

Friends of Mineralogy

Colorado Chapter Newsletter

March, 1990

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March Program:

We are fortunate to have a program on "Supergene Minerals of Bisbee, Arizona", which is to be presented by Richard Graeme. Originally a native of Bisbee, Dick has been a lifelong collector of Bisbee Minerals, and doubtlessly is a leading authority on that area. His previous experience in a New Mexico copper mine, a Utah coal mine, and gold mines in Alaska, New Mexico, California, and Nevada lend a diverse perspective of the mining industry. Those of you in FMCC who have better things to do at **7:30 p.m on the 8th of March** will doubtlessly miss an exceptional program!

We will also present a review (post-mortem?) of the Tucson Show, including some slides of "what's new" in minerals. Those fortunate enough to be in Tucson this year are encouraged to bring minerals purchased at the show to the meeting for exhibit (this is a not-so-subtle hint) in an effort to keep FM members better informed about recent activities.

Notes From the President:

(DISCLAIMER - the following is definitely not to be construed as representing, in any way, an official statement by FMCC, FM, or whatever)

I suppose that one of the benefits (if there are any) of being President of this organization (or any other organization, for all that matters) is the opportunity to get on a soapbox and editorialize about any real or imagined transgressions. What precipitated this editorial (tirade) is the fact that I recently found out that the individuals responsible for the vandalism in Clear Creek Cave were in the audience at the January FMCC meeting when the program on the cave mineral recovery operation was presented. Basically, after extensive reflection, I have concluded that this last act of unsanctimonious and egregious behavior really **□*▲▲**** me off! I can think of no reason, other than monetary gain, for anyone to purposely sneak into this site and pillage the best formations for resale (I also understand that they have recently been offered for sale to a local dealer), particularly in light of the fact that the preservation of the cave was at that time still under consideration.

Bear in mind that the goal of Friends of Mineralogy is the PRESERVATION of localities, and not the pillaging of them (needless to say, this does not mean "leave it in the ground"). As such, members of FM (specifically, FMCC) are expected to be at a level above an average "rockhound", at least in regards to an appreciation for the scientific value of minerals. It is not

anticipated that a primary consideration is the monetary value thereof. I am not a candidate for sainthood, nor am I placing myself on any sort of pedestal above anyone else; I certainly have indulged in a modest share of flogging minerals to unwary dealers (if for no other reason than to keep the yard from becoming inundated with rocks), not to mention some collecting activities of a more or less surreptitious nature. Nevertheless, there are certain ethical bounds that no conscientious collector or member of FM is ever expected to cross.

There is oftentimes a fine line between what we consider as acceptable behavior, and what is not. This point was well-illustrated when a well-known collector told me that the rock collecting business (or hobby) was like no other "collectible" endeavor (such as collecting stamps, antiques, coins, etc.), from the standpoint that 80% of all the minerals for sale were essentially stolen! In other words, much of what one sees for sale in most any show was obtained by highgrading miners, trespass in a mine (active or otherwise), on private property, or on a nonpatented mining claim (posted or otherwise); given a sufficiently pessimistic outlook on the situation, it seems that we are all culpable either by outright looting, or by purchasing "stolen goods", knowingly or otherwise. How many of you just happen to have purchased or traded for a Red Cloud wulfenite, or minerals from any one of a dozen other mining localities that come to mind, or collected at such popular places as Ruby Mountain, the Calumet Iron Mine, Stoneham, Fountain Creek, or even Table Mountain, without the owner's permission, not to mention nearly any mine dump near Leadville, Central City, Alma, or in the San Juans? The point is, for the most part these situations seem to be accepted practice, given that many mines are abandoned and no concern is given to collecting activities, and many (if not most) nonpatented mining claims are not particularly valid for one reason or another, or some claim or private property owners are benevolent in their inclination to restrict access. But to deliberately sneak past guards, at night, into an important locality that was at that time still under consideration for preservation, and remove pristine formations for purely personal monetary gain is beneath contempt by any standard.

I expect that such activity is symptomatic of a continuing decline in "rockhound" participation from a standpoint based on a simple love of the beauty of minerals, and an increasing participation based on profit motive. Witness the swap area in any major show and then count the ratio of actual swapping to "swap" dollars (= George Washington dollars) exchanged. Too many newcomers to the hobby (or profession) are encouraged to participate not necessarily because of the beauty or scientific importance of minerals, or even the beauty of their natural surroundings, but because of the Almighty Dollar. Their ignorance of minerals and good collecting practices is exceeded only by their indifference to learning. These individuals, in my opinion, are far less likely to hold any reverence for the natural world, and are far more likely to litter a collecting area with empty aluminum cans, beer flats, paper, and other crap.

It seems that somewhere we, as members of FM and the mineral community in general, are failing to instill a real sense of appreciation for minerals in themselves, not to mention a rudimentary sense of ethics. Some other incidents that come to mind regarding similarly disgusting activities are:

- the closing of a significant selenite locality at a roadcut near Canon City because of overzealous activities by a few individuals,
- the 1986 closing of the "Quartz Hill" locality (formerly an open collecting site where FMCC held a field trip during the pegmatite symposium) near Lake George because of the egregious behavior of several greedy twits from Colorado Springs,
- commercial collecting activities this past year at Stoneham, where enormous pits were left by those inconsiderate of the consequences by irate landowners who had once closed the area in the recent past (note - this does not apply to the Bryan Lees operation this past summer),
- recent incidents of intentionally mislabeling mineral localities for the purpose of maintaining secrecy from one's larcenous colleagues; also falsely labeling a mineral as to locality for the purpose of extracting a higher price,
- hypercompetitiveness; a certain degree of competition is a foregone conclusion in any endeavor that is characterized by a shortage of good material and an oversupply of "collectors", but

when taken to extremes this competitiveness has led to outright theft, not to mention lying and cheating above and beyond reasonable bounds in order to attain minerals (or whatever),

- assorted other incidents of poaching and graveyard shift activity in ACTIVE mine operations, fraudulent exhibits in shows (specimens misrepresented as having been field collected, fabricated specimens, fraudulent labeling, etc.), wholesale overcollecting of an area by rock clubs or egregious individuals, recurring incidents of careless collecting practices resulting in substantial damage to significant specimens, and other acts of total indecency, altogether too numerous to mention.

This commentary is in no way to be construed as a criticism of the numerous mineral dealers who regularly extract profit for their livelihood(s). The fact is that these dealers (many of whom I patronize on a regular basis), and the concomitant cash flow, are the driving force that provides us with a wealth of specimens to procure at a major show. What I object to is the "commercialization" of an increasing percentage of the so called "hobbyist", to a point where the above-itemized activities become acceptable or required behavior in the competitive arena of mineral collecting. It isn't hard to understand why Art Montgomery gave the collective mineral community the fickle finger (figuratively speaking) during an early 70's "farewell" speech in Tucson.

In a nutshell, we don't need this kind of crap, certainly not in FMCC where we ought to be at a level above the petty greed, jealousy, and corruption that seems to have taken hold of an increasing segment of the so called "mineral community". This sort of behavior is just what makes the idea of cooperative effort, whether it be sharing localities or mineral specimens from a recent trip, or contributing information to further scientific study, more and more a thing of the past. It is up to us to correct the situation; no one will do it for us.

As a parting comment, I should point out that I don't necessarily need to be the only one on a soap box: rebuttals to this editorial are (probably) welcome (or any other pertinent contributed editorials). No one needs to agree with all or part of the preceding commentary. However, if I have accomplished nothing else than to stimulate every FMCC member to reevaluate what the goals of FM are, and what we're supposed to be doing about them, then this editorial has served its purpose.

D. Kile

A final word(s) in this column: I am attempting to reintroduce a forgotten aspect of FMCC meetings - that is for members to bring, for exhibit, new finds that lend a contemporary theme to the meetings, as well as to stimulate higher attendance. I encourage each member to consider if recent field activities or other research projects might lend themselves to sharing with other interested members of FMCC (the above commentary notwithstanding). After all, one of the important goals of FM is to keep members abreast of recent mineral activity.

Current Rumors and Events:

From the Mineralogical Record, Vol. 20, No. 6 (1989): The International Calcite Collectors Association is being formed; planned activities include trading, and possibly a newsletter. Interested persons can contact D. Morton Metersky, 725 Cheryl Drive, Warminster, Pennsylvania, 18974. The group intends to establish a mailing list.

The FM annual auction held during the May meeting is in the planning stages; be prepared and start considering things you might want to bring in order to support the many activities that we sponsor (see report of FM treasury account below).

The Fort Collins Rockhound Club sponsoring their 1990 show at the Lincoln Center, 419 West Magnolia, March 30 - 31 and April 1. Admission is \$2.00 for adults; 3-day pass is \$3.00.

Applications for exhibits can be obtained from and sent to Randy Minch, 21607 WCR # 15, Johnstown, Colorado - 80534 (I have a few application forms on file - ed.).

For the fanatical field collector: Alaskan charter boat expeditions are available; the 10 day trips are being scheduled for the summer of 1990 by Hyak Charters, 607 "V" Street, Port Townsend, Washington - 98368 (unlimited supply of mosquitoes provided at no extra cost).

The 17th Rochester Mineralogical Symposium will be held April 5-8, 1990 at the Rochester Hilton Inn, Rochester, New York. The topic will be "What's New in Minerals".

The 1990 Rocky Mountain Federation Show will be held in Roswell, New Mexico (where is that?!) September 28 - 30, at the Yucca Center, 500 South Richardson. {Don't say you didn't hear about it soon enough...}

Book Sales: We continue to receive orders for the Precious Metals and Pegmatite symposium volumes. As of 2/1/90, we have 34 copies of the former left and only 4 copies of the pegmatite volume (we may need to consider reprinting more of these books). Sales of the Photography symposium volume have also been good.

The Grand Junction Gem and Mineral Club will sponsor its 42nd annual Gem and Mineral Show at Two Rivers Plaza (2nd & Main) in Grand Junction, Colorado, on May 19 - 29, 1990; admission \$1.00.

Report on the progress of the "Update to the Minerals of Colorado" from our intrepid update coordinator, Pete Modreski:

The authors, Bob Cobban, Rick Collins, Gene Foord, and Jack Murphy, are continuing work to produce final drafts of all the mineral entries. The present goal is to have half of the mineral species in "final-draft" form by the end of 1990. In the past month, Rick Collins has prepared "semi-final" drafts on calcite and barite. Several other people, including Dan Kile and myself (PJM), will assist in the review and editing of these drafts as they are completed.

News of Members: We welcome the following new members:

Richard and Monica Graeme (formerly from Bisbee, Arizona, among other places) - see speaker's resume above.

William Chirnside, from Lakewood, a Colorado School of Mines graduate and mineral collector since 1957.

Ginny Mast, who is the curator at the Colorado School of Mines Museum.

Kory MacFarlane, a resident of Central City and active mineral collector (see note by Keith Williams in the last FM Newsletter).

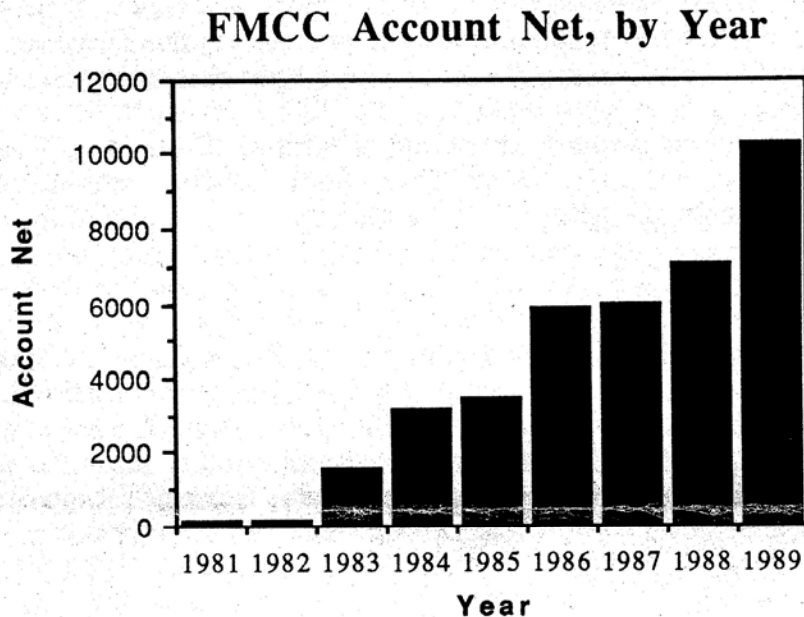
Better late than never . . . Robert F. Barrell of Boulder (45 years in the hobby! - specializing in microminerals), and Daniel E. Bockstedt from Golden.

What's New in Colorado Minerals:

Evidently there is not much that is new – THIS SPACE AVAILABLE for those who have a new find or other locality-related information to share....

FMCC Activities and Information:

Pete Modreski recently compiled a table showing the final yearly balance of the FMCC treasury. I took the liberty of transforming this data into a sexy little graph presented below:



The graph shows a steady gain in the account, attributable to a more or less steady infusion of cash from the annual auction (not to mention the donations by lots of people that ensured the continued success of the auction), as well as some incremental jumps in 1986 and 1988 as a result of symposium profits. Given the fact that we have already spent about \$6,800 (principally for manuscript typing) on the Minerals of Colorado update project, this account balance is not overly imposing. Indeed, at such time as we proceed with the final preparations for the photographs, maps, and manuscript, this sum will probably fall short of what is needed. More on this next month (as relates to the annual auction...)

Other significant finds of Pete's audit of the financial records are:

(1) Over a nine year period, we have raised a total of \$10,137 for use on the Update project; we therefore have a balance of \$3751 in the treasury which is specifically earmarked for this project.

(2) We have been able to pay all our operating expenses (newsletter, etc.) out of dues income, without having to use auction proceed or book sales to subsidize routine chapter activities.

The following short article was written by John Alexander, but it was never published. A copy of the manuscript was on file in Jack Murphy's office at the Denver Museum of Natural

History - Jack kindly gave permission to print this article (with minor editorial changes) in the FMCC newsletter. It gives an interesting firsthand account of some of the early activities of well-known collectors (John Alexander is the person who is shown in the November, 1951 issue of National Geographic, suspended from a cliff at Glen Cove).

Pikes Peak Topaz
by
John H. Alexander

To my knowledge, the first discovery of topaz at Glen Cove on Pikes Peak was made above timberline by Luther McKnight in the summer of 1944 while photographing wildflowers. He picked up two small fragments of crystal which he took to a friend and fellow employee of Stewart Brothers Photographers, Clarence Coil. Clarence was not sure of his identification so he asked the late O.A. Reese about them. One was quartz, the other with a light blue tint, was topaz.

Later that summer, when the snow had melted, Clarence Coil, O.A. Reese and Perry Osborne climbed up a rock slide looking for topaz. Clarence found the first good crystal which is now in the collection of Waynesburg College, Waynesburg, Pennsylvania. Climbing higher up the slope, the excited group found a pegmatite pocket of mottled amazonite (*microcline*) crystals. No more topaz was found that day.

In 1945 O.A. Reese and Clarence Coil returned to Glen Cove to find some good amazonstone crystals and tragedy. While on a narrow ledge Clarence worked his way to a huge flat rock under which he started to dig on a pegmatite. O.A. Reese started to pry at a smoky quartz on the other side of the slab. Suddenly Clarence had a premonition and started to get away when the slab let go. It hit him on the leg cutting a bone deep gash. It was all Reese could do to get Clarence down the slope, across the boulder field and to the hospital. Without this premonition, Clarence would have lost his leg or his life.

Ed Over was introduced to me by the late Robert D. Wilfley in the spring of 1948. I was a geology major at Colorado College, a mineral collector and mountaineer. Ed was most generous with his time and showed me many of his valuable minerals including a collection of crystalline gold specimens from all over the world and a micro-specimen of overite, named after him.

One Saturday in July of 1948 I was honored by Ed asking me to go on a field trip with him the next day. He would not say where we were going, but to bring my mountaineering equipment and pick him up at six a.m.

By eight a.m. the next day we were standing on the talus at the base of a cliff in upper Glen Cove. While we were resting, after crossing the boulder field, Ed pointed to an intermittent ledge about one hundred feet above us and half-way up the cliff. He asked me if I could get up there. I said "yes, but I would have to come down from the top." We agreed to split up, Ed going to the narrow rock slide to the west as I went east to a ridge. We soon lost sight and sound contact.

Within an hour I had driven an old Army piton into a crack in solid granite, of which there was very little. Most rock on the 45 slope was loose and very unstable. In a few minutes I had rappelled to a two foot ledge which turned out to be the floor of a pegmatite dike. It ran a few feet almost horizontally to the east and then narrowed into a vertical granite face. This ledge was barren, showing no pockets. I swung on my rope eastward to another ledge about three feet wide. I could see a pile of pocket material which had fallen from an open cavity to the ledge below. I retrieved my rope and started to scrape the pile with my pick. Immediately I found a large nine

inch smoky quartz crystal of fine quality. Mixed in the the clay and broken crystal pieces were several well formed amazonstone crystals and scraps of topaz. After two hours I had dug and wrapped several dozen pieces including some fine topaz crystals. I put them in canvas bags and tied them together for lowering. The topaz, however, was to stay with me in my pack.

I heard Ed calling from the west. When he got below me he yelled, "John, look what I have," holding up a stone about the size of a large egg. It turned out to be the finest highly etched topaz we found. It is a flawless gem of 179 grams. On climbing the talus below me, Ed asked if I had found any topaz. I lowered a sack of amazonstone and one of smoky quartz. After opening the sacks, he demanded, "Where are the topaz?" I said, "What topaz?" Ed started to get angry as he had previously collected topaz fragments just where he stood.

Ed spotted a storm cloud over the west ridge of the Cove heading our way. I packed the bag of topaz, leaving most of the tools there and started to rappel down the face. It took about twenty minutes to descend the one hundred feet, as I halted to drive several pitons. These would help in climbing the face on our next visit. Still asking about topaz, Ed helped me take off my pack. On opening the topaz bag and unwrapping some of the crystals and pieces Ed, was like a child opening gifts on Christmas morning. Each crystal or fragment was inspected for quality by expert hands. Soon the rain came and we started for the car, ending a most successful day.

On the next weekend we left at 5 a.m. to give an extra hour before the almost daily storm. I was easily able to climb the face below the pegmatite. I remember how cold it was before the sun came over the east ridge. That day Ed didn't come up to the ledge as there was only room for one person to work. We did haul up a six foot pry bar and an eight pound sledge with which I was able to move large rocks from the ledge. Some must have bounced two hundred yards before stopping. I produced a few more specimens and was lowering them to Ed when a big sleet, wind and lightning storm hit. Within five minutes everything was covered with small hail balls.

All that day Ed had his eye on an open pocket in the vertical cliff where there were no hand or foot holds. The pocket looked to be about two feet wide. On the way to the car, Ed asked if I could get in front of that pocket. I said that I thought I could.

On our next trip we took another climbing rope and a three foot hand-forged crystal rake which Ed and Arthur Montgomery had used on Mount Antero for aquamarine some years before. At the base of the cliff, I asked Ed if he wanted to come up too. He declined, saying that he didn't like high places. I did get him up the next day, however. I put in two pitons above and to the west of the open vug. From these I worked my way in front of it, but could see very little. With the long rake I dug out red mud containing some broken crystals of quartz, microcline and topaz. I put the material, mud and all, in an ore bag. Adjusting my position to get an arm into the pocket I scraped at its ceiling with my fingers. Suddenly something heavy dropped into my hand. It was a mud covered topaz. I told Ed that I had a big one, but I couldn't tell how good it was (see page 632 of National Geographic, November 1951).

The following visit marked our first blasting on the locality. Ed carried the powder and I the caps and fuse. I climbed the face and brought Ed up on belay. He decided to blow off two large rocks which covered part of the pegmatite but were too big for us to move. I put the tools in a safe place and cleaned up any pocket material which was worth taking home. He set the charge with a mud pack under the rocks. I belayed Ed to the talus, lit the long fuse and rappelled down quickly. We went to the east toward the ridge and waited.

The shot knocked both boulders off the ledge and nothing came down from the unstable rock at the top of the cliff. We climbed the rope to the ledge and started to dig where the rocks had

been. We produced a few small topaz and some large amazonstone and quartz crystals. We finished the day without the usual storm and decided we could not produce much more on this part of the pegmatite.

In two weeks we returned to the dike east of where we had been working. Ed started digging in the solid pegmatite material which looked the same as the rest of the dike. I asked why he was digging there. He replied, "just wait." In twenty minutes he had opened a pocket in which there were quartz crystals, some good quality amazonstone and several fine topaz. That day I found a large, "frozen in quartz" single topaz crystal. The crystal would have measured over four inches high if it had not been crushed; I collected as a sample several handfuls of topaz sand.

For several days into the summer we worked the area moving large rocks with pry bar or powder. We produced relatively little, often working several hours on one boulder to find nothing under or behind it. During this period we crossed over into the north pit and the bottomless pit in search of topaz. We got some small smoky quartz and pink microcline, but no topaz.

On one of the last days of work in Glen Cove, Ed saw a place on the pegmatite west of where one could stand. Again, I could see nothing different about this place, but Ed's "X-ray" eyes could. While Ed belayed me, I found a few footholds and worked over to it on the granite face. With a mineral hammer in one hand and holding on with the other, I picked at the rotten dike. After about three inches there was an open pocket about the size and shape of a large orange. I retrieved a small, very poor microcline and one egg-size topaz. On getting back to where I could stand, we wiped the mud off the topaz to find the finest quality specimen we had produced. It was a perfect flawless crystal with highly modified brilliant faces. Later, Ed sold it to the Smithsonian Institute who had it cut by John Sinkankas and is shown in his book, "Gemstones of North America." (Editor's note: I am told that Sinkankas said this is not true; he reportedly cut a large brown cleavage fragment that turned blue after being put on display!)

Glen Cove is probably the second most important topaz locality in the United States. The most important find was at Devil's Head Mountain, Colorado about the turn of the century. This locality was later worked by Arthur Montgomery and Ed Over. They produced some very fine crystals, one of which is in the Harvard Museum.

I wish to acknowledge the photographic and historical assistance of Clarence Coil, Luther McKnight, Robert Ormes and George White. For further information on topaz in Colorado, see the article in the June, 1963 issue of *Gems and Minerals* by Richard M. Pearl.

PUBLICATIONS BY THE U.S. GEOLOGICAL SURVEY:
COLORADO AND VICINITY

(Part II of II)

reprinted from the Geoliterary Society Bulletin
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Dan & Dianne Kile

Geologic folios were published by the Survey from 1894 to 1945, and consisted of large-format, color geologic and topographic maps, and usually included an informative text. Many of these folios contain seldom-seen photographs of the early mining districts or townsites. Folios on Colorado mining districts, such as the Tenmile district (Emmons, 1898), Telluride (Cross and Purington, 1899), Silverton (Cross, Howe and Ransome, 1905), Ouray (Cross, Howe and Irving, 1907), and Rico (Cross and Ransome, 1905), document the discovery, development, and economic geology of the districts; they often provide the only remaining accurate source of locality information, inasmuch as data that is subsequently abstracted has a way of incorporating typographical or other errors of translation. Other interesting and seldom-seen geologic folios are the Pikes Peak (Cross, 1894), Pueblo (Gilbert, 1897), Castle Rock (Richardson, 1915), and Colorado Springs (Finlay, 1916) folios which, by way of photographs and maps, provide an historical account of some of Colorado's metropolitan areas from a unique perspective. The Castle Rock Folio, for example, presents two pages of photographs that include sculptured geological formations in the area, as well as Castle Rock itself. A "tepee butte" is depicted in the Pueblo Folio; these unusual conical structures are capped with an erosion-resistant limestone which contains abundant Cretaceous invertebrate fossils; additional plates in this folio illustrate other remarkable fossils found in the area. The Spanish Peaks Folio (Hills, 1901), contains several spectacular photographs showing volcanic dikes with the beautiful snow-covered Spanish Peaks in the background. The Colorado Springs Folio contains a panorama of Pikes Peak at a time when the present rapidly-growing city was only a small town at the foot of the mountain. Several ore-processing mills (that have long since disappeared) are shown on the topographic map, as is the old narrow-gauge railroad line to Cripple Creek that was converted to the Gold Camp Road after the mines closed.

An additional source of information is the mineral resource series, published from 1883 to 1927. This series was printed as annual volumes covering the calendar years from 1882 to 1893, and from 1900 to 1923 (they were incorporated into the annual reports for the years 1894 to 1899). After calendar year 1906 the 'mineral resource' series was published as two volumes, titled "metals" and "nonmetals". Publication of this series by the U.S. Geological Survey ceased after 1927; resource information was later (after 1932) incorporated into the annual "Minerals Yearbook", prepared by the U.S. Bureau of Mines.

A short section in each mineral resource volume was devoted to recent activities in the precious (and not so precious) gemstone trade. These articles were initially written by G.F. Kunz (an eminent mineralogist in his time) and later by D.B. Sterrett (of the U.S. Geological Survey); both provided a contemporary insight into the fluctuating mineral and gem market, including fascinating (though brief) accounts of the annual gemstone production from Colorado and other states. Such records document topaz from Devil's Head (then called Platte Mountain) and Cheyenne Mountain, phenakite found at Crystal Peak (then called Topaz Butte) and from Crystal Park, and aquamarine from Mt. Antero (a 4" crystal found in 1885). Documentation of semi-precious minerals in Colorado includes smoky quartz from the Pikes Peak region (crystals to 4 feet long), Italian Mountain idocrase recovered in 1884, thousands of garnet crystals from the Sedalia Copper Mine sold to tourists in 1885 (1-1/2 TONS of these garnets were sold in 1887!), turquoise found near Leadville in 1888 and near Villa Grove in 1893, excellent specimens of

crystallized amethyst from Cripple Creek in 1899, amethyst recovered in Fremont County in 1908, and petrified wood from El Paso County (5,000 pounds sold in 1907). Short articles incorporated into the mineral resource series documented the geology and history of selected localities, including Mt. Antero (1908), and the amazonite-producing areas of Crystal Park and Crystal Peak (1913).

Mineral occurrences described in the mineral resource series outside the state of Colorado include: diopside from Dekalb, New York (1882), a garnet locality within New York City (where a perfect garnet weighing over 9-1/2 pounds was found in 1885), Yogo Gulch sapphires in Montana (1889), the emerald deposits in North Carolina (1893), amethyst and smoky quartz from the Pohndorf mine near Butte, Montana (1900), epidote from the Prince of Wales Island, Alaska (1901), purple apatite from Maine (1901), and benitoite from California (1907). A noteworthy volume in this series is contained in the Twentieth Annual Report, part VI (1899), where a full-page color plate is included that shows various gemstones and crystal rough, such as a Maine beryl crystal, a superb Connecticut tourmaline (elbaite) that is nearly 10 inches long, and assorted cut stones, including Yogo Gulch sapphires, New Mexico turquoise, and Maine rose quartz. Much of the information included in these books gives an important chronological record of the development and production of gemstone- and metal-mining districts, and is unavailable elsewhere in the literature. Of course, those degenerates who have an interest in the more esoteric commodities, there is also an abundance of data on petroleum, cement products, sand and gravel, and even fertilizer!

One of the more unusual Geological Survey publications is a water supply paper (no. 416) titled "The Divining Rod - A History of Water Witching". Written by A.J. Ellis and published in 1938, this colorful book gives a factual historical account of the origin and form of the divining rod, as well as the scientific controversies surrounding it. There is even a brief exposition on the use of the divining rod to detect criminals! An additional Survey publication relating to hydrology is Professional Paper 779 (1972), titled "The Story of the Water Supply for the Comstock". This account documents the chronic water shortages and the extraordinary efforts required to obtain water in this famous mining district. The Geological Survey even delved into weather with Professional Paper 1019 (1978), titled "Climatography of the Front Range Urban Corridor and Vicinity, Colorado." It provides a detailed insight into Front Range weather patterns, giving detailed maps on rainfall, wind direction and intensity, and other climate-related factors on a seasonal basis.

Another interesting Survey publication is a series of "guidebooks" which were published in bulletin format. These were printed in the early 1900's and give a detailed and non-technical description of the geology and scenery along many western railroad lines, back in a day when the train was the most elegant and expedient way to travel. Numerous photographs, geologic and shaded-relief topographic maps, and line drawings present the local history and geology from a unique perspective. The Denver and Rio Grande Western Route (Bulletin 707) covered areas that are today popular tourist sites, including (in Colorado), Georgetown, the Garden of the Gods in Colorado Springs, Manitou Springs, Pikes Peak, Cripple Creek, the Royal Gorge near Canyon City, Salida, Leadville, and Grand Junction. Photographs illustrate the geologic and historical story of these areas, and include some of the more prominent scenery along the rail lines, such as mining towns and mountain peaks along the continental divide, the Mount of the Holy Cross, Royal Gorge, Gold Camp Road (which was then the Cripple Creek Short Line), and the Black Canyon of the Gunnison. Some of the less-familiar areas are represented as well, including the prominent monoliths at Monument Park, near the town of Monument, and the Palisades near Grand Junction. The subjects range from columbine (the Colorado State flower), to old charcoal kilns (that provided charcoal for the smelters before coke became available) and even dinosaur footprints. Areas near Salt Lake City, Utah are also described, including the copper camp at Bingham. Other routes included in this series are the Northern Pacific (Bulletin 611), Overland Route (Bulletin 612), Santa Fe Route (Bulletin 613), Shasta Route and Coast Line (Bulletin 614), and the Southern and Pacific Lines (Bulletin 845). The comprehensive presentation and readability of this series and the proximity of many of the rail lines to modern interstate highways makes them

relevant even today.

An early publication of interest, written by J.D. Hague and Clarence King prior to the formal organization of the Geological Survey, is the "Report of the Geological Exploration of the Fortieth Parallel, Volume III" (1870). This historical work documents the early mining industry in Colorado, as well as in the Comstock Lode, Nevada. It is richly illustrated with line drawings that accurately depict the mining equipment used in the mid- to late 1800's, such as stamp mills, hoisting works, and ore-treatment equipment. A unique plate is included showing the square-set timbering used in the Comstock Lode (necessary because of the particularly unstable ground), and another shows an early topographic map of the "Gilpin County Gold Region". A superb plate at the frontispiece shows the "shaft landing" of the Savage mine at the Comstock Lode, including the old wooden ore cars and shaft signals. The accompanying atlas contains topographic and geologic maps, and detailed maps of some of the underground mine workings at the Comstock Lode. It is probably no coincidence that the format of this book bears a striking similarity to that used by Samuel Emmons (who was appointed by Clarence King to be the first Director of the Rocky Mountain Region) in his monograph of the Leadville district.

The early publications of the Geological Survey were distributed in several styles of binding. Annual reports, mineral resources, and monographs (with their accompanying atlases) were typically cloth hardbound in dark colors, with contrasting gold lettering and a distinctive logo (a crossed pick and hammer). Congressional editions were bound in leather, while other copies featured half-bound leather with ornate multicolored, patterned ("marbled") paper. Professional papers and bulletins were generally softbound (printed wraps), except for a limited number of library editions which were hardbound. Although many of the old bindings may be in poor condition, it would seem preferable to restore the original hard cover during rebinding, rather than replace it with a new "generic" cloth cover; such restoration preserves the unique and irreplaceable character of the original cover.

Many historical events relating to the Geological Survey are recorded in a contemporary treatise published in commemoration of the Survey's centennial. Titled "Minerals, Lands, and Geology for the Common Defence and General Welfare", and written by Mary Rabbitt, this work relates the Survey's early years in three volumes: Volume I documents the period before 1879, Volume II includes the period between 1879 and 1904, and Volume III covers 1904 to 1939. These volumes present the early history of the Survey in relation to the development of public lands and mineral resources in the United States.

Several publications guides distributed by the Geological Survey are essential to those interested in the Survey's out-of-print geological literature. The first is the so-called "red book", which is titled "Publications of the Geological Survey, 1879-1961". A second publication is the "gold book," listing the U.S. Geological Survey publications from 1962 to 1970, and a third volume lists publications from 1971 to 1981. The "red book" is particularly useful in that it not only contains a complete listing of all the early Survey publications, but it also itemizes the chapter contents of the annual reports and mineral resources. These guides (as well as annual supplements issued from 1982 to 1987) are available from the Geological Survey, at either the Books and Open File Section (Denver Federal Center, Box 25425, Denver, Colorado, 80225), the U.S. Geological Survey map sales counter (building 810, Denver Federal Center), or the Public Inquiries Office at the Federal Building (Denver, Colorado). Government geological publications issued prior to the formal inception of the U.S. Geological Survey are itemized in U.S.G.S. Bulletin 222 (1904); this bulletin lists publications of the Hayden, King, Powell, and Wheeler Surveys. All of the Survey publications cited in this article are referenced in one or more of these books.

Out-of-print Survey publications relating to the mining industry and geology of Colorado provide an excellent source of information, much of which is overlooked when confronting the enormous body of technical books. Early writers, moreover, conveyed a sense of history in a style of writing that seems to have been lost in more recent geologic literature. The information found in these lesser-known Survey publications provides a fascinating and timeless firsthand account of our mineral and geologic heritage.