

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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Thomas B. Nolan, *Director*

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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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MacMillan, Heindl 1952

Tumin and Cservenyak 1955

Texas.

Marfa rutile deposit, Jeff Davis
County: U. S. Bur. Mines 1942

Wyoming.

Iron Mountain deposit:

Back and others 1952

Dietz 1932

Frey 1946b

O'Dea 1946

Osterwald and Osterwald 1952

Pinnel 1954

Singewald 1913b

Tumin and Cservenyak 1955

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Europe.

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Bulgaria—Continued

Bourgas black sand deposits—Cont.

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Lawthers 1954

U. S. Bur. Mines 1938a

England.

Cornwall.

St. Keverne titanium placer: Lam-
ming 1952

Finland.

Miscellaneous deposits:

Härme 1955

Lawthers 1954

Marmo 1952

Palmunen 1952

Pehrman 1927

Otanmäki deposit:

Gmelin-Institut 1951

Järvinen 1954

Lawthers 1954

Magnusson 1950

Marmo 1952

Meyer 1949

Paarma 1954

Shimkin 1953

Stigzelius 1952

United Nations 1955

Vaasjoki 1947

Anonymous 1953e, g

Germany.

Frisian Islands:

Lawthers 1954

Trusheim 1935

Anonymous 1952f

Hungary.

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Pantó 1952

Szentpetery 1937

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Tucker 1927

U. S. Bur. Mines 1946b

Norway.

General:

Bugge 1953

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Magnusson 1950

Poulsen 1952

Ekersund-Soggendal area:

Barksdale 1949

Bugge 1953

Cservenyak and Tumin 1954

Dulleux 1915

Evrard 1944

Frankel and others 1951

Gillson 1949

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Hess and Gillson 1937

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Kemp 1899a, b

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Norway—Continued

Ekersund-Soggendal area—Continued

Lawthers 1954
Magnusson 1950
Meyer and Bryson 1948
Michot 1939
Poulsen 1952
Robinson 1922
Thornton 1927
Tucker 1927

United Nations 1955
U. S. Bur. Mines 1951, 1953b
Vogel, F. 1950
Warren 1918
Youngman 1930b
Anonymous 1951d, 1955h

Tellnes deposit: Anonymous 1955o,
s, u, v, w

Kragerö rutile deposit:

Barksdale 1949
Hess and Gillson 1937
Imperial Institute 1917a
Lawthers 1954
Robinson 1922
Thornton 1927
Warren 1918
Watson 1915, 1917
Watson and Taber 1913
Youngman 1930b

Rödsand:

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Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922e
Lawthers 1954
Magnusson 1950
Poulsen 1953
United Nations 1955
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Youngman 1930b
Anonymous 1955n

Selvaag:

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Gmelin-Institut 1951
Imperial Min. Res. Bur. 1922a
Lawthers 1954
Magnusson 1950
Poulsen 1952
United Nations 1955

Solnørddal:

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Imperial Min. Res. Bur. 1922e
Lawthers 1954
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Poulsen 1952

Portugal:

Barksdale 1949
Castro 1947
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Lawthers 1954
Youngman 1930b

Spain:

Miscellaneous deposits:
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Lawthers 1954

Europe—Continued

Spain—Continued

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U. S. Bur. Mines 1947b, 1949a
Anonymous 1942a, 1944

Sweden.

Järvsö, Kramsta:
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Ruotevare:

Dulleux 1915
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Kemp 1899b
Kuhn 1927
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Taberg:

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Polkanov 1937, 1944

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Ural Mountains.

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Europe—Continued

Union of Soviet Socialist Republics—Cont.

Ural Mountains—Continued

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- Gorskly 1939
- Hess and Gillson 1937
- Lawthers 1954
- Malyshev 1936
- Panteleyev and Malyshev 1934
- Shimkin 1953
- Suirokomski 1926
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Kusa deposit:

- Barksdale 1949
- Gmelin-Institut 1951
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- Kulibin 1935
- Lawthers 1954
- Malyshev 1937
- Panteleyev and Malyshev 1934
- Shimkin 1953
- Suirokomski 1926

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- Panteleyev and Malyshev 1934
- Shimkin 1953
- Suirokomski 1926
- Vertushkov 1949
- Warren 1918

Exploitation and utilization of titaniferous deposits.

General:

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- 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.

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New Zealand.

- Titaniferous iron sands: Anonymous 1953i

Union of South Africa:

- Frankel and others 1951
- Masson 1953

United States.

California.

- San Gabriel Mountains: Oakeshott 1948, 1950

New York.

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Rhode Island.

- Iron Mine Hill, Cumberland: Singewald 1913b

Exploitation and utilization of titaniferous deposits—Continued

Possibilities of utilization—Continued

United States—Continued

Virginia.

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Wyoming.

- Iron Mountain deposit: Singewald 1913b

Hawaii.

- Titaniferous soils: Sherman 1954

Exploration.

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United States.

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Florida.

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Florida and Georgia.

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South Carolina.

- Edisto Island area: Meuschke 1955

- Field test for titanium: Shapiro and Brannock 1953

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Canada, Quebec.

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- McDonald 1951
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- Ivry deposit: Osborne 1936

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New York.

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Oregon.

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Wyoming.

- Laramie Range: Dempsey 1955

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Methods of test-drilling.

Florida.

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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

Exploration—Continued

Results of test-drilling—Continued

Arkansas—Continued

Magnet Cove area—Continued

Fryklund and others 1954

Magnet Cove Rutile Co. deposit:

Reed 1949b

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Florida.

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Quebec.

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Canada—Continued

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Ivry deposit:

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Gold Coast:

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Greenland.

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- Chambers 1939
- Gillson 1949
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- Krishnan and Roy 1942
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Fukushima Prefecture.

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- Maeda 1935
- Mitsuchi 1952
- Staatz 1947, 1948

Korea.

Kyonggi-do-Porum-do:

- Gallagher and others 1946

- Shoenpelto deposit: Ichimura 1931

Madagascar:

- Gulgues 1951
- Lacroix 1920

Malaya.

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Mexico.

Guerrero.

- Papanao beach sands: Sánchez Mejorada 1952

Oaxaca.

- Huitzo ilmenite deposit: Sánchez Mejorada 1952

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Mexico—Continued

Oaxaca—Continued

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Morocco (*French*).

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Mozambique.

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New Zealand.

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- Michot 1939

Kragerö rutile deposit:

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- Lawthers 1954
- Thornton 1927
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Portugal.

Sines.

- São Torpes beach: Castro 1947

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Taberg:

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- Dulieux 1915
- Geijer and Magnusson 1952
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Liganga deposits:

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United States.

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Magnet Cove area.

General:

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Geology—Continued

United States—Continued

Arkansas—Continued

Magnet Cove Area—Continued

General—Continued

Lawthers 1954
Ross 1941
Vogel, F. A. 1944

Christy deposit:

Fryklund and others 1954
Fryklund and Holbrook 1950
Holbrook 1947
Reed 1949a

Hardy-Walsh or Kilpatrick brook-
ite deposit:

Fryklund and others 1954
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deposit:
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Kinney 1949
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Holbrook 1948

California.

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1954
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Cebolla Creek-Iron Hill:

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Phelps 1941
Thoenen and Warne 1949
Vernon 1943

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1955

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Liddell 1917

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Thoenen 1950

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Anonymous 1952d

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- Graves Mountain:
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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
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 - 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

New York.

- Adirondack Mountains:
 - Balk 1931
 - Buddington 1939
 - Evrard 1947
 - Newland 1908

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 - Dulleux 1915
 - Kemp 1899a
 - Osborne 1928
 - Singewald 1913b

Lake Sanford area.

General:

- Balsley 1943
- Dulleux 1915

Geology—Continued

United States—Continued

New York—Continued

Lake Sanford area—Continued

- Gmelin-Institut 1951
- Herres and others 1943
- Kemp 1899a
- Newland 1908
- Osborne 1928
- Calamity-Mill Pond deposit:
 - Singewald 1913b
 - 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:
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 - 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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United States—Continued

Tennessee.

Titaniferous magnetite deposits:
Bayley 1923b, c

Texas.

Baringer Hill, Llano County: Hess
1908

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County: Vogel, F. A. 1942

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Ryan 1933
Thornton 1927
Watson 1907a, b, 1915
Watson and Taber 1909, 1913
Youngman 1930b

Piney River deposit:

Cross 1949
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Bush-Hutchins deposit, Roanoke
County:

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Brown, C. B. 1937
Hess 1910
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Washington.

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Wyoming.

Iron Mountain deposit:

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Diemer 1941
Dietz 1932
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Pinnel 1954
Singewald 1913b

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United States—Continued

Wyoming—Continued

Shanton deposit:

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and Houston 1955

Hawaii.

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Maghemite:

Newhouse 1929
Sosman and Posnjak 1925
Strauss 1947
Thornton 1927

Niobium content of titanium minerals:

Fleischer and others 1952
Fryklund and others 1954

592 CONTRIBUTIONS TO BIBLIOGRAPHY OF MINERAL RESOURCES

Mineralogy—Continued

Occurrence of titanium minerals.

United States: Schrader and others 1916

Western Australia: Simpson 1948

Rutile:

Barksdale 1949

Gillson 1949

Thornton 1927

Watson and Watson 1912

Youngman 1930a

Titanium minerals in primary deposits.

Osborne 1928

Warren 1918

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

Mineralogy—Continued

Titanium minerals in secondary deposits—Continued

United States—Continued

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

Ramdohr 1953

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

Anonymous 1939, 1952g, j,

1953f, 1955f, l

Brazil.

Rutile deposits.

Ceara: Chambers 1942

Goyaz:

Frões Abreu 1936b

Leonardos 1938

Minas Geraes: Frões 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

Mining Activities—Continued

India.

Bombay State.

Ratnagiri district:

Anonymous 1953c

Travancore.

Beach deposits:

Barksdale 1949

Gillson 1949

Hess and Gillson 1937

U. S. Bur Mines 1946a, 1955a

Anonymous 1955i

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: Fryklund 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

Detweller 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

Trall Ridge mine, Starke:

Carpenter and others 1953

Cross 1949

Mining Activities—Continued

United States—Continued

Florida—Continued

Trall 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

Oidham 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

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North America.

Canada.

Alberta.

Burmils 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:

- Dulleux 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
- Dulleux 1912b, 1915
- Faessler and Schwartz 1941
- Gmelin-Institut 1951
- Imperial Institute 1917a
- Kemp 1899b
- Lawthers 1954
- Robinson 1922
- Tumin and Cservenyak 1955

Degrosbols deposit:

- Dulleux 1913, 1915
- Imperial Min. Res. Bur. 1922b
- Osborne 1936
- Robinson 1922

Ivry deposit:

- Barksdale 1949
- Buisson 1954
- Dulleux 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:

- Dulleux 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
- Dulleux 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 Natashk-
wan:

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

Bulison 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 mag-
netite deposit: Ball and Brod-
erick 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 brook-
ite 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 de-
posit:

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 titani-
ferous 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

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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
Dulleux 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
MacNeill 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, 1955i

Vero Beach deposits:

Lawthers 1954
Matthews 1945
Miller 1945

North America—Continued

United States—Continued

Georgia.

Coastal beach deposits:

- Lawthers 1954
- McKelvey and Balsley 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
- Gmellin-Institut 1951
- Grout 1926, 1949-50
- Kemp, 1899a, b
- Lawthers 1954
- Schwartz 1930
- Singewald 1918b

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

- Gmellin-Institut 1951
- Wimmeler 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
- Dulleux 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):

- Dulleux 1915
- Gmellin-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
- Dulleux 1915
- Hess and Gillson 1937
- Kemp 1899a
- Lawthers 1954
- Matthews and others 1947
- Newland 1908
- Newland and Hartnagel 1939

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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 Balsley 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
Dulleux 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
Dulleux 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 1918b
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: Anony-
mous 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
Steldtmann 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
Steldtmann 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

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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,
1, 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
Tumlin 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
Tumlin 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, 1955g

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

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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: Os-
borne 1936

Ivry, Quebec: Osborne 1936

St. Urbain, Quebec:

Gillson 1932
Mawdsley 1927
Warren 1912

Egypt.

Abu-Ghalqua (Wadi El Ranga):
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 Riv-
ers 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: Oake-
shott 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
MacIntyre mine, Tahawus: Gill-
son 1949

North Carolina.

Tennessee: Bayley 1923c

Western Piedmont:

Bayley 1923a, b, c

Layered norite complexes.

Sierra Leone.

Freetown: Junner 1930b

Union of South Africa.

Bushveld complex:

Reunig 1929
Strauss 1947

Titanium-bearing alkalic and carbonate
deposits.

Arkansas.

Magnet Cove area:

Fryklund and Holbrook 1950
Fryklund and others 1954

Colorado.

Cebolla Creek—Iron Hill: Larsen
1942

Production and consumption of titanium
ores and products.

General:

Barksdale 1949
Cservenyak and Tumin 1956
Dunn and Morgan 1955a
Fox 1926
Frankel and others 1951
Gillson 1949
Herres 1946
Hess and Gillson 1937
Krishnan and Roy 1942
Ladoo and Meyers 1951
Thornton 1927
Youngman 1930a

World.

1940-1954:

Cservenyak 1953
Cservenyak and Tumin 1954

Production and consumption of titanium
ores and products—Continued

World—Continued

1940-1954—Continued

- Matthews 1943a, b, 1945
- Matthews and Bryson 1947
- Meyer 1949, 1950, 1951
- Meyer and Bryson 1948
- Nighman and Bryson 1946
- Tumlin 1955
- Tumlin and Cservenyak 1955
- Tyler 1941
- Anonymous 1955e

Australia.

General:

- Dunkin 1953
- Dunn and Morgan 1955a
- Fisher 1949
- Gardner 1951
- Lyons 1954
- U. S. Bur. Mines 1948c, 1953a
- Anonymous 1955t

Brazil.

- Goyaz: Leonardos 1938
- Northeastern states: la Rüe 1954

Canada.

- General: Goodwin, W. M. 1953

Finland.

- Otanmäki: Järvinen 1954

French West Africa.

- Senegal: la Rüe 1932

India.

- General: Krishnan and Roy 1942
- Travancore area: U. S. Bur. Mines 1946a

Norway.

- Ekersund-Soggendal area: U. S. Bur. Mines 1951

Spain.

- Coruna Province: U. S. Bur. Mines 1947b

Resources.

Argentina.

Titaniferous sands:

- Lawthers 1954
- United Nations 1955
- Anonymous 1953k

Australia.

East coast, rutile placer deposits:

- Dunn and Morgan 1955a
- Fisher 1948
- Tumlin 1955
- Tumlin and Cservenyak 1955
- Anonymous 1955t

New South Wales, general:

- Fisher 1949
- Gardner 1951
- Imperial Min. Res. Bur. 1922d
- Lawthers 1954
- Lyons 1954
- Raggatt 1953
- United Nations 1955
- U. S. Bur. Mines 1953a
- Anonymous 1934

Resources—Continued

Australia—Continued

Queensland, general:

- Connah 1948
- Fisher 1949
- Gardner 1951
- Lawthers 1954
- Lyons 1954
- Raggatt 1953
- U. S. Bur. Mines 1948c, 1953a

Tasmania, general:

- Fisher 1949
- Gardner 1951
- Lawthers 1954
- U. S. Bur. Mines 1953a

Victoria, general:

- Fisher 1949
- Gardner 1951
- U. S. Bur. Mines 1953a

Western Australia, general:

- Fisher 1949
- Gardner 1951
- Imperial Min. Res. Bur. 1922d
- Lawthers 1954
- McMath 1951
- Tumlin and Cservenyak 1955
- U. S. Bur. Mines 1948c, 1953a
- Anonymous 1953f

Brazil.

Espirito Santo.

- Coastal beach deposits: U. S. Bur. Mines 1937c

Canada.

Quebec.

Allard Lake:

- Barksdale 1949
- Buisson 1954
- Cross 1949
- Cservenyak 1953
- Cservenyak and Tumlin 1954
- Dunn and Morgan 1955a
- Faessler 1950
- Gillson 1949
- Hammond 1949, 1952
- Illingworth 1952
- Lawthers 1954
- McDonald 1951
- Meyer 1950
- Tumlin and Cservenyak 1955
- United Nations 1955
- Anonymous 1948b, 1951a

Bay of Seven Island area:

- Buisson 1952
- Dulleux 1915
- Faessler and Schwartz 1941
- Lawthers 1954
- Tumlin and Cservenyak 1955

Chertsey township, Montcalm County:

- U. S. Bur. Mines 1955b
- Anonymous 1955j

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Resources—Continued

Canada—Continued

Quebec—Continued

Ivry deposit:

Tumlin and Cservenyak 1955

Vogel, F. 1950

Anonymous 1951b

St. Charles prospect, Chicoutimi

County:

Dulleux 1913, 1915

Imperial Institute 1917b

Imperial Min. Res. Bur. 1922b

Lawthers 1954

Stansfield 1916

St. Lawrence River sand deposits:

Dulleux 1915

Gmelin-Institut 1951

Imperial Min. Res. Bur. 1922b

Lawthers 1954

MacKenzie 1912b

United Nations 1955

St. Urbain: Vogel, F. 1950

Wexford township, Terrebonne county.

U. S. Bur. Mines 1955b

Anonymous 1955j

Ceylon.

Titaniferous beach deposits:

Fernando 1948

Gmelin-Institut 1951

Lawthers 1954

Matthews 1945

Wadia 1943

Wadia and Fernando 1944

China.

Taiwan.

Western coastal area: Chen 1953

Egypt.

Nile delta sands:

Meyer and Bryson 1948

Tumlin and Cservenyak 1955

U. S. Bur. Mines 1952c

Finland.

Otanmäki mine:

Lawthers 1954

Magnusson 1950

Marmo 1952

Meyer 1949

Shimkin 1953

Stigzelius 1952

United Nations 1955

Anonymous 1953g

Vuorokas: Marmo 1952

India.

Coastal beach sands, other than Travancore:

Krishnan 1951

Lawthers 1954

U. S. Bur. Mines 1946a

Anonymous 1951c, 1953h

Titaniferous magnetite deposits:

Krishnan 1952

Lawthers 1954

Radhakrishna 1951

United Nations 1955

Resources—Continued

India—Continued

Travancore.

Beach deposits:

Dennis 1953

Dunn and Morgan 1955a

Tumlin and Cservenyak 1955

Wadia 1950

Indonesia.

Island of Java.

Titaniferous iron sands: United Nations 1955

Japan.

Titaniferous iron sands:

Barksdale 1949

Hess and Gillson 1937

Lawthers 1954

Maeda 1935

Mitsuchi 1952

Staatz 1947

United Nations 1955

U. S. Bur. Mines 1954b

Anonymous 1927

Madagascar.

Betroka:

Barksdale 1949

Lawthers 1954

Robinson 1922

Vongoha:

Guigues 1951

Imperial Min. Res. Bur. 1922e

Lawthers 1954

Tucker 1927

Malaya.

Amang stockpiles: Meyer and Bryson 1948

Mexico.

Oaxaca.

Pluma Hidalgo: Anonymous 1955a, b, c, d

New Zealand.

Titaniferous iron sands.

General:

Barksdale 1949

Fyfe 1952

Gillson 1949

Imperial Min. Res. Bur. 1922d

Lawthers 1954

Mason 1945

Meyer 1949

United Nations 1955

Anonymous 1955q

New Plymouth deposits:

Gmelin-Institut 1951

Hutton 1945a

Wylie 1937

Patea deposits:

Gmelin-Institut 1951

Hutton 1940

Wylie 1937

Waitara deposits:

Beck 1947

Gmelin-Institut 1951

Resources—Continued

New Zealand—Continued

Titaniferous iron sands—Continued

Wanganui deposits:

Fleming 1946

Gmelin-Institut 1951

Norway.

Ekersund-Soggendal area.

General:

Barksdale 1949

Hess and Gillson 1937

Imperial Min. Res. Bur. 1922e

Lawthers 1954

Meyer and Bryson 1948

Poulsen 1952

Robinson 1922

Thornton 1927

Tucker 1927

United Nations 1955

U. S. Bur. Mines 1951, 1953b

Youngman 1930b

Storgangen deposit:

Gmelin-Institut 1951

Magnusson 1950

Tellnes deposit: Anonymous 1955o,
s, u, v, w

Rödsand:

Imperial Min. Res. Bur. 1922e

Lawthers 1954

Magnusson 1950

Poulsen 1952

United Nations 1955

Imperial Min. Res. Bur. 1922e

Selvaag:

Imperial Min. Res. Bur. 1922e

Lawthers 1954

United Nations 1955

Solnördal: Lawthers 1954

South Korea.

So-Yonpyong-do: Yagyū 1951

Sweden.

Järvsö, Kramsta:

Geljer and Magnusson 1952

Lawthers 1954

Magnusson 1950

Ruotevare:

Geljer and Magnusson 1952

Imperial Min. Res. Bur. 1922e

Lawthers 1954

Magnusson 1950

United Nations 1955

Södra Ulvön:

Geljer and Magnusson 1952

Lawthers 1954

Magnusson 1950

Taberg:

Geljer and Magnusson 1952

Imperial Min. Res. Bur. 1922e

Lawthers 1954

Magnusson 1950

United Nations 1955

Tanganyika.

Liganga deposits:

Barksdale 1949

Harpum 1952

Resources—Continued

Tanganyika—Continued

Liganga deposits—Continued

Imperial Institute 1946

Lawthers 1954

Stockley 1945

United Nations 1955

Union of South Africa.

Bushveld complex:

Frankel and others 1951

Imperial Min. Res. Bur. 1922a

Lawthers 1954

Masson 1953

Tucker 1927

United Nations 1955

Wagner 1928

*Natal.*Tugela and Mambula Rivers de-
posit:

Lawthers 1954

Wagner 1928

Umgababa deposit:

Tumin 1955

U. S. Bur. Mines 1952a, 1953c,
1954

Anonymous 1952k, 1954b, f

Southwest Africa.

Karibib rutile deposit:

Lawthers 1954

U. S. Bur. Mines 1948b

Union of Soviet Socialist Republics.

General: Shmkin 1953

Pudozhgora deposit:

Gmelin-Institut 1951

Lawthers 1954

Shmkin 1953

*Ukraine.*Titaniferous sands: Gmelin-Institut
1951*Ural Mountains.*

General:

Barksdale 1949

Hess and Gillson 1937

Lawthers 1954

Suirokonski 1926

Vogel, F. 1950

Kusa deposit:

Gmelin-Institut 1951

Imperial Min. Res. Bur. 1922e

Lawthers 1954

Panteleyev and Malyshev 1934

Shmkin 1953

Suirokonski 1926

Other deposits:

Gmelin-Institut 1951

Panteleyev and Malyshev 1934

Shmkin 1953

Suirokonski 1926

United States.

General: Lawthers 1954

Arkansas.

Magnet Cove area:

Lawthers 1954

Matthews and others 1947

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Resources—Continued

United States—Continued

Arkansas—Continued

Magnet Cove area—Continued
U. S. Senate, Comm. Interior
and Insular Affairs 1954

California.

Ilmenite deposits: Matthews and
others 1947

San Gabriel Mountains:

Baughman 1927
Lawthers 1954
Oakeshott 1937, 1948, 1950
Tucker 1927
United Nations 1955

Florida.

North Central: Anonymous 1955o, s
Pablo Beach, Mineral City: Tucker
1927

Pensacola Bay area:

Matthews 1945

Titaniferous sand deposits:

Cannon 1950
Lawthers 1954
Matthews and others 1947

Idaho.

Deary clay deposit: Scheid and
Sohn 1945

Long Valley area, Cascade: Cser-
venyak and Tumin 1954

Minnesota.

Titaniferous deposits in Duluth
gabbro:
Grout 1949-50
Lawthers 1954

Montana.

Teton County titaniferous sand-
stone:

Lawthers 1954
Anonymous 1952c

New York.

Lake Sanford area:

Balsley 1943
Hess and Gillson 1937
Lawthers 1954
Matthews and others 1947
Stephenson, R. C. 1945
Tucker 1927
United Nations 1955
Anonymous 1943

MacIntyre mine, Tahawus:

Balsley 1943
Barksdale 1949
Hagar 1942
Lawthers 1954
Matthews 1943a
Matthews and Bryson 1947
Anonymous 1950o, s

North Carolina:

Lawthers 1954
Matthews and others 1947
Buffalo Creek monazite placer: Grif-
fith and Overstreet 1953a
First Broad River monazite placer:
Hansen and Cuppels 1954

Resources—Continued

United States—Continued

North Carolina—Continued

Knob Creek monazite placer: Grif-
fith and Overstreet 1953b
Yadkin Mica and Ilmenite Company
mine: Greaves-Walker 1945

Oklahoma.

Lake Lawtonka placer deposit:
Chase 1952

Oregon.

Coastal placer deposits:

Lawthers 1954
Twenhofel 1946b

Ferruginous bauxite deposits:

Bell 1945
Lawthers 1954
Libbey and others 1945, 1946

Rhode Island.

Iron Mine Hill, Cumberland: Dri-
ver 1953

Virginia.

Amherst-Nelson Counties area:

Barksdale 1949
Hess and Gillson 1937
Lawthers 1954
Matthews 1943b
Matthews and others 1947
Anonymous 1942b

Washington.

Elma titaniferous sand:

Glover 1942
Lawthers 1954

Excelsior clay deposit:

Lawthers 1954
Scheid 1945

Wyoming.

Iron Mountain deposit:

Birch 1955
Cservenyak, and Tumin 1954
Dietz 1932
Gmelin-Institut 1951
Lawthers 1954
Newhouse and Hagner 1951
Osterwald and Osterwald 1952
Pinnel 1954
United Nations 1955
Anonymous 1954d
Titaniferous sandstones: Murphy
and Houston 1955

Smelting of titaniferous ores.

General:

Cservenyak and Tumin 1956
Dulieux 1915
Frankel and others 1951
Gillson 1949
Goodwin, W. L. 1919
Robinson 1922
Stansfield 1916
Thornton 1927
Tucker 1927
Youngman 1930a

Smelting of titaniferous ores—Continued

*Canada.**Quebec.*

- St. Charles prospect, Chicoutimi County:
- Imperial Institute 1917b
- Stansfield 1916

*Japan.**Honshu.*

- Kuji titaniferous iron sands: Anonymous 1927

New Zealand.

- Iron sands: Wylie 1938

Union of South Africa.

- Bushveld complex: Frankel and others 1951

*United States.**Idaho.*

- Valley County placer deposits: Banning and others 1955

South America.

*Argentina.**Catamarca.**Mina Podesta:*

- Bassi 1952
- Imperial Min. Res. Bur. 1922f
- Lawthers 1954
- Youngman 1930b

Coastal sands:

- Barksdale 1949
- Carnevali 1951
- Gmellin-Institut 1951
- Hess and Gillson 1937
- Imperial Min. Res. Bur. 1922f
- Lannefors 1929
- Lawthers 1954
- United Nations 1955
- Youngman 1930b
- Anonymous 1953k

*Brazil.**Ceara.**Coastal titaniferous placer deposits:*

- Barksdale 1949
- Gillson 1949, 1951
- Gmellin-Institut 1951
- Hess and Gillson 1937
- Lawthers 1954
- Lynd and others 1954
- U. S. Bur. Mines 1937b c, 1945b
- Youngman 1939b

Rutile deposits:

- Chambers 1942
- Gillson 1949
- Lawthers 1954
- U. S. Bur. Mines 1945b

*Espirito Santo.**Coastal titaniferous placer deposits:*

- Fróes Abreu 1933, 1936a
- Gillson 1951
- Gmellin-Institut 1951
- Matthews 1945
- U. S. Bur. Mines 1937c

South America—Continued

*Brazil—Continued**Goyaz.**Rutile deposits:*

- Barksdale 1949
- Chambers 1942
- Fróes Abreu 1936b
- Gillson 1949
- Gmellin-Institut 1951
- Hess and Gillson 1937
- Jobim 1941
- Lawthers 1954
- Leão 1939
- Leonardos 1938
- U. S. Bur. Mines 1937b, 1941, 1945b

*Minas Geraes.**Rutile deposits:*

- Barksdale 1949
- Fróes Abreu 1936a, b
- Gmellin-Institut 1951
- Hess and Gillson 1937
- Jobim 1941
- Lawthers 1954
- Leão 1939
- U. S. Bur. Mines 1937b, 1941, 1945b
- Zuquim 1935

Northeastern states:

- la Rúa 1954

British Guiana:

- Gmellin-Institut 1951
- Imperial Min. Res. Bur. 1922b
- Lawthers 1954
- Stockley 1955
- Youngman 1930b

Chile:

- Gmellin-Institut 1951
- Lawthers 1954

*Uruguay.**Florida titaniferous magnetite deposit:*

- Lawthers 1954
- U. S. Bur. Mines 1940

Titanium metal industry.

General:

- Frankel and others 1951
- Gillson 1949
- Kellogg 1955
- Anonymous 1955e

Methods of metal production:

- Cservenyak and Tumin 1956
- Dennis 1953
- Dunn and Morgan 1955a
- Kellogg 1955
- U. S. Bur. Mines 1954b

Uses of titanium compounds.

General:

- Barksdale 1949
- Blrch 1955
- Cservenyak and Tumin 1956
- Dennis 1953
- Dietz 1932

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Uses of titanium compounds—Continued

General—Continued

Driver 1953
 Faessler 1950
 Fisher 1949
 Frankel and others 1951
 Gardner 1951
 Gary 1942
 Gillson 1949
 Goodwin, W. M. 1953
 Herres 1946
 Hess 1909
 Hess and Gillson 1937
 Krishnan 1951
 Krishnan and Roy 1942

Uses of titanium compounds—Continued

General—Continued

Lacroix 1920
 Maillet 1950
 Matthews and others 1947
 Oldham 1952
 Robinson 1922
 Tucker 1927
 Union of South Africa Geol.
 Survey 1940
 Watson 1917
 Watson and Taber 1909
 Watson and Taber 1913
 Youngman 1930a
 Anonymous 1955h