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CHEMICAL ANALYSES OF TEXAS ROCKS AND MINERALS

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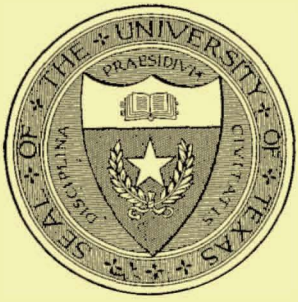

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KEY FOR USE OF THIS PUBLICATION.

The table of Contents gives the general headings under which the analyzed materials are classified, together with the numbers under which the samples and their analyses are recorded and the numbers of the pages in Part 1 and Part 2 respectively on which the data for these analyses appear.

Part 1 states the sources *etc.* of the samples, *arranged* in alphabetical order of the counties in which they were obtained. Each topic in Part 1 opens with a statement of general information on such matters as the occurrence of the analyzed material in Texas,—the relation between the composition of the material and its economic value,—etc.

Part 2 gives the analyses proper in the order of the analysis numbers.

To find the analysis of any particular material from any particular county in Texas,—

First, look through the Table of Contents for the heading under which the material is given; and note the corresponding page number in Part 1 (for later use, note also the corresponding page number in Part 2);

Second, turn to this page in Part 1, and by following the counties in their alphabetical order, find the county desired, and note the different parts of the county from which samples were obtained;

Third, after selecting a particular analysis, note its number and turn to Part 2 for the same number to secure the analysis proper (the approximate page number for this last reference was obtained before from the Table of Contents.)

TABLE OF CONTENTS

CLASSIFICATION OF ANALYZED MATERIALS

*Note:—Part 1 presents Sources of Samples, etc.; Part 2 presents the Analytical Results.

INTRODUCTION.

ORIGIN AND PURPOSE OF THIS PUBLICATION.—The value of a natural product depends largely upon its chemical composition, and since chemical analyses of natural products found in Texas are irregularly scattered throughout the literature and practically inaccessible, even to people who are interested in them, it was suggested by Dr. J. A. Udden, Director of the Bureau of Economic Geology and Technology of the University of Texas, that we collect and publish all the reliable analyses of Texas natural products which have appeared in print or are otherwise accessible.

Much of the collecting and tabulating of the material was done by T. F. Buehrer (M. A., Texas, 1918), N. H. Moore (M. A., Texas, 1916), and T. W. Ray (M. A., Texas, 1917). Some of the proof reading was done by J. E. Stullken (B. A., Texas, 1911). Dr. J. A. Udden has contributed a number of notes and has made many helpful suggestions. Appreciation of the writer's indebtedness to these co-workers is gratefully expressed here.

ARRANGEMENT OF MATERIAL.—The arrangement of the material in this publication is given in the Table of Contents. The following remarks are mainly for the purpose of explaining the arrangement adopted.

The number of different substances considered in this publication is not large; hence it did not appear to be necessary to arrange the substances in any particular or systematic order. They are easily found by consulting the Table of Contents. For the reader's convenience, there appears at the top of each page, the name of the sort of material presented by the data on that page.

It appeared to be desirable to sub-divide each kind of material according to its occurrence in different geological formations, but it was not found practicable to do this except with limestone, coal, iron ore, and petroleum; hence other materials have not been sub-divided in this manner.

The different individual specimens of any one sort of mate-

rial of which analyses are given are listed in Part 1 in the alphabetical order of the counties in which the analyzed samples were collected.

The descriptive data for each analyzed sample presents:

(1) The analysis number;

(2) The county in which the sample was collected;

(3) A brief descriptive statement of the nature of the material;

(4) The locality from which sample was obtained;

(5) A statement describing in what geological formation, or in what mineralogical, or physical form the material occurs at is source;

(6) Name or initials of sampler (when known)—for names corresponding to initials, see List of Contributors of Analyses;

(7) Initials of analysts—for corresponding names, see List of Contributors of Analyses;

(8) Reference to source from which the analysis was obtained —see page —— for list of abbreviations used in these references;

SOURCES, SELECTION AND TABULATION OF ANALYTICAL DATA.

The sources of the data, as may be inferred from the accompanying List of Sources of Analyses, are exceedingly numerous, and the advisability of republishing all the available material accumulated from these sources was considered to be questionable. Hence, a very careful selection was made, and only such analyses were used as were considered dependable and representative of the particular substances upon which the analyses were made. Analyses lacking in information concerning the localities of the sources of the materials have not been used. Many analyses were taken from the office files of the former University of Texas Mineral Survey, and from the present University of Texas Bureau of Economic Geology and Technology. Naturally, such analyses appear here in print for the first time.

All analyses accessible to the author up to September 1, 1918, have been considered in this publication. It is our intention

to keep this record up to date by publishing supplements giving the analyses made after this date. Analyses of a few specially important substances made in the Spring of 1919 have been added while proof was being read.

A few special points should be mentioned. Sanitary water analyses have been omitted because the sources of contamination are not constant, as a rule. Of ores, only a few analyses characteristic of well established sources or mines were included. Soil analyses have been omitted because soils are important only for agricultural purposes, and a chemical analysis of the mineral portion of a soil is of very little help in determining the agricultural value of the soil. Petroleum analyses were omitted because most of the available analyses are incomplete and out of date at present.

In order to be able to collect into a single table all the analyses of one kind of a substance, it was necessary to adjust the reports of different analysts to a common form. The forms used here are essentially the same as those used in the U. S. Geological Survey publications. Extensive re-arranging and re-calculating was particularly necessary in the case of water analyses, in order that these might be tabulated as simply and as accurately as possible. The tables of water analyses present (1) the total amounts of each ion—due to all of the dissolved salts together—(2) the oxides which are present in colloidal solution, such as silica (SiO_2), iron oxide (Fe_2O_3) and alumina (Al_2O_3), and (3) the suspended matter. The *plain* figures give the amount of each substance in parts per million, while a second set of figures below the plain figures, and enclosed in parentheses, gives the number of gram equivalents of each separate salt constituent (or number of corresponding univalent gram ions) per thousand liters. On page——just ahead of the tables of water analyses, appear the directions for calculating the total amount of any one salt present in the water, and also the factors for converting the figures from parts per million to other units, such as grains per gallon, pounds per thousand gallons, etc.

The tabulation of the analytical data of waters here employed is preferable to any other because it expresses the analytical

results directly—that is, without their having been subjected to unnecessary or arbitrary recalculations, such as would be involved in reporting the amounts of some salts which might be formed from these ions. Such hypothetical combinations are misleading because in these waters the salts are present wholly as separate ions, and different chemists would *assume* different combinations to be formed. The scheme employed here makes it easy for anyone to figure out the amount of any one salt that might be formed, or obtained, from a particular water.

ABBREVIATIONS FOR SOURCES OF ANALSYES.

U. T. B.=University of Texas Bulletin (Official Series).
U. T. M. S. B.=University of Texas Mineral Survey Bulletin.
T. M. S. A. N.=Texas Mineral Survey Analyses No. taken from the office files of the University of Texas Mineral Survey.
T. A. E. S. A. R.=Texas Agricultural Experiment Station Annual Report.
T. G. S. A. R.=Texas Geological Survey Annual Report.
T. G. S. A.=Texas Geological Survey Analysis taken from the office files of the Texas Geological Survey.
B. A.=Bureau Analysis:—Analyses taken from the office files of the University of Texas Bureau of Economic Geology. Those in which in the numbers are preceded by capital "C" are from the files of the new Division of Chemistry of the Bureau; e.g., B. A., C135.
T. A. S.=Texas Academy of Science (Proceedings).
U. S. G. S. W. S.=United States Geological Survey Water Supply Paper.
U. S. G. S. A. R=United States Geological Survey Annual Report.
U. S. G. S. B=United States Geological Survey Bulletin.

LIST OF SOURCES OF THE ANALYSES IN THIS BULLETIN.

1. Files of original papers of the University of Texas Mineral Survey, now in possession of the University Chemical Laboratory.
2. Files of original papers of the University of Texas, Bu-

reau of Economic Geology and Technology, now in possession of the University Division of Chemistry.

3. Transactions of the Texas Academy of Science: I, II, III. IV.
4. U. S. G. S. Bulletins:

No. 164. Reconnaissance in the Rio Grande Coal Fields of Texas, by T. W. Vaughan, including a Report on Igneous Rocks from the San Carlos Coal Fields, by E. C. E. Lord, 1900, 100 pp., 11 pls.

No. 178. The El Paso Tin Deposits, by W. H. Weed, 1901, 15 pp., 1 pl.

No. 212. Oil Fields of the Texas and Louisiana Gulf Coastal Plain.

No. 213. Contributions to Economic Geology, 1902; S. F. Emmons and C. W. Hayes, Geologists in Charge. 1903, 449 pp.

No. 220. Mineral Analyses from Laboratories of U. S. G. S., 1880-1903, by F. W. Clarke.

No. 243. Cement Materials and Industry of the United States, by Ed. C. Eckel.

No. 260. The Iron Ores of Northeastern Texas, by E. C. Eckel.

Salt, Gypsum, and Petroleum in Trans-Pecos Texas, by G. B. Richardson.

No. 262. Contributions to Mineralogy from the U. S. G. S.: Mineralogical Notes, by W. T. Shaller.

No. 340. Portland Cement Materials Near El Paso, Texas, by G. B. Richardson.

No. 405. The Mercury Minerals from Terlingua, Texas. by Hildebrand and Shaller.

No. 429. Oil and Gas in Louisiana, with a Brief Summary of Their Occurrence in Adjacent States, by G. D. Harris.

No. 430. Contributions to Economic Geology: Preliminary Report on the Iron Ores from Llano County, Texas, by Sidney Paige.

Structural Materials Available in the Vicinity of Austin, Texas, by E. F. Burchard.

No. 470. Notes on Some Clays from Texas, by Alex Deussen.

No. 419. Analyses of Rocks and Minerals from the Lab. of the U. S. G. S., 1880-1908, by F. W. Clarke.

No. 450. Mineral Resources of the Llano-Burnet Region, Texas, with an account of the Pre-Cambrian Geology, by Sidney Paige, 1911.

No. 522. Portland Cement Resources in Texas (State at Large), by J. A. Taff.

No. 591. Analyses of Rocks and Minerals, 1880-1914, by F. W. Clarke.

No. 616. The Data of Geochemistry, 3rd Ed., by F. W. Clarke.

5. U. S. G. S. Water Supply Papers:

No. 141. Observations on the Ground Waters of the Rio Grande Valley, by Chas. S. Slichter.

No. 190. The Underground Waters of the Coastal Plain of Texas, by Thos. U. Taylor.

No. 191. The Geology and Water Resources of the Western Portion of the Panhandle of Texas, by Charles N. Gould.

No. 276. The Geology and Water Resources of Northeastern Texas, by C. H. Gordon.

No. 274. Some Stream Waters of Western United States, by Herman Stabler.

No. 236. The Quality of Surface Waters in the United States, Part I; Analyses of Waters East of the One Hundredth Meridian, by R. B. Dole.

No. 317. The Geology and Underground Waters of the Wichita Region, North Central Texas, by C. H. Gordon.

No. 335. The Geology and Underground Waters of the Southeastern Part of the Texas Coastal Plain, by Alex. Deussen.

No. 375. Contributions to the Hydrology of the United States: Ground Water in LaSalle and McMullen Counties, 1915, by Alex. Deussen and R. B. Dole.

No. 364. Water Analyses from the Lab. of the U. S. G. S., tabulated 1914, by F. W. Clarke.

No. 66. Operations at River Stations, 1901, Part II, West of the Mississippi River.

6. U. S. G. S. Reports:

No. 18. Part II, Geology of the Edwards Plateau and Rio Grande Plain, Adjacent to Austin and San Antonio, Texas, with Reference to the Occurrence of Underground Waters, by R. T. Hill and T. W. Vaughan.

No. 21. Part VII, The Geography and Geology of the Black and Grand Prairies of Texas, by Robert T. Hill.

No. 22. Part I, The Asphalt and Bituminous Rock Deposit of the United States.

No. 22. Part III, The Southwestern Coal Field, by J. A. Taff.

7. Texas Geological Survey:

First Annual Report, 1889.

a. Preliminary Report on the Geology of the Gulf Tertiary of Texas, by R. A. F. Penrose.

b. A Brief Description of the Cretaceous Rocks of Texas and Their Economic Uses, by Robert T. Hill.

c. The Southern Border of the Central Coal Field, by W. F. Cummins.

d. The Permian of Texas and Its Overlying Beds, by W. F. Cummins.

e. A Preliminary Report on the Coal Fields of the Colorado River, by R. S. Tarr.

f. Geology of Trans-Pecos Texas: Preliminary Statement, by W. Von Streeruwitz.

g. A Preliminary Report on the Central Mineral Region of Texas, by T. B. Comstock.

Second Annual Report, 1890:

a. Reports on the Iron Ore District of East Texas, by E. T. Dumble, J. B. Walker, William Kennedy, etc.

b. Report on the Geology of Northwestern Texas, by W. F. Cummins.

c. Geology and Mineral Resources of the Central Mineral Region of Texas, by T. B. Comstock.

d. Report on the Geology and the Mineral Resources of Trans-Pecos Texas, by W. H. von Streeruwitz.

Third Annual Report, 1891.

a. Geology of Houston County, by W. Kennedy.

b. Geology of Section from Terrell to Sabine Pass, by W. Kennedy.

c. Geology of Llano Estacado or Staked Plains, by W. F. Cummings.

d. Notes on the Geology of the Country west of the Plains.

e. Stratigraphy of the Triassic Formation in Northwest Texas, by N. F. Drake.

f. Report on the Paleontology of the Vertebrata, by E. D. Cope.

g. Reports on the Cretaceous Area North of the Colorado River, by J. A. Taff.

h. Geology of Trans-Pecos Texas, by W. H. Streeruwitz.

Fourth Annual Report, 1892.

a. Report on the Geology of Grimes, Brazos, and Robertson Counties, by W. Kennedy.

b. Preliminary Report on the Artesian Wells of the Gulf Coastal Slope, by J. A. Singley.

e. Preliminary Report on the Organic Remains Obtained from the Deep Well at Galveston, Together with Conclusions Respecting the Age of the Various Formations Penetrated, by Gilbert D. Harris.
d. Report on the Geology of Rocks of Trans-Pecos Texas, by A. Osann.
e. Geology of Trans-Pecos Texas, by W. H. Streeruwitz.
f. Notes on the Geology of Northwest Texas, by W. F. Cummins.
g. Report on the Cretaceous Area North of the Colorado River, by J. A. Taff.
h. Report on the Colorado Coal Field of Texas, by N. F. Drake.
i. A preliminary Report on the Vertebrate Paleontology of the Llano Estacado, by E. D. Cope.
j. A Contribution to the Invertebrate Paleontology of the Texas Cretaceous, by F. W. Cragin.
k. Contributions to the Natural History of Texas, by J. A. Singley.
l. Carboniferous Cephalopods, Second Paper, by Alpheus Hyatt.

8. University of Texas Mineral Survey Bulletins:
   No. 1. Texas Petroleum, by W. B. Phillips.
   No. 2. Sulphur, Oil, and Quicksilver in Trans-Pecos Texas, by W. B. Phillips.
   No. 3. Coal, Lignite, and Asphalt Rocks, by W. B. Phillips, B. F. Hill, and H. W. Harper.
   No. 4. The Terlingua Quicksilver Deposits, Brewster County, by B. F. Hill.
   No. 5. The Minerals and Mineral Localities of Texas, by F. W. Simonds.
   No. 7. Report of Progress for the Year Ending December 31, 1903, by W. B. Phillips.
   No. 8. The Geology of the Shafter Silver Mine District, Presidio County, Texas, by J. A. Udden.
   No. 9. Report of a Reconnaissance in Trans-Pecos Texas, North of the Texas & Pacific Railway, by George Burr Richardson.

9. University of Texas Bulletins (Scientific Series):
   No. 4. Contributions from the Chemical Laboratory of the University of Texas, by Edgar Everhart.
   No. 17. Potash in the Texas Permian, 1915, by J. A. Udden.
   No. 57. Geology and Underground Waters of the Northern Llano Estacado.
   No. 93. A Sketch of the Geology of the Chisos Country, Brewster County, 1907, by J. A. Udden.

No. 102. The Clays of Texas, by Heinrich Ries.
No. 189. The Composition of Texas Coals and Lignites, by W. B. Phillips, S. H. Worrell, and D. M. Phillips.
No. 246. A Reconnaissance Report on the Geology of the Oil and Gas Fields of Wichita and Clay Counties, Texas, 1912, by J. A. Udden and D. M. Phillips.
No. 307. The Fuels Used in Texas, by W. B. Phillips and S. H. Worrell, 1913.
No. 365. The Mineral Resources of Texas, by W. B. Phillips, 1914.
No. 363. The Deep Boring at Spur, by J. A. Udden.

10. U. S. G. S. Folios:
No. 64. Description of Uvalde Quadrangle, by C. D. Walcott, 1900.
No. 194. Description of Van Horn Quadrangle, by G. B. Richardson, 1914.
No. 183. Description of the Llano and Burnet Quadrangles, by Sidney Paige, 1912.
No. 166. Description of the El Paso District, by G. B. Richardson, 1909.

11. Journal of the American Chemical Society:
Vol. XXII, 1900, pp. 553-556. Hydrocarbons in Heavy Texas Petroleum.
Vol. XXIII, 1901, pp. 264-267. Composition of Texas Petroleum.
Vol. XXIX, 1903, p. 1190. The Mercury Minerals of Terlingua, Texas.

12. Economic Geology:
Vol. I, 1905-06. The Terlingua Quicksilver Deposits, by H. W. Turner.
Vol. X, 1915. Copper Deposits in the Red-Beds of Texas, by Louis M. Richards.

13. Texas Agricultural Experiment Station:
a. Reports: Second Annual Report, Soils and Waters of Rio Grande Valley, pp. 93-98, H. H. Harrington, 1889.
b. Bulletins: No. 130, Alkali Soils and Irrigation Waters, by G. S. Fraps, 1910.

14. Miscellaneous Sources:
Pilot Knob: A Marine Cretaceous Volcano, by Robert T. Hill, 1890.
The Production of Petroleum in 1899, by F. H. Oliphant, 1900.
Graphite. Min. Res. 1913, Part II, p. 230.
Meteorite. The American Journal of Science No. 212, August, 1888, p. 113.

LIST OF ANALYSTS (KEY TO INITIALS OF NAMES.)

On the following pages will be found brief notes concerning the chemists who have contributed the Analyses in this Bulletin. These data are intended not only to invite the confidence of the reader, but to pay a tribute to the Analysts who by untiring efforts and careful, consistent work have made this contribution to Science and Industry.

After each name appears the present address of the Scientist, his highest academic degree with year and institution in which it was conferred, and the main public position he has held. It was deemed unnecessary to give biographical data when the contributors have made only a few analyses, and are not regular scientific workers.

Adriance, John Sabin, Union League Club, New York, Professor, Chem. and Toxicol, N. Y. Homeop, Med. Coll., 1897.

Bailey, Dr. James Robinson, University of Texas.—Ph. D., Munich, 1897; Professor of Organic Chemistry, The University of Texas, 1900—.

Baker, C. L., Geologist, University of Texas. Bureau of Economic Geology till 1918.

Barr, W. M.

Bates, P. H.

Bracketl, Dr. Q. M., Clemson College, S. C., Assoc. Prof. Chem. Clemson College, to 1891.

Bredlich, Dr. W.

Chandler, Charles Frederick, Chemist, 51 E. 54 St., New York, Professor of Chemistry, Columbia, 1877—.

Church, W. D.

Clarke, Prof. Frank, Wigglesworth, Washington, D. C., Harvard U., B. S., 1867—, Chemist, U. S. Geol. Survey.

Collins, W. D.

Deussen, Alexander, Geologist, Houston, Texas, B. S., Texas, 1903 and M. S., 1904. Instr. 1905-1916. Junior Geologist, U. S. Geol. Surv., 1907.

Dole, R. B., U. S. Geol. Surv. Washington, D. C., A. B., Bowdoin, 1902; Mass. Inst. Tech. 1903. With Geol. Surv. since 1903.

Dumble, Edwin Theodore, Geologist; 2003 Main St., Houston, Texas, State Geologist of Texas, 1887-96.

Eakins, L. B.

Everhardt, Dr. Edgar, 150 N. Jackson St., Atlanta, Ga., Ph.D., University of Freiburg, 1878. Prof. Chemistry, University of Texas, 1884-94.

Felsing, W. A., Boston, Mass., M. A., University of Texas, Ph. D., Inst. of Tech., Boston. Associate Professor of Chemistry, University of Texas, 1919.

Fireman, Peter. Cosmos Club, Washington, D. C., Chemist. Ph. L., Bern, 1893. Chemist, U. S. Nat. Museum, 1901-06.

Fraps, George Stronach, Agricultural Chemist, College Station, Texas; Johns Hopkins, Ph. D., 1899; State Chemist of Texas, 1905—.

Genth, F. E.

Glasscock, B. L., Maryville, Tenn., Ph. D., University of Penn., 1907. Manager of Maryville Plant of Aluminum Company of America, 1910—.

Goss, Arthur, Chemist, Lafayette, Ind., M. S., Purdue U., Dir. Ind. Agricultural Expt. Sta. since 1903.

Harper, Dr. H. Winston, Austin, M. D., University of Virginia, 1892. Professor of Chemistry, The University of Texas. 1894—.

Harrington, H. H., Prof. of Chem. and later Pres. of Agricultural and Mechanical College of Texas; Industrial Agent for St. Louis Brownsville and Mex. RR.

Heileman, W. H.

Herndon, J. H.

Hidden, William Earl, 115 Central Ave., Ocean Grove, N. J., Mineralogist, Providence, New York and Washington.

Hillebrand, Prof. William Francis, Washington, D. C., Heidelberg, Ph. D., 1875, Chemist, U. S. Bureau of Standards.

Jones, D. P.

Mackintosh, J. B.

Mallet, Dr. John William, Ph. D. Goettingen, 1852; Professor of Chemistry, University of Virginia, 1868-1912.

McAfee, A. M., Port Arthur, Tex. Ph.D., Columbia Univ., 1911. Chemist, Magnolia Petroleum Company.

Maury, Dabney Herndon, Consulting Engineer, Monadnock Blk., Chicago. M. E., Stevens Inst. Tech., 1884.

Melville, W. H.

Mew, W. M.

Mikeska, Louis Alois, New Haven, Conn. Ph. D., Yale, 1917. Instr. Yale University, 1917—.

Noyes William Albert, Chemist, Urbana, Ill. Ph. D., Johns Hopkins, 1882. Prof. Chemistry and Dir. Chem. Lb., U. of Ill., 1907—.

Palm, O. H., El Paso, Texas, B. S., University of Texas, 1900. Chemist, University of Texas Mineral Survey, 1901-1904.

Palmer, Chase, Chemist, Hammond Court, Washington, D. C. Ph.D., Johns Hopkins, 1882; U. S. Geol. Survey, Chemist, 1907—

Parkinson, G. A., Assistant Testing Engineer, Road Materials Laboratory, The University of Texas, 1914—.

Phillips, Dr. William B., Mining Engineer,. Director U. of Tex. Mineral Survey, 1901-05. Bur. Econ. Geol. and Tech., U. of Texas, 1909-14.

Phillips, Drury McNeil, Mining Engineer, Alba, Texas.

Phillips, A. J.

Porch, E. L. Jr., B. S., E. M., Michigan School of Mines, 1911. Assistant Geologist, Bur. of Econ. Geol. and Tech., University of Texas, 1914-17.

Powers, W. A.

Read, William Thornton, University of Texas, Austin, Texas. M. A., U. of T., 1915. Chemist, Division of Chemistry, Bur. of Econ. Geol. and Tech., University of Texas, Austin, Texas, 1916-1918.

Riddell, D. F.

Ries, Heinrich, Geologist, 401 Thurston Ave., Ithaca, N. Y., Ph. D., Columbia, 1896. Prof. of Economic Geology, Cornell University, 1905—.

Roberts, Milnor, Mining Engr., 4504 15th St., N. E. Seattle, Wash. A. B., Leland Stanford, Jr., U., 1899, Prof. Mining Engr'g. and Metallurgy and Dean, Coll. Mines, U. of Wash., 1901—.

Roberts, John R., Geologist, The Texas Company, Houston, Texas.

Russell, C. P.

Russell, W. M., Fort Worth, Tex.

Schaller, Waldemar Theodore, Mineralogist, U. S. Geological Survey, Washington, D. C., Ph. D., Munich, 1912; Chemist and Mineralogist, U. S. Geol. Survey, Oct. 1, 1903—.

Shannon, C. W., Dir. Okla. Geol. Survey.

Sharpless, S. P.

Schoch, Dr. Eugene Paul, Austin, Ph. D. Chicago University, 1902. Prof. of Physical Chemistry, The University of Texas, 1905—.

Seymes, G. H.

Siebel, J. E., 1424 Montana St., Chicago, Ill. Ph. D., Berlin, 1865; Director Zymotech Inst., Chicago, 1880.

Skeats,

Smith, Dr. Eugene Allen, University of Alabama, Tuscaloosa, Ala. Ph. D., Heidelberg, 1868. Prof. of Mineralogy and Geology, Ala., 1871—.

Stabler, Herman, Civil Engr., Bradley Hills, Bethseda, Md., B. S., Earlham Coll., 1899. Hydraulic and Sanitary Engr. with the U. S. Geol. Survey and U. S. Reclamation Service since 1904.

Stokes, Henry Newlin, Chemist, 1207 Q. St., Washington, D. C. Retired from chemical work in 1909. Ph. D., Johns Hopkins, 1884. Chemist, U. S. Geol. Survey, 1889-92 and 1894-1903.

Stullken, John Edward, Austin, B. A., University of Texas, 1911, Chemist, Bureau Econ. Geol. and Tech. University of Texas, 1913—.

Tilson, P. S., Assist. Prof. of Chem., A. and M. College; Owner of Houston Chemical Labs., Houston, Texas.

Tobleman, H. A.

Tucker, L. B.

Voelker, R.

Van Winkle, Walton.

Wesson, David, 11 S. Mt. Ave., Montclair, N. J., B. S., Inst. Tech., 1883. Head Chem., Am. Cotton Oil Co., 1890-95.

Whitfield, James Edward, Chemist, 406 Locust St., Philadelphia. Ph. G., Nat. Coll. Pharmacy, Washington, 1880; Student 4 yrs at Rensslaer Poly. Inst., but with U. S. Geol. Survey, 1880-8.

Worrell, S. H., B. S., University of Texas, 1901. Chemist on Bureau Eco. Geol., 1910-14. Dean of Texas School of Mines at El Paso since 1914.

PART I.

Sources of Samples, Names of Analysts, and other Related Descriptive Data.

ROCKS—A. SEDIMENTARY

I. SAND AND SANDSTONE

NOTE ON COMPOSITION OF SAND USED INDUSTRIALLY.—In its most general sense, sand is a material composed of fairly coarse grains of mineral matter resulting from the trituration or mechanical wear of any kind of a rock, and hence, it may have any kind of a composition ranging from limestone to silica. For agricultural purposes, the chemical nature of the sand is of no consequence, and hence, any coarse grain, loose, earthy material may be so designated. In most cases, however, this coarse-grained material is of such chemical composition as to give it the hardness necessary to prevent finer division, and hence, sand is generally siliceous, or even pure silica, since siliceous rocks and quartz (i. e., silica) are the most abundant rock materials of the earth's crust, and by their hardness and chemical stability are enabled to survive after the associated materials have disappeared.

Sand used for window glass must be practically pure silica, and must contain less than one-half per cent. of iron oxide; sand used for crystal and plate glass must contain less than 0.01 per cent; and sand for optical glass must contain less than 0.001 per cent of iron oxide. Bottle glass may contain as much as two per cent of iron oxide.

Sand used for building purposes should have grains with sharp edges, and it must be clean. Very finely divided sand with rounded particles may be used for scouring and polishing materials. Sand used for foundry moulds should contain about six per cent. of clay matter as a binder.

Analyses of sands have been made in most instances for determining the suitability of the material for glass. Our purest siliceous sands seem to be sands of fine texture occurring in the base of the Comanchean. Some Pennsylvanian sands, which

appear to have been leached by underground waters, also consist of quite pure siliceous material. Some pure siliceous sands occur in the dunes in the southern part of the Llano Estacado and on the gulf coast in the southern part of the state. Some Tertiary sands may be suitable for the same purpose, but in most instances these contain considerable ferruginous material which makes them suitable only for bottle glass.

Many of the samples of sand and sandstone have been tested by the Road Materials Laboratory of the University of Texas and the results recorded under the same "B. A." numbers as those given below. Such physical tests may include the determination of the compressive strength of stones, their hardness, toughness, resistance to abrasion, specific gravity, weight per cubic foot, quantity of water required to saturate, the value of sand for making cement, mortar, mechanical analysis of sand and gravel, value of gravel and crushed stone for making concrete, etc. Samples which have been tested are designated below.

Anal. No.

1. Atascosa County. Sandstone conglomerate, obtained on Crystal City Division of the S. A. U. & G. Ry., about 2 miles N. W. of New Pleasanton. Exposure light. Sampled by G. A. P. Analyzed 1915 by J. E. S. B. A. 2308.
2. Austin County. Sand from sand mound at Sealy. Sample sent to Laboratory of Univ. of Texas by F. C. Schaffner. Analyzed 1915 by J. E. S. B. A. 3055. Physical tests obtainable from University Road Materials Laboratory. (See note above under "Standard Sandstone.")
3. Bell County. Concrete sand, received from Quality Stone and Gravel Co., Temple, Texas. Analyzed 1915 by J. E. S. B. A. 2792. Physical tests obtainable from University Road Materials Laboratory: See note above.
4. Brewster County. Siliceous sandstone from Chisos Beds. University Museum No. 1323. Marked "South of Oak Canyon, west side of Chisos Mts." Analyzed 1914 by J. E. S. B. A. 1672.
5. Burnet County. Sandstone from Woods' Quarry, at the end of spur on A. & N. W. Ry., from Sandstone Spur. Sampled by W. B. Phillips and G. A. P. Analyzed 1914 by J. E. S. B. A. 1797. Physical tests obtainable from University Road Materials Laboratory: See note above.
6. Burnet County. Sandstone from Sandstone Spur. From Woods' Quarry at end of spur on A. & N. W. Ry. Sam-

pled by W. B. P. and G. A. P. Analyzed 1914 by J. E. S. B. A. 1798.

7. Burnet County. Gray sandstone from T. B. Woods' Quarry, Fairland. Analyzed 1904 by O. H. P. T. M. S. A. 2870. Physical tests obtainable from University Road Materials Laboratory: See note above.
8. Burnet County. Sandstone from Hoover's Point, about 1¼ miles east of Colorado River bridge and directly on the A. & N. W. Ry., embedded with limestone. Sampled by W. B. P. and G. A. P. Analyzed 1914 by J. E. S. B. A. 1799. Physical tests obtainable from University Road Materials Laboratory: See note above.
9. Callahan County. Sandstone 2 miles west of Baird. Analyzed by J. E. S. B. A. 1591.
10. Clay County. Sandstone from E. G. Rhoads, Newport, Texas. Analyzed 1914 by J. E. S. B. A. 1509.
11. Coryell County. Sand received from D. R. Boone, Oglesby, Texas, to be used in tests for the American Society of Testing Materials. Analyzed 1915 by J. E. S. B. A. 2787.
12. Duval County. Sandstone from Sherman Concrete Co., Noleda, Texas. Analyzed 1914 by J. E. S. B. A. 1369.
13. Fayette County. Sandstone from near Lena Spur. Sent in by J. C. Melcher, O'Quinn, Texas. Analyzed 1914 by J. E. S. B. A. 1982. Physical tests obtainable from University Road Materials Laboratory: See note above.
14. Fayette County. Sample from same locality as No. 13. B. A. 1981. Physical tests obtainable from University Road Materials Laboratory: See note above.
15. Grayson County. Ferruginous sandstone from Wm. Veich, Denison. Analyzed 1915 by J. E. S. B. A. 2360.
16. Jefferson County. Sandstone conglomerate from D. M. Picton, Beaumont. Analyzed 1914 by J. E. S. B. A. 1587.
17. Lampasas County. Sample of Sandstone from Charrick's Hill on the Colorado River. Analyzed 1914 by J. E. S. B. A. 1504.
18. Lavaca County. Sandstone from Moulton Sandstone Co., Moulton. Analyzed 1904 by O. H. P. T. M. S. A. No. 2872. Physical tests obtainable from University Road Materials Laboratory: See note above.
19. Lavaca County. Sandstone from Moulton. Aanlyzed by J. E. S. B. A. 1590.
20. Montague County. Cretaceous sandstone from Sampson Ridge, Devil's Backbone, St. Jo. U. T. B. 365, p. 184.

21. Parker County. Glass sand. Sample received from W. K. Gordon, Thurber, Texas. Marked "From Lambert, Parker County." Analyzed 1915 by J. E. S. B. A. 2204.
22. Pecos County. Sand and gravel. Sample from W. O. Washington, used locally for concrete, 25 miles northwest of Ft. Stockton. Analyzed 1915 by J. E. S. B. A. 2318. Physical tests obtainable from University Road Materials Laboratory: See note above.
23. Pecos County. Sand and gravel 5 miles north of Ft. Stockton. Sample from W. O. Washington, marked "Wash material from hills, used as sand for making concrete." Analyzed 1915 by J. E. S. B. A. 2316. Physical tests obtainable from University Road Materials Laboratory: See note above.
24. Pecos County. Sand and gravel 15 miles north of Ft. Stockton, near Grand Falls Road. Sample from W. O. Washington, marked "Wash material from hills, used locally for making concrete." Analyzed 1915 by J. E. S. B. A. 2317. Physical tests obtainable from University Road Materials Laboratory: See note above.
25. Randall County. Sand from bed about ¾ mile from Normal School at Canyon. Sample received from G. A. Endress. Analyzed 1914 by J. E. S. B. A. 1640.
26. Tarrant County. Sand from W. H. Beck, Ft. Worth, Texas, to be tested for glass sand. Analyzed 1915 by J. E. S. B. A. 2750.
27. Taylor County. Sandstone from Haynes' Quarry, ½ mile N. W. of Buffalo Gap. Analyzed 1914 by J. E. S. B. A. 1588.
28. Taylor County. Sandstone from Haynes' Quarry, ½ mile east of Buffalo Gap. Analyzed 1914 by J. E. S. B. A. 1589.
29. Tyler County. Sandstone submitted by D. M. Picton & Co., Beaumont. Obtained from the Rockland Quarry, Tyler. Analyzed 1914 by J. E. S. B. A. 1543.
30. Ward County. Sand from 5 miles north of Monahans. Analyzed 1901 by O. H. P. T. M. S. A. 1217.
31. Ward County. Sandstone from Railroad well at Monahans. T. M. S. A. 1233. Analyzed 1901 by O. H. P.
32. Ward County. Red sandstone from near Barstow. Sample from Pecos Sandstone Co. Analyzed 1904 by O. H. P. T. M. S. A. 2871. Physical tests obtainable from University Road Materials Laboratory: See note above.
33. Wood County. Sandstone (Quartzite) from John Reese property, 1 mile south of Golden at negro cemetery on line of M., K. & T. Ry. Sampled by G. A. P. Analyzed

1915 by J. E. S. B. A. 2571. Physical tests obtainable from University Road Materials Laboratory: See note above.

II. GREENSANDS

NOTE ON COMPOSITION OF GREENSANDS, AND THEIR OCCURENCE IN TEXAS.—Greensand is composed of dark, olive-green to yellowish green grains, which are essentially grains of a hydrous silicate of iron and potassium (Glauconite)—mixed with more or less of pure silica grains. The grains are probably casts of the interiors of shells of Rhizopods. The silica is supposed to come from siliceous secretions of a minute sponge that grew in the cavities afterwards filled by the Glaconite. Greensands high in potassium may be used as sources of potash.

Greensand occurs principally in three horizons in the rocks of Texas. There are extensive beds of greensand in the Cambrian formation in the Central Mineral Region. Where exposed, these greensands have frequently been oxidized and contain lenses of hematite ore. Greensands are extensively developed in the Upper Cretaceous, as in the upper part of the Taylor marl and in the Navarro beds. They are rarely seen in the Pennsylvania and Permian rocks. Scattered glauconitic grains of greensand are found in the Ordovician both in the Central Mineral Region and in the Marathon uplift. In the Wilcox formation of the Eocene, glauconitic beds are frequent in the marine formations. Similar materials are found in the Cook Mountain of the Claiborne group of the Eocene.

Anal. No.

34. Anderson County. Greensand (Eocene tertiary) from property of the City of Palestine, located about 1 mile S. W. of the City Hall on Dewey Hill. Heavy Exposure. Sampled by G. A. P. Analyzed 1915 by J. E. S. B. A. 2660. Physical tests obtainable from University Road Materials Laboratory: See note above under "Sand and Sandstone."
35. Anderson County. Greensand (Eocene tertiary) from wells in Palestine. T. G. S. A. R. I, p. 94.
36. Bexar County. Greensand (Upper Cretaceous). Seven miles west of San Antonio. Sample received from Raymond Phelps, San Antonio. Analyzed 1915 by J. E. S. B. A. 2827.

37. Bexar County. Phosphatic greensand. (Upper Cretaceous). From deposit on Leon Creek, about 1½ miles south of bridge on Castroville Road. Sampled by W. B. P. Analyzed 1914 by J. E. S. B. A. 2004.
38. Bexar County. Same as No. 2004, except that it is natural concentrate from the deposit. B. A. 2005.
39. Cass County. Greensand marl (Eocene tertiary). From near Hughes Spring on A. E. Merchant's Headright. Analyzed by J. H. H. 1890. T. G. S. A. R. II, p 94.
40. Cherokee County. Greensand (Eocene tertiary). From Mount Selman. T. G. S. A. R. I, p. 94.
44. Cherokee County. Greensand from near Dialville. Analyzed by L. E. M. T. G. S. A. R. II, p. 290 (1890).
45. Houston County. Greensand (Eocene tertiary). From K. Jones' well on N. C. Hodges Headright. T. G. S. A. R. III, p. 29.
46. Houston County. Greensand (Eocene tertiary). From Alabama Bluff on Trinity River. T. G. S. A. R. III, p. 29.
47. Houston County. Greensand (Eocene tertiary). Marked "Greensand Clay," Hurricane Bayou. T. G. S. A. R. III, p. 29.
48. Houston County. Greensand (Eocene tertiary). From L. Williams Headright. T. G. S. A. R. III, p. 29.
49. Houston County. Greensand (Eocene tertiary). From Murchison's Prairie. T. G. S. A. R. III, p. 29.
50. Houston County. Greensand (Eocene tertiary). From D. McLeany's Headright. T. G. S. A. R. III, p. 29.
51. Houston County. Greensand (Eocene tertiary). From Robbins' Well on Leonard Williams' Headright. T. G. S. A. R. III, p. 29.
52. Houston County. Greensand (Eocene tertiary). From Hurricane Bayou. T. G. S. A. R. III, p. 29.
53. Leon County. Greensand from J. W. Barton, Oakwood, Texas. Analyzed 1915 by J. E. S. B. A. 2717.
54. Leon County. Phosphatic greensand (Eocene tertiary) from near Centerville. Sample received from R. W. Carroll, Houston, Texas. Analyzed by J. E. S. B. A. 2106.
55. Llano County. Greensand (Cambrian) from south fork of Morgan Creek. Analyzed by Chase Palmer. U. S. G. S. Folio 183, p. 6.
56. Marion County. Greensand marl (Eocene tertiary) in a bluff overlooking Big Cypress in Jefferson. T. G. S. A. R. II, p. 114 (1890).
57. Nacogdoches County. Greensand marl (Eocene tertiary). One-fourth mile S. E. of Nacogdoches. Analyzed by J. H. H. T. G. S. A. R. II, p. 277.

58. Nacogdoches County. Same as No. 57, but roasted. Analyzed by J. H. H. T. G. S. A. R. II, p. 277.

59. Nacogdoches County. Altered calcareous greensand marl (Eocene tertiary). From Simpson's Hill, 4 miles N. W. of Melrose. Analyzed by J. H. H. T. G. S. A. R. II, p. 277.

60. Nacogdoches County. Greensand marl, roasted sample, from Simpson's Hill, 4 miles west of Melrose. Analyzed by J. H. H. T. G. S. A. R. II, p. 277.

61. Nacogdoches County. Indurated calcareous greensand marl, 2 inches in depth, from Simpson's Hill, 4 miles northwest of Melrose. Analyzed by L. E. Magnenat. T. G. S. A. R. II, p. 277.

62. Nacogdoches County. Same as No. 61, but roasted. Analyzed by J. H. Herndon. T. G. S. A. R. II, p. 277.

63. Nacogdoches County. Altered calcareous greensand marl, bed 2 feet, 8 miles northwest of Nacogdoches. Analyzed by J. H. H. T. G. S. A. R. II, p. 277.

64. Nacogdoches County. Same as No. 64, but roasted. Analyzed by J. H. H. T. G. S. A. R. II, p. 277.

65. Nacogdoches County. Oil-bearing greensand marl, 15 miles S. E. of Nacogdoches. Analyzed by L. E. Magnenat. T. G. S. A. R. II, p. 277.

66. Nacogdoches County. Oil-bearing greensand marl, 1 mile S. W. of Cherino, 20-inch bed. Analyzed by L. E. Magnenat. T. S. G. A. R. II, p. 277.

67. Nacogdoches County. Calcareous greensand marl (Eocene tertiary), 1 mile S. W. of Cherino. Analyzed by L. E. Magnetat. T. G. S. A. R. II, p. 277.

68. Panola County. Greensand (Eocene tertiary), from Alex Carter on the Wm. McKnight headright. T. G. S. A. R. II, p. 232. (1890).

69. Rusk County. Greensand marl (Eocene tertiary), upper bed 20 feet, Stevens' Branch, Sulphur Springs. Analyzed by J. H. H. T. G. S. A. R. II, p. 259.

70. Rusk County. Greensand marl (Eocene tertiary), from bed 6 feet under pyrite, Stevens' Branch, Sulphur Springs. Analyzed by J. H. H. T. G. S. A. R. II, p. 259. (1890).

71. Rusk County. Greensand marl (Eocene tertiary), from middle bed, 6 feet, Stevens' Branch, Sulphur Springs. Analyzed by J. H. H. T. G. S. A. R. II, p. 259. (1890).

72. Rusk County. Indurated glauconitic clay, between strata of marl, Stevens' Branch, Sulphur Springs. Analyzed by J. H. H. T. G. S. A. R. II, p. 259. (1890).

73. Rusk County. Greensand marl (Eocene tertiary), lower

bed 3 feet exposed, Stevens' Branch, Sulphur Springs. Analyzed by L. E. M. T. G. S. A. R. II, p. 259. (1890).

74. Rusk County. Altered greensand marl, or fossiliferous orange loam, Sulphur Springs. Analyzed by L. E. Magnenat. T. G. S. A. R. II, p. 259. (1890).

75. Rusk County. Altered greensand marl, 1 mile east of L. D. Stevens' house, near Sulphur Springs. Analyzed by L. E. Magnenat. T. G. S. A. R. II, p. 259. (1890).

76. San Augustine County. Greensand (Eocene tertiary), near San Augustine. Sample from W. L. Belahoussaye, Beaumont. Analyzed by J. E. S. B. A. 2741.

III. ALLUVIUM

NOTE ON COMPOSITION. — Recent deposits of soil and sand from rivers present a great variety of admixtures of calcareous, siliceous and ferruginous materials. The few analyses made do not at all adequately represent the composition of the great variety of substances belonging to this class. Few deposits of this kind exist that do not contain a mixture of many mineral ingredients.

Anal. No.

77. Atascosa County. Alluvium, received from E. E. Baird, from S. A. U. & G. Ry., north of Pleasanton. Marked "Atascosa River Sand." Analyzed 1915 by J. E. S. B. A. 2668.

78. El Paso County. Alluvium from White's Spur, ten miles above El Paso. Analyzed by P. H. Bates. U. S. G. S. B. 340, p. 413.

79. Hays County. Adobe with gravel. Sample received from Deshay Bunton. From hill 2½ miles north of Kyle on the San Antonio-Austin road, near two-story house. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2034.

80. Hays County. Adobe from about 1 mile north of Kyle on the Buda-Kyle Mountain Road, about ¾ mile west of the I. & G. N. Ry. Exposure good. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2016.

82. La Salle County. Alluvium (adobe) from Dobson, sent in by E. R. Breaker. Proposed to be used for ballast. Analyzed 1914 by J. E. S. B. A. 2041.

83. Live Oak County. Alluvium (adobe) from Fant City. Sent in by E. R. Breaker, Pleasanton, Texas. Labelled "Adobe Shale." Has given good service as ballast. Analyzed 1914 by J. E. S. B. A. 2040.

84. Live Oak County. Alluvium (adobe) from Fant City. Sam-

ple sent in by E. R. Breaker, proposed to be used as ballast. Analyzed 1914 by J. E. S. B. A. 2039.

85. San Patricio County. Alluvium (adobe) from near Mathis, sent in by E. R. Breaker of Pleasanton, Texas. Analyzed 1914 by J. E. S. B. A. 2038.
86. San Patricio County. Alluvium (adobe) from near Mathis. Sample sent in by E. R. Breaker, chief engineer of the S. A. U. & G. Ry., Pleasanton. Proposed to be used as ballast. Analyzed 1914 by J. E. S. B. A. 2037.
87. Travis County. Alluvium (Pleistocene). Heavy calcareous clay used in making dry pressed brick at Butler's brick yard, south side of Colorado River, near I. & G. N. Ry., Austin, Texas. U. S. G. S. B. 522, p. 342.
88. Travis County. Alluvium (Pleistocene). Same as No. 87, except light loamy clay used in making sand-mould brick. U. S. G. S. B. 522, p. 342.
89. Travis County. Alluvium, 300-400 yards above Pease Park, on banks of Shoal Creek, near city of Austin. Analyzed 1914 by J. E. S. B. A. 1974.
90. Travis County. Alluvium, from A. J. Zilker, Austin. Labelled "Dry Pressed Brick Clay." Analyzed 1905 by O. H. P. T. M. S. A. 3440.
91. Travis County. Calcareous brick clay (alluvium), from Butler's brick yard, Austin. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 204.
92. Travis County. Alluvium, from A. J. Zilker, Austin. Labelled "Mud Brick Clay." Analyzed 1905 by O. H. P. T. M. S. A. 3439.
93. Travis County. Alluvium (calcareous brick clay), from Belcher's place, Austin. U. T. B. 102, p. 206.

IIIa. Caliche

DEFINITION OF TERM.—Caliche is a name given to deposits formed on the surface of the ground by precipitation from mineral solutions which are brought to the surface by capilliary currents resulting from the evaportion of ground moisture. It occurs most frequently in arid regions where evaporation is great. Usually caliche consists of carbonate of lime, but in places it consists of siliceous and ferruginous material also. It may also contain large amounts of soluble salts. Thus in Chili, it contains large amounts of sodium nitrate. The rim rock of the High Plains in the Panhandle and the Llano Estacado is a caliche which has been formed, at least in part, at the level of the ground water below the surface.

Anal. No.

93a. Crosby County. Taken one mile N. W. of Mt. Blanco Post-office. Analyzed 1915 by J. E. S. B. A. No. 2253.

93b. Karnes County. Taken 365 feet west of bridge No. 184.3 from point 600 feet on south side of track of S. A. & A. P. Ry., to be used for ballast. Sent by H. H. Temple, superintendent maintenance of way, S. A. & A. P. Ry., Yoakum. Analyzed 1914 by J. E. S. B. A. 2071.

IV. SHALES, CLAYS AND MARLS

Definition of Terms. — Under the head of shales, clays and marls, there have been analyzed a great assortment of materials more or less useful for the manufacture of clay products such as brick, tile, pottery, cement and for use as fuller's earth. Clays are distributed over the entire State. Marls are especially abundant in the Upper Cretaceous formation and in deposits of the Tertiary age. They have been used for ages as fertilizers. There is no clear distinction between clays and marls, nor between clays and shales. Most of our clays from the Pennsylvanian and Permian are sufficiently indurated to be called shales. Where exposed and weathered these may be soft enough to be properly called clays. Applied to the Cretaceous sediments of this kind, the distinction between clay and shale is often based on fissility and laminated structure. Thus the clays of the Eagle Ford, when showing a laminated structure, are apt to be called shales, but in the absence of laminated structure, they are frequently called clays or marls. The Eocene clays are also sometimes called shales when indurated or laminated to a higher degree than most of the clays of this age. The distinction between clays and marls is based on the relative abundance of the calcareous materials present, the clays and the shales containing relatively less of this ingredient.

For ceramic purposes, chemical analyses of clays are strictly secondary in importance to physical tests, such as for plasticity, shrinkage and behavior on drying, behavior on firing etc. The physical properties of Texas clays which have been tested and published in the *Clays of Texas*, by H. Ries, University of Texas Bulletin 102, and hence are not republished here.

The University of Texas is installing a clay testing laboratory so that clays which might be used for ceramic purposes will be tested in a suitable manner.

Anal. No.

94. Anderson County. Marl from 1 mile south of Elkhart. T. G. S. A. R. I, p. 94.
95. Bastrop County. Shale (Eocene tertiary), 2½ miles from Elgin, near M. K. & T. Ry. Analyzed 1904.
96. Bastrop County. Fire clay from Elgin. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 77.
97. Bastrop County. Pottery clay (Eocene tertiary), from 3 miles north of McDade. Analyzed 1914. U. T. B. 365, p. 62.
98. Bastrop County. Fire clay from near Elgin. Analyzed 1908 by O. H. P. and S. H. W. U. T. B. 102, p. 77.
99. Bastrop County. Fire clay (Eocene tertiary), from near Elgin. U. T. B. 365, p. 62.
100. Bastrop County. Sandy brick clay (Eocene tertiary), from Elgin. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 63.
101. Bastrop County. Red and brown burning clay from Elgin. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 62.
102. Bell County. Calcareous clay, from Belton. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 214.
103. Bell County. Same locality, etc., as No. 102.
104. Bexar County. Pottery clay from Stromberg. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 143.
105. Bexar County. Pottery clay from 2½ miles west of Elmendorf. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 143.
106. Bexar County. Red and brown burning clay, from Adkins. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 68.
107. Bexar County. Easily fusible clay, from south side of Leon Creek, near San Antonio, between crossing of dirt road and I. & G. N. Ry., 15 feet thick. U. T. B. 102, p. 266.
108. Bexar County. Easily fusible clay, on Alazan Creek, 1¼ miles north of I. & G. N. Ry. depot, San Antonio. U. T. B. 102, p. 276.
109. Bexar County. Shale, from near San Antonio. Used by the San Antonio Portland Cement Co. in making cement. Located on I. & G. N. Ry. 5 miles north of San Antonio. University museum specimen No. 1165. Analyzed 1914 by J. E. S. B. A. 1997.
110. Bexar County. Clay, from Bem Brick Co., near San Antonio. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 171.

111. Bexar County. Clay from near Elmendorf. Analyzed 1903 by S. H. W. T. M. S. A. 2052.
112. Bowie County. Red and brown burning clay, from near Boston. U. T. B. 365, p. 74.
113. Bowie County. Sandy brick clay, from Texarkana. U. T. B. 365, p. 74.
114. Bowie County. Fire clay, from near Boston. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 101.
115. Bowie County. Red and brown burning clay, from New Boston. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 184.
116. Brazos County. Clay, from college farm at College Station. T. A. E. S. B. 25, p. 269.
117. Brazos County. Easily fusible clay, from 12 miles southeast of College Station. U. T. B. 365, p. 76.
118. Brewster County. Clay (Upper Cretaceous), from Chisos Beds in Chisos Country, west of Chisos Mountains. U. T. B. 93, p. 63.
119. Brewster County. Clay (Tornillo formation), from Chisos Country, east side of Rough Run, about 2 miles east of Dogis Mountain. Analyzed by O. H. P. U. T. B. 93, p. 56.
120. Brewster County. Chalky clay, from the Chisos Country. Terlingua Beds, west of Chisos Pens. Analyzed by O. H. P. U. T. B. 93, p. 40.
121. Brewster County. Chalky clay, from Chisos Country, Terlingua Beds, south of Cuesta Blanca. Analyzed by O. H. P. U. T. B. 93, p. 40.
122. Brewster County. Calcareous clay, from Terlingua. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 214.
123. Brewster County. Clay, from N. & S. vein, section 39, Terlingua Mining Co., Terlingua. Analyzed 1902 by O. H. P. T. M. S. A. 1629.
124. Brewster County. Clay, stratified vein material, N. & S. vein, section 39, Terlingua Mining Co., Terlingua. Analyzed 1902 by O. H. P. T. M. S. A. 1640.
125. Caldwell County. Clay, sample received from E. L. Porch, marked "Outcrop near drilling location in eastern end of Caldwell County, near Gonzales county line." Analyzed 1915 by J. E. S. B. A. 2644.
126. Chambers County. Sandy brick clay, from Cedar Bayou. U. T. B. 365, p. 91.
127. Cherokee County. Sandy brick clay, from Rusk. U. T. B. 365, p. 92.
128. Cherokee County. Marl, green clay stratum in greensand bed of Cherokee County. T. G. S. A. R. I, p. 94.
129. Cherokee County. Buff burning and semi-refractory clay

(Eocene tetriary), from Rusk. U. T. B. 365, p. 91.

130. Dallas County. Shale (Upper Cretaceous, Eagle Ford), from quarry of Texas Portland Cement Co., Dallas. U. S. G. S. B. 522, p. 343.
131. Dallas County. Same location, etc., as No. 130.
132. Dallas County. Shale, used in making cement, by the Texas Portland Cement Co., near Dallas. Analyzed 1914 by J. E. S. B. A. 1998.
133. Dallas County. Red and brown burning clay (Upper Cretaceous), from West Dallas. U. T. B. 365, p. 104.
134. Dallas County. Red and brown burning clays (Upper Cretaceous), from West Dallas. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 192.
135. Dallas County. Same location, etc., as No. 134.
136. Dallas County. Same location, etc., as No. 134.
137. Dallas County. Red and brown burning clay, same location as No. 134.
138. Delta County. Red and brown burning clay, from Cooper. U. T. B. 365, p. 106.
139. Denton County. Pottery clay, near Denton. U. T. B. 365, p. 107.
140. Denton County. Pottery clay, near Lloyd. U. T. B. 365, p. 107.
141. Denton County. Buff burning and semi-refractory clay, top layer, from near Denton. U. T. B. 365, p. 107.
142. Denton County. Buff burning and semi-refractory clay, middle layer. Denton. U. T. B. 365, p. 107.
143. Denton County. Buff burning and semi-refractory clay. Denton. U. T. B. 365, p. 107.
144. DeWitt County. From 840 feet in drill hole, at Cuero. Analyzed 1904 by S. H. W. T. M. S. A. No. 2527.
145. Dickens County. Shale from Spur well, Spur. Depth 2042 to 2047 feet. Received from Dr. J. A. Udden. Analyzed 1914 by S. H. W. B. A. 1325.
146. Eastland County. Clay from Lone Star Coal Co., Cisco. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 186.
147. Ellis County. Red and brown burning clay, from Ferris. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 192.
148. Ellis County. Red and brown burning clay. Same locality, etc., as No. 147.
149. El Paso County. Shale (Lower Cretaceous), ¼ mile south of Courchesne Quarry, El Paso, Texas. U. S. G. S. B. 522, p. 413.
150. El Paso County. Shale (Lower Cretaceous), ¼ mile north of Courchesne Quarry, El Paso. U. S. G. S. B. 522, p. 413.

151-152. El Paso County. Shale from El Paso Brick Co.'s property. U. S. G. S. B. 522, p. 413.

153. Erath County. Shale. Sample received from W. J. Gordon, of Thurber, marked "Upper one foot underlying limestone." Analyzed 1915 by J. E. S. B. A. 2523.

154. Erath County. Red and brown burning clay from Thurber. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 118.

155-156. Erath County. Clay for paving brick, from Thurbur. Analyzed by O. H. P. U. T. B. 102, p. 248.

157. Erath County. Shale, sample received from W. J. Gordon, of Thurber, marked "Mixture of lower 5 feet of shale underlying limestone." Analyzed 1915 by J. E. S. B. A. 2522.

158. Falls County. Pottery clay, from Denny. U. T. B. 365, p. 119.

159. Fayette County. Fire clay from property of Mr. Lytenburg, southeast of Lena. Analyzed 1908 by O. H. P. and S. H. W. U. T. B. 102, p. 276.

160. Fort Bend County. Sandy brick clay (Quaternary), from Wilson plantation, Fulshear. U. T. B. 365, p. 125.

161. Gonzales County. Clay (Eocene tertiary), from Harwood's property, 6 miles southeast of Gonzales. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 278.

162. Gonzales County. Clay from same locality as No. 161. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 281.

163. Gonzales County. Calcareous clay (Eocene tertiary), Gonzales. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 214.

164. Gonzales County. Calcareous clay, from same locality as No. 163. U. T. B. 102, p. 214.

165. Gonzales County. White clay, from Harwood property, 6 miles southeast of Gonzales. Average of two analyses. U. T. B. 365, p. 130.

166. Gonzales County. Clay from Sunset Brick and Tile Co., Gonzales. Analyzed by O. H. P. T. M. S. A. 1801.

167. Gonzales County. Clay from Sunset Brick and Tile Co., Gonzales. Analyzed by O. H. P. T. M. S. A. 2696.

168. Grayson County. Red and brown burning clay from Sherman. U. T. B. 365, p. 132.

169. Gregg County. Sandy brick clay, Longview. U. T. B. 365, p. 133.

170. Gregg County. Sandy brick clay, Longview. U. T. B. 365, p. 133.

171. Grimes County. Brick clay, near Piedmont Springs. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 287.

172. Grimes County. Clay, 13 miles northeast of Navasota. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 270.
173. Grimes County. Sandy brick clay from Courtney. Analyzed by O. H. P. and S. H. W. Min. Ind. 1893, Vol. II, p. 210.
174. Guadalupe County. Sandy brick clay from Morrison. Min. Ind. 1893, Vol. II, p. 210.
175. Guadalupe County. Calcareous brick clay from Seguin. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 135.
176. Harris County. Sandy brick clay from Center Bayou. U. T. B. 365, p. 139.
177. Harris County. Red and brown burning clay (Quaternary) from Houston. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 139.
178. Harris County. Red and brown burning clay (Quaternary). Locality, etc., same as No. 177.
179. Harrison County. Pottery clay (Eocene tertiary) from along road from Marshall to Jefferson. U. T. B. 365, p. 140.
180. Harrison County. Sandy brick clay (Eocene tertiary) from Marshall. U. T. B. 365, p. 140.
181. Harrison County. Clay (Eocene tertiary) from A. Dean headright. Analyzed in laboratory of Texas Geol. Survey by J. H. H. and L. E. M. U. T. B. 102, p. 291.
182. Harrison County. Clay (Eocene tertiary) from J. Sanchez headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.
183. Harrison County. Clay (Eocene tertiary) from F. Wilson headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.
184. Harrison County. Clay (Eocene tertiary) from D. McGray headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.
185. Harrison County. Clay (Eocene tertiary) from P. Whetstone headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.
186. Harrison County. Clay (Eocene tertiary) from D. McGray headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.
187. Harrison County. Clay (Eocene tertiary) from F. Wilson headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.
188. Harrison County. Clay (Eocene tertiary) from Lewis Watkins headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.
189. Harrison County. Clay (Eocene tertiary) from M. L. Rager headright. Analyzed by J. H. H. and L. E. M. U. T. B. 102, p. 291.

190. Henderson County. Pottery Clay. Average of two analyses of samples from Athens. U. T. B. 365, p. 143.

191. Henderson County. Clay (Eocene tertiary) for ornamental brick and tiles. From Henry Morrison pit near Athens. T. G. S. A. R. II, p. 199.

192. Henderson County. Clay (Eocene tertiary) for ornamental brick and tiles, from J. B. Attwood Survey near Athens. T. G. S. A. R. II, p. 199.

193. Henderson County. Fire clay (Eocene tertiary) from Malakoff. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 97.

194. Henderson County. Fire clay (Eocene tertiary) from Malakoff. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 97.

195. Henderson County. Fire clay (Eocene tertiary) from near Athens. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 94.

196. Henderson County. Fire clay (Eocene tertiary) from near Athens. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 96.

197. Henderson County. Refractory clay (Eocene tertiary) just west of town of Athens. T. G. S. A. R. II, p. 197.

198. Henderson County. Pottery clay from T. Murchison farm west side of B. Attwood headright, ½ mile north and a little east of Athens. T. G. S. A. R. II, p. 198 (1890).

199. Henderson County. Pottery clay from brook on Bishop farm on Boly C. Walter's headright, 1 mile north of Athens. T. G. S. A. R. II, p. 198 (1890).

200. Hopkins County. Fire clay from near Sulphur Springs. Ries Analysis No. 870. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 99.

201. Hopkins County. Red and brown burning clay from Sulphur Springs. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 182.

202. Houston County. Red burning clay (Eocene tertiary) from Hurricane Bayou on N. C. Hodge headright. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 295.

203. Houston County. Marl (Eocene tertiary). Sample from Major W. J. Borden, United States Engineer, Dallas. Marked "No. 2 hard pan or soft rock found at Hurricane Shoals, Trinity River, 243 miles below Dallas, and 90 miles above Riverside." Analyzed 1915 by J. E. S. B. A. 2698.

204. Houston County. Marl (Eocene tertiary). Fourteen miles east of Crockett. T. G. S. A. R. I, p. 94.

205. Hunt County. Red and brown burning clay (Upper creta-

ceous) from Greenville. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 149.

206. Jefferson County. Red and brown burning clay (Quaternary) from Beaumont. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 153.

207. Jones County. Cupriferous clay from the Avoca Area. Analyzed by H. Tobelmann. **Economic Geology,** Vol. 10, p. 642.

208. Lamar County. Red and brown burning clay from Paris. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 192.

209. Lamar County. Sample and locality, etc., similar to No. 208. Reference identical.

210. Lee County. Sandy brick clay (Eocene tertiary) from Giddings. U. T. B. 365, p. 163.

211. Leon County. Clay (Eocene tertiary). Sample received from Bear Grass Coal Co., of Jewett. Marked "Three-foot strata in 18-ft. deposit." Analyzed 1915 by J. E. S. B. A. 2575.

212. Limestone County. Fire clay from Headsville. U. T. B. 365, p. 166.

213. Limestone County. Fire clay from Headsville. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 92.

214. Marion County. Clay (Eocene tertiary) from Thos. Farrell's bank, A. Richardson headright, near Jefferson. U. T. B. 102, p. 297.

215. Marion County. Clay (Eocene tertiary) from J. Higgins' yard, near Jefferson, U. T. B. 102, p. 298.

216. Marion County. Pottery clay. **Mining Industry,** Vol II, p. 210 (1893).

217. McLennan County. Marl (Upper cretaceous) from Waco. T. M. S. A. No. 1440.

218. McLennan County. Red and brown burning clay (Upper cretaceous) from Waco. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 173.

219. McLennan County. Calcareous clay from Waco. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 214.

220. McCulloch County. Clay from Canyon Division of Brownwood bed, 1½ miles N. E. of Milburn. T. G. S. A. R. No. 4 (for 1892), p. 440: Paper by N. F. Drake, "**Report of Colorado Coal Field of Texas.**"

221. McMullen County. White clay (Siliceous sinter, Eocene tertiary) from 12 miles north of Tilden. Analyzed 1916 by J. E. S. B. A. 2988.

222. Medina County. Calcareous brick clay (Upper cretaceous) from D'Hanis. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 180.

223. Milam County. Fire clay from Vogel's Mine, Rockdale, clay under lignite. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 161.
224. Milam County. Fire clay (Eocene tertiary). Top clay from Olsen's Mine, Rockdale. Analyzed by O. H. P. U. T. B. 102, p. 158.
225. Milam County. Fire clay (Eocene tertiary) under lignite in Olsen's Mine, Rockdale. Analyzed by O. H. P. U. T. B. 102, p. 159.
226. Milam County. Fire clay from near Milano Junction. Analyzed by O. H. P. U. T. B. 102, p. 89.
227. Milam County. Fire clay from Rockdale. U. T. B. 365, p. 182.
228. Milam County. Fire clay from Rockdale. Analyzed by O. H. P. U. T. B. 365, p. 182.
229. Nacogdoches County. Pottery clay from Nacogdoches. U. T. B. 365, p. 186.
230. Navarro County. Red and brown burning clay (Upper Cretaceous) from Corsicana. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 188.
231. Nueces County. Clay. Analyzed 1890 by Dr. Edgar Everhart. T. G. S. A. R. II, p. 51.
232. Panola County. White sandy clay (Eocene tertiary) on Carthage and Timpson Road, 2 miles south of Carthage. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 300.
233. Panola County. Gray sandy clay, above lignite shale on Allen Baker farm, M. Payne headright, 4 miles east of Carthage. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 300.
234. Panola County. Plastic ferruginous clay, 1 mile east of Tatum Station. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 300.
235. Panola County. Red and gray mottled clay, under iron bed, Six Mile Creek. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 300.
236. Panola County. Indurated sandy clay, Donnel Field, ½ mile S. E. of Carthage. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 300.
237. Panola County. Lignitic clay shale, lower bed near Iron Bayou, Lagrone headright. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 300.
238. Panola County. Stiff, tenacious clay, sandy soil, light brown color, from lignitic series in plowed field, R. W. Kenard farm, Daniel Martin headright. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 300.

239. Parker County. Pottery clay from Rock Creek, about 15 miles west of Weatherford. U. T. B. 365, p. 197.
240. Polk County. Sandy brick clay from Hortense. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 200.
241. Polk County. Easily fusible clay from near Carmona. U. T. B. 365, p. 200.
242. Red River County. Sandy brick clay from Detroit (Upper cretaceous formation). U. T. B. 365, p. 205.
243. Robertson County. Clay from Calvert. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 269.
244. Robertson County. Fire clay from Bremond. U. T. B. 365, p. 207.
245. Rusk County. Gray clay, lignitic series (Eocene tertiary), used at Henderson pottery, ½ mile north of courthouse at Henderson. U. T. B. 102, p. 302.
246. Rusk County. Indurated glauconitic clay (Eocene tertiary) from greensand marl series near Sulphur Springs, 18 miles south of Henderson. U. T. B. 102, p. 302.
247. Rusk County. Micaceous sandy lignitic clay, 18 miles south of Henderson. U. T. B. 102, p. 302.
248. Rusk County. Mottled orange loam, Lower Orange Sand Formation, on hillside, northern exposure at Millville. U. T. B. 102, p. 302.
249. Rusk County. Dark gray, slightly magnesian, pocket bed Lignitic Series on Larissa Road, 8 miles west of Henderson. U. T. B. 102, p. 302.
250-a. Rusk County. Pottery clay from near Henderson. U. T. B. 365, p. 209.
250-b. San Patricio County. Clay. From land owned by R. A. Arnold, ½ mile west of Portland. B. A. No. C286. Analyzed by J. E. S. 1916.
251. Shackelford County. Clay (Permian), average of 6 analyses, from Black Ranch, 10 to 12 miles north of Albany. U. T. B. 365, p. 215.
252. Smith County. Pottery clay, near Garden Valley. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 304.
253. Smith County. Same as No. 252, except that sample came from near Tyler.
254. Smith County. Pottery clay from Liebrich Pottery Co., near Tyler. U. T. B. 365, p. 217.
255. Tarrant County. Calcareous clay shale from Washita Division of the Comanchean formation, from property of the O. K. Cattle Co., about 4 miles east of Tarrant County courthouse. Analyzed 1915 by J. E. S. B. A. 2748.
256. Tom Green County. From San Angelo. Analyzed by S. H. W. U. T. B. 102, p. 268.

257. Travis County. Marl (Taylor marl division of the Lower cretaceous), on east bank of Big Walnut Creek, 2 miles below Sprinkle and 6½ miles northeast of Austin. U. S. G. S. B. 522, p. 342.

258. Travis County. Marl (Taylor marl division of the Lower cretaceous), from wagon road on hill, just west of Little Walnut Creek, 4½ miles northeast of Austin and 1 mile north of Pecan Springs. U. S. G. S. B. 522, p. 342.

259. Travis County. Clay shale (Eagle Ford of Lower cretaceous), from south side of Big Walnut Creek 9½ miles northeast of Austin and 1½ miles below Watters Station. U. S. G. S. B. 522, p. 342.

260. Travis County. Limy shale (Eagle Ford of the Lower cretaceous), from 8 feet of bed below middle of Eagle Ford clay from bluff of small creek near I. & G. N. Ry., 1 mile south of Colorado River near Austin. U. S. G. S. B. 522, p. 342.

261. Travis County. Limy shale (Eagle Ford of the Lower cretaceous), upper 10 feet of Eagle Ford clay from bluff of small creek near I. & G. N. Ry., 1 mile south of Colorado River near Austin. U. S. G. S. B. 522, p. 342.

262. Travis County. Clay (Webberville formation) from Wilbarger Creek, 3 miles below Manor. U. S. G. S. B. 522, p. 342.

263. Travis County. Clay (Del Rio formation of the Lower cretaceous), from bluff on Barton Creek, 1-3 mile above its mouth, sampled above and below wagon road near bridge. U. S. G. S. B. 522, p. 342.

264. Travis County. Clay (Webberville formation, Lower cretaceous) from Moore's Branch of Onion Creek, 9 miles southeast of Austin. U. S. G. S. B. 522, p. 342.

265-275. Travis County. Clays (Del Rio formation of the Lower cretaceous) for cement manufacture, from property of the Austin Portland Cement Co., 3½ miles northwest of the center of Austin. Depth of strata 10 to 20 feet. U. S. G. S. B. 522, p. 341.

276. Tyler County. Sandy brick clay from Colmesneil. U. T. B. 365, p. 232.

277. Van Zandt County. Clay (Eocene tertiary) from well 10 miles northeast of Canton. T. G. S. A. R. I, p. 94.

278 and 279. Van Zandt County. Clay marl (Eocene tertiary) from Grand Saline Station on T. & P. Ry. T. G. S. A. R. I, p. 94.

280. Washington County. Calcareous clay from Brenham. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 214.

281. Washington County. Clay from Tatum Farm, near Burton. Analyzed by T. B. Tucker. U. S. G. S. B. 470, p. 318.
282. Washington County. Clay from Elliott's Farm, near Burton. Analyzed by W. W. Camp of Denver, Colo. U. S. G. S. B. 470, p. 323.
283. Webb County. Buff burning, semi-refractory clay from Minera. U. T. B. 365, p. 241.
284. Webb County. Calcareous brick clay (Eocene Tertiary) from Laredo. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 242.
285. Webb County. Shale from under coal at Minera, near Laredo. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 153.
286. Webb County. Shale beneath coal at Minera. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 153.
287. Webb County. Shale under lower or San Pedro seam at Cannel, near Laredo. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 153.
288. Webb County. Weathered shale from the lower seam or San Pedro seam at Cannel. Used for dry pressed bricks at Laredo. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 153.
289. Wharton County. Calcareous brick clay, from Wharton. Analyzed by O. H. P. U. T. B. 102, p. 214.
290. Same as No. 289.
291. Same as No. 289.
292. Williamson County. Chalk-marl (Upper Cretaceous) from San Gabriel River. U. S. G. S. A. R. III, p. 737. (?)
293. Williamson County. Greensand marl (Upper Cretaceous). From beneath I. & G. N. Ry. bridge over Brushy Creek. Analyzed by G. H. Wooten. T. G. S. A. R. III, p. 355.
294. Williamson County. Taylor marl (Upper Cretaceous) from lower portion of Taylor marl bed Brushy Creek, ½ mile S. E. of Taylor. Analyzed by J. A. Taff. U. S. G. S. A. R. XXI, Part VII, p. 337.
295. Williamson County. Taylor marl (Upper Cretaceous) from central portion of Taylor marl bed at Rice's Crossing, Brushy Creek. Analyzed by J. A. Taff. U. S. G. S. A. R. XXI, Part VII, p. 337.
296. Williamson County. Taylor marl (Upper Cretaceous) from Taylor marl bed at Rice's Crossing on Brushy Creek. Analyzed by J. A. Taff, U. S. G. S. A. R. XXI, Part VII, p. 337.
297. Williamson County. Calcareous clay from Calaveras. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 214.
298. Williamson County. Calcareous clay from Taylor. Analyzed by O. H. P. and S. H. W. U. T. B. 102 p, 214.

299. Wilson County. Fire clay (Eocene Tertiary) from near Sutherland Springs. Analyzed 1903 by S. H. W. T. M. S. A. No. 2053.
300. Wilson County. Pottery clay (Eocene Tertiary) from Lavernia. U. T. B. 365, p. 249.
301. Wilson County. Buff burning, semi-refractory clay (Eocene Tertiary) from Calaveras. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 249.
302. Wilson County. Calcareous brick clay (Eocene Tertiary) from Calaveras. Analyzed by O. H. P. and S. H. W. U. T. B. 365, p. 249.
303. Wise County. Easily fusible clay. (Pennsylvanian) from Bridgeport. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 272.
304. Wise County. Red and brown burning clay. (Pennsylvanian) from Bridgeport. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 188.
305. Wood County. Pottery clay (Eocene Tertiary). Five miles east of Winnsboro, used by the Winnsboro pottery. Analyzed by S. H. W. T. M. S. A. No. 2508.
306. Wood County. Pottery clay. Average of two analyses of samples from Cornersville. U. T. B. 365, p. 253.
307. Wood County. Pottery clay. Average of 2 analyses of samples from Winnsboro. U. T. B. 365, p. 253.
308. Young County. Sandy brick clay (vitrifiable) 14 miles west of town of Graham. U. T. B. 365, p. 255.
309. Young County. Paving brick clay. From land of H. K. Graham, near Graham. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 245.
310. Young County. Paving brick clay from gig tank 14 miles west of Graham. Analyzed by O. H. P. and S. H. W. U. T. B. 102, p. 247.
311. . . . . Shale (Upper Cretaceous) from bed of Trinity River, near Texas Midland Ry. bridge about 50 miles below Dallas. Sample received from W. J. Barden, U. S. Engineer. Analyzed 1915 by J. E. S. B. A. 2697.

V. FULLER'S EARTH

NOTE ON COMPOSITION AND METHOD OF TESTING TO REVEAL QUALITY.—Fuller's earth is a mixture of clay and sand of such physical structure or porosity as to give it a large surface area. Material of this composition, when brought in contact with aqueous or oily liquids containing coloring matter and other particles in a fine state of suspension, known as colloidal solution,

attract and hold such coloring particles, etc., to themselves, and thus serve to clarify such liquids. The extent of the clarifying action is only dependent upon the porosity or extent of surface in the fuller's earth, and is not essentially dependent upon its chemical composition. It is found that almost all clays exert such clarifying action and act as fuller's earth; but the amount of earth required to remove a certain amount of coloring matter varies greatly, and the term is applied only to such clay and sand mixtures of which comparatively small amounts suffice to remove coloring matter from aqueous and oily solutions Hence the quality of a fuller's earth is measured by determining the amount required to decolorize any particular oil as compared with the amount of a fuller's earth in common use which will produce the same effect. A chemical analysis of a fuller's earth indicates nothing concerning its quality and is practically useless. For a thorough discussion of the technology of fuller's earth, see Bulletin 71, U. S. Bureau of Mines, Fuller's Earth, by C. L. Parsons.

According to U. S. Geol. Survey's Report on "Fuller's Earth in 1917", there were 72,870 short tons of fuller's earth mined and marketed in the United States during 1917, at an average price of $10.66 per ton. By far the larger part of this was produced and marketed in the eastern States (Florida, Georgia, and Massachusetts), with Texas next in rank. The average price paid for the earth in Texas was $12.17.

During 1917, 16,994 short tons were imported from abroad.

Anal. No.

312. Burleson County. Somerville fuller's earth from Fuller's Earth Co., Somerville, Texas. Analyzed by Dr. F. C. Thiele of Coffeyville, Kan. B. A. 2113.

313. Burleson County. Fuller's earth "Brantley Brand" from Somerville Development and Improvement Co., Somerville, Texas. Analyzed by Dr. F. C. Thiele. B. A. 2146.

314. Fayette County. Fuller's Earth. Sample sent to University of Texas Bureau laboratory by J. C. Melcher, O'Quinn, Texas. Marked "No. 1." Analyzed 1914 by Dr. F. C. Thiele, chemist for the Cudahy Refining Co., Coffeyville, Kans. B. A. 2108. Not suited for extensive technical use, because of high weight per cubic foot.

315. Same generally as No. 314. B. A. 2109.

316. Same as Nos. 314 and 315, except that use is practical only when fuller's earth is well dried. B. A. 2110.

317. Fayette County. Fuller's earth sent in by H. S. Turnage, Giddings, Texas. Sample obtained from near Muldoon. B. A. 2112. High ignition loss, acidity, and wt. per cu. ft. make it impracticable for extensive use technically.

318. Shelby County. Fuller's earth. From C. L. Milledge, of Timpson, Texas. Analyzed by Dr. F. C. Thiele. B. A. 2114.

319. Washington County. Fuller's earth from the Stanley tract four miles north of Burton. Sample taken and analysis made by E. P. Schoch. The bleaching tests showed this earth to be equal to, if not better than the best English fuller's earth. The deposit was developed by the Texas Land and Improvement Company of Dallas, and regular shipments were made for quite a while.

VI. LIMESTONE

NOTE ON OCCURRENCE AND COMPOSITION.—Limestones occur among the sediments of all ages. They are most common west of the Balcones Escarpment, which extends from Dallas to San Antonio and from San Antonio to Del Rio. In the Tertiary and Pleistocene deposits which cover the coastal plain, limestones are rare. Such few limestones as occur in this region in the Tertiary and Pleistocene are for the most part soft and unsuitable for building material. Our purest limestones are found in the Comanchean which covers the south half of the Great Plains in this State. The Comanchean limestones are rarely magnesian. A few per cent of magnesia is frequently to be found in the Pennsylvanian limestones. In the samples given below, a rough classification has been made of some of the limestones, referring them to different geological divisions; but in the case of a large number of analyses, it has not been practicable to make this classification.

Limestone is composed mainly of calcium carbonate. Its purest form is the crystalline material known as calcite. Statuary marble is a granular aggregate of calcite particles. With the admixture of clay, limestone passes gradually into argillaceous limestone, calcareous mudstone and finally into incoherent marl. Limestone containing admixtures of other impurities are described as siliceous, sandy, carbonaceous, bituminous, ferruginous and phosphatic limestones. The majority of

limestones are bedded rocks of sedimentary origin and are composed of the calcareous remains of marine organisms. As a general rule, the compactness of a limestone is a measure of its geological age and vice versa, the hardest limestones are found in the oldest formations.

(*a*) *Cambrian*

Anal. No.

746. Burnet County. West side of A. & N. W. Ry., a short distance south of Honey Creek. Sampled by G. A. P., 1914. Museum No. 1979. Analyzed by J. E. S. B. A. 1833. [See footnote.]

(*b*) *Ordovician*

747. Burnet County. Sampled about ¼ mile west of the A. & N. W. Ry., and about 5 miles N. E. of Fairbanks, on Honey Creek above bridge on Reed Yett's place, by G. A. Parkinson. Analyzed 1914 by J. E. S. Museum No. 1957. B. A. 1811. [See footnote.]

748. Burnet County. Sampled by G. A. P., about ½ mile east of A. & N. W. Ry., and about 5 miles east of Fairbanks on Reed Yett's place on Honey Creek below bridge. Museum No. 1959. Analyzed 1914 by J. E. S. B. A. 1813. [See footnote.]

749. Burnet County. Sampled by G. A. P., on land of E. O. Wengren, about ½ mile west of A. & N. W. Ry., and about 6 miles east of Fairland, about ¼ mile up Hamilton Creek, from its junction with Delaware Creek. Analyzed 1914 by J. E. S. B. A. 1815. [See footnote.]

750. Burnet County. Reed Yett's place, first creek north from Sudduth section house on A. & N. W. Ry., and about ½ mile down the creek. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1831. [See footnote.]

751. San Saba County. Museum sample No. 720, marked: "Lithographic, Mrs. Houston's Cherokee Creek." Analyzed 1914 by J. E. S. B. A. 1917.

752. San Saba County. Museum sample No. 612, marked: "Lithographic B. R. Russell's Ranch." Analyzed 1914 by J. E. S. B. A. 1918.

753. San Saba County. Museum No. 722, marked: "Mrs. Houston's Cherokee Creek." Analyzed 1914 by J. E. S. B. A. 1621.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

(c) Pennsylvanian

754. Burnet County. About 1 mile northeast of A. & N. W. Ry. station at Marble Falls, and ½ mile east of high school building. Sampled by G. A. P. Museum No. 1966. Analyzed 1914 by J. E. S. B. A. 1820. [See footnote.]

755. Burnet County. From cut through Backbone Ridge, A. & N. W. Ry., about 1 mile north of Marble Falls. Sampled by G. A. P. Museum No. 1968. Analyzed 1914 by J. E. S. B. A. 1822. [See footnote.]

756. Eastland County. From Tiffin Quarry. Sample received Jan. 1915, from Tiffin Crushed Stone Co., Ranger, Texas. Analyzed 1915 by J. E. S. B. A. 2231. [See footnote.]

757. Eastland County. Ditto as No. 756.

758. Eastland County. From Rogers Quarry. Sample sent to Lab. of Univ. of Tex. Bur. Ec. Geol. by Engineering Dept. T. & P. Ry. Co., Dallas. Analyzed 1915 by J. E. S. B. A. 2211. [See footnote.]

759. Jack County. Museum No. 747, marked: "Risley Bros., Jacksboro." Analyzed 1914 by J. E. S. B. A. 1916.

760. Jack County. Limestone from Risley Bros., Jacksboro. U. T. B. 365, p. 150.

761. Jack County. Limestone, sample from J. W. Fox, Stewarton. U. T. B. 365, p. 150.

762. Jack County. Limestone, tested as road material by the U. S. Office of Public Roads, Washington, D. C. U. T. B. 365, p. 151.

763. Jack County. Sample of blue-gray limestone received from Risley Bros., Jacksboro. Analyzed 1913 by S. H. W. B. A. 549.

764. Jack County. Sample of gray limestone received from Risley Bros., Jacksboro. Analyzed 1913 by S. H. W. B. A. 550.

765. Jack County. Limestone from Jacksboro. Analyzed 1914 by J. E. S. B. A. 1533.

766. Palo Pinto County. Sample from Mineral Wells. Analyzed by J. E. S. B. A. 1613.

767. Palo Pinto County. From mountain property of J. C. Burch, Mineral Wells. Sample received from Fred Burman. Commercial Club, Mineral Wells. Analyzed 1915 by J. E. S. B. A. 2484. [See footnote.]

768.
769.
770. Palo Pinto County. From Mineral Wells Crushed Stone Co., used for ballast road making, bitulithic pavement, etc. U. T. B. 365, p. 191.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

771. San Saba County. Limestone from bed 2 miles south of Richland Springs, from land belonging to W. H. Gibbons. Analyzed 1913 by S. H. W. B. A. 824.
772. San Saba County. Gray and buff limestone, 2½ miles southeast of San Saba. Sample received from W. W. McDowell, McKinney, Texas. Analyzed 1915 by J. E. S. B. A. 2669.
773. San Saba County. Gray and brown limestone. 2½ miles S. E. of San Saba. Analyzed 1915 by J. E. S. B. A. 2670.
774. San Saba County. Gray limestone. Ditto as for No. 2670.
775. Stephens County. From David Cole, Caddo, Texas, Analyzed 1913 by J. E. S. B. A. 557.

(d) Permian

776. Callahan County. From 2 miles west of Baird. Analyzed 1914 by J. E. S. B. A. 1608.
777. Callahan County. From 1 mile west of Baird. Analyzed 1914 by J. E. S. B. A. 1607.
778. Culberson County. Sample of limestone from El Capitan Peak, Guadalupe Mts. Analyzed by W. T. Schaller. T. M. S. B. 9, p. 41.
779. Jones County. Limestone from quarry of A. C. Fox, Lueders. U. T. B. 365, p. 156.
780. Jones County. Sample from Lueders. Analyzed 1913 by S. H. W. B. A. 554.
781. Jones County. Sample from Lueders, Texas. Analyzed 1912 by J. E. S. B. A. 1483.
782. Jones County. From Lueders. Analyzed 1914 by J. E. S. B. A. 1624.
783. Jones County. From Lueders. Analyzed 1914 by J. E. S. B. A. 1551.
784. Jones County. From Lueders. Analyzed 1914 by J. E. S. B. A. 1549.
785. Jones County. From Lueders. Analyzed 1914 by J. E. S. B. A. 1538.
786. Jones County. From Lueders. Analyzed 1914 by J. E. S. B. A. 1484.
787. Jones County. From Lueders. T. M. S. A.
788. Shackelford County. Sample taken 7 miles west of Albany. Analyzed 1914 by J. E. S. B. A. 1469.
789. Wichita County. Beaverburk limestone, Wichita formation, from about ¼ mile west of Burk. U. T. B. 246, p. 34.
790. Wichita County. Beaverburk limestone, Wichita formation, from survey 33, H. & T. C. R. R. U. T. B. 246, p. 34.

(e) Comanchean Cretaceous

791. Bexar County. Museum No. 1322, marked: "Lithographic limestone, from near Leon Springs." Analyzed 1914 by J. E. S. B. A. 1904.

792. Bexar County. Mus. No. 1321. Analyzed 1914 by J. E. S. B. A. 1671.

793. Bexar County. From Balcones. Mus. No. 700. Analyzed 1914 by J. E. S. B. A. 1670.

794. Bexar County. Sampled east of Helotes. Analyzed 1914 by J. E. S. B. A. 1623.

795. Bexar County. Sampled at Balcones. Analyzed 1914 by J. E. S. B. A. 1592.

796. Bexar County. Mus. No. 753, marked: "Leon Lime Co., San Antonio, stone from Leon Springs." Analyzed 1914 by J. E. S. B. A. 1926.

797. Bexar County. 14 miles south of San Antonio on S. A. & A. P. Ry. Analyzed 1914 by J. E. S. B. A. 1482.

798. Bosque County. Sampled 1½ miles west of Iredell on Texas Central Ry. Analyzed 1914 by J. E. S. B. A. 1526.

799. Brewster County. Buda limestone from 1 mile east of Boquillas. U. T. B. 93, p. 28.

800.–802. Burnet County. Bituminous limestone from Post Mountain, Burnet. Analysis partly recalculated. U. S. G. S. A. R. 22, Part I, p. 322.

803. Burnet County. Sample from Reed Yett, 1½ miles east of Fairland. Lower part of the hill. Analyzed by J. E. S. B. A. 1806. [See footnote.]

804. Burnet County. Sampled 5 miles south of Bertram. Analyzed 1914 by J. E. S. B. A. 1674.

805. Comal County. From Dittlinger Lime Co., New Braunfels, marked: "Pulverized limestone." Analyzed 1915 by J. E. S. B. A. 2479.

806. Comal County. Sample received from Dittlinger Lime Co., New Braunfels, Museum No. 2086. Analyzed 1914 by J. E. S. B. A. 1980. [See footnote.]

807. Comal County. Sample from Dittlinger Lime, New Braunfels. Museum No. 2084. Analyzed 1914 by J. E. S. B. A. 1978. [See footnote.]

808.–811. Comal County. Samples sent in by C. W. Ling, San Antonio, and taken at or near New Braunfels. Analyzed 1915 by J. E. S. B. A. 2324-2327 inc. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

812. Comal County. Limestone screenings from New Braunfels. Analyzed 1914 by J. E. S. B. A. 1657.

813.) Comal County. Sampled few miles south of New Braunfels
814.) on I. & G. N. Ry. U. T. B. 365, p. 98.

815. Comal County. From widow Rabe's place, about 5 miles north of New Braunfels, on the old government road and about 100 yds. from crossing of wagon road and M. K. & T. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2099. [See footnote.]

816. Comal County. From Comal Rock Co., New Braunfels. Analyzed 1915 by J. E. S. B. A. 2286. [See footnote.]

817. Comal County. Sample from Dittlinger Lime Co., New Braunfels. Mus. No. 2085. Analyzed 1914 by J. E. S. B. A. 1979. [See Footnote.]

818. Coryell County. Sample from B. R. Boone, Oglesby. Analyzed 1915 by J. E. S. B. A. 2771.

819.)
820.) Coryell County. From quarry of D. R. Boone, Lone Star
821.) Lime Works, Oglesby. Analyzed by J. E. S. U. T. B.
822.) 365, p. 100.

823. Coryell County. Sample from Oglesby. Analyzed 1913 by S. H. W. B. A. 555.

824. Denton County. Located about 3½ miles southwest of Denton and about 1 mile west of M., K. & T. Ry. Sampled by G. A. P. Analyzed 1915 by J. E. S. B. A. 2469. [See Foot-note].

825. Edwards County. Section 71, Block 3, G. H. & S. A. Ry., 6 miles northwest of Leaky. Analyzed 1913 by J. E. S. B. A. 560.

826. Edwards County. Barkdale. Analyzed 1913 by S. H. W. B. A. 562.

827. El Paso County. Limestone from Courchesne Quarry, El Paso. U. S. G. S. B 340, p. 413.

828. Erath County. Sample from Dublin tested as road material by U. S. Office of Public Roads at Washington, D. C. under their number 7297. Museum No. 1926. Analyzed by E. L. Porch. B. A. 1849.

829. Gillespie County. Mus. No. 716, marked "Head of Live Oak Creek." Analyzed 1914 by J. E. S. B. A. 1908.

830. Gillespie County. Mus. No. 715, marked: "Palo Alto Creek." Analyzed 1914 by J. E. S. B. A. 1911.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

831. Hamilton County. One mile east of Hico on the Tex. Cent. Ry. Analyzed 1914 by J. E. S. B. A. 1525.

832. Hays County. About 20,000 cu. yds. exposed, about 4 miles southwest of San Marcos on the S. A.-Austin road, ¼ mile northwest of I. & G. N. Ry. Sampled by G. A. P. Analyzed by J. E. S. B. A. 2070. [See Foot-note.]

833. Hays County. Just above I. & G. N. Ry. bridge on Onion Creek, 15 miles from Austin and about ½ mile north of Buda. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1929. [See Foot-note.]

834. Llano County. From A. Parkhill's Ranch. Analyzed 1901 by O. H. P. T. M. S. A. No. 1328.

835. McLennan County. Sample of limestone from town of Crawford, reputed to be best quality in the State. U. T. B. 365, p. 174.

836. Montague County. Bluish limestone from Sampson Ridge, St. Jo. T. M. S. B. 3, p. 80.

837. Pecos County. From Anderson's Headquarters Ranch. T. M. S. A. No. 1232. Analyzed 1901 by O. H. P.

838. Pecos County. Bituminous limestone, occurring at "Oil Seep," 15 miles northeast of Ft. Stockton. T. M. S. B. 2, p. 9.

839. Tarrant County. Sample received by Lab. of Bur. Econ. Geol. of Univ. of Texas from W. S. Meller, Ft. Worth. Exact locality not stated. U. T. B. 365, p. 223.

840.
841.
842.
843.
844.
845.
846.
847. Travis County. Soft limestone, Austin chalk formation, from
848. Big Walnut Creek, 8 miles northeast of the center of the
849. City of Austin, and 1½ miles northwest of Sprinkle. An-
850. alyzed by P. H. Bates and A. J. Phillips, in Labs. of the
851. U. S. G. S. at St. Louis, Mo., U. S. G. S. B. 522, p. 341-342.
852.
853.
854.
855.
856.
857.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

858.
859.
860.
861.
862.
863. Travis County. Soft limestone for cement manufacture from property of the Austin Portland Cement Manufacturing Co., Austin, 3½ miles from Austin. Depths vary from 12-30 ft. Analyzed by P. H. B. and A. J. P. in Labs. of the U. S. G. S. at St. Louis, Mo. U. S. G. S. B. 522, pp. 341-342.

864. Travis County. From Dry Creek near Austin. Analyzed 1914 by J. E. S. B. A. 1616.

865. Travis County. Limestone from ¾ mile above Barton Springs. Analyzed 1914 by J. E. S. B. A. 1834. [See footnote.]

866. Travis County. Sample from near Spicewood Springs, 7 miles west of north of Austin. Analyzed by J. E. S. B. A. 1787. [See footnote.]

867. Travis County. About 3 miles west of Austin on the Bee Cave Road. Sampled by G. A. P. Mus. No. 2043. Analyzed 1914 by J. E. S. B. A. 1899. [See footnote.]

868. Travis County. Sampled at Dry Creek Quarry, N. W. of Austin. U. T. B. 365, p. 229.

869. Travis County. About 3¾ miles west of Austin on Bee Cave road. Sampled by G. A. P. Mus. No. 2062. Analyzed 1914 by J. E. S. B. A. 1900. [See footnote.]

870. Travis County. Sampled at Spicewood Springs, 7 miles northwest of Austin. Analyzed by J. E. S. B. A 1788. [See footnote.]

871. Travis County. An old specimen from the University of Texas Museum, marked "Coen marble, from near Austin." Analyzed 1914 by J. E. S. B. A. 1508.

872. Travis County. Old Johnson Quarry at Deep Eddy, on Colorado River near Austin. Analyzed 1914 by J. E. S. B. A. 1786. [See footnote.]

873. Travis County. Sample from Barton Creek, 1 mile above Barton Springs. Analyzed 1914 by J. E. S. B. A. 1835. [See footnote.]

874. Travis County. From Old Zilker Quarry, opposite Barton Springs, near Austin. Sampled by G. A. P. Mus. No. 2019. Analyzed 1914 by J. E. S. B. A. 1874. [See footnote.]

875. Travis County. About 1 mile from Oak Hill, near Fredericksburg Road, about 4 miles west of I. & G. N. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1838. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

876. Travis County. Old Michael Place about 3½ miles S. W. of Austin, near Fredericksburg road. Sampled by G. A. P. Museum No. 2032. Analyzed 1914 by J. E. S. B. A. 1887. [See footnote.]

877. Travis County. From Fredericksburg road, within limits of Austin, about 200 yds. west of I. & G. N. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1840. [See footnote.]

878. Travis County. From Old Taylor Quarry at lime kiln, near end of I. & G. N. Ry. tracks, Austin Dam. Analyzed 1914, by J. E. S. B. A. 1785. [See footnote.]

879. Travis County. Near Duval Station House, and about 200 yds. west of I. & G. N. Ry. Sampled by G. A. P. Museum No. 2142. Analyzed 1915 by J. E. S. B. A. 2259. [See footnote.]

880. Travis County. 6 miles west of Austin, from Marshall quarry on Marshall goat ranch. Sampled by G. A. P. Mus. No. 2063. Analyzed 1914 by J. E. S. B. A. 1902. [See footnote.]

881. Travis County. Austin White Lime Co., McNeill, from an old pit on west side of road. Sampled by G. A. P. Museum No. 2064. Analyzed 1914 by J. E. S. B. A. 1958. [See footnote.]

882. Travis County. Old Zilker Quarry, opposite Barton Springs near Austin. Sampled by G. A. P. Univ. Mus. No. 2020. Analyzed 1914 by J. E. S. B. A. 1875.

883. Travis County. Sample from dry creek near Austin. Analyzed 1914 by J. E. S. B. A. 1617.

884. Travis County. Old Walsh Quarry, near Austin Dam on I. & G. N. Ry. tracks. Analyzed by J. E. S. B. A. 1784. [See footnote.]

885. Travis County. From Dry Creek (Walker) Quarry, near Austin. Analyzed 1914 by J. E. S. B. A. 1618.

886. Travis County. Mus. No. 752. Sample from Austin White Lime Co., McNeill. Analyzed 1914 by J. E. S. B. A. 1920.

887. Travis County. Limestone, Georgetown formation, Museum No. 748. Marked "J. C. Ferguson, McNeill." Analyzed by J. E. S. B. A. 1924.

888. Travis County. Near Camp Mabry, on south side of county road about 1 mile west of I. & G. N. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1836. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

889. Travis County. On property of J. A. Patton, about 9 miles S. W. of Austin, west of Fredericksburg road, near Oak Hill, and about 5 miles west of I. & G. N. Ry. Analyzed 1914 by J. E. S. B. A. 1837. [See footnote.]

890. Travis County. On Will Birkmer's place 1 mile west of I. & G. N. Ry. and about 12 miles south of Austin. Sampled by G. A. P. Museum No. 2044. Analyzed 1914 by J. E. S. B. A. 1936. [See footnote.]

891. Travis County. First creek north of Duval Section House on I. & G. N. Ry. at crossing of wagon road and railroad, about 12 miles N. W. of Austin.

892. Williamson County. Museum No. 2033, marked "Cedar Park, Williamson County, R. B. George & Co." Analyzed 1914 by J. E. S. B. A. 1927.

893. Williamson County. Museum No. 751, marked "Round Rock White Lime Co., Round Rock, Texas." Analyzed 1914 by J. E. S. B. A. 1922.

894. Williamson County, Museum No. 751, marked "Cedar Park, Williamson Co." Analyzed 1914 by J. E. S. B. A. 1925.

895. Williamson County. Museum No. 1633, marked "Two miles south of Cedar Park." Analyzed 1914 by J. E. S. B. A. 1921.

896. Williamson County. From E. Gluck, Cedar Park. Analyzed 1915 by J. E. S. B. A. 2048.

897. Williamson County. Sample from Cedar Park. Analyzed 1913 by S. H. W. B. A. 551.

898. Williamson County. Sample from Round Rock. U. T. B. 365, p. 246.

899. Williamson County. Sample from near Cedar Park, sent in by J. R. King. U. T. B. 365, p. 246.

900. Williamson County. 2 miles north of Cedar Park. Analyzed 1913 by S. H. W. B. A. 831.

901. Williamson County. Limestone from Leander. Analyzed 1913 by S. H. W. B. A. 711.

902. Williamson County. Museum No. 726, marked "Leander, Texas." Analyzed 1914 by J. E. S. B. A. 1919.

903. Williamson County. On Brushy Creek, 1½ miles north of Round Rock, on I. & G. N. Ry. Sample received by Bur. Lab. from T. H. Love, Roadmaster, I. & G. N. Ry. Analyzed 1914 by J. E. S. B. A. 1984. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

904. Williamson County. On land of B. A. Richards, Round Rock, on I. & G. N. Ry. road to Georgetown. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1948. [See footnote.]

905. Williamson County. Along lake, Brushy Creek, about 200 yds. above I. & G. N. Ry. bridge. Sampled by G. A. P. Museum No. 2050. Analyzed 1914 by J. E. S. B. A. 1944. [See footnote.]

906. Williamson County. About ¼ mile from Round Rock and Georgetown spur, I. & G. N. Ry., from land of B. C. Richards. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1949. [See footnote.]

907. Williamson County. Forstman Place, about 1½ miles east of Round Rock on Lake Brushy Creek, 300 yds. southeast of water tank on main line of I. & G. N. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1953. [See footnote.]

908. Uvalde County. Sampled by T. W. Vaughan on Uvalde Quadrangle. Analyzed by W. F. Hillebrand. U. S. G. S. B. 591, p. 232. (For this analysis look under heading "miscellaneous.")

(f) Upper Cretaceous

909. Anderson County. Sample taken at Salt City, 6 miles west of Palestine. White chalky, and fossiliferous, with seams of yellow calcite. U. T. B. 365, p. 56.

910. Bexar County. From Portland Cement Co., about 5 miles north of San Antonio, used for making cement. Analyzed by J. E. S. B. A. 1903.

911. Bexar County. Soft or chalky limestone from near San Antonio. U. S. G. S. B. 522, p. 51.

912.–913. Bexar County. Limestone from Alamo Cement Co.'s quarry, near San Antonio. Analyzed at Lab. of the Alamo Cement Co. U. S. G. S. B. 522, p. 343.

914.–915. Bexar County. From quarry of Alamo Cement Co., San Antonio. Analyzed by R. H. B. and A. J. P. at U. S. G. S. Lab. at St. Louis, Mo. U. S. G. S. B. 522, p. 343.

916.–917. Brewster County. From the Colquitt-Tigner Mine, at Boquillas Flags. U. T. B. 93, p. 30.

918.–919. Dallas County. Sample received from F. J. Shuett, Duncanville. Analyzed 1915 by J. E. S. B. A. 2310 and 2311, respectively. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

920.) Dallas County. From quarry of the Texas Portland Cement
921.) Co., Dallas. U. S. G. S. B. 522, p. 343.

922. Dallas County. Soft or chalky limestone from Dallas. U. S. G. S. B. 522, p. 51.

923. El Paso County. Used by the Southwestern Portland Cement Co., El Paso, Texas. Analyzed by J. E. S. B. A. 1999.

924. Red River County. Sample received from Clarence Hocker, Clarksville. Classed as argillaceous limestone. Marked: "From along public road, Clarksville." Museum No. 2316. Analyzed 1915 by J. E. S. B. A. 2518. [See footnote.]

925. Travis County. Partings from top and middle of 18 ft. ledge near mouth of small creek emptying into south side of Colorado River, ¾ mile below concrete bridge, Austin. U. S. G. S. B. 522, p. 342.

926. Travis County. About 500 yds. above bridge on Onion Creek, on the Austin-Creedmoor road, up the creek. Sampled by G. A. P. Museum No. 2005. Analyzed by E. L. Porch, 1914. B. A. 1860. [See footnote.]

927. Travis County. E. Martin's Quarry on Onion Creek, about 1 mile above bridge on the Austin-Creedmoor road. Sampled by G. A. P. Museum No. 2006. Analyzed 1914 by E. L. P. B. A. 1861. [See footnote.]

928. Travis County. East of and near Austin. Analyzed by S. H. W. B. A. 910.

929.) Travis County. From Big Walnut Creek, 8 miles northeast
930.) of center of Austin, Texas, or ½ to 1½ miles northwest of
931.) Sprinkle. Soft limestone for making cement. Austin chalk
934.) formation U. S. G. S. B. 522, p. 342.

935. Travis County. 9 miles northeast of center of Austin, Texas. U. S. G. S. B. 522, p. 342.

936. Travis County. Lower 18 ft. of ledge, near mouth of small creek emptying into south side of Colorado River, ¾ mile below concrete bridge. U. S. G. S. B. 522, p. 342.

937. Travis County. Top 10 or 12 feet of ledge, same locality as in No. 936. U. S. G. S. B. 522, p. 342.

938. Williamson County. One mile below Jonah, on the San Gabriel River. T. G. S. A. R. III, p. 354.

939. Williamson County. 3 miles southeast of Hutto, on Brushy Creek. T. G. S. A. R. III, p. 352.

940. Williamson County. On Brushy Creek, about 3 miles below Round Rock. T. G. S. A. R. III, p. 351.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

(g) Tertiary

941. Fayette County. Museum No. 2250, marked: "Alabaster." From near O'Quinn. Analyzed 1914 by J. E. S. B. A. 2116. [See footnote.]

942.
943. Fayette County. Three to four miles west of La Grange, on Buckner's Creek, sent in by J. C. Melcher, O'Quinn. Analyzed by J. E. S. U. T. B. 365, p. 123.

(h) Pleistocene

944. Crosby County. Soft white chalky bed of Blanco Pliocene Age. One mile southwest of Mt. Blanco postoffice. Analyzed by J. E. S. B. A. 2253.

945. Deaf Smith County. Sample from Bryant and Huffman, Hereford, Texas. Marked: "Hadden Estate." Museum No. 2298. Analyzed 1915 by J. E. S. B. A. 2483. [See footnote.]

946. Lubbock County. Cap rock lime from State Experimental Farm, 2 miles east of Lubbock. Analyzed 1915 by J. E. S. B. A. 2228.

947. Lubbock County. Cap rock lime from railroad gravel pit at north edge of town of Lubbock. Analyzed 1915 by J. E. S. B. A. 2229.

(i) Unclassified

948. Anderson County. Six miles west of Palestine. Analyzed by J. E. S. 1914. B. A. 1609.

949. Brewster County. From Cedar Springs, east of Nine Point Mountain. Museum No. 702. Analyzed 1914 by J. E. S. B. A. 1680.

950. Burnet County. About ¾ mile north of Sudduth section house on the A. & N. W. Ry. west of the railroad, and up the creek about 450 yds. Sampled by G. A. P. Museum No. 1978. Analyzed 1914 by J. E. S. B. A. 1832. [See footnote.]

951. Burnet County. Backbone Creek, in Lacey's pasture, about ½ mile east of A. & N. W. Ry., where creek cuts through ridge, and about 1¼ miles north of the railroad station at Marble Falls. Sampled by G. A. P. Museum No. 1967. Analyzed 1914 by J. E. S. B. A. 1821. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

952. Burnet County. From cut on A. & N. W. Ry., 1 mile south of Delaware water tank. Sampled by G. A. P. Museum No. 1978. Analyzed 1914 by J. E. S. B. A. 1826. [See footnote.]

953. Burnet County. R. H. Hoover's place, about 400 yds. west of cut on A. & N. W. Ry., and 1 mile south of Delaware watertank. Sampled by G. A. P. Museum No. 1973. Analyzed 1914 by E. L. P. B. A. 1827. [See footnote.]

954. Burnet County. From Ferguson Place, near Fairland. Analyzed by J. E. S. B. A. 1793. [See footnote.]

955. Burnet County. From Wood's Branch, above Wood's Sandstone Quarry, Burnet. Analyzed by J. E. S. B. A. 1791. [See footnote.]

956. Burnet County. From Ferguson County, near Fairland. Analyzed by J. E. S. B. A. 1794. [See footnote.]

957. Burnet County. 1½ miles S. E. of Fairland, and about a mile east of A. & N. W. Ry. A. H. Edwards. Bottom strata. Analyzed by J. E. S. B. A. 1801.

958. Burnet County. From property of Reed Yett. About ¼ mile north of the A. & N. W. Ry., and about 1½ miles east of Fairland. Heavy exposure. Analyzed by J. E. S. B. A. 1808. [See footnote.]

959. Burnet County. R. H. Hoover's place on the Burnet-Marble Falls road. On a hill just north of Hoover's ranch house, about 1 mile west of the A. & N. W. Ry. and about 3½ miles southwest of Burnet. Sampled by G. A. P. Museum No. 1971. Analyzed 1914 by J. E. S. B. A. 1825. [See footnote.]

960. Burnet County. R. H. Hoover's place, about 1 mile up Honey Creek, from crossing on A. & N. W. Ry. and about ¾ mile from the railroad. Sampled by G. A. P. Analyzed 1914 by E. L. P. B. A. 1830. [See footnote.]

961. Burnet County. R. H. Hoover's place, about ½ mile east of A. & N. W. Ry., and about 6 miles east of Fairland, about ¼ mile down Hamilton Creek from pumping station. Sampled by G A. P. Museum No. 1963. Analyzed 1914 by J. E. S. B. A. 1817. [See footnote.]

962. Burnet County. Deposit from white cliff. Analyzed 1901 by O. H. P. T. M. S. A. No. 1313.

963. Burnet County. Right-hand fork of Wood's Branch above Wood's Quarry. Analyzed 1914 by J. E. S. B. A. 1792. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

964.) Burnet County. Hoover's Point. Analyzed 1914 by J. E. S.
965.) B. A. 1495 and 1496 respectively.

966. Burnet County. 1½ miles S. E. of Fairland. Center stratum. Analyzed by J. E. S. B. A. 1802. [See footnote.]

967. Burnet County. 1½ miles S. E. Fairbanks. Top stratum. Analyzed by J. E. S. B. A. 1803. [See footnote.]

968. Burnet County. Reed Yett. ½ mile east of Fairland. Top of hill. Analyzed 1914 by J. E. S. B. A. 1809. [See footnote.]

969. Burnet County. Reed Yett. ½ mile east of Fairland. Center of hill. Analyzed 1914 by J. E. S. B. A. 1807. [See footnote.]

970. Burnet County. Argillaceous limestone from R. H. Hoover's place, about ½ mile east of the A. & N. W. Ry., and about 6 miles east of Fairland, about 150 yds. above pumping station on Hamilton Creek. Sampled by G. A. P. Museum No. 1962. Analyzed 1914 by J. E. S. B. A. 1816. [See footnote.]

971. Burnet County. Hoover's Valley. Lithographic limestone. Museum No. 703. Analyzed 1914 by J. E. S. B. A. 1905.

972. Caldwell County. Siliceous limestone from the West Fork. Analyzed 1914 by J. E. S. B. A. 1610.

973. Coleman County. Gray limestone from Santa Anna. Analyzed 1914 by J. E. S. B. A. 1481.

974. Coleman County. Light red limestone from Santa Anna. Analyzed 1914 by J. E. S. B. A. 1480.

975. Coleman County. Partial analysis. T. M. S. A. No. 3432.

976. Coleman County. Sample from Museum No. 754, marked: 'Santa Anna, Coleman County." Analyzed 1914 by J. E. S. B. A. 1923.

977. Denton County. From property of Jack Pass. Tested for J. S. Niebert, Mayor of Denton, by J. E. Stullken, Chemist for the University Bur. Econ. Geol. Deposit located about 5 miles north of Denton and about 3 miles west of M. K. & T. Ry. Sampled by G. A. P. Analyzed 1914. B. A. 2452. [See footnote.]

978. El Paso County. Museum No. 1325, marked: "Blue limestone. Base of Quitman Mts. east side below Old Republic Mill." Analyzed 1914 by J. E. S. B. A. 1625.

979. El Paso County. Limestone used by the Southwestern Portland Cement Co., of El Paso. U. T. B. 365, p. 116.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

980. Erath County. Received from W. K. Gordon, of Thurber.
981. Analyzed 1914 by J. E. S. B. A. 2143, 2144, and 2145
982. respectively.

983. Erath County. Limestone from Thurber. T. M. S. A. No. 1503.

984. Erath County. Sample from W. K. Gordon, Thurber. Analyzed 1914 by J. E. S. B. A. 2142.

985. Erath County. Sample received from W. K. Gordon, Thurber. Analyzed 1914 by J. E. S. B. A. 2141.

986. Gillespie County. Museum No. 709, marked "North Texas Creek, Gillespie County." Analyzed 1914 by J. E. S. B. A. 1683.

987. Gillespie County. Museum No. 717, marked: "Squaw Creek, Gillespie County." Analyzed 1914 by J. E. S. B. A. 1915.

988. Gillespie County. Museum No. 708, marked "Smith's Mountain, Gillespie County." Analyzed 1914 by J. E. S. B. A. 1914.

989. Gillespie County. Museum No. 711, marked "Pedernales, Gillespie County." Analyzed 1914 by J. E. S B. A. 1913.

990. Gillespie County. Museum No. 712, marked "Pedernales, Gillespie County." Analyzed 1914 by J. E. S. B. A. 1912.

991. Gillespie County. Museum No. 710, marked "North Grass Creek, Gillespie County." Anlayzed 1914 by J. E. S B. A. 1907.

992. Gillespie County. Sample from Willow City. Analyzed 1914 by J. E. S. B. A. 1553.

993. Hays County. About 3 miles west of Buda, on the Buda-Kyle road, about ½ mile west of the I. & G. N. Ry. Exposure light. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2013. [See footnote.]

994. Hays County. About 4 miles S. W. of Buda, on the Buda-Kyle Mountain Road about 1 mile west of the I. & G N. Ry. Exposure good. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2014. [See footnote.]

995. Hays County. About 5½ miles S. W. of Buda, on the Buda-Kyle Mountain Road, about 1 mile west of the I. & G. N. Ry. Exposure heavy. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2015. [See footnote.]

996. Hays County. About 3½ miles S. W. of Kyle on the old government road near gravel pit. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2028. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

997. Hays County. About 3 miles S. W. of Kyle on the old government road, was used on this road. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2029. [See footnote.]

998. Hays County. About 1 mile north of Kyle on the Austin-San Antonio road. Heavy exposure in John Arbour's field, east of and near the I. & G. N. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2030. [See footnote.]

999. Hays County. Eugene Woods. About 1¼ miles north of Kyle on the S. A.-Austin road, about 100 yds. south of road and about one mile east of I. & G. N. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2031. [See footnote.]

1000. Hays County. Plum Creek, about 200 yds. up the creek from the bridge on the San Antonio-Austin road. Deshay Bunton place. Exposure fair. Sampled by G. A. Parkinson. Analyzed 1914 by J. E. S. B. A. 2033. [See footnote.]

1001. Hays County. U. Williams. Exposure heavy. About 2¼ miles south of San Marcos, on the San Antonio-Austin road, 50 yds. west of the I. & G. N. Ry. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2055. [See footnote.]

1002. Hays County. John Benneck. About 1½ miles S. E. of San Marcos, 200 yds. north of San Antonio-Austin Post road, and about ¾ mile N. W. of I. & G. N. Ry. Exposure heavy. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 2056. [See footnote.]

1003. Jefferson County. From cap rock of oil wells, Beaumont. T. M. S. B. 1, p. 27.

1004. Kaufman County. Sample received in August, 1914, from U. S. Office of Public Roads, Washington, D. C., under their No. 7015, marked "Near Chief, Kaufman County." Analyzed 1914 by J. E. S. B. A. 1847.

1005. Limestone County. Gray sample from Tehuacana. Analyzed 1914 by J. E. S. B. A. 1644.

1006. Limestone County. Soft yellow limestone, from Tehuacana. Analyzed 1914 by J. E. S. B. A. 1646.

1007. Limestone County. From Tehuacna. Analyzed 1913 by S. H. W. B. A. 832.

1008. Limestone County. From Tehuacana. Sample received from U. S. office of Public Roads, Washington, D. C., under their No. 7224, from Tehuacana. Muesum No. 1925. Analyzed 1914 by J. E. S. B. A. 1848.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

1009. McLennan County. From T. S. White, R. F. D. No. 8, Waco Texas. Marked "From locality 9 miles north of Waco." Analyzed 1915 by J. E. S. B. A. 2514.

1010. McLennan County. Blue limestone from cistern on Bosque farm, 4 miles west of Waco. T. M. S. A. No. 1480.

1011. McLennan County. From Mill's crossing road, 4½ miles from Waco. T. M. S. A. 1479.

1012. Navarro County. Bluish limestone, sample from McCall-Moore Engineering Co., Waco. Marked: "Bluish limestone, about 10 miles S. E. of Corsicana, near Richland, on McDaniell farm." Analyzed 1914 by J. E. S. B. A. 1642.

1013. Palo Pinto County. Sample received from W. K. Gordon, Thurber, Texas. Marked "From Mingus, Texas." Analyzed 1915 by J. E. S. B. A. 2515.

1014. Presidio County. From Shafter District. Museum No. 1327. Analyzed 1914 by J. E. S. B. A. 1688.

1015. Smith County. From Brooks Saline, in S. W. part of county. Analyzed 1812 by S. H. W. B. A. 198.

1016. Smith County. Southeast side of Brooks Saline, in southwestern part of county. Analyzed 1912 by S. H. W. B. A. 199.

1017. Travis County. Bear Creek, a short distance above junction with Onion Creek, ½ mile east of I. & G. N. Ry., and about 1 mile east of Manchaca. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1841. [See footnote.]

1018. Travis County. About 5 miles west of Austin, and about ¾ mile west of the I. & G. N. Ry., on the Dripping Springs road. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1839. [See footnote.]

1019. Travis County. Heavy exposure in cut of I. & G. N. Ry., about 3½ miles S. W. of Austin. Sampled by G. A. P. and J. P. Nash. Analyzed 1915 by J. E. S. B. A. 2457. [See footnote.]

1020. Travis County. On Austin-Manchaca road, about ¼ mile west of I. G. N. Ry., about 1¼ miles north of Manachaca, just above Slaughter Creek. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1844. [See footnote.]

1021. Travis County. On Slaughter Creek, 1 mile north of Manchaca and about ¼ mile west of I. & G. N. Ry. Sampled by G. A. P. Anal. 1914 by J. E. S. B. A. 1843. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

1022. Travis County. About 6 miles from Austin on upper Manchaca road, near old Oak Hill railway switch. Sampled by G. A. P. Museum No. 2041. Analyzed 1914 by J. E. S. B. A. 1933. [See footnote.]

1029. Travis County. About ¾ miles west of Manchaca, on Bear Creek. Sampled by G. A. P. Museum No. 2043. Analyzed 1914 by J. E. S. B. A. 1935. [See footnote.]

1024. Travis County. Will Birkner's place, on the upper Austin-Buda road, about 12 miles from Austin, and 1 mile west of the I. & G. N. Ry. Museum No. 2046. Analyzed 1914 by J. E. S. B. A. 1937. [See footnote.]

1025. Travis County. About 1 mile north of Watters Park on the A. & N. W. Ry., Georgetown road. Sampled by G. A. P. Museum No. 2046. Analyzed by J. E. S. B. A. 1940. [See footnote.]

1026. Travis County. 1½ miles north of Watters Park and about 100 yds. west of the A. & N. W. Ry. Sampled by G. A P. Museum No. 2047. Analyzed 1914 by J. E. S. B. A. 1941. [See footnote.]

1027. Travis County. Hamilton place, 8 miles N. W. of Austin, on Burnet road. About 500 yds. west of I. & G. N. Ry. Analyzed by E. L. Porch. B. A. 1959. [See footnote.]

1028. Travis County. Hamilton place, 8 miles N. W. of Austin, on Burnet road. About 1,000 yds. west of I. & G. N. Ry. Heavy exposure. Analyzed 1914 by E. L. Porch, Jr. B. A. 1961. [See footnote.]

1029. Travis County. E. F. Elliott. About 8½ miles N. W. from Austin, about 300 yds. west of the I. & G. N. Ry. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1962. [See footnote.]

1030. Travis County. Frank Cheatham. About 9 miles N. W. from Austin and about 300 yds. west of the I. & G. N. Ry. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1963. [See footnote.]

1031. Travis County. Bird Ranch. About 10 miles N. W. from Austin, and about 200 yds. west of the I. & G. N. Ry. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1964. [See footnote.]

1032. Travis County. About ½ mile south of Duval section house on the I. & G. N. Ry., and about 12 miles N. W. of Austin. Heavy exposure on both sides of track. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1965. [See footnote.]

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

1033. Travis County. From ⅛ to ¼ mile south of Duval section house I. & G. N. Ry., and about 12 miles N. W. from Austin. 5 ft. cut. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1966. [See footnote.]

1034. Travis County. On Walnut Creek, N. E. of Duval section-house, I. & G. N. Ry. and about 12 miles N. W. of Austin. Heavy exposure about 150 yds. west of railroad. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1968. [See footnote.]

1035. Travis County. J. D. Cahill. About ¾ mile south of McNeill station. I & G. N. Ry. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1969. [See footnote.]

1036. Travis County. Payton Place. About 7¾ miles N. W. of Austin, and about 500 yds. west of the I. & G. N. Ry. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1970. [See footnote.]

1037. Travis County. Wilson place. About 7 miles N. W. of Austin, and 200 yds. west of the I. & G. N. Ry. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1971. [See footnote.]

1038. Travis County. About 5½ miles N. W. of Austin, on the Spicewood Springs road. Sampled by G. A. P. and analyzed 1914 by J. E. S. B. A. 1972. [See footnote.]

1039. Travis County. From ravine west of I. & G. N. Ry. and north of street car line to dam, near Austin. Good exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1973. [See footnote.]

1040. Travis County. Pease Park on east side of road, Austin. Light exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1975. [See footnote.]

1041. Travis County. Continuation of Pease Park road to the north, on west side of Shoal Creek. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1976. [See footnote.]

1042. Travis County. Continuation to the north of exposure on west side of Shoal Creek, near Pease Park road, Austin. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1977. [See footnote.]

1043. Travis County. From W. E. McNeese place, about 4 miles south of Round Rock, on the Georgetown-Round Rock road, about 1 mile east of A. & N. W. Ry. Sampled by G. A. P.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

Museum No. 2049. Analyzed 1914 by J. E. S. B. A. 1943. [See footnote.]

1044. Travis County. About 8 miles south of Austin on the Manchaca road. Sampled by G. A. P. Museum No. 2042. Analyzed 1914 by J. E. S. B. A. 1934. [See footnote.]

1045. Williamson County. From G. A. Burkman's place, about ½ mile south and east of I. & G. N. Ry., and ¾ mile southeast of Round Rock. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1946. [See footnote.]

1046. Williamson County. From 1 to 1½ miles south of Round Rock, on main line I. & G. N. Ry. and McNeill wagon road. Heavy surface exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1950. [See footnote.]

1047. Williamson County. On George John's ranch, about 3 miles S. W. of Round Rock near main line I. & G. N. Ry. Heavy exposure in pasture. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1951. [See footnote.]

1048. Williamson County. On right of way of I. & G. N. Ry., quarry 1 mile north of McNeill, but in Williamson County. Light exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1952. [See footnote.]

1049. Williamson County. Forstman place, about 1½ miles east of Round Rock, on Lake Brushy Creek, and about 300 yds. S. E. of watertank on I. & G. N. Ry. main line. Lower stratum. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by E. L. Porch. B. A. 1954. [See footnote]

1050. Williamson County. Otto Granzert—W. J. Fouse pit. About 2 miles east of Round Rock on I. & G. N. Ry., main line. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by E. L. Porch, Jr. B. A. 1955. [See footnote.]

1051. Williamson County. Merrill property. About 1½ miles east of Round Rock, about 300 yds. west of I. & G. N. Ry. main line. Near Fouse's pit. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by E. L. Porch, Jr. B. A. 1957. [See footnote.]

1052. Wise County. Sample received from Gouswitz, Ft. Worth and Denver City Ry., marked "From Alvord, Wise County." Analyzed 1915 by J. E. S. B. A. 2170. [See footnote.]

1053. Wise County. 3½ miles south of Chico. Analyzed 1914 by J. E. S. B. A. 1448.

1054. Wise County. Sample from Chico, Texas. Analyzed 1914 by J. E. S. B. A. 1532.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

1055. Wise County. Sample from Bridgeport. Analyzed 1912 by S. H. W. B. A. 285.

1056. Wise County. Sample of limestone from Bridgeport. Analyzed 1912 by S. H. W. B. A. 284.

1057. Wise County. Sample from Bridgeport. Analyzed 1912 by S. H. W. B. A. 283.

1058. Wise County. Sample from Bridgeport. Analyzed 1912 by S. H. W. B. A. 285.

1059. Wise County. Sample Chico Crushed Stone Co., Chico. Tested by the U. S. Office of Public Roads, Washington, D. C., under their number 1927. Univ. Mus. No. 6684. Analyzed 1914 by E. L. Porch, Jr. B. A. 1850.

1060. Wise County. Sample from Chico Crushed Stone Co., Chico. U. T. B. 365, p. 252.

1061. Wise County. Exact locality of sample not stated. Tested as road material by the U. S. Office of Public Roads, Washington, D. C., under their No. 7242. Univ. Mus. No. 1928. Analyzed by E. L. P. B. A. 1851.

VII. DOLOMITE

NOTE ON CMPOSITION, PROPERTIES, AND OCCURRENCE.—Dolomite is a double carbonate of calcium and magnesium, which contains, in its typical form, 54.34% of calcium carbonate and 45.66% of magnesium carbonate. It occurs not only as a mineral, but as a rock, and since the two carbonates are isomorphous, the proportion of magnesium carbonate may be much less than 45.66%, so that many dolomites are merely magnesium limestones.

If magnesian limestones are calcined below red heat, only the magnesium carbonate is decomposed while the calcium carbonate remains unchanged. On slacking the product, the caustic magnesia forms a hydrate, which acts as a binder to the calcium carbonate, and the mass behaves like a hydraulic cement which is particularly resistant to the action of water.

Magnesian limestones which contain some argillaceous matter (clay) have been burned successfully to hydraulic cement.

Dolomite is used extensively to make Epsom salts, and to make the *basic* lining for the Thomas and Gilchrist method of making steel.

Dolomite and dolomitic limestones occur chiefly in the Cambrian, Ordovician and Permian rocks of this State. The Cam-

brian and Ordovician contain both limestones and dolomites. The dolomites occur mostly in the lower part of the Ellenburger formation in the Central Mineral Region. This is a compact and hard rock which is probably our best limestone for road construction and for crushed rock in concrete. The Montoya limestone of the Ordovician and the Fusselman limestone of the Silurian are likewise dolomites, or at least are more or less dolomitic. In the Ord, the Glass and the Delaware Mountains and on the plains east of the Llano Estacado, we have great beds of Permian dolomites. Some of these limestones measure several hundred feet in thickness in the Glass Mountains. Dolomites are rare in formations of other ages. A few layers in the Georgetown limestone of the Comanchean contain from 5 to 15 or 16 per cent of magnesia. These occur in Williamson and Travis Counties and in several counties farther to the west.

Anal. No.

1062. Burnet County. Mus. No. 1319. Marked "Five miles south of Bertram." Analyzed 1914 by J. E. S. B. A. 1673.

1063. Burnet County. Mus. No. 1324, marked "Spring Creek, Burnet County." Analyzed 1914 by J. E. S. B. A. 1622.

1064. Burnet County. Heavy exposure on land of Reed Yett, about half a mile south of A. & N. W. Ry., and about 1¾ miles S. E. of Fairland. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1805. [See footnote.]

1065. Burnet County. Reed Yett. About 200 yds. south of Fairland, east of Reed Yett's ranch house, very heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1810. [See footnote.]

1066. Burnet County. Reed Yett. About ¼ mile east of A. & N W. Ry., and about 5 miles N. E. of Fairland. On Honey Creek, below bridge. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1812. [See footnote.]

1067. Burnet County. Reed Yett. About ½ mile east of A. & N. W. Ry., and about 5 miles east of Fairland. Below bridge on Honey Creek. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1814. [See footnote.]

1068. Burnet County. R. H. Hoover. About a mile east of A. & N. W. Ry., and about 6 miles east of Fairland, about ¾ mile down Hamilton Creek from pumping station, east side

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

of creek. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1818. [See footnote.]

1069. Burnet County. R. H. Hoover. Immediately on track of A. & N. W. Ry., west side of Delaware Creek, and about 6 miles east of Fairland. Heavy exposure. Sampled by G. A. P. Analyzed by J. E. S. B. A. 1819. [See footnote.]

1070. Burnet County. Bryant Ranch. About ¾ mile down Hamilton Creek below Holland Spring, at the point where the Holland Branch empties into Hamilton Creek. About ¾ mile east of A. & N. W. Ry., and about 3 miles south of Burnet. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1824. [See footnote.]

1071. Burnet County. Reed Yett. About ½ mile up Honey Creek from A. & N. W. Ry. bridge. About ¼ mile west of track, and about 5 miles east of Fairland. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1828. [See footnote.]

1072. Burnet County. Reed Yett. About ¾ mile up Honey Creek from crossing of the A. & N. W. Ry. and about ¼ mile west of the track. About 5 miles east of Fairland. Heavy exposure. Sampled by G. A. P. Analyzed 1914 by J. E. S. B. A. 1829. [See footnote.]

1073. Burnet County. Dave Holland's place. About a mile south of the A. & N. W. Ry. and about 1¾ miles S. E. of Fairland. Heavy exposure. U. T. B. 365, p. 84.

1074.
1075. } El Paso County. Dolomite samples from A. Courchesne, El Paso, Texas. Analyzed by S. H. W. B. A. 663, 664 and 665, respectively.
1076.

1077. Gillespie County. Magnesian limestone from Willow City. U. T. B. 365, p. 128.

1078. Gillespie County. From Bell Mt. Analyzed 1914 by J. E. S. B. A. 1681.

1079. Gillespie County. From Crab Apple Creek. Analyzed 1914 by J. E. S. B. A. 1682.

1080. Gillespie County. From Grape Creek. Analyzed 1914 by J. E. S. B. A. 1689.

1081. Gillespie County. From Huson Mountain. Analyzed 1914 by J. E. S. B. A. 1906.

1082. Gillespie County. From Nebo Mt. Analyzed 1914 by J. E. S. B. A. 1910.

1083. San Saba County. Museum No. 721, marked "Cherokee Creek, San Saba County." Analyzed 1914 by J. E. S. B. A. 1620.

Foot Note: Physical tests—hardness, toughness, etc.—have been made on this sample and are found under the same B. A. Number in University of Texas Bulletin 62 on Road Material of Texas.

1084. Tom Green County. Mus. No. 698, marked "Ben Ficklin, Tom Green County." Analyzed 1914 by J. E. S. B. A. 1658.

1085. Travis County. Exact location can be ascertained from original source. Analyzed by S. H. W. T. M. S. A. No. 1247.

1086.) Travis County. Analyzed by O. H. Palm. Partial. T. M.
1087.) S. A. Nos. 3434 and 3435, respectively.

1088. Williamson County. Sample received from W. L. Vining, Austin, marked "D. McRae, Cedar Park, Williamson County." Analyzed 1913 by S. H. W. B. A. 553.

1089. Williamson County. Sample received from J. R. King, Austin, March, 1913, from near Cedar Park. Analyzed 1913 by S. H. W. B. A. 623.

1090. Williamson County. Sample received from J. R. King, Austin, marked "A mixture of five samples representing seven feet of material about 2 miles south of Cedar Park." Analyzed 1913 by S. H. W. B. A. 830.

VIII. KAOLIN

INTRODUCTORY NOTE.—Kaolin is essentially a hydrated aluminum silicate. In its purest form it contains 46.5% silica, 39.5% alumina, 14% water.

As kaolin, we have classified certain deposits of mostly white clays, rich in alumina. They are in some cases to be strictly separated from higher grades of ordinary or potters' clay, as in the case of the kaolin from Real County. This deposit is believed to be a result of chemical precipitation. In the case of the other kaolins, the name is merely an indication of fine plastic qualities and suitability for use in the manufacture of pottery ware. See Note on clay, shale, and marl.

Anal. No.

1091. Culberson County. Sample from Dr. J. A. Udden, marked "The Conder Cut Plateau No. 3, about 3 miles west of Boracho." Analyzed 1913 by S. H. W. B. A. 960.

1092. Edwards County. Cleaned and ground kaolin from the mill at Godbald's house, near Leaky. Analyzed 1913 by J. E. S. B. A. 584.

1093. Edwards County. Analyzed 1890 by Dr. Everhardt of the University of Texas. T. G. S. A. R. II, p. LI.

1094. Edwards County. Ground but not cleaned kaolin from mill at Godbald's house near Leaky. Analyzed 1913 by J. E. S. B. A. 585.

1095. Uvalde County. From Thornton's ranch 15 miles north of Uvalde, from hole alongside creek in Arroyo. Sampled by E. L. P., Jr. Analyzed 1914 by S. H. W. B. A. 1440.

1096. Uvalde County. Fifteen miles north of Sabinal on the Big Blanco Creek. Sample received by Univ. Bur. Ec. Geol. from Russell Myrick, San Antonio. Analyzed 1914 by J. E. S. B. A. 1268.

IX. SALT

NOTE ON OCCURRENCE.—Few complete analyses of salt have been made which show true composition of the salt as it occurs in natural deposits. Our great salt deposits are in the Llano Estacado and in the Panhandle. In the Permian sediments of this part of the State all ratios of mixtures exist, from salt-bearing sand to sand-bearing salt. Most analyses made bear on the relation of potash salts to the common salt, but all of these have been presented under the heading of Potash (Nos. 3099-3122.)

Anal. No.

1096a. Culberson County. From a lake north of Van Horn. Sent by J. A. Martin, Jr., Toyah. Analyzed 1918 by T. W. Ray. No. C637.

1097. El Paso County. Common salt from El Capitan Peak. Analyzed by S. H. W. T. M. S. B. 9, p. 63.

1098. El Paso County. From Salt Draw. Analyzed 1904 by S. H. W. T. M. S. A. No. 2739.

1099. Pecos County. North of Van Horn, 15 miles S. W. of El Capitan, and west of Salt Basin. Analyzed by S. H. W. T. M. S. B. 9, p. 62.

1100. Smith County. Salt from Tyler. T. M. S. A. No. 1431.

X. ANHYDRITE

INTRODUCTORY NOTE.—Anhydrite is a crystallized calcium sulphate without water of crystallization, and differs from gypsum only in the fact that the latter contains water according to the formula, $CaSO_4$, $2H_2O$.

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Anhydrite occurs as a primary deposit associated with the salt beds in the Permian beds of the Llano Estacado. It occurs

secondarily in the salt domes of the coast and in the salines of Northeast Texas. The analyses presented represent a body of anhydrite present in a dome-like structure near Brenham. Anhydrite has not been found exposed. Our anhydrite beds have evidently been changed by hydration to gypsum in the western part of the State, to the depth of several hundred feet.

Anal. No.

1101. Washington County. Sample of anhydrite from well No. 4, Brenham Oil Co., Brenham. Depth 1366 feet. Analyzed 1916 by J. E. S. B. A. 2937.

XI. NOVACULITE

NOTE ON COMPOSITION, USE, AND OCCURRENCE.—This is a fine grained, siliceous compact rock used for oil stones for sharpening delicate instruments and edged tools. Arkansas has been the main commercial source of this stone in the United States.

Some heavy flint beds occurring in the Paleozoic rocks of the Marathon region probably have the same origin as the novaculite in Arkansas. They are pure siliceous beds which yet contain preserved entire tests of radiolarians, from which apparently the entire deposits have been formed in the seas in which they were originally laid down.

Anal. No.

1102.
1103.
1104.
1105. Brewster County. Four samples of novaculite from one mile south of Haymond. Received from C. L. Baker. Analyzed 1915 by J. E. S. B. A. 2751, 2752, 2753 and 2754, respectively.

XI. PHOSPHATIC ROCKS

NOTE ON OCCURRENCE.—No workable deposits of phosphatic rocks have so far been found in this State. In the Ordovician limestones of the Marathon region some layers containing small fossil cyclora have been found to contain a considerable ingredient of phosphate of lime. Some shelly marls in the Tertiary have shown a few percent of phosphatic material. Phosphate occurs in small amount in the Wichita beds of the Permian, where it evidently has been derived from the attrition of the

skeletal parts of fishes and amphibians. Some greensands also carry a little phosphate in the Tertiary and in the Cretaceous rocks.

Anal. No.

1106. Bexar County. Small phosphatic pebbles, received from F. R. Newton, San Antonio, marked "Picked up on surface at deposit of phosphatic greensand on Leon Creek, about 1½ mile south of bridge on Castroville road." Analized 1914 by J. E. S. B. A. 2006.

1107. Brewster County. Phosphate rock near Agua Fria. Analyzed 1902 by S. H. W. T. M. S. A. No. 1914.

1108.–1109. Brewster County. Partial analyses for phosphorus pentoxide. 16 miles from Marathon. T. M. S. A. No. 3222 and 3223, respectively.

1110. to 1120. Bexar County. Seven miles west of San Antonio on Leon Creek. Sampled by W. B. Phillips. Analyzed 1902 by O. H. Palm of the University of Texas Mineral Survey. T. M. S. A. No. 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, respectively. Partial analyses for phosphorus pentoxide and bone phosphate. Samples taken at intervals of 1 foot to a depth of ten feet. No. 1569 consists of limestone below white nodules and above dark green rock.

XIII. ASPHALT ROCK

NOTE ON OCCURRENCE.—Rock impregnated with asphalt occurs chiefly in two horizons in this State. Asphalt is found in sandstones and limestones of the Comanchean in Cooke and Burnet Counties. In Uvalde County it occurs in the Anacacho limestone, which in some localities is very porous, being essentially a shell breccia in which the porosities have been filled with asphalt. Asphalt has also been found impregnating Eocene Tertiary sandstones as in Anderson County. Sea-wax is a substance found on the Gulf beach, evidently a residue from evaporated oil on the waters of the Gulf, drifted by the winds to the shore. It is from white to black in color and may be either chiefly asphalt or chiefly a paraffin-like substance.

Anal. No.

1121. Anderson County. Asphalt rock from Chepal Well. Analyzed by O. H. Palm and S. H. W. T. M. S. B. 3, p. 87.

1122. Anderson County. From Hassell's Well. Analyzed by O. H. P. and S. H. W. T. M. S. B. 3, p. 87.

1123. Anderson County. From Brule's Hole. Analyzed by O. H. P. and S. H. W. T. M. S. B. 3, p. 87.

1124. Burnet County. From Port Mountain, 1½ miles west of Burnet. Sundried for several years. Analyzed by O. H. P. T. M. S. A. No. 1061.

1125. Burnet County. From Post Mt. 1½ miles west of Burnet. Analyzed by O. H. P. T. M. S. A. No. 1066.

1126. Burnet County. Marked "Burnet County, No. 3" and sent in to the Lab. of the Univ. of Tex. Min. Survey by J. D. McDowell of Austin. Analyzed 1901 by O. H. P. T. M. S. A. No. 1113.

1127. Cooke County. From land of Thos. Hoover, 6½ miles east of south of St. Jo. The Muenster Field. T. M. S. A. 3, p. 82-83.

1128. Cooke County. Same locality as No. 1127, sample analyzed before heating.

1129. Cooke County. Same locality, sample analyzed after heating.

1130. Cooke County. From land of Widow Patton, near Thos. Hoover, the asphalt bed exposed in bed of small stream. (Before heating.) Analyzed 1901. T. M. S. B. 3, p. 83.

1131. Cooke County. Same locality as No. 1130, but analysis was made after heating.

1132. Cooke County. From Roemer's 1½ miles west of Muenster. (Before heating.)

1133. Cooke County. Same as No. 1132, but anlysis was made after heating.

1134. Jasper County. From old tar well near Rockland. Analyzed by O. H. Palm 1904. J. W. S. E., Dec. 1904, p. 585.

1135. Jefferson County. Sample of sea-wax, obtained on coast of County, from beach due north of oil pond. Analyzed by Dr. A. L. Metz of Tulane Univ. T. M. S. B. 1, p. 23.

1136. Montague County. Asphaltic sandstone sample submitted to Min. Surv. Lab. by A. L. Scott. Sampled at Owens' place, 2 miles north of St. Jo, 1½ miles south of Sampson Ridge. T. M. S. B. 3, p. 82.

1137. Montague County. From R. F. Sampson's ranch, sample sent in by A. L. Scott of St. Jo. Analyzed by O. H. P. T. M. S. A. No. 1111.

1138. Montague County. From W. J. Ray's ranch. Sample sent in by A. L. Scott of St. Jo. Analyzed 1901 by O. H. P. T. M. S. A. No. 1112.

1139. Montague County. From the limestone boulder in the asphalt rock at the north point of Sampson's Ridge, 3½ miles N. E. of St. Jo. Called "Limestone asphalt." Analyzed 1901 by O. H. P. T. M. S. A. No. 1197.

1140. Montague County. From north point of Sampson Ridge, 3½

miles east of north of St. Jo, first foot from the bottom. T. M. S. B. 3, p. 81.

1141. Montague County. Same locality, second foot from the bottom. See under No. 1140.

1142. Montague County. Same locality as No. 1140, taken at depth of 2 ft. 8 in.

1143. Uvalde County. Sample from deposit near Cline, Texas, sent to Lab. of U. T. Min. Surv. by Uvalde Asphalt Co., Carbonville. Marked "Powdered Asphalt rock." Analyzed 1902 by O. H. P. T. M. S. A. No. 1600.

1144. Uvalde County. W. P. May's ranch at Waxy Falls on Nueces River, 12 miles west of south from Uvalde. "Carboniferous bituminous sandstone." U. T. B. 365, p. 235.

1145. Uvalde County. Sand asphalt, May's ranch, middle bed. Analyzed by O. H. P. 1901. T. M. S. A. File 5-A.

1146. Uvalde County. Mottled rock from Smyth-Nunn ranch, Carbonville. Sent in by the Parker-Washington Co., San Antonio. Analyzed 1901 by O. H. P. T. M. S. A. File 5-A.

1147. Uvalde County. Sand asphalt, May's ranch, lower bed. Analyzed 1901 by O. H. P. T. M. S. A. File No. 5-A.

1148. Uvalde County. Uvalde County Asphalt Co.'s rock. Analyzed 1901 by O. H. P. T. M. S. A. File No. 5-A.

1149. Uvalde County. Sample of close-grained asphalt rock, resembling No. 1145, from Smyth-Nunn ranch, Carbonville. Sent in by Parker-Washington Co., of San Antonio. Analyzed 1901 by O. H. P. T. M. S. A. File 5-A.

1150. Uvalde County. Asphalt rock, bituminous limestone, near Carbonville. 20 feet thick, overlaid by 2-4 feet of limestone. Easily accessible by Southern Pacific Ry. J. W. S. E. Dec., 1914, p. 585.

1151. Wise County. Bituminous rock from Decatur. Analyzed by J. E. S. B. A. 2448.

B. IGNEOUS ROCKS

INTRODUCTORY NOTE.—Igneous rocks occur mostly in the Trans-Pecos country in this State. These are of late Cretaceous and early Tertiary age. They are prevailingly of the acidic type. Some ancient volcanic rocks are exposed in the Central Mineral Region, where they occur as intrusives in pre-Cambrian schists and gneisses. Igneous rocks occur also in the Balcones Escarpment in a belt extending from Dallas to San Antonio and from San Antonio to Del Rio.

The samples marked "sent by Baker" were collected by

Messrs. C. L. Baker and W. F. Bowman in a region described in University of Texas Bulletin 1753, and the sources of these samples have been designated here by giving their latitudes and longitudes on the "Geological Map of a Part of the Front Range in Trans-Pecos Texas",—which is a part of Bulletin 1753. The lithological characters of the samples were obtained from private memoranda of Mr. Bowman.

A number of the analyses given below were obtained from U. S. G. S. Bulletin 591, and since the minerological examination of these samples was particularly extensive, the descriptions of these are reproduced here in full.

Anal. No.

1161. Brewster County. Basaltic lava. Found at Lat. 29° 39′ N., Long. 102° 57′ W. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C332.

1162. Brewster County. Basaltic lava. Found at Lat. 29° 45′ N., Long. 102° 55′ W. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C334.

1163. Brewster County. Basaltic lava. Found at Lat. 29° 46′ N., Long. 102° 55′ W. Sent by Baker. Analyzed 1916 by J. E. S. B. A. No. C338.

1164. Brewster County. Basaltic lava. Foot of hill at Lat. 29° 48′ N., Long. 102° 58′ W. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C357.

1165. Brewster County. Basaltic lava. Found at Lat. 29° 47′ N., Long. 102° 52′ W. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C323.

1166. Brewster County. Basaltic lava. Found at Lat. 29° 48′ N., Long. 102° 58′ W. Sent by Baker. Analyzed 1917 J. E. S. B. A. No. C339.

1168. Brewster County. Basaltic lava. Found at Lat. 29° 46′ N., Long. 102° 58′ W. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C354.

1171. Brewster County. Basaltic lava. Found at Lat. 29° 49′ N., Long 102° 56′ West. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C355.

1173. Brewster County. N. end of basalt-flow between northern Sierra del Carmen and Canyon of Maravillas Creek. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C359.

1176. Brewster County. Basaltic lava flow. Found at Lat. 19° 45′ N., Long. 102° 52′ W. Sent by Baker. Analyzed by J. E. S. 1916. B. A. No. C340.

1178. Brewster County. Chisos Tuffs. From exposures in the

hills south of Ward's Spring near the Chisos Mountains. Analyzed by O. H. P. U. T. B. p. 62.

1180. Brewster County. Intrusive Syenite. Found at Lat. 29° 50′ N., Long. 103° 2′ W. Sent by Baker. Analyzed 1916.

1181. Brewster County. Intrusive Syenite. Found at Lat. 29° 50′ N., Long. 103° W. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C336.

1182. Brewster County. Basaltic lava. Found at Lat. 29° 48′ N., Long. 102° 59′ W Sent by Baker. Analyzed by L. A. M. and W. A. F. B. A. No. C339.

1183. Brewster County. Intrusive Syenite. Found at Lat. 29° 50′ N., Long. 102° 49′ W. Sent by Baker. Analyzed 1916 by J. E. S. B. A. No. 337.

1185. Brewster County. Basaltic Lava Flow. Lat. 29° 47′ N., Long. 102° 52′ W. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C341.

1186. Brewster County. Intrusive from Elephant Mountain. Lat. 30° 1′ N., Long. 103° 32′ W. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C322.

1187. Brewster County. Intrusive Syenite 2½ miles west of Capt James Ranch, Alpine Sheet. Lat. 30° 18′ N., Long. 103° 31′ W. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C325.

1188. Brewster County. Intrusive Syenite. Found at Lat 29° 52′ N., Long. 103° 13′ W. Sent by Baker. Analyzed 1916 by J. E. S. B. A. No. C349.

1189. Brewster County. Sample undertermined. From Broad flat between Santiago Range and Henderson's Ranch. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C351.

1190. Brewster County. Peconite. From Paisano Peak. Lat. 30° 18′ N., Long. 103° 46′ W. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C353.

1191. Brewster County. Intrusive Syenite. From Santiago Peak. Lat. 29° 51′ N., Long. 103° 26′ W. Sent by Baker. Analyzed 1916 by J. E. S. B. A. No. C348.

1192. Brewster County. Sample undetermined. From Chalk Valley, Alpine Sheet. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C358.

1193. Brewster County. Pulaskite, Santiago Mountain. **Nordmarkose.** Consists of alkali feldspars, with subordinate aegirite, aegirite-auguite, riebeckite, magnetite, and rare lovenite. Sp. gr., 2.581, 25.5°.

1194. Brewster County. Extrusive igneous. From "Just south of S. P. rightof-way, ½ mile east of Strobel Switch, Alpine Sheet". Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C335.

1196. Brewster County. Sample undertermined. Between summit of Santiago Range and Santiago Peak. Sent by Baker. Analyzed by J. E. S. B. A. No. C356.

1198. Brewster County. Sample undetermined. From 3 miles west of Capt James' Ranch, Alpine Sheet. Lat. 30° 18′ N., Long. 103° 31′ W. Sent by Baker. Analyzed 1916 by J. E. S. B. A. No. C344.

1199. Brewster County. Sample undetermined. From 2½ miles S. E. of Horse Mountain. Lat. 30° 2′ N., Long. 103° 8′ W. Sent by Baker. Analyzed by J. E. S. B. A. No. C346.

1201. Brewster County. Syenite porphyry, Iron Mountain, near Marathon. **Nordmarkose.** Contains many oligoclase-albite phenocrysts in a groundmass of alkali feldspar, with very little quartz. Titanite, apatite, and magnetite are present in small amounts. Sp. gr., 2.577, 15.5°.

1202. Brewster County. Intrusive rock. From N. W. side of Altruda Mts., Alpine Sheet. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C350.

1203. Brewster County. Grorudite, about 2 miles of the summit of Chisos Mountain. **Grorudosepantellerose.** Contains alkali feldspars and subordinate quartz, with riebeckite and aegirite in irregular interstitial patches. Sp. gr., 2.648, 15.5°.

1210. Brewster County. Rhyolite. From Madera Canyon. Sent by Baker. Analyzed 1916 by J. E. S. B. A. No. C342.

1218. Brewster County. Rhyolite, west of Paisano Mountain, Alpine quadrangle. **Liparose.** Contains alkali feldspars, quartz arfvedsonite, and aegirite. Sp. gr. 2.635, 15.5°.

1219. Brewster County. Rhyolite, north summit of Chisos Mountain. **Liparose.** Consists chiefly of alkali feldspars and quartz, with riebeckite and a little magnetite. Sp. gr. 2.611, 15.5°.

1221. Brewster County. Sample undetermined. Just north of Dog Canyon and just east of junction of Dog Canyon with Maravillas. Sent by Baker. Analyzed 1916 by J. E. S. B. A. No. C347.

1222. Brewster County. Rhyolite, summit of Chisos Mountain, Big Bend of the Rio Grande. **Liparose near alaskose.** Pink porphyry. Rich in alkali feldspars and quartz, with very little riebeckite and barkevikite (?). Sp. gr., 2.602, 15.5°.

1226. Brewster County. Lava. From 3 miles north of Elephant Mountain. Lat. 30° 1′ N., Long. 103° 31′ W. Sent by Baker. Analyzed by J. E. S. B. A. No. C343.

1216. Burnet County. Coarse red granite. From old Hoover Quarry, east side of Colorado River. Used in Tarrant

County Courthouse. Sampled by W. B. Phillips and G. A. P. Aug., 1914. Analyzed by J. E. S. B. A. 1800.

1227. Burnet County. Schist. From 6 miles S. W. of Burnet. Analyzed 1904 by O. H. P. U. of T. M. S. No. 2833.

1228. Burnet County. Schist. From 6 miles N. W. of Burnet Analyzed 1904 by O. H. P. U. of T. M. S. No. 2882.

1197. El Paso County. Andesite Porphyry from south end of main outcrop of rock in the city of El Paso. Analyzed by E. C. Sullivan. U. S. G. S. Folio 166 p. 7.

1200. El Paso County. Syenite porphyry, Hueco Tanks, **Phlegrose near nordmarkose.** Collected and described by G. B. Richardson. Contains orthoclase, albite, oligoclase, biotite, augite, quartz, ilmenite, magnetite, and apatite. Analysis by G. Steiger, record No. 2162. P. R. C. 1667.

1201. El Paso County. Syenite Porphyry. From Hueco Tanks. Collected by G. B. Richardson. U. S. G. S. B. 591, p. 60.

1214. El Paso County. Granite. From one of the ten prospects 12 miles north of El Paso. Analyzed by E. C. Sullivan. U. S. G. S. folio No. 166, p. 7.

1223. El Paso County. Phyolite Porphyry. From central part of the summit of Franklin Mountains. El Paso Quadrangle. Analyzed by E. C. Sullivan. U. S. G. S. Folio 166, p. 6.

1211. Fayette County. Volcanic dust from near Lena. U. of T. Bulletin 102, p. 277. Analyzed by O. H. P. and S. H. W.

1172. Jeff Davis County. Fine grained intrusive (?). From three small knobs surrounded by Valley Alluvium, 3 miles S. E. of entrance of Musquez Canyon and 1 mile south of Brewster, Jeff Davis County. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C324.

1175. Jeff Davxis County. Lava, earliest of flows at N. W. Syncline of volcano near N. W. margin of Ft. Davis. Sent by Baker. Analyzed by J. E. S. 1917, B. A. No. C345.

1184. Jeff Davis County. Syenite. From Sawtooth Mountain Lat. 30° 42′ N., Long. 104° 14′ W. From paper on Rocks from the Apache Mountains, by Dr. A. Osann—unpublished —in care of Univ. of Texas. Bur. Eco. Geol.

1195. Jeff Davis County. Sample undetermined. From volcanic neck just west of Ft. Davis, Alpine road, west of Musquez Canyon. Sent by Baker. Analyzed 1917 by J. E. S. B. A. No. C352.

1204. Jeff Davis County. Lava. Near furtherest eastward projection of mountains near Limpia Canyon, Fort Davis Sheet. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C327.

1206. Jeff Davis County. Extrusive. From west of Borancho

Peak. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C328.

1207. Jeff Davis County. Sample undetermined. From Hancock Ranch, Musquez Canyon, S. E. corner of Fort Davis Sheet. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C333. ! !

1209. Jeff Davis County. Liparite (Rhyolite). From Fort Davis. Analyzed by J. E. Whitfield, in Laboratory of U. of T., 1894. From Osann's paper on "Rocks from the Apache Mts."—unpublished—in care of Univ. of Texas Bureau Eco. Geol.

1224. Jeff Davis County. Sample undetermined. From 2 miles east of Musquez Canyon, on Alpine-Ft. Davis road. Sent by Baker. Analyzed 1916 by L. A. M. and W. A. F. B. A. No. C329.

1167. Kinney County. Plagioclase basalt, Pinto Mountain, Brackett quadrangle. **Limburgose.** Contains olivine, augite, plagioclase (labradorite), biotote, a very little alkali feldspar (?), magnetite, and apatite. Sp. gr., 3.118, 20°. P. R. C. 1067.

1208. Llano County. Gray granite. Bradshaw's quarry. Sampled by G. A. Parkinson. Analyzed 1904 by O. H. P. U. of T. Min. S. No. 2828.

1212. Llano County. Gray granite. From Teich's Quarry Analyzed by O. H. P. U. of T. M. S. No. 2829.

1217. Llano County. Granite (Opal). From land of H. C. Howard, Llano. Analyzed 1904 by S. H. W. U. of T. M. S. No. 2524.

1225. Llano County. Red granite. From Teich's Quarry. Analyzed 1904 by O. H. P. U. of T. M. S. No. 2827.

1205. Presidio County. Quartz pantellerite, Vieja Mountains, San Carlos. **Liparose.** Description furnished by E. C. E. Lord. Contains anorthoclase, augite, and grains of quartz in groundmass of aegirine-augite, a brown hornblende which is probably barkevikite, orthoclase, and quartz. Magnetite and apatite are present as accessory minerals. Analysis by George Steiger, record No. 1581.

1215. Presidio County. Graphic granite. Analyzed by O. H. P. U. of T. M. S. No. 2826.

1220. Presidio County. Rhyolite, near Shafter, Shafter quadrangle. **Liparose near alakose.** Phenocrysts of sanidine and quartz. Groundmass of alkali feldspars, quartz, riebeckite, (?), and aegirite. Spherulitic bands traverse the rock. Sp. gr., 2.617, 15.5°.

1177. Trans Pecos. Essexite, Big Hill Canyon, Rio Grande. **Essexose.** Contains predominant orthoclase, soda-rich plagioclase, and nephelite, with considerable augite, olivine,

and quartz. Groundmass of alkali feldspars, quartz, Sp. gr., 2.686, 25.5°.

1152. Uvalde County. The portion of 1160 soluble in 1:40 dilute nitric acid.

1153. Uvalde County. The portion of 1156 soluble in 1:40 dilute nitric acid.

1154. Uvalde County. The portion of 1179 soluble in 1:40 dilute nitric acid.

1155. Uvalde County. Limburgite. From Trap rock deposit at Knippa. From Texas Trap Rock Co., of Knippa. Analyzed 1914 by J. E. S. B. A. No. 1602.

1156. Uvalde County. Nepheline-melilite, basalt, from about 3 miles southwest of Uvalde. **Casselose.** Contains nepheline, melilite, olivine, augite, magnetite, and apatite. Sp. gr., 3.150, 20.5°. P. R. C. 1064.

1160. Uvalde County Nepheline basalt. Tom Nunn's Hill, Uvalde quadrangle. **Uvaldose.** Contains olivine, augite, nepheline, magnetite, and apatite. Sp. gr., 3.148, 19°. P. R. C. 1065.

1169. Uvalde County. Basanite. Mount Inge, Uvalde quadrangle. **Lujavrose.** Contains sanidine, nephelite, hornblende, augite, aegirine-augite, olivine, magnetite, apatite, and a trace of pyrite. Sp. gr., 2.770 20°. P. R. C. 1069.

1170. Uvalde County. Rock of basaltic habit, allied to 1169, 1 mile northeast of Big Mountain, Uvalde quadrangle. **Essexose.** Contains alkali feldspar, augite, magnetite, and variable amounts of olivine, nephelite, aegirite, and zeolitic minerals. Sp. gr., 2.742, 23°. P. R. C. 1068.

1179. Uvalde County. Phonolite, hill between Black and Big mountains, Uvalde quadrangle. **Laurdalose.** Contains sanidine, nephelite, and aegirite, and very little brown hornblende, augite, and magnetite. Sp. gr., 2.559, 19.5°. P. R. C. 1079.

1229. Uvalde County. Nepheline basalt, Black Mountain, Uvalde quadrangle. **Uvaldose.** Contains olivine, augite, nephelite, magnetite and apatite. Sp. gr., 3.200, 21.5°. P. R. C. 1066.

1230. Uvalde County. The portion of 1229 soluble in 1:40 dilute nitric acid.

1231. Uvalde County. Augite from 1229. Violet in color, very pure.

C. METAMORPHIC ROCKS

NOTE ON OCCURRENCE.—Very few chemical analyses have been made of the metamorphic rocks of this state. There are two groups of these; metamorphics of sedimentary origin and

metamorphics of volcanic origin. The metamorphics of sedimentary origin are represented by marble, schists and gneisses. Some analyses of an igneous metamorphic rock occurring in the Thrall field show that this rock, which is more like chlorite than serpentine, has been originally highly basic.

I. MARBLE

Anal. No.

1234 Brewster County. Black marble from Jordan's Quarry, south of Paisano Pass. Analyzed 1904 by O. H. P. T. M. S. A. No. 2835.

1235. (a) Brewster County. White marble from Jordan's Quarry, south of Paisano Pass. Analyzed 1904 by O. H. P. T. M. S. A. No. 2834.

(b) Burnet County. Marble unclassified. From Flat Rock Creek, which flows into the Colorado River two miles below Marble Falls. Sent by Geo. A. Parkinson. April 4, 1914. B. A. No. 1471. Analyzed by J. E. S.

1237. (d) El Paso County. Marble, unclassified. Variegated Pink, old specimen from museum. B. A. No. 1503. Analyzed by J. E. S. April 22, 1914.

(e) El Paso County. Marble, unclassified. Mumidian Marble, old specimen from museum. B. A. No. 1505. Analyzed by J. E. S. April 22, 1914.

(f) Gillespie County. Marble, unclassified. From Frank Teich of Llano, from Cherry Springs Quarry, 35 miles south of Llano. B. A. No. 1928. Analyzed November 14, 1914 by J. E. S.

(g) Llano County. Marble, unclassified. From Hamilton Place. Analyzed by J. E. S. 1914. B. A. 1628.

(h) Llano County. Marble, unclassified. From Cal Avery's place, Llano County. Analyzed by J. E. S. 1914. B. A. 1630.

(i) Llano County. Marble, unclassified. From Hammond Place, Sharp's Mountain, Llano County. Analyzed by J. E. S. 1914. B. A. 1639.

1236. San Saba County. Variegated pink marble from ranch of B. R. Russell, near San Saba. Museum No. 743. Analyzed 1913 by J. E. S. B. A. 1502.

1237. (a) San Saba County. Pink marble from R. B. Russell's ranch from near San Saba. Analyzed 1904 by S. H. W. T. M. S. A. No. 2873.

(b) San Saba County. Marble. Received from San Saba July 3, 1913. Marked, 12 miles south of San Saba. B. A. 825. Analyzed by S. H. W.

(c) San Saba County. Marble unclassified. Received from R. C. Fullbright, of Houston. Marked "From San Saba." B. A. No. 556. Analyzed by J. E. S. March 7, 1913.

II. SERPENTINE

1238. Gillespie County. Sample sent to Dr. W. B. Phillips, May, 1904. Analyzed by O. H. P. T. M. S. A. No. 2831.

LIGNITE

According to the most recent estimate of the U. S. Geol. Survey, Texas has more than twenty three billion tons of lignite. This is distributed over an area of about sixty thousand square miles in the outcrop of the Eocene Tertiary. The location of the lignite belt may be described as follows: it has a central line extending from Marshall to Laredo, and the belt widens out markedly towards the ends of this line.

Lignite occurs in beds of less than one to beds a dozen feet thick. Two lignite bearing zones have been recognized, one in the lowermost formation of the Texas Tertiary, and another in the later Fayette, Jackson, and Yegua formations of the Tertiary. These two zones roughly parallel each other, the older zone being farther away from the coast: the lignite found in Zavalla, Medina, Bexar, Guadalupe, Caldwell, Bastrop, Milam. Robertson, Henderson, Leon, Van Zandt, Smith, Wood, and Bowie Counties belongs to this zone; while the lignite found in Gonzales, Fayette, Washington, Burleson, Grimes, Walker. Houston, Trinity, Angelina, San Augustine, Shelby and other counties belongs to the upper zone.

Mining has so far been done only in the older zone, but developments are under way in Grimes County and at other places to mine the lignite of the upper zone.

The composition of lignite is exceedingly variable—not only from one locality to another, but also in the same locality, and even in the same layer. Thus, much of the lignite obtained in Milam County about fifteen years ago contained from 40% to 47% of volatile combustible matter, while samples obtained recently from the operating mines there do not run above 33% of

volatile combustible matter, but have a correspondingly greater per cent of fixed carbon.

Lignite is characterized by a woody structure and a high content of water. Most of the lignite mined now has from 25% to 35% moisture. The per cent of ash is naturally exceedingly variable because most of it is derived from the mud in the waters of the marshes in which the lignite was made. Very little of the lignite mined has as low as 5% ash, most of it has 8 to 10%, and some as high as 16%. The other two *proximate* components of lignite,—namely, the volatile combustible matter and the fixed carbon—are present in most lignites mined in Texas at present in a ratio varying from 5/7 to 7/5, so that with the moisture and ash together amounting to 40%, the volatile combustible matter will vary from 25 to 35% with the fixed carbon varying from 35 to 25%. In a few commercial lignites the ratio of these components is outside of this range The composition of a typical Texas lignite may be given as—

Moisture	32%
Vol. Comb. Matter	30%
Fixed Carbon	30%
Ash	8%

The sulphur content of commercial lignite can easily be kept within 1%. Greater amounts found in samples are generally due to unnecessarily large admixtures of pyrite.

The average heating value of lignite is 7500 to 8000 B. t. u. per lb.

Anal. No.

1239. Angelina County. Lignite sample, almost like pitchcoal, from bed of Angelina River. U. T. B. 365, p. 57.

1240. Atascosa County. Lignite from the Kinny mine, adjoining the Kirkwood mine, 18 miles S. W. of San Antonio. T. G. S. A. R. 1892, p. 185.

1241. Atascosa County. Lignite from mines at Poteet, and sent in by the Poteet Sand and Coal Co., Poteet. Sample exposed to the air and somewhat dry. Analyzed 1913 by S. H. W. B. A. 599.

1242. Atascosa County. From mines at Poteet. Fresh sample sent in by Poteet Sand and Coal Co., Poteet. Analyzed 1913 by S. H. W. B. A. 600.

1243. Atascosa County. From J. A. Burger, San Antonio, Texas. From ranch near Poteet, 30 to 40 feet under cover, thickness of vein 4-5 feet. Analyzed 1913 by S. H. W. B. A. 936.

1244. Atascosa County. From a vein on Franklin ranch, about 15 miles S. W. of Christine. Sample submitted to Univ. Bur. Ec. Geol. for analysis Jan., 1914. Analyzed by S. H. W. B. A. 1137.

1244a. Atascosa County. From lands between Jourdanton and Charlotte. Sample sent by Jourdan Campbell. Analyzed 1917 by J. E. S. No. C514.

1245. Bastrop County. Lignite from Glenn-Belto Mine, Bastrop. T. M. S. A. No. 1537.

1246. Bastrop County. From Independence Mining Co., Phelan, Bastrop Co. Analyzed 1910 by S. H. W. B. A. 21.

1247. Bastrop County. Outcrop near Clopton Switch, 8 miles south of Elgin. Analyzed 1912 by S. H. W. B. A. 175.

1248. Bastrop County. Lignite from Independence Mining Co., Phelan. Analyzed 1911 by S. H. W. B. A. 192.

1248a. Bastrop County. From Sayer Mine owned by F. L. Denison, McDade. Sent by State Purchasing Agent, Jan., 1918. Analyzed by J. E. S. No. C623.

1249. Bexar County. Lignite from near Cassin Station, on the S. A. U. & G. Ry. Outcrop on Medina River, 40-45 ft. below surface. Seam 4½ ft. thick. Sent in by Dr. Bredlick, Pleasanton, Texas. Analyzed 1914 by J. E. S. B. A. 1477.

1250. Bexar County. Lignite from ½ mile north from outcrop of sample No. 1249; drill sample, 164 ft. below surface; seam 14 inches thick. Sent in by Dr. Bredlick of Pleasanton. Analyzed 1914 by J. E. S. B. A. 1478.

1251. Bowie County. Lignite sample received from R. W. Rodgers, Texarkana. Analyzed 1911 by S. H. W. B. A. 38.

1252. Burnet County. The exact locality of these samples not stated. Analyzed by Dr. E. Everhardt of the Univ. of Texas. T. A. S. III, p. 25.

1253. Burnet County. Ditto as for No. 1252.

1253a. Brown County. Black lignite showing carbonized woody fiber. Sample sent by D. F. Johnson, Brownwood, 1913. Analyzed by J. E. S. B. A. 695.

1254. Caldwell County. Sample of glance coal from Burdett Wells exposure. Sample sent to Lab. of T. G. S. by S. J. McDowell. T. G. S. A. R. 1892, p. 184.

1255. Caldwell County. Brown coal, massive and laminated, taken at Burdett Wells exposures. Sample sent to Lab. of T. G. S. by S. J. McDowell. T. G. S. A. R. 1892, p. 184.

1255a. Camp County. From boundary of Wood and Camp Counties, one mile from Newsome. Depth of mine at foot of hill 33 ft. Vein is 5½ ft. thick. Another vein 20 ft. deeper is 4 or 5 ft. thick. Sample sent by Hatfield and Clinton, who own 500 acres of this lignite. Analyzed 1918 by J. E. S. No. C646.

1256. Cass County. Sample of lignite from Stone Coal Bluff, northeastern part of county, 12 feet thick. U. T. B. 365, p. 89.

1257. Cherokee County. Lignite, light to dark brown in color, laminated, taken 6 miles south of Alto. Sampled by Dr. R. A. Penrose, Jr. T. G. S. A. R. 1892, p. 196.

1258. Cherokee County. Sample of brown coal, passing into pitch coal, laminated in structure, near Jacksonville. T. G. S. A. R. 1892, p. 196.

1259. Cherokee County. Sample of brown coal, slightly lignitic. Fracture even, luster dull, compact firm, with traces of decomposed pyrites. Taken by Dr. Penrose at McBee's Schoolhouse. T. G. S. A. R. 1892, p. 196.

1260. Cherokee County. Sample from south of Alto. Analyzed by Dr. Everhardt. T. G. S. A. R. 1892, p. 196.

1261. Fayette County. Sample from Melcher Coal and Clay Co., O'Quinn. Analyzed by S. H. W. B. A. 23.

1262. Fayette County. Sample from 2 miles west of Muldoon. Sent to Lab. of Univ. Bur. Ec. Geol. by J. T. Wright of Temple. Anal. 1913 by S. H. W. B. A. 906.

1263. Fayette County. Lignite from Old Big Four Mines, Ledbetter. Represents 8-ft. seam, first stratum, 55 ft. down. Analyzed 1911 by S. H. W. B. A. 61.

1264. Fayette County. From Old Big Four Mine, Ledbetter. Represents 7-ft. seam, lower seam, 95 ft. down. Analyzed 1911 by S. H. W. B. A. 62.

1265. Fayette County. Old Big Four Mine, Ledbetter. 4 ft. of lignite 100 ft. from surface. Analyzed 1911 by S. H. W. B. A. 157.

1266. Fayette County. From Daniel Webster, Ledbetter. Taken from car shipped to Consumers' Fuel and Ice Co., Austin. Analyzed 1911 by S. H. W. B. A. 181.

1267. Fayette County. Upper vein in mines of Lower Stratum Mining Co., Ledbetter. Analyzed 1911 by S. H. W. B. A. 237.

1268. Fayette County. Sample of lignite from Lower Stratum Lignite Mining Co. Sent in by T. T. Felder. Analyzed 1911 by S. H. W. B. A. 1141.

1269. Fayette County. Sample from Lower Stratum Mining Co.

Analyzed for moisture only. Analyzed 1911 by S. H. W. B. A. 1226.

1270. Fayette County. Lignite from T. T. Felder, Ledbetter. Lower Stratum Mining Co. Analyzed 1914 by S. H. W. B. A. 1444.

1270a. Fayette County. From H. H. Harrison's land, 3 miles north of Flatonia on S. A. & A. P. Ry. Vein is 22 ft. deep and 8 ft. thick. Sample taken 10 inches from the top of vein. Analyzed 1918 by J. E. S. No. C613.

1270b. Fayette County. Outcrop of vein described under 1270a. Analyzed 1918 by J. E. S. No. C614.

1271. Freestone County. Sample from Col. Wm. Gaines of Austin, marked "J. Garmon, Teague, Texas, Shaft No. 2, from near Donie, Texas." Analyzed 1914 by J. E. S. B. A. 1498.

1272. Freestone County. Sample from Col. Wm. Gaines of Austin, marked "J. J. Garmon, Teague, Texas. Hole No. 4, from near Donie, Freestone County."

1273. Freestone County. Sample of lignite from near Donie, sent in by J. M. Bray. Analyzed 1914 by J. E. S. B. A. 1566.

1274. Freestone County. Sample labelled "No. 1, from shaft on lease of J. M. Bray, Donie." 3 ft. of lower seam, beginning at 2½ ft. from bottom of seam and extending 5½ ft. Sampled by E. L. P. Analyzed 1914 by J. E. S. B. A. 1675.

1275. Freestone County. From shaft on lease of J. M. Bray, Donie. Represents 2½ ft. of lower seam, beginning 5½ ft. and extending to 8 ft. Sampled by E. L. P. Anal. 1914 by J. E. S. B. A. 1676.

1276. Freestone County. Lignite from shaft on lease of J. M. Bray, Donie. Represents 3½ ft., beginning with 8 ft. and extending to 11½ feet. Sampled by E. L. P. Anal. 1914 by J. E. S. B. A. 1677.

1277. Freestone County. Sample taken by E. L. Porch on outcrop in creek about 1 mile N. E. of Bray's shaft, Donie. Represents 3 ft. 2 in. from top down. Anal. 1914 by J. E. S. B. A. 1678.

1278. Henderson County. Lignite from the Dallas Lignite Co.'s mine at Fredlow, 1¼ miles east of Malakoff. Analyzed by Ledoux & Co., of New York. U. T. B. 307, p. 99.

1279. Henderson County. Sample taken from same locality as No. 1278 but anal. by Babcock and Wilcox Co., of New York City. U. T. B. 307, p. 99.

1280. Henderson County. Sample from 6-ft. vein, 8 miles west of Athens. Submitted by the McKay Lignite Mining Co., of Dallas. Anal. 1914 by J. E. S. B. A. 1596.

1281. Henderson County. Sampled near outcropping 4 ft. thick.

½ mile from test hole for No. 1280. Sent in by McKay Lignite Mining Co., of Dallas. Anal. 1914 by J. E. S. B. A. 1597.

1282. Henderson County. Sample from 12-ft. vein on 2300-acre tract north of Malakoff, and about 2½ miles from Stockard. Sent in by W. Reid, Dallas, Texas. Anal. 1912 by S. H. W. B. A. 216.

1282a. Henderson County. Sample sent from Malakoff by W. C. Dodd. Anal. 1916 by J. E. S. No. C102.

1283. Hopkins County. Lignite from Como Coal Co., Como. T. M. S. A. No. 1549.

1284.
1284.
1285. Hopkins County. Samples from deposits 10-12 miles from Sulphur Springs from shaft of W. H. King. No. 1285 analyzed by Dr. Everhardt of the Univ. of Tex. T. G. S. A. R. 1892, p. 161.

1286. Hopkins County. Sample sent in by Crystal Ice Co., Sulphur Springs. Anal. 1915 by J. E. S. B. A. 2384.

1287.
1288. Hopkins County. Both samples from Como Coal Co., Como, Texas. Anal. 1911 by S. H. W. B. A. 41 and 75, respectively.

1289. Hopkins County. From test hole on Fry Land, near Como. Thickness 7 to 8 ft. with 1½ ins. seam of dirt 1½ feet from the bottom. Sample submitted by McKay Lignite Mining Co., Dallas. Anal. by J. E. S. B. A. 1209.

1290. Houston County. Sample of lignite from Houston County Coal Co., near Lovelady. T. M. S. A. No. 1545.

1291. Houston County. Sample from Mr. Crow of the Houston Coal and Mfg. Co., Crockett, Texas. Anal. 1913 by S. H. W. B. A. 662.

1292. Houston County. Sample taken from supply of lignite furnished the University of Texas Power House by Houston Coal and Mfg. Co., Crockett. Anal. 1914 by J. E. S. B. A. 2129.

1293. Houston County. Sample from Wooters Station, 11 miles south of Crockett. Room 17, north entry. U. T. B. 307, p. 105.

1294. Houston County. Same mine as No. 1293, main entry, 600 feet from shaft, 5.66 ft. cut. U. T. B. 307, p. 105.

1295. Houston County. Same sample as No. 1293 screened through ½ in. bar screen.

1296. Karnes County. Sample from depth of 1011-1013 ft. below surface of well of Manhattan Oil Co., Karnes City. Anal. by S. H. W. B. A. 851.

1297. Lee County. From Hicks. U. T. B. 365, p. 164.

1298. Lee County. From Blue Ranch. U. T. B. 365, p. 164.

1299. Lee County. From Giddings. Anal. 1914 by S. H. W. B. A. 1445.

1300. Leon County. From Bear Grass Coal Co., Jewett. H. B. Crosby, Supt. Anal. 1912 by S. H. W. B. A. 234.

1301.–1303. Leon County. From Bear Grass Coal Co., Jewett. Anal. 1912 by S. H. W. B. A. 235, 236, and 256, respectively.

1304. Leon County. Representing a shipment of 1 T. by the Bear Grass Coal Co., Jewett, to E. J. Babcock, Mining Sub-Station, Hebron, North Dakota. Anal. 1912 by S. H. W. B. A. 307.

1305. Leon County. From mines of Houston Coal and Mfg. Co., Evansville, representing material sent to Hebron, N. D. for briquetting. Anal. by S. H. W. B. A. 342.

1306. Leon County. From mines of Bear Grass Coal Co., Jewett, used for briquetting tests. Anal. 1912 by S. H. W. B. A. 373.

1307. Leon County. From Bear Grass Coal Co., Jewett. Anal. 1913 by J. E. S. B. A. 551.

1308.–1310. Leon County. Three samples from Bear Grass Coal Co. mine at Newby. Samples taken at top of vein, middle, and bottom, respectively. Anal. 1915 by J. E. S. B. A. 2337, 2338, 2339, respectively.

1311.–1312. Leon County. Samples of dry lignite from Houston Coal and Mfg. Co. Evansville. Anal. 1913 by S. H. W. B. A. 927 and 928, respectively.

1313. Leon County. Sample of lignite from Newby, screened: opening between bars 1″, straight ⅝″ across top and ⅜″ across bottom. Screenings about 20% of material thrown on screen. Analyzed 1913 by S. H. W. B. A. 933.

1314. Leon County. From F. V. Crosby, superintendent Bear Grass Coal Co., Jewett. Analyzed 1914 by J. E. S. B. A. 1888.

1315. Leon County. Evansville lignite furnished the University of Texas power house. Analyzed 1914 by J. E. S. B. A. 1987.

1316. Leon County. From Bear Grass Coal Mine, Newby. Analyzed 1914 by J. E. S. B. A. 2111.

1317.–1319. Leon County. Three samples from Houston Coal and Mfg. Co., Evansville, furnished the U. of T. power house on dates Dec., 1914.; Feb., 1915; and Mar., 1915, respectively. Analyzed by J. E. S. B. A. 2203, 2299, 2363, respectively.

1319a. Leon County. Sample sent by Bear Grass Coal Co., Jewett. Analyzed 1917 by J. E. S. No. C435.

1320. Limestone County. Sample from near Teague, sent in by H. L. Kniffin. Analyzed 1914 by E. L. P., Jr. B. A. 1669.

1321. Limestone County. Sample from Head's Prairie in southeastern part of county. Analyzed by Prof. Maurie of Chicago. T. G. S. A. R. 1892, p. 173.

1322. Medina County. Sample from Carr Mine, near Lytle, Texas. U. T. B. 307, p. 87.

1323. Medina County. Sample from Bertetti Mine, Lytle, Texas. U. T. B. 307, p. 87.

1324. Medina County. Sample from Carr Mine, Lytle, Mine No. 3, 350 feet N. E. entry No. 6, 51½″ cut. U. T. B. 307, p. 105.

1325. Medina County. Same mine as No. 1324, but 600 ft. N. W. room at middle of N. E. entry No. 5, 49¾″ cut. U. T. B. 307, p. 105.

1326. Medina County. Carr Mine, near Lytle. U. T. B. 365, p. 180.

1327. Medina County. Bertetti Mine, near Lytle. U. T. B. 365, p. 180.

1328. Milam County. From Burnet Fuel Co., Milano. Depth 4 ft. 9 in. Received from Otto Stolle, Austin, Texas. Analyzed by S. H. W. B. A. 46.

1329. Milam County. From mine of American Briquetting Co., Big Lump, Texas. Sampled by E. L. P. Jr. in boiler room of plant. Analyzed 1913 by S. H. W. B. A. 883.

1330. Milam County. From Worley Mine, Rockdale. Analyzed 1901 by O. H. P. and S. H. W. T. M. S. A. No. 1538.

1331. Milam County. From Black Diamond Coal Co., Rockdale. Analyzed 1901 by O. H. P. T. M. S. A. No. 1539.

1332. Milam County. From Lignite Eggette Coal Co., Rockdale. Analyzed 1902 by O. H. P. T. M. S. A. No. 1540.

1333. Milam County. From J. J. Olsen & Sons, Rockdale. Analyzed 1902 by O. H. P. T. M. S. A. 1541.

1334. Milam County. From Big Lump Coal Co., Rockdale. Analyzed 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1542.

1335. Milam County. From Aransas Pass Lignite Co., Rockdale. Analyzed 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1543.

1336. Milam County. Sample from deep vein at Rockdale, in mine of the American Lignite Briquette Co. Analyzed 1913 by S. H. W. B. A. 420.

1337. Milam County. Sample from Texas Coal Co., Rockdale. Air-slaked. Analyzed 1913 by S. H. W. B. A. 661.

1338. Milam County. Sample from Texas Coal Co., Rockdale, as taken from bins before being air-slaked. Analyzed 1913 by S. H. W. B. A. 745.

1339. Milam County. Sample from Texas Coal Co., Rockdale. Thoroughly subjected to the action of sun and rain for 26 days. Analyzed 1913 by S. H. W. B. A. 746.

1340. Milam County. Sample from Rowlett and Wells, Rockdale. B. A. 25.

1341. Milam County. Sample from Rockdale Lignite Co., Rockdale. B. A. 28.

1342. Milam County. Sample from Vogel Coal and Mfg. Co., Rockdale. B. A. 29.

1343. Milam County. Sample received from Texas Coal Co., Rockdale. B. A. 39.

1344. Milam County. Sample from Rockdale Coal Mine Co., Rockdale. B. A. 55.

1345. Milam County. Sample from Olsen Mine, Rockdale, 400 ft. east of shaft, 77″ cut. U. T. B. 307, p. 106.

1346. Milam County. Same locality as No. 1345, except that it was taken 500 ft. east of shaft, 79″ cut. U. T. B. 307, p. 106.

1347. Milam County. Same as No. 1345. Sample over ¾″ screen.

1347a. Milam County. From undeveloped mine, 9 miles S. E. of Rockdale. Sent by W. A. Butler, Hillsboro. Analyzed 1918 by J. E. S. No. C714.

1348. Morris County. Brown coal, on the Jonathan N. Bohonan headright, about 5½ miles south of Daingerfield. From vein at S. H. Pruitt's house, 15″ thick. T. G. S. A. R. 1892, p. 160.

1349. Palo Pinto County. Sample from near Gordon. T. A. S. III, p. 25.

1349a. Panola County. From a farm of Dell R. Todd, near Gary. Vein is 2 ft. deep and 3 ft. thick. Analyzed 1917 by J. E. S. No. C520.

1350. Robertson County. From Central Texas Mining, Mfg. and Land Co., Calvert Bluff. T. M. S. A. No. 1544.

1351. Robertson County. Calvert Mine at Calvert, Room 4 of north entry 1, south, 250 feet south of opening, upper 81¼″ bed, 77″ cut. U. T. B. 307, p. 106.

1352. Robertson County. Sample from Calvert Mine, at Calvert, Room 8, off east entry north, 550 feet N. E. of opening, 83½″ bed, 78¼″ cut. U. T. B. 307, p. 106.

1353. Robertson County. From near Bremond. Sample sent in by D. B. Matthews. Analyzed 1913 by S. H. W. B. A. 823.

1354. Robertson County. On farm of Strumensky & Son, 2½ miles N. E. of Wootan, seam 6½ ft. in well 70 ft. deep. Analyzed 1913 by S. H. W. B. A. 953.

1355. Robertson County. 1¼ miles S. W. of farm of Strumensky & Son, near Wootan. Thickness of seam 6½ ft. in well 73 ft. deep. Analyzed 1913 by S. H. W. B. A. 954.

1356. Robertson County. One-half mile N. N. W. of Strumensky & Son's farm, from 6 ft. seam in well 53 ft. deep. Analyzed 1913 by S. H. W. B. A. 955.

1357. Robertson County. One-fourth mile from Strumensky & Son's farm, near Wootan. Thickness of seam 3½ ft. in well 33½ ft. deep. Analyzed 1913 by S. H. W. B. A. 956.

1358. Robertson County. New Mine. Sample taken from 700 ft. from shaft north, depth of 60-70 ft. The Southwestern Fuel Co., Calvert. Thickness of seam 6½ ft., first seam. Analyzed 1913 by S. H. W. B. A. 957.

1359. Robertson County. From Southwestern Fuel Co., Calvert. Received from C. M. Beard, Austin, Texas. Analyzed 1913 by S. H. W. B. A. 974.

1360-1374. Robertson County. Lignite from Southwestern Fuel Co., Calvert. Sampled by W. B. Phillips from I. & G. N. car No. 1534 at the U. of T. power house. This lignite was screened through mesh screens of various sizes as given below and used in tests on the Belvet Rocking Grates. Analyzed 1914 by J. E. S. as follows:

1360. Screened through 1″, 8%. B. A. 1750.
1361. Screened through 1″ and on ½″, 32%. B. A. 1751.
1362. Screened through ½″ and on ¼″, 20%. B. A. 1752.
1363. Screened through ¼″ and on ⅛″, 20%. B. A. 1753.
1364. Screened through ⅛″, 20%. B. A. 1754.
1365. Screened through 1″, 10%. B. A. 1755.
1366. Screened through 1″ and on ½″, 34%. B. A. 1756.
1367. Screened through ½″ and on ¼″, 20%. B. A. 1757.
1368. Screened through ¼″ and on ⅛″, 20%. B. A. 1758.
1369. Screened through ⅛″, 16%. B. A. 1759.
1370. Screened through 1″, 12%. B. A. 1760.
1371. Screened through 1″ and on ½″, 26%. B. A. 1761.
1372. Screened through ½″ and on ¼″, 24%. B. A. 1762.
1373. Screened through ¼″ and on ⅛″, 18%. B. A. 1763.
1374. Screened through ⅛″, 20%. B. A. 1764.

1375. Rusk County. Sample from 5 miles S. E. of Henderson, 2½ miles from railroad. Two seams 38″ thick. Analyzed 1915 by J. E. S. B. A. 2632.

1376. Rusk County. Sample from Graham's Lake, 12 miles west of Henderson, 3-6 ft. thick. U. T. B. 365, p. 209.

1377. Rusk County. Sample from near Iron Mountain. Analyzed by Dr. Riddell. T. G. S. A. R. 1892, p. 194.

1378. Shelby County. Sample from Timpson. T. M. S. A. No. 1546.

1379. Smith County. Sample of lignite from depth of 800-900 ft. near Whitehouse. Analyzed 1912 by N. C. Hamner of Dallas. Analysis obtained from T. M. Coupland of Troupe. U. T. B. 307, p. 102.

1380. Smith County. Sample from Alec and Albert Woldert, Tyler,

obtained from outcropping near Spring. Analyzed 1910 by S. H. W. B. A. 34.

1381. Smith County. Sample obtained on eastern edge of spring branch at seam by Dr. Albert Woldert of Tyler. Analyzed 1911 by S. H. W. B. A. 35.

1382. Somervell County. Sample of lignite obtained at Hill Creek, about ½ mile from north of Bosque County and about ½ mile S. W. of Brazos River, near crossing of Hill Creek by the lower Glen Rose and Morgan Road. Sent in by Miss Lucy Tuggle, Kopperl. Black lustrous color and breaks with conchoidal fracture. Analyzed 1915 by J. E. S. B. A. 2367.

1383. Titus County. From Cookville Coal and Lumber Co., Mount Pleasant. Analyzed 1910 by S. H. W. B. A. 18.

1384. Titus County. Sample of lignite from Libby Coal Co., Cookville. Sent in by the Texas Public Service Co. of Mount Pleasant. Taken from 8 ft. seam, 50 ft. below surface; represents entire seam. Analyzed by J. E. S. B. A. 1725.

1385. Upshur County. Sample from R. B. Nelson, Gilmer. Analyzed by S. H. W. B. A. 54.

1386. Upshur County. Sample from R. E. Ezekiel, Kelsey, taken from top of vein. Analyzed 1911 by S. H. W. B. A. 148.

1387. Upshur County. Sample from R. E. Ezekiel, Kelsey, taken from bottom of vein. Analyzed 1911 by S. H. W. B. A. 149.

1388. Van Zandt County. Sample from Edgewood Coal and Fuel Co., Wills Point. Analyzed by S. H. W. B. A. 36.

1389. Walker County. Sample from 10-15 miles north of Huntsville and south of Trinity River. Analyzed 1909 by P. S. T. Sample obtained from G. A. Wynne of Huntsville. U. T. B. 307, p. 103.

1390. Washington County. Lignite from Mrs. Heber Stone, Brenham. Analyzed 1914 by J. E. S. B. A. 2101.

1391. Wilson County. Sample from 3 ft. seam in Cibolo Creek. Sent in by Miss Angela Hendricks, Sutherland Springs. Analyzed by J. E. S. B. A. 2574.

1392.) Wood County. Two lignite samples from North Texas Coal
1393.) Co. of Alba. T. M. S. A. Nos. 1547 and 1548, respectively.

1394. Wood County. Sample of lignite from Consumers' Lignite Co., Hoyt. Analyzed 1909 by Crossley Bros., Manchester, England. U. T. B. 307, p. 104.

1395. Wood County. Sample from eastern part of the county. Sent in by B. Snyder of Marshall. Analyzed by J. E. S. B. A. 2272.

1396. Wood County. Lignite from Alba. Received from Consumers' Lignite Co., Dallas. B. A. 17.

1397. Wood County. Sample from Alba. Received from Lone Star Lignite Co., Dallas. B. A. 22.

1398. Wood County. Sample from Alba. Received from Alba-Malakoff Lignite Co., Dallas, labelled "Alba-Malakoff." B. A. 59.

1399. Wood County. Lump lignite from Consumers' Lignite Co., Alba. Analyzed by S. H. W. B. A. 913.

1400. Wood County. Nut lignite from Consumers' Lignite Co., Alba. Analyzed by S. H. W. B. A. 914.

1401. Wood County. Dust lignite from Consumers' Lignite Co., Alba. Analyzed by S. H. W. B. A. 915.

1402. Wood County. Dust lignite, dry. From Consumers' Lignite Co., Alba. Analyzed by S. H. W. B. A. 916.

1403. Wood County. From Hoyt No. 1 Mine, south entry, 2,500 ft. from mouth, 8¼ ft. cut. U. T. B. 307, p. 107.

1404. Wood County. Same as No. 1403. Foot of air shart, 94″ cut.

1405. Same as No. 1403. Run of mine.

1406. Wood County. Same as No. 1403. Screened.

1407. Wood County. Same as No. 1403. 1,100 ft. S. E. of slope, 6½ ft. cut.

1408. Wood County. Same as No. 1403. 400 ft. N. E. of slope, 8 1-6 ft. cut.

1409. Wood County. Same as No. 1403. Run of mine.

1410. Wood County. Screened lump lignite from Consumers' Lignite Co., Hoyt. Sampled by W. B. Phillips at boiler plant of Lone Star Ice Co. Passed over 1″ screen. Analyzed 1914 by S. H. W. B. A. 1716.

1411. Wood County. Lump lignite, screened through 1″ and on ½″, excluding large lumps, 21.4%. Sample from Consumers' Lignite Co., Hoyt. Sampled by W. B. P. Analyzed 1914 by S. H. W. B. A. 1717.

1412. Wood County. Screened lump from Consumers' Lignite Co., Hoyt. Screened through ½″ and on ¼″, excluding all large lumps, 11%. B. A. 1718.

1413. Wood County. Lump lignite from Consumers' Lignite Co., Hoyt. Screened through ¼″ and on ⅛″, excluding all large lumps, 20.90%. Sampled by W. B. Phillips. B. A. 1719.

1414. Wood County. Screened lump lignite from Consumers' Lignite Co., Hoyt. Sampled by W. B. P. at the boiler plant of the Lone Star Ice Co. of Austin. Screened through ⅛″, excluding all large lumps, 11%. B. A. 1720.

1415-1419. Wood County. From Consumers' Lignite Co., Hoyt. Sampled by W. B. P. at the U. of T. power house from top of car No. 23510. Screened through various size screens

to determine the variation of percentage of the constituents with size of particles. All analyses reported "as received." Analyzed 1914 by J. E. S.

1415. Screened and sample taken on 1″ screen, 14%. B. A. 1728.

1416. Screened through 1″ and on ½″, 20%. B. A. 1729.

1417. Screened through ½″ and on ¼″, 24%. B. A. 1730.

1418. Screened through ¼″ and on ⅛″, 21%. B. A. 1731.

1419. Screened through ⅛″, 21%. B. A. 1732.

1420-1430. Wood County. Screened nut lignite from Consumers' Lignite Co., Hoyt. Sampled by J. E. S. Middle part of car No. 23510. Analyzed 1914 by J. E. S. All analyses are B. A.

1420. Screened on 1″, 22%. B. A. 1733.

1421. Screened through 1″ and on ½″, 32%. B. A. 1734.

1422. Screened through ½″ and on ¼″, 10%. B. A. 1735.

1423. Screened through ¼″ and on ⅛″, 14%. B. A. 1736.

1424. Screened through ⅛″, 22%. B. A. 1737.

1425. All sizes of lumps. B. A. 1738.

1426. Screened on 1″, 20%. B. A. 1739.

1427. Screened through 1″ and on ½″, 38%. B. A. 1740.

1428. Screened through ½″ and on ¼″, 20%. B. A. 1741.

1429. Screened through ¼″ and on ⅛″, 16%. B. A. 1742.

1430. Screened through ⅛″, 6%. B. A. 1743.

1431-1435. Wood County. Screened nut lignite from Consumers' Lignite Co., Hoyt. Sampled by J. E. S., bottom part of car No. 23510. Analyzed 1914 by J. E. S. All analyses are B. A.

1431. Screened on 1″, 32%. B. A. 1744.

1432. Screened through 1″ and on ½″, 40%. B. A. 1745.

1433. Screened through ½″ and on ¼″, 16%. B. A. 1746.

1434. Screened through ¼″ and on ⅛″, 8%. B. A. 1747.

1435. Screened through ⅛″, 4%. B. A. 1748.

1436. Zavala County. From a drill hole of an artesian well 12 miles west of La Pryor, at a depth of 118 ft. Received from W. J. Armstrong. Analyzed 1913 by S. H. W. B. A. 926.

1437-1458. Ultimate analyses of lignites from various counties in the State. This table copied from Dumble: "Brown Coal and Lignite of Texas," T. G. S. A. R. 1892, p. 213. Also U. T. B. 307, p. 110.

1459-1463. Ash from Wood County Lignite. Sample of lignite from Consumers' Lignite Co., Alba. Each marked "D. McN. P." B. A. 617, 618, 619 and 620, respectively.

Reference is made below to lignite analyses which were not copied because of doubtful determination of some of their constituents; e. g. sulphur.

Anderson County. T. G. S. A. R., 1892, p. 197. (1 analysis).
Bowie County, T. G. S. A. R., 1892, p. 159. (2 analyses).
Houston County, T. G. S. A. R., 1892, p. 202. (3 analyses).
Houston County. T. G. S. A. R., 1892, p. 201. (1 analysis).
Leon County. T. G. S. A. R., 1892, p. 174. (1 analysis).
Medina County T. G. S. A. R., 1892, p. 187. (1 analysis).
Morris County. T. G. S. A. R., 1892, p. 161. (1 analysis).
Panola County. T. G S. A. R, 1892, p. 192. (1 analysis).
Rains County. T. G. S. A. R., 1892, p. 171. (2 analyses).
Wood County. T. G. S. A. R., 1892, p. 171. (1 analysis).
Wood County T. G. S. A. R., 1892, p. 170. (2 analyses).

BITUMINOUS COAL

NOTE ON OCCURENCE.—Bituminous coal occurs in several beds in the Pennsylvanian formations in the north and central part of the state. The region of greatest peat accumulation in Pennsylvanian rocks lies farther north. Our coal seams in Texas in this formation are located near the seaward border of the main basin of Pennsylvanian coal formations. They are naturally thin and less free from silt ingredients than the coals farther north and east. The Cretaceous coals of west Texas are in this respect analogous to the Pennsylvanian coals. They occupy the north and east border of the principal coal-bearing beds of the Cretaceous age.

The workable area of bituminous coal in Texas is 8,200 square miles, and includes the counties of Eastland, Erath, Maverick, Palo Pinto, Webb, Wise, and Young.

I. PENNSYLVANIAN

Anal. No.
1463. Cherokee County. Sample from F. M. Synnot, Alto, Texas. Anal. 1916 by J. E. S. B. A. C278.
1464. Coleman County. Sample of coal from near Rockwood. U. T. B. 365, p. 96.
1465. Coleman County. Sample from old Silver Moon Mine, N. E. of Santa Anna. U. T. B. 365, p. 96.

1466. Coleman County. Sample from Bull Creek. (Cisco Division.) Analyst not mentioned. T. G. S. A. R. II, (1890), p. 551.

1467-1472. Coleman County. From Star and Crescent Co., about 1¼ miles southwest of Rockwood. These six analyses were made on different parts of a single block of coal representing the total thickness of the stratum and an average specimen. Anal. by L. E. Dickson. U. S. G. S. B. 164, p. 434.

1473. Eastland County. Sample of coal from the Smith-Lee Mine, near Cisco. Analysis of ash of this coal also given in orig. report. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1534.

1474. Erath County. Sample of coal from Texas and Pacific Coal Co., Thurber. Anal. 1910 by S. H. W. B. A. 10.

1475. Erath County. Sample of bituminous coal from Mine No. 7, Tex. & Pac. Coal Co., Thurber. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1529.

1476. Erath County. Sample from Mine No. 8, Tex. and Pac. Coal Co., Thurber. Anal. by O. H. P. and S. H. W. 1902. T. M. S. A. No. 1530.

1477. Erath County. Sample from Mine No. 9, Tex. and Pac. Coal Co., Thurber. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1531.

1478. Erath County. Sample from Mine No. 10, Tex. and Pac. Coal Co., Thurber. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1532.

1479. Jack County. From Stewart Creek Coal Co., Jermyn, Texas. Sample submitted by W. P. Stewart. Anal. by S. H. W. B. A. 37.

1480. Jack County. Sample from Lost Valley. Name of analyst could not be ascertained. U. T. B. 307, p. 25.

1481. McCulloch County. Sampled from large quantity of coal at Waldrip. T. G. S. A. R. I, (1889), p. 215.

1482. McCulloch County. Analysis made on one small piece of coal from Waldrip. T. G. S. A. R. I, (1889), p. 215.

1483. Montague County. Average composition of coal in a vein of coal near Bowie. Anal. 1895. Name of analyst not given. Eng. & Min. Jour. Vol. 60, No. 19, p. 443.

1484. Palo Pinto County. Sample from Strawn Coal Mining Co, Strawn. Analyzed by the Detroit Testing Laboratory, Detroit, Mich. 1912. U. T. B. 307, pp. 28-29.

1485. Palo Pinto County. Sample of coal from Strawn Coal Mining Co., near Strawn. Analysis of ash also given. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1533.

1486. Palo Pinto County. Sample of coal from Strawn Coal Mining Co., Strawn. Marked: "For analysis and investigation." Anal. 1910 by S. H. W. B. A. 9.

1487. Parker County. Bituminous coal from Texas Coal and Fuel Co., Rock Creek. Mine No. 1. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1525.

1488. Parker County. Bituminous coal from Texas Coal and Fuel Co., Rock Creek. Mine No. 2. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1526.

1489. Parker County. Bituminous coal from J. S. Young Mine, at Keeler. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1528.

1490. Parker County. Sample from Santo Mining and Development Co., Weatherford. Anal. 1910 by S. H. W. B. A. 7.

1491. Shackelford County. From a 5-ft. seam, taken at a depth of 675 feet, in boring for oil on the Smaulm Ranch, about 6 miles north of Albany. Anal. by J. E. S. B. A. 2100.

1492. Stephens County. Upper bench of bituminous coal at Coal Branch, west of Crystal Falls. Sampled by W. B. Phillips. 1906. U. T. B. 189, p. 35.

1493. Stephens County. Lower bench of bituminous coal at Coal Branch, west of Crystal Falls. Sampled by W. B. Phillips. U. T. B. 189, p. 36.

1494. Wise County. Bituminous coal from Wise County Coal Co, Bridgeport. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1522.

1495. Wise County. From Bridgeport Coal Co., Bridgeport. Anal. 1910 by S. H. W. B. A. 2.

1496. Wise County. From Wise County Coal Co., Bridgeport. Marked: "For analysis and investigation." Anal. 1910 by S. H. W. B. A. 11.

1497. Young County. Lower vein of coal in mine of W. K. Gordon, Thurber. Anal. 1903 by S. H. W. T. M. S. A. No. 2200.

1498. Young County. From near Loving. Thickness of vein about 5 feet. Sent in by H. L. Kniffin of Dallas. Anal. 1914 by J. E. S. B. A. 1343.

1499. Young County. From near Loving. Thickness 22 to 28 inches. Depth below surface 105 feet. Sent in by E. M. Gleason, Dallas. Anal. 1915 by J. E. S. B. A. 2585.

1500. Young County. From Belknap Coal Co., Newcastle. Anal. 1910 by S. H. W. B. A. 1.

1501. Young County. Sample of coal from Belknap Coal Co., Newcastle. Anal. March, 1911, by S. H. W. B. A. 53.

II. UPPER CRETACEOUS

1502. Brewster County. From west of Gano Springs in bed of creek. Anal. 1902 by O. H. P. T. M. S. A. No. 1624.

1503. Brewster County. Coal from Kimble opening N. W. of Gano Springs. Anal. 1902 by O. H. P. T. M. S. A. No. 1625.

1504. Brewster County. Coal from Christmas Mts. District. (Cub Springs.) Anal. 1902 by O. H. P. T. M. S. A. No. 1623.

1505. Brewster County. Coal from bottom of Cottonwood Creek, at Chisos Pen. 18 inches thick. Sampled by Dr. W. B. Phillips, Dec. 1904. Anal. 1904 by O. H. P. T. M. S. A. No. 3145.

1506. Brewster County. Coal from Kimble Pits, exposed on south side of hill at a point 2 miles north of Chisos Pen. Also north of Rough Run. 20 inches thick. Sample collected by W. B. P. Anal. 1904 by O. H. P. T. M. S. A. No. 3146.

1507. Brewster County. From flats 2½ miles east-southeast of Study Butte about 1¼ miles S. E. of Maverick Mt. Also on east bank of a creek near Maverick Mt. Thickness in creek bank, 8 inches. Sampled by Dr. J. A. Udden. Anal. 1904 by O. H. P. T. M. S. A. No. 3147.

1508. Brewster County. Anthracite from 2 miles S. W. of Stroud's Ranch. Taken from dump by J. A. U. Anal. 1904 by O. H. P. T. M. S. A. No. 3148.

1509. Brewster County. Anthracite with jet lustre from 2 miles S. W. of Stroud's ranch, east of the Rosillos Mts. Sampled by J. A. U. Anal. 1902 by O. H. P. T. M. S. A. No. 3149.

1510. Brewster County. Bone coal, 3 miles south of Study Butte. Sampled by J. A. U. Anal. 1904 by O. H. P. T. M. S. A. No. 3150.

1511. Brewster County. Lignitic structure coal-bearing horizon, north of Talley's ranch. Sampled by J. A. U. Anal. 1904 by O. H. P. T. M. S. A. No. 3151.

1512. Brewster County. Coal and bone, one mile east of the mouth of the Grand Canyon. From the low ridges of the flats between Terlingua Abaja and the mouth of the Terlingua Creek, about ¾ mile to the south and a little west of the village. Thickness, 18 inches. Sampled by Dr. J. A. Udden. Anal. 1904 by O. H. P. T. M. S. A. No. 3152. Also U. T. B. 93, p. 97.

1513. Brown County. Lignitic coal from D. F. Johnson of Brownwood. U. T. B. 307, p. 98.

1514. Maverick County. Upper cretaceous coal from near Eagle Pass. U. T. B. 307, p. 26.

1515. Maverick County. Average of several coal analyses from the Dolch Mine near Eagle Pass. Anal. by the U. S. Bureau of Mines. U. T. B. 307, p. 26.

1516. Maverick County. Ditto as No. 1515, except that it was analyzed Sept. 14, 1911.

1517. Maverick County. From the Maverick County Coal Co., Eagle Pass. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. No. 1520.

1518. Maverick County. Sample of coal furnished the Austin White Lime Co., McNeill, Texas, by the Olmos Coal Co., Eagle Pass. Washed nut coal. Anal. 1911 by S. H. W. B. A. 42.

1519. Maverick County. Run-of-mine at works of the Austin White Lime Co., at McNeill. Furnished by the Olmos Coal Co., Eagle Pass. Anal. by S. H. W. 1911. B. A. 43.

1520. Maverick County. Sample of coal from Rio Bravo Coal Co., Eagle Pass. Anal. 1902 by O. H. P. and S. H. W T. M. S. A. No. 1521.

1521.
1522.
1523. Maverick County. Sample from Olmos Coal Co., Eagle Pass. Analyses furnished by C. S. Plant, Superintendent Fuel Service, The Sunset-Central Lines. U. T. B. 307, p. 28.

1524. Maverick County. Lump coal from Olmos Coal Co., Eagle Pass. Anal. 1911 by S. H. W. B. A. 651.

1525. Maverick County. Washed egg coal from Olmos Coal Co., Eagle Pass. Without marks. Anal. 1913 by S. H. W. B. A. 652.

1526. Maverick County. Nut coal from Olmos Coal Co., Eagle Pass. Anal. 1913 by S. H. W. B. A. 653.

1527. Maverick County. Pea coal from the Olmos Coal Co., Eagle Pass, Texas. Anal. 1913 by S. H. W. B. A. 654.

1528. Maverick County. Coal from the International Coal Mines Co., Eagle Pass. Anal. 1913 by S. H. W. B. A. 697.

1529. Maverick County. From International Coal Mines Co., Eagle Pass. Sample "A." Screened nut. Received from W. B. Smith, of Austin, Texas. Anal. 1912 by S. H. W. B. A. 330.

1530. Maverick County. Screened egg coal from International Coal Mines Co., Eagle Pass. Sample "B." Anal. by S. H. W. B. A. 331.

1531. Maverick County. From Olmos Coal Co., Eagle Pass. Anal. 1912 by S. H. W. B. A. 332.

1532. Maverick County. From International Coal Mines Co, Eagle Pass. B. A. 4.

1533. Maverick County. "Special Sample" from International

Coal Mines Co., Eagle Pass. Anal. 1910 by S. H. W. B. A. 5.

1534. Maverick County. From Olmos Coal Co. Marked: "For analysis and investigation." Anal. 1910 by S. H. W. B. A. 6.

1535. Maverick County. Washed egg coal from Olmos Coal Co., Eagle Pass. B. A. 31.

1536. Maverick County. Washed nut coal from Olmos Coal Co., Eagle Pass. Anal. 1910 by S. H. W. B. A. 32

1537. Maverick County. Washed pea coal from Olmos Coal Co., Eagle Pass. Anal. 1910 by S. H. W. B. A. 33.

1538. Maverick County. Washed pea coal from Olmos Coal Co., Eagle Pass. Anal. 1910 by S. H. W. B. A. 50.

1539. Maverick County. Washed nut coal from Olmos Coal Co., Eagle Pass. Anal. 1910 by S. H. W. B. A. 51.

1540. Maverick County. Washed egg coal from Olmos Coal Co., Eagle Pass. Anal. 1910 by S. H. W. B. A. 52.

1541. Maverick County. Sample from Olmos Coal Co., Eagle Pass. Anal. 1915 by J. E. S. B. A. 2255.

1542. Maverick County. Washed egg coal from the Olmos Coal Co. Anal. 1915. by J. E. S. B. A. 2301.

1543. Maverick County. Washed nut coal from the Lamar Mine, Olmos Coal Co. Anal. 1915 by J. E. S. B. A. 2302.

1544. Maverick County. Washed pea coal from the Lamar Mine, Olmos Coal Co. Anal. 1915 by J. E. S. B. A. 2303.

1545. Maverick County. Washed coal, "Barleycorn," from the Lamar Mine, Olmos Coal Co. Anal. 1910 by J. E. S. B. A. 2304.

1546. Maverick County. Coal furnished the University of Texas powerhouse by the Olmos Coal Co., of Eagle Pass. Washed egg. Car of coal donated to the University. Sampled March 1-5, 1915. Coal was out in rain for several days. Anal. by J. E. S. B. A. 2331.

1547. 1548. 1549. 1550. 1551. Maverick County. Coal from the San Carlos field. Analyses, made by Dr. Peter Fireman, were made on samples from various parts of the seam as follows, respectively:

1547.....Upper part of seam.
1548.....Above binder.
1549.....Below binder.
1550.....Above clay, lower seam.
1551.....Coal shaft.

U. T. B. 307, p. 30.

1552. 1553. Presidio County. Coal from the San Carlos field. Reported in "Mineral Resources of the U. S.", 1893, p. 385. Analyses sent to the U. S. G. Survey by Mr. R. E. Russell, Gen'l Mgr. of the San Carlos Coal Co., Pittsburg, Pa. U. T. B. 189, p. 34.

1554. Presidio County. From upper vein in old cut, 300 yds. S. E. of the Old Ingle tunnel, San Carlos Coal Field. Sample brought in by Dr. J. A. Udden. This sample does not coke. Anal. 1913 by S. H. W. B. A. 836.

1555. Presidio County. From upper vein in south bank of Arroyo, near S. W. corner of Section 67, Block 3, of this county. Sampled by J. A. U. July, 1913. Anal. by S. H. W. B. A. 837.

1556. Presidio County. From lower coal Section 47, Block 3, D. & P. Ry. land. Sampled by J. A. U. Seam 18 inches thick. Anal. 1913 by S. H. W. B. A. 846.

1557. Presidio County. Coal near Stinking Spring, north area of outcrop of the San Carlos formation. Thickness of seam 20 inches. Sampled by J. A. U., July, 1913. Anal. by S. H. W. B. A. 847.

III. CANNEL COAL

1558. Webb County. Cannel coal from the Laredo District. Anal. by Dr. J. R. Bailey, of the Univ. of Tex. Analysis furnished by O. Stolley of Austin. U. T. B. 307, p. 33.

1559. Webb County. Cannel coal from upper bench in mine of Rio Grande Coal and Irrigation Co., near Laredo. Anal. by Dr. Peter Fireman of the U. S. G. S. U. T. B. 307, p. 34.

1560. Webb County. Cannel coal from lower bench of mine of the Rio Grande Coal and Irrigation Co., Laredo. Anal. by Dr. Peter Fireman. U. T. B. 307, p. 34.

1561. Webb County. Cannel coal from the Cannel Coal Co., of Laredo. Anal. by the Technologic Branch of the U. S. G. S. at Pittsburg, Pa., 1910. U. T. B. 307, p. 33. Represents lot of 1000 lbs. taken at the mine, not freed from impurities.

1562. Webb County. Cannel Coal from Cannel Coal Co., Darwin. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1519.

1563. Webb County. Cannel coal from Rio Grande Coal and Irrigation Co., Minera. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1518.

1564. Webb County. Cannel coal from Rio Grande Coal Co., Minera. Analyzed by Prof. D. P. Jones of Chicago. Analy-

sis submitted to the Univ. of Tex. Min. Survey by Thos. Brewster of the firm. Oct., 1901. T. M. Surv. File 6-A.

1565. Webb County. Cannel coal from the Santo Tomas Coal Field. U. S. G. S. 164, p. 65.

1566. Webb County. Cannel coal from the San Jose Cannel Coal Co., San Jose. Received from Dr. Bredlick. Anal. 1913 by S. H. W. B. A. 925.

1567. Webb County. Cannel coal from lands of Mrs. Shaw, in the northwestern part of the county, between San Lorenzo and San Ambrosia Creeks. Thickness of seam 6 in. Sampled by J. A. U. Anal. by S. H. W. B. A. 931.

1568. Webb County. Cannel coal from lands of Mrs. Shaw in N. W. part of county. Thickness of seam 4 inches. Sent in to Univ. Bur. Ec. Geol. Lab. by J. A. U. Anal. by S. H. W. B. A. 932.

1569. Webb County. From Cannel Coal Co., Laredo. Anal. 1910 by S. H. W. B. A. 3.

1570. Webb County. From Rio Grande Coal Co., Laredo. Marked: "For Analysis and Investigation." Anal. by S. H. W. B. A. 8.

1571. Webb County. Cannel coal from the Santo Tomas Coal Co., Laredo. 25 lbs. of material crushed to ¼ to ½ inch. Obtained from shaft No. 1, at Santo Tomas, near Laredo. B. A. 258.

1572. Webb County. Special Santo Tomas cannel coal from the Santo Tomas Mine, near Laredo. Anal. by S. H. W. B. A. 336.

1573. Webb County. Cannel coal from a carload lot of Santo Tomas mine near Laredo. Sampled Oct., 1911. Anal. by S. H. W. B. A. 337.

Reference is made to a number of analyses which are not included in this bulletin because of doubtful determination of some of the constituents.

Erath County. T. G. S. A. R., II, (1890), p. 551. (3 analyses).

Montague County. T. G. S. A. R., II, (1890), p. 551. (1 analysis).

Webb County. U. S. G. S. B., 164, p. 65.

Wise County. T. G. S. A. R., II, (1890), p. 551.

Young County. T. G. S. A. R., II, (1890), p. 551.

IRON ORE

..NOTE ON OCCURENCE.—Most of the iron ores of Texas occur in the Tertiary in association with lignite. These ores were no doubt originally carbonate of lime laid down as clay-iron-stone. Naturally they contain a considerable quantity of the siliceous sediments deposited in the same waters. Their iron content is hence naturally low. They have been classified into bedded ore and conglomerate ore. It is thought by some that the conglomerate ore represents secondary deposits derived from the banded ore. The present condition of the ore is largely in the form of limonite and hematite. In the Llano country there are magnetite deposits in the pre-Cambrian schists and gneisses. Some of these occur as thin strata in the deposits and in other cases there has been concentration of this kind of material along lines of fracture or shearing, resulting in vein-like bodies. Some of this magnetite ore has been changed to hematite and limonite by weathering. There occur also in this region lenticular masses of hematite and limonite, evidently representing beds of glauconite in the Cambrian sediments.

Iron ore is obtained in a total area of 1,300 square miles, in parts of the counties of Anderson, Cass, Cherokee, Gregg, Harrison, Henderson, Marion, Morris, Smith, Upshur, Wood, Panola, Shelby, and Rusk.

I. EOCENE TERTIARY

Anal. No.

1574. Anderson County. Average of several analyses of laminated limonite from northwest of Palestine. U. T. B. 365, p. 55.

1575. Anderson County. Average of several analyses of laminated iron ore north of locality of No. 1574. U. T. B. 365, p. 55.

1576. Anderson County. Laminated iron ore from the high divide between Still's creek and Ionic creek. U. T. B. 365, p. 55.

1577. Anderson County. Laminated iron ore from Fosterville. Anal. by J. H. H. T. G. S. A. R. 2, p. 311. (1890).

1578. Anderson County. Laminated limonite from 8 miles southwest of Palestine. Anal. by J. H. H. T. G. S. A. R. 2, p. 311. (1890).

1579. Anderson County. Limonite from one-half mile north of Nechesville. Anal. by L. E. Magnenat. T. G. S. A. R. 2, p. 311. (1890).

1580. Anderson County. Iron ore from north of Palestine. Anal. by L. E. M. T. G. S. A. R. 2, p. 311.

1581. Anderson County. Ditto as No. 1580.

1582. Anderson County. Sample of iron ore from south of Palestine. Anal. by L. E. M. T. G. S. A. R. 2, p. 311.

1583. Anderson County. Siliceous and conglomerate iron ore from south of Palestine. Anal. by L. E. M. T. G. S. A. R. 2, p. 312.

1584. Anderson County. Siliceous iron ore from 5 miles south of Palestine. Anal. by J. H. H. T. G. S. A. R. 2, p. 312.

1585. Anderson County. Conglomerate iron ore from south of Palestine. Anal. by L. E. M. T. G. S. A. R. 2, p. 312.

1586. Anderson County. Conglomerate iron ore from south of Palestine. Anal. by L. E. M. T. G. S. A. R. 2, p. 312.

1587. Anderson County. Siliceous iron ore from south of Palestine. Anal. by L. E. M. T. G. S. A. R. 2, p. 312.

1588. Cass County. Concretionary iron ore from ½ mile S. E. of Lanark Station, on the T. & P. Ry. Anal. by L. E. M. T. G. S. A. R. 2, p. 83.

1589. Cass County. Sample from N. E. corner of Horatio Cunningham's headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1590. Cass County. Sample from W. R. Gilley headright, near Queen City. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1591. Cass County. Sample from west side of Rachel P. Moore headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 83.

1592. Cass County. From corner of J. Massie headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 83.

1593. } Cass County. From Lavina Mormen headright. Anal. by
1594. } L. E. M. and J. H. H. respectively. T. G. S. A. R. 2, p. 83.

1595. Cass County. From R. Water's farm, P. M. Keeton headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1596. Cass County. From M. L. Hinton's farm, on the R. M. Hatfield headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1597. Cass County. From W. H. Hunt's farm, on the Queen City and Douglasville road, on the M. S. Mullen headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1598. Cass County. From Mr. Moore's farm, J. J. Hudson headright, near Atlanta. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1599. Cass County. From Berry Crawford's mine, one mile north of Atlanta. Anal. by J. H. H. T. G. S. A. R.2, p. 83.

1600. Cass County. On south side of A. Duncan headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1601. Cass County. From the S. Burnham survey, on Little Beach Creek. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1602. Cass County. From James Horton headright, near Springdale, 14 miles north of Jefferson. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1603. Cass County. From Oneto, 4 miles south of Cusseta, on W.

F. Young's survey. Anal. by P. S. Tilson. T. G. S. A. R. 2, p. 83.

1604. Cass County. From the S. W. corner of the John Lick survey, 7 miles N. E. of Linden. Anal. by P. T. S. T. G. S. A. R. 2, p. 83.

1605. Cass County. From 5 miles N. W. of Linden. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1606. Cass County. From S. Hill survey, 8 miles northeast of Linden. Anal. by P. S. T. T. G. S. A. R. 2, p. 83.

1607. Cass County. From the Charles Plank survey, 5 miles S. E. of Atlanta. Anal. by P. S. T. T. G. S. A. R. 2, p. 83.

1608. Cass County. From Cusseta Hill, No. 3. Anal. by P. S. T. T. G. S. A. R. 2, p. 83.

1609. Cass County. From Lambert's Hill, on the Williams Lambert survey, 9 miles north of west of Linden. Anal. by P. S. T. T. G. S. A. R. 2, p. 83.

1610. Cass County. From Bowlder, foot of hill north of Blackwell, on the D. Bryant headright. Anal. by P. S. T. T. G. S. A. R. 2, p. 83.

1611. Cass County. On Linden and Red Hill Road, 2 miles N. E. of Linden. Anal. by P. S. T. T. G. S. A. R. 2, p. 83.

1612. Cass County. From 6 miles north of Linden, near the Charles Tapp survey. Anal. by P. S. T. T. G. S. A. R. 2, p. 79.

1613. Cass County. From James W. Old's survey, 5 miles north of Linden. Anal. by P. S. T. T. G. S. A. R. 2, p. 79.

1614. Cass County. From half a mile northwest of the Cusseta Post office. Anal. by P. S. T. T. G. S. A. R. 2, p. 79.

1615. Cass County. From John Styles' headright, north of the Cusseta Post office. Anal. by P. S. T. T. G. S. A. R. 2, p. 79.

1616. Cass County. Sample from Cusseta Hill, on Crawford and Sanche's headright. Anal. by P. S. T. T. T. G. S. A. R. 2, p. 79.

1617. Cass County. From Widow Roger's farm, on James Clements headright, on the Knights Bluff road. Anal. by L. E. M. T. G. S. A. R. 2, p. 79.

1618. Cass County. From near center of A. Emanuel survey, near Queen City. Anal. by J. H. H. T. G. S. A. R. 2, p. 79.

1619. Cherokee County. Limonite. Anal. by the St. Louis Sampling and Testing Works. Sampled by John Birkinline, published in the Mineral Resources of the United States. 1887, p. 51. T. M. S. B. 5, p. 47. (1902).

1620. Cherokee County. Poor fossiliferous iron ore, from 4 miles north of Jacksonville. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1621. Cherokee County. Brown massive iron ore from 5 miles west of Jacksonville. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1622. Cherokee County. Limonite. Exact locality not stated. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1623.
1624.
1625. Cherokee County. Limonite from near Alcalde furnace,
1626. Rusk. T. M. S. B. 5, p. 47.
1627.
1628.

1629. Gonzales County. Sample of iron ore from C. F. Moore and E. Gray, Harwood, Texas. Anal. by O. H. P. and S. H. W. T. M. S. A. No. 1348.

1630. Gonzales County. Iron conglomerate from banks of Plum creek, between Shiner and Lockhart. Submitted by H. H. Temple of Yoakum, Texas. Anal. by J. E. S. B. A. 2519.

1631. Gregg County. Iron ore from A. Ferguson headright. T. G. S. A. R. 2, p. 169.

1632. Gregg County. Iron ore from L. Skillern headright. T. G. S. A. R. 2, p. 169.

1633. Gregg County. W. Robinson headright. T. G. S. A. R. 2, p. 169.

1634. Gregg County. On Gladewater road, 2½ miles west of Longview. T. G. S. A. R. 2, p. 169.

1635. Harrison County. Nodular concretionary iron ore. U. T. B. 365, 6. 141.

1636. Harrison County. Concretionary ore from top of hill, one mile west of Hynson's Springs. Anal. by J. H. H. T. G. S. A. R. 2, p. 138. (1890).

1637. Harrison County. Iron ore from top of hill at Hynson's springs. Anal. by L. E. M. T. G. S. A. R. 2, p. 138.

1638. Harrison County. From Hardy Berry farm, J. Johnson's headright, northeastern part of county. Anal. by J. H. H. T. G. S. A. R. 2, p. 138.

1639. Harrison County. From east side of Dan Davis headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 138.

1640. Harrison County. From Hardy Berry's old field, J. Johnson's headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 138.

1641. Harrison County. Laminated iron ore from Hynson's Mountain. Anal. by L. E. M. T. G. S. A. R. 2, p. 135.

1642. Harrison County. From E. Tally headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 135.

1643. Harrison County. From C. Grillet headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 135.

1644. Harrison County. From 6 miles north of Marshall, near

the railroad crossing. Anal. by J. H. H. T. G. S. A. R. 2, p. 135.

1645. Harrison County. From J. B. Hall, on C. Grillet headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 135.

1646. Harrison County. From Walnut Creek, near standpipe of Marshall Water Works. Anal. by L. E. M. T. G. S. A. R. 2, p. 135.

1647. Harrison County. From R. Hightower headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 135.

1648. Harrison County. From L. Watkins headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 135.

1649. Harrison County. From the J. Decker headright. Anal. by J. H. H. in the laboratory of the State Geol. Survey. T. G. S. A. R. 2, p. 135.

1650. Harrison County. Conglomerate iron ore from the Peter Pinchum headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 140.

1651. Harrison County. From the Thomas Gray Headright, near Wade Scott's house. Anal. by J. H. H. T. G. S. A. R. 2, p. 140.

1652. Harrison County. From near John Cole's homestead, on the M. Lindsay headright. Anal. by L. E. M. A. G. S. A. R. 2, p. 140.

1653. Harrison County. From the W. C. Allen headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 140.

1654. Harrison County. From south side of M. Lindsay headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 140.

1655. Harrison County. Ferruginous sandstone (iron ore) from T. G. Twynan's farm, Clary Grillet headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 142.

1656. Harrison County. From east side of hill at Hynson's Springs. Anal. by L. E. M. T. G. S. A. R. 2, p. 142.

1657. Harrison County. From northeast corner of the Richard Hooper headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 142.

1658. Harrison County. From the north side of the Peter Pinshum headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 142.

1659. Harrison County. From the W. C. Allen headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 142.

1660. Harrison County. From the northeast side of the Sheldon headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 142.

1661. Harrison County. From Blalock's Ridge, Thomas Gray headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 142.

1662. Harrison County. From the W. C. Allen headright, from

fracture in sand. Anal. by L. E. M. T. G. S. A. R. 2, p. 142.

1663. Henderson County. Massive limonite from near Fincastle. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1664. Henderson County. Laminated limonite. From near Fincastle. Anal. by J. H. H. T. G. S. A. R. 1, p. 83.

1665. Henderson County. Limonite from 1½ miles southeast of Brownsboro. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1666. Henderson County. Limonite from S. E. part of the county. U. T. B. 365, p. 144.

1667. Henderson County. Limonite from central part of the county around Brownsboro. U. T. B. 368, p. 144.

1668. Henderson County. A concretionary ore found 2 miles west of Fincastle. Anal. by J. H. H. T. G. S. A. R. 2, p. 191

1669. Henderson County. From Pilot Hill, on Alfred Benge headright. Anal. by J. H. H. T. G. S. A. R. 2, p. 191.

1670. Henderson County. From Round Mountain, on the A. K. Jones headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 191.

1671. Henderson County. From near Myrtle Mead Schoolhouse, on the W. J. L. Scott headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 191.

1672. Henderson County. From the A. H. Caldwell headright. Anal. by L. E. M. T. G. S. A. R. 2, p. 191.

1673. Hopkins County. 4 miles east of Sulphur Springs. Anal. by Dr. Riddell. Published in Shumard's Geology of Western Texas, 1886, p. 143.

1674. Houston County. Sample from Major W. J. Bordon, U. S. Engineer, marked "Found at Hurricane Shoals, Trinity, 243 miles below Dallas, and 90 miles above Riverside." Anal. 1915 by J. E. S. B. A. 2699.

1675. Houston County. From 12 miles N. E. of Crockett. T. G. S. A. R. 2, p. 32. Anal. by J. H. H.

1676. Houston County. From near Davis' Creek. T. G. S. A. R. 2, p. 32.

1677. Houston County. From 12 miles N. E. of Crockett. T. G. S. A. R. 2, p. 32.

1678. Houston County. From 8 miles northwest of Crockett. T. G. S. A. R. 2, p. 32.

1679. Marion County. From Lasater Hill. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1680. Marion County. Iron geode from Berry Hill. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1681. Marion County. From Drury Richardson Survey, 8 miles north of Jefferson. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1682. Marion County. Iron conglomerate from Leverett's Hill. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1683. Marion County. From Berry Hill. Anal. by J. H. H. T. G. S. A. R. 2, p. 83.

1684. Marion County. From J. A. McKinney survey, 6 miles north of Jefferson. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1685. Marion County. From the J. W. Duncan survey, 9 miles north of Jefferson. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1686. Marion County. Ochreous limonite, from McKinney and Williams headright. Anal. by J. H. H. and L. E. M. T. G. S. A. R. II, pp. 101-113.

1687. Marion County. Concretionary ore, from Nash's old furnace. Anal. by J. H. H. and L. E. M. T. G. S. A. R. II, pp. 101-113.

1688. Marion County. Concretionary iron ore, from northwest corner. Anal. by J. H. H. and L. E. M. T. G. S. A. R. II, pp. 101-113.

1689. Marion County. From N. Lilly headright. T. G. S. A. R. 2, pp. 101-113.

1690. Marion County. Brown ochre from Isaac Johnson's headright, 3 miles south of Lasater station. T. G. S. A. R. 2, pp. 101-113.

1691. Marion County. From S. J. Buress headright. T. G. S. A. R. 2, pp. 101-113.

1692. Marion County. Ochreous limonite from Samuel Jeffries' headright, 2 miles northwest of Lasater station. T. G. S. A. R. 2 pp. 101-113.

1693. Marion County. Ochreous limonites, 2 miles southwest of Lasater Station. T. G. S. A. R. 2, pp. 101-113.

1694. Marion County. Concretionary iron ore from a field, near T. Farrell's house, on the A. Richardson headright. T. G. S. A. R. II, pp. 101-113.

1695. Marion County. Iron ore from East Texas Brown Ore Development Co., 75-acre Gilbert tract, Longview. Brown ore mining. Sampled by W. B. Phillips. Anal. 1913 by S. H. W. B. A. 855.

1696.
1697.
1698. Marion County. Iron ore from 75-acre hill, Gilbert Hill tract. East Texas Brown Ore Development Co. Sampled by W. B. P. from A. T. & S. F. Ry. car 89624. Aug. 1913, Anal. 1913 by S. H. W. B. A. 859, 864, and 873 respectively.

1699. Marion County. Iron ore from same locality as No. 1698. Sample taken from workings near new toolhouse. B. A. 876.

1700. Marion County. Sample of iron ore from same locality as

No. 1698. Received through Mr. Wesley Merritt, Longview, Texas. Anal. 1913 by S. H. W. B. A. 881.

1701. Marion County. These samples from the Gilbert Hill tract,
1702. near Longview. Marked "No. 7, 13, and 16," respectively.
1703. Anal. 1913 by S. H. W. B. A. 886, 892, and 895, respectively.

1704. Marion County. Analysis of sample No. 1695, washed and dried. The yield of material was 37.5% from the dirt. Anal. by S. H. W. B. A. 900.

1705. Smith County. Mammilary limonite, from 6 miles S. E. of Tyler. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1706. Smith County. Laminated brown iron ore from 8 miles S. E. of Tyler. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1707. Smith County. Limonite from 7 miles west of Troupe. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1708. Upshur County. Laminated limonite. From Butler survey, N. E. corner of the county. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1709. Upshur County. Concretionary limonite. From 3 miles south by east of Coffeeville. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1710. Upshur County. Concretionary limonite. From northeast part of the county. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1711. Upshur County. Limonite from the Butler survey, in the N. E. corner of the county. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1712. Van Zandt County. Clay ironstone from a well 8 miles south of Grand Saline. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1713. Wood County. Limonite from 2 miles S. W. Pine Mills. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1714. Wood County. Limonite from 3¼ miles north of Mineola. Greer headright. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1715. Wood County. Concretionary Limonite from the Gonzales headright, 3 miles N. W. of Pine Mills. Anal. by J. H. H. T. G. S. A. R. I, p. 83.

1716. Wood County. Limonite from 3 miles west and north of Pine Mills. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

1717. Wood County. Limonite from ½ mile east of Lake Fork, 2 miles north of railroad. Anal. by L. E. M. T. G. S. A. R. I, p. 83.

II. IRON ORES OTHER THAN TERTIARY

1718. Blanco County. Soft hydrated iron ore from McMillan's Diggings near Westbrook. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1719. Blanco County. Hematite from Iron Rock Creek. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1720. Brewster County. Iron ore from the Chisos Mts. Anal. 1904 by S. H. W. T. M. S. A. 2613.

1721. Brown County. Sample from John Y. Rankin, Brownwood, Texas. Anal. 1903 by W. D. Blackburn. T. M. S. A. 2168.

1722. Burnet County. Soft hydrated iron ore from Marble Falls. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1723. Burnet County. Soft hydrated ore from south of Beaver Creek. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1724. Burnet County. Soft hydrated ore from west of Lion Mountain. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1725.) Burnet County. Two samples of iron ore from Dr. Edgar
1726.) Everhardt of the Univ. of Tex. T. A. S. III, p. 110.

1727. Coleman County. Iron ore from Santa Anna Gas Co., 4 miles east of Santa Anna. Anal. by J. E. S. B. A. 2459.

1728. El Paso County. Iron ore from old survey, Carrizo Mts. Anal. 1904 by S. H. W. T. M. S. A. 2775.

1729. Gillispie County. Sample analyzed by Dr. E. Everhardt of the Univ. of Tex. in 1899. T. A. S. III, p. 110.

1730. Llano County. Soft hydrated iron ore from Iron Mountain. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1731. Llano County. Soft hydrated iron ore from Cold Creek. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1732. Llano County. Soft hydrated iron ore from Riley Mts. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1733. Llano County. Soft hydrated iron ore from Little Llano Creek. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1734. Llano County. Soft hydrated iron ore from Babyhead Gap. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1735. Llano County. Soft drydrated iron ore from Garner Crossing on Llano River. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1736. Llano County. North of point of Packsaddle Mountain. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1737. Llano County. Soft hydrated iron ore from near Davidson's, Pennington Creek. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1738. Llano County. Soft hydrated iron ore from Sutton's, Pennington Creek. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1739. Llano County. Sandy iron ore from north of east of Castell. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1740.–1742. Llano County. From Olive Mine, on the Little Llano River, about 6 miles E.-N. E. of Llano, one mile south of the Lone Grove Postoffice, and one mile north of the Llano River and the H. & T. C. Ry. Anal. by S. H. W. Sampled by Robert Linton of Atwater, Linton & Atwater Mining Engrs. for the Johnston-Elliott Co. of Dallas. U. S. G. S. Folio 183, p. 13, and U. S. G. B. 450, p. 28.

1743. Llano County. Hematite from Babyhead Mt. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1744. Llano County. Hematite from Lost Hollow. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1745. Llano County. Iron ore from Baumann's. Anal. by J. H. H. T. G. S. A. R II, p 635.

1746. Llano County. Sandy iron ore from the Brady road, east of Smoothing Iron Mt. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1747. Llano County. Sandy iron ore from Lone Grove. Anal. by L. E. M. T. G. S. A. R. II, p. 634.

1748. Llano County. Hematite from near Castell. Anal. by L. E. M. T. G. S A R. II, p 634.

1749. Llano County. Hematite from Iron Mt. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1750. Llano County. Hematite from south of Packsaddle Mt. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1751. Llano County. Hematite from near Packsaddle Mt. Anal. by L. E. M. T. G. S. A. R. II, p. 634.

1752. Llano County. Hematite from Lower Lost Hollow. Anal. by J. H. H. T. G. S. A. R. II p. 634.

1753. Llano County. Iron ore from near Magill Peak. Anal. by L. E. M. T. G. S A R. II, p. 635.

1754. Llano County. Iron ore from west of Christian Schneider's house, near Castell. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1755. Llano County. Iron Ore from Iron Mountain. Anal. 1904 by S. H. W. T. M. S. A. 2609.

1756.–1758. Llano County. Magnetite from Iron Mt. Anal. 1902 by O. H. P. and S. H. W. T. M. S. B. 5, p. 51.

1759. Llano County. Iron ore from Chas. Roberts, Riley Mts. Anal. 1904 by S. H. W. T. M. S. A. 2110.

1760. Llano County. Iron ore from Section 13, Llano County. Thickness 17 feet. Anal. by R. C. Wells of the U. S. G. S. U. S. G. S. B. 450, p. 53.

1761.
1762.
1763. Llano County. Iron ore from near east end of line of outcrops on Elm Creek, north of Castell. Maximum thickness 2 feet. Anal. by R. C. Wells, of the U. S. G. S. U. S. G. S. B. 450, p. 46.

1764. Llano County. Iron ore from Elm Creek, from a point where reef crosses the wagon track. Anal. by R. C. Wells of the U. S. G. S. Maximum thickness, 2 feet. U. S. G. S. B. 450, p. 46.

1765. Llano County. Iron ore from south of the Elm Creek, on hill between creek and river, partly within the Schneider tract, but extending across the eastern boundary line. Local thickness 18 inches. Anal. by R. C. Wells, analyst for the U. S. G. S. U. S. G. S. B. 450, p. 46.

1766. Llano County. General sample of surface iron ore from Iron Mt. from private report of E. V. D'Invilliers. U. S. G. S. B. 450, p. 39.

1767. Llano County. Sample of 125 pieces of ore at a depth of 50 feet in shaft. Report of E. V. D'Invilliers. Iron Mountain. U. S. G. S. B. 450, p. 39.

1768. Llano County. Surface ore clippings, large boulders. (Sampled by a representative of McGreath.) Report of D'Invilliers. Iron Mt. U. S. G. S. B. 450, p. 39.

1769. Llano County. Surface ore main exposure. Sampled by a representative of McGreath. Report of D'Invilliers. U. S. G. S. B. 450, p. 39.

1770. Llano County. Iron ore from Iron Mt. From shaft 8 feet deep, south side of main exposure. McGreath. U. S. G. S. B. 450, p. 39.

1771. Llano County. Iron Mountain. From shaft 12 feet deep, north side of main exposure. Lower 8 feet of ore. E. V. D. U. S. G. S. B. 450, p. 39.

1772. Llano County. Iron Mt 150 yds. east of main exposure, from cut 4 ft. deep. McGreath. U. S. G. S. B. 450, p. 39.

1773. Llano County. Iron Mt. From shaft at main exposure. Ore from lower depth than 5 or 6 feet. Chiefly magnetic. E. V. D. U. S. G. S. B. 450, p. 39.

1774. Llano County. Iron Mt. Tract. Sampled and analyzed by Rattle and Nye. E. V. D. U. S. G. S. B. 450, p. 39.

1775. Llano County. Iron Mountain Mine, 50-ft. level, sample taken by R. Linton for the Johnston-Elliott Co., of Dallas. U. S. G. S. B. 450, p. 39.

1776. Llano County. Same as No. 1775.

1777. Llano County. Iron Mountain. Seven feet of new ore on east wall of winze, 48-ft. level, sampled by Dr. W. B. Phillips. Anal. by Rinaldo Williams, analyst chemist of Birmingham, Ala. U. S. G. S. B. 450, p. 39.

1778-1785. Llano County. These samples are type of Bessemer ore, with moderate iron content. Represent 9 feet, 2 inches of ore from third level mine, Olive Mine. Anal. 1893. Name of analyst not given. Analyses furnished the U. S. G. S. by Robert Linton of Dallas. U. S. G. S. B. 450, p. 29.

1786. Llano County. Magnetite from Babyhead Mt. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1787-1791. Llano County. Magnetite from Iron Mountain. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1792.) Llano County. Magnetite from the Bader Tract. Survey
1793.) No. 33. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1794. Llano County. Magnetite from north of Llano River. Lodestone. Near Johnson Creek. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1795. Mason County. Sandy iron ore from Caylor's Diggings. Anal. by L. E. M. T. G. S. A. R. II, p. 634.

1796. Mason County. Hematite from 2 miles N. W. of Katemcy. Anal. by L. E. M. T. G. S. A. R. II, p. 634.

1797. Mason County. Soft hydrated iron ore from 7 miles west of Mason. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1798. Mason County. Soft hydrated iron ore. From Survey 746. Anal. by L. E. M. T. G. S. A. R. II, p. 634.

1799. Mason County. Iron ore from James River. Anal. by L. E. M. T. G. S. A R. II, p 635.

1800 Mason County. Hematite from Pontotoc. Anal. by J. H. H. T. G. S. A. R. II, p. 634.

1801. Mason County. Iron ore from 5 miles east of Indianapolis. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1802. Mason County. Iron ore near Katemcy. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1803. Mason County. Titaniferous iron ore found near Fleming. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1804. Mason County. Hematite from H. A. Wroe of the American Natl. Bank, Austin. Anal. by J. E. S. B. A. 2009.

1805. Mason County. Iron ore from Todd Valley. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1806. McCulloch County. Soft hydrated iron ore from Heard's Diggings near Camp San Saba. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

1807. McCulloch County. Sandy iron ore from the San Saba River near Voca. Anal. by L. E. M. T. G. S. A. R. II, p. 634.

1808. McCulloch County. Iron ore from 3 miles S. E. of Camp San Saba. Anal. by L. E. M. T. G. S. A. R. II, p. 635.

1809. Presidio County. Magnetite from Shafter, east branch of Cibolo Creek. Anal. 1903 by S. H. W. T. M. S. A. 2272.

1810. San Saba County. Iron ore from near Latham's. Anal. by J. H. H. T. G. S. A. R. II, p. 635.
1811. San Saba County. Soft hydrated iron ore from Latham Creek. Anal. by J. H. H. T. G. S. A. R. II, p. 635.
1812. San Saba Creek. Soft hydrated iron ore from Deep Creek, Anal. by J. H. H. T. G. S. A. R. II, p. 635.
1813. San Saba County. Soft hydrated iron ore from Hinton Creek. Anal. by J. H. H. T. G. S. A. R. II, p. 635.

ORES OTHER THAN IRON ORES

Ores of gold, silver, copper, zinc, tin, and lead occur mostly in the mountainous western part of Texas and in the ancient rocks in the Central Mineral Region. The analyses presented are to a large extent merely partial assays for some of these metals. A separate group of these ores are the sulphides and carbonates of copper occuring in the Permian beds of the Central northern part of the State. Copper was present in relative abundance in the Permian seas, for there can be no doubt that the copper in these beds is an original constituent in the rocks. In the case of all other ores of the metals mentioned they have evidently been introduced secondarily in veins and other ore bodies. An exception should perhaps be made for the tin, which no doubt was originally an ingredient in the El Paso granite.

As a whole, the ore analyses were classified as given in the originals, excepting in doubtful cases, where they were classified on the basis of the most valuable constituents according to the current market prices, given below:

Cu @ $ 0.50 lb.	Zn @ $0.20 lb.	W @ $ 2.00 lb.
Ag @ $ 1.10 oz.	Mn @ $2.00 lb.	U @ $25.00 oz.
Pb @ $ 0.30 lb.	Hg @ $0.20 oz.	Sn @ $ 1.90 lb.
Au @ $37.50 oz.	Ti @ $6.50 oz.	

I. COPPER ORES

1814.–1815.–1816. Burnet County. Copper ore from White Eagle Burnt Ore Co., near blacksmith shop, 5 miles west of Burnet. Anal. 1902 by S. H. W. T. M. S. A. No. 1572, 1573, and 1575, respectively.
1817.–1818. Burnet County. Sample of copper ore from Hooking Valley, 9 miles west of Burnet. Anal. 1913 by S. H. W. B. A. 569, and 570.

1819. Burnet County. Copper ore from Hooking Valley, submitted by Paul Sheridan of Burnet. Anal. 1913 by S. H. W. B. A. 714.

1820. Burnet County. Copper ore from Paul Sheridan of Burnet, June 6, 1913. Sampled at Hooking Valley. Anal. 1913 by S. H. W. B. A. 713.

1821. Burnet County. Samples from Hooking Valley, submitted by Paul Sheridan of Burnet. Anal. by S. H. W. for copper only. T. M. S. A. 715, 716, 717 and 718, respectively.
1822.
1823.
1824.

1825. Burnet County. Sampled by Dr. Wm. B. Phillips Jan. 20, 1913, at "Main shaft dump, Lower shaft dump, and Main shaft dump," respectively. Anal. 1913 by S. H. W. B. A. 475, 476, and 477, respectively.
1826.
1827.

1828. Burnet County. Copper ore labelled "Burnet Selected No. 5, White Eagle Copper Co." Anal. 1901 by S. H. W. T. M. S. A. 284.

1829. Culberson County. Copper ore from Sec. 18, Blk. 54⅛. First 12 feet south side, 59-ft. level. Marked: "From Pecos Mine," about 18 miles north of Van Horn. Anal. by S. H. W. 1914. B. A. 1186.

1830. Culberson County. Second 12 ft. from shaft south of 50-ft. level. Sec. 18, Blk 54⅛, township No. 2. B. A. 1187.

1831. Culberson County. Copper ore from same location as 1829. Third 12 feet from south side of 50-ft. level. B. A. 1188.

1832. Culberson County. Copper ore from same location as 1829. Fourth 12 feet from shaft 12 feet south side of 50-ft. level. B. A. 1189.

1833. Culberson County. Copper ore from Pecos Mine, about 18 miles north of Van Horn. Sampled by S. H. W. Anal. 1914 by S. H. W. "Sample No. 4," north 12 ft. of north end of 50-ft. level. B. A. 1190.

1834. Culberson County. Copper ore from Pecos Mine. "Sample No. 6." Second 12 ft, from north end of 50-ft. level. Anal. 1914 by S. H. W. B. A. 1191.

1835. Culberson County. Copper ore from Pecos Mine. Third 12 ft. from north end of 50-ft. level. Anal. 1914 by S. H. W. B. A. 1192.

1836. Culberson County. Copper ore from Pecos Mine, about 18 miles north of Van Horn. Fourth 12 ft. from north end of 50-ft. level. Anal. 1914 by S. H. W. B. A. 1193.

1837. Culberson County. Copper ore from Pecos Mine. "Sample No. 9." Fifth 12 ft. from north end of 50-ft. level. Anal. 1914 by S. H. W. B. A. 1194.

1838. Culberson County. Copper ore from Pecos Copper Mine. From sixth 12 ft, from north end of 50-ft. level. Anal. 1914 by S. H. W. B. A. 1195.

1839. Culberson County. Copper ore from Pecos Mine. From seventh 12 ft. from north end of 50-ft. level. Anal. 1914 by S. H. W. B. A. 1196.

1840. Culberson County. Copper ore from Pecos Mine. Sample No. 12. South end of south side of 100-ft. level, 12 feet. Anal. 1914 by S. H. W. B. A. 1197.

1841. Culberson County. Copper ore from Pecos Mine. Sample No. 13 by S. H. W. Second 12 ft. of south end of south side of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1198.

1842. Culberson County. Copper ore from Pecos Mine Sample No. 14, by S. H. W. Third 12 ft. of south end of south side of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1199.

1843. Culberson County. Copper ore from Pecos Mine. Sample No. 15 by S. H. W. Fourth 12 ft. of south end of south side of 100-ft. level. Anal. 1914 by S. H. W B. A. 1200.

1844. Culberson County. Copper ore from Pecos Mine. Sample No. 16 by S. H. W. Fifth 12 ft from south end of south side of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1201.

1845. Culberson County. Copper ore from Pecos Mine. Sample No. 17 by S. H. W. First 12 ft. of north end of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1202.

1846. Culberson County. Copper ore from Pecos Mine. Sample No. 18 by S. H. W. Second 12 ft. north end of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1203.

1847. Culberson County. Copper ore from Pecos Mine. Sample No. 19 by S. H. W. Third 12 ft. of north end of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1204.

1848. Culberson County. Copper ore from Pecos Mine. Sample No. 20 by S. H. W. Fourth 12 ft. of north end of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1205.

1849. Culberson County. Copper ore from Pecos Mine. Sample No. 21 by S. H. W. Fifth 12 ft. of north end of 100-ft. level. Anal. 1914 by S. H. W. B. A. 1206.

1850. Culberson County. Copper ore from Pecos Mine. Sample of one ton from lower level. "Grab sample." Anal. 1914 by S. H. W. B. A. 1208.

1852. Culberson County. Copper ore from T. R. Owen. Sampled at Van Horn. Anal. 1901 by S. H. W. T. M. S. A. 1443.

1853. Culberson County. Copper ore from Pecos Mine, about 3 miles north of the Hazel Mine. Ore is mined in face of 35-ft. level. Anal. 1913 by S. H. W. B. A. 971.

1854. Culberson County. Copper ore from Pecos Mine. Sample mined in bottom of 110-ft. shaft. Anal. 1913 by S. H. W. B. A. 972.

1855. Culberson County. Copper ore from Pecos Mine. Average of ore mined in first ten feet of 35-ft. level. Anal. 1913 by S. H. W. B. A. 973.

1856. El Paso County. Copper ore from Crow's Nest Mine. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1777.

1857. El Paso County. Copper ore from the Hazel Mine, Sierra Diablo Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1781.

1858. El Paso County. Copper ore from Sierra Blanca Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1793.

1859. El Paso County. Copper ore from the Carrizo Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1800.

1860. El Paso County. Copper ore from the Hazel Mine. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1804.

1861. El Paso County. Copper from the Sierra Blanca Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1825.

1862. El Paso County. Copper ore from 15 miles north of Van Horn. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A 1836.

1863. El Paso County. Copper ore from the Sierra Blanca Mts. Anal. by O. H. P. and S. H. W. T. M. S. A. 1845.

1864. El Paso County. Copper ore from Crow's Nest Mine, Carrizo Mts. Anal. 1901 by S. H. W. T. M. S. A. 1121.

1865. El Paso County. Copper from Hunter's Mine. Anal. 1901 by O. H. P. T. M. S. A. 1175.

1866. El Paso County. Copper ore from Black shaft, Sierra Diablo Mts. Anal. 1901 by S. H. W. T. M. S. A. 1192.

1867. El Paso County. Copper ore from the David Harum Mine. Anal. 1904 by S. H. W. T. M. S. A. 2718.

1868. Ford County. Copper ore from Crowell. Anal. 1903 by S. H. W. T. M. S. A. 2080.

1869. Hardeman County. Sample of copper ore from this county, exact locality not stated. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1873.

1870. Llano County. Copper ore from Pecan Creek. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1798.

1871.
1872. Llano County. Copper ore from the Babyhead Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1817, and 1878, respectively.

1873. Llano County. Copper ore from Pecan Creek. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1806.

1874. Llano County. Copper ore from the Babyhead Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1017.

1875. Mason County. Copper ore from this county. Exact locality not stated. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1876.

1876. Montague County. Copper ore from this county. Exact locality not stated. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1660.

1877. Presidio County. Copper ore from Marfa. Sample sent to Univ. Min. Surv. by J. A. Gillett, in 1901. Anal. by S. H. W. T. M. S. A. 3228.

1878. Presidio County. Copper ore from this county, locality not definitely stated. Anal. 1903 by S. H. W. T. M. S. A. 2232.

1879.
1880.
1881.
1882. Stonewall County. Copper ore from this county, but exact locality not stated. Anal. Sept., 1901, by S. H. W. T. M. S. A. 1222, 1244, 1245, and 1307, respectively.

1883. Stonewall County. Anal. Nov., 1902, by S. H. W. T M. S. A. 2012.

1884. Stonewall County. Copper ore. Anal. Aug., 1902, by O. H. P. and S. H. W. T. M. S. A. 1795.

1885. Taylor County. Copper ore. Sampled by W. B. P. Anal. by O. H. P. and S. H. W. Aug., 1902. T. M. S. A. 1839.

II. SILVER ORE (See also under Cu., Pb, and Au ores.)

1886. Brewster County. Silver ore from the Chisos Mts. Sent to Univ. Min. Surv. by J. E. Van Riper of San Antonio Anal. 1901 by S. H. W. T. M. S. A. 1501.

1887. Brewster County. Sample of silver ore from Section 10, Block 238. Anal. 1901 by S. H. W. T. M. S. A. 3382.

1888. Burnet County. Silver ore from White Eagle Copper Co., Burnet. Anal. 1901 by S. H. W. T. M. S. A. 283.

1889. El Paso County. Silver ore from the Quitman Mts. Anal. by Palm, Worrell, and Harper. T. M. S. A. 1705.

1890. El Paso County. Silver ore from the Quitman Mts. Anal. by O. H. P. H. W. H., and S. H. W. T. M. S. A. 1761.

1891.
1892. El Paso County. Silver ore from Quitman Mts. Anal. 1902 by Palm and Worrell. T. M. S. A. 1713 and 1716, respectively.

1893. El Paso County. Silver ore from Carrizo Mts. Anal. 1902 by Palm and Worrell. T. M. S. A. 1728.

1894. El Paso County. Silver ore from Gray Mule Mine, Quitman Mts. Anal. 1902, by O. H. P. and S. H. W. T. M. S. A. 1729.

1895. El Paso County. Silver ore from the Bonanza Mine, Quit-

man Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1709.

1896. El Paso County. Silver ore from the Chinati Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1730.

1897. El Paso County. Silver ore from the Carrizo Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1742.

1898. El Paso County. Silver ore from the Hazel Mine. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1844.

1899. El Paso County. Silver ore from the Don Quixote Mine. Anal. 1901 by S. H. W. T. M. S. A. No. 1119.

1900. El Paso County. Silver ore from Hazel Mine, 15 miles north of Van Horn. Anal. 1902 by S. H. W. T. M. S. A. 1122.

1901. El Paso County. Silver ore from the Chinati Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1713.

1902. El Paso County. Silver ore from the Alice Roy Mine. Anal. 1901 by O. H. P. T. M. S. A. 1187.

1903. El Paso County. Silver ore from the Sancho Panza Mine. Anal. 1902 by S. H. W. T. M. S. A. 1651.

1904. El Paso County. Silver ore from King Bee Mine. Anal. 1902 by S. H. W. T. M. S. A. 1652.

1905.) El Paso County. Silver ores from the Quitman Mts. T. M.
1906.) S. B. I, pp. 97-98.

1907. Jeff Davis County. Silver ore from this county, exact locality not stated. Anal. 1903 by O. H. P. T. M. S. A. 1706. File 8-H.

1908. Llano County. Silver ore from Babyhead Mts. (?) Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1743.

1909. Llano County. Silver ore from the old Babyhead Mts. Anal. by S. H. W. Tex. Min. Surv. File 5-L.

1910. Presidio County. Silver ore from "Cibolo Mine." Anal. by S. H. W. 1901. T. M. S. A. 1127.

1911.) Presidio County. Silver ore from Presidio Mine. Anal.
1912.) 1901 by S. H. W. T. M. S. A. 1130, 1131, and 1132,
1913.) respectively.

1914. Presidio County. Silver ore from Spanish Mine. Anal. 1901 by S. H. W. T. M. S. A. 1134.

1915. Presidio County. Sample of Sphalerite from Shafter Mine, 161B. Anal. 1901 by S. H. W. T. M. S. A. 1180.

1916. Presidio County. Sample of galenite, Shafter Mine, 130 B. Anal. 1901 by S. H. W. T. M. S. A. 1185.

1917. Presidio County. Silver ore from Cibolo Mine. Anal. 1901 by S. H. W. T. M. S. A. 1654.

1918. Presidio County. Silver ore from Presidio Mine. Anal. 1901 by S. H. W. T. M. S. A. 1655.

1919. Presidio County. Silver ore from the Chinati Mts. Anal. 1901 by S. H. W. T. M. S. A. 2772.

1920. Presidio County. Silver ore from San Antonio canyon, west of Shafter. Anal. 1903 by S. H. W. T. M. S. A. 2388.

1921. Presidio County. Silver ore from the Shafter Mine. Anal. by S. H. W. T. M S A. 2723

III. LEAD ORE

1922. Brewster County. Sample of lead ore from near Alpine. Anal. 1904 by S. H. W. T. M. S. A. 2601.

1923. Burnet County. Sample of lead ore from Hooking Valley. Sent in by Paul Sheridan of Burnet. Anal. 1913 by S. H. W. B. A. 752.

1924. Burnet County. Lead ore from Silver Mine Creek, in the N. W. part of the County. Sampled by B. F. Hill. Anal. 1903 by S. H. W. T. M. S. A. 2175.

1925. Culberson County. Lead ore from Pecos Mine, 18 miles north of Van Horn. Anal. 1914 by S. H. W. B. A. 1207.

1926. Culberson County. Lead ore from the Winner Tungsten Mine, near Figure "2" Ranch. Brown ore from small cave. Anal. 1913 by S. H. W. B. A. 969.

1927. Culberson County. Lead ore from Winner Tungsten Mine, near face of drift. Anal. 1913 by S. H. W. B. A. 970.

1928. Culberson County. Sample of lead ore from Ed. Kiam of Houston, from a tungsten mine in this county. Sampled by S. H. W. on the Figure "2" Ranch. Anal. 1913 by S. H. W. B. A. 1122.

1929. El Paso County. Lead ore from north dump, Eagle Flat Mountain. Block 69, Township 8, Sec. 2. Sampled by S. H. W. Anal. 1913 by S. H. W. B. A. 944.

1930. El Paso County. Lead ore from south dump, Eagle Flat Mountain. Block 69, Township 8, Sec. 2. Sampled by S. H. W. Anal. 1913 by S. H. W. B. A. 945.

1931. El Paso County. Lead ore from the Bonanza Mine, Quitman Mts. Anal. 1905 by O. H. P. T. M. S. A. 3251.

1932.) El Paso County. Lead ore from the Bonanza Mine, Quit-
1933.) man Mts. T. M. S. B. 5, p. 98.

1934. El Paso County. Lead ore from the Belle Mine, Quitman Mts. T. M. S. B. 5, p. 98.

1935. El Paso County. Lead ore from Gray Mule, Quitman Mts. T. M. S. B. 5, p. 98.

1936) El Paso County. Lead ore from the Quitman Mts. T. M.
---1943) S. B. 5, p. 98.

1944. El Paso County. Lead ore from Chief Mine, Quitman Mts. T. M. S. B. 5, p. 98.

1945. El Paso County. Lead ore from Mount Ord Range. T. M. S. B. 5, p. 98.
1946. El Paso County. Lead ore from Don Quixote Mine. T. M. S. B. 5, p. 98.
1947. El Paso County. Lead ore from the Parlin Mine. Sierra Diablo Mts. T. M. S. B. 5, p. 98.
1948. El Paso County. Lead ore from the Carrizo Mts. T. M. S. B. 5, p. 98.
1949. Presidio County. Galena from the Chinati Mts. Anal. 1904 by S. H. W. T. M. S. A. 2772.
1950.
1951. Presidio County. Lead ore from the Chinati Mts. T. G. S. B. 5, p. 98.

IV. GOLD ORE.

1952. El Paso County. Gold ore from Hunter's Mine. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1797.
1953. El Paso County. Gold ore from Franklin Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1678.
1954. El Paso County. Gold ore from the Sierra Blanca Mts. Anal. 1902 by O. H. P. and S. H. W. T. M. S. A. 1679.
1955.
1956.
1957. El Paso County. Gold ore from the Quitman Mts. T. M. S. B. 5, pp. 97-98.
1958.
1959. El Paso County. Gold ore from Sierra Blanca Mts. T. M. S. B. 5, pp. 97-98.
1960. El Paso County. Gold ore from Franklin Mts. T. M. S. B. 5, pp. 97-98.
1961. El Paso County. Gold ore from Sierra St. Jago. Anal. by O. H. P., S. H. W., and H. W. H. T. M. S. A. 1714.
1962. Llano County. Gold ore from Pecan Creek. Anal. 1902 by O. H. P. T. M. S. A. 1708.
1963. San Saba County. Supposed gold ore from Cherokee. Anal. by O. H. P. T. M. S. A. 1069.

V. ZINC ORE

1964. Burnet County. Zinc ore from Hooking Valley. Sampled by Paul Sheridan. Anal. by S. H. W. B. A. 792.
1965. Burnet County. Zinc ore from Hooking Valley Mine. Sampled by Paul Sheridan. Anal. 1913 by S. H. W. B. A. 799.
1966. Culberson County. Zinc ore from No. 1, Boracho Mine, Sampled by J. A. U. Anal. 1913 by S. H. W. B. A. 958.
1967. Culberson County. Zinc ore, No. 2, from country rock near open cut, Boracho Mine. Anal. 1913 by S. H. W. B. A. 959.
1969. Culberson County. Zinc ore from open cut No. 4, Boracho Zinc Mine. Anal. by S. H. W. B. A. 964.
1970. Culberson County. Zinc ore from Slope 2, Boracho Mine.

Composite sample across vein. Anal. by S. H. W. B. A. 965.

1971. Culberson County. Selected sample of zinc ore from open cut No. 3 Boracho Mine. Anal. by S. H. W. 1913. B. A. 966.

1972. Culberson County. Zinc ore from composite of face in entry No. 1, Boracho Mine. Anal. 1913 by S. H. W. B. A. 967.

1973.
1974. El Paso County. Zinc ore from bottom of 60-ft. winze, on 90-ft. level, Bonanza Mine, Quitman Mts. Anal. by O. H. P. T. M. S. A. 3246.

1968. Parker County. Zinc Ore. Radiating black crystals and plates in limestone 52 feet underground. N. W. part of Parker Co., 22 miles due north of Weatherford, just across Wise County line, about 600 yards from Skein's Peak, on farm of D. P. Matheson. Anal. by J. E. S. B. A. C320.

VI. MERCURY ORE

The following list consists entirely of analyses of Terlingua, Brewster County mercury ores. There are no mercury ore analyses from any other section of the State, at least such were not available.

Anal. No.

1975.
1976. Picked sample from hole made on Study Claim, Terlingua District. Anal. 1902 by S. H. W. T. M. S. A. 2027.

1977. Select mercury ore from McKinney claim. Terlingua District. Anal. 1902 by S. H. W. T. M. S. A. 2030.

1978. Cinnabar from Study Mine. Sec. 216, Blk. G. 4. Anal. 1902 by S. H. W. T. M. S. A. 2031.

1979. Selected cinnabar from Terlingua. Anal. 1902 by S. H. W. T. M. S. A. 2032.

1980. Limestone spotted with cinnabar. Sec. 248, Blk. G. 4. Anal. 1902 by S. H. W. T. M. S. A. 2033.

1981.
1982.
1983. Mercury ore from Terlingua. L. E. Tegner Mine. No. 1, No. 2, and No. 3, respectively. Anal. 1902 by E. P. Schoch. T. M. S. A. 1941, 1942, and 1943, respectively.

1984.
1985.
1986.
1987.
1988.
1989.
1990.
1991. Mercury ore from Terlingua. Anal. by S. H. W. 1902. T. M. S. A. 1954, 1955, 1956, 1957. 1960, and 1062, respectively.

1992.
1993.
1994.
1995.
1996. Natural cinnabar from the Colquitt-Tigner Mining Co. Terlingua. Anal. 1903 by S. H. W. T. M. S. A. Nos. 2102, 2103, 2104, 2131, 2145, 2146, and 2185, respectively.

1997. Mercury ore from east part of large cut and deep shaft, Section 38, Blk. G. 12. Colquitt-Tigner Mining Co. Terlingua. Anal. 1904 by S. H. W. T. M. S. A. 2635.

1998. Ore from west end of large cut, Section 38, Blk. G-12. Colquitt-Tigner Mining Co. Anal. 1904 by S. H. W. T. M. S. A. 2636.

1999. Mercury ore from Sec. 38, Blk. G-12, about 300 ft. S. W. from large cut. Colquitt-Tigner Mining Co., Terlingua. Anal. 1904 by S. H. W. T. M. S. A. 2637.

2000. Ore from Cut No. 3, Section 38, Blk. G12, Terlingua Mining Co. Anal. 1904 by S. H. W. T. M. S. A. 2887.

2001. Ore from same location as No. 2000. T. M. S. A. 2908.

2002. Ore from Cut No. 2, Sec. 39, Blk. G12, Terlingua Mining Co. Anal. 1904 by S. H. W. T. M. S. A. 2892.

2003. Ore from cut No. 2, just east of Marfa wagon road on hill. Terlingua Mining Co. Anal. 1904 by S. H. W. T. M. S. A. 2629.

2004.
2005. Mercury ore from Sec. 38, Blk. G12, of the Terlingua Mining Co. Anal. 1904 by S. H. W. T. M. S. A. 2743 and 2764.

VII. MANGANESE ORES

2006. Dickens County. Manganese ore from near Dickens. Anal. 1905 by O. H. P. T. M. S. A. 3424.

2007. Gillespie County. Anal. by J. H. H. T. G. S. A. R. II, p. 607.

2008. Gillespie County. Anal. by J. H. H. T. G. S. A. R. II, p. 607.

2009. Llano County. Manganese ore from Chaney's Diggings. Anal. by L. E. M. T. G. S. A. R. II, p. 607.

2010. Marion County. Sample of manganese ore from near Hughes' Springs. Submitted by R. C. Hardy of Sulphur Springs. Anal. by J. E. S. B. A. 2405.

2011.
2012.
2013. Mason County. Manganese ore from Spiller Mine, 15 miles N. E. of town of Mason. Analyses made by R. A. F. Penrose, Jr. U. S. G. S. B. 427, p. 125.

2014. Mason County. Manganese ore from near Harper's Fall Creek, 7 miles west of Castell. Anal. by L. E. M. T. G. S. A. II, p. 607.

2014a. Val. Verde County. The following 12 samples were collected by John R. Roberts in 1918 and analyzed by J. E. S., B. A. C701 to C713:

1. From ore in place in the Eagle Ford formation near Feely.
2. Location same as No. 1.
3. Taken from pit on Survey 42, East Line of Red River Railway Co., Block 52, 7 mi. north of Shumla.

4. Taken from dump at pit where sample No. 3 was taken.
5. Low grade ore in bottom bed exposed in west wall of trench on Section 62, East Line of Red River R. R. Co., Block 52.
6. High grade ore in upper bed in trench, same location as sample No. 5.
7. Composite of samples Nos. 5 and 6.
8. Taken from ore in place in trench, 1½ mi. west of Shumla.
9. Ore in place in trench on Survey 63, Block 52, East Line of Red River R. R. Co.
10. From dump at Glory-hole ½ mi. west of Shumla.
11. Taken from Scherer & Wall's shipping platform at at Shumla.
12. Taken from dump at trench, Survey 63, East Line of Red River R. R. Co., Block 52.

VIII. TITANIUM ORE

2015. Mason County. Titanium ore from Wakefield Iron and Land Co. Sample taken in northeastern part of the county. Sent to Lab. of Univ. Bur. Ec. Geol, for analysis Nov., 1915, by N. J. Badu, Llano, Texas. Anal. by J. E. S B. A. 2835.

IX. TUNGSTEN ORE

The following eight analyses of tungsten ore were made on samples from Section 20, Block 66, Township 5, Texas and Pacific Ry. Culberson County. All analyses were made in 1911 by S. H. Worrell in the laboratory of the Univ. Bureau of Ec. Geology.

Anal. No.

2016. Sample of tungsten ore from a small porphyritic intrusion about 6 inches wide in the bottom of the opening B. A. 116.

2017. Sample from same place as 2016, but badly weathered and oxidized. B. A. 117.

2018. Vertical stringer along right side of opening, about 2 inches thick. B. A. 118.

2019. General sample of the small pile of ore to the north of the opening and presumably sorted out of the material from the excavation. Sept., 1911, by S. H. W.

2020. A general sample of the vein on both sides of the tunnel, supposed to represent, an average of Nos 7 and 9 following, but entirely separate and distinct from them. Taken as a check. B. A. 121.

2021. An average sample from north portion down to the change in dip. B. A. 122.

2022. An average sample of the bottom portion of the tunnel below where the change in dip occurs.

2023. An average sample taken on the south side. B. A. 124.

X. URANIUM ORE

2024.
2025. } Burnet County. Samples of uranium ore taken near Burnet. Sent in by Paul Sheridan of Burnet. Anal. Jan. 6, 1917, by J. E. S. B. A. C403 and C 404.

XI. SULPHUR ORE

INTRODUCTORY NOTE.—The sulphur ores of which analyses are given have been collected by E. L. Porch in connection with his study of their deposits, and the latter, as well as the samples have been published in University of Texas Bulletin No. 1722, "The Rustler Springs Sulphur Deposits", to which the reader is referred for further particulars concerning these samples.

Anal. No.

3075. Culberson County. Medium and high grade sulphur ore, from the Rustler Spring Sulphur Field. Picked sample of draw brown, thin irregularly banded, clay-like sulphur from Johnson Prospect. Analyzed by J. E. S. B. A. C-394.

3076. Culberson County. Same as above, except picked sample of brown, earthy material from the main exposure at the Kyle Prospect. Anal. 1917 by J. E. S. B. A. C-390.

3077. Culberson County. Same as above, except picked sample of yellow conglomerated material from the main exposure at the Kyle Prospect. Anal. 1917 by J. E. S., B. A., C-389.

3078. Culberson County. Same as above, except black gypsiferous material from the dump at pit No. 5, on the Spann Felch holdings. Analyzed 1917 by J. E. S. B. A. C-386.

3079. Culberson County. Same as above, except dark gypsiferous conglomerated material from the hard conglomerate layer on the north side of locality 8 of the property of Michigan Sulphur and Oil Co. Analyzed 1917 by J. E. S. B. A C-374

3080. Culberson County. Same as above, except picked sample of dark gypsiferous material from above the hard conglomerate layer mentioned under sample No. 5. Analyzed 1917 by J. E. S. B. A. C-381.

3081. Culberson County. Same as above, except mixed brown and black conglomeratic material from the S. W. corner of

locality 8. Some of the black material contains metallic sulphides. From the Michigan Sulphur and Oil Co. Analyzed 1917 by J. E. S. B. A. C-375 and C-376.

3082. Culberson County. Same as above, except altered conglomerate from the north side of locality 8, marked on sketch map of Michigan Sulphur and Oil Co., property. Analyzed 1917 by J. E. S. B. A. C-377.

3083. Culberson County. Same as above, except picked sample of black gypsiferous material from locality 16, marked on sketch map of Michigan Sulphur and Oil Co. Contains cream-colored or kaolin-like and greenish-yellow crystallized sulphur. Analyzed 1917 by J. E. S. B. A. C-379 and C-380.

3084. Culberson County. Brown earthy material overlying the material of serial number 3083. Analyzed by J. E. S. B. A. C-382.

3085. Culberson County. Picked sample of brown earthy and black conglomerate material from locality marked 13 on sketch map of Michigan Sulphur and Oil Co. property. Analyzed 1917 by J. E. S. B. A. C-378.

3086. Culberson County. Sulphur ore. Picked sample of gypsite from the Georgetown Prospect. Analyzed 1917 by J. E. S. B. A. C-393.

3087. Culberson County. Sulphur ore. Picked sample of brown earthy siliceous material from the main exposure at the Cooksey Prospect. Analyzed 1917 by J. E. S. B. A. C387.

3088. Culberson County. Sulphur ore. Black banded gypsiferous material from the Cooksey Prospect. Analyzed 1917 by J. E. S. B. A. C-388.

3089. Culberson County. Sulphur ore. Yellow incrustation now being deposited at Stinking Seep. Anal. 1917 by J. E. S. B. A. C-395.

3090. Culberson County. Sulphur ore. Picked sample of sulphur from near Walker's Ranch, probably in the southwest corner of Section 4, Block 109. Analyzed 1917 by J. E. S. B. A. C-391 and C-392.

3091. Culberson County. Sulphur ore. Sample of massive sulphur from the east side of the east hill, Grant Mines Property. Analyzed 1917 by J. E. S. B. A. C-396.

3092. Culberson County. Sulphur ore. Sample of gypsite from the University lands. Analyzed 1917 by J. E. S. B. A. C-383.

3093. Culberson County. Analysis of sulphur-bearing deposits from the Rustler Springs Sulphur Field. Analyzed by J. E. S. 1917. Drab-colored porous rock containing much

selenite. From the center of Section 34, Block 70. Sample taken by Dr. J. A. Udden. B. A. C-421.

3094. Culberson County. Same as above, except sample was of pure white clay-like material, containing considerable gypsum. From the S. E. corner of Section 13, Block 70. Sampled by J. A. U. Analyzed 1917 by J. E. S. B. A. C-422.

3095. Culberson County. Same as above, except sample was clay from S. E. corner, Section 13, Block 70. Sample taken by J. A. Martin, Jr., Toyah, Texas. Analyzed 1917 by J. E. S. C-426.

3096. Culberson County. Same as above, except sample was silcious gypsite. Typical rock from the Johnson Prospect. Analyzed 1917 by J. E. S. B. A. C-425.

3097. Culberson County. Same as above, except sample was dark gypsiferous and conglomeratic material, from beneath the hard conglomerate layer on the north side of locality marked 8, on the sketch map of the Michigan Sulphur and Oil Co. property. Analyzed 1917 by J. E. S. B. A. C-423.

3098. Culberson County. Same as above, except sample was typical brown earthy material from the main exposure at the Cooksey Prospect. Analyzed 1917 by J. E. S. B. A. C-424.

3098a. Pecos County. Sulphur ore from DuPont No. 1, 14 miles north of Ft. Stockton. Analyzed 1917 by J. E. S. B. A. C-524.

3098b. Pecos County. Sulphur ore from Kinsella Well, 14 miles north of Ft. Stockton. Analyzed 1917 by J. E. S. B. A. C-524a.

POTASH SOURCES

3157. Brewster County. Samples of white crystals as picked up at their source. From Aqua Frio Mountain, 65 miles southwest of Marathon. Samples secured by Dr. G. W. Worthington and Mr. J. T. Robison, State Land Commissioner. Analyzed Nov. 15, 1918, by J. E. S. B. A. No. C819 (1).

3158. Brewster County. Sample of bluish-grey rock mixed with crushed, water soluble crystals. Same source as 3157 and collected by same parties. B. A. No. C819 (2).

3159. Brewster County. Sample of white rock with dark spots and streaks. Same source as 3157. B. A. No. C819 (3).

3099. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt." Depth below surface 875-925 feet. Study made by Dr. J. A. Udden. Analyzed 1915 by J. E. S. B. A. 2193.

3100. Potter County. Boden boring. Potash in the Texas

Permian. Nature and condition of sample, "Rock Salt." Depth 875-925 feet. Analyzed 1915 by J. E. S. B. A. 2257.

3101. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Crystals of rock salt in anhydrite." Depth 875-925 feet. Analyzed by J. E. S. 1915. B. A. 2258.

3102. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt Containing Some Red Fragments." Depth 875-925 feet. Analyzed by J. E. S. 1915. B. A. 2280.

3103. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt." Depth 875-925 feet. Analyzed by J. E. S. 1915. B. A. 2274.

3104. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt." Depth 1290-1460 feet. Analyzed by J. E. S. 1915. B. A. 2282.

3105. Potter County. Boden Boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt." Depth 1290-1460 feet. Analyzed by J. E. S. 1915. B. A 2283.

3106. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt from upper part of dump." Analyzed by J. E. S 1915 B. A. 2335.

3107. Potter County Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt from uprer part of dump." Analyzed by J. E. S. 1915 B. A 2273.

3108. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt from upper part of dump." Analyzed by J. E. S. 1915 B. A. 2334.

3109. Potter County. Boden boring. Potash in the Texas Permian. Same as above. B. A. 2275.

3110 Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt from middle part of dump." Analyzed by J. E. S. 1915. B. A. 2276.

3111. Potter County · Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt from lower part of dump." Analyzed by by J. E. S. 1915. B. A. 2284.

3112. Potter County. 3112-3113 same as above. B. A. 2278 and 2285.

3114. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Rock Salt in a matrix of anhydrite." Analyzed by J. E. S. 1915. B. A. 2279.

3115. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Some colorless salt present." Depth 870-930 feet. Analyzed by J. E. S. 1915. B. A. 2281.

3116. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "All red salt." Depth 875-925 feet. Analyzed by J. E. S. 1915. B. A. 2193.

3117. Potter County. Boden boring. Potash in the Texas Permian. Nature and condition of sample, "Taken from dump, some colorless salt present." Analyzed by J. E. S. 1915. B. A. 2336.

3118. Randall County. Miller boring. Potash in the Texas Permian. Nature and condition of sample, "Cuttings of rock salt, no color." Depth 1300 feet. Analyzed by J. E. S. 1915. B. A. 2293.

3119. Randal County. Miller boring. Potash in the Texas Permian. Sample, "Cuttings of rock, some yellow." Depth 1300 feet. Analyzed by J. E. S. 1915. B. A. 2295.

3120. Randall County. Miller boring. Potash in the Texas Permian. Sample, "Cuttings taken on dump." Depth, middle of dump. Analyzed by J. E. S. 1915. B. A. 2296.

3121. Randall County. Miller boring. Potash in the Texas Permian. Sample, "Cuttings taken on dump, some reddish fragments." Middle of dump. Analyzed by J. E. S. 1915. B. A. 2297.

3122 Randall County. Miller boring. Potash in the Texas Permian. Sample same as above. Analyzed by J. E. S. 1915. B. A. 2294.

3123. Randall County. Miller boring. Potash in the Texas Permian. "Cuttings taken from lower part of dump." Analyzed by J. E. S. 1915. B. A. 2287.

3124. Randall County. Miller boring. Potash in the Texas Permian. "Cuttings taken from lower part of dump." Analyzed by J. E. S. 1915. B. A. 2292.

3125. Randall County. Miller boring. Potash in the Texas Permian "Efflorescent salt' on surface of dump." Analyzed by J. E. S. 1915. B. A. 2289.

3126. Randall County. Miller boring. Potash in the Texas Permian. "Cuttings taken on dump.' Analyzed by J. E. S, 1915. B. A. 2298.

3127. Randall County. Miller boring. Potash in the Texas

Permian. "Cuttings taken on dump, much shale present." Analyzed by J. E. S. 1915. B. A. 2291.

3128. Randall County. Miller borning. Potash in the Texas Permian. "Cuttings taken from dump, some red salt present." Analyzed by J. E. S. 1915. B. A. 2288.

3129. Randall County. Miller boring. Potash in the Texas Permian. "Picked red salt fragments." Depth 1500-1700 feet. Analyzed by J. E. S. 1915. B. A. 2215.

3130. Randall County. Miller boring. Potash in the Texas Permian. "Picked fragments containing some red salt." Depth 1700-2100 feet. Analyzed by J. E. S. 1915. B. A. 2220.

3131. Randall County. Miller boring. Potash in the Texas Permian. Same as above. B. A. 2216.

3132. Randall County. Miller boring. Potash in the Texas Permian. "Colorless salt in anhydrite." Depth 1700 feet. Analyzed by J. E. S. 1915. B. A. 2290.

2545a. Tom Green County. **Potash**—in water from well four miles north of San Angelo, on ranch of J. W. Harris. Depth of well, 2448 ft. Flow 106 gallons per minute. Analyzed Aug. 3, 1918, by J. E. S. B. A. C732. Analytical results are given in Part 2 under No. 2545a which is placed with the water analyses.

3160. Terry County. **Potash** in "Salt Lake". Analyses made by Ft. Worth Laboratories, Pres. F. B. Porter, March 13, 1919. Entered in U. of T. Records under B. A., C974.

NITRATE SOURCES

3157.
3158. } Brewster County. See same numbers under **Potash Sources** above.
3159.

3161. Presidio County. Soda Niter. From T. R. Owen. Canlelaria. Contained in very hard dense trachyte, inclining towards porphyrytrachyte. Inclusions of sanidin and labradorite. Partial analysis by E. B. P. B. A. No. 30.

3162. San Saba County. Samples of porous (washed out) limestone rock with crystalline salt in interstices. Found 3 miles east of San Saba, on E. Gilman Survey No. 34 now owned by E. A. Petty. Sample secured by C. M. Ellis. Analyzed Feb. 6, 1919 by J. E. S. B. A. No. C858.

NATURAL GAS

NOTE ON SOURCES, COMPOSITION, ETC.—Natural gas has been discovered in small quantities in nearly all parts and formations of the state. Productive pools of commercial importance occur at Petrolia and Moran in the Pennsylvanian rocks, and at Mexia, and Piedras Pintas in the upper Cretaceous sediments. A peculiarity of the Pennsylvanian gas is its large content of nitrogen. An interesting fact in this connection is that many of the deeper shales of the Pennsylvanian rocks yield much ammonia on distillation.

Furthermore,—the wells in the Petrolia field furnish helium, the greatest amount being 1%. The U. S. Government is extracting helium from these gases. The gas must contain more than 0.5% of helium to make its extraction commercially profitable.

Anal. No.

2116. Clay County. Sample from Wichita Falls. Anal. 1912 by S. H. W. B. A. 170.

2117. Clay County. Sample of natural gas from Petrolia Field. Anal. by W. M. Russell, gas inspector in Ft. Worth. U. T. B. 307, p. 80.

2118. Clay County. Natural gas fom the Patrolia field. Anal. by the United Gas and Improvement Co. of Philadelphia, Pa. Sept. 1909. U. T. B. 307, p. 80.

2119. Clay County. Natural gas from Petrolia. Anal. by United Gas and Improvement Co. of Philadelphia, Pa. Anal. 1910. U. T. B. 307, p. 80.

2120. Clay County. Natural gas from Petrolia Field, sampled from pipe line in Dallas. Anal. 1912 by S. H. W. U. T. B. 307, p. 80.

2121. Clay County. Sample of natural gas from Petrolia Field, sample taken from main in Ft. Worth, Texas. Anal. 1913 by S. H. W. U. T. B. 307, p. 80.

2122. Clay County. Natural gas from the Lone Star Gas. Co., Ft. Worth. Anal. 1916 by J. E. S. B. A. C253.

2123. Clay County. Sample of natural gas taken from main of the North Texas Gas Co. at Wichita Falls. Sampled by W. B. Phillips, Dec. 16, 1911. Anal. by S. H. W. B. A. 158.

2124. Clay County. Sample of natural gas taken from main at the plant of the Wichita Falls Grain and Elevator Co. by W. B. P. Dec. 19, 1911. Anal. by S. H. W. B. A. 159.

2125. Clay County. Sampled at main of the North Texas Gas Co., Wichita Falls. Anal. 1912 by S. H. W. B. A. 170.

2126. Clay County. Natural gas, sampled at main in Ft. Worth by C. W. Sears. Anal. 1912 by S. H. W. B. A. 171.

2127. Clay County. Natural gas from Petrolia, taken from main in Dallas, 1912, by C. W. Tippy. Anal. 1912 by S. H. W. B. A. 172.

2128. Clay County. Sample of natural gas from main of the North Texas Gas Co., piped to Wichita Falls. Anal. Jan. 30, 1913 by S. H. W. B. A. 177.

2129. Clay County. Natural Gas from Petrolia from the mains of the Dallas Gas Co., Dallas. Anal. Feb. 1913 by S. H. W. B. A. 191.

2130. Coleman County. Natural gas from the Santa Anna Gas Co. of Santa. Anal. 1916 by J. E S. B. A. C171.

2130a Coleman County. From Santa Anna Gas Co., Santa Anna. Anal. 1918 by J. E. S., B. A. C747.

2131. Erath County. Natural gas from Thurber. Anal. Jan. 24, 1914 by S. H. W. B. A. 1162.

2132. Gonzales County. Gas from well 9 miles west of Gonzales. Anal. by S. H. W. U. T. B. 307. p. 80.

2133. Houston County. Natural gas from 14 miles west of Crockett. Anal. by S. H. W. U. T. B. 307, p. 80.

2134. Limestone County. Natural gas from the Mexia-Groesbeck field. Sample taken from Mexia Oil and Gas Co.'s Adamson Well, near the north end of the gas field. Anal. by G. A. Burrell of the Bureau of Mines. U. S. G. S. B. 629, p. 102.

2135. Limestone County. Natural gas from the Central Texas Oil Co.'s Gamble Well, between the Adamson Well and the Navasota River. Anal. by G. A. Burrell of the U. S. Bureau of Mines. U. S. G. S. B. 629, p. 102.

2136. Limestone County. Natural gas from the Posey Well, No. 1, of the Herring Oil and Gas Co., a short distance south of the Navasota River. Anal. by G. A. Burrell of the U. S. Bureau of Mines, Washington. U. S. G. S. B. 629, p. 102.

2137. Limestone County. Natural gas from the Anglin Well of the Robinson Oil and Gas Co., Mexia-Groesbeck Field at the south end of the field. Anal. by G. A. Burrell, of the U. S. Bureau of Mines. U. S. G. S. B. 629 p. 102.

2138. Maverick County. Natural gas from the Fleming and Davidson Well. Depth 712 feet. Anal. by S. H. W. U. T. B. 307 p. 80.

2139. McMullen County. Sample of natural gas from Crowther, Boston and Texas corporation. Anal. by S. H. W. U. T. B. 307, p. 80.

2140. Montgomery County. Sample of natural gas marked:

"South Texas Developing Co., Well No. 1," Montgomery County." Anal. 1915 by J. E. S. B. A. 2261.

2141. Navarro County. From Navarro County Oil Field. J. W. S. E. Vol. IX, p. 588. (Dec. 1904.)

2142. Palo Pinto County. Strawn Oil Field, just west of the town of Strawn in southwestern part of the county. From the Stuart Bros. Well No. 10, (Texas and Pacific Coal Co. No. 37), from pipe line ¼ mile from well. Anal. by G. A. Burrell of the Bureau of Mines. U. T. B. 307, p. 80.

2143. Palo Pinto County. Natural gas from the Texas and Pacific Well No. 15, from pipe line 1 mile from the well. Anal. 1915 by G. A. Burrell of the Bureau of Mines. U. T. B. 307, p. 80.

2144. Palo Pinto County. Natural gas from the Dallas Gas and Fuel Co. of Dallas. Anal. 1901 by S. H. W. and O. H. P. T. M. S. A. 1323.

2145. Red River County. Natural gas bubbling up through the Red River at the mouth of Cask Creek. Anal. 1912 by S. H. W. B. A. 197.

2146. Robertson County. Sample from Corsicana Petroleum Co., Dallas. Marked "From well on A. J. Adams farm near Hearne." Anal. by J. E. S. B. A. 2460.

2147. San Patricio County. Natural gas from well at Gregory. Anal. 1914 by J. E. S. B. A. 2128.

2148. San Patricio County. Sample of natural gas from Well No. 2 of the White Point Oil and Gas Development Co. about 8 or 9 miles northwest of Corpus Christi. Anal. 1914 by J. E. S. B. A. 2092.

2149. Shackelford County Natural gas from gas line 16 miles from well at Moran. Sampled at main of Lone Star Gas Co., Ft. Worth. Anal. by S. H. W. U. T. B. 307, p. 80.

2150. Trinity County. Natural gas from spring one mile east of town of Trinity. Anal. by S. H. W. U. T. B. 307, p. 80.

2151. Webb County. Sample of the natural gas supplied to city of Laredo from Reiser by the Border Gas Co. Anal. by S. H. W. B. A. 311. U. T. B. 307, p. 80.

2152. Webb County. Same as 2151. U. T. B. 307, p. 80.

2153. Zapata County. Natural gas received from Laredo marked "Well No. 1, on J. D. Jennings farm, in Section 207, Zapata County about 30 miles south of Aguilares." Anal. 1914 by J. E. S. B. A 1986.

WATER

Relation of Composition to Source.—It might be expected that waters should be classified as stagnant surface waters running surface waters, spring waters, and shallow and deep well waters, and that the latter may be further classified as coming from different strata with more or less inidividual characteristics as to the solutions furnished. However, it is impossible to carry out such a classification in a categorical manner. The greater part of the time our streams of central and west Texas, except those of largest size, are not running, and the water held in pools of the larger or smaller size can be found in all degrees of concentration due to evaporation, precipitation and natural filtering through sands. Some of our streams disappear in porous sands, silts and even porous limestones, to appear again at other points as springs. It is difficult also to draw distinctions between wells and springs in many cases. Much of the drainage of the west is underground in limestones and appears as large springs which continue their flow as small and permanent streams. Shallow wells and deep wells would be an entirely arbitrary distinction of no value.

A geologic classification can be made in many cases, but in other cases, again, it cannot be made on account of a lack of knowledge of the condition of the well at the time the samples were taken. Thus in many regions, bore holes penetrate several different water-bearing horizons which will mingle in the product of the well, if this is not cased. Even when cased, there may be leaks in the casing which nearly always develop after some years of service. However, concerning samples from definite strata, the following general facts may be stated.

Deep wells which are nearest the outcrop of the water-bearing rocks are less mineralized than wells far away. A general survey of our water horizons shows that the Trinity sand furnishes our most desirable deep waters over a large part of the eastern area of the state. The waters obtained from sands in the Pennsylvanian are nearly always salty and frequently produce strong brines. The sands of the middle Comanchean produce many of our mineral waters. They are rich in magnesia and alkalies.

Some quite pure water occurs in the Cambrian sandstone around the Central Mineral Region. The waters furnished by the sands and conglomerates of the Triassic formation on the east side of the Llano Estacado are good potable waters. An unique class of waters is found in springs issuing from the Permian formation on the east side of the Delaware Mountains and in the Rustler Hills. These waters frequently contain sulphuric acid.

Further than this, it is not safe to venture any general statements without a detailed consideration of the geological formations and physical structure of the layers in which a water is found. Such discussions, to be worth anything, must necessarily be lengthy and detailed, and cannot be given here. They will be found in the following publications:

Bulletin No. 9 of the University of Texas Mineral Survey, "Reconnaissance in Trans-Pecos, Texas, north of the Texas and Pacific Railway," by George Burr Richardson.

Water Supply and Irrigation, Paper No. 191 of the U. S. Geol. Survey: "The Geology and Water Resources of the Western Portion of the Panhandle of Texas," by Charles N. Gould.

Water Supply, Paper 335, of the U. S. Geol. Survey: "Geology and Underground Waters of the Southeastern Part of the Texas Coastal Plain," by Aleyander Deussen.

Bulletin of the University of Texas No. 57 (1915), "Geology and Underground Waters of the Northern Llano Estacado," by Charles Lawrence Baker.

MANNER OF REPORTING THE ANALYTICAL RESULTS.—The analytical results obtained in the determination of the soluble salts in waters are reported *first* in "number of parts of solid per million parts of water", and *second* in "relative number of combining units", the latter being the number of gram-equivalents of each ion per 1000 liters,—as shown in the following example of a report of a water analysis:

Constituents	Parts per million	Relative Number of Combining Units (Gram-Equiv. per 1000 Liters	
Calcium ion	138	6.89	
Magnesium ion	29	2.37	
Sodium ion	69	2.99	12.25
Carbonate ion	12	0.40	
Bicarbonate ion	290	4.76	
Sulphate ion	198	4.12	
Chloride ion	106	2.97	12.25

Since in the formation of any salt a given number of units of any positive ion (or metal atom) combines with an equal number of units of any negative ion (or acid radical), it is evident that—

(a) the sum of the "relative number of combining units" of *all* the positive ions should be equal to the corresponding sum of the negative ions—and the third column of figures shows this to be so;

(b) the sum of the relative number of combining units of the carbonate ion plus that of the bicarbonate ion is 5.16,—hence if these ions are removed in combination with calcium, then $\frac{5.16}{6.89}$ of 138 = 103 parts per million is the total amount of calcium which will be thus removed, and the total amount of salts thus removed from the water is the sum of the weights of their constituents, that is, 103+290+12=405 p.p.m.

Similarly other quantity relations necessary for the interpretation of a water analysis are readily obtained.

In this publication, the *second* numbers, which express the relative numbers of combining units, have been enclosed in parentheses, and placed *below* their corresponding first numbers. The latter express parts per million.

Substances other than the ions of soluble salts are reported directly as determined in the analysis. Thus the total solids,

the volatile and organic matter and the suspended matter are reported in just the amounts and forms in which they were obtained from the water and weighed. With reference to the suspended matter, it should be remarked that it includes only that finely divided material which can not be separated from the water by filtering, and which is usually spoken of as being in colloidal solution: in other words, ordinary suspended matter was either absent in these samples or it had been removed by filtration and hence is not included under the column of suspended matter here. The materials present in colloidal solution are usually those listed in these analysis,—namely, silica, iron oxide, and alumina. The elements silicon, iron, and aluminum are scarcely ever present in such dilute solutions as these in any other form than their oxides. Hence, they are reported in this form.

The fundamental idea of the method used here for reporting the analyses of waters is to express, directly, the results obtained by chemical analysis—that is, with as little arbitrary or unnecessary re-calculating as possible—and yet to have them intelligible at a glance.

In many analyses, sodium and potassium are reported together; in these cases the number of combining units could not be calculated, and hence the numbers in parentheses are omitted.

Relation Between Salt Content and Quality.

Waters for Domestic Use.—Water for domestic use should be colorless (free from sediment), odorless, and agreeable to the taste (not salty, or sweetish). A water that meets these requirements may usually be used for domestic purposes without being examined for anything except its bacterial content.

Such water usually contains less than 2 parts per million of iron, and less than 600 parts per million of total dissolved solids.

Very small amounts of iron impart a decided taste to water: —waters containing more than 8 parts per million of iron cannot be used for domestic purposes until the iron has been re-

moved chemically. Waters with high iron content are classed as *chalybeate* waters. Much less than 8 parts per million of iron will give a water a chalybeate taste, and produce rust spots on fabrics.

When, as is mostly the case, waters contain only ions of calcium, magnesium, sodium, carbonate, sulphate, and chloride, they may carry much more than 600 parts per million of dissolved salts and yet be usable for domestic purposes. However, when they contain from 300 to 600 parts per million of chloride ion, they taste slightly brackish or salty, with 800 to 900 parts per million of chloride ion, waters are distinctly disagreeable to the taste, and with more than 2000 parts per million of chloride ion, they are undrinkable. Stock, however, are said to tolerate slightly more than 2000 parts per million of chloride ion.

Large amounts of sulphate ion in a drinking water are more objectionable than the same amount of chloride ion: 2000 parts per million of sulphate ion is laxative, and continual drinking of it is disastrous.

Water for Steam Boilers.—In steam boilers, the mineral constituents may produce three different kinds of trouble—corrosion, scale formation, and foaming.

Corrosion is due mostly to free acid—either present as such or produced by the decomposition (hydrolysis) of iron or aluminum salts, and of magnesium chloride in waters free from carbonates. These ingredients in corrosive waters can usually be "neutralized" or removed without much trouble or cost,—hence there is no excuse for using such waters raw in boilers. Any chemist can, after examining the water, give proper directions for removing this cause of corrosion.

Water high in sodium ion—e.g. 400 parts per million or more—are also decidedly corrosive; nothing can be done to lessen this trouble except distilling it.

Scale formation in boilers takes place by the calcium ion combining to the full extent with the carbonate, bicarbonate, and sulphate ions, the separation of silica, alumina, and iron oxide as such, the separation of magnesium as the oxide (or car-

bonate), and the inclusion of suspended matter by all of these. If these scale forming ingredients in a water amount to—

(Parts per million)

more than	and less than	then the water is classified as
..	90	good
90	200	fair
200	430	poor
430	680	bad
680	..	very bad

(Table by R. B. Dole, U. S. G. S. W. S. 335, page 104).

Waters containing from 90-200 parts per million of scale forming ingredients can be profitably treated to remove the scale former; those containing above 200 parts per million *should* always be so treated.

An upper limit for this softening treatment is reached when the resulting water contains 200 to 400 or more parts of sodium (and potassium) ion per million parts of water, because such water is liable to foam. However, the foaming tendency of water can be lessened, or foaming entirely prevented, by filtering the water and by keeping the boiler contents clean and free from sediment.

Even, then, a water containing more than 400 p.p.m. of sodium is objectionable because it produces corrosion.

WATER FOR IRRIGATION.—Great concentrations of *soluble* salts inhibit the growth of plants, and of sodium carbonate even small amounts, are objectionable unless gypsum is used to react with it. It is impossible to state even approximate limits for the amounts of soluble salts allowable in irrigation waters, because many factors such as the character of the crop, the character of the soil, the drainage, etc., enter into the determination of the amounts of salts allowable. The question can be answered only by a chemist who has an opportunity to study the water, the soil, the subsoil, and the crops to be grown.

As a very rough approximation it may be said that waters containing more than 350 p.p.m. of chloride ion are unfit for irrigation.

I. WELL WATER.

Anal. No.

2154. Angelina County. Well water from 2½ miles west of Platt, on land owned by A. P. Mimmey. 430 to 456 feet deep. Wilcox formation. Sept. 1907 by B. L. Glasscock. U. S. G. S. W. S. 335, p. 110.

2155. Same as No. 1, except that the well is 1024 to 1070 feet deep.

2156. Austin County. From well at Kennedy, Texas. Sample from Maulding Land Co., San Antonio. Analyzed by W. T. Read Jan. 18, 1913. B. A. C827

2157. Bastrop County. Artesian water from depth of 220 feet under 40 feet of coarse white sand. Sent by J. T. Crysup. Bastrop, Texas. B. A. 2524.

2158. Baylor County. Well water. Roundhouse well at Seymour. By W. M. Barr. U. S. G. S. W. S. 317, p. 60. Sampled Nov. 1, 1906.

2159. Baylor County. Gin well at Round Timber. 20 feet deep. U. S. G. S. W. S. 317, p. 69.

2160. Baylor County. Well at Round Timber. 200 yards N. E. of store. 40 feet deep. U. S. G. S. W. S. 317, p. 69. Sampled, October 1906.

2161. Bell County. Artesian water. Trinity reservoir. Fort Worth, Southward. Owner Professor C. L. Myers. Reporter, Prof. C. L. Myers. These waters are from an upper Trinity reservoir, or possibly from the Glen Rose reservoir. U. S. G. S. A. R. 21 part 7, p. 449.

2162. Bexar County. Terrell Well, San Jose, Texas. Analyzed by W. T. Read, who collected sample. No data given. B A. C828.

2163. Bexar County. Well at Guenther Milling Co. San Antonio. B. A. No. 2679.

2164. Bowie County. From a spring near Dalby Springs, Bowie County, Wilcox formation. Date of analysis not given. W. S. Paper 276, p. 75.

2165. Bowie County. Well near New Boston, furnishing city water supply. Nacatoch formation. Analyzed Sept. 10, 1907 by R. B. Dole and M. G. Roberts. W. S. Paper 276, p. 75.

2166. Bowie County. Same date as No. 2165.

2167. Brazoria County. Well water from Terry's Landing, from land of Guy M. Bryan, Lissie formation. Depth 1,020 (?) feet. U. S. G. S. W. S. 335, p. 110.

2168. Brazoria County. Well water from Velasco. From E. D. Dechester. Lissie formation, 1,100 feet in depth. Analyzed by H. H. H., U. S. G. S. W. S. 335, p. 110.

2169. Brazoria County. From 3½ miles S. E. of Velasco, from land belonging to. C. H. Alexander. Depth unknown

Analyzed by Dr. Edgar Everhardt, of the University of Texas. U. S. G. S. W. S. 335, p. 110.

2170. Burleson County. From village of Clay. Depth 647 to 687 feet. Yegua formation. U. S. G. S. W. S. 335, p. 110.

2171. Burleson County. Water from deep well owned by Mit. Parker, 3 miles S. E. of Tunis, Burleson County. Depth 760 feet. W. S. Paper 190, p. 60.

2172. Cass County. From springs owned by H. R. Hughes, Hughes Springs, Texas. Wilcox formation. Collected Sept. 1907. Analyzed by B. L. Glasscock. U. S. G. S. W. S. 276, p. 75.

2173. Cass County. From well owned by W. H. Coon, of Linden. Wilcox formation. Sample collected Nov. 1907. Analyzed by J. R. Bailey and A. McAfee. U. S. G. S. W. S. 276, p. 75.

2174. Chambers County. Water from Smith Spring No. 2. N. W. part of High Island. Analyzed by James Kennedy. U. S. G. S. W. S. 335, p. 110.

2175. Chambers County. Water from Smith Spring No. 3, N. W. part of Chambers County. Analyzed by H. H. H. U. S. G. S. W. S. 335, p. 110.

2176. Cherokee County. From 1½ miles N. E. of Dialville. Sample from Castalian Springs. Analyzed Feb. 1908, by J. R. Bailey and A. M. McAfee. U. S. G. S. W. S. 335, p. 110.

2177. Coleman County. From well of F. D. Snodgrass, Coleman. Sept. 1915. Analyzed by J. E. S. B. A. No. 2767.

2178. Cook County. Artesian water. Gainesville. Lower Trinity Reservoir. Owner, Gainsville Oil Milling & Gin Co. Reporter, officers of company.

2179. Cook County. Artesian water. Gainesville. Lower Trinity Reservoir. North of Trinity. Owner, Gainesville Ice Co. Reporter President of Co. U. S. G. S. A. R. 21, part VII., p. 449.

2180. Culberson County. Water from well on Sayle's ranch in Gypsum Belt. Analyzed by S. H. W. T. M. S. B. IX., p. 86.

2181. Culberson County. Water from Screwbean Spring on eastern slope of Rustler Hills. Analyzed by S. H. W. T. M. S. B. IX., p. 82.

2182. Dallas County. Artesian water from Dallas Court House. Reported by L. M. Conner. Main Woodbine Reservoir. U. S. G. S. A. R. 21, part VII., p. 449.

2183. Dallas County. Well water from the Dallas News. Well at Dallas. Analyzed by W. T. R., Feb. 1, 1917. B. A. No. C1030.

2184. Dallas County. Same as No. 2183, except that it was analyzed in 1915 by W. T. R. B. A. No. C1031.

2185. Deaf Smith County. From well 3 miles S. E. of Hereford. Analyzed by J. E. S. U. T. B. 57, p. 90.

2186. Denton County. Denton, Texas. Woodbine and Paluxy Reservoirs. Analyzed by T. G. S. U. S. G. S. A. R. 21, part VII., p. 449.

2187. Dickens County. From deep well, on Spur Ranch. Submitted by C. A. Jones, Spur, Texas. Depth of well 2200 feet.

2188. Dimmitt County. Mineral water from dug well ½ mile south of courthouse at Carrizo Springs. Depth 60 feet. U. S. G. S. W. S. 66, p. 63.

2189. Eastland County. From about 800 feet of the Scarbrough Well, 6 miles north of Cisco. Analyzed by J. E. S. B. A. 2747.

2190. Ellis County. Artesian water. Waxahachie. Main Woodbine Reservoir. Reporter, E. A. DuBose, Mayor of Waxahachie. By Texas Agricultural and Mechanical College. U. S. G. S. A. R. 21 part VII., p. 449.

2191. Ellis County. Artesian water from Millford. Woodbine and Paluxy Surveys. U. S. G. S. A. R. 21, part VII., p. 449.

2192. Ellis County. Artesian water from Millford. Woodbine and Paluxy Surveys. U. S. G. S. A. R. 21, part VII., p. 449.

2193. El Paso County. From wells of El Paso, Rock Island Ry. wells. Analyses furnished by C. B. Eddy. T. M. S. B. IX., p. 98. At Fort Bliss Station. Depth 260 feet.

2194. El Paso County. Same as before, except depth of well is 420 feet.

2195. El Paso County. Well water from the Rhoden Well in East El Paso. Analysis furnished by S. M. Skeats. T. M. S. B. IX., p. 108.

2196. El Paso County. From White's Well in the Rio Grande Valley, about 10 miles north of El Paso. Analysis furnished by S. M. Skeats. T. M. S. B. IX., p. 107.

2197. El Paso County. From Army Post Well, near Fort Bliss. Analysis furnished the Tex. Min. Survey by the El Paso Chamber of Commerce. Depth 312 feet. T. M. S. B. IX, p. 97.

2198. El Paso County. Well water from El Paso Ice and Refrigerating Co. Inferior shallow water at 199 feet. Separated from good water by clay stratum 9 feet. Analysis furnished by S. M. Skeats. T. M. S. B. IX., p. 107.

2199. El Paso County. Water from El Paso Hot Wells. Analysis furnished by S. M. Skeats. Depth 1,000 feet. Temperature 110° F. U. T. B. 365, p. 116.

2200. El Paso County. Well water from 70-foot well on ranch of A. Courchesne near Ysleta about 12 miles S. E. of El Paso. U. S. G. S. W. S. 141, p. 75.

2201. El Paso County. From Chemical Springs (Stinking Seep) in N. E. part of El Paso County, 3 miles N. W. of Cooksey's ranch. Section 44, Blk. 60. Sampled by W. B. P. Analyzed 1904 by S. H. W. B. A. C967.

2202. El Paso County. Hydrant water from El Paso. Analyzed for Chamber of Commerce, El Paso. T. M. S. B. IX., p. 108.

2203. El Paso County. From lime quarry, El Paso. Depth 30 feet. W. S. Paper, 141, pp. 76-77.

2204. El Paso County. From new 400-foot well of El Paso Ice and Refrigerator Company, El Paso, Texas. W. S. Paper 141, pp. 76-77.

2205. El Paso County. Near El Paso. Analysis made on total solids. W. S. Paper 141, pp. 74-75.

2206. El Paso County. Same as above.

2207. El Paso County. Van Horn Quadrangle. Water from Railroad wells at Van Horn. Collected Nov. 10, 1910. Analyzed by Dole, Palmer and Collins. U. S. G. S. Folio, No. 194.

2208. El Paso County. Water from the well at Figure Two Ranch Headquarters. Collected Nov. 1, 1908. Depth of well 30 feet. U. S. G. S. Folio, No. 194.

2209. El Paso County. J. S. Borcher's Well, 8 miles below El Paso. Analyzed by Arthur Goss. U. S. G. S.

2210. El Paso County. Same as above.

2211. El Paso County. Army Post Well, Fort Bliss. U. S. Folio, No. 166, p. 11.

2212. El Paso County. El Paso and N. W. Ry. Well, Fort Bliss. U. S. Folio, No. 166, p. 11.

2213. El Paso Hydrant (Old System). U. S. Folio, No. 166, p. 11.

2214. El Paso County. E. J. Hadlock Valley wells, 3 miles east of El Paso. U. S. Folio, No. 166, p. 11.

2215. El Paso County. J. S. Porcher Valley wells, 8 miles east of El Paso. U. S. Folio, No. 166, p. 11.

2216. El Paso County. Same as above.

2217. El Paso County. A. Courchesne Valley wells, Ysleta. U. S. Folio, No. 166, p. 11.

2218. Erath County. Sutherland Mineral water. Owned by Duffan Mineral Wells Developing Co., Duffan. Analyzed by G. S. Fraps, of A. & M. College, U. T. B. 365, p. 118.

2219. Erath County. Jones Gas Well, Stewart Pasture. Depth 1290 feet. Sent by W. K. Gordon, Thurber, Texas. Analyzed by J. E. S. B. A. No. 2551.

2220. Falls County. Artesian Water from Marlin. Glen Rose

Reservoir. Analyzed by W. H. Allen. U. S. G. A. R. 21, part VII., p. 449.

2221. Falls County. From Marlin Hot Wells. Depth of well 3,350 feet. Analyzed by E. Everhardt of University of Texas. U. T. B. 365, p. 119.

2222. Floyd County. Well near N. W. corner, Section 6, Blk. K, Floyd County, near Hale County line. Submitted by F. H. Hillebrand. Analyzed 1914 by J. E. S. B. A. No. 2121.

2223. Fort Bend County. Well water from land of Eliza Jones, near town of Thompson. Lissie formation. Depth 406 feet. Analyzed by J. R. Bailey and A. M. McAfee. U. S. G. S. W. S. 335, p. 110.

2224. Galveston County. Well water from Corner Post Office and 26th Sts. Owned by Brush Electric Light and Power Co., Depth 813 feet. Lissie formation. Analyzed by C. P. Russell. U. S. G. S. W. S. 335, p. 110.

2225. Galveston County. Well water from Texas Ice and Cold Storage Co., corner of 20th and Avenue A, Galveston. Lissie formation. Depth 856 feet. Analyzed by S. P. Sharpless. U. S. G. S. W. S. 335, p. 110.

2226. Galveston County. Well water from the shops of the Santa Fe R. R. Lissie formation. Depth 797 feet. Analyzed by R. Voelker. U. S. G. S. W. S. 365, p. 110.

2227. Galveston County. Well water from well belonging to National Cotton Oil Co., corner of 18th St., and Avenue A, Galveston. U. S. G. S. W. S. 335, p. 110. Analyzed by David Wesson.

2228. Galveston County. Well water from well of the bagging factory, Corner 38th and Church Sts., Galveston. Lissie formation. From the horizon that supplies most of the wells at Galveston. Analyzed by Prof. Williams. U. S. G. S. W. S. 335, p. 110.

2229. Galveston County. Water from Well No. 1, of the South Galveston Land Co., ten miles S. W. of City of Galveston. Lissie formation. Depth 810 ft. From horizon that supplies wells of Galveston. Anal. by H. H. H. U. S. G. S. W. S. 335, p. 110.

2230. Galveston County. Water from well of Galveston City Water Works, at Alta Loma, Well No. 8. Analyzed 1899 by Fraser and Co. Lissie formation. Depth 796 feet. U. S. G. S. W. S. 335, p. 110.

2231. Galveston County. Water from Galveston City Water Works. Well No. 13, Alta Loma. Depth 740 to 860 feet. Lissie formation. Analyzed 1899 by Fraser and Co. U. S. G. S. W. S. 335, p. 110.

2232. Galveston County. Water from well of A. H. Tacquard, of

Hitchcock 1½ miles west of Galveston. Depth 750 feet. Lissie formation. Analyzed Feb. 1908, by J. R. Bailey and A. M. McAfee. U. S. G. S. W. S. 335, p. 110.

2233. Galveston County. Water from well of G. C. and S. F. Ry., Hitchcock. Lissie formation. Depth 711-726 feet. Analyzed by W. H. Melville. U. S. G. S. W. S. 335, p. 110.

2234. Galveston County. Water from J. Tacquard, of Hitchcock, 1½ miles N. W. of Galveston. Depth 710 feet. Lissie formation. Analyzed by W. H. Melville. U. S. G. S. W. S. 335, p. 110.

2235. Galveston County. Water from well of R. T. Wheeler, 1½ miles east of Hitchcock. Lissie formation. Depth 690 feet. Analyzed by W. D. Church. U. S. G. S. W. S. 335, p. 110.

2236. Galveston County. Water from Nichols well, of Dickenson. Lissie formation. Depth 600 feet. Analyzed by W. H. Melville. U. S. G. S. W. S. 335, p. 110.

2237. Galveston County. Water from Fairwood. Lissie formation. Depth 576 feet. Analyzed by J. E. Sieble. U. S. G. S. W. S. 335, p. 110.

2238. Galveston County. Sample from G. H. & H. Ry., at League City. Lissie (?) formation. Depth 935-1,020 feet. Analyzed by the St. Louis Sampling and Testing Works. U. S. G. S. W. S. 335, p. 110.

2239. Galveston County. Well water from Kohfeldt and Braun, ¾ miles N. E. of Lamarque. Lissie formation. Depth 827-843 feet. Analyzed by J. R. Bailey and A. M. McAfee, April, 1908. U. S. G. S. W. S. 335, p. 110.

2240. Grimes County. Spring water from spring on branch of Navasota river. Analyzed by T. G. S. On George Mason headright, 16 miles north of Navasota. U. S. G. S. W. S. 335 p. 110.

2241. Grimes County. Spring water from spring near the one mentioned in No. 2240. Analyzed 1889 by T. G. S. U. S. G. S. W. S. 225 p. 110.

2242. Grimes County. Water from shallow well on George Mason headright, 16 miles north of Navasota. Analyzed 1889 by T. G. S. Depth of well 10-12 feet. U. S. G. S. W. S. 335, p. 110.

2243. Grimes County. Same as No. 2240, except that analysis was made by H. H. H.

2244. Grimes County. Same as No. 2240. Analysis made by T. G. S. 1889.

2245. Grimes County. Water from R. B. Templeman Waterworks, of Navasota. Catahoula formation. Analyzed 1908 by J. R. Bailey and A. M. McAfee. U. S. G. S. W. S. 355, p. 110.

2246. Grimes County. Water from well of R. B. Templeman, from Isaac Jackson league west of Navasota. Catahoula (?) formation. Depth 520 feet. Analyzed Feb. 1908 by J. R. Bailey and A. M. McAfee. U. S. G. S. W. S. 335, p. 110.

2247. Grimes County. Artesian water from Navasota. Depth of well 280 feet. U. S. G. S. W. S. 190, p. 42.

2248. Grayson County. Nos. 2248-2251, inclusive, are well water from Tioga Sanitarium and Water Co., Tioga, Texas. U. T. B. 365, p. 132.

2252. Grayson County. Artesian water, Tioga, Texas, Upper Woodbine Reservoir. Owner, G. W. Rains. Reporter, H. C. Sperry. Analyzed by H. H. H. U. S. G. S. A. R. 21, part VII, p. 449.

2253. Grayson County. Artesian water, El View, Texas. Upper Woodbine Reservoir. Reporter, H. C. Sperry. Analyzed by H. H. H. U. S. G. S. A. R. 21, part VII., p. 449.

2254. Grayson County. Artesian water. Big Mineral Creek. Main Woodbine Reservoir. Reporter, W. C. Eubank. Owner, W. C. Eubank. Analyzed by L. M. Conner. U. S. G. S. A. R. 21, part VII., p. 449.

2255. Grimes County. Water from Navasota. Depth of well 220-237 feet. Catahoula formation. U. S. G. S. W. S. 335, p. 110.

2256. Hale County. Corner Restriction and Archer Streets, Plainview. Miss Mayhew's well, near High School. Analyzed by J. E. S. B. A. No. 1988.

2257. Hale County. From B. H. L. King's well, corner of Third and Jones street, southeast part of town, near north bank of Blanco Creek, Plainview. Analyzed by J. E. S. B. A. No. 1989.

2258. Hale County Courthouse well, center of Plainview. Analyzed by J. E. S. B. A. No. 1990.

2259. Hale County. Bowlin well, corner Sterling and East Sixth Street, Plainview, southeast part of town. Analyzed by J. E. S. B. A. No. 1991.

2260. Hale County. Knight well, Third and East Streets, Plainview, northeast part of city. Analyzed by J. E. S. B. A. No. 1992.

2261. Hale County. Town well, Hale Center. Analyzed by J. E. S. B. A. No. 1993.

2262. Hale County. Sanders well, one mile S. W. of Hale Center. Analyzed by J. E. S. B. A. No. 1994.

2263. Hale County. Moore well, near N. E. corner of Hale County. Analyzed by J. E. S. B. A. No. 2000.

2264. Hale County. A. B. Rosser well, Section 114, Blk. D. 2, N. E. part of county. Analyzed by J. E. S. B. A. No. 2001.

2265. Hale County. Pearson well, No. 2. Submitted by Charles L. Baker, Nov. 14, 1914. Analyzed by J. E. S. B. A. No. 2058.

2266. Hale County. Dan Gray windmill well. About ¼ miles north of S. W. corner. Section 4, Block JK-4 on east side of Running Water Road, near its junction with the Olton Road. Analyzed by J. E. S. B. A. No. 2059.

2267. Hale County. Tar Water well, Running Water Post Office, at post office. Analyzed by J. E. S. B. A. No. 2060.

2268. Hale County. H. W. Witte well, near N. W. corner Section 6, Blk. G, 3¾ miles of Running Water Postoffice. Analyzed by J. E. S. B. A. No. 2061.

2269. Hale County. Olsen well, N. W. corner of Hale County. 75 feet to water. Analyzed by J. E. S. B. A. No. 2062.

2270. Hale County. Malone City Water Works well, Plainview. Analyzed by J. E. S. B. A. No. 2063.

2271. Hale County. Windmill well, north 55° E. of Plainview Courthouse, Plainview. Analyzed by J. E. S. B. A. No. 2072.

2272. Hale County. E. Dowden well, N. E. quarter Section 54, Blk. JK-2. Analyzed by J. E. S. B. A. No. 2073.

2273. Hale County. E. A. Cragen's well, 4½ miles due north of center of Hale Center. Analyzed by J. E. S. B. A. No. 2074.

2274. Hale County. S. H. Howard well, near S. W. corner Section 23, Blk JK-3. Analyzed by J. E. S. B. A. No. 2075.

2275. Hale County. Morgan windmill well, 200 yds. north of irrigation well and ten miles west of Plainview. Analyzed by J. E. S. B. A. No. 2076.

2276. Hale County. Dr. R. R. White's windmill well at the S. E. of the two irrigation wells. Analyzed by J. E. S. B. A. No. 2077.

2277. Hale County. H. H. O'Brien's well, one and one-half miles west-northwest of Aiken and 200 yards south of Floydada branch railroad, 100 yards N. W. of the new syndicate well. Analyzed by J. E. S. B. A. No. 2078.

2278. Hale County. From well in S. W. corner, Section 10, Block A-4. Analyzed by J. E. S. B. A. No. 2122.

2279. Hale County. From F. H. Springer well, N. E. quarter section 11, Blk. 2-A, 55.5 feet to water. Analyzed by J. E. S. B. A. No. 2123.

2280. Hale County. Peter well, 10 miles N. W. of Hale Center. Analyzed by J. E. S. B. A. No. 2124.

2281. Hale County. J. B. Ross well, N. E. corner of Section 20, Blk. A-4. 53.4 feet to water. Analyzed by J. E. S. B. A. No. 2125.

2282. Hale County. From town well, Petersburg. Analyzed by J. E. S. B. A. No. 2126.

2283. Hale County. From Benson well, 9 miles S. W. of Hale Center. Analyzed by J. E. S. B. A. No. 2117.

2284. Hale County. Texas Land and Development Co., Lake Plainview well. U. T. B. 57, p. 90.

2285. Hale County. Texas Land and Development Co., Well No. 2. U. T. B. 57, p. 90.

2286. Hale County. Texas Land and Development Co., Well No. 11. U. T. B. 57, p. 90.

2287. Hale County. Texas Land and Development Co., well No. 43, (Pioneer Farm). U. T. B. 57, p. 90.

2288. Hale County. Texas Land and Development Co., windmill well No. 11, File 72. U. T. B. 57, p. 90.

2289. Hale County. Water from city well, Plainview. U. T. B. 57, p. 90.

2290. Hale County. Water from Col. Smythe irrigation well, Plainview. U. T. B. 57, p. 90.

2291. Hall County. Artesian water, Hubbard City, Glen Rose Reservoir. U. S. G. S. A. R. 21, part VII., p. 449.

2292. Hardeman County. From well of Bert Abbott, Collected Sept. 12, 1907. Depth 65 feet, Upper Permian. U. S. G. S. W. S. 317, p. 62. Analyzed by B. L. Glasscock.

2293. Hardeman County. From well at Ice Plant, Quanah, Texas. Upper Permian. Collected Sept. 24, 1907. Analyzed by B. L. Glasscock. U. S. G. S. W. S. 317, p. 62.

2294. Hardin County. From well of G. C. & S. F. Ry., at Silsbee. Lissie formation. Depth 392-466 feet. U. S. G. S. W. S. 335, p. 110.

2295. Hardin County. From well of Olive-Sternenberg Lumber Co., Olive, Texas. Lissie formation. Depth 286-339 feet. Analyzed by J. R. B. and A. M. McA. 1908. U. S. G. S. W. S. 335, p. 110.

2296. Hardin County. From well of G. C. & S. F. Ry. Co., at Votaw. Lissie formation. Depth 265-320 feet. U. S. G. S. W. S. 335, p. 110.

2297. Hardin County. From well of G. C. & S. F. Ry. Co., at Dies, Lissie formation. Depth 75-268 feet. U. S. G. S. W. S. 335, p. 110.

2298. Harris County. Houston. Water from A. V. Kellogg (H. & T. C. Ry.) Analyzed by S. H. W., 1903. B. A. C965.

2299. Harris County. Brine from Humble oil field, near Houston. Analyzed 1910 by Charles Palmer. U. S. G. S. W. S. 364, p. 16.

2300. Harrison County. Water from Hynson Springs, 6 miles west of Marshall. Mount Selman formation. Analyzed Feb.

1908, by J. R. B. and A. M. McA. U. S. G. S. W. S. 335, p. 110.

2301. Harrison County. From water works, 3 miles N. E. of Marshall. Wilcox formation. Analyzed Sept. 1907 by B. L. G. Depth 60 feet. U. S. G. S. W. S. 335, p. 110.

2302. Harrison County. Same as above but taken at depth 253 feet.

2303. Harrison County. Water from Roeborough Springs No. 1, 9 miles south of Marshall. Analyzed by J. H. H. U. S. G. S. W. S. 335, p. 110.

2304. Harris County. From G. H. & H. Ry., Well No. 1, at Genoa. Lissie formation. Depth 661-683 feet. Analyzed by St. Louis Sampling and Testing Works. U. S. G. S. W. S. 335, p. 110.

2305. Harris County. From well of G. H. & H. Ry., at Genoa, Well No. 2, about 9 feet north of Well No. 1. Lissie formation. U. S. G. S. W. S. 335, p. 110.

2306. Harris County. From well of Cummings Export Co., Houston, 4 miles east of Postoffice. Depth 500 (?) feet. Analyzed 1908 by J. R. B. and A. M. McA. U. S. G. S. W. S. 335, p. 110.

2307. Haskell County. Well of J. W. Westbrook, Haskell, Texas. Depth 10 feet. Seymour formation. Analyzed by B. L. G. U. S. G. S. W. S. 317, p. 65.

2308. Haskell County. Courthouse well at Haskell, Texas. Depth 20 feet. Seymour formation. Analyzed by B. L. G. U. S. G. S. W. S. 317, p. 65.

2309. Haskell County. Well, "Harder water," at Rule, Texas. Depth 75 feet. Upper Permian. Analyzed by B. L. G. U. S. G. S. W. S. 317, p. 65.

2310. Haskell County. Well, "Soft water, at Rule, Texas. Depth 40-50 feet. Seymour formation. Analyzed by B. L. G. U. S. G. S. W. S. 317, p. 65.

2311. Haskell County. Foster and Jones' hotel well, at Rule, Texas. Depth 60 feet. Seymour formation. Analyzed by B. L. G. U. S. G. S. W. S 317, p. 65.

2312. Hays County. Water from Peter Dressen, Kyle, Texas. Depth 500 (?) feet. 4 miles east of Kyle, on pasture of Peter Dressen. T. M. S. A. No. 1456.

2313. Hidalgo County. Artesian water from white sulphur well. Lasater Ranch. Analyzed by H. W. Harper, and B. L. Glascock, April, 1903. U. S. G. S. W. S. 190, p. 8.

2314. Hill County. Artesian water from Hillsboro. Main Woodbine Reservoir. (This water may come from lower reservoirs.) U. S. G. S. A. R. 21, part VII., p. 449.

2315. Hill County. Mineral well water from Hubbard. Depth

3,300 feet. Temperature of water 137° F., and flow 200,000 gallons per 24 hours. Analysis furnished by Hot Wells Sanitarium. U. T. B. 365, p. 145.

2316. Hill County. City water from Hillsboro. Sent by Dr. E. Vaughn, City Health Officer, March 15, 1912. Analyzed J. R. B. B. A. C938.

2317. Hockley County. Sample "A" from flowing well, about 1,000 feet deep, Littlefield lands. Sent by A. P. Duggan. Analyzed by J. E. S. B. A. No. 2413.

2318. Hockley County. Sample "B" from flowing well about 78 feet deep, Littlefield lands. Sent by A. P. Duggan. Analyzed by J. E. S. B. A. No. 2414.

2319. Jack County. From well of J. R. Edmondson at Jeanette, Texas. Analyzed by B. L. G. Sample collected Sept. 24, 1907. U. S. G. S. W. S. Paper 317, p. 86.

2320. Jack County. From well of the Postmaster at Finis, Texas. Analyzed by B. L. G. Sample collected Sept. 24, 1907. U. S. G. S. W. S. Paper 317, p. 86.

2321. Jack County. Vineyard mineral water, at Vineyard, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper 317, p. 86.

2322. Jack County. Helm's well, 12 miles east of Jackboro. Vineyard, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper, 317, p. 86.

2323. Jack County. Well of W. L. Vesner, at Vineyard, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper, 317, p. 86.

2324. Jack County. Well of W. F. Worden, 1 mile west of Courthouse, Jacksboro, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper, 317, p. 86.

2325. Jack County. Well of H. Hensley, 1½ miles west of Courthouse, Jacksboro, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper 317, p. 86.

2326. Jack County. Well at Phipps place, 2 miles N. E. of Courthouse, Jacksboro, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper, 317, p. 86.

2327. Jack County. Hensley and Johnson's farm well at Hess, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper, 317, p. 86.

2328. Jack County. Well at Hannible Pass place, Hess, Texas. Analyzed by B. L. G. U. S. G. S. W. S. Paper, 317, p. 86.

2329. Jasper County. Artesian water from deep well at Kirbyville, U. S. G. S. W. S. Paper, 190, p. 50.

2330. Jasper County. Well water from well of J. A. Bohler, 2½ miles N. E. of Horger. Catahoula formation. Depth 182-660 feet. Analyzed 1908 by J. R. B. and A. M. McA. U. S. G. S. W. S. 335, p. 110.

2331. Jasper County. Water from well of Alexander-Gilmer Lum-

ber Co., at Remlig, Mt. Cook, Mt. Selman and Wilcox formation. Depth 1,037-1,320 feet. U. S. G. S. W. S. 335, p. 110.

2332. Jasper County. Water from Kirbyville. Depth 82-212 feet. Lissie formation. U. S. G. S. W. S. 335, p. 110.

2333. Jasper County. Water from Kirbyville Oil Company, Kirbyville, Catahoula formation. Depth 1,312-1,346 feet. Analyzed by B. L. G. U. S. G. S. W. S. 335, p. 110.

2334. Jasper County. Spring water from Doom Spring at Salt Works, 4 miles east of Rockland. Analyzed Sept: 1907 by B. L. G. U. S. G. S. W. S. 335, p. 110.

2335. Jasper County. Water from well of Kountze Bros. Two miles north of Rockland, Yegua formation. Analyzed Sept. 1907 by B. L. G. Depth 1,229-1,241 feet. U. S. G. S. W. S. 335, p. 110.

2336. Jefferson County. Water from Spindletop Power Co., Spindletop. Lissie formation. Depth 360 feet. Analyzed 1907 by J. R. B. and A. M. McA. U. S. G. S. W. S. 335, p. 110.

2337. Jefferson County. Water from Beaumont Country Club, 3½ miles north of Beaumont. Lissie formation. Depth 360-650 feet. Analyzed 1907 by J. R. B. and A. M. McA. U. S. G. S. W. S. 335, p. 110.

2338. Karnes County. Well at Kennedy, from Moulding Land Co., San Antonio, Texas. B. A. C971.

2339. Lamar County. From salt well on Main street, of Blossom, Texas. Eagle Ford formation. Analyzed by R. B. Dole and M. G. Roberts April 7, 1908. U. S. G. S. W. S. 276, p. 75.

2340. Lamar County. From well of Dr. A. J. Beauchamp, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. Feb. 9, 1907. U. S. G. S. W. S. 276, p. 75.

2341. Lamar County. From well on Main Street, Blossom, Texas. Eagle Ford formation. Analyzed by R. B. D. and M. G. R., Feb. 1907. U. S. G. S. W. S. 276, p. 75.

2342. Lamar County. From Black Well, Blossom, Texas. Eagle Ford formation. Analyzed by R. B. D. and M. G. R., Feb. 14, 1907. U. S. G. S. W. S. 276, p. 75.

2343. Lamar County. From well of J. C. Thompson, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. Feb. 11, 1907. U. S. G. S. W. S. 276, p. 75.

2344. Lamar County. From well of Ed Arnold, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. April 7, 1908. U. S. G. S. W. S. 276, p. 75.

2345. Lamar County. From well of W. J. Wallace, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. Feb. 9, 1907. U. S. G. S. W. S. 276, p. 75.

2346. Lamar County. From well of T. F. Hefner, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. April 7, 1908. U. S. G. S. W. S. 276, p. 75.

2347. Lamar County. From well of Cotton yard, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. April 7, 1908. U. S. G. S. W. S. 276, p. 75.

2348. Lamar County. From well owned by J. W. Williams, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. April 7, 1908. U. S. G. S. W. S. 276, p. 75.

2349. Lamar County. From well of A. P. Ball, Blossom, Texas. Blossom formation. Analyzed by R. B. D. and M. G. R. April 7, 1908. U. S. G. S. W. S. 276, p. 75.

2350. Lamar County. From wells of Frisco Plant, of Paris. Blossom formation. Nov. 29, 1902. Kennicut Water Softener Co., U. S. G. S. W. S. 276, p. 75.

2351. Lamar County. Mineral water from the Blossom Mineral Water Co., Blossom, Texas, Marked "Government Analysis." U. T. B. 365, p. 160.

2352. Lampasas County. Artesian water from Lampasas, Texas. Underlying Paleozoic Rocks. Analyzed by Prof. E. Waller. U. S. G. S. A. R. 21, part VII., p. 449. (This water also contains .186 grains Lithium bicarbonate not included in total.)

2353. Lavaca County. Hallettsville. Water from St. Mary's Mineral Well. U. T. B. 365, p. 163.

2354. Lampasas County. Water from Lampasas, Texas. Sent by W. B. Abney. Mixture of water from 550, 1,110 and 1,560 feet. Analyzed by S. H. W. 1903. B. A. C954.

2355. La Salle County. From well 750 feet deep, 5 miles west of Fowlerton, on the Dull Ranch in the N. E. part of La Salle County. Analyzed by S. H. W. B. A. No. 47.

2356. Liberty County. From well of G. C. & S. F. Ry. at crossing on Trinity River. Lissie formation. Depth 240-290 feet. U. S. G. S. W. S. 335, p. 110.

2357. Liberty County. From Well of G. C. & S. F. Ry., at Cleveland. Lissie formation (?). Depth 288-267 feet. Analyzed by W. A. Powers. U. S. G. S. W. S. 335, p. 110.

2358. Liberty County. From well of Miller and Vidor Lumber Co. at ¼ mile S. W. from town of Milvid. Dewitt formation. Depth 532-585 feet. Analyzed by G. H. Seynes. U. S. G. S. W. S. 335, p. 110.

2359. Lubbock County. From well on Lubbock State Farm. Analyzed by State Chemist. U. T. B. 57, p. 90.

2360. Lynn County. Herring well, Tahoka. Analyzed by J. E. S. Analysis No. 2127. U. T. B. 57, p. 90.

2361. LaSalle County. Well 400 yards south of Artesia. Depth 160 feet. U. S. G. S. W. S. 375. Owner T. J. Alderman.

2362. LaSalle County. Well 200 yards west of Artesian. Depth 200 feet. Owner J. W. McInnes. U. S. G. S. W. S. 375.

2363. LaSalle County. Well ½ mile south of Artesia. Depth not given. Owner, Pruitt Commission Co. U. S. G. S. W. S. 375.

2364. LaSalle County. Well 150 yards N. E. of Artesia. Depth 120 feet. Owner, M. H. Baine. U. S. G. S. W. S. 375.

2365. La Salle County. Well 1½ miles east of Artesia. Depth 475 feet. Owner, G. B. Wiltse. U. S. G. S. W. S. 375.

2366. LaSalle County. Well 3 miles S. W. of Artesia. Depth 200 feet. Owner, W. E. Alderman. U. S. G. S. W. S. 375.

2367. LaSalle County. Well ½ mile south of Artesia. Depth 250 feet. Owner, J. M. Ramsey. U. S. G. S. W. S. 375.

2368. LaSalle County. Well 300 yards S. W. of Artesia. Depth 165 feet. Owner, A. G. Salmon. U. S. G. S. W. S. 375.

2369. LaSalle County. Well 900 feet S. E. of depot, Artesia. Depth 194 feet. Owner, C. C. Hurley. U. S. G. S. W. S. 375.

2370. LaSalle County. Well ½ mile N. W. of Artesia. Depth 330 feet. Owner LaSalle Land and Fig Co. U. S. G. S. W. S. 375.

2371. LaSalle County. Well ½ mile north of Artesia. Depth 200 feet. Owner, E. N. Johnston. U. S. G. S. W. S. 375.

2372. LaSalle County. Well ½ mile S. E. of Artesia. Depth 248 feet. Owner, R. L. Hendrickson. U. S. G. S. W. S. 375.

2373. LaSalle County. Well 1½ miles south of Artesia. Depth 170 feet. Owner, R. C. Maxwell. U. S. G. S. W. S. 375.

2374. LaSalle County. Well 1¼ miles south of Artesia. Depth 193 feet. Owner, John Robuck. U. S. G. S. W. S. 375.

2375. LaSalle County. Well 1¼ miles S. E. of Artesia. Depth 450 feet. Owner, J. M. Ramsey. U. S. G. S. W. S. 375.

2376. LaSalle County. Well 3 miles east of Artesia. Depth 300 feet. Owner, J. M. Ramsey. U. S. G. S. W. S. 375.

2377. LaSalle County. Well 7 miles N. W. of Artesia. Depth 150 feet. Owner, John Hicks. U. S. G. S. W. S. 375.

2378. LaSalle County. Well 100 yards west of Artesia. Depth 487 feet. Owner, J. W. McInnes. U. S. G. S. W. S. 375.

2379. LaSalle County. Well 500 yards south of Artesia. Depth 500 feet. Owner, T. J. Alderman. U. S. G. S. W. S. 375.

2380. LaSalle County. Well 100 feet north of Artesia. Depth 400 feet. Owner, Asherton & Gulf Ry. U. S. G. S. W. S. 375.

2381. LaSalle County. Well 5 miles west of Artesia. Depth 130 feet. Owner J. L. Jones. U. S. G. S. W. S. 375.

2382. LaSalle County. Well 1 mile N. W. of Artesia. Depth 1,560 feet (?). Owner, C. H. Bever. U. S. G. S. W. S. 375.

2383. LaSalle County. 600 feet N. W. of Atlee. Owner, T. A. Coleman. U. S. G. S. W. S.. 375.

2384. LaSalle County. Courthouse well, Cotulla. Depth 165 feet. U. S. G. S. W. S. 375.

2385. LaSalle County. Well 400 yards N. W. of Cotulla. Depth 100 feet. Owner, J. T. Carr. U. S. G. S. W. S. 375.

2386. LaSalle County. Well ¾ mile N. E. of Cotulla. Depth 105 feet. Owner W. N. Guinn. U. S. G. S. W. S. 375.

2387. LaSalle County. Well 1 mile north of Cotulla. Depth 127 feet. Owner, L. W. Gantis. U. S. G. S. W. S. 375.

2388. LaSalle County. Well 4 miles N. E. of Cotulla. Depth 100 feet. Owner, Roy Lewis. U. S. G. S. W. S. 375.

2389. LaSalle County. Well 12½ miles N. E. of Cotulla. Depth 290 feet. Owner, E. C. Hatton. U. S. G. S. W. S. 375.

2390. LaSalle County. Well ½ mile N. W. of Bolton. U. S. G. S. W. S. 375.

2391. LaSalle County. Well 1¼ miles S. W. of Cotulla. Depth 330 feet. Owner Joseph Cotulla. U. S. G. S. W. S. 375.

2392. LaSalle County. Well 300 feet south of depot, Cotulla. Depth 1,008 feet. Owner, I. & G. N. Ry. U. S. G. S. W. S. 375.

2393. LaSalle County. Same as above.

2394. LaSalle County. Well 8 miles N. W. of Cotulla. Depth 760 feet. Owner, not given. U. S. G. S. W. S. 375.

2395. LaSalle County. Well 8½ miles east of Cotulla. Depth 2,000 feet. Owner, O. S. Dewees. U. S. G. S. W. S. 375.

2396. LaSalle County. Well 10 miles east N. E. of Cotulla, on Dewees Ranch. Depth 1,850 feet. Owner, O. S. Dewees. U. S. G. S. W. S. 375.

2397. LaSalle County. Well 12 miles N. E. of Cotulla. Depth 1,800 feet. Owner, O. S. Dewees. U. S. G. S. W. S. 375.

2398. LaSalle County. Well 1 mile west of Cotulla. Depth 2,424 feet. Owner, Joseph Cotulla. U. S. G. S. W. S. 375.

2399. LaSalle County. Well same as above.

2400. LaSalle County. Well 150 feet S. W. of Encinal. Depth 350 feet Owner, T. A. Coleman. U. S. G. S. W. S. 375.

2401. LaSalle County. Well 300 feet N. E. of Encinal. Depth 800 feet. Owner, I. & G. N. Ry. U. S. G. S. W. S. 375.

2402. LaSalle County. Well 300 feet S. W. of Encinal. Depth 146 feet. Owner, G. N. Berry. U. S. G. S. W. S. 375.

2403. La Salle County. Well 600 feet south of Encinal. Depth 350 feet. Owner, J. W. McMullen. U. S. G. S. W. S. 375.

2404. LaSalle County. Well ¾ mile N. E. of Encinal, on Section 498. Depth 300 feet. Owner, G. A. Welhausen. U. S. G. S. W. S. 375.

2405. LaSalle County. Well ¾ mile north of Encinal. Depth 375 feet. Owner G. W. Welhausen. U. S. G. S. W. S. 375.

2406. LaSalle County. Well 1½ miles west of Encinal. Depth 300 feet. Owner, G. W. Welhausen. U. S. G. S. W. S. 375.

2407. LaSalle County. Well 3 miles west of Encinal. Depth 275 feet. Owner, G. W. Welhausen. U. S. G. S. W. S. 375.

2408. LaSalle County. Well 3 miles N. E. of Encinal. Depth 175 feet. Owner, A. R. Munn. U. S. G. S. W. S. 375.

2409. LaSalle County. Well 3 miles N. W. of Encinal, in Section 694. Depth 258 feet. Owner, G. A. Welhausen. U. S. G. S. W. S. 375.

2410. LaSalle County. Well 5 miles N. W. of Encinal, in Section 650. Depth 275 feet. Owner, G. A. Welhausen. U. S. G. S. W. S. 375.

2411. LaSalle County. Well 7 miles N. E. of Encinal. Depth 506 feet. Owner S. S. Charles. U. S. G. S. W. S. 375.

2412. LaSalle County. Well 7 miles N. W. of Encinal. Depth 284 feet. Owner, Ted Watkins. U. S. G. S. W. S. 375.

2413. LaSalle County. Well 5½ miles S. W. of Fowlerton. Owner, A. L. Warner. U. S. G. S. W. S. 375.

2414. La Salle County. Well 5½ miles N. W. of Fowlerton. Depth 340 feet. U. S. G. S. W. S. 375. Tennessee Garden Well.

2415. LaSalle County. Well 7½ miles S. W. of Fowlerton. Depth 300 or 400 feet. Owner, Gus Jones. U. S. G. S. W. S. 375.

2416. LaSalle County. Well 6½ miles west of Fowlerton. Depth 1,000 feet. Owned by Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2417. LaSalle County. Well 7 1-6 miles N. W. of Fowlerton. Depth 1,400 feet. Same owner as above. U .S. G. S. W. S. 375.

2418. LaSalle County. Well same as above.

2419. LaSalle County. Well 6¼ miles west of Fowlerton. Depth 1,000 feet. Owner, Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2420. LaSalle County. Well 6½ miles west of Fowlerton. Depth 1,000 feet. Owner, Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2421. LaSalle County. Well 7½ mile N. W. of Fowlerton. Depth 1,000 feet. Owner, Gus Jones. U. S. G. S. W. S. 375.

2422. LaSalle County. Well 13 miles N. W. of Fowlerton. Depth 797 feet. Owner, Mrs. Helen Irwin. U. S. G. S. W. S. 375.

2423. LaSalle County. Well ¼ mile west of Fowlerton. Depth 1,857 feet. Owner Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2424. LaSalle County. Well ¼ mile west of Fowlerton. Hotel Well No. 3. Owner, Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2425. LaSalle County. Well same as above.

2426. LaSalle County. Well same as above.

2427. LaSalle County. Well ¼ mile west of Fowlerton. Depth 2,056 feet. Owner, Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2428. LaSalle County. Well 1½ miles west N. W. of Fowlerton. Depth 1,957 feet. Owner, Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2429. LaSalle County. Well 1½ miles west N. W. of Fowlerton. Depth 1,957 feet. Owner, Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2430. LaSalle County. 2430-2436 inclusive are the same as 2429.

2437. LaSalle County. Well 4½ miles N. W. of Fowlerton. Depth 1,792 feet. Owner, Fowler Bros. Land Co. U. S. G. S. W. S. 375.

2438. LaSalle County. Well 3 miles S. W. of Fowlerton. Depth 1,850 feet. Owner, B. C. Richardson. U. S. G. S. W. S. 375.

2439. LaSalle County. Well same as above.

2440. LaSalle County. Well ¼ mile east of Gardendale. Depth 300 feet. Owner F. R. Zeigler. U. S. G. S. W. S. 375.

2441. LaSalle County. Well 1 mile east of Gardendale, in Section 81. Depth 300 feet. Owner, Jack Goodman. U. S. G. S. W. S. 375.

2442. LaSalle County. Well ¾ miles S. E. of Gardendale. Depth 200 feet. Owner, J. R. Burnett. U. S. G. S. W. S. 375.

2443. LaSalle County. Well same as above.

2444. LaSalle County. Well 1 mile east of Gardendale. Depth 295 feet. Owner, W. T. Arnison. U. S. G. S. W. S. 375.

2445. LaSalle County. Well 1 mile east of Gardendale. Depth 372 feet. Owner, J. W. Cain. U. S. G. S. W. S. 375.

2446. LaSalle County. Well 2 miles N. E. of Gardendale. Depth 308 feet. Owner, Fritz Schneebli. U. S. G. S. W. S. 375.

2447. LaSalle County. Well on public square, Gardendale. Depth 2,360 feet. Owner Gardendale Colony. U. S. G. S. W. S. 375.

2448. LaSalle County. Well 1 mile east of Millett. Depth 1,465 (?) feet. Owner, W. C. Atkinson. U. S. G. S. W. S. 375.

2449. LaSalle County. Well 3 miles west of Woodward. Depth 182 feet. Owner, A. Y. Armstrong. U. S. G. S. W. S. 375.

2450. LaSalle County. Well 3½ miles S. W. of Woodward. Depth 760 feet. Owner, B. J. Ownby. U. S. G. S. W. S. 375.

2451. LaSalle County. Well same as above.

2452. LaSalle County. Well 1½ miles S. W. of Woodward. Depth 1,720 feet. Owner, Creamer and Ireland. U. S. G. S. W. S. 375.

2453. LaSalle County. Well same as above.

2454. LaSalle County. Well 1,587 feet deep. Owner, Woodward Vichy Co., U. S. G. S. W. S. 375.

2455. LaSalle County. Well same as above.

2455a. Leon County. Well 230 feet deep. Water rises within 50 ft. from the surface and does not lower by pumping. Sent by Powell Drug Co., Marquez, in 1917. Anal. by T. W. R. B. A. C559.

2843a. Martin County. Well 30 feet deep, flow inexhaustible. Owned by J. R. Vance, Stanton. Analyzed 1918 by T. W. R., B. A., C-608.

2456. McMullen County. Well 3 miles N. E. of Crowther. Depth 100 feet. Owner, Boston-Texas Corporation. U. S. G. S. W. S. 375.

2457. McMullen County. Well 1 mile S. W. of Crowther. Depth 750 feet. Owner, Boston-Texas Corporation. U. S. G. S. W. S. 375.

2458. McMullen County. Well 2 miles S. E. of Crowther. Owner, Boston-Texas Corporation. U. S. G. S. W. S. 375.

2459. McMullen County. Well 2 miles south of Crowther. Owner, Boston-Texas Corporation. U. S. G. S. W. S. 375.

2460. McMullen County. Well ¼ mile east Tilden. Depth 31 feet. Owner, W. H. Martin. U. S. G. S. W. S. 375.

2461. McMullen County. Well 10 miles east of Tilden. Depth 58 feet. Owner, C. E. Byrne. U. S. G. S. W. S. 375.

2462. McMullen County. Well 7 miles south of Tilden. Depth 54 feet. Owner, A. W. Lowe. U. S. G. S. W. S. 375.

2463. McMullen County. Well 9 miles S. W. of Tilden. Depth 34 feet. Owner, Hugh Fitzpatrick. U. S. G. S. W. S. 375.

2464. McMullen County. Well 12 miles east of Tilden. U. S. G. S. W. S. 375.

2465. McMullen County. Well 8 miles N. E. of Tilden. Depth 741 feet. Owner, C. R. Byrne. U. S. G. S. W. S. 375.

2466. McMullen County. Well 7 miles S. W. of Tilden. Owner, A. W. Lowe. U. S. G. S. W. S. 375.

2467. McMullen County. Well on Tilden public square. Depth 920 feet. U. S. G. S. W. S. 375.

2468. McMullen County. Well 4½ miles east of Tilden. Depth 2,800 feet. Owner, Two Rivers Rice Co. U. S. G. S. W. S. 375.

2469. McMullen County. Well 11 miles south of Tilden. Depth 72 feet. Owner, John Fitzpatrick. U. S. G. S. W. S. 375.

2470. McMullen County. Well at Zella. Depth 2,105 feet. Owner, Humphries. U. S. G. S. W. S. 375.

2471. Marion County. Well of J. M. DeWare, ¼ mile north of Jefferson. Wilcox formation. Depth 811 feet. Analyzed 1907 by G. L. B. U. S. G. S. W. S. 335, p. 110.

2472. McLennan County. Artesian water from Valley Mills. Lower Trinity Reservoir, north of Trinity. Owner, Overshine. Chemist, H. H. H. Reporter, R. P. Head.

2473. McLennan County. Artesian water from Waco. Trinity Reservoirs, Ft. Worth, southward. Owner, Wells of Bell Waterworks. Analyzed by U. S. G. S.

2474. McLennan County. Artesian water from Bosque Co., near Waco. Owner, W. L. Prather. Reporter, J. K. Prather. U. S. G. S. A. R. 21, part VII., p. 449.

2475. McLennan County. Artesian water from Waco. Trinity Reservoir, north of Trinity. Owner, Mr. Moore. U. S. G. S. A. R. 21, part VII., p. 449.

2476. McLennan County. Artesian water from McGregor. Trinity Reservoir Ft. Worth, northward. Owner, McGregor Water Co. Reporter, President of Company. U. S. G. S. A. R. 21, part VII, p. 449.

2477. Mitchell County. Water from Mrs. Nancy Winston, Colorado, Texas., Jan. 1917. Analyzed by W. T. R. B. A. No. C909.

2478. Montague County. From well of W. T. Small, near Stoneberg, Texas. Carboniferous formation. Analyzed by Walter Van Winkle. U. S. G. S. W. S. 317, pp. 41-44.

2479. Montague County. From well of C. M. Chase, near Stoneberg, Texas, May 1907. Analyzed by Walter Van Winkle. Carboniferous formation. U. S. G. S. W. S. 317, pp. 41-44.

2480. Montague County. From new City Well, Bowie, Texas. Analyzed by Van Winkle, March 1907. Carboniferous area. U. S. G. S. W. S. 317, pp. 41-44.

2481. Montague County. From Courthouse well, Montague, Texas. Analyzed by W. M. Barr, Dec. 1906. Depth 60 feet. Carboniferous formation. U. S. G. S. W. S. 317, pp. 41-44.

2482. Montague County. From Parsonage well, Montague, Texas. Analyzed by W. M. Barr, Dec. 1906. Depth 60 feet. About 600 feet south of Courthouse well. U. S. G. S. W. S. 317, pp. 41-44.

2483. Montague County. Wagonhouse well, Montague, Texas. Depth 40 feet. About 500 feet west of Courthouse well. Analyzed by W. M. Barr, Dec. 1906. Cretaceous formation. U. S. G. S. W. S. 317, pp. 41-44.

2484. Montague County. From G. S. & S. F. Ry. well, at Bobbin, Dewitt formation. Depth 114-134 feet. U. S. G. S. W. S. 335, p. 110.

2485. Montgomery County. From G. C. & S. F. Ry. well at Conroe. Dewitt formation. Depth 577-642 feet. U. S. G. S. W. S. 335, p. 110.

2486. Morris County. Well near Daingerfield. Owner, Jos. Brad-

field. Wilcox formation. Analyzed Sept. 1907 by B. L. G. U. S. G. S. W. S. 276, p. 75.

2487. Nacogdoches County. Spring water from Stoker Mineral Springs, E. Chandler Survey, near Stoker. Mt. Selman formation. Analyzed by Monroe, Hall and Hopkins. U. S. G. S. W. S. 335, p. 110.

2488. Nacogdoches County. Water from "White Spring" at Garrison. Wilcox formation. Analyzed Sept. 1907 by B. L. G. U. S. G. S. W. S. 335, p. 110.

2489. 2489-2490. Nacogdoches County. Well of Whiteman-Decker Lumber Co., Caro. Wilcox formation. Analyzed Sept. 1907 by B. L. G. Well No. 2489 is 300 feet deep. No. 2490 comes from a spring at this place. U. S. G. S. W. S. 335, p. 110.

2491. Nacogdoches County. From well of Nacogdoches Ice and Cold Storage Co., at Nacogdoches. Wilcox formation. Depth 340-500 feet. Analyzed by J. R. B. and A. M. McA., 1907. U. S. G. S. W. S. 335, p. 110.

2492. Nacogdoches County. Water from waterworks spring at Nacogdoches. Analyzed 1907 by B. L. G. U. S. G. S. W. S. 335, p. 110.

2493. Nacogdoches County. Spring water from Shawnee Mineral Spring on Samuel H. Hamil headright, near Angelina River, south portion. Analyzed Sept. 1907 by B. L. G. U. S. G. S. W. S. 335, p. 110.

2494. Navarro County. Artesian water from Corsicana, Texas. Upper Woodbine Reservoir. Analyzed by H. H. H. U. S. G. S. A. R. 21, part VII., p. 449.

2495. Nueces County. Balli well, Seeligson Ranch. Analyzed 1903 by Dr. H. W. Harper and Barney Brooks. U. S. G. S. W. S. 190, p. 13.

2496. Nueces County, Santa Clara Well, on King's Ranch. Analyzed 1903 by Dr. H. W. Harper and E. Anderson. U. S. G. S. W. S. 190., p. 12.

2497. Orange County. From Parker farm, 8 miles north of Beaumont. Lissie formation (?) Depth 740 ft. (?). Analyzed by H. H. H. U. S. G. S. W. S. 335, p. 110.

2498. Palo Pinto County. Austin Well, Mineral Wells. Analyzed by W. T. Read, 1913. B. A. C919.

2499. Palo Pinto County. Gibson Well, Mineral Wells. Analyzed by W. T. Read, Jan. 25, 1913. B. A. C916.

2500. Palo Pinto County. Indian Well, Mineral Wells. Water fresh from well. Analyzed by W. T. Read, Sept. 1913. B. A. C914.

2501. Palo Pinto County. Ross tract, about ½ mile due east of

Strawn. Depth 850 feet. Analyzed by J. E. S. B. A. No. 2446.

2502. Palo Pinto County. Crazy Well, No. 2, Mineral Wells. Analyzed by W. T. Read, June 16, 1913. B. A. C918.

2503. Palo Pinto County. Pinto Well, Mineral Wells. Analyzed by W. T. R. May 21, 1915. B. A. C917.

2504. Palo Pinto County. O. K. or Sleepy water from Lamar Well, Mineral Wells. Analyzed by P. S. Tilson. U. T. B. 365, p. 192.

2505. Palo Pinto County. From Lamar Well furnished by Company. Analyzed by F. B. Porter. U. T. B. 365, p. 192.

2506. Palo Pinto County. From Gibson Well Water Co., Mineral Wells. Analyzed by J. R. B. U. T. B. 365, p. 193.

2507. Palo Pinto. B. B. Water, Mineral Wells. Analyzed by W. T. R. U. T. B. 365, p. 193.

2508. Palo Pinto County. Mineral Water from Gibson Well, Mineral Wells. Analyzed by E. T. Dumble. U. T. B. 365, p. 193.

2509. Palo Pinto County. Water from Mineral Wells. Analysis furnished by Company. U. T. B. 365, p. 195.

2510. Palo Pinto County. Same as above.

2511. Palo Pinto County. Lamar White Sulphur Water. Analyzed by T. S. Tilson. U. T. B. 365, p. 194.

2512. Palo Pinto County. Mineral water from Star Wells, Mineral Wells. Analyzed by A. Merrill of St. Louis. U. T. B. 365, p. 195.

2513. Palo Pinto County. Sent by Mr. Milton Pelt, of the Gibson Well Water Co., Mineral Wells, Texas, Oct. 1912. Analyzed by W. T. R. B. A. C932.

2514. Palo Pinto County. Gibson Well Water Co. Analyzed 1912, by J. R. B. B. A. C933.

2515. Palo Pinto County. Gibson Well Water Co. Sent by Milton Pelt. Analyzed 1912 by J. R. B. B. A. C951.

2516. Palo Pinto County. From Carlsbad Water Co. Well No 1, Mineral Wells, Texas. Analyzed by W. T. R. B. A. C910.

2517. Palo Pinto County. From Carlsbad Water Co. Well No. 2, Mineral Wells, Texas. Analyzed by W. T. R. 1912. B. A. C911.

2518. Palo Pinto County. From Carlsbad Water Co. Well No. 3. Mineral Wells, Texas. Analyzed by W. T. R., 1912. B. A. C912.

2519. Palo Pinto County. From Carlsbad Water Co. Well No. 4. Mineral Wells, Texas. Analyzed by W. T. R., 1912. B. A. C913.

2520. Palo Pinto County. Artesian Water from Palo Pinto. Under-

lying Paleozoic Rocks. U. S. G. S. A. R. 21, part VII., p. 449.

2521. Palo Pinto County. 2521-2524, inclusive, are from Crazy Well, Mineral Wells. Analyzed by W. T. R. U. T. B. 365, p. 195.

2525. Palo Pinto County. 2525-2526, inclusive, American Vichy Water, Mineral Wells. Analysis furnished by Company. U. T. B. 365, p. 194.

2525a. Pecos County. Well 20 miles west of Sheffield. Depth 1600 ft. Flow 100,000 gallons per day. Anal. 1918 by J. E. S., B. A. C624.

2527. Red River County. From Seep cistern. Owned by B. F. Mason, Clarksville. Annona formation. Analyzed March 5, 1905 by H. S. Spaulding. U. S. G. S. W. S. 276, p. 75.

2528. Red River County. From well at Clarksville. Depth 600 feet. Blossom formation. Analyzed March 5, 1907, by H. S. S. U. S. G. S. W. S. 276, p. 75.

2529. Reeves County. From Rustler Spring Well. Depth 2,045 feet. Toyah, Texas. B. A. No. 2786. Analyzed by J. E. S.

2530. Robertson County. From Overall Mineral Well No. 1, at Franklin. Analyzed by Dr. Edgar Everhardt. U. S. G. S. W. S. 335, p. 110.

2531. Robertson County. From Overall Mineral Well No. 2, at Franklin. Analyzed by Dr. Edgar Everhardt. U. S. G. S. W. S. 335, p. 110.

2532. Robertson County. From Wootan Mineral Well, No. 1, at Wootan Wells. Wilcox formation. Depth 80-84 feet. Analyzed by W. M. Mew. U. S. G. S. W. S. 365, p. 110.

2533. Robertson County. Same as above, except Well No. 2.

2534. Robertson County. Same as above, except Well No. 3.

2535. Robertson County. Same as above, except Well No. 4.

2536. Sabine County. From G. C. & S. F. Ry. Well, at Bronson. Wilcox formation. U. S. G. S. W. S. 335, p. 110.

2537. Shelby County. From G. C. & S. F. Ry. Well, at Center. Wilcox formation. Depth 564-614 feet. U. S. G. S. W. S. 335, p. 110.

2538. Smith County. Riviere Mineral Water from Tyler. Analyzed by Dr. J. W. Mallet, of University of Va. U. T. B. 365, p. 219.

2539. Starr County. Artesian water from Mesquite Well, Lasater Ranch. Analyzed by Dr. H. W. Harper and C. Hartman, April 1903. U. S. G. S. W. S. Paper 190, p. 9.

2540. Tarrant County. Artesian water, Ft. Worth. Trinity Reservoirs, Ft. Worth, Southward. Owner Chicago and Ft. Worth Packing Co. Reported by Company. U. S. G. S. A. R. 21, part VII., 449.

2541. Titus County. Mineral water from Red Mineral Spring No. 1, at Mount Pleasant. Analyzed by H. H. H., of A. & M. College. U. T. B. 365, p. 225.

2542. Titus County. Same as above, except that sample came from Red Mineral Spring, No. 2, at Mount Pleasant.

2543. Tom Green County. From Concho Land Co., of San Angelo. Analyzed by W. T. Garbade of the Medical Department of the University of Texas. U. T. B. 365, p. 227.

2544. Tom Green County. Mineral water from Morgan Mineral Well Co., of Christoval. Analyzed by T. H. Needham. U. T. B. 365, p. 227.

2545. Tom Green County. Water from Concho Land Co., Carlsbad. Analyzed by W. T. Garbade, of the Medical Department of the University of Texas. U. T. B. 365, p. 227.

2545a. Tom Green County. From Jno. W. Harris' ranch, four miles north of San Angelo. Well 2449 ft. deep. Flow 6000 gallons per hour. Anal. 1918 by J. E. S. B. A., C732.

2546. Travis County. 2546-2547. From shallow well adjacent to Colorado River. Depth 1,000 feet. Water level 9-12 feet. Austin Street Railway Company. Sept. 1915. Analyzed by J. E. S. B. A. 2719 and 2720.

2548. Travis County. From well at Capitol at Austin, 1,511 feet deep. Flow 3,600 gallons per hour. U. T. B. 365, p. 231.

2549. Travis County. Champion Mineral Well water, from near junction of small branch of main channel of Bull Creek. Analyzed by H. W. Harper. U. T. B. 365, p. 231.

2550. Travis County. Well of E. L. Steck, Austin. Depth 500 feet. Analyzed by W. T. R. Sept. 13, 1913. B. A. C921.

2551. Travis County. Collins Boring No. 1, near Pilot Knob, Depth 770 feet. B. A. No. 2784.

2552. Travis County. Artesian water, near San Jacinto and Fifth Sts., Austin. Glen Reservoir. Analyzed by Dr. H. W. Harper. U. S. G. S. A. R. 21, part VII., p. 449.

2553. Travis County. From Capitol grounds, marked water from East Well. Sent by Mr. C. E. Gilbert. Feb. 1905 Analyzed O. H. P. B. A. C920.

2554. Van Zandt County. Bittern from Grand Saline, Brine. Analyzed 1913 by B. R. B. U. S. G. S. W. S. 364, p. 16.

2555. Van Zandt County. Same as above.

2556. Walker County. Water from well at Texas State Penitentiary at Huntsville. Depth 339 to 384 feet. Catahoula formation. Analyzed 1894 by H. H. H. U. S. G. S. W. S. 335, p. 110.

2557. Washington County. From well 1¼ miles north of Brenham. Depth 22 feet. Owner, T. S. Estes. Sent by H. A.

Wunderlich of the Brenham Oil Co. Analyzed Feb. 24, 1916 by J. E. S. B. A. No. C77.

2558. Wichita County. Elevator well in alluvial deposits. Depth 20 feet. Analyzed by W. M. B. Oct. 1, 1906. U. S. G. S. W. S. Paper, 317, p. 54.

2559. Wichita County. E. A. Chamberlain's well, Bluff Street, Wichita Falls. In red shales and sand stone of Wichita formation. Depth 40 feet. Analyzed by Walter Van Winkle, 1906. U. S. G. S. W. S. Paper, 317, p. 54.

2560. Wichita County. Well owned by F. D. Keena. Depth 220 feet. Analyzed by J. R. B. 1911. U. S. G. S. W. S. Paper 317, p. 54.

2561. Williamson County. Artesian water from Taylor, probably from Fredericksburg Reservoir. Owner Artesian Well Co. of Taylor. Analyzed by Dr. E. Everhardt. U. S. G. S. A. R. 21, part VII., p. 449.

2562. Williamson County. Artesian water from Round Rock, Texas. Glen Rose Reservoir. Sent by J. D. Robinson. Analyzed by Professor R. S. Hyer. U. S. G. S. A. R. 21, part VII., p. 449.

2563. Williamson County. Artesian water from Georgetown. Glen Rose Reservoir. Owner Mr. Page. Analyzed by Dr. E. Everhardt. U. S. G. S. A. R. 21, part VII., p. 449.

2564. Williamson County. Salt water from Taylor. Sent by Messrs. Mantor and Briggs. Analyzed 1902 by O. H. P. T. M. S. No. 1618.

2565. Wise County. Artesian water from Newark. Lower Trinity Reservoir, north of the Trinity. Owner C. R. I. and P. Ry. Analyzed by H. H. H. U. S. G. S. A. R. 21, part VII., p. 449.

2566. Wood County. From well of Mineola Ice and Light Co., Mineola. Wilcox formation. Analyzed 1908 by J. R. B. and A. M. McA. U. S. G. S. W. S. 276, p. 75.

2567. Wood County. Same as above, except water from City Water supply of Mineola.

2568. Wood County. Well at Mineola. Depth 1,400 feet. U. of T. Bulletin 365, p. 264.

2569. Young County. Well of Judge R. F. Arnold, Graham. Depth 110 feet. Analyzed 1906 by W. M. D. U. S. G. S. W. S. 317, p. 77.

2570. Young County. Barber shop well. Depth 61 feet. Analyzed by H. S. S. Feb. 1907. U. S. G. W. S. 317, p. 77.

2572. Young County. Well on lot 10, Block 11, Graham. Analyzed 1906 by W. M. B. U. S. G. W. S. 317, p. 77.

2573. Young County. Pandy's well, 3 miles S. E. of Spring

Creek. Depth 20 feet. Analyzed 1906 by W. M. B. U. S. G. S. W. S. 317, p. 77.

II. SURFACE WATER

2574. Culberson County. Spring water. Spring at head of Delaware Creek, in the Guadalupe-Delaware Mountains, Trans-Pecos, Texas. T. M. S. B. 9, p. 87.

2575. Culberson County. From head of draw east of Lindsey's property.

2576. Culberson County. Running water in creek, N. W. of Maverick Spring. Collected by W. B. P. Analyzed 1916 by J. E. S. B. A. No. 3138.

2577. Culberson County. Water from deep pool in draw near road to W. B. Hick's house. Collected by W. B. P. Nov. 1916 by J. E. S., B. A. No. 3134.

2578. Culberson County. Water from seep below Maverick Spring. Collected by W. B. P. 1916. Anal. by J. E. S. B. A. No. 3135.

2579. Culberson County. Water in N. W. part of Section 1, Blk. 111. Depth 23 feet. Collected by W. B. P. Anal. by J. E. S. B. A. No. 3143.

2580. Delta County. From creek near town of Ben Franklin. Owned by W. H. Coon. Analyzed 1902 by W. P. U. S. G. S. W. S. 276, p. 75.

2581. Delta County. From creek, near Ben Franklin. Analyzed Sept. 1902 by J. R. B. and A. M. McA. U. S. G. S. W. S. 276, p. 75

2582. El Paso County. From Crow Spring, Salt Basin, Trans-Pecos Region. T. M. S. B., 9, p. 90.

2583. El Paso County. Mineral Spring water, El Paso, Texas, collected by G. W. Huffmann. Analyzed by W. T. R, 1914. B. A. C923.

2584. El Paso County. El Paso, Texas. U. S. G. S. W. S. 274, p. 140.

2585. El Paso County. Mineral Spring water from El Paso. Analyzed 1914 by Harper and Reed. B. A. C922.

2586. El Paso County. From Salt Draw, west of House, Maverick Springs, Section 13, Block 113. Analyzed 1904 by S. H. W. B. A. C942.

2587. El Paso County. Salt Draw, north of House, Maverick Springs, Block 113, Section 13, Analyzed 1904 by S. H. W. B. A. C943.

2588. El Paso County. 2588-2835, inclusive, are from water of Rio Grande River at Courchesne, near El Paso, Texas. U. S. G. S. W. S. 274.

2836. Grimes County. Water from Navasota Ice, Light & Power Co., Navasota. Water was to be treated for making raw water ice. Analyzed 1917 by T. W. R. B. A. C-781.

2837. Hardeman County. North Groesbeck Creek, near Quanah. May, 1905. No other data given.

2838. Hardeman County. Same as above.

2839. Hardeman County. Golston's Pond, about 2 miles west of Quanah. Analyzed 1915 by J. E. S. B. A. 2803.

2840. Hays County. From San Marcos River, at San Marcos. Sent by Utilities Company's plant. Analyzed 1904 by Geo. W. Lord Co. B. A. C930.

2841. Hays County. River water at San Marcos. From Utilities Company's plant. Analyzed by Parson's Chemical Co., 1904. B. A. C931.

2842. Hays County. Spring water San Marcos. Sent by J. L. Fomby Analyzed 1913 by W. T. R. B. A. C915.

2843. Lamar County. From City water supply, artificial lake, Paris. Blossom formation. Analyzed 1902 by the Kennicutt Water Softener Co. U. S. G. S. W. S. Paper 276, p. 75.

2844. Maverick County. From Rio Grande Water and Power Co., Eagle Pass. Analyzed 1904 by S. H. W. M. S. B. A. C968.

2845. McLennan County. Water from Brazos River, near Waco. 2845-2850, inclusive, were analyzed by W. M. B., 2851 by H. S. S., and 2852-2874, inclusive by R. B. B., Charles Palmer and W. D. Collins. U. S. G. S. B. 236.

2875. Palo Pinto County. Water from Frank Richards Mineral Wells, Pipe Creek. Analyzed 1904 by O. H. P. B. A. C944.

2876. Reeves County. Soft water from Tucher's well, 2½ miles N. W. of Riverton. Water collected in barrel sunk in Four-mile Draw. Sent by Avery Turner. T. M. S. B. IX, p. 81.

2877. Reeves County. From Pecos River, about 10 miles below Pecos. T. M. S. B. IX, p. 77

2878. Tarrant County. Water from Trinity River. Filter beds, Ft. Worth. Supplied by T. U. Taylor. Analyzed by J. R. B. March 11, 1912. B. A. C936.

3067. Terry County. Water from "Salt Lake." Analysis made by Ft. Worth Laboratories, Pres. F. B. Porter, March 13, 1919. Entered in U. of T. records under B. A. C974. This analysis is primarily listed under "Potash".

2879. Travis County. Barton Springs. Sent by F. H. Bruce. Analyzed by S. H. W. Oct. 17, 1903. B. A. C935.

2880. Travis County. Sand filter bed. Colorado River water

used in boilers of the Austin St. Ry. Co. B. A. 2555. Analyzed by J. E. S.

2881. Travis County. Colorado River water, at Austin. U. S. G. S. W. S. Paper 236, p. 116.

2882. Travis County. Filter bed. Colorado River water, taken from pipe in Laboratory of Bureau of Economic Geology and Technology, University of Texas. Dec. 20, 1911. Analyzed by S. H. W. B. A. 162.

2883. Travis County. 2883-2918, inclusive, are water from Colorado River at Austin. Analyzed by W. H. Heileman. U. S. G. S. W. S. 236.

2919. Webb County. 2919-2955, inclusive, are water from Rio Grande River at Laredo, Texas. Analyzed by W. H. H. U. S. G. S. W. S. 236.

2956. Webb County. From Rio Grande River, near Laredo, Texas. U. S. G. S. W. S. Paper 236, p. 118.

2957. Wichita County. City water from artificial lake at Wichita Falls. Analyzed 1906 by W. M. B. U. S. G. S. W. S. Paper 317, p. 54.

2957a. Wichita County. From bed of Red River, near Burkburnet oil field. Sent by C. B. Farquharson, Wichita Falls. Anal. 1917 by T. W. R. B. A., C556.

III. MISCELLANEOUS OR UNCLASSIFIED WATER

2958. Anderson County. From J. L. Chambers, Palestine. Analyzed 1904 by S. H. W. B. A. C956.

2959. Anderson County. Same as above.

2959a. Aransas County. From Heldenfels Bros., Rockport. Analyzed 1917 by T. W. R. B. A. C555.

2959b. Bastrop County. From Clifton Rice, Bastrop. Water taken from Copperas Creek. Anal. 1917 by T. W. R. B. A. C-609.

2960. Bell County. From J. E. Elliott, Belton. Analyzed by S. H. W. B. A. C955.

2962. Bowie County. From B. E. McCauley, Texarkana, Texas. R. F. D. No. 3. Analyzed by S. H. W. B. A. C958.

2962. Bowie County. Same as above. B. A. C959.

2962a. Brazoria County. Water taken from a well on Stratton Ridge, Velasco. Sent by Roxana Petroleum Co., Houston. Analyzed 1917 by T. W. R. B. A. C-557.

2963. Caldwell County. From J. G. Burleson, Lockhart. Analyzed 1903 by S. H. W. B. A. C957.

2963a. Cooke County. Sent by Gainesville Gravel Co., Gainesville. Water taken from a gravel pit. Analyzed 1917 by T. W. R. B. A. C-558.

2964. El Paso County. From Cooksey Ranch, east of Block 46. Analyzed 1904 by S. H. W. B. A. C939.

2965. DeWitt County. Water from Heaton Bros., Cuero. Analyzed by S. H. W. T. M. S. A. No. 2651.

2966. Dickens County. From head of salt creek on H. & G. N. Ry. Survey No. 25. Block No. 8, Spur Ranch. Analyzed by J. E. S. B. A. No. 2525.

2967. Dickens County. Same as above, except Survey No. 14, Block No. 2. B. A. No. 2526.

2968. Dickens County. East side of lake on H. & G. N. Ry. Survey No. 65. Block No. 8, Spur Ranch. Analyzed by J. E. S. B. A. No. 2527.

2969. Dickens County. West side of Salt Lake, on the H. & G. N. Ry. Survey No. 65. Block 8. Spur Ranch. Analyzed by J. E. S. B. A. No. 2528.

2970. Ellis County. City water from Dr. J. E. Sewell, Midlothian, Texas. Analyzed for drinking purposes by S. H. W. B. A. C941.

2971. El Paso County. Spring water from El Paso. Collected by G. W Hoffmann. Analyzed 1914 by W. T. R. B. A. C924.

2972. El Paso County. Mineral Spring water from El Paso. Analyzed 1914 by W. T. R. B. A. C925.

2973. El Paso County. From El Paso Ry. Co., El Paso. Analyzed 1913 by J. R. B. B. A. C926.

2974. Falls County. Water from R. H. Waters, Rose Bud. Analyzed by O. H. P. B. A. C940.

2975. Grayson County. From L. A. Robertson, manager of Star Mineral Well, Tioga, Texas. Analyzed 1903 by S. H. W. B. A. C962.

2976. Grayson County. Water from S. S. Winsett, Sherman, R. F. D. No. 3. Analyzed 1904 by S. H. W. B. A. C961.

2977. Grayson County. From C. G. Cannaday, Tioga, Texas. Analyzed 1903 by S. H. W. B. A. C963.

2978. Grayson County. From G. B. Marshall, Tioga, Texas. Analyzed 1903 by S. H. W. and Blackburn. B. A. C964.

2979. Grayson County. From J. L. Harbison, Collinsville. Analyzed 1903 by S. H. W. B. A. C945.

2980. Hill County. From R. H. Baker, Hillsboro. Analyzed 1902 by S. H. W. B. A. C969.

2981. Lavaca County. From L. W. Jelinek, Halletsville, mineral water. Analyzed 1901 by S. H. W. B. A. C948

2982. Leon County. From Oliver Drug Company, Buffalo. Analyzed by O. B. Hargins. B. A. C949.

2983. Limestone County. From Citizens Water & Ice Co., Groesbeck. Analyzed 1904 by S. H. W. B. A. C960.

2984. LaSalle County. Fowler Bros. Land Co., Fowlerton, Texas. Analyzed 1912. B. A. C927.

2985. LaSalle County. Fowler Bros. Land Co., Fowlerton. Sent by B. D. Hatcher, manager. Analyzed 1912. B. A. C928.

2986. LaSalle County. Fowler Bros. Land Co., Fowlerton. Sent by B. D. Hatcher, manager. Analyzed 1912. B. A. C929.

2987. McCullough County. From Conley Grocery Co., Brady. Analyzed 1903 by S. H. W. B. A. C934.

2988. Maverick County. From Rio Grande Water & Power Co., Eagle Pass. Analyzed by S. H. W. T. M. S. A. No. 2875.

2989. Milam County. From J. D. Hefley, Cameron. Analyzed 1903 by S. H. W. B. A. C966.

2989a. Nolan County. From West Texas Electric Co., Sweetwater. Analyzed 1918 by J. E. S. B. A. C-740.

2989b. Palo Pinto County. From Mineral Wells Electric Co., Mineral Wells. Analyzed 1918 by J. E. S., B. A. C-750.

2990. Palo Pinto County. From Colonial Hotel, Mineral Wells. Analyzed by W. T. R. B. A. C950.

2991. Pecos County. Toyah Valley. Avary water, 16 miles east of Pecos. Sent by P. A. Whaley. Analyzed 1912 by S. H. W. B. A. 154.

2992. Pecos County. Toyah Valley. Lagoon water, 21 miles from Pecos. Analyzed 1912 by S. H. W. B. A. 163.

2993. Pecos County. Toyah Valley. Morris water, sampled 16 miles from Pecos. Analyzed Jan. 1912 by S. H. W. B. A. 164.

2994. Pecos County. Toyah Valley. Lewis water, 25 miles from Pecos. Analyzed 1912 by S. H. W. B. A. 165.

2995. Pecos County. Toyah Valley. From 8 milse S. E. of Toyah. Analyzed 1911 by S. H. W. B. A. 147.

2996. Pecos County. Toyah Valley. Chris Ritz water, 8 miles east of Pecos. Sent by P. A. Whaley. Analyzed 1911 by S. H. W. B. A. 153.

2997. Pecos County. Toyah Valley. Boyd water. Analyzed 1912 by S. H. W. B. A. 194.

2998. Pecos County. Toyah Valley. Sample marked "Helder." Analyzed 1912 by S. H. W. B. A. 195.

2998a. Potter County. From Amarillo Oil Co., Amarillo. Analyzed by J. E. S. in 1918. B. A. C-749.

2999. Presidio County. Mineral water sent by T. H. Rowls, Marfa. Analyzed by O. D. Hargis, 1903. A strongly acidic alum water. B. A. C937.

3000. Presidio County. From Gus Elmendorf, Marfa. Analyzed by S. H. W. B. A. C947.

3001. Tyler County. From Dr. D. McMickin, Woodville. Analyzed 1904 by S. H. W. B. A. C946

3002. Travis County. 3002-3009, inclusive, sent by Major Littlefield of Austin. B. A. Nos. 2874-82 inclusive.

3009a. Walker County. From Huntsville Electric Light & Power Co., Huntsville. Analyzed 1917 by T. W. R. B. A. C-606.

3010. Webb County. Laredo Light & Ry Co., Laredo. Analyzed 1902 by S. H. W. B. A. C953

3011. Williamson County. From the mayor of Taylor. Analyzed by S. H. W. B. A. C953.

MINERALS OF DEFINITE COMPOSITION

Analyses of minerals of Texas have been made in some cases for accurate determination of their composition. In other cases, they have been made for determining some ingredients of probable economic value. The latter are mostly only partial analyses.

The Table of Contents in front presents an alphabetical list of the minerals of which analyses are presented here.

Anal No.

3012.–3020. Brewster County. Kleinite from Terlingua, Texas. 3012-3020, inclusive. Analysis made by miscellaneous methods. U. S. G. S. Bul. 405, p. 41.

3021. Brewster County. Kleinite, from Terlingua, Texas. Average of several determinations by W. F. Hillebrand, reduced to a gangue-free basis. U. S. G. S. B. 591, p. 290.

3022. Brewster County. Terlinguaite from Terlingua, Texas. U. S. G. S. B. 591, p. 289.

3023. Brewster County. Eglestonite from Terlingua, Texas. Analyzed by Hillebrand and Schaller. 3023-3025, inclusive. U. S. G. S. B. 591, p. 289.

3070. Brown County. Epsomite. Epsomite occurs in large quantities in Brown County, and of a purity sufficient to make it the source of an exceedingly cheap commercial product. Tex. Acad. Sci. V. 2., Pt. 2., pp. 91-92, 1899. Analyzed by H. W. H.

3071. Brown County. Epsomite. Same as above.

3028. Burnet County. Gadolinite. Sent by Earl Hidden. Analyzed by F. A. Genth. Includes the Fe_2O_3 and SiO_2 insoluble in dilute sulphuric acid. Tex. Acad. Sci. III, p. 116.

3029. Burnet County. Gadolinite. Sent by Earl Hidden. Analyzed by F. A. Gent. Tex. Acad. Sci. III, p. 116.

3026. Culberson County. Asbolite from Sec. 30, Township 8, block 66, Culberson County. From T. R. Owen, Sierra

Blanca, Texas. Analyzed March 31, 1914, by S. H. W. B. A. No. 1460.

3027. Culberson County. Bauxite from northern part of Culberson County. Sent by S. H. Worrel, Sierra Diablo Range. Analyzed by S. H. W. B. A. No. 923.

3039. Culberson County. Wolframite. From north of Van Horn, Culberson County, (35 miles) being near Figure 2 Ranch. Sent by S. H. W. Analyzed Nov. 6, 1912. B. A. No. 399.

3040. Culberson County. Same as above, except B. A. No. 400.

3037. Edwards County. Halloysite. Analyzed by McNeill. U. S. G. S. B. 591, p. 341.

3038. El Paso County. Borax. From evaporation crust on lake, about 2 miles S E. of Salt Lake, Trans-Pecos region. Analyzed by E. M. S. of El Paso. U. S. G. S. B. 260, p. 579.

3064. Fayette County. Grahamite. Section at O'Quinn Creek. Analyzed 1889 by L. E. Magnenat. Tex. Acad. Sci. III., p. 96.

3033. Jones County. Chalcocite Nodules. Near Avoca, Texas. Analyzed by H. A. Tobelmann. Economic Geology. Vol. 10, p. 642.

3034. Jones County. Chalcocite Pseudomorph. From Avoca Area. Analyzed by H. A. T. Econ. Geo. Vol. 10, p. 642.

3030. Llano County. Gadolinite. Analyzed by Eakins. U. S. G. S. B. 591, p. 319.

3031. Llano County. Gadolinite. 3031-3032, inclusive. Sent by Earl Hidden. Analyzed by F. A. Gent. Tex. Acad. Sci. III, p. 116.

3035. Llano County. Soapstone. From near Valley Spring, Llano County. Analyzed by J. E. S. B. A. No. 1595.

3036. Llano County. Baryte. From N. J. Badu, Llano, Texas. Sample yields 89.45% $BaSO_4$ and 2.84% gypsum. Analyzed by J. E. S. B. A. No. 2809.

3041. Llano County. Rowlandite. From Barringer Hill, Llano County. Analyzed by W. F. H. U. S. G. S. B. 591, p. 320.

3042. Llano County. Spessarite. From Horse Mountain, 5 miles north of Llano. Analyzed by Dr. W. M. Melville. T. M S. B. 5, p. 76.

3043. Llano County. Thorogumite. A hydrated uranium Thorosilicate. From Barringer Hill, Llano County. T. M. S. B. 5, p. 80.

3044. Llano County. Nivenite (Uraninite) U. S. G. S. B. 591, p. 367.

3045. Llano County. Nivenite (Uraninite) from Barringer Hill. Analyzed by Hidden and Mackintosh. T. M. S. B. V, p. 60.

3046. Llano County. Fergusonite. Barringer Hill. Monohydrated. Tex. Acad. Sci. II, p. 139-140.

3047. Llano County. Same as above, except Tri-hydrated.

3048. Llano County. Mackintoshite. Barringer Hill. Analyzed by W. F. H. U. S. G. S. B. 591, p. 320.

3049. Llano County. Mackintoshite. Same as above. Analysis made with utmost care on a small sample. Selected grain by grain, but was evidently not much purer than the first lot.

3050. Llano County. Tengerite. Barringer Hill. Sent by W. E. Hidden. Analyzed by W. F. H. Magnesia, alkalies, etc., undetermined. U. S. G. S. B. 591, p. 297.

3051. Llano County. Metagadolinite. Barringer Hill. T. M. S. B. V. 5, p. 56.

3052. Llano County. Powerlite. From Barringer Hill. Chreous, Coating Molybdenite. Sp. Gr. 4.15. U. S. G. S. B. 591, p. 364.

3053. Llano County. Yttrialite. From Barringer Hill. Tex. Acad. Sci. III, p. 136.

3054. Llano County. Yttrialite. From Barringer Hill. Analyzed by W. F. H. U. S. G. S. B. 419, p. 275.

3065. Llano County. Allanite (silicate of aluminum, calcium, iron and the rare metals). Mexican diggings, Babyhead Creek, Barringer Hill. Analyzed by W. Muthmann and L. Stuetzel of the Royal Academy of Science, of Munich, 1900, T. M. S. B. 5, p. 6.

3073. Llano County. Graphite from "Buda place, 6 miles east of Llano."

3074. Llano County. Graphite. A general sample was made of all the samples secured underground and crushed to pass a 10-mesh sieve. U. S. G. S. Min. Res. 1913., Part II., p. 230. Sample sent by Sidney Paige of U. S. G. S.

3062. Presidio County. Jct. From San Carlos Coal Field. Sent by Dr. J. A. Udden, July 1913. Analyzed by S. H. W. B. A. No. 848.

3055. Mason County. Tephroite. From Kothmann Tract, 3 miles S. E. of Spiller Mine, Mason County. "A protoxide silicate of manganese." Analyzed by W. A. N.

3056. Mason County. Andradite. From the Kothmann Tract, 15 miles N. E. of Mason. Analyzed R. M. B. Massive semi-crystalline; color, chocolate-brown; streak, light brown; lustre, resinous. T. M. S. B. V., p. 8.

3057. Mason County. Same as above, except that color, deep yellow, lustre resinous to vitreous. Crystalline.

3027b. Reeves County. Bauxite. 11 miles west by northwest of Toyah. Sample secured by A. J. Martin, 1917. B. A. C372.

3027c. Reeeves County. Bauxite, another sample of same deposit from which preceding sample was obtained. B. A. C370.

3058. San Saba County. Onyx. Golden Onyx from B. R. Russell's Ranch 9 miles S. E. of town of San Saba. B. A. C972.

3059. San Saba County. Oynx. Same as above, except Black Onyx. B. A. C973.

3066. Travis County. Celestite. From deposit of celestite at Mt. Barker, 3½ miles N. W. of Austin. Analyzed 1904 by O. H. P. T. M. S. A. No. 3038.

3061. Uvalde County. Augite. From Black Mountain, Uvalde Quadrangle. U. S. G. S. B. 591, p. 59.

3063. Webb County. Grahamite. From between Eagle Pass and Hidalgo. Section at Webb Bluff. Analyzed by L. E. Magnenat 1889. Tex. Acad. Sci. III., p. 95.

METEORIC IRON

A score of meteors have been found in Texas and about half of these have been meteoric iron. Analyses have no doubt been made of other iron meteors than those here given. These are recorded merly as a matter of passing interest.

Anal No.

3133. Bosque County. Meteoric iron from 6 miles S. W. of Iredell. Analyzed 1899 by J. E. Whitfield. T. M. S. B. 5, p. 56.

3134. Denton County. Meteroic iron. Analyzed 1860 by Prof. W. T. Riddell. T. M. B. 5, p. 56.

3135. Fayette County. Meteorite. Analyzed 1917 by J. E. S. Sent by George Bruns, Route 4, LaGrange, Texas. B. A. No. C429.

3136. Fayette County. Meteoric iron. From Bluff, Fayette County. Analyzed 1888 by J. E. Whitfield in Chem. Lab. of U. S. G. S. T. M. S. B. V., p. 56.

3137. Hamilton County. Meteoric iron, marked "Hamilton County Meteorite." From northern part of county. Analyzed 1890 by L. G. Eakins, of U. S. G. S. lab. T. M. S. B. 5, p. 56.

3138. Maverick County. Meteorite, labelled "Maverick County Meteorite." Found near Ft. Duncan, June 1882. Analyzed by J. B. MacIntosh. T. M. S. B. 5, p. 67.

3139. McLennan County. Meteoric iron from near Mart. Analyzed by H. N. Stokes. U. S. G. S. B. 419, p. 239.

3140. Tom Green County. Meteoric iron marked "San Angelo Meteorite." Found 7 miles south of San Angelo. Analyzed 1898 by Martin and Haskins, Chicago, Ill. Specimen from Univ. of Texas. T. M. S. V. 5, p. 57.

3141. Travis County. Meteoric iron (Stony Meteorite). Analyzed by L. G. Eakins, U. S. G. S. Chem. Lab., Record No. 1097. U. S. G. S. B. 419, p. 235

3142. Wichita County. Meteoric iron, marked "Wichita County Meteorite." Long held by the Comanches as an object of worship. Removed to Ft. Belknap, 1858, by Major Neighbors. Analyzed by J. W. Mallett, 1884. T. M. S. B. 5, p. 58.

BAT GUANO

Deposits of bat guano are quite common in caves in our great limestone region, also known as the Edwards Plateau. Other deposits of this kind have been discovered in caves in the mountains of the Trans-Pecos country. Some of the deposits have evidently been leached and considerably altered.

Anal. No.

3143. Blanco County. Bat guano from Blowout, Blanco County. Analyzed 1904. U. of T. Min. Sur No. 3048. Analyzed by O. H. P.

3144. Blanco County. Same as above.

3145. Burnet County. Bat Guano from Marble Falls. Analyzed 1905 by O. H. P. Tex. M. S. No. 3226.

3146. Comal County. Bat Guano from New Braunfels. T. M. S. No. 3005. Analyzed by S. H. W. July 29, 1904.

3147. Travis County. Bat Guano from Eckles Cave. Analyzed 1902 by S. H. W. U. of T. M. S. No. 1475.

WOODS

Some analyses of native woods made by the Bureau of Economic Geology are interesting as showing their normal contents of ash.

Anal. No.

3148. Travis County. Sample furnished by H. B. Beck. Mesquite wood. Analyzed by S. H. W. 1912. B. A. 58.

3149. Travis County. Mulberry, well seasoned. Analyzed by S. H. W. 1912. B. A. 350.

3150. Travis County. Well-seasoned Post-oak. Analyzed by S. H. W. 1912. B. A. 351.

3151. Travis County. Well-seasoned Sycamore. Analyzed by S. H. W. 1912. B. A. 352.

3152. Travis County. Well-seasoned Hickory. Analyzed by S. H. W. 1912. B. A. 353.

3153. County not given. Long leaf yellow pine from east Texas. Analyzed by S. H. W. 1912. B. A. 575.

3154. County not given. Chinaberry. Analyzed by S. H. W. 1912. B. A. 343.

3155. Travis County. Bastrop Pine. Furnished by Mr. H. B. Beck. Analyzed by S. H. W. 1912. B. A. 344.

3156. Travis County. Willow, well-seasoned. Analyzed by S. H. W. 1912. B. A. 349.

PART TWO

I. SAND AND SANDSTONE

Anal. No.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	CO_2	SO_3	Ignition Loss	Total
1	52.80	3.51	38.49							5.30	99.80
2	77.40	7.20		Trace	Trace	0.	50			5.50	90.60
3	39.50	3.70	1.70	29.16				22.91			96.97
4	48.60	6.84	1.86	20.33	1.01			13.50	3.09	4.80	100.09
5	72.00	13.60	4.20	4.10	1.27			3.30	0.21	2.28	100.96
6	73.00	10.43	3.75	4.31	1.25			3.80	0.21	1.50	98.25
7*	65.60	8.85	3.90	6.00	0.80	6.00	1.50	5.98		0.25	98.88
8	65.28	7.12	4.50	8.51	1.28			12.10	0.21	0.00	99.00
9	88.00	4.42	1.22	0.80	0.72			0.80	1.65	1.90	99.51
10	77.90	11.41	4.05	0.60	0.79			0.90	Trace	4.56	100.21
11	98.60	0.36	0.34	0.08						1.00	100.38
12	92.14	1.07	2.89	1.52				1.20		1.42	100.24
13	88.80	None	1.81	1.38	1.45			2.68	0.59	1.92	99.80
14	77.40	8.48	4.12	2.32	1.40			2.36	0.55	2.34	99.97
15	57.00		34.10					0.60	0.84	6.70	99.24
16	74.06	10.45	5.35	Trace	Trace					9.50	99.36
17	85.20	7.82	4.68	1.09				1.10		0.30	100.19
18*	90.28	1.70	1.10	0.40	1.55	0.80	3.10	None		0.20	99.13
19	81.92	2.88	0.76	0.48	0.51	3.29	6.25	0.70	1.51	1.86	100.16
20	63.18	2.04	Trace	20.52				11.50		3.08	100.32
21	95.96	2.68	Trace	Trace							98.64
22	65.40	15.00	5.50	3.76	0.43	2.28	2.17	3.35	1.25	0.89	100.03
23	5.00	7.10	1.10	43.68				35.75	0.69	6.25	99.57
24	17.20	2.95	1.65	41.18				32.36	0.83	2.64	98.81
25	81.30	4.59	0.61	6.96	None			4.20	None	2.40	100.06
26	97.00	1.05	0.85	0.50				0.40	0.77	0.10	100.67
27	83.32	5.81	2.15	1.33	1.12			0.80	1.92	3.94	100.39
28	67.80	3.85	1.07	6.34	0.46	0.41	1.78	8.30	5.32	4.90	100.24
29	80.30	7.87	2.83	None	0.87			None	1.51	6.62	100.00
30†	99.08	0.98	0.30	Trace	Trace	0.	46				100.82
31	71.02	1.21	Trace	14.60	None			10.24	1.20		98.24
32*,	70.00	7.50	3.00	8.00	0.30	2.50	2.00	6.00		0.40	99.70
33	97.00		1.90	0.62					0.80		100.32

*Contains trace of MnO_2 and P_2O_5
†Trace of sulfur.

II. GREENSAND

Sel No	SiO_2	Al_2O	Fe_2O_3	FeO	CaO	MgO	K_2O	Na_2O	CO_2	P_2O_5	SO_3	H_2O	Org. Matr	Total
34	9.20	7.48	15.31		29.51	------	------	------	29.80	4.21	0.77	3.10		99.38
35	16.10	13.09	49.46		9.80	1.48	0.04	2.26	------	1.88	------	------	------	94.11
36	30.53	4.36	13.10		17.26	----	10.77	------	14.27	5.29	1.37	3.53		100.48
37	35.18	5.30	17.25		16.00	Trace	1.69	1.39	8.00	3.30	2.06	10.10		100.17
38	42.12	8.35	20.25		8.00	Trace	1.51	0.85	6.00	3.30	0.00	9.00		99.38
39	60.80	------	22.20	------	0.90	0.72	0.66	2.90	------	Trace	2.69	9.50		100.46
40	20.95	16.28	47.62		1.81	1.46	0.93	3.94	------	0.00	------	5.65	------	98.64
41	25.95	11.20	45.25		5.20	1.10	0.13	2.12	------	0.38	------	5.85	------	97.48
42	30.85	16.87	36.83		0.60	1.46	1.72	3.44	------	0.41	------	6.00	------	98.18
43	32.00	20.66	24.54		0.66	1.14	0.66	3.77	------	0.42	------	6.85	------	100.60
44	14.40	2.07	56.23		3.05	5.60	4.61	Trace	------	0.54	Trace	14.00	------	99.90
45	29.40	7.46	5.60	14.54	20.00	2.38	3.41	Trace	14.80	Trace	------	2.20		100.29
46	45.70	18.09	4.00	4.71	3.70	2.00	4.57	1.20	11.00	0.12	Trace	------	------	100.09
47	49.47	24.29	6.76	------	1.48	------	0.13	2.17	N. D.	0.072	1.51	14.17		100.15
48	47.00	9.78	21.42	------	7.58	2.30	1.27	4.65	N. D.	0.56	0.22	N. D.		------
49	15.30	6.53	39.47	------	6.34	5.70	0.60	5.15	N. D.	0.25	0.34	N. D.		------
50	43.10	13.66	27.54	------	1.07	4.76	0.56	3.60	N. D.	0.17	0.25	N. D.		------
51	30.00	14.11	25.09	------	10.80	3.46	0.80	4.41	N. D.	0.44	0.69	N. D.		------
52	74.90	9.30	5.50	------	0.90	0.58	1.27	6.67	N. D.	0.08	0.60	N. D.		------
53	24.68	13.96	27.22		10.83	------	0.35	0.66	13.00	0.34	0.84	8.15		100.03
54	------	------	------	------	------	------	------	------	------	0.64	------	------	------	------
55	70.38	------	10.64	1.70	------	------	3.46	------	------	------	------	6.12		------
56	45.80	------	38.40	------	2.20	2.23	1.14	6.00	------	Trace	0.91	4.21		100.89
57	30.50	24.47	4.93	14.49	2.31	3.66	2.05	Trace	------	0.41	0.31	17.00		100.13
58	32.00	------	54.60	------	5.18	11.20	Trace	Trace	None	0.83	0.78	------	------	104.59
59*	20.10	------	32.34	------	11.20	Trace	2.66	1.90	5.90	0.75	0.37	13.50		90.27
60	------	------	------	------	------	------	4.89	0.66	------	------	Trace	N. D.		------
61	15.30	24.40	17.14	12.26	6.30	4.32	5.10		11.20	0.29	Trace	5.70		102.01
62†	------	------	------	------	------	------	0.78	4.45	------	0.32	------	------	------	------
63	15.30	17.60	18.75	6.85	24.25	0.82	Trace	2.83	------	0.19	0.13	12.01		98.73
64	------	------	------	------	------	------	0.70	2.96	------	Trace	------	------	------	------
65	33.45	20.39	5.36	15.69	1.65	5.05	2.05	1.14	------	Trace	0.74	14.55		100.07
66	34.10	14.58	7.06	14.94	8.28	3.68	0.68	2.03	------	Trace	0.55	19.00		99.90
67	47.10	4.66	21.43	2.60	6.83	2.81	2.62	3.52	------	Trace	0.69	7.00		99.26
68	48.30	8.81	34.19		2.06	1.44	2.48	1.58	------	Trace	0.89	------	------	99.75
69	25.20		58.68		2.96	4.68	4.15	4.04	------	Trace	1.33	3.11		100.04
70	30.40		52.60		2.46	3.92	2.28	4.97	------	Trace	0.51	3.11		100.25
71	16.60		67.00		4.11	4.75	2.48	3.63	------	1.27	0.72	------	------	100.56
72	7.40		53.40		6.58	8.28	2.57	5.26	------	Trace	0.73	13.50		97.72
73	32.10	15.54	12.71	20.39	1.98	5.20	3.62	2.37	------	Trace	0.98	5.20		100.09
74	20.70	7.40	44.62	------	1.31	0.57	Trace	0.42	2.90	4.79	0.12	16.10		------
75	26.30	27.81	29.59	------	0.90	1.60	3.29	4.66	------	0.22	0.38	5.00		96.45
76	37.50	8.89	32.33		2.39	0.80	0.99	0.65	1.80	0.12	0.82	13.02		99.31

*Contains 1.55 per cent Mn.
†Contains 1.85 per cent Mn.

III. ALLUVIUM

Serial No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	CaO	MgO	K_2O	Na_2O	CO_2	P_2O_5	SO_3	TiO_2	Loss on Ignition	Total
77	98.80	1.00												0.48	100.28
*78	64.22	14.02	2.16	1.25		4.01	1.84	2.19	1.04	1.10		0.10		5.74	99 97
79	10.20	2.13	1.47			45.08	2.22			37.10		0.67		0.62	99.49
80	1.30	0.87	1.13			52.88	0.38			41.19		0.69		1.21	99.65
82	76.00	12.88	1.92			4.53	0.66			0.30		3.57		0.00	99.86
83	61.36	10.61	3.39			6.95	0.92			4.10		0.82		10.46	98.61
84	58.60	11.04	1.92			12.11	0.88			5.80		0.63		7.16	98.14
85	39.16	5.24	2.11			25.41	Trace			19.49		0.96		5.87	98.27
86	52.50	1.41	3.75			21.05	Trace			15.75		1.23		3.65	99.34
†87	50.05	10.25	3.31		0.04	13.94	1.70	1.80	0.51			0.05		16.48	100.08
‡88	67.98	7.90	2.27		0.03	8.98	1.03	1.51	0.63			Trace		9.07	100.21
89	8.40	3.15	3.75			44.60	0.47			33.20				6.70	99.67
90	60.96	6.91	4.25			12.00	Trace	1.18	2.00	9.10				3.00	99.40
91	53.60	9.00	2.60			16.80	1.20	1.80	Trace	11.64			0.80		100.16
92	67.38	6.80	2.56			14.31	Trace	1.24	2.22	11.20					99.06
93	34.60	15.09	3.02			21.48	0.15	1.43	1.43	15.60			0.96	6.00	99 60

*Contained water at 100°, 23 per cent.
†Contained water at 100°, 1.94 per cent.
‡Contained water at 100°, 0.81 per cent.

IIIa. CALICHE

Serial No.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	CO_2	SO_3	Loss on Ignition	Total
93a	18.80	5.80	1.10	31.31	4.85	29.94	0.55	5.86	98.21
93b	18 80	2.11	1.69	41.82	1.14	33.36	1.36		99.68

IV. CLAY, SHALE AND MARL

No.	SiO_2	Al_2O_3	Iron Oxide	MnO	CaO	MgO	K_2O	Na_2O	CO_2	P_2O_5	SO_3	TiO_2	H_2O	Organic Matter	Total
94	21.36	13.65	32.21		19.00	0.32	0.71	3.39	none	0.61	none		5.52		96.77
95	61.19	16.74	5.99		0.90		1. 31					1.62	12.11		99.86
96	65.60	22.50	1.20		0.70	Tr.	Tr.	1.70				1.10	7.70		100.50
97	74.30	16.00	1.40		Tr.	none	0.50	0.60				0.50	5.07		99.60
98	71.30	19.70	1.00		2.10	Tr.	Tr.	0.08				Tr.	5.80		100.70
99	68.45	21.10	1.10		1.40	Tr.	Tr.	1.25				0.05	6.75		100.10
100	72.70	9.50	1.10		4.10	0.30	2.40	Tr.				0.60	4.50		99.10
101	70.40	17.30	1.30		1 06	Tr.	0.60	2.20				0.60	5.40		99.10
102	47.20	4.10	2.40		21.00	1.40	Tr.	1.30	18.10			0.70	2.90		99.10
103	82.84	3.16	0.75		5.32	0.40	0.90	0.25	4.00			0.20	2.30		99.72
104	65.64	20.48	1.44		1.70	0.32	1.00	0.60				0.27	7.50		98.95
105	68.30	20.10	1.00		Tr.	2.40	Tr.	0.60				1.20	6.60		100.20
106	68.70	15.90	3.30		3.10	0.50	Tr.	0.30				1.40	5.90		99.10
107	38.08	11.36	2.60		23.70	Tr.	0.58	1.60				0.70	3.06		100.44
108	57.01	11.85	3.02		9.56	1.20	0.75	2.01				1.13	4.00		98.53
109	55.30	13.56	4.50		9.48	none			7.45		none			8.85	99.14
110	50.17	18.24	4.77		4.30	Tr.	Tr.	0.24	3.25		0.90	1.14	5.70	0.55	98.56
111	66.72	24.42	Tr.		0.42	Tr.	Tr.	Tr.			Tr.		7. 94		99.50
112	71.20	18.00	0.60		Tr.	2.00	0.90	0.30				0.95	5.80		99.58
113	88.71	14.88	2.00		0.30	0.97	Tr.	Tr.				0.90	2.28		100.04
114	73.61	17.01	0.50		0.08	1.36	Tr.	0.15				1.57	6.00		100.75
115	66.01	18.82	6.33		0.55	1.88	0.16	0.08				0.95	4.80		99 58
116	76.17	8 33	2.99		0.60	0.55	0.80		0.47	0.083	0.106		5.82	3.94	99.80

IV. CLAY, SHALE AND MARL.—Continued

No.	SiO_2	Al_2O_3	Iron Oxide	MnO	CaO	MgO	K_2O	Na_2O	CO_2	P_2O_5	SO_3	TiO_2	H_2O	Organic Matter	Total
117	68.56	18.53	0.72	.....	0.60	0.12	2.27	2.72	.....	.....	.....	0.43	7.00	.....	100.95
118	72.64	12.11	3.45	.....	1.46	0.25	1.40	1.70	.....	.....	.....	.....	7.20*	.....	100.21
119	64.10	18.81	6.05	.....	0.74	0.30	1.28	0.58	.....	.....	.....	.....	8.50†	.....	.....
120	4.54	0.75	1.40	.....	52.04	0.24	.....	.....	40.70	.....	.....	.....	0.50	.....	100.07
121	19.34	3.00	2.16	.....	39.50	1.00	.....	.....	31.50	.....	.....	.....	2.30	0.90	99.70
122	51.90	12.40	4.60	.....	12.50	1.40	1.50	2.40	8.50	.....	.....	0.70	5.50	.....	101.40
123	64.16	23.57	5.39	.....	0.12	0.18	0. 40		.....	.....	.....	.....	6. 22		100.04
124	19.30	7.88	0.92	.....	38.88	0.40	none	none	30.44	.....	.....	.....	1. 08		98.90
125	49.40	22. 67		.....	2.26	.....	.....	.....	.....	.....	0.96	.....	24.55‡	.....	99.93
126	85.00	6.71	1.44	.....	Tr.	0.43	0.50	0.65	.....	.....	.....	1.00	3.10	.....	99.43
127	72.70	14.46	3.81	.....	0.08	1.93	Tr.	Tr.	.....	.....	.....	1.43	4.61	.....	99.08
128	25.80	42.20	19.75	.....	0.90	0.80	0.26	2.50	.....	0.49	.....	.....	none	.....	92.70
129	82.45	10 92	1.08	.....	0.22	0.96	none	none	.....	.....	.....	1.00	2.47	.....	99.10
130	45.07	15.78	4.92	0.02	7.98	1.18	1.70	0.08	.....	.....	9.71	.....	6.51	6.89	99.84
131	56.71	19.74	5.74	0.02	1.28	1.91	1.67	0.36	.....	.....	0.25	.....	4.00	8.62	100.30
132	57.26	18.45	8.25	.....	1.52	none	.....	.....	1.20	.....	none	.....	13. 00		99.68
133	[illegible]	[illegible]	[illegible]	.....	1 95	1 41	0.67	0.61	1.88	.....	0 00	1.33	6.24	2.79	100.70
134	58.70	21.73	5.49	.....	1 00	1.24	0.32	0.18	.....	.....	0.33	1.13	5.88	3.00	99.06
135	55.10	23.80	3.51	.....	3.28	1.24	0.50	0.21	1.75	.....	3.37	1.05	6.00	.....	99.81
136	53.80	23.24	3.60	.....	1.76	1.44	1.65	2.00	0.80	.....	.....	1.10	6.04	3.36	99.09
137	58.21	22.83	6.48	.....	1.70	1.72	Tr.	0.05	3.10	.....	.....	1.75	7.06	2.00	99.90
138	53.48	14.70	6.24	.....	8.08	1.44	0.85	1.60	4.06	.....	.....	1.00	6.90	.....	99.01
139	69.50	15.60	2.37	.....	2.38	2.00	0.77	0.87	.....	.....	.....	1.20	5.00	.....	99.84
140	70.00	18.70	1.20	.....	0.50	1.20	Tr.	1.50	.....	.....	.....	1.00	6.10	.....	100.20
141	57.0	25.5	3.4	.....	0.90	0.72	0.94	0.82	.....	.....	.....	1.87	10.00	.....	100.34
142	51.50	17.60	16.60	.....	1.00	1.10	1.50	Tr.	.....	.....	.....	1.60	7.70	.....	98.60
143	56.20	23.70	1.50	.....	0.60	1.50	1.40	2.20	.....	.....	.....	1.60	11.10	.....	99.80
144	51.90	17.30	4.50	.....	10.00	1.90	Tr.	3.60	6.50	.....	.....	Tr.	4.90	.....	100.60
145‖	42.40	16.82	7.50	.....	10.82	1.60	.....	.....	.....	.....	7.20	.....	12.72	.....	.....
146	62.36	22.63	3.74	.....	0.20	0.21	1.44	1.73	.....	.....	.....	1.13	6.82	.....	100.26
147	49.60	16.06	5.60	.....	10.06	2 14	1.38	0.77	6.91	.....	1.12	0.70	5.02	.....	99.39
148	47.92	14.40	3.60	.....	12.30	1.08	1.20	1.50	9.50	.....	1.44	1.22	4.85	1.34	100.35
149	49.08	10.90	7.74	0.11	13.56	1.36	1.26	0.20	none	.....	0.22	.....	1.59	14.37	100.39
150	55.54	15.72	6.96	0.13	4.88	2.43	1.64	0.51	none	.....	0.28	.....	2.63	9.25	99.97
151	75.15	13.76	2.35	0.04	0.66	0.45	0.96	0.15	none	.....	0.45	.....	0.58	5.48	99.93
152	58.73	20.71	4.67	0.05	2.05	1.71	1.76	0.05	none	.....	0.44	.....	0.80	8.91	99.82
153	53.66	12.97	5.63	.....	9.43	1.21	0.70	0.80	7.41	.....	0.57	.....	.....	7.59	99.97
154	68.75	15.81	4.05	.....	0.60	1.64	Tr.	0.08	.....	.....	.....	0.60	4.07	2.10	97.70
155	64.52	17.72	4.46	.....	0.27	1.58	2.71	1.24	.....	.....	none	1.30	5.44	.....	99.24
156	63.07	19.43	4.75	.....	1.32	0.50	none	none	.....	.....	0.15	1.47	6.90	.....	99.09
157	69.50	13.60	4.40	.....	2.46	0.97	1.18	0.99	1.93	.....	0.63	.....	.....	5.31	100.37
158	68.60	20 47	0.72	.....	Tr.	0.40	1.33	0.25	.....	.....	.....	1.13	6.26	.....	99.16
159	73.00	15.79	0.63	Tr.	1.29	1.53	0.10	0.16	.....	.....	.....	0.43	5.76	.....	98.69
160	83.80	9.23	2.30	.....	Tr.	Tr.	0.56	0.54	.....	.....	.....	0.87	3.10	.....	100.40
161	73.16	13.86	1.44	.....	3.14	1.61	Tr.	0.23	.....	.....	.....	0.70	5.15	.....	99.29
162	74.82	13.61	0.72	.....	1.69	2.02	Tr.	0.27	.....	.....	.....	0.39	5.67	.....	98.19
163	37.05	8.13	1.80	.....	2.23	0.08	0.47	Tr.	22.12	.....	.....	0.47	2.64	.....	99.82
164	41.20	6.50	1.98	.....	1.62	0.14	0.43	0.09	20.63	.....	.....	0.43	2.28	.....	99.27
165	75.41	12.49	0.72	.....	1.82	1.80	0.29	0.56	.....	.....	.....	0.19	5.93	.....	99.21
166	57 78	17.11	Tr.	.....	2.70	1.86	1. 12		.....	.....	.....	none	19.85	.....	100.42
167	76.00	11.36	0.72	.....	1.96	1.58	0.58	0.86	.....	.....	.....	Tr.	6.20	.....	99.26
168	59.34	15.71	5.76	.....	3.00	2.00	0.56	1.44	1.07	.....	0.31	1.83	7.02	2.00	100.13
169	73.06	9.88	6.92	.....	1.50	0.25	Tr.	0.12	.....	.....	.....	1.00	6.64	.....	99.37
170	68.50	18.41	3.02	.....	0.70	1.05	0.47	0.91	.....	.....	.....	1.31	6.20	.....	100.57
171	58.50	18.39	3.21	.....	2.34	1.61	2.70	4.93	.....	.....	Tr.	.....	8. 20		99.88
172	68.56	18.53	0.72	.....	0.60	0.12	2.27	2.72	.....	.....	.....	0.43	7.00	.....	100.95

*1.60 combined water, 2 00 Hygroscopic.
†2.70 combined water, 6 00 Hygroscopic.
‡7.25 combined and 17.30 Hygroscopic.
‖1 66 soluble in water

IV. CLAY, SHALE AND MARL.—Continued

No.	SiO_2	Al_2O_3	Iron Oxide	MnO	CaO	MgO	K_2O	Na_2O	CO_2	P_2O_5	SO_3	TiO_2	H_2O	Organic Matter	Total
173	40.69	12.68	3.90	-----	18.12	0.92	1. 14		-----	-----	-----	none	22.55	-----	100.00
174	72.30	19.33	2.47	-----	Tr.	0.50	4. 44		-----	-----	-----	none	none	-----	99.04
175	18.62	3.23	1.26	-----	31.30	0.42	-----	-----	32.50	-----	-----	-----	2.42	-----	99.75
176	83.41	7.20	2.26	-----	0.78	0.45	Tr.	0.12	-----	-----	-----	0.66	3.58	-----	98.46
177	72.45	11.72	3.38	-----	3.66	1.34	Tr.	9.19	-----	-----	-----	0.87	3.44	-----	97.05
178	49.40	17.90	4.50	-----	9.50	1.88	none	Tr.	9.55	-----	-----	1.05	4.58	-----	98.36
179	68.90	21.83	1.57	-----	-----	-----	2. 00		-----	-----	-----	-----	5.60	-----	99.90
180	83.90	5.52	4.75	-----	0.40	1.32	0.15	0.45	-----	-----	-----	1.67	2.44	-----	100.50
181	78.11	17.77	2.83	-----	0.40	0.28	2.76	3.02	-----	-----	-----	-----	-----	-----	100.17
182	74.15	14.11	4.03	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
183	68.35	16.22	4.08	-----	-----	1.08	2. 20		-----	-----	-----	-----	8.00	-----	99.93
184	-----	-----	-----	-----	-----	-----	3.20	2.90	-----	-----	-----	-----	-----	-----	-----
185	71.00	20.20	2.20	-----	Tr.	Tr.	1.24	6.16	-----	-----	-----	-----	-----	-----	100.80
186	65.90	18.43	3.77	-----	0.60	0.30	0.95	4.08	-----	-----	-----	-----	6.36	-----	100.39
187	82.10	14.24	1.56	-----	1.15	-----	-----	§1.00	-----	-----	-----	-----	-----	-----	-----
188	68.90	21.83	1.57	-----	-----	-----	6.60	4.00	-----	-----	-----	-----	-----	-----	-----
189	75.30	13.87	2.53	-----	1.90	1.23	2.62	2.65	-----	-----	-----	-----	-----	-----	100.10
190	71.11	17.85	0.28	-----	0.05	0.41	0.36	0.68	-----	-----	-----	1.45	6.31	-----	98.50
191	72.30	19.33	2.47	-----	Tr.	0.50	Tr.	4.44	-----	-----	-----	-----	-----	-----	99.04
192	61.90	23.70	5.50	-----	Tr.	1.11	Tr.	1.27	-----	6.52	-----	-----	-----	6.52	100.00
193	62.12	25.11	0.30	-----	0.33	0.21	Tr.	0.10	-----	-----	-----	2.12	10.00	-----	100.29
194	69.88	20.47	0.21	-----	0.50	0.30	0.15	0.33	-----	-----	-----	1.40	6.68	-----	98.92
195	74.04	15.15	0.50	-----	0.50	0.27	0.42	1.12	-----	-----	-----	1.31	6.00	-----	99.31
196	77.29	15.29	1.59	-----	0.33	Tr.	Tr.	0.12	-----	-----	-----	1.18	4.75	-----	100.55
197	68.55	26.00	Tr.	-----	Tr.	0.11	Tr.	Tr.	-----	-----	-----	-----	6. 00		100.66
198	69.20	21.08	1.37	-----	Tr.	0.94	Tr.	2.30	-----	-----	-----	-----	5. 16		100.00
199	70.80	18.56	1.04	-----	Tr.	1.58	Tr.	5.35	-----	-----	-----	-----	2. 60		99.93
200	74.03	17.10	0.57	-----	0.10	0.22	0.30	0.60	-----	-----	-----	1.36	6.15	-----	100.43
201	69.30	14.67	4.46	-----	0.28	1.74	1.55	2.09	-----	-----	-----	1.13	3.64	0.96	99.88
202	77.70	10.37	9.33	-----	1.70	Tr.	0.24	0.54	-----	-----	-----	-----	-----	-----	99.78
203	42.40	19.82	15.48	-----	6.66	0.44	-----	-----	5.26	-----	0.11	-----	9. 84		100.01
204	29.12	14.30	42.10	-----	11.21	0.72	0.62	1.58	-----	0.58	-----	-----	6.10	-----	106.33
205	79.00	11.38	2.44	-----	0.50	0.20	0.35	0.65	-----	-----	-----	0.78	3.80	-----	99.00
206	77.97	11.04	3.19	-----	0.84	0.38	none	none	-----	-----	0.51	1.23	3.24	-----	98.40
*207	41.40	8.60	3.57	-----	6.80	-----	-----	-----	-----	-----	3.75	-----	-----	-----	-----
208	67.00	17.61	3.67	-----	Tr.	1.32	0.68	1.57	-----	-----	0.53	2.10	5.20	1.03	100.73
209	64.20	20.13	1.87	-----	0.34	1.62	0.69	1.78	Tr.	-----	1.80	2.00	5.32	1.00	100.75
210	81.50	5.43	3.60	-----	1.30	0.25	0.49	1.56	-----	-----	-----	0.87	4.00	-----	99.00
211	67.20	12.48	3.52	-----	5.78	0.25	-----	-----	4.54	-----	1.17	-----	-----	4.96	99.90
212	77.40	12.70	0.70	-----	-----	-----	-----	-----	-----	-----	-----	0.70	5.70	-----	100.20
213	70.82	18.90	0.40	-----	Tr.	Tr.	Tr.	0.50	-----	-----	-----	2.10	6.80	-----	99.52
214	62.40	20.66	8.54	-----	0.40	Tr.	1.12	7.77	-----	-----	-----	-----	-----	-----	100.89
215	76.00	9.45	4.75	-----	Tr.	none	2.00	4.00	-----	-----	-----	-----	4.70	-----	100.90
216	58.20	23.97	4.43	-----	-----	-----	7. 11		-----	-----	-----	none	5.36	-----	99.07
217	51.22	20.34	6.82	-----	7.94	Tr.	0. 14		6.23	0.02	none	-----	1.05	-----	93.56
218	72.36	7.84	1.72	-----	6.48	2.23	1.20	1.70	3.30	-----	-----	0.12	3.72	-----	100.67
219	71.40	8.20	2.30	-----	6.34	2.44	1.22	1.60	3.25	-----	-----	0.14	3.70	-----	100.59
220	57.60	19.34	6.14	-----	1.23	2.01	2.02	2.73	-----	-----	-----	-----	1.70	7.09	99.86
221	67.20	13.50	-----	-----	2.00	-----	1.16	0.11	1.65	-----	0.75	-----	-----	13.25	99.72
222	51.12	11.04	4.10	-----	14.24	0.90	0.40	1.59	10.62	-----	-----	0.96	4.00	-----	98.97
223	67.00	19.68	0.72	-----	0.62	1.06	Tr.	0.18	-----	-----	-----	1.82	6.07	-----	97.15
224	77.00	15.87	1.26	-----	1.10	0.37	none	none	-----	-----	-----	0 .87	4.50	-----	100.97
225	64.00	22.59	1.22	-----	0.88	1.15	Tr.	0.06	-----	-----	-----	1.51	5.80	-----	97.21
226	57.40	28.84	0.72	-----	0.10	0.10	Tr.	0.47	-----	-----	-----	1.48	10.44	-----	99.55
227	69.33	19.38	1.07	-----	0.87	0.86	Tr.	0.12	-----	-----	-----	1.40	5.46	-----	98.49
228	72.90	14.70	4.50	-----	0.60	0.30	1.50	0.70	-----	-----	-----	1.00	4.20	-----	99.50
229	75.33	14.73	1.10	-----	0.05	1.61	0.64	0.10	-----	-----	-----	1.27	4.50	-----	99.30
230	55.28	21.27	8.37	-----	3.90	0.28	none	Tr.	3.30	-----	-----	1.05	4.26	1.43	99.14

§ as Chlorides.
*Silver .65 oz. per ton; copper 11.8 per cent.

IV. CLAY, SHALE AND MARL.—Continued

No.	SiO_2	Al_2O_3	Iron Oxide	MnO	CaO	MgO	K_2O	Na_2O	CO_2	P_2O_5	SO_3	TiO_2	H_2O	Organic Matter	Total
231	46.60	33.66	-----	-----	0.43	0.96	1.65		-----	-----	-----	-----	4.53	-----	87.83
232	82.80	9.83	2.77	-----	Trace		1.62	3.84	-----	-----	-----	-----	-----	-----	100.86
233	72.00	11.82	3.38	-----	Trace		2.57	5.56	-----	-----	-----	-----	5.70	-----	101.03
234	57.80	18.94	7.55	-----	Trace		1.05	5.62	-----	-----	-----	-----	9.01	-----	99.97
235	79.00	5.54	5.66	-----	Trace		0.66	5.38	-----	-----	-----	-----	4.50	-----	100.74
236	83.40	6.45	4.40	-----	Trace		1.38	3.87	-----	-----	-----	-----	-----	-----	99.45
237	73.60	-----	-----	-----	Trace		2.33	4.75	-----	-----	-----	-----	-----	-----	-----
238	79.20	6.12	2.51	-----	Trace		1.33	6.09	-----	-----	-----	-----	4.70	-----	100.15
239	55.25	19.80	4.60	-----	0.73	4.51	2.21	1.73	4.17	-----	-----	1.31	4.78	0.91	100.00
240	70.00	18.60	4.50	-----	Tr.	Tr.	Tr.	0.90	-----	-----	-----	0.60	6.10	-----	100.70
241	68.34	15.28	3.44	-----	1.20	0.88	2.47	3.55	-----	-----	-----	0.52	4.70	-----	100.38
242	78.50	10.50	3.60	-----	0.45	0.23	0.90	0.40	-----	-----	-----	0.32	4.22	-----	99.12
243	83.50	8.51	1.40	-----	1.00	1.08	0.50	1.50	-----	-----	-----	1.05	2.40	-----	100.94
244	83.00	7.42	0.36	-----	Tr.	3.01	0.30	1.26	-----	-----	-----	0.70	3.70	-----	99.75
245	64.40	24.17	3.23	-----	Tr.	Tr.	-----	3.50	-----	Tr.	-----	-----	7.25	-----	-----
246	7.40	55.00	4.40	-----	6.58	8.28	2.57	5.26	-----	Tr.	0.73	-----	13.50	-----	99.72
247	73.00	6.91	5.69	-----	Tr.	0.50	2.62	2.50	-----	-----	-----	-----	9.00	-----	100.22
248	62.00	12.12	5.08	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
249	71.25	18.58	1.62	-----	Tr.	0.60	-----	4.00	-----	-----	Tr.	-----	5.50	-----	-----
250a	69.80	15.85	1.60	-----	3.40	0.53	0.50	1.05	-----	-----	-----	0.17	0.72	-----	99.62
250b	74.04	7.50	4.16	-----	4.37	-----	0.79	0.66	-----	-----	0.17	-----	9.10	-----	100.79
251	62.70	17.97	6.94	-----	0.92	0.60	1.53	0.86	-----	-----	0.44	0.24	8.05	-----	100.25
252	64.00	24.17	3.23	-----	Tr.	Tr.	5.50		-----	-----	-----	-----	7.25	-----	102.15
253	85.40	10.07	2.18	-----	0.10	none	Tr	ace	-----	-----	-----	-----	1.95	-----	99.65
254	78.22	8.71	0.72	-----	3.36	1.10	0.45	1.17	-----	-----	-----	0.17	5.50	-----	99.40
255	50.20	20.90	5.10	-----	8.93	-----	-----	-----	7.02	-----	1.88	-----	-----	6.08	100.11
256	58.48	18.23	7.54	-----	1.24	3.83	1.15	2.88	-----	-----	-----	1.05	5.46	-----	99.86
257	36.08	18.61	4.14	0.01	17.39	1.74	1.49	0.19	-----	-----	1.59	-----	3.09	15.77	100.13
258	26.18	9.66	3.55	0.07	28.15	1.28	1.06	0.12	-----	-----	1.20	-----	2.65	26.66	100.38
259	17.81	6.10	2.04	0.02	34.76	1.27	0.50	1.60	-----	-----	0.92	-----	1.81	32.95	99.78
260	17.56	7.60	1.76	0.02	32.59	1.28	1.74	0.40	-----	-----	1.08	-----	1.82	34.08	99.93
261	16.30	6.97	1.65	0.02	36.03	1.29	1.78	0.30	-----	-----	0.89	-----	1.81	36.03	99.91
262	36.28	13.60	1.44	0.01	16.42	3.83	0.64	0.22	-----	-----	0.16	-----	7.52	20.07	100.19
263	51.01	18.23	3.51	0.02	8.87	1.54	2.16	0.08	-----	-----	1.03	-----	2.72	11.04	100.21
264	40.38	18.69	3.62	0.03	9.74	3.16	0.77	0.70	-----	-----	0.27	-----	8.21	14.63	100.15
265	41.20	16.12	3.41	0.05	16.36	1.26	1.44	0.24	-----	-----	0.28	-----	2.32	17.50	100.18
266	42.56	15.34	5.28	0.04	14.26	1.01	1.21	0.57	-----	-----	0.47	-----	2.25	17.29	100.28
267	40.86	14.92	6.10	0.04	14.81	0.70	1.48	0.22	-----	-----	0.86	-----	1.72	18.56	100.27
268	38.42	16.95	5.07	0.02	14.86	0.83	1.61	1.01	-----	-----	0.39	-----	2.59	18.59	100.40
269	37.64	13.80	6.00	0.06	17.18	0.79	1.28	0.72	-----	-----	0.48	-----	2.56	19.86	100.37
270	42.10	15.90	3.35	0.07	15.33	0.36	2.03	0.23	-----	-----	0.82	-----	2.57	17.37	100.13
271	29.48	12.25	2.60	0.12	26.32	0.82	1.61	0.16	-----	-----	0.07	-----	2.17	24.61	100.30
272	32.91	13.42	2.69	0.12	23.61	0.97	1.73	0.15	-----	-----	0.92	-----	1.70	21.97	100.20
273	42.09	17.78	2.46	0.01	14.24	0.98	0.83	1.05	-----	-----	1.06	-----	1.96	17.82	100.28
274	40.70	15.59	3.24	0.07	16.41	0.71	1.97	0.38	-----	-----	0.81	-----	2.21	18.17	100.26
275	41.63	15.55	3.57	0.07	15.68	0.98	1.66	0.20	-----	-----	0.74	-----	2.97	17.00	100.05
276	90.00	4.60	1.44	-----	0.10	0.10	Tr.	Tr.	-----	-----	-----	0.70	3.04	-----	99.98
277	68.11	20.08		-----	-----	-----	2.63	2.18	-----	-----	-----	-----	00.00	-----	92.99
278	50.65	00.00	23.53	-----	00.00	00.00	2.63	2.22	-----	00.00	00.00	-----	-----	-----	-----
279	75.20	0.00	0.00	-----	0.00	0.00	2.93	0.30	-----	0.00	0.00	-----	-----	-----	-----
280	51.30	14.40	6.20	-----	10.30	Tr.	Tr.	4.10	7.60	-----	-----	0.80	4.90	-----	99.60
281	67.18	13.96	1.25	-----	1.94	1.36	1.43	2.77	-----	-----	-----	-----	10.06		99.95
282	61.56	19.25	1.65	-----	1.10	0.79	1.86		-----	-----	-----	-----	13.79	-----	100.00
283	60.41	22.43	1.90	-----	0.44	0.61	0.45	0.24	-----	-----	-----	1.30	6.00	6.50	100.28
284	59.03	11.19	2.77	-----	12.16	0.80	Tr.	0.18	9.60	-----	-----	1.05	2.10	-----	98.88
285	63.00	23.00	2.50	-----	Tr.	1.10	1.70	0.30	-----	-----	-----	1.80	-----	-----	97.70
286	63.43	23.42	1.15	-----	0.45	1.23	0.07	0.26	-----	-----	-----	1.13	-----	0.40	98.54
287	57.00	22.20	2.10	-----	0.25	Tr.	Tr.	0.21	-----	-----	-----	1.31	16.65		99.72
288	58.22	21.10	1.85	-----	1.08	0.10	0.05	0.18	-----	-----	-----	1.48	14.42		98.48
289	65.92	10.57	1.94	-----	9.33	1.23	-----	-----	7.66	-----	-----	0.90	2.65	-----	100.20
290	63.56	8.18	4.32	-----	10.00	0.15	Tr.	1.00	7.30	-----	-----	0.95	4.16	-----	99.68
291	65.07	9.16	2.80	-----	8.44	0.21	0.50	1.66	0.92	-----	-----	1.05	3.72	-----	99.53

IV. CLAY, SHALE AND MARL.—Continued

No.	SiO_2	Al_2O_3	Iron Oxide	MnO	CaO	MgO	K_2O	Na_2O	CO_2	P_2O_5	SO_3	TiO_2	H_2O	Organic Matter	Total
292	15.98	8. 47		-----	38.86	-----	0.15	2.84	31.74	0.108	0.83	------	1.10	------	------
293	40.82	16.05	5.25	-----	3.66	-----	1.75	2.94	2.85	0.187	1.06	------	5.35	------	99.917
294	45.02	16.17	4.78	-----	14.26	none	0.975	3.22	10.36	0.113	0.97	------	4.36	------	100.23
295	48.72	16.10	4.87	-----	11.79	Tr.	1.14	3.07	8.30	0.109	2.21	------	3.68	------	99.99
296	28.34	7.50	3.92	-----	29.76	none	0.29	2.04	22.80	0.118	1.04	------	3.77	------	99.58
297	37.45	7.72	2.02	-----	27.92	0.36	-----	-----	21.80	-----	-----	Tr.	2.40	------	99.67
298	21.72	7.97	2.23	-----	36.54	0.95	Tr.	Tr.	28.44	-----	-----	0.52	2.06	------	99.73
299	73.15	20.46	Tr.	-----	none	Tr.	Tr.	Tr.	-----	-----	Tr.	-----	6. 37		99.98
300	68.84	21.15	1.15	----	Tr.	Tr.	0.45	1.12	-----	-----	-----	1.22	6.62	------	100.55
301	70.50	18.30	1 80	-----	Tr.	0.90	Tr.	0.20	-----	-----	-----	1.20	5.5	------	98.40
302	37.45	7.72	2.02	-----	27.92	0.36	-----	-----	21.80	-----	-----	------	2.40	------	99.67
303	59.20	20.60	6.90	-----	1.08	1.62	1.60	1.84	-----	-----	-----	1.50	4.66	0.20	99.20
304	56.01	24 07	2.59	-----	Tr.	1.11	1.19	1.44	-----	-----	-----	1.50	7.30	4.04	99.40
305	63.30	23.40	1.60	-----	Tr.	0.30	0.90	1.00	-----	-----	-----	1.20	7.60	------	99.30
306	71.78	16.75	1.11	-----	0.32	1.17	0.19	0.86	-----	-----	-----	1.15	5.90	------	99.23
307	67.65	20.50	1.20	----	Ti.	0.25	1.05	0.50	-----	-----	-----	1.30	6.60	------	99.05
308	60.90	20.95	5.30	-----	0.05	0.25	1.85	1.40	-----	-----	-----	0.80	6.30	------	100.50
309	63.30	24.50	1.30	-----	0.10	0.20	2.30	1.30	-----	-----	-----	1.00	8.70	------	100.10
310	60.50	19.40	9.30	-----	Tr.	0.80	1.40	1.50	-----	-----	-----	0.60	9.30	------	99.50
311	54.80	20.48	2.22	-----	7.74	0.80	-----	-----	6.09	-----	0.55	------	------	6.71	99.39

V. FULLER'S EARTH

No.	Sp. Gravity	Wt. lbs. per cu. ft	Acidity	Loss on drying 220° F	Loss on ignition	Color of orig. oil	Color of filt. oil	Decrease of color
						In Lovibond's Tintometer Units		
312	1.067	66	2.44%	4.10%	7.18%	No. 4	No. 2	50
313	1.033	77	2.40%	4.45%	6.53%	No. 4	No. 2½	37½
314	1.058	66.1	2.16%	2.98%	7.57%	No. 4	No. 3½	12½
315	1.007	62.90	2.92%	2.51%	6.56%	No. 4	No. 3	25
316	1.156	72.20	2.30%	12.71%	10.30%	No. 4	No. 2½	37½
317	1.047	65.40	3.01%	4.64%	25.54%	No. 4	No. 3	25
318	0.9296	58.00	2.00%	1.85%	4.82%	No. 4	No. 3½	12½
319	------	77	------	10.0%	Bleaching power equal to that of best English fuller's earth.			

VI. LIMESTONE

(a) Cambrian

No.	Mois.	Silica	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	CO_2	SO_3	P_2O_5	Loss on Igni.	Total
219		67.7*	15.5	4.4	1.15	0.75	1.4	0.7	Manganese oxide calcium sulphate 0.3			Combined water 7.15	100.05
746	------	0.50	0.69	1.21	48.78	3 84	------	------	42.51	none	------	1.79	99.32

*42% as free sand.

(b) Ordovician

No.	Mois	Silica	Al_2O_3	Fe_2O_3	Ca O	Mg O	K_2O	Na_2O	$C O_2$	$S O_3$	P_2O_5	Loss on Igni.	Total
747	------	0.94	3.08	1.53	46.91	2.90	------	------	40.50	none	------	3.46	99.31
748	------	1.98	5.68	1.52	46.64	0.20	------	------	41.20	none	------	2.50	99.72
749	------	4.30	8.48	1.82	27.03	14.99	------	------	41.70	none	------	2.60	100.92
750	------	3.40	4.19	0.91	28.36	16.98	------	------	41.20	none	------	5.14	100.18
751	------	4.50	0.40	0.60	49.29	3.15	------	------	41.49	------	------	0.41	99.94
752	------	1.81	0.10	0.60	53.36	none	------	------	41.93	------	------	1.27	99.10
753	------	2.60	0.92	1.22	49.11	0.51	------	------	38.59	2.74	------	3.91	99.60

(c) Pennsylvanian

754	------	43.10	5.65	3.32	22.26	1.12	------	------	19.10	none	------	5.50	100.05
755	------	0.75	0.23	1.22	53.26	none	------	------	41.95	none	------	1.95	99.36
756	------	1.20	none	1.00	54.00	none	------	------	42.43	0.55	------	0.97	100.17
757	------	3.10	0.75	1.65	49.72	1.11	------	------	40.30	0.56	------	2.20	99.70
758	------	0.90	0.86	0.64	52.86	------	------	------	40.93	0.41	------	3.00	99.10
759	------	6.06	1.81	2.73	46.20	0.57	------	------	36.82	------	------	4.38	98.57
760	------	2.08	------	1.54	51.81	0.48	------	------	40.83	------	------	3.00	99.74
761	------	3.62	------	3.46	51.40	none	------	------	40.10	------	------	------	98.58
762	------	0.40	0.05	2.57	51.06	0.23	------	------	40.66	------	------	2.78	97.75
763	------	1.11	0. 97		54.50	0.04	------	------	43.00	------	------	------	99.62
764	------	0.40	2. 29		53.37	1.32	------	------	41.63	------	------	------	99.01
765	------	0.74	0.16	0.94	53.19	Trace	------	------	41.68	Trace	------	2.62	99.33
766	------	0.60	0.44	0.76	51.25	------	------	------	40.25	------	------	4.45	97.75
767	------	16.00	1.72	2.28	43.46	------	------	------	33.64	0.91	------	2.12	100.13
768	------	0.80	none	1.05	52.50	0.59	------	------	40.10	0.88	------	4.00	99.92
769	------	3.14	none	1.95	48.93	0.33	------	------	38.96	0.35	------	4.04	97.70
770	------	5.18	0.50	1.80	48.25	1.38	------	------	37.90	1.72	------	3.52	100.25
771	------	0.20	0. 90		54.50	Trace	------	------	42.64	------	------	1.00	99.24
772	------	1.00	0.70	0.34	53.75	------	------	------	42.46	------	------	1.84	100.09
773	------	0.50	------	0.68	54.48	------	------	------	42.81	------	------	1.49	99.96
774	------	5.60	0.55	0.51	51.17	------	------	------	40.21	------	------	1.79	99.83
775	------	0.63	0.39	14.18	30.29	12.07	------	------	41.14	------	------	------	98.70

(d) Permian

776	------	0.64	0.33	1.07	53.82	none	------	------	40.30	------	------	3.30	99.46
777	------	2.90	1.37	1.83	47.72	------	------	------	38.46	------	------	3.94	96.22
778	------	1.01	0. 31		31.35	21.10	------	------	------	------	------	------	------
779	------	2.33	1.19	1.39	52.02	Trace	------	------	40.59	------	------	3.00	100.52
780	------	3.62	1. 17		53.34	0.05	------	------	41.63	------	------	------	99.84
781	------	1.34	3.41	1.09	50.69	------	------	------	40.44	------	------	3.12	100.09
782	------	1.60	0.49	0.61	53.31	none	------	------	41.90	none	------	2.10	100 04
783	------	1.76	0.60	2.20	51.81	none	------	------	39.40	1.03	------	3.50	100.30
784	------	1.30	0.14	1.26	54.34	none	------	------	40.40	none	------	3.40	100.84
785	------	3.10	0.05	1.09	52.25	none	------	------	39.30	------	------	3.85	99.64
786	------	2.40	1.50	1.90	49.60	------	------	------	41.50	------	------	3.40	100.30
787	0.50	2.80	1.45	0.80	52.10	0.18	0.40	0.60	41.44	------	Trace	------	100.27
788	------	1.44	0.74	0.86	50.80	0.43	------	------	40.70	0.24	------	4.20	99.41
798*	------	8.81	12.74	2.40	35.14	1.12	0.	37	34.75	Trace	Trace	1.63	100.00
790	none	7.56	14.93	2.57	35.74	5.69	------	------	33.80	0.65	Trace	------	100.94

(e) Comanchean Cretaceous

791	------	4.10	5.55	1.05	47.04	none	------	------	36.96	none	------	5.24	99.94
792	------	1.10	1.30	none	52.06	0.51	------	------	38.60	none	------	5.90	99.47
793	------	3.50	1.35	1.05	49.35	0.98	------	------	39.10	1.03	------	3.54	99.90
794	------	0.38	1.55	0.45	52.43	0.25	------	------	41.20	0.34	------	2.54	99.14
795	------	1.40	0.24	0.76	51.92	Trace	------	------	41.36	1.51	------	2.92	100.11
796	------	0.20	0.60	0.90	54.90	none	------	------	42.90	------	------	1.30	100.49

*Oxide of Manganese, 3.05 per cent.

(e) Comanchean Cretaceous (Continued)

No	Lois	Silica	Al_2O_3	Fe_2O_3	Ca O	Mg O	K_2 O	Na_2O	C O_2	S O_3	P_2O_5	Loss on Igni.	Total
797	-----	0.70	0.28	0.72	55.05	-----	-----	-----	41.90	-----	-----	2.10	100.75
798	-----	6.10	1.88	0.78	48.69	none	-----	-----	38.20	-----	-----	3.30	98.95
799	0.51	2.35	0.21	0.24	53.90	0.15	-----	-----	42.23	Trace	-----	-----	99.59
800§	-----	1.26	0. 36		52.19	0.605	-----	-----	-----	-----	-----	-----	-----
801	-----	1.49	0. 75		51.35	0.818	-----	-----	-----	-----	-----	-----	-----
802†	-----	3.66	0. 57		50.68	0 84	-----	-----	-----	-----	-----	-----	-----
803	-----	68.90	5.97	3.03	11.07	0.42	-----	-----	8.20	1.01	-----	0.44	99.04
804	-----	0.76	0.80	0.86	49.76	0.34	-----	-----	40.70	2.06	-----	3.14	98.42
805	-----	1.40	0. 60		53.79	-----	-----	-----	42.36	0.80	-----	1.24	100.09
806	-----	0.30	1.35	0.75	54.40	none	-----	-----	42.75	none	-----	1.15	100.70
807	-----	0.36	1.23	0.53	51.04	0.18	-----	-----	40.20	-----	-----	3.76	97.30
808	-----	0.40	9.00	0.40	53.56	-----	-----	-----	42.08	1.25	-----	1.06	98.75
809	-----	0.30	none	0.20	53.30	-----	-----	-----	41.88	1.25	-----	2.02	98.95
810	-----	0.25	none	1.10	53.56	-----	-----	-----	42.08	0.55	-----	2.04	99.58
811	-----	0.15	none	0.10	54.34	-----	-----	-----	42.70	0.55	-----	1.30	99.14
812	-----	2.10	0.09	0.61	50.50	0.72	-----	-----	38.80	Trace	-----	5.60	98.48
813	-----	0.21	0.16	Trace	55.35	0.03	-----	-----	43.17	-----	-----	1.23	100.05
814	-----	0.16	0.33	0.43	50.50	0.07	-----	-----	39.68	-----	-----	7.52	98.69
815	-----	0.30	none	1.02	53.72	none	-----	-----	42.21	0.14	-----	1.75	99.14
816	-----	1.00	none	1.10	53.35	-----	-----	-----	41.92	0.55	-----	1.58	99.50
817	-----	1.18	3.17	0.45	51.50	0.22	-----	-----	40.00	-----	-----	3.33	99.85
818	-----	0.40	0.69	0.51	54.30	-----	-----	-----	42.70	-----	-----	1.30	99.90
819	-----	0.30	0.16	0.12	55.39	0.11	-----	-----	42.61	-----	-----	-----	98.69
820	-----	0.49	0.51	0.43	51.66	0.32	-----	-----	42.40	0.17	-----	2.18	98.07
821	-----	0.30	0.47	0.29	52.12	0.54	-----	-----	40.95	0.17	-----	4.05	98.89
822	-----	0.04	0.01	0.29	52.62	0.48	-----	-----	41.50	0.20	-----	4.00	99.14
823	-----	0.30	0. 28		55.39	0.11	-----	-----	42.61	-----	-----	-----	98.69
824	-----	2.20	1.04	1.76	52.28	-----	-----	-----	41.08	-----	-----	1.66	100.02
825	-----	0.53	0. 59		55.33	Trace	-----	-----	43.17	-----	-----	-----	99.62
826	-----	0.70	0. 70		53.12	0.54	-----	-----	43.30	-----	-----	0.54	98.90
827*	0.16	3.22	0.78	0.28	52.36	1.01	0.11	none	41 74	0.12	-----	-----	100.09
828	-----	6.60	5.92	1.18	44.77	none	-----	-----	35.65	none	-----	5.67	99.79
829	-----	3.60	none	1.96	49.03	0.41	-----	-----	37.60	-----	-----	6.60	99.20
830	-----	0.14	none	0.91	53.50	0.65	-----	-----	42.36	-----	-----	1.44	99.00
831	-----	3.14	0.43	1.09	53.33	none	-----	-----	41.90	-----	-----	1.30	101.19
832	-----	1.40	0.45	1.65	51.88	none	-----	-----	40.76	0.33	-----	2.34	98.81
833	-----	1.00	none	1.50	53.57	none	-----	-----	42.10	-----	-----	2.20	100.33
834	-----	52.92	7 74	4.50	28.88	3.77	-----	-----	0.64	-----	0.30†	-----	98.75
835	-----	Trace	0.60	Trace	55 60	-----	-----	-----	43.68	-----	-----	-----	100 68
836	-----	63.18	2 04	Trace	20.52	none	-----	-----	11.50	Trace	-----	4.08	101.32
837	-----	0 81	2.26	0.60	54.70	none	-----	-----	42.70	none	-----	-----	101.04
838	-----	12 68	2.80	0 76	44.74	-----	-----	-----	35.30	-----	-----	3.20	99.57
839	-----	0.50	0.44	0.76	53.77	-----	-----	-----	42 20	-----	-----	1.86	99.53

§Asphalt 3.78 per cent.
†Asphalt 3.98 per cent.
‡Asphalt 3 64 per cent.
*Manganese oxide 0 31 per cent
†Phosphorus.

(e) Camanchean Cretaceous (Continued)

No.	Moisture	Silica	Al_2O_3	Fe_2O_3	MnO	CaO	MgO	K_2O	Na_2O	CO_2	SO_3	P_2O_5	Loss on ignition	Total
840	0.82	10.58	5.23	1.24	0.04	43.36	1.22	0.76	0.31	-----	0.12	-----	36.46	100.14
841	1.23	8.94	3.00	2.27	0.06	45.43	1.19	0.45	0.27	-----	0.14	-----	37.28	100.27
842	0.89	10.00	3.89	1.53	0.04	43.35	1.25	0.60	0.50	-----	0.16	-----	37.75	99.96
843	1.45	9.26	3.59	1.09	0.05	44.76	0.93	0.53	-----	-----	0.30	-----	37.83	99.79
844	0.41	5.59	2.33	0.93	0.06	48.59	0.94	0.45	0.79	-----	0.54	-----	39.80	100.43
845	0.44	7.18	3.52	1.24	0.03	46.63	1.07	0.51	0.15	-----	0.19	-----	39.32	100.28
846	0.55	5.76	2.70	0.47	0.03	49.17	0.96	0.64	0.11	-----	0.71	-----	39.17	100.27
847	1.12	7.80	4.64	1.14	0.02	45.33	1.13	0.66	-----	-----	0.12	-----	38.10	100.26
848	0.37	6.00	1.50	1.63	0.05	48.31	1.15	0.55	0.17	-----	0.24	-----	39.73	99.70
849	0.44	6.64	3.55	1.19	0.06	47.23	1.26	0.55	-----	-----	0.18	-----	39.12	100.22
850	0.52	4.93	1.78	0.67	0.03	49.38	0.87	0.12	0.71	-----	0.13	-----	40.82	99.96
851	0.35	6.17	2.41	0.88	0.06	48.55	0.91	0.49	0.06	-----	0.08	-----	39.84	99.80
852	0.36	2.82	0.96	0.51	0.09	51.39	1.10	0.22	-----	-----	0.08	-----	42.40	99.93
853	0.47	6.76	2.83	0.67	0.03	47.54	0.76	0.40	-----	-----	0.12	-----	40.33	99.91
854	0.77	4.31	1.89	0.52	0.03	49.54	0.84	0.49	0.03	-----	0.70	-----	40.70	99.82
855	0.37	2.28	0.57	0.56	0.04	52.14	1.22	0.02	-----	-----	0.12	-----	42.54	100.17
856	0.23	2.87	1.09	0.46	0.03	52.49	0.85	0.21	0.17	-----	0.10	-----	41.26	99.79
857	0.56	3.84	1.31	0.47	0.03	51.29	1.03	0.28	-----	-----	0.07	-----	40.84	99.72
858	0.51	11.31	5.89	0.77	0.08	42.86	1.03	0.47	0.26	-----	Trace	-----	37.32	100.50
859	0.28	4.32	3.22	0.57	0.04	40.57	7.63	0.10	0.10	-----	0.12	-----	43.20	100.15
860	0.49	10.39	3.13	1.03	0.03	35.09	11.42	0.24	-----	-----	0.44	-----	38.13	100.39
861	0.38	1.38	4.20	0.57	0.03	49.50	1.77	0.39	none	-----	0.13	-----	41.91	100.26
862	0.75	8.09	3.04	0.83	0.03	46.62	0.94	0.39	none	-----	0.08	-----	38.57	100.24
863	0.41	10.33	4 75	1.50	0.07	43.25	0.60	0.67	0.05	-----	0.06	-----	38.27	100.05
864	-----	0.10	0.61	0 46	-----	53.71	Tr.	-----	-----	42 09	-----	-----	1.30	97.91
865	-----	0.40	none	1.20	-----	53.23	none	-----	-----	41.47	none	-----	2.63	98.93
866	-----	0.80	1.55	0.75	-----	45.41	5.29	-----	-----	41.60	0.34	-----	3.00	98.74
867	-----	0.67	none	0.91	-----	53.45	none	-----	-----	42.10	none	-----	1.80	98.93
868	-----	1.07	0.22	0.71	-----	52.91	-----	-----	-----	41.28	-----	-----	1.91	98.10
869	-----	0.70	none	0.75	-----	53.50	none	-----	-----	42.20	-----	-----	1.46	98.61
870	-----	0.50	0.21	0.75	-----	51.18	none	-----	-----	41.74	3.54	-----	1.96	99.88
871	-----	0.90	0.06	0.14	-----	53.96	none	-----	-----	42.40	-----	-----	1.71	99.17
872	-----	1.30	0.50	0.60	-----	53.72	none	-----	-----	42.44	none	-----	1.06	99.62
873	-----	0 50	0.74	1.82	-----	52.20	1.01	-----	-----	42.50	none	-----	1.60	100.37
874	-----	0.80	0.25	0.75	-----	54.06	none	-----	-----	43.49	none	-----	1.27	99.62
875	-----	0.70	0.29	1.21	-----	53.03	none	-----	-----	42.06	none	-----	2.60	99.73
876	-----	1.20	none	2.00	-----	52.20	none	-----	-----	41.20	none	-----	2.20	98.80
877	-----	1.20	0.27	1.67	-----	53.50	none	-----	-----	42.20	none	-----	0.94	99.74
878	-----	0.16	0 40	0.60	-----	52.50	none	-----	-----	41.50	none	-----	2.90	98.06
879	-----	0.80	0.16	0 44	-----	53 16	-----	-----	-----	42.20	0.34	-----	1.70	98.86
880	-----	1.26	none	0.91	-----	52.57	none	-----	-----	41.30	0.86	-----	2.14	98.94
881	-----	0.30	0.30	0.90	-----	55 10	none	-----	-----	43.30	-----	-----	0.04	99.94
882	-----	0.50	0.45	0.75	-----	53.53	none	-----	-----	42.06	none	-----	1.70	98.99
883	-----	2.36	0 58	0.92	-----	51 7	Tr.	-----	-----	40.20	-----	-----	2.50	98.29
884	-----	0.70	2.30	0.30	-----	53.13	none	-----	-----	40.40	none	-----	3.40	100.23
885	-----	0.50	0.04	0.76	-----	53.23	Tr.	-----	-----	41.64	-----	-----	1.92	98.09
886	-----	0.20	none	0.60	-----	53.53	none	-----	-----	42.06	-----	-----	2.00	98.39
887	-----	0.50	0.05	0.75	-----	54.06	none	-----	-----	42.48	-----	-----	1.58	99.42
888	-----	0.60	2.38	1.52	-----	40.62	9.67	-----	-----	42.30	none	-----	3.84	100.93
889	-----	0.60	none	1.82	-----	53.57	none	-----	-----	42.20	none	-----	2.06	100.05
890	-----	1.40	none	1.50	-----	54.00	none	-----	-----	42.43	-----	-----	0.73	100.06
891	-----	0.40	0.05	1.35	-----	54.08	none	-----	-----	42.49	-----	-----	1.51	99.88
892	-----	0.20	0 41	0.15	-----	54.59	none	-----	-----	42.90	-----	-----	1.17	99.72
893	-----	0.26	none	0.75	-----	54.59	none	-----	-----	42.90	-----	-----	1.10	99.60
894	-----	0.06	0.40	0.90	-----	53.22	none	-----	-----	41.82	-----	-----	2.28	98.68
895	-----	5.30	5.30	1.50	-----	40.02	4.85	-----	-----	35.86	-----	-----	7.64	100.47
896	-----	0.40	0.06	0.44	-----	54.41	none	-----	-----	42.60	0.32	-----	1.40	99.61
897	-----	0.39	0. 31		-----	55.06	0.11	-----	-----	42.94	-----	-----	-----	98.81
898	-----	1.00	1.30	Trace	-----	55.00	Tr.	-----	-----	42.90	-----	-----	-----	100.20
899	-----	5.96	2.00	0.82	-----	41.66	7.51	-----	-----	41.30	-----	-----	1.24	100.49
900	-----	3.51	6. 98		-----	45.00	2.72	-----	-----	41.20	-----	-----	-----	99.44
901	-----	1.40	0.	36	-----	54.80	0.48	-----	-----	41.90	-----	-----	1.76	100.76
902	-----	0 70	none	0.90	-----	53.36	none	-----	-----	41.98	-----	-----	1.55	98.44
903	-----	0.46	none	4 70	-----	50.20	none	-----	-----	38.73	-----	-----	4 67	99 06
904	-----	0.10	3.51	3.25	-----	50 15	0.15	-----	-----	39 57	-----	-----	3.03	98.76

(e) Camanchean Cretaceous (Continued)

No.	Moisture	Silica	Al_2O_3	Fe_2O_3	Mn O	Ca O	Mg O	K_2O	Na_2O	CO_2	S O_3	P_2O_5	Loss on ignition	Total
905	------	0.50	0.67	0.75	------	52.50	0.29	-----	-----	41.60	------	-----	2.28	98.61
906	------	0.30	none	0.75	------	53.66	0.07	-----	-----	42.34	------	-----	1.56	98.68
907	------	0.20	1.10	1.50	------	52.50	none	-----	-----	41.30	------	-----	2.00	98.60
908 (See miscellaneous analyses.)														

(f) Upper Cretaceous

909	------	3.28	2.93	1.07	------	50.72	none	-----	-----	38.30	------	-----	3.80	100.10
910	------	7.80	3.45	1.35	------	46.64	none	-----	-----	36.65	------	-----	3.35	99.24
911	------	5.77	2. 12		------	50.49	0.15	-----	-----	39.66	------	-----	------	98.19
912	------	20.09	2.40	1.20	------	40.82	-----	1. 45		------	0.07*	-----	------	------
913	------	22.90	1.70	0.70	------	40 77	----	2. 00		------	2.10*	-----	------	------
914	------	16.50	6.10	1.00	------	48.31	-----	-----	-----	------	------	-----	------	------
915	---	22 10	2 00		------	40.8?	----	-----	-----	------	0.70*	-----	------	------
916	0.20	7.80	1.30	1.30	------	49.20	0.15	-----	-----	38.50	------	-----	1.60	100.05
917	0.10	20.72	0.16	0.45	------	43.15	0.52	-----	-----	34.20	------	-----	0.32	99.62
918	------	9.40	2.40	3.30	------	40.04	0.29	-----	-----	31.46	1.51	-----	9.80	98.20
919	------	4.56	2.95	1.65	------	47.16	-----	-----	-----	37.05	0.96	-----	5.81	100.14
920	0.42	6.54	3.22	2.12	0.04	46.72	0.61	0.50	0 38	------	0.55	-----	38.64	99.90
921	0.38	9.08	4.59	2.33	0.11	44.44	0.62	0.72	0.74	------	0.07	-----	36.80	99.78
922	------	23 55	1. 50		------	39.32	0.58	-----	-----	30.89	------	-----	------	95.84
923	------	27.76	4.70	3.40	------	36.40	none	---	---	28.60	0.60	-----	4.70	100.56
924	------	15.00	4.34	1.76	------	41.00	-----	-----	-----	32.20	0.82	-----	4.50	99.62
925	1.24	7.80	2.11	1.38	0.01	45.88	0.85	1.54	0.91	------	0.31	-----	38.24	100.27
926	------	0.70	none	0.74	------	51.50	0.17	-----	-----	40.86	------	-----	3.64	97.61
927	-----	0.55	6.61	1.47	------	47.65	none	-----	-----	38.26	none	-----	5.64	100.18
928	7.54	23.70	14.07	9.23	------	22.13	-----	-----	-----	12.84	------	-----	------	100.00
929	0.37	4.70	1.61	0.36	0.03	50.01	1.09	0.28	0.05	------	0.09	-----	41.27	99.86
930	0.20	3.12	0.92	0.26	0.03	51.91	0.44	0.16	-----	------	0.52	-----	42.84	100.40
931	0.67	9.18	3.50	1.05	0.05	45.22	1.13	0.55	0.17	------	0.14	-----	38.02	100.28
932	0.27	4.30	1.52	0.77	0.05	50.22	0.97	0.47	0.23	------	0.22	-----	40.88	99.90
933	0 43	4.76	1.72	0.62	0.04	49.79	0.88	0.46	0.06	------	0.10	-----	40.95	99.83
934	0 56	10.19	3.81	1.14	0.03	44.84	1.08	0.81	0.12	------	0.22	-----	37.54	99.84
935	0.60	6.17	2.17	0 88	0.09	48.66	0.90	0.21	0.50	------	0.30	-----	39 39	99.87
936	0.52	5.76	1.19	0.82	0.01	49.85	1.30	0.39	-----	------	0.26	-----	40.48	100.18
937	0.43	3.82	1.30	0.72	0.02	50.72	1.05	0.44	0.14	------	0.29	-----	41.17	100.10
937	0 43	3.82	1.30	0.72	0.02	50.72	1.05	0 44	0 14	------	0.29	-----	41.17	100.10*
938	1.27	11.31	5.78	1.72	------	42.61	-----	0.33	2.36	33.86	1.13	0.131	------	100.501
939	0.51	10.32	5.41	1.15	------	45.31	Tr.	0.17	2.07	34.44	1.04	0.218	------	100.638
940	0.82	5.94	1.41	1.31	------	58.73	-----	0.20	2.60	37.84	0.42	0.142	------	99.142

(g) Tertiary

941	-----	2.06	0.90	1.02	------	52.14	none	-----	-----	40.97	0.16	-----	2.17	99.42
942	------	8.50	0.60	2.26	------	46.87	0.39	-----	-----	37.10	0.54	-----	2.96	99.22
943	------	28.70	0.59	0.93	------	37.39	0.30	-----	-----	29.38	0.41	-----	3.02	100 72

(h) Pleistocene

944	-----	18.80	6. 90		------	31.31	4.85	-----	-----	29.94	0.55	-----	5.86	98.21
945	------	33 70	1.44	1.76	------	30.34	-----	-----	-----	23.84	0.55	-----	7.12	98.75
946	------	22.30	0. 42		------	40.19	0.14	-----	-----	31.58	0.14	-----	5.87	100.64
947	------	5.80	0. 60		------	47.07	0.14	-----	-----	36.84	0.20	-----	8.36	99.01

*Sulphur.
*Sulphur.

(i) *Unclassified*

No.	Moisture	Silica	Al_2O_3	Fe_2O_3	Mn O	Ca O	Mg O	K_2O	Na_2O	C O_2	S O_3	P_2O_5	Loss on ignition	Total
948		3.28	2.93	1.07		50.72	none			38.30			3.80	100.10
949		5.54	2.17	1.05		49.77	none			39.00	none		1.50	99.03
950		12 80	2.88	2.42		43.46	1.67			25.80	none		0.36	99.39
951		26.64	0.43	3.18		38.16	none			30.40	none		1.80	100.60
952		13.76	1.91	4.57		39.60	1.06			29.50	0.59		6.70	97.69
953		1.58	0.65	0.91		50.74	0.93			40.66	0.49		2.62	98.58
954		7.77	0.05	4.25		45.38	2.36			38.70	none		1.20	99.71
955		6.00	1.40	3.60		41.76	5.94			39.38	none		2.64	100.36
956		12.50	1.26	2.40		45.07	0.22			35.30	0.21		1.80	98.76
957		5.01	2.01	1.35		50.04	none			39.74	none		1.66	99.84
958		30.10	4.58	1.82		33.66	none			28.10	0.54		0.20	99.00
959		3.80	0.53	3.27		50.82	none			40.10	none		2.00	99.52
960		0.60	none	0.60		43.57	0.45			43.05	0.48		0.73	99.48
961		0.46	none	1.80		54.06	none			42.40	none		1.42	100.14
962		2.23	0.35	Trace		53.00	none			41.64	none			97.22
963		9.04	1.84	6.76		33.50	S 87			35.82	none		4.04	99.87
964		29.20	2.05	4.95		31.82	0.62			26.32	0.27		3.18	98.41
965		11.00	1.50	2.30		43.73	none			36.90	none		2.40	98.87
966		40.40	1.83	7.51		24.94	none			22.10	none		1.90	98.68
967		5.44	4.92	1.20		48.04	none			40.20	none		1.34	101.14
968		6.60	0.82	3.18		46.41	1.40			37.84	0.26		2.66	99.17
969		39.90	2.36	4.54		28.59	none			23.36	0.14		1.04	99.87
970		6.10	1.48	1.82		49.98	none			39.30	none		1.10	99.78
971		1.30	4.08	0.60		49.29	none			38.73	none		4.95	98.95
972		52.80	5.87	1.53		18.19	0.64			12.10			5.00	96.13
973		0.74	0.72	0.58		54.77				41.60			2.40	100.81
974		4.00	1.36	1.30		50.15				39.40			3.10	99.31
975		0.80				54.82	Tr.							
976		0.60	none	1.50		52.79	none			41.48			2.32	98.69
977		4.80	0.89	2.81		50.35				40.70			0.80	100.35
978		0.30	0.09	0.61		52.27	0.25			40.80	0.89		2.48	97.69
979		22.76	4.70	3.40		36.40	none			28.60	none		4.70	100.56
980		2.90	0.98	1.31		50.82	0.39			40.12	0.41		2.58	99.52
981		1.90	0.13	1.21		52.87	0.05			41.25	0.41		1.45	99.27
982		2.40	0.37	1.43		51.33	0.02			39.95	0.69		3.19	99.38
983		2.78	2.11	1.07		52.86	none			41.52	0.12			100.45
984		3.70	0.75	1.65		49.79	0.10			38.74	0.69		2.90	99.32
985		9.12	2.63	1.87		44.66	0.10			36.85	0.69		2.45	98.37
986		0.68	0.40	0.60		52.50	0.29			42.14	0.35		2.26	99.22
987		0.60	0.06	0.90		53.63	none			42.14			1.76	99.09
988		6.30	3.20	0.06		47.40	none			37.49			5.21	100.50
989		0.90	none	1.05		48.76	4.45			42.65			1.15	98.86
990		5.50	0.51	0.75		51.51	0.87			41.28			0.12	100.54
991		1.16	0.09	0.52		51.60	0.60			40.90			2.64	97.51
992		3.80	7.59	2.67		30.20	8.93			40.78	1.72		4.82	100.51
993		0.50	1.48	1.72		52.27	none			37.87	5.84		0.31	99.99
994		2.58	1.50	1.14		53.30	none			41.88	0.41			100.81
995		1.00	none	2.20		53.97	none			41.41	0.41		0.53	100.82
996		4.20	1.87	1.71		50.13	none			37.28	3.84		0.68	99.71
997		4.00	2.93	1.37		49.07	none			37.80	1.37		3.43	99.97
998		1.00	0.37	1.03		52.80	none			41.22	0.48		1.70	98.60
999		0.58	none	1.32		54.40	none			41.36	2.20		0.14	100.00
1000		1.30	0.22	1.14		53.87	none			41.61	1.15		0.54	99.83
1001		1.88	0.97	1.75		50.19	0.51			39.40	0.82		3.60	99.12
1002		0.19	0.97	1.03		52.14	2.20			40.95	0.41		2.05	99.94
1003*		0.40	0.	50		54.89	Tr.			42.45	0.21			100.03
1004		28.60	11.48	2.42		28.39	none			24.30	none		4.90	100.09
1005		4.80	1.29	1.35		50.02	none			39.40	none		2.70	99.56
1006		5.50	1.67	1.53		48.69	none			37.00	none		5.00	99.39
1007		3.90	5.	36		50.65	Tr.			40.27				100.27
1008		5.40	7.33	1.67		44.79	none			36.60	none		4.96	100.75
1009		4.50	1.77	1.23		51.25				40.27	0.41		1.49	100.92
1010	1.01	5.20	1.51	1.29		50.00	0.82	none	none	39.27	none	none		99.10
1011	0.81	3.68	1.61	0.97		51.30	0.71	none	none	41.29	none	none		100.37

*Sulfur (free) and in organic combination 1.58 per cent.

(i) Unclassified

No.	Moisture	Silica	Al_2O_3	Fe_2O_3	MnO	CaO	MgO	K_2O	Na_2O	CO_2	SO$_3$	P_2O_5	Loss on ignition	Total
1012	------	2.96	1.41	0.31	------	51.36	none	------	------	39.40	none	------	3.90	99.28
1013	------	3.30	0.12	2.28	------	52.48	------	------	------	41.23	------	------	1.33	100.88
1014	------	5.66	1.20	1.50	------	47.93	1.30	------	------	36.54	0.34	------	4.76	99.23
1015	------	62.00	3.75	0.25	------	46.00	none	------	------	35.70	0.05*	Tr.	------	100.00
1016	5.42	6.70	4.50	0.34	------	48.70	none	------	------	34.20	0.14*	Tr.	------	100.00
1017	------	1.34	6.04	1.06	------	48.23	------	------	------	39.20	none	------	4.80	100.67
1018	------	0.80	1.68	1.52	------	50.35	0.54	------	------	40.40	none	------	3.24	98.53
1019	------	13.80	6.22	5.28	------	39.93	Tr.	------	------	31.37	------	------	1.95	98.55
1020	------	2.80	5.82	1.52	------	45.21	none	------	------	38.10	none	------	6.50	99.45
1021	------	1.90	6.74	0.76	------	46.38	none	------	------	39.10	none	------	4.30	99.18
102	------	0 40	0.80	1.20	------	54.0	none	------	------	42.48	none	------	1.92	100.86
102	------	1.00	0.20	1.20	------	54.59	none	------	------	42.90	------	------	0.60	100.49
102	------	0.90	none	1.20	------	54.33	none	------	------	42.70	------	------	0.94	100.07
10	------	1.10	0.90	1.50	------	51.24	none	------	------	40.26	------	------	3.70	98.70
10	------	1.06	0.51	0.75	------	52.02	none	------	------	40.88	------	------	3.55	98.77
10	------	2.34	2 81	1.68	------	44.96	------	------	------	39.44	------	------	3.98	94.61
1028	------	0.48	0.10	0.44	------	52.71	0.19	------	------	39.24	------	------	8.98	97.14
10	------	0.60	none	1.20	------	54.60	none	------	------	42.90	none	------	0.94	100.24
103	------	1.00	0.30	0.60	------	55.12	none	------	------	43.31	none	------	0.39	100.72
1031	------	1.00	0.50	0.60	------	54.08	none	------	------	42.50	none	------	1.60	100.28
1032	------	0.26	0.15	0.75	------	53.86	none	------	------	42.32	none	------	1.88	99.22
1033	------	0.70	0.70	0.80	------	42.79	9.24	------	------	44.21	none	------	1.35	100.79
1034	------	0.40	none	0.75	------	54.08	none	------	------	42.49	none	------	1.41	99.13
1035	------	0.22	2.90	2 90	------	50.40	none	------	------	39.60	none	------	4.72	98.74
1036	------	0.30	2.25	0.75	------	51.98	none	------	------	40.85	none	------	3.35	99.48
1037	------	0.06	0.46	1.50	------	53.03	none	------	------	41.67	none	------	1.83	98.55
1038	------	5.40	1.70	1.80	------	48.49	none	------	------	38.10	none	------	3.00	98.49
1039	------	1.70	1.70	1.80	------	50.00	none	------	------	39.30	none	------	4.40	98.90
1040	------	1.10	none	5.25	------	48.80	0.84	------	------	39.06	none	------	4.14	99.19
1041	------	1.20	none	4.80	------	50.00	none	------	------	39.30	none	------	4.10	99.40
1042	------	2.70	none	3.46	------	49.70	none	------	------	39.05	none	------	4.55	99.46
1043	------	1.42	1.82	1.50	------	50.47	none	------	------	39.66	------	------	3.52	98.39
1044	------	0.80	0.20	1.20	------	54.00	none	------	------	42.50	------	------	0.80	99.50
1045	------	0.10	1.65	1.35	------	52.00	0.29	------	------	41.18	------	------	1.76	98.33
1046	------	0.52	4.50	1.50	------	50.93	none	------	------	40.02	------	------	3.58	101.05
1047	------	0.40	0.55	0.45	------	53.03	none	------	------	41.67	------	------	2.35	98.45
1048	------	1.16	none	1.95	------	53.55	none	------	------	42.08	------	------	1.82	100.56
1049	------	1.70	2.68	1.18	------	48 76	0 29	------	------	38 52	------	------	4 58	97.51
1050	------	1.40	4.34	0.52	------	49.90	0.48	------	------	39.60	------	------	3.28	99.52
1051	------	1.66	1.35	2.21	------	49 35	0.19	------	------	38.80	------	------	3.30	97.46
1052	------	1.50	0.36	0.44	------	52.87	none	------	------	41.23	0.55	------	2.17	99.12
1053	------	1.76	1.03	0.57	------	50.60	0 69	------	------	39.75	0.45	------	5.65	100.32
1054	------	1.60	Trace	2.40	------	53.14	Tr.	------	------	40.76	Trace	------	2.04	100.03
1055	------	1.32	1.06	Trace	------	55.50	none	------	------	41.14	------	------	------	99.02
1056	------	5.20	1.02	Trace	------	51.78	none	------	------	41.50	------	------	------	99.50
1057	------	2.50	1 50	Trace	------	53 56	none	------	------	42.00	------	------	------	99.56
1058	------	2.20	0 50	1.10	------	53 70	Tr	------	------	41.80	------	------	------	99.30
1059	------	1.21	5.45	1.47	------	47.75	0.17	------	------	36 05	none	------	6.96	99.06
1060	------	1.76	1 03	0.57	------	50.60	------	------	------	39.75	------	------	5.65	99.36
1061	------	0.67	2.64	0.96	------	51.27	none	------	------	37.14	none	------	5.88	98.56

*Sulphur.

VII. DOLOMITE

No.	Silica	Al_2O_3	Fe_2O_3	CaO	MgO	CO_2	SO_3	Loss On Ignition	Total
1062	10.60	10.50	1.14	25.73	10.51	35.50	1.03	5.70	100.73
1063	0.84	1.25	0.91	31.83	17.34	40.30	1.72	6.40	100.59
1064	2.30	3.60	1.50	30.98	17.42	43.50	none	1.70	101.00
1065	1.56	2.88	1.82	30.98	15.17	45.00	0.26	1.30	98.97
1066	0.56	1.28	1.52	30.90	18.71	45.20	none	1.90	100.07
1067	3.32	12.88	2.88	28.62	10.81	40.00	none	0.58	99.09
1068	3.33	5.43	3.18	29.38	14.32	42.00	none	3.00	100.64
1069	7.92	5.38	2.12	28.09	14.29	37.75	none	3.35	98.90
1070	5.00	2.54	1.96	30.32	15.14	40.47	none	4.49	99.92
1071	1.16	1.45	0.91	29.06	19.83	44.00	0.75	3.06	100.22
1072	0.86	0.04	1.22	37.04	14.91	40.07	0.44	6.85	101.43
1073	3.00	----------	1.80	28.98	20.40	43.70	----------	2.46	100.34
1074	1.86	1.70		28.89	20.18	44.30	----------	2.50	99.43
1075	1.44	0.42		28.99	20.21	45.20	----------	2.10	98.35
1076	0.70	1.20		29.56	20.76	44.54	----------	3.20	99.96
1077	3.80	7.59	2.67	30.20	8.93	40.73	1.72	4.82	100.51
1078	1.50	5.44	0.30	30.45	15.92	43.34	none	3.70	100.65
1079	4.00	5.51	1.05	29.56	15.08	41.76	none	3.44	100.40
1080	4.70	5.10	1.50	28.25	15.97	44.64	none	1.42	101.68
1081	12.30	8.00	1.50	25.97	11.51	33.06	none	6.90	99.24
1082	0.92	2.35	0.91	33.52	14.82	39.99	0.34	6.01	98.86
1083	3.60	2.37	1.53	28.46	19.65	41.30	----------	3.62	100.53
1084	6.90	5.19	0.61	29.69	13.91	28.60	none	5.00	99.90
1085	4.165	3.485		27.78	7.50	20.21	----------	----------	----------
1086	0.17	----------	----------	31.58	20.31	----------	----------	----------	----------
1087	0.25	----------	----------	31.10	20.50	----------	----------	----------	----------
1088	0.62	0.74		33.00	18.56	46.66	----------	----------	99.58
1089	5.96	2.82		41.66	7.51	41.30	----------	1.24	100.49
1090	1 50	4 40		41.50	9.00	42.70	----------	----------	99.10

VIII. KAOLIN

No.	Silica	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	CO_2	H_2O (comb)	H_2O (Hyg.)	Total
1091	76.36	17.00	0.46	0.64	----------	----------	----------	----------	6.30	----------	100.76
1092	45.50	33.23	0.60	----------	----------	----------	----------	----------	12.50	6.42	98.26
1093	48.41	43.17	----------	0.38	0.10	1.78		----------	6.05	----------	99.39
1094	45.04	32.99	2.73	----------	----------	----------	----------	1.80	8.23	4.97	98.45
1095	45.52	42.30	----------	Trace	----------	----------	----------	----------	13.92	----------	100.74
1096	45.00	33.50	1.50	1.00	0.30	----------	----------	----------	18.20	----------	99.50

IX. COMMON SALT

Serial No.	Na Cl	SiO_2	Al_2O_3	Fe_2O_3	Ca	Mg	Na	SO_4	Cl	H_2O	Total
1096a	87.35	----------	----------	----------	1.20	1.60	----------	1.45	6.60	1.80	100.00
1097	97.30	0.60	0.60	Trace	----------	----------	0.45	0.95	----------	----------	99.90
1098	91.50	----------	----------	Trace	----------	1.68	----------	6.72	----------	----------	99.90
1099	97.74	----------	----------	----------	0.10	0.20	----------	1.20	----------	1.00	100.24
1100	45.01	3.70	----------	----------	14.87	----------	----------	36.08	----------	----------	99.66

X. ANHYDRITE

No.	SiO_2	$Al_2O_3+Fe_2O_3$	CaO	SO_3	Ign. loss	Total	$CaSO_4$ (Anhydrite)
1101	1.05	1.60	37.18	53.10	6.00	98.93	90.28

XI. NOVACULITE

No.	Silica	Alumina	Iron Oxide	Lime	Potass'm Oxide	Sodium Oxide	Sulphuric Acid	Loss on Ignition	Total
1102	97.32	0.90	1.70	1.19	0.10	0.90	0.28	0.00	102.39
1103	97.80	1.07	0.53	0.88	0.43	0.13	0.41	----------	101.20
1104	97.00	1.18	1.02	0.71	0.34	0.70	0.55	0.06	101.55
1105	96.80	1.18	1.02	0.71	0.14	0.94	0.28	0.02	101.09

XII. PHOSPHATIC ROCK

No.	Silica	Alumi.	Iron Oxide	Lime	M'gnes.	CO_2	SO_3	P_2O_5	Bone Phos.	Loss Ignit'n	Total
1106	7.50	31.03	4.58	18.08	-------	4.60	1.76	18.19	-------	12.60	98.34
1107	43.39	-------	-------	31.34	*none*	-------	-------	0.60	1.30	-------	-------
1108	-------	-------	-------	-------	-------	-------	-------	1.70	-------	-------	-------
1109	-------	-------	-------	-------	-------	-------	-------	6.03	-------	-------	-------
1110	-------	-------	-------	-------	-------	-------	-------	3.09	6.74	-------	-------
1111	-------	-------	-------	lb ------	-------	-------	-------	2.38	5.19	-------	-------
1112	-------	-------	-------	-------	-------	-------	-------	3.22	7.02	-------	-------
1113	-------	-------	-------	-------	-------	-------	-------	3.07	6.70	-------	-------
1114	-------	-------	-------	-------	-------	-------	-------	4.00	8.73	-------	-------
1115	-------	-------	-------	-------	-------	-------	-------	2.73	5.95	-------	-------
1116	-------	-------	-------	-------	-------	-------	-------	4.32	9.43	-------	-------
1117	-------	-------	-------	-------	-------	-------	-------	2.60	5.67	-------	-------
1118	-------	-------	-------	-------	-------	-------	-------	3.70	8.07	-------	-------
1119	-------	-------	-------	-------	-------	-------	-------	3.97	8.67	-------	-------
1120	-------	-------	-------	-------	-------	-------	-------	0.25	0.54	-------	-------

XIII. ASPHALT ROCK

No.	Asphaltine	Petrolene	Total Bitumen	Calcium Carbonate	Silica	Sulphur	Phosphorus	Mineral Matter	Organic matter other than Bitumen	Insoluble matter
1121	11.25	12.09	23.34	none	76.71	0.43				
1122	6.92	16.52	17.44	0.96	81.60	0.61				
1123	2.35	5.82	8.17	Trace	91.83	0.18				
1124	Trace	0.65	0.65	88.54	10.81	0.038				
1125	7.76	6.75	14.51	18.33	4.16	0.22				
1126	1.90	8.40	10.30	88.20	1.50	0.23				
1127	0.45	5.31	5.76	0.56	93.68	0.14				
1128	Trace	7 43	7.45			1.00				
1129	1.23	4.92	6.15	none	92.85	0.71				
1130	0.82	14.17	14.99	Trace	87.36	2.38				
1131	2.46	10.18	12.64			0.92				
1132	Trace	10.10	10.10	Trace	89.90	0.50				
1133	3.00	6.24	9.24			0.30				
1134	7.12	20.14	27.26	72.	74	0.15				
1135			98.24					0.32	1.44	
1136	3.60	7.00	10.60	Trace	89.20					
1137	1.20	8.80	10.00	3.00	87.00	0.48				
1138	0.20	1.90	2.10	28.10	69.80	0.50				
1139	0.60	1.22	1.82	12.14	86.04	0.19				
1140	1.35	9.00	10.35	Trace	89.65	0.20				
1141	1.46	9.50	10.96	Trace	89.04	0.24				
1142	1.58	9.10	10.68	Trace	89.32	0.22				
1143	8.29	7.70	15.99	83.45	0.56					
1144	4.19	5.28	9.47	11 24	79.27	0.91				
1145	5.08	5.12	10.20	7.69						82.11
1146	5.31	6.07	11.37	85.44						3.18
1147	3.31	5.45	8.86	14.80						76.44
1148	7.68	7.13	14.81	84.91						0.28
1149	6.73	9.28	16.01	78.73		1.50				5.26
1150	7.0	7.00	14.00	83.00	2.00	0.17				
1151	5.4	9.00	14.40				3.55			

B. IGNEOUS ROCK

Serial No.	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163
SiO_2	12.27	19.32	26.90	35.76	37.90	38.00	38.35	39.00	40.32	41.48	41.95	42.20
Al_2O_3	6.09	7.12	14.34	18.65	10 11	26 76	9.18	30 89	9.46	20.85	24.74	19.41
Fe_2O_3					3.60	14.36	20.32	10.71	4.75	13.50	11.98	7.93
FeO	2 83	3.16	0.60	10.27	7.50				7.48			6.15
MgO	6.48	6.59		11 26	14 60		13.78	1.43	18.12	0.84	2.23	3.50
CaO	1.45	7.75	0.30	12.52	16.28	14 89	11 76	12.87	10.55	6 79	9 66	10.14
Na_2O	2.30	2.11	8.32	5.42	2.18	2.32	2.77	1.77	2.62	3 21	3.74	4 07
K_2O	0.93	0.67	1.22	1.13	0.69	0.64	2.02	0.74	1.10	1.42	1.16	0.62
H_2O below 100°					0 39				0.57			
H_2O above 100°					1.82				1.25			
TiO_2		Trace			2.93				2.66	3.00	2.29	1.00
P_2O_5	0.68	1.13	0.11		1.13				0.68	2.07	1.04	1.76
ZrO_2					none				none			
Cr_2O_3					0.08							
NiO_2					0.04				0.06	0.21	0.18	
MnO					0.22				0.25			
SiO					0.05				0.03			
BaO					0.06				0.06			
LiO					Trace				Trace			
S					0.04				0.01			
SO_3				1.85	0.03	0.82		1.37	0.03			0.55
H_2O (—) Hyg										3.02	0.12	0.30
H_2O (+) Com										3.90	1.19	1.56
Mn_3O_4												1.20
Cl					Trace				0.05	none	none	
F					0.07				0.04			
CO_2				0.10								
Loss on ignit'n				2.65		1.76	1.20	2.60				
Total					100.13	99.55	99.38	100.88	100.09	100.29		100.39

IGNEOUS ROCK (Continued)

Serial No.	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175
SiO_2	43.26	43.65	44.66	45.11	46.60	48.18	43.23	45.86	50.20	50.92	51.23	51.54
Al_2O_3	14.73	26.96	16.80	12.44	24.43	18.44	17.43	16.50	19.98	14.61	16.35	16.52
Fe_2O_3	5.35	12.85	4.31	2.67	------	3.41	2.77	2.96	12.62	4.45	4.01	10.06
FeO	7.22	------	6.75	9.36	6.70	4.30	5.92	8.03	------	5.35	6.15	2.96
MgO	0.58	0.09	2.22	11.56	2.12	3.06	2.99	0.54	0.25	1.19	2.68	------
CaO	9.88	9.76	7.20	10.61	2.96	5.89	6.38	8.84	4.07	10.14	8.37	2.86
Na_2O	1.00	2.81	4.98	3.05	6.13	8.00	6.87	4.58	4.57	3.78	3.33	1.28
K_2O	0.24	0.73	1.90	1.01	3.12	3.80	2.78	1.74	3.29	0.32	0.52	9.03
H_2O below 100°	------	------	------	0.16	------	0.18	0.54	------	------	------	------	------
H_2O above 100°	------	------	------	0.78	------	1.59	2.84	------	------	------	------	------
TiO_2	1.50	Trace	2.00	2.34	1.62	1.74	2.00	1.00	1.45	1.39	0.80	0.08
P_2O_5	4.63	1.08	2.42	0.51	------	0.49	0.69	2.64	1.44	------	1.40	Trace
ZrO_2	4.70	------	------	------	0.75	0.05	0.04	2.75	------	2.80	------	------
Cr_2O_3	------	------	------	------	------	none	none	------	------	------	------	------
NiO	0.24	0.98	------	0.04	------	0.02	Trace	0.80	------	------	------	------
MnO	0.93	------	------	0.22	0.56	0.19	0.18	1.77	Trace	0.74	------	------
SrO	------	------	------	Trace	------	0.10	0.08	------	------	------	------	------
BaO	------	------	------	Trace	0.26	0.10	0.08	------	------	------	------	------
LiO	------	------	------	none	------	Trace	Trace	------	------	------	------	------
S	------	------	------	0.01	------	0.09	0.08	------	------	------	------	------
SO_3	------	------	0.65	------	0.63	------	------	------	------	------	0.45	0.60
H_2O (—) Hyg	------	0.27	0.60	------	0.44	------	------	0.20	0.37	0.30	0.90	1.60
H_2O (+) com	4.00	0.48	4.30	------	3.10	------	------	1.40	1.48	4.20	1.40	3.40
$MnsO_4$	------	------	2.00	------	------	------	------	------	------	------	2.60	------
Cl	------	0.16	------	0.11	------	0.29	0.03	------	Trace	------	------	------
F	------	------	------	undet	------	0.06	undet	------	------	------	------	------
CO_2	------	------	------	------	------	------	------	------	------	------	------	------
Loss on ignit'n	------	------	------	------	------	------	------	------	------	------	------	------
V_2O_5	------	------	------	------	------	------	0.04	------	------	------	------	------
Total	100.13	99.82	100.41	100.02	100.13	99.93	99.97	99.61	99.72	100.19	100.21	99.90

IGNEOUS ROCK (Continued)

Serial No.	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187
SiO_2	53.30	53.31	53.42	54.42	56.10	57.20	58.86	58.90	59.48	59.84	59.36	59.63
Al_2O_3	7.70	17.92	9.17	20.76	21.24	16.72	20.82	17.08	13.16	19.91	18.2	12.25
Fe_2O_3	14.43	2.27	2.33	2.64	7.01	7.00	8.43	4.16	6.71	8.51	6.19	7.66
FeO	2.68	5.51	------	1.33	------	none	------	1.34	------	------	------	------
MgO	9.67	1.40	0.80	0.22	0.03	0.27	0.62	0.18	1.64	0.59	0.15	0.21
CaO	2.86	4.19	17.15	1.34	2.69	1.92	7.19	1.66	1.83	2.23	1.64	2.05
Na_2O	4.37	6.41	------	10.41	6.67	2.51	3.24	5.48	11.67	3.34	5.99	6.46
K_2O	5.04	4.32	------	4.89	5.27	7.67	0.67	3.73	6.03	2.62	5.28	4.06
H_2O below 100°	------	0.58	------	0.22	------	------	------	------	0.20	------	------	------
H_2O above 100°	------	2.08	------	2.50	------	------	------	------	------	------	------	------
TiO_2	0.50	1.60	------	0.40	0.22	------	1.22	0.17	------	0.45	Trace	0.78
P_2O_5	1.47	0.44	------	0.11	Trace	1.50	4.88	0.77	------	0.66	Trace	0.33
ZrO_2	------	Trace	------	0.15	------	------	------	------	------	------	------	------
Cr_2O_3	------	------	------	none	------	------	------	------	------	------	------	------
NiO	------	------	------	none	0.31	------	0.30	------	------	------	------	------
MnO	------	0.17	------	0.17	------	------	------	------	------	Trace	Trace	0.12
SrO	------	0.06	------	Trace	------	------	------	------	------	------	------	------
BaO	------	0.0	------	0.0	------	------	------	------	------	------	------	------
LiO	------	Trace	------	Trace	------	------	------	------	------	------	------	------
S	------	0.05	Trace	0.01	------	------	------	------	------	------	------	------
SO_3	1.50	------	------	------	------	0.41	------	1.95	------	------	------	------
H_2O (—) Hyg	0.60	------	0.25	------	0.17	0.20	0.44	0.40	------	0.17	1.1	0.95
H_2O (+) com.	2.54	------	1.05	------	0.62	1.50	0.95	2.20	------	1.33	0.22	0.84
$MnsO_4$	2.50	------	------	------	------	2.50	------	2.46	------	------	------	------
Cl	------	------	------	0.22	Trace	------	------	------	------	Trace	0.31	Trace
F	------	------	------	none	------	------	------	------	------	------	------	------
CO_2	------	Trace	16.00	------	------	------	------	------	------	------	------	------
Loss on ignit'n	------	------	------	------	------	------	------	------	------	------	------	------
V_2O_5	------	------	------	------	------	------	------	------	------	------	------	------
Rare earths	------	0.05	------	------	------	------	------	------	------	------	------	------
Total	100.06	100.46	99.51	99.82	100.53	99.68	100.21	100.31	101.19	99.63	99.72	99.69

IGNEOUS ROCK (Continued)

Serial No.	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199
SiO_2	61.04	60.10	61.40	62.18	62.30	62.46	63.24	63.90	63.30	63.73	64.10	64.46
Al_2O_3	14.86	16.31	16.53	17.70	9.07	17.10	14.96	15.11	11.97	.....	20.80	15.11
Fe_2O_3	5.50	5.95	0.89	1.69	2.97	2.49	7.20	4.46	4.46	.....	0.30	4.23
FeO	.....	.....	3.48	2.54	.....	2.65	.....	.....	4.01	.....	2.43	2.14
MgO	.....	0.07	0.14	.....	0.11	0.28	none	.....	0.36	.....	.....	.....
CaO	1.46	1.56	0.88	1.30	7.80	1.27	1.02	1.66	1.56	3.53	1.30	1.56
Na_2O	6.19	7.59	8.74	6.31	1.39	6.84	4.62	6.13	7.65	5.94	5.03	6.59
K_2O	3.10	4.90	5.50	3.77	3.19	5.44	5.91	4.59	4.65	2.74	3.49	4.53
H_2O below 100°	.....	.....	.....	.....	.....	0.15	.....	.....	.....	.....	.....	.....
H_2O above 100°	.....	.....	.....	.....	.....	0.49	.....	.....	.....	.....	.....	.....
TiO_2	.....	0.19	0.83	1.43	0.50	0.38	0.55	0.58	.....	.....	.....	0.08
P_2O_5	.....	.....	.....	.....	.....	0.11	0.25	.....	0.71	.....	.....	.....
ZrO_2	.....	1.85	0.35	.....	.....	0.10	.....	0.45	0.85	.....	.....	.....
Cr_2O_3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
NiO	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
MnO	.....	0.74	0.93	.....	0.93	0.18	0.26	0.65	0.65	.....	.....	.....
SrO	.....	.....	.....	.....	.....	none	.....	.....	.....	.....	.....	.....
BaO	.....	0.13	0.13	.....	.....	none	.....	0.26	.....	.....	.....	.....
LiO	.....	.....	.....	.....	.....	Trace	Trace	.....	.....	.....	.....	.....
S	.....	.....	.....	.....	.....	none	.....	.....	.....	.....	.....	.....
SO_3	0.58	0.19	.....	0.40	.....	.....	.....	0.75	.....	.....	0.75	0.89
H_2O (−) hyg.	3.30	0.16	0.20	0.40	3.76	.....	0.32	0.46	0.40	.....	0.52	0.62
H_2O (+) com.	1.62	1.10	0.10	0.74	8.10	.....	1.08	0.86	0.80	.....	0.90	0.72
Mn_3O_4	2.26	.....	.....	2.50	.....	.....	.....	.....	.....	.....	0.54	.....
Cl	.....	.....	.....	.....	.....	.....	Trace	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
CO_2	.....	.....	.....	.....	.....	Tr(?)	.....	.....	.....	.....	.....	.....
Loss on ignit'n	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
V_2O_5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rare earths	.....	.....	.....	.....	.....	0.03	.....	.....	.....	.....	.....	.....
Total	99.85	100.84	100.10	99.96	100.12	99.97	100.41	99.86	100.47	.....	100.16	100.93

IGNEOUS ROCK (Continued)

Serial No.	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211
SiO_2	64.51	65.47	66.50	68.25	68.32	68.71	69.00	69.30	70.20	71.10	71.20	72.51
Al_2O_3	16.75	17.93	18.44	13.60	15.82	13.45	17.12	13.40	17.36	11.39	15.04	15.00
Fe_2O_5	2.05	2.15	3.27	3.66	4.18	5.31	2.45	5.60	1.32	5.33	1.10	0.81
FeO	1.00	0.43	0.81	1.43	.....	0.75	.....	.....	1.90	.....	2.96	.....
MgO	0.60	0.06	.....	0.02	Trace	0.19	Trace	none	0.20	1.54	.....	0.33
CaO	1.38	1.10	0.88	0.54	0.78	0.96	0.71	0.66	1.46	0.08	1.04	0.60
Na_2O	6.08	6.21	5.28	6.52	4.02	4.63	6.63	4.45	4.30	3.95	3.73	0.33
K_2O	5.74	5.21	3.57	4.73	4.41	5.51	2.24	5.40	2.90	6.37	3.64	Trace
H_2O below 100°	0.31	0.19	.....	0.16	.....	.....	.....	.....	.....	.....	.....	.....
H_2O above 100°	0.46	0.41	.....	0.32	.....	.....	.....	.....	0.70	0.44	.....	8.31
TiO_2	0.75	0.29	.....	0.26	0.54	0.21	0.23	0.45	.....	0.57	0.09	0.52
P_2O_5	0.14	0.19	Trace	0.02	0.57	0.04	0.46	0.29	0.06	0.15	.....	.....
ZrO_2	.....	0.07	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....
Cr_2O_3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
NiO	.....	.....	.....	.....	.....	.....	0.26	.....	.....	.....	.....	.....
MnO	0.21	Trace	.....	0.04	0.87	0.14	.....	Trace	.....	.....	.....	.....
SrO	.....	Trace	.....	Trace	.....	none	.....	.....	.....	.....	.....	.....
BaO	.....	0.16	.....	Trace	.....	None	.....	.....	.....	.....	.....	.....
LiO	.....	none	.....	Trace	Trace	none	Trace	Trace	.....	.....	.....	.....
S	.....	Trace	.....	Trace	.....	.....	.....	.....	.....	.....	.....	.....
SO_3	.....	.....	0.60	.....	.....	0 05	.....	.....	.....	.....	0.52	.....
H_2O (−) hyg.	.....	.....	0.36	.....	0.19	0.13	0.27	0.21	.....	.....	0.40	.....
H_2O (+) com.	.....	.....	0.26	.....	0.61	0.36	0.86	0.49	.....	.....	0.30	.....
Mn_3O_4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.70	.....
Cl	0.04	.....	.....	.....	.....	.....	Trace	Trace	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	None	.....	.....	.....
CO_2	.....	Trace	.....	Trace	.....	.....	.....	.....	Trace	.....	.....	.....
Loss on ignit'n	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
V_2O_5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rare earths	.....	0.05	.....	0.08	.....	.....	.....	.....	.....	.....	.....	.....
MnO_2	.....	.....	.....	.....	.....	.....	.....	.....	Trace	.....	.....	.....
Hydrous Si	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.72
Total fluxes	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.07
Total	100.02	99.92	99.97	99.88	100.30	100.44	100.33	100.25	100.40	100.92	100.72	98.41

IGNEOUS ROCK (Continued)

Serial No.	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223
SiO_2	72.80	73.35	73.76	74.00	74.80	74.90	72.86	74.85	75.12	75.30	76.30	76.34
Al_2O_3	15.40	14.38	.....	14.00	7.48	11.10	11.74	12.83	10.94	5.53	11.53	.....
Fe_2O_3	2.15	1.96	.....	1.00	9.00	1.60	2.71	1.40	2.88	1.78	1.83	.....
H_2O below 100°	.....	.....	.....	.....	.....	.....	0.51	0.24	0.18	.....	0 19	.....
FeO	0.40	0.34	.....	.....	.....	1.50	1.66	0.37	0.86	1.02	0.76	.....
MgO	1.00	0.09	.....	Trace	None	.....	0.06	0.04	0.07	.....	0.03	.....
CaO	1.60	0.26	0.81	Trace	1.36	0.20	0.24	0.48	0.20	6.24	0.16	0.77
Na_2O	2.70	4.33	3.64	6.20	.....	8.50	4.63	4.24	4.46	2.51	4.01	2.88
K_2O	2.30	5.66	5.66	3 90	.....	Trace	4.92	5.12	4.54	1.59	4.70	5.76
H_2O above 100°	0.45	.....	.....	Trace	.....	0.30	0.40	0.30	0.19	.....	0.34	.....
TiO_2	.....	.....	.....	.....	.....	0.50	0.20	0.15	0.20	Trace	0.16	.....
P_2O_5	0.05	.....	.....	Trace	.....	.....	Trace	Trace	None	.....	None	.....
ZrO_2	.....	.....	.....	.....	.....	.....	0.28	0.09	0.13	.....	0.11	.....
Cr_2O_3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
NiO	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
MnO	.....	.....	.....	.....	.....	1.90	0 07	Trace	0.08	.....	Trace	.....
SrO	.....	.....	.....	.....	.....	.....	None	None	None	.....	None	.....
BaO	.....	.....	.....	.....	.....	.....	None	None	None	.....	None	.....
LiO	.....	.....	.....	.....	.....	.....	Trace	Trace	Trace	.....	Trace	.....
S	.....	.....	.....	.....	.....	.....	Trace	Trace	0.05	.....	Trace	.....
SO_3	.....	.....	.....	.....	.....	.....	.....	.....	None	0.92	.....	.....
H_2O (—) hyg.	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.20	.....	.....
H_2O (+) com.	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.90	.....	.....
Mn_3O_4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cl	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	None	.....	.....	None	.....	.....	.....	.....	.....	.....	.....	.....
CO_2	None	.....	.....	None	.....	.....	Trace	Trace	0.01	.....	Trace	.....
Loss on ignit'n	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
V_2O_5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.02	.....
Rare earths	.....	.....	.....	.....	.....	.....	0 05	0.07	0.04	.....	.....	.....
MnO_2	Trace	.....	.....	Trace	.....	.....	.....	.....	.....	.....	.....	.....
Total	98.85	100.37	.....	99.10	92.64	.....	100.33	100.18	99.98	99.99	100.14	.....

IGNEOUS ROCK (Continued)

Serial No.	1224	1235	1226	1227	1228	1229	1230	1231
SiO_2	76 45	78.00	82.44	60.90	61 40	39.92	12.00	45 23
Al_2O_3	11.73	12.35	5.41	16.20	16.85	8.60	5.15	7.73
W_2O_3	2.90	1.30	0.80	2.60	2.25	4.40	.....	2.95
FeO	.....	None	1.87	4.20	3.20	8.00	3.38	4.07
MgO	Trace	0.60	.....	0 90	0.50	20 17	7.16	12.25
CaO	1.34	0.15	1.56	4.50	4.20	10.68	1.33	23.37
Na_2O	5.03	3.40	3.90	6.50	6.75	1.01	1.77	.47
K_2O	1.55	4.34	2.52	2.75	2.70	1.03	.77	.12
H_2O below 100°	.....	.....	.....	0.40	0.50	.43	(?)	.37
H_2O above 100°	.....	0.20	.....	.....	.....	1 45	(?)	.....
TiO_2	0.41	.....	0.09	.....	.....	2.70	.....	4.28
P_2O_5	Trace	0.04	.....	0.09	0.08	.51	.51	None
ZrO_2	.....	.....	.....	.....	.....	None	.....	.....
Cr_2O_3	.....	.....	.....	.....	.....	.14	.....	.....
V_2O_3	.....	.....	.....	.....	.....	0.04	.....	.....
NiO	.....	.....	.....	.....	.....	.06	.....	.05
MnO	0.17	.....	.....	.....	.....	.24	.....	.07
SrO	.....	.....	.....	.....	.....	.04	.....	.....
BaO	.....	.....	.....	.....	.....	.06	.....	.....
Li_2O	Trace	.....	.....	.....	.....	Trace	.....	Trace
S	.....	.....	.....	.....	.....	Trace	.....	.....
SO_3	.....	.....	0.60	.....	.....	.....	.....	.....
H_2O (—) Hyg.	0.02	.....	0.16	.....	.....	.....	.....	.....
H_2O (+) com.	0.94	.....	0.94	.....	.....	.....	.....	.....
Mn_3O_4	.....	.....	.....	.....	.....	.....	.....	.....
Cl	Trace	.....	.....	.....	.....	Trace	.....	.....
F	.....	None	.....	.....	.....	.07	.....	.....
CO_2	.....	None	.....	.....	.....	.....	.....	.....
Loss on ignition	.....	.....	.....	.....	.....	.....	.....	.....
V_2O_5	.....	.....	.....	.....	.....	.....	.....	.....
Rare earths	.....	.....	.....	.....	.....	.....	.....	.....
MnO_2	.....	Trace	.....	.....	.....	.....	.....	.....
Total	100.54	100.38	100.38	99.04	98.43	100.45	32.07	100.96
Less Oxygen	.....	.....	.....	.....	.....	.03	.....	.....
	.....	.....	.....	.....	.....	100.42	.....	.....

C. METAPHORPHIC ROCKS

Marble 1234—1237i Serpentine 1238

Serial No.	1234	1235a	1235b	1236	1237a	1237b	1237c	1237d	1237e	1237f	1237g	1237h	1237i	1238
H_2O	0.20	0.10			0.22									13.20
SiO_2	3.40	2.00	1.10	3.42	2.60	0.16	0.57	4.06	34.86	0.50	0.82	7.76	1.24	40.66
Al_2O_6	0.50	0.25	0.27	2.42	0.30			1.38	5.44	0.37	0.54	3.24	0.23	1.70
Fe_2O_3	0.25	0.15	0.27	0.78	0.15	0.32	0.21	0.62	2.34		0.46	0.62	0.31	5.20
FeO	Trace	None			None					0.75				3.06
SO_3	None	None			None						1.51	0.55	0.48	None
CaO	54.00	54.00	55.05	39.79	38.00	55.50	55.50	50.69	29.70	54.59	50.13	28.46	53.34	Trace
MgO	Trace	Trace		9.41	13.00	Trace	0.05	1.08		None	1.88	18.47	0.39	35.50
K_2O	Trace	Trace			0.60									0.25
Na_2O	0.50				1.40									0.60
CO_2	42.00	42.15	42.42	41.64	43.24	43.60	43.30	38.28	23.34	42 90	41.00	37.70	39.84	None
P_2O_5	Trace	None			None									None
Fluorine	Trace	None			None									None
Ignition loss			1.38	2.10				3.97	3.46	1.02	3.12	2.84	2.82	
Total	100.85	99.65	100.49	99.56	99.51	99.58	99.63	100 08	99.14	100.13	99.46	99.64	98.65	100.17

LIGNITE

	As Received							Dry Basis						Ultimate						
No.	Moisture	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Vol. and comb. matter	Fixed carbon	Ash	Total	ulphur	B. T. U.	Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	Ash	Total
1239	12.50	36.37	37.67	13.46	100.60															
1240	13 285	59.865	18.325	8.325	100.00															
1241	25.00	18.20	43.80	13.00	100.00	1.23	8105	24.27	58.40	17.33	100.00	1.64	10131							
1242	34.82	19.73	34.62	10.80	100.00	1.26	7860	26 50	58.90	14.60	100.00	1.73	10598							
1243	24.00	36.07	32.97	6.96	100.00	0.62	9002	47.46	43.38	9.14	100.00	0.82	11845							
1244	16.40	37 04	32.85	14.21	100.00	3.10	8590	44.30	36.70	17.00	100.00	3.71	10286							
1244a	6 50	30.70	8.80	54.50	100.00			32.83	8.88	58.29	100.00									
1245	35 40	36.88	21.22	6.50	100.00	0.94							12166							
1246	37.26							50.76	39.54	9.70	100.00	0.90	10228							
1247	10 00							51.75	26.50	21.75	100.00	2.50	9036							
1248	24.50							47.34	40.66	12.00	100.00	0.80	10970							
1248a	32 50	28 96	32 18	6.36	100.00		7325	42 90	47.68	9.42	100.00		10852							
1249	23.64	43 51	23.15	9.70	100.00	2.03	8104	56.98	30.32	12.70	100.00	2.66	10613							
1250	14.60	18.00	8.60	58.60	100.00			21 08	10.07	68.85	100.00									
1251	13.68							55.20	29.84	14.96	100.00	0.54	11780	53.49	4.45	24.82	1.74			
1252	4.38	38.97	43.03	13.62	100.00	4.14														
1253	4.13	39.89	40.40	15.58	100.00	5.22														
1253a	18 0	4 07	35 8	1 2	100 0	1.77	10734	54.8	43.70	1.50	100.00	2.16	13170							
1254	13.06	43.18	36.59	7.17	100.00	5.70														
1	8.15	21.0	39.73	23.08	100.00	1.33														
1255a	20.74	37.26	28 60	13.40	100.00		8416	47.01	36.09	16.90	100.00		10618							
1256	15.80	39.42	39.78	5.00	100.00															
1257	7.00	53.70	32.55	6.75	100.00	0.89														
1258	5.40	34 65	27.70	33.25	100.00	1.33														
1259	8.15	43.55	42.50	5.80	100.00	3.37														
1260	16.42	18.80	28.75	36.03	100.00													*		
1261	31.12							49.28	17.82	32.90	100.00	1.34	9709	56.67	4.70	18.14	1.33			
1262	1.20	33.42	16.58	48.80	100.00	5.77	8416	33.83	16.78	49.39	100.00	5.84	8516							
1263	19 82							45.42	35.19	19.39	100.00									
1264	27 80							53.05	18.14	28.81	100.00									
1265	33 50							50.30	27.40	22.30	100.00									
1266	39 00							58 50	34.50	7.00	100.00	2.40						2.40	7.00	
1267	38.50							56.52	32.48	11.00	100.00		11110							

LIGNITE (Continued)

	As Received							Dry Basis						Ultimate						
No.	Moisture	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	Ash	Total
1268	46.30							54.50	33.30	12.20	100.00	2.70	11222	59.82	5.44	18.26	1.58	2.70	12.20	100.00
1269	38.60																			
1270	46.00							49.04	41.22	9.74	100.00									
1270a	31.26	23.24	19.80	25.70	100.00		6000	33.81	28.80	37.39	100.00		8722							
1270b	31.50	29.94	28.56	11.00	100.00		7559	42.25	41.69	16.06	100.00		11035							
1271	26.90	33.80	29.40	9.90	100.00	1.65	7714	46.24	40.22	13.54	100.00	2.25	10566							
1272	23.47	31.83	26.50	18.20	100.00	1.92	7481	41.59	34.62	23.79	100.00	2.51	9775							
1273	25.64	37.16	29.90	7.30	100.00	1.24	9195	49.97	40.21	9.82	100.00	1.66	12365							
1274	27.40	26 53	36.71	9.36	100.00	1.39	7977	36.54	50.56	12.90	100.00	1.92	10983							
1275	27.20	33.23	31.13	8.44	100.00	1.40	8056	45.64	42.76	11.60	100.00	1.92	11066							
1276	51.00	32.09	30.29	6.62	100.00	0.86	7560	46.50	43.90	9.60	100.00	1.24	10957							
1277	23.00	34.40	32.59	10.01	100.00	0.95	7903	44.68	42.32	13.00	100.00	1.24	10264							
1278	25.00	34.47	33.25	7.28	100.00															
1279	25.00	33.59	33.39	8.02	100.00															
1280	22.50							54.70	36.30	9.00	100.00	0.07	10600							
1281	16 50	39.00	31.30	13.20	100.00	1.69	8338	46.71	37.48	15.81	100.00	2.02	9986							
1282	12.60	40.20	26.40	20.80	100.00	2.27	8338	46.00	30.21	23.79	100.00	2.59	9540							
1282a	30.60	30.99	30.42	8.00	100.00	1.23	7793	44.64	43.83	11.53	100.00	1.77	11229							
1283	33.87	45.88	3.41	16.84	100.00							0.68	9790							
1284	10.20	39.92	44.13	5.75	100.00															
1285	22.92	50.28	21.66	5.14	100.00															
1286	23.10	29.96	30.50	16.44	100.00	1.38	7481	38.96	39.67	21.37	100.00	1.80	9728							
1287	36.64							44.70	42.63	12.67	100.00	0.64	10605	57.66	4.40	23.70	1.53	0.64	12.67	100.00
1288	34.00							39.50	49.38	11.12	100.00	1.01	11680	62.59	4.84	18.12	2.32			
1289	17.80							40.10	38.30	21.60	100.00	1.26	9967							
1290	36.10	33.16	19.93	10.75	100.00							0.40	10994							
1291	41.50	28.90	23.17	6.42	100.00	1.38	6605	49.40	39.60	11.00	100.00	2.37	11291							
1292	30.70	29.04	29.66	10.60	100.00		6936	41.90	42.80	15.30	100.00		10009							
1293	32.58	37.02	19.56	10.84	100.00	0.56														
1294	33.50	39.50	16.25	10.75	100.00	0.56	7142													
1295	34.70	33.23	21.87	11.20	100.00	0.76	7056													
1296	6.90	16.07	8.79	68.24	100.00	1.46		17.26	9.44	73.30	100.00	1.57								
1297	12.60	44.75	33.90	8.75	100.00	0.63														
1298	16.50	36.07	37.17	10.26	100.00	1.66	9774													
1299	16.00							53.54	37.16	9.30	100.00									

1300	1.80							62.22	22.78	17.00	100.00											
1301	12.80							56.06	34.94	9.00	100.00											
1302	2.60							62.32	27.58	11.10	100.00											
1303	20.00							58.62	33.68	7.70	100.00	1.46	11020									
1304	15.00							51.93	38.07	10.00	100.00	0.60	11380									
1305	25.80							45.00	43.00	12.00	100.00	1.40	10380									
1306	15.71							45.20	46.30	8.50	100.00											
1307	28.20							44.38	39.28	15.84	100.00	1.31	10006									
1308	33.00	28.90	29.40	9.70	100.00	0.98	8027	43.13	42.39	14.48	100.00	1.48	11980									
1309	33.00	27.84	30.26	9.00	100.00	0.88	8057	41.40	45.16	13.44	100.00	1.48	12025									
1310	31.50	27.60	24.20	6.70	100.00	0.82	8260	40.29	49.93	9.78	100.00	1.20	12038									
1311	24.60	32.60	32.70	10.10	100.00	0.62	7760	43.24	43.36	13.40	100.00	0.82	11221									
1312	34.80	29.28	30.25	5.67	100.00	0.55	7510	44.90	46.40	8.70	100.00	0.84	11538									
1313	26.50	28.96	28.81	15.73	100.00	1.11	6523	39.40	39.20	21.40	100.00	1.51	8.84									
1314	19.80	35.74	35.00	9.46	100.00	0.90	8194	44.57	43.64	11.80	100.00	1.12	10598									
1315	30.80	30.24	31.76	7.20	100.00	0.82	7496	42.70	45.90	10.40	100.00	1.19	10832									
1316	23.04	33.72	35.20	8.04	100.00	1.29	8697	43.82	45.74	10.44	100.00	1.68	11274									
1317	30.20	28.04	30.18	11.58	100.00		7733	40.17	48.24	16.59	100.00		10800									
1318	27.30	31.28	30.92	10.50	100.00		7405	40.02	42.54	14.44	100.00		10188									
1319	27.10	30.70	28.80	13.40	100.00		6546	42.11	39.51	18.38	100.00	2.71	8080									
1319a	27.80	31.80	31.70	8.70	100.00	1.19	8808	44.04	43.91	12.05	100.00	1.65	12196									
1320	9.00	34.62	43.84	12.54	100.00	1.41	7658	38.04	48.18	13.78	100.00	1.54	8416									
1321	12.00	42.00	32.00	13.00	100.00																	
1322	35.30	36.33	28.85	7.52	100.00							0.93	12215									
1323	34.29	40.31	18.50	6.90	100.00							1.20	11470									
1324	31.67	24.81	26.49	17.03	100.00	3.55																
1325	32.92	27.42	27.08	12.58	100.00	1.16	6840															
1326	27.39	35.07	28.16	9.38	100.00	0.88	7485															
1327	28.34	41.49	21.63	8.54	100.00	0.87	7846															
1328	28.20							45.78	39.15	15.07	100.00											
1329	32.00	29.77	29.20	9.03	100.00	1.24	7842	43.78	42.94	13.28	100.00	1.65	11533									
1330	32.79	37.09	22.91	7.21	100.00							1.18	11551									
1331	34.72	34.26	22.73	8.29	100.00							1.04	11792									
1332	32.27	44.30	15.26	8.17	100.00							2.31	10001									
1333	33.63	16.78	7.45	12.14	100.00							0.99	11088									
1334	31.52	44.49	17.48	6.51	100.00							0.93	11750									
1335	29.07	28.96	24.47	7.60	100.00							3.29	10489									
1336	24.20	36.28	30.62	8.90	100.00	1.14	7684	47.87	40.39	11.74	100.00	1.14	7684									
1337	13.41	37.03	39.43	10.13	100.00	1.36	9582	42.76	45.54	11.70	100.00	1.57	11066									
1338	29.60	31.50	30.24	8.66	100.00	1.00	7593	44.74	42.96	12.30	100.00	1.37	10785									
1339	16.73	36.09	35.36	11.82	100.00	1.26	8695	43.34	42.46	14.20	100.00	1.51	10442									
1340	30.34							49.00	44.00	7.00	100.00	0.87	9957	60.47	4.76	25.20	1.70	0.87	7.00	100.00		
1341	30.20							47.60	41.31	11.09	100.00	0.98	10030	61.20	4.06	20.38	2.09	0.98	11.09	100.00		
1342	32.12							50.52	39.20	10.28	100.00	1.20	9855	59.16	3.82	22.96	2.58	1.20	10.28	100.00		
1343	20.64							45.66	41.12	13.22	100.00	0.80	10410	58.81	4.46	20.21	2.50	0.80	13.22	100.00		
1344	12.60							51.20	38.78	10.02	100.00	0.72	11182	64.20	4.56	19.30	1.20	0.72	10.02	100.00		

LIGNITE (CONTINUED)

No.	As Received: Moisture	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Dry Basis: Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Ultimate: Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	Ash	Total
1345	36.01	27.95	28.66	7.38	100.00	0.77	7132													
1346	35.56	27.91	27.49	8.04	100.00	0 75														
1347	31.06	27.67	33.39	7.88	100.00	0.99	7870													
1347a	27.30	27.40	33.55	11.10	100.00	0.65		40.33	42.93	15.93	100.00	0.80								
1348	4.45	52.05	15.15	28.35	100.00															
1349	0 86	32.64	63.64	2.86	100.00	0.25														
1349a	30 24	30.22	32.68	6.86	100.00	3.73	8494	43 32	46.82	9.87	100.00	5.38	12176							
1350	29.86	51.00	10.00	9.14	100.00							0.91	11305							
1351	84 32	35.95	30.93	8.80	100.00	0.93	7214													
1352	33 50	26.06	30.38	10.06	100.00	0.97														
1353	31.00	34 02	27.88	7.10	100.00	0.65	8500	44.55	45.15	10.30	100.00	0.85	11140							
1354	29.40	32.12	33.89	4.59	100.00	0.73	8110	45.50	48.00	6.50	100.00	1.04	11487							
1355	29.40	29.51	32.01	9.08	100 00	1.29	10536	41.80	45 34	12.86	100 00	1.29	10536							
1356	25.60	32.24	27.46	4.70	100 00			50.06	42.74	7.30	100.00	1.19	11455							
1357	31 40	29 98	31 25	7.99	100 00			42.80	45.57	11.64	100.00	1.16	11019							
1358	30.60	30 19	34 07	5.14	100.00			43.50	49.10	7.40	100 00	1.13	11674							
1359	29 80	24 51	29 69	5.97	100 00	0 77	9129	49.20	42.30	8.50	100.00	1.10	11580							
1360	25.80	34.40	31.20	8.60	100.00	1.24	8416													
1361	20 34	36.76	31.70	11.20	100.00	1.24	9118													
1362	21 20	32.80	32.10	13.90	100.00	1.37	8806													
1363	18.90	35.52	30.18	15.40	100.00	1.37	8775													
1364	16.50	31.50	24.90	27.10	100.00	1.37	7995													
1365	24.20	34.40	30.90	10.50	100.00	1.24	8884													
1366	26.90	32.00	32.80	8.30	100.00	1.24	8962													
1367	20 70	33 10	29.60	16.60	100.00	1.24	8872													
1368	20.10	31.60	31.90	16.40	100.00	1.24	9507													
1369	18.30	29.40	25.90	26.40	100.00	1.37	7949													
1370	10.30	38.70	37.60	13.40	100.00	1.24	10209													
1371	14.30	39.10	36.10	10.50	100.00	1.37	10162													
1372	15.10	37.30	35.80	11.80	100.00	1.37	9894													
1373	10.90	35.50	35.30	18.30	100.00	1.37	9663													
1374	12.54	31 36	29.50	26.60	100.00	1.37	8650													
1375	11.50	43.90	38.04	6.56	100.00	2.22	11221	49.60	42.90	7.41	100.00	2.51	12680							
1376	13.51	45.36	32.44	8.69	100.00	0.88														
1377	15.701	4.105	79.137	1.057	100.00															

1378	31.96	39.53	23.05	5.46	100.00							1.46	11837						
1379	14.45	38.82	35.18	11.55	100.00	0.93													
1380	28.00							24.20	14.42	61.38	100.00	2.40	52.20						
1381	21.50									65 50									
1382	13.20	53.70	29.80	3.30	100.00	2.99	11424	61.87	34.33	3.80	100.00	3.45	13160						
1383	31.24							58.60	30 64	10.76	100.00	1.05	9782						
1384	34.50	29.96	29.04	6.50	100.00	1.28	7403	45.74	44.34	9.92	100.00	1.95	11298						
1385	11.40							48 30	38.10	13.60	100.00	1.00							
1386	25.20							50.02	34.78	15.20	100.00	1.60	10200						
1387	22.50							46.50	31.12	22.38	100.00	1.50	9850						
1388	27.20							56.18	37.20	6.62	100.00	0.65	10540	61.42	5.12	24.63	1.56	0.65	6.62	100.00
1389	13.73	45 95	37.22	3.10	100 00														
1390	19.80	33.38	25.32	21.50	100.00	2.81	5209	41.62	31.57	26.81	100.00	3.50	6607						
1391	30 90	25 70	24 50	19.50	100 60	3 02	8857	36.87	35.15	27.98	100.00	4 34	9842						
1392	35.60							70.21	18.02	11.77	100.00	0.73	11751						
1393	34.23							63.47	30.19	6.34	100.00	0.86	11694						
1394	24 50	31 20	38 06	6 20	100 00												0.98		
1395	27.00	35.90	28.70	8 40	100.00	1.92	7512	49.18	39.31	11.51	100.00	2 63	10290						
1396	29.20							52 14	38 22	9.64	100.00	0.81	10510	61.14	4.75	21.95	1.71	0.81	9.64	100.00
1397	27 50							48.54	37.65	13.81	100.00	1.00	9707	56 58	4.29	19 99	1.33	1.00	13.81	100.00
1398	15 00							51.30	38.48	10.22	100.00	1.10	10340	58.20	4.21	24.65	1.62	1.10	10.22	100.00
1399	25.35	35.58	31.30	7.27	100.00	0 54	7974	47.99	42.21	9.80	100 00	0.73	10754						
1400	27.51	33 42	28.12	10.95	100.00	0.62	7739	46.10	38 80	15.10	100 00	0.85	10676						
1401	26.54	30.85	32.71	9 90	100 00	0.68	7728	42.00	44 52	13.48	100.00	0.92	10520						
1402	24.05	32.21	32.66	10.78	100.00	0.70	7785	42.92	42.72	14.36	100.00	0.93	10598						
1403	28 86	35.96	27.26	7.92	100.00	0 50	7999												
1404	31 34	41.18	18 96	8.50	100 00	0 57													
1405	33 71	29.25	29 76	7.28	100.00	0 53	7348												
1406	33.98	31 01	27.33	7.68	100.00	0.56													
1407	36.80	28 86	28.09	6.25	100.00	0.53	7101												
1408	31.87	29.80	27.69	7.64	100.00	0.59													
1409	33.85	27.50	31.35	7.30	100.00	0.51	7197												
1410	24.80	32 20	29.20	13.80	100.00	1.10	8105	42 89	38.83	18.84	100.00	1.46	10780						
1411	22.30	33.80	24.60	19.30	100.00	1.37	8213	43.50	31.66	24.84	100.00	1.76	10570						
1412	19.90	33 36	30.04	16.50	100.00	1.24	8385	41 90	37 50	20 60	100 00	1 54	10470						
1413	19 70	34.06	29 94	16.30	100 00	1.64	8260	42.41	37.29	20 30	100.00	2.04	10290						
1414	16.60	29.90	28.50	25.00	100.00	1.33	7278	35 85	34 16	29 99	100.00	1.81	8727						
1415	23 36	30 14	31.40	15.10	100 00	1.24	8027	36 93	30 66	30.30									
1416	26.94	30 66	30.30	12.10	100.00	1.85	8260												
1417	27.56	30.94	29.60	11.90	100.00	1.78	8027												
1418	27.70	30.50	29 30	12.50	100.00	1.85	7359												
1419	22.40	29 50	28.80	19.30	100.00	1.58	72·7												
1420	21.40	35.66	31.44	11.50	100.00	1.10	8572												
1421	22.60	32.20	30.70	14.50	100.00	1.03	8104												
1422	26.70	32.10	28.90	12.30	100.00	1.35	7824												
1423	23.12	33.64	29.04	14.20	100.00	1.35	7918												

LIGNITE (Continued)

	As Received							Dry Basis						Ultimate						
No.	Moisture	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	Ash	Total
1424	22.50	31.24	29.36	16.90	100.00	1.20	7637	----	----	----	----	----	----	----	----	----	----	----	----	----
1425	23.46	33.60	32.64	10.30	100.00	1.10	8343	----	----	----	----	----	----	----	----	----	----	----	----	----
1426	16.60	35.60	34.00	13.80	100.00	0.96	8887	----	----	----	----	----	----	----	----	----	----	----	----	----
1427	17.46	38.44	28.50	15.60	100.00	1.24	8198	----	----	----	----	----	----	----	----	----	----	----	----	----
1428	19.70	34.00	33.00	13.30	100.00	1.10	8650	----	----	----	----	----	----	----	----	----	----	----	----	----
1429	20.76	32.64	31.20	15.40	100.00	1.24	8182	----	----	----	----	----	----	----	----	----	----	----	----	----
1430	16.26	32.64	32.00	19.10	100.00	1.37	8214	----	----	----	----	----	----	----	----	----	----	----	----	----
1431	18.90	35.40	35.20	10.50	100.00	0.96	9118	----	----	----	----	----	----	----	----	----	----	----	----	----
1432	20.50	34.36	33.74	11.40	100.00	1.24	8712	----	----	----	----	----	----	----	----	----	----	----	----	----
1433	16.90	35.60	35.95	11.60	100.00	1.24	9090	----	----	----	----	----	----	----	----	----	----	----	----	----
1434	14.10	36.50	36.60	12.80	100.00	1.24	9585	----	----	----	----	----	----	----	----	----	----	----	----	----
1435	12.14	34.06	34.70	19.10	100.00	1.24	8775	----	----	----	----	----	----	----	----	----	----	----	----	----
1436	8.37	25.93	36.40	29.30	100.00	1.68	8104	28.30	30.72	31.98	100.00	1.83	8844	----	----	----	----	----	----	----

ULTIMATE ANALYSIS OF TEXAS LIGNITE

No.	County	Moist.	Carbon	Hydro.	Oxygen and Nitro.	Ash	Sulphur
1437	Anderson		53.06	4.06	24.12	17.74	1.02
1438	Bowie	10.67	59.84	3.10	26.97	9.10	1.00
1439	Cherokee		66.67	3.81	22.08	5.83	1.64
1440	Gregg	12.00	60.79	4.96	23.68	9.27	0.89
1441	Harrison	13.35	66.32	3.95	21.56	8.97	2.20
1442	Houston		63.09	3.64	22.56	9.68	1.03
1443	Lee	16.50	62.48	3.21	20.80	11.56	1.95
1444	Leon		63.60	4.03	24.02	7.79	0.55
1445	Medina	13.25	60.92	2.57	25.34	9.10	1.47
1446	Milam		60.93	4.12	22.27	11.36	1.32
1447	Milam	17.75	62.50	5.45	20.84	7.54	0.97
1448	Milam	18.25	64.50	5.37	20.76	8.56	0.81
1449	Morris	8.55	59.87	4.70	24.35	8.66	2.42
1450	Rains		57.04	4.01	24.48	13.35	1.11
1451	Rains		59.32	2.80	20.27	16.63	0.98
1452	Robertson		58.16	4.46	13.11	12.77	1.50
1453	Robertson	16.40	65.14	5.29	19.28	9.21	1.15
1454	Rush	16.63	58.93	4.20	22.14	10.09	4.64
1455	San Augustine		61.12	3.32	24.53	7.75	3.39
1456	Smith	9.83	57.40	3.60	23.31	14.74	0.95
1457	Webb (outcrop)		59.28	3.29	16.98	17.56	0.89
1458	Wood	10.85	56.33	4.29	24.13	14.39	0.84
Average		13.67	60.98	4.01	22.16	11.01	1.48

ASH FROM WOOD COUNTY LIGNITE

No.	Silica	Alumina	Ferric Oxide	Lime	Magnesia	Sulphuric Acid	Total
1459	45.03	19.14	5.15	22.95	0.80	8.04	101.11
1460	46.88	24.35	2.23	15.90	0.82	9.15	99.33
1461	46.64	23.46	6.58	19.57	0.87	4.31	101.43
1462	35.64	27.32	6.60	21.45	0.46	10.16	101.63

COAL

1. PENNSYLVANIAN

No.	As Received							Dry Basis						Ultimate						
	Moisture	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	Ash	Total
1463	12.10	42.90	32.80	12.20	100.00	2.25	9819	48.80	37.32	13.88	100.00	2.50	11171							
1464	3.07	33.05	39.10	24.78	100.00	3.10														
1465	2.36	38.55	43.88	15.21	100.00	5.91														
1466	10.40	35.94	49.47	4.19	100.00	1.35														
1467	4.71	39.26	46.24	9.79	100.00	2.22														
1468	3.98	37.36	40.58	18.08	100.00	5.06														
1469	2.67	38.79	46.12	12.42	100.00	4.19														
1470	2.29	39.43	43.49	14.45	100.00	2.90														
1471	2.29	23.49	32.06	42.16	100.00	3 29														
1472	2.17	19.95	26.13	51.75	100.00	0.99														
1473	13.44							40.28	42.02	17.70	100.00	2.94	11101							
1474	2.70							41 95	50.08	7.97	100.00	1.98	12526	71.78	5.35	10.75	2.17	1.98	7.97	100.00
1475	5.36							33 72	45.47	20.81	100.00	2.16	12099							
1476	5.46							37.72	52.01	10.27	100.00	1.71	13755							
1477	5.83							35 26	45.83	18.91	100 00	2.77	12157							
1478	4.31							37.22	46.56	16.22	100.00	3.14	12817							
1479	10.24							38.18	39.01	22.81	100.00	1.84	10510	60.28	3.77	9.88	1.42	1.84	22.81	100.00
1480	10.28	25.49	55.10	9.13	100.00			28 11	60.77	11.12	100.00									
1481	8.25	38 275	47.250	6 200	100 00	3.250														
1482	4 550	38 505	44.805	12.140	100.00	7.960														
1483	9.00	28.00	47.22	14.04	100.00	1.74														
1484	1.06	39.28	50.12	9.54	100.00	2.88	13421	39.70	50.65	9.65	100.00	2.91	13563							
1485	4.00							33.11	43.80	23.09	100.00	2.49	12005							
1486	2.90							39.60	49.56	10.84	100.00	3.17	12265							
1487	8.12							32.24	49.90	17.86	100.00	1.70	12533							
1488	5.95							35.18	47.63	17.19	100.00	2.13	12175							
1489	5.31							33.00	40.86	26.14	100.00	5.03	11707							
1490	3.50							39.50	50.99	9.51	100.00	2.10	12410	70.91	4.85	9.29	3.34	2.10	9.51	100.00
1491	4.12	31.98	35.10	28.80	100.00		9993	33.35	36.61	30.04	100.00		10422							
1492	6.90	38.07	37.03	18.00	100.00	6.49														
1493	3.15	41.95	43.60	11.30	100.00	3.75														
1494	12.50							36.26	49.12	14.62	100.00	2.11	12190							
1495	9.40							38.30	46.94	14.76	100.00	3.41	11196	65.42	4.40	9.21	2.80	3.41	14.76	100.00
1496	9.20							37.40	47.37	17.23	100.00	2.00	11269	63.80	4.67	11.40	2.90	2.00	15.23	100.00

1497	9.04	48.90	30.28	11.78	100.00															
1498	18.00	30.91	40.18	10.91	100.00	1.11	10421	37.79	49.00	13.30	100.00	1.35	12709							
1499	18.50	31.70	37.10	12.70	100.00	1.92	10442	38.90	45.52	15.58	100.00	2.36	12651							
1500	11.00							38.45	42.68	18.87	100.00	4.24	10213	58.25	4.17	12.35	2.12	4.24	18.87	100.00
1501	7.00							41.38	43.20	15.42	100.00	2.13	10970	61.21	5.09	12.15	3.00	2.13	15.42	100.00

II. UPPER CRETACEOUS

1502	1.16	32.79	44.52	21.52	99.99	3.39	11958													
1503	4.76	29.84	49.84	15.58	100.02	1.26	11887													
1504	10.65	50.91	19.52	18.96	100.04	0.86	8432													
1505	6.12	37.41	44.74	14.42	100.00	1.32														
1506	4.68	24.20	54.52	16.60	100.00	0.88														
1507	6.46	34.88	32.76	25.90	100.00	1.00														
1508	2.44	15.38	77.95	4.23	100.00	0.93														
1509	1.47	13.07	83.53	1.93	100.00	1.26														
1510	4.82	12.84	80.33	2.51	100.00	1.30														
1511	6.57	49 00	31.85	12.58	100.00	1.22														
1512	9.10	37.33	32.02	21.50	100.00	0.90														
1513	18.04	44.91	35.82	1.23	100.00	1.77	10704													
1514	9.40	32.70	39.80	18.10	100.00	1.35	10068	40.92	43.29	15.79	100.00									
1515	1.60	32.40	58.95	7.05	100.00	1.70	14020													
1516	2.80	32.80	55.55	8.85	100.00	0.80	13165													
1517	9.405							38.52	44.26	19.22	100.00	1.42	12317							
1518	4.20							38.15	33.76	28.09	100.00	0.74	10200	50.44	4.04	13.96	2.73	0.74		
1519	3 64							29 99	38.60	31.50	100.00	0.56	11000	51.23	3.73	11.78	1.20	0.56		
1520	6.91							41.00	39.56	19.44	100.00	1.28	12324							
1521	7.48	32 18	45.67	14.67	100.00		11530													
1522	6.43	32.43	42.88	18.26	100.00		11240													
1523	6.43	29.33	40 73	23.51	100.00		10146													
1524	8 83	32.68	44.89	13.60	100.00	0.90	10041	35 84	49.24	14.92	100.60	0.99	12001							
1525	6 68	30.94	42.94	17.44	100.00	0.90	10361	33 88	47.02	19.10	100.00	1.02	11455							
1526	7.98	30.00	40.06	21.96	100.00	0.94	9681	32.60	43.54	23.86	100.00	1.02	10520							
1527	11.11	28.53	42 26	18.10	100.00	1.06	9098	32.10	47.54	20.36	100.00	1.19	10910							
1528	6.76	27.04	33.66	32.54	100.00	1.79	8792	29.06	36.10	34.90	100.00	1.92	9429							
1529	5.20							32.13	41.92	25.95	100.00	0.91	10147							
1530	5.22							33 57	45.76	17.67	100.00	0.90	12165							
1531	4 50							37.70	42.30	20.00	100.00	2 10	11250							
1532	4.85							40.25	48.65	11.10	100.00	2.14	11695	67.38	4 83	13.08	1.47	2.14	11.10	
1533	8.20							39.20	57.73	3.07	100.00	1.80	12527	74.74	5.08	13.67	1.64	1.80	3.07	
1534	6.10							33.70	39.96	26.34	100.00	2.00	9636	55.44	4.14	9.56	2.52	2.00	26.34	
1535	5 40							38.09	44.49	17 51	100.00	1.30	11545	64.12	4.92	10.41	1.74	1.30	17.51	
1536	5 90							37 58	40.49	21.93	100.00	1.70	10807	60.01	4.63	9.93	1.80	1.70	21.93	
1537	5.70							35.50	39.16	25.34	100.00	1.80	10412	57.20	4.40	7.96	3.30	1.80	25.34	
1538	4.90							34.80	39.19	26.01	100.00	1.62	10380	56.08	4.00	10.08	1.81	1.62	26.01	
1539	5.20							36.42	43.07	20.51	100.00	1.56	10720	56.72	4.13	14.95	2.13	1.56	20.51	
1540	5.30							39.18	44.02	16.80	100.00	1.20	11412	62.08	4.20	14.00	1.72	1.20	16.80	

UPPER CRETACEOUS (Continued)

	As Received							Dry Basis					Ultimate						
No.	Moisture	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Vol. and comb. matter	Fixed carbon	Ash	Total	Sulphur	B. T. U.	Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	Ash	Total
1541	9.10	29.20	38.90	22.80	100.00	1.39	10754	32.12	42.79	25.09	100.00	1.53	11831							
1542	8.70	32.90	38.20	20.20	100.00	1.26	9819													
1543	8.96	32.60	40.64	17.80	100.00	1.27	10084													
1544	9.40	32.70	39.80	18.10	100.00	1.35	10068													
1545	10.76	29.84	37.10	22.30	100.00	1.46	9008													
1546	8.16	32.26	36.98	22.60	100.00	1.24	9975	35.12	40.28	24.60	100.00	1.25	10860							
1547	1.09	36.61	35.29	24.01	100.00															
1548	1.17	39.93	35.39	23.51	100.00															
1549	1.19	39 73	40.30	18.78	100.00															
1550	1.68	60.37	24.89	13.06	100.00															
1551	0.97	40.95	43.77	14.31	100.00															
1552	1.00	39.05	49.05	10.00	99.10	Trace														
1553	0.94	34.48	58.96	5.62	100.00	0.64														
1554	4.60	39.20	50.10	6.10	100.00	0.62	12157	41.13	52.47	6.40	100.00	0.64	12757							
1555	4.90	32 80	43.04	19 26	100.00	0.85	9868	34 49	45.26	20 25	100.00	0.88	10161							
1556	2.47	34.84	32.36	30.33	100.00	1.61	8848	35 72	33.18	31 10	100.00	1 65	9585							
1557	5.67	14.58	4.66	75.09	100.00	0.32		15.46	4.94	79.60	100.00	0.84								
								III. EOCENE TERTIARY (CANNEL COAL)												
1558	3.00	48.37	39.52	8.61	100.00	3.52	13107	50.34	40.71	8.95	100.00	3.63	13503							
1559	2.26	48.64	36.15	12.95	100.00			49.77	36.99	13.24	100.00									
1560	2.03	45.67	39.96	11.74	100.00			46.91	41.04	12.05	100.00									
1561	3.97	43.63	36.15	16.25	100.00	4.18	11588	45.43	37 65	16.92	100.00	4.35	12067							
1562	3.46							50.70	37 93	11.37	100.00	2.17	12170							
1563	4.09							50.00	40.55	9.45	100.00	2.56	12566							
1564	1.00	51.87	36.46	10.46	99.79		12401*													
1565	2.59	51.05	39.01	7.35	100.00	1.50														
1566	5.50	37 31	38.14	19.05	100.00	2.66	10752	39.48	40.36	20.16	100.00	2.82	11877							
1567	10.10	36.59	32.09	21.22	100.00	0.62	8617	40.70	35.70	23.60	100.00	0.69	9585							
1568	6.00	40.23	29.52	24.25	100.00	0.62	10182	42 80	31 40	25.80	100.00	0.67	10832							
1569	2.30							54.00	37.97	8.03	100.00	2.25	12604	71 04	5 65	10.03	3.00	2.25	8.03	100.00
1570	2.80							50 45	38.10	11.45	100.00	2.09	11740	66.06	5.72	12.18	2.50	2.09	11.45	100.00
1571	4.00							47 52	39.18	13.30	100.00	2.05	12470							
1572	2.60							47 70	40.00	12.30	100.00	2.40	12660							
1573	2 50							46.40	30.00	23.60	100.00	2.50	11190							

*Calculated.

IRON ORE (1) TERTIARY

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	Mn	S	P	SO_3	P_2O_5	CO_2	Loss on Ignition	Total	Metallic iron
1574	11.17	13.57	-----	-----	-----	-----	-----	-----	0.49	-----	-----	-----	-----	-----	44.62
1575	11.35	8.00	-----	-----	-----	-----	-----	-----	0.24	-----	-----	-----	-----	-----	48.65
1576	10.72	10.11	-----	-----	-----	-----	-----	-----	0.30	-----	-----	-----	-----	-----	46 61
1577	13.36	3.40	68.80	-----	Tr.	Tr.	-----	-----	-----	-----	0.12	-----	13.70	99.38	48.16
1578	8.70	13.18	64.32	-----	Tr.	-----	-----	-----	-----	Tr.	Tr.	-----	14.10	100.30	45.02
1579	9.84	8.16	67.84	-----	Tr.	-----	-----	-----	-----	-----	Tr.	-----	14.69	100.33	47 49
1580	11.40	18.27	59.53	-----	Tr.	Tr.	-----	-----	-----	Tr.	1.00	-----	9.60	99.80	41.67
1581	10 95	8.76	68.54	-----	Tr.	-----	-----	-----	-----	Tr.	1.25	-----	10.25	99.75	47.97
1582	12.75	7.04	68.86	-----	Tr.	-----	-----	-----	-----	Tr.	0.70	-----	10.70	100.05	48.20
1583	53.45	3.71	38.29	-----	Tr.	-----	-----	-----	-----	Tr.	Tr.	-----	4.50	99.95	-----
1584	24.48	-----	60.05	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	42.04
1585	17.00	7.78	62.42	-----	Tr.	-----	-----	-----	-----	Tr.	Tr.	-----	13.10	100.30	43.69
1586	15.95	17.03	60.17	-----	0.45	0.29	-----	-----	-----	-----	Tr.	-----	6.60	100.49	42 11
1587	54.00	2.80	37.00	-----	Tr.	Tr.	-----	-----	-----	Tr.	Tr.	-----	6.10	99.90	25.90
1588	49.90	4.31	37.99	-----	0.80	Tr.	-----	-----	-----	0.20	Tr.	-----	7.00	100.20	26 59
1589	17.20	3.17	70.83	-----	Tr.	Tr.	-----	-----	-----	0.24	Tr.	-----	8.22	99.66	49.83
1590	13.80	3.57	70.83	-----	0.20	Tr.	-----	-----	-----	Tr.	0.22	-----	12.01	100.63	49.58
1591	25.30	3.20	61.80	-----	Tr.	Tr.	-----	-----	-----	1.56	Tr.	-----	8.50	100.36	43.26
1592	41.80	-----	37.46	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	26.22
1593	5.55	2.15	80.85	-----	-----	-----	-----	-----	-----	Tr.	Tr.	-----	11.60	100.15	56.59
1594	27.80	5.16	61.44	-----	0.10	-----	-----	-----	-----	Tr.	0.28	-----	5.25	100.03	43.00
1595	9.00	5.00	74.60	-----	Tr.	Tr.	-----	-----	-----	0.10	0.32	-----	10.30	99.32	52 22
1596	6.20	4.68	79.32	-----	Tr.	Tr.	-----	-----	-----	0.51	Tr.	-----	9.17	99.88	55.52
1597	29.80	4.48	57.92	-----	Tr.	Tr.	-----	-----	-----	0.34	0.32	-----	7.35	100.21	40.54
1598	7.60	7.39	77.61	-----	0 21	-----	-----	-----	-----	Tr.	0.32	-----	6.85	99.98	54.32
1599	14.60	4.63	73.97	-----	Tr.	-----	-----	-----	-----	0.11	Tr.	-----	6.61	99.92	51.77
1600	0.40	7.50	85.70	-----	0.50	-----	-----	-----	-----	Tr.	0.25	-----	6.11	100.46	59.99
1601	3.00	4.24	81.36	-----	0.82	-----	-----	-----	-----	0.51	0.32	-----	9.60	99.85	56.92
1602	9.00	4.04	77.56	-----	0.51	-----	-----	-----	-----	0.34	0.32	-----	8.15	99.92	54.29
1603	1.85	7.47	79.11	-----	0.69	-----	-----	-----	-----	0.22	0.12	-----	10.95	100.51	55 38
1604	10.23	14.79	62 28	-----	0.65	Tr.	-----	-----	-----	0.14	0.62	-----	11.86	100.52	44.56
1605	3.01	14.03	70.93	-----	-----	0.084	-----	-----	-----	0.19	Tr.	-----	11.32	99.59	49.65
1606	7.20	14 76	67.31	-----	Tr.	0.082	-----	-----	-----	0.25	0.13	-----	10.41	100.092	47.12
1607	9.14	7.68	71.37	-----	Tr.	-----	-----	-----	-----	0.92	0.32	-----	11.43	100.86	49.96
1608	10.10	16.73	59.30	-----	0.20	-----	-----	-----	-----	0.90	0.93	-----	12.93	101.20	41.55
1609	12.07	16.12	58.90	-----	0.77	Tr.	-----	-----	-----	Tr.	0.94	-----	12.02	100.82	41 23
1610	14.94	15.18	57.47	-----	0.45	-----	-----	-----	-----	Tr.	0.25	-----	11.92	100.21	40 23
1611	3.07	11.25	76.84	-----	0.27	-----	-----	-----	-----	0.57	0.25	-----	9.11	101.36	53.79
1612	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	34.71
1613	19.04	11.87	55.90	-----	0.89	-----	-----	-----	-----	0.11	0.27	-----	13.68	100.95	39.13
1614	21.12	11.89	53.24	-----	0.23	-----	-----	-----	-----	0.57	0.27	-----	12.64	100.06	37.34
1615	18.00	15.76	53.06	-----	0.44	-----	-----	-----	-----	Tr.	0.18	-----	13.06	100.50	37.14
1616	7.28	14.99	61.61	-----	0.11	-----	-----	-----	-----	0.47	0.98	-----	14.46	99.90	43.13
1617	35.80	10.75	43.75	-----	0.40	Tr.	-----	-----	-----	0.51	Tr.	-----	9.40	99.91	30.32
1618	36.00	-----	62.33	-----	-----	-----	-----	-----	-----	0.33	Tr.	-----	-----	-----	43.63
1619	10 81	3.40	-----	-----	0.24	Tr.	0.43	1.116	0.268	-----	-----	-----	13.28	-----	48.24
1620	18.42	18.49	44.80	-----	0.56	4.41	-----	-----	-----	4.40	-----	-----	8.73	100.00	31.36
1621	-----	23.41	59.74	-----	0.51	1.18	-----	-----	-----	1.86	-----	-----	-----	99.13	41.86
1622	25.13	4.24	60.35	-----	0.33	Tr.	-----	-----	-----	-----	0.26	-----	9.24	99.57	42 25
1623	17.54	-----	-----	-----	-----	-----	-----	-----	0.153	-----	-----	-----	-----	-----	46.55
1624	17.67	-----	-----	-----	-----	-----	-----	-----	0.069	-----	-----	-----	13.09	-----	45.65
1625	20.30	-----	-----	-----	-----	-----	-----	0.038	0.062	-----	-----	-----	15.25	-----	45.17
1626	23.84	-----	-----	-----	-----	-----	-----	0.01	0.315	-----	-----	-----	15.76	-----	40.63
1627	16.65	-----	-----	-----	-----	-----	-----	0.027	0.284	-----	-----	-----	13.71	-----	48.31
1628	10.45	-----	-----	-----	-----	-----	-----	-----	2.12	-----	-----	-----	14.64	-----	48.11
1629	18.50	4.31	-----	-----	-----	-----	-----	0.22	0.088	-----	-----	-----	-----	-----	41.19
1630	62.40	4.80	25.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.70	100.48	-----
1631	35.80	-----	50.48	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	35.34
1632	10.10	6.78	75.42	-----	0.10	Tr.	-----	-----	-----	0.11	0.44	-----	7.01	99.96	52.79
1633	11.60	-----	66.98	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	46.88
1634	44.00	-----	46.59	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	32.61
1635	11.67	9.20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	47.81
1636	10.90	-----	62.33	-----	-----	-----	-----	-----	-----	0.43	0.38	-----	-----	74.04	43.63
1637	11.85	16.26	61.34	-----	Tr.	Tr.	-----	-----	-----	0.25	Tr.	-----	10.40	100.10	42.98
1638	9.80	8.17	73.03	-----	Tr.	Tr.	-----	0.29	0.32	0.15	0.96	-----	8.20	99.81	51.12
1639	11.30	6.80	72.40	-----	Tr.	Tr.	-----	-----	-----	0.15	0.96	-----	8.21	99.82	50.68

IRON ORE (1) TERTIARY (Continued)

No	SiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	Mn	S	P	SO_3	P_2O_5	CO_2	Loss on ignition	Total	Metallic iron
1640	14.50	5.80	72.46	----	0.60	Tr.	----	----	----	0.30	0.19	----	6 30	100.09	50 68
1641	11.60	7.09	67.91	----	Tr.	----	----	----	----	Tr.	0.27	----	13.20	100.07	47.53
1642	15.15	10.18	61.22	----	----	----	----	----	----	Tr.	Tr.	----	13.50	100.05	42.85
1643	35.65	6.37	47.52	----	Tr.	Tr.	----	----	----	Tr.	0.56	----	9.90	100 01	33.27
1644	16.70	10.77	64.03	----	Tr.	----	----	----	----	0.32	0.35	----	7.90	100 07	44.82
1645	13.20	2.05	69.65	----	Tr.	Tr.	----	----	----	0.08	1.14	----	14.00	100 12	48 75
1646	26.70	0.70	64.90	----	Tr.	----	----	----	----	----	0.07	----	7.81	100.18	45.43
1647	16.80	5.15	67.75	----	Tr.	Tr.	----	----	----	0.10	0.26	----	9.60	99.96	47 42
1648	39.70	8.33	44.07	----	Tr.	Tr.	----	----	----	0.33	0.15	----	7.20	99.78	30.84
1649	13.40	8.30	63.95	----	Tr.	----	----	----	----	0.22	0.12	----	14.20	100.19	44.76
1650	39 40	----	48.79	----	----	----	----	----	----	----	----	----	----	----	----
1651	38.40	----	50 68	----	----	----	----	----	----	----	----	----	----	----	----
1652	25.90	0 63	62.27	----	0.20	Tr.	----	----	----	0.09	0.71	----	10.00	99 90	43.65
1653	33.60	----	52.87	----	----	----	----	----	----	----	----	----	----	----	----
1654	41.80	----	36.41	----	----	----	----	----	----	----	----	----	----	----	----
1655	49 30	----	31 16	----	----	----	----	----	----	----	----	----	----	----	21.81
1656	60.90	----	32.11	----	----	----	----	----	----	----	----	----	----	----	22.477
1657	33.60	----	52.87	----	----	----	----	----	----	----	----	----	----	----	37.009
1658	58 40	----	36.20	----	----	----	----	----	----	----	----	----	----	----	25.34
1659	35.80	----	41.16	----	----	----	----	----	----	----	----	----	----	----	28.812
1660	26.80	----	53.20	----	----	----	----	----	----	----	----	----	----	----	37.24
1661	60.20	----	25 81	----	----	----	----	----	----	----	----	----	----	----	18.067
1662	46.80	----	35.77	----	----	----	----	----	----	----	----	----	----	----	25 039
1663	16.20	11.20	59 20	----	Tr.	----	----	----	----	----	Tr.	----	15.45	100.05	41.44
1664	15.40	10.70	64.30	----	1.06	----	----	----	----	----	0.24	----	7.70	99.40	45 01
1665	10.06	9.89	73.60	----	Tr.	----	----	----	----	----	Tr.	----	6.75	100.30	51.52
1666	12.13	8.86	----	----	----	----	----	----	----	----	----	----	----	----	47.26
1667	10.06	9.89	----	----	----	----	----	----	----	----	----	----	----	----	51.52
1668	4.30	3.15	8.45	----	Tr.	Tr.	----	----	----	Tr.	Tr.	----	12.15	100.05	56.31
1669	10.40	10.90	69.90	----	Tr.	Tr.	----	----	----	Tr.	0.35	----	8.05	100.10	48.93
1670	17.20	14.81	55.59	----	Tr.	Tr.	----	----	----	Tr.	1.10	----	11.05	100.05	38.91
1671	10.30	9 06	67.14	----	Tr.	Tr.	----	----	----	Tr.	0.54	----	30.20	100.24	47.00
1672	14.30	9.58	63.02	----	Tr.	Tr.	----	----	----	Tr.	0.51	----	12.50	99.91	44.11
1673	8.794	1.076	71.78	----	----	----	----	----	----	----	----	----	18.387	100.00	----
1674*	8.60	6.60	45.26	----	8.69	----	----	----	----	0.69	----	24.00	4.60	98.44	----
1675	36.75	5.24	51.46	----	0.82	----	----	----	----	0.40	0.49	----	4.90	100.06	36 02
1676	32.60	4.56	55 04	----	0.60	----	----	----	----	0.19	0.20	----	6.70	99.89	38 53
1677	37.10	4.00	50.91	----	1.15	----	----	----	----	0.47	0.17	----	6.10	99.99	35 64
1678	33.92	4.19	54.21	----	1.00	----	----	----	----	0.59	0.28	----	6.10	100 29	37.94
1679	6.97	8.70	69.75	----	----	0.23	----	----	----	1.99	----	----	12.15	100.00	48.83
1680	1 49	16 51	74.11	----	1.04	1.76	----	----	----	0.93	0.12	----	----	98.08	51.88
1681	6.04	0.69	79.06	----	1.50	----	----	----	----	Tr.	Tr.	----	12.68	99.97	55.54
1682	53.20	6.73	26.27	----	----	1.05	----	----	----	1.55	----	----	11.23	100.00	18 37
1683	26.43	3.83	64.42	----	0.98	1.01	----	----	----	1.84	----	----	----	99.70	49.09
1684	6.77	19.56	60.44	----	Tr.	----	----	----	----	Tr.	Tr.	----	12.95	99.72	42.31
1685	0.93	19.96	65.79	----	Tr.	----	----	----	----	Tr.	Tr.	----	13.90	100.58	46 06
1686	8 92	7.07	67 93	----	1.57	Tr.	----	0 06	0 14	0.18	0.32	----	14.40	100.39	49.55
1687	4.24	8.86	76.24	----	----	----	----	0.04	0.162	0.10	0.225	----	12.60	100.365	53 43
1688	24.54	1.58	63.43	----	----	----	----	0.112	----	0.28	Tr.	----	10.70	100.52	44.39
1689	3.10	6.20	76.42	2.61	1.13	Tr.	----	0.24	0.09	0.61	0.22	----	9.90	100.19	55.52
1690	1.30	2.41	83.40	----	Tr.	----	----	----	0.09	Tr.	0.21	----	12.80	100.12	58.28
1691	10.78	1.75	74.87	----	Tr.	Tr.	----	0.11	0.03	0.275	0.08	----	12.20	99.92	52.40
1692	2.90	Tr.	84.46	----	Tr.	Tr.	----	0.068	0.08	0.17	0.19	----	12.20	100.97	59.12
1693	1.22	2.05	84.15	----	0 94	Tr.	----	0.09	0.08	0.22	0.19	----	12.20	100.97	58.91
1694	7.10	5.42	70.78	----	Tr.	----	----	0.22	0.22	0.56	0.51	----	6.70	100.07	55.84
1695*	----	----	----	----	----	----	----	----	----	----	----	----	12.60	----	24.65
1696	----	----	----	----	----	----	----	----	----	----	----	----	14.54	----	44.62
1697	----	----	----	----	----	----	----	----	----	----	----	----	12.14	----	51.81
1698	----	----	----	----	----	----	----	----	----	----	----	----	14.30	----	41.17
1699	----	----	----	----	----	----	----	----	----	----	----	----	12.46	----	53.87
1700	----	----	----	----	----	----	----	----	----	----	----	----	12.60	----	55.90
1701	----	----	----	----	----	----	----	----	----	----	----	----	13.30	----	46.11
1702	----	----	----	----	----	----	----	----	----	----	----	----	13.24	----	57 02
1703	----	----	----	----	----	----	----	----	----	----	----	----	10.94	----	58.74
1704	----	----	----	----	----	----	----	----	----	----	----	----	12.40	----	38.02
1705	10.79	8.20	66 10	----	Tr.	----	----	----	----	----	Tr.	----	14.27	99.36	46.27

IRON ORE (1) TERTIARY (Continued)

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	Mn	S	P	SO_3	P_2O_5	CO_2	Loss on ignition	Total	Metallic iron
1706	8.18	30.68	57.25	-----	1.24	0.80	-----	-----	-----	1.45	-----	-----	-----	100.12	40.08
1707	15.33	12.56	57.09	-----	Tr.	-----	-----	-----	-----	-----	Tr.	-----	15.05	100.03	39.96
1708	18.77	8.31	65.79	-----	2.30	Tr.	-----	-----	-----	0.36	Tr.	-----	5.05	100.48	46.05
1709	4.30	2.22	80.78	-----	0.88	Tr.	-----	-----	-----	0.02	0.38	-----	10.47	99.09	56.55
1710	26.07	12.65	48.65	-----	2.30	Tr.	-----	-----	-----	0.26	Tr.	-----	10.30	100.23	34.06
1711	11.85	6.91	60.09	-----	1.81	Tr.	-----	-----	-----	0.37	0.28	-----	12.40	99.71	46.26
1712	6.91	17.04	45.71	-----	15.68	-----	-----	-----	-----	-----	-----	-----	-----	97.25	31.71
1713	36.70	6.82	44.98	-----	2.27	Tr.	-----	-----	-----	0.02	0.16	-----	9.70	100.65	31.49
1714	40.40	8.42	39.78	-----	1.06	Tr.	-----	-----	-----	0.18	0.31	-----	9.50	99.65	27.85
1715	14.50	5.17	68.23	-----	0.86	Tr.	-----	-----	-----	0.34	0.57	-----	10.20	99.87	47.76
1716	36.27	4.54	48.96	-----	2.10	Tr.	-----	-----	-----	0.31	Tr.	-----	7.25	100.63	34.27
1717	40.60	7.86	42.84	-----	2.10	Tr.	-----	-----	-----	1.04	-----	-----	6.10	100.54	29.99

*Numbers 1695-1704 inclusive in column marked "Loss on ignition" include moisture and combined water which were determined separately in the analysis.

II. IRON ORES OTHER THAN TERTIARY

1718	5.05	4.72	79.78	-----	0.25	Tr.	-----	-----	-----	0.89	Tr.	-----	9.50	100.19	55.85
1719	1.90	1.33	94.82	-----	1.73	Tr.	-----	-----	-----	0.12	0.09	-----	-----	100.00	66.98
1720	26.5	-----	-----	-----	-----	-----	-----	Tr.	0.02	-----	-----	-----	-----	-----	49 00
1721	28.55	33.91	-----	-----	Tr.	-----	-----	-----	0.17	-----	-----	-----	-----	-----	37.37
1722	2.90	3.49	85.31	-----	1.56	-----	-----	-----	-----	0.13	Tr.	-----	6.60	99.99	59.72
1723	3.70	5 21	81.99	-----	2.05	0.28	-----	-----	-----	0.20	0.38	-----	7.10	100.82	57.39
1724	23.35	1.90	68.70	-----	-----	Tr.	-----	-----	-----	0.33	Tr.	-----	3.90	100.18	48.09
1725	4.65	-----	86.40	-----	-----	-----	-----	0.002	0.001	-----	-----	-----	-----	-----	60.48
1726	2.46	-----	87.43	-----	-----	-----	-----	0.10	0.08	-----	-----	-----	-----	-----	61.00
1727	13.26	-----	79.14	-----	2.87	-----	-----	-----	-----	0.82	-----	2.40	1.90	100.39	-----
1728	10 60	-----	-----	-----	-----	-----	-----	-----	0.018	-----	-----	-----	-----	-----	60.60
1729	3 86	-----	84.41	-----	-----	-----	-----	0.01	0.05	-----	-----	-----	-----	-----	59.09
1730	5.61	3.17	78.83	-----	Tr.	-----	-----	-----	-----	0.06	Tr.	-----	12.50	100.81	55.18
1731	14.95	7.71	64.77	-----	0.61	Tr.	-----	-----	-----	0.30	Tr.	-----	10.10	99.56	45.34
1732	17.60	0.28	71.67	-----	0.81	0.80	-----	-----	-----	0.84	Tr.	-----	8.00	100.00	50.17
1733	14.40	8.21	67.39	-----	-----	0.54	-----	-----	-----	-----	-----	-----	5.20	-----	47.17
1734	14.40	6 64	73.76	-----	0.10	Tr.	-----	-----	-----	0.53	0.09	-----	5.10	100.62	51.63
1735	30.30	1.66	57.54	-----	0.48	-----	-----	-----	-----	0.82	0.51	-----	9.36	100.61	40.28
1736	22.70	2.93	57.27	-----	0.74	4.47	-----	-----	-----	Tr.	0 58	-----	4.20	99.89	40.09
1737	7.70	2.82	75.98	-----	0.62	-----	-----	-----	-----	0.47	Tr.	-----	12.40	99 99	53.16
1738	21.36	3.10	69 80	-----	Tr.	Tr.	-----	-----	-----	Tr.	-----	-----	4.40	100.08	48.86
1739	47.76	6.53	42.07	-----	1.24	Tr.	-----	-----	-----	0.24	Tr.	-----	1.80	99.68	29.49
1740	8.40	-----	-----	-----	-----	-----	-----	0.28	Trace	-----	-----	-----	-----	-----	57.80
1741	8.60	-----	-----	-----	-----	-----	-----	Tr.	Trace	-----	-----	-----	-----	-----	57.50
1742	10.16	-----	-----	-----	-----	-----	-----	0.55	0.021	-----	-----	-----	-----	-----	54.35
1743	11.60	5.55	81.35	-----	0.66	Tr.	-----	-----	-----	Tr.	Tr.	-----	-----	100.16	57.76
1744	1.10	1.70	96.71	-----	0.41	-----	-----	-----	-----	Tr.	Tr.	-----	-----	99.92	68.12
1745	9.40	0.41	89.96	-----	Tr.	-----	-----	-----	-----	0.03	Tr.	-----	-----	99.83	62.97
1746*	69.50	2.85	25.85	-----	1.48	Tr.	-----	-----	-----	Tr.	0.86	-----	-----	100.54	71.31
1747	84.30	0.40	12.00	-----	1.98	Tr.	-----	-----	-----	0.27	1.31	-----	-----	100.26	8.40
1748	8.51	2 45	88.87	-----	Tr.	Tr.	-----	-----	-----	0.12	Tr.	-----	-----	99.95	60.85
1749	5.30	5.90	78.60	-----	3.46	Tr.	-----	-----	-----	0.22	7.16	-----	-----	100.63	53.85
1750	10.20	9.65	77.35	-----	0.53	-----	-----	-----	-----	0.24	Tr.	-----	-----	99.97	54.16
1751	9.75	-----	82.61	-----	1.60	Tr.	-----	-----	-----	-----	-----	-----	-----	100.10	57.83
1752	41.90	7.55	47.17	-----	0.35	-----	-----	-----	-----	0.01	Tr.	-----	3.23	100.21	33.24
1753	14.00	1.82	83.58	-----	Tr.	Tr.	-----	-----	-----	0.80	Tr.	-----	-----	100.20	58.50
1754	47.88	4.19	44.86	-----	Tr.	Tr.	-----	-----	-----	-----	Tr.	-----	2.10	93.39	31.40
1755	7.50	-----	-----	-----	-----	-----	-----	-----	Trace	0.02	-----	-----	-----	-----	65.30
1756	2.38	2 69	-----	-----	-----	-----	-----	0.44	0.032	-----	-----	-----	-----	-----	66.33
1757	6.52	Tr.	-----	-----	-----	-----	-----	Tr.	0.048	-----	-----	-----	-----	-----	64.40
1758	6.54	Tr.	-----	-----	-----	-----	-----	Tr.	0.145	-----	-----	-----	-----	-----	64.40
1759	2.9	-----	-----	-----	-----	-----	-----	-----	0.06	-----	-----	-----	-----	-----	58.7
1760†	34.57	-----	-----	-----	-----	1.05	-----	0.04	0.07	-----	-----	0.15†	-----	-----	35.87
1761	54.56	-----	-----	-----	-----	-----	Tr.	0.06	0.04	-----	-----	0.10†	-----	-----	25.68
1762	52.23	-----	-----	-----	-----	-----	0.06	0.01	0.05	-----	-----	0.20†	-----	-----	26.04
1763	62.53	-----	-----	-----	-----	-----	-----	0.04	0.01	-----	-----	0.11†	-----	-----	14.60
1764	55 68	-----	-----	-----	-----	-----	Tr.	0.07	0.05	-----	-----	0.10†	-----	-----	24.70

*Trace of manganese dioxide.
†Titanium oxide.

IRON ORE (1) TERTIARY (Continued)

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	CaO	MgO	Mn	S	P	SO_3	P_2O_5	CO_2	Loss on ignition	Total	Metallic iron
1765	34.68	-----	-----	-----	-----	-----	Tr.	0.04	0.08	-----	-----	0.15†	-----	-----	35.40
1766	4.695	-----	-----	-----	-----	-----	-----	-----	0.069	-----	-----	-----	-----	-----	65.40
1767	4.690	-----	-----	-----	-----	-----	-----	-----	0.093	-----	-----	-----	-----	-----	67.60
1768	-----	-----	-----	-----	-----	-----	-----	-----	0.061	-----	-----	-----	-----	-----	65.45
1769	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	66.53
1770	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	64.90
1771	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	58.87
1772	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	61.45
1773	-----	-----	-----	-----	-----	-----	-----	-----	.045	-----	-----	-----	-----	-----	67.70
1774	-----	-----	-----	-----	-----	-----	-----	Tr.	0.34	-----	-----	-----	-----	-----	66.10
1775	4.70	-----	-----	-----	-----	-----	-----	Tr.	.008	-----	-----	-----	-----	-----	68.23
1776	4.65	-----	-----	-----	-----	-----	-----	0.30	Trace	-----	-----	-----	-----	-----	66.82
1777	6.30	-----	-----	-----	-----	-----	-----	0.01	0.046	-----	-----	-----	-----	-----	66.30
1778	81.52	-----	91.76	-----	-----	-----	-----	.58	.0264	-----	-----	-----	-----	100.51	46.33
1779	11.08	-----	87.17	-----	-----	-----	2.25	0.93	.0177	-----	-----	-----	-----	101.44	61.02
1780	25.28	-----	-----	-----	-----	-----	-----	2.21	.0607	-----	-----	-----	-----	-----	24.08
1781	8.87	-----	89.27	-----	-----	-----	-----	0.32	0.0104	-----	-----	-----	-----	98.47	62.49
1782	19.45	-----	69.81	-----	-----	-----	-----	0.64	.0279	-----	-----	-----	-----	89.90	48.87
1783	22.41	-----	60.56	-----	-----	-----	-----	0.53	.0569	-----	-----	-----	-----	83.49	42.35
1784	25.14	-----	61.0[illegible]	-----	-----	-----	-----	0.47	0.0663	-----	-----	-----	-----	86.73	42.74
1785	10.54	-----	88.34	-----	-----	-----	-----	0.64	.0168	-----	-----	-----	-----	99.53	61.84
1786	14.00	4.93	70.22	10.49	0.66	Tr.	-----	-----	-----	-----	-----	Tr.	-----	100.30	57.30
1787	3.50	6.25	74.14	15.41	Tr.	-----	-----	-----	-----	0.24	1.02	-----	-----	100.56	63.87
1788	4.70	6.77	81.31	8.12	0.65	Tr.	-----	-----	-----	Tr.	0.02	-----	-----	100.97	63.23
1789	5.80	11.07	65.40	16.53	0.78	Tr.	-----	-----	-----	0.18	Tr.	-----	-----	99.76	58.62
1790	4.70	4.44	65.70	23.20	1.40	-----	-----	-----	-----	Tr.	Tr.	-----	-----	99.50	64.02
1791	4.65	0.70	77.10	16.54	Tr.	-----	-----	-----	-----	0.75	Tr.	-----	-----	99.80	66.82
1792	24.00	1.50	62.77	11.94	0.10	-----	-----	-----	-----	0.20	Tr.	-----	-----	100.57	53.22
1793	6.00	3.06	68.27	23.03	Tr.	-----	-----	-----	-----	0.17	Tr.	-----	-----	100.53	65.68
1794	5.10	-----	68.64	26.49	0.01	-----	-----	-----	-----	-----	-----	-----	-----	100.24	68.63
1795	4.11	5.82	88.48	-----	0.40	Tr.	-----	-----	-----	0.43	-----	-----	-----	99.24	61.94
1796	2.67	-----	87.98	-----	-----	-----	-----	-----	-----	Tr.	2.21	-----	-----	-----	60.61
1797	41.58	3.61	46.21	-----	0.45	Tr.	-----	-----	-----	0.35	Tr.	-----	5.15	100.03	32.35
1798*	61.00	9.10	16.50	-----	0.99	-----	-----	-----	-----	Tr.	0.70	-----	9.90	100.12	11.55
1799	9.35	2.51	85.79	-----	2.20	Tr.	-----	-----	-----	0.65	Tr.	-----	-----	100.50	60.06
1800	12.60	1.12	85.68	-----	Tr.	Tr.	-----	-----	-----	0.16	Tr.	-----	-----	100.03	59.98
1801	12.20	1.61	83.69	-----	1.23	-----	-----	-----	-----	Tr.	Tr.	-----	-----	100.91	60.28
1802	12.40	4.71	81.89	-----	1.23	Tr.	-----	-----	-----	0.20	Tr.	-----	-----	100.43	57.32
1803	5.52	3.82	82.51	5.82	0.22	Tr.	-----	-----	-----	-----	-----	2.20‡	-----	100.2[illegible]	62.[illegible]
1804	10.68	5.67	-----	-----	0.59	-----	-----	-----	-----	0.58	-----	-----	2.92	98.45	54.60
1805	18.60	0.95	78.95	-----	1.15	Tr.	-----	-----	-----	Tr.	Tr.	-----	-----	99.97	55.27
1806	2.58	1.60	82.60	-----	1.15	Tr.	-----	-----	-----	0.20	0.92	-----	11.80	100.85	57.82
1807	61.60	0.04	7.76	-----	17.70	Tr.	-----	-----	-----	Tr.	0.51	12.20	-----	99.81	5.43
1808	13.84	4.62	81.83	-----	0.55	Tr.	-----	-----	-----	Tr.	Tr.	-----	-----	99.84	55.63
1809	5.62	-----	-----	-----	-----	-----	-----	-----	0.05	-----	-----	-----	-----	-----	66.54
1810	26.70	5.15	65.85	-----	2.20	Tr.	-----	-----	-----	0.34	0.38	-----	-----	100.62	46.10
1811	2.10	3.22	63.74	-----	0.93	Tr.	-----	-----	-----	0.13	Tr.	-----	10.20	99.82	44.62
1812	6.40	1.48	79.92	-----	1.26	-----	-----	-----	-----	0.13	Tr.	-----	10.70	99.89	55.94
1813	5.20	0.17	86.63	-----	1.48	Tr.	-----	-----	-----	0.18	0.09	-----	6.60	100.35	60.64

*Manganese trioxide 1.93
†Titonium dioxide.
‡Manganese dioxide 0.23.

COPPER ORE, SILVER ORE, LEAD ORE, GOLD ORE

No.	Cu (%)	Ag (oz/T)	Pb (%)	Au (oz/T)	No.	Cu (%)	Ag (oz/T)	Pb (%)	Au (oz/T)
1814	0.90	None	----------	Trace	1889	----------	9.9	----------	0.10
1815	2.90	None	----------	Trace	1890	----------	1.95	----------	Trace
1816	5.65	None	----------	Trace	1891	----------	9.0	4.74	None
1817	1.50	----------	----------	----------	1892	----------	9.15	27.3	None
1818	0.30	----------	----------	----------	1893	----------	22.65	59.2	None
1819	1.32	----------	----------	----------	1894	----------	11.25	27.0	None
1820	0.70	----------	----------	----------	1895	----------	60.0	77.0	None
1821	0.24	----------	----------	----------	1896	----------	49.50	26.2	0.45
1822	0.87	----------	----------	----------	1897	----------	7.0	24.95	0.05
1823	0.67	----------	----------	----------	1898	24.3	271.6	----------	None
1824	0.77	----------	----------	----------	1899	----------	1.2	----------	None
1825	0.19	0.40	----------	None	1900	4.4	198.71	----------	None
1826	0.12	None	----------	None	1901	----------	16.50	74.0	None
1827	0.07	None	----------	None	1902	----------	1.3	None	None
1828	16.6	1.00	None	None	1903	None	37.0	None	0.17
1829	7.6	6.00	3.5	----------	1904	None	1.1	None	None
1830	7.5	5.00	3.0	----------	1905	----------	19.00	----------	0.25
1831	11.1	6.00	2.5	----------	1906	----------	48.00	----------	0.50
1832	10.7	7.00	1.5	----------	1908	----------	11.0	39.0	Trace
1833	3.8	4.00	1.00	----------	1909	None	2.70	None	None
1834	18.5	10.5	1.00	----------	1910	None	56.21	Trace	None
1835	6.3	9.5	14.00	----------	1911	None	177.8	None	None
1836	7.6	8.5	3.50	----------	1912	3.0	4089.5	None	2.0
1837	5.3	11.5	5.0	----------	1913	Trace	2892.2	None	Trace
1838	8.7	8.5	6.0	----------	1914	None	20.7	Trace	None
1839	0.3	5.0	1.0	----------	1915	None	1.4	Trace	Trace
1840	2.4	5.5	1.0	----------	1916	None	60.0	55.0	None
1841	3.7	6.5	3.0	----------	1917	----------	435.3	----------	Trace
1842	3.2	5.0	4.0	----------	1918	----------	131.45	----------	Trace
1843	1.7	5.5	2.0	----------	1919	----------	Trace	7.5	None
1844	0.9	4.5	None	----------	1920	----------	29.5	21.0	None
1845	1.5	3.0	None	----------	1921	----------	8.12	----------	None
1846	1.3	4.0	None	----------	1922	----------	33.75	38.1	None
1847	2.5	6.0	4.0	----------	1923	Trace	None	3.10	----------
1848	3.2	5.0	3.0	----------	1924	None	None	18.50	----------
1849	2.3	5.0	3.0	----------	1925	2.4	6.0	5.5	----------
1850	3.0	5.0	4.0	----------	1926	----------	4.0	8.5	----------
----------	----------	----------	----------	----------	1927	----------	14.0	12.0	----------
1852	5.0	2.5	13.0	None	1928	----------	2.5	2.0	----------
1853	10.0	2.0	----------	----------	1929	----------	4.0	12.0	----------
1854	8.6	2.5	8.0	----------	1930	----------	5.0	10.0	----------
1855	12.5	2.0	----------	----------	1931	----------	33.0	55.58	Trace
1856	21.8	2.0	----------	Trace	1932	----------	60.0	77.0	----------
1857	43.0	77.0	----------	Trace	1933	----------	28.0	61.0	----------
1858	4.3	None	----------	0.05	1934	----------	30.15	43.70	----------
1859	23.9	48.0	----------	0.5	1935	----------	11.25	27.00	----------
1860	19.9	29.0	----------	None	1936	----------	25.80	37.00	----------
1861	2.5	14.0	----------	Trace	1937	----------	31.20	68.70	----------
1862	46.4	4.5	----------	None	1938	----------	9.0	47.40	----------
1863	24.7	71.5	----------	Trace	1939	----------	57.75	49.50	----------
1864	5.6	7.8	9.0	None	1940	----------	9.15	27.30	----------
1865	0.7	1.1	----------	None	1941	----------	16.80	16.50	----------
1866	5.5	.450	None	None	1942	----------	6.00	8.90	----------
1867	23.8	Trace	----------	None	1943	----------	24.60	48.00	----------
1868	Trace	None	----------	None	1944	----------	24.00	43.00	----------
1869	79.4	None	----------	None	1945	----------	75.00	60.00	----------
1870	33.2	25.5	----------	None	1946	----------	27.45	52.00	----------
1871	2.0	None	----------	None	1947	----------	43.35	51.70	----------
1872	48.5	22.0	----------	None	1948	----------	7.00	24.95	0.05
1873	7.5	20.0	----------	1.1	1949	----------	Trace	7.5	None
1874	2.3	0.085	----------	----------	1950	----------	16.50	74.00	----------
1875	2.6	None	----------	None	1951	----------	49.50	26.20	0.45
1876	3.4	None	----------	None	1952	5.4	8.6	----------	1.4
1877	9.90	65.80	----------	None	1953	None	None	None	.25
1878	10.7	None	----------	None	1954	None	None	None	0.05
1879	9.5	----------	----------	----------	1955	----------	6.00	----------	0.50
1880	3.5	----------	----------	----------	1956	----------	19.30	----------	0.70

COPPER ORE, SILVER ORE, LEAD ORE, GOLD ORE—Continued

No.	Cu (%)	Ag (oz/T)	Pb (%)	Au (oz/T)	No.	Cu (%)	Ag (oz/T)	Pb (%)	Au (oz/T)
1881	2.5	None	----------	None	1957	----------	Trace	----------	0.20
1882	3.7	None	----------	None	1958	----------	8.6	----------	1.40
1883	1.15	None	----------	None	1959	----------	None	----------	0.20
1884	8.6	None	----------	None	1960	----------	None	----------	0.25
1885	34.8	None	----------	None	1961	----------	62.70	----------	30.00
1886	None	1120.4	None	None	1962	None	None	None	3.20
1887	None	1.80	None	Trace					
1888	None	2.70	None	None					

*Zinc 23.16.

ZINC ORE

No.	Cu (%)	Ag (oz/T)	Pb (%)	An (oz/T)	Zn	No.	Cu (%)	Ag (oz/T)	Pb (%)	An (oz/T)	Zn
1964	----------	----------	----------	----------	5.72	1970	----------	None	----------	----------	1.00
1965	.72	----------	----------	----------	14.17	1971	----------	None	----------	----------	26.00
1966	----------	None	----------	----------	34.60	1972	----------	None	----------	----------	0.50
1967	----------	None	----------	----------	2.00	1973	Trace	5.20	7.63	Trace	53.20
1968	----------	None	----------	----------	30.0	1974	Trace	2.60	5.10	Trace	34.80
1969	----------	None	----------	----------	26.50						

MERCURY ORE

No.	Hg (%)	No.	Hg (%)	No.	Hg (%)	No.	Hg (%)
1975	51.9	1986	1.1	1997	0.1	----------	----------
1976	Trace	1987	0.30	1998	0.5	----------	----------
1977	58.54	1988	1.75	1999	0.5	----------	----------
1978	0.65	1989	0.21	2000	1.65	----------	----------
1979	3.82	1990	15.20	2001	0.1	----------	----------
1980	4.66	1991	22.52	2002	0.31	----------	----------
1981	13.1	1992	0.7	2003	2.7	----------	----------
1982	0.7	1993	40.14	2004	62.2	----------	----------
1983	3.0	1994	4.5	2005	22.2	----------	----------
1984	0.04	1995	3.42	----------	----------	----------	----------
1985	0.08	1996	0.2				

MANGANESE ORE

No.	SiO_2	P	S	Metallic Mn	MnO_2	Al_2O_3	Fe_2O_3	CaO	MgO	P_2O_5	SO_3	Water	Mn_2O_5
2006	13.40	None	0.054	62.70	------	------	------	------	------	------	------	------	------
2007	27.00	------	------	------	52.0	4.15	53.85	8.80	0.75	Trace	Trace	------	------
2008	36.20	------	------	------	8.54	9.09	41.81	3.45	1.51	0.24	0.03	------	------
2009	21.65	------	------	------	11.12	3.09	57.65	3.20	3.24	------	------	4.45	------
2010	------	0.28	------	40.76	------	------	------	------	------	------	------	------	------
2011	19.13	------	------	48.32	3.06	7.63	------	0.73	Trace	------	------	3.00	66.64
2012*	43.10	Trace	------	22.48	Trace	------	18.35	9.74	Trace	Trace	------	------	------
2013	46.15	Trace	------	26.07	1.48	------	7.50	8.90	Trace	Trace	------	------	36.12
2014	47.50	------	------	------	------	------	25.88	------	------	Trace	0.17	------	8.27
2014a:													Loss by Ignition
1.	59.70	------	------	------	6.04	4.06	7.39	11.37	0.72	0.25	------	0.44	7.96
2.	10.66	------	------	------	5.81	8.92	8.86	31.07	0.95	0.32	------	1.42	18.20
3.	1.90	------	------	------	6.79	10.73	9.60	35.42	0.80	0.27	------	0.90	23.70
4.	9.06	------	------	------	16.39	17.01	19.20	19.65	0.60	0.29	------	2.41	13.50
5.	31.60	------	------	------	4.00	13.41	20.68	10.59	1.16	0.61	------	4.20	11.90
6.	11.78	------	------	------	9.92	7.49	11.81	31.02	3.62	------	------	1.48	16.56
7.	14.90	------	------	------	4.31	16.48	3.70	17.16	1.20	0.48	------	4.90	21.90
8.	17.30	------	------	------	3.15	4.23	4.42	34.43	1.23	0.25	------	2.60	23.60
9.	18.46	------	------	------	6.85	1.81	10.34	37.07	0.91	0.25	------	2.24	28.20
10.	15.16	------	------	------	7.18	5.23	10.34	25.59	0.91	0.23	------	0.94	24.26
11.	13.87	------	------	------	7.60	6.70	3.47	33.97	------	------	------	0.76	27.10
12.	9.66	------	------	------	3.87	3.08	5.91	39.14	0.80	0.19	------	1.30	31.50

*Manganese Oxide, 29.04.

Tianium Ore

2015.	Silica	2.40
	Titanic oxid	27.80
	Alumina	1.50
	Oxide of iron	68.49
		100.191

Tungsten Ores

Serial No.	Tungstic oxide
2016	0.70%
2017	Trace
2018	2.20
2019	3.50
2020	17.70
2021	19.00
2022	10.80
2023	14.10

Uranium Ore

Serial No.	Uranium	Copper
2024	0.57%	2.00%
2025	0.95	none

NATURAL GAS

No.	CO_2	Illuminants	H	CO	CH_4	C_2H_6	O_2	N	Total	B. T. U.	Sp. Gr.	S
2116	None	None	3.40	None	.80	35.80	------	60.40	100 00	304.50	------	------
2117	None	0 80	0.70	None	Trace	67.93	------	31.37	100 80	715.00	------	------
2118	0.20	0.30	0.40	.80	------	47.2	12.50	38.6	100.00	474.00	------	------
2119	None	0.30	0.20	1.00	.30	55.90	------	36.80	100.00	561.00	------	------
2120	None	None	None	None	None	56.00	------	44.0	100 00	649.00	------	------
2121	None	None	2.2	None	None	50.3	------	47.5	100.00	503.0	------	------
2122	------	------	------	------	------	53 6	6.4	40.0	------	684	------	------
2123	None	None	None	None	7.40	6.40	------	86 20	------	77.90	0.943	------
2124	None	None	None	None	2.00	6.00	------	92.00	------	54 96	0.948	------
2125	None	None	3.40	None	0.80	35.40	------	60.40	------	304.50	0 827	------
2126	None	None	0.20	None	0.60	32.00	------	66.00	------	280.0	0.831	------
2127	None	None	None	None	None	37.0	------	63.00	------	315.0	0.815	------
2128	None	None	None	None	0.80	37.20	------	66.50	------	282.0	0.834	------
2129	None	None	None	None	0.80	38.60	------	60.90	------	332.0	------	------
2130	None	None	4.00	None	None	65.6	None	30.4	100.00	662.0	------	------
2130a	------	------	------	------	------	90.00	------	10.00	100.	909.	------	------
2131	None	None	1.00	None	None	84.00	------	15.00	100.00	932.0	------	------
2132	None	None	None	None	None	85.4	------	14.6	100.00	862.0	------	------
2133	None	None	0.2	None	None	90.4	------	9.40	100.00	913.0	------	------
2134	0.60	------	------	------	------	98.40	------	1.00	100.00	1,047	0.57	------
2135	0.20	------	------	------	------	98.30	------	1.50	100.00	1,047	0.56	------
2136	0.70	------	------	------	------	98.10	------	1.20	100.00	1,045	0.57	------
2137	Trace	------	------	------	------	98.50	------	1.5	100.00	1,052	0.56	------
2138	None	None	1.40	None	1.2	34.8	------	62.6	100.00	300.5	------	------
2139	0.4	None	0.2	22.8	None	74.0	------	2.6	100.00	947.0	------	------
2140	------	------	------	------	------	87.4	------	12.6	100.00	882.0	------	------
2141	------	4.20	0.90	1.70	3.70	64.00	------	25.50	100.00	784	------	None
2142	None	------	None	------	------	79.0	13.90	7.10	100.00	1100	------	------
2143	None	------	None	------	------	78.20	12.90	8.90	100.00	1072	------	------
2144	------	4.20	0.90	1.70	3.70	64.00	------	25.50	100.00	784.42	------	------
2145	5.20	None	2.60	25.80	None	84.30	------	20.10	100.00	463.0	------	------
2146	------	2.00	------	------	------	74.00	------	24.0	100.00	787.0	------	------
2147	------	------	------	------	3.0	74.8	------	22.2	100.00	755	------	------
2148	1.6	------	9.2	4.0	2.6	42.4	------	40.2	100.00	450	------	------
2149	None	None	None	None	None	80.8	------	19.2	100.00	835.5	------	------
2150	None	None	None	None	None	92.0	------	8.0	100.00	929	------	------
2151	None	None	Trace	None	None	85.2	------	14.8	100.00	726.0	------	------
2152	None	None	0.6	None	0.4	66.3	------	32.7	100.00	564	------	------
2153	None	None	0.60	------	0.80	87.80	------	10.80	100.00	887	------	------

WATER

The **plain** figures express parts (weight) per one million parts of water

The figures underneath (in parentheses) express "relative numbers of combining units" (i.e. number of gram-equivalents per 1000 liters). See Introductory Note on **Waters** in Part I.

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2154	36.00	1.71	1.69	14.00	4.00	718.00	7.40	22.00	90.30	31.00	2.70	591.00			1874.00
				(.70)	(.32)	(31.20)	(.18)	(.73)	(1.48)	(.64)	(.043)	(16.65)			
2155	34.00	.57	.94	6.80	2.20	295.0	3.20	38.00	661.00	73.00	2.00	17.00			758.00
				(.34)	(.189)	(12.76)	(.08)	(1.26)	(10.84)	(1.52)	(.032)	(.478)			
2156	26.00	2.00		63.20	4.10	731.30		7.20	364.40	278.60	0.40	821.40			2298.60
				(3.15)	(.33)	(31.65)		(.24)	(5.97)	(5.8)	(.065)	(23.13)			
2157	48.00	.047		38.70	3.49	28.20			41.50	65.08	5.50	50.00			236.00
				(1.93)	(.28)				(.68)	(1.35)	(.028)	(1.41)			
2158	22.00	0.71		61.00	32.00	183.00		None	401.00	86.00	9.70	152.0			746.00
				(3.05)	(2.63)				(6.57)	(1.79)	(.156)	(4.28)			
2159	24.00	.86		139.00	51.00	79.00		None	437.00	172.00	4.30	130.00			839.00
				(6.95)	(4.19)				(7.16)	(3.58)	(.069)	(3.66)			
2160	28.00	.57		82.00	54.00	323.00		None	414.00	173.00	40.00	401.00			1318.00
				(4.10)	(4.44)				(6.79)	(3.60)	(.645)	(11.29)			
2161		11.82				533.80		3.96		468.80		478.80			1543.05
						(23.20)		(.132)		(9.77)		(13.49)			
216[illegible]	30.00		11.00	658.40	252.40	371.60	30.70	None	266.00	1836.40	None	959.00		SO_3	
				(23.92)	(20.76)	(16.11)	(.78)		(4.36)	(38.59)		(27.01)		.60	4430.10
216[illegible]	10.00	4.29		63.75		31.02		14.38	214.60	13.08	1.41	12.88			244.00
				(3.18)				(.48)	(3.52)	(.27)	(.023)	(.36)			
2164	78.00	13.01	1.58	7.10	3.80	38.00	2.30		41.00	31.00		39.00			230.00
				(.355)	(.312)	(.165)	(.06)		(.67)	(.65)		(1.09)			
2165	16.00	.71		11.00	0.8	862.00		24.00	717.00	1.60		1134.00			2271.00
				(.55)	(.066)			(.80)	(11.75)	(.033)		(31.84)			
2166	48.00	3.29		14.00	1.60	882.00		26.00	706.00	3.60		1152.0			2333.00
				(.70)	(.13)			(.86)	(11.57)	(0.75)		(32.45)			
2167	29.00			87.00	27.00	1357.00			264.00	38.00		2138.00	56.00		3891.00
				(4.39)	(2.22)				(4.33)	(.79)		(60.22)			
2168				79.00	28.00	1331.00			241.00			2132.00			3424.00
				(3.95)	(2.30)				(3.95)			(60.60)			

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2169	14.00	9.90		92.0	27.00	1101.0			409.0	Tr		1670.0			3117.00
				(4 6)	(2.22)				(6.71)			(47.04)			
2170	38.00			21.00	8.00	490.00		30.00	320.00	4.6		490.0	79.00		1481.00
				(1.05)	(.659)			(1.0)	(5 24)	(.096)		(13.85)			
2171				11 00	4 00	520.00	7.00	520.0		630.00		64.00			1756.00
				(.55)	(.33)	(22 54)	(.179)	(17.33)		(13.13)		(.180)			
2172	21.00	17.16	9.20	4.90	4 40	3.40	2.70		18.00	25.00		5.20			86.00
				(.245)	(36)	(.15)	(.07)		(.295)	(.52)		(.146)			
2173	23.00	17.16		11 00	8 50	13.00			41.00	1.90	1.00	5.50			112.00
				(.55)	(669)	(.56)			(.67)	(.039)	(.016)	(.155)			
2174	12.00	7 15	15.98	98.0	84.0	416.00	Tr		651.00	76.00		640.00	8.70		2008.00
				(4 90)	(6 90)	(18.08)			(10.67)	(1.58)		(18.03)			
2175	27.00	25.71	14.35	46 00	6.20	52.00	12.00			247.00		63.00			479.00
				(2 30)	(51)	(2.25)	(.31)			(5.14)		(1.77)			
2176	50 00	11.44	10.24	6 20	0 30	32 00	6.20		46 00	50.00	.06	14.00			180.00
				(31)	(.024)	(1.36)	(.16)		(.75)	(1.04)	(.0009)	(.395)			
2177	26.8	.715	52.92	204 00	173.80	559.90		19 22	444 0	1196.00	176.10	503.0	Li. .89		3320.00
				(10 20)	(14.25)	(24 25)		(.64)	(7.28)	(24.92)	(2.84)	(14 17)	(.129)		
2178	36.04	20.415		.6 86	2.109	210 30		278.40		33.62		17.66			
				(.34)	(.17)	(9.12)		(8.61)		(.70)		(4.98)			
2179	10.30					161.70		20 20		28 99		13.20			
						(7.00)		(67)		(.60)		(.37)			
2180	31.60			637.0		106.60		413.8		1088.6					2507.80
				(31 85)		(4.62)		(13 79)		(22 86)					
2181	14.40	Tr	4.40	584 40	172.00	134.00		162.6		1912.2		393.6			3123.60
				(29.22)	(14.14)	(5 81)		(5 42)		(39.83)		(3 93)			
2182	6.00			16 02	14.24	555.2		520.3		176.4		182.5			1469.21
				(.80)	(1.17)	(24.65)		(17.35)		(3.67)		(51.41)			
2183				9.00	Tr	645.0	None	None	607.00	515.00		276 00			
				(4 5)		(27.95)			(9 95)	(10 70)		(7 78)			
2184	10.00		15.04	12.00	4.00	637.0	None	40 00	586 0	522.0	3.00	230.0			1814.00
				(6 0)	(.33)	(27.61)		(1 33)	(9 61)	(10.87)	(.048)	(6.48)			
2185	49.5		16.92	39.4	31.5	52.00		160 4	162.5	35.1		27.8			
				(1.97)	(2.59)			(5.35)	(2.665)	(.73)		(.78)			
2186		12.28		58.64	4.08	133.2		90.1		.154		275.7			574.77
				(2.93)	(.33)	(5.77)		(3.0)		(.003)		(7.76)			
2187							350.5 (8.96)					317.5 (8.94)			124380.00

2188	2.175			2236.5 (111.82)	778.9 (64.87)	5685.5 (246.35)	47.18 (1.21)		999.8 (16.39)	7702.06 (160.46)		4862.0 (186.95)			22400.98
2189		2.66	6.05	2528.00 (126.4)	1215.0 (99.99)	34625.0 (1500.9)	10.28 (.26)			1.49 (.03)		62208.0 (1748 44)			47440.00
2190	16.12			4.46 (.223)	1.92 (.16)	581.2 (25.19)	.617 (.015)	446.0		2937.79 (61.21)		151.75 (4.27)			1506.625
2191	21.27	9.74		55.4 (2.77)		2554.0 (110.71)		14.86 11.84 (.395)		4765.8 (97.2)		533.0 (15.01)			8467.64
2192	2.05	.749	.749	107.40 (5.37)	21.45 (1.83)	175.8 (7.62)		530.0 (17.67)		2993.5 (62.37)		210.25 (5.9.)			5656.65
2193	25.00		3.76	38.0 (1.9)	18.40 (1.51)	52.3 (2.27)		119.9 (1.96		52.4 (1.09)		22.00 (.62)			330.00
2194	25.00		9.40	44.0 (2.2)	25.9 (2.13)	88.7 (3.84)		143.9 (2.36)		62.8 (1.30)		35.6 (1.09)			405.00
2195	19.60	15. 00		9.99 (.499)	6.54 (.54)	142.4 (6.17)		114.4 (3.81)		76.3 (1.6)		65.4 (1.85)	5.00		454.60
2196		106 .60		104.10 (5,205)	.812 (.066)	481.58 (20.87)		19.50 (.65)		364.05 (7.58)		638.60 (17.99)	100.70		1720.00
2197		23.40		32.9 (1.65)	14.20 (1.17)	50.80 (2.20)	4.69 (.119)	119.9 (4.00)		52.8 (1.10)		13.10 (.37)	2.40		314.00
2198	5.00	Tr		15.90 (.795)	18.10 (1.49)	66.50 (2.88)		78.0 (2.6)		53.40 (1.11)		55.1 (1.49)			301.90
2199	18 86			7.38 (.369)	2.40 (.197)	162.15 (7.02)			244.6 (4.01)	128.6 (2.68)	4.63 (.075)	30.88 (.87)			599.80
2200	30.00	22. 19		60.00 (.30)	8.60 (.707)	169.40 (7.34)		180 2 (6.00)		52.50 (1.11)		141.4 (3.98)	17.60		1060.00
2201	27.20	Tr		846.36 (42.32)	36.46 (3.00)	135.5 (5.88)				1353.7 (28.20)		664.38 (18.71)			3136.00
2202		Tr		275.45 (13.77)	63.45 (5.22)	428.80 (14.25)	22.98 (.589)	208.85 (6 96)		580.50 (12.10)		695.80 (19.60)	171.50		2497.04
2203	26.00		37.60	319.41 (15.97)	64.80 (5.32)	488.2 (21.15)		135.48 (4.516)		584.04 (12.16)		756.0 (21.29)		Water 275.00	2860.00
2204	5.00		Tr	15.87 (.79)	18.00 (1.48)	67.94 (2.94)		55.33 (1.84)		43.29 (.902)		53.10 (1.49)			290.00
2205	30.00		20.00	186.02 (9 30)	36 66 (3.01)	137.79 (5.99)		150.00 (5.00)		230.60 (4.81)		206.0 (5.80)		Water 12.00	1166.50
2206	70.00		10.00	47.57 (2 37)	16.80 (1.38)	121.69 (5.28)		74.80 (2.49)		132.81 (2.77)		87.00 (2.45)		Water 2.50	639.80
2207		.786		23.00 (1.15)	9.10 (.75)	118.00		14.00 (.47)	229.0 (3.75)	86.00 (1.79)		21.00 (.59)			425.09
2208		.43		243.0 (12.15)	141.00 (11.58)	310.00		12.00 (.40)	193.00 (3.16)	938.0 (19.54)		508.0 (14.31)			2,366.00
2209	SiO_2 / $Al_2O_3+Fe_2O_3$		31.20	208.05 (10.40)	43.85 (3.60)	251.28 (10.89)	21.66 (.55)	164.58 (5.48)		364.08 (7.58)		438.6 (12.35)			
2210	SiO_2 / $Al_2O_3+Fe_2O_3$		16.80	137.68 (6.88)	35.42 (2.91)	202.38 (8.77)	18.76 (.48)	157.01 (5.23)		376.08 (7.84)		207.50 (5.84)			

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
	SiO_2			33.00	14.20	50.90	6.40	120.0		52.80		13.10		Igniti'n	316.20
2211	$Al_2O_3+Fe_2O_3$		23.40	(1.65)	(1.16)	(2.01)	(.16)	(4.0)		(1.10)		(.38)		2.40	
	SiO_2			38.00	18.50	52.40		119.20		52.30		21.90			329.30
2212	$Al_2O_3+Fe_2O_3$		27.00	(1.90)	(1.52)	(2.27)		(3.97)		(1.09)		(.62)			
	SiO_2			161.20	37.00	250.60	18.30	121.40		338.50		405.60		Igniti'n	1457.10
2213	$Al_2O_3+Fe_2O_3$		24.50	(8.06)	(3.04)	(10.86)	(.47)	(4 05)		(7.05)		(11.43)		100.00	
	SiO_2			46.00	13.10	183.80	26.00	117.00		141.00		182.70		Igniti'n	747.10
2214	$Al_2O_3+Fe_2O_3$		35.00	(2.30)	(1.07)	(7.97)	(.66)	(3 90)		(2 94)		(5 14)		2.50	
	SiO_2			206.70	43.90	251.50	21.70	164.60		364.00		438.60		Igniti'n	1705.58
9915	$Al_2O_3+Fe_2O_3$		31.20	(10 33)	(3.61)	(10.90)	(.55)	(5.49)		(7.58)		(12.35)		178.30	
	SiO_2			138.10	35.50	212.50	18.80	157.0		376.0		207.50		Igniti'n	1235.40
2216	$Al_2O_3+Fe_2O_3$		16.80	(6 91)	(2.92)	(9.22)	(.48)	(5.23)		(7.84)		(5.85)		73.10	
	SiO_2			60.10	88.70	267.00		179 90		255.30		141.20		Igniti'n	1059.80
2217	$Al_2O_3+Fe_2O_3$		130.00	(3.00)	(7.29)	(11.57)		(5.99)		(5.32)		(3.98)		17.60	
2218				67 43	23.69	81 61		13.65		129.02	.21	202.2			522.32
				(3.37)	(1.94)	(3 51)		(4.56)		(2.69)	(.034)	(5.69)			
2219	11.99	11.99		7560.0	874.00	2154.70	257.60		205.00	24.72		49849.0			81218.00
				(378.0)	(71.84)	(933.4)	(6.58)		(3.36)	(.516)		(1390.11)			
2220		20.7	192.2	254.0	55.96	1813.4	6.06	459.4		3942.0					8720.26
				(12.70)	(4.62)	(78.54)	(0.16)	(15.31)		(82.12)					
2221	32.24	2.06	60.56	189.35	55.92	2588.0	3.09		145.8	4476.5		117.50			8660.75
				(9.47)	(4.60)	(109.05)	(.08)		(2.39)	(93.26)		(3.31)			
2222	45.62	0.24	6.29	22 82	33.91	83.84		24 02	273.40	61 86	1.41	70.00			460.20
				(1.14)	(2.79)			(.80)	(4.48)	(1.29)	(.02)	(1.97)			
2223	21.00	.214	1.165	42.00	12.00	55.00	3.50	12.00	231.00	3 30	1.40	28.0			283.00
				(2.10)	(.986)	(2.38)	(.09)	(.40)	(3.79)	(0.68)	(0.23)	(.789)			
2224				20 00		1422.0			43.90			1970.0			
				(1.00)					(7.20)			(55.49)			
2225	17.00	3.00		33.00	17.00	1229.0	22.0		384.0	.30		1793.0			3306.00
				(1.65)	(1.39)	(53.27)	(.56)		(6.30)	(.006)		(50 51)			
2226		3.86				1280.00			768.0			1519.0	7.70		3192.00
									(12.59)			(42 79)			
2227				152.0	10.00							2774.0			5308.00
				(7.6)	(.82)							(78.14)			
2228		118. 00										2276.0	111.00		
												(64.11)			

2229				33.00 (1.65)	18.00 (1.48)	1152.00				154.0 (3.21)		1773.0 (41.49)			2996.00
2230												24.40 (6.88)	21.00		693.00
2231												1014.0 (28.56)	31.00		1974.00
2232	27.00	.28	2.44	8.40 (.42)	9.90 (.81)	18.80 (8.15)	2.80 (.07)	12.0 (.40)	311.0 (5.10)	3.90 (.08)	.02 (.0003)	96.00 (2.70)			504.00
2233	29.00	2.60		6.00 (.30)	3.00 (.24)	225.0 (9.75)	2.00 (.05)		419.0 (6.87)		.50 (.008)	122.0 (3.44)			600.00
2234	30.0	2.00		8 6 (.43)	1.60 (.13)	215.0 (9.32)	0.9 (.023)		358 0 (5.82)			146.0 (4.13)			582.00
2235	6.00	4.30		15.0 (.75)	4.30 (.35)	146.00			281.0 (4.61)			100.00 (2.82)			
2236	20.00	2.20		4.00 (.20)	2.00 (.16)	260.0 (11.27)	1.20 (.03)		508.0 (8.33)			117 0 (3.29)			660.00
2237	21.00	Trace		28.0 (1.40)	5.50 (.45)	198.0			414 0 (6.79)	Trace		125.0 (3 52)	79.00		665.00
2238	12.00	12.00		21 0 (1 05)	9.20 (.75)	789.0			560.0 (9.18)	Trace		870.0 (24.5)	142.0		2021.00
2239	28.00	.08	0.6	21.0 (1.05)	7.90 (.65)	331.0 (14.35)	9.7 (.25)		394.0 (6.46)	5.3 (.11)		354.0 (9.97)			901.00
2240	37.00	130.13	7.78	159 0 (7.95)	68.0 (5.18)	1481.0 (64.19)	28.0 (.71)		356.0 (5.82)	1280.0 (26.66)		1746.0 (49.18)			5068.00
2241	39.00	157.3	101.52	202 0 (10 10)	134.0 (11.02)	790.0 (34.24)	6.30 (.16)			1650.0 (34 37)		1115.0 (31.41)			
2242	9.60	31.46	26.32	206 0 (10.30)	84.0 (6.9)	149.0 (6.46)	128.0 (3.27)		350.0 (5.74)	680.0 (14.17)		248.0 (6.98)			1768.00
2243		343.2		95.0 (4 75)		577.00				1.00 (.021)		235.0 (6.61)	70.00		2739.00
2244		7.15	150.15		7 0 (.57)					109.0 (2.27)			933.00		3732.00
2245	38.0	.143	1.57	24 0 (1 2)	4 90 (.40)	193.0 (8 37)	26.0 (.66)	24 0 (80)	40.10 (6 54)	15.0 (.31)	.02 (.0004)	56.0 (1 58)			565.00
2246	36.0	.28	.83	24 0 (1 20)	3.50 (.287)	193 0 (8 37)	26.0 (66)	22.0 (.73)	481.0 (7.06)	2.60 (.054)	.02 (.0004)	72.00 (2.03)			592.00
2247				43 0 (2 15)	8 80 (72)	140 0 (6 07)		168 0 (5.60)		41.00 (.85)		79 0 (2.23)	38.00		532.86
2248	1.57			33 96 (1 70)		33 98 (1 47)		4.55 (.151)	7.41 (.121)	31.12 (.65)		83.69 (2.36)			238.32
2249	2.92		2.90	20 03 (1 50)	13.08 (1 08)	29.97 (1 30)		3.44 (.115)		119.75 (2.49)		48.81 (1.37)			248.87
2250	2.54		2.54	30.15 (1 50)	35.44 (2.915)	68.29 (2.96)				301.85 (6.29)		41.33 (1.16)			488.67
2251	5.59		1.82	32.62 (1.63)	9.01 (.74)	85.35 (3.70)		370.0 (12.33)		108.74 (2.26)					368.18

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + Organic	Misc.	Total Solids
2252	79.98	----------	306.3	644.8 (32.24)	246.1 (20.23)	602.0 (26.09)	----------	----------	----------	3610.0 (75.20)	----------	3049.2 (85.90)	----------	----------	8647.08
2253	16.50	----------	20.21	43.9 (.219)	----------	223.0 (9.67)	----------	325.2 (10.85)	----------	3286.9 (68.47)	----------	717.6 (20.21)	----------	----------	583.44
2254	9.09	4.28	.12	2.40 (.12)	.786 (.065)	87.50 (3.79)	.128 (.033)	79.60 (3.98)	----------	39.10 (.815)	----------	18.02 (.51)	----------	----------	245.58
2255	----------	15.00		43.0 (2.15)	8.80 (.72)	140.0 (6.07)	----------	----------	336. (5.51)	41.0 (.85)	----------	79.0 (.25)	38.00	----------	533.00
2256	73.60	1.55	1.28	51.26 (2.56)	39.32 (3.23)	1.37		38.14 (1.27)	230.18 (3.77)	39.52 (.82)	1.32 (.021)	44.02 (1.24)	----------	----------	444.04
2257	70.00	1.71	.15	88.10 (4.405)	73.80 (6.13)	39.96		----------	307.60 (5.025)	151.50 (3.15)	8.80 (.14)	128.6 (3.605)	----------	----------	704.20
2258	77.62	1.42	2.05	65.10 (3.25)	48.05 (3.95)	43.67		21.60 (.72)	268.40 (4.45)	85.68 (1.78)	4.41 (.07)	80.20 (2.26)	----------	----------	598.40
2259	69.20	2.00	----------	51.26 (2.56)	27.80 (2.28)	24.58		----------	290.50 (4.76)	39.52 (.82)	----------	42.04 (1.18)	----------	----------	400.80
2260	66.00	1.71	----------	57.18 (2.86)	11.17 (.92)	80.42		----------	302.0 (5.45)	45.72 (.95)	2.19 (.035)	36.00 (1.01)	----------	----------	402.40
2261	61.20	2.14	----------	63.88 (3.19)	57.32 (4.63)	16.24		19.28 (.64)	287.80 (4.88)	65.84 (1.37)	.87 (.014)	56.12 (1.58)	----------	----------	472.40
2262	74.04	.70	----------	35.25 (1.76)	47.56 (3.91)	44.60		26.4 (.88)	385.80 (6.32)	13.16 (.27)	4.41 (.07)	6.04 (.13)	----------	----------	402.40
2263	61.24	.557	----------	65.08 (3.25)	41.48 (3.41)	11.75		None	290.50 (4.76)	50.06 (1.04)	1.09 (.017)	48.0 (1.35)	----------	----------	352.40
2264	65.26	.75	1.49	80.08 (4.00)	44.98 (3.69)	4.97		None	292.50 (4.80)	102.20 (2.12)	1.76 (.028)	40.10 (1.13)	----------	----------	556.80
2265	58.04	.70	2.78	44.35 (2.22)	46.85 (3.85)	14.30		26.40 (.88)	268.50 (4.40)	39.82 (.83)	.60 (.009)	30.20 (.84)	----------	----------	354.20
2266	62.46	1.14	.18	62.12 (3.10)	32.74 (2.69)	21.28		12.00 (.40)	246.0 (4.03)	44.60 (.93)	.39 (.006)	62.04 (1.75)	----------	----------	356.40
2267	71.68	.84	13.10	65.58 (3.28)	61.20 (5.03)	5.19		14.4 (.72)	410.0 (6.80)	82.38 (1.71)	.88 (.014)	62.04 (1.74)	----------	----------	523.20
2268	74.88	2.14	6.19	82.80 (4.14)	50.28 (4.16)	5.40		28.8 (.96)	262.50 (4.32)	85.0 (1.77)	.206 (.003)	70.08 (1.97)	----------	----------	470.50
2269	70.80	1.84	10.60	63.00 (3.30)	43.35 (3.56)	.205		28.8 (.96)	200.0 (3.28)	45.30 (.94)	.60 (.009)	50.04 (1.41)	----------	----------	326.40

2270	70.80	1.14	**4.68**	61.0 (3.05)	47.35 (3.81)	10.81		21.61 (.72)	267.00 (6.80)	44.40 (1.71)	.39 (.014)	44.02 (1.74)	----------	----------	400.80
2271	60.42	2.86	**.60**	96.40 (2.82)	41.12 (3.38)	1.09		736.00 (24.53)	236.81 (6.88)	28.00 (.58)	.395 (.006)	20.00 (.56)	----------	----------	350.15
2272	79.65	.715	**.704**	52.0 (2.60)	50.70 (4.22)	3.89		26.80 (1.00)	263.19 (7.96)	45.40 (.94)	.206 (.008)	37.74 (1.06)	----------	----------	480.00
2273	72.45	4.14	**1.96**	56.99 (2.85)	1.33 (.109)	.8538		**36.80** (1.22)	**227.00** (3.72)	52.75 (1.09)	.395 (.006)	97.74 (1.06)	----------	----------	400.20
2274	49.58	.715	**1.69**	78.40 (2.97)	69.90 (5.75)	4.70		19.20 (.84)	358.00 (5.87)	95.28 (1.93)	.89 (.014)	64.08 (1.28)	----------	----------	470.40
2275	73.65	.55	**3.71**	99.0 (3.10)	95.80 (2.04)	25.90		91.60 (.72)	231.75 (3.80)	41.20 (.858)	1.303 (.021)	32.00 (.992)	----------	----------	370.50
2276	67.24	.55	**1.90**	64.18 (3.21)	38.32 (3.15)	27.42		91.07 (.80)	302.80 (4.93)	39.52 (.82)	.892 (.014)	30.02 (.846)	----------	----------	400.20
2277	60.0	.858	**7.00**	70.20 (2.51)	1.66 (.136)	971.94		65.84 (2.19)	173.26 (2.83)	82.35 (1.715)	.806 (.013)	44.02 (1.24)	----------	----------	470.20
2278	58.80	.04	**.039**	50.84 (2.54)	24.52 (2.01)	77.46		21.61 (.72)	227.00 (5.36)	31.90 (.66)	1.40 (.022)	36.10 (.84)	----------	----------	380.00
2279	58.40	.024	**4.20**	57.61 (2.88)	26.92 (2.15)	52.54		135.00 (4.50)	85.40 (1.40)	26.20 (.42)	1.40 (.022)	36.00 (1.01)	----------	----------	350.20
2280	49.22	.04	**6.29**	93.59 (4.17)	34.58 (2.84)	17.88		16.38 (.546)	268.20 (4.39)	65.88 (1.37)	1.40 (.022)	52.04 (1.46)	----------	----------	410.50
2281	42.40	.028	**3.21**	60.09 (3.04)	28.80 (2.32)	44.82		45.60 (1.52)	200.00 (3.28)	65.88 (1.37)	1.00 (.016)	40.10 (1.13)	----------	----------	430.00
2282	33.20	.14	**5.91**	39.50 (1.97)	35.50 (2.92)	49.32		21.61 (.72)	260.00 (4.75)	24.72 (.51)	1.40 (.022)	36.00 (1.01)	----------	----------	315.00
2283	50.0	.14	**6.29**	85.40 (4.27)	32.63 (2.68)	59.66		12.0 (.40)	305.00 (5.0)	84.28 (1.75)	2.79 (.045)	67.88 (1.88)	----------	----------	480.00
2284	----------	----------	----------	48.0 (2.40)	42.0 (3.45)	36.00		343.00 (11.43)	349.00 (5.72)	35.30 (.74)	----------	32.10 (.94)	----------	----------	----------
2285	----------	----------	----------	40.00 (2.00)	47.0 (3.87)	42.00		310.00 (10.33)	315.00 (5.16)	76.40 (1.66)	----------	30.00 (.84)	----------	----------	----------
2286	----------	----------	----------	47.00 (2.35)	53.0 (4.38)	41.00		320.00 (10.67)	325.00 (5.33)	62.70 (1.31)	----------	51.50 (1.73)	----------	----------	----------
2287	----------	----------	----------	40.00 (2.00)	42.0 (3.45)	41.00		338.00 (11.27)	344.00 (5.64)	40.20 (.84)	----------	24.00 (.67)	----------	----------	----------
2288	----------	----------	----------	50.0 (2.50)	67.0 (5.51)	44.0		358.00 (11.93)	364.00 (5.97)	89.00 (1.85)	----------	71.00 (2.00)	----------	----------	----------
2289	----------	----------	----------	42.30 (2.12)	29.00 (2.38)	**46.80**		153.50 (5.12)	157.10 (2.57)	33.20 (.69)	----------	26.30 (.74)	----------	----------	----------
2290	----------	----------	----------	----------	----------	46.40		89.40 (2.98)	91.00 (1.49)	26.50 (.55)	----------	20.00 (.56)	----------	----------	----------
2291	----------	138.6	----------	248.55 (12.43)	22.87 (1.88)	1902.5 (82.40)	77.38 (1.98)	1072.40 (35.75)	----------	3296.50 (68.68)	----------	----------	----------	----------	----------
2292	16.00	.858	.413	406.0 (20.30)	79.0 (6.49)	46.0 (1.99)	13.00 (.33)	----------	249.0 (4.08)	1141.00 (23.78)	5.00 (.08)	60.00 (1.69)	----------	----------	1988.00

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2293	18.00	1.72	1.88	252.0	85.0	74.00	12.00	----------	151.00	816.00	19.00	173.00	----------	----------	1618.00
				(12.60)	(6.99)	(3.21)	(.31)		(2.48)	(16.91)	(.31)	(4.88)			
2294	19.0	----------	----------	36.0	5.90	24.0	----------	9.50	136.00	15.00	----------	26.00	44.00	----------	----------
				(1.80)	(.49)	(1.04)		(.32)	(2.23)	(.31)	----------	(.73)			
2295	53.0	.20	.50	44.0	2.20	15.0	3.30	6.00	134.00	7.00	.02	14.00	----------	----------	204.00
				(2.20)	(.18)	(.65)	(.08)	(.20)	(2.20)	(.15)	(.0003)	(.40)			
2296	22.0	$FeSo_4$ / $Al_2(SO_4)_3$ / $FeSo_4$ / $Al_2(SO_4)_3$	10.	13.00	----------	2.70	----------	----------	38.00	5.80	----------	----------	89.00	----------	----------
				(.65)		(.12)			(.62)	(.12)					
2297	45.0	Tr	4.09	59 0	----------	83.0	----------	----------	158.00	2.20	----------	62.00	87.00	----------	334.614
2298	14.00			(2.95)		(1.43)			(2.59)	(.05)		(1.75)			
				171.5	17.53	197.17		226.70	----------	108.68	----------	7.99	----------	----------	338.17
				(8.58)	(1.46)			(7.53)		(1.78)		(.23)			
2299	----------	----------	----------	2,000.00	290.0	31,380.00		----------	----------	3,516.00	----------	53,070.00	----------	----------	90,250.00
				(100.0)	(24.14)	(1358.0)				(73.17)		(1496.00)			
2300	78.00	40.0	10.0	9.80	16.0	11.0	5.40	----------	----------	239.0	.06	14.0	----------	----------	435.00
				(.49)	(1.33)	(.48)	(.14)			(4.98)	(.001)	(.40)			
2301	24.0	.31	1.30	5.40	2.00	15.0	----------	----------	6.10	24.0	.44	7.0	----------	----------	86.00
				(.27)	(.17)	(.65)			(.10)	(.50)	(.007)	(.20)			
2302	26.0	.26	1.70	32.0	11.0	33.0	4.30	4.80	171.0	86.0	4.90	20.0	----------	----------	347.00
				(1.60)	(.92)	(1.43)	(.11)	(.16)	(2.81)	(1.79)	(.008)	(.56)			
2303	94.0	104.0	17.0	184.0	80.0	125.0	30.0	----------	----------	1164.0	----------	118.0	----------	----------	----------
				(9.20)	(6 66)	(5.42)	(1.67)			(24.25)		(3.33)			
2304	----------	----------	----------	17.00	9.00	177.0		----------	----------	----------	----------	8.0	3.00	----------	483.00
				(.85)	(.75)	-						(.23)			
2305	16.0	2.00		54.0	27.0	151.0		----------	422.0	----------	----------	----------	121.00	----------	650.00
				(2.70)	(2.25)	-			(6.90)						
2306	10.0	3.00	2.20	26.0	12.0	436.0	21.0	19.0	467.0	157.0	.01	342.0	----------	----------	1197.00
				(1.30)	(1.00)	(18.87)	(.54)	(.63)	(7.66)	(3.27)	(.0002)	(9.63)			
2307	23.00	.35	5.60	464.0	301.0	2377.0	25.00	19.00	571.0	3512.0	2512.0	1.06	----------	----------	9469.00
				(23.20)	(24.75)	(102.90)	(.64)	(.63)	(9.39)	(73.20)	(40.52)	(.03)			
2308	29.0	.60	.40	30.00	16.00	133.0	6.50	19.00	283.0	134.0	102.0	26.0	----------	----------	626.00
				(1.50)	(1.32)	(5.76)	(.17)	(.63)	(4.64)	(2.79)	(.165)	(.73)			
2309	20.0	1.00	3.80	311.0	120.0	190.0	8.00	4.80	202.0	1287.0	1.69	4.00	----------	----------	2320.00
				(15.55)	(.986)	(8.23)	(.20)	(.16)	(3.32)	(25.77)	(.027)	(.11)			
2310	37.0	.80	.80	70.0	30.00	72.0	8.00	2.40	373.0	50.0	21.00	11.0	----------	----------	446.00
				(3.50)	(2.47)	(3.12)	(.20)	(.08)	(6.12)	(1.04)	(.34)	(.31)			

2311	20.0	.20	.40	259.0 (12.950)	106.0 (8.72)	195.0 (8.45)	25.0 (.64)	----------	150.0 (2.46)	1148.0 (23.92)	174.0 (2.81)	2.50 (.07)	----------	----------	2065.00
2312	----------	----------	----------	----------	520.0 (42.69)	----------	----------	----------	----------	2,249.0 (46.80)	----------	----------	----------	----------	12,358.00
2313	36.00	3.72	----------	75.0 (3 75)	29.0 (2.38)	260.0 (11.26)	----------	----------	120.00 (.197)	170.00 (3.54)	.02 (.0003)	380.00 (10.70)	12.00	----------	1084.66
2314	----------	12.78	----------	2.95 (.15)	.39 (.03)	141.78 (6.15)	----------	.909 (.03)	----------	99.50 (2.07)	----------	596.00 16.80	----------	----------	----------
2315	----------	13.89	----------	245.0 (12.25)	23.50 (1.93)	3779.86 (168.70)	37.74 (.96)	1060.00 (35.33)	----------	3398.50 (70.80)	----------	2007.60 (56.40)	----------	----------	10,567.80
2316	12.0	.30	.50	48.20 (2.41)	27.60 (2.27)	481.80 (20.95)	3.00 (.08)	23.10 (.77)	366.00 (6.00)	827.00 (17.22)	1.00 (.02)	61.50 (1.73)	----------	----------	1,854.00
2317	----------	8.16		9.59 (.48)	----------	291.59		.98 (.03)	6.669 (.11)	110 39 (2.29)	----------	379.06 (10.67)	----------	----------	803.13
2318	----------	10.58		4.93 (.25)	----------	19.85		1.93 (.06)	15.69 (.26)	14.87 (.31)	----------	29.62 (.83)	----------	----------	79.64
2319	12.0	1.34	3.76	10.0 (.50)	3.00 (.246)	330.0 (14.30)	8.00 (.204)	14.00 (.466)	517.00 (8.47)	137.00 (2.85)	1.80 (.049)	139.00 (3.92)	----------	----------	907.00
2320	20.0	1.28	5.64	20.0 (1.00)	3.50 (.28)	963.0 (41.75)	13.0 (.33)	22.00 (.73)	610.00 (10.00)	166.00 (3.46)	1.33 (.02)	1040.00 (29.29)	----------	----------	2568.00
2321	32.0	.88	4.51	105.0 (5.25)	54.0 (4.44)	114.0 (4.94)	7.80 (.199)	7.20 (.24)	439.00 (7.20)	303.00 (6.31)	.44 (.007)	55.00 (1.55)	----------	----------	922.00
2322	15.0	1.0	.94	197.0 (9 85)	138.0 (11.35)	1040.0 (45.08)	13.0 (.33)	7.20 (.24)	756.00 (12.39)	1590.00 (33.12)	4.96 (.079)	795.60 (22.39)	----------	----------	4190.00
2323	14.0	1.07	2.44	224.0 (11.2)	153.0 (12.58)	1109.0 (48.07)	15.0 (.38)	----------	766.00 (12.55)	1758.60 (36.62)	1.33 (.02)	870.00 (24.51)	----------	----------	4595.00
2324	10.0	1.07	4.32	8 50 (.425)	3.00 (.246)	291.0 (12.61)	5.30 (.135)	4.80 (.16)	659.00 (10.80)	80.00 (1.66)	1.33 (.02)	73.00 (1.04)	----------	----------	758.00
2325	2.50	1.14	2.44	9.00	11.0	293.0	34.0	29.00	669.00	100.00	3.10	50.00	----------	----------	844 00
2326	10.	1.1	3.26	(.45) 26 0	(.904) 11.0	(12.70) 944.0	(.86) 12.0	(.966) 7.20	(10.96) 549.00	(2.08) 231.00	(.05) 3.10	(1.41) 1125.00	----------	----------	2766.00
2327	5.0	1.21	1.88	(1.30) 102.0	(.90) 31.0	(40.91) 664.0	(.31) 132.0	(.24) ----------	(9.09) 224.09	(4.81) 1603.00	(.05) .44	(31.68) 181.00	----------	----------	2806.00
2328	5.0	1.14	2.44	(5 1) 96 0	(2.55) 33.0	(28.78) 689.0	(3.37) 15 0	----------	(3.67) 266.00	(33.38) 1468.00	(.007) 1.10	(5.1) 115.00	----------	----------	2513.00
		$FeSO_4$		(4.8)	(2.71) 9.20	(29.88) ----------	(.38) ----------	21.00	(4.36) ----------	(30.58) 11.65	(.017) ----------	(3.24) 2.50	----------	----------	----------
2329	----------	$Al_2(SO_4)_3$	3.35	----------	(.75)	----------	----------	(.70)	----------	(.24)	----------	(.07)	----------	----------	----------
2330	40.0	1.00	6.95	140.0 (7.0)	24.0 (1.97)	1955.0 (84.74)	102.0 (2.61)	----------	531.00 (8.72)	12.00 (.25)	----------	3063.00 (86.28)	----------	----------	5454.00
2331	Tr	Tr	Tr	3.40 (.17)	2.40 (.197)	416.0		----------	183.00 (3.00)	604.00 (12.58)	----------	41.00 (1.15)	171.00	----------	1332.00
		$FeSO_4$		----------	9.20	----------	----------	21.00	----------	----------	----------	2.50	----------	----------	----------
2332	----------	$Al_2(SO_4)_3$	15.0		(.75)			(.70)				(.07)			
		$FeSO_4$		85.0	5.0	22.00		----------	292.00	12.00	Tr	24.00	10.00	----------	266.00
2333	36.0	$Al_2(SO_4)_3$	3.80	(4.25)	(.41)				(4.78)	(.25)		(.67)			

WATER (Continued)

Seria No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2334	53.0	1.14	6.77	158 0	9 0	1120.0	43.0		110.00	12.00		1962.00			3540.00
				(7.9)	(74)	(48.59)	(1.09)		(1 80)	(.25)		(55.21)			
2335	62.0	14.0	35.72	675 0	66 0	4821.0	55.0		217.00	9 80		8700.00			15146.00
				(33.75)	(5 41)	(208.54)	(1.41)		(3 55)	(.20)		(245 08)			
2336	26.0	4.29	.37	3.20	1 50	728.0	78 0	27.00	265.00	40.00		1102.00			2190.00
				(16)	(123)	(31.55)	(1.86)	(.90)	(4 35)	(83)		(31.04)			
2337	5.50	1.43		24 0	14 0	360.0	44.0	24 00	273.00	100 00		470.00			1118.00
				(1 20)	(1 15)	(15 61)	(1.12)	(80)	(4.47)	(21)		(13.25)			
2338	26.0	1.60	.40	63 20	4 10	731 30		7 10	364 40	278 60	.40	821.40			2,298.60
				(3 16)	(337)	(31 68)		(.236)	(5 97)	(5 80)	(.006)	(23.13)			
2339	49.00	0.30		549 00	91 00	542.00			175.00	1670.00		703.00			3788.00
				(27 10)	(7.48)				(2 87)	(34 79)		(19 80)			
2340	48.00	0.27		510 00	88 00	530.00	35.00		38.00	2485 00	1.80	151.00			4112.00
				(25 50)	(7 28)	(22.97)	(0 89)		(0 57)	(51 77)	(0.029)	(4.25)			
2341	50.00	0.28		630 00	110 00	965.00	35.00		78 00	1935 00		1872.00			5558.00
				(31 00)	(9.04)	(41 82)	(0.89)		(1.27)	(43 01)		(52.73)			
2342	75.00	0.86	15.40	485 00	113 00	720 00	42 00		11.00	2695 00	.20	328.00			4694.00
				(24 25)	(9.29)	(31.18)	(1.07)		(0 18)	(56.14)	(0.003)	(9.24)			
2343	18.00	0.28		965 00	28 00	208 00	61 00		227 00	465 00	10.00	499.00			1693.00
				(13 25)	(2 30)	(9 01)	(1.56)		(3.72)	(9 69)	(0.16)	(14.06)			
2344	31.00	0.114		304 00	24.00	214.00			179.00	767.00		237.00			1982.00
				(15 20)	(1.97)				(2.93)	(15.98)		(6.54)			
2345	49.00	5.48		460 00	128.00	890.00	27.00		146 00	3180 00	0 30	79.00			5078.00
				(23 00)	(10 52)	(38.57)	(0.69)		(2.39)	(66.25)	(0.005)	(2.25)			
2346	84.00	0.17	7.52	474.00	109 00	892.00			3 50	3247 00		99.00			5185.00
				(23.70)	(8.96)				(0.05)	(67.64)		(2 79)			
2347	42.00	0.05		492 00	114.00	960.00			106 00	3241 00		88.00			5089.00
				(24 60)	(9 37)				(1.74)	(67.52)		(2.48)			
2348	48.00	3.43		472.00	44.00	660.00			98 00	2585.00		40.00			3984.00
				(23.60)	(3.60)				(0.62)	(53 84)		(1.12)			
2349	16.00	0.63		44.00	2.90	55.00			179 00	55.00	5.00	31.00			324.00
				(2.20)	(0.24)				(2.94)	(1.14)	(0.08)	(0.87)			
2350	43.00	2.15		25.00	4.00	85.00		35.00		108.00		66.00			
				(1.25)	(0 33)	(3.70)		(1.16)		(2.25)		(1.86)			
2351	42.00	0.055		492.00	114.00	960.60			106.00	3242.00		89.04			5088.03
				(24 60)	(9.38)				(1.74)	(67.54)		(2.51)			

2352	----------	0.58	1.01	284.85	63.26	335.80	1.54	250.40	----------	63.05	----------	866.80	----------	----------	1829.90
				(11.74)	(5.20)	(14.55)	(0.04)	(8.34)		(1.31)		(24.41)			
2353	----------	----------	----------	1481.80	179.10	1281.60	----------	----------	1386 50	454.20	----------	3998 85	----------	----------	8778.90
				(740 90)	(14.81)	(55.55)			(22 73)	(9.46)		(112.64)			
2354	9.80	168.88	Trace	2458.90	719.11	19633.55	571.13	----------	3344.11	138.39	----------	36400.00	----------	----------	----------
				(122.94)	(59.36)	(851.04)	(14.58)		(54.81)	(2.88)		(1025.34)			
2355	----------	----------	----------	22.88	4.38	1115.92	----------	108 00	2290.74	107 47	----------	41 54	----------	----------	4051.20
				(1 14)	(0.36)	(48.37)		(3 67)	(35.49)	(2.24)		(11.59)			
2356	14.00	----------	----------	38.00	4.40	19.00		7.00	127.00	20 00	----------	16.00	50.00	----------	305.40
				(1 90)	(.36)			(0.23)	(3.24)	(.416)		(0.45)			
2357	27.00	----------	----------	43.00	30.00	12.00		74.00	63 00	118 00	----------	9.00	32.00	----------	340.00
				(1 15)	(2.46)			(2.46)	(1.03)	(2.35)		(.025)			
2358	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	244.00
2359	----------	----------	----------	26.80	45.70	47.00		110 90	123.30	85 60	----------	60 40	----------	----------	----------
				(1.34)	(3.75)			(3 69)	(2.02)	(1.78)		(1.70)			
2360	45.60	Trace	40.51	152.40	62.90	131.80		88.80	75 60	274.60	0.70	308.00	----------	----------	1070.00
				(7 62)	(5.17)			(2 96)	(1.24)	(5.72)	(0.011)	(8.68)			
2361	----------	----------	----------	----------	----------	500.00		66 00	106.00	362.00	----------	388.00	----------	----------	1400 00
								(2.20)	(1.74)	(7.55)		(10.92)			
2362	----------	----------	----------	----------	----------	500.00		9 00	211.00	246.00		459.00	----------	----------	1350.00
								(0.30)	(3.46)	(5 13)		(12.92)			
2363	----------	----------	----------	----------	----------	540.00		31.00	158.00	431 00	----------	367.00	----------	----------	1450 00
								(1 03)	(2 59)	(9.00)		(10 23)			
2364	----------	----------	----------	----------	----------	790.00		24 00	137 00	689 00	----------	617.00	----------	----------	2200.00
								(0 80)	(2.25)	(14.35)		(17.00)			
2365	----------	----------	----------	----------	----------	540.00		19 00	163 00	415 00	----------	396.00	----------	----------	1450.00
								(0 63)	(2 67)	(8 65)		(11 15)			
2366	----------	----------	----------	----------	----------	480.00		14 00	249.00	492.00	----------	258 00	----------	----------	1400.00
								(0 47)	(4 08)	(10 24)		(7.27)			
2367	----------	----------	----------	----------	----------	670.00		29 00	163 00	666.00	----------	412.00	----------	----------	1800.00
								(0 97)	(2 67)	(13 05)		(11.60)			
2368	----------	----------	----------	----------	----------	670.00		34 00	158 00	635 00	----------	454.00	----------	----------	1950.00
								(1 13)	(2 55)	(13 64)		(12.73)			
2369	----------	----------	----------	----------	----------	650.00		19 00	166 00	600 00	----------	474.00	----------	----------	1850.00
								(0 63)	(2 73)	(12.50)		(13.35)			
2370	----------	----------	----------	----------	----------	590.00		----------	269.00	444.00	----------	469.00	----------	----------	1700.00
									(4.42)	(9.20)		(13.20)			
2371	----------	----------	----------	----------	----------	610.00		----------	284.00	626.00	----------	372.00	----------	----------	1800.00
									(4.74)	(13.04)		(10.47)			
2372	----------	----------	----------	----------	----------	660.00		----------	149.00	574 00	----------	508.00	----------	----------	1850.00
									(2 44)	(11.96)		(14.82)			
2373	----------	----------	----------	----------	----------	1050.00		----------	295 00	919.00	----------	739.00	----------	----------	2850.00
									(4 84)	(19.15)		(20.82)			
2374	----------	----------	----------	----------	----------	320.00		----------	294.00	313 00	----------	160.00	----------	----------	1000.00
									(4.84)	(6.52)		(4.51)			

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2375						590.00		29.00 (0.97)	180.00 (2.96)	574.00 (11.95)		319.00 (9.00)			1600.00
2376						700.00		19.00 (0.63)	180.00 (2.95)	511.00 (10.66)		522.00 (14.70)			1800.00
2377						320.00			443.00 (7.26)	372.00 (7.76)		188.00 (5.30)			1250.00
2378						590.00		14.00 (0.47)	210.00 (3.44)	475.00 (9.90)		405.00 (11.40)			1600.00
2379						450.00		13.00 (0.43)	210.00 (3.44)	238.00 (4.96)		387.00 (10.90)			1400.00
2380		1.00		20.00 (1.00)	12.00 (0.99)	930.00		122.00 (4.07)	248.00 (4.07)	398.00 (8.30)		306.00 (8.62)			1388.00
2381		2.86				610.00			366.00 (6.00)	1252.00 (26.07)		1180.00 (33.28)			4100.00
2382		5.72				1500.00		66.00 (2.20)	861.00 (14.12)	431.00 (8.99)		1264.00 (35.60)			3550.00
2383		4.29				720.00		13.00 (1.43)	77.00 (1.26)	756.00 (15.75)		(724.00) (20.39)			2400.00
2384						1600.00			173.00 (2.84)	626.00 (13.03)		1980.00 (55.80)			4300.00
2385						1400.00			189.00 (3.10)	1104.00 (23.02)		1071.00 (30.20)			3550.00
2386						850.00			296.00 (4.89)	864.00 (18.00)		449.00 (12.65)			2300.00
2387						330.00			347.00 (5.78)	383.00 (7.98)		152.00 (4.28)			1150.00
2388		10.01				880.00			212.00 (3.48)	362.00 (7.42)		979.00 (27.30)			2350.00
2389						880.00		35.00 (1.17)	302.00 (4.95)	690.00 (14.36)		491.00 (13.82)			2150.00
2390						660.00		43.00 (1.43)	347.00 (5.55)	552.00 (11.50)		299.00 (8.43)			1700.00
2391						1050.00		110.00 (3.67)	176.00 (2.89)	574.00 (11.95)		834.00 (23.50)			2550.00
2392	16.	0.04		24.00 (1.20)	10.00 (0.84)	1046.00 (45.35)	191.00 (4.88)	1.00 (0.03)	776.00 (12.70)	882.00 (18.37)		752.00 (21.16)			3657.00

2393		0.57		24.00	12.00	1636.00	4.00	281.00	788.00		1846.00			4846.00
				(1.20)	(0.99)		(0.13)	(4.60)	(16.42)		(52.20)			
2394				5.50	0.50	953.00		605.00	236.00		745.00			2291.00
				(0.28)	(0.04)			(9.92)	(4.92)		(21.00)			
2395						640.00	62.00	729.00	173.00		304.00			1500.00
							(2.07)	(11.95)	(3.61)		(8.56)			
2396				3.00	1.50	432.00	481.00		83.00		89.00			1150.00
				(0.15)	(0.12)		(16.03)		(1.73)		(2.53)			
2397						1550.00	44.00	999.00	626.00		1126.00			3700.00
							(1.47)	(16.36)	(13.04)		(31.75)			
2398		1.29				530.00	82.00	771.00	132.00		123.00			1250.00
							(2.73)	(12.63)	(2.75)		(3.47)			
2399						250.00	58.00	278.00	125.00		68.00			660.00
							(1.93)	(4.56)	(2.62)		(1.92)			
2400		1.43				550.00	22.00	149.00	690.00		310.00			1760.00
							(0.73)	(2.44)	(14.36)		(8.74)			
2401		1.43				470.00	26.00	185.00	756.00		167.00			1600.00
							(0.87)	(3.04)	(15.75)		(4.71)			
2402						1100.00	5.00	205.00	1723.00		793.00			4050.00
							(0.17)	(.36)	(35.92)		(22.35)			
2503		1.43				560.00		180.00	626.00		404.00			1750.00
								(2.95)	(13.02)		(11.37)			
2404						980.00		88.00	984.00		893.00			3000.00
								(1 44)	(20.50)		(25.01)			
2405						600.00		225.00	765.00		335.00			1900.00
								(3.69)	(15.92)		(9.44)			
2406		3.43				280.00		274.00	254.00		168.00			910.00
								(4.49)	(5.30)		(4.73)			
2407						440.00		298.00	574.00		213.00			1500.00
								(4.89)	(11.95)		(6.00)			
2408		1.57				760.00	10.00	321.00	919.00		299.00			2150.00
							(0.33)	(5.26)	(19.15)		(8.44)			
2409						450.00		308.00	626.00		160.00			1500.00
								(5.05)	(13.02)		(4.51)			
2410		1.72				510.00		333.00	689.00		196.00			1650.00
								(5.46)	(14.35)		(5.52)			
2411						1450.00	38.00	327.00	1060.00		1060.00			3650.00
							(1.27)	(5.36)	(22.10)		(29.90)			
2412						230.00		293.00	103.00		216.00			780.00
								(4.81)	(2.15)		(6.08)			
2413						1290.00		925.00	1292.00		18580.00			32850.00
								(15.15)	(26.95)		(523.50)			
2414				32.00	10.00	1700.00	249.00		1298.00		1450.00			4750.00
				(1.60)	(0.82)		(8.30)		(27.05)		(40.90)			
2415		1.86		118.00	22.00	3086.00		172.00	1394.00		3896.00			8590.00
				(5.90)	(1.81)			(2.82)	(29.06)		(109.070)			

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2416						1700.00		88.00	1188.00	328.00		1186.00			3950.00
								(2.20)	(19.50)	(6.84)		(39.05)			
2417				44.00	15.00	2122.00		264.00		1404.00		2040.00			5870.00
				(2.20)	(1.24)			(8.80)		(29.26)		(97.25)			
2418						1900.00		52.00	1670.00	383.00		1376.00			4350.00
								(1.73)	(27.55)	(7.95)		(38.80)			
2419						1550.00		13.00	1714.00	256.00		1030.00			3550.00
								(0.43)	(28.10)	(5.34)		(29.06)			
2420						1500.00		92.00	1260.00	328.00		1066.00			3500.00
								(3.07)	(20.80)	(6.84)		(30.50)			
2421						1750.00		47.00	1305.00	246.00		1519.00			4050.00
								(1.57)	(21.40)	(5.13)		(42.80)			
2422						510.00		57.00	747.00	140.00		134.00			1200.00
								(1.90)	(12.24)	(2.92)		(3.77)			
2423		0.29		12.00	4.00	1339.00		40.00	1196.00	256.00		11.62			3636.00
				(0.60)	(0.33)			(1.33)	(19.60)	(5.34)		(32.75)			
2424	16.00	4.40		3.50	1.10	1220.00		715.00		228.00		871.00			3063.00
				(0.18)	(0.09)			(23.80)		(4.75)		(24.55)			
2425		1.29		16.00	8.00	808.00		96.00	1214.00	176.00		346.00			2248.00
				(0.80)	(0.66)			(3.20)	(19.90)	(3.67)		(9.76)			
2426						940.00		106.00	1175.00	222.00		379.00			2150.00
								(3.53)	(19.27)	(4.63)		(10.67)			
2427				5.00	3.00	980.00		62.00	1412.00	199.00		482.00			2420.00
				(0.25)	(0.25)			(1.07)	(23.15)	(4.15)		(13.57)			
2428						2650.00			288.00	1380.00		2650.00			6600.00
									(4.64)	(28.77)		(74.70)			
2429						1800.00		24.00	386.00	1214.00		1450.00			4550.00
								(0.80)	(6.33)	(25.30)		(41.70)			
2430						1850.00		24.00	382.00	1214.00		1490.00			4600.00
								(0.80)	(6.26)	(25.30)		(42.00)			
2431		1.14				2500.00		24.00	775.00	756.00		2545.00			6000.00
								(0.80)	(12.79)	(15.75)		(71.70)			
2432						1750.00			1520.00	362.00		1351.00			4050.00
									(24.92)	(7.54)		(38.05)			
2433						990.00		65.00	1250.00	286.00		396.00			2200.00
								(2.17)	(20.50)	(5.96)		(11.15)			

2434				5.00	3.00	874.00		65.00	1264.00	206.00		395.00			2188.00
				(0.25)	(0.25)			(2.17)	(20.72)	(4.29)		(11.12)			
2435						1100.00		53.00	1295.00	430.00		420.00			2550.00
								(1.43)	(21.23)	(8.96)		(11.82)			
2436				4.00	3.00	895.00		66.00	1286.00	202.00		422.00			2145.00
				(0.20)	(0.25)			(2.10)	(21.10)	(4.22)		(11.87)			
2437						1000.00			1224.00	208.00		583.00			2350.00
									(20.05)	(4.34)		(16.42)			
2438				3.00	2.00	2079.00		1316.00		349.00		1400.00			5100.00
				(0.15)	(0.16)			(43.87)		(7.28)		(39.46)			
2439						1750.00		101.00	1188.00	326.00		1422.00			4050.00
								(3.37)	(19.50)	(7.54)		(40.05)			
2440		8.58				250.00			181.00	372.00		102.00			900.00
									(2.97)	(7.76)		(2.88)			
2441						400.00			430.00	247.00		469.00			1550.00
									(7.05)	(5.15)		(13.20)			
2442						490.00			313.00	1147.00		405.00			2650.00
									(5.13)	(23.90)		(11.42)			
2443		1.43				680.00			352.00	1061.00		328.00			2450.00
									(5.77)	(22.10)		(9.24)			
2444		2.00				460.00		14.00	396.00	427.00		205.00			1350.00
								(0.47)	(6.50)	(8.90)		(5.78)			
2445		1.43				340.00			410.00	288.00		188.00			1050 00
									(6.72)	(4.96)		(5.30)			
2446		2.86				430.00			336.00	323.00		286.00			1250.00
									(5.51)	(6.73)		(8.05)			
2447		0.72		14.00	4.00	396.00		56.00	656.00	110.00		118.00			1146.00
				(0.70)	(0.33)			(1.87)	(10.75)	(2.29)		(3.33)			
2448						490.00		40.00	630.00	154.00		184.00			1150 00
								(1.32)	(10.32)	(3.21)		(5.19)			
2449	79.00	0.14	1.69	499.00	1.60	2056.00	5.30		50.00	2916.00		2390.00			8222.00
				(24.95)	(0.13)	(89.40)	(0.12)		(0.82)	(60.80)		(67.40)			
2450						1050.00		118.00	747.00	276.00		740.00			2500.00
								(3.93)	(12.25)	(5.75)		(20.83)			
2451						1050.00			910.00	256.00		740.00			2400.00
									(14.93)	(5.34)		(20.83)			
2452		0.43		10.00	4.00	246.00		30.00	350.00	104.00		92.00			768.00
				(0.50)	(0.33)			(1.00)	(5.74)	(2.17)		(2.59)			
2453						390.00			670.00	108.00		100.00			930.00
									(11.13)	(2.25)		(2.82)			
2454	14.00	7.60		3.00	6.00	350.00		15.00	618.00	107.00		104.00	18.00		1012.00
				(0.15)	(0.49)			(0.50)	(10.13)	(2.23)		(2.93)			
2455						650.00		28.00	452.00	136.00		535.00			1550.00
								(0.93)	(7.42)	(2.84)		(15.06)			
2455a				28.27	10.69	49.00			29.28	136.80		38.60			262.00
				(1.40)	(0.90)	(2.10)			(0.50)	(2.80)		(1.10)			

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2456		15.73		210.00 (10.50)	200.00 (1.65)	1011.00			148.00 (2.43)	1060.00 (22.10)		1182.00 (31.90)			3600.00
2457						4250.00		10.00 (0.33)	474.00 (7.77)	1726.00 (36.00)		4457.00 (125.50)			10250.00
2458						2350.00			363.00 (5.95)	313.00 (6.52)		2938 00 (82.80)			5550.00
2459						4450.00			68.00 (1.12)	54.00 (1.13)		6304.00 (177.70)			10500.00
2460						290.00			334.00 (5 48)	202.00 (4.21)		347.00 (9.78)			1200.00
2461						1400.00			601 00 (9.86)	1312 00 (27.32)		846.00 (23.82)			3050.00
2462		1.43				170.00		22 00 (0.97)	244 00 (4.00)	98 00 (2.04)		20 00 (0.57)			460.50
2463						95.00			274.00 (4.50)	7.00 (0.15)		94.00 (2.65)			430.00
2464						6050.00			904.00 (14 82)	25 00 (0.52)		8262 00 (232.50)			14250.00
2465						4850.00			473.00 (7.76)	26.00 (1.54)		6660.00 (187.60)			11250.00
2466						2700.00			1232.00 (20.20)			3197.00 (90.10)			6250.00
2467		1.72		32.00 (1.60)	16.00 (1.32)	2676.00			622.00 (10.20)	552.00 (11.50)		3458.00 (79.50)			7200.00
2468						3200.00		51.00 (1.70)	383.00 (6.28)	1448.00 (30 20)		3192.00 (90.00)			7750.00
2469						1300.00			400.00 (6.56)	1256.00 (26.15)		885.00 (24.92)			3650.00
2470		0.49		6.00 (0.30)	7.00 (0.58)	375.00		34.00 (1.13)	571.00 (9.36)	106.00 (2.21)		158.00 (4.45)			1060.00
2471	31.00	25.74	12.03	32 00 (1.60)	14.00 (1.15)	25.00			80.00 (1.31)	79.00 (1.65)	1.30 (0.02)	20.00 (0.56)			297.00
2472	25.90			1.20 (0.004)		385.60 (16.70)		345.00 (11.50)		150.75 (3.14)		75.82 (2.14)			1023.34
2473	12.79	2.429		10.00 (0.50)		373.99 (16.20)		242.50 (8.08)		277.90 (5.80)		55.92 (1.58)			975.23

2474	7.20	2.74		107.50	8.06	63.45	36.04	122.35		181.70		45.60			311.62
				(5.38)	(0.66)	(2.75)	(0.95)	(4.08)		(3.79)		(1.28)			
2475	17.75	2.56	Tr	7.88	4.10	327.00		222.20		278.20		63.79			923.00
				(0.39)	(0.34)	(14.13)		(7.41)		(5.80)		(1.77)			
2476	5.15	1.70		5.15	1.96	289.20		230.35		189.50		49.05			772.09
				(0.26)	(0.16)	(12.52)		(7.68)		(3.96)		(1.38)			
2477				321.00	133.00	410.00			310.00	1299.80		449.00			2921.00
				(16.05)	(10.95)	(17.75)			(5.08)	(27.10)		(12.65)			
2478	4.80	0.08		32.00	8.20	121.00			365.00	49.00	1.06	61.00			457.00
				(1.60)	(0.67)				(5.98)	(1.02)	(0.02)	(1.72)			
2479	7.20	0.30		6.40	10.00	174.00			381.00	25.00	0.97	36.00			458.00
				(0.32)	(0.82)				(6.24)	(0.52)	(0.02)	(1.01)			
2480	5.40	0.30		21.00	9.50	772.00			382.00	129.00	1.86	972.00			2119.00
				(1.05)	(0.77)				(6.25)	(2.69)	(0.03)	(27.40)			
2481	19.00	Tr		397.00	74.00	284.00			442.00	262.00	102.00	653.00			2075.00
				(16.35)	(6.04)				(7.24)	(5.46)	(1.65)	(18.37)			
2482	26.00	3.60		96.00	27.00	26.00			334.00	54.00	Tr	43.00			446.00
				(4.80)	(2.25)				(5.48)	(1.13)		(1.21)			
2483	21.00	0.05		270.00	29.00	8.80			249.00	104.00	334.00	186.00			1272.00
				(13.50)	(2.39)				(4.17)	(2.17)	(5.38)	(5.24)			
2484	27.00	4.36	5.55	110.00	14.00	90.00		65.00	358.00	11.00		167.00	70.00		
				(5.50)	(1.15)			(2.17)	(5.89)	(0.23)		(4.71)			
2485	21.00			73.00	16.00	41.00			340.00			48.00	38.00		
				(3.65)	(1.32)				(5.58)			(1.35)			
2486	18.00	0.68	0.70	62.00	1.50	394.00	1.00	17.00	518.00	2.10	2.60	319.00			1082.00
				(3.10)	(0.12)	(16.95)	(0.03)	(0.57)	(8.50)	(0.04)	(0.05)	(9.00)			
2487	145.00	141.00	116.00	728.00	866.00	85.00	5.00			4128.00		1434.00			7484.00
				(36.40)	(71.20)	(3.68)	(0.13)			(86.20)		(40.40)			
2488	64.00	11.00	7.00	126.00	96.00	273.00	9.00			564.00		443.00			1624.00
				(6.30)	(7.90)	(11.82)	(0.23)			(11.75)		(12.50)			
2489	16.00	0.50	1.90	4.00	2.50	8.60			11.00	16.00	0.09	6.20			67.00
				(0.20)	(0.21)				(0.18)	(0.33)	(0.001)	(0.17)			
2490	47.00	0.08	3.40	17.00	7.40	19.00	5.70		66.00	50.00	0.90	9.50			193.00
				(0.85)	(0.61)	(0.82)	(0.15)		(1.08)	(1.04)	(0.014)	(0.27)			
2491	12.00	1.00	0.60	2.20	2.10	49.00	2.50		107.00	19.00	1.80	8.80			150.00
				(0.11)	(0.17)	(2.12)	(0.06)		(1.76)	(0.40)	(0.03)	(0.24)			
2492	21.00	0.70	0.50	3.00	1.40	12.00			16.00	1.50	1.80	4.50			48.00
				(0.15)	(0.12)				(0.26)	(0.03)	(0.03)	(0.13)			
2493	68.00	7.20	2.30	20.00	3.60	23.00	0.40		45.00	21.00		13.00			179.00
				(1.00)	(0.30)	(1.00)	(0.01)		(0.74)	(0.44)		(0.37)			
2494				35.50		2294.67		53.36		968.28		2835.00			626.43
				(1.78)		(99.40)		(1.78)		(20.18)		(80.00)			
2495	33.00	2.00		69.00	0.90	270.00	8.30		180.00	250.00	0.01	250.00			1080.00
				(3.45)	(0.07)	(11.68)	(0.21)		(2.96)	(5.21)		(7.05)			
2496	24.00	2.00		35.00	16.00	130.00	11.00		140.00	140.00	0.05	140.00	40.00		678.06
				(1.75)	(1.32)	(5.64)	(0.28)		(2.30)	(2.94)	(0.001)	(3.95)			

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + rganic	Misc.	Total Solids
2497	----	----	----	17.00	4.00	----	----	----	----	----	----	527.00	----	----	1335.00
				(0.87)	(0.32)							(14.85)			
2498	8.00	10.00		133.60	66.80	1549.20	33.30	----	578.30	2283.80	26.71	354.20	----	0.424	5653.70
				(6.68)	(5.49)	(67.16)	(0.85)		(9 48)	(48.58)	(0.43)	(9.98)		NH_3	
2499	8.00	10.00		333.80	372.50	1699.00	38.40	9.90	592.50	4166.00	0.40	905.10	----	----	8135 60
				(16.69)	(30.63)	(73.64)	(0.98)	(0.33)	(9.71)	(86.83)	(0.006)	(25.49)			
2500	17.00	----	182.36	106.30	70.56	1611.50	49.50	18.00	514.80	3035.50	11.00	340.80	----	----	5865.90
				(5.02)	(5.79)	(69.81)	(1.26)	(0.60)	(8.44)	(63.24)	(0.18)	(9.60)			
2501	----	5.01	----	6164.00	848.00	17175.00		----	156.25	8.20	----	40006.14	----	----	64580.00
				(308.20)	(69.74)				(2.56)	(0.17)		(1126.90)			
2502	23.00	92.00		131.30	169.30	1050.70	137.80	12.00	568.50	1811.80	255.60	639 80	----	----	4891.80
				(6.56)	(13.92)	(45.54)	(3.52)	(0.40)	(93 19)	(37.45)	(41.21)	(18.02)			
2503	1.10	5.00		103.00	97.50	1765.80	37.50	7.20	524 60	3462.40	32.00	298.10	----	0.66	6336.80
				(5.15)	(8.02)	(76.55)	(0.96)	(0.24)	(8.60)	(72.15)	(0.52)	(8.39)		NH_3	
2504	9.95	----	----	61.40	60.02	175.75	----	170.40	----	311.00	----	140.60	87.92	----	1016.37
				(3.07)	(4.93)	(7.62)		(5.68)		(6.48)		(3.96)			
2505	----	3.77	----	106.70	537.00	1588.95	22.64	----	559.90	4586.00	----	375.00	----	----	7666.05
				(5.34)	(44.16)	(68.87)	(0.58)		(9.18)	(95.54)		(10.56)			
2506	27.95	0.34	8.57	64.26	58.18	1379.10	8.60	----	695.80	2473.89	----	243.80	----	----	4955.49
				(3.22)	(4.79)	(59.79)	(0.09)		(11.41)	(51.23)		(6.87)			
2507	7.89	0.51	9.26	281.10	372.70	1680.34	26.54	627.40	----	5150.30	----	----	----	----	8087.94
				(14.06)	(30.65)	(72.84)	(0.93)	(20.91)		(107.30)					
2508	20.41	0.15	----	107.20	29.69	1742.44	----	514.50	----	2948.09	----	210.20	----	----	5588.37
				(5.36)	(2.44)	(75.53)		(17.15)		(61.42)		(5.92)			
2509	197.25	----	----	166.70	75.32	1209.00	119.88	514.50	----	3030.00	----	202.55	----	----	5506.86
				(8.04)	(6.19)	(52.41)	(3.13)	(17.15)		(63.13)		(5.71)			
2510	197.20	----	----	83.69	3.77	1653.43	124.50	51.60	----	3359.68	----	241.28	----	----	6179.14
				(4.18)	(0.31)	(71.67)	(3.18)	(1.72)		(69.99)		(6.79)			
2511	28.48	----	----	207.30	223.00	1116.67	----	307.88	----	305.99	----	139.50	262.40	----	5340.51
				(10.37)	(18.33)	(48.40)		(10.26)		(6.36)		(3.93)			
2512	31.78	28.13	----	68.96	73.98	855.09	10.98	78.24	2212.69	----	----	335.80	168.15	----	3850.15
				(3.45)	(6.08)	(37.02)	(0.28)	(2.61)	(36.27)			(9.18)			
2513	20.00	4.80	45.31	223.30	163.00	1554.30	45.60	34.20	648.50	2687.30	----	903.20	----	----	6308.30
				(11.17)	(13.40)	(67.38)	(1.16)	(1.14)	(10.63)	(55.98)		(25.44)			
2514	22.00	0.10	31.77	258.60	275.90	1243.10	5.20	30.96	444.20	3234.90	1.70	494.40	----	----	6027.90
				(12.93)	(22.69)	(53.88)	(0.13)	(1.03)	(7.28)	(67.39)	(0.03)	(13.92)			

2515	28.00	0.40	16.17	88.60 (4 43)	60.50 (4 97)	1397.30 (60.57)	3 90 (0.99)		691 70 (11.34)	2494.70 (51 97)		242.10 (6.82)			5015.80
2516	715.00	0.20	52.26	65.60 (3 28)	76.60 (6.29)	714.20 (30.96)	28.30 (0 72)	13.20 (0 44)	550.00 (9 01)	1348 90 (28.10)	0.70 (0.01)	135 10 (3.80)			2975.80
2517	22.00	0.20	42.86	69.70 (3 49)	74 60 (6 13)	645 00 (97 95)	22 00 (0 56)	19 80 (0 66)	531.10 (8 70)	1209.40 (25 19)	1.50 (0 03)	127.6 (3 59)			2745.70
2518	34.00	0.30	61.47	172 40 (8 62)	155 60 (12 79)	1276 00 (55 39)	27 80 (0 71)	19 80 (0 66)	370 90 (6.08)	3197 80 (66 62)	1.10 (0.02)	149.00 (4 19)			5437.70
2519	43.00	0.20	72.94	125 80 (6.29)	101 20 (8.32)	1328 00 (57 34)	26 00 (0.06)	28 60 (0 06)	449 80 (7 37)	2792.00 (58.17)	2 90 (0.05)	270.40 (6.20)			5146.20
2520	20.50	14.99		107 40 (5 37)	29.68 (2 40)	845.20 (36 64)		519 80 (17 33)		3905.05 (81 35)		209.10 (5.89)			5651.81
2521	24.02	Tr	92.80	153 80 (7 69)	167.51 (13.77)	643.60 (27 89)	41.86 (1.06)	7 20 (0 24)	611 60 (10 02)	1253 00 (25 73)	41 86 (0.08)	490.20 (13.81)			3502.10
2522	22.98	Tr	91.78	129 60 (6 48)	169 61 (13.95)	1026.93 (44.51)	137.80 (3.52)	12.00 (0 40)	570 00 (9.34)	1810.00 (37.71)	255.60 (4.12)	602 60 (16.97)			4891.69
2523	22.97	Tr	58.82	148 60 (7.43)	154.00 (12.66)	1181.50 (51.21)	34 98 (0.89)	31.20 (1.04)	462.10 (7 58)	2837 19 (59.52)	4 12 (0.06)	147 70 (4.16)			5101.94
2524	19.88	Tr	3.77	81.46 (4 07)	63.98 (5.22)	1674 80 (72 59)	46.63 (1.19)	23 15 (0 77)	434 90 (7 13)	3206 50 (66 89)	4 46 (0.07)	311.46 (8.75)			5852.77
2525	175.20			56 08 (2 80)	66 20 (5.44)	1212.50 (54 72)	24.35 (0.62)	65 26 (2 18)	171 75 (3 81)	2440.41 (50 91)		191 60 (5 39)		HSO3=	4660.17
2525a	66.40		765.30	548 00 (97 40)	262.10 (21 84)	1336 60 (58.12)			761 20 (11 37)	2256 30 (45 09)	S=40.40	2573 60 (72 79)		808.50	8624.80
2526	25.73		145.75	108.85 (5 44)	79.78 (6 56)	1424 50 (61 74)	133 16 (3.47)	108 70 (6 62)		2799 00 (58 31)		253 00 (7.13)			5600.33
2527	11.00	Tr		80.00 (4.00)	9 20 (0 76)	98.00 (4.24)			194 00 (3 18)	96 00 (2 00)	16 00 (0 28)	103 00 (2.90)			5288.00
2528	9.60	0.28		6 40 (0 32)	3 50 (0.29)	304.00 (13 17)		37 00 (1.23)	987 00 (6 31)	147 00 (3 06)	3 30 (0.05)	122.00 (3 44)			835.00
2529	30.00	0.49	3.70	680 00 (94 00)	166 00 (13 65)	5260 00 (232.00)	70 80 (1.81)		268 20 (4.40)	6405 00 (133 50)		5348 00 (150 70)			18000.00
2530	35.00	481.00	5.00	106 00 (5 00)	45 00 (3 70)	112.00				7363 00 (98 40)		100 00 (2 87)	42.00		2288.00
2531		918.00	13.00	187 00 (9 35)	69 00 (5.52)	329.00				2855 00 (59.60)		54.00 (1 52)	38.00		4465.00
2532	56.00	38.00	11.00	260 00 (13 00)	166 00 (13 65)					1225 00 (25 50)		417 00 (11.75)	164.00		2394.00
2533	48.00	133.00	14.00	317.00 (15 85)	118 00 (9 72)	585.00				1371.00 (28 60)		567 00 (15.97)			2878.00
2534				392 00 (16 60)	180 00 (14 80)	1628.00						607.00 (17 10)	210.00		3194.00
2535	70.00	156.00	31.00	344 00 (17.20)	231 00 (19.25)	230.00				1774 00 (37.00)		622.00 (17.50)			3644.00
2536	17.00					330.00			790 00 (12.95)	8.10 (0.17)		30.00 (0.18)	34.00		

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO2	Fe2O3	Al2O3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO3	HCO3	SO4	NO3	Cl	Vol. + organic	Misc.	Total Solids
2537	24.00			4.10		370.00			860.00	14.00		57.00	31.00		
				(0.21)					(14.09)	(0.29)		(1.61)			
2538		1207.80		259.20	241.90	588.40	74.79			6188.00				Li 0.24	8861.23
				(29.46)	(19.90)	(24.20)	(1.91)			(128.90)				(0.02)	
2539	18.00	0.14		38.00	0.30	170.00			153.00	39.00		0.40	44.00		683.00
				(1.90)	(0.02)	(7.38)			(2.46)	(0.81)		(0.01)			
2540	11.32			2.68	0.15	558.50		259.20		106.80		101.70			970.00
				(0.13)	(0.01)	(24.25)		(11.97)		(2.24)		(2.87)			
2541				27.28	6.69	30.18	19.22			25.04					
				(1.36)	(0.55)	(1.31)	(0.49)			(0.52)					
2542				16.95	5.49	2.92	3.77			25.04					
				(0.85)	(0.45)	(0.12)	(0.09)			(0.52)					
2543	17.66	0.16		501.60	35.68	766.50			295.75	1112.50		1184.30			3938.00
				(2.51)	(2.93)	(33.22)			(4.85)	(23.16)		(33.35)			
2544	7.20		16.46	21.27	27.97	366.75		31.90	47.51	147.70		539.40			1206.00
				(1.06)	(2.30)	(15.90)		(1.06)	(0.78)	(3.08)		(15.19)			
2545	58.16	9.09		574.20	371.50	1296.50	12.18		612.00	531.60		210.10			7287.30
				(28.71)	(30.55)	(56.13)	(0.31)		(10.30)	(11.08)		(5.91)			
2545a			140	2018	884	26897	481		520	4094		4462.0			33950.00
				(100.7)	(73.6)	(1167.3)	(12.3)		(8.50)	(85.20)		(1258.07)			
2546	27.10	0.29	35.32	11.84	4.80	618.40		100.85	363.60	446.30	88.00	235.40			1900.20
				(0.59)	(0.39)			(3.36)	(5.96)	(9.29)	(1.42)	(6.61)			
2547	18.02		21.09	54.36		209.10		28.82	276.00	156.49	74.98	147.74			830.12
				(2.72)				(0.96)	(4.53)	(3.24)	(1.21)	(4.16)			
2548	13.81	Tr		92.60	49.08	573.70		110.60		846.40		447.00			2138.00
				(4.63)	(4.04)	(24.87)		(3.65)		(17.63)		(12.59)			
2549	5.49		5.14	78.30	315.50	370.10			1102.80	4377.50		578.80			
				(13.92)	(25.95)	(16.04)			(18.08)	(91.16)		(16.30)			
2550		17.16		32.00	31.00	788.00		74.00		460.00		938.00			2407.00
				(1.60)	(2.54)	(34.15)		(2.47)		(7.54)		(26.42)			
2551	30.00	1.41		1036.00	493.90	4638.00			2177.00	2598.00		8350.00			16060.00
				(51.80)	(40.61)				(35.69)	(54.13)		(235.31)			
2552		6.00		276.80	107.30	3150.45		658.50		1323.00		4034.00			10266.85
				(13.84)	(8.82)	(136.56)		(21.95)		(27.56)		(133.63)			
2553	13.05	Tr	Tr	77.33	4.40	401.24	20.30	529.90		699.43		145.34			1892.56
				(3.87)	(0.36)	(17.39)	(0.52)	(17.66)		(14.57)		(4.09)			

2554				1500.00		101300.00	400.00				2500.00		158300.00				$64,000.00
				(75.00)		(4896.42)	(10.22)				(52.08)		(4459.16)				
2555				1500.00		102,100.00	100.00				3400.00		157100.00				264,200.00
				(75.00)		(4439.13)	(2.55)				(70.83)		(4425.35)				
2556	104.00			82.00	3.00	68.00	27.00		328.00		47.00		53.00				
				(4.10)	(0.24)	(2.95)	(0.69)		(5.38)		(0.98)		(1.49)				
2557	2.79	5.67		108.00				16.40	246.50		6.62	10.99	15.00				324.00
				(5.30)				(0.55)	(4.04)		(0.14)	(0.18)	(0.42)				
2558	9.60	Tr		28.00	42.00	252.00		19.00	395.00		292.00	Tr	102.00		Suspended 2.80		927.00
				(1.40)	(3.45)			(0.63)	(6.48)		(6.08)		(2.87)				
2559	12.00	0.07		187.00	86.00	739.00		2890.00	2289.00		294.00	33.00	1380.00				7053.00
				(9.35)	(7.07)			(96.33)	(37.52)		(6.12)	(0.53)	(88.87)				
2560	7.00	0.07	7.52	1387.00	411.00	16611.00	43.00		93.00		512.00	0.02	29077.00				48,726.00
				(69.85)	(33.79)	(720.02)	(1.10)		(1.53)		(10.66)	(.0003)	(819.07)				
2561	4.97	1.89	4.46	38.78	0.11	550.10	13.83	186.10			594.10		300.80				1661.84
				(1.94)	(0.01)	(24.27)	(0.35)	(6.20)			(12.37)		(8.47)				
2562				243.00	153.20	1276.00		376.90			2658.00		520.80				6170.91
				(12.15)	(12.58)	(55.31)		(12.56)			(55.38)		(14.68)				
2563	1.71	9.57	143.78	250.25	218.00	1090.00	45.80	267.80			3454.50						6499.63
				(12.51)	(17.92)	(47.68)	(1.17)	(8.93)			(71.97)						
2564						127858.							191016.00				325,218.00
						(5558.6)							(5380.73)				
2565	17.00			9.60	3.90	686.10	20.22	243.50			133.30		724.00				1836.25
				(0.48)	(0.32)	(29.74)	(0.52)	(3.12)			(2.77)		(20.39)				
2566	17.00	4.29	3.57	2.60	4.20	49.00	2.80	2.40	102.00		19.00	1.80	7.00				154.00
				(0.13)	(0.34)	(2.12)	(0.07)	(0.80)	(1.67)		(.089)	(0.03)	(0.19)				
2567	26.00	(0.57)	(0.79)	8.00	8.60	404.00	33.00	31.00	485.00		10.00	0.01	310.00				1069.00
				(0.40)	(0.71)	(17.51)	(0.84)	(1.03)	(7.95)		(0.21)	(.0002)	(8.74)				
2568	34.32			10.27	12.00	526.80	42.78	41.18	631.56		12.00		404.90				1722.80
				(0.50)	(0.99)	(22.79)	(1.09)	(1.37)	(10.35)		(0.25)		(11.40)				
2569	7.60	5.72		898.00	230.00	7316.00			164.00		42.00	2.20	13580.00				22879.00
				(44.90)	(18.99)				(2.69)		(0.88)	(0.04)	(382.50)				
2570	13.00	2.57		554.00	534.00	166.00			445.00	2934.00	8.20		293.00				5334.00
				(27.70)	(43.91)				(7.29)		(61.13)	(0.13)	(8.25)				
2571	12.03	Tr		83.00	16.00	70.00			339.00		55.00	4.20	55.00				451.00
				(4.15)	(1.32)				(5.56)		(1.15)	(0.07)	(1.58)				
2572	8.40	0.64		504.00	222.00	295.00			242.00		1887.00	16.00	158.00				3328.00
				(25.20)	(18.25)				(3.97)		(39.32)	(0.25)	(4.45)				
2573	14.00	Tr		116.00	46.00	164.00			354.00		154.00	28.00	245.00				945.00
				(5.80)	(3.78)				(5.80)		(3.21)	(0.45)	(6.90)				
2574	4.80	5.60		81.40	101.10						50.64						3108.60
				(4.07)	(8.32)						(1.05)						
2575				978.00	259.00	2025.00			106.00		2645.00		3590.00		H_2S		10054.00
				(48.90)	(21.29)				(1.74)		(55.10)		(101.12)		32.00		
2576				974.00	168.00	2530.00			117.00		2563.00		4150.00				10538.00
				(48.70)	(13.89)				(1.88)		(53.39)		(116.90)				

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2577				1263.00	303.00	5990.00			451.00	2039 00		9825.00		H_2S	21182.00
				(63.15)	(24.09)				(7.39)	(63 31)		(276.76)		92.00	
2578				1148.00	604.00	8540.00			398.00	3960.00		13780 00		H_2S	27,813.00
				(57.40)	(49.67)				(6.51)	(82.50)		(388.17)		(65.00)	
2579				1348.00	384.00	8538.00			307 00	3886.00		13651.00			28,008.00
				(67.40)	(31.57)				(5.04)	(80 95)		(384 53)			
2580				38.00	3.50	57.00		8.50		17 00		8 50			161.00
				(1.90)	(0.29)	(2.47)		(0.28)		(0.35)		(0 14)			
2581	16.00	2.70		36.00	4.50	11.00		60.00		20.00		9.10			161 30
				(1.80)	(0.37)	(0.47)		(2.00)		(0.42)		(0 25)			
2582	24.80	Tr	22.80	184.60	104.30	97.20		126.40		685.10		134 80			1732.80
				(9.23)	(8.53)	(4.20)		(4.22)		(14.27)		(3.80)			
2583	225.00		5.00	184.50	43.60	2408.50	235.20		962.60	1225.00		2915.50			8002.40
				(9.23)	(3.58)	(104.39)	(6.00)		(15.78)	(25.52)		(82 53)			
2584				100.00		110.00			240.00	210.00	0.49	100.00			699.00
				(5.00)					(3.94)	(4.37)	(.008)	(2.82)			
2585	35.00		6.50	163.40	32.80	2410.70	242.50	6.00	161.00	1197 50		2915.50			7908 00
				(8.17)	(2.69)	(104.94	(6.20)		(14.81)	(24.94)		(82.13)			
2586	46.40	24.80		1181.00	574.19	9765.76		1248.05		4401.60		14044.19			31,408.92
				(59.05)	(47.22)	(423.27)		(41.60)		(91.70)		(395.61)			
2587	0.80	14.40		1382.18	434.46	7473.50		716.33		4306.12		11232.94			25,560.73
				(69.11)	(35.72)	(324.94)			(23.87)	(89.71)					
2588								6.00				128.00			678.00
								(0.20)				(3.61)			
2589								20.00	156.00			98.00			618.00
								(0.67)	(2.56)			(2.76)			
2590									272.00			62.00			528 00
									(4 46)			(1.70)			
2591									258.00			100.00			638.00
									(4.26)			(2.82)			
2592									184.00			113.00			662.00
									(3.02)			(3.18)			
2593									222.00			113.00			654.00
									(3.64)			(3.18)			
2594								11.00	170.00			106.00			690.00
								(0 37)	(2.79)			(2.99)			

2595	-----	-----	-----	-----	-----	-----	-----	-----	193.00 (3.20)	-----	-----	71.00 (2.00)	-----	-----	544.00
2596	-----	-----	-----	-----	-----	-----	-----	-----	186.00 (3.05)	-----	-----	78.00 (2.02)	-----	-----	544.00
2597	-----	-----	-----	-----	-----	-----	-----	-----	192.00 (3.15)	-----	-----	56.00 (1.58)	-----	-----	850.00
2598	-----	-----	-----	-----	-----	-----	-----	-----	199.00 (3.27)	-----	-----	49.00 (1.38)	-----	-----	716.00
2599	-----	-----	-----	-----	-----	-----	-----	-----	166.00 (2.72)	-----	-----	42.00 (1.18)	-----	-----	570.00
2600	-----	-----	-----	-----	-----	-----	-----	-----	169.00 (2.77)	-----	-----	52.00 (1.47)	-----	-----	534.00
2601	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	67.00 (1.89)	-----	-----	564.00
2602	-----	-----	-----	-----	-----	-----	-----	-----	168.00 (2.75)	-----	-----	45.00 (1.27)	-----	-----	552.00
2603	-----	-----	-----	-----	-----	-----	-----	-----	180.00 (2.97)	-----	-----	74.00 (2.08)	-----	-----	764 [illegible]
2604	-----	-----	-----	-----	-----	-----	-----	-----	178.00 (2.92)	-----	-----	40.00 (1.13)	-----	-----	454.00
2605	-----	-----	-----	-----	-----	-----	-----	-----	183.00 (3.00)	-----	-----	42.00 (1.18)	-----	-----	448.00
2606	-----	-----	-----	-----	-----	-----	-----	-----	190.00 (3.12)	-----	-----	41.00 (1.15)	-----	-----	464.00
2607	-----	-----	-----	-----	-----	-----	-----	-----	195.00 (3.20)	-----	-----	42.00 (1.18)	-----	-----	440.00
2608	-----	-----	-----	-----	-----	-----	-----	-----	173.00 (2.84)	-----	-----	39.00 (1.10)	-----	-----	324.00
2609	-----	-----	-----	-----	-----	-----	-----	-----	141.00 (2.31)	-----	-----	23.00 (0.65)	-----	-----	402.00
2610	-----	-----	-----	-----	-----	-----	-----	-----	154.00 (2.53)	-----	-----	27.00 (0.76)	-----	-----	284.00
2611	-----	-----	-----	-----	-----	-----	-----	-----	151.00 (2.48)	-----	-----	26.00 (0.73)	-----	-----	296.00
2612	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	28.00 (0.79)	-----	-----	410.00
2613	-----	-----	-----	-----	-----	-----	-----	-----	152.00 (2.50)	-----	-----	113.00 (3.19)	-----	-----	396.00
2614	-----	-----	-----	-----	-----	-----	-----	-----	136.00 (3.23)	-----	-----	88.00 (2.48)	-----	-----	404.00
2615	-----	-----	-----	-----	-----	-----	-----	21.00 (0.70)	135.00 (3.21)	-----	-----	233.00 (6.53)	-----	-----	872.00
2616	-----	-----	-----	-----	-----	-----	-----	-----	161.00 (2.64)	-----	-----	136.00 (3.84)	-----	-----	660.00
2617	-----	-----	-----	-----	-----	-----	-----	23.00 (0.77)	138.00 (2.26)	-----	-----	178.00 (5.02)	-----	-----	746.00

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2618									184.00			175.00			
2619									(3.02)			(4.93)			758.00
2620									174.00			108.00			
2621								6.00	(2.85)			(2.90)			868.00
2622								(0.20)	192.00			117.00			
2623									(3.15)			(3.30)			848.00
2624									904.30	1197 50		2915.50			
2625								(0.20)	(2.64)			(2.00)			860.00
2626									157.00			106.00			
2627									(2.58)			(2.99)			902.00
2628									167.00			187.00			
2629									(2.74)			(5 29)			1060.00
2630									234.00			275.00			
2631									(3.84)			(7.78)			1190.00
2632									209.00			362.00			
2633									(3.43)			(10.20)			1350 00
2634								19.00	173.00			494.00			
2635								(0.63)	(2.84)			(13.90)			1700.00
								35.00	172.00			759.00			
								(1.17)	(2.82)			(21.40)			2490.00
								18.00	219 00			1070 00			
								(0.60)	(3.59)			(30.15)			3470.00
								15.00				1230.00			
								(0.50)				(34.65)			3720.00
								16.00	219.00			1080.00			
								(0.53)	(3.59)			(30.45)			3330.00
								7.00	239.00			1220.00			
								(0.23)	(3.92)			(34.40)			3780.00
									178.00			233.00			
									(2.92)			(6.57)			948.00
									179.00			285.00			
									(2.94)			(8.04)			1090.00
									213.00			582.00			
									(3.49)			(16.40			2250 00
									262 00			1020 00			
									(4.29)			(28.75)			3250.00

2636	-----	-----	-----	-----	-----	-----	-----	-----	240.00 (3.94)	-----	-----	1240.00 (34.95)	-----	-----	3880.00
2637	-----	-----	-----	-----	-----	-----	-----	-----	167.00 (2.74)	-----	-----	131.00 (3.69)	-----	-----	686.00
2638	-----	-----	-----	-----	-----	-----	-----	-----	167.00 (2.74)	-----	-----	130.00 (3.66)	-----	-----	716.00
2639	-----	-----	-----	-----	-----	-----	-----	-----	189.00 (3.10)	-----	-----	205.00 (5.78)	-----	-----	1530.00
2640	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	318.00 (8.96)	-----	-----	1940.00
2641	-----	-----	-----	-----	-----	-----	-----	-----	244.00 (3.68)	-----	-----	458.00 (12.90)	-----	-----	1800.00
2642	-----	-----	-----	-----	-----	-----	-----	-----	246.00 (4.04)	-----	-----	640.00 (18.04)	-----	-----	2220.00
2643	-----	-----	-----	-----	-----	-----	-----	-----	251.00 (4.12)	-----	-----	797.00 (22.45)	-----	-----	2470.00
2644	-----	-----	-----	-----	-----	-----	-----	-----	258.00 (4.23)	-----	-----	736.00 (20.75)	-----	-----	2350.00
2645	-----	-----	-----	-----	-----	-----	-----	-----	229.00 (3.75)	-----	-----	562.00 (15.83)	-----	-----	1850.00
2646	-----	-----	-----	-----	-----	-----	-----	-----	224.00 (3.67)	-----	-----	561.00 (15.80)	-----	-----	1800.00
2647	-----	-----	-----	-----	-----	-----	-----	8.00 (0.27)	218.00 (3.58)	-----	-----	467.00 (13.15)	-----	-----	1470.00
2648	-----	-----	-----	-----	-----	-----	-----	10.00 (0.33)	194.00 (3.18)	-----	-----	401.00 (11.28)	-----	-----	1320.00
2649	-----	-----	-----	-----	-----	-----	-----	-----	182.00 (2.99)	-----	-----	247.00 (6.96)	-----	-----	994.00
2650	-----	-----	-----	-----	-----	-----	-----	4.00 (0.13)	162.00 (2.66)	-----	-----	154.00 (4.34)	-----	-----	702.00
2651	-----	-----	-----	-----	-----	-----	-----	12.00 (0.40)	149.00 (2.44)	-----	-----	102.00 (2.88)	-----	-----	704.00
2652	-----	-----	-----	-----	-----	-----	-----	13.00 (0.43)	142.00 (2.33)	-----	-----	127.00 (3.58)	-----	-----	822.00
2653	-----	-----	-----	-----	-----	-----	-----	-----	174.00 (2.85)	-----	-----	128.00 (3.61)	-----	-----	712.00
2654	-----	-----	-----	-----	-----	-----	-----	-----	162.00 (2.66)	-----	-----	76.00 (2.14)	-----	-----	546.00
2655	-----	-----	-----	-----	-----	-----	-----	-----	180.00 (2.95)	-----	-----	84.00 (2.36)	-----	-----	612.00
2656	-----	-----	-----	-----	-----	-----	-----	-----	154.00 (2.53)	-----	-----	49.00 (1.38)	-----	-----	508.00
2657	-----	-----	-----	-----	-----	-----	-----	-----	169.00 (2.77)	-----	-----	68.00 (1.92)	-----	-----	572.00
2658	-----	-----	-----	-----	-----	-----	-----	-----	173.00 (2.83)	-----	-----	86.00 (2.42)	-----	-----	658.00

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2659									175.00 (2.87)			89.00 (2.50)			618.00
2660									165.00 (2.70)			88.00 (2.48)			600.00
2661									168.00 (2.75)			81.00 (2.28)			576.00
2662									168.00 (2.75)			95.00 (2.68)			552.00
2663									168.00 (2.75)			99.00 (2.79)			550.00
2664									172.00 (2.82)			107.00 (3.02)			520.00
2665									178.00 (2.92)			99.00 (2.79)			534.00
2666									196.00 (3.22)			180.00 (2.04)			756.00
2667									199.00 (3.26)			207.00 (5.84)			958.00
2668								24.00 (0.80)	185.00 (3.08)			246.00 (6.98)			932.00
2669								14.00 (0.47)	205.00 (3.36)			254.00 (7.16)			890.00
2670								22.00 (0.73)	193.00 (3.17)			260.00 (7.33)			980.00
2671									224.00 (3.67)			199.00 (5.16)			856.00
2672									231.00 (3.79)			166.00 (4.68)			752.00
2673									204.00 (3.35)			116.00 (3.26)			610.00
2674									175.00 (2.87)			76.00 (2.14)			480.00
2675									168.00 (2.76)			72.00 (2.03)			524.00
2676									172.00 (2.82)			87.00 (2.45)			544.00

2677									182.00		83.00		528.00
									(2.96)		(2.34)		
2678								6.00	162.00		87.00		500.00
								(0.20)	(2.66)		(2.45)		
2679									174.00		103.0		586.00
									(2.85)		(2.90)		
2680									158.00		99.00		540.00
									(2.59)		(2.42)		
2681									166.00		86.00		580.00
									(2.72)		(2.42)		
2682									159.00		80.00		556.00
									(2.61)		(2.25)		
2683									154.00		76.00		464.00
									(2.53)		(2.14)		
2684								15.00	124.00		90.00		506.00
								(0.50)	(2.03)		(2.79)		
2685									185.00		113.00		542.00
									(3.03)		(3.19)		
2686									198.00		113.00		570.00
									(3.25)		(3.19)		
2687									178.00		82.00		518.00
									(2.92)		(2.31)		
2688									159.00		102.00		620.00
									(2.61)		(2.88)		
2689									169.00		101.00		596.00
									(2.77)		(2.85)		
2690									174.00		121.00		592.00
									(2.86)		(3.44)		
2691									182.00		138.00		694.00
									(2.98)		(3.89)		
2692									170.00		100.00		584.00
									(2.79)		(2.82)		
2693									162.00		79.00		476.00
									(2.66)		(2.23)		
2694									166.00		97.00		634.00
									(2.72)		(2.73)		
2695								8.00	142.00		97.00		678.00
								(.027)	(2.33)		(2.73)		
2696									166.00		165.00		784.00
									(2.72)		(4.65)		
2697									160.00		112.00		658.00
									(2.63)		(3.16)		
2698									160.00		68.00		630.00
									(2.63)		(1.92)		
2699									150.00		68.00		682.00
									(2.46)		(1.92)		

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2700									144.00 (2.36)			63.00 (1.78)			592.00
2701								4.00 (0.13)	129.00 (2.12)			78.00 (2.20)			554.00
2702									77.00 (1.26)			58.00 (1.63)			470.00
2703									140.00 (2.33)			39.00 (1.10)			356.00
2704									156.00 (2.56)			63.00 (1.77)			372.00
2705									144.00 (2.36)			57.00 (1.60)			470.00
2706									134.00 (2.20)			48.00 (1.35)			492.00
2707									206.00 (3.38)			44.00 (1.24)			502.00
2708									156.00 (2.56)			39.00 (1.10)			464.00
2709									147.00 (2.41)			34.00 (0.96)			420.00
2710									147.00 (2.41)			34.00 (0.96)			346.00
2711									134.00 (2.20)			24.00 (0.68)			354.00
2712									128.00 (2.10)			25.00 (0.70)			276.00
2713									140.00 (2.30)			29.00 (0.82)			382.00
2714									80.00 (1.31)			34.00 (0.96)			426.00
2715									73.00 (1.20)			34.00 (0.96)			364.00
2716								9.00 (0.30)	98.00 (1.61)			32.00 (0.90)			330.00
2717									137.00 (2.25)			29.00 (0.82)			348.00

2718									128.00			29.00		370.00
									(2.10)			(0.82)		
2719								13.00	830.00			39.00		328.00
								(0.43)	(13.60)			(1.10)		
2720									134.00			34.00		348.00
									(2.20)			(0.96)		
2721									140.00			34.00		338.00
									(2.33)			(0.96)		
2722									118.00			30.00		286.00
									(1.97)			(0.85)		
2723									134.00			30.00		298.00
									(2.20)			(0.85)		
2724									134.00			30.00		266.00
									(2.20)			(0.85)		
2725									131.00			25.00		272.00
									(2.15)			(0.71)		
2726									140.00			30.00		294.00
									(2.30)			(0.85)		
2727								6.00	102.00			30.00		274.00
								(0.30)	(1.67)			(0.85)		
2728									129.00			30.00		272.00
									(2.11)			(0.85)		
2729									128.00			20.00		266.00
									(2.10)			(0.56)		
2730									108.00			30.00		246.00
									(1.77)			(0.85)		
2731									255.00			25.00		280.00
									(4.18)			(0.71)		
2732								72.00	77.00			30.00		252.00
								(0.40)	(1.26)			(0.85)		
2733									140.00			30.00		354.00
									(2.30)			(0.85)		
2734									144.00			30.00		420.00
									(2.36)			(0.85)		
2735									160.00			30.00		434.00
									(2.63)			(0.85)		
2736									141.00			30.00		364.00
									(2.31)			(0.85)		
2737									154.00			25.00		340.00
									(2.53)			(0.71)		
2738									138.00			30.00		348.00
									(2.27)			(0.85)		
2739									72.00			30.00		378.00
									(1.18)			(0.85)		
2740									65.00			30.00		336.00
									(1.07)			(0.85)		

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2741								26.00	36.00			30.00			276.00
								(0.87)	(0.59)			(0.85)			
2742									144.00			30.00			204.00
									(2.36)			(0.85)			
2743									147.00			35.00			416.00
									(2.41)			(0.98)			
2744									278.00			40.00			466.00
									(4.55)			(1.13)			
2745									160.00			28.00			370.00
									(2.63)			(0.79)			
2746									140.00			40.00			408.00
									(2.30)			(1.30)			
2747									137.00			64.00			562.00
									(2.25)			(1.80)			
2748									155.00			60.00			500.00
									(2.54)			(1.69)			
2749									146.00			74.00			506.00
									(2.40)			(2.09)			
2750									154.00			97.00			520.00
									(2.53)			(2.73)			
2751									141.00			42.00			300.00
									(2.31)			(1.18)			
2752									151.00			68.00			418.00
									(2.48)			(1.91)			
2753									171.00			147.00			722.00
									(2.80)			(4.15)			
2754								9.00	204.00			229.00			1130.00
								(0.30)	(3.34)			(6.95)			
2755									246.00			390.00			1650.00
									(4.04)			(10.97)			
2756									252.00			467.00			1920.00
									(4.13)			(13.16)			
2757								38.00	216.00			534.00			2110.00
								(1.27)	(3.54)			(15.15)			
2758								13.00	188.00			590.00			1630.00
								(0.43)	(3.00)			(16.62)			

2759	-	-	-	-	-	-	-	-	205.00 (3.36)	-	-	466.00 (13.13)	-	-	1680.00
2760	-	-	-	-	-	-	-	-	233.00 (3.82)	-	-	641.00 (18.06)	-	-	2440.00
2761	-	-	-	-	-	-	-	-	164.00 (2.69)	-	-	72.00 (2.03)	-	-	480.00
2762	-	-	-	-	-	-	-	5.00 (0.17)	163.00 (2.67)	-	-	69.00 (1.95)	-	-	1170.00
2763	-	-	-	-	-	-	-	10.00 (0.33)	124.00 (2.03)	-	-	73.00 (2.06)	-	-	1120.00
2764	-	-	-	-	-	-	-	-	141.00 (2.31)	-	-	81.00 (2.28)	-	-	1100.00
2765	-	-	-	-	-	-	-	-	153.00 (2.51)	-	-	39.00 (1.10)	-	-	554.00
2766	-	-	-	-	-	-	-	-	135.00 (2.21)	-	-	47.00 (1.32)	-	-	492.00
2767	-	-	-	-	-	-	-	3.00 (0.10)	139.00 (2.28)	-	-	32.00 (0.90)	-	-	396.00
2768	-	-	-	-	-	-	-	-	127.00 (2.08)	-	-	31.00 (0.87)	-	-	338.00
2769	-	-	-	-	-	-	-	-	131.00 (2.15)	-	-	35.00 (0.99)	-	-	316.00
2770	-	-	-	-	-	-	-	-	126.00 (2.07)	-	-	37.00 (1.04)	-	-	308.00
2771	-	-	-	-	-	-	-	-	137.00 (2.25)	-	-	45.00 (1.27)	-	-	392.00
2772	-	-	-	-	-	-	-	-	133.00 (2.18)	-	-	39.00 (1.10)	-	-	366.00
2773	-	-	-	-	-	-	-	-	139.00 (2.28)	-	-	46.00 (1.30)	-	-	450.00
2774	-	-	-	-	-	-	-	-	116.00 (1.90)	-	-	50.00 (1.40)	-	-	426.00
2775	-	-	-	-	-	-	-	-	142.00 (2.33)	-	-	31.00 (0.87)	-	-	324.00
2776	-	-	-	-	-	-	-	-	150.00 (2.46)	-	-	80.00 (2.25)	-	-	444.00
2777	-	-	-	-	-	-	-	-	134.00 (2.20)	-	-	35.00 (0.99)	-	-	288.00
2778	-	-	-	-	-	-	-	-	142.00 (2.33)	-	-	29.00 (0.82)	-	-	300.00
2779	-	-	-	-	-	-	-	-	137.00 (2.25)	-	-	32.00 (0.90)	-	-	254.00
2780	-	-	-	-	-	-	-	-	151.00 (2.48)	-	-	32.00 (0.92)	-	-	272.00
2781	-	-	-	-	-	-	-	-	126.00 (2.07)	-	-	39.00 (1.10)	-	-	242.00

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2782									138.00 (2.26)			39.00 (1.10)			244.00
2783									128.00 (2.10)			34.00 (0.96)			268.00
2784									148.00 (2.43)			41.00 (1.16)			264.00
2785									206.00 (3.38)			58.00 (1.63)			508.00
2786									136.00 (2.23)			52.00 (1.47)			534.00
2787									129.00 (2.12)			45.00 (1.27)			444.00
2788									129.00 (2.12)			40.00 (1.13)			344.00
2789									130.00 (2.13)			46.00 (1.30)			330.00
2790									155.00 (2.54)			56.00 (1.58)			364.00
2791									142.00 (2.33)			53.00 (1.49)			338.00
2792									141.00 (2.31)			54.00 (1.52)			350.00
2793									144.00 (2.36)			50.00 (1.41)			378.00
2794									143.00 (2.34)			49.00 (1.38)			322.00
2795									174.00 (2.85)			57.00 (1.61)			388.00
2796									135.00 (2.21)			54.00 (1.52)			326.00
2797									144.00 (2.36)			56.00 (1.58)			324.00
2798									140.00 (2.30)			59.00 (1.66)			350.00
2799									140.00 (2.30)			46.00 (1.30)			314.00

2800										144.00			54.00	358.00
										(2.36)			(1.52)	
2801										164.00			56.00	428.00
										(2.69)			(1.58)	
2802										152.00			56.00	352.00
										(2.49)			(1.58)	
2803										142.00			56.00	364.00
										(2.33)			(1.58)	
2804										148.00			46.00	316.00
										(2.35)			(1.30)	
2805										126.00			46.00	348.00
										(2.07)			(1.30)	
2806										136.00			46.00	358.00
										(2.23)			(1.30)	
2807										138.00			46.00	368.00
										(2.26)			(1.30)	
2808										136.00			46.00	370.00
										(2.23)			(1.30)	
2809										141.00			46.00	374.00
										(2.31)			(1.30)	
2810										131.00			46.00	318.00
										(2.15)			(1.30)	
2811										136.00			58.00	470.00
										(2.23)			(1.63)	
2812										138.00			52.00	400.00
										(2.26)			(1.47)	
2813										138.00			57.00	430.00
										(2.26)			(1.61)	
2814										138.00			52.00	436.00
										(2.26)			(1.47)	
2815										134.00			52.00	420.00
										(2.20)			(1.47)	
2816										134.00			57.00	410.00
										(2.20)			(1.61)	
2817										138.00			52.00	440.00
										(2.26)			(1.47)	
2818									9.00	215.00			28.00	400.00
									(0.30)	(3.52)			(0.79)	
2819									5.00	146.00			62.00	434.00
									(.17)	(2.39)			(1.75)	
2820										143.00			51.00	400.00
										(2.35)			(1.49)	
2821									9.00	139.00			62.00	440.00
									(0.30)	(2.28)			(1.75)	
2822									9.00	139.00			52.00	440.00
									(0.30)	(2.28)			(1.47)	

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2823									153.00 (2.51)			41.00 (1.15)			390.00
2824								19.00 (0.63)	124.00 (2.03)			41.00 (1.15)			352.00
2825								5.00 (0.17)	129.00 (2.12)			36.00 (1.02)			320.00
2826									129.00 (2.12)			42.00 (1.18)			266.00
2827									126.00 (2.07)			38.00 (1.02)			300.00
2828									124.00 (2.03)			47.00 (1.33)			278.00
2829									124.00 (2.03)			36.00 (1.02)			300.00
2830									148.00 (2.43)			46.00 (1.30)			386.00
2831									150.00 (2.46)			46.00 (1.30)			352.00
2832									134.00 (2.20)			43.00 (1.21)			340.00
2833									134.00 (2.20)			46.00 (1.30)			340.00
2834									134.00 (2.20)			43.00 (1.21)			364.00
2835									124.00 (2.03)			37.00 (1.04)			358.00
2836				25.00 (1.25)	10.00 (0.82)	183.00			464.00 (7.61)	6.00 (0.13)		78.00 (2.19)			766.00
2837				525.00 (26.25)	79.00 (6.49)	206.00			1 83.00 (3.00)	1630.00 (33.96)	0.09 (0.001)	273.00 (7.69)			3000.00
2838				604.00 (30.20)	122.00 (10.03)	448.00			126.00 (2.07)	1820.00 (37.92)		767.00 (21.61)			4080.00
2839	12.00	8.78		16.97 (0.85)		9.81			73.20 (1.19)	6.60 (0.14)		6.40 (0.18)			98.00
2840	60.17			76.32 (3.82)	18.53 (1.52)	19.55 (0.85)		145.45 (4.85)		24.69 (0.41)		30.14 (0.86)			375.01

2841	3.60	7.38		82.21	23.50	18.70		168.60		34.82		28.99			364.90
				(4.21)	(1.93)	(0.81)		(5.45)		(0.73)		(0.82			
2842	8.00		0.94	81.20	56.30	48.10			403.80	65.80	30.00		91.00		581 00
				(4.06)	(4.63)	(1.87)			(6.61)	(1.37)	(0.48)				
2843	45.00	3.70		31 00	5.10	55.00		35.00		57.00		70.0(			
				(1.55)	(0.42)	(2.38)		(1.16)		(1.18)		(1.97)			
2843a				106.00	75.00	187.00			256.00	266.00		349.00			1402.00
				(5 30)	(6.15)	(7 97)			(4.30)	(5.50)		(9.80)			
2844	16.20	Trace	Trace	98.10	20.97	126.26		129.38		144.00		148.7(			670.90
				(4.91)	(1.72)	(5.47)		(4.31)		(3.00)		(4.20			
2845	23.00	Trace		113.00	14.00	247.00			159.00	222.00	1.70	382.00			1113.00
				(5.65)	(1.15)				(2.61)	(4.63)	(0.03)	(10.75)			
2846	15.00	0.72		126.00	20.00	313.00			198.00	241.00	1.80	533.0(			1430.00
				(4.20)	(1.65)				(3.23)	(5.02)	(0.03)	(15.00)			
2847	12.00	0.72		102.00	18.00	190.00			197.00	181.00	3.50	315.0(			952.00
				(5.10)	(1.48)				(3.23)	(3.77)	(0.06)	(8.80			
2848	12.00	Trace		107.00	20.00	258.00			182.00	231.00	1.70	392.0(			1128 (0
				(5.35)	(1.65)				(2.99)	(4.82)	(0.03)	(11.03			
2849	14.00	Trace		129.00	27.00	378.00			195.00	266.00	0.80	575.0(			1513.00
				(4.30)	(2.22)				(3.20)	(5.55)	(0.01)	(16.20)			
2850	16.00	Trace		103.00	24.00	265.00			204.00	197.00	1.10	254.0			1114 00
				(5.15)	(1.98)				(3.84)	(4.10)	(0.02)	(9.98			
2851	11.00	0.07		131.00	30.00	376.00			190.00	276.00	4.40	564.0(			1532.00
				(6.55)	(2.45)				(3.12)	(5.75)	(0.07)	(15.87)			
2852	12.00	0.04		77.00	19.00	257.00			242.00	222.00	1.70	293.0(			1004.50
				(3.85)	(1.56)				(3.97)	(4.63)	(0.03)	(8.25)			
2853	12.00	0.07		86.00	21.00	193.00			190.00	175.00	0.70	283.0(			890 00
				(4.30)	(1.73)				(3.12)	(3.65)	(0.01)	(7.98)			
2854	14.00	0.07		93.00	20.00	267.00			196.00	242.00	Trace	322.0(			1068.00
				(4.65)	(1.65)				(3.22)	(5.04)		(9.07			
2855	11.00	0.14		81.00	19.00	182.00			166.00	188.00	Trace	253.00			808.00
				(4.03)	(1.56)				(2.72)	(3.82)		(7.13)			
2856	15.00	0.24		88.00	22.00	184.00			171.00	216.00	4.20	253.00			892 00
				(4.40)	(1.81)				(2.80)	(4.50)	(0.07)	(7.13)			
2857	12.00	0.03		70 00	22.00	168.00			163.00	202.00	1.10	228 0(			826 00
				(3.50)	(1.81)				(2.68)	(4.21)	(0.02)	(6.42)			
2858	65.00	1.29		71 00	19.00	94.00			149.00	139.00	3.20	124.00			648.00
				(3.55)	(1.56)				(2.45)	(2.90)	(0.05)	(3.48)			
2859	60.00	1.57		70.00	7.80	82.00			140.00	90.00	4.20	121.00			547.00
				(3.50)	(0 52)				(2.30)	(1.88)	(0.07)	(3.41)			
2860	11.00	0.03		60.00	6.30	69.00			118.00	84.00	5.60	119.00			420.00
				(3.00)	(0.52)				(1.93)	(1.75)	(0.09)	(3.36)			
2861	19.00	0.21		104.00	18.00				127.00	198.00	4.10				908.00
				(5.20)	(1.07)				(2.08)	(4.02)	(0.07)				
2862	9.60	0.03		131.00	16.00	182.00			110.00	320.00	5.10	297.00			1077 00
				(6.55)	(1.32)				(1.80)	(6.67)	(0.08)	(8.38)			

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2863	31.00	0.70	----------	218.00	26.00	346.00		----------	119.00	555.00	1.50	533.00	----------	----------	1848.00
				(10.90)	(2.14)				(1.95)	(11.55)	(0.02)	(15.02)			
2864	26.00	0.86	----------	105.00	13.00	155.00		----------	136.00	260.00	2.20	201.00	----------	----------	845.00
				(5.10)	(1.07)				(2.23)	(5.42)	(0.04)	(5.52)			
2865	20.00	0.10	----------	186.00	23.00	201.00		----------	123.00	390.00	6.00	270.00	----------	----------	1161.00
				(6.80)	(1.89)				(2.02)	(8.12)	(0.10)	(7.61)			
2866	15.00	0.23	----------	99.00	16.00	108.00		----------	127.00	212.00	2.60	133.00	----------	----------	696.00
				(4.95)	(1.31)				(2.08)	(4.42)	(0.04)	(4.20)			
2867	27.00	0.01	----------	149.00	21.00	215.00		----------	133.00	324.00	0.50	295.00	----------	----------	1186.00
				(7.45)	(1.73)				(1.85)	(5.25)	(0.01)	(8.31)			
2868	26.00	1.30	----------	194.00	26.00	344.00		----------	134.00	494.00	0.40	470.00	----------	----------	1677.00
				(9.70)	(2.14)				(2.20)	(10.28)	(0.01)	(13.23)			
2869	23.00	1.30	----------	178.00	27.00	308.00		----------	147.00	450.00	0.40	451.00	----------	----------	1618.00
				(8.90)	(2.22)				(2.41)	(9.38)	(0.01)	(12.70)			
2870	18.00	0.14	----------	182.00	28.00	326.00		----------	164.00	451.00	Trace	468.00	----------	----------	1638.00
				(9.10)	(2.30)				(2.69)	(9.40)		(13.18)			
2871	50.00	1.00	----------	150.00	20.00	300.00		6.20	129.00	377.00	----------	418.00	----------	----------	1442.00
				(7.50)	(1.63)			(0.21)	(2.12)	(7.86)		(11.77)			
2872	31.00	0.37	----------	162.00	15.00	306.00		3.60	140.00	402.00	----------	427.00	----------	----------	1458.00
				(8.10)	(1.23)			(0.12)	(2.30)	(8.38)		(12.02)			
2873	21.00	1.16	----------	118.00	13.00	181.00		3.60	146.00	247.00	----------	253.00	----------	----------	937.00
				(5.90)	(1.07)			(0.12)	(2.39)	(5.15)		(7.14			
2874	29.00	1.30	----------	206.00	7.80	314.00		6.00	98.00	523.00	----------	482.00	----------	----------	1695.00
				(10.30)	(0.64)			(0.20)	(1.61)	(10.95)		(12.05)			
2875	8.60	Trace	Trace	297.40	275.00	1200.00		532.20	----------	1832.00	838.00	----------	----------	----------	4678.20
				(14.87)	(22.61)	(52.01)		(17.77)		(38.17)	(13.51)				
2876	30.88	1.72		76.85	56.96	99.82	----------	280.80	----------	54.20	----------	19.90	68.60	----------	543.60
	SiO_2		}	(3.84)	(4.68)	(0.99)		(9.36)		(1.13)		(0.56)			
2877	$Al_2O_3+Fe_2O_3$		} 12.00	496.50	167.60	590.80	35.37	82.26	----------	1400.00	----------	944.1	----------	----------	3590.00
				(21.83)	(13.78)	(25.61)	(0.90)	(2.74)		(29.17)		(26.56)			
2878	8.00	1.60		50.00	7.50	91.50	6.00	----------	243.70	104.50	1.30	36.90	----------	NO_2 Tr	----------
				(2.50)	(0.62)	(3.97)	(0.15)		(3.99)	(2.18)	(0.02)	(1.04)			
2879	11.00	Trace	2.40	82.72	14.20	30.07	----------	162.65	----------	19.82	----------	28.04	63.00	----------	413.90
			(0.70)	(4.14)	(1.16)	(1.23)		(5.42)		(0.41)		(0.79)			
2880	10.00	0.28	----------	294.20	----------	164.50	41.12	28.80	386.50	614.00	88.10	226.20	----------	----------	1606.00
				(14.71)		(7.13)	(1.05)	(0.96)	(6.32)	(10.71)	(14.21)	(6.37)			

2881	18.00	4.48		52.00	17.00	49.00			195.00	42.00		59.00	321.00
				(2.60)	(1.39)				(3.19)	(0.88)		(1.66)	
2882	12.86	**0.21**		97.64	12.68	32.42		164.20		44.42		83.44	399.65
				(4.48)	(1.04)	(1.40)		(6.47)		(0.93)		(0.94)	
2883	19.00	**3.60**		53.00	7.90	30.00	1.80		177.00	41.00		34.00	300.00
				(2.65)	(0.65)	(1.30)	(0.05)		(2.90)	(0.86)		(0.96)	
2884	23.00	**4.00**		58.00	12.00	42.00	3.60		199.00	52.00		37.00	322.00
				(2.90)	(0.99)	(1.82)	(0.09)		(3.26)	(1.08)		(1.04)	
2885	28.00	**1.40**		53.00	15.00	45.00	5.30		171.00	38.00		47.00	316.00
				(2.65)	(1.24)	(1.95)	(0.14)		(2.80)	(0.79)		(1.33)	
2886	26.00	**2.80**		69.00	16.00	58.00	3.60		220.00	39.00		44.00	296.00
				(3.45)	(1.32)	(2.51)	(0.09)		(3.61)	(0.81)		(1.24)	
2887	27.00	1.40		56.00	14.00	48.00	7.50		212.00	45.00		53.00	326.00
				(2.80)	(1.15)	(2.08)	(0.19)		(3.48)	(0.94)		(1.49)	
2888	25.00	**2.60**		57.00	15.00	103.00	7.00		156.00	110.00		137.00	498.00
				(2.85)	(1.24)	(4.47)	(0.18)		(2.56)	(2.30)		(3.86)	
2889	30.00	**1.00**		73.00	15.00	52.00	4.30		187.00	60.00		98.00	432.00
				(3.65)	(1.24)	(2.25)	(0.11)		(3.06)	(1.25)		(2.76)	
2890	20.00	**1.80**		49.00	10.00	72.00	11.00		175.00	34.00		32.00	244.60
				(2.45)	(0.82)	(3.11)	(0.28)		(2.87)	(0.71)		(0.90)	
2891	27.00	**2.00**		52.00	10.00	49.00	8.30		161.00	37.00		40.00	248.00
				(2.60)	(0.82)	(2.12)	(0.21)		(2.64)	(0.77)		(1.13)	
2892	21.00	**2.40**		47.00	9.10				174.00	29.00		32.00	226.00
				(2.35)	(0.75)				(2.85)	(0.61)		(0.90)	
2893	22.00	**1.80**		54.00	13.00				173.00	33.00		38.00	255.00
				(2.70)	(1.07)				(2.84)	(0.69)		(1.07)	
2894	19.00	**2.40**		47.00	12.00				173.00	34.00		41.00	246.00
				(2.35)	(0.99)				(2.84)	(0.71)		(1.15)	
2895	17.00	**3.20**		46.00	15.00	30.00	3.60		197.00	24.00		49.00	268.00
				(2.30)	(1.24)	(1.30)	(0.09)		(3.23)	(0.50)		(1.38)	
2896	14.00	**1.80**		47.00	17.00	31.00	4.40		201.00	21.00		44.00	280.00
				(2.35)	(1.40)	(1.38)	(0.11)		(3.29)	(0.44)		(1.24)	
2897	15.00	**1.20**		47.00	19.00	27.00	1.20		223.00	18.00		48.00	294.00
				(2.35)	(1.56)	(1.17)	(0.03)		(3.66)	(0.38)		(1.37)	
2898	10.00	2.00		53.00	20.00	32.00	4.30		238.00	26.00		56.00	366.00
				(2.65)	(1.56)	(1.39)	(0.11)		(3.90)	(0.54)		(1.58)	
2899	8.80	4.60		54.00	21.00	34.00	5.80		228.00	28.00		53.00	330.00
				(2.70)	(1.73)	(1.47)	(0.10)		(3.90)	(0.58)		(1.47)	
2900	9.00	2.80		49.00	21.00	34.00	4.00		228.00	29.00		60.00	324.00
				(2.45)	(1.73)	(1.47)	(0.10)		(3.74)	(0.60)		(1.69)	
2901	10.00	3.20		48.00	21.00	38.00	3.50		220.00	24.00		55.00	298.00
				(2.40)	(1.73)	(1.65)	(0.09)		(3.61)	(0.50)		(1.53)	
2902	14.00	3.40		51.00	22.00	35.00	3.40		219.00	29.00		48.00	290.00
				(2.55)	(1.81)	(1.51)	(0.09)		(3.59)	(0.61)		(1.35)	
2903	12.00	**3.60**		47.00	22.00	34.00	3.60		214.00	25.00		51.00	306.00
				(2.35)	(1.81)	(1.45)	(0.09)		(3.48)	(0.52)		(1.44)	

WATER (Continued)

Seria No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2904	9.00	1.20		48.00	24.00	35.00	4.00		218.00	42.00		66.00			324.00
				(2.40)	(1.98)	(1.51)	(0.10)		(3.58)	(0.88)		(1 86)			
2905		1.60		48.00	23.00	19.00	4.00		221.00	39.00		59.00			320.00
				(2 40)	(1 89)	(0.82)	(0.10)		(3 63)	(0.81)		(1.66)			
2906	8.80	1.80		49.00	24.00				223 00	35.00		86.00			336 00
				(2.45)	(1.98)				(3.66)	(0.73)		(2.42)			
2907	14.00	2.40		52.00	21.00	39.00			239.00	35.00		56 00			338.00
				(2.60)	(1.73)	(1.69)			(3.92)	(0.73)		(1.58)			
2908	11.00	2.60		59.00	25.00	44.00			217.00	49.00		75.00			320 00
				(2.95)	(2.05)	(1 99)			(3.56)	(0.96)		(2 11)			
2909	14.00	3.00		48 00	24 00	64 00			204.00	80.00		79.00			204.00
				(2.40)	(1.98)	(2.77)			(3 35)	(1.67)		(2.22)			
2910	14.00	6.40		56 00	24.00	53.00	3.50		205.00	89 00		75 00			426.00
				(2.80)	(1.98)	(2.30)	(0.09)		(3.36)	(1.85)		(2.11)			
2911	18.00	6.80		68.00	24.00	77.00	4.90		180.00	112 00		113.00			526 00
				(3 40)	(1.98)	(3 34)	(0.13)		(2.95)	(2.33)		(3.19)			
2912	14.00	3.60		45.00	21.00	90.00	4.40		184 00	102 00		154 00			550.00
				(2.25)	(1.73)	(3.90)	(0.11)		(3.15)	(2.13)		(3 78)			
2913	19.00	4.80		57 00	8.70	51.00	4.30		154.00	37.00		67.00			294.00
				(2.85)	(0.72)	(3.21)	(0.11)		(2.53)	(0.52)		(1.89)			
2914	35.00	7.00		62 00	17.00	36 00	2.20	18.00	151.00	30.00		55 00			270.00
				(3 10)	(1.40)	(1 56)	(0.06)	(0.60)	(2.48)	(0 63)		(1.55)			
2915	21.00	2.80		41 00	13 00	51.00	9.90		166.00	43.00		57 00			308.00
				(2.05)	(1.07)	(2 20)	(0 25)		(2 73)	(0 90)		(1 71)			
2916	17.00	4.40		40 00	6 80	25 00	8 90		169 00	18 00		26 00			220.00
				(2.00)	(0.56)	(1.08)	(0.23)		(2.62)	(0.38)		(0.73)			
2917	13.00	4.60		45.00	10.00	31.00	6.90		177.00	28.00		52.00			268.00
				(2.25)	(0 82)	(1.34)	(0.18)		(2.90)	(0.58)		(1.47)			
2918	21.00	4.40		40.00	6.5	11.00	9.20		133.00	14.00		24.00			178.00
				(2.00)	(0.53)	(0.48)	(0.24)		(2.17)	(0.29)		(0.68)			
2919	35.00	5.00		137.00	18.00	104.00	9.50		164.00	446.00		128.00			772.00
				(6.85)	(1.58)	(4 50)	(0.24)		(2 69	(9 60)		(3 6			
2920	40.00	3.40		204.00	25.00	102.00	9.90		159.00	267.00		143.00			1090.00
				(10.20)	(2.06)	(4.42)	(0.25)		(2.61)	(5.56)		(4.03)			
2921	33.00	3.00		117.00	14.00	118.00	7.20		166.00	202.00		111.00			666.00
				(5.85)	(1.15)	(5.01)	(0.18)		(2.72)	(4.21)		(3.13)			

2922	32.00	3.80	98.00 (4.90)	20.00 (1.65)	96.00 (4.15)	5.20 (0.13)		178.00 (2.92)	185.00 (3.86)		144.00 (4.06)			676.00
2923	31.00	2.40	104.00 (5.20)	19.00 (1.57)	65.00 (2.82)	4.90 (0.13)		185.00 (3.04)	202.00 (4.21)		152.00 (4.29)			746.00
2924	33.00	2.20	87.00 (4.35)	14.00 (1.15)	64.00 (2.77)	3.60 (0.09)		165.00 (2.70)	164.00 (3.42)		77.00 (2.17)			540.00
2925	33.00	2.60	67.00 (3.35)	10.00 (0.82)	51.00 (2.20)	5.20 (0.18)		161.00 (2.64)	88.00 (1.83)		71.00 (2.00)			436.00
2926	39.00	3.00	97.00 (4.65)	17.00 (1.40)		6.50 (0.17)		178.00 (2.92)	138.00 (2.88)		134.00 (3.78)			600.00
2927	36.00	4.60	98.00 (4.90)	20.00 (1.65)	104.00 (4.50)	9.60 (0.24)		195.00 (3.20)	192.00 (4.00)		134.00 (3.78)			684.00
2928														836.00
2929	22.00	2.40	110.00 (5.50)	25.00 (2.06)				190.00 (3.12)	233.00 (4.85)		203.00 (5.72)			864.00
2930	27.00	3.20	76.00 (3.80)	15.00 (1.23)				153.00 (2.52)	155.00 (3.23)		139.00 (3.92)			612.00
2931	27.00	2.60	108.00 (5.40)	26.00 (2.14)	112.00 (5.29)	4.90 (0.13)		176.00 (2.89)	252.00 (5.25)		182.00 (5.12)			904.00
2932	28.00	2.00	107.00 (5.35)	23.00 (1.89)	98.00 (4.24)	12.00 (0.31)		165.00 (2.71)	243.00 (5.03)		144.00 (4.06)			812.00
2933	23.00	2.60	87.00 (4.35)	18.00 (1.48)	72.00 (3.12)	4.70 (0.12)			191.00 (3.96)		113.00 (3.19)			612.00
2934	24.00	3.20	92.00 (4.60)	20.00 (1.65)	97.00 (4.20)	4.50 (0.12)			192.00 (4.00)		149.00 (4.20)			720.00
2935	26.00	4.40	112.00 (5.80)	31.00 (2.55)	122.00 (5.28)	5.90 (0.15)		212.00 (3.48)	268.00 (5.59)		201.00 (5.66)			956.00
2936	30.00	3.60	148.00 (7.45)	35.00 (2.88)	153.00 (6.62)	6.00 (0.15)		245.00 (4.02)	298.00 (6.06)		240.00 (6.76)			1080.00
2937	29.00	4.00	142.00 (7.10)	35.00 (2.88)	142.00 (6.35)	3.70 (0.10)		185.00 (3.03)	330.00 (6.88)		241.00 (6.80)			1112.00
2938	17.00	4.60	130.00 (6.50)	34.00 (2.80)	118.00 (5.10)	3.10 (0.08)		188.00 (3.08)	322.00 (6.71)		241.00 (6.80)			1072.00
2939	23.00	2.60	82.00 (4.10)	19.00 (1.56)	141.00 (6.10)	11.00 (0.28)		126.00 (2.06)	192.00 (4.00)		82.00 (2.31)			668.00
2940	25.00	1.00	83.00 (4.15)	22.00 (1.81)	103.00 (4.46)	5.40 (0.13)		160.00 (2.63)	193.00 (4.02)		120.00 (3.38)			690.00
2941	34.00	1.80	104.00 (5.20)	29.00 (2.38)	143.00 (6.20)	8.90 (0.10)			254.00 (5.30)					916.00
2942	33.00	4.00	112.00 (5.60)	34.00 (2.80)	147.00 (7.36)		6.30 (0.22)	175.00 (2.87)	294.00 (6.13)		227.00 (6.40)			1004.00
2943	25.00	4.00	105.00 (5.25)	28.00 (2.30)	145.00 (6.33)			169.00 (2.77)	297.00 (6.20)		265.00 (7.46)			1054.00
2944	35.00	4.00	107.00 (5.35)	38.00 (3.18)	190.00 (8.22)			166.00 (2.73)	319.00 (6.65)		304.00 (8.58)			1040.00

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2945	27.00	3.40		103.00	36.00	162.00			157.00	310.00		292.00			1072.00
				(5.15)	(2.96)	(7.02)			(2.60)	(6.46)		(8.24)			
2946	26.00	10.20		131.00	38.00	205.00	8.90		255.00	309.00		346.00			1304.00
				(6.55)	(3.13)	(8.90)	(0.23)		(4.88)	(6.44)		(9.75)			
2947	31.00	6.20		151.00	31.00	131.00	5.90		225.00	368.00		275.00			1094.00
				(7.55)	(2.55)	(5.68)	(0.15)		(3.70)	(7.67)		(7.74)			
2948	22.00	5.80		83.00	27.00	81.00	5.10		204.00	168.00		121.00			580.00
				(4.15)	(2.22)	(3.50)	(0.13)		(3.34)	(3.50)		(3.41)			
2949	35.00	3.20		85.00	20.00	89.00	4.40		170.00	210.00		154.00			752.60
				(4.25)	(1.65)	(3.85)	(0.11)		(2.79)	(4.38)		(4.34)			
2950	29.00	7.00		89.00	25.00	86.00	5.70		172.00	193.00		115.00			684.00
				(4.45)	(2.06)	(3.72)	(0.15)		(2.82)	(4.02)		(3.25)			
2951	26.00	3.40		97.00	20.00	137.00	10.00		172.00	236.00		108.00			782.00
				(4.85)	(1.65)	(5.93)	(0.26)		(2.82)	(4.92)		(4.09)			
2952	19.00	1.60		64.00	18.00	78.00	8.80		157.00	146.00		105.00			524.00
				(3.20)	(1.48)	(3.37)	(0.23)		(2.57)	(3.04)		(2.96)			
2953	21.00	2.40		68.00	12.00	65.00	6.80		171.00	112.00		105.00			480.00
				(3.40)	(0.99)	(2.81)	(0.17)		(2.80)	(2.34)		(2.91)			
2954	35.00	2.40		72.00	11.00	82.00	7.40	13.00	150.00	116.00		74.00			466.00
				(3.60)	(0.91)	(3.55)	(0.19)	(0.43)	(2.46)	(2.42)		(2.08)			
2955	32.00	2.20		69.00	10.00	72.00	6.30	6.30	147.00	118.00		50.00			410.00
				(3.45)	(0.91)	(3.12)	(0.16)	(0.21)	(2.41)	(2.46)		(1.41)			
2956	29.00	5.15		104.00	23.00		119.00		178.00	228.00		164.00			791.00
				(5.20)	(1.89)		(3.08)		(2.92)	(4.78)		(4.62)			
2957	117.00	9.15	63.92	18.00	15.00	14.00			60.00	20.00	0.88	22.00			310.00
				(0.90)	(1.23)	(0.61)			(0.98)	(0.42)	(0.01)	(0.62)			
2957a				357.00	6.00	1635.00			441.00	1405.00		1872.00			4580.00
				(17.90)	(0.50)	(71.10)			(7.20)	(29.30)		(52.70)			
2958	21.40	Tr	Tr	48.58	28.84	240.90		313.90				170.38			824.00
				(2.43)	(2.37)	(10.44)		(10.46)				(4.79)			
2959	21.40	Tr	Tr	48.60	22.83	240.80		314.00				176.37			824.00
				(2.43)	(1.87)	(10.44)		(10.46)				(4.96)			
2959a				246.00	24.00	1157.00			198.00			2171.00			3942.00
				(12.30)	(2.00)	(50.30)			(3.20)	Tr		(61.20)			
2959b				60.60	44.90	216.00				441.60		245.00			797.00
				(3.03)	(3.74)	(9.39)				(9.20)		(6.90)			

2960	12.60	Tr	Tr	114.90	73.10	2125.52		242.60		2878.33		1282.90		6301.40
				(5.74)	(6.00)	(92.13)		(8.08)		(59.97)		(36.14)		
2961	12.40	24.00		588.00	816.69	1541.80				4456.40		911.80		9701.60
				(29.40)	(67.16)	(66.83)				(92.84)		(2.57)		
2962	18.40	11.60		537.00	500.00	116.52		581.40		4064.28		490.70	24.80	7118.80
				(26.85)	(41.11)	(5.05)		(19.39)		(84.67)		(13.83)		
2962a				26.00	2.20	880.00		261.00	366.00	800.00		299.00		2696.00
				(1.30)	(0.18)	(38.20)		(8.70)	(6.00)	(16.60)		(8.40)		
2963	61.80	75.40	Tr	587.20	168.70			210.80					1328.80	4023.20
				(29.36)	(13.86)			(7 02)						
2963a				12.00		285.00		64.80	480.70	110.40		17.40		640.00
				(0.60)		(12.39)		(2.16)	(7.88)	(2.30)		(0.50)		
2964	34.40	Tr	Tr	641.61	22.72	109.93		27.33		1630.60		140.21		2608.80
				(32.18)	(1.86)	(4.76)		(0.91)		(33.97)		(3.95)		
2965	27.90	7.00		6.12	3.39	262.73		235.30		101.61		67.95		713.80
				(0.31)	(0.28)	(11.39)		(7.84)		(2.12)		(1.91)		
2966	8.60	1.16		616.00	222.00	15070.00	45.10		131.00	2089.00		23420.00		40,350.00
				(30.80)	(18.22)	(653.23)	(1 15)		(2.15)	(43 33)		(659.57)		
2967	3.39	1.16		362.00	153.80	7415.20	29 50		222.20	1324.00		11435.00		21,700.00
				(18.10)	(12.64)	(321.82)	(0.57)		(3.65)	(27.58)		(322.11)		
2968	24.01	2.27		4110.00	213.20	10087.50	77.92		205.00	2614.00		21498.00		40,220.00
				(205.50)	(17.52)	(437.25)	(1 08)		(3 36)	(54 46)		(605.58)		
2969	24.02	3.00		3150.00	164.20	7538.00	48 20		231 80	2014.00		16100.00		29,400.00
				(157 50)	(13.50)	(326.74)	(1 23)		(3.80)	(41.96)		(453.52)		
2970	158.00	Tr	8.20	Trace		120.16		793.30		99.02		112.15		
						(5 21)		(26 44)		(2 06)		(3.16)		
2971	25.00		5.00	214 00	32.70	2709.90	982.20	160.30		1309 40		3357 90		8938.40
				(10 70)	(2 69)	(117.46)	(7 20)	(2 34)		(27.28)		(94.57)		
2972	10.00		7.50	175 00	28.80	2392.80	264 20		872 70	1189 20		2937 6		7878.80
				(8.75)	(2.37)	(10.72)	(6 75)		(14 36)	(24 78)		(82 75)		
2973		1.00		44 00	19.00	24.00		17 00	100 00	64 00		43 00		
				(2 20)	(1.56)	(1.04)		(0 57)	(1.64)	(1 34)		(1 21)		
2974	2.00	30.20	Tr	493 70	211.60	9317 00		34.00		214.00		14235.50		
				(24 68)	(17 40)	(403 85)		(1 13)		(4.46)		(401 16)		
2975	Tr	Tr	Tr	510 04	997 77	1604 20		9405 79		1347 35		490 76		6744.00
				(25 50)	(24 49)	(69 54)		(8? 19)		(28.07)		(13.82)		
2976	87.20	76.79	76.25	569 00	100 65	269 80		Tr		2218 25		342.74		
				(28 44)	(8 97)	(11 69)				(46.21)		(9.65)		
2977	68.00	Tr	80.00	649 65	974 79	1256 40		894 12		2392 70		1293.40		6950.00
				(32.13)	(29.17)	(54.46)		(29.80)		(49 83)		(36.53)		
2978	112.60	Tr	14.00	624.20	390.05	45 58		1099 40		2479 15		511.62		4665.00
				(31.21)	(27.10)	(1.99)		(33 65)		(51 65)		(8.76)		
2979	9.20	35.00		351 25	134.70	220.90				97.75		513 30	556.00	3028.60
				(17.56)	(11.08)					2.04		(14.45)		
2980	11.19	Tr	77.59	142.79						38 12			0.98	
				(7.13)						(0.79)				

WATER (Continued)

Serial No.	SUSPENDED MATTER: COLLOIDAL MATTER SiO_2	Fe_2O_3	Al_2O_3	DISSOLVED SALTS: BASIC RADICALS Ca	Mg	Na	K	ACID RADICALS CO_3	HCO_3	SO_4	NO_3	Cl	Vol. + organic	Misc.	Total Solids
2981	----	----	64.00	402.24 (20.11)	55.00 (4.52)	718.38 (31.13)	----		1018.60 (16.70)	534.91 (8.92)	----	1526.61 (37.37)	652.00	----	4638.10
2982	48 20	638.40	120.60	107.30 (5.36)	185.00 (15.22)	467.00 (20.24)	482.10 (12.32)	379.60 (19.82)	----	201.46 (4.19)	----	720.00 (20.28)	590.00	----	4270.00
2983	20.00	Tr	Tr	120.59 (6.03)	----	17.79 (0.77)	----	196.79 (6.56)	----	----	----	8.63 (0.24)	----	----	360.60
2984	25.00	0.40	1.60	48.50 (2.42)	16.40 (1.35)	1086.90 (47.11)	----	71.20 (2.37)	1368.10 (22.42)	227.10 (4.73)	----	579.10 (16.33)	----	----	3604.30
2985	1.20	0.30	0.70	50.40 (2.52)	18.50 (1.52)	1495.10 (64.81)	----	13.20 (0.44)	213.10 (3.49)	1260.40 (26.26)	0.10 (.002)	1374.60 (38.44)	----	----	4427.60
2986	76.00	0.10	41.90	20.60 (1.03)	15.70 (1.29)	1814.30 (78.64)	----	48.80 (1.63)	333.70 (5.47)	1108.00 (23.08)	----	1805.40 (50.85)	----	----	5244.50
2987	2 80	Tr	19.80	15 78 (0.79)	----	Tr	----	863.20	----	----	----	----	20.60	Alkoli Carbo. 963.20	----
2988	16.20	Tr	Tr	173 90 (8.69)	20.90 (1.72)	29.82 (1.29)	----	129.48 (4.32)	----	144.00 (3.00)	----	156.70 (4.41)	----	----	671.00
2989	17.20	Tr	3.50	131.15 (6.56)	24.00 (1.97)	33.80 (1 46)	----	----	----	----	----	84.20 (2.37)	----	----	----
2989a	36.00	----	----	85.70 (4.29)	1.59 (0.13)	99.36 (4.32)	----	----	316.70 (5.19)	60.90 (1.27)	----	75.30 (2.12)	----	----	538.00
2989b	14.00	----	----	55.40 (2 77)	33.90 (2.83)	90.40 (3.90)	----	----	350.60 (5.70)	171.20 (3.60)	----	88.80 (2.50)	----	----	682.00
2990	44.00	----	13.00	197.10 (9.86)	127.80 (10.51)	393.50 (17 06)	31.70 (0.81)	----	573.40 (9.40)	1030.20 (21.46)	19.70 (0.32)	248.40 (6.99)	----	----	2678.80
2991	49.71	3.94		209.06 (10.45)	24.48 (2.01)	77.26 (3 34)	----	232.18 (7.77)	----	175.27 (3.65)	----	157.78 (4.45)	----	----	929.55
2992	35.16	----	----	137.44 (6.87)	21.88 (1.80)	77 86 (3.37)	----	95.01 (3.17)	----	267.88 (5.88)	----	120.22 (3.38)	----	----	755 46
2993	34.50	----	----	108.73 (5.44)	13.59 (1.12)	115.76 (5.02)	----	184.35 (6.15)	----	162.24 (3.37)	----	73.83 (2.08)	----	----	692.86
2994	52.48	Tr	Tr	155.79 (7.79)	23.59 (1.94)	71.88 (3.11)	----	15.04 (0.50)	247.47 (4.06)	303.11 (6.32)	----	93.12 (2.62)	----	----	975.36
2995	2 78	Tr	23 49	18.18 (0.91)	19.64 (1.61)	381.76 (16.55)	----	85.75 (2.86)	----	621.86 (12.96)	----	117.82 (3.32)	----	----	1271.24
2996	42.88	----	7.89	278.34 (13.92)	30.01 (2.47)	202.03 (8.76)	----	485.20 (16.17)	----	187.39 (3.90)	----	153.49 (4.32)	----	----	1397.22

2997	Tr	Tr	Tr	356.55	65.61	547.50			324.25	912.50		805.85			3008.28
				(17.83)	(5.39)	(23.73)			(5.31)	(19.01)		(22.64)			
2998			Tr	641.80	319.90	191.48			472.00	1514.99		976.00			4114.11
				(32.09)	(26.31)	(8.29)			(7.74)	(31.56)		(27.49)			
2998a	33.30			557.40	150.20	1290.60			90.50	2126.30		1788.90			6262.00
				(27.87)	(12.52)	(56.10)			(1.50)	(44.30)		(50.40)			
2999	840.80	3,096.00	19,294.50	1644.00	413.00	4,286.00				36,852.00		88.00			61,863.00
				(82.20)	(33.95)					(767.75)		(2.47)			
3000	49.00	Tr	Tr	Tr	Tr	88.08		49.13				77.76			263.91
						(3.82)		(1.64)				(2.19)			
3001	10.00	12.00	Tr	14.28	6.94	9.39		42.08				10.51			105.20
				(0.71)	(0.57)	(0.41)		(1.40)				(0.03)			
3002						62.84	4.55								
						(2.72)	(0.12)								
3003						163.56	7.02								
						(7.09)	(0.18)								
3004						3044.00	56.07								
						(131.94)	(1.43)								
3005						20.27	3.94								
						(0.88)	(0.10)								
3006						1.33	0.14								
						(0.06)	(.004)								
3007						119.12	0.70								
						(5.16)	(0.01)								
3008						15.83	0.24								
						(6.85)	(0.006)								
3009						3.39	0.78								
						(0.15)	(0.02)								
3009a				149.00	15.3	5.00			366.00	14.00		92.60			586.00
				(7.45)	(1.20)	(0.22)			(6.00)	(0.30)		(2.60)			
3010	355.80	42.00		9.84	3.71	374.39		104.16	46.40			391.20			
				(0.49)	(0.31)	(16.20)		(3.47)	(0.76)			(11.02)			
3011	10.00	Tr	Tr	44.76	5.07	47.59		107.59		26.43		20.96			262.40
				(2.24)	(0.42)	(2.06)		(3.59)		(0.55)		(0.58)			

KLEINITE

Serial No.	3012	3013	3014	3015	3016	3017	3018	3019	3020	3021
Hg	84.55	84.40	84.77	82.69	83.19			94.77	84.90	85.86
Cl	7.25	7.21	7.23	7.05	7.05	7.06	7.04	7.22	7.16	7.30
SO_4	3.05	2.92	2.98		3.07			3.09	3.05	
N	2.54	2.50	2.52	2.49		2.532	2.65	2.575		2.57
H_2O		0.48	0.75		1.10		1.19		1.18	1.08
Non.—Vol.	1.09	1.75	1.07	2.47	2.86	0.87	0.99	1.04		
CO_2					0.46					
Total	98.46	99.26	99.32	94.70	97.73	10.46		108.69	92.32	99.86

TERLINGUAITE

Serial No.	3022
Hg	88.61
Cl	7.83
O	3.75
Total	100.19

EGLESTONITE

Serial No.	3023	3024	3025
Hg.	88.33	88.94	89.73
Cl	8.32	8.23	8.19
O	1.72	1.84	1.80
Total	98.37	99.01	99.65

ASBOLITE

Serial No.	3026
Co.	2.94
Mn	3.15
Ag	None

BAUXITE

Serial No.	3027a	3027b	3027c
Vol. Matter	10.06	45.80	44.00
Al_2O_3	27.10	33.60	29.60
SiO_2	60.00	4.60	8.60
Na_2O		2.56	3.05
K_2O		4.60	4.65
CaO	1.07		
MgO	1.12		
Sol. NaOH		97.90	94.85
Sol. HCl		93.06	88.08

GADOLINITE

Serial No.	3028	3029	3030	3031	3032
SiO_2	22.87	23.40	23.79	22.80	22.92
Al_2O_3	0.28	0.33	------	0.31	0.29
Fe_2O_3	------	------	9.96	------	------
FeO	13.69	13.58	12.46	12.93	13.03
Ce_2O_3	2.6	2.7(	2.62	2.67	2.8/
$(La, Di)_2O_3$	5.22	5.17	5.22	5.01	5.33
Y_2O_3	------	------	}	------	------
Er_2O_3	------	------	}41.55	------	------
$(Y,Er)_2O_3$	44.35	44.65	------	44.45	44.30
MnO	0.22	N. D.	Trace	0.18	N. D.
GlO	------	------	11.33	------	------
CaO	0.64	0.54	0.74	0.71	0.78
MgO	0.07	0.08	Trace	0.11	N D.
ThO_2	------	------	0 58	------	------
K_2O	0.15	N D.	Trace	0.12	N. D.
Na_2O	0.20	N. D.	Trace	0.23	N. D.
P_2O_5	------	------	0.05	------	------
BeO	9.24	9.32	------	9.19	9.34
H_2O	------	------	1.02	------	------
Igneous	------	------	------	0.79	N. D.
H_2SO_4	------	------	------	0.93	0.92
Vol. Mat.	0.72	------	------	------	------
Total	100.30	------	100.29	100.42	------

CHALCOCITE NODULES

Serial No.	3033
Au	Trace
Ag	3.36 oz. per T.
Cu	39.35%
Fe	0.40%
SiO_2	11.00%
Al_2O_3	1.40%
CaO	1.40%
S	12.90%

CHALCOCITE PSEUDOMORPH

Serial No.	3034
Au	Trace
Ag	0.10 oz. per T.
Cu	50.00%
Fe	1.90%
CaO	1.90%
S	13.20
Insoluble q	8.20%

SOAPSTONE

Serial No.	3035
SiO_2	29.32
Al_2O_3	52.24
Fe_2O_3	0.76
CaO	------
MgO	6.01
H_2SO_4	1.16
Vol Mat.	10.96

BORAX

Serial No.	3038
Insol. sulphates of Ca,Mg,Na	73.00
NaCl	18.30
Borax	8.70
------	------
Total	100.00

BARYTE

Serial No.	3036
SiO_2	2.08
Fe_2O_3	2.38
TiO_2	Trace
BaO	58.74
CaO	1.17
MgO	0.43
H_2SO_4	33.24
Vol Mat.	1.86
Total	99.90

HALLOYSITE

Serial No.	3037
SiO_2	42.03
Al_2O_3	39.25
Fe_2O_3	0.41
CaO	0.29
Water below 100°	2.69
Water above 100°	15.52
Total	100.19

ROWLANDITE

Serial No.	3041
SiO_2	26.04
X	0.59
ThO_2	0.59
Ce_2O_3	5.06
La_2O_3	9 34
Yt_2O_3	47.70
Be_2O_3	0.69
FeO	4.39
MnO	0.67
CaO	0.50
MgO	1 62
Alkalies	0.28
H_2O	0.24
CO_2	0.34
F	3.87
P_2O_5	Tr
Total	101.12

SPESSARTITE

Serial No.	3042
SiO_2	35.93
Fe_2O_3	4 60
Al_2O_3	18.08
MnO	31.77
CaO	8.48
$Ba(OH_2)$	Tr
MgO	0.69
K_2O	}
Na_2O	} 0.17
Titanic Acid	} Tr
Loss at 105°	} 0.03
Loss on Ignition	} 0.36
Total	100.11

WOLFRAMITE

Serial No.	3039	3040
Tungstic oxide	21.00%	3.00%

THOROGUMMITE	
Serial No.	3043
SiO_2	13.085
UO_3	22.43
ThO_2	41.44
Al_2O_3	0.965
Fe_2O_3	0.845
$(Ce,Y)_2O_3$	6.69
PbO	2.16
CaO	0.41
H_2O	7.88
H_3PO_4	1.19
Moisture	1.23
Total	98.325

NIVENITE (Uraninite)		
Serial No.	3044	3045
UO_3	20.89	46.75
UO_2	44.17	19.89
ThO_2	6.69	7.57
ZrO_2	0.34	
CeO_2	0.34	
$(La,Di)_2O_3$	2.36	
$(Y,Er)_2O_5$	9.46	
CaO	0.32	
PbO	10.08	10.16
H_2O	1.48	2.54
He	0.08	
SiO_2	0.46	
Fe_2O_3	0.14	0.58
Insoluble	1.47	1.22
Y_2O_3		11.22
Total	98.28	

FERGUSONITE		
Serial No.	3046	3047
Cb_2O_5	46.27	42.79
UO_3	1.54	3.12
UO_2		3.93
ThO_2	3.38	0.83
Al_2O_3	0.09	0.85
Fe_2O_3	0.98	3.75
Y_2O_3	42.33	31.36
PbO	1.43	1.94
ZnO	0.24	
CaO	0.10	2.74
MgO	0.04	
Loss on ignition	1.98	7.57
H_2O	0.04	0.62
F	0.91	0.502
Total	99.33	100.00

MACKINTOSHITE		
Serial No.	3048	3049
SiO_2	13.90	13.92
UO_2	22.40	21.86
ZrO_2 (?)	0.88	
ThO_2		
Ce_2O_3 (?)	45.30	Lost
La_2O_3		
Y_2O_3	1.86	
PbO	3.74	3.92
FeO	1.15	
CaO	0.59	0.44
MgO	0.10	0.13
K_2O	0.42	
$(Na,Li)_2O$	0.68	0.70
P_2O_5	0.67	0.46
Water above 100°	4.31	
Water below 100°	0.50	0.35
Total	96.50	

TENGERITE	
Serial No.	3050
Y_2O_3	40.80
Ce_2O_3	7.00
Fe_2O_3	4.00
GlO	9.70
CO_2	19.60
Water below 100°	3.20
Water above 100°	14.10
SiO_2	0.40
Total	98 80

METAGADOLINITE	
Serial No.	3051
SiO_2	18.145
Ce_2O_3	20.662
Fe_2O_3	26.026
Y_2O_3	21.854
CaO	3.642
MgO	0 214
H_2O	9.761
Total	100.30

YTTRIALITE		
Serial No.	3053	3054
SiO_2	29.17	29.63
FeO	2.89	1.90
Al_2O_3	0.55	
CaO	0.60	0.67
PbO	0.854	0.80
ThO_2	12.00	10.85
MnO	0.77	0.88
Ce_2O_3	1.86	3.07
Y_2O_3	46.50	43.45
$(La, Di)_2O_3$	2.94	5.18
UO_3	0.83	1.64
Loss ignition	0.79	
MgO		0.16
Titania		0.05
Fe_2O_3		0.76
CO_2		0.11
P_2O_5		0.12
A, He and alkalics		0.31
Water at 105°		0.32
Water above 105°		0.04
Total	99.75	100.00

POWERLITE

Serial No.	3052
SiO_2	None
Al_2O_3	None
Fe_2O_3	None
CaO	27.46
MgO	None
CuO	None
MoO_3	67.90
WO_3	None
MoS_2	1.50
H_2O	2.33
Insoluble	0.88
Total	100.07

TEPHROITE

Serial No.	3055
SiO_2	28.57
Fe_2O_3	5.52
Al_2O_3	2.46
MnO	58.89
CaO	0.30
MgO	0.80
Na_2O	0.27
CO_2	2.92
Total	99.70

ANDRADITE

Serial No.	3056	3057
SiO_2	37.24	36.24
Fe_2O_3	31.17	15.91
Al_2O_3	Trace	11.23
MnO	20.11	30.72
CaO	10.16	2.04
MgO		2.22
MgO	1.32	
Alkalies (Difference)		1.64
Total	100.00	100.00

ONYX

Serial No.	3058	3059
SiO_2	0.30	0.30
Al_2O_3	0.90	1.00
Fe_2O_3	Trace	Trace
CaO	54.80	54.70
MgO	Trace	Trace
Alkalies	Trace	Trace
CO_2	44.30	42.60
Organic Mat.	None	2.20
Total	100.30	100.80

CELESTITE

Serial No.	3060
$SrSO_4$	98.00

AUGITE

Serial No.	3061
SiO_2	45.23
Al_2O_3	7.73
Fe_2O_3	2.95
FeO	4.07
MgO	12.25
CaO	23.37
Na_2O	0.47
K_2O	0.12
H_2O	0.37
Titanium oxide	4.28
P_2O_5	None
NiO	0.05
MnO	0.07
SrO	None
$Ba(OH)_2$	None
Li_2O	Trace
Total	100.06

GRAHAMITE

Serial No.	3063	3064
Moisture	0.30	None
Vol. com. matter	44.00	57.90
Fixed carbon	52.80	37.70
Ash	2.90	4.40
Total	100.00	100.00

NITRATE SOURCES

3161	$NaNO_3$, 25.0 %
3162	$NaNO_3$, 5.0 %
	Na_2SO_4 3.28%

Potassium salts—trace.
Carbonates—absent.
A sample of 125 lbs. from the same sources contained only 0.43% of sodium nitrate.

JET

Serial No.	3062
Moisture	2.20
Vol. com. matter	59.08
Fixed carbon	37.52
Ash	1.20
Total	100.00

ALLANITE

Serial No.	3065
SiO_2	29.21
Fe_2O_3	50.33
Cerium earth	25.06*
Al_2O_3	12.20
CaO	3.69
Total	100.49

*Nd_2O_3=4.76.
Pr_2O_3=2.31.

GRAPHITE

Serial No.	3073	3074
Graphite	10.30%	14.50%

EPSOMITE

Serial No.	3070	3071
Water	40.07	40.00
SiO_2	20.07	21.43
Al_2O_3 (	2.20	2.21
Fe_2O_3 (	2.20	2.21
MgO	12.381	12.38
CaO	Tr	
SO_3	24.01	24.01
Total	99.74	100.08

SULPHUR

Serial No.	Sulphur content (%)	Arsenic (Quantitative test)
3075	54.00	Not tested
3076	40.50	
3077	74.90	
3078	15.80	
3079	14.00	
3080	14.370	
3081	20.70	None
3082	12.70	
3083	54.40	
3084	10.10	
3085	41.40	
3086	36.80	
3087	41.80	
3088	30.10	
3089	3.20	
3090	90.80	
3091	79.20	None
3092	20.40	

SULPHUR

Serial No.	3093	3094	3095	3096	3097	3098	3098a	3098b
SiO_2	2.34	10.66	34.54	37.20	8.60	49.34		
Fe_2O_3	0.15	0.08	11.44	0.27	0.32	0.16		
Al_2O_3	1.95	33.48	16.69	1.63	11.28	0.18		
Titanic acid			0.67					
P_2O_5			Trace	Trace				
CaO	31.72	2.50	0.76	19.76	5.72	1.35		
MgO	0.36	0.34	1.01	0.51	0.30	0.32		
SO_3	23.87		5.08	30.50	19.23			
Sulphur, free	8.16	13.35	1.70	1.00	22.00	46.00	52.00	82.60
Na_2O	4.89	6.14	0.70	0.34	1.24			
K_2O	0.08	0.19	1.16	0.34	1.32			
Moisture	10.10	2.00	9.28	7.64	10.06	2.30		
Loss on ignition	16.04	31.25	10.50	1.40	20.14	0.86		
Total	99.66	99.99	99.53	100.69	100.21	100.51		

POTASH

Serial No.	K_2O in percentage of soluble portion
3099	0.99
3100	1.16
3101	0.45
3102	0.94
3103	0.98
3104	0.70
3105	0.43
3106	0.71
3107	0.31
3108	0.68
3109	0.25
3110	0.43
3111	0.26
3112	0.49
3113	0.68
3114	0.43
3115	2.07
3116	9.23
3117	1.74
3118	0.62
3119	0.91
3120	0.37
3121	0.37
3122	0.33
3123	0.31
3124	0.64
3125	0.49
3126	0.47
3127	0.49
3128	0.55
3129	6.14
3130	1.72
3131	2.79
3132	10.50

WOOD

Serial No.	Ash (%)	B. t. u's.	Kind
3148	3.10	8,650	Mesquite
3149	3.34	8,027	Mulberry
3150	2.16	8,416	Big Post Oak
3151	1.24	7,762	Sycamore
3152	1.94	8,728	Hickory (Pecan)
3153	2.50	9,118	Long Leaf Yellow Pine
3154	0.50		Chinaberry
3155	1.12	8,759	Rosemon Pine
3156	3.22	8,463	Willow

BAT GUANO

Serial No.	Moisture (%)	NH_3 (%)
3143	13.65	12.16*
3144	26.53	11.02*
3145	36.60	6.73
3146		8.10
3147		11.44

*Kjeldahl (exclusive of nitrates.)

METERORIC IRON

Serial No.	3133	3134	3135	3136	3137	3138	3139	3140	3141	3142
SiO_2				37.70					44.[illegible]	0.132
Al_2O_3				2.17					2.72	
Fe	93.75	94.02	20.80	3.47	86.54	94.90	89.68	91.958	1.[illegible]	90.769
FeO				23.82			Trace		16.04	
Cr_2O_3							Trace		0.52	
Ni	5.51	5.429	0.28	0.65	12.77		9.20	7.86	0.22	8.342
Ni_2O_3				1.59					0.52	
Co	0.52	Trace		0.09	0.63	4.87	0.33	Trace	Trace	0.265
Co_2O_3				0.16						
Mn								Trace?		Trace
MnO				0.45					2.23	
CaO				2.20					27.93	
MgO				25.94					0.13	
K_2CO_3									1.13	
Na_2CO_3								0.099	0.41	
P	0.20				0.16	0.23	0.158			0.141
H_3PO_4				0.25				0.032	0.41	
S	0.06			1.30	0.03	Trace	0.017		1.83	0.016
C					0.11	Trace		0.011		0.19
Si								0.04		
Cu					0.02		0.037		Tr.CuO	0.018
Sn										0.004
HNO_3		0.328								
H_2O									0.84	
Total	100.04	99.78		99.79	100.26	100.00	99.42	100.00	101.11	99.877

POSTASH SOURCES—Continued.

Analysis Number	3157	3158	3159
Per cent. potassium ion extractable with water	29.2	20	Trace
Per cent nitrate ion extractable with water	17.6	4.4	2.6

3160. POTASH IN BRINES FROM FERRY CO. 'SALT LAKE."

Average of	Soluble Solids Expressed in per cents of weight of water sample	Per cent of K_2O of fused salts
20 Samples Brine	21.94	6.24
3 Samples of Mud	19.66	8.30
6 Samples from Springs and Seeps	5.83	17.31

ANALYSIS OF COMPOSITE OF SAMPLES FROM VARIOUS PARTS OF LAKE

	Per cents of Wt. of water sample	Relative No. of Combining Units (Gram-Equiv. per 1000 liters). (Sp. Gr. 1.18)
Total dissolved solids	23.428	------
Volatile matter	0.609	------
Silica, etc.	0.017	------
Iron and Alumina	.029	------
Calcium ion	.063	37.1
Magnesium ion	1.103	1088.0
Potassium ion	1.5	455.
Sodium ion	5.363	2730.
Sulphate ion	3.42	841.
Chloride ion	10.41	3460.
Carbonate ion	0.02	7.9