Chapter Seven

World Economic Geography

Chapter Concepts

- Age and Dimensions of Earth
- Resource: Concept and Types
- Energy Resources
- Mineral Resources

Economic geography deals with the analysis of the spatial distribution of the transportation and consumption of resources, goods, and services, and their effect on landscape.

Resource: Concept and Types

Any thing that fulfills peoples needs is known as a resource. Resource may be natural, like mineral-ores, water, soil, natural vegetation, climate or man-made – labour, skills, finance, capital, technology and working environment. Resources may be classified into two categories, i.e. non-renewable and renewable resources.

Non-Renewable Sources

Mineral resources like coal, petroleum and natural gas are the exhaustible, non-renewable resources. They cannot be replaced once they are consumed. Coal and petroleum, the fossil fuels on which the modern culture relies so much, are non-renewable. These energy resources have been concentrated and preserved by geologic processes that operated over the vast periods of geologic time. Although the same processes may function today, they operate so slowly to replenish our supplies of these fuels.

Renewable Resources (Flow Resources)

A recurrent resource which is not diminished when used, but which will be restored. Examples include solar, tidal and wind energy. Renewable resources may be consumed without endangering future consumption as long as use does not outstrip production of new resources, as in fishing.

Energy Resources

Renewable energy resources

These are known as the alternate sources of energy. Renewable energy resources include solar energy, hydropower, bio mass, tidal, wind and geothermal energy. Together they cannot be expected to fulfill our energy needs. Nuclear energy may, however, become a major energy source to fulfill the shortage in the future.

Modern society's technological progress and standard of living are intimately related to energy consumption. According to social scientists, the higher the energy consumption per head, the higher is the standard of living of the people. People all over the world are however, experiencing a serious energy shortage which may become more acute in future. In such a scenario, hydro-power and nuclear energy are the best alternate sources of energy.

Hydro-Power

Throughout the history water played an important role in the agricultural industrial and trade development of the world. Water is used for irrigation, industries, domestic purpose, nutrition, navigation and for the generation of hydro-electricity. Water became a major source of energy after the invention of water-power-generator in 1882. It has no capacity to produce energy within itself. Water creates power by its motion-usually by falling vertically. The greater the distance of fall, the greater the power potential. Typically, this potential occurs in upland areas or in mountainous environments with human-made dams.

At present, water power provides an important source of electricity in the world. Hydroelectricity, however, despite a clean source of energy, provides only 6.5 per cent of the total energy consumed in the world. About 99 per cent of the total energy requirement of Norway is obtained from water, while New Zealand, Switzerland obtain about 75 per cent of their power requirements from water. In South American countries also about 75 per cent of the total power is hydro- power.

Nuclear Energy

The nuclear energy production was started in the 1950s. Its production was started first in USA. At present over 60 nuclear reactors exist in USA. Most of these reactors are located in the highly urbanized regions of North-East USA. Other important producers of nuclear energy are France, Russia, Japan, Germany, Italy, Belarus, Poland, Romania, and Ukraine. After the Chernobyl (1986) and Fukishima (2011) nuclear tragedy it has been proved that it is the most risky form of energy.

Non-renewable Energy Resources

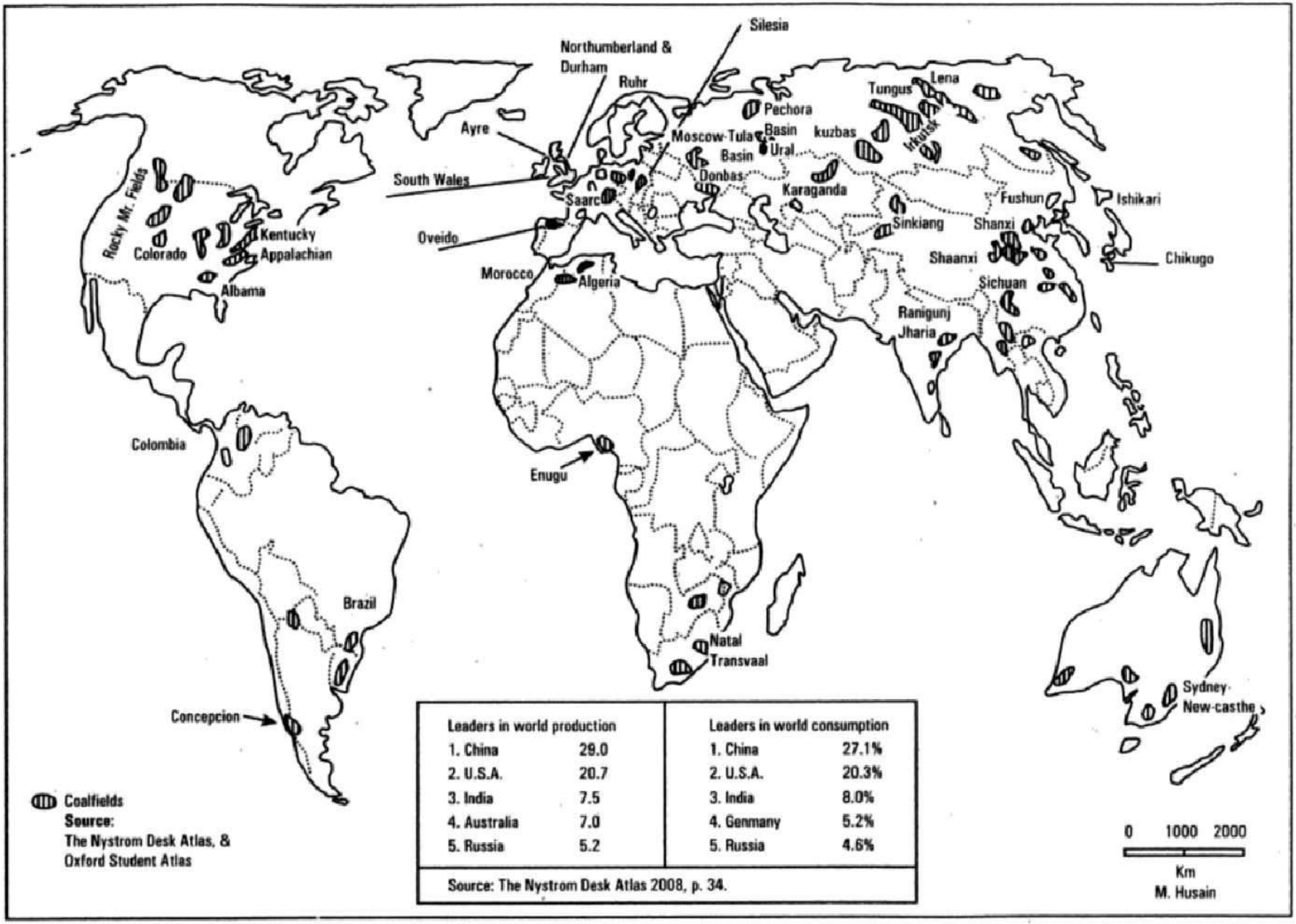
Oil (Petroleum), natural gas, coal, wood, solar water and uranium fill most of the world's energy requirements. All but wood, water, wind, tidal and solar are renewable while fossil fuels – coal, petroleum and natural gas are non-renewable sources of energy. In fact, all fossil fuels (coal, petroleum, natural gas), once used cannot be renewed.

Coal

Coal is abundant and cheap but exhaustible. The consumption of coal is more than 5 billion tons per year. In the developed countries of Europe, USA, Canada, Japan, Australia and New Zealand, each person consumes an equivalent of 5 tons or more coal in a year. Coal combustion, however, accounts for 35 per cent of worldwide carbon dioxide emissions .

There are four types of coal: (i) peat, (ii) lignite, (iii) bituminous, and (iv) anthracite. The physical and chemical properties of coal depends on the degrees of compression and or the depth of burial. Peat develops with the decay of plants in bogs. This process yields *peat*. Compressed *peat* yields *lignite*, a low grade coal, often called *brown coal*. When coal is buried deeply, moisture expelled and the material subjected to increased temperatures, a firmer *bituminous* coal results. It is most popular in metallurgy and referred as *soft coal*. Further compression yields *anthracite*, the highest quality hard coal. The high grade coal used in the steel industry is frequently called *coking coal*. It results from the heating of coal in the absence of oxygen, which burns off volatile gases.

The distribution of major coal deposits of the world have been shown in **Fig. 7.1** while, the main coal deposits of U.S.A., Europe and Russia have been plotted in **Figs.. 7.2** to **7.4.**, respectively. **Tables 7.1** and **7.2** shows the leading coal producing and coal consuming countries of the world.



Leaders in world production		Leaders in world consumption	
1. China	29.0	1. China	27.1%
2. U.S.A.	20.7	2. U.S.A.	20.3%
3. India	7.5	3. India	8.0%
4. Australia	7.0	4. Genmany	5.2%
5. Russia	5.2	5. Russia	4.6%

Source: The Nystrom Desk Atlas 2008, p. 34.

Fig. 7.1 – World – Distribution of coal

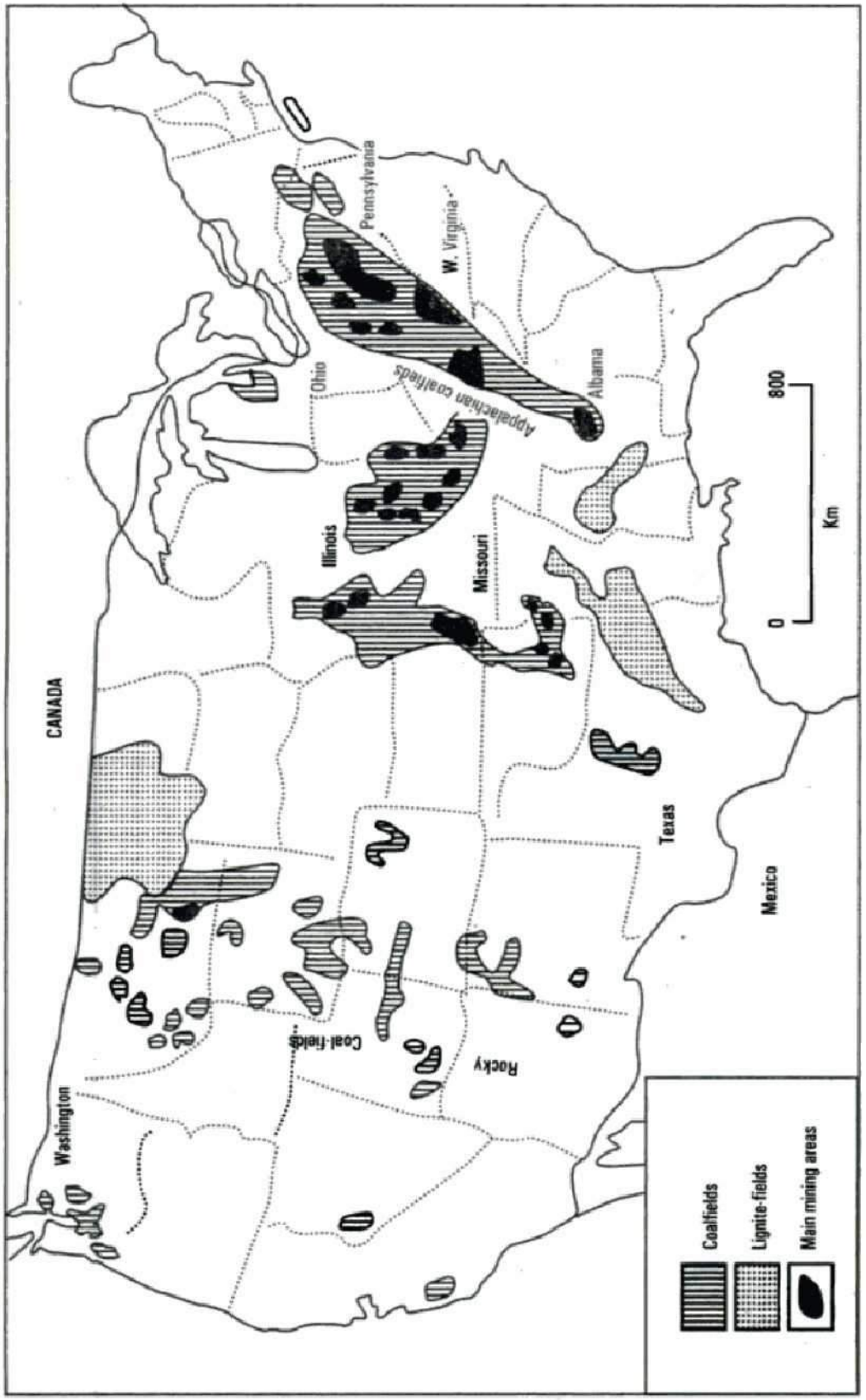


Fig. 7.2 – U.S.A. coalfields

Table 7.1:– Coal – Leading Coal Producing Countries of the World

Country	Percentage of total production
1. China	29.0
2. U.S.A.	20.7
3. India	7.5
4. Australia	7.0
5. Russia	5.2

Table 7.2: Coal – Leading Consumers in the World

Country	Percentage of total consumption
1. China	27.1
2. U.S.A.	20.3
3. India	8.0
4. Germany	5.2
5. Russia	4.6

Table 7.3: Major Coalfields of the World

Country	Coal Mines
1. China	Shaanxi(Shansi), Shanxi (Shensi), Sichuan, Fushun, Shenyang, Sinkiang
2. USA	Arkansas, Colorado, Illinois, Indiana, Iowa, Kentucky, Michigan, Montana, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, Pittsburgh, West Virginia (Appalachian), Utah, Wyoming **(Fig. 7.2)**
3. India	Bokaro, Jharia, Karanpur, Neyvelli, Korba, Raniganj, Singreni, Singrauli, Talcher
4. Australia	Bowen Basin, Brisbane, Canberra, Sydney-New- Castle (New South Wales), Fingal (Tasmania), Ipswich (Queensland), Gippsland (Victoria), Pagingo
5. Russia	Moscow-Tula, Chokot Basin (Eastern Siberia), Irkutsk Basin, Lena Basin, Kizel, Komi-Ukhta (Pechora Basin), Kuznetsk (Kuzbas), northern and eastern Siberia, Irkutsk, Ob Basin, Sakhalin Island, Tungaska Basin, Tyumen (Ob Basin) Upper Lena, Vladivostok, Yakut Basin, Zyryanska Basin **(Fig. 7.3)**
6. Poland	Upper Silesian and Lower Silesian Fields **(Fig. 7.4)**

7. Germany	Rhur, Saxony, Leipzig, Magdeburg, Dresden, Saar, Bavaria, Cologne **(Fig. 7.4)**
8. Great Britain	Cumberland, Durham, Derbyshire, Lancashire, Leicestershire, Northumberland, Nottinghamshire, South Wales, Warwickshire **(Fig. 7.4)**
9. Canada	Alberta, Vancouver (British Columbia)
10. France	Pas de Calais and Nord (North-Eastern France), Franco-Belgian Coalfields, Alsace-Lorraine Fields, Central Massif
11. Belgium	Franco-Belgian Coal-Fields, Campine Coalfields
12. Brazil	Southern Brazil
13. South Africa	Transvaal, Natal
14. Chile	Concepcion
15. Others	Argentina, Columbia, Nigeria, Peru

Japan is the leading importer of coal, the west European countries import about 34 per cent of the coal in the world. Over 50 per cent of the total import is done by Japan, West European countries and Canada import more than 60 per cent of the total coal trade in the world.

Oil (Petroleum)

Oil is the most efficient source of energy in the world today. Petroleum and natural gas and their products are the most important commodities in international trade today. It is a global industry, wherein prices are reported almost exclusively in international terms. South West Asia has the largest deposits of petroleum and natural gas. The first oil well was dug near *Titusville* (Pennsylvania) north of Pittsburg. Subsequently oil was found in Romania and Russia, near Caspian Sea-Baku (Azarbaijan). At present over 50 per cent of the oil is found in the countries of South-West Asia. The leading oil producing and oil consuming countries have been given in **Fig. 7.5**, while **Figs. 7.6 to 7.10** show the major oil deposits in South West Asia, U.S.A., Soviet Union, Europe and the North Sea, respectively.

The oil exporting countries raised the price of petroleum rapidly in 1974 which led to energy crisis in the world. The OPEC countries include 1. Angola, 2. Algeria, 3. Iran, 4. Iraq, 5. Kuwait, 6. Indonesia, 7. Libya, 8. Nigeria, 9. Qatar, 10. Saudi Arabia, 11. UAE, 12. Venezuela. The other oil exporting countries include Mexico and Russia **(Fig. 7.11).**

***Table 7.4** : Oil (Petroleum) – Leading Producers in the World*

Country	*Percentage of total production*
1. Saudi Arabia	12.3
2. Russia	11.7
3. United States	8.1
4. Iran	5.4
5. China	4.9

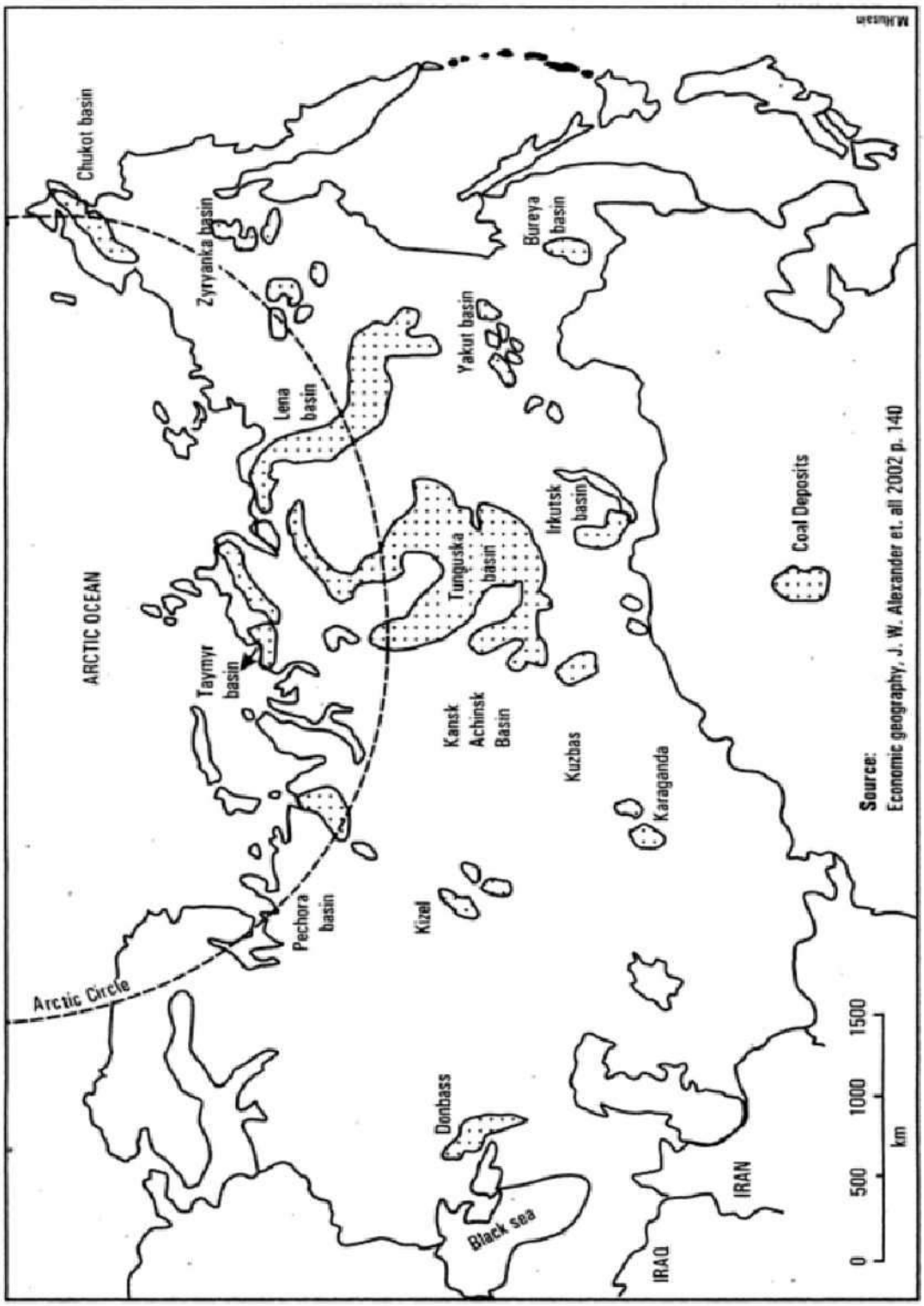


Fig. 7.3 – Russia coal deposits

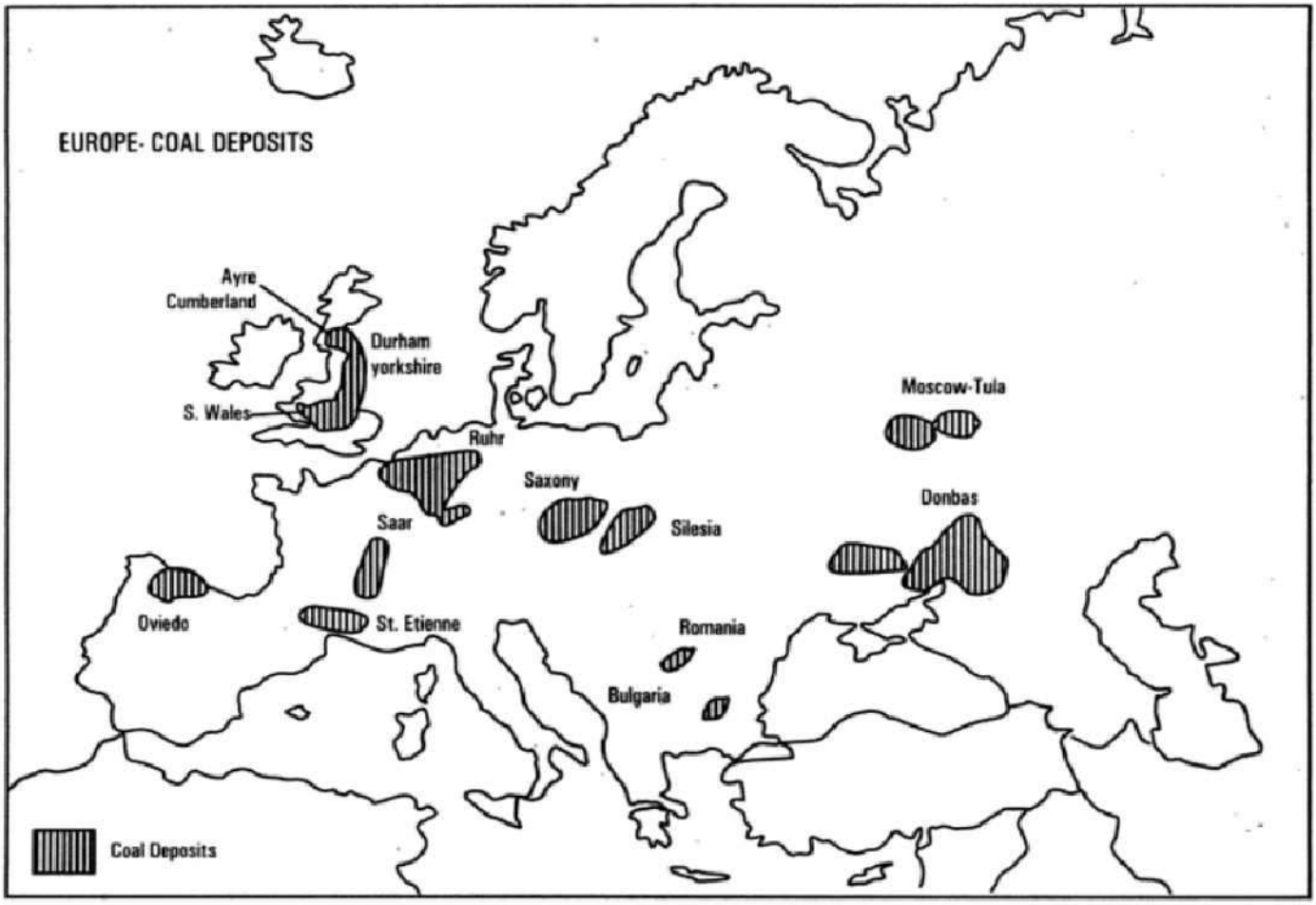


Fig. 7.4 – Europe coal deposits

***Table 7.5:** Oil (Petroleum) – Leading Consumers in the World*

Country	*Percentage of total consumption*
1. United States	25.2
2. Japan	7.0
3. China	6.6
4. Germany	3.5
5. Russia	3.3

***Table 7.6:** Major Petroleum Producing Centres*

Country	*Producing Centres*
Algeria	Bougie, Edjele,Hassi Massould, Hassi R'Mel,
Australia	Alice Spring (Northern Territory), Bass Starait, Moonie (Queensland), Daly Basin (Northern Territory), Port Hedland (Western Australia)
Brunei	Northern shore of Brunei
Brazil	Amazon Basin, Coastal Brazil

Canada	Alberta, Athabaska, Saskatchewan
China	Daqing (Taching), Dakang (Takang), Shandong (Shantung), Panshan, Yumen, Karami in Xinjiang (Sinkiang), Kashi (Kashgar)
Egypt	Sinai Peninsula
India	Bombay High, Digboi, Gulf of Khambat, Upper Assam
Indonesia	Jambi, Minas, Palembang, Kalimantan (Borneo Island), Balikpapan
Iran	Agha-Jari, Bahregan, Lali, Masjid-i-Sulaiman
Iraq	Alwand, Basara, Kirkuk, Mosul
Libya	Marsa Brega, Zelten, Ras Sidar, Sirte Basin,Tobruk
Malaysia	Sarawak, east Coast of Peninsula of Malaysia.
Mexico	Cludad Madero, Poza Rica, Reynosa
Niger	Niger Delta
Russia	Bashkiria, Grozny, Kuybyshev, Maikop, Nizhnevartovsk, Perm, Sakhalin Island, Tataria, Tomsk
Saudi Arabia	Abqaiq, Ain Dar,Dahran, Ghawar, Jubail, Safania
U.K.	Northern Sea
U.S.A.	Alaska, Arkansas, California, Illinois, Kentucky, Lousiana, Michigan, New Mexico, Ohio, San Joaquin, Texas, Wayoming
Venezuela	Aruba, Lagunillas, Maracaibo Lake

The major exporters of oil and petroleum have been plotted in **Fig.7.11.** The oil exporting countries (OPEC) include: Angola, Algeria, Iran, Iraq, Kuwait, Indonesia, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates (UAE) and Venezuela. Among the other main oil exporting countries are Mexico and Russia.

Natural Gas: Natural gas is one of the important sources of energy. Natural gas burns clean andis easy to use, and relatively cheap to buy. Its storage and distribution is, however, complicated. It is found either separately or with crude oil. The leading natural gas producers and leading consumer countries have been shown in **Figs. 7.12.**

It may be seen from **Fig. 7.12** that Russia with a percentage share of 22.8 is the leading producer of natural gas, followed by U.S.A. (20.7 %), Canada (7.1%), U.K. (3.9%) and Algeria (3.1%). So far as the consumption of natural gas is concerned USA with a percentage share of 24.4 is the leading consumer, followed by Russia (16 %) , U.K.(3.6 %), Germany(3.5 %) and Canada(3.3%).

The regional distribution of natural gas in U.S.A., Europe, and Australia have been shown in **Figs.7.13, 7.14** and **7.15,** respectively. In USA, the major natural gas deposits lie in Arkansas, California, Colorado, Houston, Indiana, Kansas, Louisiana, Montana, Ohio, Oklahoma, Pennsylvania, Texas, and West Virginia. In Europe, North Sea, Italy, Germany, France, Poland, Romania, and Ukraine have rich deposits of natural gas. The distribution of important mineral resources of Australia including natural gas and petroleum have been shown in **Fig.7.15**. It may be observed from this figure that Australia, a country with small population, is quite endowed with coal, iron-ore, copper, gold, silver, lead, uranium, platinum, tin, and zinc. Australia is one of the important exporters of the basic minerals and energy resources.

Table 7.7: Leading Natural Gas Producers in the World

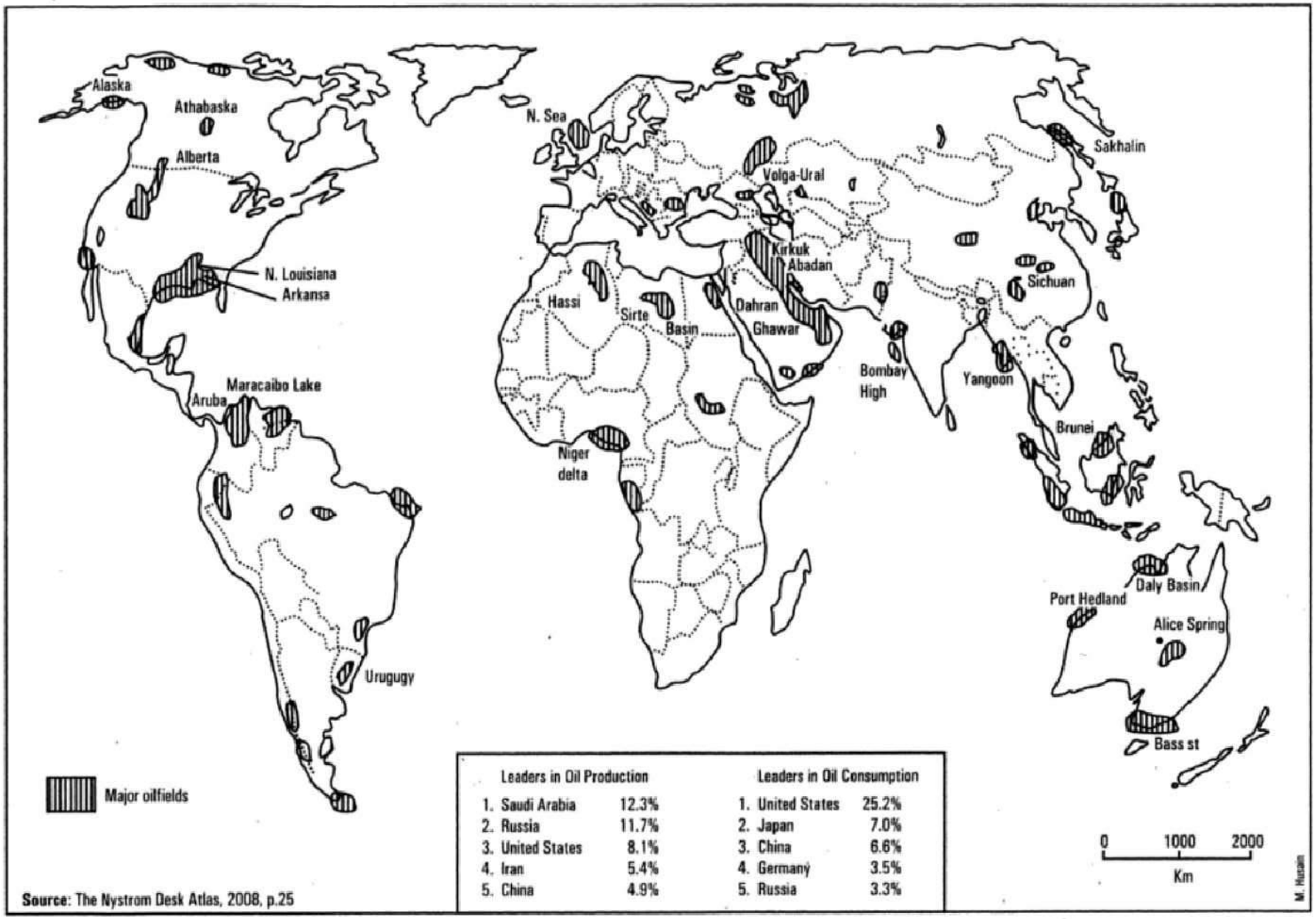
Country	Percentage of total production
1. Russia	22.8
2. United States	20.7
3. Canada	7.1
4. United Kingdom	3.9

Table: 7.8: Leading Natural Gas Consumers in the World

Country	Percentage of total consumption
1. United States	24.4
2. Russia	16.0
3. United Kingdom	3.6
4. Germany	3.5
5. Canada	3.3

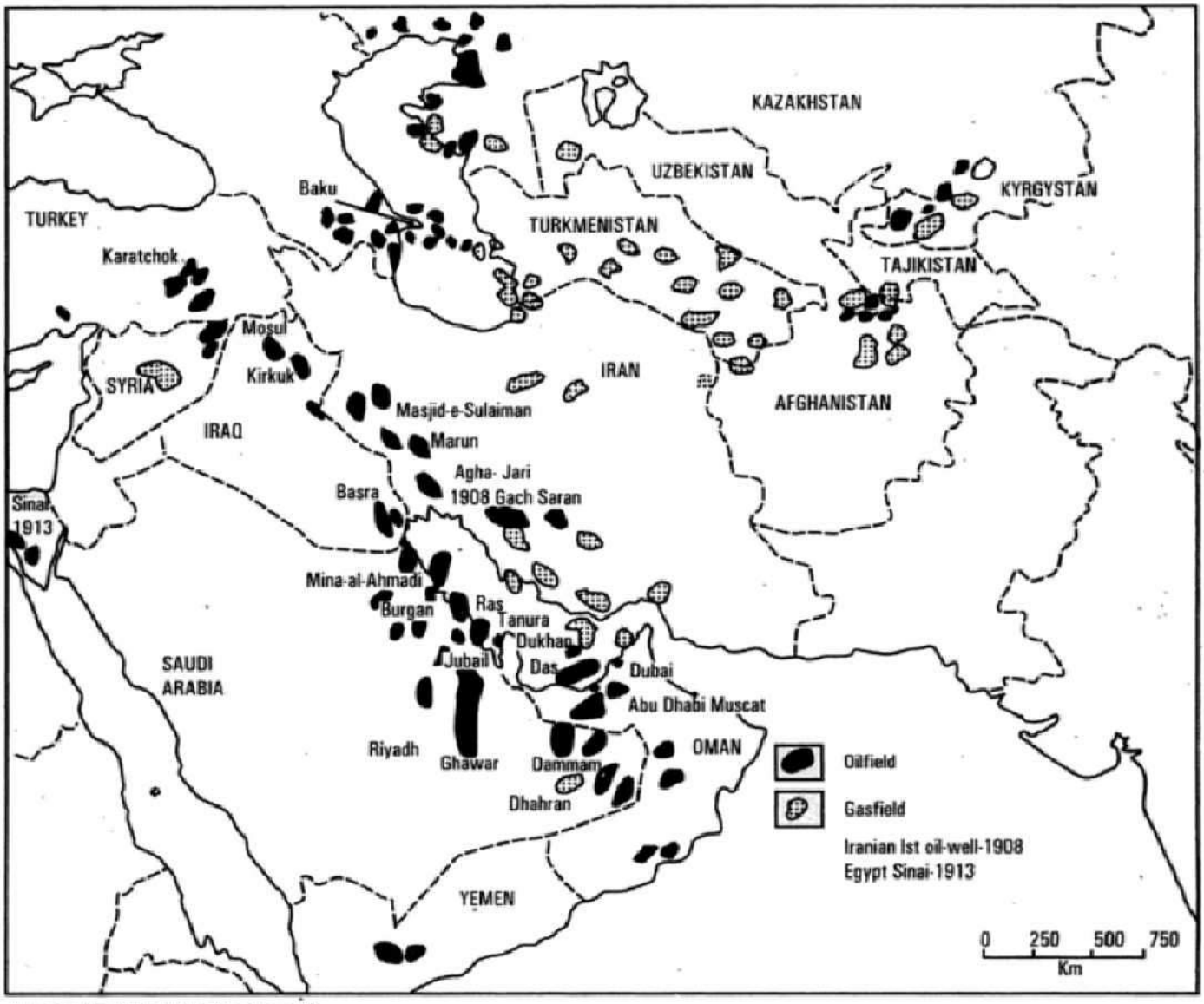
Table 7.9: Natural Gas Producing Centres

Country	Mining Centres
Algeria	Hassi R'Mel
Australia	Barrow Island, Bass Strait, Flounder, Port Hedland, Scott Reef
Brunei	Bandar Sri Bagawan
Canada	Alberta, British Columbia, Clarke Lake, Edmonton, Saskatchewan
China	Nan-Chang, Sichuan
India	Bombay High, Mangla, Rawa, Tripura
Iraq	Basra, Kirkuk, Mosul
Iran	Agha-Jari, Gach-Saran, Abadan
Indonesia	Palembang, Kalimantan
Libya	Sirte Basin
Mexico	Baja Peninsula, Cardenas, Cludad Madero, Poza Rica Reynosa, Sabinas
Nigeria	Niger Delta
Netherlands	North Sea, Rhine Delta
Romania	Danube Delta
Russia	Grozny, Volga-Ural region, Shaim, Sakhalin
Saudi Arabia	Burgan, Dahran, Dammam, Ghawar, Jubail
U.K.	North Sea
U.S.A.	Albama,Arkansas, California, Colorado, Houston, Indiana, Kansas, Lousiana, Montana, Ohio, Prudhoe Bay (Alaska), Texas, West Virginia Wyoming
Venezuela	Aruba, Maracaibo Lake



Source: The Nystrom Desk Atlas, 2008, p.25

Fig. 7.5 – World – Major oilfields



Source: After H.J. de Blij. 9th ed. p. 297

Fig. 7.6 – South West Asia and Central Asia – Oil and natural gas deposits

Mineral Resources

In the economic and industrial development of nations, the importance of minerals can not be under-emphasised. Iron-ore, bauxite and copper are the mainstay of metal production and heavy industries in the world.

Iron Ore

There are several grades of iron ore, based on purity and mineral content. Hematite, the highest grade ore, is reddish in colour. The intermediate grade, magnetite, is characteristically black.

Taconite, the lowest quality ore, requires crushing, magnetic separation, and heating to convert the ore to pellets that are marketable. The distribution and production of iron-ore are highly uneven.

The leading producers and important mining centers of iron-ore have been shown in **Fig. 7.16**.

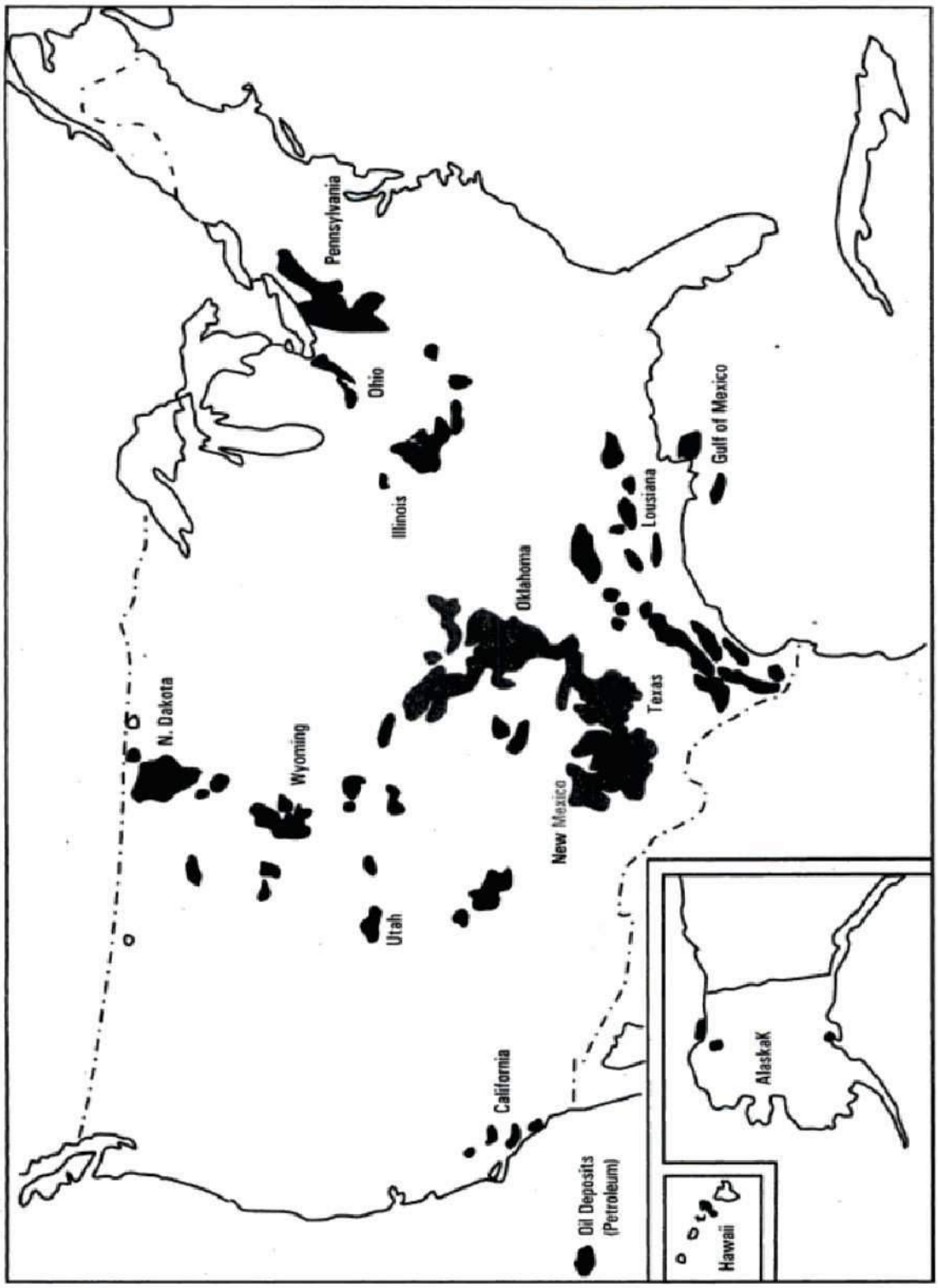


Fig. 7.7 – U.S.A. oil deposits

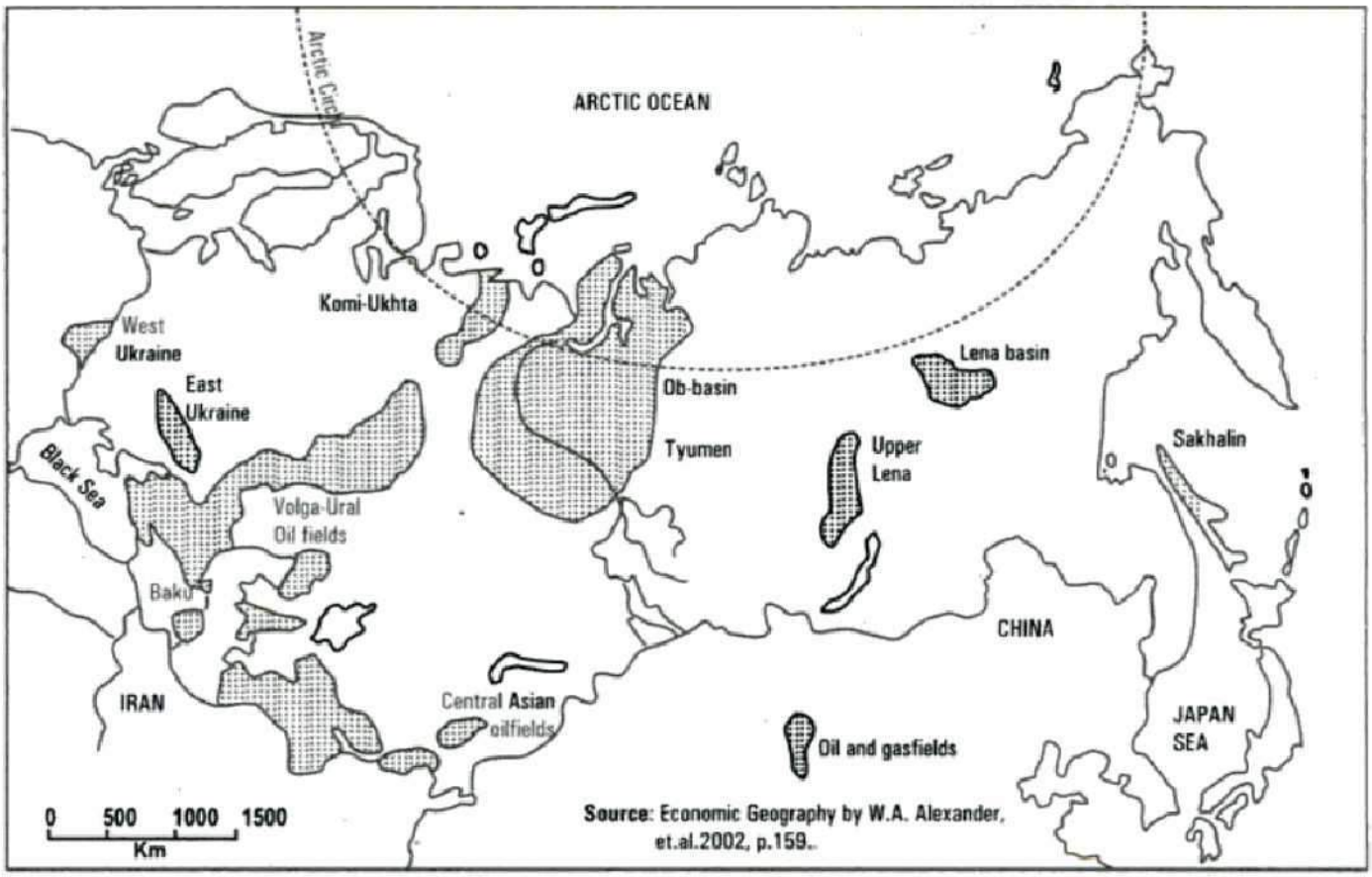


Fig. 7.8 – Russia and Central Asia – Oil deposits

***Table 7.10** : Iron Ore (Fe) – Leading Producers in the World*

Country	*Percentage of total production*
1. China	32.5
2. Brazil	17.7
3. Australia	15.2
4. India	9.6
5. Russia	5.8
6. Ukraine	4.10
7. U.S.A.	2.9
8. South Africa	2.3
9. Canada	1.9
10.Others	8.0

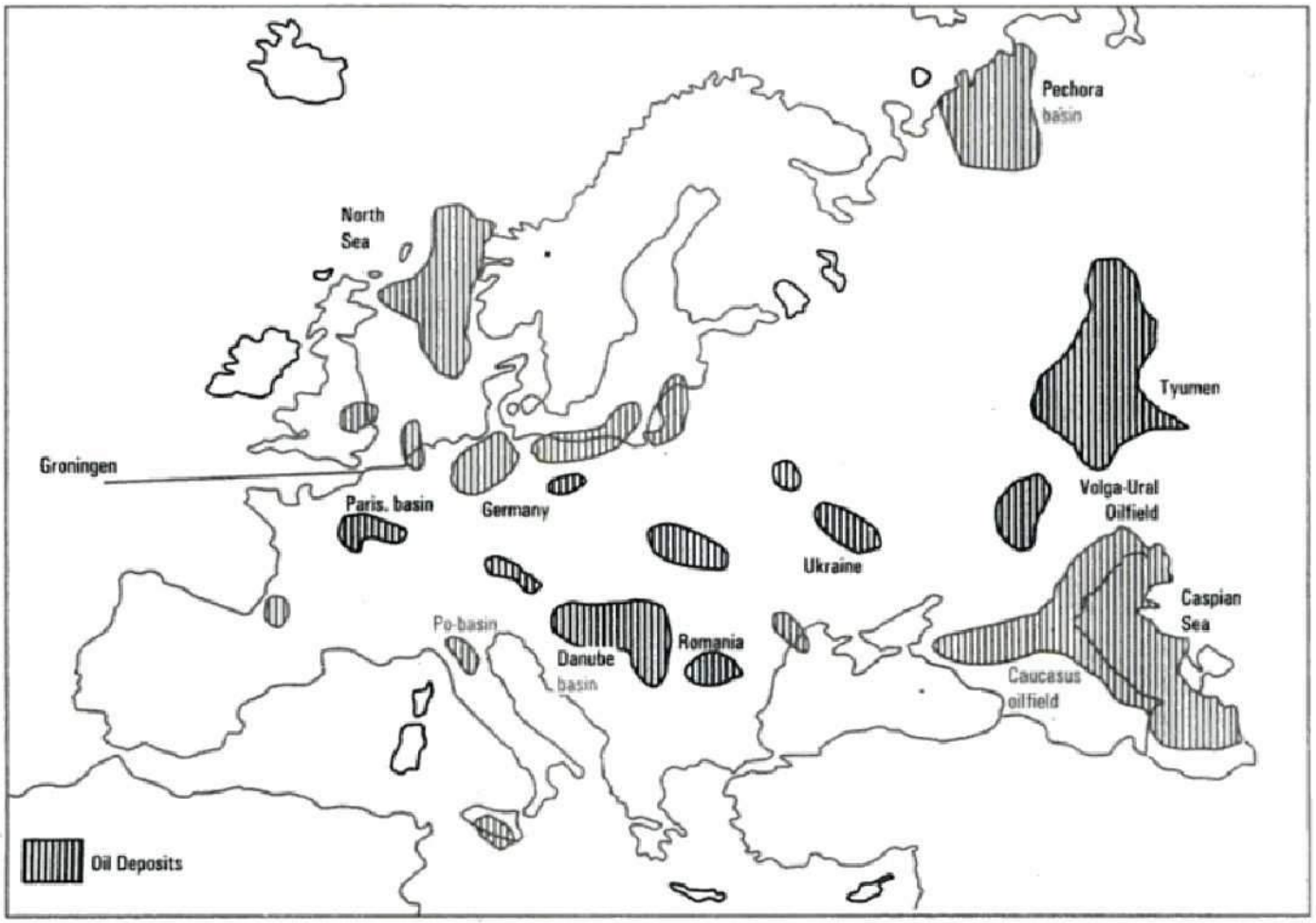


Fig. 7.9 – Europe oil–deposits

***Table 7.11:** Major Iron-Ore Mining Centres of the World*

Country	*Mining Centres*
Brazil	Itabira
Australia	Mt. Bruce, Mt Goldsworthy, Mt Tom Price, Mt. Whaleback
China	Anshan (Manchuria), Chongquing (Chungking), Shandong (Shantung), Sinkiang, Xi-Jiang (Si Kiang), Guangzhou (Canton)
India	Badampahar, Dalli Rajhara, Goa, Kundermukh, Mayurbhanj
Russia	Magnitogorsk(Urals), Kuzbas, Angara (eastern Siberia)
USA	Mesabi Range, Vermilion, Marquette Range (Lake Superior), Adirondacks (New York), Cornwall (Pennsyvania), Albama, Birmingham (Appalachian), California, Utah, Wyoming
Canada	Labrador, Eastern Quebec

France	Lorraine, Normandy, Central Massif
Germany	Rhur Basin
Liberia	Bomi Hill, Mt. Nimba
Sweden	Kiruna, Gallivare
Ukraine	Krivoi Rog
Mauritania	Zouerate
Chile	Algarrobo in central Chile
Venezuela	Cerro Bolivar (Guiana Highlands)

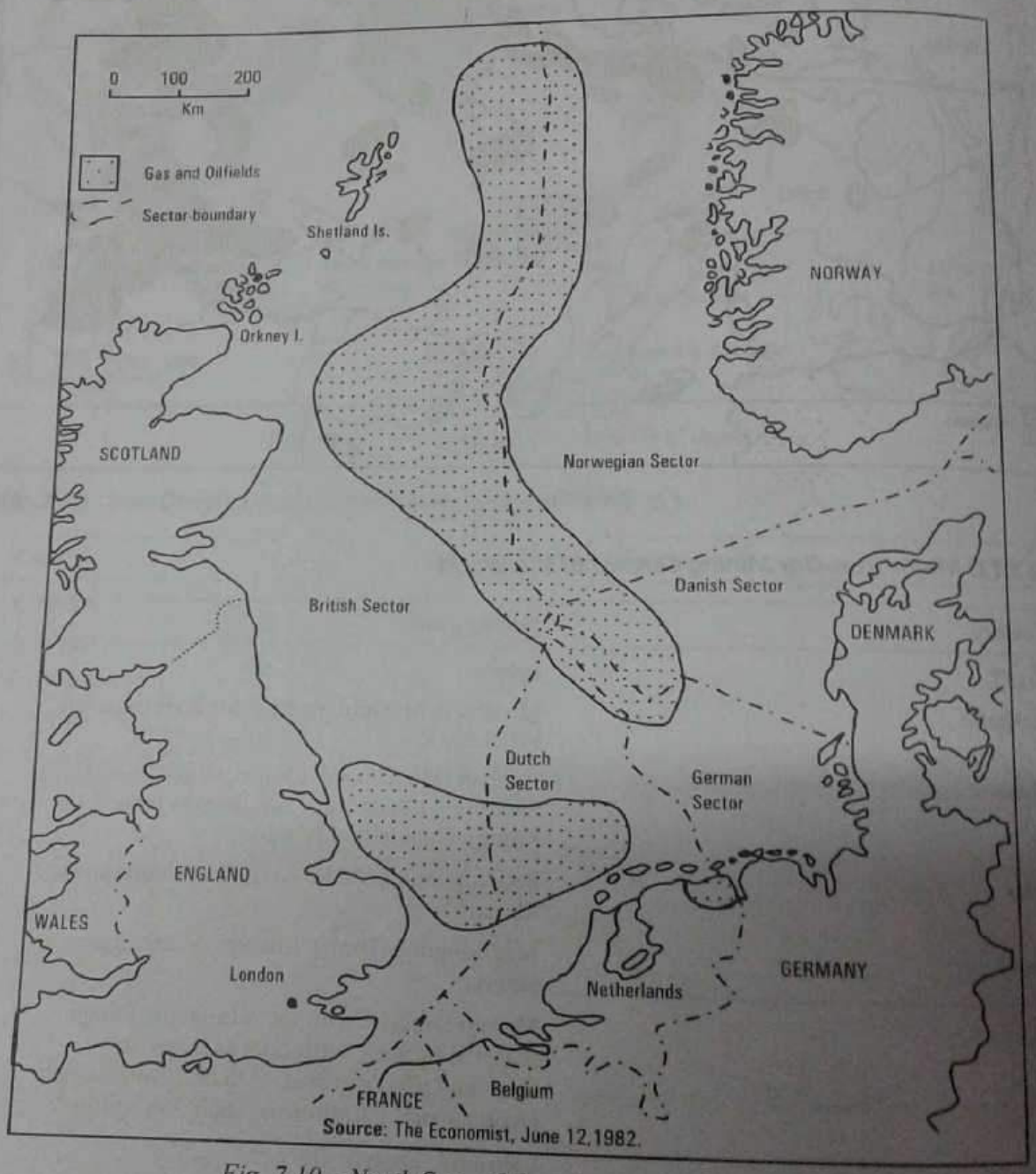
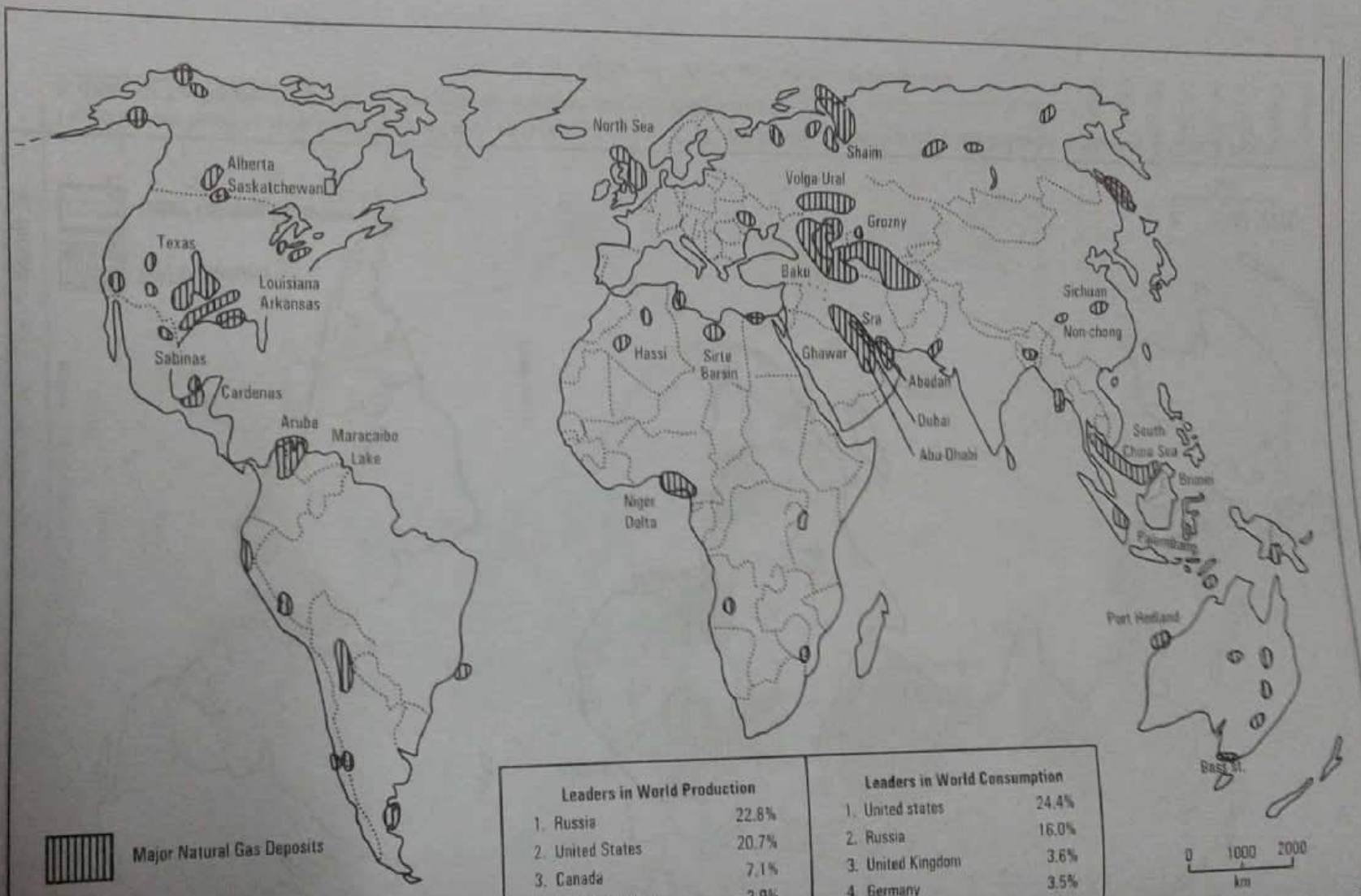


Fig. 7.10 – North Sea – Oil and natural gas deposits

The 12 member countries of the Organisation of Petroleum Exporting Countries (OPEC) are: Angola 2. Algeria 3. Iran, 4. Iraq, 5. Kuwait, 6. Indonesia, 7. Libya, 8. Nigeria, 9. Qatar, 10. Saudi Arabia, 11. U.A.E., 12. Venezuela. (They produce over 40% of the worlds oil.)

Fig. 7.11 – Leading oil exporting countries of the world



Leaders in World Production	
1. Russia	22.8%
2. United States	20.7%
3. Canada	7.1%
4. United Kingdom	3.9%
5. Algeria	3.1%

Leaders in World Consumption	
1. United states	24.4%
2. Russia	16.0%
3. United Kingdom	3.6%
4. Germany	3.5%
5. Canada	3.3%

Source: 1. The Nystrom Desk Atlas, 2008, p.25
2. Oxford Student Atlas.

Fig. 7.12 – World – Leading producers and consumers of natural gas

Fig. 7.12 – World – Leading producers and consumers of natural gas

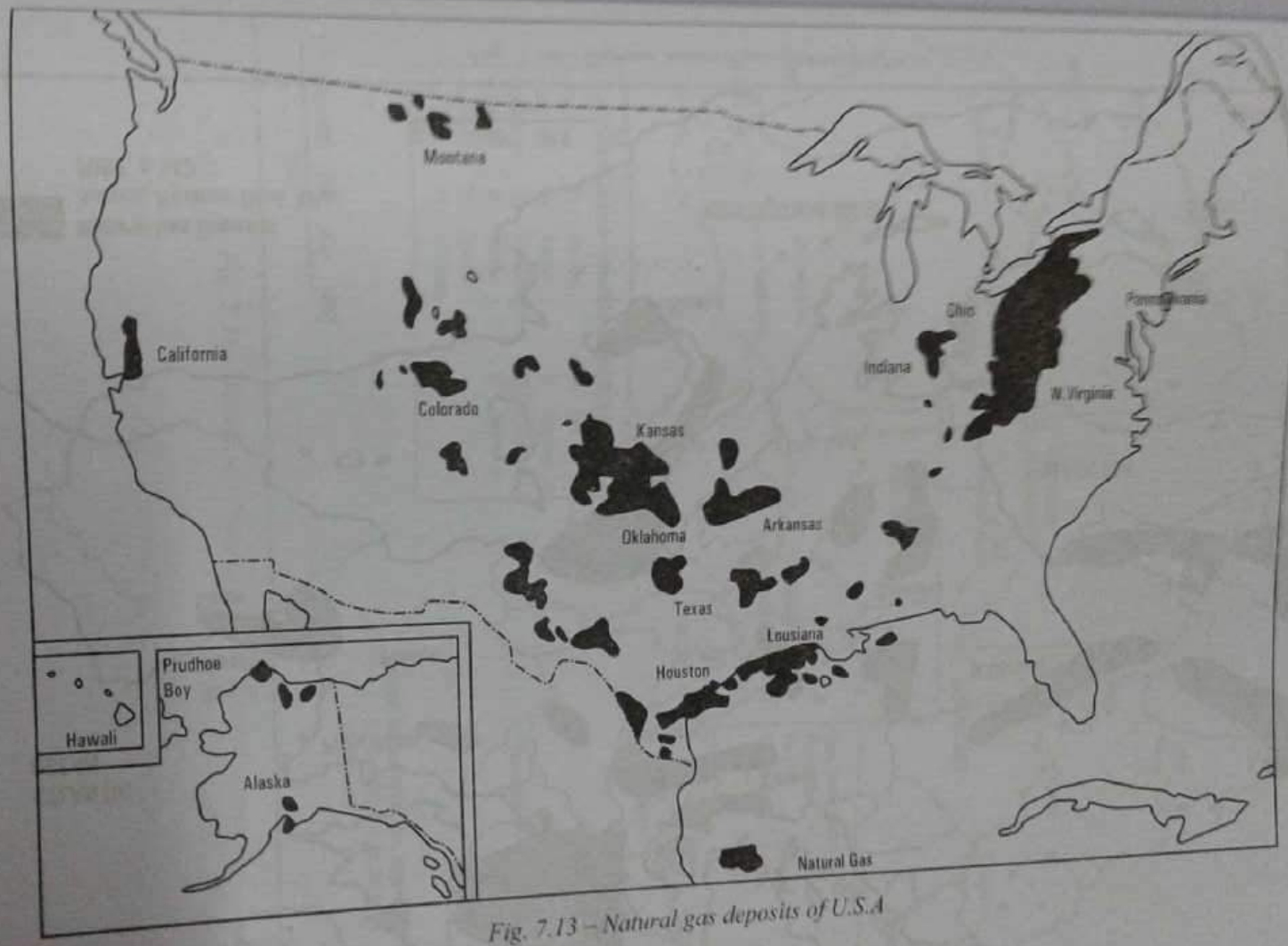


Fig. 7.13 – Natural gas deposits of U.S.A

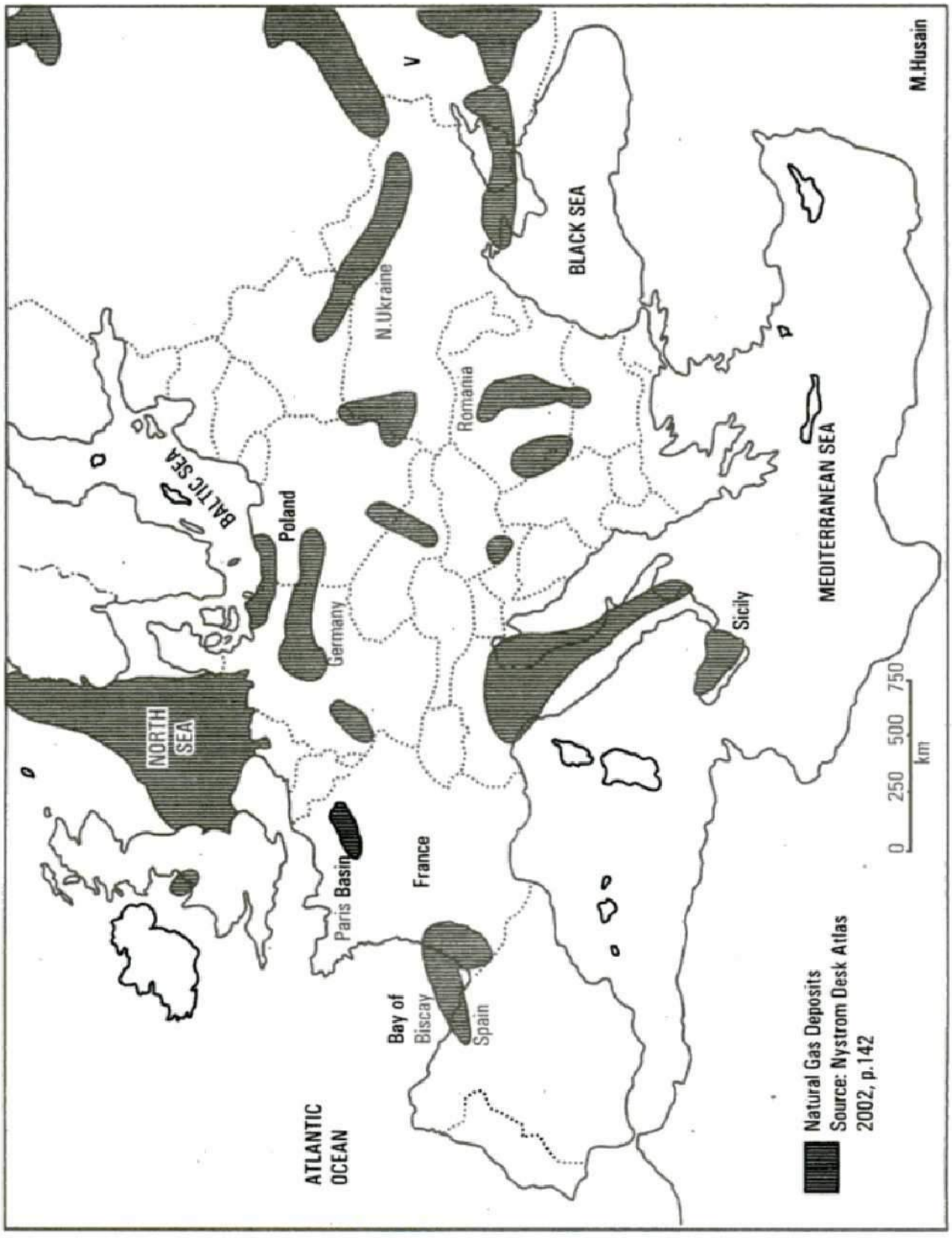


Fig. 7.14 – Europe natural gas deposits

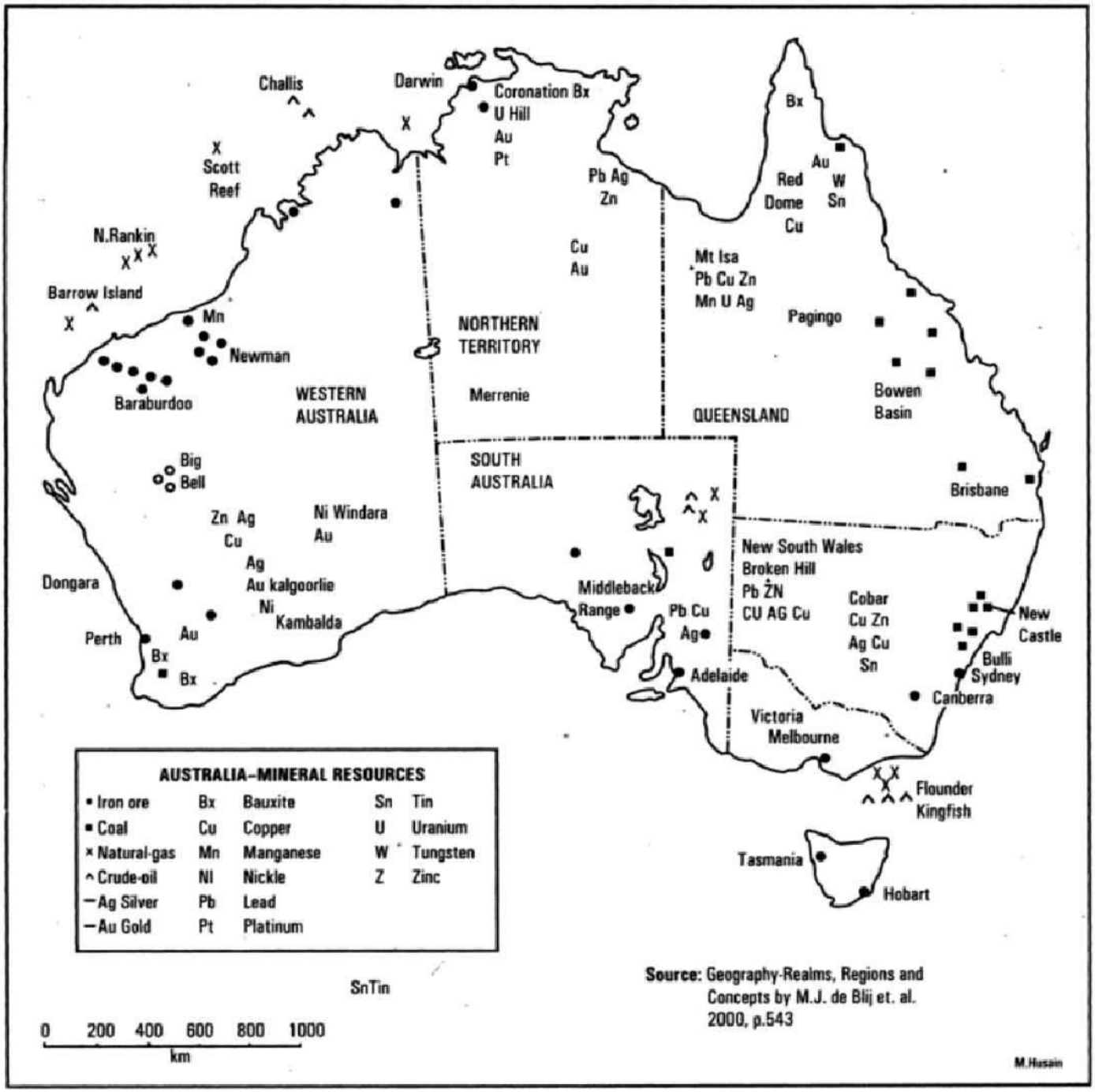


Fig. 7.15 – Australia – Natural gas and mineral resources

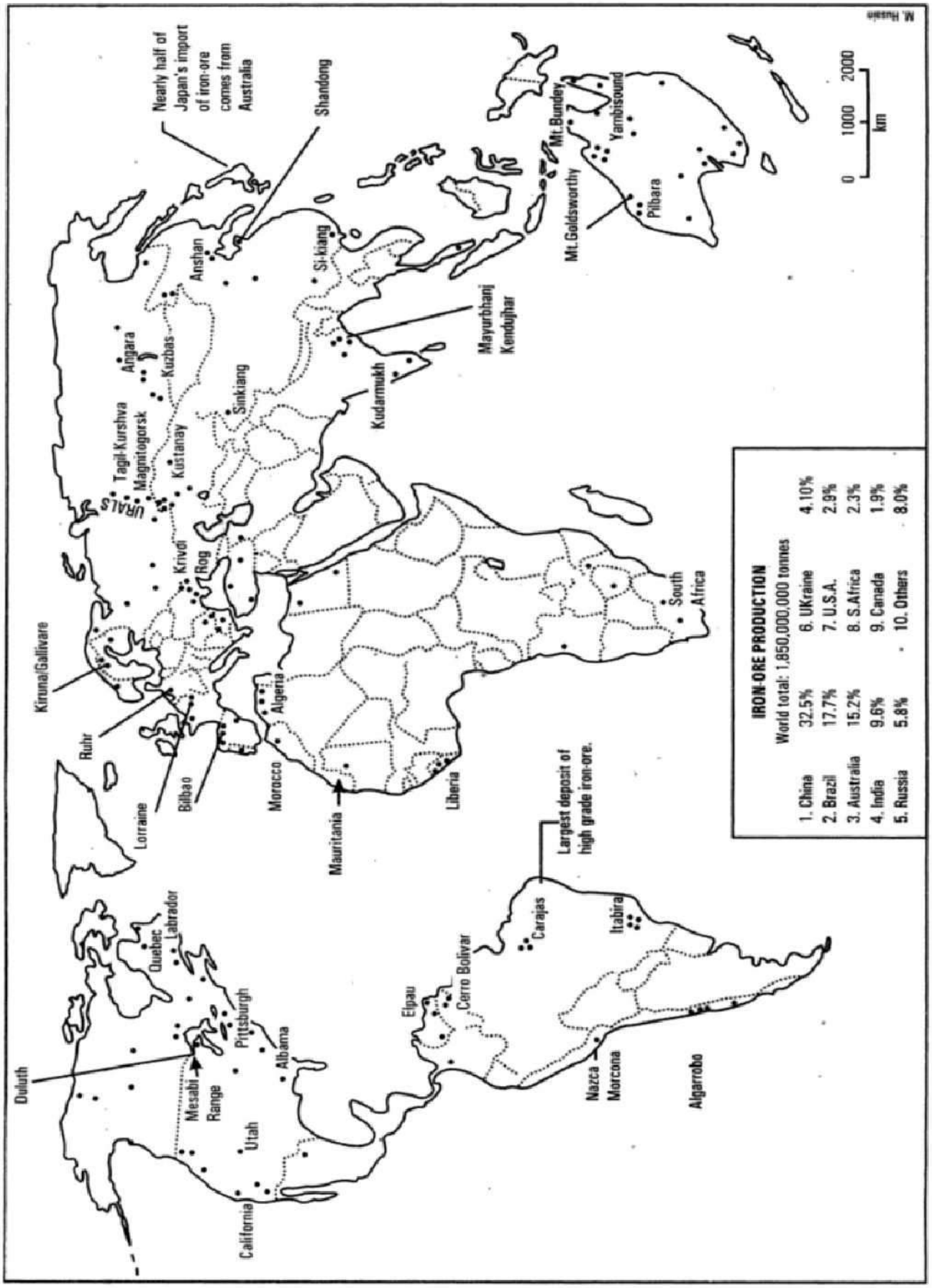


Fig. 7.16 – World major iron ore deposits

Manganese (Mn)

Manganese is found as a free element or in combination with iron-ore or some other minerals. Manganese compounds were used by the Egyptian and Roman glass makers. It forms only about 0.1% of the Earth's crust. It is an important metal alloy particularly in stainless steel. In fact, it is essential to iron and steel production. It is also used in the manufacturing of disposable batteries. Nearly 80 per cent of the total manganese deposits are found in South Africa. At present, manganese is mainly mined in South Africa, Australia, China, Brazil, Gabon, Ukraine, India and Ghana **(Fig. 7.17)**.

Table 7.12: Manganese: Leading Producers in the World

	Country	Percentage of total production
1.	South Africa	30%
2.	Australia	25%
3.	China	18%
4.	Brazil	10%
5.	Gabon	6%
6.	Ukraine	5%
7.	India	4%

Table 7.13: Table Manganese Deposits (Fig.7.17)

	Country	Manganese Deposits
1.	Australia	Kimberley Plateau
2.	Brazil	Amapa
3.	Chile	Central Chile
4.	China	Hunan, Guiz Hou
5.	Ghana	Nsuta
6.	India	Balaghat, Singhbhum, Goa, Vishakhapatnam
7.	Japan	Honshu
8.	Morocco	Bou Azzer, Imini
9.	Pakistan	Quetta
10.	Philippines	Zambales
11.	Russia	Outokumpu, Urals
12.	South Africa	Postmasburg, Krugersdorp, Rustemburg
13.	Spain	Betican Cordilleras
14.	Turkey	Anatolia Plateau
15.	Ukraine	Chiatura, Nikopol,
16.	U.S.A.	Cuyuna, Nye Butte, Kelloga Butte
17.	Venezuela	Nadola
18.	Zambia	Katanga, Nadola

Fig. 7.16 – World major iron ore deposits

Fig. 7.17 – World – Manganese deposits

Copper(Cu)

The people of Turkey started the use of copper during the pre historic period. It is used for making electric wires, cooking utensils and military products. The ratio of weight loss in copper refining is extremely small, scarcely one per cent of the weight of the refiner's raw material. The main producers of copper in the world have been shown in **Fig. 7.18**. Chile, USA and Indonesia are the leading producers of copper followed by Australia and Peru, Zambia, Zaire border (Zaire's Katanga District). Africa yields about 20 per cent of the total copper production of the world. United States, West Germany, France, Italy, Great Britain and United Kingdom are the main importers of copper, while Chile, Zambia, Belgium/ Luxembourg and Zaire are the main exporters in the world.

***Table 7.14:** Copper–Leading Producers in the World*

Country	*Percentage of total production*
1. Chile	34.8
2. United States	8.8
3. Indonesia	7.9
4. Australia	6.3
5. Peru	5.9

***Table 7.15:** Main Mining Centres of Copper*

Country	*Mining Centres*
Chile	Braden, Chuquicamata, El-Teniente, Potrerillos
USA	Ajo, Bisbee, Morenci (Arizona), Bingham (Utah), Butte(Montana), New Mexico, Alaska
Indonesia	Sumatra
Australia	Broken Hill, Mt. Isa, Mt. Morgan
Jamaica	Jamaica
Zambia	Nechanga, Kitwe, Mufulira Copper Belt
Zaire	Katanga-Zambia Copper Belt
Russia	Dzhezkazgan, Norilsk, Urals
Japan	Honshu, Shikoku
Peru	Morococha
India	Balaghat, Khetri (Jhunjhunu-Rajasthan)
South Africa	Transvaal
Canada	Flin Flon, Nunavut, Sudbury

Bauxite

Bauxite is the raw material for aluminum industry. Bauxite occurs more frequently in tropical areas having clay-limestone rocks exposed to weathering. Bauxite formation is attributed to lateritic weathering. It is the raw material for aluminium which is an important metal because it combines the strength of such metals as iron, with extreme lightness and also with great conductivity and malleability. The bauxite is first crushed, washed and dried in a

rotary kiln at a temperature of over 982°C. Its plants are located either close of the hydel-power or near the sea coasts. In 2009, Australia producing about one-third of the world's production became the leading producer of bauxite in the world. Australia is followed by China, Brazil, Jamaica, Guinea, Surinam, Russia, Guyana, USA, France and India.

About 95 per cent of the world's bauxite production is processed first into alumina, and then into aluminum by electrolysis. Its smelting requires cheap hydro-power. Consequently, the leading producers of aluminum in the world are Canada, Norway, USA, Japan, and West Germany.

The leading consumers of aluminum are USA, Japan, Russia, China.

Germany, France and U.K. The leading producers of bauxite are given in **Table 7.16.**

***Table 7.16:** Leading Producers of Bauxite*

	Country	*Percentage of total production*
1.	Australia	34.0
2.	China	14.0
3.	Brazil	12.0
4.	Jamaica	11.0
5.	Guinea	10.0
6.	Surinam	5.5
7.	Russia	3.5
8.	Guyana	2.5
9.	U.S.A.	1.5
10.	France	0.5

Tin: The leading tin producing countries and the important mining centres have been shown in **fig. 7.19** and also given in tables **7.17** and **7.18** respectively.

***Table 7.16:** World: Leading Producers of Tin*

	Country	*Percentage of total production*
1.	China	35.9
2.	Indonesia	29.6
3.	Peru	15.8
4.	Bolivia	6.4
5.	Brazil	4.8

***Table 7.17:** Main Tin Mining Centres*

Country	*Mining Centres*
Australia	Mt. Isa (Queensland)
Bolivia	Potosi (Andes)
Brazil	Grossa, Mato, Rondonia
China	Hubei, He Xian (Honsein), Jiangsa, Nanling Shan
Indonesia	Banka Billiton and Singkep (Sumatra)

Malaysia	Kinta Valley (around Kuala Lumpur), Larut Plain, Kelang Valley, Jelebu Valley, Kota Tinggi
Nigeria	Bauchi Plateau
Thailand	Kara Peninsula, Phuket Island, Ranong, Phangnga, Takuapa
UK	Cornwall
Zaire	Katanga Plateau

Gold (Au)

Gold is a valuable and the most sought precious metal. Gold is the most malleable and ductile of all metals; a single gram can be beaten into a sheet of one square meter. About 50 per cent of the gold is used for jewellery, 40 per cent in investment, and 10 per cent in industry. Today, the international monetary system is backed by gold. The distribution and major producers of gold have been given in **Fig. 7.20.**

In 2009, South Africa was the leading producer of gold, followed by China. The other major producers are United States, Australia, Russia, Peru, Chile and Argentina. The *Savuka* mines of South Africa are the deepest gold mines of the world with a depth of 3777 m.

Table 7.19: Leading Producers of Gold in the World

	Country	Percentage to total production
1.	South Africa	14.7
2.	China	11.1
3.	U.S.A.	10.8
4.	Australia	8.1
5.	Russia	6.7
6.	Peru	5.0

Silver (Ag)

Silver is one of the precious metals and is used to make ornaments, jewellery, high value tableware, utensils (*silverware*), decorative items, mirrors, and currency coins. It is also used in medicines, food, optics, photography, construction of high quality musical instruments, flutes, etc. It is found in native form, an alloy with gold, sulfur, arsenic, antimony or chlorine. The leading producers of silver are Peru, Mexico, China, Australia, Chile, Poland and Serbia **(Fig. 7.21)**.

The famous silver producing mines are *Proaño/Fresnillo* (Mexico) *Cannington* (Queensland-Australia), *Dukat* (Russia), *Uchucchacua* (Peru) and *Green Creek Mines* (Alaska).

Table 7.20: Silver – Leading Producers in the World

	Country	Percentage to total production
1.	Peru	15.6
2.	Mexico	14.2
3.	China	12.5
4.	Australia	10.9
5.	Canada	7.2

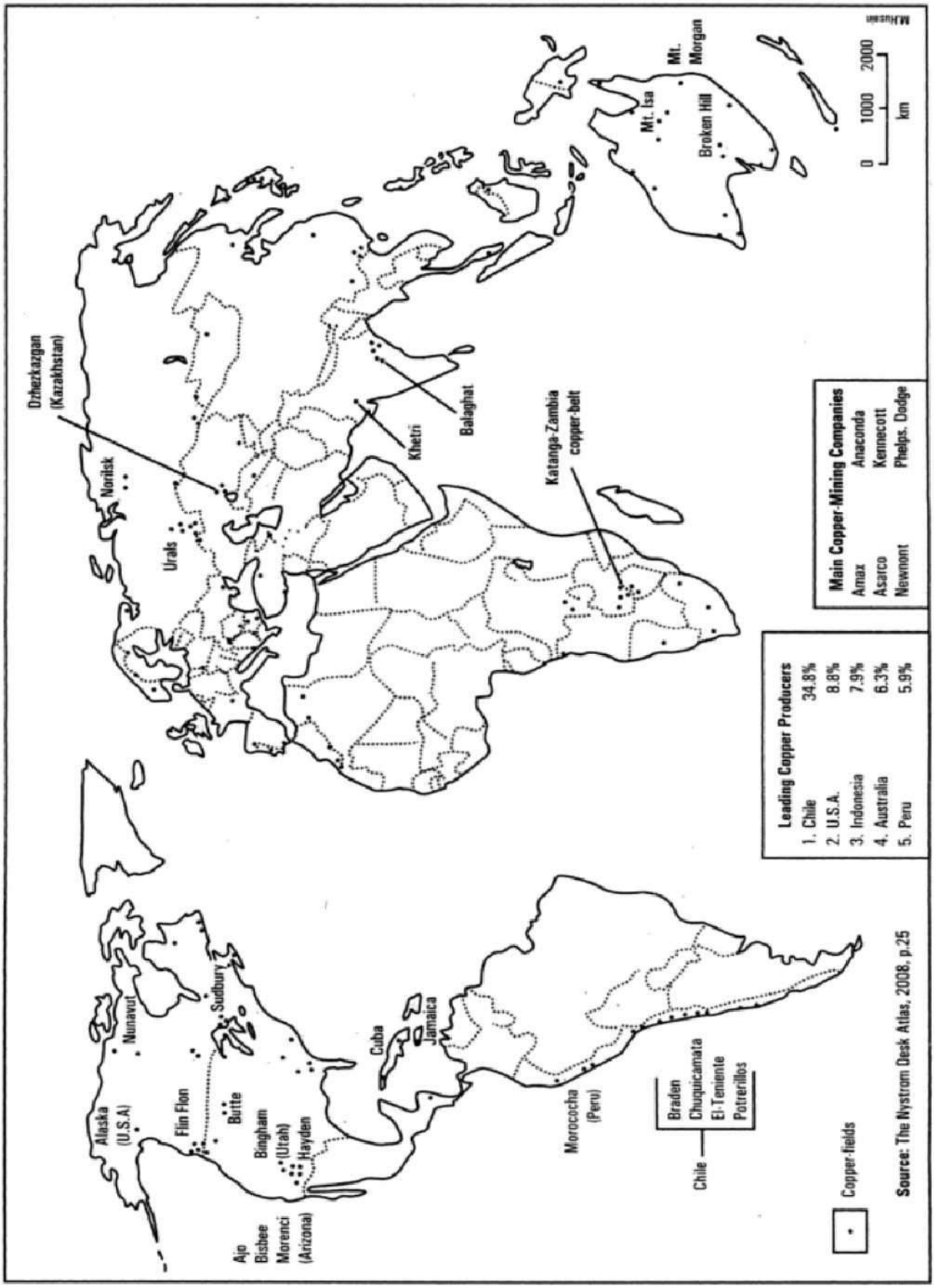
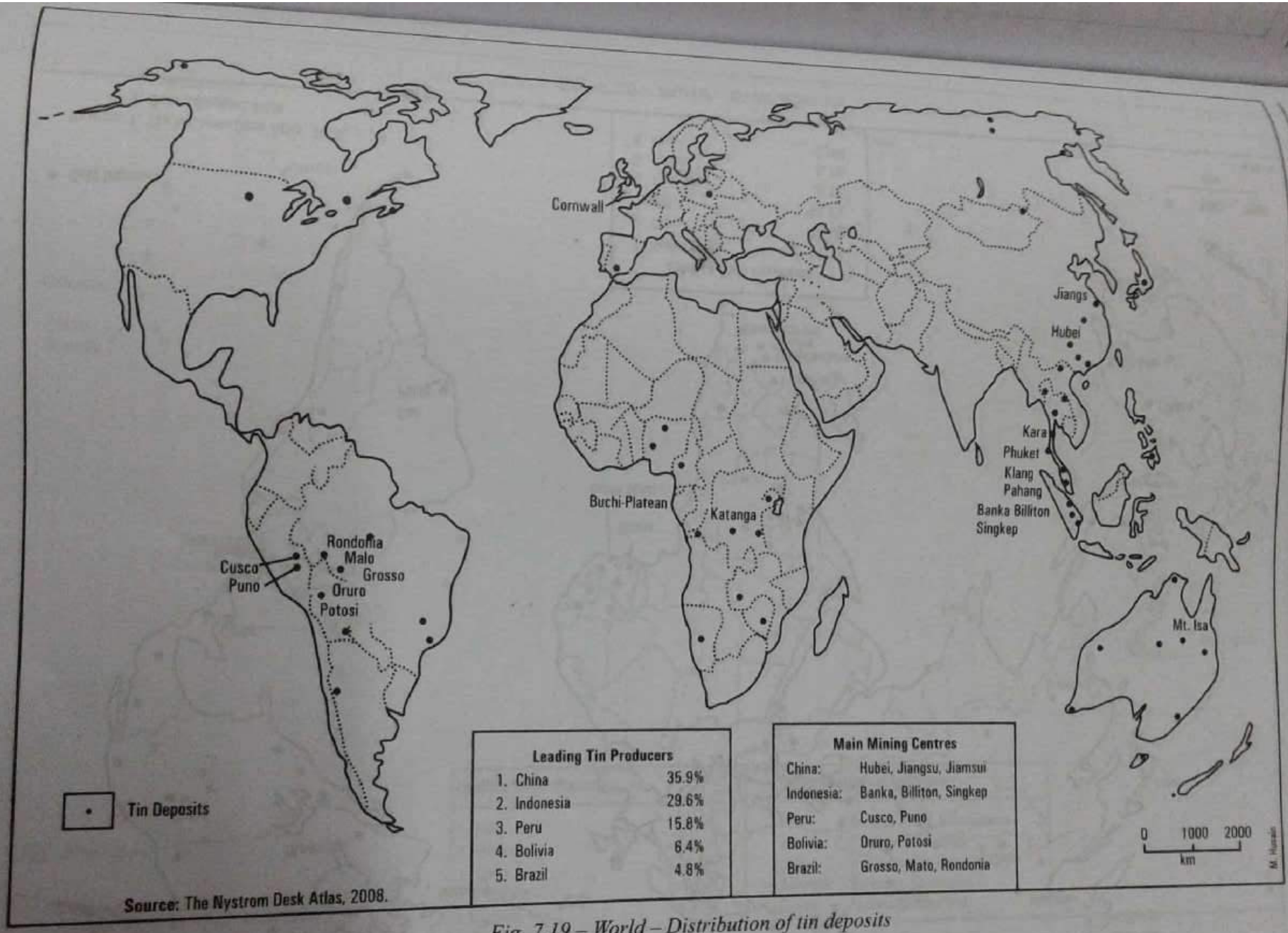


Fig. 7.18 – World – Copper deposits



Source: The Nystrom Desk Atlas, 2008.

Fig. 7.19 – World – Distribution of tin deposits

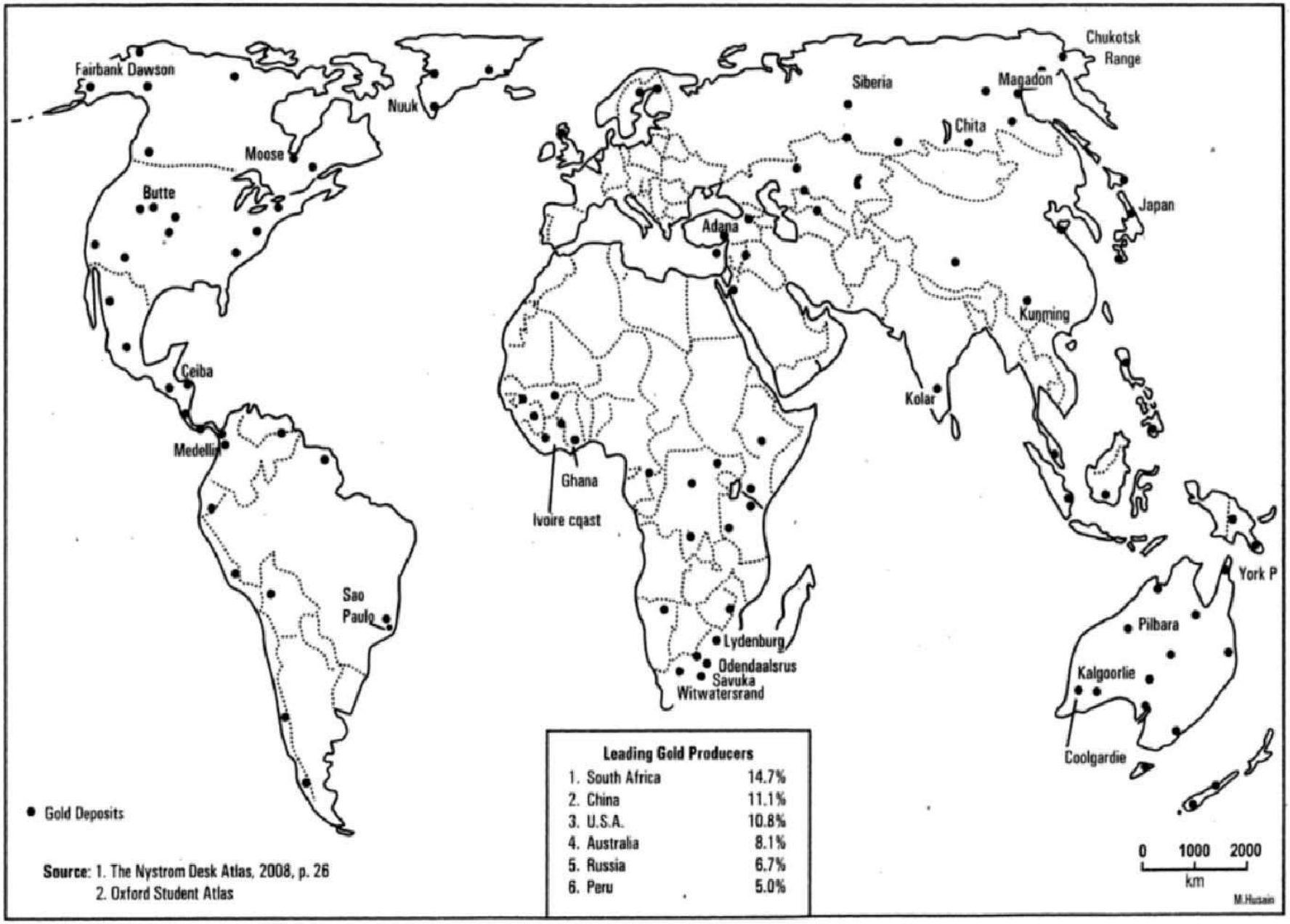
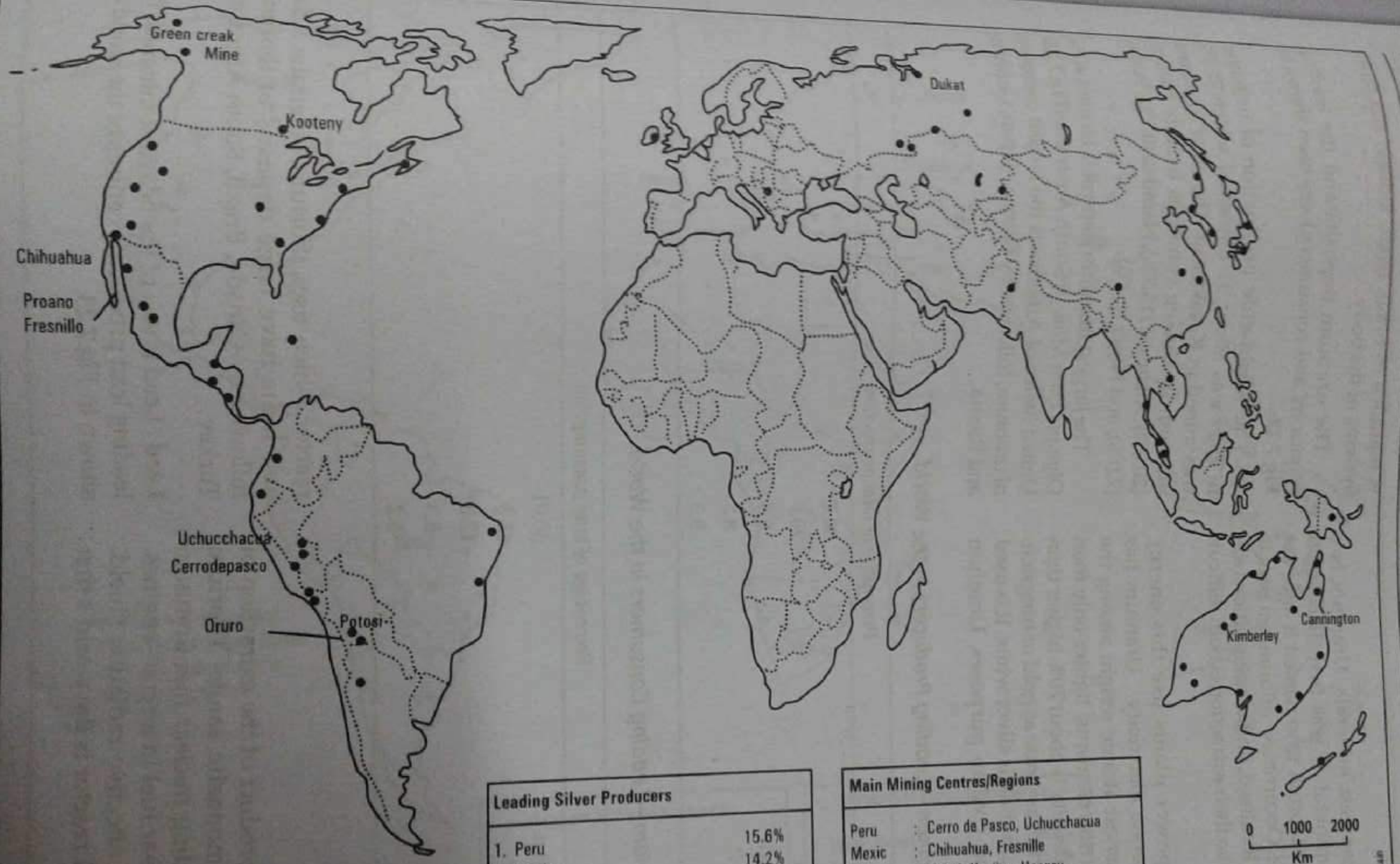


Fig. 7.20 – World – Gold deposits



Leading Silver Producers	
1. Peru	15.6%
2. Mexico	14.2%
3. China	12.5%
4. Australia	10.9%
5. Canada	7.2%

Main Mining Centres/Regions	
Peru	: Cerro de Pasco, Uchucchacua
Mexic	: Chihuahua, Fresnille
China	: Anhui, Nanjing, Hangsu
Australia	: Kimberley, Cannington
Canada	: Kooteny, Arnhemland

Source: The Nystrom Desk Atlas, 2008, p. 26

Fig. 7.21 – World – Silver deposits

Uranium (U)

One of the heaviest minerals, Uranium is a radio-active mineral. It was first discovered by Martin H. Klaproth who named it after the planet Uranus. Occurrence of uranium ores is very rare and localised, and concentrations are generally low, so their extraction is both difficult and costly.

Nuclear power plants use this energy source to generate electricity. Uranium has the second heaviest atomic weight among the naturally occurring elements, lighter only than plutonium. Its density is about 70% higher than that of lead, but not as dense as gold or tungsten. When refined, uranium is silver white. It is used for military and civilian purposes. Uranium is injurious to brain, heart, kidney, and other systems of the body.

The uranium deposits and the leading producers and consumers have been shown in **Fig.7.22**.

The worldwide production of uranium in 2009 was about 51 tonnes of which 27.3% was mined in Kazakhstan. The other important uranium producing countries include Canada (20.0%), Australia (15.7%), Namibia (0.1%), Russia (7.0%), and Niger (6.4%).

The largest uranium deposit is located at the *Olympic Dam Mine* in South Australia **(Fig.7.22).** United States of America is the largest consumer of uranium, followed by France, Japan, Germany and Russia.

***Table 7.21:** Uranium – Leading Producers in the World*

	Country	*Percentage of total production*
1.	Canada	30.1
2.	Australia	20.9
3.	Kazakhstan	8.8
4.	Niger	8.5
5.	Russia	8.3

***Table 7.22:** Uranium – Leading Consumers in the World*

	Country	*Percentage of total consumption*
1.	United States	30.01
2.	France	15.5
3.	Japan	12.5
4.	Germany	5.3
5.	Russia	5.2

Thorium (Th)

Thorium is a by-product of the extraction of rare earths from monazite sands. Thorium was used for breeding nuclear fuel-uranium. It is used as a nuclear fuel in aircraft engines. Thorium is a very effective radiation shield. India's Kakrapara-1 reactor is the world's first reactor which uses thorium. Australia, USA, and India have large deposits of thorium, followed by Canada, Brazil, South Africa and Turkey.

Lead : Lead is one of the heaviest minerals. The leading lead producing centres of the world are shown in **Fig.7.23**.

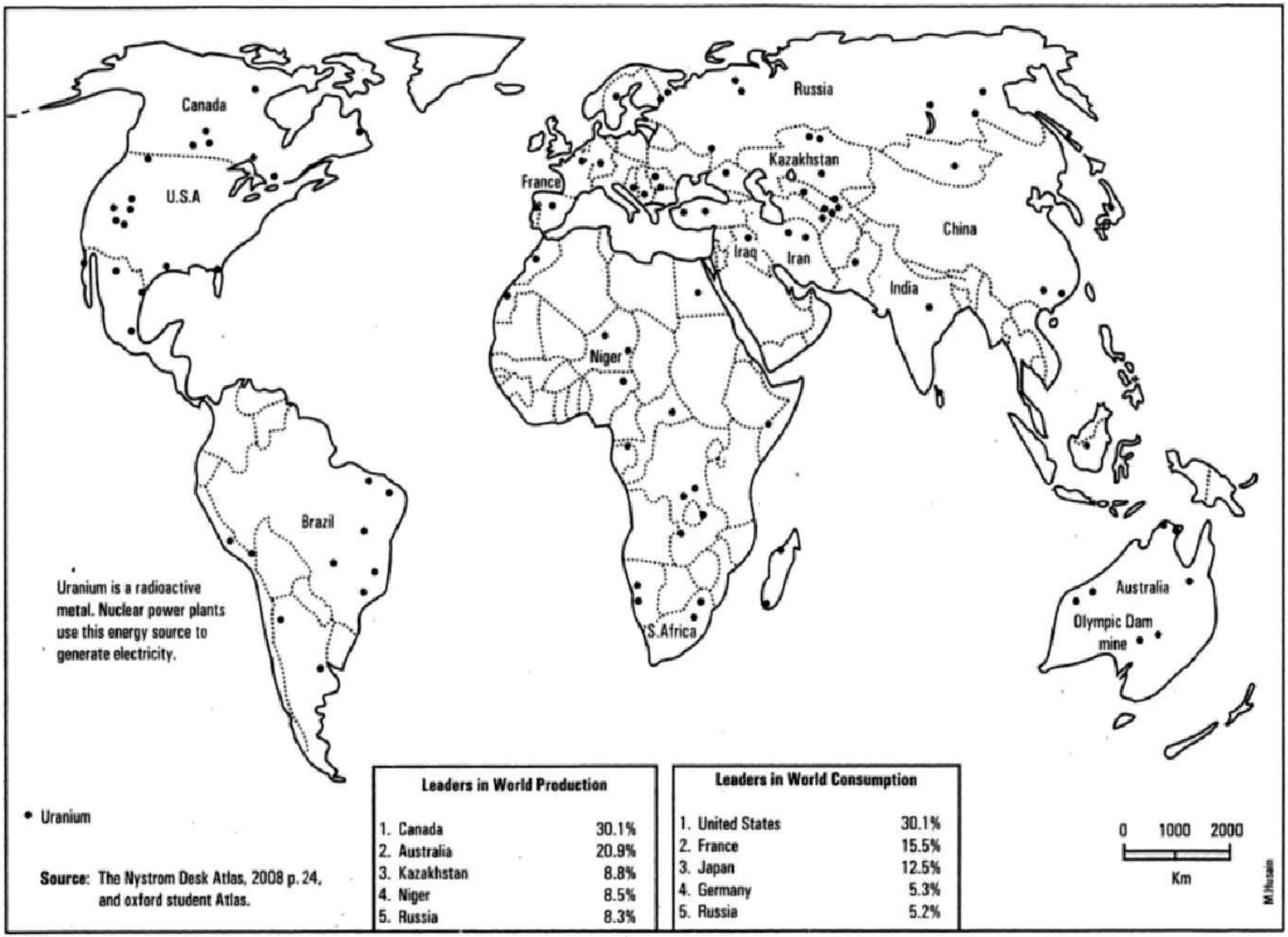


Fig. 7.22 – World uranium deposits

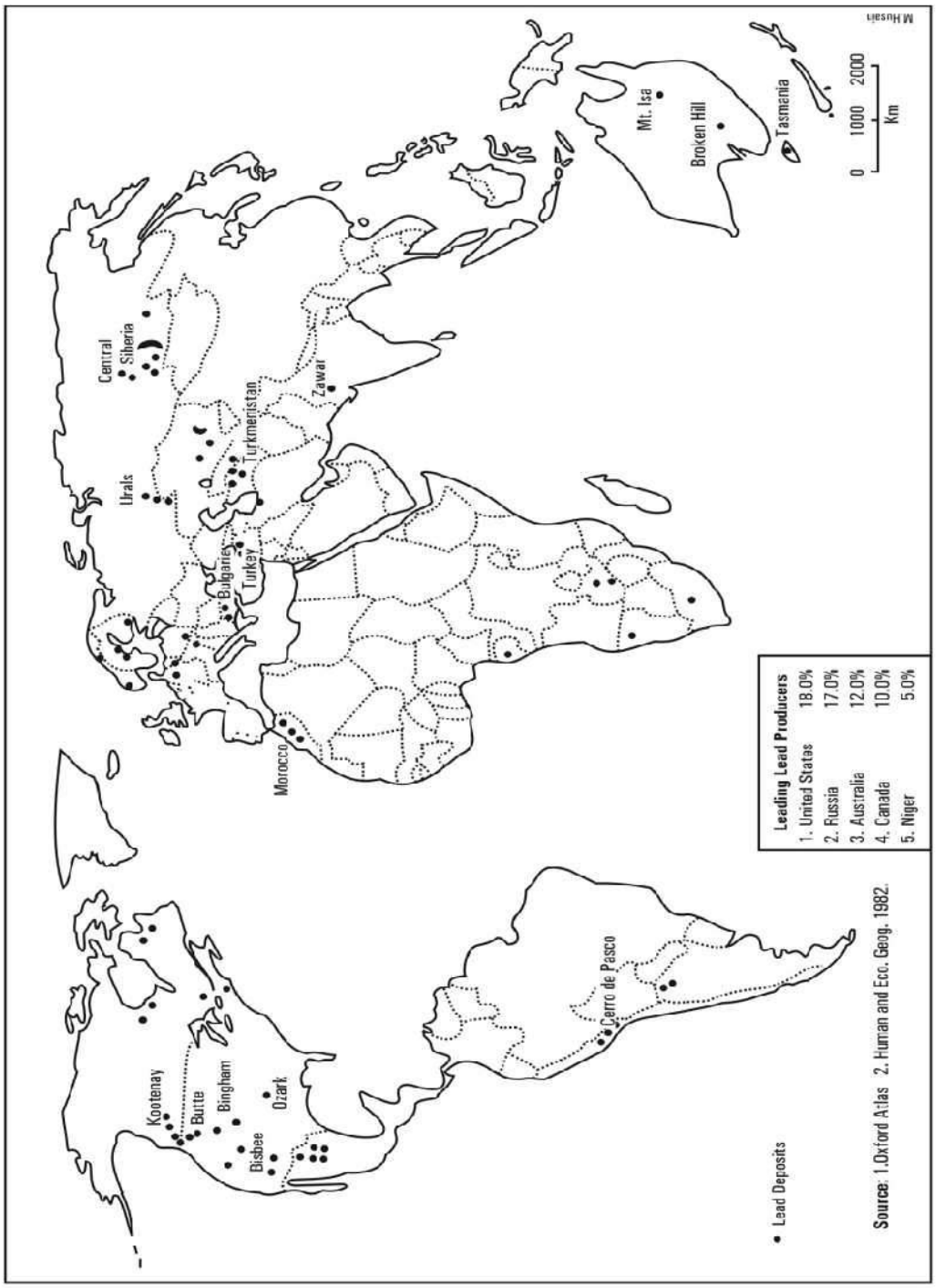


Fig. 7.23 – World – Lead deposits

***Table 7.23:** Leading Producers of Lead in the World*

	Country	*Percentage to total production*
1.	United States	18.0
2.	Russia	17.0
3.	Australia	12.0
4.	Canada	10.0
5.	Niger	5.0

Zinc

The leading zinc producing countries and its main mining centres have been shown in **Fig. 7.24.**

***Table 7.24:** Zinc – Leading Producers in the World*

	Country	*Percentage to total production*
1.	China	21.1
2.	Australia	14.3
3.	Peru	13.7
4.	Canada	9.0
5.	United States	8.3

Nickel: The distribution of nickel and its leading producers have been shown in **Fig. 7.25.**

***Table 7.25:** Nickle–Leading Producers in the World*

	Country/Mining Centres	*Percentage of total production*
1.	Russia (Severo, Siberskaya, Urals)	23.2
2.	Australia (Broken Hill, Mt. Isa, Pilbara)	15.2
3.	Canada (Sudbury, Lynn Lake, Thompson and Hope)	13.3
4.	Indonesia	9.0
5.	New Caledonia (Fr.)	8.0

Industrial Regions

Some of the main industrial regions have been shown in **Figs. 7.26-7.28,** while their main industries have been given in **Table 7.26.**

***Table 7.26:** Main Industrial Regions of the World*

Industrial Region	*Main Industries*
Europe	
Bohema	Iron and steel, heavy machinery, mining equipments, electric goods, light machinery, consumer goods, agricultural machinery **(Fig. 7.26).**

Lorraine	Iron and steel, textiles, heavy and light machinery, consumer goods, brewery, food processing **(Fig. 7.26).**
Moscow	Iron and steel, cotton and woolen textiles, engineering goods, assorted machinery, automobiles, electric goods, pharmaceutical and food processing **(Fig. 7.26).**
Po-Basin	Automobiles, electronic goods, consumer goods, porcaline, agricultural machinery, financial services **(Fig. 7.26).**
Ruhr Basin	Iron and steel, heavy machinery, petrochemicals, mining equipments, electronic goods, agricultural machinery, consumer items **(Fig. 7.26).**
Saar Basin	Iron and steel, automobiles, electric goods, electronics, chemicals, agricultural machinery, textiles and food processing **(Fig. 7.26).**
Zabrze	Heavy machinery, mining equipments, automobiles, electric goods, electronics, consumer goods, textiles, and food processing.
Cardiff -Swansea (Wales)	Ship-building, iron and steel, heavy machinery, automobiles, petrochemicals, light machinery, consumer goods, food-processing **(Fig. 7.27).**
Glasgow	Ship-building, iron and steel, heavy machinery, automobiles, consumer goods and food processing **(Fig. 7.27).**
Manchester-Liverpool	Ship-building, textiles, light machinery, utensils **(Fig. 7.27).**
New Castle	Ship-building, machinery and consumer goods.
Volga Region	Petrochemical, textiles, electric goods, agricultural machinery
Industrial Cities of Great Lakes (N.A.)	
Buffalo	Iron and steel, electrical appliances, chemicals, grains-milling **(Fig. 7.28).**
Cleveland	Automobiles, Iron and steel, automobiles, petrochemical, engineering goods, precision instruments, consumer goods **(Fig. 7.28).**
Detroit (Motown or Motor-Town)	Automobiles, Headquarters of Ford, General Motors, Chrysler, consumer goods, food processing **(Fig. 7.28).**
Duluth	Grain exporting, fir-trade, electric goods **(Fig. 7.28).**
Gary	Heavy machinery, electric goods, engineering goods, precision instruments, agricultural machinery **(Fig. 7.28).**
Milwaukee	Brewing, chemicals, light machinery, electric goods, food processing **(Fig. 7.28).**
Toledo	Automobiles, iron and steel, glass products, ceramics, fruits-packing, dairy products **(Fig. 7.28).**
Toronto	Iron and steel, air-crafts, chemicals, pharmaceuticals, textiles, agricultural machinery and food processing **(Fig. 7.28).**

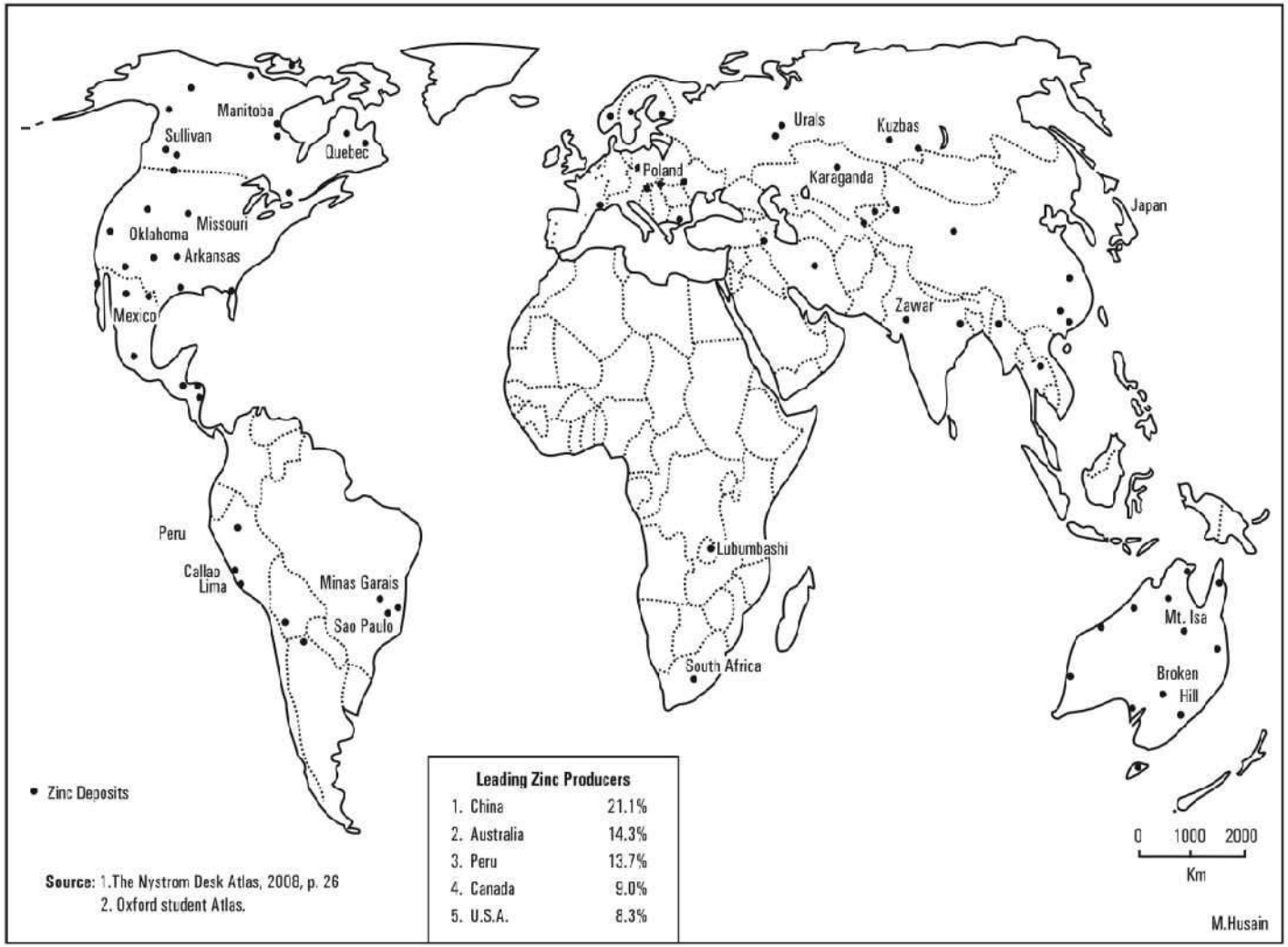


Fig. 7.24 – World zinc deposits

Fig. 7.25 – World – Nickle deposits

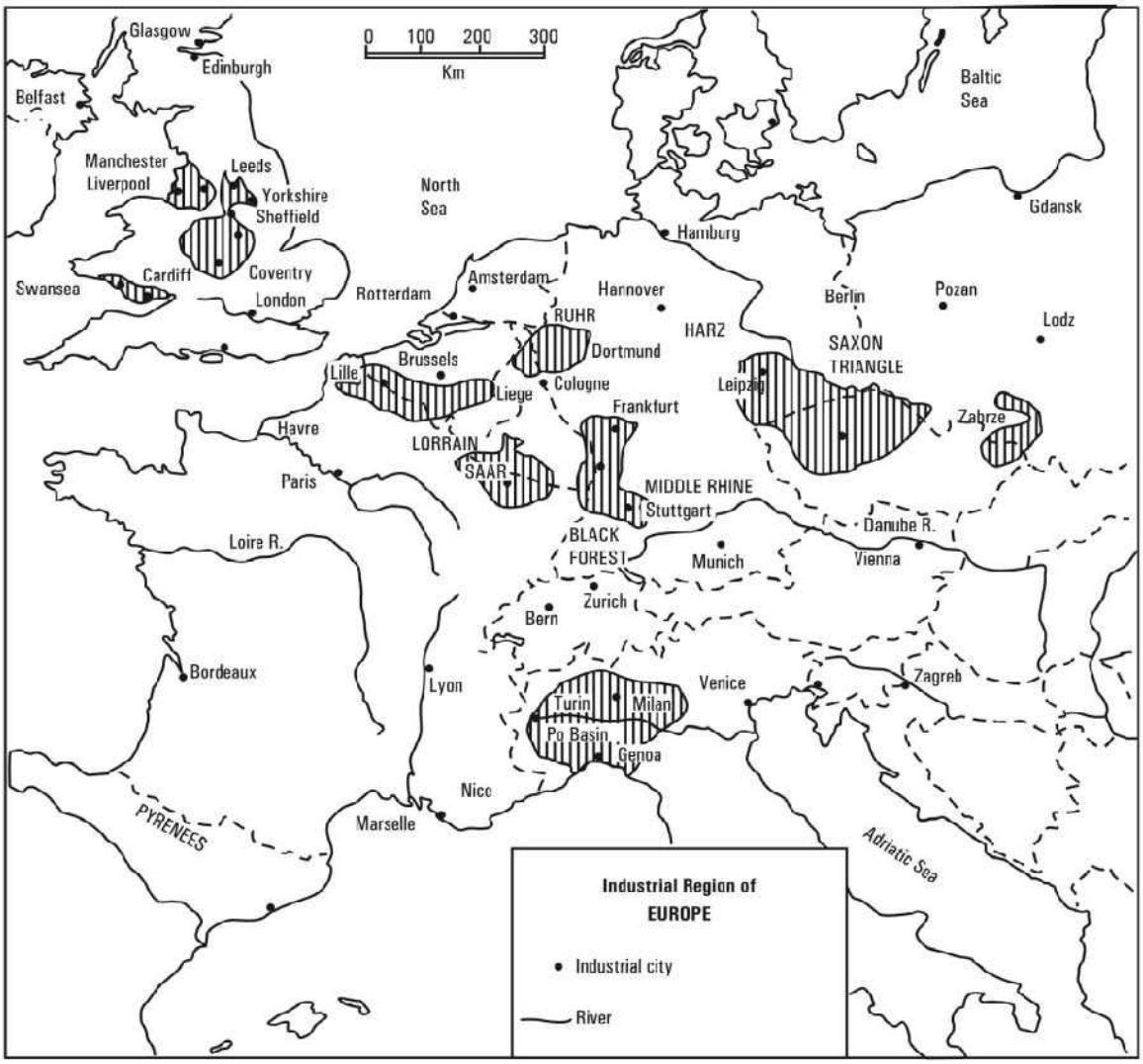


Fig. 7.26 – Industrial regions of Europe

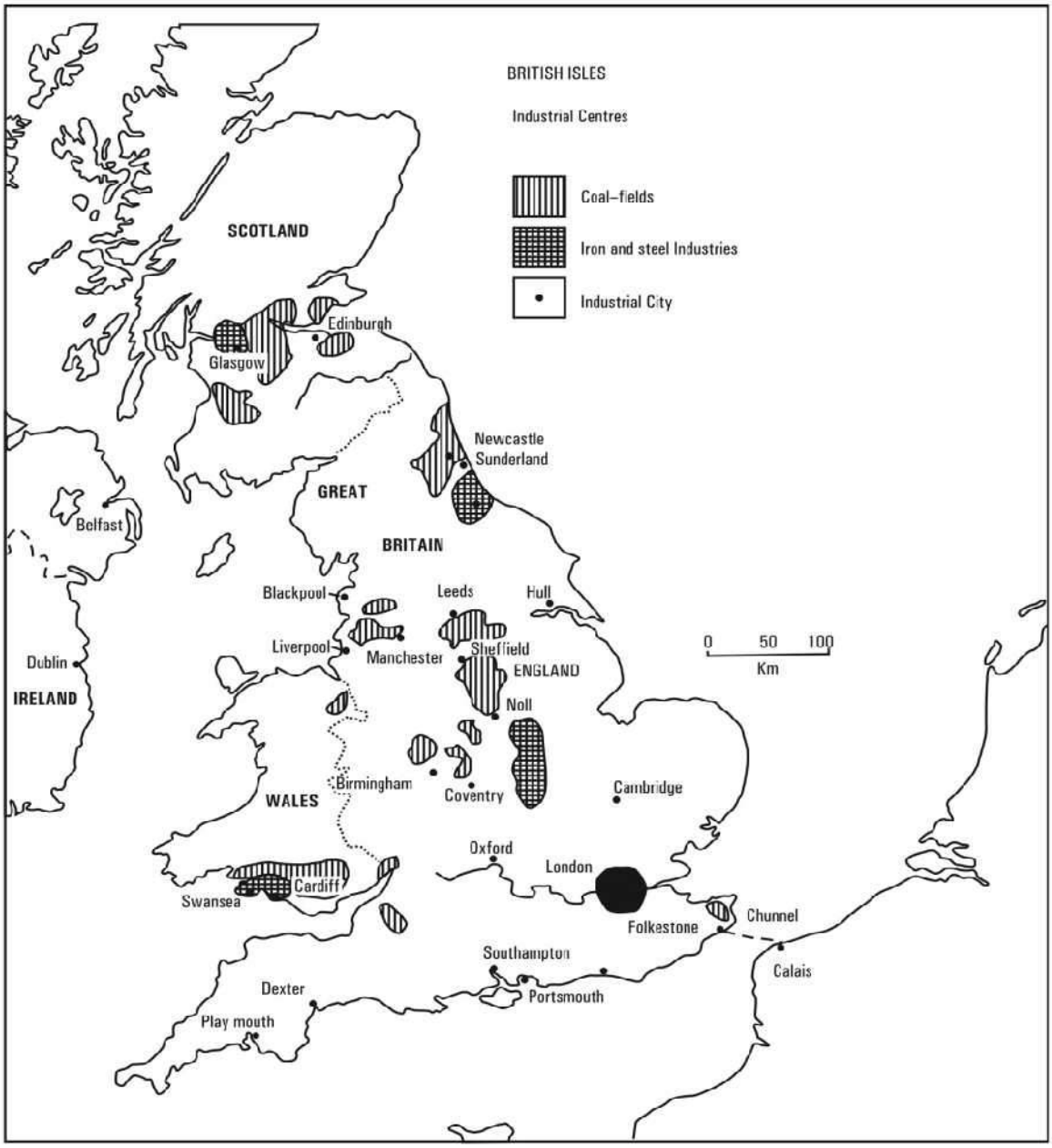


Fig. 7.27 – Industrial regions of U.K

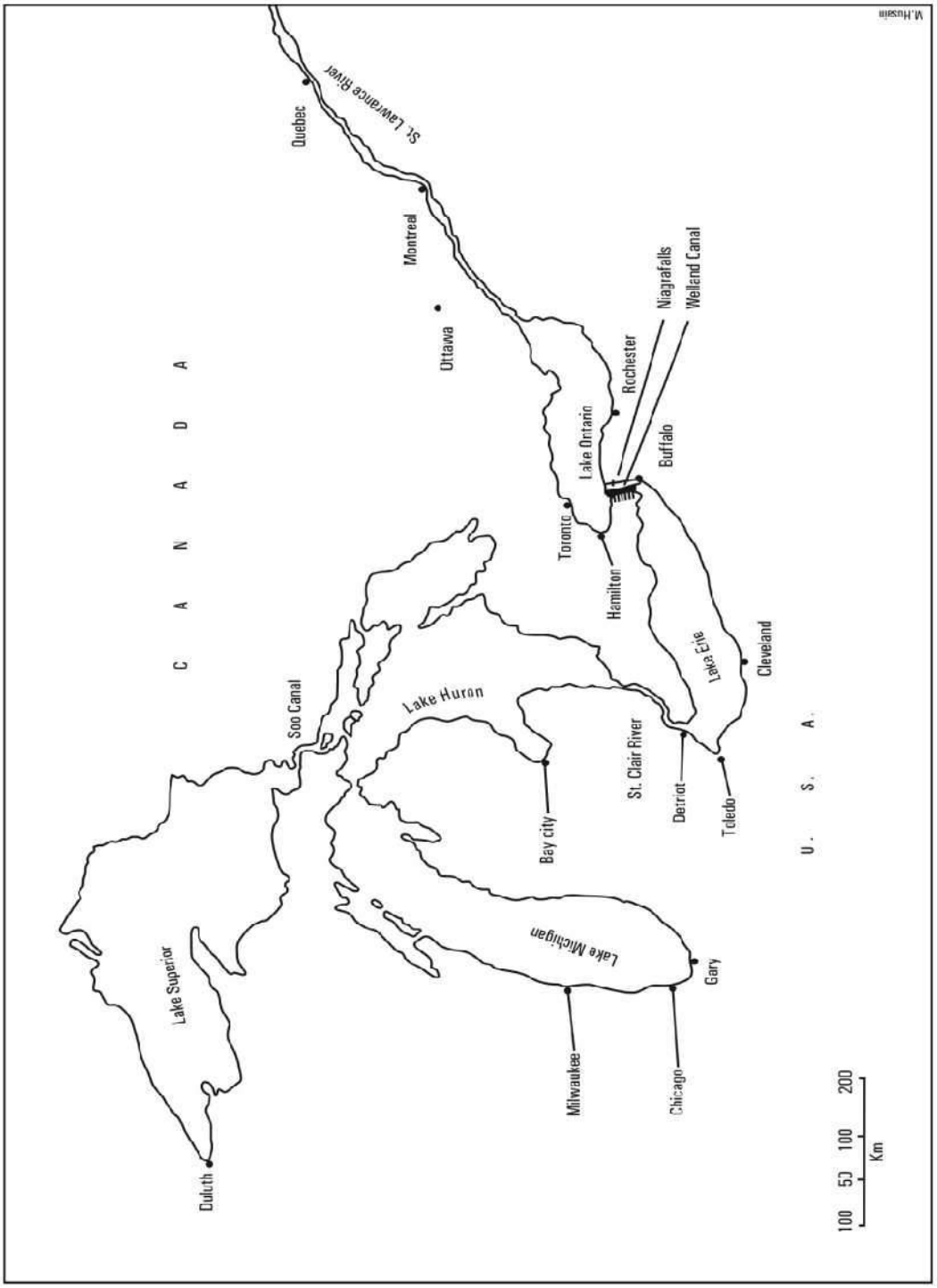


Fig. 7.28 – Industrial towns around the Great Lakes of North America

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