

Contents

	Preface	13
1	Introduction	15
2	Structure and evolution of continents and oceans (Z. Mísař).	18
2.1	Geotectonic cycles in the development of the Earth's crust and their geological products	18
2.2	Evolution and division of continental and oceanic regions	23
2.2.1	Continental regions	24
2.2.2	Oceanic regions	40
3	Mineral Deposits of Eurasia (Z. Pouba, M. Vaněček)	44
A	Mineral Deposits of Europe	44
3.1	Principal metallogenic units of Europe	44
3.2	Precambrian metallogeny of the European part of Eurasia.	45
3.2.1	Archean deposits in the northern part of the Baltic Shield.	46
3.2.2	Proterozoic deposits of the Baltic Shield	47
3.2.3	Deposits of industrial minerals and rare elements of the Baltic Shield	56
3.2.4	Ore deposits of the Russian platform	58
3.2.5	Uranium deposits of Fennosarmatia	62
3.3	Caledonian mineralization in northern and western Europe	62
3.3.1	Mineralization of the autochthonous and paraautochthonous units in the foreland of the Caledonides of the Baltic Shield	63
3.3.2	Mineralization in the Norwegian Caledonides	63
3.3.3	Epigenetic deposits of the post-Caledonian stage in Norway	66
3.3.4	Caledonian and post-Caledonian deposits in Ireland	67
3.4	Mineralization of the European Hercynides.	69
3.4.1	Mineralization of the Hercynian median masses in Europe	70
3.4.2	Mineralization in the Barrandian-Brioverian zone	74
3.4.3	Mineralization in the Saxo-Thuringian zone	74
3.4.4	Mineralization in the Rheno-Hercynian zone	77

3.4.5	Industrial minerals of the European Hercynides	81
3.4.6	Uranium mineralization in the younger developmental stages of the European Hercynides	83
3.5	Mineralization in the European post-Hercynian platform cover.	85
3.5.1	Permian mineralization	85
3.5.2	Triassic mineralization	87
3.5.3	Jurassic iron ores	87
3.5.4	Uranium mineralization in Cretaceous and Tertiary	88
3.6	Metallogenesis in Alpine Europe	88
3.6.1	Mineralization in the Betic Cordillera	89
3.6.2	Mineralization in the Pyrenees	89
3.6.3	Mineralization in older geological units in the inner part of the Alpine system (Mediterranean)	89
3.6.4	Mineralization in the Eastern Alps	90
3.6.5	Mineralization in the Southern Alps and Appenines	92
3.6.6	Mineralization in the West Carpathian system	92
3.6.7	Mineralization in the East Carpathian system	94
3.6.8	Mineralization of the Carpathian-Balkan zone	97
3.6.9	The Serbian-Macedonian metallogenic zone	100
3.6.10	Mineralization in the Dinaric Zone and in the Hellenides	103
3.6.11	Uranium mineralization in the European Alpides	106
3.6.12	Industrial minerals in the European Alpides	106
B	Mineral Deposits of North Asia	108
3.7.	Mineralization of the North-Asian platforms (Eurasia)	108
3.7.1	The Siberian or Angara platform	108
3.7.2	The Chinese platform	116
3.8	Mineral deposits of the Caledonides and Hercynides in northern Asia	123
3.8.1	The Ural metallogenic belt	123
3.8.2.	The Taimyr metallogenic zone	133
3.8.3	The Kazakhstan-Mongolian metallogenic zone	134
3.8.4	The Central Asian metallogenic megaprovince	142
3.8.5	The Inner Chinese mobile zones	145
3.9.	Mineral deposits of the Tethyan Alpides of Asia	146
3.9.1	The Caucasian-Asia Minor province	146
3.9.2	The Iranian-Afghanistani province	150
3.9.3	The Pamirs-Hindu-Kush and Himalayan provinces	151
3.10	Mineral resources of the Pacific Old Alpides	152
3.10.1	Mineralization of the Transbaikalian metallogenic province	152
3.10.2	Mineralization of Northeast Asia	155
3.10.3	Mineralization of Southeast Asia	157
3.10.4	Mineralization of the Old Alpides in China.	158
3.10.5	Mineralization of the Old Alpides in Vietnam	162
3.10.6	Mineralization of the Old Alpides in Indonesia	163
3.10.7	Mineralization of the Old Alpides on the Malayan Peninsula	163
3.10.8	Okhotsk-Chukotka metallogenic zone	164
3.11	Mineral resources of the Pacific Young Alpides	164
3.11.1	The Kamtchatka-Koryak metallogenic zone.	164
3.11.2	The Sikhote-Alin metallogenic belt	166
3.11.3	Mineralization of the Japan-Taiwan arc	166

3.11.4	Mineral resources of the Philippines	170
3.11.5	Mineralization of the Young Alpides in Indonesia	170
3.11.6	Mineralization of the Young Alpides in Burma	171
C	Mineral Deposits of the Gondwanian Asia	172
4	Mineral deposits of North America (Z. Pertold)	177
4.1	Mineral deposits of the Canadian Shield	177
4.1.1	Mineralization of the Abitibi belt	182
4.1.2	Mineralization of other parts of the Superior province	190
4.1.3	Deposits in the Lower Proterozoic platform	192
4.1.4	Provinces of Proterozoic orogenic development	194
4.2	Deposits of the Appalachian orogene (Appalachides)	203
4.2.1	Stratiform deposits of massive sulphides	206
4.2.2	Other deposits in Ordovician and Silurian	208
4.2.3	Deposits in Devonian to Triassic	211
4.3	Deposits of the Phanerozoic platform cover	213
4.3.1	Deposits of the Mississippi Valley type	215
4.3.2	Other deposits	218
4.4	Deposits of the North American Cordilleras	220
4.4.1	Deposits of the Lower Precambrian	223
4.4.2	Deposits in Middle and Upper Proterozoic	224
4.4.3	Deposits in Paleozoic	227
4.4.4	Deposits in Triassic, Jurassic and Lower Cretaceous	229
4.4.5	Deposits in Upper Cretaceous and Lower Paleogene	234
4.4.6	Deposits in Upper Paleogene to Recent	241
5	Mineral deposits of Central America (Z. Mísař)	247
5.1	The Central American Cr, Ni(Co) metallogenic ophiolite province	247
5.1.1	The Cr ophiolite region of Guatemala	248
5.1.2	The Cr, Ni(Co) metallogenic ophiolite region of Cuba	248
5.2	The Central American base-metal metallogenic province	249
5.2.1	The Motagua base-metal region in Guatemala and Honduras	249
5.2.2	The base-metal ore region of Pinar del Rio in Cuba	249
5.2.3	The base-metal ore district of Las Villas	251
5.3	The Central American gold-bearing metallogenic province	251
5.3.1	The continental gold-bearing metallogenic region of Central America	251
5.3.2	The gold-bearing metallogenic region of Central Cuba	252
5.4	The Central American metallogenic province of porphyry copper ore deposits	253
5.4.1	The Panama region of porphyry copper deposits	253
5.4.2	The porphyry copper deposits of the Greater Antilles	255
5.4.3	The Cu and Au-Cu region of Eastern Cuba	257
5.5	Mn ores of Central America	258
5.6	The bauxite province of Central America	259
5.6.1	Bauxite deposits of Jamaica	259
5.6.2	Bauxite deposits of Cuba	259
5.6.3	Bauxite deposits in Haiti and the Dominican Republic	260
6	Mineral Deposits of South America (Z. Poubá)	261
6.1	Metallogeny of the South American platform	261

6.1.1	Iron ores in Brazil	262
6.1.2	Iron ores in Venezuela, Argentina, Bolivia, and Uruguay	265
6.1.3	Fe-Ti-V-Cr ore deposits in Brazil	267
6.1.4	Precambrian copper deposits in Brazil	268
6.1.5	Lead, zinc, and silver ore deposits in Brazil.	269
6.1.6	Tin, tungsten and rare-earth deposits related to granites and pegmatites	269
6.1.7	Apatite and rare-earth deposits in alkaline complexes	270
6.1.8	Gold deposits in the South American platforms	270
6.1.9	Weathering deposits in the South American platforms	272
6.2	Metallogeny of the South American Cordilleras	274
6.2.1	Gold deposits in the Andes	279
6.2.2	Porphyry copper ores in the Andes	279
6.2.3	Copper deposits of the manto type	284
6.2.4	Zinc and lead deposits in the Andes	286
6.2.5	Tin and tungsten deposits in the Andes	287
6.3	Uranium deposits in South America.	291
6.4	Industrial minerals of South America	293
7	Mineral deposits of Africa (M. Kuřvart)	294
7.1	Deposits of the African Precambrian platforms and orogenies	294
7.1.1	Deposits of the Guinean metallogenic province	295
7.1.2	Deposits of the Sahara-Cameroon metallogenic province	298
7.1.3	Deposits of the southern African metallogenic province.	299
7.1.4	Deposits of the Arabian-Somalian metallogenic province	319
7.2	Deposits of the African Hercynides (Mauretanides and Capides)	323
7.3	Deposits of the African Alpides (Atlasides) and Tello-Rifides	323
7.4	Deposits of the platform cover	326
8	Mineral deposits of Australasia (Z. Mísař)	330
8.1	The Archean Yilgarn-Pilbara province	330
8.1.1	The Kambalda Ni ore subprovince	331
8.1.2	The Norseman-Wiluna gold belt	333
8.1.3	The West Australian volcanogenic Cu-Pb-Zn-Ag subprovince	334
8.1.4	The Archean Fe subprovince of Western Australia	335
8.1.5	The remaining ore deposits in the West Australia	335
8.2	The Proterozoic Arunta-Gawler Range province.	335
8.2.1	The Hamersley Range Fe subprovince	336
8.2.2	The Bangemall Pb-Cu-Ba subprovince.	336
8.2.3	The Kimberley Fe, Ni and diamond subprovince	338
8.2.4	The Pine Creek Au-U and base-metal subprovince.	339
8.2.5	The Proterozoic subprovinces of central Australia	342
8.2.6	The base-metal area of Mount Isa	343
8.2.7	The base-metal subprovince of the McArthur basin	345
8.2.8	The Broken Hill base-metal metallogenic subprovince	345
8.2.9	The Gawler Range subprovince and the subprovinces of the Stuart stable shelf	348
8.2.10	The base-metal metallogenic subprovince of Adelaide	350
8.2.11	The Georgetown, Yambo and Coen Au-Cu metallogenic subprovinces.	351
8.3	The Paleozoic Tasman metallogenic province	351
8.3.1	The Delamare metallogenic subprovince	352
8.3.2	The Lachlan metallogenic subprovince.	355

8.3.3	The metallogenic subprovince of New England–Queensland	359
8.4	Major secondary deposits of Australia	360
8.5	The Older Alpine Australasian province	361
8.6	The Australasian Alpine province of the porphyry copper deposits	364
8.6.1	The east Australasian Alpine metallogenic belt	364
8.6.2	The metallogenic belt of the northern Australasian continental margin in Western Irian and Papua-New Guinea	364
8.6.3	The metallogenic belt on the Older Alpine orogene in Western Irian and Papua-New Guinea	365
8.6.4	The oceanic metallogenic belt of the Bismarck and New Britain Islands	365
8.6.5	The oceanic metallogenic belt of the New Hebrides and Solomon Islands	367
8.7	Other nonmetallic minerals of Australia	368
9	Mineral resources of Antarctica (Z. Mísař)	369
10	Mineral resources of Oceanic regions (M. Kužvart)	373
10.1	Deposits in the Pacific region	376
10.2	Mineral resources in the Atlantic region	380
10.3	Deposits in the Indian Ocean region	381
11	Main features of the metallogenic development of continents and oceans (Z. Mísař, F. Patočka, Z. Pouba)	384
11.1	Principal agents controlling the genesis of mineral deposits	384
11.2	Origin of ore deposits during the earliest stages of the Earth's crustal development	385
11.2.1	Principal regions and types of Archean mineral deposits	388
11.2.2	Mineral deposits of Upper Archean-Lower Proterozoic cratons	391
11.3	Origin of mineral deposits and the Wilson Cycle	394
11.3.1	Interaction of mantle plumes with the continental lithosphere	397
11.3.2	Development of intracontinental rifts	399
11.3.3	Ocean floor spreading and development of passive continental margins	400
11.3.4	Subduction of the oceanic lithosphere and development of island arcs and active continental margins	404
11.3.5	Continent-continent collision and continent-island arc collision	410
11.3.6	Development of post-collisional rifts	410
11.4	Mineral deposits in Proterozoic orogenes, aulacogenes and rifts	411
11.4.1	Mineral deposits in Proterozoic orogenes	411
11.4.2	Mineral deposits in Proterozoic aulacogenes and rifts	416
11.4.3	Mineral deposits connected with the Proterozoic anorogenic magmatism	418
11.5	Regions of Caledonian-Hercynian (Variscan) metallogeny	419
11.6	Regions of Alpine metallogeny	423
11.7	Recent mineralization processes	426
12	Principal trends in exploiting the world's mineral wealth (M. Vaněček)	427
12.1	Stage and development of the world's mineral base	427
12.1.1	Asia (excluding former U.S.S.R.)	431
12.1.2	Former Soviet Union	431
12.1.3	Europe (excluding former U.S.S.R.)	432
12.1.4	Africa	432
12.1.5	North America	433
12.1.6	Central and South America	433

12.1.7	Australia and Oceania	434
12.2	Industrial types of ore deposits	436
12.2.1	Iron ores	436
12.2.2	Manganese ores	437
12.2.3	Chromites	438
12.2.4	Ni ores	438
12.2.5	Co ores	439
12.2.6	Copper ores	439
12.2.7	Pb-Zn ores	441
12.2.8	Tin ores	443
12.2.9	Tungsten ores	443
12.2.10	Molybdenum ores	444
12.2.11	Antimony ores	445
12.2.12	Al ores	446
12.2.13	Silver ores	447
12.2.14	Gold ores	447
12.3	Production and reserves of the main industrial minerals and rocks	449
12.3.1	Graphite	450
12.3.2	Mg-bearing raw materials	450
12.3.3	Fluorite	450
12.3.4	Barite	451
12.3.5	P-bearing raw materials	451
12.3.6	K salts	452
12.3.7	Sulphur	452
12.3.8	Diamonds	452
	Literature	454
	Subject Index	479
	Locality Index	483
	Enclosures	521