The Mineral City Show

JAN 27 — FEB 11

2023

Mineral-City.com

516 & 532 W Lester Street and 445 & 525 & 531 W Plata Street, Tucson Arizona 85705, USA

Painting & Photo by
Ksenia Levterova

The Fine Mineral Collection of

DR. ERIKA POHL

Big things are happening in 2023.

We're honored to be partnering with the Pohl family and the Granada Gallery, in the release of specimens from the Dr. Erika Pohl collection.

An initial selection of several hundred specimens from her Tsumeb and Morocco suites will be shown at the Granada Mineral Showcase and at The Arkenstone in Tucson. This is a teaser selection for many more specimens to follow in the upcoming years.

THE Arkenstone
www.iRocks.com

GRANADA MINERAL SHOWCASE

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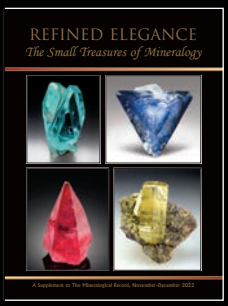
We are honored to announce the acquisition of the

SCHAUSS THUMBNAIL COLLECTION

Mark Mauthner Photo

Over six decades of collecting, Dr. Alex Schauss accumulated hundreds of the world's best thumbnails. We are excited to share these with you in Tucson, as an educational exhibit prior to sale.

RELEASE PARTIES - Jan. 28 and Feb. 8, 2023



To allow visitors an opportunity to enjoy the collection as a whole, the Schauss Thumbnail Collection will remain intact on exhibit at our Tucson location through February 8. Any specimens purchased from the collection prior to February 8 can be picked up starting the 9th.

Due to capacity restrictions, release parties will have a closed guest list. Please contact us at info@irocks.com to request an invitation.

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INTRODUCTION

Collectors and Dealers,

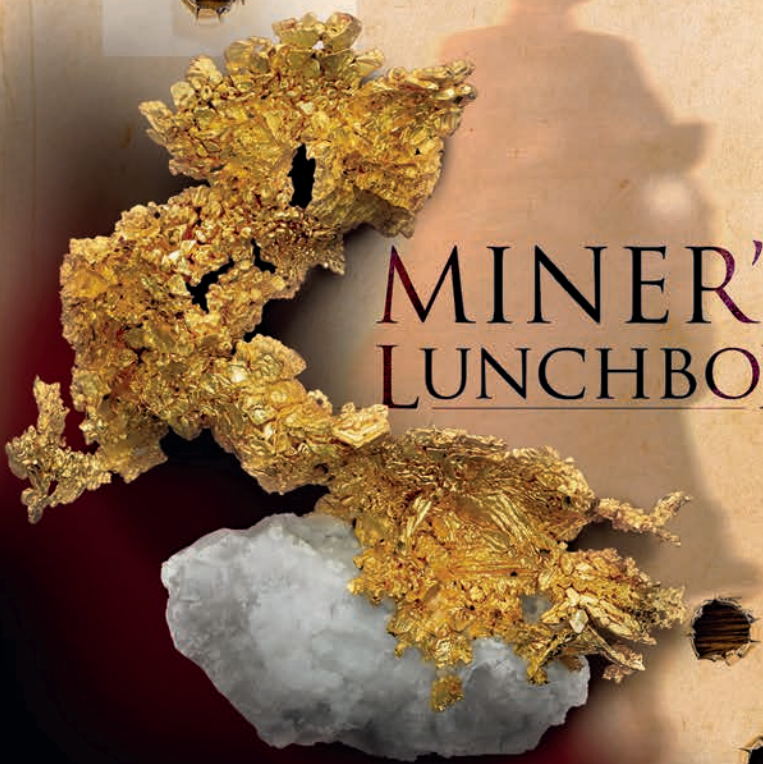
Its that time again where we get to talk rocks, buy rocks, and live the 24/7 mineral lifestyle for a couple of weeks.

I would like to give those new to Mineral City a brief history of the Mineral City Show. 5 years ago, at this time Mineral City was just an idea I had, and nothing more. During the 2018 Tucson show I asked several dealers if they would be interested in the idea of a permanent showroom. With a handful of yeas, I set the plan in motion for what would become Mineral City. I owe a lot to those first few dealers, and in particular Tomek Praszkier who went above and beyond in helping me get things off the ground. The first year grand opening it was very "special" with the electricity provided by a big diesel generator, the parking lot half paved and some rooms not quite finished. Besides those hiccups the venue was a success for all the dealers. The next year, with new partners Scott Werschky and Dan Kennedy, I remodeled the old warehouse behind the now finished "A Building" and expanded into the "B Building" to the west. For 2021 I was planning another expansion when Covid struck. In spite of this, we finished construction on the "D" and "E" Buildings, along with renovation of the "F Building" and held a much smaller show that April. All was going well until our partner Dan Kennedy passed away unexpectedly in July. This was a huge loss for the mineral collecting community, and especially so for Scott and me. Subsequently, Scott and I have purchased the Kennedy family's portion of Mineral City and things are now back on track. As we go into our 5th year with all the buildings finished, we are looking forward to giving the full Mineral City Show experience to the dealer and collector community. I hope you will enjoy your visit to what has become the best mineral show in Tucson.

Graham Sutton

scott@minerslunchbox.com

SCOTT WERSCHKY



MINER'S LUNCHBOX

Mineral City Bldg D, Room 39-41, 525 W. Plata Street

5635 Riggins Court • Suite 7 / Reno, Nevada • 89502 USA / 1-775-829-6881

CONTENTS


UK MINING VENTURES
FIND US AT SUN GEMSTONES (MINERAL VILLAGE),
1801 N ORACLE ROAD, TUCSON, ARIZONA 85705


WULFENITA
MEXICAN MINERALS
FIND US AT BUILDING A UNIT 1,
516 WEST LESTER STREET, TUCSON, ARIZONA 85705

RAYS IN THE SWISS ALPS

Patrick Reith

Searching for untouched clefts high above my hometown of Disentis.

The search for minerals, or "blasting" as we call it in Switzerland, can look back on thousands of years of history. In 2012, deer antlers were found in an old chasm on a remote glacier where I have set up my bivouac for the last few years. That wouldn't be particularly unusual if the chasm hadn't just melted free of the ice. During subsequent investigations, stone tools and firewood were recovered from the chasm. The unbelievable thing is that the antlers were estimated to be 7000 years old! **But why did people then and now continue to accept such dangers and deprivations?**

The value of a crystal certainly played a bigger role in the past than it does today. Certainly today there are more convenient ways of earning a living. I live in these rough mountains summer after summer, and I believe that even then, there was

Doubly terminated Amethyst, Bieliger Valley, Valais, Switzerland. Size: 8cm. Private Collection. Jeff Scovil photo.

A brilliant smoky quartz specimen, found at the Galmihorn, Valais, Switzerland. This cleft opened the door for me to become a professional strahler. Size: 14cm, Private Collection. Christian Hager photo.

a lot more to it than just money. The search for crystals is a passion that guides your whole life and, eventually, your death. Despite mountaineering skills and equipment having improved enormously in recent decades, it hasn't exactly become easier to discover a new gap. With these advantages also comemore people and, as a result, some of the reliable locales have been shifted to the edges of the glacier, which is currently melting. Add to this the fact that the good zones in the respective discovery areas are now known to practically everyone - and the competition is therefore great. For this reason, I specialized in searching in remote and very difficult to access regions of the mountains. Of course, also because the adventure appealed to me. To shine like that sometimes almost means planning a small expedition. The ropes, tents and much more must be laboriously carried along the glacier and up the rock faces for several hours. As soon as you have arrived at a suitable place, the camp is set up for the summer. Most of the time we only return to the valley at the weekend or when snow starts to fall.

It's a simple life, but we love it and I wouldn't trade my job for the world. The feeling of being truly in tune with nature, living in a tent with no electricity, cell phone, etc., is a big part of the crystal hunt. But sometimes even I find it difficult to motivate myself every morning. Because most of the time you only find 1-2 good clefts in a whole summer - if at all! That often means weeks of climbing around in rough and sometimes very dangerous areas without a single beautiful crystal. Many of the cliffs I climb have never been scaled or rappelled. In the event of a mistake, withdrawal is not easily possible.

Continued on Page 12

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by Mark Mauthner

Emanuele Marini
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Golconda Mine - Minas Gerais - Brazil
Photo J. Scovil

Perfectly etched quartz from the Val Cavrein, Disentis, Grisons, Switzerland. Size: 13cm, Private Collection. Jeff Scovil photo.

In addition, the sites are often found in fault zones and transition areas of different types of rock. This leads to a good formation of fissures but unfortunately also to brittle and falling rocks — which represent the greatest danger for us climbers. We are only a small group of "crazy people" but, unfortunately, almost no summer goes by without fatal accidents. But despite the dangers and the shoveling of snow in midsummer, which takes some getting used to, the crystals exert an almost magical attraction on us.

Due to the demanding terrain and the long distances that you cover in one day, we only work with light tools. Classic blasting tools include the blasting stick (a kind of lightweight crowbar), a screwdriver, a thin long hook to pull out the crystals, and of course, a hammer and chisel. Once you have found a chasm, you often have to work for several days or even weeks to be able to salvage the crystals as carefully and undamaged as possible. The tension when breaking out rocks that then open to the entrance of a chasm is almost unbearable. And the moment when you are the first person to stretch your hand into the chasm and, with luck, pull out a perfect crystal group that has defied the weather and the ice ages in the dark for 15 million years, is indescribable and worth all the effort. There are dangers but, there's also the feeling of overwhelming happiness, the views of the incredible sunsets at 3000m high and the sense of freedom we crystal seekers feel in our hearts, makes up the true value of a crystal from the Swiss Alps.

 Continued on Page 14

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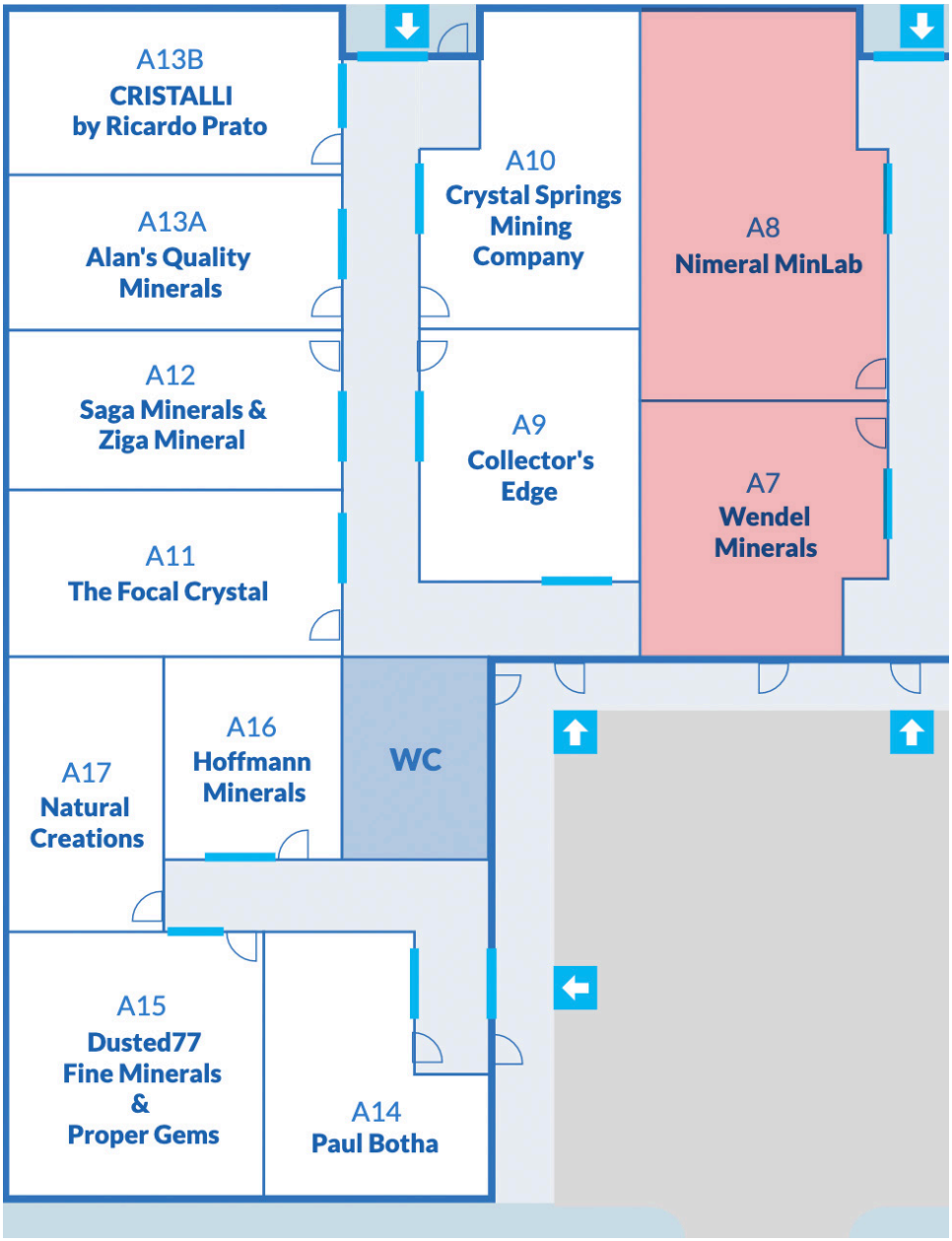
One of my first smoky quartz gwindels found in Val Strem, Sedrun, Switzerland. Size: 8cm. Private Collection.

Unfortunately, with the disappearance of the glaciers and the discovery areas that have been searched for centuries, the chances of a good find are becoming smaller and smaller. But this makes the joy and fascination we feel when we find these treasures of the mountains all the greater. Especially in the last few years, some of my pieces have found their way into the most important mineral museums and collections in the world. Rare minerals are also becoming increasingly popular as exclusive works of art. Of course, I'm extremely grateful for that... after all, it allows me to live my dream of becoming a professional crystal seeker a little longer.

— Patrick Reith

Biwak at the top of Mt. Witenalpstock: If you climb an unknown place for the first time you often have no space in your backpack for a tent. But this pure and fast alpine stile provides you fascinating sunsets you never forget.

BUILDING A 516 W Lester St, Tucson, AZ 85705, USA



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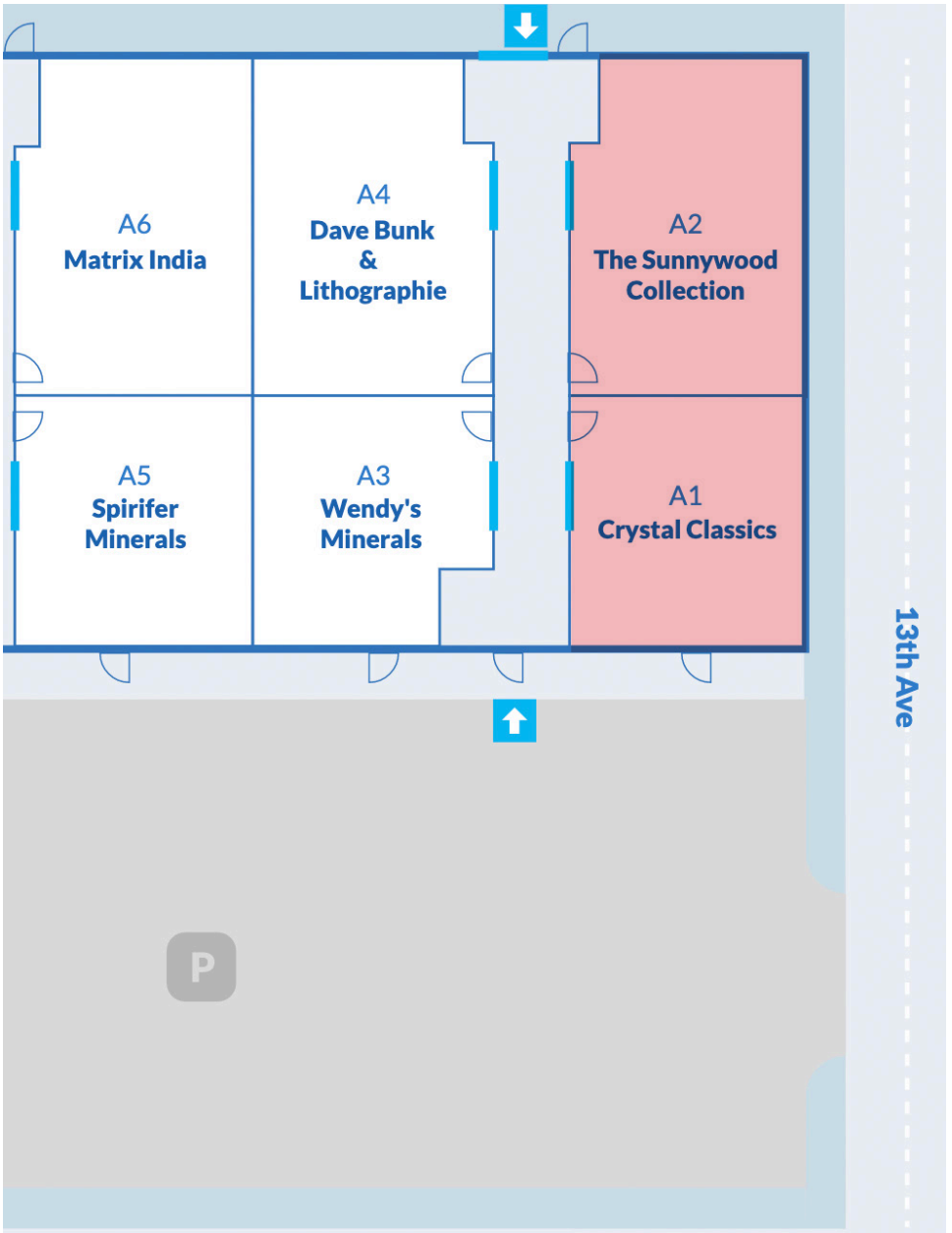
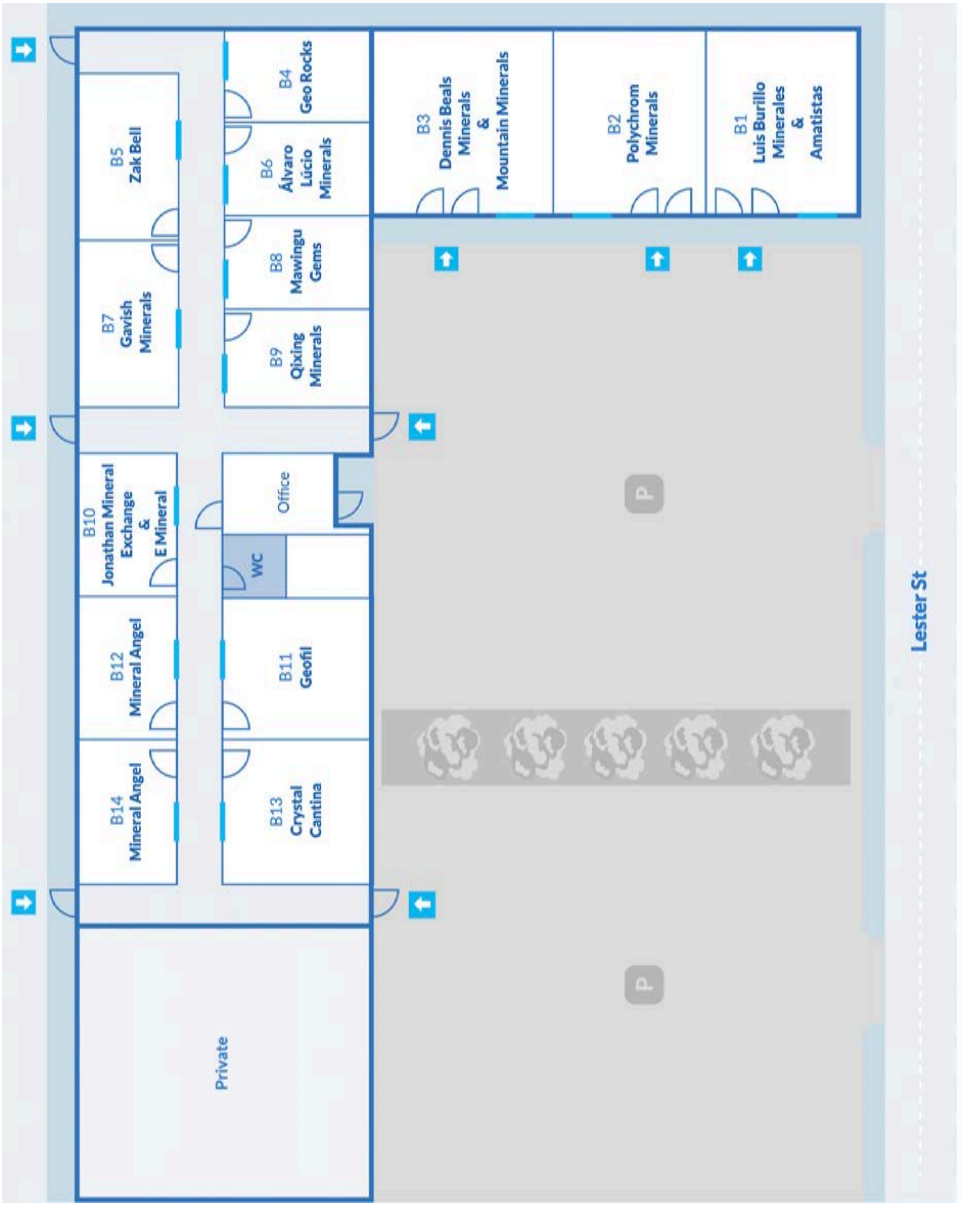

A6
Matrix India
A4
Dave Bunk
&
Lithographie
A2
The Sunnywood
Collection
A5
Spirifer
Minerals
A3
Wendy's
Minerals
A1
Crystal Classics
13th Ave
P

BUILDING B

532 W Lester St, Tucson, AZ 85705, USA



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BUILDING C

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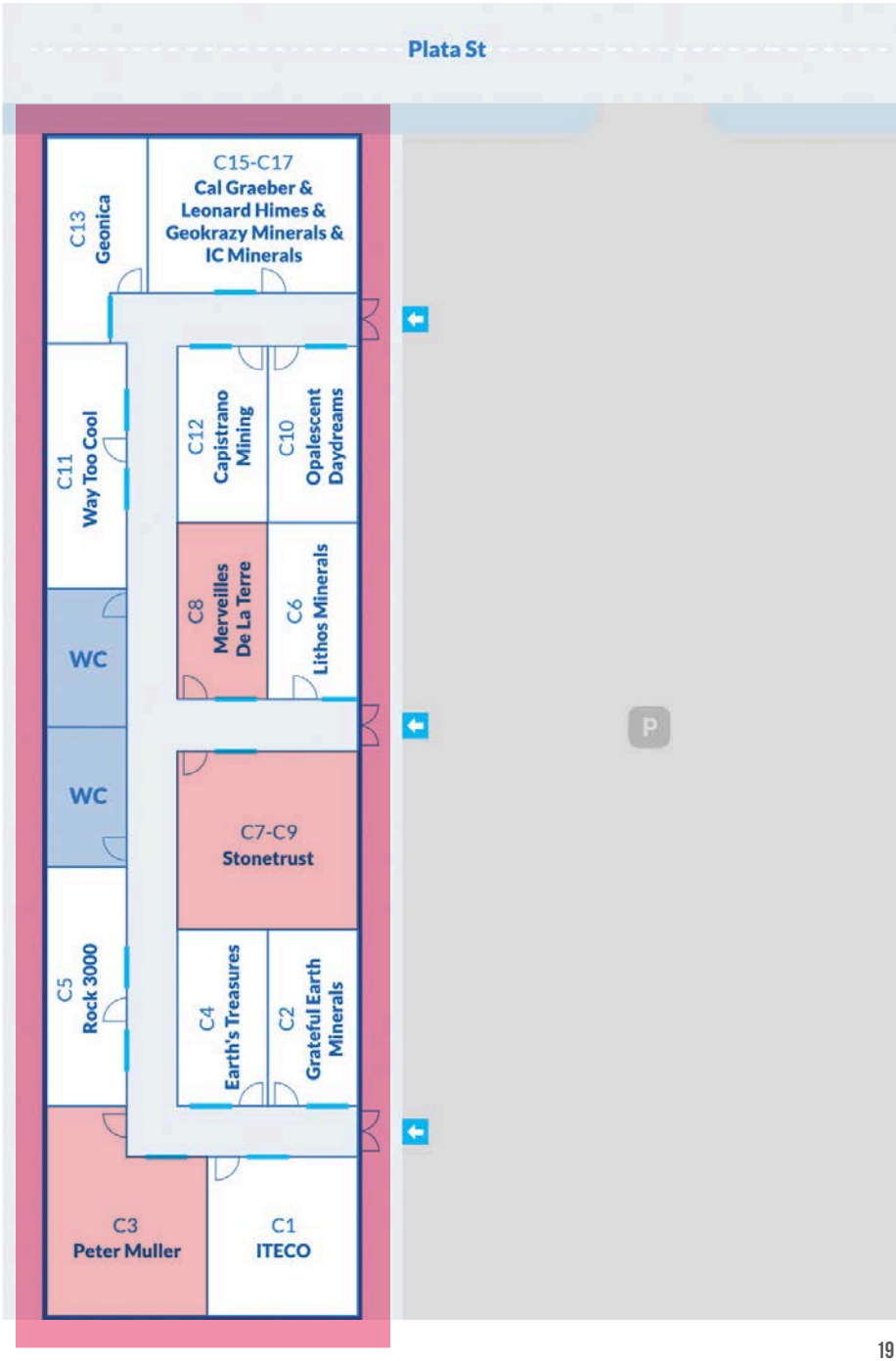
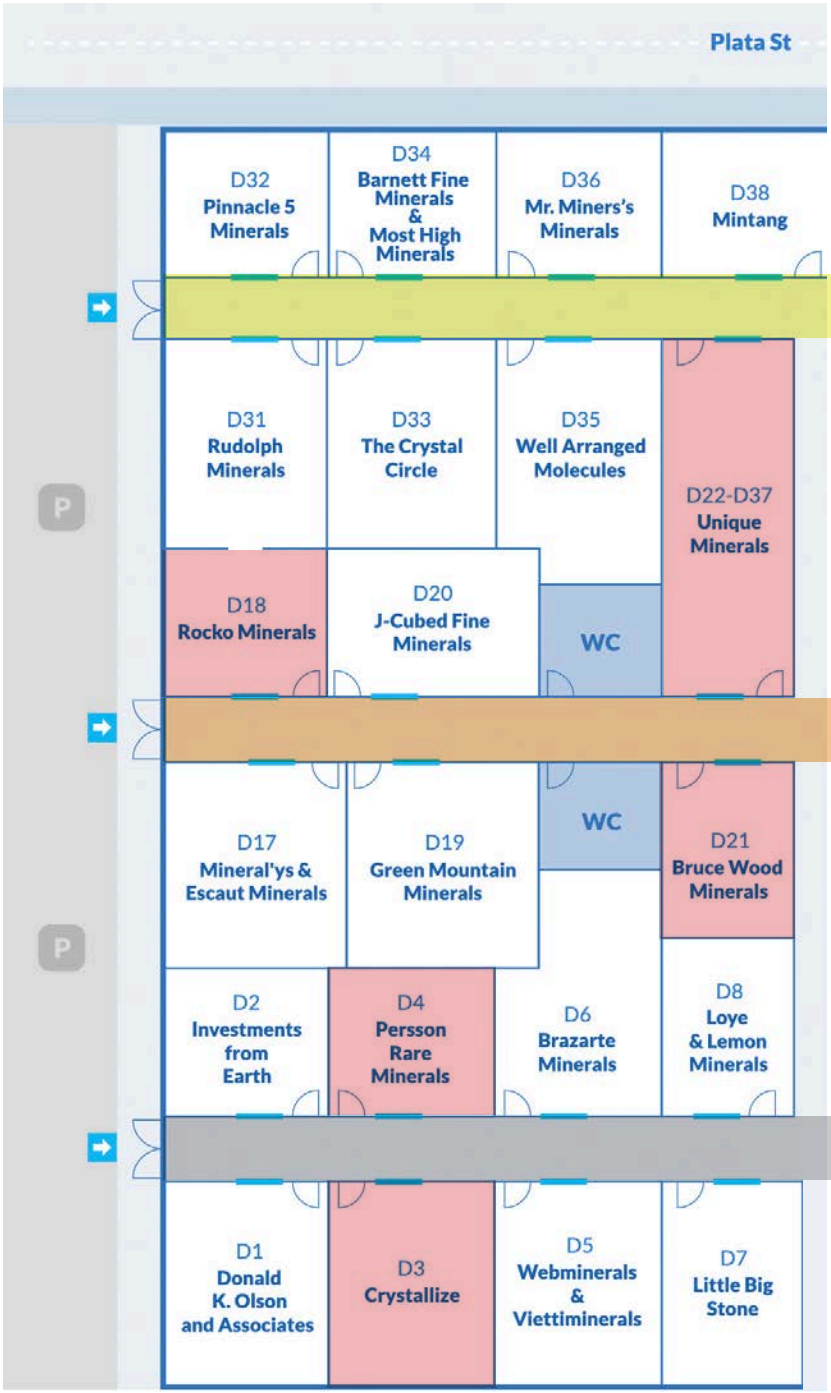


BUILDING D 525 W Plata St, Tucson, AZ 85705, USA



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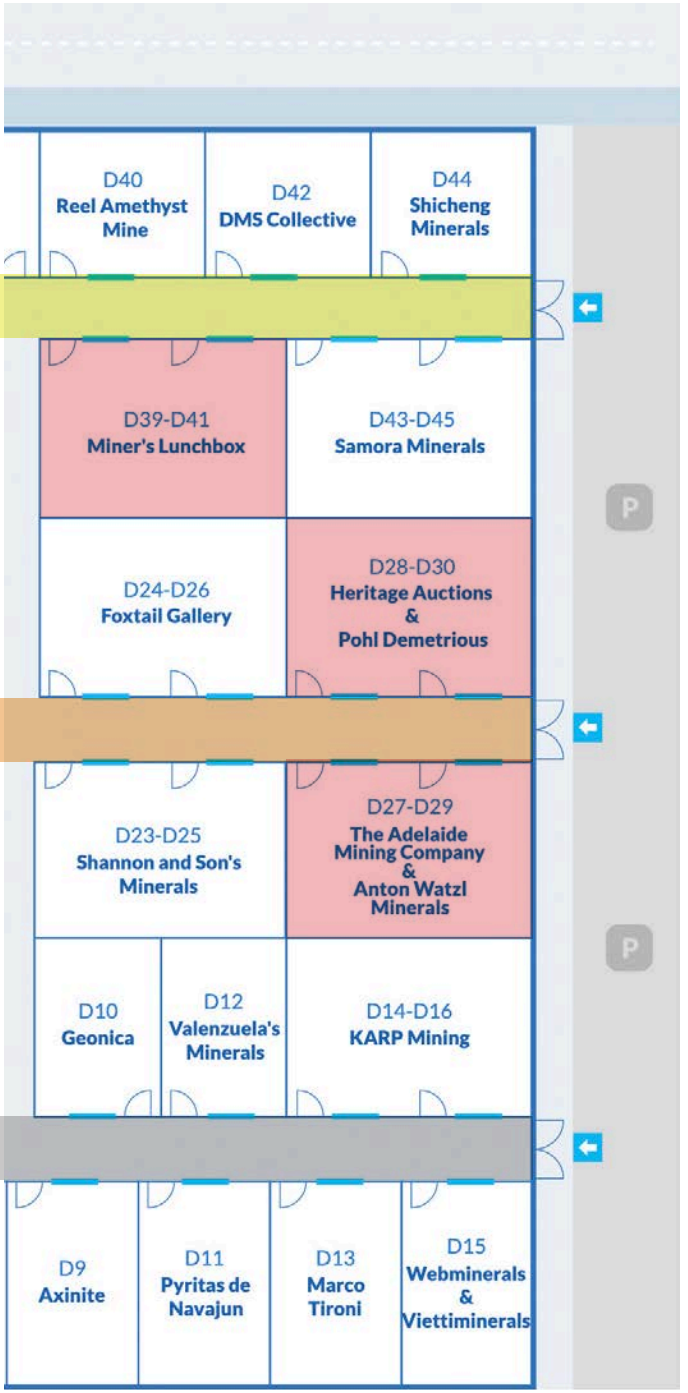
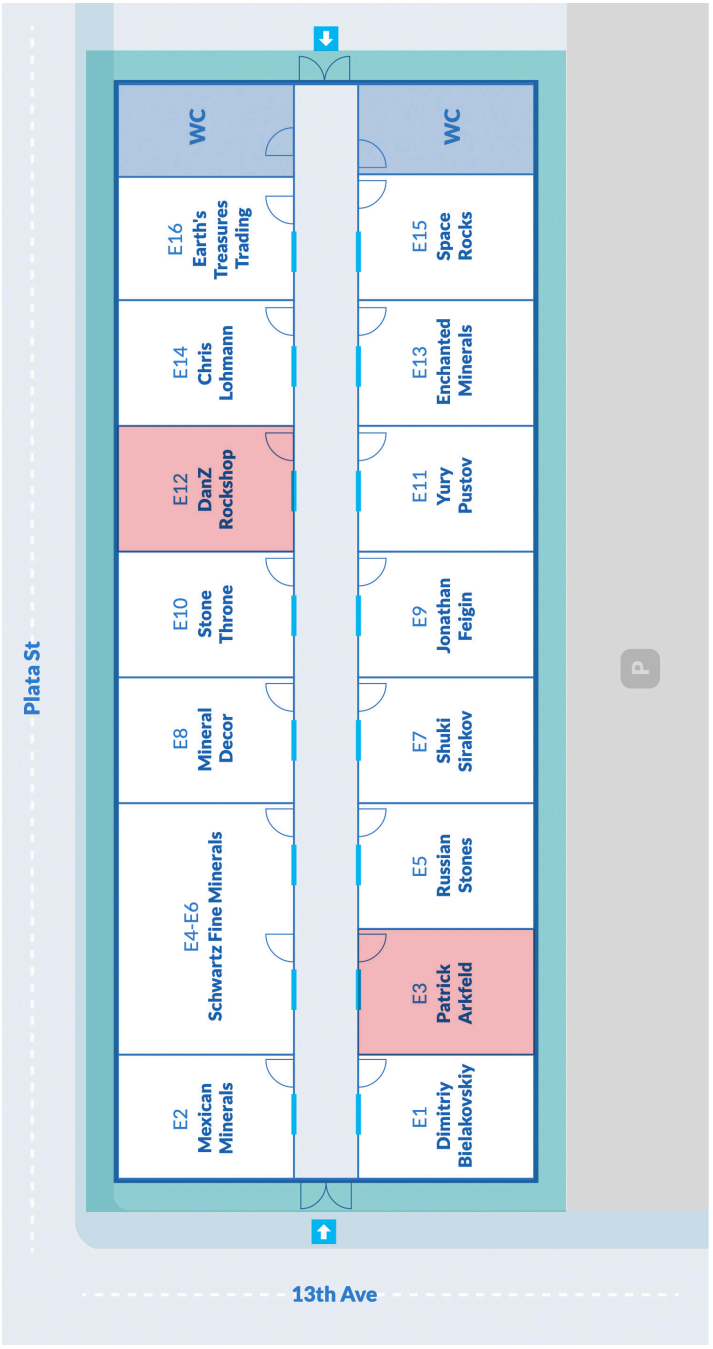

D40
Reel Amethyst Mine
D42
DMS Collective
D44
Shicheng Minerals
D39-D41
Miner's Lunchbox
D43-D45
Samora Minerals
P
D24-D26
Foxtail Gallery
D28-D30
Heritage Auctions & Pohl Demetrious
D23-D25
Shannon and Son's Minerals
D27-D29
The Adelaide Mining Company & Anton Watzl Minerals
P
D10
Geonica
D12
Valenzuela's Minerals
D14-D16
KARP Mining
D9
Axinite
D11
Pyritas de Navajun
D13
Marco Tironi
D15
Webminerals & Viettiminerals

BUILDING E

445 W Plata St, Tucson, AZ 85705, USA



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BUILDING F

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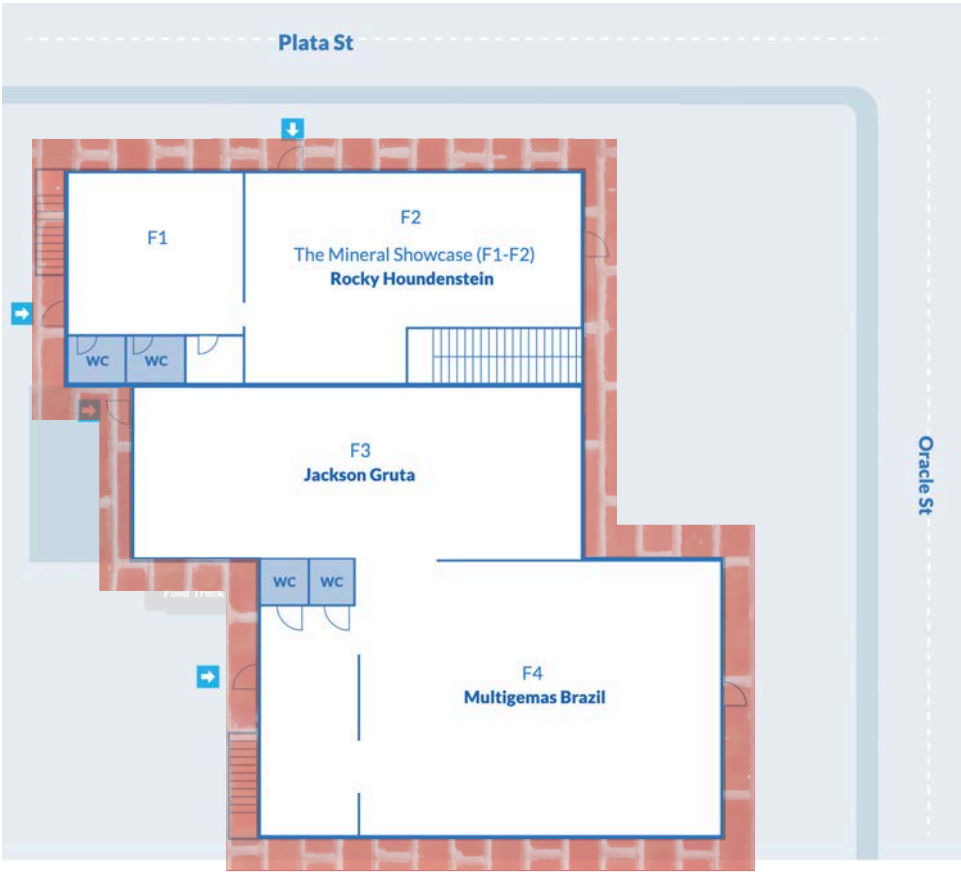

BUILDING G

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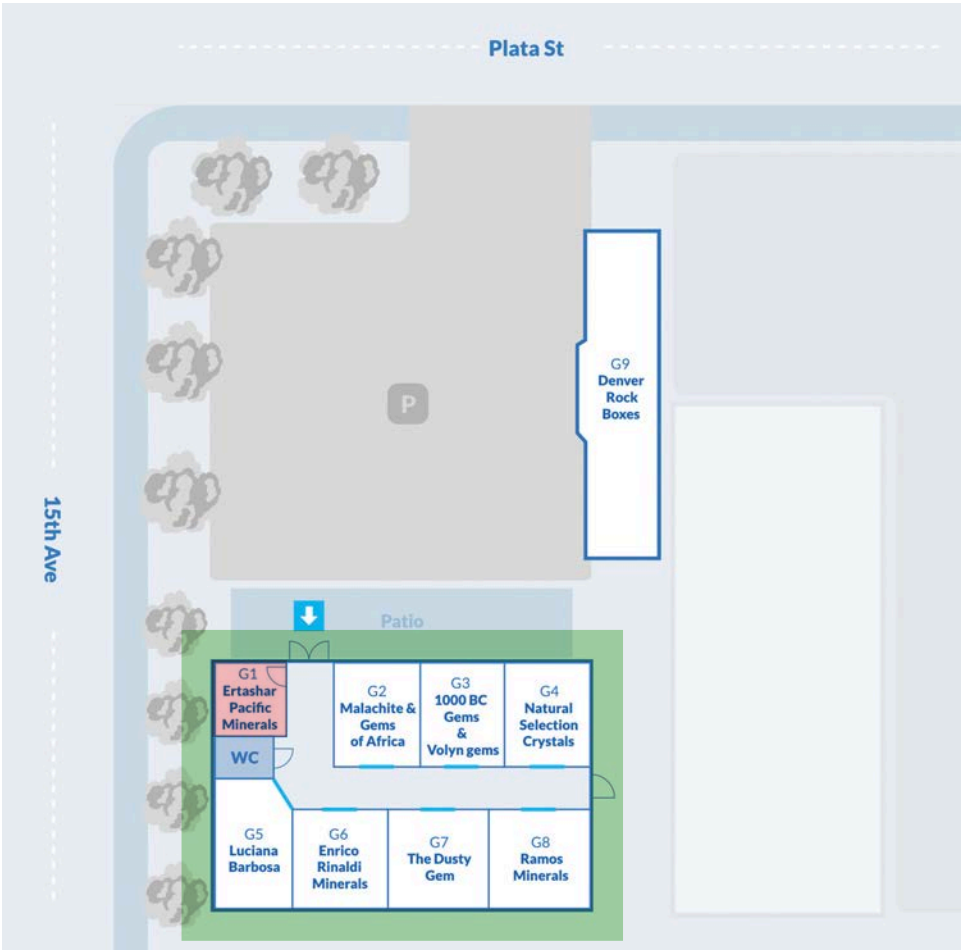

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BUILDING SG (MINERAL VILLAGE)

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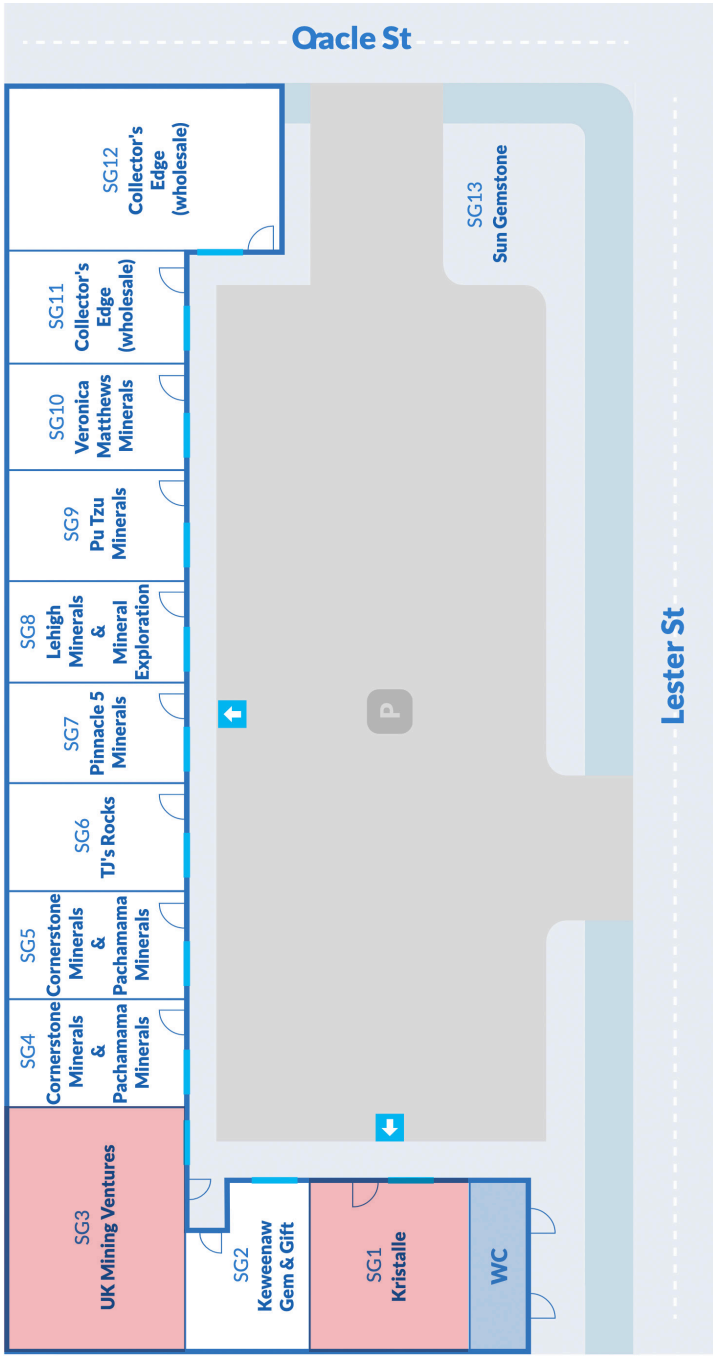

LA FUENTE DE PIEDRAS

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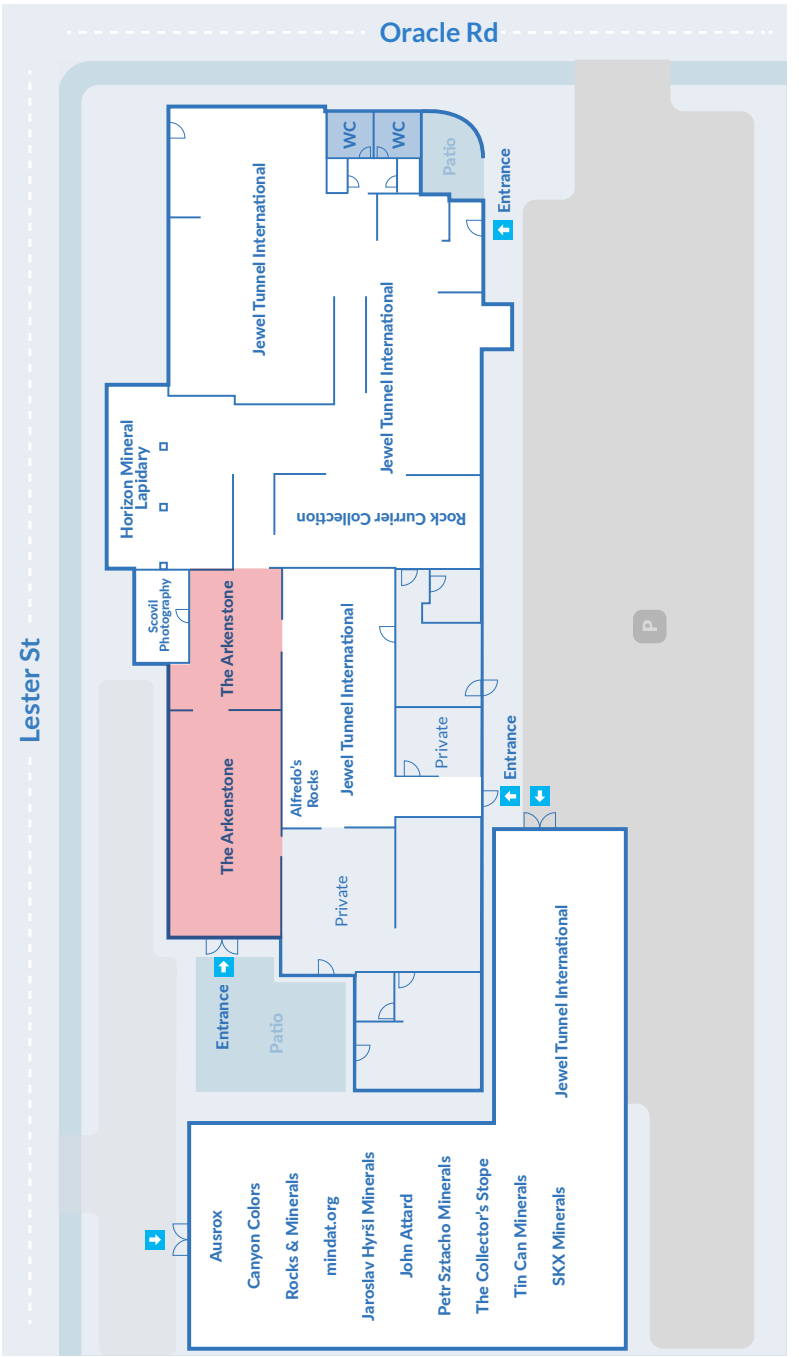

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MINERAL VAULT

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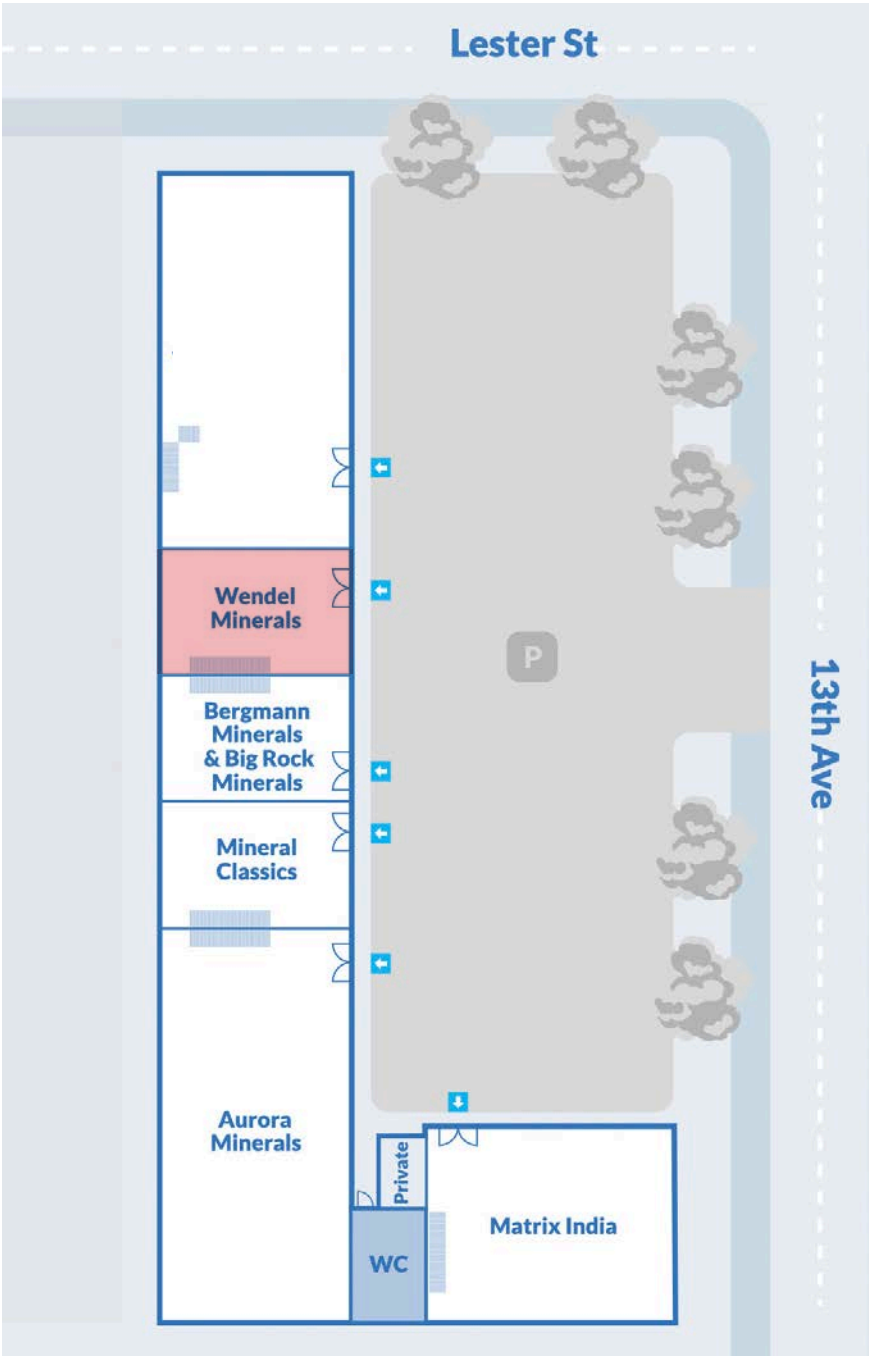
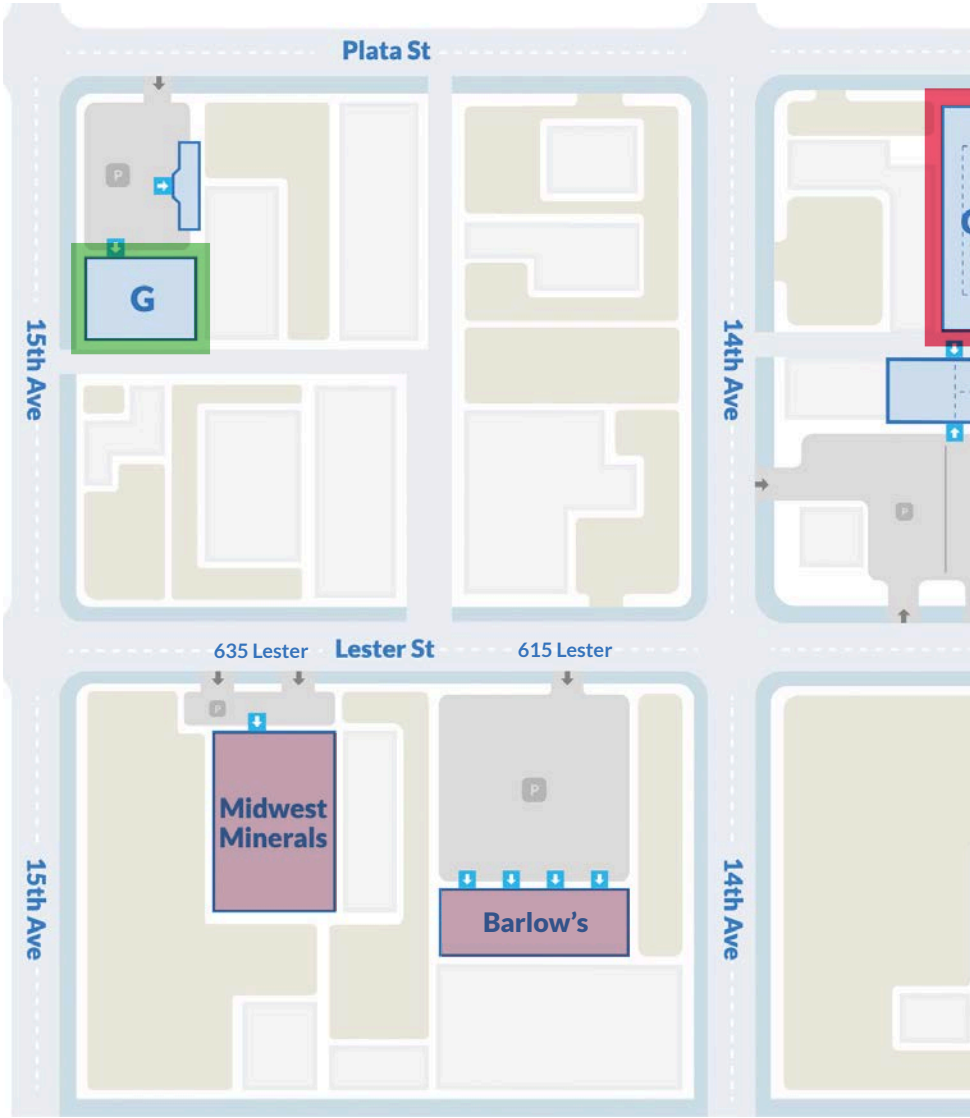
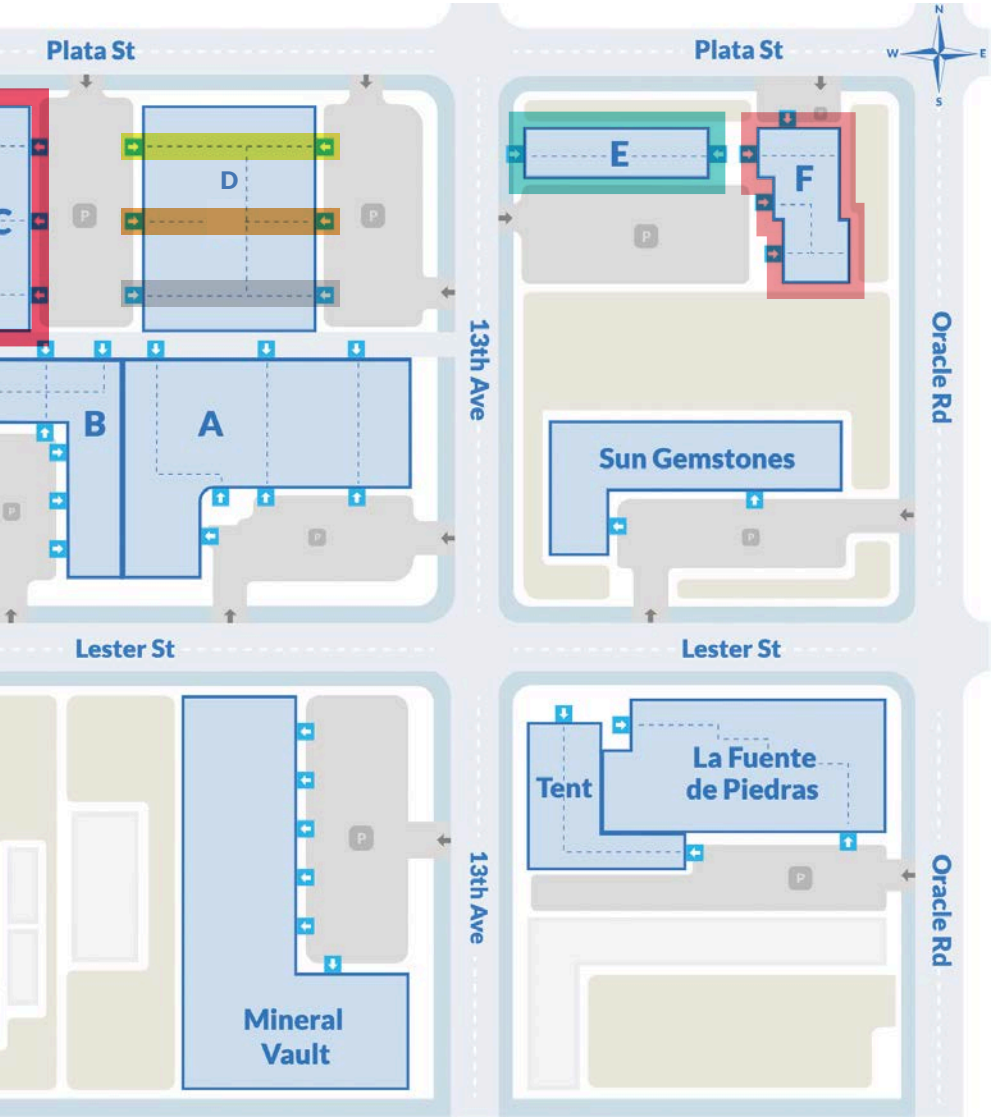


BUILDING MAPS | Previous Page




Plata St
Plata St
N
W
E
S
D
E
F
P
13th Ave
Oracle Rd
B
A
Sun Gemstones
Lester St
Lester St
Tent
La Fuente de Piedras
Mineral Vault
13th Ave
Oracle Rd

DEALER DIRECTORY

Building A — D Dealers

MAP OF ALL MINERAL CITY SHOW VENUES

Previous Page

A13A	Alans Fine Minerals
A9	Collector's Edge
A13B	Cristalli
A1	Crystal Classics
A10	Crystal Springs Mining Company
A4	Dave Bunk / Lithographie
A15	Dusted77 Fine Minerals
A11	Focal Crystal, The
A16	Hoffman Minerals
A6	Matrix India
A17	Natural Creations
A8	Nimeral MinLab
A14	Paul Botha
A15	Proper Gems
A12	Saga Minerals
A5	Spirifer Minerals
A2	Sunnywood Collection, The
A7	Wendel Minerals
A3	Wendy's Minerals
A12	Ziga Minerals

B6	Álvaro Lúcio Minerals
B1	Amatistas
B13	Crystal Cantina
B3	Dennis Beals Minerals
B10	E Mineral
B7	Gavish Minerals
B4	Geo Rocks
B11	Geofil
B10	Jonathan Mineral Exchange
B1	Luis Burillo Minerals
B12/B14	Mineral Angel
B3	Mountain Minerals
B2	Polychrom Minerals
B9	Qixing Minerals
B8	WeMinerals
B5	Zac Bell

C12	Capistrano Mining
C4	Earth's Treasures
C16	Geokrazy Minerals
C13	Geonica
C15	Graeber + Himes
C2	Grateful Earth Minerals
C17	IC Minerals
C1	ITECO
C6	Lithos Minerals
C8	Merveilles De La Terre
C10	Opalescent Daydreams
C3	Peter Muller
C5	Rock 3000
C7/C9	Stonetrust
C11	Way Too Cool

D9	Axinite
D6	Brazarte Minerals
D3	Crystallize
D1	Donald K. Olson and Associates
D10	Geonica
D2	Investments From Earth
D14/16	KARP Mining
D7	Little Big Stone
D8	Loye & Lemon Minerals
D13	Marco Tironi
D4	Persson Rare Minerals

DEALER DIRECTORY

Building D — SG Dealers

D11	Pyritas de Navajun
D12	Valenzuela's Minerals
D5	Webminerals
D27/D29	Adelaide Mining Company
D21	Bruce Woods Minerals
D28/D30	Demetrious Pohl
D17	Escaut Minerals
D24/26	Foxtail Gallery
D19	Green Mountain Minerals
D28/30	Heritage Auctions
D20	J-Cubed Fine Minerals
D17	Mineral'ys
D18	Rocko Minerals
D15	Rory Boyan
D23/25	Shannon and Son's Minerals
D22/37	Unique Minerals
D34	Barnett Fine Minerals
D33	Crystal Circle, The
D42	DMS Collective
D39/D41	Miner's Lunchbox
D38	Mintang
D36	Peace of Mind Minerals
D32	Pinnacle 5 Minerals
D40	Reel Amethyst Mine
D31	Rudolph Minerals
D43/45	Samora Minerals
D44	Shicheng Minerals
D35	Well Arranged Molecules

E3	Arkfeld Minerals
E14	Chris Lohmann
E12	DanZ Rock Shop
E1	Dimitriy Bielakovskiy
E16	Earth's Treasures Trading
E13	Enchanted Minerals
E15	Ignat Baraxhin
E9	Jonathan Feigin
E2	Mexican Minerals
E8	Mineral Decor
E5	Russian Stones
E4/E6	Schwartz Fine Minerals
E7	Shuki Sirakov
E10	Stone Throne
E11	Yury Pustov

F3	Jackson Gruta
F4	Multigemas Brazil
F1/F2	Mineral Showcase, The Rocky Houndenstein

G5	Barbosa Family Minerals
G9	Denver Rock Box
G7	Dusty Gem, The
G6	Enrico Renaldi Minerals
G1	Ertashar Pacific Minerals / Eric DeCarlo
G2	Malachite and Gems of Africa
G4	Natural Selection Crystals
G8	Ramos Minerals
G3	Rory Boyan / 1,000 B.C. Gems
G3	Volyn Gems

SG11/12	Collector's Edge (wholesale)
SG4/5	Cornerstone Minerals
SG2	Keweenaw Gem & Gift
SG1	Kristalle
SG8	Lehigh Minerals
SG8	Mineral Exploration
SG4/5	Pachamama Minerals
SG7	Pinnacle 5 Minerals
SG9	Pu Tzu Minerals

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Building SG, La Fuente, Lester, and Mineral Vault Dealers

SG6	TJ's Rocks
SG3	UK Mining Ventures
SG10	Veronica Matthews Minerals
La Fuente	Alfredo's Rocks
La Fuente	Arkenstone, The
La Fuente	Ausrox
La Fuente	Canyon Colors
La Fuente	Collector's Stope, The
La Fuente	Horizon Mineral Lapidary
La Fuente	Jaroslav Hyrsl Minerals
La Fuente	Jewel Tunnel International
La Fuente	John Attard
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La Fuente	Tin Can Minerals
615 Lester	Barlow's Gems
635 Lester	Midwest Minerals
Mineral Vault	Aurora Minerals
Mineral Vault	Big Rock Minerals
Mineral Vault	Matrix India
Mineral Vault	Mineral Classics
Mineral Vault	Wendel Minerals

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MINERALS OF DISTINCTION

Building D **Room 37**

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THE TOP FIVE MINERAL LOCALITIES IN THE WORLD

By Phil Persson

I have often had collectors ask me what localities I consider to be 'important' or 'world-class' as far as diversity, quality and quantity of minerals, and I've also spent much time pondering this question myself. In the end, the answer is highly subjective, depending on the person's interests and experience in mineralogy and what drives them as collectors. There are "mineralogical rainforests" such as Mont Saint Hilaire, Canada or Russia's Kola Peninsula which, while not well-known for aesthetic crystallized specimens, host an incredible diversity of mineral species. Then there are locales that have produced iconic and beautiful examples of one or perhaps a few different minerals but are otherwise fairly 'simple.' Colorado's Sweet Home Mine or the Elmwood Mine in Tennessee likely fall into this category. In my opinion, the best localities are those that successfully bridge the gap between these extremes; those that have produced beautiful, highly collectible crystals but also have a deep appeal to the academic mineralogist or serious systematic collector. **The following is a brief, somewhat arbitrary (and in no particular order) list of what I consider to be five of the top such locales, and I hope you enjoy my musings on each mineralogical treasure chest.**

#1

FRANKLIN-STERLING HILL, SUSSEX COUNTY, NEW JERSEY USA

Ah, Franklin. The name instantly kindles an affectionate smile or nod from seasoned rare species or fluorescent mineral collectors, and perhaps a begrudging acknowledgment from collectors of aesthetic minerals. No matter your interests, however, the unique appeal of Franklin (and its slightly smaller sister deposit, Sterling Hill) cannot be denied. These two mines, both now closed, are situated in the surprisingly bucolic Northwest corner of New Jersey, approximately 45 airline miles from New York City. The unique and varied mineralogy of Franklin & Sterling Hill (over 350 mineral species now known, a number exceeded only by Mont Saint Hilaire and Germany's Clara mine) can be attributed to the unusual forces that led to their creation. Originally these deposits were seafloor volcanogenic massive sulfide deposits, which formed near 'black smoker' type hydrothermal vents in a rifting (extensional) environment in the late Proterozoic period approximately one billion years ago. The Franklin & Sterling Hill orebodies were later subjected to fairly high-grade regional metamorphism (upper amphibolite

Zincite - Franklin Furnace, Ogdensburg, New Jersey, 2.5 x 5.0 x 3.0 cm. Opaque, dark red crystal in the shape of a well-formed hexagonal pyramid, exhibiting the hemihedry of this species. Ex Paterson Museum collection.

facies) which turned the surrounding carbonate rocks into crystalline marbles, and transformed the fairly benign sulfide mineralogy of the proto-deposits into the exotic mixture it is today. The deposits are principally composed of the Zn-Fe-Mn oxide Franklinite, the Zn-silicate Willemite, and the Zn-oxide Zincite. None of these minerals can be considered 'common' on a global scale, and two (franklinite and zincite) are essentially unknown outside the district.

I will not delve too deeply into the history of the Franklin-Sterling Hill District, which could (and does) occupy an extensive treatise unto itself- suffice it to say that the orebodies, which originally outcropped in a spectacular fashion, have been known since at least the late 17th century and probably earlier. When the Sterling Mine finally brought its last ore bucket to the surface in early 1986, the district had a several hundred year history of mineral collecting and mineral science.

It would take another monograph to describe the minerals of Franklin & Sterling Hill in detail, so I will just say a few words about some of the more notable species. At the top of the list of course are the aforementioned minerals: franklinite, willemite, and zincite. Except for willemite (and this is debated amongst some), Franklin & Sterling Hill have produced by far the world's premier crystallized examples of these species; in often attractive euhedral crystals, up to 20 cm(!) on edge for Franklinite, and similarly large (or larger) for willemite.
Willemite is a 'chameleon' at Franklin-Sterling Hill and occurs in nearly all imaginable colors and textures. Early 20th-century New Jersey Zinc Company chemist Lawson Bauer had a box of over 50 specimens (now in Harvard University's collection) he would often have visitors try and identify. The trick is they were all willemite! Willemite even occurs rarely as flawless, gemmy prisms in attractive shades of green and yellow to blue to 4 or 5 cm. in size, which any real Franklin collector would murder their grandmother for. Zincite also occurs as sharp blood-red pyramids up to 5 cm, though 99.9% of it is massive.

Next in importance and distribution in collections are probably the Mn-bearing and so-called 'skarn minerals', Rhodonite being the most important. Broken Hill, Australia or Brazil have perhaps produced gemmier and more lustrous Rhodonites, but as far as sheer abundance, diversity and mineral associations, nowhere can beat Franklin. Attractive pink to red rectangular prisms to 20+ cm. embedded in white calcite matrix associated with willemite and franklinite crystals comprise the Franklin 'uber-classic.'

No discussion of Franklin would be complete without mentioning the fluorescent minerals. Mineral fluorescence, a spectacular property some minerals exhibit when certain outer shell (or 'valence') electrons are energized and emit vibrantly colored visible light when excited by ultraviolet light sources, reaches its global zenith at Franklin. Over 80 minerals found at Franklin & Sterling Hill fluoresce under UV light, and many in bright and attractive combinations of color known the mineral world over. The cause for such a diversity of fluorescent minerals has been much debated, but probably involves the metamorphic and geochemically-complex nature of the deposits, as well as the abundance of certain elements such as Mn & Pb thought to act especially well as 'activators', or elements receptive to UV light-induced excitation of key electrons.

 Continued on Page 38

Franklinite - Sterling Mine, Ogdensburg, New Jersey. 8.5 x 9.0 x 6.0 cm. Octahedron on calcite and willemite. The matrix is fluorescent under shortwave UV light. Ex Ed David collection.

One of the major ore minerals at Franklin & Sterling Hill, willemite, fluoresces bright green under short-wave UV light, and the major gangue mineral for both deposits, calcite, fluoresces bright red due to trace manganese content.

Finally, the huge diversity of 'rare' species must be acknowledged. I put rare in quotation marks because it is a relative term at these enigmatic deposits, but some minerals are 'truly rare' and are unknown outside Franklin/Sterling Hill. It would be futile to describe these in detail here, but suffice it to say that they have names like Gerstmannite, Walkilldellite, Hauckite, Ogdensburgite, Kraisslite, Cahnite, Charlesite, and Samfowlerite which pay homage to their shared type locality and the scientists and collectors whose passion for the district led to their discovery.

#2

MONT SAINT HILAIRE, QUEBEC, CANADA

Collectors of "normal" minerals are now really rolling their eyes and assuming I must have some hidden ugly mineral agenda. But wait! Have you not seen the lustrous, bright orange 20 cm serandite crystals studded with white analcime golf balls? Or the lemon-yellow tablets of bright catapleiite with swords of lustrous red manganeptunite shooting out of them? Or the brilliant-blue cubes of carletonite? Or perhaps the gemmy red crystals of Rhodochrosite on a bed of shiny natrolite prisms? Not everything at the 'super classic' pair of quarries nestled in an enigmatic hillside in the Quebec countryside requires a microscope to see. But, for those with an eye for the rare and unusual, Mont Saint Hilaire truly opens up another universe, with 400+ known mineral species and more awaiting proper documentation.

Mont Saint Hilaire (MSH) is a globally-significant example of a multi-phase alkalic intrusion, an unusual type of igneous rock typically associated with either extensional tectonism (rifting) or hot spot activity, both of which have the capability to bring deep-seated, 'primitive' mantle magmas enriched in rare elements to the surface. In the case of Mont Saint Hilaire, the unusual alkali intrusive complex formed approximately 120 million years ago when the New England hot spot — a relatively fixed, long lived mantle-plume like conduit for deep magmas ascending to the surface — erupted a series of intrusive and extrusive igneous rocks as the North American plate slid westward over it (Currie et al. 1986). At Mont Saint Hilaire, the igneous intrusion consisted of a highly diverse suite of rocks ranging from gabbro at the mafic end to nepheline syenite at the felsic, critically silica-undersaturated end. The surrounding 'country rocks', mainly Paleozoic carbonate rocks, were also thermally 'cooked' by the intruding magma, and produced a contact-metamorphic rock type known as hornfels (Currie et al. 1986). The most interesting rock type produced during this intrusion are the pegmatites, which are often highly alkaline (e.g; enriched in elements such as Na & K) and contain a huge diversity of minerals (one pegmatite contained over 100 minerals!) due to the ability of such late-stage melts and associated hydrothermal fluids to transport large amounts of typically incompatible elements, such as Ti, Zr, Nb, & REE.

Carletonite - Carrière Poudrette, Mont Saint-Hilaire, Québec, Canada. 4.5 x 4.5 x 3.5 cm. Group of crystals with an intense dark blue color, accompanied by a clear yellow granular mineral that is probably calcite and reinforces the contrast with the blue.

The history of Mont Saint Hilaire as a mineral locality is relatively recent and started in earnest after WWII. The mountain, which rises ~400 meters above the surrounding flat, agricultural countryside, was long noted for its unusual igneous rocks, but generally poor exposure precluded any notice of its unusual mineralo-

Sérandite - Carrière Poudrette, Mont Saint-Hilaire, Québec, Canada. 7.5 x 6.5 x 8.0 cm. Crystals in a nice orange color, with with crystals of analcime, natrolite, mangan-neptunite. Ex Francesco Spertini Collection.

gy. Industrial-scale quarrying for road metal for the nearby city of Montreal changed this situation dramatically, when a large body of layered and zoned nepheline syenite and associated agpaitic rocks loaded with rare minerals were exposed in the 1950's and 60's. Quarrying, as well as scientific study of the mineralogy and geology of the mountain intensified in the 1970's, and probably reached its zenith in the early 1980's. Stories of 'walk in' (or crawl-in) pockets abounded, and one pocket filled with amazing crystals was said to be almost 10 meters deep and 2 meters wide, easily swallowing several collectors at a time!

The quarry slowly moved away from the more productive, pegmatite-rich zones of the intrusive complex and into the hornfels, and finally into the 'barren' Paleozoic sedimentary rocks of the St. Lawrence lowlands. This move, coupled with restrictions on collector access leading to long periods of essentially no access to newly-quarried exposures, meant that many wrote off MSH as being a 'dead' locality. The mountain is far from exhausted however as far as its mineralogical treasures are concerned, and perhaps a new, more scientifically-receptive ownership or a change in demand for road material will awaken a new era for this truly world-class mineral locality.

The 'poster child' (and indeed, it has been on many posters) of this locality is serandite, which forms lustrous, sometimes even gemmy salmon-pink to vibrant orange crystals to 20+ cm. Often associated with these are crystals of analcime, itself not a rare mineral but especially well-crystallized at MSH, where lustrous, sharp baseball-sized crystals are not unusual. Carletonite, first discovered at MSH, occurs as beautiful, sky-blue crystals to several cm., often in attractive groups. Aegirine, natrolite, manganeptunite, leucophane, siderite, rhodochrosite,

genthelvite, donnayite-(Y), and eudialyte are all notable species for the locality, some reaching their best here. While access at the moment is restricted to Mont Saint Hilaire, the large pegmatite-rich zone of the intrusion is far from exhausted, and new quarrying to supply the growing city of Montreal will surely expose new world-class minerals.

#3

BROKEN HILL, NEW SOUTH WALES, AUSTRALIA

Broken Hill is a world-class mineral deposit in every sense of the word. Economically, it is one of the largest single mineral deposits on earth and it helped start a company that is now Australia's largest (BHP Resources). Scientifically, it is a global enigma which has puzzled economic geologists and mineralogists for generations. Culturally, it paved the way for the success of 'frontier mining towns' of the Australian interior which became essential to creating what is now a nation with one of the highest standards of living in the

Parahopeite - 16.5 x 10.0 x 10.0 cm. Yellow, tabular crystals on a matrix, with hopeite crystals at the base. Perhaps finest example of Parahopeite known. Ex Edward Swoboda Collection.

Rhodonite - 3.5 x 2.5 x 9.5 cm. Large, translucent red doubly terminated and intact crystal. Some hexagonal crystals of the rare mineral pyrosmalite-(Mn) have developed on the faces, which is typical of this mine.

world. While not nearly operating at its former pace, the district is still the site of active mining, and exploration for new major deposits in the area is still actively underway.

Geologically, Broken Hill is classed as a metamorphosed volcanogenic massive sulfide (VMS) type deposit. It began as a large, essentially flat-lying body of Zn, Pb, Cu, & Ag sulfides with other metal enrichment on the seafloor at the site of extensive and long-lived hydrothermal venting during rifting on the ocean floor almost 2 billion years ago. Around 1.6 billion years ago, the entire rock package was subjected to regional high-grade metamorphism. The relatively simple sulfide orebodies as well as their host rock were 'cooked' and recrystallized into the diverse mineralogy seen today. Perhaps more importantly, as the metamorphic process waxed and waned, the whole system was able to 'stew in its own juices' (to quote Brian England) and develop an even more unusual geochemistry. The originally-flat deposit was then folded and refolded into the complex geometry seen today, the original 'Broken Hill.'

The human history of Broken Hill is likewise fascinating. While sporadically settled and travelled through by aboriginal peoples for thousands of years, Anglo settlers first visited the area in the 1840-50's, though the outcrops of leached ore hinting at the bonanza hidden below did little to inspire early pioneers and prospectors. Finally, in 1883, itinerant prospector Charles Rasp (raspite) staked several claims on the outcrops known as the 'Broken Hill, founding the Broken Hill Proprietary Company, or BHP (Worner 1982). Mining probably peaked around WWII and has been in slow decline since as the main orebodies are slowly exhausted. New exploration, however, could be promising since structural complexities and post-ore faulting mean that a large portion of the original sulfide seafloor VMS deposit could

have been later isolated from the main 'line of load' and lie undetected at depth. Mineralogically, there are over 300 minerals known from Broken Hill, with over 20 of these having first been described there. To collectors, perhaps the best-known are the ruby-red rhodonite and spessartine crystals, often embedded in massive galena, which were found at one time in great abundance from the North and South underground mines and other operations. Cerussite is another Broken Hill specialty, occurring in superb, large twinned 'snowflake' group of reticulated crystals perhaps only exceeded in quality by those from Tsumeb, Namibia.

Excellent examples of malachite and azurite, amongst Australia's finest, were found in quantity when the supergene-enriched near surface ores were mined. Likewise, pyromorphite also forms in the supergene or oxide ores, and occurs as beautiful groups of intergrown prismatic crystals, in shades of green and brown. Smithsonite, the zinc carbonate mineral, occurs in a plethora of colors and varieties, as does calcite, often colored pink by manganese. On the rarer end of the spectrum, raspite, marshite and miersite were all first discovered at Broken Hill, and all tell of the unusual conditions of secondary ore enrichment at the deposit. Less well-known from Broken Hill are the rare but world-class specimens of the unusual zinc phosphate mineral Parahopeite, particularly a specimen considered to be the world's finest example of this rare mineral, which is currently in the collection of the mim museum in Beirut.

Nowadays, good Broken Hill mineral specimens are hard to acquire, both in Australian and abroad. While many if not most miners collected 'rocks', many have long-since sold or given away their minerals, and while mining continues, the supply of good minerals appears to be sporadic. With some luck and persistence, good examples of the 'classic' minerals like rhodonite and spessartine are still available, but truly top-notch examples will drain your bank account. The sun has not set on Broken Hill yet, however, and this classic and unique locality may have a new lease on life in the coming years.

Azurite - 12.0 x 7.5 x 12.0 cm. Two large, perfectly formed blue crystals along with a smaller third one in matrix. Ex Steve Neely/James Horner piece.

#4

TSUMEB MINE, TSUMEB, OSHITOKO REGION, NAMIBIA

The Tsumeb Mine is one of, if not the world's premier mineral locality. Though it's 285+ mineral species already put it in the same league as Mont Saint Hilaire or Franklin in terms of mineralogical diversity, Tsumeb's true accomplishment is that is has produced thousands of aesthetic, well-crystallized mineral specimens, including arguably the world's best examples of many collector favorites such as azurite, dioptase, mimetite, cerussite, and smithsonite. This unique juxtaposition of rare species known nowhere else in the world (Tsumeb is the type locality for 71 species) and large, euhedral, colorful crystals is not a coincidence — it is due to an unusual combination of complex geochemistry and development of a massive oxidation zone where supergene enrichment created a paradise for collectors and mineralogists.

Tsumeb is located in the Oshikoto region of northern Namibia, a semi-arid, hilly to mountainous region which is fairly sparsely populated, but rich in mineral deposits and mining districts. The orebody at Tsumeb outcropped spectacularly above the largely flat, scrubby semi-desert landscape around it, and was known

 Continued on Page 46

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Cérusite - 24.0 x 16.0 x 6.0 cm. Formed by the intersection of three sets of crystals locked together at 60° angles, the result looks like a snowflake. Ex Perkins Sams Collection.

amongst the local Herero tribes for thousands of years. Small quantities of secondary copper ore, chiefly malachite, were removed by the native tribes and traded to other parts of Namibia, where they were smelted by simple means into metallic copper. The first recorded mention of the deposit by Europeans was in 1857 when missionaries from South Africa, traveling into 'bushman territory' of what was then South-West Africa (SWA), wrote back to Johannesburg to report the 'most incredible exposure of colored copper ores (sic) they had ever seen.'

Small-scale mining continued until 1900, when larger industrial development began thanks to a new railroad connecting the, then quite remote, Tsumeb to the coast. From there ore could be easily transported to distant refineries. After SWA became a German colony, a corporation called the Otavi Minen-Und-Eisenbahngesellschaft, or OMEG was formed, which quickly removed the remains of the famous 'green hill', expanded it into a modest open-pit mine, and soon went underground, chasing higher and higher grades as the pipe-like orebody continued vertically down. After Namibian independence from Germany, OMEG merged into the Tsumeb Corporation, controlled at various times by Newmont Mining and other global mining consortiums. The deposit, while not especially large on a global scale, had a unique set of mining challenges including its steeply dipping pipe-like form and the constant danger of flooding, due to extensive paleo-karst which housed a large aquifer. High grades (averaging 10% Pb, 4.3% Cu, 3.5% Zn, 100 ppm Ag, 50 ppm Ge), made the tremendous expenditure of dewatering the mine and treating the metallurgically-complex ores profitable (Lombaard et al, 1986). When the great Tsumeb mine closed in 1996

and was allowed to flood, over $5 billion in copper, lead, zinc, silver, germanium, and gold had been produced. An effort by a consortium of collectors and dealers led by Ian Bruce was made in the late 1990's to re-open part of the Tsumeb mine for mineral specimen mining, but unfortunately this was found to be uneconomic.

Geologically, Tsumeb is part of a small group of high-grade polymetallic, carbonate-hosted 'ore pipe' deposits. Mineralization occurs in a pipe-like, steeply dipping cylindrical body bounded by 'psuedoaplite' dikes, which are probably clastic dikes related to complex salt tectonics and salt diapirism which has been observed elsewhere in this sequence in Namibia and neighboring countries. The great wealth of collectible minerals at Tsumeb is mainly due to the great depths of oxidation and supergene enrichment of primary sulfide ores, with supergene mineralization predominating above 400 meters depth, and considerable secondary mineralization persisting to depths of 800 meters! This great oxidation depth is probably related to the permeability of the dolomitic carbonate rocks, as well as the unique influence of salt tectonics on mineralization.

Ask any mineral collector which species he or she first thinks of when the word 'Tsumeb' in mentioned, and the answer will invariably be 'azurite.' Not only did Tsumeb produce azurite crystals of outstanding color and luster, but their size was world-class as well, with specimens such as the 'Newmont Azurite' which features individual crystals to over 20 cm(!). Azurite occurs in a variety of forms, from blocky to tabular to elongate prismatic crystals. Malachite psuedomorphs after azurite are a specialty, with faithfully preserved sharp green crystals to 10+ cm. being fairly common and occurring in spectacular large groups. Associated minerals include smithsonite, calcite, duftite, olivenite, mottramite, and more, leading to combinations with outstanding colors and aesthetics. Dioptase is probably a close second in terms of beauty and fame from Tsumeb, with the most famous and sought-after specimens consisting of rich 'carpets' of brilliant blue-green crystals to 2+ cm. on a matrix of snow-white dolomite or calcite. Thousands of such specimens were found in the 1960-70's but are now rather scarce (and expensive) on the collector market.

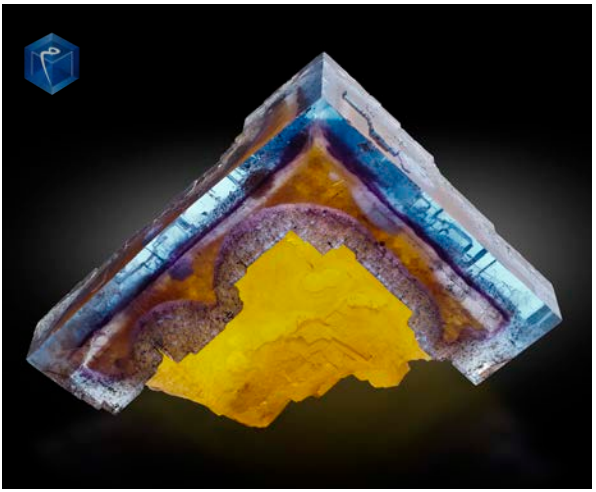
Cerussite is another mineral which reaches its worldwide zenith at Tsumeb, occurring in a variety of forms and colors, from complexly-crystallized, reticulated 'snowflake' crystal groups (sometimes to 30+ cm!) to heart-shaped twins in beautiful limpid shades of yellow to colorless. Individual crystals have been reported up to 60 cm(!), surely a record for the species. Inclusions can cause cerussite crystals from Tsumeb to appear green, blue or red, and the luster is typically high. Mimetite, one of the most common secondary minerals in both major oxidation zones at Tsumeb, also reaches a zenith here, with the most famous crystals being from the 1971 'gem pocket' which produced gem-clear yellow crystals to 6 cm., with only a few dozen good specimens being found. A great mimetite from this pocket would easily set you back several tens of thousands of dollars today.

No article on Tsumeb would be complete without mentioning smithsonite, which also probably sets a global standard at Tsumeb. Perhaps most remarkable about Tsumeb smithsonite is the variation in color, spanning colorless to yellow to pink, green, and deep-blue, and seemingly every shade between. Tsumeb is also one of the few localities in which smithsonite forms well-developed crystals, often to several cm each and with outstanding luster. As far as rarer species, it is futile to try and cover the breadth and uniqueness of rare minerals from Tsumeb. Species such as cuproadamite, alamosite, arsentsumebite, bayldonite, leadhillite, ludlockite, and olivenite demonstrate that rare does not always mean ugly. While Tsumeb as a mine is probably closed forever, the good news for collectors is that the veritable flood of specimens during the 20th century means that the average collector should be able to obtain good Tsumeb specimens for years to come.

#5

ILLINOIS-KENTUCKY FLUORSPAR DISTRICT, USA

Considering many of the preceding localities such Mont Saint Hilaire and Tsumeb whose world-class status is indisputable, I was a little hesitant to include the Illinois-Kentucky Fluorspar District in the Midwestern United States to the 'top five' list, but as much as I tried to ignore it, it kept coming back into my mind. While certainly not as diverse as Mont Saint Hilaire or unique as



Fluorite - Minerva #1 Mine, Rosiclare level, Cave in Rock, Hardin County, Illinois. 10.0 x 11.5 x 6.0 cm. Fluorite altered by barite dissolution, topped by a partial blue fluorite cube. Ex Ross Lillie Collection.

Tsumeb, the fluorite mines of Southern Illinois and northern Kentucky constitute one of the earth's premier endowments in beautiful, crystallized mineral specimens. Specimens from this district are currently experiencing a "renaissance" in popularity and demand as well among all types of collectors, adding to the appeal of this iconic mining district. From the early 19th century up until 1996, literally tens of thousands of fine specimens of fluorite, calcite, sphalerite, galena, witherite, and more were saved from the crushers, and there is scarcely a serious mineral collector in the world who does not own at least one specimen from the district. Combine this abundance of specimens with a seemingly endless variety in color and form in this (albeit limited) species list and you have the makings of a world-class locality.

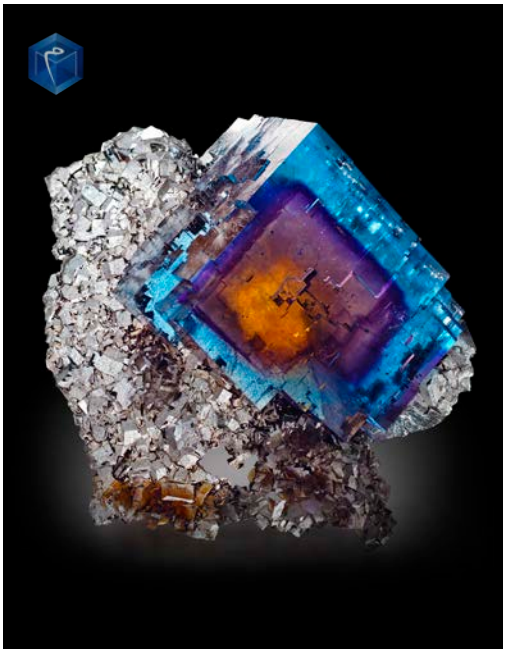
The history of mining and minerals from the Illinois-Kentucky fluorspar district is closely linked to the history of the Midwestern US and the westward migration of pioneers and prospectors in the 18th and 19th centuries. In the early 19th century, Southern Illinois was still a fairly wild and undeveloped region, with local Indian tribes outnumbering white settlers. This changed as word of rich outcropping of galena ore (associated with then less-valuable fluorite) were found along the banks of the Ohio river near what is now Cave-in-Rock, and prospectors as well as farmers began settling the area. Mining in the 19th century focused mainly on galena/sphalerite Pb-Zn ores, and it was not until a steelmaking process in the 1880's required fluorite for flux that mining in the district shifted to the massive fluorite (or 'fluorspar') deposits (Goldstein 1997). Before WWII, most mining was focused on the Rosiclare area, but this moved to Cave-in-Rock in later years, with large underground mines such as the Minerva #1, Denton, and Annabel-Lee accounting

for most of the fluorite production in the later 20th century. Goldstein (1997) noted over 95 individual mines in the Illinois side of the district, and over 130 on the Kentucky side, though to be certain many of these are small prospects, and a handful of large mines on the Illinois side accounted for 75% of modern production. The district supplied over 90% of the American commercial fluorite production, and large amounts of lead, zinc and barium were also recovered (Goldstein 1997). Unfortunately while the huge fluorite reserves in the district are probably far from depleted, rising production costs and cheap imported Chinese fluorite made mining economically unfeasible in the late 1990's, and the last mine, the Annabel Lee, closed in 1996, marking the end of over 200 years of fairly continuous mining in the Illinois-Kentucky Fluorspar District.

Geologically, the Illinois-Kentucky fluorspar district seems deceptively simple, but in reality, it is part of a complex and still-poorly understood region which has been affected by processes such asfaulting, sedimentation, and igneous intrusions. The surface and near-surface (upper few kilometer) geology is dominated by sedimentary rocks ranging from middle Devonian to early Pennsylvanian in age (Goldstein 1997). The fluorite-barite-galena-sphalerite orebodies occur as two generalized types, bedding-replacement deposits which are mainly horizontal and controlled by stratigraphy, and steeply-dipping veins which follow structures and can extend to great depths. Really, these two ore deposit styles are probably related, as the 'bedding replacement' deposits require a structural conduit for mineralizing fluids to reach a favorable limestone bed where replacement can occur. Both ore types occur in a large anticlinal structure known as Hick's Dome, whose uplift is probably related to regional compression as well as emplacement of a potential deep alkalic intrusion, which may have been the source for fluorine for the deposits. The Illinois-Kentucky fluorspar district sits in the most heavily faulted area of the Midwestern USA, and these faults provided the 'structural plumbing' necessary for creation of the numerous ore deposits.

Without a doubt, the premier mineral from the Illinois-Kentucky fluorspar district is, not surprisingly, fluorite. Fluorite from the district probably shows more variation in color than at any other locality in the world, ranging from purple to blue, yellow, gray, pinkish and every shade in-between. The only 'dominant

 Continued on Page 52



Fluorite - Minerva #1 Mine, Rosiclare level, Cave in Rock, Hardin County, Illinois. 7.0 x 10.0 x 11.0 cm. Fluorite cube, with yellow, violet, and blue. Ex Ross Lillie Collection.

color' missing is the rich greens of the UK fluorites, though green crystals were found rarely in several of the older Illinois mines. Perhaps most famous and coveted are the large, gemmy groups of cubic crystals showing crisp color zonation, typically yellow with violet edges or vice-versa, from mines such as the Annabel-Lee, Minerva #1, and Denton. Most of these came out from ~1980-1995, and pockets were so abundant that high-quality fluorite sold either by the pound or by 'the table' at shows or at a miner's residence. Competition for top specimens was fierce, however, and prominent dealers in the region such as Ross Lillie, Dan Weinrich and Mark & Joe Kielbaso have many stories about racing down to Cave-in-Rock or Rosiclare to see 'the next big find' moments ahead of their competition (Goldstein 1997).

Sadly, as fluorite had little value at the time due to its perceived commonness, many specimens were either damaged upon removal, or broken down into 'spar octahedrons' which are produced by exploiting fluorite's two perfect cleavage directions with a small hammer. During this period, many fine examples of galena and sphalerite were also found, with galena crystals from the Hill-Ledford mine sometimes reaching 15 cm on edge. The Minerva #1 mine, discovered accidentally when a night-shift driller salted their drill hole cuttings to hide their nighttime work absences, became the premier locality for the barium minerals witherite and benstonite from the late 1940's up to the 1980's (Goldstein 1997). Witherite occurs there as sharp white to yellow barrel-shaped crystals up to 15 cm, sometimes isolated on fluorite or barite matrix. The Minerva #1 mine is also the premier locality in the district for intensely color-zoned, highly-lustrous fluorite crystals.

 Continued on Page 54

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Celestine, a somewhat rare mineral for the district, was found as excellent blue-gray crystals to 5 cm on fluorite from the Annabel-Lee mine (Goldstein 1997). Galena, having previously consisted of sharp but dull crystals from the W.L. Davis-Deardorff and Hill-Ledford mines, was found as brilliant cubo-octahedrons on fluorite at the Denton mine. Many fluorite crystals show dissolution textures, where later fluids have corroded them into bizarre shapes and sometimes deposited new minerals, such as paralstonite and smithsonite. Strontianite in attractive yellow to white sprays was sometimes associated with these altered fluorite crystals as well, and occasionally, circular 'holes' would be seen in otherwise unaltered fluorite crystals where inclusions of spherical barite had dissolved. While current economic conditions are not bright for the return of fluorite mining to the Illinois-Kentucky fluorspar district, the good news is that the sheer number of specimens produced means that every collector can own a piece of this world-class mineral locality for many years to come.

— Phil Persson

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