Bibliography of Titanium Deposits of the World

GEOLOGICAL SURVEY BULLETIN 1019-G

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By ROBERT LAWTHERS *and* HELEN R. MARK

CONTRIBUTIONS TO BIBLIOGRAPHY OF MINERAL RESOURCES

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BIBLIOGRAPHY OF TITANIUM DEPOSITS OF THE WORLD

By Robert Lawthers and Helen R. Mark

INTRODUCTION

Since early 1951, when the U. S. Geological Survey issued Circular 87, "Bibliography on titanium," by J. R. Carpenter and G. W. Luttrell, the titanium industry has continued to expand. Not only has the production of titanium metal advanced from the experimental stages to become a new and important industry, but the production of titanium pigments has increased. As a result of this expansion, new sources of titanium ore have been developed. This bibliography has been prepared, therefore, to fulfill the need for a comprehensive, up-to-date compilation of the literature on raw materials used by this important industry.

The preparation of the bibliography was facilitated by consulting references given in Circular 87, and by using articles obtained during the senior author's studies of the worldwide resources of titanium (manuscript in preparation).

The authors acknowledge with thanks the assistance given by A. P. Cerkel during initial phases of the compilation.

EXPLANATION OF THE BIBLIOGRAPHY

This bibliography contains about 600 references selected to provide information on the resources and utilization of titanium deposits; it includes articles on the geology, resources, exploration, mining methods, and beneficiation of deposits. Because some general background information is necessary for a proper evaluation and understanding of the economics of titanium, a few articles are included on the mineralogy of titanium minerals, the geology of rocks in which titanium deposits occur, and the petrology and geochemistry of mineral assemblages that are common to both titaniferous and other deposits.

The utilization of a deposit depends, in part, on mining and ore-dressing techniques, hence articles on these subjects relevant to certain deposits are included.

Production and consumption statistics, information on uses of titanium

compounds, methods of producing metal and pigments, and other data on various phases of the titanium industry are of secondary importance in this bibliography. Such material has been treated comprehensively in other reports. (See, for example, Archer and Gibson, 1953; Brophy, Archer, and Gibson, 1952; and DuMont, 1947).

The bibliography has been compiled from domestic and foreign publications available through December 31, 1955, in libraries in the Washington, D.C., area. Most of the entries were obtained from publications in the U. S. Geological Survey Library and the Central Library of the Department of the Interior.

Individual references are given in the language that appears on the title page of the publication. Exceptions are references by Japanese and Chinese publications, which are given in English. A translation, within the citation, of the title and publication of some foreign entries, particularly Russian, is inclosed in brackets. In some instances brief notes have been added at the end of the citation, and where there were no titles, brief bracketed titles have been supplied.

Much information published as short articles in the "current events" sections of technical journals is of interest only for a short time. However, all such articles that contain material believed to be of permanent value have been included in the bibliography.

Annual summaries of developments in the titanium industry appear in many technical journals and publications of State and Federal geological surveys and mining bureaus. Although many of these reports give excellent annual summaries, the references included in this bibliography are those which contain information on titanium deposits that has not been published elsewhere. Exceptions are the issues of the Minerals Yearbook from 1940 to the present, which are included because they provide excellent summaries of the years of greatest development of the domestic titanium industry. The annual volumes of the Minerals Yearbook have been published for the years 1932–33 to the present by the U. S. Bureau of Mines. They were preceded by the annual volumes of the Mineral Resources of the United States, issued for the years 1924 through 1931 by the Bureau of Mines, and from 1882 through 1923 by the U. S. Geological Survey.

The references in this bibliography are listed by authors in alphabetical order; those by anonymous authors are at the end. All citations are cross-indexed, and the index is subdivided to include such topics as location of deposit, geology, resources, mineralogy, petrology, and mining activities. Information pertaining to production, consumption, trade statistics, metal technology, uses of titanium products, and related subjects is not indexed completely, because the principal purpose of the bibliography is to provide references on deposits of titanium.

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Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922e
Lawthers 1954
Magnusson 1950
Poulsen 1953
United Nations 1955
U. S. Bur. Mines 1953b
Youngman 1930b
Anonymous 1955n
Selvaag:
Bugge 1953
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922e
Lawthers 1954
Magnusson 1950
Poulsen 1952
United Nations 1955
Solnördal:
Bugge 1953
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922e
Lawthers 1954
Magnusson 1950
Poulsen 1952
Portugal:
Barksdale 1949
Castro 1947
Gmelin-Institut 1951
Lawthers 1954
Youngman 1930b
Spain.
Miscellaneous deposits:
Gmelin-Institut 1951
Lawthers 1954

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U. S. Bur. Mines 1947b, 1949a
Anonymous 1942a, 1944
Sweden.
Järvsö, Kramsta:
Geijer and Magnusson 1952
Lawthers 1954
Magnusson 1950
Ruoutevare:
Dulieux 1915
Geijer and Magnusson 1952
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922e
Kemp 1899b
Kuhn 1927
Lawthers 1954
Magnusson 1950
United Nations 1955
Södra Ulvön:
Geijer and Magnusson 1952
Gmelin-Institut 1951
Lawthers 1954
Magnusson 1950
Mogensen 1946
Taberg:
Bateman 1951
Dulieux 1915
Evrard 1944
Geijer and Magnusson 1952
Hjelmqvist 1949
Imperial Min. Res. Bur. 1922e
Kemp 1899b
Kuhn 1927
Lawthers 1954
Magnusson 1950
United Nations 1955
Union of Soviet Socialist Republics.
Karelia and Kola Peninsula.
General:
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922e
Lawthers 1954
Leningrad, Geog.-ekon. nauchno-issled. inst. 1934
Leningrad, Geog.-ekon. nauchno-issled. inst. 1935
Polkanov 1937, 1944
Pudozhgora deposit:
Gmelin-Institut 1951
Lawthers 1954
Leningrad, Geog.-ekon. nauchno-issled. inst. 1934
Shimkin 1953
Suirokomski 1926
Anonymous 1948a
Miscellaneous deposits:
Bol'shoy sovetskiy atlas mira 1937-39
Gmelin-Institut 1951
Lawthers 1954
Suirokomski 1926
Ural Mountains.
General:
Afanas'yev-Solov'yev 1934

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Barksdale 1949
Gmelin-Institut 1951
Gorskiy 1939
Hess and Gillson 1937
Lawthers 1954
Malyshev 1936
Panteleyev and Malyshev 1934
Shimkin 1953
Suirokomski 1926
Vogel, F. 1950
Kusa deposit:
Barksdale 1949
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922e
Kulibin 1935
Lawthers 1954
Malyshev 1937
Panteleyev and Malyshev 1934
Shimkin 1953
Suirokomski 1926
Other deposits:
Gmelin-Institut 1951
Panteleyev and Malyshev 1934
Shimkin 1953
Suirokomski 1926
Vertushkov 1949
Warren 1918
Exploitation and utilization of titaniferous deposits.
General:
Dulieux 1915
Singewald 1913b
Development plans.
Maryland.
Cove Point: Anonymous 1955g
Mexico.
Pluma Hidalgo: Anonymous 1955a, b, c
Western Australia.
Wonnerup: McMath 1951
Possibilities of utilization.
Argentina.
Buenos Aires Province coastal sands: Lannefors 1929
New Zealand.
Titaniferous iron sands: Anonymous 1953l
Union of South Africa:
Frankel and others 1951
Masson 1953
United States.
California.
San Gabriel Mountains: Oakeshott 1948, 1950
New York.
Essex County deposits: Singewald 1913b
Sanford Hill deposit: Singewald 1913b
Rhode Island.
Iron Mine Hill, Cumberland: Singewald 1913b
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Virginia.
Amherst-Nelson Counties area: Ryan 1933
Rutile deposits: Watson and Taber 1913
Wyoming.
Iron Mountain deposit: Singewald 1913b
Hawaii.
Titaniferous soils: Sherman 1954
Exploration.
Airborne radioactivity surveys.
United States.
Southeast coast: Moxham and Johnson 1953
Florida.
Beaches of west coast: Meuschke and others 1953
Florida and Georgia.
Folkston area: Moxham 1954
South Carolina.
Edisto Island area: Meuschke 1955
Field test for titanium: Shapiro and Brannock 1953
Magnetic surveys.
Canada, Quebec.
Allard Lake:
Bourret 1949
Hammond 1952
McDonald 1951
United Nations 1955
Degrosbois deposit: Osborne 1936
Ivry deposit: Osborne 1936
Natashkwan sand deposits: United Nations 1955
St. Urbain: Gillson 1932
Norway.
Ekersund-Soggendal area: Anonymous 1955u, w
United States.
New York.
Lake Sanford area: Balsley 1943
Oregon.
Sands of southwest coast: Stephenson, E. L. 1945
Wyoming.
Laramie Range: Dempsey 1955
Shanton deposit: Frey 1946a
Methods of test-drilling.
Florida.
Trail Ridge area: Thoenen 1950
Idaho.
Long Valley area, Cascade: Argall 1954
Virginia.
Piney River deposit: Davidson 1948
Results of test-drilling.
Arkansas.
Christy brookite deposit: Reed 1949a
Magnet Cove area: Dupuy 1949

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Fryklund and others 1954
Magnet Cove Rutile Co. deposit:
Reed 1949b
Spencer 1946
Florida.
Buried heavy mineral sands, central and northeast part of state: Thoenen and Warne 1949
Trail Ridge area: Spencer 1948
Trail Ridge mine, Starke: Carpenter and others 1953
Idaho.
Bovill clay deposit: Scheid and Hosterman 1951
Deary clay deposit:
Scheid and Sohn 1945
Scheid, Sohn 1952
Olson clay deposit: Scheid, Hosterman 1951a
Stanford clay deposit: Scheid, Hosterman 1951b
Stockton and Stanley Hill clay deposits: Scheid 1952
Maryland.
Cove Point: Anonymous 1953d
Minnesota.
Titaniferous deposits in Duluth gabbro: Grout 1949–50
Montana.
Teton County titaniferous sandstone: Wimmler 1946
New York.
Lake Sanford area: Balsley 1943
North Carolina.
Buffalo Creek monazite placer: Griffith and Overstreet 1953a
First Broad River monazite placer: Hansen and Cuppels 1954
Knob Creek monazite placer: Griffith and Overstreet 1953b
Virginia.
Bush - Hutchins deposit, Roanoke County: Hickman 1947
Washington.
Excelsior clay deposit:
Scheid 1945
Scheid, Hosterman 1945
Wyoming.
Iron Mountain deposit:
Frey 1946b
Pinnel 1954
Shanton deposit:
Frey 1946a
Hild 1953
Tumin 1955
Geochemistry.
General:
Clarke 1924
Daly 1933
Hevesy, von 1931
Rankama and Sahama 1951

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Association of titanium and niobium.
General: Fleischer and others 1952
Arkansas.
Magnet Cove area: Fryklund and others 1954
Chemical composition of ilmenite and magnetite.
General: Buddington and others 1955
Greenland.
Skaergaard complex: Vincent and Phillips 1954
Wyoming.
Iron Mountain: Newhouse and Hagner 1951
Chromium, titanium, and vanadium relations.
General:
Lawthers 1954
Robinson 1922
Wilson, H. D. B. 1953
New York.
Lake Sanford area: Balsley 1943
New Zealand.
Taranaki iron sands:
Hutton 1945b
Wylie 1938
Union of South Africa.
Bushveld complex: Schwellnus and Willemse 1943
Field test for titanium: Shapiro and Brannock 1953
Magnetic properties of ilmenite-magnetite assemblages: Chevallier and others 1954
Stability of geikielite and ilmenite: Sahama and Torgeson 1949
Geology.
Algeria.
Sand deposits: Bellair 1940
Argentina.
Buenos Aires Province.
Coastal sands: Lannefors 1929
Catamarca.
Mina Podesta: Bassi 1952
Australia.
Beach deposits.
General:
Blaskett 1950
Dunkin 1953
Fisher 1948, 1949
Gardner 1951
Gillson 1949
Lyons 1954
U. S. Bur. Mines 1948c
Anonymous 1955i
New South Wales:
Poole 1939
U. S. Bur. Mines 1935
Anonymous 1939
Queensland:
Beasley 1948, 1950
Carlson 1944
Connah 1948
Morton 1948

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Beach deposits—Continued
Western Australia: McMath and de la Hunty 1951a, b
New South Wales.
Titaniferous magnetites near Williams and Karuah Rivers: Imperial Min. Res. Bur. 1922d
Queensland.
Boyne River, Kingaroy district: Cribb 1943
South Australia.
Mount Crawford area:
Imperial Institute 1938
Watson 1915
Watson and Taber 1913
Belgian Congo:
Huge and Egoroff 1948
Brazil.
Coastal placer deposits:
Fróes Abreu 1933, 1936a
Gillson 1951
Gmelin-Institut 1951
Rutile deposits:
Chambers 1942
Fróes Abreu 1936a
Jobim 1941
Leonardos 1938
Zuquim 1935
British Borneo.
Beach sands: Fitch 1952
Canada.
Alberta.
Burmis titaniferous sandstone: Robinson 1922
Ontario.
Angus township titaniferous magnetite deposit, Nipissing district: Hurst 1932
Pine Lake deposit, Haliburton county: Dulieux 1915
Seine Bay and Bad Vermillion Lake area: Robinson 1922
Quebec.
General: Dulieux 1915
Allard Lake:
Bateman 1951
Bourret 1949
Buisson 1952
Gmelin-Institut 1951
Hammond 1949, 1952
Illingworth 1952
Lawthers 1954
Retty 1942, 1944
Tumin and Cservenyak 1955
Bay of Seven Islands area:
Dulieux 1912b, 1915
Faessler and Schwartz 1941
Robinson 1922
Degrosbois deposit:
Dulieux 1913, 1915
Osborne 1936
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Ivry deposit:
Dulieux 1913, 1915
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St. Charles prospect, Chicoutimi county:
Denis 1925
Dulieux 1913, 1915
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St. Lawrence River sand deposits:
Dulieux 1912a, 1915
MacKenzie 1912b
St. Urbain:
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Dulieux 1912b, 1915
Gillson 1932
Gmelin-Institut 1951
Karpoff 1953
Lawthers 1954
Mawdsley 1927
Osborne 1928
Robinson 1922
Ross 1941
Warren 1912, 1915
Watson and Taber 1913
Ceylon.
Titaniferous beach deposits:
Fernando 1948
Wadia 1943
Wadia and Fernando 1944
China.
Chi-chia-tzu deposit: Tsuru 1934
Egypt.
Abu Ghalqa deposit (Wadi El Ranga):
Amin 1954
Attia 1950, 1952
Stella 1932
England.
Cornwall.
St. Keverne titanium placer: Lamming 1952
Finland.
Miscellaneous deposits:
Härme 1955
Palmunen 1925
Pehrman 1927
Otanmäki mine:
Magnusson 1950
Marmo 1952
Paarma 1954
Stigzelius 1952
Vaasjoki 1947
French Cameroons.
Rutile placer deposits: Haugou 1935
French West Africa.
Dahomey:
Blondel 1932
Chermette 1938
Ivory Coast.
Coastal beach deposits:
Bolgarsky 1951
la Rüe 1927, 1932

Geology—Continued
French West Africa—Continued
Senegal.
Coastal beach deposits:
Arnaud 1945
la Rüe 1932
Legoux 1939
Legoux and Faucheux 1935
Germany.
Frisian Islands.
Beach deposits: Trusheim 1935
Gold Coast:
Junner 1950
Greenland.
Skaergaard complex: Vincent and Phillips 1954
Titaniferous placers: Moos 1938
Hungary.
Szarvasko, Bükk Mountains:
Pantó 1952
Szentpetery 1937
India.
Titaniferous magnetite deposits:
Dunn and Dey 1937
Fox 1926
Krishnan 1952
Krishnan and Roy 1942
Swanimathan 1928
Tipper 1936
Travancore.
Beach deposits:
Barksdale 1949
Chambers 1939
Gillson 1949
Krishnan 1951
Krishnan and Roy 1942
Tipper 1914
Viswanathan 1951
Japan.
Fukushima Prefecture.
Kengamine Mine: Andrews 1947
Titaniferous iron sands:
Andrews 1947
Kikuchi and others 1955
Maeda 1935
Mitsuchi 1952
Staatz 1947, 1948
Korea.
Kyonggi-do–Porum-do:
Gallagher and others 1946
Shoenpeito deposit: Ichimura 1931
Madagascar:
Guigues 1951
Lacroix 1920
Malaya.
Tin-bearing placer deposits: Scrivenor 1928
Mexico.
Guerrero.
Papanoa beach sands: Sánchez Mejorada 1952
Oaxaca.
Huitzo ilmenite deposit: Sánchez Mejorada 1952

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Pluma Hidalgo: Sánchez Mejorada 1952
Morocco (French).
Beach sands: Agard and Permingeat 1952
Mozambique.
Kakanga: Legraye 1940
Mawili: Legraye 1940
New Zealand.
Titaniferous iron sands:
Finch 1947
Gillson 1949
Gmelin-Institut 1951
Hutton 1940, 1950
Imperial Min. Res. Bur. 1922d
Kemp 1899b
Wylie 1937
Norway.
Ekersund-Soggendal area:
Bugge 1953
Dulieux 1915
Evrard 1944
Gillson 1949
Gmelin-Institut 1951
Kemp 1899b
Michot 1939
Kragerö rutile deposit:
Barksdale 1949
Lawthers 1954
Thornton 1927
Watson 1915
Watson and Taber 1913
Portugal.
Sines.
São Torpes beach: Castro 1947
Sierra Leone.
Freetown norite deposit:
Gmelin-Institut 1951
Junner 1930b, 1950
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Pollett 1951
Sweden.
Ruoutevare deposit: Kuhn 1927
Södra Ulvön:
Gmelin-Institut 1951
Magnusson 1950
Taberg:
Bateman 1951
Dulieux 1915
Geijer and Magnusson 1952
Hjelmqvist 1949
Kemp 1899b
Kuhn 1927
Lawthers 1954
Taiwan.
Western coastal area: Chen 1953
Tanganyika.
Liganga deposits:
Gmelin-Institut 1951
Harpum 1952
Stockley 1945

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Thailand.
Titaniferous placer deposits: Burvas 1951
Turkey.
Istanbul.
Sile: Egeran 1941
Uganda.
Bukusu Hill: Broughton and others 1950
Union of South Africa.
Bushveld complex:
Bateman 1951
Frankel and others 1951
Gmelin-Institut 1951
Hall 1932
Imperial Min. Res. Bur. 1922a
Lawthers 1954
Masson 1953
Reunig 1929
Union of South Africa Geol. Survey 1940
Wagner 1928
Natal.
Coastal sands:
Frankel and others 1951
Kent 1938
Partridge 1938
Union of South Africa Geol. Survey 1940
Anonymous 1954b
Tugela and Mambula Rivers deposit:
Du Toit 1918
Wagner 1928
Southwest Africa:
Frankel and others 1951
Frommurze and others 1942
Gmelin-Institut 1951
Union of Soviet Socialist Republics.
Kola Peninsula: Polkanov 1937, 1944
Ural Mountains.
General:
Gorskiy 1939
Panteleyev and Malyshev 1934
Kusa deposit:
Gmelin-Institut 1951
Malyshev 1937
Panteleyev and Malyshev 1934
Other deposits:
Gmelin-Institut 1951
Panteleyev and Malyshev 1934
Suirokomski 1926
Vertushkov 1949
United States.
Arizona.
Yavapai County titaniferous magnetite deposit: Ball and Broderick 1919
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Magnet Cove area.
General:
Fryklund, Harner 1954
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Ross 1941
Vogel, F. A. 1944
Christy deposit:
Fryklund and others 1954
Fryklund and Holbrook 1950
Holbrook 1947
Reed 1949a
Hardy-Walsh or Kilpatrick brookite deposit:
Fryklund and others 1954
Fryklund and Holbrook 1950
Magnet Cove Rutile Company deposit:
Fryklund and others 1954
Fryklund and Holbrook 1950
Kinney 1949
Reed 1949b
Spencer 1946
Mo-Ti deposit:
Fryklund and others 1954
Fryklund and Holbrook 1950
Southern Howard County.
Titaniferous sands:
Holbrook 1948
California.
San Gabriel Mountains:
Higgs 1954a, b
Moorehouse 1938
Oakeshott 1937, 1948, 1950, 1954
Tucker 1927
Colorado.
Caribou Hill: Singewald 1913b
Cebolla Creek–Iron Hill:
Larsen 1942
Singewald 1912, 1913b
Iron Mountain, Freemont County:
Kemp 1899b
Singewald 1913b
Florida.
Beach deposits, modern and buried:
Cannon 1950
Lawthers 1954
MacNeil 1950
Martens 1935
Phelps 1941
Thoenen and Warne 1949
Vernon 1943
Highland mine, Lawtey: Roberts 1955
Pablo Beach mine, Mineral City:
Liddell 1917
Trail Ridge area:
Spencer 1948
Thoenen 1950
Trail Ridge mine, Starke:
Carpenter and others 1953
Anonymous 1952d

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Georgia.
Coastal sand deposits: Teas 1921
Graves Mountain:
Watson 1915
Watson and Taber 1913
Watson and Watson 1912
Idaho.
Long Valley area, Cascade: Argall 1954
Titanium-bearing, high-alumina clay deposits:
Scheid 1952
Scheid and Hosterman 1951
Scheid, Hosterman 1951a, b
Scheid and Sohn 1945
Scheid, Sohn 1952
Maryland.
Cove Point beach placer: Anonymous 1953d
Harford County rutile deposits:
Ostrander 1942
Tomlinson 1946
Minnesota.
Titaniferous deposits in Duluth gabbro:
Broderick 1917
Emmons and Grout 1943
Grout 1926, 1949–1950
Kemp 1899b
Lawthers 1954
Singewald 1913b
Van Hise and Leith 1911
Montana.
Titaniferous sandstones:
Stebinger 1914
Wimmler 1946
Nevada.
Corral Canyon mine: Ferguson 1939
New Jersey.
Titaniferous magnetite deposits:
Bayley 1910
Singewald 1913b
Smith 1933
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Adirondack Mountains:
Balk 1931
Buddington 1939
Evrard 1947
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Essex County titaniferous magnetite deposits:
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Kemp 1899a
Osborne 1928
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Calamity–Mill Pond deposit:
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Stephenson, R. C. 1945, 1948
Cheney Pond deposit:
Singewald 1913b
Stephenson, R. C. 1945, 1948
Iron Mountain (Mt. Adams) deposit: Stephenson, R. C. 1945, 1948
MacIntyre mine, Tahawus:
Bateman 1951
Gillson 1949
Lawthers 1954
Stephenson, R. C. 1945, 1948
Sanford Hill deposit (At present, MacIntyre mine): Singewald 1913b
North Carolina.
Buffalo Creek monazite placer: Griffith and Overstreet 1953a
First Broad River placer deposit: Hansen and Cuppels 1954
Knob Creek monazite placer: Griffith 1953b
Titaniferous magnetite deposits:
Bayley 1923a, b, c
Cross 1949
Singewald 1913b
Yadkin Mica and Ilmenite Company deposit:
Gillson 1949
Singewald 1913b
Oklahoma.
Wichita Mountains:
Chase 1952
Merritt 1938, 1939, 1940
Oregon.
Coastal placer deposits:
Pardee 1934
Stephenson, E. L. 1945
Twenhofel 1943, 1946a, b
Ferruginous bauxite deposits:
Lawthers 1954
Libbey and others 1945, 1946
Pennsylvania.
Chester County: Watson 1915
Rhode Island.
Iron Mine Hill, Cumberland:
Johnson and Warren 1908
Kemp 1899b
Lawthers 1954
Singewald 1913b
Warren and Powers 1914
South Carolina.
Gaffney rutile deposit: Watson 1915

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Tennessee.
Titaniferous magnetite deposits: Bayley 1923b, c
Texas.
Baringer Hill, Llano County: Hess 1908
Marfa rutile deposit, Jeff Davis County: Vogel, F. A. 1942
Virginia.
Amherst-Nelson Counties area.
General:
Barksdale 1949
Gillson 1949
Gmelin-Institut 1951
Hess and Gillson 1937
Lawthers 1954
Merrill 1902
Moore 1940
Pegau 1950
Ross 1932, 1936, 1941, 1942
Ryan 1933
Thornton 1927
Watson 1907a, b, 1915
Watson and Taber 1909, 1913
Youngman 1930b
Piney River deposit:
Cross 1949
Davidson 1948
Davidson and others 1946
Roseland rutile mine: Hess 1909
Bush-Hutchins deposit, Roanoke County:
Hickman 1947
Watson and Taber 1913
Goochland and Hanover Counties:
Brown, C. B. 1937
Hess 1910
Watson 1915
Watson and Taber 1913
Miscellaneous deposits:
Bloomer and DeWitt 1941
Watson 1922
Watson and Taber 1913
Washington.
Excelsior clay deposit:
Scheid 1945
Scheid, Hosterman 1945
Wyoming.
Iron Mountain deposit:
Ball 1907
Birch 1955
Diemer 1941
Dietz 1932
Dulieux 1915
Frey 1946b
Gmelin-Institut 1951
Kemp 1899b
Lawthers 1954
Newhouse and Hagner 1951
Osterwald and Osterwald 1952
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Shanton deposit:
Diemer 1941
Hild 1953
Titaniferous sandstones: Murphy and Houston 1955
Hawaii.
Titaniferous soils: Sherman 1952, 1954
Uruguay.
Florida titaniferous magnetite deposit: U. S. Bur. Mines 1940
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General:
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Dana 1911
Ford 1932
Frankel and others 1951
Gary 1942
Gillson 1949
Hess and Gillson 1937
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Palache and others 1944
Vogel, F. 1950
Alteration of titanium minerals:
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Frederickson 1948
Lynd and others 1954
Murphy and Houston 1955
Arizonite:
Gillson 1949
Overholt and others 1950
Palmer 1909
Coulsonite:
Dunn and Dey 1937
Frankel and Grainger 1941
Strauss 1947
Ilmenite:
Barksdale 1949
Gillson 1949
Sahama and Torgeson 1949
Thornton 1927
Youngman 1930a
Leucoxene:
Allen, V. T. 1950
Broughton and others 1950
Coil 1933
Creitz and McVay 1948
Edwards 1942
Frederickson 1948
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Newhouse 1929
Sosman and Posnjak 1925
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Niobium content of titanium minerals:
Fleischer and others 1952
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United States: Schrader and others 1916
Western Australia: Simpson 1948
Rutile:
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Thornton 1927
Watson and Watson 1912
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Titanium minerals in primary deposits.
Osborne 1928
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Canada, Quebec.
St. Urbain: Warren 1912
Union of South Africa.
Bushveld complex:
Frankel and Grainger 1941
Strauss 1947
United States.
Colorado.
Cebolla Creek-Iron Hill: Larsen 1942
Italian mountains: Cross and Shannon 1927
New York.
Lake Sanford area: Stephenson, R. C. 1945, 1948
Virginia.
Amherst–Nelson Counties area:
Ross 1941
Watson and Taber 1913
Titanium minerals in secondary deposits.
General: Lynd and others 1954
Australia.
Chromium in beach sands of east coast: Blaskett and Dunkin 1948
New South Wales:
Poole 1939
U. S. Bur. Mines 1948c
Whitworth 1931
Anonymous 1939
Queensland:
Beasley 1950
U. S. Bur. Mines 1948c
New Zealand.
New Plymouth:
Fyfe 1952
Hutton 1945a
South Island: Hutton 1950
Wanganui iron sands: Finch 1947
United States.
Coastal beach sands of southeastern states: Martens 1935
Florida.
Beach sands, modern and buried:
Cannon 1950
Miller 1945
Phelps 1941
Idaho.
Placer deposits: Shannon 1922

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Oregon.
Coastal beach sands: Twenhofel, 1943, 1946a, b
Texas.
Gulf coast: Bullard 1942
Wyoming.
Buried beach sand deposits: Murphy and Houston 1955
Ulvöspinel.
Girault 1953
Mogensen 1946
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Mining Activities.
Australia.
Rutile placer mines:
Blaskett 1950
Carlson 1944
Dunkin 1953
Fisher 1949
Gardner 1951
Gillson 1949
Lyons 1954
Meyer 1950
Tumin 1955
Tumin and Cservenyak 1955
U. S. Bur. Mines 1948c, 1953a
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Brazil.
Rutile deposits.
Ceara: Chambers 1942
Goyaz:
Fróes Abreu 1936b
Leonardos 1938
Minas Geraes: Fróes Abreu 1936b
Canada.
Quebec.
Allard Lake and Sorel:
Buisson 1952
Cross 1949
Cservenyak 1953
Cservenyak and Tumin 1954
Illingworth 1952
Knoerr 1952
Lawthers 1954
McDonald 1951
U. S. Bur. Mines 1955b
Anonymous 1948b 1951a
Egypt.
Damietta and Rosetta mines: U. S. Bur. Mines 1945a, 1952c
Finland.
Otanmäki:
Järvinen 1954
Anonymous 1953e
French West Africa.
Senegal.
Coastal beach sands: U. S. Bur. Mines 1954a

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India.
Bombay State.
Ratnagiri district:
Anonymous 1953c
Travancore.
Beach deposits:
Barksdale 1949
Gillson 1949
Hess and Gillson 1937
U. S. Bur Mines 1946a, 1955a
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Japan.
Titaniferous iron sands: Maeda 1935
Malaya.
Tin-bearing placer deposits: Fermor 1940
Norway.
Ekersund–Soggendal area.
Storgangen:
Magnusson 1950
U. S. Bur. Mines 1951
Rödsand: Magnusson 1950
Union of South Africa.
Natal.
Umgababa:
U. S. Bur. Mines 1953c
Anonymous 1953b
United States.
Arkansas.
Magnet Cove Rutile Company: Frykland and Holbrook 1950
Titanium Alloy Company mine: Vogel, F. A. 1944
California.
Hermosa and Redondo Beaches:
Baughman 1927
Tucker 1927
Youngman 1930a
Florida.
Highland mine, Lawtey:
Roberts 1955
Anonymous 1953j, 1955r
Jacksonville mine:
Cross 1949
Detweiler 1952
Gillson 1949
Hubbard and others 1953
Humphreys 1945
Lawthers 1954
Lenhart 1949
Michell 1952
Pablo Beach mine, Mineral City:
Liddell 1917
Martens 1928
Robinson 1922
Youngman 1930a
Riz Mineral Co. mine, Melbourne:
Vernon 1943
Trail Ridge mine, Starke:
Carpenter and others 1953
Cross 1949
Mining Activities—Continued
United States—Continued
Florida—Continued
Trail Ridge mine, Starke—Cont.
Cservenyak and Tumin 1956
Dennis 1953
Gillson 1949
Hubbard and others 1953
Lawthers 1954
Lenhart 1949, 1951
Michell 1952
Anonymous 1950a, 1952d
Idaho.
Long Valley area, Cascade:
Argall 1954c
Anonymous 1954c
New York.
MacIntyre mine, Tahawus:
Balsley 1943
Barksdale 1949
Cross 1949
Cservenyak and Tumin 1956
Dennis 1953
Frankel and others 1951
Gillson 1949
Hagar 1942
Herres 1946
Herres and others 1943
Kearney and Lutjen 1953
Macmillan, Dinnin, and Conley 1950
Matthews 1943a
Matthews and Bryson 1947
Merritt 1952
Milliken 1948
Oldham 1952
Stephenson, R. C. 1945, 1948
Tumin and Cservenyak 1955
Anonymous 1943, 1951e
North Carolina.
Yadkin Mica and Ilmenite Company mine:
Cross 1949
Lawthers 1954
Oregon.
Placer mines along coast: Pardee 1934
Virginia.
Piney River mine:
Cross 1949
Cservenyak and Tumin 1956
Hubbard and others 1953
Lawthers 1954
Anonymous 1942b
Roseland rutile mine:
Bevan 1942b
Hess and Gillson 1937
Robinson 1922
Thornton 1927
Watson 1907a
Watson and Taber 1913
Youngman 1930b

North America.
Canada.
Alberta.
Burmis titaniferous sandstone:
Goodwin, W. L. 1919
Imperial Min. Res. Bur. 1922b
Lawthers 1954
Robinson 1922
Youngman 1930b
Newfoundland:
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922b
Lawthers 1954
Youngman 1930b
Nova Scotia.
Rutile occurrences:
Robinson 1922
Watson and Taber 1913
Ontario.
Miscellaneous deposits:
Gmelin-Institut 1951
Goodwin, W. L. 1919
Hurst 1932
Kemp 1899b
Lawthers 1954
Robinson 1922
Pine Lake deposit, Haliburton County:
Dulieux 1915
Imperial Min. Res. Bur. 1922b
Kemp 1899b
Seine Bay and Bad Vermillion Lake:
Barksdale 1949
Lawthers 1954
Parsons and others 1934
Robinson 1922
Tucker 1927
Youngman 1930b
Quebec.
Allard Lake and Sorel:
Barksdale 1949
Bateman 1951
Bourret 1949
Brown, D. I. 1951
Buisson 1952, 1954
Cross 1949
Cservenyak 1953
Cservenyak and Tumin 1954, 1956
Dennis 1953
Dunn and Morgan 1955a
Faessler 1950
Frankel and others 1951
Gillson 1949
Gmelin-Institut 1951
Goodwin, W. M. 1953
Hammond 1949, 1952
Illingworth 1952
Knoerr 1952
Lawthers 1954
McDonald 1951
Maillet 1950
Matthews 1943b
Meyer 1950, 1951
Oldham 1952

North America—Continued
Canada—Continued
Quebec—Continued
Allard Lake and Sorel—Continued
Retty 1942, 1944
Tumin 1955
Tumin and Cservenyak 1955
United Nations 1955
U. S. Bur. Mines 1955b
Wilson, H. D. B. 1953
Anonymous 1948b, 1951a, d, 1955i
Bay of Seven Island area:
Buisson 1952
Dulieux 1912b, 1915
Faessler and Schwartz 1941
Gmelin-Institut 1951
Imperial Institute 1917a
Kemp 1899b
Lawthers 1954
Robinson 1922
Tumin and Cservenyak 1955
Degrosbois deposit:
Dulieux 1913, 1915
Imperial Min. Res. Bur. 1922b
Osborne 1936
Robinson 1922
Ivry deposit:
Barksdale 1949
Buisson 1954
Dulieux 1913, 1915
Gmelin-Institut 1951
Hess and Gillson 1937
Lawthers 1954
Osborne 1928, 1936
Robinson 1922
Tucker 1927
Tumin and Cservenyak 1955
Vogel, F. 1950
Youngman 1930b
Anonymous 1951b
Miscellaneous deposits:
Dulieux 1913, 1915
Girault 1953
Goodwin, W. L. 1919
Imperial Min. Res. Bur. 1922b
Kemp 1899b
Lawthers 1954
Robinson 1922
U. S. Bur. Mines 1955b
Watson and Taber 1913
Youngman 1930b
Anonymous 1955i
St. Charles prospect, Chicoutimi County:
Barksdale 1949
Denis 1925
Dulieux 1913, 1915
Gmelin-Institut 1951
Imperial Institute 1917b
Imperial Min. Res. Bur. 1922b
Kemp 1899b
Lawthers 1954
Robinson 1922, 1926
Stansfield 1916

North America—Continued
Canada—Continued
Quebec—Continued
St. Lawrence River sand deposits, including Moisie and Natashkwan:
Dulieux 1912a, b, 1915
Gmelin-Institut 1915
Imperial Min. Res. Bur. 1922b
Kemp 1899b
Lawthers 1954
MacKenzie 1912a, b
United Nations 1955
St. Urbain:
Barksdale 1949
Buisson 1954
Dulieux 1912b, 1915
Gillson 1932, 1949
Gmelin-Institut 1951
Hess and Gillson 1937
Imperial Institute 1917a
Imperial Min. Res. Bur. 1922b
Karpoff 1953
Kemp 1899b
Lawthers 1954
Mawdsley 1927
Osborne 1928
Robinson 1922
Ross 1941
Thornton 1927
Tucker 1927
Vogel, F. 1950
Warren 1912, 1918
Watson 1915, 1917
Watson and Taber 1913
Youngman 1930b
Anonymous 1951d
Yukon Territory.
Rutile occurrences:
Robinson 1922
Watson and Taber 1913
Greenland:
Lawthers 1954
Moos 1938
Ramberg 1948
Vincent and Phillips 1954
Mexico.
Miscellaneous deposits:
Lawthers 1954
Meyer 1949
Sánchez Mejorada 1952
U. S. Bur. Mines 1947a
U. S. Tariff Comm. 1946
Youngman 1930b
Anonymous 1952i
Oaxaca.
Pluma Hidalgo deposit:
Gmelin-Institut 1951
Lawthers 1954
Meyers 1949
Sánchez Mejorada 1952
Anonymous 1955a, b, c, d, e
United States.
Alabama:
Watson and Taber 1913
Youngman 1930b
North America—Continued
United States—Continued
Arizona.
General: Day and Richards 1906
Hackberry: Palmer 1909
Yavapai County titaniferous magnetite deposit: Ball and Broderick 1919
Arkansas.
Christy deposit:
Falconer and Crawford 1944
Fine and Frommer 1952
Fryklund and others 1954
Fryklund and Holbrook 1950
Holbrook 1947
Reed 1949a
Tumin and Cservenyak 1955
Hardy-Walsh or Kilpatrick brookite deposit:
Fryklund and others 1954
Fryklund and Holbrook 1950
Magnet Cove area, general:
Barksdale 1949
Cservenyak and Tumin 1956
Dupuy 1949
Fine and others 1949
Fryklund and others 1954
Fryklund and Holbrook 1950
Gmelin-Institut 1951
Hess and Gillson 1937
Lawthers 1954
Matthews 1943b, 1945
Matthews and others 1947
Nighman and Bryson 1946
Ross 1941
U. S. Bur. Mines 1938b
U. S. Senate, Comm. Interior and Insular Affairs 1954
Vogel, F. A. 1944
Warren 1918
Watson and Taber 1913
Youngman 1930b
Magnet Cove Rutile Company deposit:
Fryklund and Holbrook 1950
Fryklund and others 1954
Kinney 1949
Reed 1949b
Spencer 1946
Mo-Ti deposit:
Fryklund and others 1954
Fryklund and Holbrook 1950
Holbrook 1948a
Southern Howard County titaniferous sands:
Holbrook 1948b
Lawthers 1954
Titanium in bauxite:
Calhoun 1950
Cservenyak and Tumin 1956
California: Matthews and others 1947
Aptos, Santa Cruz County:
Barksdale 1949
Gary 1942
Youngman 1930b

North America—Continued
United States—Continued
California—Continued
Hermosa and Redondo beaches:
Barksdale 1949
Baughman 1927
Gary 1942
Gmelin-Institut 1951
Lawthers 1954
Tucker 1927
Youngman 1930a, b
Los Angeles County: Mulryan 1951
San Gabriel Mountains:
Barksdale 1949
Baughman 1927
Gary 1942
Gillson 1949
Gmelin-Institut 1951
Hess and Gillson 1937
Higgs 1954a, b
Lawthers 1954
Meyer 1950
Moorehouse 1938
Oakeshott 1937, 1948, 1950, 1954
Tucker 1927
United Nations 1955
Youngman 1930b
Colorado.
Caribou Hill:
Barksdale 1949
Jennings 1913
Kemp 1899b
Lawthers 1954
Singewald 1913b
Cebolla Creek–Iron Hill:
Barksdale 1949
Brunton 1913
Gmelin-Institut 1951
Larsen 1942
Lawthers 1954
Singewald 1912, 1913b
El Paso County rutile occurrences:
Watson and Taber 1913
Iron Mountain, Freemont County:
Barksdale 1949
Dulieux 1915
Kemp 1899b
Lawthers 1954
Singewald 1913b
Italian Mountain, Gunnison County:
Cross and Shannon 1927
Florida.
Beach deposits, modern and buried:
Gmelin-Institut 1951
Lynd and others 1954
MacNeil 1950
Martens 1928, 1935
Matthews 1934b
Matthews and others 1947
Meuschke and others 1953
Moxham 1954
Moxham and Johnson 1953
Phelps 1941
Thoenen and Warne 1949

North America—Continued
United States—Continued
Florida—Continued
Beach deposits, modern and buried —Continued
Vernon 1943
Youngman 1930b
Anonymous 1955e, m, o, s
Highland mine, Lawtey:
Roberts 1955
Tumin 1955
Anonymous 1953j, l, n, 1955e, r
Jacksonville mine:
Cannon 1950
Cross 1949
Detweiler 1952
Gillson 1949
Hubbard and others 1953
Humphreys 1945
Lawthers 1954
Lenhart 1949
Matthews 1945
Michell 1952
Miller 1945
Anonymous 1951d
Pablo Beach, Mineral City:
Barksdale 1949
Gillson 1949
Lawthers 1954
Liddell 1917
Martens 1928
Robinson 1922
Thornton 1927
Tucker 1927
Youngman 1930a, b
Pensacola Bay area:
Gmelin-Institut 1951
Lawthers 1954
Matthews 1945
Miller 1945
Trail Ridge area:
Cannon 1950
Creitz and McVay 1948
Lawthers 1954
Spencer 1948
Thoenen 1950
Thoenen and Warne 1949
Trail Ridge mine, Starke:
Cannon 1950
Carpenter and others 1953
Cross 1949
Cservenyak and Tumin 1956
Dennis 1953
Gillson 1949
Hubbard and others 1953
Lawthers 1954
Lenhart 1949, 1951
Meyer 1949, 1951
Michell 1952
Anonymous 1950a, 1952d, 1955l
Vero Beach deposits:
Lawthers 1954
Matthews 1945
Miller 1945

North America—Continued
United States—Continued
Georgia.
Coastal beach deposits:
Lawthers 1954
McKelvey and Baisley 1948
Martens 1928, 1935
Moxham and Johnson 1953
Teas 1921
Youngman 1930b
Graves Mountain:
Lawthers 1954
Watson 1915
Watson and Taber 1913
Watson and Watson 1912
Youngman 1930b
Miscellaneous deposits:
Lawthers 1954
MacNeil 1950
Moxham 1954
Idaho.
Long Valley area, Cascade:
Argall 1954
Banning and others 1955
Cservenyak and Tumin 1954, 1956
Shelton and Stickney 1955
Anonymous 1954c
Miscellaneous placer deposits:
Lawthers 1954
Shannon 1922
Shelton and Stickney 1955
Anonymous 1954c
Titanium-bearing high-alumina clay deposits:
Scheid 1952
Scheid and Hosterman 1951
Scheid, Hosterman 1951a, b
Scheid and Sohn 1945
Scheid, Sohn 1952
Maryland.
Cove Point beach placer: Anonymous 1953d, 1955g
Harford County rutile deposits:
Lawthers 1954
Ostrander 1942
Tomlinson 1946
Miscellaneous deposits:
Miller 1945
Youngman 1930b
Michigan.
Copper district: Cornwall 1951
Minnesota.
Titaniferous deposits in Duluth gabbro:
Barksdale 1949
Broderick 1917
Clements 1903
Emmons and Grout 1943
Gmelin-Institut 1951
Grout 1926, 1949–50
Kemp, 1899a, b
Lawthers 1954
Schwartz 1930
Singewald 1913b
North America—Continued
United States—Continued
Minnesota—Continued
Titaniferous deposits in Duluth gabbro—Continued
Tucker 1927
Van Hise and Leith 1911
Youngman 1930b
Missouri.
Fredericktown–Einstein Silver mine:
Youngman 1930b
Montana.
Teton County titaniferous sandstone: Barksdale 1949
Gmelin-Institut 1951
Wimmler 1946
Anonymous 1952c
Titaniferous sandstone:
Lawthers 1954
Stebinger 1914
Youngman 1930b
Nevada.
Blue Metal corundum property:
Binyon 1946
Lawthers 1954
Corral Canyon mine:
Ferguson 1939
Lawthers 1954
U. S. Bur. Mines 1938b
New Jersey.
Titaniferous magnetite deposits:
Bayley 1910
Dulieux 1915
Kemp 1899b
Singewald 1913b
Smith 1933
Youngman 1930b
New Mexico.
Hidalgo County: Coulter 1939
New York.
Adirondack Mountains:
Balk 1931
Buddington 1939
Evrard 1947, 1949
Essex County titaniferous magnetite deposits (exclusive of Lake Sanford area):
Dulieux 1915
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922f
Kemp 1899a, b
Lawthers 1954
Newland 1908
Osborne 1928
Singewald 1913b
Anonymous 1943
Lake Sanford area, general:
Brunton 1913
Dulieux 1915
Hess and Gillson 1937
Kemp 1899a
Lawthers 1954
Matthews and others 1947
Newland 1908
Newland and Hartnagel 1939

North America—Continued
United States—Continued
New York—Continued
Lake Sanford area, general—Con.
Osborne 1928
Singewald 1913b
Tucker 1927
United Nations 1955
Warren 1918
Watson 1917
Youngman 1930b
Anonymous 1943
Lake Sanford area deposits, exclusive of MacIntyre mine:
Balsley 1943
Gmelin-Institut 1951
Singewald 1913b
Stephenson, R. C. 1945, 1948
MacIntyre mine, Tahawus:
Balsley 1943
Barksdale 1949
Bateman 1951
Cross 1949
Cservenyak and Tumin 1956
Dennis 1953
Frankel and others 1951
Gillson 1949
Gmelin-Institut 1951
Hagar 1942
Herres 1946
Herres and others 1943
Kearney and Lutjen 1953
Lawthers 1954
MacMillan, Dinnin 1950
MacMillan, Heindl 1952
Maillet 1950
Matthews 1943a, b, 1945
Matthews and Bryson 1947
Meyer 1951
Michell 1952
Milliken 1948
Oliver 1942
Stephenson, R. C. 1945, 1948
Tumin and Cservenyak 1955
Tyler 1941
Anonymous 1950o, 1951d, e, 1955h, s
Miscellaneous deposits:
Ellison 1950
Kemp 1899b
Lawthers 1954
Newland 1908
Singewald 1913b
North Carolina.
Beach placer deposits:
Lawthers 1954
Lynd and others 1954
McKelvey and Baisley 1948
Moxham and Johnson 1953
Rutile deposits:
Gillson 1949
Hess and Gillson 1937
Matthews 1943b
Murdock 1950(?)
Watson and Taber 1913
Youngman 1930b

North America—Continued
United States—Continued
North Carolina—Continued
Stream placer deposits:
Griffith and Overstreet 1953a, b
Hansen and Cuppels 1954
Titaniferous magnetite deposits:
Bayley 1923a, b, c
Dulieux 1915
Gmelin-Institut 1951
Kemp 1899b
Lawthers 1954
Matthews and others 1947
Murdock 1950(?)
Singewald 1913b
Yadkin Mica and Ilmenite Company, Caldwell County:
Barksdale 1949
Cross 1949
Cservenyak and Tumin 1956
Frankel and others 1951
Gillson 1949
Gmelin-Institut 1951
Greaves-Walker 1945
Lawthers 1954
McMurray 1944
Maillet 1950
Murdock 1950(?)
Singewald 1913b
Tumin and Cservenyak 1955
Anonymous 1951d
Oklahoma.
Wichita Mountains, placer deposits:
Chase 1952
Youngman 1930b
Wichita Mountains, titaniferous magnetite deposits:
Barksdale 1949
Gmelin-Institut 1951
Lawthers 1954
Merritt 1938, 1939, 1940
Oregon.
Coastal placer deposits:
Dasher and others 1942
Gmelin-Institut 1951
Griggs 1945
Lawthers 1954
Pardee 1934
Stephenson, E. L. 1945
Twenhofel 1943, 1946a, b
Ferruginous bauxite deposits:
Bell 1945
Lawthers 1954
Libbey and others 1945, 1946
Pennsylvania:
Bayley 1941
Lawthers 1954
Watson 1915
Watson and Taber 1913
Youngman 1930b
Rhode Island.
Iron Mine Hill, Cumberland:
Barksdale 1949
Brunton 1913
Driver 1953
Dulieux 1915

North America—Continued
United States—Continued
Rhode Island—Continued
Iron Mine Hill, Cumberland—Continued
Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922f
Johnson and Warren 1908
Kemp 1899b
Lawthers 1954
MacMillan and Heindl 1952
Singewald 1912b
Tucker 1927
Tumin and Cservenyak 1955
Warren 1918
Warren and Powers 1914
Youngman 1930b
South Carolina.
Coastal placer deposits:
McKelvey and Balsley 1948
Martens 1935
Meuschke 1955
Marine Minerals, Aiken: Anonymous 1955e
Rutile occurrences:
Watson 1915
Watson and Taber 1913
Youngman 1930b
South Dakota:
Custer County area:
Watson and Taber 1913
Youngman 1930b
Tennessee.
Titaniferous magnetite deposits:
Bayley 1923a, b, c
Gmelin-Institut 1951
Texas.
Baringer Hill, Llano County:
Hess 1908
Lawthers 1954
Youngman 1930b
Gulf Coast: Bullard 1942
Marfa rutile deposit, Jeff Davis County:
Gmelin-Institut 1951
Lawthers 1954
U. S. Bur. Mines 1942
Vogel, F. A. 1942
Virginia.
Amherst–Nelson Counties area:
Barksdale 1949
Bevan 1942b
Brunton 1913
Cservenyak and Tumin 1956
Gillson 1949
Gmelin-Institut 1951
Hess and Gillson 1937
Imperial Institute 1917a
Lawthers 1954
Matthews and others 1947
Merrill 1902
Meyer and Bryson 1948
Moore 1940
Pegau 1950
Robinson 1922
Ross 1932, 1936, 1941, 1942, 1947
North America—Continued
United States—Continued
Virginia—Continued
Amherst-Nelson Counties area—Continued
Ryan 1933
Thornton 1927
Tucker 1927
Tyler 1941
Warren 1918
Watson 1907a, b, 1915, 1917
Watson and Taber 1909, 1913
Youngman 1930b
Anonymous 1942b
Bush–Hutchins deposit, Roanoke County:
Hickman 1947
Lawthers 1954
Steidtmann 1931
Watson 1907a
Watson and Taber 1913
Goochland and Hanover Counties:
Brown, C. B. 1937
Hess 1910
Hess and Gillson 1937
Lawthers 1954
Pegau 1950
Watson 1915, 1917
Watson and Taber 1913
Youngman 1930b
Anonymous 1942b
Miscellaneous deposits:
Bevan 1942b
Bloomer and DeWitt 1941
Gmelin-Institut 1951
Lawthers 1954
Moxham and Johnson 1953
Pegau 1950
Steidtmann 1931
Watson 1922
Watson and Taber 1913
Piney River deposit:
Cross 1949
Davidson 1948
Davidson and others 1947
Hubbard and others 1953
Maillet 1950
Matthews 1943b
Roseland rutile deposit:
Cross 1949
Hess 1909
Meyer 1950 1951
Ross 1932
Youngman 1930b
Washington.
Excelsior clay deposit:
Lawthers 1954
Scheid 1945
Scheid, Hosterman 1945
Other deposits:
Glover 1942
Huntting 1943
Lawthers 1954
Tucker 1927
Youngman 1930b

North America—Continued
United States—Continued
Wisconsin.
N.W. of Wausau: Youngman 1930b
Wyoming.
Iron Mountain deposit:
Back and others 1952
Ball 1907
Barksdale 1949
Birch 1955
Brunton 1913
Cservenyak and Tumin 1954
Dempsey 1955
Diemer 1941
Dietz 1929, 1932
Dulieux 1915
Frey 1946b
Gillson 1949
Gmelin-Institut 1951
Herres 1946
Hess and Gillson 1937
Kemp 1899a, b
Lawthers 1954
Meyer and Bryson 1948
Newhouse and Hagner 1951
O'Dea 1946
Osterwald and Osterwald 1952
Pinnel 1954
Singewald 1913b
Tucker 1927
Tumin and Cservenyak 1955
United Nations 1955
Warren 1918
Watson 1917
Youngman 1930b
Anonymous 1954d
Shanton deposit:
Diemer 1941
Frey 1946a
Gmelin-Institut 1951
Hild 1953
Newhouse and Hagner 1951
Osterwald and Osterwald 1952
Singewald 1913b
Tumin 1955
Taylor deposit:
Diemer 1941
Osterwald and Osterwald 1952
Titaniferous sandstones: Murphy and Houston 1955
Hawaii.
Titaniferous soils:
Sherman 1952, 1954
Anonymous 1953m
Oceania.
Australia.
Placer deposits of east coast:
Blaskett 1950
Dunn and Morgan 1955a
Fisher 1948
Gillson 1949
Gmelin-Institut 1951
Hess and Gillson 1937
Raggatt 1953
Anonymous 1952g, 1953f, 1955f, i, k, l, t

Oceania—Continued
Australia—Continued
New South Wales.
Rutile-bearing placers of east coast:
Blaskett and Dunkin 1948
Dunkin 1953
Fisher 1949
Gardner 1951
Lawthers 1954
Lyons 1954
Meyer 1950
Poole 1939
Raggatt 1953
Tumin 1955
Tumin and Cservenyak 1955
U. S. Bur. Mines 1935, 1948c, 1953a
Whitworth 1931
Anonymous 1934, 1939
Titaniferous magnetite deposits near Williams and Karuah Rivers:
Gardner 1951
Imperial Min. Res. Bur. 1922d
Lawthers 1954
United Nations 1955
Youngman 1930b
Northern Territory:
Fisher 1949
Gardner 1951
Lawthers 1954
Queensland.
Rutile-bearing placers of east coast:
Beasley 1948, 1950
Blaskett and Dunkin 1948
Carlson 1944
Connah 1948
Cservenyak and Tumin 1954
Dunkin 1953
Fisher 1949
Gardner 1951
Lawthers 1954
Lyons 1954
Meyer 1950
Morton 1948
Nighman and Bryson 1946
Raggatt 1953
Tumin 1955
Tumin and Cservenyak 1955
U. S. Bur. Mines 1948c, 1953a
Watson and Taber 1913
Youngman 1930b
Anonymous 1952j
Titaniferous deposits other than placers of east coast:
Cribb 1943
Fisher 1949
Gardner 1951
Lawthers 1954
South Australia.
General:
Fisher 1949
Gardner 1951
Lawthers 1954
U. S. Bur. Mines 1953a

Oceania—Continued
Australia—Continued
South Australia—Continued
Miscellaneous deposits:
Alderman 1925
Hess and Gillson 1937
Mount Crawford area:
Fisher 1949
Gardner 1951
Imperial Institute 1917a, 1938
Lawthers 1954
Thornton 1927
Watson 1915, 1917
Watson and Taber 1913
Tasmania.
King Island:
Barksdale 1949
Fisher 1949
Gardner 1951
Gmelin-Institut 1951
Hess and Gillson 1937
Lawthers 1954
U. S. Bur. Mines 1948c
Youngman 1930b
Anonymous 1928
Miscellaneous deposits:
Fisher 1949
Gardner 1951
Imperial Institute 1917a
Anonymous 1928
Victoria:
Edwards 1942
Fisher 1949
Gardner 1951
Lawthers 1954
U. S. Bur. Mines 1953a
Youngman 1930b
Western Australia.
Coastal placer deposits:
Fisher 1949
Gardner 1951
Lawthers 1954
McMath 1951
McMath and de la Hunty 1951a, b
Tumin and Cservenyak 1955
U. S. Bur. Mines 1948c, 1953a
Anonymous 1953f, 1955h
Titaniferous deposits other than coastal placers:
Fisher 1949
Gardner 1951
Imperial Min. Res. Bur. 1922d
Lawthers 1954
Tumin and Cservenyak 1955
Youngman 1930b
New Zealand.
Titaniferous iron sands.
General:
Aubel 1920
Barksdale 1949
Fyfe 1952
Gillson 1949
Imperial Institute 1917a
Oceania—Continued
New Zealand—Continued
Titaniferous iron sands.
General—Continued
Imperial Min. Res. Bur. 1922d
Kemp 1899b
Lawthers 1954
Mason 1945
Meyer 1949
United Nations 1955
Wylie 1938
Youngman 1930b
Anonymous 1953i, 1955q
New Plymouth deposits:
Beck 1947
Gmelin-Institut 1951
Hutton 1945a, b
Wylie 1937
Patea deposits:
Donovan 1916
Gmelin-Institut 1951
Hutton 1940
Wylie 1937
Wanganui deposits:
Finch 1947
Fleming 1946
Gmelin-Institut 1951
South Island:
Hutton 1950
Mason 1945
Petrology.
Titaniferous deposits.
General: Lawthers 1954
Anorthositic and gabbroic deposits.
Argentina.
Mina Podesta, Catamarca: Bassi 1952
Canada.
St. Urbain area, Quebec: Ross 1941
Greenland.
General: Ramberg 1948
India.
Mayurbhanj and Singhbhum: Dunn and Dey 1937
United States.
California.
San Gabriel Mountains:
Higgs 1954a, 1954b
Moorehouse 1938
Minnesota.
Duluth gabbro: Grout 1949–50
New York.
Adirondack Mountains:
Balk 1931
Buddington 1939
Rhode Island:
Iron Mine Hill, Cumberland: Johnson and Warren 1908
Virginia.
Amherst–Nelson Counties area:
Davidson and others 1946
Moore 1940
Ross 1936, 1941, 1947
Watson 1907b
Watson and Taber 1909, 1913

Petrology—Continued
Anorthositic and gabbroic deposits—Con.
United States—Continued
Wyoming.
Laramie Range: Newhouse and Hagner 1951
Ferromagnesian deposits.
Sweden.
Taberg: Hjelmqvist 1949
Iron oxides associated with titanium minerals.
General:
Bateman 1951
Brunton 1913
Buddington and others 1955
Evrard 1944
Kemp 1899a
Osborne 1928
Ramdohr 1926, 1939
Rechenberg 1955
Singewald 1913a, 1913b
Warren 1918
Wilson, H. D. B. 1953
Australia.
General: Edwards 1938
Canada.
Allard Lake, Quebec:
Hammond 1949
Retty 1944
Bay of Seven Islands area, Quebec: Faessler and Schwartz 1941
Degrosbois deposit, Quebec: Osborne 1936
Ivry, Quebec: Osborne 1936
St. Urbain, Quebec:
Gillson 1932
Mawdsley 1927
Warren 1912
Egypt.
Abu-Ghalqua (Wadi El Rangar): Amin 1954
Finland.
Attu: Pehrman 1927
Otanmäki: Vaasjoki 1947
Greenland.
Skergaard complex:
Chevallier and others 1954
Vincent and Phillips 1954
Hungary.
Szarvasko: Pantó 1952
India.
Dhalbum and Mayurbhanj: Tipper 1936
Norway.
General: Bugge 1953
Union of South Africa.
Bushveld complex:
Schwellnus and Willemse 1943
Wagner 1928
Natal—Tugela and Mambula Rivers deposit: Du Toit 1918
Union of Soviet Socialist Republics.
Ural Mountains: Malyshev 1936

Petrology—Continued
Iron oxides associated with titanium minerals—Continued
United States.
Arizona.
Western Yavapai County: Ball and Broderick 1919
California.
San Gabriel Mountains: Oakeshott 1948
Michigan.
Copper district lavas: Cornwall 1951
Minnesota.
Duluth gabbro: Schwartz 1930
New Jersey: Bayley 1910
New York.
Adirondacks, General:
Buddington 1939
Evrard 1947, 1949
Lake Sanford area:
Balsley 1943
Newland, D. H. 1908
Stephenson, R. C. 1945, 1948
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North Carolina.
Tennessee: Bayley 1923c
Western Piedmont:
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Layered norite complexes.
Sierra Leone.
Freetown: Junner 1930b
Union of South Africa.
Bushveld complex:
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Titanium-bearing alkalic and carbonate deposits.
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Magnet Cove area:
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Fryklund and others 1954
Colorado.
Cebolla Creek–Iron Hill: Larsen 1942
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Barksdale 1949
Cservenyak and Tumin 1956
Dunn and Morgan 1955a
Fox 1926
Frankel and others 1951
Gillson 1949
Herres 1946
Hess and Gillson 1937
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Ladoo and Meyers 1951
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1940–1954:
Cservenyak 1953
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Tumin and Cservenyak 1955
Tyler 1941
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Australia.
General:
Dunkin 1953
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Fisher 1949
Gardner 1951
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U. S. Bur. Mines 1948c, 1953a
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Goyaz: Leonardos 1938
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Canada.
General: Goodwin, W. M. 1953
Finland.
Otanmäki: Järvinen 1954
French West Africa.
Senegal: la Rüe 1932
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General: Krishnan and Roy 1942
Travancore area: U. S. Bur. Mines 1946a
Norway.
Ekersund-Soggendal area: U. S. Bur. Mines 1951
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Coruna Province: U. S. Bur. Mines 1947b

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Titaniferous sands:
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Australia.
East coast, rutile placer deposits:
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New South Wales, general:
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Gardner 1951
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U. S. Bur. Mines 1953a
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U. S. Bur. Mines 1948c, 1953a
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Victoria, general:
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Gardner 1951
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McMath 1951
Tumin and Cservenyak 1955
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Brazil.
Espirito Santo.
Coastal beach deposits: U. S. Bur. Mines 1937c
Canada.
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Allard Lake:
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Cross 1949
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Gillson 1949
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Illingworth 1952
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McDonald 1951
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Tumin and Cservenyak 1955
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Anonymous 1948b, 1951a
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Tumin and Cservenyak 1955
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Anonymous 1955j

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Ivry deposit:
Tumin and Cservenyak 1955
Vogel, F. 1950
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St. Charles prospect, Chicoutimi County:
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Stansfield 1916
St. Lawrence River sand deposits:
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MacKenzie 1912b
United Nations 1955
St. Urbain: Vogel, F. 1950
Wexford township, Terrebonne county.
U. S. Bur. Mines 1955b
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Ceylon.
Titaniferous beach deposits:
Fernando 1948
Gmelin-Institut 1951
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Matthews 1945
Wadia 1943
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Taiwan.
Western coastal area: Chen 1953
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Nile delta sands:
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Otanmäki mine:
Lawthers 1954
Magnusson 1950
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India.
Coastal beach sands, other than Travancore:
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Lawthers 1954
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Beach deposits:
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Betroka:
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Lawthers 1954
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Amang stockpiles: Meyer and Bryson 1948
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Titaniferous iron sands.
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New Plymouth deposits:
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Gmelin-Institut 1951
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Waitara deposits:
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U. S. Bur. Mines 1951, 1953b
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Storgangen deposit:
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Tellnes deposit: Anonymous 1955o, s, u, v, w
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Imperial Min. Res. Bur. 1922e
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Solnördal: Lawthers 1954
South Korea.
So-Yonpyong-do: Yagyū 1951
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Järvsö, Kramsta:
Geijer and Magnusson 1952
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Ruoutevare:
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Bushveld complex:
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Umgababa deposit:
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U. S. Bur. Mines 1952a, 1953c, 1954
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General: Shimkin 1953
Pudozhgora deposit:
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Ukraine.
Titaniferous sands: Gmelin-Institut 1951
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Other deposits:
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U. S. Senate, Comm. Interior and Insular Affairs 1954
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Ilmenite deposits: Matthews and others 1947
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Pablo Beach, Mineral City: Tucker 1927
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Deary clay deposit: Scheid and Sohn 1945
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Titaniferous deposits in Duluth gabbro:
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Teton County titaniferous sandstone:
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Lake Lawtonka placer deposit: Chase 1952
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Iron Mine Hill, Cumberland: Driver 1953
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Watson 1917
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