

## THE CANADIAN MINERALOGIST

## Volume 22, Index

## AUTHOR INDEX

- ABBOTT, R.N. Jr. Al-Si ordering in 1M trioctahedral micas, 639
- ANSELL, H.G. with Grice, J.D., 233
- ANTONOVSKY, A. and Sandy, M.J. Color SEM-imaging of mineralogical samples sulfide ores and zeolites, 373
- AYUSO, R.A. and Brown, C.E. Manganese-rich red tourmaline from the Fowler talc belt, New York, 327
- BANGROFT, G.M. with Muir, I.J., 689
- BARNES, S.J. with Campbell, I.H., 151
- BARNES, S.J. with Thompson, J.F.H., 55
- BARNETT, R.L. with La Tour, T.E., 621
- BIRCHALL, T. with Manning, P.G., 357
- BIRKETT, T.C. and Trzcieski, W.E. Jr. Hydrogarnet multi-site hydrogen occupancy in the garnet structure, 675
- BLANK, H. with Cabri, L.J., 521
- BONARDI, M. with Jambor, J.L., 239
- BOWDEN, P. with Ike, E.C., 401
- BROWN, C.E. with Ayuso, R.A., 327
- CABRI, L.J., Blank, H., El Goresy, A., Laflamme, J.H.G., Nobiling, R., Sizgoric, M.B. and Traxel, K. Quantitative trace-element analyses of sulfides from Sudbury and Stillwater by proton microprobe, 521
- CABRI, L.J. with Harris, D.C., 493
- CAMPBELL, F.A. and Ethier, V.G. Nickel and cobalt in pyrrhotite and pyrite from the Faro and Sullivan orebodies, 503
- \_\_\_\_\_ and \_\_\_\_\_ Composition of allanite in the footwall of the Sullivan orebody, British Columbia, 507
- CAMPBELL, I.H. and Barnes, S.J. A model for the geochemistry of the platinum-group elements in magmatic sulfide deposits, 151
- CARLSON, E.H. with Hollenbaugh, D.W., 369
- ČERNÝ, P., Smith, J.V., Mason, R.A. and Delaney, J.S. Geochemistry and petrology of feldspar crystallization in the Věžná pegmatite, Czechoslovakia, 631
- CHANG, L.L.Y. with Tyson, R.M., 23
- CHAO, G.Y. with Gunter, A.E., 447
- COGULU, E. and Laurent, R. Mineralogical and chemical variations in chrysotile veins and peridotite host-rocks from the Asbestos Belt of southern Quebec, 173
- CRAW, D. and Jamieson, R.A. Anomalous optics in low-grade chlorite from Atlantic Canada, 269
- CRESSY, B.A. and Whittaker, E.J.W. Magnetic orientation of amphibole fibres, 669
- CRIDDLE, A.J. with Desborough, G.A., 343
- \_\_\_\_\_ with Dunning, G.R., 233
- \_\_\_\_\_ with Harris, D.C., 227, 487, 561
- DÉLANEY, J.S. with Černý, P., 621
- DESBOROUGH, G.A. and Criddle, A.J. Bowleite a new rhodium-iridium-platinum sulfide in platinum-alloy nuggets, Goodnews Bay, Alaska, 543
- DONNAY, J.D.H. with Stevenson, J.S., 265
- DUKE, J.M. with Thompson, J.F.H., 55
- DUNN, P.J., Peacor, D.R. and Simmons, W.B., Lennelanapeite, the Mg-analog of stilpnomelane, and chemical data on other stilpnomelane species from Franklin, New Jersey, 239
- \_\_\_\_\_ with Peacor, D.R., 471
- \_\_\_\_\_ Rouse, R.C. and Nelen, J.A. Englishite: new chemical data and a second occurrence, from the Tip Top pegmatite, Custer, South Dakota, 469
- DUNNING, G.R., Laflamme, J.H.G. and Criddle, A.J. Sopheite: a second Canadian occurrence, from the Lac-des-Iles complex, Ontario, 233
- DYMEK, R.F. and Gromet, L.P. Nature and origin of orthopyroxene megacrysts from the St-Urbain anorthosite massif, Quebec, 297
- ECKSTRAND, O.R. and Watkinson, D.H. Ore deposits and related petrology of mafic-ultramafic suites, preface, 1
- EL GORESY, A. with Cabri, L.J., 521
- ETHIER, V.G. with Campbell, F.A., 503, 507
- FEININGER, T. Stilpnomelane in metamorphic rocks associated with stauite and in regional schists, Quebec Appalachians, 423
- GAULT, R.A. with Grice, J.D., 233
- GRICE, J.D., Gault, R.A. and Ansell, H.G., Edingtonite: the first two Canadian occurrences, 233
- \_\_\_\_\_ and Robinson, G.W. Jeffreyite,  $(Ca,Na)_2(Be,Al)Si_2(O,OH)_7$ , a new mineral species and its relation to the melilite group, 443
- GROMET, L.P. with Dymek, R.F., 297
- GRUNDY, H.D. with Hassan, I., 333
- GUNTER, A.E., Skippen, G.B. and Chao, G.Y. Cell dimensions, Mössbauer and infrared-absorption spectra of synthetic cordierite, 447
- HARRIS, D.C., Cabri, L.J. and Nobiling, R. Silver-bearing chalcopyrite, a principal source of silver in the Izok Lake massive-sulfide deposit: confirmation by electron- and proton-microprobe analyses, 493
- \_\_\_\_\_ with Moëlo, Y., 219
- \_\_\_\_\_ Roberts, A.C. and Criddle, A.J. Jaskolskite from Izok Lake, Northwest Territories, 487
- \_\_\_\_\_ Roberts, A.C., Thorpe, R.L., Criddle, A.J. and Stanley, C.J. Kiddcreedite, a new mineral species from the Kidd Creek mine, Timmins, Ontario and from the Campbell orebody, Bisbee, Arizona, 227
- \_\_\_\_\_ Roberts, A.C., Thorpe, R.L., Jonasson, I.R. and Criddle, A.J. Lapleite  $CuNiSbS_3$ , a new mineral species from the Yukon Territory, 561
- HARRIS, J. with Pabst, A., 653
- HASSAN, I. and Grundy, H.D. The character of the cancrinite-vishnevit solid-solution series, 333
- HAWKE, D. with James, R.S., 93
- HAWTHORNE, F.C. The crystal structure of stemonite and the classification of the aluminofluoride minerals, 245
- \_\_\_\_\_ The crystal structure of mandarinite,  $Fe^{3+}_2Se_2O_9 \cdot 6H_2O$ , 475
- HOGARTH, D.D. and Lapointe, P. Amphibole and pyroxene development in fente from Cantley, Quebec, 281
- HOLLENBAUGH, D.W. and Carlson, E.H. The occurrence of wurzite polytypes in eastern Ohio Erratum, 369
- IKE, E.C., Bowden, P. and Martin, R.F. Fayalite and clinopyroxene in the porphyries of the Tibchi anorogenic ring-complex, Nigeria: postmagmatic initiation of a peralkaline trend, 401
- JAMBOR, J.L., Sabina, A.P., Roberts, A.C., Bonardi, M., Ramik, R.A. and Sturman, B.D. Franconite, a new hydrated Na-Nb oxide mineral from Montreal Island, Quebec, 239
- \_\_\_\_\_ with Moëlo, Y., 219
- JAMES, R.S. and Hawke, D. Geology and petrogenesis of the Kanichee layered complex, Ontario, 93
- JAMIESON, R.A. with Craw, D., 269
- JAN, M.Q., Windley, B.F. and Wilson, R.N. Chromian andradite and olivine-chromite relations in a chromite layer from the Jijal complex, northwestern Pakistan, 341
- JOHNSON, O. with Petersen, O.V., 465
- JONASSON, I.R. with Harris, D.C., 561
- JONES, W. with Manning, P.G., 357
- KARUP-MØLLER, S. with Makovicky, E., 565
- KERRICH, R. with LaTour, T.E., 621
- KIMBALL, K.L. and Spear, F.S. Metamorphic petrology of the Jackson County Iron Formation, Wisconsin, 605
- KLINE, S.W. Iron-rich hornblende plus albite in low-pressure metabasites, Chibougamau, Quebec, 391
- LA TOUR, T.E., Kerrich, R. and Barnett, R.L. Hydrothermal alteration and dynamic recrystallization of feldspar in an Archean iron-formation, 621
- LAFLAMME, J.H.G. with Cabri, L.J., 521
- \_\_\_\_\_ with Dunning, G.R., 233
- LAPOINTE, P. with Hogarth, D.D., 281
- LAURENT, R. with Cogulu, E., 173
- \_\_\_\_\_ with Taner, M.F., 437
- LEONARDBSEN, E.S. with Petersen, O.V., 465
- LIGHTFOOT, P.C. and Naldrett, A.J. Chemical variation in the Insizwa Complex, Transkei, and the nature of the parent magma, 111
- LORAND, J.P. and Pinet, M. L'orcelite des péridotites de Beni Bousera (Maroc), Ronda (Espagne), Table Mountain et Blow-Me-Down Mountain (Terre-Neuve) et du Plinde septentrional (Grèce), 553
- MACLEAN, W.H. with Stamatelopoulos-Seymour, K., 595
- MAKOVICKY, E. and Karup-Møller, S. Ourayite from Ivigtut, Greenland, 565
- MANDARINO, J.A. Rules of procedure of the Commission on New Minerals and Mineral Names, International Mineralogical Association, 367

- MANNING, P.G., Birchall, T. and Jones, W. The partitioning of non-apatite inorganic phosphorus in sediments from Lakes Erie and Ontario, 357
- MARTIN, R.F. with Ike, E.C., 401
- MASON, R.A. with Cerný, P., 621
- METSON, J.B. with Muir, I.J., 689
- MOËLO, Y., Jambor, J.L. and Harris, D.C. Tintinaïte et sulfosels associés de Tintina (Yukon): la cristallographie de la série de la kobellitine, 219
- MUGRIDGE, S.-J. and Young, H.R. Rapid preparation of polished thin sections for cathodoluminescence study of carbonate rocks, 513
- MUIR, I.J., Metson, J.B. and Bancroft, G.M. <sup>57</sup>Fe Mössbauer spectra of perovskite and titanite, 689
- NALDRETT, A.J. with Lightfoot, P.C., 111  
with Scribblins, B.T., 67
- NELEN, J.A. with Dunn, P.J., 469
- NOBILING, R. with Cabri, L.J., 321  
with Harris, D.C., 493
- NUGTEREN, H.W. with Zakrzewski, M.A., 583
- PABST, A. and Harris, J. Pellyites new localities and new data, 653
- PAGE, N.J. and Talkington, R.W. Palladium, platinum, rhodium, ruthenium and iridium in peridotites and chromitites from ophiolite complexes in Newfoundland, 137
- PAKTUNC, A.D. Metamorphism of the ultramafic rocks of the Thompson mine, Thompson Nickel Belt, northern Manitoba, 77
- PASTERIS, J.D. Further interpretation of the Cu-Fe-Ni sulfide mineralization in the Duluth Complex, northeastern Minnesota, 39
- PATTERSON, G.C. and Watkinson, D.H. The geology of the Thiery Cu-Ni mine, northwestern Ontario, 3  
and Watkinson, D.H. Metamorphism and supergene alteration of Cu-Ni sulfides, Thiery mine, northwestern Ontario, 13
- PEACOR, D.R., Dunn, P.J. and Simmons, W.B. Earlschannonite, the Mn analogue of whitmoreite, from the Kings Mountain pegmatite, North Carolina, 471  
with Dunn, P.J., 259
- PEARCE, T.H. Optical dispersion and zoning in magmatic plagioclases: laser-interference observations, 383  
and Thomas, M. Laser-induced fluorescence in minerals: preliminary results, 379
- PETERS, H.R. Memorial to V. Stephen Papezik (1927-1984), 700
- PETERSEN, O.V., Johnsen, O., Leonardsen, E.S. and Rønso, J.G. Kvanefjeldite, a new mineral species from the Ilmaussaq alkaline complex, southwest Greenland, 465
- PINET, M. with Lorand, J.P., 553
- POULIOT, G., Trudel, P., Valliquette, G., and Samson, P. Arsenite - thulite - albite veins at Réminigny, Quebec: the second occurrence of arsenite, 433
- RAABE, K.C. and Sack, R.O. Growth zoning in tetrahedrite-tennantite from the Hock Hocking mine, Alma, Colorado, 577
- RAE, D.R. with Scribblins, B.T., 67
- RAMIR, R.A. with Jambor, J.L., 239
- REYNOLDS, I.M. Tectonically deformed ilmenite in titaniferous iron ores of the Mambala Complex, Zululand, South Africa, 411
- ROBERTS, A.C. with Harris, D.C., 227, 487, 561  
with Jambor, J.L., 239  
with Szymanski, J.T., 681
- ROBINSON, G.W. with Grice, J.D., 443
- RØNBO, J.G. with Petersen, O.V., 465
- ROUSE, R.C. with Dunn, P.J., 469
- SABINA, A.P. with Jambor, J.L., 239
- SACK, R.O. with Raabe, K.C., 577
- SAMSON, P. with Pouliot, G., 453
- SANDY, M.J. with Antonovsky, A., 373
- SCRIBBLINS, B.T., Rae, D.R. and Naldrett, A.J. Mafic and ultramafic inclusions in the splay of the Sudbury Igneous Complex, 67
- SIMMONS, W.B. with Dunn, P.J., 259  
with Peacor, D.R., 471
- SIZGORIC, M.B. with Cabri, L.J., 521
- SKIPPEN, G.B. with Gunter, A.E., 447
- SMITH, J.V. with Cerný, P., 621
- SPEAR, F.S. with Kimball, K.L., 605
- STAMATELOPOULOU-SEYMOUR, K. and MacLean, W.H., Metamorphosed volcanogenic ores at Montouan, Grenville Province, Quebec, 595
- STANLEY, C.J. with Harris, D.C., 227
- STEVENSON, J.S., Stevenson, L.S. and Donnan, J.D.H. A postscript to the McGillite story, 265
- STEVENSON, L.S. with Stevenson, J.S., 265
- STURMAN, B.D. with Jambor, J.L., 239
- SZYMANSKI, J.T. and Roberts, A.C. The crystal structure of tungstite,  $W_3O_8 \cdot H_2O$ , 681
- TALKINGTON, R.W. and Watkinson, D.H. Trends in the distribution of the precious metals in the Lac-des-Iles complex, northwestern Ontario, 125  
with Page, N.J., 137
- TANER, M.F. and Laurent, R. Iron-rich amesite from the Lake Asbestos mine, Black Lake, Quebec, 437
- THOMAS, M. with Pearce, T.H., 379
- THOMPSON, J.F.H., Barnes, S.J. and Duke, J.M. The distribution of nickel and iron between olivine and magmatic sulfides in some natural assemblages, 55
- THORPE, R.I. with Harris, D.C., 227, 561
- TRAXEL, K. with Cabri, L.J., 321
- TRUDEL, P. with Pouliot, G., 453
- TRZCIENSKI, W.E. Jr with Birckett, T.C., 675
- TYSON, R.M. and Chang, L.L.Y. The petrology and sulfide mineralization of the Partridge River troctolite, Duluth Complex, Minnesota, 23
- VALIQUETTE, G. with Pouliot, G., 453
- WATKINSON, D.H. with Eckstrand, O.R., 1  
with Patterson, G.C., 3, 13  
with Talkington, R.W., 125  
with Whittaker, P.J., 161
- WEIDNER, J.R. Equilibria in the system Fe-C-O and the origin of native iron, 347
- WHITTAKER, E.-J.W. with Cressley, B.A., 669
- WHITTAKER, P.J. and Watkinson, D.H. Genesis of chromitite from the Mitchell Range, central British Columbia, 161
- WICKS, F.J. Deformation histories as recorded by serpentinites, I. Deformation prior to serpentinization, 185  
Deformation histories as recorded by serpentinites, II. Deformation during and after serpentinization, 197  
Deformation histories as recorded by serpentinites, III. Fracture patterns developed prior to serpentinization 205
- WILLIAMS, H.R. Field relations and chemistry of sapphirine-bearing rocks from the Bjørnesund area, Flaknaeset, western Greenland, 417
- WILSON, R.N. with Jan, M.Q., 341
- WINDLEY, B.F. with Jan, M.Q., 341
- ZAKRZEWSKI, M.A. Jaskolskita, a new Pb-Cu-Sb-Bi sulfosalt from the Vena deposit, Sweden, 481  
Minerals of the bravoite-villamaninite series and cuprian siegenite from Karniowice, Poland, 499  
and Nugteren, H.W. Mineralogy and origin of the distal volcanosedimentary deposit of the Hålefors silver mine, Bergslagen, central Sweden, 583

## SUBJECT INDEX

- A model for the geochemistry of the platinum-group elements in magmatic sulfide deposits, (Campbell and Barnes), 151
- A postscript to the McGillite story, (Stevenson et al.), 265
- Al-Si ordering in 1M trioctahedral micas, (Abbott), 659
- Amphibole and pyroxene development in fenite from Cantley, Quebec, (Hogarth and Lapointe), 281
- Anomalous optics in low-grade chlorite from Atlantic Canada, (Craw and Jamieson), 269
- Arsenite - thulite - albite veins at Réminigny, Quebec: the second occurrence of arsenite, (Pouliot et al.), 433
- Book reviews, 517
- Bowieite a new rhodium-iridium-platinum sulfide in platinum-alloy nuggets, Goodnews Bay, Alaska, (Desborough and Criddle), 543
- Cell dimensions, Mössbauer and infrared-absorption spectra of synthetic cordierite, (Gunter et al.), 447
- CHEMICAL ANALYSIS (see also Electron-microprobe analysis)
- Rocks  
diorite, 455, dunite, 103, gabbro, 103, granite porphyry, 404, peridotite, 103, pyroxenite, 103, quartzite, 625, quartz porphyry, 404, rodingite, 440, schist, 9, stibnomelane schist, 432
- Chemical variation in the Isizwa Complex, Transkei, and the nature of the parent magma, (Lightfoot and Naldrett), 111
- Chromian andradite and olivine-chromite relations in a chromitite layer from the Jilal complex, northwestern Pakistan, (Jan et al.), 341
- Color SEM-imaging of mineralogical samples: sulfide ores and zeolites, (Antonovsky and Sandy), 373
- Composition of allanite in the footwall of the Sullivan orebody, British Columbia, (Campbell and Ethier), 507
- CRYSTALLOGRAPHY (see also Twinning)
- Al-Si ordering in mica, 659, amphibole chemistry, 610, cancrinite-vishnevite series, 333, classification of aluminofluoride minerals, 249, edingtonite, 254, hydrogarnet formula, 678, lilliantite homologous series, 565, tintinaïte-kobellitine series, 219
- CRYSTAL STRUCTURE (see also X-ray Diffraction)
- arnesite, 458, biotite, 659, mandarinite, 475, stononite, 245, tungstite, 681, vishnevite, 333
- Deformation histories as recorded by serpentinites, I. Deformation prior to serpentinization, (Wicks), 185  
Deformation histories as recorded by serpentinites, II. Deformation during and after serpentinization, (Wicks), 197  
Deformation histories as recorded by serpentinites, III. Fracture patterns developed prior to serpentinization, (Wicks), 205
- D.T.A.  
Fe-C-O system, 350  
Earlschannonite, the Mn analogue of whitmoreite, from the Kings Mountain pegmatite, North Carolina, (Peacor et al.), 471  
Edingtonite: the first two Canadian occurrences, (Grice et al.), 253

## ELECTRON-MICROPROBE ANALYSIS

acanthite, 17, actinolite, 606, aegirine, 287, alkinite, 572, albite, 625, 636, allanite, 509, allargentum, 589, amesite, 440, amphibole, 383, 606, armenite, 453, arsenopyrite, 589, berrylite, 572, biotite, 659, bornite, 15, 41, boulangierite, 589, bournonite, 589, bowieite, 544, braggite, 131, braunite, 329, bravoite, 500, carrollite, 15, chalcopryite, 19, 41, 496, 579, chlorite, 274, chromian andradite, 342, chrogonite, 72, 169, 343, chrysotile, 178, 343, clinopyroxene, 72, 98, clinzoisite, 462, cubanite, 15, 41, 589, cummingtonite, 607, dyserarsite, 589, earlshannonite, 473, edingtonite, 255, electrum, 579, emplectite, 15, englshite, 470, ferristilpnomelane, 261, ferroaugite, 405, ferrohedenbergite, 406, franconite, 241, freibergite, 591, galena, 573, 589, gedrite, 419, grossular, 440, gudmundite, 589, heazlewoodite, 41, 596, hornblende, 96, 419, 607, hydrogarnet, 676, ilmenite, 412, jalpaite, 579, jamesonite, 221, jaskolskite, 483, 488, jeffreite, 445, kiddcreekite, 229, kobellite, 223, kotulskite, 17, 131, kvanefjeldite, 466, lapieite, 564, lennilenapeite, 261, lizardite, 176, macdonawite, 41, magneteite, 412, matildite, 573, maucherite, 536, meneghinite, 589, merenskyite, 17, millerite, 15, moncheite, 17, Na-amphibole, 286, olivine, 49, 58, 71, 83, 304, 405, 419, orcelite, 555, orthoclase, 625, 637, orthopyroxene, 71, 83, 304, 419, ourayite, 567, pellyite, 656, pentlandite, 15, 45, 539, 556, perovskite, 690, phlogopite, 419, piemontite, 462, plagioclase, 49, polybasite, 579, polydymite, 19, pyrrhotite, 589, pyrite, 16, 504, pyrite (cuprian), 500, 579, pyrrhotite, 15, 41, 505, riebeckite, 606, robinsonite, 221, sapphirine, 419, siegenite, 500, silver, 17, 589, silver-bearing chalcopryite, 496, 579, smythite, 16, socpheite, 237, sphalerite, 16, 579, 589, spinel, 83, 419, stannite, 589, stephanite, 589, stilpnomelane, 261, 427, stromeyerite, 579, stuetzite, 17, tennantite, 579, tetrahedrite, 579, 591, thulite, 462, tinnaitite, 221, titanite, 690, tourmaline, 329, tremolite, 96, 329, trolite, 41, unknown  $Ag_3BiTe_2$ , 15, unknown JC ( $Pb_2CuSb_5S_7$ ), 221, unknown (Ni, Cu, Co) $_2As_2$ , 45, uvite, 329, vaesite, 19, villamaninite, 500, violarite, 16, vishnevite, 335, vsyotskite, 131, wittichenite, 15

Englshite new chemical data and a second occurrence, from the Tip Top pegmatite, Custer, South Dakota, (Dunn et al.), 469

Equilibria in the System Fe-C-O and the origin of native iron, (Weidner), 347

EXPERIMENTAL (see also Petrology)

General

Al-Si ordering in mica, 659, color SEM-imaging, 373, cordierite synthesis, 448, dispersion in plagioclase, 384, fluid inclusion data, 47, ion microprobe, 636, laser-induced fluorescence, 379, laser interferometry, 383, magnetic amphibole, 669, Ni/Fe distribution coefficient, 53, oxygen isotopes, 627, Pd in pentlandite, 529, polished thin section preparation, 513, proton-microprobe, 493, 521, selenium in sulfides, 528

System

Fe-C-O, 347, Ni-Fe-S, 19

Fayalite and clinopyroxene in the porphyries of the Tibchi anorogenic ring-complex, Nigeria: postmagmatic initiation of a peralkaline trend, (Ike et al.), 401

<sup>57</sup>Fe Mössbauer spectra of perovskite and titanite, (Muir et al.), 689

Field relations and chemistry of sapphirine-bearing rocks from the Björnund area, Fiskensæset, western Greenland, (Williams), 417

Franconite, a new hydrated Na-Nb oxide minerals from Montreal Island, Quebec, (Jambor et al.), 239

Further interpretation of the Cu-Fe-Ni sulfide mineralization in the Duluth Complex, northeastern Minnesota, (Pasteris), 39

Genesis of chromitite from the Mitchell Range, central British Columbia, (Whittaker and Watkinson), 161

Geochemistry and petrology of feldspar crystallization in the Věžná pegmatite, Czechoslovakia, (Cerný et al.), 621

Geology and petrogenesis of the Kanichee layered complex, Ontario, (James and Hawke), 93

Growth zoning in tetrahedrite-tennantite from the Hock Hocking mine, Alma, Colorado, (Raabe and Sack), 577

Hydrogarnet multi-site hydrogen occupancy in the garnet structure, (Birkett and Trzcinski), 675

Hydrothermal alteration and dynamic recrystallization of feldspar in an Archean iron-formation, (LaTour et al.), 621

INFRARED SPECTRA

armenite, 461, cordierite, 447, franconite, 241, hydrogarnet, 677

Iron-rich amesite from the Lake Asbestos mine, Black Lake, Quebec, (Taner and Laurent), 437

Iron-rich hornblende plus albite in low-pressure metabasites, Chibougamau, Quebec, (Kline), 391

Jaskolskite, a new Pb-Cu-Sb-Bi sulfosalt from the Vena deposit, Sweden, (Zakrzewski), 481

Jaskolskite from Izok Lake, Northwest Territories, (Harris et al.), 487

Jeffreyite,  $(Ca,Na)_2(Be,Al)Si_2O_7(OH)_2$ , a new mineral species and its relation to the mellite group, (Grice and Robinson), 443

Kiddcreekite, a new mineral species from the Kidd Creek mine, Timmins, Ontario, and from the Campbell orebody, Bisbee, Arizona, (Harris et al.), 227

Kvanefjeldite, a new mineral species from the Ilimaussaq alkaline complex, southwest Greenland, (Peterson et al.), 465

Lorcelite des péridotites de Beni Boumar (Maroc), Ronda (Espagne), Table Mountain et Blow-Me-Down Mountain (Terre-Neuve) et du Pindé septentrional (Grèce), (Lorand and Pinet), 533

Lapieite  $CuNi_5S_8$ , a new mineral species from the Yukon Territory, (Harris et al.), 361

Laser-induced fluorescence in minerals: preliminary results, (Pearce and Thomas), 379

Lennilenapeite, the Mg-analogue of stilpnomelane, and chemical data on other stilpnomelane species from Franklin, New Jersey, (Dunn et al.), 259

Mafic and ultramafic inclusions in the sublayer of the Sudbury Igneous Complex, (Scribbs et al.), 67

Magnetic orientation of amphibole fibres, (Cressey and Whittaker), 669

Manganese-rich red tourmaline from the Fowler talc belt, New York, (Ayuso and Brown), 37

Memorial to V. Stephen Papezik (1927-1984), (Peters), 700

Metamorphic petrology of the Jackson County Iron Formation, Wisconsin, (Kimball and Spear), 605

Metamorphism and supergene alteration of Cu-Ni sulfides, Thierry mine, northwestern Ontario, (Patterson and Watkinson), 13

Metamorphism of the ultramafic rocks of the Thompson mine, Thompson Nickel Belt, northern Manitoba, (Paktunç), 77

Metamorphosed volcanogenic ore at Montauban, Grenville Province, Quebec, (Stamatelopoulos-Seymour and MacLean), 595

MICROHARDNESS

bowieite, 545, kiddcreekite, 230

MINERAL DATA (see also Electron-Microprobe Analysis)

aegirine, 285, allanite, 507, amesite, 437, amphibole, 393, 607, armenite, 453, biotite, 659, bowieite, 543, bravoite-villamaninite series, 499, chalcopryite, 521, chlorite, 269, chromian andradite, 341, earlshannonite, 471, edingtonite, 253, englshite, 469, feldspar, 625, 631, franconite, 239, freibergite, 591, garnet, 341, hydrogarnet, 675, ilmenite, 411, jaskolskite, 481, 487, jeffreite, 443, kiddcreekite, 227, kobellite, 222, kvanefjeldite, 465, lapieite, 561, lennilenapeite, 259, lilliantite homologous series, 565, McGillite, 265, mandarinite, 475, matildite, 572, mica, 639, Mn-tourmaline, 327, Na-amphibole, 285, native iron, 347, orcelite, 553, ourayite, 565, pellyite, 653, pentlandite, 521, perovskite, 689, sapphirine, 417, socpheite, 233, stemonite, 245, tetrahedrite-tennantite, 577, 591, thulite, 453, tinnaitite, 220, titanite, 689, tungstite, 681, unknown  $Ag_3BiTe_2$ , 15, unknown JC ( $Pb_2CuSb_5S_7$ ), 224, unknown (Ni,Cu,Co) $_2As_2$ , 45 uvite, 327, violarite, 19, vishnevite, 333

Mineralogical and chemical variations in chrysotile veins and peridotite host-rocks from the Asbestos Belt of southern Quebec, (Cogulu and Laurent), 173

Mineralogy and origin of the distal volcanosedimentary deposit of the Hällefors silver mine, Bergslagen, central Sweden, (Zakrzewski and Nugteren), 583

Minerals of the bravoite - villamaninite series and cuprian siegenite from Karniowice, Poland, (Zakrzewski), 499

MÖSSBAUER SPECTROSCOPY

cordierite, 447, lake sediment, 357, perovskite, 689, titanite, 689

Nature and origin of orthopyroxene megacrysts from the St-Urbain anorthosite massif, Quebec, (Dymek and Gromet), 297

NEW MINERALS

bowieite, 543, earlshannonite, 471, franconite, 239, jaskolskite, 481, jeffreite, 443, kiddcreekite, 227, kvanefjeldite, 465, lapieite, 561, lennilenapeite, 259, Nickel and cobalt in pyrrhotite and pyrite from the Faro and Sullivan orebodies, (Campbell and Ethier), 503

NOMENCLATURE

aluminofluoride minerals, 249, bowieite, 543, earlshannonite, 471, englshite, 469, franconite, 239, jaskolskite, 481, jeffreite, 443, kiddcreekite, 227, kvanefjeldite, 465, lapieite, 561, lennilenapeite, 259, lilliantite homologous series, 565, mellite group, 444, stilpnomelane, 428, tinnaitite, 220, tourmaline, 329

Optical dispersion and zoning in magmatic plagioclase: laser-interference observations, (Pearce), 383

OPTICAL PROPERTIES

General

amesite, 440, armenite, 457, chlorite, 269, earlshannonite, 473, edingtonite, 253, franconite, 241, jeffreite, 443, kvanefjeldite, 467, lennilenapeite, 260, pellyite, 656

Reflectance

bowieite, 547, jaskolskite, 482, 489, kiddcreekite, 230, lapieite, 562, orcelite, 553, socpheite, 234

Ore deposits and related petrology of mafic-ultramafic suites, preface, (Eckstrand and Watkinson), 1

Ourayite from Ivigtut, Greenland, (Makovicky and Karup-Møller), 565

Palladium, platinum, rhodium, ruthenium and iridium in peridotites and chromitites from ophiolite complexes in Newfoundland, (Page and Talkington), 137

Pellyite new localities and new data, (Pabst and Harris), 653

PETROLOGY (see also Experimental)

amphibole coexistence, 395, amphibole in iron formation, 605, anomalous negative chlorite, 269, carbonate-derived fenite, 281, chromitite, 161, 341, coexisting amphiboles, 606, Cu/Ni ratio in sulfide ores, 6, 20, 35, cuprian pyrite, 500, Duluth Complex, 23, 39, dynamic metamorphism, 8, 17, element mobility during alteration, 10, feldspar petrogenesis, 645, geobarometry, 8, 599, 644, geothermometry, 8, 86, 344, 414, 581, 598, 644, iron-formation chemistry, 611, 626, layered complex, 74, 93, 111, 125, 521, magmatic carbon, 44, 347, magmatic sulfides, 5, 521, metamict allanite, 507, metamorphic stilpnomelane, 423, mylonite, 8, Ni/Co ratio in pyrite and pyrrhotite, 503, ophiolite complex, 137, 161, 173, orthopyroxene megacrysts, 297, oscillatory zoning in plagioclase, 384, parent-magma calculations, 74, 103, 117, 323, PGE concentration, 15, 133, 137, 521, PGE geochemistry, 129, 141, 151, 521, PGE in ophiolite, 137, 167, PGE in solid solution, 536, pyrrholite oxidation, 292, Rb-Sr isotopic data, 315, REE geochemistry, 114, 310, sapphirine, 417, serpentinization, 89, 99, 173, 197, silver-bearing chalcopryite, 493, sphalerite geobarometer, 599, Sudbury Complex, 67, 521, violarization, 19, volcanogenic sulfides, 583, 595

Quantitative trace-element analyses of sulfides from Sudbury and Stillwater by proton microprobe, (Cabri et al.), 521

Rapid preparation of polished thin sections for cathodoluminescence study of carbonate rocks, (Mugridge and Young), 513

Rules of procedure of the Commission on New Minerals and Mineral Names, International Mineralogical Association, 367

SCANNING-ELECTRON MICROGRAPHS

chalcopryite-pentlandite intergrowth, 46, color imaging, 373

Silver-bearing chalcopyrite, a principal source of silver in the Izok Lake massive-sulfide deposit: confirmation by electron- and proton-microprobe analyses, (Harris et al.), 493

Sopchite: a second Canadian occurrence, from the Lac-des-Iles complex, Ontario, (Dunning et al.), 233

Stilpnomelane in metasomatic rocks associated with steatite and in regional schists, Quebec Appalachians, (Feininger), 423

Tectonically deformed ilmenite in titaniferous iron ores of the Mambula Complex, Zululand, South Africa, (Reynolds), 411

**TEXTURES**

bravoite, 499, chromite, 161, 341, coexisting amphiboles, 607, cumulus, 69, 81, 97, 342, deformational (sulfide), 600, feldspar-quartz, 623, 634, galena-matildite, 573, ilmenite-magnetite, 411, mylonite, 8, 17, olivine, 26, 42, 55, 70, 80, 97, 114, 176, 185, 197, 205, 342, olivine-chromite, 161, 341, orcelite, 554, orthopyroxene megacrysts, 300, pyrite-pyrrhotite, 503, recrystallization, 624, serpentinization, 87, 176, 185, 197, 205, silicate, 69, 81, sulfide, 16, 29, 41, 56, 597, sulfide-silicate, 30, 41, 56, 99, 130, 170, 600, tetrahedrite-tennantite, 577, tourmaline, 328, violarization, 19

The character of the cancrinite-vishnevite solid-solution series, (Hassan and Grundy), 333

The crystal structure of mandarinoite,  $\text{Fe}^{3+}_2\text{Se}_3\text{O}_8 \cdot 6\text{H}_2\text{O}$ , (Hawthorne), 475

The crystal structure of stenoite and the classification of the aluminofluoride minerals, (Hawthorne), 245

The crystal structure of tungstite,  $\text{WO}_3 \cdot \text{H}_2\text{O}$ , (Szymański and Roberts), 681

The distribution of nickel and iron between olivine and magmatic sulfides in some natural assemblages, (Thompson et al.), 55

The geology of the Thierry Cu-Ni mine, northwestern Ontario, (Patterson and

Watkinson), 3

The occurrence of wurtzite polytypes in eastern Ohio: Erratum, (Hollenbaugh and Carlson), 369

The partitioning of non-apatite inorganic phosphorus in sediments from Lakes Erie and Ontario, (Manning et al.), 357

The petrology and sulfide mineralization of the Partridge River troctolite, Duluth Complex, Minnesota, (Tyson and Chang), 23

**T.G.A.**

edingtonite, 256, franconite, 240

Tintinaite et sulfosels associés de Tintina (Yukon): la cristallographie de la série de la kobellite, (Moëlo et al.), 219

Trends in the distribution of the precious metals in the Lac-des-Iles complex, northwestern Ontario, (Talkington and Watkinson), 125

**TWINNING** (see also Crystallography)

armenite, 456, ilmenite, 411, jeffreyite, 445

**X-RAY DIFFRACTION** (see also Crystal Structure)

**Cell Dimensions**

amesite, 441, armenite, 458, bowieite, 548, cordierite, 447, earlshannonite, 472, edingtonite, 255, franconite, 242, hydrogarnet, 676, jaskolskiite, 483, 491, jeffreyite, 445, K-feldspar, 638, kiddcreekite, 229, kvanefjeldite, 467, lapieite, 564, mandarinoite, 476, ourayite, 568, pellyite, 656, stenoite, 245, synthetic cordierite, 447, tungstite, 681, vishnevite, 335

**Powder Data**

amesite, 441, armenite, 459, bowieite, 548, earlshannonite, 472, franconite, 242, hydrogarnet, 675, jaskolskiite, 484, 490, jeffreyite, 444, kiddcreekite, 230, kvanefjeldite, 466, lapieite, 564, lunnapeite, 260, ourayite, 570, synthetic cordierite, 449, tungstite, 685

For everyone interested in minerals,  
rocks, and fossils

## ROCKS & MINERALS

America's Oldest  
Popular Mineral Magazine  
is  
BETTER THAN EVER!

Since 1926, ROCKS & MINERALS  
has been publishing comprehensive and  
interesting articles on mineralogy, geology,  
and paleontology.



SUBSCRIBE TODAY!

ROCKS & MINERALS  
4000 Albemarle St., N.W.  
Washington, D.C. 20016  
Telephone: (202) 362-6445

\$19.00 for 6 fact-filled issues

**THE PAST PRESIDENTS' MEDAL**  
of  
**THE MINERALOGICAL ASSOCIATION OF CANADA**

The Past Presidents' Medal of the Mineralogical Association of Canada is awarded annually to a scientist who has made major contributions to the mineralogical sciences in Canada. The Medal is intended to recognize the breadth and universality of these contributions, in mineralogy, petrology, crystallography, geochemistry or the study of mineral deposits, rather than a narrow area of expertise. The nominee must have made important contributions, judged on the basis of a combination of

- scholarly achievement
- authorship or editing of books
- service to the Mineralogical Association of Canada
- leadership in fostering links between scientists in government, universities, and industry
- illustrious record of teaching at a Canadian university
- any other major contribution to the mineralogical sciences in Canada.

A committee of three, chaired by the Past President, considers all nominations received by the Secretary of the Association. The medal is awarded at the joint annual meeting of the GAC and MAC, at the MAC luncheon.

Nominations, including curriculum vitae, list of publications and a citation of at least one hundred words, must be received by February 15, 1985 in order to receive consideration. Nominees will be considered in three successive competitions, after which a renomination will be required.

Please send nominations to the interim secretary, Dr. Murray Duke, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8.

**NOTICE**

TO PURCHASERS OF  
SHORT COURSE HANDBOOKS AND SPECIAL ISSUES OF  
**THE CANADIAN MINERALOGIST**

STARTING JANUARY 1st, 1985, THERE WILL BE A  
\$2.00 HANDLING CHARGE TO COVER POSTAGE  
TO DESTINATIONS OUTSIDE CANADA

**22nd ANNUAL  
SHORT SUMMER COURSE IN X-RAY POWDER DIFFRACTION  
June 17-21, June 24-28, 1985**

The 22nd annual summer two-week short course in modern X-ray powder diffraction will be offered at the State University of New York at Albany from June 17 to June 28, 1985. The course will be instructional and will develop the basic theory and techniques starting from elementary principles. No previous knowledge or experience is required. The first week will cover basic principles, techniques, and practical applications; and the second week will continue with further fundamentals and practical applications. Emphasis in the first week will be on camera and film techniques, X-ray instrumentation, especially the diffractometer, identification of powder patterns, multi-phase identifications using several indices and fundamentals of quantitative analysis. The second week will cover more advanced principles and techniques with emphasis on diffractometer alignment, complex quantitative analysis, complex powder identifications, computer automation of diffractometers, and computer search-match methods. Equal time will be devoted to lectures and laboratory/problem-solving sessions. A suitable amount of time will be set aside for individual sessions. Registration may be made for one week, either week, at a registration fee of \$850.00 or for the entire two-week session at a registration fee of \$1,600.00, payable in US dollars drawn on a US bank. For further information and to register, please communicate with:

Professor Henry Chessin  
Department of Physics  
State University of New York at Albany  
1400 Washington Avenue  
Albany, NY 12222  
518/457-8339

---

**22nd ANNUAL  
SHORT SUMMER COURSE IN X-RAY SPECTROMETRY  
June 3-7, June 10-14, 1985**

The 22nd annual short course in modern X-ray spectrometry will be offered at the State University of New York at Albany from June 3 to June 14, 1985. The course will be instructional and will develop the basic theory and techniques starting from elementary principles. No previous knowledge or experience is required. The first week will cover basic principles, techniques, and practical applications; and the second week will continue with further fundamentals and practical applications. Both weeks will illustrate and employ equally the wavelength-dispersive and energy-dispersive methods. Emphasis in the second week will be placed on advanced principles and techniques, absorption-enhancement corrections by several procedures including mathematical methods, computer calculations, and computer automation of modern X-ray spectrometers. Equal time will be devoted to the lectures and laboratory/problem-solving sessions. Registration may be made for one week, either week, at a registration fee of \$850.00 or for the entire two-week session at a registration fee of \$1,600.00, payable in US dollars drawn on a US bank. For further information and to register, please communicate with:

Professor Henry Chessin  
Department of Physics  
State University of New York at Albany  
1400 Washington Avenue  
Albany, NY 12222  
518/457-8339

# **THE CANADIAN MINERALOGIST**

**Journal of the  
Mineralogical Association  
of Canada**



**R.F. Martin, Editor**

**Volume 22, 1984**

# THE CANADIAN MINERALOGIST

## CONTENTS, VOLUME 22

Preface	O.R. ECKSTRAND & D.H. WATKINSON	1
The geology of the Thierry Cu-Ni mine, northwestern Ontario	G.C. PATTERSON & D.H. WATKINSON	3
Metamorphism and supergene alteration of Cu-Ni sulfides, Thierry mine, northwestern Ontario	G.C. PATTERSON & D.H. WATKINSON	13
The petrology and sulfide mineralization of the Partridge River troctolite, Duluth Complex, Minnesota	R.M. TYSON & L.L.Y. CHANG	23
Further interpretation of the Cu-Fe-Ni sulfide mineralization in the Duluth Complex, northeastern Minnesota	J.D. PASTERIS	39
The distribution of nickel and iron between olivine and magmatic sulfides in some natural assemblages	J.F.H. THOMPSON, S.J. BARNES & J.M. DUKE	55
Mafic and ultramafic inclusions in the sublayer of the Sudbury Igneous Complex	B.T. SCRIBBINS, D.R. RAE & A.J. NALDRETT	67
Metamorphism of the ultramafic rocks of the Thompson mine, Thompson Nickel Belt, northern Manitoba	A.D. PAKTUNÇ	77
Geology and petrogenesis of the Kanichee layered complex, Ontario	R.S. JAMES & D. HAWKE	93
Chemical variation in the Insizwa Complex, Transkei, and the nature of the parent magma	P.C. LIGHTFOOT & A. J. NALDRETT	111
Trends in the distribution of the precious metals in the Lac-des-Iles complex, northwestern Ontario	R.W. TALKINGTON & D.H. WATKINSON	125
Palladium, platinum, rhodium, ruthenium and iridium in peridotites and chromitites from ophiolite complexes in Newfoundland	N.J. PAGE & R.W. TALKINGTON	137
A model for the geochemistry of the platinum-group elements in magmatic sulfide deposits	I.H. CAMPBELL & S.J. BARNES	151
Genesis of chromitite from the Mitchell Range, central British Columbia	P.J. WHITTAKER & D.H. WATKINSON	161
Mineralogical and chemical variations in chrysotile veins and peridotite host-rocks from the Asbestos Belt of southern Quebec	E. COGULU & R. LAURENT	173
Deformation histories as recorded by serpentinites. I. Deformation prior to serpentinitization	F.J. WICKS	185
Deformation histories as recorded by serpentinites. II. Deformation during and after serpentinitization	F.J. WICKS	197
Deformation histories as recorded by serpentinites. III. Fracture patterns developed prior to serpentinitization	F.J. WICKS	205
Color SEM-imaging of mineralogical samples: sulfide ores and zeolites	A. ANTONOVSKY & M.J. SANDY	213
Tintinaïte et sulfosels associés de Tintina (Yukon): la cristallogénèse de la série de la kobellite	Y. MOËLO, J.L. JAMBOR & D.C. HARRIS	219
Kiddcreekite, a new mineral species from the Kidd Creek mine, Timmins, Ontario and from the Campbell orebody, Bisbee, Arizona	D.C. HARRIS, A.C. ROBERTS, R.I. THORPE, A.J. CRIDDLE & C.J. STANLEY	227



Sopchete: a second Canadian occurrence, from the Lac-des-Iles complex, Ontario	G.R. DUNNING, J.H.G. LAFLAMME & A.J. CRIDDLE	233
Franconite, a new hydrated Na-Nb oxide mineral from Montreal Island, Quebec	J.L. JAMBOR, A.P. SABINA, A.C. ROBERTS, M. BONARDI, R.A. RAMIK & B.D. STURMAN	239
The crystal structure of stemonite and the classification of the aluminofluoride minerals	F.C. HAWTHORNE	245
Edingtonite: the first two Canadian occurrences	J.D. GRICE, R.A. GAULT & H.G. ANSELL	253
Lennilenapeite, the Mg-analogue of stilpnomelane, and chemical data on other stilpnomelane species from Franklin, New Jersey	P.J. DUNN, D.R. PEACOR & W.B. SIMMONS	259
A postscript to the McGillite story	J.S. STEVENSON, L.S. STEVENSON & J.D.H. DONNAY	265
Anomalous optics in low-grade chlorite from Atlantic Canada	D. CRAW & R.A. JAMIESON	269
Amphibole and pyroxene development in fenite from Cantley, Quebec	D.D. HOGARTH & P. LAPOINTE	281
Nature and origin of orthopyroxene megacrysts from the St-Urbain anorthosite massif, Quebec	R.F. DYMEK & L.P. GROMET	297
Manganese-rich red tourmaline from the Fowler talc belt, New York	R.A. AYUSO & C.E. BROWN	327
The character of the cancrinite-vishneville solid-solution series	I. HASSAN & H.D. GRUNDY	333
Chromian andradite and olivine-chromite relations in a chromitite layer from the Jijal complex, northwestern Pakistan	M.Q. JAN, B.F. WINDLEY & R.N. WILSON	341
Equilibria in the system Fe-C-O and the origin of native iron	J.R. WEIDNER	347
The partitioning of non-apatite inorganic phosphorus in sediments from Lakes Erie and Ontario	P.G. MANNING, T. BIRCHALL & W. JONES	357
Rules of procedure of the Commission on New Minerals and Mineral Names, International Mineralogical Association		367
The occurrence of wurtzite polytypes in eastern Ohio: Erratum	D.W. HOLLENBAUGH & E.H. CARLSON	369
Color SEM-imaging of mineralogical samples: sulfide ores and zeolites	A. ANTONOVSKY & M.J. SANDY	373
Laser-induced fluorescence in minerals: preliminary results	T.H. PEARCE & M. THOMAS	379
Optical dispersion and zoning in magmatic plagioclase: laser-interference observations	T.H. PEARCE	383
Iron-rich hornblende plus albite in low-pressure metabasites, Chibougamau, Quebec	S.W. KLINE	391
Fayalite and clinopyroxene in the porphyries of the Tibchi anorogenic ring-complex, Nigeria: postmagmatic initiation of a peralkaline trend	E.C. IKE, P. BOWDEN & R.F. MARTIN	401
Tectonically deformed ilmenite in titaniferous iron ores of the Mambula Complex, Zululand, South Africa	I.M. REYNOLDS	411
Field relations and chemistry of sapphirine-bearing rocks from the Bjørnesund area, Fiskenæsset, western Greenland	H.R. WILLIAMS	417
Stilpnomelane in metasomatic rocks associated with steatite and in regional schists, Quebec Appalachians	T. FEININGER	423
Iron-rich amesite from the Lake Asbestos mine, Black Lake, Quebec	M.F. TANER & R. LAURENT	437

Jeffreyite, (Ca,Na) <sub>2</sub> (Be,Al)Si <sub>2</sub> (O;OH) <sub>7</sub> , a new mineral species and its relation to the melilite group	J.D. GRICE & G.W. ROBINSON	443
Cell dimensions, Mössbauer and infrared-absorption spectra of synthetic cordierite	A.E. GUNTER, G.B. SKIPPEN & G.Y. CHAO	447
Armenite - thulite - albite veins at Rémigny, Quebec: the second occurrence of armenite	G. POULIOT, P. TRUDEL, G. VALIQUETTE & P. SAMSON	453
Kvanefjeldite, a new mineral species from the Ilimaussaq alkaline complex, southwest Greenland	O.V. PETERSEN, O. JOHNSEN, E.S. LEONARSEN & J.G. RØNSBO	465
Englishite: new chemical data and a second occurrence, from the Tip Top pegmatite, Custer, South Dakota	P.J. DUNN, R.C. ROUSE & J.A. NLEN	469
Earlshannonite, the Mn analogue of whitmoreite, from the Kings Mountain pegmatite, North Carolina	D.R. PEACOR, P.J. DUNN & W.B. SIMMONS	471
The crystal structure of mandarinoite, Fe <sup>3+</sup> <sub>2</sub> Se <sub>3</sub> O <sub>9</sub> ·6H <sub>2</sub> O	F.C. HAWTHORNE	475
Jaskólskiite, a new Pb-Cu-Sb-Bi sulfosalt from the Vena deposit, Sweden	M.A. ZAKRZEWSKI	481
Jaskólskiite from Izok Lake, Northwest Territories	D.C. HARRIS, A.C. ROBERTS & A.J. CRIDDLE	487
Silver-bearing chalcopyrite, a principal source of silver in the Izok Lake massive-sulfide deposit: confirmation by electron- and proton-microprobe analyses	D.C. HARRIS, L.J. CABRI & R. NOBILING	493
Minerals of the bravoite - villamaninite series and cuprian siegenite from Karniowice, Poland	M.A. ZAKRZEWSKI	499
Nickel and cobalt in pyrrhotite and pyrite from the Faro and Sullivan orebodies	F.A. CAMPBELL & V.G. ETHIER	503
Composition of allanite in the footwall of the Sullivan orebody, British Columbia	F.A. CAMPBELL & V.G. ETHIER	507
Rapid preparation of polished thin sections for cathodoluminescence study of carbonate rocks	S-J. MUGRIDGE & H.R. YOUNG	513
Book reviews		
Carbonates: Mineralogy and Chemistry (R.J. Reeder, ed.)	R. BOGOCH	517
International Tables for Crystallography. A. Space-Group Symmetry (T. Hahn, ed.)	J.T. SZYMANSKI	517
Quantitative trace-element analyses of sulfides from Sudbury and Stillwater by proton microprobe	L.J. CABRI, H. BLACK, A. EL GORESY, J.H.G. LAFLAMME, R. NOBILING, M.B. SIZGORIC & K. TRAXEL	521
Bowieite: a new rhodium-iridium-platinum sulfide in platinum-alloy nuggets, Goodnews Bay, Alaska	G.A. DESBOROUGH & A.J. CRIDDLE	543
L'orcelite des péridotites de Beni Bousera (Maroc), Ronda (Espagne), Table Mountain et Blow-Me-Down Mountain (Terre-Neuve) et du Pinde septentrional (Grèce)	J.P. LORAND & M. PINET	553
Lapieite CuNiSbS <sub>3</sub> , a new mineral species from the Yukon Territory	D.C. HARRIS, A.C. ROBERTS, R.I. THORPE, I.R. JONASSON & A.J. CRIDDLE	561
Ourayite from Ivigtut, Greenland	E. MAKOVICKY & S. KARUP-MØLLER	565
Growth zoning in tetrahedrite-tennantite from the Hock Hocking mine, Alma, Colorado	K.C. RAABE & R.O. SACK	577
Mineralogy and origin of the distal volcanosedimentary deposit at the Hällefors silver mine, Bergslagen, central Sweden	M.A. ZAKRZEWSKI & H.W. NUGTEREN	583
Metamorphosed volcanogenic ores at Montauban, Grenville Province, Quebec	K. STAMATELOPOULOU-SEYMOUR & W.H. MACLEAN	595
Metamorphic petrology of the Jackson County Iron Formation, Wisconsin	K.L. KIMBALL & F.S. SPEAR	605
Hydrothermal alteration and dynamic recrystallization of feldspar in an Archean iron- formation	T.E. LA TOUR, R. KERRICH & R.L. BARNETT	621

Geochemistry and petrology of feldspar crystallization in the Věžná pegmatite, Czechoslovakia	P. ČERNÝ, J.V. SMITH, R.A. MASON & J.S. DELANEY	631
Pellyite: new localities and new data	A. PABST & J. HARRIS	653
Al-Si ordering in 1M trioctahedral micas	R.N. ABBOTT, JR.	659
Magnetic orientation of amphibole fibres	B.A. CRESSEY & E.J.W. WHITTAKER	669
Hydrogarnet: multi-site hydrogen occupancy in the garnet structure	T.C. BIRKETT & W.E. TRZCIENSKI, JR.	675
The crystal structure of tungstite, $WO_3 \cdot H_2O$	J.T. SZYMAŃSKI & A.C. ROBERTS	681
$^{57}Fe$ Mössbauer spectra of perovskite and titanite	I.J. MUIR, J.B. METSON & G.M. BANCROFT	689
Proceedings of the twenty-ninth annual meeting of the Mineralogical Association of Canada	S.M. BARR	695
The Hawley medal for 1984 to Frank C. Hawthorne		696
The Past Presidents' medal for 1984 to Petr Černý		697
Memorial to V.S. Papežik	H.R. PETERS	699
Index	J.D. SCOTT	701