entered into a mass of statistics and hitherto unavailable information was brought to light for the first time. These proceedings will soon be published by Mr. Cahill's office. As they contain the most complete inventory ever made of the multifold mineral resources of Wyoming it will finally be possible to supply mining and industrial corporations, as well as commercial boards, public libraries and private individuals with a reference work for which a seemi-

insatiable demand has long existed.

CERAMIC MATERIALS.

For pioneer development of hitherto latent mineral resources first honors go to the ceramic industry in 1927. During the year Wyoming joined the sisterhood of thirty states that now have cement mills of their own. Also, for the first time, a large plant was completed for the manufacture of fancy and ornamental building brick within our State. Both of these new ceramic ventures offer material and indisputable evidence of Wyoming's gradual but certain departure from the pioneer to industrial stage of development.

NEW CEMENT MILL.

For their rapidly expanding market throughout the western half of the two Americas the Monolith Portland Cement Company selected the city of Laramie as the most logical site for their latest cement mill unit. At the present writing large crews of concrete and steel workers are rapidly erecting a modern \$2,000,000 cement mill directly south of that city. When completed during the early part of the coming summer the new plant will have a daily capacity of 7,000 barrels of cement. By far the greater part of that huge output will have to be exported to more populous neighboring states in which natural cement deposits are either of inferior quality, or else entirely absent. However, nearly all of the annual turn-over of \$1,500,000 required for the operation of the new mill will be expended in Wyoming to meet the payroll, quarrying and manufacturing costs of the company.

It is extremely gratifying to report that before the Monolith Company made their final selection, their officials as well as their engineering and chemical staff conducted detailed technical and economical investigations of widely separated sites over a period of five years. At the recent Mining Congress the president of the company, Mr. Coy Burnett, announced that for converting raw materials into finished products on a large scale there existed in Wyoming the cheapest coal of any place that his company had ever heard about. For the requirements of his particular industry fuel was mentioned as even of more importance than the item of labor. As soon as equally enterprising

executives of other national corporations will conduct investigations of similar thoroughness absolutely identical discoveries will be made in regard to our extensive and varied fuel deposits. As power and fuel costs become of daily increasing importance it is possible that many similar discoveries will be made in Wyoming as industry constantly advances along automatic machinery and laborless mass production lines.

NEW BRICK WORKS.

During the past fall the Parco Brick Company completed at a cost of \$75,000.00 a modern brick works at Parco. At the present time the plant has a capacity of 250,000 standard and ornamental face bricks per month. Additions to the plant are already contemplated for the manufacture of fire brick as well as thinware in the shape of hollow building tile, roofing and drain tile, as well as other ceramic products.

For raw material the company has acquired a conveniently located shale deposit. For operation of the plant natural gas is used exclusively for fuel, and power in the form of electricity is obtained from the refinery of the Producers and Refiners Corporation. Wholly by the aid of delicately controlled thermostatic apparatus the company has so far been able to produce in commercial quantities ornamental bricks in no less than twelve different shades and colors from one uniform shale deposit. Without natural gas it would be entirely impossible to obtain the highly sensitized temperatures and controls that the complete line of Parco products require for standardized manufacture. The present operation in Parco plainly discloses the absolute necessity of using one of Wyoming's ideal forms of fuel in the modern ceramic industry.

A number of modern buildings have already been completed in Wyoming of Parco bricks. The pleasing appearance of these bricks already has been widely observed. In the past Wyoming had to import all better grades of bricks from neighboring states but from now on the new plant at Parco will largely eliminate that serious economic drain upon the State.

STATE DEPARTMENT.

So far no fire bricks are made in Wyoming. However, during the past few months this office received a number of inquiries in regard to the Kyanite deposits of the State.

The wonderful properties of Kyanite as a modern refractory do not appear to have been discovered until the past year. Accordingly, it has been found out that bricks made of Kyanite will withstand two cones of temperature higher than that of any other commercial refractive so far discovered. Its melting temperature of 3,400 degrees Fahrenheit permits the calcined mineral to be used for lining kilns and electric ovens in which the highest temperatures of modern metallurgical practice are produced.

Important discoveries of this rather rare mineral in a relatively high state of purification are frequently reported from both Wheatland and Encampment localities. At present mineral of similar purity appears to be sold at eastern points from \$50 to \$65 per ton after undergoing mining and preparation costs ranging from \$15 to \$20 a ton. In event the Wyoming deposits prove to be of commercial extent plants for the pulverization and calcination of this highly refractory material will certainly be erected in the Wheatland and Encampment localities. But before this office can supply reasonably conclusive information to correspondents on these and similar deposits, constantly reported, the services of one or more research ceramicists would have to be continuously employed first of all. At the present time this Department has no funds available to conduct extremely advanced chemical and pyrometrical tests of Wyoming material, the virtues of which so far remain largely undescribed in the latest scientific literature. For that and other reasons modern ceramic establishments that invade Wyoming must continue to finance their preliminary test and research work themselves. Obviously, the results of their expensive and time-consuming investigations are almost wholly of a private character.

ASBESTOS SHINGLE MILL.

During the past year capital was floated for the establishment of an asbestos shingle mill in Casper. The leading party of interest in

the enterprise is Mr. Fred Patee who has been a pioneer of asbestos exploration and development in the Casper region for many years past.

For raw materials the new organization will depend upon the extensive deposits of asbestos situated on Casper Mountain a few miles south of the city. In a bulletin published in 1911 the United States Geological Survey reached the conclusion that the Casper area seems destined to become a factor in the asbestos industry of America. Until the recent activities of Mr. Patee practically no steps were taken to exploit these unusual deposits in a commercial manner.

One factor that retarded development for so long a period is the shortness of fiber of the Casper deposits. Most all of the local deposits consist of fiber from $\frac{1}{8}$ to $\frac{1}{2}$ inch long, or lengths far too short to serve as the extremely valuable spinning fibers of commerce. However, in the past few years the monopoly that long has had complete control of the asbestos industry of America discovered that a most excellent type of shingle could be manufactured from their comparative worthless short fiber material. The superiority of the new shingle is already conceded, and during the past year the asbestos monopoly conducted a nationwide advertising campaign that doubtlessly led to vastly increased sales of their modern and costly roofing products.

The new shingles will be made under Patee's own patents exclusively. In the process it is understood that no attempt is made to separate the contained asbestos from the gangue rock. All of the material, as mined, is ground and pulverized into a matrix which is later casted and moulded into shingle squares by the aid of cementing solutions. As manufactured, the contained fiber acts as a mechanical binder and thereby sufficient additional strength and resiliency is imparted to the thin casting to permit its use as modern shingling material. In doing away with costly hand separations Patee maintains that he can produce asbestos shingles at a cost approximating 10% of the retail prices now established by his powerful competitors. At the present time Patee also claims ownership of countless thousands of tons of rock suitable for the manufacture of his asbestos shingles. As fully 99 $\frac{1}{2}$ % of the asbestos products consumed in the United States are of foreign origin, and in view of the many superiorities that have lately been recognized

in asbestos shingles as modern roofing material, Mr. Patee and financial conferees now appear to be opening up an exceptionally promising field of industrial activity. As the form of mineral deposits now being exploited is exceedingly rare in the United States, it is believed that the pioneer efforts of Patee and associates will receive the continued support of local financial interests.

BUILDING AND POTTERY CLAYS.

During the year the Cross Gas Company excavated and mined 4770 tons of clays and shales for the manufacture of their well known lines of drain and sewer pipes, floor tiles, face bricks, flue linings, and hollow blocks in their modern plant situated at Lovell. The finished wares of this firm are of the highest known standards and largely for that reason the fame and market for their ceramic products broaden widely in each succeeding year.

In their plant natural gas is used exclusively. Without that ideal form of fuel it would be impossible to obtain the sensitive temperature controls demanded for the manufacture of their products of superior merit.

GYPSUM.

A volunteer correspondent who has had exceptional investigational training in the past estimates that during 1927 approximately 42,000 tons of gypsiferous rock and soil was excavated in the Laramie district. All of this material was used in making plaster and gypsite products in the mills of the Overland Cement Plaster Company and of the Certain-teed Products Corporation located in the city of Laramie. Most of these manufactured products were likewise sold outside of the State. In the Laramie and other mills of the Certain-teed Corporation scattered throughout the United States, over a hundred different products, generally used in the building trades, are manufactured. By aggressive advertising and ultra modern selling methods the latter company has built up a distribution system of broad dimensions for the disposal of its products made in Wyoming and elsewhere.

In the Basin gypsum products in the form of stucco cement, building blocks, plaster board, floor and roof tiling were made for home consumption during the past year. So far no outside market has been developed for the enormous gypsum deposits of that district. Doubtlessly the next plaster mill that locates in Wyoming will select the rapidly growing Basin region as a logical site.

New uses for gypsum are constantly being reported. During the past year a process appears to have been developed abroad for the conversion of gypsum into sulphuric acid as well as into soluble ammonium sulphate. If the final tests show that the process can be exploited commercially, the widely distributed gypsum beds of Wyoming will provide exhaustless raw material of the highest purity for the establishment of giant chemical and fertilizer industries.

MINERAL PIGMENTS.

The most valuable pigment material manufactured in Wyoming is carbon black made entirely by subjecting natural gas to a process of incomplete combustion. The plants at Lance Creek and Riverton annually produce about 2,000,000 pounds of carbon black, worth approximately \$100,000. That output is sufficient to rank Wyoming in fifth place among the carbon black producing states. It may also interest taxpayers to know that every pound of this production is sold entirely outside of the state.

Another material manufactured on a large scale in Wyoming that frequently finds its way in the paint industry is asphaltum. Under the road material section of this report the large amounts of asphaltic sales and exports made by the Midwest refineries in 1927 is fully reviewed.

During the past month four car loads of bentonite were shipped from Cody to a large paint works in the east with a view of ascertaining its suitability as filler material. In event the test shipment will prove satisfactory a new market will be created for the extensive bentonite deposits of the State. Other pigment materials recently shipped from the State in car load lots or less include products as widely dif-

ferent as graphite, terra alba (ground gypsum) barytes and ground mica.

From our soft iron ore deposits at Rawlins, Hartville and elsewhere, beautiful shades of red, brown and yellow ochers can be obtained in unlimited quantities. As our infant ceramic industry expands a domestic demand will be created for these ochers in the manufacture of additional color lines of ornamental bricks, tiles, asbestos shingles and other building products typical of modern Wyoming.

From our chrome and titaniferous iron ore deposits far more modern and valuable lines of brilliants and enamels will doubtlessly be manufactured in course of time. So far no complete study has ever been made of the mineral pigments of Wyoming. Merely to catalog the character and extent of these multifold and widely distributed resources would require the entire time of my force for many months to come. In the meantime my office views with alarm the scale on which the largest paint manufacturing corporation of America has recently been exploiting European titanium deposits of lesser magnitude than the Iron Mountain ore body with the view of controlling future world markets of these newly discovered pigments.

BENTONITE.

Two plants for the pulverization and refining of bentonite continued operations throughout the year in Wyoming. The markets for their products are apparently expanding. Owing to the fact that the management of the local companies have to develop their own markets, and inasmuch as their sales are not disclosed, no statistics are available on their productions for the past year.

So far over 100 uses have been discovered for the remarkable mineral, bentonite. Unfortunately, as soon as a new use is discovered some scientist or near scientist immediately proceeds to patent the discovery with the expectation that some nationwide industry will soon reward him with royalty tributes of truly exorbitant magnitudes. That line of procedure has seriously interfered with the plausible development of the mineral; but inasmuch as the patents on all of these unexploited processes will expire in due course of time, it is probable

that the next decade will witness a decided increase of bentonite operations within the State. Fortunately, the Wyoming deposits are of ample magnitude to take care of all possible expansion regardless of how many additional uses may be discovered for the mineral in all years to come.

GLASS MAKING MATERIALS.

An increasing demand is constantly arising for the products of the Salem Co-operative Glass Company. During the year the company made no less than 32,000 boxes of window glass in their Lovell plant. That record breaking production was shipped to points as far east as Minneapolis and as far west as the Pacific Coast ~~points~~. New lines of glassware are constantly being added to their production schedules and to satisfy the widening market the pioneer glass works of Wyoming is at last being operated under full blast.

During the year the Chamber of Commerce at Laramie transferred valuable deposits of glass sands, limestones and sodas to a powerful member of the Vanderbilt family. All of those remarkable deposits exist in an extreme state of purification within a few miles of the city limits, and as they describe all of the ingredients that go into the complete glass furnace charge it would appear that the strong financial interests who finally purchased the unusual deposits will not delay their development much longer. In order that all lines of ceramic deposits of the Laramie region will be developed in an interlocking manner, and also, to make the city a capital of the ceramic industry in America, live wire members of the Chamber of Commerce will doubtlessly see that a substantial glass making industry will also be established in their most remarkably favored city at the earliest practical date.

SAND AND GRAVEL.

Every town and city in the State is either underlain or else situated near deposits of sand and gravel. These deposits are of sufficient magnitude to take care of any possible expansion that may occur in the structural or building trades in the future.

The great consumer of these lowly materials is the 3023 mile long Federal Aid Highway System started in 1917. At the present time

about 200,000 yards of sands, gravels and crushed rock are annually used for surfacing material on this semi-completed modern road system. Much of this material is taken from pits and quarries situated on or directly adjacent to the new road construction.

Every mile of the 1922 miles of railroad constructed in the State is ballasted with Wyoming material. A total mileage almost as long situated outside of the State is also constructed of the same material. For ballasting their road bed as far east as Omaha the Union Pacific annually excavates many thousands of tons of disintegrated granite from their Sherman Hill borrow pits. For their lines in Utah gravel is dug from the Irvine pit located at Green River. At the present time \$50,000 is being expended in opening up a new pit in that city that will provide an additional shipment of 700 tons daily.

To stimulate further development the State Public Service Commission announced during the past month that the railroads reduced their rates on sand and gravel shipments in this State approximately 40%. That aid denotes increased expansion in a rapidly growing industry largely financed by Federal highway funds as well as by out-of-state sales and shipments.

MODERN ROAD MATERIALS.

On completion of the Laramie cement mill Wyoming will be among the two or three states of the Union that will produce a superabundance of all materials used in every type of modern highway construction. These materials will include manufactured bricks, cements and road oils, as well as both natural and manufactured asphaltic products.

Our extensive deposits of asphaltic sandstones provide first class surfacing material in their raw form. Due to the isolation of these deposits, as well as their inability to compete with the pure asphaltic bi-products of our refineries, the natural deposits have so far remained undeveloped. Logically, development of these unusual mineral reserves must await the increased road expansion programs of the future.

During the past two years 50 miles of highway in the Casper and Laramie districts were treated with road oil. This work has received

so much favorable commendation that increased mileages in both of those refinery areas will soon receive similar treatment. At the present time the Poison Spider and Warm Springs fields appear to produce the best quality of asphaltic base crude oils. In 1927 the Midwest Company shipped and delivered no less than 1,200,000 gallons of asphalt oils from their Wyoming refineries. All of this road oil was sold in the Rocky Mountain region and nearly all of it was consumed at points beyond the State boundaries.

All of our cities are rapidly completing the paving of their streets. Among those that began pavement proceedings during the past year were Laramie, Rawlins, Rock Springs, Kemmerer and Evanston.

So far but 36 miles of the State Highway System has been paved. In the future long mileages of these roads will doubtlessly be paved with modern asphalt and concrete material, all of which will be made right here in Wyoming, exclusively.

According to recent report kindly submitted by the Midwest Refining Company, their shipments and deliveries of asphalt from their Wyoming refineries in 1927 will approximate as follows:

Rocky Mountain territory (Wyo., Colo., Mont., etc.)	- 5,600	tons
East of Rocky Mountain territory, except Nebr.	- 15,500	"
Nebraska	- 2,425	"
Canada	- 825	"
Total	- 24,350	"

The foregoing figures plainly disclose that before Wyoming can consume the greater portion of her manufactured asphalt production, the population of the State will have to be multiplied at least tenfold. Precisely similar remarks apply to practically all of her mineral products, irrespective of all contrary propaganda current to buy or sell only home made goods. As a matter of fact, due almost exclusively to our giant oil industry, Wyoming is already one of the big export states of the Union.

LIMESTONE.

Throughout its period of pioneer development no market or demand existed for the limestone of Wyoming. However, at the present time new demands and uses are constantly being created for these exhaustless deposits.

Since the Federal Aid Highway System was started 10 years ago large amounts of limestone in the form of crushed rock have annually been used in surfacing our improved highways. Also during the past decade many sugar refineries were erected in Wyoming as well as in the adjoining states of Nebraska, Montana and Colorado. For their refining operations the sugar mills of these four adjoining states now annually purchase from the Wyoming quarries 200,000 tons of limestone of required purity at a price of not less than \$1.50 per ton at the quarry.

The Ingleside Limestone Company, a Colorado corporation, is by far the greatest producer and marketer of sugar refining limestone in Wyoming. During 1927 the following record breaking shipments were made from their widely distributed quarries in the State.

Granite Canon, Wyo. - - - - -	7,788.07	tons
Altus, Wyo. - - - - -	14,671.22	"
Horse Creek, Wyo. - - - - -	72,048.98	"
Spence, Wyo. - - - - -	7,418.72	"
Guernsey, Wyo. - - - - -	65,542.46	"
Total - - - - -	167,469.45	"

All of the foregoing production was bought by the largest beet sugar refining company of the Rocky Mountain area. Most of the mills of the latter corporation are situated in states adjacent to Wyoming and into which shipments of superior limerock can be conveniently made from the strategically located quarries of Wyoming.

As other new industries are established in Wyoming the demand for limestone will be multiplied many times. Already the limestone consumption of our pioneer glass industry is of appreciable magnitude. Incidentally, the law passed by the last legislature requiring coal mine operators to dust their mines with rock powder created a new domestic demand for Wyoming limestone. Moreover, as soon as the new cement mill starts operations at Laramie early next summer, an additional one-half million tons of limerock will be pulverized and calcined annually by that plant alone.

In either the raw or calcined state, lime is one of the basic ingredients consumed in over one hundred different metallurgical, chemical and technical industries. In course of time the vast limestone deposits of Wyoming are bound to attract more of these modern industries. At the present time none of the Wyoming limestones are used for lime burning or for smelting fluxes. But as soon as chemical, fertilizer and steel making

industries are established in the State additional demands of wide extent will be created for these limestone deposits.

OIL SHALE REFINERY.

Noteworthy among pioneer developments of the year was the completion of the oil shale refinery of the Wyoming Oil Products Company at Green River. Extractions as high as 40 gallons of oil to the ton are already reported for the richest shales so far treated in the first completed unit of the new refinery.

The new venture at Green River is the first oil shale refinery constructed by private capital in America. It consists of a completely equipped unit in which 50 tons of shale can be treated daily by the superheated steam processes covered by the Trumbell patents. In event the long predicted shortage of flowing oil ever occurs in the United States, other costly units will be added to the refinery as marketing conditions improve. As the recoverable petroleum in the local shales has been estimated to be of sufficient volume to supply the world for the next 200 years to come, it is apparent that the owners of the pioneer Wyoming refinery have but little fear of the specter of oil exhaustion as long preached by schools of alarmists and conservationists.

IRON ORE.

During the year the Colorado Fuel and Iron Company shipped from their Sunrise mine 603,334 tons of iron ore, valued at \$2.50 per ton, to their blast furnaces situated at Pueblo, Colorado. That record production would have been even larger if the strike in the Colorado coal fields had not seriously interfered with the smelting operations of the company towards the close of the year. For mining this ore, as well as the overburden rock, a total force of 550 men, working in three eight-hour shifts each day, was employed.

No development work was done in the two remaining iron ore fields of Wyoming. However, during the year the government finally completed a geologic survey of the Seminoe Mountain field. The long delayed report on those extensive deposits is daily awaited with increasing inter-

est.

The largest known deposit of titaniferous iron ore in the world is situated in the Platte River valley at Iron Mountain. Until 1927 no way was known to exploit such highly refractory deposits in a commercial manner. But during the past summer the National Lead Company purchased and began the development of a titaniferous ore body in Norway on a large scale. To reduce the extremely refractory titaniferous ore, no temperature short of that produced in the electric furnace will suffice. By the sale of bonds to the American public one of our largest international banking groups has already financed operations for the electric smelting of iron ore in Japan with a highly gratifying degree of success. As soon as the powerful hydro-electric resources of the North Platte River are finally hooked-up it is believed that the vast financial interests of Wall Street will look upon the Iron Mountain deposits with equally as much favor as those situated in even more distant Norway or Japan.

In variety, quality or quantity the iron ore reserves of Wyoming are far superior to those found in any state west of the Mississippi River. In event an iron industry of magnitude is ever established in this major area of the United States, the known reserves of Wyoming are bound to receive first consideration.

GOLD, SILVER, PLATINUM,
ETC., ETC.

Almost weekly throughout the year, your paper and other members of the Associated Press in Wyoming and adjoining states reported the discoveries of gold, silver, platinum, radium, copper, tin, lead, zinc, manganese, chromium, vanadium, uranium, bismuth and arsenic minerals in both the older and newer mining districts of Wyoming. The less said about these discoveries, the better it will be for all concerned. As a matter of fact, at the present time this office has no funds available to confirm or deny the validity of the numerous discoveries reported weekly by the loyal Wyoming press.

COAL.

In 1927 approximately 6,400,000 tons of coal were mined in Wyoming. That production is about 100,000 tons short of the previous year but the gross sales receipts appear to exceed the total of \$17,827,000 netted in 1926.

At the present time almost all of the leading cities and towns of Wyoming burn gas for house heating fuel. The ability of the large coal operators of Wyoming to meet this serious and constantly increasing loss of domestic business is only appreciated by a few of our citizens. To continue former production schedules the progressive operators have by this time completely mechanized most all of the important mines of the State. In lieu of the extremely toilsome labor of yesteryear, vast tonnages of coal are now mined in Wyoming with slightly more human effort than that required to turn on air valves and electric switches. This modern machine installation was exceedingly costly, but as now equipped, the daily production per man of our mines has been greatly augmented. As a matter of fact, with the present installations the big operators could easily double the coal production of the State.

Against the apparent extinction of the household heating market in Wyoming, the year of 1927 finally offered at least one promising solution. For pulverizing and calcining at prodigiously high temperatures a half million tons of limerock in the new cement mill at Laramie fully 200,000 tons of coal will be annually consumed. After conducting investigations for 5 years in many states the president of the cement company discovered that coal could be obtained in Wyoming at a lower cost than any place he ever heard about. For cement making and many other industrial pursuits coal is still the preferred fuel. As soon as other equally alert executives carry on similar economic investigations an industrial demand of wide dimension will originate directly within the State for our coals.

Noteworthy among pioneer developments of the year was the starting of 2 strip-mining operations. One of these locations is in the Gillette field and the other is in the opposite corner of the State

in the Point of Rocks area. At both of those locations wide seams of coal will be loaded directly on the railway cars with steam shovels as soon as those deposits are stripped of shallow overburdens. For excavating coal at the lowest possible cost no method can approach the steam shovel operations now under way in Wyoming.

In the future many similar stripping operations will be started in Wyoming. The coals recovered from such cheap processes must necessarily be of inferior quality. But when such rapidly slacking fuels are pulverized into fine powder and mechanically fed in gaseous form with the aid of compressed air they produce far higher heats than the best coals do when fired in the common highly wasteful form. During the past year many large power houses in the east altered their boiler plants to burn the far more efficient mechanical gases in lieu of the long used solid fuels. Also, toward the close of the year, some of the leading steamship lines of England took steps to abandon their recently installed oil burning boilers in order that their costly fuel bills at sea would be cut in two by the use of the coal dust combustion system. In other industrial lines old King Coal is also threatening to stage a come-back against his more youthful and inexperienced rival and usurper.

At no time did the future of the Wyoming coal industry offer as much promise as today. At the present time far more costly and scientific research investigations are being conducted on lignite coals, typical of the exhaustless Wyoming deposits, than on any single material extant. In the past 15 or 20 years European powers have expended many millions of dollars to extract the multifold forms of truly titanic energies at last surrendered by these lowly fuels. Already the findings of their experiments have exceeded even the dreams of the alchemist and perpetual motion fan of the archaic past. To conduct the world war the blockaded group of powers were compelled to rely on their little esteemed lignite deposits for their entire gunpowder supply. Moreover, to obtain United States patent rights to an even more sensational discovery, a billion dollar oil corporation of America was required to finance, during the past year, one-fourth of the cost of an experimental plant in which 30,000 men are now employed abroad.

Examination of international patent records now discloses some 200 different processes in which inferior coals are burned in more efficient manner. During the past year some of these processes have played havoc with operations in the Pennsylvania anthracite field in which the purest form of coal occurs in the United States. However, space in this paper only permits the mention of those two most revolutionary methods in which the molecules of solid coals are broken down and transformed to either the simpler liquid or gaseous forms by synthetic and catalytical activations that are rather too involved and elaborate to warrant undue reference herein.

The more perfected and widely known of these two processes calls for the almost complete liquefaction of low-grade lignites under the Bergius patents. So long as the overproduction of crude oil continues from our wells no economic reason can exist to exploit this new process in America. As a consequence the process proves far more attractive to nations like Germany, France, England and Canada which have all lately seen fit to start liquefaction plants of their own in order that they could make their own supplies of motor oils. But to insure America against possible shortages of similar fuels in the future, our largest Standard Oil unit finally acquired the valuable patent rights that cover the new process for this country.

Just like wonderful Wyoming, metropolitan centers of progress and culture in the east have lately demanded increasingly large volumes of gas for domestic fuel consumption. To satisfy the widely expanded markets research workers have been compelled to generate increasingly large volumes of gas from eastern coals. As matters now stand, the problem of outstanding importance to the artificial gas industry is that of complete gassification of coal on the grand scale. Today that problem appears nearer to solution in England than with us.

No recent phase of the public utility industry shows greater expansion than the artificial gas field. Along the Atlantic seaboard high pressure gas mains for long distance transmission are now being installed in much the same manner as interconnection of electric power systems has been effected during the past few years. In those conduits

transmission of gas in great volumes is claimed to be less costly than the transport of coal by rail to local gas works. In this respect it may pay to watch the development of projects in Germany for concentrating in the single Ruhr coal field the entire gas industry of the country and effecting nationwide distribution through the network of high pressure mains leading therefrom. In event the fuelless metropolises of the Missouri and Mississippi valleys should demand similar service the nearer coal fields of Wyoming would prove to be logical sites for gas processing plants of like magnitudes. Perhaps in less than a generation the present methods for shipping coal to be burned in its raw state under boilers hundreds of miles from the mines will appear to be as primitive and rudely unscientific as whatever practices the cavemen used to heat and light their unostentatious places of abode.

As civilization advances and becomes less toilsome increasingly greater drafts must be made on the energies contained in the exhaustless lignite deposits of Wyoming. To insure its safety from foreign attack, as well as the continued vitality of its fertile soils, America can no longer delay the establishment of its own nitrate industry. In the many discussions recorded during the year in the Wall Street Journal as well as in other financial and scientific publications of similar standing, all writers agreed that the success of this giant industry of the future will be more dependent on cheap coal supply than on any other material factor. In 1927 at least one large coal-consuming industrial concern ascertained to its own satisfaction that coal could be obtained in Wyoming at costs far lower than those known in any other state. Due to economic findings, so conclusive in character, American bankers may finally be prevailed upon to float a bond issue for the construction of a national nitrate powder works right here in Wyoming. As matters now stand, our financiers have so far provided the public with opportunities to invest only in the nitrate plants and fields of the European, Asiatic and South American continents alone. Sad to relate, the Wyoming investing public probably subscribed its full quota on the big European nitrate issue underwritten and sold during the closing months of the year by the single banking corporation of America.

whose assets vastly exceed one billion dollars. In the opinion of this office, until America can equal other nations in making their own war-waging powders, the form of foreign bond buying described would appear to be the most dangerous of all buying-away-from-home movements so far exposed and censured by the local press.

HYDRO-ELECTRIC DEVELOPMENT.

In all probability future historians will record the completion of 2 hydro-electric developments as the most outstanding advancement consummated in Wyoming during 1927. For some unknown reason that modern form of potential energy has been permitted to remain idle in Wyoming for an undue period of delay. However, during the year the government completed at their own expense a power plant at Guernsey developing 6800 horse power from the impounded flow of the North Platte River, and a few miles above Cody, a small power unit generating 2200 horse power was constructed at the foot of the famous Shoshone dam of the Reclamation Service.

Before construction had ended at each site, numerous cities of the State began to clamor for more than their due share of power allocations therefrom. Obviously, not all of these cities could be accommodated, but in order to appease their future anxieties, it may be safely mentioned that our present statesmen will not rest content until deeply obligated federal agencies will finance and construct power development in Wyoming at least 20 times as great as the pioneer operations completed in 1927.

As now constructed, both of the new hydro-electric developments merely represent supplemental possibilities of immense irrigation projects long ago completed by the Reclamation Service, apparently with the view of reclaiming lands alone. As a matter of fact, in recent years the Reclamation Service has experienced a decided slump in the market for their high cost irrigated lands; but in states that have vast undeveloped mineral resources, like Wyoming, no shortage of market will ever exist for all of the seasonal or permanent hydraulic power

that can be developed from these giant projects of the government. In course of time those more popular markets will duly impress the officials of the Reclamation Service; and largely at their own initiative, more power may be developed to satisfy the crying demands of the present municipalities of Wyoming. To operate the new completion at Guernsey it is necessary to release sizeable volumes of water the year around at the Pathfinder dam. By merely constructing a power house at the latter site, the same release of water would duplicate the existing power development at Guernsey. Moreover, as soon as the supplemental Alcova-Casper irrigation unit is completed, the present hydraulic development on the North Platte would be more than triplicated by the highest of all permanent heads that would be created by the construction of the 133-foot high diversion dam required at the Alcova Canon site.

In spite of the simplicity of calculations involved by the preceding hook-up, a federal functionary recently published in a departmental water supply bulletin his opinion to the effect that it would be "impracticable to generate power at this (Alcova) site." Apparently, the scientist who filed the quoted conclusion is still unconscious of the fact that the single county in which all of the Casper-Alcova project will be located has already paid into the Treasury of the United States mineral royalties not only sufficient to prepay the entire cost of the power-irrigation project, aforesaid, but also a remaining sum more than twice sufficient to repay the original cost price of that great empire and bread basket of America known as the Louisiana Purchase and which the included county happens to be an almost invisible, infinitesimal part thereof. Manifestly, in lieu of preaching programs of indolent negation the great State of Wyoming is entitled to receive consideration of a more constructive character on the part of federal experts who have long enjoyed the privilege of appraising its vastly undeveloped power resources in whatever free and unmolested manner their personal fancies might have dictated.

Moreover, in appraising the hydraulic resources at the Alcova location, sight was also lost of the fact that every second foot of water diverted for the reclamation of project lands in lower Wyoming and all of Nebraska would necessarily have to fall over the high di-

version dam proposed at that site. As those lower lands of the government project exceed over 200,000 acres, it is apparent that their continued reclamation would generate a hydraulic development at the 133-foot high Alcova barrier of not less than 30,000 horse power, throughout the length of the irrigation season. In this age such seasonal development could be entirely consumed in reducing the highly refractory titaniferous iron ore deposit situated in the local river valley in the hydro-electrical manner that American capital developed a similar deposit abroad during the past year. Moreover, as all of the great iron mines of the United States only operate in the summer months, it may be possible to expedite the time when similar seasonal operations can be conducted in Wyoming at a profit.

In regard to future hydraulic development, it is clear that Wyoming still retains title to all of the power resources that can be generated from her high gradient river courses. In deeding water resources, formerly owned ~~in fee simple~~ ^{by Wyoming,} to other states, only the irrigating values of those waters were apparently considered. Taking into account the manner in which the government has vastly enriched the taxable lands of other states, solely at the expense of water gratuitously deeded by the sovereign State of Wyoming, certain federal agencies are morally obligated to develop the still intact power resources of our streams.

In the minds of many citizens, the preceding conclusions prevail whether or not the mineral royalties already paid by the single State of Wyoming for the explicit object of promoting irrigation development throughout the arid west are of sufficient size to finance all local projects only once or even 10 times over. To prevent further retardation of industrial development in cities that would be served by combined power and irrigation projects, long proposed, it is clear that the day has arrived for the citizens of Wyoming to receive strictly modern cooperation from the hydrographic appraisers in the employ of federal bureaus.

During 1927, or the first year of his administration, no single problem received more attention from the Governor of Wyoming

than the proposed development of the Colorado River basin. As yet few people have any complete concept of the benefits that will accrue to the State when that exceedingly complex problem is finally solved. In the way of hydro-electrical development, alone, proposals under consideration call for the construction of a huge dam across the Green River tributary at the Flaming Gorge site that will create an immense lake reaching from Green River city to a point 4 miles south of the State line. From that impoundage a stabilized flow could be released over a 290 foot head sufficient to generate no less than 71,000 brake horsepower the year around. In point of size the proposed development would only be exceeded, among the existing completions, by those situated along the Niagara and Mississippi rivers. At the latter points the harnessed stream channels are already bordered by long lines of industrial establishments. Accordingly, it is reasonable to believe that much the same scenery will be depicted in southwestern Wyoming as soon as the vastly important problem of Colorado River interstate development is finally solved.

MINERAL FERTILIZERS.

During the year approximately 7500 tons of calcium phosphate was mined in the Cokeville district and shipped to California as a mineral restorative for the high cost fruit-growing lands of that State.

In Wyoming all soils seem to carry an unusually high content of phosphate, nitrates and potashes, or the three mineral energizers that are alone absorbed by plant life in attaining its structural growth. Under such favorable circumstances many years will pass before our extremely fertile lands can possibly require any of the three mineral fertilizers known to exist in complete and exhaustless quantities only in one single locality in the world. Incidentally, that locality lays in southwestern Wyoming between the cities of Rock Springs and Cokeville.

For many years the nitrate and potash production of the world were perfected monopolies conducted exclusively by two foreign govern-

ments. To sustain the fertility of their soils eastern and southern planters were long compelled to pay extortionate tributes in the form of the export duties that those governments collected on the fertilizer products that were shipped from their shores. In recent years science has, however, devised other means to obtain those vital fertilizing minerals, and instead of going to Chile for all of their nitrates, the production of artificial nitrates in Europe, during 1926, was 3 times as great as that of the soulless mineral monopoly that lately thrived unmolested in the distant South American Republic mentioned.

Until recently, virtually all of the potash of the world was obtained from the deep brines of Germany. However, in the past few years Italian scientists have devised a method to extract not only potash, but also, metallic aluminum and pure gelatinous silica from the leucite lava flows emitted by the Mt. Vesuvius volcano. Leucite is an extremely rare lava flow, and outside of Italy its presence is confined to that part of the Rock Springs region known as the Leucite Hills. There it forms the entire content of those spectacular and bizarre volcanic necks and knobs commonly known as the Pilot Butte, Boar's Tusk, Zirkel Mesa, Steamboat Mountain and the like. So far as known, that exhaustless material has the identical potash and aluminum content found in the Italian lava.

During the world war when potash prices went out of sight, an attempt was made to work the local leucite deposits wholly for their fertilizer content. The rock proved so refractory that the venture was a complete failure. The modern Italian process involves first of all an electro-magnetic process to concentrate the mineral values in the base rock to double strength. That process calls for a considerable consumption of electric current, and to reduce the aluminum minerals to a metallic state, no temperatures short of those produced in the electric furnace will suffice. Obviously, the abortive attempt made to work this extremely refractory rock in the pre-hydro-electrical era of the district was doomed to certain and complete failure.

To obtain the energy necessary to transform the free nitrogen of the atmosphere into the combined form required by plant life, no

sources of Wyoming
Industrial corporations, as well as commercial boards, public libraries
and private individuals with a reference work for which a seem

being opened a few miles east of Rock Springs by steam shovels. To date similar deposits of fuels were alone found sufficient to start big nitrate industries in foreign countries. For starting a similar industry in the Rock Springs area two other extremely formidable inducements are offered. One of these is potash and the other is phosphate. With both of those salts the nitrogen radical combines, and in each case, the resultant product contains two instead of one of the chemical elements consumed by organic life.

It has long been established that the energy content of these double salts is twice that of any single mineral fertilizer ordinarily sold in commerce. The former products are the kind that can stand the long freight hauls of international commerce. Possibly, in course of time some billion dollar aggregation of capital may find it more expedient to chemically combine nitrogen, potash, and phosphate products wholly within the Rock Springs area, than to import the several materials in the raw form from countries as widely separated as Germany and Chile.

John G. Mearns,
State Geologist,
Cheyenne, Wyoming.

Jan'y 19, 1928

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sources of Wyoming it will finally be possible to supply ~~mining~~
industrial corporations, as well as commercial boards, public libraries
and private individuals with a reference work for which a seem'

MINERAL PRODUCTION FOR 1926

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During the past week the Federal Bureau of Mines released the final figures on the mineral production of all States of the Union for the year 1926.

For Wyoming, the record breaking sum of \$78,988,000.00 was attained. That total is \$243,000.00 higher than 1925, which heretofore was the banner year for mineral production in the present decade.

Geographically, the preceding total is extremely enlightening. For many years past Colorado has been looked upon as one of the greatest mining States of the Union. In 1926 the mineral production of Wyoming exceeded that of Colorado by over \$13,000,000.00. Moreover, the Wyoming production came within a million dollars of the total recorded for Montana during the year 1926. Few people fully appreciate the ability of Wyoming to make so favorable comparisons against the premier gold and copper producing States of the Nation. As a matter of fact, the showings of our larger and far more populous neighbors would offer far less favorable contrasts if recent discoveries of oil and other fuels, typical of Wyoming deposits, had not been made within their boundaries.

Historically, the latest production total is more assuring than any previous record. Five years has already passed since the far famed Salt Creek oil pool reached its maximum peak production. In 1923 the aggregate output of the field was 35,300,000 barrels, but even in that banner year the sum total mineral production of the State was short over one and one quarter million dollars of the figure recorded by the Government statisticians for 1926. To continue to presume that all mineral values of Wyoming are derived from one product, or even from a single oil structure, is obviously a great mistake. In truth and in fact each succeeding year discloses a more complete and varied range of products mined and recovered within the boundaries of our State.

In all probability, many years will pass before another Section 36 will occupy the heart of an oil field as large and lasting as the Salt Creek pool; and from which a princely royalty as high as 65% can be exacted for the direct support of the State-wide school system. To offset that declining

MINERAL RESOURCES OF WYOMING 1938

revenue, other pools must be discovered elsewhere in the State. At the present time, the new Oregon Basin field offers more promise than any structure brought in since the discovery of Salt Creek.

The latest figures of the Government disclose that the production of minerals is still the largest industry of Wyoming. This leading position is constantly being strengthened by new development. The completion of the new cement mill at Laramie, this year, will augment the future mineral production of the State by two million dollars annually. Other new development in the way of brick works, gypsum and plaster mills will also swell the annual total to an appreciable extent. While the exploitation of these hitherto latent ceramic resources will yield no royalty tributes to the treasury of the State, nevertheless, localities in which such development is started are assured of greatly increased sources of revenue in the future.

At the present time, title to the mineral rights of fully 75% of the area of the State remains separately or jointly in either the hands of the Government or the State, itself. Included in this vast area are potential oil structures, as well as no less than 19,000,000 acres of lands known to be underlain with profitable coal seams. As the properties of existing coal mining companies are worked out, additional acreages of these publicly owned lands will have to be acquired from time to time. The acquisition of these adjoining areas will be made almost entirely under the mineral leasing acts of either the Government or of the State. In either case, increased royalties from coal mining operations should be received by the State Treasury in each succeeding year.

Another source for prospective royalties is the large leucite deposits situated near Rock Springs. Locked-up in these deposits are virtually exhaustless tonnages of potash, an indispensable fertilizing mineral for which America is still almost entirely dependent on foreign supplies for its requirements. Abroad, considerable progress has recently been made towards the recovery of potash contained in precisely similar leucite deposits. If the Potash Bill of Representative Winter passes the present Congress, some practical means may at last be evolved to exploit the huge deposits of Wyoming in a profitable manner.

If these pioneer efforts are rewarded with a practical solution, the future potash royalties and monopolies of Wyoming would vastly exceed the sum-total of all oil royalties received to date.

The latest official figures places Wyoming in the twentieth position among the major mineral producing States of the Union. As a sole or joint owner of known mineral producing lands of unprecedented extent, Wyoming still remains in a class by itself. In the past the public domain of Wyoming has paid 75% of all mineral royalties received by the Federal Treasury. In the future, Wyoming's allotment of 37½% of these funds should be found sufficient to finance the construction of many more school buildings and additional miles of highway. As a private and joint royalty holder of vast mineral production, the latest statistics indicate that Wyoming will continue to lead all other States, separately or collectively, for many years to come.

In conclusion, it may be of interest to record that the per capita mineral production of Wyoming is still the largest in America. Apparently, the second position that our highly favored citizens enjoy in per capita wealth is, likewise, still secure.

Total Quantity of Coal Production in Wyoming in Tons

1865-	800	1933-	7,575,031	
1866-	2,500	1934-	6,757,468	
1867-	5,000	1935-	6,553,232	
1868-	6,925	1936-	6,512,288	
1869-	49,382	1937-	6,753,656	
1870-	105,295	1938-	6,571,683	
1871-	147,328	1939-	6,704,790	
1872-	221,745	1940-	6,088,133	
1873-	259,700	1941-	4,993,686	
1874-	219,061	1942-	4,170,963	
1875-	300,808		1933-	4,013,167
1876-	334,550		1934-	4,367,961
1877-	342,853		1935-	5,177,142
1878-	333,200		1936-	5,780,590
1879-	400,991		1937-	5,918,359
1880-	527,811		1938-	5,203,877
1881-	628,181		1939-	5,383,000
1882-	707,764		1940-	5,808,042
1883-	779,689		1941-	
1884-	902,620		1942-	
1885-	807,328			
1886-	829,355			
1887-	1,170,318			
1888-	1,481,540			
1889-	1,380,947			
1890-	1,870,366			
1891-	2,327,841			
1892-	2,503,839			
1893-	2,459,311			
1894-	2,417,463			
1895-	2,246,911			
1896-	2,229,624			
1897-	2,597,886			
1898-	2,863,812			
1899-	3,837,392			
1900-	4,014,602			
1901-	4,485,374			
1902-	4,429,491			
1903-	4,635,273			
1904-	5,178,556			
1905-	5,602,021			
1906-	6,133,994			
1907-	6,252,990			
1908-	5,489,902			
1909-	6,393,109			
1910-	7,533,088			
1911-	6,744,864			
1912-	7,368,124			
1913-	7,393,066			
1914-	6,475,293			
1915-	6,554,021			
1916-	7,910,647			
1917-	8,575,619			
1918-	9,438,638			
1919-	7,219,738			
1920-	9,630,271			
1921-	7,200,666			
1922-	5,971,724			

ESTIMATED VALUE OF MINERAL PRODUCTION FOR 1929
FOR THE STATE OF WYOMING

Clay products	\$ 300,000.	
Clay, raw	350,000.	
Coal	18,250,000.	
Gold	1,500.	
Gypsum	(a)	
Iron ore	(a)	
Lime	1,000.	
Natural gas	4,000,000.	
Natural gasoline	3,000,000.	
Petroleum	23,000,000.	<i>28,600,000</i>
Phosphate rock	30,000.	
Sand and gravel	500,000.	
Sodium salts	(a)	
Stone	500,000.	
Miscellaneous, including (a)	<u>1,067,500.</u>	<i>567,500</i>
	\$56,000,000.	<i>+ 100,000</i>

ESTIMATED VALUE OF MINERAL PRODUCTION FOR 1927, 1928 AND 1929
FOR THE STATE OF WYOMING

	<u>1927</u>	<u>1928</u>	<u>1929</u>
Clay products - - - - -	\$ 101,708.00	\$ 300,000.00	\$ 300,000.00
Clay, raw - - - - -	121,163.00	350,000.00	350,000.00
Coal - - - - -	18,152,000.00	18,250,000.00	18,250,000.00
Gold - - - - -	1,200.00	1,500.00	1,500.00
Gypsum - - - - -	(a)	(a)	(a)
Iron Ore - - - - -	(a)	(a)	(a)
Lime - - - - -	600.00	1,000.00	1,000.00
Natural Gas - - - - -	3,269,800.00	4,000,000.00	4,000,000.00
Natural Gasoline - - - - -	2,899,000.00	3,000,000.00	3,000,000.00
Petroleum - - - - -	29,830,000.00	28,000,000.00	28,600,000.00
Phosphate Rock - - - - -	29,000.00	30,000.00	30,000.00
Sand and Gravel - - - - -	494,065.00	500,000.00	500,000.00
Sodium Salts - - - - -	(a)	(a)	(a)
Stores - - - - -	431,104.00	500,000.00	500,000.00
Miscellaneous, including (a) -	<u>958,120.00</u>	<u>1,067,500.00</u>	<u>567,500.00</u>
Totals	<u>\$56,166,600.00</u>	<u>\$56,000,000.00</u>	<u>\$56,100,000.00</u>

Seventh	Gas Production	45,539,000,000 cu. ft.
	Iron Ore Production	630,387 tons.
Eighth	Area	97,914 sq. mi.
Ninth	Coal Production	6,738,561.57 tons
Tenth	*Gypsum Production	(See Footnote)
	Hydro-electrical Potential	1,182,000 H.P.
Tenth Twelfth	Copper Production (To date)	31,673,157 lbs.

- *Cannot publish statistics without disclosing operations of private concerns.
**Unless otherwise stated, all production statistics are for last available year.
***To Nov. 1, 1928.

Manifestly, the foregoing tabulation is far from a complete work. To calculate the colossal coal content of Wyoming required more than 25 years of hard labor on the part of the United States Geological Survey. Other estimates heretofore filed on the gold, iron ore, petroleum and other important reserves typical of Wyoming were found on examination to be of too subtle character to receive any mention whatsoever in foregoing table of comparative ratings.

Good reasons exist for the belief that Wyoming leads all states in deposits of asbestos as well as divers sorts of sodium and magnesium chemical salts. Originally, it was intended to include these and some other minerals under the No. 1 listing of preceding tabulation. Finding all investigational work to be of a fragmentary order, sufficient authorities could not be cited to warrant the listing of these valuable minerals under any number of preceding tabulation.

As years pass and as more definite information is collected, more and more listings can be added to the purely preliminary tabulation, hereinbefore recorded. Moreover, as Wyoming and adjoining states grow, a broader market will be created for the leading mineral products of Wyoming. Such development will decidedly advance the extremely high production ratings already achieved by Wyoming.

A vast amount of work remains to be done before either the inherent or unfolded values of Wyoming can be expressed by any comparative set of statistical ratings. At present, manifold factors are operating that will assume ^{the} preparation of more extensive and conclusive rating charts in the future.