Collections
of
Ohio State University
Geological Sciences Professor
Robert Latimer Bates (1912-1994)

An Index for Industrial Rocks & Minerals
and
Photoslides

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A “Short Table” of Contents for Collections of Professor Robert Latimer Bates

1 Industrial Rocks & Minerals: Labeled Drawers in Four Cabinets - a two page, two column list

2 Bates Industrial Rocks and Minerals Collection: Specimens in the Drawers - a detailed listing of specimens with rock descriptions, geologic age, localities, collectors, dates of collections and dimensions as available 76 pp.

   Cabinet 1   p 1
   Cabinet 2   p 22
   Cabinet 3   p 39
   Cabinet 4   p 59

3 Robert L. Bates Photoslide Collection

4 List of categories and the number of slides in each one-page

5 List of descriptions annotated on each photoslide 17 pp.
1. Industrial Rocks & Minerals
Labeled Drawers in Four Cabinets
  housed in basement of
  Mendenhall Laboratory

Cabinet 1
Granite 1
Granite 2
Granite 3
Granite 4
Basalt 1
Pumice 1
Perlite 1
Slate 1
Slate 2
Slate 3
Miscellaneous Test Sets
606.02
Marble 1
Marble 2
Verd Antique 1
Gravel 1
Gravel 2
Sandstone/Sand 1
Sandstone/Sand 2
Sandstone/Sand 3
Sandstone/Sand 4
Clay 1
Clay 2
Clay 3
Clay 4

Cabinet 2
Clay 5
Clay 6
Clay 7
Clay 8
Clay 9
Clay 10
Clay 11
Limestone-Dolomite 1
Limestone-Dolomite 2
Limestone-Dolomite 3
Limestone-Dolomite 4
Limestone-Dolomite 5
Limestone-Dolomite 6
Limestone-Dolomite 7
Limestone-Dolomite 8
Phosphate Rock 1
Phosphate Rock 2
Phosphate Rock 3
Gypsum 1
Gypsum 2
Gypsum 3
Gypsum 4
Salt 1
Empty Drawer

Cabinet 3
Nepheline/Syenite 1
Pegmatite 1
Spruce Pine 1
Spruce Pine 2
Mica 1
Lithium 1
Beryl 1  
Barite 1  
Barite-Magnesite 1  
Magnesite 1  
Fluorspar 1  
Fluorspar 2  
Olivine and Carbonatite 1  
Wollastonite & Kyanite 1  
Graphite 1  
Asbestos 1  
Asbestos 2  
Asbestos 3  
Asbestos 4  
Talc 1  
Talc 2  
Talc 3  
Talc 4  

Cabinet 4  
Talc 5  
Pyrophyllite 1  
Vermiculite 1  
Diatomite & Vermiculite 1  
Trona 1  
Trona 2  
Trona 3  
Potash 1  
Potash 2  
Potash 3  
Borax 1  
Sulfur 1  
Garnet 1  
Novaculite 1
2 Robert L. Bates Industrial Rock and Mineral Collection

Samples are listed with a rock or mineral name, popular or commercial name, geologic age, location, collector, collection date, sample description, comments, and other descriptors.

Cabinet 1

Granite 1

Red Granite (St. Cloud Red) - Proterozoic (mid-Keweenawan)
Granite City, Granite County, MN
JE Carman

Red Granite (Missouri Red) - Precambrian
St. Francis Mountains, Graniteville, Iron Co., MO
RL Bates, 1959

Ruby Red Granite (606-2.5)
Ortonville, MN
Ortonville Monument Works, 457 Monadnock Bldg, Chicago
3 sm. polished (1 side) spls. all have “#7”

Dark Gray Granite (“Pioneer Gray”) (606.2.7)
North Star Granite Co., Cold Spring, MN
1 polished side

Red Granite “J&L Mahogany Granite” (606-2.4)
Ortonville Monument Works, Ortonville MN
Chicago Office 733 Monadnock Bldg
2 sm polished (1 side) spls “#8”

Pink Granite (Pearl Pink)
MN
3 sm pcs (1 polished side) - as Mershon steps and balustrades

Pink Granite (Town Mountain Granite)
Quarry on Hoy Mtn. Stop 2 Field Trip,
4th FGIM, Austin TX
Burnet Co. TX
RL Bates 3/15/68
Gray Granite (St. Cloud Gray)  
Proterozoic, Mid-Keweenawan  
St. Cloud, MN  
Granite City, Granite Co. MN  
JE Carman  
1 polished side

Pink Granite (606-1.10)  
(fine-gr)  
Plymouth Quarries, Inc.  
Unpolished, seam face ashlar

Granite 2

Gray Granite (probably Devonian)  
Barre, VT, Rock of Ages Quarry, East Graniteville  
JE Carman  
2 spls (1 in tray) 1 side polished; the other (606-1.2)

Stone Mountain Granite (606-22 tray; 606-4 rock)  
Stone Mtn., GA

Quartz Monzonite (Mt. Airy Granite) 606.2  
Fist-sized

Biotite Granodiorite, med. white feldspar (Mt. Airy Granite)  
North Carolina Granite Corp.  
RO Utgard (1971-79)  
7 pcs with bag of “Gran-i-Grit” for poultry gizzards; 2 brochures

1. Mt Airy Gray Granite  
2. Mt. Airy “Dyed” (Black)  
3. Pink Granite (Balfour Pink)  
4. Pink Granite (Crystal Pink)  
Herman Stone Co. @ 1800 N. Gettysburg Ave, Dayton, OH or PO Box 4000, Mt. Airy, NC  
RL Bates  
4 spls in box - surface plates (to roll axles) - used for machine tool industry (see Note)

Granite #5
3 small slabs (1 side polished), no label
Granite 3

Swenson Gray Granite (606-1.5) some spms have #3
John Swenson Granite Co. Concord, NH (quarry)
Big slab with 4 polished edges + box with 7 sm spls with polished edges

Swenson’s Pink Granite
John Swenson Granite Co. Concord, NH (quarry)
Large slab with polished edges and 1/2 polished side + 6 sm spls

Red Granite (606-1.13)
Smith Granite Quarry
Westerly, Rhode Island
Willard Barry

Gray Granite
Sullivan Extra Fine-Gr., Blue-White Westerly Granite (#6)
Sullivan Granite Co. Quarry, Westerly, Rhode Island
Sm polished tile

Wallrock Schist
Barre, VT
RL Bates handwriting
One chunk split

Anorthosite (Blue Granite) with iridescent feldspar (labradorite)
No label

Granite 4

Pink-Gray Granite 606-1.7 (see Ashlar 606-1.10 in Granite 1 Drawer)
Plymouth Quarries, Inc.
Gray split face (large chunk)

Sappy split face Pink fine-gr. Granite (606-1.12)
Plymouth Quarries, Inc.

Biotite Granite (fine-gr.) 606-1.6
Westerly, RI
Wards Nat. Sci. Estab., Rochester, NY

Alkali Granite (med.- coarse gr.) 606.19 label; 606-2 on spm
Quincy, MA
Wards Nat. Sci. Estab., Rochester, NY
Rough slab
Gray Granite (prob. Mid-Devonian)
Fairmount Quarry, Stanstead Area, Que., Canada, nr. Beebe
RL Bates
IGC trip 9/72
2 pcs. with 1 polished side

2 Granites 1 polished side each (Red, Sweden; Dark, Africa)
From Yard of Fairmount Granite Ltd., Stanstead Area, Que.
RL Bates, IGC 9/72

Biotite Granite (Variscan - Carboniferous)
Cz Quarry Mráktín, w. of Telc, Moravia, Czechoslovakia
RL Bates, 10/75
For dimension stone

Gray Granite (Proterozoic)
Cz - Leskoun nr. Brno, Czechoslovakia
RL Bates 10/75
For crushed stone

Pink Granite
NC? Georgia? Salisbury?
RLB
Fist-sized, finished but not produced

**Basalt 1**

Black Granite (606-2.9)
3 sides polished

Black Granite (fine-gr.)
Diabase
Pennsylvania
2 sides polished

Pulaskite ("Blue Granite")
Big Rock Quarry, Arkansas
Lois Jones
GSA, 1967 Arkansas Field Trip

Basalt (Miocene)
Stara Vada, nr. Cheb, Czechoslovakia
2 surfaces weathered, for manufacturing, floor tiles & other products
Basalt (Triassic)
Somerset Co. NJ
Wards Nat Sci. Estab., Rochester, NY

Watchung Basalt (Triassic)
New Jersey
For traprock

Basalt (Miocene)
Stara Vada, nr. Cheb, (western) Czechoslovakia
RL Bates 10/75
Tile & other material, “cast and annealed from molten basalt”

Gray, porphyritic
Christchurch (New Zealand)
JM Schopf
For crushed stone

Vereinigte Porphybrüche (Rochlitzer Porphyr)
DDR (Germany)
Jim Schopf, 5/4/69
Pink porous rhyolite tile unpolished; description page in German

**Pumice 1**

Gray Pumice
Open pit, s. of Espanola NM
RL Bates 5/14/81
17th FGIM
Box with sm pcs

Gray Pumice
Santa Fe Pumice Co., 6 mi. e. of Los Alamos, NM
RL Bates 7/53
Box gravel size sieved + 7 small boxes

Pumice (unboxed) 100 [?]
No label

Perlite
Milford, UT
DG Tobin, 1958
Box with 1 lg + 4 smaller spls; lg pc has obsidian inclusions
Perlite
Milford, UT
DG Tobin, 1958
With inclusions of obsidian

Perlite?
Milford, UT
DG Tobin, 1958
Country rock of perlite? RO Utgard, '96; probably could've been tossed

Pumice (W2)
Millard Co. UT
Wards Nat. Sci. Estab., Rochester, NY
3X4 1/2X1 1/2"

Pumicite (sedimentary deposit of Pearlette Ash) - Pleistocene
N. of Wilmore, KS
DG Tobin, 1959
RO Utgard has citation
Abrasive for scouring

**Perlite 1**

Perlite
Socorro, NM
RL Bates
2 pcs

Expanded perlite
Socorro, NM
RL Bates?
4X6X2" box

Perlite
Socorro,NM
Elvin Thompson, 1955
7 spls of crude perlite

Perlite
Socorro?
8 sm plastic boxes of expanded perlite
Slate 1

Blue-Gray with ribboning, shiny (113.05)
Holed for roofing 8X16"

Slate, Unfading Green
O’Brien Bros. Slate Co. Greenville, NY (quarry & mining office)
101 Park Avenue NYC, NY
5X8” slate

Slate, Unfading Green
FC Sheldon Slate Co., Greenville, NY
5X5” tile

Slate (100)
Unfading Variegated Green and Purple
Vendor Slate Co., Easton, PA
5X11” tile

Slate (102)
Unfading Mottled Gray
Vendor Slate Co., Easton, PA

Slate (108)
Mettowee Weathering Green and Gray Slate
2 roofing tiles

Black Slate (Hard Vein)
Vendor Slate Co., Easton, PA
8X11”, ribboning clear

Slate (111)
Mettowee Weathering Dark Gray or Black
Vendor Slate Co. Easton, PA

Black Slate Weathered (Rustics)
Vendor Slate Co. Easton, PA
Tile

Slate
No. 1 Genuine Bangor Ribbon
Vendor Slate Co. Easton, PA
Tile
Black Roofing Slate  
Chapman Slate Co., Bethlehem, PA  
Quarry at Chapman’s Quarries, PA  
Sample of Genuine William Chapman Quarry Hard Vein  
From depth of 200 feet

Slate 2

Pennsylvania Slate Bangor #1  
Mill stock  

Pennsylvania Slate # 1 Clear Bangor  

#3 Vermont-New York Slate  
Unfading Mottled Gray  

#5 Slate  
Superior Weathering Purple

Slate 3

Slate  
West Chester, PA  
3 pcs

Martinsburg Slate (Ordovician)  
Capitol Slate Co., Bangor, PA  
Middle of w. corner of Delaware Water Gap 15’ quadrangle  
MP Weiss, 6/14/63  
Variegated red and green, fist-sized

Bl. Slate (Ordovician)  
Quarry at Granville, NY  
Capitol Slate Co. Bangor, PA  
RL Bates, 9/66  
2 pcs

Skiddaw Slate (Ordovician “containing Bryograptus”)  
Wales  
9/7/48  
Spm with slatey cleavage/fracture cleavage [stop 84]

Pyramid Brand Pennsylvania Slate  
Pen Argyll, PA  
Circular spl of structural slate
“Metamorphic Rock” (Archean)
Hillsboro, NC
Building Stone of Duke University
JE Carman
2 spls of garnetiferous, phyllitic “near schist”

Slate (606-10.3)
Structural Slate Co., Pen Argyl, PA
1 pc 3X3” black & gold structural slate; sea-green spatter structural slate (stained? glazed ?)

Miscellaneous Test Sets 606.02

Marble 1

Marble (Danby Imperial)
Danby, VT
RL Bates 9/3/74
White-green marble, with gold (micaceous) striations
From room and pillar mine

Marble
Danby Mine, VT
RL Bates 9/3/74
2 very white spls; 1 grayish white with streaks

Marble
Danby Mine, VT
RL Bates 9/3/74
3 1/2X4”“ dolomitic marble core (1 1/4”d)

Marble (606-5.13 - label; 606-12 rock)
Swanton, VT
Wards Nat. Sci. Est., Rochester, NY
Variegated (mainly red)

Marble (606.11 label; 606-14 rock)
Med. to coarse gr. with mica and pyrite
Gray (“Blue”) Marble, Gouverneur, NY
Wards Nat. Sci. Estab., Rochester, NY

White Marble (fine-gr.) 606-5.10
West Rutland, VT
1 sawed surface, iron-stained
Neshobe Gray Marble
Vermont Marble Co., Proctor, VT
2 tiles; 3X5” each, with 1 side polished
#1 “approved for hospital addition”
#2 Eckhardt Monumental Co., Toledo, OH

White Marble with gray streak
8x12” one inch thick slab

Micaceous Gray and White Marble
“White” Beaver Dam Marble (606-5.2 label; 606-1.4 rock)
Cockeysville, MD
Beaver Dam Marble Co., Baltimore, MD
1 polished, 1 sawn, 4 rough

Marble 2

White Marble, med. - coarse gr. (606-5.9 label; 606-12 on spm)
Tate, GA
Wards Nat. Sci. Estab., Rochester, NY

Pink Etowah & White Cherokee (early Paleozoic)
Murphy Marbles
Tate, GA
RL Bates 6/73
5 spls, cut slabs

Etowah Pink
Georgia Marble Co., Tate GA
RL Bates, G&M 670, 9/75
Slab

White Marble, med.-gr.
Marble Hill, GA
RL Bates, G &M 670, 9/75
2 lg rough spls, hi-grade for fine grinding

White Marble (606-5.3 label; 606-12 on core)
Ga. Marble Co. Tate, GA
Core spl

Solution Breccia
Ga. Marble Co., Tate, GA
RL Bates, 6/73
Gray Marble
6X8" polished slab of Ga. Marble

Georgia Gray and Vermont White Marbles
8 trays with 2 cut and polished spls (1 Ga. Gray; 1 Vt. White)

Verd Antique

"Vermont" Verd Antique
3 polished slabs ("2X5")

Vermont Verd Antique
RL Bates
Cut piece, "marble", actually serpentine; with "asbestoform" serpentine

Variegated Pink & White fine gr. Marble
Norway; from mill of Vermont Marble Co., Proctor, VT
RL Bates 8/20/79 (3)
Reference: Lance Meade

Rough Variegated Greenish-gray Verd Antique
Connemara Marble Quarry, Clifden Co., Galway, Ireland
RL Bates, 9/71

Carrara Marble
Italy
Charles Summerson, 1966
2 sm cut pcs, gray white

Marbles (Upper Devonian)
Jedovnice, nr. Brno, Czechoslovakia (from Czech. Geol. Survey)
RL Bates 10/75
Spls evaluated for production: split core (polished) (V-9 47.7m); broken slab with lacquer on surface, subrectangular-ovoid, wavy texture, greenish yellow (V-10) + 3rd pc

Gray/Red Faulted Brecciated Marble (# 65 L1)
? Jedovnice? Czechoslovakia?

Black Limestone Marble with Stringocephalus (brachiopod)
Josefof, nr. Brno, Czechoslovakia (from Czech. Geol. Survey)
Circular cut, 4 1/2"d (3/8" thick)
Gray Marble with Red Brown matrix, brecciated [v 13 21, Io-21, H59L]
Jedovnice, Czechoslovakia
RL Bates, 10/75

“Campan Melange Vert” Marble
Espiadet Quarries, Campan Valley, Hautes Pyrenees, France
RL Bates 8/30/74
From Vermont Marble Co. mill, Proctor, VT
Ref: Lance Meade
Caution: may have “jumped” box

Unlabeled Samples
3 Polished Marbles (#1 white gray-greenish; #2 fine-gr. buff with pink veins & calcite-filled veins - not shiny; #3 polished gray ls. with shell hash)

Gravel 1
Gravel after heavy mineral separation (HMS)
From granites, gneiss, ls., quartzite, etc.
Killins Gravel Co., Ann Arbor MI
RL Bates 1957
3 box stockpile gravel: pea-, pebble-, cobble-size; 1 box “reject gravel” (chert & shale)

Gravel
American Aggregates, Frank Rd.
Crushed Stone in tray

Gravel
Ohio Ferroalloys Corp. Brilliant Plant, Brilliant, OH
G. McKenzie
Man-made ferrosilicon (Fe25%, Si 75%)

Gravel
Ohio Ferroalloys Corp. Brilliant Plant, Brilliant, OH
G. McKenzie
Man-made 98% silicon (2 spms)

Gravel 2
Columbus Limestone
Frank Road - American Aggregates Quarry
Aggregate (gravel/crushed) from stockpile
In large wooden box
Knox County
Agglutinated treated (screened) gravel (cardboard box) glacial

Sandstone/Sand 1

St. Peter Ss. Ottawa, Illinois
Tray of fracing (fracturing) sand

Mansfield Fm. (Pottsville, Lower Pennsylvanian)
General Refractories Quarry
SW of Shoals, Ind.
RL Bates, 1957
Lg 3X4X1 1/2” yellow conglomerate for hi-silica stone

Sylvania Ss. (Devonian)
Old Toledo Quarry, France Stone Co.
RL Bates 9/76
3X4X1” pure silicic ss.

Sandstone (pure white, fine-gr., friable)
Klondike, MO
Glass sand (4X3X2”; 2X1 1/2X 1”)
Wards Nat. Sci. Estab., Rochester, NY

Lt. buff Oil Creek Ss. (mid-Ordovician)
Quarry of Pennsylvania Glass Sand Corp, Johnston Co., OK
RL Bates 13th FGIM, 5/14/77
V. fine-gr.

Sylvania Ss. (Devonian)
Silica, Lucas Co., OH
3pcs (1X1X1” – traingular)

Oriskany Fm. (Devonian)
Pennsylvania Glass Sand Co. Quarry
Berkeley, WV
RL Bates 6/67
White ss. with fossil molds

St. Peter Ss. ?
St. Louis area
Stop 8, AAPG field trip, 4/24/66
St. Peter (Ordovician - Chazyan)
Upper Mississippi Valley
Med-fine gr. sand

Lens blanks
American Optical Co. Southbridge, MA
G.E. Moore

Green Sand (606-15.18)
Birmingham, NJ
Wards Nat. Sci. Estab., Rochester, NY
Sm spl, 8 sample boxes, disaggregated sands

Molding Sand
#3 red, for med. wt. gray iron castings
LK Brown, Zanesville, OH
8 sm plastic boxes of molding sand

# 7 Sand
Downerd Glass Sand Co., Zanesville, OH
Sand blast sand (in plastic box)

# “0” Sand
Downerd Glass Sand Co., Zanesville, OH
Glass sand (in 8 plastic boxes)

Unlabeled plastic box of sand
Slightly coarser than “0”

Sandstone/Sand 2

Oriskany Ss. (Devonian)
Pennsylvania Glass Sand Co.
Berkeley, WV
CH Summerson 6/67
Tray with v. lg + 2 smaller pcs

Setters Quartzite (with muscovite and tourmaline)
1 mile s. of Marriottsville, MD
Dimension Stone
RL Bates 6/14/67

Connoquenessing or Massillon Ss. (Pottsville, L. Pennsylvanian)
Briar Hill Stone Co., Glenmont, Holmes Co. OH
6X8X1” cut slab
Artificially grown Quartz crystal (for piezos)
Sawyer Research, East Lake, OH
Carl Wancho (G&M 100 student), summer 1975

Potsdam Ss. (Cambrian)
St. Canut, Quebec
Quarry of Industan, Ltd
RL Bates IGC field trip, stop 2, 9/72

Black Flint pebble with white weathering rind
From gravel dredged and moved to Rotterdam by BOS Kalis-Westminster and processed for aggregate
RL Bates, 10/75
From North Sea bottom about 60 ft off east coast of England

Fracing (Fracturing) Sand
Dowell Inc. display bottles: 10-20 mesh; 20-40 mesh; 40-60 mesh

Fine-grained Sand
Westralian Sand Ltd, Capel, West. Australia
Tele 93905
Plastic display bag: (6 spls) 1-ore as mined, 2-Ilmenite, 3-HYTI 70, 4-HYTI 91, 5-Ceramic Zircon, 6 Coarse Zircons

Sandstone/Sand 3

Split Rock Sandstone
Ohio Quarries Co., Union Trust Bldg. Cleveland, OH
Cut slab 6X8X1”

Red Sandstone from Potsdam, NY (606-15.11; 606-4.2)
Wards Nat. Sci. Estab., Rochester, NY

Micaceous Brownstone (Triassic) from Portland, CT
(606-15.4)
Wards Nat. Sci. Estab., Rochester, NY

Brownstone (Triassic) Field number 27.35
Connecticut River Valley
Building Stone
Fond du Lac Ss. (PreC or C)
Port Wing, Wisconsin
(Port Wing Brownstone)
Produced by Port Wing Brownstone Co., 510-11 Plymouth Bldg., Minneapolis, MN
Chemical Analysis by WW Daniels
SiO2 89.3; Al2O3 6.05; Fe2O3 1.41; CaO tr.; MgO tr.; KO 2.12; Na2O
0.59 = total of 99.50%
"to Chicago as Connecticut Brownstone is to NYC"
Used for Pillsbury Hall, University of Minnesota

Berea Ss. (606-41)
Birmingham warm tone buff ss.
Ohio Quarries Co., 1217 Union Trust Bldg. Cleveland, OH
2 lg slabs 6X8X1”

Red Sandstone (606-16.1 label; 606-39 rock; p127 on rock & label)
Mansfield, OH
Dimension stone or ss. brick with alteration rind

Berea Ss. (606-16.2 label; p126 on label and rock)
Berea, OH
Birmingham warm tone buff ss.
6 slabs: 2 12X4X1” with 1 cut side

Sandstone/Sand 4

Genesee Valley Bluestone (Devonian) label 606-16.4; 606-40 rock
Gray siltstone-sandstone
For exterior sills, steps, coping, etc. “sand sawed finish”
Sawn block 1 1/2X3 1/2X5”

Non-slip Blue Stone Interior (Greywacke)
Fine sandstone, American Blue Stone Corp.
Stair tread
Box with 10 pcs; 1 1/2X1 1/2X1”

Naturcleft Flagging
American Blue Stone Co., 101 Park Avenue, NYC
For porch & terrace floors, garden walks (comes in 14 colors)
3X5X3/4”

Asphaltic Ss. (Pennsylvanian)
Quarry n. of Brownsville, KY nr. Sweeden, KY
RL Bates, 1959
Berea Ss.
South Amherst, OH
Box with 3 cores 3/4X3” & two 3/4 X1+”
RL Bates
Spsms for salesman

Sharon Conglomerate (L. Pottsville, Pennsylvanian) = Olean
Brandywine Creek, OH
Lg irregular chunk 3X3X4”

Gray, Yellow, Micaceous Ss.
L. Freeport Ss. (Allegheny, Pennsylvanian)
Doanville, OH
1 3/4X4X5”

Kettle River Ss. (label 606-15.6; rock 606-4.2)
Pink Ss. medium gr.
Sandstone Quarries Co., Plymouth Bldg., Minneapolis, MN
4X4X2”

Buena Vista Ss. (Mississippian)
McDermott, OH
Walker Stone Co.
CH Summerson 9/74
3 pcs: 1 1/4X3X5” and two smaller
Impregnated with resin and coated for laboratory benches

?Massillon Ss. (Pennsylvanian)
Briar Hill Stone Co.
3/4X4X6” sawn slab

Clay 1

Fullers Earth, Attapulgite
Attapulgus, GA
Wards Nat. Sci. Estab., Rochester, NY
3X4X1” rough

Diaspore
Swiss, MO
Beige to Gray
Cheltenham Clay
GE Moore
2 1/2X2 1/2X3”
Oolitic Flint Clay, Diaspore
Cheltenham
4X4X3” irregular chunk

Oolitic, unusual Flint Clay
Swiss, MO
GE Moore
2 1/2X2 1/2X3/4”

Hi-aluminum Clay
Boehmite-diaspore var.
Swiss, MO
GE Moore
Al2O3 70-72%
In one pit nr. Swiss, MO
2 pcs: 1 1/2X1 1/2X 1 1/2” ea.

Diaspore
Swiss, MO
GE Moore
Box with 3 irregular shaped 2 1/2X3X 1 1/2”
Various textures: flint clay oolitic; massive diaspore; weathered spm with weathered oolites missing

Kaolin, Tuscaloosa Fm. (basal Cretaceous)
Deepstep, GA
RL Bates 9/73
Box with top: 3X4xX1”

Kaolinized grains
Blackpool pit of ECLP, Cornwall, England
RL Bates 7/70
Box of residual kaolin bits

Kaolin “ore” Kaolinized Arkose (Carboniferous)
Kazanejov, 25 km n. of Plzen, Czechoslovakia
RL Bates 10/75
Box of disaggregated with qtz pebbles

Filtered Paper Clay
Kazanejov, 25 km n. of Plzen, Czechoslovakia
RL Bates, 10/75
From Plant
Clay 2

Bentonite (mid-Tertiary)
Landschut area, nr. Munich, Bavaria (West Germany)
RL Bates, 5/76
In lenses along trend, probably alluvial from ashfalls
Box with 6 sm spls

Bentonite
Colony Plant, Baroid Sales Div., National Lead Co.
20 mi. from Belle Fourche, WY
RL Bates, 1955
Box with several sm spls

Porter Creek Clay (Paleocene)
Olmstead, IL (SSE of St. Louis, MO)
RL Bates, 1959
Non-swelling bentonitic clay (adsorptive)
2X3X1 1/2" + others

Bentonite drilling mud additive (Cretaceous)
Benton Clay Co., Casper, WY
Covered tray 4X5X1"
Co. also produces granular binder for foundry sand

Clayspur Bentonite (base of Frontier Fm.- mid Cretaceous)
Quarry, Emigrant Gap, WY - Sec.10 T33N R81W
RL Bates and JNV, 1955
Box of loose pcs

Bentonite
Bidshochie Fm., AZ
Mr. Little, Spring, 1958

Bedford Shale (Mississippian)
Clay Craft Co. pit, e. of airport, Columbus, OH
For brick and tile
Box of loose pieces

Bedford Shale (Mississippian)
Rocky Fork, Gaahanna, OH
RO Utgard 1982
Lg box with loose pcs
Granular Bentonite
        Benton Clay Co., Casper, WY
        Sm plastic box

   Clay 3

   Sciotoville Clay ("Pink Eye")
   Label 606-17.8; 2387 label; on 1 chunk 606-45
   Red River, KY
   Lg tray with 12 spms, mottled red gray

   Fire Clay 606-17.16 label;606-19 rock
   Golden, CO
   Ward Nat. Sci. Estab., Rochester, NY
   Laminated Black Shale

   Mississinewa Dolomitic Mudstone
   Checky, massive; no longer used here; according to CH Summerson
   This is rock on which Indiana rock wool got started
   3X5X2 1/2" chunk

   Martinsburg Fm. (Ordovician)
   Pit off Cushwa Face Brick Co., Williamsport, Ind.
   MP Weiss 6/17/63 on NSF Appalachian Conference
   Tray with 2 spms - Weathered zone ca. 40' deep; 60-70% of weathered zone used for brick;
   entire balance sold 12 mi. RR for Portland cement.

   Diaspore-bearing Clay
   Clearfield, PA
   RL Bates, 11/63
   For Al content in plant of Atlantic Cement Co., Ravenna, NY
   Not refractory grade

   Martinsburg Shale
   E. Maryland
   2 sm souvenir red bricks (Calvert & Cushwa);
   Lower fresh part to cement plant; upper part weathered

   Unlabeled
   Sm tray with 5 subspherical cobbles

   Unlabeled 2X4X1" clay slab
Clay 4

Brookville #4 Clay (Pottsville Fm.)
Shawnee, OH
RL Bates, 8/8/60
Rail-shipped to Claycraft Plant, Columbus, OH for refractory brick
4 pcs

Clarion Fire Clay, below Clarion Coal #4, Pennsylvanian)
606-17.2 label; one pc has label 606-44
Nr. McArthur, Vinton Co., OH
Gift of W. Stout
Tray, brown clay 5 pcs 1X1x1” and smaller

Lawrence Clay
606-17.11 label; 606-44 label
Sec 18 Elizabeth Township, Lawrence Co., OH
1X2X4”

Lower Kittanning Clay - plastic (Allegheny, Pennsylvanian)
606-17.4 label & 2383; one chunk labeled 2383
Mineral City, Tuscarawas Co. OH
Dark gray clay pc: 1X1X1”

Bolivar Clay - “Salina Clay” (Pennsylvanian, Allegheny)
606-17.0 label; 2485
Salina, Westmoreland Co. PA
1X1 1/2X1 1/2” mottled lt. brown and brown

Sciotoville Clay, Semi Flint (Pottsville, Pennsylvanian)
606-17.1 label; 9352 rock & label
Carter Co. KY
3X2X6”

Lawrence Clay (gray, plastic)
606-17.3 label
Lawrence Clay Mine, sec 18 Elizabeth Township, Lawrence Co. OH
Dark gray 4X2 1/2X2 1/2”

Mercer Clay: Higrade Fire Clay (Pennsylvanian)
Clarion Co. PA
1X1 1/2X2”
Lower Kittanning Fire Clay (Allegheny, Pennsylvanian)
Below # 5 coal (Lower Kittanning), Oak Hill, Jackson Co. OH
5/10/16 W Stout
Pyro Clay Products Co.

Lower Kittanning Flint Clay
Snake Run, SW Crooksville, Perry Co., OH
GE Moore, 5/29/51
Tray with 4 pcs

Unlabeled Brown Clay with slickened surfaces
606-17.10

Cabinet 2

Clay 5

Wildstein Fm. (Pliocene)
Nová Ves 10.5 km NNE of Cheb, W. Bohemia, Czechoslovakia
RL Bates, 10/75
Box of “Nero Clay” with plant fossils (wood)
Reddish-brown & lt weight, it burns white

Wildstein Fm. (Pliocene)
Nová Ves 10.5 km NNE of Cheb, W. Bohemia, Czechoslovakia
RL Bates, 10/75
Box of ball clay, gray-white with muscovite specks

Calcined clay (chamottis)
Nová Ves 10.5 km NNE of Cheb, W. Bohemia, Czechoslovakia
RL Bates, 10/75
For grinding & with refractory clay to manufacture fire brick

Sets of 10 spms
1 Residual Kaolin, Spruce Pine NC
2a Swelling bentonite, Mowry Fm. (upper Cretaceous), NE WY
2b As above, ground for drilling mud
3 Non-swelling bentonite, Bidohochie Fm. (Pliocene), NE AZ
4 Marine clay, Porters Creek Clay (Paleocene) - adsorbent, South IL
5 Marine clay- ceramic, Raritan Fm. (Cretaceous), NJ coastal plain
6 Underclay, Lower Kittanning (Pennsylvanian), Tuscarawas Co. OH
7 Underclay, Sciotoville Ball Clay (Pennsylvanian), KY
8 Underclay, good for bonding clay & molding sand, E. OH
9 Marine clay, Bedford Sh. (Mississippian), Claycraft pit, Columbus OH
Clay 6
5 trays of 10 sample sets as in Clay 5 Drawer

Clay 7
Bauxite, Saline Co. Arkansas
RL Bates, 2/74 SEG field trip
Box of nepheline syenite degrading to kaolinitic clay; 5 spms: nepheline to slightly weathered, med.-weathered, well-weathered and kaolinitic clay.

Kaolinized Alaskite (coarse granite)
Spruce Pine, NC

Kaolin Ore
Brushy Mountain Mine, Harris Mining Co., Spruce Pine NC
RL Bates, G&M 670, 9/75
Tray with palmable spls & box of finer spms, all same spl. Deeply weathered Alaskite on terraces above South Toe River

Residual Clay (white clay), Halloysite acc. to Co. geologist
Corduroy Ridge pit, Harris Mining Co., Spruce Pine, NC
RL Bates writing

Tourmalinized wallrock
Devonian metasediments
Blackpool pit, ECLP, Cornwall, England,
RL Bates, 7/74

Calcined Kaolin “molochite”
Blackpool Plant, ECLP, Cornwall, England
RL Bates 7/74
“a special refractory product”

Kaolinized wallrock
Blackpool pit, ECLP, Cornwall, England,
Devonian metasediments
RL Bates, 7/74

Kaolin
Blackpool Plant, ECLP, Cornwall, England
Sm plastic bag of China Clay after filtration
RL Bates, 7/74
Fossil shark teeth (Eocene)
Georgia Kaolin Co., Dry Branch GA
Sm bag of 4 teeth

Clay 8

Ione Clay
Airplane pit, Gladding-McBean & Co., Ione, CA
PH Mitchell, 1961
Box of light-brown clay

Lt. Gray Clay
McGuire pit, Gladding-McBean & Co., Ione, CA
PH Mitchell, 1961

White Clay
Laterite pit, Gladding-McBean & Co., Ione, CA
PH Mitchell, 1961
Box of reddish-brown, yellow clay

Ione Clay
McGuire pit, Gladding McBean & Co., Ione, CA
PH Mitchell, 1961
Sm box

Clay
Airplane pit, Gladding-McBean & Co., Ione, CA
PH Mitchell, 1961
Box with sm pcs

Clay (white)
Airplane pit, Gladding-McBean & Co., Ione, CA
PH Mitchell, 1961

Clay 9

Unlabeled box with 6 spls - complete range of Ione, CA
Gladding-McBean & Co., Ione, CA

Lincoln Fire Clay, Ione Fm.
Lincoln, Placer Co. CA
PH Mitchell, 1961
2 trays, yellowish white
GSA Bull. 176, p 136
Clay 10

Kittanning Clay
Putnam Hill, Zanesville, OH
5X4X3”

Oak Hill, Ohio Flint Clay
2 1/2X3X3” & 1 1/4X1 1/4X 3/4” triangular shaped
Worm-eaten label

Sciotoville Flint Clay (one spm), (Pottsville - Pennsylvanian)
Geepart Sta., Scioto Co. OH
March 1916 (Probably collected by W. Stout)
Midway betw. Sharon & Quakerstown Coal - same horizon as Sciotoville semi Flint Clay
2 labels, one says 2 spms
Pyro Clay Products

Clay 11

Clay
Laterite pit, Gladding-McBean & Co., Ione, CA
Lg plastic bag of red & cream mottled clay

Limestone-Dolomite 1

Oolitic Lacustrine Ls., Green River Fm. (Eocene)
Temple Hill Quarry, Manti, UT
RO Utgard, 7/84
Block, sawed on 4 sides, 3X3X6”

Potomac Marble (Triassic fanglomerate with lower Paleozoic pebbles)
Dr. Cloos unnumbered stop US 40, 2 miles w. of Frederick, MD (at Mrs. Roses Steakhouse)
MP Weiss 6/13/63; NSF Appalachian Conference
Box of 5 pcs

Jacksonburg Ls. (Mid-Ordovician)
Lehigh Portland Cement Co. Quarry, Ormrod FL
RL Bates writing
Cement Rock

Black Ls. (Ord)
606-11.12 label; 606-25 rock.
Isle La Motte, VT
Wards Nat. Sci. Estab., Rochester, NY
Unlabeled
Petroliferous Conglomeratic, Fossiliferous Ls.
Dark brown and white

6 bottles of cement manufacturing sequence
Bottle labels say Alpha Portland Cement CO.
1 crushed Maxville Ls. (Mississippian)
2 Lower Kittanning clay
3 Gypsum
4 Ground Raw Mix
5 Clinker
6 Portland Cement

**Limestone-Dolomite 2**

Leuders Ls.
Wichita Group (Permian)
Cordova Shell (Texas Ls.) by Texas Quarries, Inc., Box 91, Austin, TX
Lueders, Jones Co. & Ballinger, Runnels Co., North Central Texas
5 sawed slabs: 1X4X5 - Buff Leuders; Texas Limestone (West Texas Stone Co. PO Box 412, Austin, TX)- 2 sps; Cordova Green from Texas Limestone Co. 2 slabs

Mankato Stone, Oneota Dolomite (Ordovician)
T.R. Caughlin Co. - Quarrymen, Mankato,MN
Sawed sps: Cream Mankato - 2 spms; Gray Mankato Stone (606-12.13); Yellow Mankato Stone (606-12.12)

Oneota Dolomite (Ordovician)
“Kasota” Stone
Babcock & Wilcox, Kasota, MN
1 slab Plain Kasota Pink (606-29) 3 1/2X5X 1/2”; 2 slabs Grained Kasota Pink (606-12.17 rock; 606-17 box); 2 slabs Buff Kasota (606-12.18) & asstd prism and smaller cuts

Black Ls. “Water Lime” (606-13.9; label)
Rosendale, NY
Wards Nat. Sci. Estab., Rochester, NY

**Limestone-Dolomite 3**

Chalk (Cretaceous)
Dover Cliffs, England
Wards Nat. Sci. Estab., Rochester, NY
Lithographic Ls. (Jurassic - Solenhofen?) 606-11.4 label; 606-25 rock
Bavaria, Germany
Polished surface

Sucrosic Tan Dolomite
Pfizer Quarry nr. Bennettsbridge, Co. Kilkenny, Ireland
RL Bates, 9/71
Box with 2 spls

"Venetian Pavement" (man-made); Devonian Breccia; Proterozoic Marble from Silesia; and
other rocks; Muschelkalk in polystyrene
Quarry and fabrication plant Mrakotin, w. of Telc, Moravia, Czechoslovakia
RL Bates 10/75

Purbeck Limestone (marble?) Upper Jurassic
Isle of Purbeck, England
RL Bates 5/63
"Fresh water dinosaur track, fish fossils, bones (spec. period)"
2 spls with many different layers of different lithologies

Palliser Ls. (Devonian)
Quarry nr. Edmonton, Alberta
Grahame Larson, 1973
3 spls; cement raw material; see Larson slides

Limestone (Lower Devonian)
Quarry in Certory, Schody, SW of Prague, Czechoslovakia
RL Bates, 10/75
Reef complex, coarse texture, crystalline gray limestone
High purity for cement

**Limestone-Dolomite 4**

Cedarville Dolomite (Mid-Silurian)
Quarry nr. Phillipsburg, OH
OAS trip 4/22/67 RL Bates writing
According to Bob Alberts stone is good for flux stone and aggregate

Tan, Lower Maxville Ls. (Mississippian)
Chester Hill Quarry
RL Bates 9/23/70
From storage pile
Columbus Limestone (Devonian)  
Marble Cliffs Quarry, Columbus OH  
RL Bates, 2/53  
1X1X1”; Steel mill flux stone - 4”

San Antonio Fm. - Senonian (Upper Cretaceous)  
Approx. 11 km e. of Puerto La Cruz, in E. Venezuela roadcut of Cumara Hwy  
Box with 2 spms; used for cement rock

Columbus Limestone (Devonian)  
Barberton Limestone Mine  
MP Weiss 2/21/59  
Dark gray ls.

Upper Silurian Dolostone  
Maumee Quarry, Maumee, OH  
RL Bates 9/22/68  
6 spms in box

Brassfield Ls. (Lower Silurian) after beneficiation  
Highland Stone Division, w. of Hillsboro, OH  
Sm box with crushed ls. aggregate

Guelph Fm. (Niagaran - mid-Silurian)  
Ohio Lime Co. Quarry, Woodville, OH  
RL Bates, 10/52  
Box with 2 spls - high purity dolostone

Ocala Ls.  
Medusa Cement Co. Quarry, nr. Churchfield, GA  
RL Bates, 6/73  
Cement raw material
Limestone-Dolomite 5

Brassfield Ls. (Lower Silurian)
Southwestern Portland Cement Co., Fairborn, OH
RL Bates, 9/21/79
For cement

Austin Chalk (Upper Cretaceous)
The Longhorn Portland Cement Co., San Antonio TX
Mr. Gaines Voigt
Cement rock used without admixture, 3X3X4" chunk

Greenbrier Ls. (Mississippian)
Greer Ls. Mine, 11 mi. SE of Morgantown, WV
RL Bates writing
Box with 3 pcs

Dark Gray Limestone (Mississippian)
Quarry of Florida Rock Ind., Rome GA
RL Bates, 4/76
Geologic section: Floyd Sh. 30-40 ft; Upper ls. cement 70 ft; Shaley ls. 20-25 ft; Lower ls. unit A cement 110 ft (below specs); Silurian ls. ags. 30-35 ft; Lower ls. unit B cement below.

Ocala Ls. (Eocene)
Quarry of Dixie Lime and Stone Co., nr. Sumterville, FL
RL Bates, 5/72, Univ. South Florida trip
Raw material for lime

Plattin Ls. (Mid-Ordovician)
Marquette Cement Mfg. Co., Cape Girardeau, MO
RL Bates, 3/2/60
gray-green, fine texture, combined with Mississippi R. flood plain clay

Maxville Ls. (Mississippian)
606-12.2
Alpha Portland Cement Co. Ironton OH
Sec. 26, T1N R18W

Loyalhanna Sandy Ls.
Quarry Laurel Hill, PA, Hwy 31
RL Bates 7/75

Limestone, Gray, Fossiliferous with Nautiloid Cephalopods
Quarry, Kaiser Cement Co. Red Mountain, n. of Kendall, ne of Bellingham, WA
RL Bates, 1965
Niagaran Dolomite, lt gray, porous
Quarry, National Lime & Stone Co., Buckland, Anglaize Co., OH
RL Bates, 9/76
3X5” chunk

Kokomo Dolomitic Ls. (Upper Silurian)
Quarry, Yeoman Stone Co., nc Indiana
Crushed for aggregate; 3X6X1 1/2”, finely laminated

**Limestone-Dolomite 6**

Glen Dean Ls. (Mississippian)
Melzer Bros. Quarry, 7 mi w. of English, Indiana
RL Bates, 1957
3X5X3/4”, for crushed stone

Coral Ls. (606-25 rock; 606-11.11)
Key Largo, FL
Wards Nat. Sci. Estab., Rochester, NY

Greenbrier Ls. (Mississippian)
Greer Ls. Mine, 11 mi SE of Morgantown, WV
RL Bates, SE section GSA field trip, 5/18/57
Dark gray, 3X5X1 1/2”

Niagaran Dolomite
Woodville Lime & Chemical Co. quarry, Woodville OH
RL Bates, 9/76

Limestone (Jurassic)
Isle of Portland, England
RL Bates, 5/63
2 pcs of Portland stone, 1 is cut, the other weathered
Cut stone w/lg well-preserved pelecypod; used cut & rough in construction & dimension stone.

Galena in Bonne Terre Dolomite
St. Joseph Lead Co. mine, Bonne Terre, MO
RL Bates, 1959
Run of mine, but richer than average

Limestones, St. Louis area
RL Bates, 4/24/66, AAPG trip
4 (once 5) pcs: 31 St. Louis Ls (missing); #2 & 3 cherty Salem Ls. (Mississippian);
#4 Chouteau ? Ls. of stop 5; $5 Plattin Ls., stop 6
Tennessee Marble, Holston Ls. (Ordovician)  
Knoxville, TN  
3 1/2X6X1/2” polished slab, crinoids and stylolites  
OSU natatorium finished in this

Tennessee Marble, Holston Ls. (Ordovician)  
Knoxville, TN  
Reddish brown spms in tray

Tennessee Marble, Holston Ls. (Ordovician)  
Knoxville, TN  
7 polished spls: gray & dark reddish-brown stylolitic 2 1/2X4X1; + 6 squares Houlston Pink

Limestone-Dolomite 7

Upper Maxville (Mississippian)  
Chesterhill Quarry  
RL Bates 9/23/70  
3X4X1” rough from storage pile

7 trays with 3 spls each  
1 Greenbrier Ls., dense gray; Greer Mine, nr. Morgantown WV, aggregate stone  
2 New Market Ls. (Ordovician), VA dense med.-gray, hi-calcium stone  
3 Columbus Ls., Marble Cliffs Quarry, lt. buff, hi-calcium stone, steel mill flux

Limestone-Dolomite 8

Brassfield Ls. (Silurian -Alexandrian) 13162 - rock & label  
Goes Sta., Greene Co. OH  
RL Bates writinig  
1 1/2X3X5” rough

Kokomo Dolomitic Ls.  
Tray of crushed spls  
Stop 2  
Not acceptable by Indiana Hwy Dept., because shaley laminations split  
Used by county

Spergen Ls. (Mississippian) - “Indiana Ls.”  
S. of Bloomington, IN  
Indiana Ls. Co., Bedford, IN  
10 squares (3X3X3/4” cut + 7 spls with different labels on back  
1 variegated smooth finish Indiana Ls., Salem Fm.; 2 Select gray, smooth; 3 rustic buff; 4 rustic gray; 5 Standard gray smooth; 6 Standard buff smooth; 7 Gothic smooth
Unlabeled Indiana Ls. 4X8X1" cut

Phosphate Rock 1

Fertilizer spl Kit
Smith Agricultural Chemical Co., Columbus, OH;
Saginaw, MI; Indianapolis, IN; Holland, MI Trademark is SACCO
12 spls: 1 Sulfate of Ammonia; 2 Dolomite; 3 Superphosphate; 4 Sulfur; 5 SACCO 2-12-6;
6 Cyanimid ; 7 20% superphosphate; 8 humus; 9 Sacco 0-14-6; 10 Phosphate rock; 11 Potash;
12 Nitrate of soda

Phosphoria Fm. - Permian
Conda, Idaho
Wards Nat. Sci. Estab., Rochester, NY
Spls of Phosphorite in tray

Oolitic Phosphate Rock
Conda, Idaho
Wards Nat. Sci. Estab., Rochester, NY

Phosphorite, "Oolitic" with Calcite veins
Conda, Idaho
Wards Nat. Sci. Estab., Rochester, NY

Phosphate Rock 2

Bone Valley Fm.
Noralyn mine, IMC corp. FL
RL Bates, FGIM trip 4/30/71
Phosphate rock spls, with sm box of shark teeth, a large bone (whale) & odd (manatee?) tooth

Coarse Pebble Phosphate rock with large shark tooth and manatee teeth
Bonnie Lake mine, Davison Chemical Co., Polk Co. FL
RL Bates, 3/56

Upper Bone Valley Fm., leached zone
Homeland mine, Polk Co., FL
RL Bates 3/56
Quartz sand, aluminum phosphate, and some clay

Limonitic and Manganiferous Sand & Consolidated Sand
Bonnie Lake mine, Polk Co., FL
RL Bates, 2/56
Overburden
Fine-pebble Phosphate Rock
Homeland mine, Polk Co., FL
RL Bates, 3/56
In bottle and 2 consolidated pcs, and 8 small plastic boxes

Fine-pebble Phosphate Rock
Homeland mine of VA Carolina Chemical Co., Polk Co., FL
Splts with bed clay and manatee bone

Hawthorn Ls. (below Bone Valley Pebble Phosphate)
IMC Kingsford mine
RL Bates writing; 5/13/72
Univ. S. Florida field trip
Weathered sandy spl.

**Phosphate Rock 3**

Cooper Marl and Nodular Phosphate Rock (Oligocene)
South Carolina
Freeman Weiss, 1962
Within 6 ft of Ashley River level on bank
See Malde, HE, 1959; USGS Bull 1079

Phosphate Rock (796)
Ashley River, SC
2 chunks

Phosphate Rock (9345) Tertiary
Florida
Lg chunk

Phosphate Rock (11844)
Nelson Co. VA
Al Smith
Heavy chunk

Phosphate Rock (15101), Ordovician
Mt. Pleasant, Maury Co., TN
Fed. Chem Co., Columbus OH
82% CaPO4

Sedimentary Phosphorite
E-191; 606-62 on rock
Apatite
Templeton, Quebec, Canada
Ward Nat. Sci. Estab., Rochester, NY
Lg 3X4X1 1/2 & 2 sples 1x1x1"

Phosphorite (Pebble Conglomerate)
Brewster, FL
2 bottles and 7 sm plastic boxes

**Gypsum 1**

Gypsum (Satin Spar & Massive)
Michigan Fm. (Mississippian)
Kentwood mine, Geo Pacific, Grand Rapids MI
RL Bates 5/11/73 E-central sect. NAGT
Box with pcs of satin spar and 5 massive chunks

Gypsum (Permian)
Best Gypsum Quarry
Top of Gypsum Hills, 8 mi SW of Medicine Lodge, KS
CSP

Gypsum var. Alabaster (606-14.4)
6 cut slabs, 1 is satin spar

Anhydrite with Dolomite and Gypsum (?)
Syracuse Fm. (Upper Silurian)
US Gypsum Co. mine, Oakfield NY
W Leutze, 9/57
4 core chunks from dump

Massive Rock Gypsum
Windsor, Nova Scotia
Western Reserve University, Geologic Museum, collection of HP Cushing

Anhydrite
Plaster City, CA
Western Reserve University, collections of HP Cushing
Vernon Fm. (Upper Silurian), below Syracuse Fm.
W Leutze, 9/57
From dump of US Gypsum Co. mine, Oakfield, NY
Tray with anhydrite and green shale, veins and cores
Gypsum 2

Gypsum (rock) 606-14.7
Grand Rapids, MI
Wards Nat. Sci. Estab., Rochester NY
3X4X2” chunk

Anhydrite, Castille Fm. (Permian)
Stop 6 Trans-Pecos 11/8/49
Banded gypsum [anhydrite] with dk. brown (organic-rich) calcareous bands - “varves”
Guidebook p. 47

Gypsum
Celotex Corp. mine, Marblehead Peninsula OH
Rex Lane 2/82 (RO Utgard student), report for GS 660.02
3X2X1”

Gypsum var. Rock Gypsum
Grand Rapids, MI
Wards Nat. Sci. Estab. Rochester, NY
Box with 20 pcs

Gypsum (Upper Silurian)
Celotex mine, Port Clinton, OH
KAM (student in GS 660.02) 1/30/85
Plastic bag with gypsum

Unlabeled spl Satin Spar
2X1X1”

Gypsum
Oakfield, OH
Western Reserve University collections of HP Cushing
3 chunks: 4X4X1 1/2”

Anhydrite (606-14.9)
Mound House NV
Wards Nat. Sci. Estab., Rochester NY
3X4X1 1/2”
Bl. gray anhydrite
Gypsum 3

Anhydrite (606-14.10)
Hants Co. Nova Scotia
Ward Nat. Sci. Estab., Rochester, NY
3X4X1 1/2" crystalline

Gypsum var. Alabaster (606-14.6 rock; 606-33 label)
Pomaia, Italy
Ward Nat. Sci. Estab., Rochester, NY
2 pcs

Gypsum
Windsor Fm. (Mississippian)
5 mi from Baddeck, Cape Breton Island, New Brunswick [Nova Scotia]
JE Carman, 1939

"White Hard Gypsum"
Virginia
HP Cushing Collection, Western Reserve University
Chunks with 2 sawed surfaces

Massive Gypsum
Southard, OK
HP Cushing Collections, Western Reserve University
5 sm pcs

Selenite & run of mine Gypsum
Lambert Bros., Vajours, NE of Paris {France}
3/16/78
Plaster form block

Anhydrite (dk) and Dolomite (lt) - Salina Fm. (Silurian)
Allegan Co. 10 mi SE Holland MI
Carter Knobloch #1 1900 ft
Core (3 1/2"d) mounted in plaster slab

Plaster (gypsum) Wallboard
6 pcs
Gypsum 4

Gypsum with Dolomite and Green-Gray Shale (St. Louis Fm. - Mississippian)
National Gypsum Co. mine, Shoals, IN
RL Bates, 1957
4X6X2" rough & 3X2X1"
2 trays with 4 pcs

Pure Rock Gypsum - St. Louis Fm. (Mississippian)
Mine, US Gypsum Co., Shoals, IN
RL Bates, 4/1/66
3X4X2"

Massive Gypsum
St. Louis Fm. (Mississippian)
National Gypsum Co. mine
RL Bates, 1957

Anhydrite Caprock
Gulf Coast Salt Dome
From dump of US Salt Corp. mine, Hockley Dome, Harris Co., TX
RL Bates, 3/53

Salt 1

Rock Salt
Mine of US Salt Corp., Hockley Dome, Harris Co., TX
RL Bates 3/53
NaCl with 6% CaSO4

Rock Salt
Mine of US Salt Corp., Hockley Dome, Harris Co., TX
RL Bates 3/53
Bottle of crushed rock salt as loaded in bulk onto boxcars

Rock Salt
Mine of US Salt Corp., Hockley Dome, Harris Co., TX
RL Bates 3/53
Pure rock salt slab 1X2X4"
Halite & Sylvite
Paradox Fm. (Pennsylvanian)
Delhi-Taylor Oil Corp. #2 well
Sec. 35 T26S R20E Grand Co. UT
2790' (dip = 60 degrees)
Tom Schopf, 1957
2 1/2” core slab, 10-12” long
Less than 2% sylvite

Salt
Paradox Fm. (Pennsylvanian)
Delhi-Taylor Oil Corp. #3 well
Sec. 35 T25S R20E Grand Co. UT
3985'
Tom Schopf, 1957
Squared piece from core 7” long (1 1/2X2”)

Salt, Paradox Fm. (Pennsylvanian)
Delhi-Taylor Oil Corp. #8 well
Sec. 35 T25S R20E Grand Co. UT
5110’
Tom Schopf, 1957
Core slab 2 pcs; dip = 60 degrees

Halite Crystals
Bonneville Salt Flats, UT
Lois Jones, 1966
3 surface spls, white, porous, euahedral crystals

Gray coarse-gr Halite (606-19.11 box label; 606-34 spms)
Detroit, MI
Wards Nat. Sci. Estab., Rochester NY
3 pcs

German Salts (5 rock salt; 1 gypsum)
German spl labels; list salt %; red, white, gray, etc.

Empty Drawer
Cabinet 3

Nepheline Syenite 1

Nepheline Syenite
Blue Mountain, Ontario, Canada
RL Bates, 1972
2 sm trays

Nepheline Syenite
Blue Mountain, Ontario, Canada
CJ Koenig, 1961 (OSU, Ceramic Eng ?)
Tray with 6 chunks

Nepheline Syenite
[Blue Mountain, Ontario, Canada?]
4 unlabeled chunks in tray

Nepheline Syenite
[Blue Mountain, Ontario, Canada]
RL Bates writing
Ground nepheline syenite feed to separator; grinding ball of fused alumina

Nepheline Syenite
Blue Mountain, Ontario, Canada
RL Bates writing
Ground product after high intensity magnetic separation

Nepheline Syenite
[Blue Mountain, Ontario, Canada]
RL Bates writing
Final product & pottery grade
Sm plastic box & spl paper bag

Pegmatite 1

Pegmatite
E of Godfrey, 20 mi N of Kingston, Ontario, Canada
RL Bates, 9/61
2 trays: 3X4X1 1/2” spls (2)

Pegmatite (orthoclase, quartz, muscovite)
606-3.6 tray; 606-8 rock
3 pcs 2X2X1”; 1x1x3/4”; and 2x2x1 1/2”
Pegmatite
606-3.7 label; 606-3 rock
Quartz, feldspar, muscovite, 2X3X3”

Unlabeled Pegmatite
1X4X3” mainly muscovite, sm. corner of country rock

Aplite (fine-gr. Granite)
606-1.3 label
Boulder, CO
Wards Nat. Sci. Estab., Rochester NY

Spruce Pine 1

Pegmatite
Spruce Pine NC
5X3X1 1/2” sl. weathered

Bull quartz (milky, smokey)
Old McKinney mine (now flooded), sw of Spruce Pine, NC
RL Bates, G&M 670, 9/75

Alaskite (coarse gr. Granite aka Pegmatite)
Chalk Mountain mine, Spruce Pine, NC
RL Bates G&M 670, 9/75
Cuttings from blast hole drilling

Alaskite (pegmatite)
Chalk Mountain Feldspar quarry, Spruce Pine, NC
RL Bates writing 6/73
Lg sple 3X4X5” with large (1”) orthoclase crystals

Pegmatite
Chalk Mountain mine, Spruce Pine, NC
Tray with 2 spls: 1 Alaskite 1X3X2 with lots of sm garnets; 2 vein alaskite in contact with biotite schist country rock (4X5X1”)

Misc. Alaskite pegmatite material
Tray with 6 pcs incl. country rock
Spruce Pine 2

Alaskite replacing Biotite Schist
Chalk Mountain mine, Feldspar Corp., Spruce Pine, NC
RL Bates writing, 6/73
Spl 3X4X5”

Alaskite
Chalk Mountain mine, Spruce Pine, NC
RL Bates, G&M 670 9/75
1 1/2X3X4” slab with red garnet
Run of mine ore ?

Alaskite
Chalk Mountain mine, Spruce Pine, NC
RL Bates, 6/73
3 pcs 4X5X1 1/2”; & sm
Ore of Feldspar

Garnet-bearing Pegmatite
Old McKinney mine, SW of Spruce Pine, NC
RL Bates, G&M 670 9/75

Roan Gneiss & Schist
RLB writing
Hornblende, Biotite, Garnet
Country rock of Alaskite and Pegmatite

Alaskite
Spruce Pine NC
Muscovite-rich chunk 1X2X2 1/2”

Porcelain with Feldspar Glaze
Corningware, Pyroceran

Feldspar 1

Microcline var. Amazonite
606-3.13 label; 606-7 rock
Amelia Courthouse, VA
Wards Nat. Sci. Estab., Rochester, NY
1 1/2X3X4”
Microcline var. Perthite (green in part)
Wards Nat. Sci. Estab., Rochester, NY
Sm spl

Albite (Na-plagioclase)
606-3.10 label
Tray with 1X3/4X3/8” and larger, shows twinning

Oligoclase 606-3.15 label
Mitchell Co. NC
Wards Nat. Sci. Estab., Rochester, NY
Excellent example of twinned plagioclase
1 1/2X3X4”

Anthophyllite/Talc/Phlogopite
RL Bates writing
2X3X5”

Anthophyllite var. Asbestos
606-8.8 label; 606-19 rock
Bakersville, Mitchell Co, NC
Wards Nat. Sci. Estab., Rochester, NY
2X3X4”

“Feldspars from Pegmatites in Ontario”
Buckingham, Quebec
RL Bates, IGC trip in Quebec-Ontario, Canada
5 pcs of various feldspars (pink, gray, green, etc) and quartz grinding pebbles

Mica 1

Biotite 606-4.1 (both spms); 606-10 (on one spm)
2 10X18X1/4” books

Muscovite
Spruce Pine, NC
RL bates writing
4 pcs 1 1/2X1 1/2X1/4” each

Muscovite as Flake Mica, “scrap” - a size term
Spruce Pine, NC
1/4” flakes of Muscovite, with Quartz and Feldspar
Muscovite 606-4.5
4X3X1/2” book with pegmatite minerals attached

Phlogopite 606-4.2 label; 606-10 rock
1/4X5X6” book

Phlogopite 606-4.6 label; 606-11 rock
Bedford Township Ontario, Canada
Wards Nat. Sci. Estab., Rochester, NY
1/8X2 1/2X4”

Muscovite in Pegmatite
606-4.4 label; 606-11 rock
More quartz than muscovite

Unlabeled
Quartz rock with Muscovite
1” hexagonal book

South Africa Sericite
30 mesh
J. Allen, Munich Congress, AMC London 01-626 4521
Plastic bag

“Suzorite” Mica, registered name
Marrietta Resouces International Ltd.
74 E 55th St. Suite 603, NY, NY 10022
Grade 402 (fine) in plastic bag

Lithium 1

Lepidolite
Ohio City, Gunnison, CO
VE Nelson
3X2 1/2X2” (purple mica with quartz)

Lepidolite 104 (rock)
Taos Co. NM
RL Bates, 1953
Finely disseminated in Harding pegmatite

Lepidolite 104 (rock)
Taos Co. NM
RL Bates, 1953
Tray, quartz, apatite, lepidolite: 4X3X1 1/2”; 1X2X1 1/2”, Harding pegmatite
Lepidolite
Black Mountain pegmatite area, Maine
Bonnett, 1963
Very little lepidolite

Lepidolite 606-9.8
San Diego Co.
Wards Nat. Sci. Estab., Rochester, NY
Fine texture, 3X3X2 1/2”

Lepidolite
Taos Co. NM
RL Bates 1953
Mainly quartz, albite, and lepidolite, Harding pegmatite

Spodumene
Taos Co., NM
RL Bates, 1953
Harding pegmatite with quartz and apatite

Spodumene “sandwiches”
Taos Co., NM
RL Bates, 1953
Harding pegmatite, 2 pcs 1X1 1/2X2” and 2 1/2X2 1/2X1”

Amphibolite with Holmquistite (pre-Devonian)
Kings Mountain Spodumene-Pegmatite district, NC
RL Bates, G&M 670, 6/73
2 pcs: 31 holmquistite (greenish blue lithium bearing glaucophane); wall rock
#1 4X3X1”; #2 3X2X2”

Amblygonite
nr. Keystone, SD
Wards Nat. Sci. Estab., Rochester, NY
4X3X2” + pc of ivory rock

Lepidolite (green) 606-4.9 label: 606-11 rock
Wards Nat. Sci. Estab., Rochester, NY
3X4X2” + sm pink spm

Spodumene ore (Devonian?)
Kings Mountain, NC
Foote Mineral Co.
RL Bates, 9/73, G&N 670
1X3X4”
Beryl 1

Beryl
Acworth, NH
Sid White, 1938
5 pcs 1X1X1"

Beryl
JJ Stephens, from a mineral collection, 1962
As delivered in bags by rail to plants in nw OH, 4 pcs 2X2X1” and sm.

Unlabeled Beryl
4 pcs

Beryl
New Milford, CT
Wards Nat. Sci. Estab., Rochester, NY
Pegmatite, 5X4X1 1/2"

Beryl
6 pcs. in unlabeled box

Beryl 606-3.3 label; 606-8 rock
Perthite with Beryl Crystal

Barite 1

Barite
Versailles, MO
Wards Nat. Sci. Estab., Rochester, NY
2 pcs: 3X4X2” & 4X2X2”

Barite
Baroid’s mine, Magnet Cove, Arkansas
Stratiform deposit in Stanley Shale (Mississippian)
RL Bates, SEG trip, 2/72
3 pcs 2 1/2X2X1 1/2”; 1x1x1”; 3X2X2”
Average mill feed is 60% BaSO4

Barite 606-62 (on each)
Found in carbonaceous Ls.
5 pcs

Barite
2 pcs: 1X1X2” massive; 3X3X2 1/2” crystalline and bladed
Barite on Quartz
Residual barite deposit nr. old mines, Washington Co., MO
RL Bates, 1959
With hematite pseudomorphs after pyrite

Barite, Fluorite, Sphalerite
Nr. Athens, KY
RO Utgard, 1973
3 pcs: 5X4X3"; 5X3X4"; 2X1X1 1/2"
Central KY mineral district, from vein deposit on I-75

Barite
Cartersville, GA
Barite residual
5X4X3"

Barite (unlabeled)
4X2 1/2X1"
3X3X2"; typical central KY quarry vein (up to 2 ft wide) that cuts bed at 90 degrees; many smaller 1/4 to 1" veins in area

**Barite-Magnesite 1**

Barite
Carterville GA (Lower Cambrian)
RL Bates, 9/76
Pit in residual clay above Shady Ls. (Shady Dolomite), 2 pcs: 2X2X2"
Clay runs 8-10% barite

Barite
"Magcobar Quarry Ireland"
RL Bates, 9’71
2 pcs dark gray: 2X2X2"; 1X1X1"

Barite 3X4X1", white bladed

Celestite (SrSO4)
US Gypsum Co., Sperry Gypsum min, IA
RL Bates writing, Forum trip 4/14/72
Scattered lenses up to 4 ft across, 1 ft thick; top of gypsum bed below overlying dark dolomite

Brucite (606-60)
Wakefield, Quebec, Canada
Wards Nat. Sci. Estab., Rochester, NY
Magnesite
Chewelah, Stevens Co., WA
Wards Nat. Sci. Estab., Rochester, NY
2 pcs: 3X4X1”; 2X2X1”

Calcined Magnesite
Greece
RL Bates, IGC trip 6/72 stop 4
From stockpile of Canadian Refractories, Ltd
Marelan, Quebec, Canada
Loose brown gravel

Calcined Magnesite
Yugoslavia
RL Bates IGC 9/72 stop 4
Lt green gravel from stockpile
Canadian Refractories, Ltd., Marelan, Quebec, Canada

Magnesite 1

Magnesite
Canadian Refractories, Ltd. Kilmar, Quebec, Canada
RL Bates, IGC trip, stop 3, 9/72, 3X4X2”

Magnesite Ore
Canadian Refractories, Ltd. Kilmar, Quebec, Canada
RL Bates, IGC trip, stop 3, 9/72
Med. grade, typical run of mine,
2 pcs: 2X4X1”; 1X1X1/2”

Magnesite Ore
Canadian Refractories, Ltd. Kilmar, Quebec, Canada
RL Bates, IGC trip, stop 3, 9/72
Low grade 50-60% magnesite, 3X3X1”

Magnesite Ore
Canadian Refractories, Ltd. Kilmar, Quebec, Canada
RL Bates, IGC trip, stop 3, 9/72
Hi grade ore; 4X3X1”

Calcined Magnesite from MgCl2 brine
Dow Chemical Co., Ludington, MI
RL Bates, IGC trip stop 4
From stockpile of Canadian Refractories, Ltd. Kilmar, Quebec, Canada
Tray of gravel, white-tan
Dead-burned Magnesite with impurities
Canadian Refractories, Ltd. Kilmar, Quebec, Canada
RL Bates, IGC trip, stop 4, 9/72
Burned gravel 60-70 % Mg; also Fe, Al, Si from raw material

Purple Magnesite with Dolomite
Red Marble mine, NW Magnesite Co., Chewelah, WA
RH Mitchell, 1961
4X3X1"

Gray Magnesite
Red Marble mine, NW Magnesite Co., Chewelah, WA
RH Mitchell, 1961
4X3X1"

Magnesite 46-7-5
UT
Maple Grove Quarry
Dolomite Inc
2 pcs 3X3X1 1/2"

Greenville Ls.; Aerpline Dolomite; Chrysotile Asbestos, Diopside, Dolomitic Magnesite
Canadian Refractories, Ltd. Kilmar, Quebec, Canada
6 1/2X1/2X12" pcs in plastic box of rock spl set

Fluorspar 1

Fluorspar
Rosiclare IL
ALCOA mill
Gilbert Smith, 8/1/57
Stockpile spls, vein and fissure deposits; Pb and Zn are by-products, main product is fluorspar
for manufacture of HF at East St. Louis
2 spms: #1 sphalerite-rich; #2 galena-rich w/ calcite & brecciated country rock 4 1/2X2 1/2X2"

Fluorspar & Ls.
Renault (Downey’s Bluff)
Davis-Oxford ore body, IL, Cave-in Rock district
Coontail ore
RL Bates, stop 2, 9th Forum trip, 4/73

Fluorite & Associated Minerals
Fairview mine, ALCOA, Rosiclare, IL
RL Bates, 1959
2 pcs, 2X3X3/4": brecciated ls. calcite w/ purple fluorspar xstals 1 surface; calcite w/ sphalerite
Fluorspar & Associated Minerals
Fairview mine, ALCOA, Rosiclare, IL
RL Bates, 1959
4 pcs: 3X4X3/4”, purple fluorite; 4X3X1 1/2”, purple and white fluorite; 3X3X2”, rough surface with fluorite crystals and large galena crystals;
3X2 1/2X2” sphalerite, fluorite and galena

Fluorspar Ore
Gaskins mine, Minerva Oil Co., Pope Co., IL
RL Bates, stop 1, 9th Forum trip, 4/73
Vein deposits -fault system in Mississippian ls., 5X4X1 1/2” purple fluor spar and gray ls.

Fluorspar
Rosiclare District, IL
Gilbert Smith, 8/1/57
2 cores: 1 3/4dX 4” long; 1d, 2 1/2” long, brecciated ls. with purple fluorite. Lg white core from Good Hope mine is ca. 90% CaF2

Galena in Dolomite
Abandoned Catherine mine nr. Fredericktown, MO
Bonneterre Dolomite (Upper Cambrian)
RL Bates, 1959

Fluorspar 2

Fluorspar
In bands within dark gray ?ls., 3X5X2”

Unlabeled Fluorspar
Purple and yellow with galena, 2X2X1 1/2”

Unlabeled Purple-White-Gray Fluorspar Ore
One surface covered by pyrite

Fluorspar
Fairview mine, ALCOA, Rosiclare, IL
RL Bates, 1959
2 pcs: 5X3X1 1/2” with 1/2” fluor spar layers on country rock; 1X2 1/2X2” relatively pure, white to gray fluorite

Sphalerite with Fluorite
Ozark-Mahoning Co., Davis-Oxford mine, Cave-In Rock District, IL
RL Bates, 4/73, stop 2, 9th Forum field trip
5X3X1/”, replacement deposit in Renault (Downeys Bluff) Ls., beneath Bethel Ls.
Zinc Ore
NJ Zinc mine, Jefferson City, TN
RL Bates, 6/73
Sphalerite in dolomite breccia: 2 pcs: 4 1/2X4X1” - mostly brecciated dolomite with yellow sphalerite; 2 spms 1X1X1” mainly yellow sphalerite

Fluorspar
Rosiclare District, IL
Dave Stiles, 1962
2 trays: 7X5X2 1/2” coarse crystalline fluorite and 4 pcs 3X3X2” and smaller +6 pcs 1X1X1”

Olivine and Carbonatite 1

Dunite
Pit at US 19E and NC 80, 9mi w. of Spruce Pine, NC
RL Bates G&M 670, 9/75
3 pcs 4X2 1/2X2 1/2”; 2X3X1” (2)

Daybook Dunite (mislabeled as Daybook?)
Spruce Pine, NC
RL Bates

Carbonatite Ore
Molycorp Inc. mine
Mountain Pass, CA
RL Bates, 2/76
3 pcs: 2X3X3/4; 2X3X1”; 2X2x3/4”

Carbonatite
Molycorp Inc. mine
Mountain Pass, CA
RL Bates, 2/76
Bastnaesite ore with barite
3 pcs: 1X3X3”; 2X2X1”; 1X1X1”

Carbonatite
Molycorp Inc. mine
Mountain Pass, CA
RL Bates, 2/76
3 pcs: 2X2X1”; 5X2X1/2”; 3 1/2X3X1/2” (sawed slab)
Carbonatite Ore (PreC)
Molycorp, Inc. mine
Mountain Pass, CA
RL Bates, 2/76
Bastnaesite (RF) CO3
6 pcs: 2X4X1” sawed surface; + 5 at 1X1X1”
Ore contains 8-10% rare earths; 50% of this Ce and La, also contains barite

Carbonatite
Moly Corp Inc. mine
Mountain Pass, CA
Charles E. Robinson 10/24/85
4X4X1/2” sawed slab; 4X4X3” sawed surface; 3X3X2 1/2”, sawed surface; 3X3X1 1/2” chunk
Rare Earth deposit 4640 on label; ore mineral is bastnaesite
“Pink stuff largely carbonate” - Doug Pride

Wollastonite & Kyanite 1

Wollastonite Ore
Interpace mine, Willsboro, NY
RL Bates, 9/74
Crystal 3X2X2” & 2X2X1 1/2” with garnets and magnetite

Wollastonite
Willsboro, NY
Braley, OSU Ceramics Department
4 1/2X3 1/2XX2 1/2”. crystalline wollastonite & associated minerals (e.g., garnet)

Wollastonite Ore
Interpace mine, Willsboro, NY
RL Bates, 9/74
6X4X2 1/2”; with garnets in clusters

Wollastonite (CaSiO3)
Interpace mine, Essex Co., Willsboro, NY]
Susan Richardson, 1976 or 1977
10 pcs
With andradite garnet and diopside; 4X3X2” crystalline wollastonite; 3X3X1” garnetiferous;
3X2X2” wollastonite; 6 pcs ca. 1x1x1” wollastonite & associated minerals

Kyanite
Baker Mountain, Prince Edward Co., VA
7X5X2 1/2” medium grained kyanite gneiss with 1” kyanite (dark bluish black) crystals
Kyanite Ore
Abandoned quarry, Henry’s Knob, York Co., SC
DE Pride, 6/73
7X5X3 1/2”
Main country rock is quartzite

Kyanite Ore?
Abandoned Henry’s Knob mine, York Co., SC
RL Bates, 6/73
5X3X1 1/2”; 1X1X3/4” (kyanite crystals in micaceous groundmass)

Graphite

Graphite
Ceylon (aka Sri Lanka)
Tray with 4 pcs pure graphite: 3X3X3/4”; 1X1X3” 1 1/2X1 1/2X1/12”

Graphite 606-92
Colombo Mines, Ceylon (Sri Lanka)
Wards Nat. Sci. Estab., Rochester, NY
2 pcs: 3X1 1/2X1 1/2 & @ 1/2X1X1”

Graphite Schist
Packsaddle Schist (PreC)
Sivern Graphite Co., Burnet Co., TX
RL Bates 4/15/68, stop 1, 4th FGIM trip, Austin TX
3 pcs: 5X4X1 1/2”; 3X1 1/2X1”; 2 1/2X1X1/2”

Graphite Schist
St. Lawrence Co., NY
Wards Nat. Sci. Estab., Rochester NY
4X3X1”

Graphitic Anthracite 606-18.11
Providence, RI
Wards Nat. Sci. Estab., Rochester NY
3X4X2”

Unlabeled Graphite Schist 1X4X3”

Graphite Schist
505-9.3 label; 606-21 spm
Pope Mills, St. Lawrence Co., NY
Wards Nat. Sci. Estab., Rochester NY
4X3 1/2X1” with location map
Flake Graphite
In vial

**Asbestos 1**

*Crocidolite (606-8.9)*  
Prieska District, Griqualand, Western South Africa  
Wards Nat. Sci. Estab., Rochester NY  
3 1/2X3X2” & 3X1X1”

*Magnetite & Picrolite*  
RL Bates, 1958  
tray of 3 pcs: 8X4X1 1/2” & 2 pcs of 4X1X1”  
In shear zones with serpentinized peridotite

*Loose Asbestos Fibers*  
Jeffrey Mine, Asbestos, Quebec, Canada  
RL Bates, 1958  
Slip fiber Chrysotile

*Brucite*  
Jeffrey Mine, Asbestos, Quebec, Canada  
RL Bates 1958  
4X2X1/2” in shear zones on serpentinized peridotite along granite dikes (no value: in too brittle rock)

*Footwall “Slate” (Phyllite)*  
RL Bates 1958  
4X4X2”  
Next to contact with serpentinized peridotite, somewhat crumpled and sheared

*Anthophyllite, Talc, Phlogopite*  
Spruce Pine NC  
3 pcs in tray: 4X3X2” 2 1/2X3X1 1/2”, 2X1 1/2X3/4”

*Serpentine*  
Ruberoid Co. Asbestos quarry, Hyde Park, VT  
RL Bates, 1956  
5X3X1” asbestos-bearing chunk

*Garnet at Schist-Serpentine contact*  
Ruberoid asbestos quarry, Hyde Park, VT  
RL Bates, 1956  
3X2X1”  
**Asbestos 2**
Chrysotile Fiber
Ruberoid Co., Hyde Park, VT
RL Bates, 1956
2 1/2X3X1/2" & 4X4X3/4"

Country Rock
Ruberoid Co., Hyde Park, VT
RL Bates, 1956
4X3X1"

Asbestos, Long Fiber Chrysotile
Ruberoid Co., Hyde Park, VT
RL Bates, 1956
10X5X1", partly discolored by weathering

Anthophyllite (606-19)
3X2X3" (2 spms); 1X1 1/2X3" (650/03)

Unlabeled Disaggregated Asbestos Fiber
2 spls - lt. green, looks fibrous (but isn’t), shiny, soft soapy feel, both 2X1 1/2X1/2"
7 plastic boxes and 1 bottle, unlabeled

Asbestos 3

Picrolite
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, 1958
5X3X3/4"
Shear zone

Contact of "granite" dike with serpentinized peridotite
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, 1958
2 1/2X2 1/2X4"
"Granite" is probably a variety of syenite. Note biotite which is characteristic of such zones

Asbestos Ore
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, 1958
Core (2 1/2"d). 9" long. Serpentinized peridotite with chrysotile veinlets
"Granite" dike with Serpentine entering fractures
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, 1958
4X5X2 1/2"

Asbestos Ore
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, 1958
2 trays: 9X6X1 1/2" + 5 smaller pcs; serpentinized peridotite with chrysotile veinlets

Johns Manville Descriptive Brochure
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, 1958

Asbestos 4

Chrysotile Asbestos
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, IGC trip 1972
Tray of hi-grade asbestos ore 3X2X3/4", and tray of partially disaggregated asbestos

Chrysotile Asbestos in Serpentine
Jeffrey mine, Asbestos, Quebec, Canada
RL Bates, IGC trip, 1972
“Ribbon fiber”

Brucite, Fibrous
8X4X1” and loose fibers (see Drawer 1 for likely locality)

Anthophyllite - Talc - Phlogopite
RL Bates writing
4X3X1 1/2”, 1 1/2X1 1/2X2” 2 spms); 1 1/2X2X3/4”
Talc 1

Talc & Schist
Dump, Eastern Magnesia & Talc mine. Johnson, VT
RL Bates, 1956,
Talc - 4X3X1”; Black schist with pyrite 5X3X2 1/2”

Hi-grade Talc
Talcville mine, International Talc Co., Gouverneur, NY
RL Bates 8/66
4X4X1/2”

Talc Schist (PreC)
Quarry, 1 mi. nw of Marriottsville MD
RL Bates writing 6/14/67
5X4X1 1/2”, rectangular shapes - Bates trimming style

Talc
Run of mine
Paleozoic- Sutton Range
Baker mine, Highwater, Quebec, Canada
RL Bates, stop 10 IGC trip, 1972
3X2 1/2X1”

Talc
Talcville mine, International Talc Co., Gouverneur, NY
RL Bates 8?66
4X5X1”; 4X2 1/2X3/4”; 3X1 1/2X1 1/2”
“Various grades of Commercial Talc mostly Tremolite”

Talc
From mill stockpiles of Southern Talc Co., Chatsworth GA
RL Bates, 6/73
5X3X1 1/2”; 4X3X1”; 3X2 1/2X1 1/2”
Locally derived, probably all from Columbia Schist (PreC)

Talc
Providence, RI
Wards Nat. Sci. Estab., Rochester NY
Talc 2

Gray Soapstone, 606-7.5 label
Alberene, VA
Wards Nat. Sci. Estab., Rochester NY
5X4X1 1/2”, 2 sides partially sawed

Soapstone
Tile 2 1/2X 3X1/2”
Sawed with hole through it

Talc & Quartz
Belmont mine, Edwards, NY (Gouverneur District)
3X1 1/2X3/4”

Talc Schist (606-7.2 label; p154 on rock)
Warren Co. NY
2X2 1/2X3/4”

Talc with Ankerite (garnet-like)
India
JJ Stephens (Battelle)
7X3X4 1/2”, “for baby powder” on paper bag

Actinolite in Talc (6067.3 label; 606-17 rock)
5X3X2”, actinolite needles

Talc with Tremolite “Fibrous Talc” 606-7.7 label
Nr. Fullerville, St. Lawrence Co., NY
Wards Nat. Sci. Estab., Rochester NY
4 1/2X3 1/2X1 1/2”

Talc
Murphy, Cherokee Co. NC
6X2 1/2X2”

Talc
Talcville mine, International Talc Co., nr Gouverneur, NY
RL Bates, 1960
Box of various grades of Commercial Talc, mostly Tremolite
4X4 1/2X1 1/2”, 3X4X1 1/2” & 5X3 1/2X3/4” (greenish pc may be out of place)
Chlorite-Talc Schist
Baker mine, Highwater, Quebec, Canada
RL Bates, stop 10, IGC trip, 1972
2X2 1/2X1/2", "hard tale" for eskimo carving

Talc 3

Talc
Monarch mine, nr. Shoshone, CA (nr. Death Valley)
RH Mitchell, 1961
9X3 1/2X3 1/2" to gravel size pcs

Talc
Grantham mine (Johns-Manville), Death Valley CA
RL Bates 2/76
5X4X2", alteration of dolomite along diabase

Talc
South of Angel's Camp, Calaveras Co., CA
RH Mitchell, 1961
4X3X2"

Talc 4

Talc
Eastern Magnesia & Talc Co., Johnson, VT
RL Bates 1956
2 1/2X4 1/2X5 1/2" block, 2 sawn sides; and paper envelope with ground talc (grade 549)

Greenish Talc
Baker mine, Highwater, Quebec, Canada
RL Bates, stop 10, IGC trip, 1972
Soft carving talc

Talc
Amalgamated Metal Corp. Ltd., Minerals Division, London, Paris & Toronto or British Metal Corp., Deutschland, GmbH, Dusseldorf
5/76
Lg bag of ground talc

"AMC" Talc
200 mesh.
Australian origin, as exhibited at 2nd Industrial Minerals Congress, Munich
Tremolite (Commercial Talc)
Talcville mine, International Talc Co., Gouverneur NY
RL Bates, 8/60

Talc
In Cohutta Schist (PreC)
Ernest mine, Southern Talc Co., e. of Chatsworth GA
RL Bates, 9/73
2X2 1/2X1” & 2X3 1/2X1” greenish to gray to white

Tremolite (Commercial Talc)
Talcville mine, International Talc Co., Gouverneur NY
RL Bates, 8/60
Various grades of Commercial Talc (i.e. Tremolite): 5X4X2”; to 3X2 1/2X1 1/2”

Talc (Paleozoic, Sutton Range)
Baker Talc Ltd., Highwater, Quebec, Canada
RL Bates, stop 10, IGC trip, 1972
From outcrop, 3X2 1/2X3/4”

Cabinet 4

Talc 5

Talc
Ben Warner”s talc mine and plant, Murphy,NC
RO Utgard, 5/84
2 1/2X9X9” (pure talc) for talc crayons and cosmetics

Marble core with Talc
Ben Warner”s talc mine and plant, Murphy, NC
RO Utgard, 5/84
5X4X2 1/2” core with bag of ground cosmetic-grade talc

Pyrophyllite 1

Pyrophyllite
Hillsboro NC
RL Bates 12/11/65
4X3X2; and 2 pcs 2 1/2X1 1/2X1”; radial in quartz vein
Pyrophyllite
Hillsboro NC
RL Bates 12/11/65
Radial and splintery ("splintery is run of the mine"): 6 pcs: #1 Splintery 7X2 1/2X1"; the other 5 spms are "radial": 2 1/2X2X1 1/2"; 3 smallest are 3/4X3/4X1"

Pyrophyllite and Andalusite
Hillsboro NC
RL Bates 12/11/65
2 1/2X1 1/2X1"

Pyrophyllite replacing (?) Carolina Slate
Hillsboro NC
RL Bates 12/11/65
4X2 1/2X3/8"

Alunite  K2Al6(OH)12(SO4)4
Quartzite, Yuma Co., AZ
Wards Nat. Sci. Esab. Rochester NY
Massive white with conchoidal to subconchoidal fracture
4 1/2X4/2 1/2"

Amphiblooe var. Tremolite in Dolomite
606-8.7 label; 606-19 rock
Lime Rock, CT
Wards Nat. Sci. Estab., Rochester NY
4 1/2X4X1 1/2"

Vermiculite 1

Vermiculite ("Zonalite")
Libby, MT
RL Bates 6/75
Expanded vermiculite
Box and tray with 3 sm plastic boxes

Vermiculite
Libby, MT
"Libby Suite"
RL Bates, 6/20/75
Box hi-grade vermiculite from lag pod in pit wall; not good for milling; can't be stacked because it slumps; can't be put in bins because it won't flow out - LEAVE IN QUARRY
Vermiculite
Libby MT
RL Bates 6/20/75
Syenite dike material cutting pod of hi-grade vermiculite
5 pcs

Vermiculite
WR Grace mine, Libby, MT
RL Bates, 6/20/75
Tray with 5 pcs of 2 1/2X2X1” and bag of smaller pcs crushed to gravel
Libby Suite ore: 27,000 tons/day for 700 tons of vermiculite (92%) concentrate

Biotite, Pyroxenite with serpentine, tremolite; pyroxenite with sulfides
WR Grace mine, Libby MT
RL Bates 6/20/75
4 pcs: 2 1/2X3/2” to 1X1X3”
From biotite core

Fibrous Tremolite in Ore, Libby Suite
Libby MT
RL Bates, 6/20/75
3X3X2”

**Diatomite & Vermiculite 1**

Vermiculite
Spruce Pine NC
RL Bates writing
4 1/2X3 1/2X1” & 4X2 1/2X2 1/2”

Box of Vermiculite Concentrate
Louisa Co., VA
RL Bates 5/90

Vermiculite
Louisa Co., VA
RL Bates 5/90
4 pcs: 2X2X1/2” to 1X1X3/4”

Vermiculite - 606-4 (?) label partly obliterated
Burnsville, NC
2 1/2X2X1”
Bee Tree Vermiculite
Bee Tree Vermiculite Mines, Inc, Asheville NC and Tigerville SC
Plastic vial

Diatomaceous Earth
Santa Barbara CA
Wards Nat. Sci. Estab., Rochester NY
5X3X3"

Diatomite (Pliocene)
Diatomite Quarry, 6 mi nw of Richmond, Deschutes Co., OR
HD Squires
4X3X2 1/2"
Quarry section: Black scoriaceous basalt conglomerate 10 ft; Diatomite 60 ft; then black sandstone and shale

Modella Diatomite
Nw of San Pedro Hills CA
JE Carman, 1933
2 pcs: lg pc 3X3X2"

**Trona 1**

Trona
Intermountain Chemical Co. Westvaco mine, Green River Basin, WY (nr. Westvaco, WY)
1959
Tray of massive trona: 18 pcs, 2X2X2” each

Trona
Intermountain Chemical Co. Westvaco mine, Green River Basin, WY (nr. Westvaco, WY)
1959
12 pcs crystalline trona

Trona
Intermountain Chemical Co. Westvaco mine, Green River Basin, WY (nr. Westvaco, WY)
1959
5 trays with massive & crystalline spms in each

Trona and Shale
Intermountain Chemical Co., Westvaco mine, Green River Basin, WY (nr. Westvaco, WY)
1959
4 pcs: 2X2X2”
Trona 2

Granular Tuff, Shortite in Shale
Upper Wilkens Peak member, Green River Fm. (Eocene)
At 527' in Diamond Alkali #1 McKenna well
Textoris, 1959
2 1/2" d core 1 1/2" long

Shortite in Oil Shale
Lower Wilkens Peak member, Green River Fm.
Diamond Alkali #1 Reid
Textoris 1959 (see his Ohio St. thesis, fig. 15)
2 1/2" d core, 2" long

Ostracodal Ls.
Base of Tipton Tongue, Green River Fm.
Along UPRR, e of Carter, SW Bridger Basin, WY
RL Bates 1959
5X4X1/2"

Ostracodal Low Grade Oil Shale
Laney Shale member, Green River Fm.
Sand Butte, w. side of Washakie Basin, WY
RL Bates, 1959
4X3X1/2" & 3 1/2X1 1/2X1/2"

Shortite in Shale
Diamond Alkali #5 Reid
M. Wilkens Peak member, Green River Fm.
Textoris, 1959 (see Fig. 14 OSU thesis)
2 1/2" d split core with sawed face (2" long)

Gaylussite in silty clay
At 1895 ft in Diamond Alkali #1 well
Lower Wilkens Peak member, Green River Fm.
Textoris, 1959
3X1 1/2X1 1/2"

Trona
Chaplin, Saskatchewan, Canada
Box of loose NaSO4 raw material (white powder)
Trona - NaSO4
Saskatchewan Minerals, Sodium Sufate Division, Box 120, tel. 21, Plants at Chaplin and
Bishopric, Saskatchewan
Chaplin, Saskatchewan, Canada
Grahame Larson, 1973
3 bags: 2 labeled “natural NaSO4 (saltcake)”
See photoslides
Uses on bag back: craft, pulp, glass and detergents, stockfeed and chemicals

Trona
Unlabeled bottle (with powder)

Unlabeled tray with 5 pcs:
“Trona associated rock “ RO Utgard, pers. comm., 1997

Trona 3

Trona collection
Allied Chemical Co. mine, Green River Basin, WY
RL Bates SEG trip 6/17/71
1) Run of mine ore, bed # 17
2) Green marlstone with shortite crystals
3) Oil shale with shortite crystals
4) Fibrous trona from thin bed ca. 3 feet above ceiling
5) Trona from near ceiling with rosette crystals (2X3X1” and 2X1 1/2X3/4”)

Trona collection
Stauffer Mine
RL Bates SEG trip 6/17/71
6) Run of mine ore - bed #24 (4 1/2X3 1/2X2”)
7) White ash - ca. 1.5 feet thick above ceiling
8) Oil shale with shortite and fibrous trona
9) Marlstone with shortite crystals

Unlabeled
Textoris ?
2 1/2” d core - 4” long (sawed)

Potash 1

Sylvite
Prairie Evaporite Fm (Devonian)
Potash Co. of America, Saskatchewan, Canada
Walter O. Kupsch, University of Saskatchewan, Dept of Geological Sciences 11/1/65
3000 feet below surface; 6X4X1 1/2”
Polyhalite (Castille Fm., Permian)
International Minerals & Chemicals Corp. mine, nr. Carlsbad NM
RL Bates (?) 11/7/49
Tray with 20 pcs

Langbeinite, 606-36 rock
International Minerals & Chemicals Corp. mine, nr. Carlsbad NM
6X4X2 1/2”

Langbeinite, 606-34 rock
International Minerals & Chemicals Corp. mine, nr. Carlsbad NM
6X4X2 1/2”

Langbeinite
International Minerals & Chemicals Corp. mine, nr. Carlsbad NM
11/7/49
3X1 1/2X1 1/2”; 5X3 1/2X2”; 3X2 1/2X1” from 750 ft level in mine

Sylvite
Castille Fm. (Permian) 750’ level
International Minerals & Chemicals Corp. mine, nr. Carlsbad NM
11/7/49
2X1X1”; 2X1 1/2X4 3/4” (2 spms)

Clear Sylvite with blue speck of Halite
International Minerals & Chemicals Corp. mine, nr. Carlsbad NM
Tray of gravel-size crystals

Polyhalite (orange form)
International Minerals & Chemicals Corp. mine, nr. Carlsbad NM
6 spms: ca. 1 1/2X1 1/2X1”

Langbeinite
International Minerals & Chemicals Corp. mine, e. of Carlsbad NM
RL Bates, 5/12/81, 17th Forum on IM
“not mined”

Halite
International Minerals & Chemicals Corp. mine, e. of Carlsbad NM
RL Bates, 5/12/81, 17th Forum
Box of purple to bluish to white crystalline halite
Note color, parting
Potash 2 - Mostly boxes of classroom spls

Polyhalite
3 trays, with numerous pcs in each tray; red, gray and white spms

Sylvite and Langbeinite
3 trays with both, 4 trays lack “sylvinite”

Polyhalite (606-14.13 label)
Carlsbad NM
Ward Nat. Sci. Estab., Rochester NY
Trays with polyhalite
Lg pc 5X4X2 1/2” and smaller

“Dirty Halite”
Unlabeled core pc sawed on 5 sides: 2X1 1/2X2”

Bottled display set (5 lg, 5 sm)
International Minerals & Chemicals Corp. mine, near Carlsbad NM
1) Muriate potash - 95% KCl, 60% K2O
2) Muriate potash - granular- 80-85% KCl - 50 % min K2O
3) Sulfate of potash - 90-95% K2SO4
4) KCl (chemical grade) - 99% min
5) Sol-po-mag (sulfate of K-magnesia) 40% K2SO4, 18% water soluble
Small bottles look like (?) Portland Cement ingredients (ls., coke, clinker, gypsum, cement)

Potash 3

Potash Sample Set
International Minerals & Chemicals Corp., near Carlsbad NM
Plastic display sheet with 8 types (same as bottles)

Borax 1

Ulexite
“Television rock”
12 pcs in 2 trays

Kernite
Boron, CA
Ca. 20 pcs in 2 trays
Colemanite
Inyo Co. CA
Wards Nat. Sci. Estab., Rochester NY
Sm tray: 1X1X1 1/2” crystal and 8 smaller crystal masses

Colemanite (Ca2B6O11 5H2O)
Boraxo mine, Death Valley, CA
RL Bates, 2/76
4X3X1 1/2”; 3X2 1/2X1 1/2”; 1 1/2X1 1/2X1”
Ore - Tenneco operation, feed for mill runs, 17-20% colemanite

Kieserite
Stassfurt, Prussia
Wards Nat. Sci. Estab., Rochester NY
2X1/2X1/4” looks like Kernite

Kalinite
Silver Peak, 50 mi sw of Tonopah NV
Wards Nat. Sci. Estab., Rochester NY
2X2X1”

Borax 2

Borax
Tray with 6 pcs: Lg 3X2 1/2X2 1/2” to slightly smaller

Colemanite
Boron, CA
Espenshade, 1978
6X6x2 1/2 and two sm pcs

Colemanite
Tenneco mine feed (Death Valley)
5 pcs in trya: 2X2X2” and smaller

Colemanite and Yellow Calcite
Boron CA
Espenshade, 1978
5 pcs: 3X2 1/2X1 1/2” and smaller

Colemanite
3 pcs: 3X2X1 1/2” and smaller
Ulexite (mislabeled?) NaCaB5O9 + 8H2O  
Boraxo mine of Tenneco, Inc, Death Valley, CA  
Radial crystals rather than fibrous  
RL Bates, 2/76  
3 pcs: 2 are 3X2X1” and a very sm pc  
Ore mineral  

Probertite NaCaB5O9 + 5H2O  
Boraxo mine of Tenneco, Inc., Death Valley CA  
RL Bates, 2/76  
4X3X2” and sm pc  
Ore mineral  

Sulfur 1  

Sulfur  
Spls with other rocks  
Box of sm pcs of sulfur ore: 50 pcs, 1/2X1/2X1/2”  

Anhydrite  
Freeport mine  
Lake Washington Salt Dome, Plaquemines Parish, LA  
1955  
Core of barren anhydrite; caprock below limestone  

Sulfur-bearing Ls.  
Lake Washington Salt Dome, LA, s. of New Orleans, depth 1400 feet  
1955  
2 trays: 5-inch core puck 2 inches thick; 2 pcs sawed core 5”d, 4” thick ; Core pc (sawed, split 4” thick) 6 sm pcs  

Sulfur  
Phosphoria Fm. (Permian)  
Manderson Field, Bighorn Basin, WY  
Jefferson Lake Sulfur Co.  
RL Bates, 1955  
Broken block of pure sulfur with embossed lettering  
On label: Sulfur from gas with 18% H2S  

Pure Sulfur  
Jefferson Lake Sulfur Plant  
Manderson, WY  
RL Bates, 1955  
2 sm pcs 1X3/4X1/2”; note bubble structure
Crystalline Sulfur
Unlabeled
Box of gravel size pcs

**Garnet 1**

Garnet
Gore Mountain, Warren Co., NY
Garnet with Hornblende [metadiabase]
6X4X4”

Garnet Ore
Barton mine, Warren Co., Gore Mountain, NY
RL Bates, 9/74
3 trays with 5X4X4’, 4 1/2X3 1/2X1/12” and others

Garnet with Biotite
Barton mine, Gore Mountain, Warren Co., NY
RL Bates 9/74
5X4X2”; with 1 1/2X3/4” Garnet
Common association

Corundum (606-60)
Gallatin Co., MT
4 1/2X3X2”

Gneissic structure with 3/4” Garnet crystals
Gore Mountain, NY - Barton mines?
RL Bates, 9/74
Spm from display cabinet

Garnet
Gore Mountain, Warren Co., NY
Collected by Gray, 1953
2 pcs: 2X1 1/2X3/4” and 1 1/2X1X1/4”

Corundum var. Emery
Peekskill, NY
Wards Nat. Sci. Estab., Rochester NY
4X3X1 1/2”

Andalusite
White Mountain, Mono Co., CA
Wards Nat. Sci. Estab., Rochester NY
4X3X1 1/2”
Novaculite 1

Novaculite (606-15.16 label; 606-38 rock)
Nr. Hot Springs Arkansas
Wards Nat. Sci. Estab., Rochester NY
4 1/2X3X1 1/2"

Arkansas Novaculite
Magnet Cove, Arkansas
RL Bates 2/74 SEG trip
2 1/2X2! 1/2"

Arkansas Novaculite (Mid. Devonian)
Potato Hills, ne. of Albion OK
JE Carman
Tray with 3 pcs: 3 1/2X2X1” and smaller

Novaculite
Quarry of National Lead Co., Baroid Division, Magnet Cove, Arkansas
Joan Echols, 8/66
2 pcs: 4 1/2X2X2 1/2” and 2 1/2X1 1/2X1”
Discolored by iron, copper, manganese, and cobalt

Arkansas Novaculite
Magnet Cove, Arkansas
8/59
Gray to reddish, 3 1/2X4X3”

Novaculite
Sm tray with gravel size pcs

Bauxite (chief mineral Gibbsite)
Bauxite, Saline Co., Arkansas
RL Bates, SEG trip, 9/74
3X2 1/2X1”
Reworked result of laterite weathering of nepheline syenite in early Eocene; color no indication of grade

Unlabeled
Box of dyed stones (Quartz)
1X3/4X1/2”
Coal 1

 Anthracite or "Mineral" Coal (606-18.10 label)
 Lehigh Valley, PA
 Wards Nat Sci Estab., Rochester NY
 Tray with 4 pcs: 5X4 1/2X2"; 2 spms of 4X3X2'; and 1X1X1/2"

 Anthracite or "Mineral" Coal (14946 rock)
 Jeddo PA
 Wards Nat. Sci Estab, Rochester NY
 Tray with 2 spms: 4X2 1/2X2 1/2" sawed on end and polished on 1 surface

 Anthracite
 Gunnison CO
 Wards Nat. Sci. Estab., Rochester NY
 4 1/2X4X2 1/2" and 6 pcs 1?2X1/2X1/2"

 Mineral Coal var. Sub-bituminous
 Red Lodge MT
 Wards Nat. Sci. Estab., Rochester NY
 5 pcs all 3X2X2" with tape labels

 Mineral Coal, Brown Coal (Pechbraun Kohle)
 Pennsberg, Bavaria
 Wards Nat. Sci. Estab., Rochester NY
 3X2X1 1/2" and 2X1 1/2X1 1/2" sawed on 2 ends

 Bright Coal
 5X4X2"

 Pittsburg # 8 Coal (Bituminous)
 Fairport #No. 9 miine, Hanna Coal Co., St. Clairsville, OH
 Coal thickness 5’ 3"; Spm 2X2 1/2X2 1/2"
 "# 8" painted on spm (also a "5"

 Coal 2

 Splint Coal
 Dorothy Bed, WV
 4X4X2 1/2"
 2 labels: one says "mostly durain" taped on "splint"; Analysis: moisture 1.3-5.5%; Vm = 27.9-40%; BTU = 12,230-14,470; FC = 40-63%; Ash = 3.8-11.7%; Sulfur 0.5-1.0%; Fus T (F) = 2850-3010)
Attrital Coal (nonbanded) - 606-19.3 label
4X4 1/2X2"

Fusain in Banded Coal
8X7X1"

Bone parting
Pittsburg # 8 Coal
Hanna Coal Cos., Willow Grove No. 10 Mine
BC Freeman, 11/2/38
3X2X1 1/2"

Middle Kittanning Coal # 6
Donald Mine, sec. 25, Hardy Township, Holmes Co., OH
3X2X1 1/2"

Attrital Coal (C-T on label)
Blackhawk Fm., nr. Gunnison, UT
3 pcs: taped labels “attrital”, 1X1X3/4"
C-T coal with resin

Attritus = “Clarain”
2 1/2X1 1/2X1 1/2” and 3 smaller pcs
“# 6” painted on 2 spms

Sub-Bituminous or Lignite
Mexico
12 pcs, largest 1X1X1 1/2"

Coal with Resin
Blackhawk Fm., Gunnison UT
3X3X2 1/2"

Quakertown # 2 Coal
Sec. 25, T8N R18W
Strip mine, Wellston OH
6X1 1/2X1 1/2”
“Bone below seam that is mined; anthraxylon (vitrain) bands separated by dull sediment-filled attritus (somewhat similar to European “durain”)

Coal 3

Bituminous Coal
Indiana # 6
Banded coal, 2 1/2X6X3” with 1 sawed surface
Graphitic Anthracite
 Portsmouth, RI
 Wards Nat. Sci. Estab., Rochester NY
 2 pcs 2 1/2X3X1 1/2"

Coke
Tray with 6X1X1" and 6X2X1 1/2"

Pittsburg Coal # 8 (606-21.5 label; 1654 on spm)
10X8X2 1/2"

Meigs Creek # 9
Bottom bench nr. Warner, Salem Township, Washington Co.
Autumn, 1960
8 pcs with sawed surfaces; 4X4X1" and smaller

Coal 4

Peat
Alfred, Ontario, Canada
Wards Nat. Sci. Estab., Rochester NY
7X2X1 1/2"

Peat
Ireland
RL Bates, 1971
2 1/2X2X1 1/2"

Peat
5X3X2 1/2" and 4X2 1/2X2"

Peat (Recent)
Road to Aultnaceal-gach Hotel, nr. Loch Alish, Scotland, NW Highlands
8/16/48
3X2 1/2X3/4"

Peat
Tray with 5 pcs 1 1/2X1X1/2"

Peat
Bayard, Duval Co. FL
Brown try: 10 pcs, largest 1 1/2X1X1"
Lignite (Tertiary)
Dickinson, ND
1 1/2X1X3/4” and 2X2 1/2X1”

Peat
5 pcs in tray labeled “peat”: 1X13/4” each

Expanded Slag
Steel mills, Cleveland Area
7 pcs: 1X1X1” and smaller

Coal 5

“Cleat” Bituminous
Pittsburg Coal, Fisher mine, Morgan Co. OH
6X6X3”

Bituminous
Meigs Creek
Monaco’s Stripping, Lafferty, Bel[mont] Co.,
5X4 1/2X3”

Lignite (Brown Coal) 20 pcs in tray (coarse gravel)

Lignite
Tray with pc 1X1X3/4” & gravel pcs

Mineral Coal var. Cannel
Cannel City KY
Wards Nat. Sci. Estab., Rochester NY
2 pcs labeled KY: 4X3X1 1/2”

Cannel Coal 4X4X2 1/2” (conchoidal fractures)

Cannel Coal 6X4 1/2X4”

Coal 6

Cannel Coal
Spl has “Cannel” penciled on side
6X3 1/2X2”

Cannel Coal
6 pcs with taped label “cannel”
4X3X1” to 2 1/2X2 1/2X1”
Bituminous  
8X5X2 1/2”

Bituminous  
3X1 1/2X1” and smaller with light colored partings (?pyrite)

Bituminous  
8X4X2 1/2”  
Coal with thin pyrite partings

Coal 7

No. 1 Lignite (Pliocene)  
Broad Pass, AK  
DM Hopkins  
Bottles with analysis: M = 3150; V = 38.0 FC = 21.0; Ash = 10.0; BTU = 7030

Coal collections  
2 cards - #1 Shaley Lignite, Pliocene, Broad Pass, AK #2 Blocky Lignite ND collected NW  
Lord, 1909  
7 trays of test spls (color-coded dots on plastic box): green - Anthracite, red - Bituminous, yellow  
- Shaley Lignite, orange - Blocky Lignite and white - Peat.

Coal 8

Miscellaneous test pieces  
10 pcs, mostly bituminous, with sawed surface

Bituminous  
6 pcs, largest 2X1 1/2X1/2”

Bituminous  
10X5X3/4”: fissile with shiny leaf (?) fossils

Vitrain with Marcasite partings  
2X1 1/2X1” and 1 1/2X1 1/2X1”

Tray with 4 accessory labels
3 Robert L. Bates Photoslide Collection

The following pages list 429 photoslides taken mainly by Dr. Bates on his many journeys to examine the exploitation of non-metallic rocks and minerals. The slides illustrate international sites where industrial rocks and minerals have been quarried, mined and processed.

These photoslides were used in various courses taught by Dr. Bates and serve both as a testimony and a legacy of the numerous field trips he took mainly in the 1950’s, 1960’s and 1970’s as he pursued his interest in this practical application of geology.

32 categories were designated by Dr. Bates and his category list precedes a detailed 17-page list of his annotations upon each slide.

The abbreviations listed are those that appear on the slides.

The slide collection is housed in a single wooden slide box /
4 List of categories and number of slides in each
Industrial Rocks and Minerals - Robert L. Bates Photoslide Collection

Number of photoslides in each category

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granite</td>
<td>37</td>
</tr>
<tr>
<td>Slate</td>
<td>8</td>
</tr>
<tr>
<td>Marble</td>
<td>29</td>
</tr>
<tr>
<td>Sd + Gr [Sand and Gravel]</td>
<td>29</td>
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<tr>
<td>Ss. [Sandstone]</td>
<td>36</td>
</tr>
<tr>
<td>Ls. + Dol [Limestone and Dolomite]</td>
<td>83</td>
</tr>
<tr>
<td>Fluorspar</td>
<td>10</td>
</tr>
<tr>
<td>Feld. [Feldspar]</td>
<td>13</td>
</tr>
<tr>
<td>Mica</td>
<td>4</td>
</tr>
<tr>
<td>REO</td>
<td>7</td>
</tr>
<tr>
<td>Neph. Sy. [Nepheline Syenite]</td>
<td>13</td>
</tr>
<tr>
<td>Spod. [Spodumene]</td>
<td>4</td>
</tr>
<tr>
<td>Barite</td>
<td>12</td>
</tr>
<tr>
<td>Garnet</td>
<td>2</td>
</tr>
<tr>
<td>Talc</td>
<td>7</td>
</tr>
<tr>
<td>Vermiculite</td>
<td>8</td>
</tr>
<tr>
<td>Asb. [Asbestos]</td>
<td>21</td>
</tr>
<tr>
<td>Diat. [Diatomite]</td>
<td>13</td>
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<tr>
<td>Trona</td>
<td>2</td>
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<td>Perlite</td>
<td>13</td>
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<td>Pumice</td>
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<td>Dunite</td>
<td>2</td>
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<tr>
<td>Clay</td>
<td>61</td>
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<tr>
<td>Shale</td>
<td>5</td>
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<tr>
<td>Ls. Dol. [II]</td>
<td>11</td>
</tr>
<tr>
<td>Gyp. [Gypsum]</td>
<td>10</td>
</tr>
<tr>
<td>Phos. [Phosphate Rock]</td>
<td>14</td>
</tr>
<tr>
<td>Magnesite</td>
<td>3</td>
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<tr>
<td>Am. Agg. Quarry</td>
<td>29</td>
</tr>
<tr>
<td>Sod. Sulf. [Sodium Sulfate - Trona]</td>
<td>4</td>
</tr>
<tr>
<td>Borax</td>
<td>21</td>
</tr>
<tr>
<td>Sulfur</td>
<td>13</td>
</tr>
</tbody>
</table>
5 List of Robert L. Bates Industrial Rocks and Minerals photoslides
Abbreviations follow Bates

Granite

1. Mt. Airy 1958
2. Granite, gen. view Mt. Airy quarry 63
3. Granite Block at Mt. Airy 63
4. Granite removing block - Mt. Airy 63
5. Granite paving blocks Mt. Airy 63
6. Granite removing block Mt. Airy 63
7. Inclusion in granite block - Mt. Airy NC 9-75
8. Granite working paving blocks Mt. Airy 63
9. Granite Schist inclusion Mt. Airy 63
10. Granite preparing paving blocks Mt. Airy ‘63
11. Granite preparing to remove block Mt. Airy 63
12. Crushed stone quarrying, Mt Airy 63
13. Granite quarry, Barre, Vermont. Rock of Ages Co.# 606
14. Granite Quarry showing channel and drilling Rock of Ages Co. 56
15. Granite finishing mill Barre, Vt.
16. Quarrying Granite at Rock of Ages Quarry, Barre Vt. 56
17. Granite Schist Contact - in Rock of Ages Quarry, Barre, Vt. 56
18. Schist inclusion in granite on wall Rock of Ages quarry, Barre, Vt. 56
19. Basalt Dike in granite quarry Rock of Ages, Barre, Vt. 56
20. Loading blast holes in granite Quarry near Griffin, Ga 4/21/76
21. Inclusion in Granite - qy near Griffin, Ga. 4/21/76
22. Granite Qy near Griffin, Ga. w/ Bob Timmons - Fla. Rk. Prods. Co. Primary Crusher 4/21/76
23. Granite Quarry Cold Spring, Minnesota 55
24. Granite Quarry Cold Spring, Minn. 55
25. Granite Quarry at Graniteville, Mo. Pre-C Note sheet structure 59
26. Granite Quarry at Graniteville, Mo. Pre-C Note joint 59
27. Granite masonry at HDQ, Hayward Granite Co. Graniteville, Mo 59
28. Granite Fairmont Qy. separated block 2 9/5/72
29. Granite Fairmont Qy. separated block 1 9/5/72
30. Granite Fairmont qy. Que - hoisting block 3 9/5/72
31. Granite Block in sling - Fairmont qy. Que 4 9/5/72
32. Granite Fairmont Qy. 2 mi. NW of Beebe Que 9/5/72
33. Granite Polishing unit, Starstead Co. mill, Beebe, Que
34. GRAN CZ Granite ready to ship - qy at Mrakotin 10/75
35. GRAN CZ Granite ready to ship quy at Mrakotin 10/75
36. GRAN CZ Granite at Mrakotin W of Telc Note wthrg 10/25/75
37. GRAN CZ Granite qy. Leskaun SW of Brno 10/75
Slate

1. Slate Imperial Bank of Commerce Bldg in Montreal 3½ acres of slate on sides from Lancashire "Certain wall spandrels" 9-72
2. Slate Cleavage and bedding Quarry near Granville, N.Y. Sept. 66
4. Slate Red & gn slate in qy at Middle Granville, N.Y. 9/66
5. Slate quarry in e’n [eastern] Pa. J. Epstein
6. Slate - e’n Pa. Epstein?
7. Slate Flooded quarry & old shacks near Granville N.Y. 9/66
8. Slate red and grn slate at q’y near Middle Granville, N.Y. [Cambrian] Mettawee fm. 9/66

Marble

1 View in qy. at Tate, Ga. June 73
2. Georgia Marble Co. Tate, Ga. 9-15-85
3. Etowah pink ashlar for shipment Tate, Ga. June 73
4. Quarrying Etowah pink ashlar, Tate, Ga., June 73
5. Active qy - Tate Ga. June 73
6. Old qy - Tate. Note sol’n cavity across quarry June 73
7. Active qy Tate, Ga. June 73
8. Sol’n channel on side of active qy Tate, Ga. June 73
9. Georgia Marble Co. 9-15-85
10. Georgia Marble Co. 9-15-85
11. Georgia Marble Co. 9-15-85
12. Larry Rooney at Tate, Ga. Forum 4/24/76
13. Active Qy., Tate, Ga. June 73
14. Connemare q’y, Ireland 9-71
15. Connemare q’y, Ireland 9-71
16. Connemare q’y, Ireland 9-71
17. Qy of Vt. Mar. Co. at Pittsford 8/30/74
18. Marble at W. Rutland quarry, Vt. 9/66
19. Qy. of Vt. Marble Co. at Pittsford 8/30/74
20. Tate qy w/ sol’n pits and passages - Ga. Forum 4/24/76
21. Old qy - Tate, Ga. note sol’n cavity June 73
22. Qy in Etowah Pink ashlar - Tate Ga. June 73
23. Memorial - Ga Marble Co, Tate June 73
24. F. trip group at Tate including L. Rooney and Mickey Bergstrom 4/24/76
25. View up to surface West Rutland q’y 9/66
26. Entrance to Danby q’y Vt. 9/3/74
27. Old marble - dump at Manchester Depot [Vt. or NH.] Sept. 66
29. Wire saws - Connemara q’y N.G. [sic] Ireland 9-71
Sd + Gr [Sand and Gravel]
1. Gravel pit - glacial outwash near Ann Arbor
2. Coarse reject gravel - pit near Zanesfield, O. on US 33 Valley Train 4-14-62
3. Gravel Kames of Wisconsin Moraine near Alfred, NY Tom Lewis '59
4. Gravel Kame near Alfred, NY Lge wh. = met’c; rd = Medina ss.; gy = chty Onon. ls; other with local Dev slst. T. Lewis
5. Gravel Kames of Wisc. moraine near Alfred NY Tom Lewis ’59
8. SAND + GRAVEL Oil-mixing plant op. for Wyo. Hwy. Dept. portable ‘59
9. SAND + GRAVEL Oil-mixing plant op. for Wyo. Hwy. Dept. portable ‘59
13. GRAVEL PIT Seyler pit near Ann Arbor. Till on top; Spg 1957
14. Gravel Pit Glacialfluvial near Ann Arbor
15. Dragline above pumped pit; train Note patches of alluvium around powerline poles Mar. 72
16. RR for gravel Nov. 71
17. CONGLOMERATE left in working gravel pit near Ann Arbor
18. HMS UNIT Killins Gravel Co. near Ann Arbor
19. Gravel stripped ready for dragline Dec. 72
20. Gravel Separation - Good Gr on R. reject on L. Killins Co. Ann Arbor
21. Gravel being stacked in wtr. 10/75 # 2
22. Flint gravel being stacked in wtr at Rotterdam - Bos Kalis Westminster 10/28/75 # 1
23. Reclaiming gravel from wtr 1 10/75
24. Reclaiming gravel from wtr 2 10/75
25. Gravel as received at R’dam 10/75
26. Gravel as received at R’dam 10/75
27. Gravel Screen on dredge 10/75
28. Gravel Fine fractions on dredge 10/75
29. Gravel Barges being loaded 10/75

Ss. [Sandstone]

1. Berea ss., S. Amherst 9/72
2. Gang saws - So. Amherst 9/72
3. Berea ss. # 1 E. Laws 64
4. Berea ss. # 2 E. Laws 64
5. Berea ss. # 3 E. Laws 64
6. Berea ss. # 4 E. Laws 64
7. Berea ss. # 5 E. Laws 64
8. Berea SS. Quarry Vertical view showing channels So. Amherst ‘55
9. MET Wh Qtzt, PC (?), Ont. 68 just N of Sheguiandah, Manitoulin Id. [Island] 1970 <20 mi. from Bedgeley Id.
10. X-bdy Loyalhanna Isq'y near Lychippeus, Pa, Eidemiller q. w/ ROV 6-71
11. Berea SS. Quarry So Amherst '55
12. Berea SS. Quarry So Amherst '55
13. HIGH-SILICA SAND Mansfield fm. (Penn.) SW. Indiana
14. Penn. asphaltic ss. on Ky. 65, N. of Brownsville, Ky. Quarry near Sweeden
15. From truck into primary crusher - Glass Rock qy 9/72
16. Bin & aerial tramway - Glass Rock qy 9/72
17. Strasburg - wthrd ss. prepared for repair 4/74 [slide mount loose]
18. Strasburg wthrd ss. 4/74 [slide mount loose]
20. Massilon ss. qy. at Glass Rock Bill Keighin 9/72
22. Hanging wall at St. Donat, Que. Gneiss IGC trip 8/31/72
23. Stockpile at St. Donat Que. IGC trip 8/31/72
24. Plant at St. Donat dep. Que. primary crusher to L of pic. IGC trip 8/31/72
25. St. Donat silica dep. Potsdam ss. w/ till cover, IGC trip, INDUSMIN STOP 2 8/31/72
26. Joints in Potsdam ss. - St. Canut, Que IGC trip 8/31/72
27. Mine - run rock - Potsdam ss. at St. Canut, Que. IGC trip 8/31/72
31. Pit in Arb. Mtns. Forum field trip 5/14/77
33. Pit in Arb. Mtns. Forum f. Trip 5/14/77
34. St. Donat silica dep. Que - PC metaseds. dips steeply to N (R) 99% SiO2 IGC trip STOP 1 8/31/72
35. Small inactive quarry in Potsdam ss. near Ste. Clothide, Ont. '60

Ls. + Dol [Limestone and Dolomite]

1. Air view - Union Lime and Stone Co. qy. w/ WAP 8/10/72
2. 14th Forum Industrial Minerals, Albany, N.Y. 5/4-6/78
5. 14th Forum Industrial Minerals, Albany, N.Y. 5/4-6/78 Field Trip, Hudson Cement Co. Kingston, NY
6. 14th Forum Industrial Minerals, Albany, N.Y. 5/4-6/78 Field Trip Atlantic Cement Co. Ravena, NY
7. 14th Forum Industrial Minerals, Albany, N.Y. 5/4-6/78 Banquet
9. 14th Forum Industrial Minerals, Albany, N.Y. 5/4-6/78 Field Trip
   Hudson Cement Co. Kingston, NY 5/6/78
10. 14th Forum Industrial Minerals, Albany, N.Y. 5/4-6/78 Field Trip
    Hudson Cement Co. Kingston, NY 5/6/78
11. 14th Forum Industrial Minerals, Albany, N.Y. 5/4-6/78 Field Trip
    Hudson Cement Co. Kingston, NY 5/6/78
14. Ls. Dundee Is. (background) + Silica Sh. used in portland cmt. Medusa P.C. Co. NW Ohio
15. 5th F.G.I.M. 5/13/69 Hanover Quarry, Bethlehem Steel Co.
17. L.S. Reef dips Mississinewa Is. Mill Cr. quarry near Rich Valley, Ind. 1961 trip, stop 3
18. Cement Plant using waste from “marble” Gray Knox Quarry 3-21-61
20. L.S. Ship w/ 30,000 tons aragonite at cmt. plant, Tampa 5/72
22. L.S. Kilns + plant Atlantic Cmt. Co. Ravenna, N.Y. GSA Nov. ‘63
23. Ls. Replacing steps Orton Hall ‘63
25. Ls. Replacig steps Orton Hall Oct. ‘63
26. Dol Loading RR cars at Pfizer Q’y Ireland 9-71
27. Ls. Quarry at Isle of Portland ‘63
28. Ls. Portland stone - blocks at quarry ‘63
29. 1974 Forum f. trip at Mickey Bergstrom rep of Property Buzz C., Dick Struble 4/19/74
30. CEMENT Gen. view in Plattin ls. quarry, Cape Girardeau, Mo. RLB Snowstorm ‘60
31. CEMENT Gen view in Plattin ls. quarry, Cape Girardeau, Mo. RLB Snowstorm ‘60
32. 1974 Forum - f. trip in pits of new develop’t in old quarries 4/19/74
34. Cement Breaking blocks of Plattin ls., Cape Girardeau, Mo. RLB Snowstorm
35. Gen. view in Ind. ls. quarry Apr. ‘66
36. Working Trench Ind. ls. q. FGIM Apr. ‘66
37. Ls. Wire saws - Ind. ls. quarry Apr. ‘66
38. Ls. Cly seam, Tenn. Marble - Gray Knox quarry Mar. 61
39. Ls. Tennessee Marble Blocks, Mill at Knoxville
40. Ls. Old part of Gray Knox Marble Co. quarry, K’ville Note bedding Mar. ‘61
45. Ls. Replacing steps, Orton Hall ‘63
46. Ls. stone in new lib. at U. of Houston 3/73
47. Stone in lib. bldg., U of Houston 3/73
48. Ls. CZ “Venetian pavement” mfrd. [manufactured] atMrakotin 10/75
49. Ls. CZ pallets of “Venetian Pavement” - granite qy. at Mrakotin. 10/75
50 Rogers City quarry, Mich. '60
51. Ls. Train in Rogers City quarry, Mich. Plant in distance
52. Qy in Palliser ls. for cmt. + sign near Edmonton Alta. G.Larson '75
53. Distant view of Qy in Palliser ls. for cmt. G.Larson '73
54. Qy near Rome, Ga. w/ Bob Timmons 4/21/76
55. CEMENT Shot-hole drill in quarry Cape Girardeau '60 Snowstorm
56. CEMENT loading Plattin ls. in quarry, Cape Girardeau snowstorm '60
57. L.S. Safety sign in qy near Rome, Ga. 4/21/76
58 Sed Loyalhanna ls. + Pocono red-beds w/ ROV Eidemiller qu, Pa. 6/71
59. Ls. view to E in Toledo Stone + Glass Sd. quarry - Anderdon fm. on far wall. '60
60. Ls. Pressure ridge, ls. qy at Lima, Ohio 9/76
61. Warrensburg qy. - air view with WAP 8/10/72
62. Cols.-Del. contact Marble Cliff 9-10-71
64. Japanese cement carrier, 21,000 tons will unload @ 2,000 tph Pit +Q July 73
66. L.S. Cmt kiln, Cape Girardeau, Mo.
67. DOL.LS May qy., Ft. Wayne, Ind. Gen view to NE 1961 trip - stop 4
68. DOL.LS May qy., Ft. Wayne, Ind. Gen view to NE 1961 trip - stop 4
69 L.S. Quarrying Tenn "marble" Gray Knox Quarry. Mar. 61
70. DOL.LS May qy. Ft. Wayne Ind. Pleist. overburden (utilized) 1961 trip - Stop 4

71. 5th Forum 5/2/89 Thomasville Stone + Lime Co, Mine. - Thomasville, Pa.


73. 5th FGIM - 5/17/69 Hanover quarry - Bethlehem Steel Co. - Looking W. from roof of screening tower Note FGIM bus in quarry.

74. Ls. Gen. view Ind. ls. quarry FGIM - apr. '66
75. Sol'n in wall , Ind. ls. q. Apr. '66
76. Cement plant W. of Calgary C.Nardone 11/77
77. Ls. quarry Cmt. plant W. of Calgary C.Nardone 11/77
78. Ls. CZ Ls. qy - SW of Prague Lo Dev.- Hi-Ca 10/75
79. Ls. CZ Ls. qy - SW of Prague L Dev.- Hi-Ca 10/75 note loader tires
80. Ls. CZ Ls. qy - SW of Prague L Dev.- Hi-Ca 10/75
81. DOL.,Ls. May qy., Ft. Wayne Ind. Gen view to SW 1961 trip Stop4
82. DOL.,Ls. May qy., Ft. Wayne Ind. Gen view to NE 1961 trip Stop4
83. Ls. Channeling Ind. ls. Bedford dist. FGIM - Apr. '66
84. Ls. Quarry in Purbeck beds near Swanage where dino. tracks were found. ‘63

85. Ls. Fluck Stone sign Apr. ‘66
86. Ls. mine at Greer, W.Va. Greenbriar Ls.
87. Pressure ridge, ls. qy at Lima, Ohio.
88. Plum Run, O.- old q - Greenfield, Peebles, Lilley. Geol 670 9-19-70

Fluorspar

1. Forum welcome sign - Paducah, Ky. Apr 73
2. Don Carr, Forum at Paducah Minerva Fluorspar mine Jim Martin
3. Ill-Ky. fluorspar dist. and Miss. embayment Brecke ‘64 p. 1294
4. Ill-Ky. fluorspar dist. RLB book
5. X-secs. of Ill. bedding replace’t depts of fluorspar Finger et al. ‘60 p. 7


10. Gaskins mine, Ill. Note wtr. Forum Apr. 73

Feld.


5. Old McKinney mine SW of Spruce Pine NC. looking N Sept. 73
6. Feldspar Corp. plant, Spruce Pine NC 9-13-85
7. Feldspar Corp. plant, Spruce Pine NC 9-13-85
8. Feldspar Corp. plant, drying + firing feldspar, Spruce Pine NC 9-13-85
10. Old McKinney mine SW of Spruce Pine NC looking S. Sept 73
11. Chalk Mtn. mine Spruce Pine, NC (Alaskite) 9-75
12. Chalk Mtn. mine Spruce Pine, NC (Alaskite) 9-75
13. Stockpile at inactive plant of IMC at Buckingham, Que. (Peg.) from Back Mine) IGC Stop 6 9/1/72
14. Group at Chalk Mtn. mine, Spruce Pine, NC Sept. 75
15. PEG. Fold-mica pegmatite Old McKinney mine, Spruce Pine Sept. 73

**Mica**

1. Kings Mtn. Mica Co. 8-14-85
2. Kings Mtn. Mica Co
3. Outcrop of weathered natural Doug Pride + John Connor to R 9-14-85
4. Kings Mtn. Mica Co. 9-4-85

**REO**

1. Distant view of pit, Mtn Pass, CA 2/76
2. Pit at Mtn Pass, CA 2/76
3. Mill at Mtn Pass, CA 2/76
4. New flotation cells, Mtn Pass, CA 2/76
5. Flotation cells - Mtn. Pass, CA 2/76
6. Pit at Mtn. Pass, CA (Molycorp.) 2/76
7. Gen. view of Mtn. Pass dep. toward S 2/ 76

**Neph. Sy. [Nepheline Syenite]**

1. Neph. Sy. Map of dep. of Indusmin at Nephton, Ont. IGC stop 8 9/3/72
2. View of Cabin Ridge qy. - toward SW - Indusmin mill beyond. IGC trip 9/3/72
3. Sharp contact at L gradational at R. NE of Cabin Ridge q’y IGC trip 9/3/72

4. Contact w/ gneiss - Cabin Ridge qy. IGC trip 9/3/72
5. Syenite & gneiss - looking SW toward mill IGC trip 9/3/72
6. Masses of nepheline - Indusmin dep. IGC trip 9/3/72
7. Joints in syenite - Blue Mtn. qy. of IMC 9/3/72
8. Joint - IMC dep 9/3/72
9. Roll crushers, IMC mill 9/3/72
10. Drying kiln - IMC mill 9/3/72
11. Ball mills IMC plant 9/3/72
12. Mag + hem. removal from neph. sy. IMC mill 9/3/72
13. Joints and 2dary mins. - IMMC dep. 9/3/72

**Spod. [Spodumene]**

1. Lithium corp. of Am. mine, Bessemer City, N.C. 9-14-85
2. View of Kings Mtn. mine of Foote Min. Co. Spt. 73
3. View of Foote Min. Co. qy at Kings Mtn. N.C. Sept. 73
5. View into Foote Min. Co. qy at Kings Mtn. N.C. Sept 73

**Barite**

1. Rhythmic bddg. in Magnet Cove barite dep. Zimmermann & Armstrong ‘64 p. 238
2. offset module of Barite, Magnet Cove dep. Zimmermann & Armstrong ‘64 p. 367
3. Barite Pits in Washington Co. Mo. ‘59
8. Gen. view of Magcobar’s barite q’y near silvermines looking S; W dip Ireland 9-71
9. Gen. view Magcobar q’y Ireland 9-71
10. Mag. Cove - Gen. view into pit SEG trip 2/74
11. Mag. Cove - View of ore at bot. of syncline in pit SEG trip 2/74
12. Mag. Cove - View into pit SEG trip 2/74
13. Mag. Cove - Gen. view into pit SEG trip 2/74
16. Loading ore Forum trip 4/24/76
17. Dol. pinnacles below residuum - Cartersv. Ga. 4/24/76

Garnet

1. Garnet at Barton Mine, N.Y. 9-4-74
2. Garnet at Barton Mine, N.Y. 9-4-74

Talc

1. Dump, Granthem mine Death V.N. Mon. 2/76
2. Folds in talc-bearing beds, Granthem mine, Death V.N. Mon. 2/76
3. Cut, Granthem mine, Death V.N. Mon. 2/76
4. Party on outcrop at Baker deo. 15 min. W of Highwater, Que. light rock below ledge is talc, 9/5/72
5. Flot’n cells at Baker plant at Highwater, Que 9/5/72
7. Dump, Granthem mine Death V. N. Mon. 2/76

Vermic. [vermiculite]

1. 11th F.G.I.M. 6/17-20/75 Field Trip 6/20/75 Vermiculite Mountain Mine, Libby, Mt. Note Al Kreuzer, The Happy Dutchman
2. Libby Mine, MT June '75
3. 11th F.G.I.M. 6/17-20/75 Field Trip 6/20/75 Vermiculite Mountain Mine, Libby, Mt.
4. Loading - at Libby mine, Mt. June 75
5. Loading - at Libby 6-20-75
6. 11th F.G.I.M. 6/17-20/75 Field Trip 6/20/75 Vermiculite Mountain Mine, Libby, Mt.
7. 11th F.G.I.M. 6/17-20/75 Field Trip 6/20/75 Vermiculite in place, Vermiculite Mine, Mountain Mine Libby, Mt.
8. Libby Mine, MT June '75

Asb. [Asbestos]

1. Asbestos, Que, Gen. view of pit. Blast down 1500 tons/time
2. Asbestos - Jeffrey mine - portable rotary drill - 6¾" - 35’ for blasting and coring
3. Asbestos, Que. Bottom of pit. note - coning from mining 150’down
Waste fill is slumped
4. Asbestos, Que. View N toward footwall slate + cement plant
5. Asbestos mine, Hyde Park, Vermont. Ruberoid Co,
6. Jeffrey mine THE ORE 9-6-72
7. Jeffrey mine - group collecting 9-6-72
8. Asbestos - Jeffrey mine - along footwall contact with “slate” Note dike, L.
9. Jeffrey mine - ramp beyond pit w/ old drifts NB pumping lines
10. Jeffrey mine & loading 9-6-72
11. “Johns Manville Jeffrey Mine” 9/6/72
12. Jeffrey mine looking NE 9-6-72
14. Jeffrey mine 200-ton cap'y truck 9-6-72
15. Jeffrey mine - shothole drill NB Dust protection for operator. Also mounting legs 9-6-72
16. Jeffrey mine - from hoist house 9-6-72
17. Jeffrey mine 200-ton-cap'y [capacity] truck w/ geol' st from Thailand 9-6-72
19. Jeffrey mine from hoist house 9-6-72
20. Mine from hoist house 9-6-72
21. Jeffrey mine hoisting ramp 9-6-72

Diat. [Diatomite]

1. Diatom forms
2. Diatomite
3. Diatom as filter aid
4. Anticline in dist’s sh. Lompoc CA Mar. ‘73
5. Sign - JM Corp. Lompoc CA Mar. ‘73
6. Waste dump Lompoc Mar. ‘73
7. Diatomite beds. Lompoc CA Mar ‘73
8. Trench in qy. Note nails Lompoc CA Mar 73
9. Trench in qy. Waste between nails, Lompoc CA Mar 73
10. Measuring & c - quarry, Lompoc CA Mar. 73
11. Sampling - Lompoc qy, CA Mar. 73
12. Quarrying machine - Lompoc Mar. 73
13. Diatomite being loaded in qy. Mar. 73

Trona

1. Fibrous trona Allied mine SEG trip 6-71
2. Fibrous trona Allied mine SEG trip 6-71

Perlite

1. Socorro de. - w/ Geo. Austin et al. 2/24/78
2. Perlite showing flow banding - Milford, Utah Tobin - 58
3. Perlite and obsidian - Milford, Utah Tobin 58
4. Perlite interbedded with obsidian in flows. Milford, Utah Tobin
5. Perlite - Milford, Utah Tobin ‘58
6. Perlite - Milford, Utah Tobin ‘58
7. Tongue of Perlite in obsidian - Milford, Utah Tobin ‘58
8. Perlite Socorro deposit - w/ Geo. Austin et al. 2/24/78
9. View of Scorro plant 2/24/78
10. Perlite Socorro dep. - stockpile 2/24/78
11. Perlite Socorro dep. mill 2/24/78
12. Perlite Joints - Grants dep. w/ Geo. Austin 2/24/78
13. Perlite Grants dep. w/ Geo. Austin 2/25/78

**Pumice**

1. Pumice Dep. near Grants, NM 2/25/78
2. Pumice Dep. near Grants, NM 2/25/78

**Dunite**

1. Dun Dunite pit - US 19E & NC 80, N. of Spruce Pine 9-75
2. Dun Dunite pit - US 19E & NC 80, N. of Spruce Pine 9-75

**Clay**

1. ECC docks at Fowey, Cornwall 7/10/74
2. Clay Fullers earth - Porters Creek, near Olmstead, Ill. Paleocene
3. Clay CZ Ball clay and overburden at Nova Ves NB bk. “Nero clay” by shovel 10/75
4. Clay CZ Hydrated muscovite zone below clay - Nova Ves 10/75
5. Slurry agitator at pit of Ga. Kaolin Co. Sept. 73
6. Mining ball clay - Nova Ves 10/75
7. Nova Ves - ball clay 10/75
8. Hand cutting ball clay Nova Ves 10/75
9. Mining crew - ball clay - Nova Ves 10/75
10. Prod’n record inwall of clay pit - Nova Ves 10/75
11. Nova Ves - washout in overburden w [?] c spring wtr. 10/75
12. Stripping machine & belt Nova Ves 10/75
14. Stripping overburden - Nova Ves ball clay 10/75
15. Trash truck getting wheels washed. Redhill fullers earth dep. Surrey 7/16/74
16. Fullers earth at Redhill, Surrey LaPorte Inds. Ltd. 7/16/74
17. Fullers earth at Redhill Surrey w/ Ms. Coomber LaPorte Inds. Ltd. 7/16/74
18. Fullers earth dep. at Redhill, Surrey w/ Ms. Coomber. LaPorte Inds. Ltd. 7/16/74
19. Nova Ves - ball clay 10/75
20. WBB ball-clay pit, Newton Abbot, Devon 7/11/74
21. WBB ball-clay pit at Newton Abbot, Devon Note quality-control man by dragline 7/11/74
22. Hand cutting ball clay - Nova Ves 10/75
23. Gen. view - Kaolinized arkose at Kaznjenov (Stephanian) ±20% K 10/75
24. Clay, Kaolin - Kaolinized arkose, Kasnejov - note pebbles 10/75
25. Clay, Kaolin - Kaolinized arkose, Kasnejov -note pebbles of qtz, cht (PC) - Stephanian 10/75
26. Conveyor belt w/ waste - Nova Ves 10/75
27. Kiln for mfr. of Molochite ECC - Cornwall 7/4
28. ECC loading facilities at Fowey, Cornwall 7-10-74
29. Tuscaloosa fm. below Twiggs clay near Deepstep Ga. Thiele mine June ‘73
32. Bentonite stockpile and truck ‘55 Colony plant NW of Black Hills.
33. Bentonite plant and stockpile, Colony plant, NW of Black Hills ‘55
34. Clay Fullers earth - Porters Creek clay, Olmstead Ill. Paleocene
35. Clay detail of Porters Creek clay - pit at Olmstead, Ill. ‘59
36. View in Thiele pit near Deepstep, Ga. June 73
37. Brick plant, Columbia C Hsu 2 of 3
38. Brick plant, [Colombia] C Hsu 1 of 3
39. Brick plant C Hsu [Colombia] 3 of 3
40. Scene in Kaolin pit near Deepstep, Ga. Sept 73
41. Scene in pit of Ga. Kaolin, Co. Dragline & slurry mixer Sept 73
42. Carol Foss in clay - Kaolin pits NE of Spruce Pine NC 9-75
43. Hosts - Marsburg-Landshut area - Neuhaus & Giebisch 5/20/76
44. Guide w/ Süd-chemie Marsburg-Landshut area 5/20/76
45. Reclamation of pit in Marsburg-Landshut area 5/20/76
46. Pit, Marsburg-Landshut area 5/20/76
47. BENT In pit Marsburg-Landshut area W. Germ. 5/20/76
48. Pit in Marsburg-Landshut area, W. Germany 5/20/76
49. Kaolin Gen. view of China-clay area Cornwall 7/74
50. Kaolin Gen. view of Blackpool pit Cornwall 7/74
51. Kaolin Greisinized & kaolinized granite, Blackpool pit, Cornwall 7/74
52. Kaolin Porphyritic granite, partly kaolinized, Blackpool pit, Cornwall, 7/74
53. Kaolin - Monitor at Blackpool pit, Cornwall 7/74
54. Kaolin Bottom of Blackpool pit, Cornwall Monitor out of view to R 7/74
55. Kaolin Pump houses Blackpool pit, Cornwall 7/74
56. Product storage, Cornwall 7/74
57. ECC docks at Fowey, Cornwall 7/10/74
58. ECC docks at Fowey, Cornwall 7/10/74
60. Pit near Deepstep Ga. Sept 73
61. Residual kaolin, Brushy Cr. Mine, NE of Spruce Pine NC 9-75
Phos.

1. Jets making slurry in pit, Bonny Lake mine 10/66
2. Jets making slurry in “well” in pit Bonny Lake (Grace) mine, Fla. 10/66
3. Bucket taking up matrix, Bonny Lake mine 10/66
4. View in Kingsford mine 3 4-30-71
5. Ph. rk. workings 2 - Kingsford mine O is below to R. 4-30-71
9. Bucket & jets - Bonny Lake mine, Fla. 10/66
10. Part of 1½-mile (2.4 km) conveyor system at Fla. ls. qy. R. Prod.
11. Unit train w/phos. rock from plant to Tampa (40 mi.) R Prod. 9/73
13. Bone Valley “matrix” w/ bone. Noralyn mine 4-30-71
14. Bone Valley + overburden, Kingsford mine 4-30-71

Magnesite

1. Mag Mine of Canadian Refractories Ltd. at Kilmer, Que. magnesite in Laurentian rx adjacent to intrusives IGC trip 9/1/72
2. Yard of Can. Refrs. Ltd. at Marsden w/ piles of mag. &c from various sources IGC trip 9/1/72

3. Mag Stock piles of various refr. mats. - mag. from Greece, Yugo. Dow Chemical &c Marsden, Que. IGC stop 4 9/1/72

Am. Agg. Quarry

1. General view to NE Dec. 71
2. Gen. view of pit Am. Agg. qy 9-9-72
3. Bedrock surface Nov 71
4. “Ripples” w/ J. Chapel 2-1-74
5. Mud-filled joint Feb ‘72
6. Sump + inflow - NW end w/ J. Chapel 2-1-74
Shale

1. Yard of Claycraft Co. E. of Col’s ‘60
2. BENT Bent., Marburg-landshu area, W. Germ. 5-20-76 [misfiled?]
3. Old style coal-fired brick kiln, Claycraft Co. ‘60
4. Just-opened brick kiln, Claycraft Co. E. of Co’s ‘60
5. Old brick kiln, converted from coal to gas, Claycraft ‘60

Ls. Dol. [II]

1. Dol Truck for pulverized Filler for asphalt - Plum Run quarry 63
2. Dol - Plum Run
3. Dol - Plum Run
4. Dol - Plum Run
5. 5th Forum 5/2/69 Hanover Quarry - Bethlehem Steel Co. Looking N from roof of screeninig tower, Pigeon Hills, in background. Len Duersmith
6. [unlabeled w/ slide mount date of sep 78]
7. Fo [sic] Dipping Mid-Ord Iss. - old q’y near Tyrone, Pa. 6/71 w/ ROU
8. Dol Pfizer’s q’y near Bennettsbridge, Co. Kilkenny 9-71
9. Ls Loading slot holes w/ pk blasting net. Peebles q’y, O. 3-67
10. LS Wall of Gray-Knox quarry, Tenn. showing clay seams
11. Fo Nappes in Beak dol - Rheems, Pa. 6-67
12. LS Loading shot holes - Marble Cliff 9/72
13. Ls. mine at Greer, W.Va., Greenbriar ls.

Gyp

1. at qy. of Weyer’r Co. Briar, Ark. Low. Cret. - Trinity SEG trip 2/74
2. 8th Forum - Iowa City, Iowa April 11-15, 1972. U.S. Gypsum Co. Sperry mine, Sperry, Iowa Duersmith
4. Celesten qy. - Gypsum, O. Sal (info blurred on slide wrong kind of ink)
5. Gypsum - contorted bed at base of q’y wall - Gypsum O. MBGS trip 6-71
6. Stockpile at dep. NW of Bernalillo, NM 2/25/78
7. Gypsum - qy at Gypsum O. MBGS trip 6-71
8. Loading ay dep. NW of Bernalillo, NM 2/25/78
9. Dep. NW of Bernalillo, NM 2/25/78
10. Gypsum & shaly dol. Gypsum, O. MBGS trip 6-71
7. Gen. view to SE - egpt [sic] moving in Dec 71
8. Gen. view to SE Jan 74
9. Stone sec., gravel conveyor belt w/ J Chapel 2-1-74
10. Water entering thru gravel Nov. 71
11. Bedrock surface Nov. 71
12. Gen. view of bedrock surface Nov 71
13. Bedrock surface Dec. 71
14. Apr 73
15. Bedrock channels Nov. 71
16. NW corner - ramp & inflow w/ J. Chapel 2-1-74
17. Basal sd. “welded” to ss. Note flat surface, sculptured joint Dec. 71
18. Till in Is. Apr. 72
19. Bedrock channels Nov. 71
20. “Ripples” on Is. surface Mar. 72
21. “Ripples” on Is. surface Dec. 71
22. Solution passage & till Mar. 72
23. Apr. 72
24. Gen. view to W. - disposing of mud Nov. 71
25. Bergström and Jaanusen on bone bed. Dec. 71
26. Bone bed at top of bedrock Mar. 72
27. Contact between Del. Is. & Col’s Is. Mar. 72
28. Mud-filled joint Mar. 72
29. Silurian channel filled w/ till, and top of bedrock Mar. 72

Sod. Sulf.

2. Ditch from lake evp’g ponds Na sulfate, Chaplin. Sask. G. Larson ‘73
4. Sodium sulfate at Chaplin, Sask. From Lake Aug. 65

Borax

1. Boraxo mine. Death Valley N. Mon. 2/76
2. Death Valley from bus 2/76
3. Boraxo mine. Death Valley N. Mon. 2/76
4. View to E at Boraxo mine. Death Valley N. Mon. 2/76
5. Boraxo mine. Death Valley N. Mon. 2/76
6. Boraxo pit. Death Valley N. Mon. 40’ benches 2/76
7. Radial stacker at Tenneco’s plant, Nev. 2/76
8. Tenneco plant N of D.V. Jct. in Nev. 2/76
10. Furnace Creek Rch. Death Va. N. Mon. 2/76
11. Furnace Cr. Ranch Death Valley N. Mon. 20 Mule Team wagon 2/76
12. Old steam engine, Furnace Cr. Death V. N. Mon 2/76
13. Old RR engine, Furnace Cr. Ranch, Death Valley N, Mon. 2/75
14. Bad Water [sic], Death Valley 2/76
15. Sign at Borax, Calif 6-6-85
16. Cliff w/ Sea-Level sign Badwater, Death V. 2/76
17. Rim of pit, Borax, Calif 6-8-85
18. Borax, Calif. 6-8-85
19. Borax, Calif. 6-8-85
20. Borax, Calif. waste disposal 6-8-85
21. Plant at Borax, Calif. 6-8-85

**Sulfur**

1. Sulfur-gathering shed, Lake Washington, La. '56
2. Sulfur - Miss. delta, La. 56
7. Sulfur on plains near Calgary, Alta. C. Nardone 11/77
8. Sulfur loading at Vancouver, B.C. Craig Nardone 11/77
12. Loading sulfur at plant near Mander -