

PROPERTY OF  
HORACE D. THOMAS

FOURTEENTH BIENNIAL REPORT  
OF THE  
STATE GEOLOGIST  
OF THE  
STATE OF WYOMING



PROPERTY OF  
HORACE D. THOMAS

For the Period  
October 1, 1926, to and Including  
September 30, 1928

Fourteenth Biennial Report  
OF THE  
State Geologist



FOR THE PERIOD  
OCTOBER 1, 1926  
TO AND INCLUDING  
SEPTEMBER 30, 1928

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John G. Marzel, State Geologist  
Cheyenne, Wyoming

JOHN G. MARZEL-----State Geologist  
C. S. DIETZ-----Deputy State Geologist  
FRANK B. TAYLOR-----Oil and Gas Inspector  
PERRY A. COLE-----Clerk

To His Excellency,  
Frank C. Emerson,  
Governor of the State of Wyoming.

Dear Sir:

Pursuant to the requirements of Section 302, Wyoming  
Compiled Statutes 1920, I submit herewith the Biennial Re-  
port of the State Geologist for the period ending September  
30, 1928.

Very respectfully submitted,  
JOHN G. MARZEL,  
State Geologist.

Cheyenne, Wyoming,  
October 31, 1928.

# Fourteenth Biennial Report of the State Geologist

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October 1, 1926, to and including October 1, 1928

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## PURPOSES OF THE OFFICE

The original law creating the office of State Geologist was that the appointee should make reports on mining property, to collect official information relating to the various mines and mining projects of the State, and to publish and circulate such information as he may deem advisable for advertising the mineral wealth of the State, as well as to take any steps which would be likely to advance the development of the mining industry.

The duties of the State Geologist were increased by the enactment of a law in 1903 making the State Geologist ex-officio Inspector of Mines, with power to examine into the condition of any mine, mill, or part thereof, and all matters or things connected with or relating to the safety of the persons employed in or about the same; to examine into and make inquiry respecting the condition of machinery or mechanical devices, and, if necessary, to have same tested; to appear at all coroner's inquests respecting accidents and, if necessary, to examine and cross-examine witnesses. These duties, however, do not apply to coal mines, as they are under the supervision of the Coal Mine Inspector.

The duties of the State Geologist were still further enlarged by the action of the Legislature in 1919 that required the State Geologist to make examinations and reports on any State or school lands when so requested by the State Land Board, and to make written report concerning the geology of any lands in which the State of Wyoming is or may hereafter become interested, as well as on similar matters that the said Board may desire information upon. The Act of 1919 further charged the State Geologist with the duty of enforcing the laws of the State of Wyoming relating to the oil industry.

The laws of 1921 provided for further conservation of the natural resources of the State. These laws place all oil and gas operations on State and patented lands under the supervision of the State Geologist. Their intent is to prevent waste of valuable oil and gas resources by grossly negligent methods of operation. At the present time, they are enforced by a single Oil and Gas Inspector, who makes annual inspections of wells throughout the State. When necessary, the Inspector supervises repair work, conducts production tests and also performs other protective duties that the State Geologist may direct with the view of prolonging the life of our greatest source of direct revenue—the oil and gas fields of the State.

In the Session Laws of 1927 the duties of the State Geologist were again enlarged. In the latest act, he was charged with the duty of enforcing all of the laws of Wyoming relating to the oil industry. Moreover, the enforcement of all other Acts relating to mineral deposits, aside from coal deposits, were therein placed under his jurisdiction. The re-enacted law also directed the State Geologist to make valuation surveys, investigations, appraisements and reports on the mineral resources of the State. Provision was also made for authority of the State Geologist to supervise mining operations on State and school lands in the interest of their economic development. Also, authority was thereby granted to co-operate with the United States Government, departments of the State of Wyoming, University of Wyoming or private corporations in the matter of geological, topographic, soil and mineral surveys, as well as on industrial investigations and examinations that may bring further economic development of the mineral resources of the State, with the stipulated proviso that in no instance should the State pay more than 50% of the total cost of such joint investigations. Other provisions of the law required that a biennial report be made to the Governor, covering the activities of the office, in which would be included suggestions as to the enactment of laws relating to the mineral resources of the State. Permission was also granted to publish other reports, maps and data that would be considered of public interest. Finally, the law of 1927 created the new office of Deputy State Geologist, and on June 15, 1927, the appointment of the present official was made.

## MINES AND MINING

In 1901, when the present office of State Geologist was created, the entire mineral production of Wyoming totaled slightly under \$7,000,000.00. At the present time, the mineral production of Wyoming is over \$78,000,000.00 per annum. This production increment of over 1,000% has brought about a profound change in the economic structure of the State. Within that official tenure of 27 years, mineral production advanced from a comparatively insignificant undertaking to the most important industry ever known to the State. Due to this unparalleled expansion, our annual mineral production of \$405.00 per capita is a record so far unapproached by any of the great mining states of America.

In 1901, when the present office was established, fully 95% of the mineral production of the State was mined from deeded lands that belonged to large corporations and wealthy individuals. At the present time, at least 70% of our record-breaking mineral production is being recovered on lands owned either by the State or else by the United States. In the past nine years, operations on these publicly owned lands have paid bonuses and royalties totaling far over \$50,000,000.00 directly to the State and Federal treasuries. Inasmuch as the Government returns 37½% of all funds they receive from the leasing of local lands to the State Treasury, Wyoming, in reality, has long been a joint owner and proprietor of mineral production the like of which is totally unknown to any other state in the Union. In cold figures, the Wyoming royalty payments received under the Federal Leasing Act exceed the sum total so far collected in all of the remaining 47 states by a margin of more than four times over.

Besides the foregoing joint proprietorship, the State also owns oil and mineral bearing school sections. For operating on these lands, princely bonuses are exacted solely for the benefit of the State Treasury. Due to these State and Government royalty payments, the mineral industry was able to underwrite in Wyoming during the past ten year period, school, highway, and other civic improvement programs of a scale of magnificence quite beyond the financial capacity of any prior decade to undertake or even conceive.

The far-reaching transition of the mineral production of the State from privately to publicly owned lands has inundated my administration with a host of problems that were entirely non-existent when the Legislature first created the office 27 years ago. In 1901, mineral production was a decidedly unimportant industry of the State. At that time

the Legislature likely believed that a capable official could stimulate sufficient additional interest for capital to open and develop the long dormant mineral reserves of the State. At any event, if exploitation could be promoted along those lines, individual communities would not only be benefited, but also, new sources of normal revenues would at least be collected by local tax-gatherers. At the present time, all intents of the original law that created the office are completely over-shadowed by ensuing State and Federal Mineral Leasing Acts that have long been paying enormous tributes directly to the Treasury of the State itself.

As matters now stand, the big problem of my office is to devise ways and means by which the mineral industry will continue to pour millions of dollars annually directly into the strong-box of the State. As a rule, the few private proprietorships that are able to harvest equally handsome profits are commonly manned by a crew of hard-working executives, trained technologists, efficiency engineers, statistical and clerical staffs, as well as other re-enforcements such as offices generally armed with powers of a custodial character. In lieu of a single field inspector, this office now has need for additional assistants who will faithfully protect all possible sources of revenue that the giant mineral industry can yield either now or in future years. Moreover, to see that not all of the prodigious revenues now reaped from mineral operations from our public lands are expended on lines of endeavor entirely non-mineral in character, it would seem that the time will soon be here to employ men who possess a sound comprehension of modern economic laws and trends.

As the several organic acts now read, the office of the State Geologist appears to be invested with powers amply sufficient to protect the future welfare of the mighty mineral resources that still repose almost undisturbed within the confines of the Sovereign State of Wyoming. As a matter of fact, to enforce the State's own inherited proprietorship over these vast sources of direct income, the appropriations at my disposal only permit the most skeletal form of supervisory custodianship conceivable.

So long as present exigencies continue, this office will not detour from the straight-line policy it established two years ago. From hence on no positions remain to be filled on the part of applicants who are thoroughly incapable of visualizing what the mineral industry has done for the State of Wyoming in the past or what it might do to it in the future. In the meanwhile, unappreciative petitioners, merely interested in drawing their salary or the receipt of vacation

rights, as well as other prerogatives oft-times understood to go with positions of a public character, should file no applications for employment in this office. Unlike all other states, mineral production in Wyoming is largely a business of the State itself. Obviously, a profit-producing enterprise of its present magnitude is entitled to supervisory direction as well as protective guardianship of the broadest and most constructive character obtainable.

#### SUMMARY OF ACTIVITIES FROM MARCH 1, 1927, TO OCTOBER 31, 1928

From March 1, 1927, to date, this office rendered services to the State Board of Land Commissioners and in addition thereto has gathered much information which is available in our files, as follows:

Examinations and reports for State Board of Land Commissioners:

##### Osage Field

- Lease No. 35636—Section 16-46-63—Elton Oil Co.
- Lease No. 35646—Section 16-46-63—Whedon Oil Co.
- Lease No. 37264—Section 16-46-63—Leroy Griffin.
- Lease No. 35689—Section 36-46-64—Updike & Arnold.
- Lease No. 35705—Section 36-46-64—John C. Manlove.
- Lease No. 35705—Section 36-47-64—John C. Manlove.
- Lease No. 35646—Section 16-46-63—Whedon Oil Co.
- Lease No. 35689—Section 36-46-64—Updike & Arnold.
- Lease No. 38779—Section 36-46-64—Reserve Oil Co.
- Lease No. 35636—Section 16-46-63—Elton Oil Co.

##### Baxter Basin

- Lease No. 32231—Section 16-16-104—J. B. Sutherland.
- Lease No. 35297—Section 36-18-104—Midwest Refining Co.
- Lease No. 32231—Section 16-16-104—J. B. Sutherland.
- Lease No. 34958—Section 36-17-104—Producers & Refiners Corp.

##### Warm Springs

- Lease No. 32625—Section 36-43-94—C. B. Shaffer.
- Lease No. 32625—Section 36-43-94—C. B. Shaffer.

##### Salt Creek

- Lease No. 38606—Section 16-40-79—Ohio Oil Co.
- Lease No. 32594—Section 36-40-79—Midwest Refining Co.
- Lease No. 34479—Section 16-39-78—Argo Oil Company.

**Big Muddy**

- Lease No. 22187—Section 9-33-76—Merritt Oil Corp.  
 Lease No. 25095—Section 21-33-76—Merritt Oil Corp.  
 Lease No. 22014—Section 10-33-76—Merritt Oil Corp.  
 Lease No. 25094—Section 15-33-76—Merritt Oil Corp.  
 Lease No. 22188—Section 8-33-76—Merritt Oil Corp.  
 Lease No. 33864—Section 16-33-76—Ohio Oil Company.  
 Lease No. 31952—Section 16-33-76—Ohio Oil Company.  
 Lease No. 21686—Section 4-33-76—Ohio Oil Company.  
 Lease No. 34334—Section 16-33-76—Midwest Refining Co.  
 Lease No. 21945—Section 5 and 6-33-76—Continental Oil Co.

**Rock Creek**

- Lease No. 34262—Section 34-20-78—Ohio Oil Company.  
 Lease No. 31992—Section 26-20-78—Ohio Oil Company.  
 Lease No. 31987—Section 14-19-78—Ohio Oil Company.

**Elk Basin**

- Lease No. 31853—Section 36-58-100—Ohio Oil Company.

**Polecat**

- Lease No. 33843—Section 16-57-98—Daniel J. Danker.

**Little Buffalo Basin Field**

- Lease No. 33950—Section 36-48-100—Ohio Oil Co.

**Ferris Field**

- Lease No. 34719—Section 36-26-87—P. & R. Corp.

Little Buffalo Basin—Furnishing information to aid in arriving at an agreement for the operation of the gas field as a unit.

Big Muddy Field—Metering gas and furnishing data for agreement with the Continental Oil Company and the Ohio Oil Company for royalty on the gas produced from the Big Muddy Field, in 1927, and again in 1928.

Report by the Deputy State Geologist in regard to mineral or non-mineral character of Lot 37, Twp. 13 N., Rg. 106 W.

**Field Examinations, Mineral and Other Activities, as Follows:**

The State Geologist and Deputy State Geologist visited and examined the following mineral properties:

The Cox Copper Mine on Big Creek, southeast of Encampment, Wyo.

North Platte Valley, south of Encampment—Manganese deposit.

Gold prospects southwest of Encampment in the Hanley, Ashley and other prospects.

Amphibole asbestos prospects of Mr. Huston.

Phlogopite mica mine of Kuykendahl, six miles north of Encampment.

Oil extraction plant and shale deposits of the Wyoming Oil Products Company, on the Lincoln Highway, one mile west of Green River.

Leucite Hills, near Superior.

Atlantic City Mining District.

Alum, epsomite, bentonite and metallic mineral deposits located at the foot of Copper Mountain, 20 miles northeast of Bonneville.

Casper Mountain asbestos, chromium, vanadium, manganese, iron ore, copper and a gold prospect located in Deer Creek Canyon in the Casper Mountains.

Copper prospect on Laramie Peak.

A gold quartz prospect on Birds Eye Mountain.

Deposit of pumicite northwest of Riverton.

Sunrise Mine—Sunrise, Wyoming.

A gold prospect in Crow Creek Basin, 30 miles northeast of Dubois.

Phosphate deposit at Cokeville.

Coal in the Grays River Valley.

Gold and platinum mines and mill on Centennial Mountain, belonging to A. J. Hull.

Copper mine and mill, two miles south of Tie Siding.

Copper, gold and zinc deposits of John Morris, Prosper McCarthy and Horace Adams, in the Silver Crown Mining District.

Arsenic and gold prospect on the Brooks Ranch in the Ferris Mountains.

Assays, examinations and qualitative tests of many samples brought in and sent to this office by prospectors from practically all parts of the State. Chemical equipment lately installed will identify any Wyoming mineral.

Publication of a complete resume of the mineral and oil activities for the year 1927 by the Casper Tribune-Herald, in their Industrial Edition, under date of February 19, 1928.

Publication of mineral and oil activities for the year 1927, by the Engineering and Mining Journal, in their New Year's Edition.

Articles and reviews published in Union Pacific Employes' Magazine, Pit and Quarry, American Mining Journal, Pathfinder, Wall Street Journal, Oil and Gas Journal, also

furnished many timely articles to the local press of the State.

Completed the following chapters for complete volume that will shortly be published under title of "Developed and Undeveloped Mineral Resources of Wyoming":

### PART I

- Chapter 1.  
**PRECIOUS METALS**  
 Gold  
 Silver  
 Platinum
- Chapter 2.  
**NON-FERROUS METALS**  
 Copper  
 Lead  
 Manganese  
 Tin  
 Zinc
- Chapter 3.  
**IRON ORES**  
 Hematite  
 Limonite  
 Chrome Iron Ores  
 Titaniferous Iron Ores  
 Paint Iron Ores
- Chapter 4.  
**RARE METALS**  
 Radium  
 Vanadium  
 Uranium

### PART II

#### NON-METALLIC MINERALS

- Chapter 5.  
**ABRASIVE MATERIALS**  
 Natural Abrasives  
 (a) Corundum  
 (b) Garnet  
 (c) Grindstone  
 (d) Pumice and Pumicite  
 (e) Tripoli  
 Artificial Abrasives  
 (a) Alundum  
 (b) Carborundum

- Chapter 6.  
**CERAMIC MATERIALS**  
 Natural Cement Deposits  
 Portland Cement Deposits  
 Clay Deposits  
 Brick Shale Deposits  
 Fire Brick Deposits  
 Pottery Deposits
- Chapter 7.  
**ALKALI AND SALINE DEPOSITS**  
 Salt  
 Sodium Sulphate  
 Sodium Carbonate  
 Sodium Hydroxide  
 Magnesium Sulphate  
 Prospects for the Establishment of a Complete Alkali Industry in Wyoming
- Chapter 8.  
**MINERAL FERTILIZERS**  
 Phosphates  
 Potash  
 Nitrogenous Deposits  
 Calcium Cyanamid Manufacture  
 \*Advantages that the Unique Green River Valley Offers for the Establishment of a Complete Fertilizer Industry
- Chapter 9.  
**MINERAL FUELS**  
 Coal  
 Oil  
 Natural Gas
- Chapter 10.  
**MISCELLANEOUS NON-METALLICS**  
 Asbestos  
 Asphaltic Sands  
 Bentonite  
 Gypsum  
 Kyanite  
 Limestone  
 Mineral Pigments  
 Road Materials  
 Sand and Gravel

\*Summary published last month in the Rock Springs Rocket.

## PART III

## GENERAL ECONOMIC PAPERS

## Chapter 11.

\*How Early Development of Wyoming's Hydro-electrical Resources Will Aid the Mineral Industry

## Chapter 12.

Improved Efficiency Exponentials and some Benign and Bracing Stimuli of a Humanistic Order that Industry Would Gain by a General Hegira From Shivering and Sweltering Fog-Encased Climes to the Equable and Invigorating Atmosphere that Perpetually Envelopes the Wyoming National Playground

## Chapter 13.

Wyoming's Unrivalled Supremacy in Future Stores of the 20 Leading and Most Valuable Mineral Products now Being Produced in the United States.

## Chapter 14.

Review of Present-Day Trends in the Rapidly Expanding Mineral Industry of Wyoming.

## Chapter 15.

## CHARTS AND TABLES

- (a) List of all Minerals recorded by the United States Geological Survey as Occurring in Wyoming.
- (b) Comparative Tables Showing all Mineral Royalties Paid Annually by Wyoming and also by all Remaining States into the Federal Treasury Since Passage of the Leasing Act of February 25, 1920.
- (c) Total Mineral Production in Wyoming During the Past 25 Year Period.
- (d) Wyoming's Per-Capita Record in Undeveloped Mineral Wealth.
- (e) Wyoming's Per-Capita Record in Actual Mineral Production.
- (f) Wyoming's Rank (Here all minerals are listed in which Wyoming is 1st, 2nd, 3rd to 10th amongst the States).

\*Published in its entirety last September in the Casper Tribune.

The State Geologist represented the State of Wyoming at the annual meeting of the American Mining Congress held at Washington, D. C., on December 3rd, 4th, 5th, and 6th, 1927.

The Deputy State Geologist attended pipe line abandonment proceedings of the Illinois Pipe Line Company, Pilot Butte to Riverton, before the Public Service Commission in July, 1927.

The Deputy State Geologist represented the State of Wyoming at the Second International Conference on Bituminous Coal, held at the Carnegie Institute of Technology, Pittsburgh, Pennsylvania, November 19th to 24th, 1928, inclusive.

The Deputy State Geologist concluded co-operative field investigations with Mr. L. A. Holmes, representative of the American Petroleum Institute, for the object of determining the porosity of the Embar formation as an oil producing reservoir.

Conducted field investigations and prepared reports on gypsum deposits situated in the Laramie district on which litigation may arise for the Attorney General.

Joining with the State Department of Commerce and Industry in promoting a Mining Congress at Casper, Wyoming, on November 28th and 29th, 1927, and at Laramie, Wyoming, on December 10th and 11th, 1928, together with the mineral exhibit in connection therewith, with programs as follows:

## Program

## MINING SECTION

October 27, 1927

## MORNING SESSION

## Governor Presiding

- 9:00 A. M. Address of Welcome-----  
-----Jack Scott, Mayor of Casper, Wyo.
- 9:10 A. M. Opening Address -----  
Hon. Frank C. Emerson, Governor, Cheyenne, Wyo.
- 9:30 A. M. Wyoming's Leading Industry-----  
--John G. Marzel, State Geologist, Cheyenne, Wyo.
- 10:00 A. M. Discussions.
- 10:15 A. M. Modern Geological Investigation-----  
G. F. Loughlin, Geologist, U. S. G. S., Denver, Colo.
- 11:15 A. M. Open for Five Minute Addresses or Discussion  
from the Floor-----Everybody  
GEO. HAUSER, Guernsey  
"An Iron Ore Plant in Wyoming."

## AFTERNOON SESSION

**W. F. Wilkerson, Presiding**

- 1:15 P. M. The Mineralization of Medicine Bow Range with Special Reference to the Centennial Mountain Platinum Deposits -----  
Andrew J. Hull, Sec'y-Treas., Wyoming Platinum and Gold Mining Syndicate, Laramie, Wyo.
- 2:15 P. M. Discussions.
- 2:30 P. M. Undeveloped Resources of the Big Horn Mountains-----George Haywood, Sheridan, Wyo.
- 3:30 P. M. Discussions.
- 3:45 P. M. Obstacles Encountered in the Marketing of Mineral Products-----Ray E. Steffen, Casper, Wyo.
- 4:30 P. M. Open for Five Minute Addresses or Discussions from the Floor-----Everybody  
W. G. BUCKLES, Parco  
Manager Parco Brick Plant  
"Ceramics in Southern Wyoming."

## EVENING SESSION

**Harry R. Weston, Presiding**

October 28, 1927

## MORNING SESSION

**L. L. Newton, Presiding**

- 9:00 A. M. The Platte County Plan for the Development of the Mineral Resources of the State-----  
A. B. Bartlett, Former State Geologist, Glendo, Wyo.
- 10:00 A. M. The Byron Plan of State Mining Development as it Would Apply to the State of Wyoming---  
-----F. L. Byron, Prospector, Casper, Wyo.
- 11:00 A. M. Open for Five Minute Discussions from the Floor ----- Everybody  
COY BURNETT, Los Angeles, California  
President Monolith Portland Midwest Co., Laramie, Wyo.  
"The Cement Industry in Wyoming from Our Standpoint"  
Mr. Burnett's company are now erecting a \$2,000,000.00 Cement Plant in Laramie.

## AFTERNOON SESSION

**Ray T. Baird, Presiding**

- 1:30 P. M. Mineral Resources of Natrona County-----  
-----G. R. Hagens, Attorney, Casper, Wyo.

- 2:30 P. M. The Geology of the Metal Bearing Rocks of Wyoming--Dr. S. H. Knight, Professor of Geology, State University, Laramie, Wyo.
- 3:30 P. M. Local Asbestos and Asbestos Products---  
-----Fred Patee, Casper, Wyo.
- 3:45 P. M. For the Furtherance of the Mining Industry of the State--Interested Parties Everywhere in Wyoming.
- 4:30 P. M. Open for Five Minute Discussions from the Floor -----Everybody  
HON E. H. FOURT, Lander  
"High Spots of the Congress"

## Program

## MINING CONGRESS

December 10, 1928

## MORNING SESSION

**Governor Frank C. Emerson, Presiding**

- 9:30 A. M. Address of Welcome-----  
-----Stephen Corlett Downey, Mayor, Laramie, Wyo.
- 9:40 A. M. Opening Address -----  
Hon. Frank C. Emerson, Governor, Cheyenne, Wyo.
- 10:00 A. M. Present and Future of the Mining Industry of Wyoming--John G. Marzel, State Geologist, Cheyenne, Wyo.
- 10:25 A. M. University and State Development-----  
Dr. A. G. Crane, President, State University, Laramie, Wyo.
- 10:50 A. M. Nomination and Election Resolutions Committee.
- 11:00 A. M. Laramie University Engineering College Hour:  
11:00 Plans for Improvement in Assaying Service at the University--R. L. Rhoades, Dean of Engineering.
- 11:25 Assaying at the University-----  
Prof. Joseph R. Guiteras, Prof. of Mining Engineering
- 11:35 Assay Problems-----  
-----A. C. Dart, Assaying Department
- 11:45 A. M. Discussion and Questions from the Floor ----- Everybody
- 12:00 A. M. Further Discussion and Inspection of University Assay Department's Facilities, Engineering Hall.

## AFTERNOON SESSION

W. F. Wilkerson, Presiding

- 2:00 P. M. Report by Committee of Eleven-----  
-----G. R. Hagens, Chairman, Casper, Wyo.
- 2:30 P. M. Discussion and Questions.  
2:30 Andrew J. Hull, Laramie, Wyo.  
2:40 From the Floor-----Everybody
- 3:10 P. M. Beneficiating Iron Ore-----  
L. B. Weed, General Supt. Colo. Fuel & Iron Co.,  
Pueblo, Colo.
- 3:35 P. M. The Value of the Mining Industry to a Com-  
munity, State or Nation—George Haywood, Mining  
Engineer, Sheridan, Wyo.
- 4:00 P. M. Development of the Non-Metallic Resources of  
Wyoming—E. C. Hoag, Industrial Agent, U. P.  
R. R., Omaha, Nebr.
- 4:20 P. M. Needed Co-operation for Boosting Wyoming's  
Resources and Climate—George H. Ennis, Pres.  
Eden Irrigation Project, Rock Springs, Wyo.
- 4:45 P. M. Open for Five-Minute Addresses or Discussion  
and Questions from the Floor-----Everybody

## EVENING PROGRAM

Ray T. Baird, Presiding

- 6:15 P. M. Banquet at Connor Hotel.
- 8:00 P. M. Banquet Addresses and Music broadcasted by  
KFBU, "Top of the World" Station.
- Banquet Program**
- |  |         |
|--|---------|
| 1. Governor Emerson-----   | 15 Min. |
| 2. State Geologist, Marzel-----  | 15 Min. |
| 3. E. M. Westervelt, Land and Industrial Commis-<br>sioner C. B. & Q. R. R., Lincoln, Nebr.----- | 15 Min. |
| 4. Z. E. Sevison, State Highway Engineer and Super-<br>intendent-----                            | 15 Min. |
| 5. Hugh Lee Kirby, with the Montana, Wyoming R. R.<br>Co.-----                                   | 15 Min. |
| 6. Val Kuska, Colonization Agent, C. B. & Q. R. R.<br>Co.-----                                   | 15 Min. |

December 11, 1928

## MORNING SESSION

Harry R. Weston, Presiding

- 9:30 A. M. Design of Small Mill for Treatment of Com-  
plex Lead, Zinc, Gold, Silver and Copper Ore of the  
Esterbrook Mine—A. B. Bartlett, Mining Engineer,  
Wheatland, Wyo.

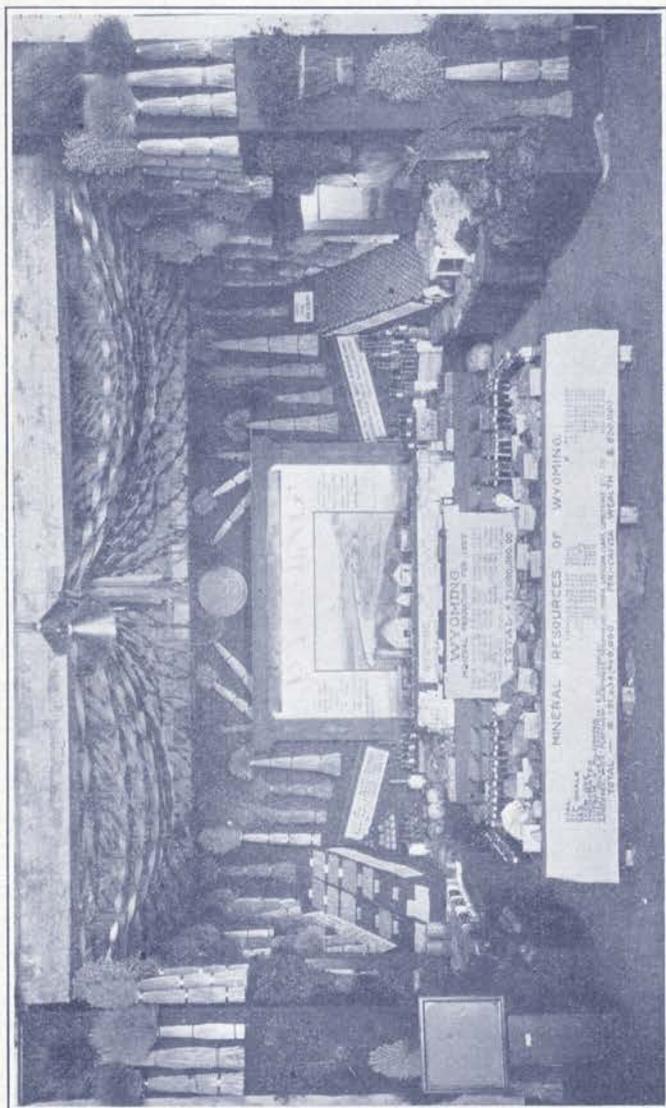
- 10:00 A. M. Discussion and Questions.
- 10:15 A. M. The Present Status of Our Knowledge of the  
Metal-Bearing Rocks of Wyoming—Dr. S. H.  
Knight, Professor of Geology, State Univer-  
sity, Laramie, Wyo.
- 10:40 A. M. Subject to Be Announced-----  
E. H. Denney, E. M., Safety Division, U. S. Bureau  
of Mines, Denver, Colo.
- 11:05 A. M. Future of Oil in Wyoming-----  
Frank B. Taylor, State Oil and Gas Inspector, Cas-  
per, Wyo.
- 11:35 A. M. Relation of Oil Industry with Mining in the  
Development of Wyoming—D. W. Greenburg, Pub-  
licity Representative Editor, The Midwest  
Review, Casper, Wyo.
- 12:00 A. M. Inspection of University Mining Department  
Facilities, Engineering Hall.

## AFTERNOON SESSION

L. L. Newton, Presiding

- 2:00 P. M. Milling Problems of Centennial Mountain  
Platinum Ore—Andrew J. Hull, Member Commit-  
tee of Eleven, Laramie, Wyo.
- 2:25 P. M. Wyoming Cement-----  
W. S. Trueblood, General Supt., The Monolith  
Portland Midwest Cement Company, Laramie,  
Wyo.
- 2:50 P. M. Bentonite—A. G. Van Eman, Mgr. Owyhee  
Chemical Products Co., Cheyenne, Wyo.
- 3:15 P. M. Parco Brick and Big Creek Copper-----  
W. G. Buckles, Mgr. Parco Brick Company, Parco,  
Wyo.
- 3:40 P. M. Gypsum and Gypsum Products-----  
A. M. Turner, Mgr. U. S. Gypsum Company, Lara-  
mie, Wyo.
- 4:05 P. M. Asbestos Shingles-----  
Fred Patee, Member Committee of Eleven, Casper,  
Wyo.
- 4:30 P. M. Open for Five-Minute Discussions from the  
Floor-----Everybody
- 4:45 P. M. Report and Recommendations of Resolutions  
Committee.

Delegates and Visitors are cordially invited to use  
"the old swimming hole" in the University Gym-  
nasium from 4:00 to 6:00 P. M.



State Geologist's Mineral Exhibit at the Ak-Sar-Ben Fair, November 3rd to November 9th, 1928, at Omaha, Nebraska.

### EVENING PROGRAM

8:00 P. M. Studio Broadcasting.

8:00 P. M. Moving Picture—"The Story of Copper"—Mining and Milling, Seven Reels at the Little Theater, University Campus.

#### Studio Broadcasting Program

1. State Geologist, John G. Marzel.....10 Min.
2. A. B. Bartlett, Mining Engineer.....10 Min.
3. Frank L. Byron, Wyoming Prospector.....10 Min.
4. Frank B. Taylor, State Oil and Gas Inspector...10 Min.

Preparing exhibit and exhibiting display of minerals at Wyoming State Fair at Douglas, Wyoming, both for the year 1927 and 1928.

Preparing mineral exhibit for the Ak-Sar-Ben Fair at Omaha, Nebraska, November 3rd to 9th, 1928, inclusive.

Sundry Notices and Reports on Wells acted upon—303.

General administration of office and regular routine office work, which consists of disseminating geological information relative to the occurrences of mineral and oil deposits in the State.

On the occasion of the third fire in the Sunrise Mine of the Colorado Fuel and Iron Company located at Sunrise, Wyoming, the State Geologist was present coincidentally with the Department of Commerce rescue car and the forces of the Bureau of Mines and the State Coal Mine Inspector. Valuable aid was accorded the company in fighting the fire and although there was considerable damage caused by the fire, most of it, however, was due to a necessary shutting down of operations. No life was lost, although many miners were in jeopardy. This was the first metallic mine fire of record at which the State Geological Department was present.

#### Activities of Frank B. Taylor, State Oil and Gas Inspector

Notified Manager Wise of O'Bannon & Barker, operating in the Brenning Basin, to make out sundry notice reports of wells drilled, or be shut down within 15 days.

Made further inspection of O'Bannon & Barker wells in the Brenning Basin.

Sealed wells of O'Bannon & Barker for failure to make out reports of operations.

In company with R. D. Ferguson of the United States Geological Survey, took off seals at O'Bannon & Barker lease in the Brenning Basin field.

With the State Geologist, held conference in the Sand Draw field with Messrs. Wertz, Wagner and Rusk regarding gas escaping from well in that field.

Inspected pumping arrangements at the Carter well in the Sand Draw field.

With the State Geologist, held conference with United States Geological Survey officials at their office in Casper and with Mr. E. M. Parks, regarding casing log for well in the Little Buffalo Basin.

Inspected the Big Bear Oil Company's well and shut down same, placing seals on machinery, for not making a report on pulling out this well and abandoning same.

On account of so small an expense contingent for this department, it was found that only one Oil and Gas Inspector could be employed for full time in this department. Mr. Frank B. Taylor of Casper, Wyoming, received this appointment and has been active in carrying on this work during the biennium, as is shown herewith as follows:

Inspected State Lands in the Salt Creek Field.

Made an examination of the area north of the Big Muddy Field, generally known as the Cole Creek Dome and refuted statements made by a Mr. Walker and others of New York and Philadelphia to the effect that there is an oil field developed there.

Made inspection of the gas production of the Big Muddy field, in company with the State Geologist and Mr. Fuller, Fiscal Agent of the University of Wyoming.

Held conference at Casper, Wyoming, with the Ohio Oil Company and Continental Oil Company's officials on the subject of metering the gas in the Big Muddy field.

In company with the State Geologist, made inspection of Section 16, Twp. 40, Rg. 79, on west side of field and the gas plants of the Midwest Refining Company in that field.

Held several conferences with United States Geological Survey officials at Casper regarding future work between the State and Government and especially in the outlining of plans for the unit operations of the Little Buffalo Basin gas field.

Made survey of SW $\frac{1}{4}$  Section 36, Twp. 40, Rg. 79, Salt Creek Field, to determine correctness of contours there on maps.

Examined and approved six wells the Midwest Refining Company had been doing work on.

Held several conferences with officials of the Midwest Refining Company, The Ohio Oil Company and the United States Geological Survey regarding unit operations at Buffalo Basin.

Accompanied by Mr. C. O. Wertz, State Gauger, made inspection and located corners of State School Section at top of Casper Mountain.

Made inspection and reports on the Lance Creek, Mule Creek, Osage, Moorcroft and Upton fields.

With the State Geologist, made inspection of the Greyrocks well and geology of that area, located about 20 miles east of Wheatland.

Held conferences at Casper office with regard to Little Buffalo Basin.

Made inspections and reports on Mule Creek Dome, the Osage field, Moorcroft field, Manhattan field near Sundance, abandoned well near Rosette, Billy Creek field, and Tarrant and Crazy Woman wildcat wells.

In company with Mr. Barton of the United States Geological Survey, made inspections and reports on the Brenning Basin field, Edelman well in Big Muddy field, and wells at Glendo, Lingle and Jay Em.

With the State Geologist and members of Reiter-Foster party, drove to Salt Creek, Billy Creek and then to Tensleep and the Big Horn Basin, then through Yellowstone Park and by rail to Rock Springs and from that point by auto to Hiawatha Dome, then to Cheyenne.

In company with John Frost of the United States Geological Survey, made inspection and report on the Little Buffalo Basin relative to a unit operation agreement between the State of Wyoming and the United States Government.

Conference with State Land Board regarding unit operation in Little Buffalo Basin field.

Made inspection of Greybeal well of the Graybeal Synclinate.

Examined area on Section 36, Twp. 40, Rg. 79, Salt Creek field, in relation to location of Well No. 3A of the Midwest Refining Company, also inspected wells approved through sundry notice reports.

Inspected the Torchlight, Greybull, carbon black plant at Cowley, Byron, Frannie, Elk Basin and Oregon Basin fields and made out reports on trips and fields.

With the State Geologist, held conferences with United States Geological Survey officials and officials of Chamber of Commerce at Casper regarding mineral deposits in and around Casper.

In company with the State Geologist and Deputy State Geologist, examined an area northeast of Bonneville for minerals.

With the State Geologist and Deputy State Geologist and others, examined deposits of minerals at top of Casper Mountain.

Made inspection of several wells in the Big Muddy field. Arranged mineral exhibit and attended State Fair at Douglas, Wyoming.

With the State Geologist and Mr. Steele of the United States Geological Survey, made inspection of mine on upper part of Deer Creek.

With the State Geologist, Mr. Linton and Mr. Sheehan, made examination of Ferris Mountain area for minerals.

Had conference at Rock Springs with Mr. Johnson regarding Boars Tusk Well and also with Mr. Wilson and Mr. Abrogast in regard to gold deposits in Atlantic City district. Inspected wells on State and Patented lands in the LaBarge field. Made report on above trip.

Conferred with the State Geologist and T. J. Cahill on the matter of arrangements for the Mining Congress to be held in Casper.

Brought specimens of ore from State Fair grounds at Douglas for Mining Congress.

Attended Mining Congress at Casper October 27th and 29th, 1927.

Held conference with State Land Board at Cheyenne.

Read and set gas meters in Big Muddy field for test of gas wells.

Conference at Casper with the State Geologist and Deputy State Geologist.

Made frequent trips to Big Muddy field, reading meters on the gas test there.

Made inspection of Brenning Basin area and also examined well on Government land west of Douglas, known as the Irvine Structure, for general information.

Examined wells on SW $\frac{1}{4}$  Section 36, Twp. 40, Rg. 79, Salt Creek field.

Made examination and report of well of Dr. Goldberg on State Land at LaBarge.

Made out annual report in December and January.

In company with D. P. Wardwell and R. D. Ferguson of the United States Geological Survey, held conference with officials of Utah Oil Refining Company regarding plugging wells in the Lost Soldier field.

Made trip to Kemmerer and LaBarge field for inspection of properties and wells there and made special inspection in regard to water showing in the Texas Company and Goldberg wells, supposedly from the Rainbow well on Government land.

Held conferences in Salt Lake City, Utah, with various oil operators interested in the LaBarge and other Wyoming fields and wells.

Held conferences with oil operators at Evanston regarding general oil field practice and water encroachment in the Spring Valley field.

Inspected two wells drilling near Evanston.

The Mining Congress Committee met at Casper and formed plans for the year.

In company with R. D. Ferguson of the United States Geological Survey, visited Midway Dome in search for old well there.

In company with E. H. Matthews of the United States Geological Survey, inspected gas wells in the Sand Draw field.

With C. O. Wertz, State Gauger, made inspection and report on coal mine about 15 miles north of Glenrock.

Made trip to Washington, D. C., on Teapot trial of Sinclair. Did not testify and returned to Casper.

Made two inspections of Tylee well at Brenning Basin.

Held conference at Big Muddy field with J. C. Thomas of the Continental Oil Company regarding gas test of wells on Continental leases of State Land.

To Big Muddy, Brenning Basin and Douglas, on general inspection trip of wells.

In company with the State Geologist, drove up through the Big Horn Basin, making inspection of structure near Powell and one near Cody, then to the Byron field.

Made inspections and reports on the LaBarge and Baxter Basin fields.

With Mr. C. O. Wertz, State Gauger, made survey of State land at the Gothberg ranch in regard to buildings thereon.

Inspected Black Mountain field.

Examined old dry hole on Section 36, Twp. 40, Rg. 79, Salt Creek field.

Made inspections and reports on the Squires well in the LaBarge field, Baxter Basin field, and a coal mine at Rawlins.

With the State Geologist, inspected well of the Texas Company at Alkali Butte.

Examined mineral exhibit at Douglas for report on same to the State Geologist.

Made inspection of Wiseman well on North Casper Creek Dome.

Inspected Dilger well in Brenning Basin field, then had conference with Mr. Dilger at Douglas.

Arranged mineral exhibit and attended State Fair at Douglas.

Made inspections and reports on wells in the Lost Soldier and Ferris fields.

Drew scaled geological column of Wyoming geology.

Inspected Warm Springs, Grass Creek, Little Buffalo Basin, Oregon Basin and Greybull fields.

Conference with John Frost of the United States Geological Survey regarding general conditions in the Big Horn Basin fields.

Inspected Polecat Dome, Badger Basin, Byron field and wildcat wells in that district.

Assisted in shipping minerals for exhibition from Douglas to the Ak-Sar-Ben Fair at Omaha.

Publication of a bulletin on the economic mineral resources, power developments and future industrial expansion of the State of Wyoming.

#### PROPOSED ACTIVITIES FOR THE BIENNIUM 1929-1931

Our mineral resources cannot possibly be surpassed by those of any other state and the people of the whole United States are beginning to realize this fact. Inquiries come into this office from all parts of the country, not only in regard to oil and gas, but in regard to every other mineral and ore deposit which is believed to be contained in our varied geological formations.

Practically every other state in the Union with substantial mineral resources has built up its Geological Survey along with its mineral development and I think that it is the experience that the best and most intensive development is being done in the states where the most comprehensive geological programs are being carried out.

In the preparation of the budget for the coming biennium, no attempt was made or contemplated to expand the geological department in a degree which is not comparable with the increase of the mineral industry of the State and in particular to the interest which is being shown by the interested citizens of the State. It is believed that the request for appropriation for the biennium 1929-1931 is in proportion to the natural growth of the industry and altogether in keeping therewith.

The budget shows a request for an increase of approximately 45% of the last appropriation, which as can be noted, equals \$16,600.00 and is analyzed as follows:

\$9,400.00 for additional help.

\$3,000.00 for additional expenses.

\$4,200.00 for raise in salaries.

The first item is for the employment of an Assistant Geologist, at a salary of \$2,700.00 per annum and for the employment of a clerk, at the rate of \$2,000.00 per annum. The State Geologist's Contingent Fund (Expense), during the past year has seriously handicapped the efficiency of this department and it is believed that the additional appropriation for extra help and expenses will materially increase the output of the department.

The request for raise in salary is based on comparisons with salaries paid in other state departments and is believed to be meritorious in all instances.

The amount of \$3,833.33, which shows as an increase, is actually the unused amount from the salary of one Oil and Gas Inspector. Only one full-time Oil and Gas Inspector was employed, for the reason that it was impossible to keep more than one active Inspector in the field on the expense contingent fund appropriated. On examination you will find that the \$3,000.00 increase in the Conservation Oil and Gas Contingent was made to take care of the expenses of two full-time State Oil and Gas Inspectors, thus materially increasing the efficiency of this department.

If your Excellency believes that a request for an appropriation should be included which would permit of a project being undertaken in co-operation with the United States Geological Survey relative to the investigation of some mineral deposit which would materially advance the date of the development of an industry requiring the use of some one or more of the vast mineral deposits of the State; in that case I would recommend that an amount aggregating not more than \$3,400 be included in the request for this proposition, which would then make a total request for the coming biennium in the amount of \$56,600.00, or an increase of \$20,000.00 over the amount of the budget for the past biennium. If this amount for co-operative work be omitted, the increased amount in the request for the budget of the coming biennium will be \$8,300.00 per annum.

You will note that the budget estimate does not contain request for appropriation for either an assayer or equipment for an assay laboratory. This matter, after due study and consideration, is believed to be too much of an expense for this department at the present time, especially in view of the fact that the State University has increased its facilities and forces to the extent that it will be able to make all assays of the samples submitted to them by prospectors who are operating within the State. The budget, however, does contain a small amount of money for the equipment of a small testing laboratory in which qualitative

determinations can be made of samples of rock and ores that are submitted from time to time by our citizenry, for determination.

#### MINERAL PRODUCTION FOR 1926

During the mid-summer, the Federal Bureau of Mines released the final figures on the mineral production of the several states for the year 1926. For Wyoming the following summary was recorded:

MINERAL PRODUCTION OF WYOMING IN 1926

Product	Quantity	Value
Clay Products		*
Clay, raw, short tons	4,409	** 96,853
Coal, short tons	6,512,288	17,827,000
Gypsum, short tons	*	*
Iron Ore, long tons	630,387	*
Lime, short tons	*	*
Mineral Waters, gallons sold	***	***
Natural Gas, M cubic feet	46,567,000	4,669,000
Natural-gas Gasoline, gallons	40,625,000	3,934,000
Petroleum, barrels	25,776,000	51,020,000
Phosphate Rock, long tons	4,464	29,000
Sand and Gravel, short tons	941,292	139,273
Sodium salts (carbonate and sulphate) from natural sources, short tons	*	*
Stone, short tons	153,940	316,463
Miscellaneous		1,053,330
Total value, eliminating duplications		78,988,066

\*Value included under "Miscellaneous."

\*\*Value not included in total value for State.

\*\*\*No canvass.

The preceding \$78,988,066 total discloses that the mineral production of Wyoming broke another record for the last year officially reported by the Bureau. The latest total is \$243,000 higher than 1925, which heretofore held the record for mineral production during the past decade.

#### COMPARISON WITH NEIGHBORING STATES

For friendly comparisons with some of our better known neighbors, 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 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.

#### Past Productions of Wyoming

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.

#### Future Outlook for Royalties From State Lands

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 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.

#### Wyoming's Largest Industry

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.

#### Future Outlook For Royalties From Government Lands

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 revenues is the large leucite deposits situated near Rock Springs. Locked-up in those 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.

#### A LEADING MINERAL STATE

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.

#### MINERAL PRODUCTION FOR 1927

As this report goes to press, no figures on the mineral production of Wyoming for the year 1927 have been released by the Bureau of Mines. As soon as these figures are available, this office will mail them to interested newspapers of the state. Preliminary estimates indicate that production for 1927 will compare favorably with the total recorded for the prior banner year.

#### THE MINERAL INDUSTRY OF WYOMING IN 1927

Immediately upon assuming office a demand was sensed for timely statistical information on the progress and expansion that the mineral industry was making in Wyoming. Not only do wide awake citizens most interested in the development and future welfare of our state call for this information, but during the past two years, many similar requests were received from outside corporations and business agencies.

To indicate the character and extent of the developments under way in the mineral industry, as complete a review as possible was prepared with the aid and co-operation of the mineral producers of the state. This initial review covered operations for the year 1927, and on completion, it was immediately published in its entirety in the Wyoming Development Edition of the Casper Tribune-Herald, under date of February 19, 1928. Upon publication, 200 copies of the valued edition were purchased and mailed to inquiring correspondents throughout the United States. As the supply purchased proved inadequate for the requirements of the office a full reprint of the original review follows below for the benefit of pending and future correspondents.

The canvass of the mineral production of Wyoming in 1928 is not complete as this publication goes to press. Already, the Casper Tribune has filed a request for an extended review of all mineral operations conducted in the state during 1928. This statistical information will be collected for publication in their Mining and Industrial Edition that will be out about the first of February. For supplying timely information to the public, no greater aid is possible than the continued co-operation and good will of the Press of the state.

As long as the Press, statesmen, as well as other agencies and individuals continue to demand information of the character outlined, the continuation of the review will be an annual feature of my administration.

## REVIEW FOR 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.

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 1927 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

## 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 6,000 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 fall of 1927 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 and 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.

#### FIRE BRICK

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 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 com-

mercial 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 in 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 comparatively 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 cast 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 approximately 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 99½% 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 4,770 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 different 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 1926, 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. 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 75 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 year 1927 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 a 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 tons
Nebraska	2,425 tons
Canada	825 tons
Total	24,350 tons

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 tons
Horse Creek, Wyo.....	72,048.98 tons
Spence .....	7,418.72 tons
Guernsey, Wyo. ....	65,542.46 tons
Total.....	167,469.45 tons

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 REFINERIES

Noteworthy among pioneer developments of the year 1927 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 1927 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 Seminole Mountain field. The long delayed report on those extensive deposits is daily awaited with increasing interest.

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 summer of 1927 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 and 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.

#### PRECIOUS METALS

Almost weekly throughout the year, 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 6,400,00 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 five 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 two 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 these 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.

#### Future of Coal

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 exhaust-

less 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 synthetical or 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 gasification 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 two 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. 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 these 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 sizable 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.

#### Power to Spare

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 diversion dam proposed at that site. As these 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 val-

ley 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 than can be generated from her high gradient river courses. In deeding water resources, formerly owned 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 ten 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 co-operation 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 four 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 horse power 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 of 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 governments. 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 three 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 Rocca Monfina 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 temperature 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 fuel would be more economical than the lignite deposit that is now 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 favorable 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.

In his presidential address delivered before the British Association of Science towards the close of that quasi-scientific decade now known to history as the Gay Nineties, Sir William Crookes, the eminent chemist and physicist whose contemporary fame largely rests on his invention of the vacuum tube of the now familiar radio set, gloomily calculated the early day when all plant and animal life would vanish from off of the face of the globe due to the

exhaustion of the Chilean nitrate deposits. Thanks to the progress that science has made in the brief interval that has followed that awe inspiring address, it will be quite impossible to broadcast any similar alarm in the future. As a matter of fact, the same potentialities contained in the immense lignite seams of the Rock Springs and Kemmerer fields also threaten to explode in an equally decisive manner the unduly popular and premature calculations that all rule-of-thumb statisticians have recently filed in regard to the immediate exhaustion of the motor fuel resources of America.

In many respects the potentialities and mineral resources found in the lower Green River valley of Wyoming are of a truly remarkable order. In the lowly lignites, shales, and lavas that virtually compose the mountain masses of the valley, as well as in the channel of the mighty Green that precipitously descends the rugged terrain drained, every form of energy, fuel, and mineral resource typical of the Niagara, the Allegheny, the Ruhr, or any of the remaining great industrialized valleys of the world, appears in truly formidable amounts. As a matter of fact, in each of the three distant valleys mentioned, only a single form of material resource is found. In the Green River valley all of those resources, as well as many other complete lines of fuels, mineral fertilizers and metallic ores, not present at all in the highly industrialized valleys mentioned, are consolidated within a single area. In course of time these little known resources will doubtlessly be compelled to release multitudinous forms of energies and vitalizing forces far in excess of the sum total now being generated within the three most highly industrialized valleys of the world. To write the future of this matchlessly favored valley, time, in lieu of any existing precedent, must alone tell the story.

#### RESUME OF THE OIL INDUSTRY OF WYOMING FOR 1927

The year 1927 opened with heavy production of crude oil and gasoline from natural gas all over the Mid-Continent fields. The new Seminole Field in Oklahoma caused the oil market to become weak and districts such as the Rocky Mountain Region, that did not have the transportation facilities or the low freight rates that applied to the Mid-Continent region and some others, found themselves in a precarious state with much high priced oil in storage and a declining market.

Production was accordingly curtailed in the Rocky Mountain Region and especially in Wyoming's oil fields, the production from our State being particularly affected by the conditions in the other parts of the Nation. At Casper, Natrona County, is located the largest refinery in the whole Rocky Mountain Region, the plant of the Standard Oil Company of Indiana with a daily capacity of 55,000 barrels. The Standard Oil Company of Indiana had contracted for several years past with large European marketers of petroleum products for a large amount of the oil products production of this large refinery. This contract necessitated the shipping of solid train loads of sixty cars each of oil products from Casper, Wyoming, to Baton Rouge, Louisiana, where the contents of the tank cars was placed on board tank ships and sent to European ports.

The cost of production was such that the gasoline that constituted a large part of these shipments, had to be sold delivered on board the tanker at Baton Rouge, for 11 cents per gallon. Even at this price, the return to the Standard Oil Company of Indiana was relatively small.

When the flood of low priced crude swept through the small refining districts of the Mid-Continent Region, the refiners there were able to contract gasoline delivery at Baton Rouge on board tanker for seven cents per gallon and as a result the large refinery at Casper was compelled to close down the major portion of its plant for a time. Due to intensive business drives for more trade, the Standard Oil Company of Indiana has now placed almost all of its big plant in operation again.

Thus the larger operators in the Wyoming oil fields were conservative in their field operations during the year 1927 and none of the larger companies made any attempt to develop new territory except where they were compelled to do so by the terms of their leases. It was generally considered that the best policy was one of conserving the oil and gas by retaining it in the sands, rather than bringing it to the surface with consequent losses through evaporation and leakage.

This policy was further strengthened by the report of the Conservation Committee of the Rocky Mountain District of the American Petroleum Institute, meeting in Casper, January 27, 1927, at which meeting a general appeal to all oil operators to conserve their production to the utmost was made. It was noticeable throughout the year that this policy was carried out in nearly every instance.

In January, the Midwest Refining Company started producing from the new Lakota sand in the Salt Creek Field. This was done at first merely to keep up the production of the field because the lead lines from the wells had frozen, causing a general shutdown of the first and second Wall Creek sand wells, but later on it was decided to keep producing the Lakota sand wells on account of water troubles showing in some of the wells when shut in.

The Mosher interests found a shale well on the west side of the Salt Creek Field, in Section 20-40-79 that started to produce at the rate of 250 barrels daily from a depth of 2,100 feet. As this well is larger than many wells drilled to the regular sands in the heart of the Salt Creek Field, it would appear that the west side of the field still offers good prospective territory for wildcatting in the shale area. The oil will be discovered along fault lines that appear on the surface in a few instances but should be traced by well records in the main.

It appeared to the refiners of petroleum in Wyoming in 1927 that that year would prove a good one for the asphalt trade. Working on this theory, the Standard Oil Company of Indiana increased its runs of black oil by opening up the Hamilton Dome Field in Hot Springs County. The oil from this field was run to Greybull where the refinery there made it into asphalt.

The Producers and Refiners Corporation also enlarged their input of black oil by drilling some of the wells in the Hudson Field near Lander deeper and increasing the production of that field. This oil was then sent by tank car to Casper and then by pipe line from Casper to Parco to the refinery at the latter point.

Early in February, the Ohio Oil Company discovered a heavy flow of black oil in the Embar sand in the Oregon Basin Field. Various estimates were made as to the capacity of this well and such estimates range from 3,000 barrels to 28,000 barrels, but no adequate test has been made as the year closes. There is no doubt but that the well opens a new field of large proportions.

At Dutton Creek, in Carbon County, the Midwest Refining Company proved the productiveness of the Dutton Creek Dome by drilling and producing a well there. This structure was outlined by sinking shallow water holes to learn the undersurface geology.

The Carter Oil Company found a dry hole on Section 35-17-70, on the Horse Creek Dome, Laramie County. This well is located northwest of Cheyenne and on a defined structure but failed to find commercial production.

C. B. Shaffer and others purchased the wells and leases of the Warm Springs Field in Hot Springs County and the expectations are that the field will be producing in 1929 and the Alliance refinery at Thermopolis will be refining the oil.

Early in 1927, the Prairie Oil & Gas Company decided to move its offices from Cheyenne to Parco and completed the plan about the middle of the summer, the offices of the company are all located in Parco at this time.

The Carter Oil Company appears to be withdrawing from Wyoming fields after more than ten years spent in development work. This company has sold all its holdings in the Maverick Springs Field in Fremont County to the Midwest Refining Company. The Carter Oil Company, however, still retains its productive territory in the Salt Creek Field and the gas wells in the Billy Creek Field of Johnson County.

The Margalexon Oil Company drilling on the outside of the withdrawn area of the Teapot Dome, struck a commercial well in the shale about 2,000 feet. This well proves an area long held by many geologists to be oil bearing in the shale.

The United States Government advanced its bond required on oil leases on Federal lands from \$1,000 to \$5,000. This advance is considered advisable in order to insure the proper abandonment of the dry holes.

In the spring of 1927, the New York Oil Company purchased the Central Pipe Line Company's pipe line from the Salt Creek Field to Casper. This line was originally laid to carry oil from the leases of the Texas Company and affiliated firms to the Texas Refinery at Casper. The New York Oil Company cut the line at Teapot and used same to carry gas from the Teapot compressor plant to Casper.

The Wyomont Oil Company discovered a ten barrel well on Section 14-33-76 in a shallow sand in the Big Muddy Field. The depth of this well is 1,140 feet and it appears that this strike of shallow oil is worthy of further development.

The Producers & Refiners Corporation renovated the wells in the Torchlight Field in the Big Horn Basin, about five miles from Basin City, and the Company plans to drill a deep test some time in the future. The Torchlight oil is a very high grade crude found in lenticular sands at about 500 feet deep. It has long been supposed that the oil has migrated from some large mother pool in the deeper sands.

The Midwest Refining Company, The Ohio Oil Company and The Continental Oil Company have agreed upon unit operation of their holdings in the Elk Basin Field, Park County. In theory the method of unit operation should work to the benefit of the field and all concerned and the test of these companies in Elk Basin will either prove or disprove same.

The Continental Oil Company established a new record for deep well drilling in the Big Muddy Field when a well there was completed in seventeen working days. This well was drilled with a rotary which was equipped with the new differential drive.

The Midwest Refining Company and the Wyoming Gas Company started work on a gas pipe line from the Little Buffalo Basin in Hot Springs County to a connection with the Hidden Dome line near Worland. The work was completed in July and the line is now serving the towns in the central part of the Big Horn Basin and also the refineries at Greybull.

The Ohio Oil Company purchased the holdings of the Producers & Refiners on the Enos Creek Dome where the Producers & Refiners drilled a gas well several years ago. The Ohio Oil Company also took over the holdings of the Union Oil Company on the same structure, thereby obtaining control of the whole structure.

The Illinois Pipe Line Company started construction in May on an eight inch pipe line from the Oregon Basin Field to the Burlington Railroad at Cody. This line was laid to carry the oil from that field to the loading rack on the railroad. A four mile water line was laid by the Ohio Oil Company at the same time to furnish water for the Oregon Basin development.

Early in June it was apparent that many small operators were abandoning small producers in various fields of the Rocky Mountain Region because it was no longer profitable to operate same at the low market price for oil. Sunburst Field in Montana was the heaviest sufferer in this respect.

An electric transmission line from the Shoshone Dam above Cody, on the Shoshone River, was built to the Oregon Basin Field by a company formed by Big Horn Basin men, and this line will furnish electric power for the development of the Oregon Basin Field. It is planned to build it farther down into the Big Horn Basin and eventually furnish power for the Grass Creek and other fields, also the cities and towns.

The Ohio Oil Company purchased the wells and leases of M. Guiterman, a Cody oil operator. These wells and leases lie on the north bank of the Shoshone River east of Cody and find a small production of light oil in the shale at about 1,200 feet.

On the southeast extremity of the Elk Basin Field, the Local Oil Company found a local high and is developing a small pool there.

The Illinois Pipe Line Company made application to abandon its pipe line from the Pilot Butte Field to River-ton. The application was refused.

An explosion and fire at the Parco refinery of the Producers & Refiners Corporation resulted in the death of twenty-three men and the destruction of the cracking stills and battery at the refinery.

A gas pipe line to furnish natural gas to Salt Lake City is proposed. This line is to take gas from the Hiawatha and Baxter Basin structures and to carry same to Ogden and Salt Lake City, Utah.

The Anthills Dome was discovered by the Buck Creek Oil Company, a subsidiary of the Continental Oil Company. Oil production estimated good for 200 barrels daily was found in the Muddy sand at 3,946 feet on Section 25-37-63. The structure is thought to be rather small and is not expected to develop into a large field.

The Ohio Oil Company secured by purchase the leases of the Enalpac Oil and Gas Company in the Oregon Basin Field. This deal transferred about 800 acres from the Enalpac Oil and Gas Company to the Ohio Oil Company.

The shale oil plant of the Wyoming Products Company at Green River started operation. This plant has the Trumbull process and has a capacity of 40 tons per day.

The Ohio Oil Company found a gas well of commercial size on the Hiawatha Dome in Colorado, just across the Wyoming line. This well is expected to lead to a similar development on the Wyoming side of the line as the structure lies across the state line.

The Producers & Refiners Corporation sold its royalty oil contract for the oil from State of Wyoming lands in the Salt Creek Field to the White Eagle Refining Company.

At the close of the year, the Navy Department took over the Teapot Dome under the Court decision. The Navy Department will shut in all wells on the Teapot Dome and hold same without production until such time as the Department may require the oil.

## MARKETING OF OIL AND OIL PRODUCTS

During 1927, Wyoming oil products, made in Wyoming, have travelled to practically all parts of the globe. Wyoming made gasoline is driving autos on the streets of London, Paris and Tokyo, besides many other foreign cities. China takes a large proportion of our paraffine wax and Wyoming made lubricants make smooth the wheels of progress in every part of the world.

With the relatively small population of about 240,000 people in Wyoming, it is necessary that our State must export our oil products to find a market. The refiners of Wyoming have therefore established markets for Wyoming gasoline in other States.

The competition from other oil regions has limited the market for Wyoming gasoline to adjoining states in the main. The California refiners market gasoline made from California crude oil in Nevada, part of Utah and Idaho. The California gasoline meets the Wyoming products in central Utah and in western Idaho. Montana does not use any California gasoline, but imports some from Wyoming to supply her needs over and above the amount produced at her refineries.

On the south, Mid-Continent refiners contend for trade in New Mexico and the southern part of Colorado, with stocks made from Wyoming crude oil. This condition also exists in northwest Kansas. Arizona takes only a very small portion of Wyoming gasoline, this State being covered by the California stocks.

Nebraska is being sought as a market by both the Wyoming refiners and the Mid-Continent refiners. Up to the new year of 1928, the Wyoming refiners have been able to sell this territory in spite of the efforts of the Mid-Continent refiners and the Wyoming refiners have sold on through Nebraska and in 1927 were selling in Iowa and Minnesota against the Mid-Continent shipments.

North and South Dakota have always been fertile markets for Wyoming gasoline and lubricants although North Dakota is now in competition between Montana and Wyoming refiners to some extent. The recent purchase of the Argo Oil & Refining Company's warehouses and filling stations by the Midwest Refining Company will, it is believed, do away with much competition against Wyoming products in Montana and North Dakota.

One refining company of Wyoming has invaded the former California markets on the northwest Pacific coast. This company is now marketing Wyoming petroleum prod-

ucts in Oregon and Washington in successful competition with tanker shipments from southern California points. This same company is also exporting into Canada in spite of the long freight haul and the Canadian refineries.

Crude oil shipments outside of the State of Wyoming are relatively small compared to the total production. The Mule Creek and Osage fields ship practically all the oil produced to Canadian refineries for treatment. The Rock River and Lost Soldier fields export a portion of the production to Utah for refining and all of the LaBarge and Spring Valley field oil is also sent to Utah. Shipments from other fields were made in 1927, but these were more or less sporadic and only to fill a sudden requirement that would not be lasting.

#### WYOMING OIL DEVELOPMENT

Petroleum was known in Wyoming before the advent of the white man. The oil seeps in what is now known as the Dallas Field were used by the Indians to anoint the leg joints of their ponies under the impression that the oil would enable the animals to travel faster. Instances are on record where the early emigrants on their way to California and Oregon obtained lubricants for their wagons at some of the oil seeps in this State.

Many attempts were made to interest capital in Wyoming's oil structures. The early endeavors failed in attaining their end through lack of financial aid to bring to successful conclusion the developments that were started.

The entrance of the larger oil interests into the Wyoming territory about 1916 and 1917, gave the needed impetus to bring about development on a commercial scale that insured a bright future for the State from its petroleum deposits.

However, the factors that prevent the small operator from developing the prospective oil territory in Wyoming still exist in the form of high freight rates on material and equipment, deep drilling in many areas which in turn requires such heavy outlay of money that the small capitalist is unable to carry the burden and transportation of the petroleum after it has been brought to the surface.

Even the large oil firms find the heavy overhead costs a serious burden and any means that may lower the cost of field development would be welcomed by them. For this reason, the needs and possibilities of innovations in field operations has been given considerable study by the

State Oil and Gas Inspector in his regular trips over the State.

On account of the above statements regarding costs of operation, Wyoming and the Rocky Mountain Region is generally known through the oil regions elsewhere as a "rich man's territory," meaning thereby that large capital is required to develop the oil and gas fields of this State.

The first large contract for crude oil from Wyoming was made between the Ohio Oil Company, a Standard subsidiary, and the Imperial Oil Company of Canada, by which the Imperial Oil Company was to receive and pay for one million barrels of oil. This contract was filled with oil from the Grass Creek Field in the Big Horn Basin and was the primary enterprise of the oil operators of this State on a large scale.

After the Ohio Oil Company had developed the Grass Creek Field to complete its contract with the Canadian interests, the Standard Oil Company of Indiana became interested in the development of the great Salt Creek Field and this led to the absorption of the Midwest Refining Company's holdings by the Standard Oil Company of Indiana and the building of a larger refinery at Casper. Later the Greybull Refinery was taken over by this company and a new refinery built at Laramie, so that the Standard Oil Company of Indiana was able to refine the crudes produced in the three great divisions of Wyoming, the southern part of the State, the central area, and the Big Horn Basin.

Owing to the small population of the State of Wyoming, a market for the petroleum produced in our State could not be had within the boundaries of our commonwealth and the markets of this Nation were well supplied with petroleum products from other regions. The Standard Oil Company of Indiana, through its great resources, was able to secure a market in Europe for the products of Wyoming's oil fields and by arranging special rates on oil shipments in train-load lots, this firm was able to deliver the products of its refineries in Wyoming to seaboard at Baton Rouge, Louisiana, for trans-Atlantic shipment to European ports. Later the heavy overproduction of crude oil in other regions, as mentioned previously, caused a glut in the crude petroleum market and enabled other refining companies in the Mid-Continent region to crowd out the Wyoming oil products and take over the European markets supplied by the Standard Oil Company of Indiana.

This resulted in a sudden stoppage of production both in the Salt Creek and other fields of central Wyoming to

a minimum until a new outlet could be found for the production. By the middle of the year 1928, other markets had been found and the refineries were again coming back to normal in operation while the fields were being produced at a point above the minimum production.

The present trend of the oil market appears to be upwards. It is quite evident that the conservation measures taken by the oil operators themselves or the States where the oil operators have not made such moves, have tended to stabilize the oil market to such an extent that there is a strengthening all along the line of oil products and even an increase in the market in some cases.

This condition could be hurt immensely in a very short period simply by opening the wells that are now shut in and throwing the accumulated production held in storage on the market, however there is no indication that any such event will take place.

California has closed in, through her State Conservation Department, a large proportion of the oil production in her fields. Oklahoma and Texas are now completing the details for a general restriction of oil production in the Mid-Continent Fields, and, except in the case of Oregon Basin, the Wyoming oil operators have voluntarily closed in surplus production or stored it in tankage rather than sell on a weak market.

With the Mid-Continent fields pro-rating their production and the Wyoming oil operators continuing the course they have laid out for themselves, there is little doubt but that the oil market will shortly assume a strength it has not had for the past three years and indications are already noticeable that an advance in the crude market will be had soon.

As soon as the oil market shows a tendency to advance, leases and holdings on probable oil structures in Wyoming will come into demand. This will bring a campaign of wildcatting in this region in an effort to discover new oil fields and such conditions may become prevalent in the spring of 1929 unless a great new field similar to Seminole in Oklahoma or the fields about Amarillo, Texas, again floods the market with crude at a time when it is just recovering from a former flood.

One of the most prominent threatened floods of oil that may affect the present stability of the market for petroleum and its products is thought by experienced oil men to lie in the South American oil regions that have been recently discovered and are now under process of development.

Of these, the newly opened fields of Venezuela appear to cause the greatest concern. It is reported that these new fields possess unlimited quantities of petroleum and that same may be delivered at Baton Rouge for import into this country at lower cost than Salt Creek crude can be delivered to refining points outside of Wyoming.

## FUTURE INVESTIGATIONS

### Sulphur

In order to reduce the cost of field operations in the fields of Wyoming, the State Oil and Gas Inspector has conducted some experiments looking to the use of sulphur instead of cement in the setting of casing in the wells and this has resulted in evolving a theoretical use of sulphur for this purpose that is much superior to the present method of using Portland cement for the shutting off of water in wells.

When the regular Portland oil well cement is used in wells to fix the casing and shut off water flows, the cement will not make a perfect bond with shale, especially the shales of the Cretaceous strata. Samples of shales bonded with cement such as is used in oil wells and drilling wells show that the bond between the cement and the shale will readily come apart. Similar experiments carried on with melted sulphur show that the shale and sulphur joint is much more cohesive and that the shale or sulphur backing will break before the bond gives away.

In using sulphur in cementing wells, the sulphur would be placed in the well in a melted state and allowed to cool and set. According to the experiments carried on in this matter, it should form a perfect shut-off for the casing.

If at any time, the casing should be required to be moved, the sulphur could be brought to a liquid state again by simply heating same to 218 degrees F., this temperature being the melting point of sulphur. The casing could then be recovered from the well or set at a lower point to shut off another influx of water. Numerous heaters are now on the market for heating oil sands in wells that would be suitable for heating a sulphur cement as outlined above. At present, the methods of removing casing from a well when same is being abandoned consists in shooting a part of the casing off that is held by the Portland cement and recovering what the shot does not damage. This method is to be condemned as being very costly and uneconomical.

It is only in use because there is no other tried method by which the casing in a well can be recovered.

Sulphur for use in the above described process can be obtained, it is reported, from deposits near Thermopolis and Cody, in the Big Horn Basin.

This substance has been known as a cement and binder from the early history of civilization down through the ages to the present time. Sulphur is still used at a binder or cement in many trades and materials. A test made by using sulphur as a binder for bricks instead of mortar showed that the bricks would break before the bond would pull apart, however it will not stand heat. Sulphur is used in cementing anchor bolts in holes drilled in rock and tests have shown it to be an excellent material for this purpose.

In case actual practice would follow the experimental tests made with sulphur, in the oil fields, the annual saving in operation costs to the oil men and companies of Wyoming would reach more than a million dollars per year.

#### Carbon Dioxide

In the State of Colorado, close to the southern boundary of Wyoming, a well was drilled two years ago that produced carbon dioxide gas instead of the usual hydrocarbon gases. This well is still producing this gas in large quantities and recent information furnished by the owning firm disclosed that there appeared to be no diminution in the gas flow since the well was first opened.

Carbon dioxide is now being manufactured in several of the larger cities of the Nation and is marketed under the name of "dry ice" as blocks of compressed carbon dioxide snow. Its advantage over common ice is that it will give a more intense cold, last longer than ice made from water and does not give off water or moisture when melted.

It is being used in soda fountains in the cities where it is marketed and tests made with compressed carbon dioxide snow in the ice tanks of refrigerator cars show that cars iced with this substance can go from New York to San Francisco without replenishing the material. This insures a great saving to the railroads and shippers of perishable foodstuffs.

It is believed that carbon dioxide gas may be discovered in Wyoming and the State Oil and Gas Inspector believes that a lucrative industry could be made by utilizing any such gas flows to produce the compressed carbon dioxide snow on a commercial scale.

#### Helium Gas

Helium gas is now in great demand for use in dirigible air ships and its production is limited to a certain area in the State of Texas. The production at this point is limited and the cost of production is high, so that other sources of helium gas are being eagerly sought for in the Mid-Continent fields.

There is no known reason why this gas should not be contained in some of the gas productive areas of Wyoming, some tests have been made to ascertain whether some of the gases of this State contain helium but the results so far have been nil. However, it is the belief of the State Oil and Gas Inspector that such gas exists in Wyoming and that tests should be made of every gas flow from wells within the boundaries of Wyoming to determine the helium content.

#### PETROLEUM AND HIGHWAYS

At present, the crying need in Wyoming and many other States in the West is adequate highways to carry the traffic and trade of this vast region. Transportation is civilization and today our civilization is depending more and more upon highway transport as auto trucks are being used more extensively for the carrying of our goods and chattels.

In the Pennsylvania Broad Street Station in Philadelphia, on the esplanade stands a massive sculptured statuary depicting the progress of transportation. Leading the long line is a small child with an airplane in his hands, behind him is a larger lad with an auto, then a hercules representing the railroads. After the railroads comes the horse drawn vehicles and then the patient oxen drawing the heavy wagons of ancient days. Behind these come the cumbersome coaches of the rich and mighty of former ages, the sedan chair and, lastly, the weary foot traveler.

The artist, in his conception, struck a deeper note than the mere showing, in an allegorical way, how civilization improved its methods of getting from one place to another. He brought forth in this statuary a statement that has been accepted as a fact in many places, namely that transportation is civilization. From this fact as a base has developed the accepted theory of our present day cosmos that anything that saves time increases our cosmic civilization. Proofs are noticeable on every hand, our high speed trains and airplanes connect our most highly civil-

ized areas while the slower trains and service of other parts attend a relatively lower plane of improvement. If every home in a farming community could have the same service of transportation as the large cities, our farm homes would be equipped with as modern conveniences as the city's apartments.

#### New Highway Era

We, here in the Rocky Mountain Region, are now entering upon an era of improvement in transportation. Ten years ago the Yellowstone Highway from Casper to Thermopolis was merely a name for a rough trail through the sage. Its markings consisted of a few stones painted yellow and with a black letter H.

The contrast between that road and our present Yellowstone Highway is striking in the extreme. The Wyoming State Highway Department has built a graded and gravel-surfaced road where the sage brush trail formerly meandered over the plains and all over the State the network of improved highways now afford easy transport to the public compared to former years. We now spend hours in going from one point to another where formerly it took days.

The State Highway Department of Wyoming had to pioneer in its road building the same as the early inhabitants who first settled the Atlantic Seaboard had to pioneer in the early American wilderness. The present highway departments of the eastern states have a well established system ready to hand and their work is mainly upkeep. Here in the West however, we have to start where our eastern forefathers started a century or more back and with conditions that they never encountered nor made rules to govern. For instance, our country is largely made up of volcanic detrius which is the poorest material imaginable for the building of permanent roads and highways. This type of soil wads when wet, its resistance to traffic impact diminished to a negligible quantity with a slight rain and it collects on the wheels of traffic until the most powerful vehicle is stalled.

#### Grading of Roads

The first rule of highway construction is to keep the base or bed of the road dry. If this can be done, a permanent highway is a relatively small problem, other factors being equal. Early highway construction attempted to solve this problem by making the center of the road

higher than the edges, thus draining the rainfall to the gutters. While this was immensely better than the uncrowned road, it failed largely because of the pervious nature of the soil and to remedy this latter fault, a covering of various substances and materials was used.

Crushed stone material for roads formed the best and cheapest roads up to the time of the advent of the automobile. However, the latter created new problems for the highway engineer that could not be solved by the Macadam form of construction. In the slow moving traffic of the horse age, the friction of iron tires with the road bed tended to crush the stone material to a finer size and this finer material gravitated to the voids or spaces between the larger pieces and thus formed a solid footing.

#### Effects of Automobile Traffic

With the advent of the automobile with its large, soft tire of rubber and higher speed, it was found that the Macadam roadbed of crushed stone disintegrated quickly under the new type of vehicle. The reason was not hard to find; as an automobile passes over a piece of road, the tire gives under the weight of the car and spreads over an area of the roadbed. As the wheel turns, the portion of the tire in connection with the roadbed leaves the road, but at the same time, a suction is created by this action which pulls out the fines in the voids between the larger pieces of the surfacing material. The action is much the same as when a piece of rubber is dampened and placed on a piece of glass, the vacuum created between the glass and the rubber is sufficient to lift considerable weight.

When a dust cloud is apparent behind an automobile, this sucking action is taking place on the road and the resultant dust is usually blown by the winds to adjacent country where it is not needed and away from the highway where it should be retained to fill the interstices between the larger particles of roadbed material.

Many substances have been tried to remedy this fault, but all highway engineers are generally coming to the conclusion from many thousands of tests that asphaltic oil produces the best binder to be had for the expenditure made.

#### Difference in Oils

There are two classes of petroleum oils, paraffine and asphalt. The paraffine oil is in greater demand and use because of its easier refining qualities and better products for most purposes. However, a paraffine base crude does not give a residue after distillation that will make a suit-

able binder for roads. To the uninitiated, a sample of a paraffine base residuum and a like sample from an asphaltic crude oil appear to have the same qualities. In actual use however, the paraffine base residuum will not hold the particles of road material in cohesion as does the asphaltic oil. For this reason the sentiment is swinging away from the paraffine base residuums and the asphaltic base bottoms are being called for by the highway construction engineers. For this reason Salt Creek, Big Muddy and Rock River in Wyoming will not furnish oils for our highway construction.

The State of Wyoming is blessed however with many asphaltic oil fields that could yield on demand a copious output of asphaltic base oil very suitable for highway construction. As there is a difference in the oils from the various paraffine base fields of this State, so there are similar differences in the asphaltic oils produced here. Salt Creek crude has a wholly different content of paraffine from Big Muddy or Rock River. Grass Creek light oil has a much higher gravity than either of the other fields mentioned.

Hamilton Dome Field produces a rather high gravity asphaltic oil while Maverick Springs crude is a heavy tar oil as it comes from the wells, so it runs; over our whole State we can supply almost any grade of asphaltic oil called for from a 50 degree gravity crude that is produced in Elk Basin, down to a 12 or 15 degree gravity tar that is so thick it collects on the drilling tools in wads and drops off in semi-solid lumps.

#### Natural Road Oil

Some of this asphaltic oil can be used as it comes from the well, on highway construction, other crudes must have some constituent parts removed before they are suitable for the Highway Engineer. The lighter gravity crude must have the gasoline and kerosene content taken out by distillation before it reaches the consistency required for highway use. The contained gasoline and kerosene or naphtha content will, in almost every crude tested here, pay for the cost of this treatment and allow a profit to the refiner.

In making use of an asphaltic base oil as a binder for the fines in road surfacing, the common practice is to have the oil delivered on the work in tank trucks, and then spread on the road with a special truck carrying a heating apparatus and pump to deliver the oil steadily and evenly. The oil is brought to the work from the refining points or

fields by rail or by direct truck haul, depending upon the location of the work.

The road surface is scarified to a depth of about four inches and the oil is applied direct to this loose surfacing, after which it is mixed by harrowing and the use of the blades in turning the loosened material so as to impregnate the whole mass with the oil. After thoroughly mixing, the material is then spread evenly and bedded to a smooth surfacing by the traffic or rolling. With modern equipment, the cost of this kind of highway construction has been brought to a point that it can be recommended on economic grounds for every graded road in Wyoming.

For several years past, the asphaltic or black oils of the Rocky Mountain fields have been hampered by the small demand. The production of the light oils was such that this source easily supplied the needs of the markets to be reached handily, with the oil products of commerce. Most of the black oil fields are therefore shut down and some have never even been produced except to furnish fuel oil for the field development itself. Wyoming therefore finds itself with a superabundance of this grade of oil and what appears to be a great outlet forming through the experiments being carried on in this and other states in highway construction.

#### Wyoming Experiments

The experiments carried on in Wyoming by the State Highway Department were made in the central part where the ordinary road material is possibly the worst to be found in the State. One of the roads bearing the heaviest traffic was selected, this being a portion of the Casper to Salt Creek Highway. Part of this highway is paved with asphalt pavement laid on a concrete base and the highway engineers proposed to lay an asphalt oil and gravel mat for the remaining distance from the end of this pavement to the Salt Creek Field.

Another experiment was the laying of an asphalt and gravel mat on the Yellowstone Highway west of Casper to Natrona, about 30 miles distant from Casper city. The following statistics are taken from the results of these two experiments in road building with asphalt oils and are typical as to costs for any part of the State.

The Casper to Salt Creek highway was first tried with a concrete pavement. A double width roadway was laid for about five miles, but the cost of this was prohibitive when the length of this highway was considered, also

the concrete disintegrated under the heavy traffic on account of insecure foundation over areas of shale.

#### Trial of Different Kinds

Concrete slabs, precast and then hauled to location were then tried, but this form also became prohibitive on account of the high cost. At last it was decided to try an asphaltic concrete on top of the cement concrete and this has given perfect satisfaction where before the cement concrete by itself failed. However, the later experiments where an asphaltic oil and gravel mix is placed direct upon the road is proving quite as satisfactory as the concrete or concrete and asphalt mix and the expense is far below either of the concrete or the concrete and asphaltic roadway.

The gravelled roadway is cheaper to put down than the gravel and asphalt mix, but in a few years' time, the upkeep of the gravel highway including the replacing of the gravel thrown off the road by the traffic, will surpass even the cost of a concrete highway. Gravel highways lose one inch every year under ordinary traffic conditions for country roads. Dirt roads cost about \$1,000 per mile in maintenance but are quite unsatisfactory in wet weather and also in cost of upkeep. The cost of an asphalt and gravel mix on a dirt road is from \$1200 to \$1500 per mile, this considers a three inch mat 18 feet wide.

In experimenting with asphaltic road oils and tars to date in Natrona County, the amount of oil to be used for best results seems to be three gallons to each running foot of highway, or about 15,000 gallons of oil to the mile.

Taking as an example the first of the projects on the Yellowstone Highway west of Casper. This project has 133,740 square yards of surface to be oiled and at the rate of three gallons to the running foot of highway, this project would require some 200,000 gallons of road oil. As a matter of fact, after this road was completed it was found that a total of 193,698 gallons was actually used, the rest being saved through a slight adjustment in the valves of the distributing truck. The costs of this particular stretch of highway was as follows:

Cost of oil at the refinery-----	.04	per gallon
Freight and demurrage to loading station -----	.0067	per gallon
Heating and loading on trucks--	.0012	per gallon
Hauling and distribution-----	.0119	per gallon
Pro rata camp expense-----	.0014	per gallon
Total cost per gallon of oil delivered on job-----	.0612	per gallon

This particular stretch of highway work is 11.398 miles long and the total expense was \$16,050.36 or a per mile cost of \$1,408.17 and a cost per square yard of surface of 12 cents.

A second example is given in the costs of a second stretch of the Yellowstone Highway comprising about four miles and also just west of Casper.

Cost of oil at the refinery-----	.04	per gallon
Freight and demurrage-----	.0077	per gallon
Heating and loading-----	.0033	per gallon
Hauling and distribution-----	.0116	per gallon
Pro rata camp expense-----	.0013	per gallon

This gives a total cost of oil delivered on work ----- .0639 per gallon

This stretch of highway is 3.475 miles long and the total cost was \$4,059.20 with the cost per mile at \$1,213.12 and a cost per square yard of .1106 cents.

Now the total cost of asphalt oil delivered on these appears to be somewhat in excess of the field prices. The present field price of asphalt oil at Lander is ninety cents, at Poison Spider, one dollar, and some producers in Oregon Basin are selling their oil at fifty-three cents while others are getting eighty-five cents. It is noticeable, however, that no black oil quotations are more than one dollar per barrel for a barrel of 42 gallons.

#### Price of Road Oil

Taking one dollar as a base price, this grade of oil can be had at about two cents per gallon. Its naphtha and lighter oil content can be skimmed out at a profit, leaving the cost of the oil to the refiner very low. In fact, some contracts for asphaltic road oil have been delivered in Wyoming from California at two cents per gallon F. O. B. Wyoming railroad point.

With one dollar as a base price for his crude, the average operator in any of the black oil fields in Wyoming can produce his oil at a profit and the black oil fields are laid out over the State in such a way as to reach nearly every part of our commonwealth with comparative ease by motor truck haul. There are a few points such as the Jackson Hole country, the upper Wind River region, the Cheyenne district and the area along the Idaho line that do not fall under this classification, but the rest of the State can be reached from local fields.

Montana has made some tentative experiments similar to Wyoming's with asphaltic road oil and the people of that State are so well pleased that the Kalispell Chamber of Commerce recently went on record petitioning the State Legislature to advance the present tax on gasoline sales from three cents to five cents in order to reduce the time of completion of the road program for making oil gravel roads.

Inquiries from Nebraska indicate that a demand for this road oil will come to Wyoming next season for the building of roads in that State and South Dakota is making similar examinations.

A new industry is therefore apparent in the near future for Wyoming. Up to now we have had such a small demand for black oil as to be practically negligible, now it seems that not only will we build our highways with a product we had no use for before, but this same product will bring trade to our State from other commonwealths, trade that will employ our workers who would otherwise be idle.

List of oil operators and oil companies operating in Wyoming oil fields and wildcat districts in the past five years:

Name	Officer or Agent	Address
Adriance, Joseph		523 Park Ave., Casper, Wyo.
Akers, A. A.		Hanna, Wyoming.
Alaska Development Co.	A. C. Hanson, Pres.	Box 693, Casper, Wyo.
Alkali Butte Oil Co.	Lee Champion, Pres.	Denver, Colo., and Riverton, Wyo.
Akin Butte Oil Co.	W. T. Chealey, Agt.	Calpet, Wyo.
All American Oil Corp.	John Bryne, Pres.	317 Symes Bldg., Denver, Colo.
Amalgamated Royalty Corp.	W. D. Waltman, Pres.	1st Nat. Bank Bldg., Denver, Colo.
American Workers Oil Fields Co.	B. H. Offutt, Pres.	Bremerton, Wash.
Anna Belle-Wyoming Oil Co.	W. E. Patton, Pres.	Rawlins, Wyo.
Anderson, P. P.		220 Midwest Bldg., Casper, Wyo.
Apex Refining Co.	J. W. Crapsey, Pres.	Basin, Wyo.
Argo Oil Co.	Max W. Ball Herman C. Crile, Agt.	421 E. 18th Ave., Denver, Colo.
Argonaut Petroleum Co.		Denver, Colo.
Associated Oil Co.-Wyo.	H. W. Gray, Mgr.	Roswell, N. M., and Midwest Bldg., Casper, Wyo.
Associated Producers Synd.	Will F. Kahl, Pres.	Osage, Wyo.
Bair Oil Co.	H. E. West, Pres.	79 New Montgomery St., San Francisco, Cal.
Bear River Oil Co.	Midwest Refg. Co.	and Rock Springs, Wyo.
Beerits, J. H. Co.		Calpet, Wyo.
Beneficial Oil Co. of Ogden, Utah	A. G. Burritt, Agt.	Parco, Wyo.
		1st Nat. Bank Bldg., Denver, Colo.
		Box 1123, Casper, Wyo.
		c/o W. B. Seoville, LaBarge, Wyo.

Name	Officer or Agent	Address
Bessemer Oil Syndicate		Rm. 10, Smith Bldg., Casper, Wyo.
Bethlehem Oil & Gas Co.	W. S. Buckingham, Pres.	Cheyenne, Wyo.
Big Bear Oil Co.	Wm. G. Krape, Mgr.	950 G. & E. Bldg., Denver, Colo.
Big Horn Development Co.		Thermopolis, Wyo.
Big Indian Oil & Gas Co.	Sidney Eastwood, Pres.	804 Interstate Trust Bldg., Denver, Colo.
Big Piney Oil Co.	John D. Ford, Gen. Supt.	1004 Patterson Bldg., Denver, Colo.
Blackstone Petroleum Co.	R. M. Birek, Pres.	510 Foster Bldg., Denver, Colo., and 512 E. 47th St., Chicago.
Blackstone-Salt Creek Oil		P. & R. Bldg., Casper.
Boston-Wyo. Oil Co.	O. H. Williams, Pres.	1st Nat. Bank Bldg., Denver, Colo.
Bradford-Wyo. Oil Co.		327 P. & R. Bldg., Casper, Wyo.
Brennan, Clyde		Natrona, Wyo.
British Assoc. Oil Co. Ltd.	Maurice Singer, Mgr.	29 Regent St., London, and Thermopolis, Wyo.
Buck Creek Oil Co.	A. E. DeRicques, Pres.	Continental Oil Bldg., Denver, Colo.
Buffalo Basin Oil Co.	S. A. Lane, Pres.	Townsend Hotel, Casper, Wyo.
Burke Oil Co.	S. H. Keoughan, Pres.	1st Nat. Bank Bldg., Denver, Colo.
Burnside Oil Co.	C. D. Zimmerman, Pres.	Somerset, Pa., and Lander, Wyoming.
California Company		Box 846, Colorado, Tex.
	G. N. Larson	Box 1125, Kemmerer, Wyo.
		Billings, Mont.
		225 Bush St., San Francisco, Cal.
California Oil Co.-Wyo.	I. T. Brockett, Pres.	San Diego, Cal., and 404 Con. Roy. Bldg., Casper, Wyo.
California Pet. Corp.-Utah		Kearns Bldg., Salt Lake City, 1001 Security Bldg., Los Angeles, Cal.
		Calpet, Wyo.
Carrington, Jos. P.	J. R. Chase	1020 Patterson Bldg., Denver, Colo.
Carter Oil Co.		26 Broadway, New York City.
	R. W. Loucks, Supt.	206-211 Midwest Bldg., Casper, Wyo.
	J. R. Freeman, A. Pettier, Pres.	Tulsa, Okla.
Casper Oil Fields Co.		Townsend Bldg., Casper, Wyo.
Cat Creek Oil Co.		306 Con. Roy. Bldg., Casper, Wyo.
Central Wyoming Co.		1st Nat. Bank Bldg., Denver, Colo.
Chappell Oil Co.		701 U. S. Nat. Bank Bldg., Denver, Colo.
Circle Oil & Gas Co.	J. C. Theriot, Supt.	Box 45, Calpet, Wyo.
Clay Spur Refining Co.	L. Erickson	Osage, Wyo.
Cody Petroleum Co.	Lou Nixon, Supt.	Box 529, Cody, Wyo.
Colonel Kevin Oil Co.	E. C. Carney	837 Plymouth Bldg., Minneapolis, Minn.
	L. Erickson	Osage, Wyoming.
Columbine Oil Co.	E. T. Williams, Pres.	512 Detwiler Bldg., Los Angeles, Cal.
Columbus Oil Co.	R. W. Sole	Box 747, Thermopolis.
Comet Oil Syndicate		415 Con. Roy. Bldg., Casper, Wyo.
Conger, G. C.		Cumberland, Wyoming.
Connell, Mrs. M. B.		Box 330, Evanston, Wyo.
Consolidated LaBarge Drlg. Co.	N. A. Glasso, Pres.	612 Midland Savings Bank, Denver, Colo.
Consolidated Royalty Co.	B. B. Brooks, Pres.	401 Con. Roy. Bldg., Casper, Wyo.
Continental Oil Co.		Continental Oil Bldg., Denver, Colo.
	J. J. Foley, Agt.	Albuquerque, N. M.

Name	Officer or Agent	Address
Continental Oil Prod. Co.	(Cont. Oil Co.)	Above address, and Box 548, Midwest, Wyo. Kemmerer, Wyo.
Cretaceous Oil Co.	Chas. Lackey, Agt. (New York Oil Co.)	Casper, Wyo.
Curtis Petroleum Co.	R. H. Nichols	St. Louis, Mo.
Dakoming Oil Co.	Eugene H. Angert	Lander, Wyo.
Dallas Dome-Wyo. Oil Fields Co.	Frank M. Brooder, G. M.	Kemmerer, Wyo.
Davis, Apperson & Murphy	L. W. Davis, Fld. Supt.	LaBarge, Wyo.
DeFontaine Prod. Co.	M. H. Magie	Evanston, Wyo.
Delaney, N. J.	(No. Casper Crk. Synd.)	Casper, Wyo.
Denham, J. E.		
Denver-LaBarge Oil & Gas Co.	Will F. Kahl, Pres. (See Dunne, Thos.)	Tulsa, Wyo.
Derby Dome-Wyo. Oil Co.	E. J. Campen, Pres.	Denver, Colo. and Douglas, Wyo.
Derrick Oil Co.		Smith Bldg., Casper, Wyo.
Domino-Bessemer Assn. Domino-Wyo. Oil Co.	A. E. Winter	201 Con. Roy. Bldg., Casper, Wyo.
Dunne Oil Fields, Co. (Dunne, Thomas)	Porter B. Coolidge	Lander, Wyo.
Durm Oil Co.		306 Con. Roy. Bldg., Casper, Wyo.
Duthie Oil Co.		Box 1832, Seattle, Wash. Cheyenne, Wyo.
Eclipse Oil Co.	C. G. McCoy	Midwest, Wyo.
Elk Basin Cons. Pet. Co.		Baird, Wyo.
Elk Butte Oil & Gas Co.		Midwest, Wyo.
Elkhorn Oil Co.		1st Nat. Bank Bldg., Denver, Colo.
Empire State Oil Co.	W. S. Kimball, Pres. Dan Allen Curtis, Pres. H. D. Curtis	Cody, Wyo.
Enalpac Oil & Gas Co.	Franco-Wyoming Oil Co.	Casper, Wyo.
Essex Oil Co.	G. W. Metcalf, Pres.	Jamestown, N. Y.
E. T. Williams Oil Co.		Box 693, Thermopolis, Wyo. Casper, Wyo.
Euelid Oil Co.	Wm. Sayre, Pres. M. F. DeBolt, in chg. (Continental Oil Co.)	Douglas, Wyo.
Eureka-Wyo. Pet. Co.		P. & R. Bldg., Casper Box 11, Midwest, Wyo.
Evans Oil Corp.	L. O. Goodman, Pres.	Osage, Wyo.
Falk, Martin F.		Continental Oil Bldg. Denver, Colo.
Fargo-Western Oil Co.	W. D. Weathers	Butte, Mont.
Federal Drilling Co.	G. L. Brown	Casper, Wyo.
Fensland Oil Co.		Lander, Wyo.
Ferdig, S. C.	H. L. Garner	219 Con. Roy. Bldg., Casper, Wyo.
First Change Oil Co.	Ivan S. Jones	Box 164, Evanston, Wyo.
Five Tribes Petroleum Co.	E. J. Sullivan	P. & R. Bldg., Casper, Wyoming.
Fletcher Oil Co.		Cody, Wyo.
Flinn, Ralph		Kemmerer Hotel, Kemmerer, Wyo.
Fontaine Prod. Co.	J. W. B. Milligan, G. M.	Rawlins, Wyo.
Fontenelle Oil Co.	Glen Watson, Supt.	Thermopolis, Wyo.
Ford D. W. Oil Co.		Torrington, Wyo.
Foreman Synd., The	L. A. Whipple	Kemmerer, Wyo.
Fossil Oil & Refg. Co.	R. L. Paynter, Pres.	Kemmerer, Wyo.
Francis Oil Co.	J. A. Minton, Mgr.	309 1st Nat. Bank Bldg., Denver, Colo.
Frantz Corporation		Cat Creek, Mont. Casper, Wyo.
Frontier Oil & Gas Synd. General Pet. Corp.-Colo.	G. M. Bowen (Taken over by Indian Pet. Corp.)	Thermopolis, Wyo. Box 851, Rawlins, Wyo.
Glendo Oil, Gas & Pet. Co.	Fred Hogg, Pres.	Wheatland, Wyo.
Glenn Oil Company	G. C. Thompson	Box 455, Osage, Wyo.
Glenrock Oil Co.	(Absorbed by Argo Oil Co.)	Box 1132, Casper.
Glenrock Oil & Gas Co.	John E. Higgins, Pres.	Glenrock, Wyo.

Name	Officer or Agent	Address
Glenrock Refining Co.	(Absorbed by Continental Oil Co.)	Glenrock, Wyo.
Goldberg, M. J.	A. B. Cobb, Fld. Supt.	Kemmerer, Wyo. Box 312, Rawlins, Wyo.
Good, E. R. Oil Co.	(See Wyoming United Oil Co.)	
Goshen Wyoming Oil Co.	(See Consolidated Royalty Oil Co.)	
Grass Creek Oil & Gas Co.	(See Continental Oil Co.)	
Grass Creek Petroleum Co.		c/o Casper Realty Co. Casper, Wyo.
Grude Oil Co.		Idal Bldg., Denver. 4th and Boston Sts., Tulsa, Okla.
Gypsy Oil Co.	F. P. Rushmore	Rock Springs, Wyo.
Hall, E. B.		309 1st Nat. Bank Bldg., Denver, Colo.
Hamilton Oil Corp.	Montaca Oil Co.	P. & R. Bldg., Casper, Also Midwest, Wyo.
Hardendorf, A. J.		427 Ford Bldg., Great Falls, Mont.
Hardrock Oil Co.		Rawlins, Wyo.
Hatfield Oil Co.	G. M. Bergen (J. R. Chase)	1020 Patterson Bldg., Denver, Colo.
Henderson, Wm. R.		Lovell, Wyo.
Hoskins, W. S.		Montana Bldg., Lewistown, Mont.
Hover-Schwartz Oil Co.		Lander, Wyo.
Hudson Oil Co.	E. H. Fourt, Pres. (Operated by P. & R. Corp.)	Box 494, Rawlins, Wyo.
Indian Petroleum Corp. Iowa-Wyoming Oil Co.	E. D. Milliken, Pres.	403 1st Nat. Bank Bldg., Denver, Colo. and 331 Midwest Bldg., Casper, Wyo.
Isenberg-Littlefield Oil Co.		510 Foster Bldg., Denver, Colo.
Ivanhoe Oil & Gas Co.	E. C. Keith, Pres.	Townsend Bldg., Casper, Wyo.
Jarvis, George	(Spindle Top Oil Co.)	Casper, Wyo.
Johnson, A. R.	R. R. Schull, Supt.	Box 223, Evanston, Wyo.
Jupiter Oil Co., The	C. W. Sparr	401 Con. Roy. Bldg., Casper, Wyo.
Kampf, F. W.		Box 922, Cheyenne, Wyo.
Kanawha Oil Co.	R. L. Pattison, Pres.	Box 1158, Cheyenne.
Kasoming Oil Co.	O. E. Garretson	Box 1, Parco, Wyo.
Kemmerer-LaBarge Oil Co.	C. G. McCoy	Baird, Wyo.
Keystone Oil & Refg. Co. of Wyoming	E. L. Smith, Sec'y.	Kemmerer, Wyo.
Kinney-Coastal Oil Co.	F. VonTacky, Pres.	Milwaukee, Wis.
LaFleiche Oil Co.	Pierre LaFleiche	1st Nat. Bank Bldg., Denver, Colo.
Lake Valley Oil Co.	G. H. Huthman, Pres.	Box 746, Midwest, Wyo. Casper, Wyo.
Lance Creek Syndicate	J. O. B. Keener (See Lumberman's Oil Corp. of America)	Osage, Wyoming.
Lance Creek Royalties Co.	C. D. Zimmerman, Pres.	810 Guaranty Bldg., Portland, Ore.
Lander Valley Petroleum Co.	E. A. Gustin, Pres.	Rawlins, Wyo.
LaPas Oil Co.	J. E. Nelson, Sec'y.	Douglas, Wyo. Lander, Wyo.
Laramie Oil Dev. Co.	David Reid, Pres.	1044 E. 1st St., Casper, Wyo.
Legion Oil Co.	J. M. Douglas, Pres.	Rm. 4, Converse Bldg., Laramie, Wyo.
Lost Well Oil Co.	W. F. Shipton, Pres.	306 Con. Roy. Bldg., Casper, Wyo.
Lox Syndicate, Inc.	J. L. Crawford, Pres.	Riverton, Wyo.
Lumberman's Oil Corp. of America	A. P. Nesbit, Pres.	Duluth, Minn., and 203 W. 2nd St., Casper, Wyo.
Lusk Pet. Co.	B. A. Hopkins, Pres.	307 O-S Bld., Casper, Wyo.
M. & M. Coal & Pet. Co.	W. O. Meier, Pres.	1st Nat. Bank Bldg., Cheyenne, Wyo.
Mahoney Dome Syndicate	Jas. Rendel	Thermopolis, Wyo. c/o Stockman's Loan Co., Stock Yards, Denver.

Name	Officer or Agent	Address
Mammoth Oil Co.	O. E. Dougherty	45 Nassau St., New York City. Continental Bldg., Box 1859, Casper. Box 365, Rawlins, Wyo.
Major Oil Co. Manewal-Bradley Co. Marine Oil Co. McConnell, G. R. McGonagle, G. F.	W. J. Bradley	Osage, Wyo. Box 1132, Casper. Laramie, Wyo. Patterson Bldg., Denver, Colo. Con. Roy. Bldg., Casper, Wyo.
McPherson Syndicate	Angus McPherson, Pres.	Daly Bldg., Casper. Douglas, Wyo. Glenrock, Wyo. Continental Oil Bldg., Denver, Colo. Billings, Mont. 1st Nat. Bank Bldg., Denver, Colo. Same Address Same Address, also Casper, Wyoming, and Various Field Offices. Cottman Bldg., Casper, Wyo. Box 434, Craig, Colo. Thermopolis, Wyo. Oshorne Bldg., Rawlins, Wyo. Kemmerer, Wyo. 396 Con. Roy. Bldg., Casper, Wyo. Rock Springs, Wyo. Box 1132, Casper, Wyo. P. & R. Bldg., Casper. 626 1st Nat. Bank Bldg., Denver, Colo., also Casper, Wyoming. 1st Nat. Bank Bldg., Denver, Colo. Box 1105, Casper. Continental Oil Bldg., Denver, Colo., and Columbine, Wyo. Riverton, Wyo. Rm. 10, Smith Bldg., Casper, Wyo. 1st Nat. Bank Bldg., Denver, Colo. Newcastle, Wyo. Box 953, Kemmerer, Wyo. Casper, Wyo., and Field Offices. 518 U. S. Nat. Bank Bldg., Denver, Colo. Williamsport, Pa. Cowley, Wyo. 2422 Washington Ave., Ogden, Utah. Box 1079, Casper, Wyo. Also Field Offices. Midwest Bldg., Casper, Wyo. Evanston, Wyo. 806 Magee Bldg., Pittsburgh, Pa. 1st Nat. Bank Bldg., Cheyenne, Wyo. Uinta Co., Wyoming. 914 Security Bldg., Denver, Colo., also Cody, Wyo. Box 187, Cody, Wyo. Osage, Wyo. Spring Valley, Wyo.
Mellem Oil Co. Mercantile Oil & Refg. Co. Merrico Royalties Co. Merritt Oil Corp.	N. R. Mellem, Mgr. E. E. Bovard, Pres. H. C. Young, in chg.	
Mid-Northern Oil Co. Midwest Exploration Co.	(Subsidiary of Midwest)	
Midwest Oil Co. Midwest Refg. Co.		
Miles Oil Co.		
Miller, Joe Miners Oil Co. Minnie Bell Oil Co.	(Shaeffer O. & R. Co.) C. D. Markham N. R. Greenfield	
Minton, Jos. A. M'Kim Oil Co.	J. W. McKim, Pres.	
Montical Oil Co. Mosher Oil Co. Mosher-Salt Creek Synd. Mountain & Gulf Oil Co.	W. B. Hall H. F. Crocker, Pres.	
Mountain Producers Corp.	John T. Barnett, Pres.	
Mutual Oil Co.		
Myrines Oil Co. Natrona Crude Oil Co.	E. D. Holmes, Pres.	
New Bradford Oil Co.	C. O. Dillard, in chg.	
Newcastle Oil Co. Newlon, W. D. New York Oil Co.	A. M. Nichols	
North Platte Pet. Corp.		
Occidental Oil & Gas Co.	Edwin Biney, Pres.	
Ogden-LaBarge Oil Co.	Adam Patterson, Jr.	
Ohio Oil Co.	Wm. Holland	
Oil Well Sand Cleaner Co.	J. B. Clark, Pres.	
Olsen & Zimmerman Omar Oil and Gas Co.	Ben Olsen N. F. Clark, Pres.	
O'Mahoney, Jos. C.		
Omaha Wyoming Oil Co. Orchard, Chas. E.	G. W. Johnson, Pres.	
Oregon Basin Oil & Gas Co. Osage-Upton Oil Co. Oscar Peterson Oil Co.	Bob White, G. M.	

Name	Officer or Agent	Address
Osage Trust Co. Osceola-Teapot Oil Corp. Out West Pet. Co.	E. B. Jones G. O. Housely, Pres. Frank McLaughlin, Pres.	Osage, Wyo. Box 493, Casper. Denham Bldg., Denver, Colo. Equitable Bldg., Denver, Colo. Townsend Bldg., Casper, Wyo. Con. Roy. Bldg., Casper, Wyo. Saratoga, Wyo.
Pacific-Wyoming Oil Co.	F. Chatterton, Pres.	Con. Roy. Bldg., Casper, Wyo.
Philadelphia-Casper Oil Co.		
Picardy Oil Corp.	Pat Sullivan, Pres.	Con. Roy. Bldg., Casper, Wyo.
Pick Springs Oil Co. Pilot Butte Oil Co. Pioneer Oil Co.	W. H. Johnston, Pres. (See Glenrock Oil Co.)	Con. Roy. Bldg., Casper, Wyo.
Powder River Royalty Co.	C. T. Boone, Pres.	Con. Roy. Bldg., Casper, Wyo. Townsend Bldg., Casper, Wyo. Parco, Wyo. Casper, Wyo. Box 1, Parco, Wyo. 700 Patterson Bldg., Denver, Colo. Box 747, Thermopolis. Newcastle, Wyo.
Prairie Oil and Gas Co. Premier Petroleum Co. Producers & Refiners Corp.	O. E. Garretson Will McMurray, Pres. R. E. Wertz	Thermopolis, Wyo. Box 8, Wamsutter, Wyo. 820 Patterson Bldg., Denver, Colo. Box 747, Thermopolis. Newcastle, Wyo.
Providence Oil Co. Quinn Oil Co. Ray Petroleum Co. Red Desert Oil Syndicate Reddick, H. M.	P. S. Houston, Pres. Ray Phebus, in chg. D. W. Hughes	Thermopolis, Wyo. Box 8, Wamsutter, Wyo. 820 Patterson Bldg., Denver, Colo. Frontier, Wyo. Continental Bldg., Casper, Wyo. Roswell, N. M. Great Falls, Mont. 217 Con. Roy. Bldg., Casper, Wyo. c/o Chester Ingle, Box 632, Thermopolis, Wyo.
Reese Oil Co. Repollo Oil Co.	Gormer Reese O. E. Dougherty	305 Con. Roy. Bldg., Casper, Wyo. Rochester, Minn. Box 1132, Casper.
Resolute Oil Co. Riverton Pet. Drilling Co.	T. P. Carr, Agt. G. O. Forsman, Field Supt.	Patterson Bldg., Denver, Colo. Douglas, Wyoming. Lander, Wyo. 1st Nat. Bank Bldg., Denver, Colo.
Robbins, Ralph		
Robertson Investment Co.	E. J. Schulte, Pres.	1st Nat. Bank Bldg., Denver, Colo. 1st Nat. Bank Bldg., Denver, Colo. Box 365, Rawlins, Wyo. Box 1700, Casper. Osage, Wyo. Box 68, Basin, Wyo. 329-330 P. & R. Bldg., Casper. Box 416, Midwest, Wyo. Kemmerer Hotel, Kemmerer, Wyo. Riverton, Wyo. 820 Patterson Bldg., Denver, Colo. Sheridan, Wyo. 329 Midwest Bldg., Casper, Wyo. Medicine Bow, Wyo. Midwest Bldg., Casper, Wyo.
Rochester-Anoka Syndicate Royalty & Prod. Co.	F. W. Schuster (Operated by Argo Oil Co.) (Marland Oil Co.)	
Ruby, Glen M.		
Safe Investment Co. Sage Creek Pet. Co. Salt Creek Consolidated Oil Co. Salt Creek Oil Co.	Geo. D. Berou, Pres. J. VanHouton, Pres. James Owen, Pres.	
Salt Creek Prod. Assoc.	(Absorbed by Wyo. Oil Fields Co.)	
Salt Creek Prod. Assoc.		
Sand Draw Oil Co.	E. M. Bosworth, Pres.	
Sand Hills Oil Co. San Juan Petroleum Co. Sankey & Stahl Scanlon, J. E. Schuster, M. B.	A. J. Hardendorf	
Seabeck Oil Co.	E. B. Smith, Pres.	
Sellish Oil Co. Shaffer Oil & Refg. Co.	M. A. O'Connell, Pres. A. L. Dade, Jr.	
Sheridan-Byron Dev. Co. Shidler Syndicate	James Burchley, Pres. K. S. Alberts, Trustee	
Simpson Ridge Pet. Co. Sinclair Crude Oil Purch. Co. Sinclair-Wyoming Oil Co. Sovereign Oil Co.	Larry T. Williams, Pres.	
Spencer, P. C.	T. O. Turner, Agt.	

Name	Officer or Agent	Address
Spindle Top Oil Co.	G. W. Jarvis	Casper, Wyo.
Spokane-Wyo. Oil Co.		Lander, Wyo.
Spring Valley Pet. Co.		Spring Valley, Wyo.
Staley Syndicate	W. J. Lindsay	Con. Roy. Bldg., Casper, Wyo.
Standard Oil Co. of Calif.	E. R. Wright, Agt.	Santa Fe, N. M.
Standard Oil Co. of Ind.		910 So. Michigan Ave., Chicago, Ill., also Various Field Offices.
Standard Royalty Corpora- tion.	R. C. Wyland, Pres.	415 Midwest Bldg., Casper, Wyo.
Star-Bair Oil Co.	C. D. Murane, Pres.	Casper, Wyo.
Steele Creek Synd.	R. C. Tarrant	Sheridan, Wyo.
Summit Oil & Gas Co.	W. B. Fry	327 So. Lincoln St., Casper, Wyo.
Sunset Oil Co.	A. A. Spaug, Pres.	Manville, Wyo.
Superior-Wyo. Oil Co.	R. H. Sanders, Sec'y.	Superior, Wyo.
Teapot Dome Syndicate		Henning Hotel, Casper, Wyo.
Teapot Petroleum Co.	M. E. McDonnell, Pres.	318 Midwest Bldg., Casper, Wyo.
Teton Gas Products Co.	James McDade, Pres.	Williamsport, Pa.
Teton Petroleum Co.	Victor J. Wallin	727 Metropolitan Bldg., Minneapolis, Minn.
The Texas Company	E. R. Wright, Agt.	Santa Fe, N. M.
Texas Production Co.	A. R. Wilson A. B. Patterson	Denver, Colo. Foster Bldg., Denver. Becklinger Bldg., Casper, Wyo., and Various Field Offices.
Tom Don Oil Company		Osage, Wyo.
Tough Creek Association		Shoshoni, Wyo.
Tower Petroleum Co.	W. B. Scoville, Mgr.	2441 Grand Ave., Ogden, Utah.
Traders Oil Co.	Chas. Liebenstein, Pres.	Casper, Wyo.
Trail Creek Oil & Drig. Co.	J. Q. Love	Moorcroft, Wyo.
Transcontinental Oil Co.	John C. Ford J. W. Ward, Field Mgr.	Tulsa, Okla. Craig, Colo. 7 W. 10th St., Wilmington, Del. 1004 Patterson Bldg., Denver, Colo.
Trapshooters Oil & Gas Assn.	John Kelly, V. P.	Box 1495, Casper, Wyo.
Tropic Oil Co.	T. J. Swisher, Pres.	Rawlins, Wyo.
Trustee Oil Assn.	Louis Cook, Pres.	Douglas, Wyo.
Trustees' Subdivision	Myron W. Whitmore, Tr.	908 Tacoma Bldg., Chicago, Ill.
Tumbador Oil Co.		Box 1042, Thermopolis.
Uinta Oil & Gas Dev. Co.	A. L. Brown, Supt.	Evanston, Wyo.
Union Oil Co.-Cal.	S. Grinsfelder	Casper, Wyo.
U. S. Oil & Refg. Co.		Ft. Collins, Colo. Salt Lake City, Utah Box 595, Midwest, Wyo.
Utah Oil Refining Co.		Osage, Wyo. Box 595 Midwest, Wyo. Salt Lake City, Utah. Midwest Bldg., Casper.
Utah Shale & Oil Corp.	G. W. Sparr, Pres.	401 Con. Roy. Bldg., Casper, Wyo.
Vermillion Oil Co.	Warren A. Haggott, Pres.	Symes Bldg., Denver, Colo.
Vernon Petroleum Co.	Frank Spear, Pres.	Glenrock, Wyo.
Victor-Wyoming Oil Co.	A. C. Johnston, Pres.	Ida Grove, Iowa
Vulcan Oil & Refg. Co.	C. E. Waldner	Evanston, Wyo.
Wakeman, E. E.		Newcastle, Wyo.
Walds Oil & Gas Co.		Osage, Wyo.
Warm Springs Oil & Dev. Co.	Dr. H. E. Byars, Pres.	Thermopolis, Wyo.
Wellington Oil Co.	J. H. Parker	Box 173, Rawlins, Wyo.
Western Pipe Line Co.	Max W. Ball, Pres.	Denver, Colo., and Casper, Wyo.
Western Royalty & Oil Co.	Ward Hildreth, Pres.	Torrington, Wyo., and Casper, Wyo.
Western Slope Oil & Refg. Co.	(Midwest Refg. Co.)	Casper, Wyo.

Name	Officer or Agent	Address
Western States Oil and Land Co.	H. C. Bretschneider, Pres. (Operated by Ago Oil Co.)	1st Nat. Bank Bldg., Denver, Colo.
Western Wyoming Oil Co.	F. A. MacPherson	Box 871, Thermopolis, Wyo.
West Ray Oil Co.	Wesley K. Wilder, Pres.	Osage, Wyo.
Westland Oil Co., Inc.	Victor Cotner	Lovell, Wyo.
Western Exploration Co.	C. E. Richardson, Pres.	401 Con. Roy. Bldg., Casper, Wyo.
West Zimmerman Butte Oil Co.	F. A. MacPherson	Box 871, Thermopolis, Wyo.
Whiteman, A. J.		Leroy, Wyo.
Wind River Prod. & Refg. Co.	Tom Botterill, Pres.	514 Ideal Bldg., Denver, Colo.
Winston Oil Co.	Christion Vrang, Res. Geol- ogist.	913 Bank of Italy Bldg., Los Angeles, Cal.
Wolf Petroleum Co.	T. P. Beadle, Supt.	Calpet, Wyo.
Wyatt Oil & Refg. Co.	A. Stocker, Pres.	Denver, Colo.
Wykora Oil & Refg. Co.	E. Roy Townsend, Pres.	Newcastle, Wyo.
Wyokans Oil Co.	C. B. Williams, Supt. John R. Healy, Sec.	Townsend Bldg., Casper, Wyo.
Wyoming Chief Oil & Refg. Co.	C. O. Brown, Pres.	Interstate Trust Bldg., Denver, Colo.
Wyoming-Dakota Pet. Co.	W. W. Wright, Pres.	Edgemont, S. D.
Wyoming Exploration Co.	(Absorbed by Alaska Development Co.)	
Wyoming Fuel Oil Co.	Archie Allison, Sec'y.	1st Nat. Bank Bldg., Cheyenne, Wyo.
Wyoming Holding & Dev. Co.	W. H. Edelman, Pres.	Sheridan, Wyo.
Wyoming Hollow Basin Oil Co.	A. M. Kirk	Laramie, Wyo., and Colorado Springs, Colo.
Wyoming-Illinois Oil & Shale Co.		Carter, Wyo.
Wyoming-Missouri Dev. Co.	N. P. Wilson, Pres.	Lander, Wyo.
Wyoming-Montana Oil Co.	B. V. Hole, Supt.	Thermopolis, Wyo.
Wyoming Mutual Oil Co.	A. D. Russell, Pres.	Guernsey, Wyo.
Wyoming Oil Fields Co.		1st Nat. Bank Bldg., Denver, Colo.
Wyoming Oil and Coal Co.	W. J. Lindsay, Pres.	Riverton, Wyoming.
Wyoming Oil Wells Corp.	F. B. Dykeman, Pres.	Riverton, Wyoming.
Wyoming Prod. & Refg. Co.	J. E. Higgins, Pres.	Glenrock, Wyo.
Wyoming Reserve Oil Co.	W. D. Newlon, Pres.	Box 1065, Kemmerer, Wyo.
Wyoming Star Oil Co.	H. A. Myrin, Pres.	Riverton, Wyo.
Wyoming Teapot Oil Synd.		Suite 3, Zuttermeister Bldg., Casper, Wyo.
Wyoming United Oil Co.	S. L. Chamberlaine, Pres.	2 Wall St., New York City.
Wyoming Vendome Oil Co.	(Absorbed by Blackstone- Salt Creek Oil Co.)	
Wyoming Yellowstone Oil Co.	Harry Levin, Pres.	Thermopolis, Wyo.
Wyland Syndicate	R. C. Wyland	Casper, Wyo.
Wyotah Oil & Gas Co.	Arza W. Paul, Pres. (Sold to Calif. Pet. Corp.)	Ogden, Utah.
Young Oil Co.	H. C. Young	Glenrock, Wyo.
Zola Oil Co.	E. P. Houghton, Pres. P. S. Hendershot, Sec'y.	Tacoma, Washington. Bairroll, Wyo.

## FIELDS OF WYOMING

Fields	Gravity	Number Wells	Date Discovered
Ant Hills	--	1	1927
Buffalo Basin	--	1	1922
Big Muddy	35.5	188	1917
Brenning Basin	34	12	1910
Buffalo Basin (Park Co.)	--	7	1917
Byron	44.2	10	1917
Big Sand Draw	--	5	1918
Billy Creek	--	3	1922
Black Mountain	--	5	1922
Bolton Creek	28	5	1920
Boone Dome	--	6	1917
Circle Ridge	18	1	1922
Crystal Creek	17	4	1919
Dutton Creek	34	1	1926
Dallas	22.2	38	1904
Derby	22.2	4	1919
Dry Piney	48	3	1918
Eight Mile Lake	--	2	1923
Elk Basin	43	145	1917
Enos Creek	--	1	1921
Grass Creek	34 & 26.5	346	1917
Greybull	35	6	1918
Golden Eagle	--	2	1920
Hamilton Dome	26.7	27	1919
Hidden Dome	--	5	1918
Hudson	22.5	26	1916
Hiawatha	--	2	1926
Iron Creek	32	3	1919
Kirby Creek	--	5	1919
La Barge	32	45	1919
Lance Creek	43	29	1919
Lost Soldier	32	73	1917
Lamb Dome	--	2	1917
Mule Creek	31.5	41	1919
Moorcroft	22	9	1916
Maverick Springs	21.5	24	1918
Medicine Bow	32	1	1923
Notches	22.5	3	1923
Oregon Basin	23	5	1917
Osage	41.6	89	1919
Pilot Butte	37.2	27	1917
Plunkett	45	4	1919
Pine Mountain	18	3	1917

Fields	Gravity	Number Wells	Date Discovered
Poison Spider	19.3	19	1917
Rex Lake	38	4	1923
Rock River	38.2	61	1919
Salt Creek	38.2	2125	1884
Simpson Ridge	23	7	1923
Spring Valley	32	29	1906
Teapot Dome	37	63	1922
Thornton	41	4	1917
Torchlight	41	15	1916
Warm Springs	20	30	1917

The names of structures or near structures are often confusing, especially to a stranger in this region. A complete list of all structures or near structures in the State of Wyoming is herewith appended with the names by which they are known and referred to:

Field or Structure	County	Twp.	Rge.
Agate Basin (Mule Creek)	Niobrara	39N	61W
Alcova Dome (Spindle Top)	Natrona	30N	82W
Alkali Butte Anticline	Fremont	1S & 33N	6E & 94W
Alkali Creek (Vermillion Creek)	Sweetwater	13N	99W
Alkali Dome	Big Horn	54N	95W
Allen Lake	Carbon	22N	79W
Altamont (Aspen)	Uinta	14N	118W
Ant Hills	Niobrara	37N	63W
Antelope Gap	Platte	24N	68W
Arch Creek	Crook	49N	64W
Arminto	Natrona	37N	86W
Aspen (Altamont)	Uinta	14N	118W
Badger Basin	Park	58N	102W
Baggs Dome	Carbon	13N	92W
Bailey Dome	Carbon	26N	89W
Bates Creek Dome	Natrona	39N	81W
Bates Hole (Schnoor Dome)	Natrona	30N	81W
Bates Park	Natrona	29N	80W
Baxter Basin	Sweetwater	16N	104W
Bear Creek	Sweetwater	25N	98W
Bear Dome (Crystal Creek)	Big Horn	54N	93W
Beaver Valley	Weston	42N	61W
Belle Springs	Carbon	23N	88W
Berry	Hot Springs	45N	96W

Field or Structure	County	Twp.	Rge.
Bessemer Bend (Goose Egg Anticline)	Natrona	32N	81W
Big Dome (Maverick Springs)	Fremont	6N	2W (Shoshone)
Big Hollow	Albany	15N	75W
Big Muddy	Converse	33N	76W
Big Piney	Sublette	28-31N	112-114W
Big Sand Draw	Fremont	32N	95W
Big Sulphur Springs (Wilson Dome)	Natrona	38N	83W
Billy Creek	Johnson	48N	82W
Black Dome (Hurst) (Spence)	Big Horn	54N	94W
Black Mountain Anticline (Bruce Dome)	Hot Springs	43N	91W
Black Tail (Shoshone Indian Res.)	Fremont	7N	2W
Blue Springs Anticline (Kirby Creek)	Hot Springs	43N	93W
Bodie Dome	Natrona	31N	80W
Bolton Creek	Natrona	29N	81W
Bonanza Anticline	Big Horn	49N	91W
Boone Dome	Natrona	35N	85W
Bothwell Structure	Albany	25N	76W
Brenning Basin	Converse	32N	73W
Bridger	Uinta	16N	117W
Brooks Structure	Hot Springs		
Bruce Dome (Black Mt.)	Hot Springs	43N	91W
Buck Springs Anticline	Fremont	35N	91, 92, 93W
Bud Kimball Anticline	Washakie	45N	88W
Buffalo Basin	Park	48N	100W
Buffalo Anticline (Oil Springs Anticline)	Fremont	27N	95W
Bull Creek	Crook	58N	62W
Bunker Hill	Carbon	27N	89W
Burris Dome	Johnson	42N	79W
Burley Dome	Fremont	32N	94W
Butte Monocline	Crook	52N	67W
Byron	Big Horn	56N	97W
Canyon Creek Dome (Hiawatha Anticline) (Wilson Dome)	Sweetwater	12N	100W
Carroll Ranch	Natrona	33N	79W
Carter Dome	Uinta	17N	116W

Field or Structure	County	Twp.	Rge.
Carter Domes (Graybeal)	Carbon	29N	81W
Casper Dome	Natrona	33N	79W
Castle Creek	Natrona	37-38N	80-81W
Cedar Ridge	Carbon	22N	85W
Centennial Valley	Albany	15N	78W
Chabot Anticline	Washakie	43N	88W
Chalk Cliffs (McGill Anticline)	Albany	21N	75W
Cherry Anticline	Big Horn	52N	92W
Cherokee Ridge	Sweetwater	12-13N	95 to 98W
Cherokee River (Mule Creek) (Agate Basin)	Niobrara	39N	61W
Chicago Creek	Crook	58N	61W
Chudd	Fremont	39N	92W
Circle Ridge Dome (Shoshone Ind. Res.)	Fremont	6N	2-3W
Clark Dome	Natrona	31N	81W
Coal Creek Dome (Cole Creek)	Converse	36N	76W
Cocoanut Creek	Fremont	33N	94W
Cody Anticline (Shoshone)	Park	53N	101W
Cole Creek (Coal Creek Dome)	Natrona	36N	76W
Colony Dome	Crook	57N	61W
Colter	Washakie	46N	93W
Como Ridge	Albany	23N	76W
Conant Creek Anticline	Fremont	33N	94W
Cooper Cove	Carbon	18N	77W
Corley	Hot Springs	43N	93W
Cottonwood Anticline (Hamilton)	Hot Springs	44N	98W
Cottonwood Dome (Rozet Dome)	Campbell	50N	69W
Cottonwood Creek	Natrona	38N	85W
Cow Gulch	Niobrara	36N	62W
Cowley Anticline (Sage Creek)	Big Horn	57N	97W
Crazy Woman	Johnson	47N	82W
Crooks Creek	Fremont	27N	93W
Crooks Gap	Fremont	27N	92W
Crooked Creek	Big Horn	58N	96W
Crooked Stick	Converse	31N	71-72W
Crystal Creek Dome (Bear Dome)	Big Horn	54N	93W

Field or Structure	County	Twp.	Rge.
Cumberland	Lincoln	19N	116W
Cumberland } Same Dome	Uinta	18N	116W
Dallas Dome	Fremont	32N	99W
Danker	Park	57N	98W
Davidson Dome	Lincoln	21N	115W
Dead Horse	Natrona	39N	81W
Derby Dome	Fremont	31N	98W
Dewey	Weston	42N	61W
Diamond Dome	Albany	18N	77W
Douglas Monocline	Converse	32N	72W
Dry Creek (Mease Dome) (Shoshone Ind. Res.)	Fremont	6N	3W
Dry Dome (Eight Mile Dome)	Big Horn	50N	92W
Dry Lake Dome	Sweetwater	18N	103W
Dry Piney (Big Piney)	Sublette	28-29-30 31N	112-113 114W
Dugout Creek	Johnson	40-41N	80W
Dutton Creek Dome	Carbon	18N	77W
Dutton Creek Dome	Fremont	34N	90W
East Big Hollow	Albany	15N	75W
East Foot Creek	Albany	21N	76W
East Fork	Carbon	20N	82W
East Sand Draw	Fremont	32N	94W
East Teapot	Natrona	37N	78W
Eight Mile Dome (Dry Dome)	Big Horn	50N	92W
Eight Mile Lake (Lake Valley)	Carbon	19N	88W
Elk Basin	Park	58N	99W
Elk Mountain	Carbon	20N	81W
Embar Anticline	Hot Springs	8N	2E
Emigrant Gap Anticline (Place Dome) (Palmer) (Triangulation Dome) (Virginian Dome)	Natrona	33-34-35N	81-82W
Enos Creek Anticline	Hot Springs	46N	100W
Evanston	Uinta	15N	120W
Ferris Dome	Carbon	26N	86W
Fiddler Creek	Weston	45N	64W
Flat Top Anticline	Carbon	23N	78W
Foot Creek Anticline	Carbon	22N	78W
Fort Steele (Picnic Grounds)	Carbon	21N	85W

Field or Structure	County	Twp.	Rge.
Fossil Dome	Lincoln	21N	117W
Four Bear Anticline	Park	48N	103W
Frannie	Big Horn	58N	98W
Freeland (Bodie Dome)	Natrona	31N	80W
Freeze-Out-Hills	Carbon	24N	79W
Frontier	Big Horn	52N	93W
Frost Ridge	Park	50N	101W
Garland	Park	56N	98W
Garland	Big Horn	56N	97W
G. P. Dome	Carbon	25N	86W
Geary Dome	Natrona	34N	77W
Gebo Anticline	Hot Springs	44N	95W
Gillette Anticline	Campbell	50N	72W
Gillispe	Albany	22N	75W
Glendo Monocline	Platte	29N	68W
Glenrock	Converse	33N	75W
Golden Eagle Dome	Hot Springs	45N	97W
Gooseberry Dome	Park	47N	100W
Goose Egg Anticline (Bessemer Bend)	Natrona	32N	81W
Gose Dome	Weston	47N	85W
Goshen Hole	Goshen	21N	61W
Gothberg Dome	Natrona	36N	82W
Government Hill Anticline	Natrona	40N	80W
Granger	Sweetwater	19N	110W
Granville Anticline	Carbon	21N	84-85W
Grass Creek Anticline	Hot Springs	46N	98W
Graybeal (Carter Dome)	Carbon	28N	80W
Gray Bull (Peay Hill)	Big Horn	52N	93W
Gray Rocks	Platte	25N	66W
Green River Anticline	Sublette	28N	111W
Grey's River	Lincoln	36N	117W
Guernsey	Platte	27N	67W
Gyp Creek	Big Horn	58N	96W
Gyp Springs	Hot Springs	42N	95W
Half Moon Anticline	Park	51N	102W
Hale Dome (Wild Horse Butte Anticline)	Hot Springs	42N	93W
Hamilton Dome (Cottonwood)	Hot Springs	44N	98W
Hiawatha Dome	Sweetwater	14N	99W
Hidden Dome	Washakie	48N	90W
Hilliard	Uinta	13N	119W

Field or Structure	County	Twp.	Rge.
Hjorth Dome (Medicine Bow Anticline)	Carbon	21N	79W
Horse Creek Anticline	Laramie	17N	70W
Horseshoe Dome (Muskrat)	Fremont	34N	92W
Horse Track Anticline (Pickett Lake)	Fremont and Carbon	27N	97W
Horton Dome	Washakie	43N	89W
Howard Structure	Weston	44N	64W
Hudson Anticline (Lander)	Fremont	2S	1-2E
Hurst (Black Dome) (Spence)	Big Horn	54N	94W
Ilo Ridge (Waugh Anticline)	Hot Springs	45N	97W
Indian Creek Dome	Niobrara	35N	61W
Ionia Anticline	Big Horn	57N	95W
Iron Creek Dome	Natrona	32N	83W
Irvine Anticline	Laramie	31N	70W
Islay Anticline	Laramie	15N	70W
James Lake Dome	Albany	17-18N	75W
Kaycee Dome	Johnson	43N	82W
Kelly Dome	Fremont	8N	3W
Kemmerer	Lincoln	21N	115W
Kirby Creek (Blue Springs Anticline)	Hot Springs	43N	92W
Knight	Uinta	14N	119-120W
LaBarge	Lincoln	25-26N	112-113W
LaBarge	Sublette	27N	112-113W
LaBonte (Warm Springs)	Converse	31N	71W
LaFlame	Crook	56N	51W
Lake Creek Anticline	Hot Springs	43N	91-92W
Lake Hattie (Strom Anti.)	Albany	15N	76W
Lake Valley Anticline (Eight Mile Carbon Lake)	Carbon	19N	88W
Lamb Anticline	Big Horn	51N	92W
Lander (Shoshone Ind. Res.)	Fremont	2S	1E
Lander (Hudson Anticline)	Fremont	33N	99W
Lance Creek Anticline	Niobrara	35-36N	63-64-65W
Lane Dome (Notches)	Natrona	37N	88W
Lasell Creek	Uinta	18N	117W
LeRoy	Uinta	16N	117W
Lingle Dome	Goshen	26N	62W

Field or Structure	County	Twp.	Rge.
Little Buffalo Basin	Park	47-48N	99-100W
Little Creek Dome	Hot Springs		
Little Dome (Shoshone Ind. Res.)	Laramie	16N	70W
Little Grass Creek Dome	Fremont	5N	1W
Little Pole Cat Anticline	Hot Springs	46N	99W
Little Sheep Mt. Anticline	Park	56N	98W
Logan Gulch	Big Horn	56N	95W
Lost Creek Anticline	Fremont	33N	93W
Lost Soldier Anticline	Sweetwater	26N	95W
Lovell Anticline	Sweetwater	26N	90W
Lox	Big Horn	56N	96W
Lucerne Anticline	Natrona	37N	86W
Lusk	Hot Springs	44N	95W
Lysite Mt. Anticline	Niobrara	36N	61W
Mahogany Butte Anticline	Hot Springs	42N	90W
Mahoney Dome	Washakie	43N	88W
Mandel Dome (Millbrook)	Carbon	26N	87-88W
Manderson Anticline	Albany	16N	76W
Manville	Big Horn	50N	92W
Maverick Springs (Big Dome) (Shoshone Ind. Res.)	Niobrara	32N	65W
McComb Dome (Schaad)	Fremont	6N	2W
McGill Anticline (Chalk Cliffs)		39-40N	92W
McGown Structure (Megown) (Shoshone Ind. Res.)	Albany	21N	75W
McKinley	Fremont	1S	2E
Mease Dome (Dry Creek) (Shoshone Ind. Res.)	Converse	31N	69W
Medicine Bow Anticline (Hjorth Dome)	Fremont	6N	3W
Megown Structure (McGown) (Shoshone Ind. Res.)	Carbon	21N	79W
Mellen Dome	Fremont	1S	2E
Mercer Anticline	Natrona	29N	81W
Midway-Geary Anticline	Big Horn	51N	90W
Millbrook (Mandel)	Natrona	34N	78W
Miller Hill Dome	Albany	16N	76W
Monument Anticline	Carbon	17N	89W
	Park	53N	103W

Field or Structure	County	Twp.	Rge.
Moorcroft Monocline	Crook	52N	67W
Morris Anticline	Big Horn	52N	92W
Mormon Butte	Big Horn	57N	95W
Morton Dome	Washakie	43N	90W
Mud Creek Domes	Hot Springs	8N	3E
Muddy Creek Monocline (Dad)	Carbon	17N	92W
Mule Creek Domes (Agate Creek) (East and West)	Niobrara	39N	60W
Murphy Dome	Hot Springs	43N	91W
Muskrat Dome (Horseshoe)	Fremont	34N	92W
Natrona Dome	Natrona	37N	83W
Neiber Anticline	Washakie	45N	93W
Newcastle-Salt Creek	Weston	45N	61W
North Baxter Basin	Sweetwater	19N	104W
North Casper Creek Anticline	Natrona	37N	82W
North Oregon Basin (Wiley Anticline)	Park	52N	100W
North Sunshine	Park	47N	101W
Notches Dome (Lane Dome)	Natrona	37N	85W
Nowood Anticline	Washakie	48N	90W
O'Brien Springs Anticline	Carbon	24N	86W
Oil Creek	Weston	45N	62W
Oil Mountain	Natrona	32N	82W
Oil Mountain Anticline	Natrona	32N	82W
Oil Springs Anticline	Carbon	23N	79W
Old Woman Creek Anticline	Niobrara	36-37N	62W
Oregon Basin Dome	Park	50N	100W
Osage Terrace	Weston	46-47N	63-64W
Paint Rock Anticline	Big Horn	49-50N	90-91W
Palmer Dome (Emigrant Gap)	Natrona	34N	82W
Parco	Carbon	21N	86W
Pass Creek	Carbon	18N	81W
Peay Hill (Greybull)	Big Horn	52N	93W
Pedro	Weston	45-46N	62-63W
Pickett Lake Anticline (Horse Track Anticline)	Sweetwater	26N	97W
Picnic Grounds (Fort Steele)	Fremont		
	Carbon	21N	85W

Field or Structure	County	Twp.	Rge.
Pilot Butte (Shoshone Ind. Res.)	Fremont	3N	1W
Pine Mountain Dome	Natrona	35N	84W
Pinto	Park	47N	100W
Pitchfork Anticline	Park	48N	102W
Place Dome (Emigrant Gap)	Natrona	34N	82W
Plunkett Dome	Fremont	1S	1E
Poison Lake	Converse	31N	71W
Poison Spider	Natrona	33N	83W
Pole Cat Terrace	Park	57N	98W
Portland Dome	Carbon	26N	86W
Potato Ridge	Big Horn	51N	92W
Powder River	Natrona	41N	81W
Puddle Springs	Fremont	33N	90W
Pump Creek Anticline	Weston	46N	64W
Quealy Dome	Albany	17N	77W
Rattlesnake	Natrona	34N	89W
Rawhide Creek Dome	Goshen	26N	62W
Rawlins	Carbon	21N	88W
Red Creek Syncline	Sweetwater	25N	98W
Red Desert Anticline	Sweetwater	27N	95W
Red Dome	Big Horn	55N	95W
Red Fork Anticline	Johnson	45N	84W
Red Springs Anticline	Hot Springs	43N	93W
Rex Lake	Albany	16N	77W
Richard Dome	Hot Springs	41N	91W
Riverton	Fremont	2N	5E
Rock Creek Anticline	Carbon	19-20N	72W
Rock Springs Anticline	Sweetwater	17N	104W
Rocky Ford Anticline	Crook	52N	61W
Rocky Point Anticline	Crook	55N	67W
Rozet Dome (Cottonwood)	Campbell	50N	69W
Sage Creek Anticline	Carbon	18N	87W
Sage Creek (Cowley) Ant.	Big Horn	57N	97W
Sage Creek	Carbon	18N	87W
Sage Creek (Shoshone Ind. Res.)	Fremont	1N	1W
Sage Hen	Converse	31N	72W
Salt Creek-Newcastle Anticline	Weston	44-45N	61W
Salt Creek Anticline	Natrona	39-40N	78-79W
Sand Draw Anticline	Hot Springs	44N	96W
Schaad Dome (McComb)	Fremont	39N	92W

Field or Structure	County	Twp.	Rge.
Schnoor Dome (Bates Hole)	Natrona	31N	80W
Seaman Hills	Niobrara	35N	62W
Separation Flats	Carbon	25N	88W
Seven Anticlines	Carbon	19N	92W
Seven Mile Dome	Albany	17N	77W
Shannon Anticline	Natrona	41N	79W
Sheep Creek Dome	Fremont	28N	92W
Sheep Mountain Anticline	Big Horn	54N	94W
Shell Creek Dome	Big Horn	53N	92W
Shelbourne Dome	Hot Springs	42N	97W
Sheldon Dome (Allotted Indian Land, Shoshone Ind. Res.)	Fremont	5N	2W
Shepard	Campbell	57N	61W
Sherard Dome	Carbon	25N	89W
Shirley Anticline	Carbon	25N	80W
Shoshone Anticline (Cody)	Park	53N	101W
Simpson Ridge Anticline	Carbon	21N	80W
Skull Creek Structure	Park	53N	102W
Skull Creek	Weston	44N	62W
Snyder Basin (South Piney)	Sublette	29N	115W
Soda Creek	Weston	47N	65W
Sodergreen	Albany	14N	76W
Solo	Sweetwater	19N	110W
South Baxter Basin	Sweetwater	14N	102W
South Casper Creek	Natrona	34N	83W
South Piney (Snyder Basin)	Sublette	29N	115W
South Sunshine Anticline	Park	46N	101W
Spence Dome (Black Dome) (Hurst)	Big Horn	54N	94W
Spindle Top (Alcova)	Natrona	30N	81W
Split Hill	Converse	37N	67W
Spring Creek	Fremont	28N	92-93W
Spring Creek Anticline	Park	49N	101-102W
Spring Valley	Uinta	15N	118W
Steele Creek	Johnson	46N	82W
Stockade-Beaver Creek	Weston	46N	60W
St. Mary's Anticline	Carbon	21N	84W
Strom Anticline (Lake Hattie)	Albany	15N	76W
Sugar Creek	Carbon	21N	84W
Sunshine Anticline	Park	47N	101W

Field or Structure	County	Twp.	Rge.
Teapot Dome	Natrona	39N	78W
Tensleep Anticline	Washakie	46N	88W
Thermopolis Anticline	Hot Springs	44N	96W
Thornton	Weston	49N	66W
Tisdale Dome	Johnson	41N	81W
Torrington	Goshen	22N	61W
Torchlight Dome	Big Horn	51N	92W
Triangulation Dome (Emigrant Gap)	Natrona	34N	82W
Troublesome Anticline	Carbon	24N	81W
Two Bar Dome	Natrona	31N	81W
Two Rivers Anticline	Albany	17N	74W
Upton-Thornton	Weston	48N	65W
Vermillion-Creek (Alkali Creek)	Sweetwater	13N	89W
Virginian Dome (Emigrant Gap)	Natrona	34N	82W
Wagon Hound Anticline	Hot Springs	45N	99W
Wakeman Flats	Weston	49N	66W
Walcott	Carbon	21N	83W
Wallace Creek Anticline	Natrona	34N	87W
Wamsutter Arch	Sweetwater	19N	99W
Warm Springs Dome	Hot Springs	43N	93-94W
Warm Springs (LaBonte)	Converse	31N	71W
Waugh Anticline (Ilo)	Hot Springs	45N	97W
Waterfall Dome	Lincoln	22N	115W
Wertz	Carbon	26N	90W
West Foot Creek	Carbon	22N	78W
West Mule Creek	Niobrara	39N	61W
West Salt Creek	Natrona	39N	79W
Wheeler Ranch	Natrona	33N	80W
White Face	Fremont	7N	3W
Wild Horse Butte Anticline (Hale Dome)	Hot Springs	42N	93W
Wiley Anticline (N. Oregon Basin)	Park	52N	100W
Willow Creek	Lincoln	33N	118W
Wilson Dome (Hiawatha Anticline) (Canyon Creek Dome)	Sweetwater	12N	100W
Wilson Dome (Big Sulphur Springs)	Natrona	38N	83W
Winkleman Anticline	Fremont	2N	1W
Zeisman Dome	Big Horn	49N	89W

Field or Structure	County	Twp.	Rge.
Zimmerman Butte Anticline	Hot Springs	43-44N	93W

#### PIPE LINES

The development of the pipe line industry to transport oil and gas from one point to another, dates back to the early history of the oil business in the hills of Pennsylvania. Today there are some 97,000 miles of oil pipe lines carrying oil from the various fields, some across the continent to refining points. These oil pipe lines represent an investment of \$950,000,000. The natural gas lines carrying natural gas from the fields to cities and distribution points have some 55,000 miles of lines with a total investment of over a billion dollars.

Most oil pipe lines are powered with stations at various intervals where pumping machinery pushes the oil through the long miles of pipe to the next station until its destination in the great storage tanks is reached. The State of Wyoming, however, contains the longest oil line in the world not powered with mechanical means of forcing the oil through the pipe; this is the Grass Creek to Greybull pipe line of the Illinois Pipe Line Co., and this line is 85 miles in length and is a gravity line for the entire distance. The oil placed in this line in the Grass Creek Field flows by gravity alone to Chatam on the Big Horn River and thence to Greybull to the tank farm of the Standard Oil Company's refinery located there.

The first line was laid in the State of Wyoming between the Dallas Field and the Northwestern Railroad, at what is now termed Wyopo. This line is still carrying oil from this field and the newer Derby Dome development, to the rail point. This line was laid in 1907 and is about 12 miles in length.

Since the laying of the first pipe line near Lander some seventy pipe lines for the transportation of oil, gas and gasoline have been laid in the State of Wyoming. One gas line carries gas from Wyoming to another state. One gas line brings gas from another state to a Wyoming city, and one oil line carries oil from the fields of Wyoming to delivery on the transcontinental trunk lines that transport the oil to the Atlantic seaboard and intermediate points.

During the past year of 1927 and the last few months of 1928, up to and including the month of August, one large

gas line has been laid from the Little Buffalo Basin gas field in Hot Springs County, to a junction with the existing gas line to Basin and Greybull. An oil pipe line was laid from the LaBarge Field in Lincoln County to the Oregon Short Line Railroad at Opal, to carry the oil from the LaBarge Field to Opal.

One large gas line is proposed and the survey completed. This is the line from Hiawatha and Baxter Basin to Salt Lake City. Another gas line is rumored that will connect the Texas to Denver trunk gas line with the large gas wells in the Lost Soldier Field of Wyoming and thus insure a supply of the fuel from either end of the line.

Under the present administration of the State of Wyoming, the central towns and cities of the Big Horn Basin were assured a continuous and ample natural supply of natural gas by the Midwest Refining Co. and the Big Horn Gas Co. completing the line to the Buffalo Basin Field. The long hoped for oil line from the LaBarge Field that would enable the oil operators of that field to market their oil was also completed and is now carrying oil across the plains to the tank cars on the railroad for shipment to the refineries.

The gasoline lines that carry gasoline from the compression or absorption plants in the fields to the shipping or refining points are a new branch of pipe line engineering. Wyoming has eight such lines in use in various fields of this State.

## OIL PIPE LINES IN WYOMING

Revised to September 1, 1928

Company	Length	Size	From	To
Bolton Oil Company	32. mi.	6 in.	Bolton Creek	Casper
Dallas Dome Wyo. Oil Co.	5. mi.	4 in.	Derby Dome	Dallas Field
Dallas Dome Wyo. Oil Co.	11. mi.	6 in.	Dallas Field	Wyopo
Fargo Oil Company	22.5 mi.	6 in.	South Casper Creek	Casper
Illinois Pipe Line Co.	3.5 mi.	3 in.	Byron	Cowley Junction
Illinois Pipe Line Co.	3.5 mi.	3 in.	Dutton Creek	Ties into Rock Creek-Rock River Line
Illinois Pipe Line Co.	30.5 mi.	8 in.	Salt Creek	Ilco
Illinois Pipe Line Co.	13.8 mi.	8 in.	Ilco	Casper
Illinois Pipe Line Co.	21.43 mi.	8 in.	Big Muddy	Casper
Illinois Pipe Line Co.	13.89 mi.	6 in.	Hamilton Dome	Grass Creek
Illinois Pipe Line Co.	49.35 mi.	8 in.		
Illinois Pipe Line Co.	29.16 mi.	6 in.	Grass Creek	Greybull
Illinois Pipe Line Co.	63.39 mi.	6 in.	Elk Basin	Greybull
Illinois Pipe Line Co.	8.11 mi.	6 in.	Rock Creek	Rock River
Illinois Pipe Line Co.	38.44 mi.	6 in.	Rock Creek	Laramie
Illinois Pipe Line Co.	25.55 mi.	6 in.	Lance Creek	Lusk
Illinois Pipe Line Co.	13.56 mi.	3 in.	Mule Creek	Dakoming
Illinois Pipe Line Co.	29.13 mi.	3 in.	Pilot Butte	Riverton
Illinois Pipe Line Co.	6.2 mi.	3 in.	Osage	Clay Spur
Illinois Pipe Line Co.	2.54 mi.	6 in.	Big Muddy	Glenrock
Illinois Pipe Line Co.	15.5 mi.	8 in.	Oregon Basin	Cody
Lowell Oil & Refining Co.	9. mi.	3 in.	Byron	Lowell
Midwest Refining Company	25.8 mi.	8 in.		
Midwest Refining Company	16.6 mi.db.	6 in.	Salt Creek	Casper
Midwest Refining Company	25.8 mi.	8 in.		
Midwest Refining Company	16.6 mi.db.	6 in.	Salt Creek	Casper
Midwest Refining Company	29.3 mi.	7 in.		
Midwest Refining Company	14.28 mi.db.	6 in.	Salt Creek	Casper
Midwest Refining Company	44.5 mi.	6 in. Water line		
Midwest Refining Company	10.15 mi.	6 in. Water line	Casper	Salt Creek
Midwest Refining Company	7.5 mi.	2 in.	Notches Dome	Lox
Midwest Refining Company	38.00 mi.	4 in.	LaBarge	Opal
Albert E. Mays	4.5 mi.	4 in.	Osage Field	Osage
Producers & Refiners	99.76 mi.	6 in.		
Producers & Refiners	37.72 mi.	8 in.	Salt Creek	Parco
Producers & Refiners	6.25 mi.	6 in.	Branch S. C.-Parco	Casper
Producers & Refiners	54. mi.	6 in.	(To White Eagle Refinery)	
Sinclair Pipe Line Co.	90.26 mi.	12 in.	Lost Soldier	Parco
Sinclair Pipe Line Co.	37.58 mi.	10 in.		
Sinclair Pipe Line Co.	34.97 mi.	8 in.		
C. B. Shaffer	9. mi.	6 in.	Teapot	East line of Wyo.
			Warm Springs	Thermopolis

## STATE GEOLOGIST

## GAS PIPE LINES OF WYOMING

Field	Market	Company	Use	Size	Miles	Total Length
Elk Basin	Billings, Mont.	Gallatin Gas Co. (Ohio)	Domestic and Industrial	8 in.	37.50	66.60 miles
Byron	Powell, Wyoming	Rocky Mountain Gas (Ohio)	Domestic	10 in.	29.10	5.80
Byron	Lowell, Wyoming	Lowell Gas Company	Domestic and Sugar Factory	4 in.	5.35	11.15 miles
Branch from Lovell Line)				6 in.		8.00 miles
Byron	Cowley, Wyoming	Lowell Gas Company	Domestic	2 in.		6.00 miles
Hidden Dome	Byron, Wyoming	Byron Gas Company	Domestic	2 in.		1.50 miles
Golden Eagle	Basin-Greybull	Midwest-Wyoming Gas Co.	Domestic	8 in.		34.30 miles
Little Dome	Thermopolis, Wyo.	Thermopolis Gas Company	Domestic	6 in.		20.00 miles
Oregon Basin	Golden Eagle	Thermopolis Gas Company	For Thermopolis Line	4 in.		13.80 miles
Little Buffalo	Cody, Wyoming	Rocky Mountain Gas (Ohio)	Domestic	4 in.		12.80 miles
Branch Buffalo)	Greybull, Wyo.	Big Horn Gas Company	Standard-Midwest Ref's.	10 in.	.64	
Greybull Line )				12 in.	13.56	
				14 in.	59.75	
				3 in.	2.26	
				8 in.	4.40	
				8 in.		6.66 miles
				10 in.	43.65	6.70 miles
				12 in.	52.75	95.40 miles
Sand Draw	Grass Creek, Wyo.	Big Horn Gas Company	Field Operations	10 in. & 8 in.	10.00	19.90 miles
Extension of Sand Draw-Casper Line)	Worland, Wyo.	Big Horn Gas Company	Domestic and Industrial	6 in. & 8 in.		16.50 miles
Boone Dome	Casper, Wyoming	New York Oil Co. (Foreman)	Domestic	4 in.	35.80	45.80 miles
Sand Draw	Riverton-Lander	New York Oil Co. (Foreman)	Domestic	6 in.		15.00 miles
Baxter Basin	Rock Springs	New York Oil Co. (Foreman)	Domestic	6 in.		14.40 miles
8 Mile Lake	Parco, Wyoming	Producers & Refiners Corp.	Domestic and Refinery	8 in. & 10 in.		32.60 miles
Mahoney	Parco, Wyoming	Prairie Oil and Gas	P. & R. Refinery	8 in.	24.31	28.18 miles
	Rawlins, Wyo.	Rocky Mountain Gas (Ohio)	Domestic	8 in.	3.87	
Branch Mahoney)						
Rawlins Line	Parco, Wyoming	Producers & Refiners Corp.	Idle	8 in.	17.90	7.60 miles
Wertz-Ferris)	Casper, Wyoming	Producers & Refiners Corp.	Standard-Midwest Ref's.	10 in.	23.20	23.20
Mahoney	Casper, Wyoming	Midwest Refining Company	Standard-Midwest Ref's.	12 in.	48.60	89.70 miles
Teapot Dome	Casper, Wyoming	New York Oil Co. (Empire)	Idle	8 in. & 6 in.		35.40 miles
Salt Creek	Casper, Wyoming	Midwest Refining Company	Refineries-Casinghead Gas	10 in.		41.30 miles
Wellington	Cheyenne, Wyo.	Cola. Public Service Co.	Domestic	4 in.		40.00 miles
Hiawatha and Baxter Basin	Salt Lake City, Utah	Ohio Oil Co. et al.	Domestic and Industrial	10, 12, 15, 20, 24 in.		200.00 miles

## WYOMING GASOLINE LINES

Field	Destination	Company	Use	Size	Length
Elk Basin	Frannie, Wyoming	Midwest Refining Company	Casinghead Gasoline	2 in.	11.85 Miles
Salt Creek	Casper, Wyoming	Midwest Refining Company	Casinghead Gasoline	4 in.	39.75 Miles
Salt Creek	Casper, Wyoming	Midwest Refining Company	Naptha (Idle)	3 in.	39.45 Miles
Grass Creek	Chattham, Wyoming	Ohio Oil Company	Casinghead Gasoline	3 in.	28.00 Miles
Salt Creek	Midwest Gas Plant	Ohio Oil Company	Casinghead Gasoline	3 in.	3.00 Miles
Lance Creek	Manville, Wyoming	Ohio Oil Company	Casinghead Gasoline	2 in.	19.48 Miles
Rock River	Rock River, Wyo.	Ohio Oil Company	Casinghead Gasoline	2 in.	10.50 Miles
Salt Creek	Midwest Gas Plant	Carter Oil Company	Casinghead Gasoline	2 in.	3.00 Miles

## GASOLINE PLANTS

The lighter hydrocarbons that compose a large part of the petroliferous deposits of the Wyoming oil fields, are capable of carrying the lighter oils found in the crude oil, in suspension and as a gas. These constituents can be removed by compression, absorption, refrigeration and other processes, but in the main, the compression and absorption processes are in use in the State of Wyoming.

In the compressor process, the natural gas containing the gasoline is passed through a compressor or series of compressors that raise the pressure of the gas to certain points. At these points, the natural gas vapor condenses in part and the resultant liquid or naptha is removed through suitable piping and mechanical devices, to storage and market.

In the absorption process, the well known law of physics relating to gases is employed; a column of gas ascending in a tower or other suitable container, meets with an absorbing medium, usually a mineral seal oil, which medium absorbs the naptha content of the gas and same is later removed by distillation or other methods.

The gasoline obtained by the above processes is usually of such high gravity when it comes from the compressors or absorber stills, that it requires treatment called weathering to reduce the content of the gaseous hydrocarbons that have been combined with the naptha in the process of removal from the natural gas vapor. In weathering, the naptha is allowed to give off its lighter constituents until its gravity is reduced to about the gravity the market demands. It is also often mixed with the heavier gasolines from the distillation of crude oil and used to raise the gravity of the latter to such points as the market demands.

## CARBON BLACK PLANTS

In the manufacture of carbon black, natural gas is burned in a condition of imperfect combustion wherein the flame gives off a maximum of soot. This soot is collected by suitable mechanical means, placed in bags or barrels and shipped to market. Only one plant is in operation in Wyoming in the fall of 1928, this is located in the Lance Creek Field in Niobrara County and there were three plants shut down.

## GASOLINE PLANTS

Company	Location	Type Plant	Capacity
Midwest Refining Co.	Salt Creek	Comp.	100,000
Ohio Oil Co.	Salt Creek	Absp.	12,000
Carter Oil Co.	Salt Creek	Absp.	15,000
Continental Oil Co.	Rock River	Absp.	4,000
New York Oil Co.	Sand Draw	Absp.	
Ohio Oil Co.	Lance Creek	Absp.	4,900
Ohio Oil Co.	Grass Creek	Comp.	6,000
Producers & Refiners Corp.	Casper	Absp.	7,000
*New York Oil Co.	Teapot	Comp.	2,000
*Standard Engineering Co.	Evansville	Absp.	2,500
*Midwest Refining Co.	Elk Basin	Comp.	10,000
* Shut Down			

## CARBON BLACK PLANTS

Location	Firm	Capacity	Production Per Thousand Feet	Status
Lance Creek	J. M. Huber Company	7,000,000	1.8	Operating
Cowley	Preston, et al	-	-	Shut Down
Golden Eagle	Wilson, et al	-	-	Shut Down
Riverton	Teton Gas Prod. Co.	6,000,000	1.8	Operating

## REFINERIES

The refining of petroleum came into existence with the early production of oil in Pennsylvania. Even before the drilling of the first wells, chemists had experimented with samples taken from oil springs and seeps and had found that it could be distilled and cut into different products through this distillation process. However, the refining industry had its problems as well as the developing of the fields and some of these problems still present only a partial solution or makeshift operation to gain the required end.

Different grades of crude oil require different treatment, some crude oils can be passed directly into a steam still for their gasoline content while others, especially the asphaltic oils, require fire heated stills and the cracking process to obtain the maximum content of gasoline. The fields of the State of Wyoming produce oils of all grades so that the refiners of this State may select any crude oil they wish to use, if the transportation of same does not complicate its economical use.

One of the early problems of the refiners of petroleum was the removal of sulphur from the petroleum oils. This still presents difficulties today and some of the Wyoming oils are rich in sulphur, making these very objectionable to the small plant where the facilities for treating for sulphur are inadequate. Sulphur distills over in the re-tort much like oil itself and is always found in the resultant gasoline when proper safeguards are not taken for its removal. In the automobile engine, the use of gasoline loaded with sulphur is extremely corrosive to the cylinder walls and therefore objectionable.

The danger from gasoline with a high sulphur content is much more pronounced in cold weather than during the warm summer months and at temperatures near zero, the corrosion of iron or steel takes place very rapidly with a gasoline having a high sulphur content. At many small refineries and skimming plants, the cold months of winter enable the condensers to function better than during the warm season and thus a larger content of sulphur is carried over in the distillation process.

At Franklin, Pennsylvania, there is a relatively small production of a certain grade of oil from wells on the outskirts of that city that is unequalled for lubrication purposes anywhere in the world. For many years this production has been controlled by the Galena Signal Oil Co. and its subsidiary companies and the oil is utilized for special trades and machines.

With the single exception of this high grade oil, the fields in the State of Wyoming can produce oils of a quality equal to any other fields in the Nation and with the care, experience and equipment, lubricating oils the equal of any grade refined in this country can be had here in the State of Wyoming.

It is noted that through great advertising campaigns, lubricating oils from refining points in the east have supplanted in part, the lubricating oils refined in the State of Wyoming, although the former oils must pay a heavy transportation cost across the country to reach this market. The motorists from the East appear to help this trade by asking for the eastern lubricating oils and some unfortunate examples of faulty lubrication due to improperly refined oils has worked against the marketing of the lubricating products of the State of Wyoming, giving same a bad name that is undeserved.

In the process of refining gasoline and kerosene products of petroleum, these grades are placed in contact with sulphuric acid to remove small particles in suspension, of the heavier hydrocarbons. It is very necessary that all traces of this sulphuric acid be removed by thorough washing and neutralizing with soda, but in a few instances, probably due to the heavy market demands at a rush season, some kerosene and gasoline has reached the market containing a percentage of sulphuric acid. This has resulted in the ruin of oil stoves and the pitting and corrosion of motors and a resultant depreciation of the reputation of petroleum products refined from Wyoming oils.

The State Oil and Gas Inspector has heard much objection voiced during the summer of 1928, against the use

of oil products imported from other States, by the oil producers of this State. The black oils of Wyoming show the same chemical analyses as the asphaltic oils of other States and therefore should refine into the same products.

In the boom period of Wyoming's oil history, notably during the years of 1917, 1918 and 1919, many small refining plants were built in anticipation of a great flood of crude. Some of these plants were built by experienced men or firms, but in many instances the refineries were abortive attempts on the part of promoters or parties without any experience in the business of refining oil.

Most of these small plants have been definitely abandoned now and the buildings are falling into decay while the machinery and other equipment that presented some value have been moved away. For this reason the list of operating refineries in Wyoming in 1928 is less than appeared in former years, although the annual output of petroleum products is measurably greater than during the early years.

## REFINERIES

Name of Company	Location	Crude Capacity	Type Plant	Cracking Capacity	Type Cracking Unit
Continental Oil Co.	Glenrock	10,000	S-C	3,600	Burton
Midwest Refining Co.	Casper	50,000	Comp.	30,000	Burton
Midwest Refining Co.	Greybull	10,000	S & A	15,000	Burton
Midwest Refining Co.	Laramie	3,000	S & C	4,500	Burton
Northwestern Petro. Co.	Osage	300	S	—	—
Producers & Refiners Corp.	Parco	8,000	S-C	4,000	Dubbs
The Texas Company	Casper	6,000	Comp.	7,800	Holmes-Manley
White Eagle Oil & Ref. Co.	Casper	6,000	S-C	2,500	Holmes-Manley
*Alliance Oil & Ref. Co.	Thermopolis	1,500	S	—	—
*Clay Spur Refining Co.	Clay Spur	200	S	—	—
*Lovell Refinery	Lovell	600	S	—	—
*Egaso Holding Co.	Osage	1,000	S	—	Cross
* Shut Down.					

Key—Comp. —Complete Plant.

S-C —Skimming and Cracking.  
S & A —Skimming and Asphalt.  
S —Skimming.

## GENERAL RESUME

1928

The year 1928 saw a continued slump in oil operations throughout Wyoming and the Rocky Mountain States. Wildcatting was only carried on where lease terms required it as the oil operators were endeavoring to restrict production in order to help the market conditions.

Only one operation showed as a new field in the first half of 1928, the Spindletop Field in Natrona County, about 35 miles south of Casper, was found to carry black oil production in the Sundance sand at about 1200 feet depth.

The Oregon Basin Field in northwest Wyoming continues to hold the interest of the Rocky Mountain oil men as the new year starts. The Cody Petroleum Company found a producer in their test in January and the excitement increased as a result of this strike. The oil was found in the Embar sand at a depth of 3553 feet.

The Ohio Oil Company completed a deep Embar well in the Grass Creek Field that extended the black oil territory there about a mile. Owing to the low market for black oil, the Ohio Oil Company is holding this production in the ground as much as possible until such time as the market strengthens.

The New York Oil Company, one of the early independent operating companies of Wyoming, changed from the Curtis control of Jamestown, New York to the Foreman interests of Chicago, through purchase. The subsidiary interests of the Midwest Refining Company will also take over some of the Salt Creek properties of the New York Oil Company through purchase.

The Buck Creek Oil Company has a wildcat producer in the Muddy sand on the Ant Hills structure in Niobrara County that marks the opening of a new field, although the surface indications of this area are such as to indicate that the field will be quite small. Only six wells can be drilled on the Ant Hills structure according to some geological maps of the area.

The Producers and Refiners Corporation drilled in a wildcat discovery well in the Ferris Field, Carbon County, that is expected to start a new prospecting area of deep sand work. This well found a light grade oil at a depth of 4523 feet in the Tensleep sand, that has a gravity of 36 degrees. This is the first time a high grade oil like this has been found in the Tensleep sand in the Rocky Mountain Region.

In February of 1928, the first oil from the Oregon Basin Field in Park County was run through the Illinois Pipe Line Company's line to the loading racks at Cody. This oil came from the Cody Petroleum Company's lease and wells.

The Midwest Refining Company laid the LaBarge to Opal pipe line to carry oil from LaBarge to Opal. The line is 38 miles long, four inch pipe and powered by two pumping stations, one located in the field and the other about half way at Slate Creek.

The White Eagle Oil and Refining Company made the highest bids for the royalty oil from State of Wyoming lands in the Grass Creek and Big Muddy fields at the sale

held on April 16. The amount of oil from Grass Creek in 1927 was 56,043 barrels and from Big Muddy 73,043 barrels. Other royalty bids were practically the same as last year.

By placing oil heaters on the Poison Spider to Casper oil pipe line, the Fargo Western Oil Company and the Empire State Oil Company have been able to ship the black oil from the Poison Spider regularly. This oil is furnishing the Midwest Refinery at Casper with what black oil it requires to furnish the asphalt trade with asphaltic products.

The Texas Company has taken over the holdings of the California Petroleum Company, generally referred to as the Calpet, in the LaBarge Field. The Texas Company will hereafter operate the wells as its own. Preparations for reducing the size of the Calpet camp in the LaBarge Field is one of the first endeavors announced by the Texas officials.

The Custer Petroleum Company completed a large gas well on the Wyoming side of the State line at Hiawatha Dome. This well proves that the Hiawatha structure is about evenly divided between Colorado and Wyoming.

A heavy wind storm did much damage in the Salt Creek Field to oil equipment. Some derricks were crumpled like cardboard and some steel buildings housing some of the large gas compressors and engines were wrecked while the engines were running at full speed. Luckily no deaths occurred in the damage caused by the storm. The oil companies proceeded to repair the damage as soon as the storm passed and in a week the field was operating as usual.

The Ohio Oil Company and the Crawford interests surveyed a proposed route for a pipe line from the Hiawatha and Baxter Basin fields in southern Sweetwater County, to Salt Lake City. This proposed pipe line is to furnish natural gas for the use of Salt Lake City and other towns and cities along the route. The actual work was to be started in the summer of 1928, but owing to difficulties encountered in obtaining a franchise in the Utah capital, the work of building the pipe line was delayed until 1929.

All the wells on the Teapot Dome were plugged and abandoned or shut in, during the early spring of 1928, and this area is not producing any oil or gas any more.

The Texas Company started erection on a refinery at Cody, Wyoming, to handle the oil from the Oregon Basin Field. In several experimental shipments of this crude to refineries at distant points, it was found that Oregon

Basin oil cannot be shipped economically and refined at the present refining points in central Wyoming. The Texas Company therefore is building a refinery at Cody which will refine the oil there and distribute the oil products from that point. This makes the third refinery the Texas Company owns in the Rocky Mountain Region.

In August of 1928, the Texas Company brought in a 500 barrel well in the Alkali Butte Dome, Fremont County, a wildcat operation and the new well is only a few hundred feet from a State of Wyoming school land section. The oil was found at 3980 feet in the Thermopolis shale above the Muddy sand and doubt is expressed in some quarters as to whether the well will prove a field or is merely a shale pocket.

The Summit Oil Company and other interests drilled in a wildcat producer near Frannie, Wyoming in the Embar sand and the strike is estimated good for 250 barrels of black oil daily. This is expected to open a new field in that vicinity.

The Producers & Refiners Corporation, drilling a deep test in the Muskrat Dome, about 20 miles south of Moneta, Fremont County, found a heavy gas flow about 4,000 feet and then lost the drilling tools. Just what this strike will amount to remains to be seen.

#### FUTURE DEVELOPMENT

At the close of the year 1927, the fields of Wyoming, with the exception of Ant Hills, LaBarge, Hiawatha and Oregon Basin, were declining in production. The Great Salt Creek Field passed its peak of production and in order to supply our refineries with the crude oil for their operation, new fields must be found. The incentive to find new fields has been lacking in the past two years, but the year 1929 appears as the beginning of a new period in Wyoming oil history.

Wyoming still presents great areas for the oil prospector. Up to now, the oil men have sought out those geological structures that were prominently displayed by Nature on the surface. Only recently has it been shown that there are structures lying under the surface that can be found by drilling shallow wells to determine the geology and then drilling to the productive sands with wells located by the information gained from the shallow wells.

Three great areas of the state offer possible oil development of this nature. The central part of the Big Horn

Basin, the area north of the Platte River, between the Big Horn Mountains and the Black Hills, and the Red Desert country. These three areas are covered with Tertiary overlay that could well hide many fields as large as Salt Creek.

All of the area along the east side of the Darby Fault in southwestern Wyoming offers excellent wildcat territory. At present the LaBarge Field is the only development of size in this area, but it seems very doubtful if LaBarge is the only petroleum deposit along this great fault.

Between the Granite Mountains along the north bank of Sweetwater River and the south flank of the Rattlesnake Range, there is a virgin area that has never had any wells drilled thereon. The surfacing is recent Tertiary or even Quarternary and there is very little if any surface evidence of petroleum structures.

Several of the small fields of Wyoming that have been idle for many years could be renovated with profit. The Moorcroft Field in Crook County, the Rocky Fork Field in the same county, Crystal Creek in Big Horn County and Big Hollow Field in Albany County, could produce black oil if handled efficiently. Brenning Basin, Plunkette, Shannon and Fossil would produce light oil if operated in the same manner.

## OIL FIELDS, GAS FIELDS, AND PARTIAL ANALYSES OF CRUDE OIL

Field	County	Zone	Degrees A. P. I.	% Gaso- line & Naptha	Per Cent Kerosene	Base
Alkali	Fremont	Muddy	36.0			Intermediate
*Allen Lake	Carbon	Muddy				Gas
Anthills	Niobrara	Muddy	34.4	14.0	10.0(?)	Intermediate
Aspen	Uinta	Beckwith (Frontier)	2.13	4.0	7.0	Asphaltum
Baxter Basin	Sweetwater	(Dakota)				Gas
*Belle Springs	Carbon	Dakota				Gas
Big Muddy	Converse	Shannon	15.1	24.0	8.2	Intermediate
Big Muddy	Converse	1st W. C.	32.2	22.2	15.7	Intermediate
Big Muddy	Converse	(Muddy Dakota)	33.6	23.1	9.8	Intermediate
Big Piney	Sublette	Wasatch	45.1			Intermediate
Big Sand Draw	Fremont	Frontier				Gas
Billy Creek	Johnson	Frontier				Gas
Black Mountain	Hot Spgs.	(Tensleep Embar)	22.6			Asphaltum
Bolton Creek	Natrona	(Sundance Embar)	25.0			Asphaltum
*Boone Dome	Natrona	Frontier				Gas
Buffalo Anticline	Sweetw't'r	Frontier				Gas
*Byron, South	Big Horn	Dakota	39.3			Intermediate
Casper Cr. No.	Natrona	(Tensleep Sundance)				Black Oil & Gas
Casper Cr. So.	Natrona	(Lower Sund. Tensleep)	14.1	6.4	2.5	Hybrid (Paraffin & Asphaltum) Hybrid (Paraffin & Asphaltum) Hybrid (Paraffin & Asphaltum)
*Cedar Ridge	Carbon	Embar				Black Oil (Show)
*Circle Ridge	Fremont	Embar (Show)	23.7	11.0	9.5	Intermediate
*Crystal Creek	Big Horn	Embar (Show) (Sundance)				Black Oil Asphaltum
Dallas	Fremont	(Embar)	23.3	12.8	8.7	Intermediate
Dutton Dome	Albany	Dakota				Light Oil
Derby	Fremont	Embar	21.0	6.5	9.0	Intermediate
Dry Piney	Sublette	Hilliard	(42.3 30.0)			Intermediate
*Eight Mile Lake (Hatfield)	Carbon	Dakota				Gas (Ex'd)
Elk Basin	Park	(Frontier)	39.6	40.5	5.2	Mixed Paraffin to Naphthene
Elk Basin	Park	(Frontier)	44.5	45.8	5.1	Mixed Paraffin to Naphthene
Elk Basin	Park	(Frontier)	43.4	48.4	10.8	Mixed Paraffin to Naphthene
*Enos Creek	Hot Spgs.	(Embar Tensleep)				Gas (1 producing well)
Four Bear	Park	(Frontier)	15.0			Asphaltum
Ferris	Carbon	Dakota	36.6	31.1	7.4	Intermediate
		Embar	35.9	15.0		
G. P. Dome	Carbon	Niob. Sh. (?)	36.4			Intermediate
Grass Creek	Hot Spgs.	Frontier	43.4	42.6	13.3	Intermediate
Grass Creek	Hot Spgs.	Embar	24.7	16.7	8.3	Intermediate
		Tensleep				
Greybull	Big Horn	Greybull	44.7	38.6	17.8	Intermediate
Hamilton Dome	Hot Spgs.	Embar	25.2	17.6	9.0	Intermediate
Hamilton Dome	Hot Spgs.	Chugwater	26.8	18.0	9.3	Intermediate
Hudson Field (Lander)	Fremont	Embar	23.0	4.4	12.0	Intermediate
		Tensleep				
Iron Creek	Natrona	Dakota	28.4	13.1	3.0	Intermediate
LaBarge	(Uinta Sweetwater)	Almy	29.5	14.6	10.0	Intermediate
		Muddy	18 to 36	3.1 to 20.5	8 to 12	Int. to Paraffin
Lance Creek	Niobrara	Dakota	40.4	33.5	10.0	
		Dakota				
Lost Soldier	Carbon	Sundance	30.4	13.3		Intermediate
Lost Soldier	Carbon	Lakota	32.0	16.7	18.5	Intermediate
		Frontier	31.1	14.8		Intermediate
Mahoney	Carbon	Frontier	27.1 (also gas)			Asphaltum
Maverick Spgs.	Fremont	Embar(Top)	21.8	8.6	14.7	Intermediate

## OIL FIELDS, GAS FIELDS, AND PARTIAL ANALYSES OF CRUDE OIL

Field	County	Zone	Degrees A. P. I.	% Gaso- line & Naptha	Per Cent Kerosene	Base
*Medicine Bow	Carbon	Frontier	35.6	30.0	15.5	Light Oil
Moorcroft Anticline	Crook	Seepage	16.0			Heavy Asphaltum (No Gasoline)
*Moorcroft Anticline	Crook	Muddy	21.9			Heavy Asphaltum (No Gasoline)
*Mule Creek	Niobrara	Dakota	31.7	11.7	9.8	Intermediate
Newcastle	Weston	2nd W. C.	37.0	31.6	11.1	Intermediate
Notches Dome	Natrona	Tensleep	23.0			Intermediate
Oregon Basin	Park	Dakota Gas				
		Tensleep	22.5	16.8	5.0	Intermediate
Osage	Weston	Embar	37.6	34.3	10.3	Intermediate
*Pedro	Weston	Muddy	31.5		15.0	Intermediate
		(Show)				
Pilot Butte	Fremont	Shale Sand Chugwater	35.4	24.0	19.7	Paraffin Asphalt
*Pine Mountain	Natrona	Tensleep	17.0	(Show frsak oil No Gasoline)		
*Plunkett (Field Abandoned)	Fremont	Mowry Shale	35.8	21.0	14.4	Intermediate
Poison Spider	Natrona	Sundance	22.8	18.1	31.5	Intermediate
Poison Spider	Natrona	Tensleep	15.0	7.5	2.9	Napthene
*Powder River	Natrona	Muddy (?)	38.0			Intermediate
		(Show)				
Rex Lake	Albany	Muddy	32.1	22.0	18.8	Intermediate
Rex Lake	Albany	Dakota	30.8	18.9	8.4	Intermediate
Rock Creek	Carbon	1st & 2nd Muddy and Dakota	36.1	31.4	14.2	Intermediate
Salt Creek	Natrona	1st & 2nd W. C.	36.8	29.3	9.9	Intermediate
Salt Creek	Natrona	3rd W. C.	37.2	28.2	4.7	Intermediate
Salt Creek	Natrona	Lakota	33.2	23.8	4.1	Intermediate
Salt Creek	Natrona	Sundance				Intermediate
Shannon	Natrona	Shannon	24.2	3.1	11.1	Napthene
Simpson Ridge	Carbon	Mesaverde	20.0 (?)		2.0	Intermediate
*Spence Anticline	Big Horn	Embar	21.1	10.6	4.0	Intermediate (Show)
Spindletop	Natrona	Sundance	21.8			Asphaltum
Spring Valley	Uinta	Aspen & Bear River	22 to 40	9 to 32		Intermediate
Sunshine, North	Park	Tensleep	15.8	6.5	3.2	Asphaltum
Sunshine, South	Park	Embar	19.6			Asphaltum
Teapot Dome	Natrona	2nd W. C.	35.4	29.9	3.9	Intermediate
Teapot Dome	Natrona	3rd W. C.	36.0	28.0	4.5	Intermediate
Teapot Dome	Natrona	Shale	43.2	39.5	17.3	Paraffin
Torchlight	Big Horn	Mowry	44.8	49.6	13.6	Paraffin
Wertz Dome	Carbon	Frontier Gas				
*Wakeman	Crook (Show)					
Warm Spgs.	Hot Spgs.	Embar	11.9	5.4	2.9	Intermediate

\*Non-commercial or non-producing.

## WYOMING OIL PRODUCTION, BY FIELDS, IN YEAR

1927

Field	No. Wells	Barrels
Big Muddy	188	1,063,657
Black Mountain	6	7,581
Bolton Creek	5	1,802
Byron	10	19,555
Dallas Dome	38	75,394
Derby	4	9,284
Dutton Creek	1	7,389
Elk Basin	145	224,783
Ferris	23	22,089
Grass Creek	346	973,645
Greybull	6	6,482
Hamilton Dome	27	391,082
Hudson	32	129,217
LaBarge (Sublette County)	28	240,231
LaBarge (Lincoln County)	17	87,616
Lake Creek	2	3,949
Lance Creek	26	279,478
Lost Soldier	73	1,294,188
Maverick Springs	27	454
Mule Creek	41	186,398
Notches	3	24,107
Oregon Basin	31	5,122
Osage	89	100,235
Pilot Butte	27	17,422
Poison Spider	19	20,321
Rex Dome	4	43,546
Rock Creek	61	972,177
Salt Creek	2125	14,302,733
Simpson Ridge	7	24,476
South Casper Creek	19	218,994
South Sunshine	1	5,886
Spring Valley	16	873
Teapot	63	295,702
Torchlight	50	756
Miscellaneous		89,869
	3560	21,146,493

From reports to State Board of Equalization.

WYOMING OIL PRODUCTION, BY COUNTIES, IN YEAR  
1927

Albany -----	43,546 Bbls.
Big Horn -----	26,793 "
Carbon -----	1,026,131 "
Converse -----	1,063,657 "
Fremont -----	231,771 "
Hot Springs -----	1,376,257 "
Lincoln -----	87,616 "
Natrona -----	14,967,653 "
Niobrara -----	451,751 "
Park -----	235,792 "
Sublette -----	240,231 "
Sweetwater -----	1,294,187 "
Uinta -----	873 "
Weston -----	100,235 "
Total Production -----	21,146,493 Bbls.

## MINERAL RESOURCES OF WYOMING

From Estimates of United States Geological Survey and State Geologist

Coal -----	1,076,620,100,000 Tons	@	\$0.10	\$107,682,010,000
Oil -----	553,500,000 Bbls.		2.00	1,107,000,000
Oil Shale -----	20,000,000,000 Bbls.		2.00	40,000,000,000
Gas -----	7,000,000,000,000 Cu. Ft.		0.10	700,000,000
Iron Ore -----	500,000,000 Tons		1.00	500,000,000
Phosphates -----	200,000,000 Tons		1.00	200,000,000
Potash and Alumina -----	1,973,000,000 Tons		0.20	394,700,000
Metallic Minerals—Gold, Silver, Copper, etc., estimated -----				51,250,000
Other Minerals, Asbestos, Mica, Platinum, Graphite, Sulphur, Sodas, Gypsum, Clays, Building Stone, Limestone, etc., estimated -----				1,000,000,000
Total -----				\$151,634,960,000

## LIST OF PUBLICATIONS

John G. Marzel, State Geologist,  
Cheyenne, Wyoming

## Mineral:

- \*Albany County: Beeler 1906.
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- \*Mines in 1907: Beeler, 1908.
- \*South Pass Gold District: Beeler, 1903.
- \*South Pass Gold District: Beeler, 1904.
- South Pass Gold District: Beeler, 1908.
- \*Bull. 1, Mineral Resources: Jamison, 1911.
- \*Bull. 7, Atlantic City Gold District: Trumbull, 1914.
- \*Press Bull. 10, Mineral Resources: Morgan, Oct. 1, 1920.
- Developed and Undeveloped Resources: Dietz, 1928.—  
Price \$1.25.

## Miscellaneous:

- \*State Geologist's Report: Beeler, 1903.
- \*Bull. 6, Mining Laws: Trumbull, 1913.
- \*Bull. 9, Biennial Report, 1913-14: Trumbull, 1915.
- \*Bull. 16, Mining Laws: Trumbull, 1917.
- \*Bull. 17, Bibliography and Index: 1918.
- Bull. 18, Mining Laws, State and Federal: Morgan, 1921.
- Bull. 19, Mineral Hot Springs of Wyoming: Bartlett, May 6, 1926.
- Bull. 20, Atlantic City South Pass Gold Mining District: Bartlett, July 15, 1926.
- Map, State Topographic, 1000 ft. contour: Price \$1.00.
- \*Map, State Geologic: April 1, 1921.
- Map, Wyo. Oil and Gas Fields, U. S. G. S., 1921.

## Oil:

- \*Bull. 2, Fremont County (Lander Field): Jamison, 1911.
- \*Bull. 3-a, Douglas Oil Field: Jamison, 1912.
- \*Bull. 3-b, Muddy Creek Oil Field: Jamison, 1912.
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- \*Bull. 5, Prospective Oil Fields, Trumbull, 1913.
- \*Bull. 8, Salt Creek Oil Field: Trumbull, 1914.
- \*Bull. 10, Basin-Greybull Oil and Gas Fields: Hintze, 1915.
- \*Bull. 11, Pt. 1, Little Buffalo Basin Gas Fields: Hintze.
- Pt. 2, Grass Creek Oil & Gas Field: Hintze, 1915.

- \*Bull. 12, Light Oil Fields: Trumbull, 1916.
- \*Bull. 13, Pilot Butte Oil Field: Ziegler, 1916.
- Bull. 14, Byron Oil and Gas Field: Ziegler, 1917.
- Bull. 15, Oregon Basin Gas Field: Ziegler, 1917.
- \*Sci. Ser., Bull. 1, Pt. 1, Petroleum in Granite.  
Pt. 2, Effect of Structure Upon Migration of Oil:  
Trumbull, 1916.
- \*Map, Big Muddy-Douglas Oil Field: Trumbull, 1915.  
Map, Rock Springs Uplift, (Dry Lake Dome: Trum-  
bull, 1915).
- \*Press Bull. 2, Rawlins and Vicinity: Morgan.
- \*Press Bull. 4, Laramie Basin: Morgan, Oct. 24, 1919.
- \*Press Bull. 7, Rock Cr. Oil Field: Morgan, April 1,  
1920.
- \*Press Bull. 8, Osage-Newcastle Oil Field: Morgan,  
July 8, 1920.
- \*Press Bull. 9, Dry Piney-LaBarge Oil Field: Morgan,  
Aug. 1920.
- \*Press Bull. 11, Fossil Oil Field: Morgan, Aug. 1921.  
Eleventh Biennial Report, Morgan, 1922.  
Twelfth Biennial Report: Bartlett, 1924.  
Thirteenth Biennial Report: Bartlett, 1926.
- \*Press Bull. 14, Present Condition of Oil and Gas De-  
velopments of Big Horn Basin: Bartlett, 1923.  
Press Bull. 15, Oil and Gas Developments of Laramie-Medicine Bow District: Bartlett, 1924.

\*Out of print.

**CORRELATION TABLE SHOWING THE GEOLOGICAL FORMATIONS IN THE OIL PRODUCING AREAS OF WYOMING**

ERA	EPOCH	Southwestern Wyoming	Wind River Basin	Big Horn Basin	Shoshone River Basin	FORMATIONS	Rawlins Area	Laramie Basin	Eastern Wyoming	Northeastern Wyoming	Southeastern Wyoming	
Tertiary	Wasatch	Bridger Green River	Wind River	Wasatch	Wasatch	White River		Undifferentiated	White River		Ogallala Arikaree Brule Clay Chadron	
		Knight Fowkes Almy	Wind River	Fort Union	Fort Union	Wind River	Wasatch					
		Evanston				Fort Union	Fort Union		Fort Union	Fort Union		
Tertiary or Cretaceous		Laramie		Ilo (Lance)	Ilo (Lance)	Lance	Laramie	Lewis	Lance	Lance	Fox Hills	
		Adaville	Mesaverde	Mesaverde (Eagle sand)	Geba (Eagle)	Mesaverde (Teapot sand) (Parkman sand)	Mesaverde	Mesaverde	Fox Hills	Fox Hills	Fox Hills	
Cretaceous	Montana	Hilliard (Blair) (Baxter shale)		Pierre Basin (Niobrara)	Cody	Steele (Shannon sand)	Pierre	Steele	Pierre	Pierre	Pierre	
		Frontier	Mancos	Frontier (Torchlight-Peay sands)	Frontier (Sands)	Frontier (Wall Creek sands)	Niobrara	Niobrara	Niobrara	Niobrara	Niobrara	
		Aspen		Mowry (Kimball sand) (Oeth Louie sand)	Mowry	Mowry	Mowry (Shale & sand)	Mowry	Mowry	Mowry	Mowry	
Cretaceous	Colorado	Bear River	Dakota (Sand) (Shale and sand)	Thermopolis (Sand)	Thermopolis (Sand)	Thermopolis (Sand)	Dakota (Sands)	Cloverly (Sands)	Dakota Fuson Lakota	Dakota Fuson Lakota	Cloverly	
		Beckwith	Morrison	Morrison (Sand)	Morrison (Byron sand)	Morrison	Morrison	Morrison	Morrison	Morrison	Morrison	
		Twin Creek Nugget	Sundance	Sundance	Sundance	Sundance	Sundance	Sundance	Sundance	Sundance	Sundance	
Jurassic	Cretaceous ? Jurassic ?	Ankarch Thaynes Woodside	Chugwater	Chugwater	Chugwater	Chugwater	Chugwater	Chugwater	Spearfish	Spearfish	Chugwater	
		Park City	Embar (Sand)	Embar (Sand)	Embar	Embar (Sand)			Minnekahta Opeche	Minnekahta Opeche		
Permian (Carboniferous)		Webster		Tensleep Amsden	Tensleep Amsden	Tensleep Amsden	Casper	Forelle Santanka Casper	Hartville	Minnehaha	Casper	
				Madison	Madison	Madison			Guernsey	Pahasapa		

TABULATION OF OIL STRUCTURES IN WYOMING

Field	County	A. v. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Agate Basin	(See Mule Creek)					
Alcova Dome	Natrona				Carlile shale	Dry hole drilled to granite
Arminto Dome	Natrona		All below Dakota		Pierre shale	Some gas in 3rd Wall Crk.
Alkali Butte	Fremont		All below Dakota		Mesa Verde	Oil found in Muddy shale
Alkali Creek	(See Hiawatha)					
Alkali Dome	Big Horn		No deep test		Niobrara shale	
Allen Lake	(See Eight Mile Lake)					
Altamont	(See Spring Valley)					
Ant Hills	Niobrara	4,000	All below Sundance	1,200 a.	Pierre shale	Oil found in Muddy sand
Antelope Gap	Platte		All sands		White River	No test made
Arch Creek	Crook		Sundance and lower		Dakota	No test made
Aspen	(See Spring Valley)					
Arvada			All sands		Lower Tertiary	No test made, but enough gas flows through faults to run engine on C. B. & Q. R. R. pumping station
Badger Basin	Park	4,000 ?	All sands	12 sq. miles	Fort Union	Test started in 1928
Baggs	Carbon	4,500 ?	All sands		Lower Tertiary	Test started 1928
Bailey Dome	Carbon				Steele shale	No test
Bates Creek	Natrona		All below Sundance		Dakota	No test
Bates Hole (Schnoor)	Natrona			3 sections	Morrison	Tested to Tensleep and abandoned

**TABULATION OF OIL STRUCTURES OF WYOMING—Continued**

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Eates Park	Natrona		Amsden and below	4 sections	Dakota	Tested to Tensleep and abandoned
Baxter Basin	Sweetwater	4,000	All below Lakota	Very large	Hilliard and older shales	Gas production in Frontier sands
Bear Creek	Sweetwater		All sands		Green River form.	No test drilled
Bear Dome	(See Crystal Creek)					
Beaver Valley	Weston		All below Dakota		Pierre shale	No test drilled
Belle Springs	Carbon	4,000	Sundance and below		Mesa Verde	Gas production in Frontier sands
Berry Dome	Hot Springs		All sands		Mesa Verde	No test drilled
Bessemer Bend (Goose Egg)	Natrona		Below Embar		Morrison	One dry hole drilled
Big Dome	(See Maverick Springs)					
Big Hollow	Albany	4,000	Amsden and Madison		Benton shale	Deep test dry and abandoned. Black oil at shallow depth
Big Muddy	Converse	4,500	All below Lakota	7 sections	Pierre shale	Oil production in Cretaceous sands
Big Piney	(See Dry Piney)					
Big Sand Draw	Fremont	3,500	All below Frontier	5 sections	Mesa Verde	Gas production in Frontier sands
Big Sulphur Springs (Wilson Dome)	Natrona		All sands		Niobrara	Not tested
Billy Creek	Johnson	4,500	All below Lakota	5 sections	Pierre shale	Gas production in Muddy sand

**TABULATION OF OIL STRUCTURES IN WYOMING—Continued**

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Black Dome	(See Spence Dome)					
Black Mountain	Hot Springs	3,200	Amsden and Madison	3 sections	Morrison	Black oil in Embar and Tensleep
Black Tail	Fremont		All sands		Morrison	Not tested
Blue Spring	Hot Springs (See Kirby Creek)					
Bodie Dome (Freeland)	Natrona		All sands		Dakota	Not tested
Bolton Creek	Natrona	3,000	Amsden and Madison	2 sections	Frontier	Black oil in Sundance and Embar
Bonanza Dome	Big Horn		Amsden and Madison		Frontier	
Boone Dome	Natrona	4,500	Dakota and below	1 section	Pierre	Gas in first Wall Creek
Bothwell Dome	Albany		All sands		Cloverly	Not tested
Brenning Basin	Converse	400	Embar and below	2 sections	White River	Light oil at shallow depth, small wells
Bridger Dome	Uinta				Bear River	Not tested
Brooks Dome	Hot Springs				Cody shale	Not tested
Bruce Dome	(See Black Mountain)					
Buck Springs	Fremont				Fort Union	Not tested
Bud Kimbal	Washakie				Cloverly	Not tested
Lt. Buffalo Basin	Park	2,800	Dakota and below	8 sections	Cody shale	Gas in Frontier

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Buffalo Basin (Oil Springs)	Fremont	2,000	Dakota and below		Steele shale	Gas in Frontier (not commercial)
Bull Creek	Crook				Carlile shale	Not tested
Bunker Hill	Carbon		Dakota and below		Mesa Verde	Tested in upper sands
Burr's Dome	Johnson		Dakota and below		Mesa Verde	One dry hole
Burley Dome	Fremont				Morrison	Not tested
Butte Monocline	Crook (See Moorcroft Field)					
Byron Field	Big Horn	400 & 2,800	Sundance and below	4 sections	Niobrara shale	Oil in shallow and gas in deep sands
Canyon Crk. Dome	(See Hiawatha)					
Carcyhurst Dome (Horseshoe)	Converse		Frontier and below		Pierre shale	One dry hole
Carroll Ranch	Natrona		Sundance and below		Steele shale	One dry hole
Cartier Dome	Uinta (Also see Greybeal)				Bear River	One dry hole
Casper Dome	Natrona		All sands		Pierre shale	Several shallow dry holes one deep dry hole
Castle Creek	Natrona		Dakota and below		Pierre shale	One dry hole
Cedar Ridge	Carbon				Mesa Verde	Untested
Centennial Valley Dome	Albany				Dakota	Untested
Chabot Dome	Washakie				Morrison	Untested

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Chalk Cliffs	(See McGill Dome)					
Cherry Dome	Big Horn				Niobrara	Untested
Cherokee Ridge	Sweetwater				Green River	Untested
Cherokee River	(See Mule Creek)					
Chicago Creek	Crook				Carlile shale	Untested
Chudd Dome	Fremont				Wind River	One dry hole
Circle Ridge	Fremont (See Maverick Sprgs.)					
Clarke Dome	Natrona				Pierre shale	Untested
Coal or Cole Creek Dome	Converse		Sundance and below		Mesa Verde	One deep dry hole
Cocoanut Creek	Fremont				Benton shale	Untested
Cody Dome	(See Shoshone Dome)					
Colony Dome	Crook				Carlile shale	One deep dry hole
Colter Dome	Washakie				Wasatch	Untested
Como Ridge	Albany				Benton shale	Untested
Conant Creek	Fremont				Steele shale	Untested
Cooper Cove	Carbon				Mesa Verde	One dry hole
Corley Dome	Hot Springs				Pennsylvanian	Untested
Cottonwood	(See Hamilton Dome)					
Cottonwood Crk.	Natrona				Benton	Untested

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Cow Gulch	Niobrara				Morrison	Black oil showings in some early wells
Crazy Woman	Johnson				Mesa Verde	One dry hole
Cowley Dome	Big Horn				Mesa Verde	One dry hole
Crooks Gap (Spring Crk.)	Fremont	2,000	Muddy and below		Steele shale	Showings of light oil in Frontier
Crooked Crk.	Big Horn				Morrison	Untested
Crooked Stick	Converse				Chugwater	Untested
Crystal Creek	Big Horn	700	Tensleep and below		Morrison	Black oil production in Sundance
Cumberland	Lincoln and Uinta		Dakota and below		Aspen shales	One dry hole
Dad Monocline	Carbon		All sands		Wasatch	Untested
Dallas Dome	Fremont	900	Arnsden and Madison	1 section	Morrison	Black oil production
Danker Dome	Park	2,000	Dakota and below	3 sections	Mesa Verde	Gas production in Frontier
Davidson Dome	Lincoln				Wasatch	Untested
Dead Horse	Natrona				Niobrara	Untested
Derby Dome	Fremont	900	Arnsden and Madison	3 sections	Morrison	Black oil production
Dewey Dome	Weston				Pierre shale	Untested
Diamond Dome	Albany (See Cooper Cove)					
Diamond Basin	Park				Cody shale	Untested, now drilling

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Douglas Monocline	Converse				White River	One dry hole
Dry Creek	Fremont		Dakota and below		Wind River	One dry hole
Dry Piney	Sublette				Wasatch	Showings of light oil in Tertiary shales
Dugout Creek	Natrona		Dakota and below		Pierre shale	One dry hole
Dutton Creek	Carbon	4,000	Dakota and below		Wasatch	One producing well, light oil
Dutton Creek	Fremont		Dakota and below		Wind River	Two dry holes
East Foote Creek	Albany				Steele Shale	Untested
East Fork	Carbon				Thermopolis shale	Untested
East Sand Draw	(See Sand Draw)					
East Teapot	(See Teapot Dome)					
Eight Mile Dome	Big Horn				Lance Formation	Untested
Eight Mile Lake	Carbon	3,000	Sundance and below	8 sections	Cody shales	Commercial gas production
Elk Basin	Park	2,000	Dakota and below	9 sections	Mesa Verde	Oil and gas production from Frontier sands
Elk Mountain	Carbon				Cody shale	Untested
Embar Dome	Hot Springs				Chugwater	Untested
Emigrant Gap Dome	Natrona		Tested to granite	22 sections	Mowry shale	Seven dry holes
Enos Creek	Hot Springs	2,500	Dakota and below		Mesa Verde	One commercial gasser
Evanson	Uinta				Tertiary	One dry hole

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Ferris Field	Carbon	2,000	Amsden and Tensleep	10 sections	Steele Shale	Oil production and deep oil production in Tensleep
Fiddler Creek	Weston				Pierre shale	Untested
Flat Top Dome	Carbon				Chugwater	Untested
Fort Steele	Carbon				Steele shale	Untested
Fossil Field	Lincoln	400		1 section	Tertiary	Small oil wells making light oil
Four Bear	Park				Chugwater	Heavy black oil showings Being tested
Frannie	Big Horn	2,000	Amsden and Madison		Mowry	Black oil from Embar or Tensleep
Freeland	(See Bodie Dome)					
Freeze Out Dome	Carbon				Chugwater	Untested
Frontier Dome	Big Horn				Niobrara	Untested
Frost Ridge	Big Horn				Mesa Verde	Untested
Garland	Big Horn	2,500	Sundance and below		Niobrara	Gas production from Frontier
G. P. Dome	Carbon	1,800	Sundance		Steele shale	Oil production, mixed base
Geary Dome	Natrona (See Cole Creek)					
Gebo Dome	Hot Springs		Dakota and below		Mesa Verde	One dry hole and another test proposed
Gillette Dome	Campbell				Tertiary	Untested

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Gillespie Dome	Albany				Benton	Untested
Glendo Monocline	Platte				Mowry	One dry hole flowing water
Golden Eagle Dome	Hot Springs		Sundance and below		Mesa Verde	Two gas wells in Frontier are exhausted and abandoned
Gooseberry Dome	Park				Mesa Verde	
Goose Egg Dome	(See Bessemer Bend)					
Gose Dome	Weston				Carlisle shale	One deep test abandoned
Goshen Dome	Goshen				Tertiary	One deep test abandoned
Gothberg Dome	Natrona (See North Casper Creek)					
Government Hill	Natrona		Sundance and below		Benton	Two dry holes
Granger Dome	Sweetwater				Tertiary	Untested
Granville Dome	Carbon				Lewis Shale	Untested
Grass Creek Field	Hot Springs	900 and 4,000	Madison and below	9 sections	Mesa Verde	Oil production in Frontier of light oil and black oil in Tensleep, Embar and Madison
Greybeal	Natrona	4,500	Amsden and Madison		Pierre shale	Deep dry hole
Greybull	Big Horn	600	Dakota and below	1 section	Tertiary	Shallow production light oil
Gray Rocks	Platte		Amsden and Madison		Chugwater	Dry hole abandoned
Green River Dome	Sublette				Tertiary	Untested
Grey's River	Lincoln				Mowry and Aspen	Being tested

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Guernsey Dome	Platte				Sundance	Shallow test abandoned
Gyp Creek	Big Horn				Cloverly	Untested
Gyp Springs	Hot Springs				Thermopolis shale	Untested
Half Moon	Park				Carlile	Being tested
Hale Dome	Hot Springs				Morrison	Untested
Hamilton Dome	Hot Springs	1,500	Tensleep and below	4 sections	Cody shale	Black oil production from Sundance
Hiawatha Dome	Sweetwater (Partly in Colorado)	2,500+	Tertiary sands and Cretaceous	No estimate	Tertiary	Gas production from sands in Wasatch formation
Hidden Dome	Washakie	2,000	Embar and below	No estimate	Thermopolis	Gas production from Dakota
Hilliard Dome	Uinta				Tertiary	Shallow test abandoned
Hjorth Dome	Carbon				Mesa Verde	Several abandoned tests
Horse Creek	Albany				Pierre shale	
Horseshoe Dome	(See Muskrat)					
Horsetrack Dome (Pickett Lake)	Carbon				Steele shale	One deep test abandoned
Horton Dome	Washakie				Mesa Verde	Untested
Howard Dome	Weston				Tertiary	Untested
Hudson Dome	Fremont	1,000 and 2,800	Amsden and Madison	3 sections	Chugwater	Black oil production from Embar and Tensleep
Hurst Dome (Spence Dome)	Big Horn				Morrison	Partially tested

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Ilo Ridge Dome	Hot Springs				Mesa Verde	Partially tested
Indian Creek Dome	Niobrara				Pierre shale	Untested
Iona or Ionia Dome	Big Horn				Cloverley	Untested
Iron Creek Dome	Natrona	1,200 to 2,200	Amsden and Madison		Dakota	Gas production abandoned as exhausted
Irvine Dome	Converse		Sundance and below		Tertiary	Dry hole
Islay Dome	Albany				Pennsylvanian	Untested
James Lake Dome	Albany				Steele shale	Partially tested
Kaycee Dome	Johnson				Dakota	One dry hole
Kelly Dome	Fremont				Pennsylvanian	Untested
Kemmerer Dome	Lincoln				Aspen shale	Partially tested
Kirby Creek Dome	Hot Springs				Frontier	Partially tested
Knight Dome	Uinta				Sundance	Untested
LaBarge	Lincoln and Sublette	1,500	All Cretaceous sands	10 sections	Tertiary	Light oil production from Tertiary sand lenses
LaBonte	Converse				Chugwater	Untested
La Flame	Crook				Graneros	Untested
Lake Creek	Hot Springs	2,000	Amsden and Madison		Cody	Black oil production from Embar sand
Lake Hattie Dome	Albany				Mesa Verde	Partially tested
Lake Valley Dome	(See Eight Mile Lake)					

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Lamb Dome	Big Horn				Niobrara	Untested
Lander Dome	(See Hudson Dome)					
Lance Creek Field	Niobrara	3,800	Sundance and below	12 sections	Pierre shale	Light oil producing field from Muddy and Dakota sands
Lane Dome	(See Notches)					
Lassell Creek	Uinta				Hilliard shale	Untested
Leroy Dome	Uinta				Aspen shale	Untested
Lingle Dome	Goshen				Tertiary	Deep test drilled over a mile but did not penetrate Cretaceous
Little Buffalo Basin	(See under B)					
Little Creek Dome	Albany				Benton	Untested
Little Dome	(See Maverick Springs)					
Little Grass Creek Dome	Hot Springs	2,000	Dakota and below	4 sections	Mesa Verde	Gas production from Frontier
Little Pole Cat Dome	(See Danker Dome)					
Little Sheep Mountain Dome	Big Horn				Lower Pennsylvanian	Being tested
Logan Gulch	Fremont				Steele shale	Untested
Lost Creek Anticline	Sweetwater				Wasatch	Untested except in shallow parts
Lost Soldier Anticline	Carbon	2,000 to 4,000	Amsden and Madison		Tertiary	Gas and oil production from Frontier, Dakota and Sundance formations

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Lovell Dome	Big Horn				Niobrara	Partially tested
Lox Dome	Natrona	1,800	Dakota and below		Niobrara	One well shows oil and gas in Frontier formation
Lucerne Dome	Hot Springs				Mesa Verde	Partially tested
Lusk Dome	Niobrara				Pierre shale	Untested, White River also on surface, unconformably
Lysite Mountain Dome	Hot Springs				Frontier	Untested monocline, seeps of heavy oil
Mahogany Butte	Washakie				Cody shale	Partially tested
Mahoney Dome	Carbon	3,000	Embar and below		Carlisle shale	Commercial gas area in Dakota and Sundance formations
Mandel Dome	Albany				Mesa Verde	Untested
Manderson Dome	Big Horn				Niobrara	Untested
Manville Dome	Niobrara				Pennsylvanian	One dry hole
Maverick Springs	Fremont	2,000	Tensleep and below		Carlisle shale	Black oil production from Embar sands
McComb Dome	Fremont				Tertiary	One dry hole
McGill Dome	Albany				Niobrara	Untested
McGown Dome	Fremont				Mancos	Partially tested
McKinley Dome	Converse		All sands drilled through to granite		Tertiary	Drilled and abandoned
Mease Dome	(See Dry Creek)					

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Medicine Bow Dome	(See Hjorth Dome)					
Megown Dome	(See McGown Dome)					
Mellen Dome	Natrona		Sundance and below		Niobrara	One dry hole
Mercer Dome	Big Horn				Chugwater	Untested
Midway Geary Dome	Natrona		Dakota and below		Mesa Verde	One dry hole
Millbrook Dome	Albany				Mesa Verde	Untested
Miller Hill Dome	Carbon				Frontier	Partially tested
Monument Dome	Park				Dakota	Untested
Moorecroft Monocline Field	Crook	900	Below Dakota	2 sections	Graneros shale	Black oil production in Dakota sand.
Morris Dome	Big Horn				Morrison	Untested
Mormon Butte Dome	Big Horn				Niobrara	Untested
Morton Dome	Washakie				Cody shale	Untested
Mud Creek Dome	Hot Springs				Dakota	Partially tested
Muddy Creek Dome	(See Dad Dome)					
Mule Creek Dome	Niobrara	1,200	Sundance and below	4 sections	Niobrara shale	Light oil production from Lakota sand
Murphy Dome	Hot Springs				Chugwater	Black oil production from Embar sand
Muskat Dome	Fremont	4,200	Dakota and below		Tertiary	Gas production from Muddy sand
Natrona Dome	Natrona				Pierre shale	Untested

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Neiber Dome	Washakie				Mesa Verde	Partially tested
Newcastle (Salt Creek)	Weston				Dakota	Partially tested
North Baxter Basin	(See Baxter Basin)					
North Casper Creek	Natrona	4,000	Amsden and Madison		Pierre shale	One well to Tensleep had commercial black oil but was plugged. Some gas at 900
North Oregon Basin (Wiley Anticline)	Park				Mesa Verde	Partially tested
North Sunshine Dome	Park					
Notches Dome	Natrona	2,000	Amsden and Madison		Mesa Verde	Partially tested
Nowood Anticline	Washakie				Benton	Black oil production
O'Brien Springs	Carbon				Cloverley	Partially tested
Oil Creek	Weston				Mesa Verde	Gas in Frontier sands
Oil Mountain	Natrona				Pierre shale	Partially tested
Oil Springs Dome	Carbon		Tensleep and lower		Steele shale	Tested and abandoned
Old Woman Dome	Niobrara				Mesa Verde	Partially tested
Oregon Basin	Park	3,500	Amsden and Madison	20 sections	Dakota	Partially tested, black oil
Osage Field	Weston	1,500	Tensleep and below	8 sections	Cody shale	Black oil production from Embar and Tensleep sands
Paint Rock Dome	Big Horn				Pierre shale	Light oil production in Muddy sand
					Dakota	Partially tested

TABLATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Palmer Dome	(See Emigrant Gap)					
Parco Dome	Carbon				Steele shale	Untested
Pass Creek	Carbon				Frontier	Untested
Pedro	Weston	400	Muddy and below	2 sections	Pierre shale	Light oil production from shale
Pickett Lake (Horse Track)	Sweetwater				Wasatch	One dry hole abandoned
Picnic Grounds	(See Fort Steele)					
Pilot Butte	Fremont	900	All sands		Wind River	Light oil production from shale
Pine Mountain	Natrona	1,800	Amsden	4 sections	Dakota	Showings of black oil and gas
Pinto	Park				Mesa Verde	Untested
Pitchfork	Park		Embar		Cloverley	Being tested, black oil showing
Place Dome	(See Emigrant Gap)					
Plunkett Dome	Fremont	400	All sands		Benton shale	Light oil production from shale
Poison Lake	Converse				Dakota	Untested
Poison Spider	Natrona	2,000	Amsden and Madison	6 sections	Dakota	Black oil and gas production from Sundance, Embar and Tensleep
Portland Dome	Carbon				Steele shale	Untested
Potato Ridge	Big Horn				Niobrara shale	Untested

TABLATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Powder River	Natrona					
Puddle Springs	Fremont (See Muskrat)		Dakota and below		Pierre shale	Some gas in Frontier sands
Pump Creek Dome	Weston					
Quealey Dome	Albany				Dakota	Untested
Rattlesnake Dome	Natrona				Mesa Verde	Partially tested
Rawhide Creek	Goshen				Steele	Partially tested
Rawlins Dome	Carbon				Arikaree	Untested
Red Creek	Sweetwater				Mesa Verde	Untested
Red Desert Anticline	(See Lost Creek)				Mesa Verde	Untested
Red Dome	Big Horn					
Red Fork Dome	Johnson				Niobrara	Untested
Red Springs	Hot Springs				Chugwater	Untested
Rex Lake	Albany	3,000	Sundance and below		Thermopolis	Untested
Richards Dome	Hot Springs				Mesa Verde	Light oil production from Muddy sand
Richards Dome	Fremont				Chugwater	Untested
Riverton Dome	Fremont		All sands		Fort Union	Untested
Rock Creek (Rock River)	Carbon		Sundance and below		Wind River	Untested
Rock Springs	(See Baxter Basin)				Mesa Verde	Light oil production in Muddy sand

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Rocky Ford (Rocky Point)	Crook	400		1 section	Morrison	Black oil production in Sundance sand
Rozet Dome	Campbell				Tertiary	One dry hole did not reach sands
Sage Creek Dome	Carbon				Hilliard shale	Untested
Sage Creek Dome	(See Cowley)					
Sage Creek Dome	Fremont	1,800	Tensleep and below		Morrison	One test found black oil in Embarras but abandoned
Sage Hen Dome	Converse				Cloverley	Untested
Salt Creek	(See Newcastle)					
Salt Creek	Natrona	1,200 2,000 2,500	Amsden and Madison	15 sections	Mesa Verde	Greatest light oil field in Rocky Mts.
Sand Draw	Hot Springs			1 section	Eagle S. S.	Test now drilling
Sand Draw	Fremont	3,000	Dakota and below	10 sections	Mesa Verde	Gas production from Frontier sands
Seaman Hills	Natrona				Tertiary	Untested
Separation Flats	Carbon				Steele shale	Untested
Seven Anticlines	Carbon				Cloverley	Untested
Seven Mile Dome	Albany				Mesa Verde	Untested
Shannon Dome	Natrona	500		2 sections	Shannon S. S.	Light oil production on edge Salt Creek Field
Sheep Creek Dome	Fremont (See Crooks Gap)					

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Sheep Mountain	Fremont					
Sheep Mountain	Big Horn (See Little Sheep Mtn.)				Pennsylvanian	Untested
Shell Creek	Big Horn				Morrison	Untested
Shelbourne	Hot Springs				Chugwater	Untested
Sheldon Dome	Fremont	2,000	Dakota and below		Mesa Verde	Three dry holes, one with small production of light oil
Shepard Dome	Campbell				Tertiary	Untested
Sherrard Dome	Carbon				Mesa Verde	Gas production in Frontier sand
Shirley Dome	Carbon				Cloverley	Untested
Shoshone Dome (Cody)	Park	4,200	Amsden and Madison		Mesa Verde	Showing black oil and hot water, some shale oil at 1,000
Simpson Ridge	Carbon				Mesa Verde	Black oil production at 900 and deep test to 6,200 without finding any sands
Skull Creek	Park				Morrison	Untested
Skull Creek	Weston		Sundance and below		Pierre	One dry hole
Snyder Basin	(See Dry Piney)					
Soda Creek	Weston				Pierre shale	Untested
Sodergren Dome	Albany				Tertiary	Untested
Solo Dome	Sweetwater				Tertiary	Untested

TABULATION OF OIL STRUCTURES IN WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
South Baxter Basin	(See Hiawatha)					
South Casper Creek	Natrona				Tertiary	Partially tested
South Piney	(See Dry Piney)					
South Sunshine	Park (See Sunshine Basin)					
Spence Dome	Big Horn				Morrison	Partially tested
Spindle Top	Natrona	1,800	Amsden and Madison		Frontier	Black oil production from Sundance sand
Split Hill	Converse				Tertiary	Shallow test only
Spring Creek	Fremont (See Crooks Gap)					
Spring Creek	Park				Mesa Verde	Untested
Spring Valley	Uinta	900-1,500			Aspen shales	Light oil production in sand lenses in shale beds
Steele Creek	Johnson				Steele shale	One dry hole
Stockade Beaver	Weston				Morrison	Partially tested
St. Mary's	Carbon				Mesa Verde	Partially tested
Sugar Creek	Carbon				Mesa Verde	Untested
Sunshine Basin	Park				Mowry shale	Partially tested
Teapot Dome	Natrona	3,000	Dakota and below	7 sections	Steele shale	Light oil and gas production from Frontier sands
Tensleep Dome	Washakie				Morrison	One deep test abandoned

TABULATION OF OIL STRUCTURES OF WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Thermopolis Dome	Hot Springs		Amsden and Madison		Morrison	Several shallow tests abandoned
Thornton Dome	Weston	500	All sands		Tertiary	Light oil production in shale
Tisdale Dome	Johnson	3,000	Amsden and Madison		Mowry shale	Hot water in Tensleep
Torrington Dome	Goshen (See Goshen Dome)					
Torelight Dome	Big Horn	1,000	All sands	2 sections	Mesa Verde	Light oil production in shale
Triangulation Dome	Natrona (See Emigrant Gap)					
Troublesome Dome	Carbon				Tertiary	Untested
Two Bar Dome	Natrona				Morrison	Untested
Two Rivers	Albany				Niobrara	Untested
Upton Thornton	Weston (See Thornton)					
Vermillion Dome	(See Hiawatha)					
Virginian Dome	Natrona (See Emigrant Gap)					
Wagon Hound Dome	Hot Springs				Thermopolis	Partially tested
Wakeman Dome	(See Thornton)					
Walcott Dome	Carbon				Mesa Verde	Untested
Wallace Creek	Natrona				Mesa Verde	One deep dry hole
Wamsutter Arch	Sweetwater				Tertiary	Untested
Warm Springs	Hot Springs	1,000	Amsden and Madison	4 sections	Chugwater	Black oil production from Embar and Tensleep

TABULATION OF OIL STRUCTURES OF WYOMING—Continued

Field	County	Av. Depth	Sands Not Tested	Estimated Area	Surface Formation	Remarks
Warm Springs	(See LaBonte)					
Waugh Anticline	(See Illo)					
Waterfall Dome	Lincoln				Aspen shale	One deep dry hole
Wertz Dome	Carbon	3,000	Embar and below		Mesa Verde	Gas production from Frontier and Sundance
West Fork Dome	Carbon				Benton	Untested
West Mule Creek	Niobrara (See Mule Creek)					
West Salt Creek	Natrona	2,000	All sands		Pierre shale	Light oil production from shale on west side Salt Creek field
Wheeler Ranch	Natrona	1,000			Pierre shale	Several shallow dry holes
Whiteface Dome	Fremont				Dakota	Untested
White Horse Butte	(See Hale Dome)					
Wiley Dome	Park (See Oregon Basin)					
Willow Creek Dome	Lincoln				Jurassic	Untested
Wilson Dome	Sweetwater (See Hiawatha)					
Wilson Dome	Natrona				Pierre shale	Untested
Winkleman Dome	Fremont	1,800	Dakota and below		Frontier	Gas production in Frontier
Zeisman Dome	Big Horn				Dakota	Untested
Zimmerman Butte	Hot Springs				Cody shale	One dry hole