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The

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Mineralogist

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*December * * 1941*



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We express appreciation to all who have contributed to the success of our meetings, programs, field trips and magazine.

To all, a Merry Christmas

A Happy and Prosperous New Year



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The Society will be responsible only for viewpoints and opinions
expressed by unsigned articles.

OBJECTS OF THE SOCIETY

1. To collect and study minerals.
 2. To disseminate a general knowledge of minerals.
 3. To provide opportunity for the exhibition and exchange of specimens.
 4. To encourage social relationships among the members and the exchange of ideas regarding mineralogical subjects.
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CERAMIC CLAYS

Formation—History—Deposits

By HAROLD J. HUECKEL

Formation. The forces of nature are very active in the formation of our various rocks and minerals. Water, combined with oxygen, carbonic acid, and temperature changes, are the slow but sure levelling agents whereby rocks are broken down, and moved, to form new strata and mineral deposits.

Feldspathic rocks, which have undergone this process of weathering and breaking down, form a larger part of the clay deposits. Through the influence of water, and the carbonic acid dissolved in it, part of the alkalines, limes, and silicas are carried away. So, a pure potassium feldspar would suffer a loss of about 50% on complete transformation into clay. This percentage is much greater if besides weathering, a washing takes place; such as in the sedimentary clay beds.

Clays may be divided into two classifications according to their origin. The first, residual or primary clays, are in place, and formed above the parent rock. The second, sedimentary clays, have been transported in quiet pools of water where the particles of clay are held in suspension by the water and deposited according to the fineness of the particles. Due to this suspension and slow settling, clays of different character, and distinguishable by color or texture, frequently lie one above the other.

There are three main groups of clay used today by the Ceramic trade; Kaolin, Ball clay, and fire clay.

Kaolin, sometimes called china clay is mainly a residual or primary clay, found in lump form in the midst of pegmatites and granites. Before this clay is ready for use it must be

hand sorted and subjected to either a washing or grinding process. Some few sedimentary deposits may be used in the same form as mined. Kaolin is a highly refractory clay and burns to a beautiful color.

Ball clay is a sedimentary clay of high plasticity. The original ball clay works were in England, whence the clay was recovered from open pits and mined in the form of huge balls weighing approximately 33 pounds; thus deriving its name, ball clay. This clay generally contains a larger amount of carbonaceous matter than other clays.

Fire clay is generally listed as a clay whose fusion point is not below 3,000 degrees fahrenheit, and may be divided into two main types, plastic and flint clay. The flint clays are of a harder structure than the plastic and require grinding to assure a better workability. The plastic clays are readily broken down in water and require no preparation for use.

Chemical analysis alone does not give sufficient knowledge of the properties of clay. It serves only to recognize constituents which may prove beneficial or harmful. "Rational analysis" detects the amount of quartz, clay substance, and feldspar, so serves to show the workability or plasticity of clay.

History. As early as 5,000 B.C. the clay deposited by the overflow of the Nile River in Egypt, was used in the manufacture of rough brick. This is perhaps the earliest known use of clay. Some 2,000 years later vases of terra-cotta were first made, and on the walls of tombs of that period were depicted scenes of the ancient potters plying their trade.

It is known that clay deposits were accessible to the Chaldeans and Assyrians, as they erected the palaces of Croesus, Mausolus and Attalus in beautiful red fired brick. Tombs of that era were sometimes made of a single piece of pottery ware, or of two sections fitted together. The ancient cities of Nineveh and Babylon were constructed of yellowish white brick and coated with greyish and yellow glazes.

The early Greek potters mined deposits of very fine clays, which they probably washed and fired at high temperatures. This is evidenced by the special hardness and fineness of the clay wares of that period.

The first use of clay in China dates to 2700 B.C. when the first pieces of pottery were made by Kouen-Ou, during the reign of Emperor Hoang-Ti. It was not until 200 B.C. that the large deposits of Kaolin, in China, were used to develop a true hard porcelain ware.

Many centuries later in 1765, the famous Kaolin beds of St. Yrieix, France, were discovered. Three years later in 1768, the vast Cornish beds of Kaolin, in England, were found. These discoveries of kaolin, the essential clay in the manufacture of hard porcelain, assured the supremacy of hard porcelain ware on the continent of Europe.

Natives of the American Continent were producing exceptionally fine terra-cottas, in Mexico and Central America, as early as 1000 B.C.

Thus, the manufacture and use of clay wares was discovered by three different peoples, the Egyptians, Chinese and Mexicans (aztecs) at the beginning of their respective civilizations, and at a date too remote to be accurately determined.

Deposits. Some of the best known clay deposits are the English Kaolin beds in and near the St. Austell district, which produce a fine white burning clay of residual origin. Eng-

lish ball clays are mined from the North and South Devon and Dartmouth areas.

The importation of English Kaolin, by this country, before the present war, averaged over 500,000 tons annually—part of which was used by the paper trade. Due to uncertain deliveries and unstable prices, this importation has been rapidly decreasing.

The largest deposits of domestic Kaolin are the residual deposits of North Carolina, South Carolina, and Georgia; and the sedimentary deposits of Florida and Georgia. These clays compare favorably with the English Kaolins, although these deposits are not as well developed nor are they as large and uniform as the English.

Domestic ball clays are mined chiefly in Tennessee and Kentucky. These clays have been used by Eastern manufacturers since 1890. Until recently however, the West Coast potters have been able to buy the English clay cheaper, due to the difference in rail and water transportation costs.

In Southern California, we have a number of clays of local importance. The Alberhill clays in the Lake Elsinore district have been used extensively in the manufacture of fire brick, terra-cotta, drain tile, sewer pipe, storeware and roofing tile.

California has two Kaolin deposits being mined and marketed. One of these clays, located in Orange County, is approximately 40 percent clay and 60 percent silica, as mined. By a process of crushing and washing the silica is separated from the clay, producing a Kaolin, very close to the English type. The silica is recovered and ground for the pottery and foundry trade.

The second Kaolin deposit is located in Mono County, and was formed by the alteration of rhyolite

(continued on page 25)

PRACTICAL MINERALOGY IN THE SCHOOLS; AND MINERALS OF MINT CANYON

By **BRITTON A. NICOL***

Interest in mineralogy is growing in the schools even more rapidly possibly than it is as an avocational or hobby interest in layman groups. In both instances it is a "natural," since it is related to such a wide variety of other worthwhile interests. In school it is related to science, geology, botany, chemistry, and to a lesser degree geometry through crystallography. It provides subject material for art, flower arrangement, and photography, and a universal interest in itself for clubs, trips, socials, and school displays. The "mineral of the week" idea is never failing as a source of interest in classroom, library, or general school showcase display. Mineral exploration, with its travel, physical exercise, outdoor activity, and hand-work activities is an ideal release for tensions of indoor, mental, or routine physical occupations. One need not find an ore deposit to be enriched by mineralogy, neither should anyone be ashamed to admit that he would recognize a certain ore if he saw it. We have probably only scratched the surface in scientific mineral exploration in this country. The knowledge of mineral and natural lore by both school children and adults should be more extensive because it does provide a basis for such a wide variety of lasting interests and appreciations which make for richer living. We should know more about the world we live on and the mineralogical, chemical, and geological processes that have and are going on in the earth itself.

Schools are awakening to this new

broad area of student interest, but it is hard to do much about it. Teachers often find their teaching load both in and out of school so heavy, the schoolwide functions, committees, institutes, library, visual aids, course of study, and materials collecting activities so numerous, that they are at a loss to find time or even energy to plan trips, hold club meetings, and do most of the work of preparing information for presentation to groups.

Students themselves are even burdened sufficiently by their school activities that they would rather relax and talk and play with their friends during noon period and after school rather than attend club meetings, especially if they are called upon to provide part of the program. Students do however exhibit enthusiastic interest in field trips, and like to examine, identify, and learn about processes by which minerals are formed, if that activity is as far removed from any appearance of regular classroom procedure as possible.

Trips, collections, both individual and school, experiments, assaying, and talks by the teacher or students who are respected for their knowledge of minerals seem to be the preferred functions. A few key students are sufficiently interested to carry on with display arranging, and maintain interest in assaying processes performed by a qualified chemistry student on N.Y.A. project assignment, etc., while the bulk of the members meet less frequently to plan and to go on trips.

Bus transportation is now provided free by the board of education for

*Dr. Britton A. Nicol, now at Lincoln High School, received his doctor's degree in education at the University of Southern California upon the completion of a five year study in mathematical statistics, in the development of formulae designed to simplify the work of research workers in this field.

school trips, and the requirement of being in good standing by paying monthly dues of ten cents, to go on trips, provides a small fund to be spent for the purchase of certain items of special equipment which will enable the club to perform chemical assays of student samples in a special laboratory set-up. Most of the general chemicals and supplies can be secured through the chemistry department, but the club needs a vacuum filtering flask, six inch filtering funnel, and suction pump to be attached to a water faucet to provide vacuum and reduce time required to filter a solution to one minute, so that the solutions and precipitates of a complex qualitative analysis may proceed with dispatch. If it takes most of the period to filter a single solution, interest cannot be maintained in the process.

An ore pulverizer that will reduce a sample to 200 mesh dust in one operation takes most of the hard work out of grinding specimens. Water bath, special reagents, and cooking dishes add to the list of materials required. An energetic club can arouse sufficient interest on the part of students to have trips so it can finance and carry on a number of interesting projects. Contrary to belief, students will not go on trips unless they are genuinely interested. The willingness of fifty to seventy students to go on trips and pay dues for that reason only, provides funds to enable those of more consuming interest to carry on the more academic interests of the club. The San Fernando High club, probably very strategically located as regards access to minerals, but decidedly not in respect to the time consumed in transit on club trips, nevertheless conducted numerous successful trips probably averaging about three per semester, in school busses, besides field trips in private cars as far as Bakersfield, and took one trip of seventy mem-

ers to the Dominguez Field of Union Oil Co. in South Los Angeles, and built up a treasury of about \$30.00, in addition to an investment of \$15.00 in laboratory equipment.

The Los Angeles Mineralogical Society is in a position to aid the formation and ease the teacher burden of carrying on such clubs. They could invite teachers, whether members or not, to avail themselves of library loans of booklets and trip plans distributed through school mail to schools without cost to either the LAMS or the teacher. They could keep a file of mimeographed sketches of local field trips to be mailed on request to schools, and invite teachers and students at a nominal fee to join LAMS and go on trips, although the latter are often either too long or expensive for students or teachers to attend.

Sufficient interest was exhibited by teachers in a mineral field trip institute session, about one hundred-fifty requests being sent in by seventy-three schools with reservation limited to forty, that the board of education is planning to repeat the offering and possibly expand it to two or three trips, and the LAMS through its mineralogy in the schools committee could help immeasurably with suggestions and plans to acquaint interested teachers with mineral locations in the areas surrounding Los Angeles and accessible to students on one-day trips. Members could be invited to attend and serve as guides to increase the value of these trips, and could sponsor trips especially adapted to teachers needs and interests as part of its regular field trip program throughout the year, and thus sponsor the increased interest of teachers in forming these needed contacts with outside of school groups interested in common problems.

A list of certain minerals of Mint Canyon prepared for this year's institute trip includes many which the

writer first visited on a LAMS trip, are well known to LAMS tripsters, but thought worthy of mention by the editor for their interest to the newer members.

Mimeographed sketches of mineral locations and descriptions of minerals to be found might be a desirable supplement to services already extended to the members through the Pacific Mineralogist. If some member would work out a simple and positive chemical qualitative assay test for the presence of gold which could be used by school clubs in selecting the specimens brought in by students which are worth the price of a quantitative assay, it would be a great help. The aqua regia and other field tests described in the University of Arizona bulletin on Field Tests for the Common Metals (No. 147, price 15c, Tucson) though it includes some of the finest descriptions available, do not seem to work satisfactorily, due principally to the three or four hour digesting time required by heating in water bath.

Possibly someone could also indicate how a metal shop gas furnace could be used as a muffle furnace in assay tests by school clubs. There must be a great number of such problems wherein we can all help each other greatly. Another University of Arizona bulletin which was found of greatest value in connection with school mineral clubs, and which with the one above were purchased by a considerable number of the members, is Bulletin 139 by Butler, on "Some Facts About Ore Deposits," price 15c including mailing charges.

Minerals of Mint Canyon

Pyrite. Auriferous (gold bearing) Iron sulfides. "Fool's Gold." Axiom of mineralogy: "Wherever there's pyrite there's gold." Every iron stained specimen worth an assay.

Quartz XLS. Large or distinct quartz crystals in cores of agate

geodes. Solid quartz cores and hollow cored geodes covered with fine scintillating xl coating. Silica or indistinctly fine or micro-xl quartz in the bull quartz matrix of the iron pyrite ore from Governor mine. Many specimens disintegrated to 'sugar' quartz. Pure silica or quartz as clear as a window pane may be a valuable gold bearing ore yielding high values in invisible free flour and flake gold or grayed with silver. Large deposits of silica are valuable and in demand on West Coast for glass manufacturing.

Ribbon Agate Geode Gemstones.

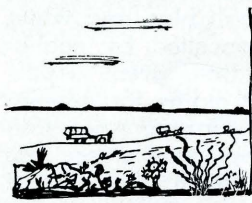
The ribbon agate geode deposits visited are among the finest in the country. Solid geodes are called nodules and are exceptionally fine cutting material yielding settings in a variety of shades of cobalt blue and white. The silica is deposited by cooling mineral waters from great depths, bearing different stains for different periods of time, forming rings from outside in. If deposition closes passage flow, balance of silica deposit will be in form of quartz xls, filling or partially filling cavity. Nodules of solid banded agate are formed on underside of geodes, or a portion of the geode will show bedding planes of seasonal or periodic deposit. Process may take only a few months or a number of years. It is the same process that goes on when agate replaces wood or other cellulose or soluble minerals. Geodes are thought to be formed in gas voids in basalt deposits. Basalt is formed on the surface then buried to depths where underground mineral waters fill voids with agate and quartz silica deposits, then brought to the surface again by later earth deformations. Basalt weathers away and decomposes, leaving geodes. Basalt with agate filled voids is to be found in this location. The small agate nodules coated with green griffithite noted later.

(Continued on page 19)

BONES

By JAMES C. ARNOLD

This is no fireside chat—it is not even a skeleton in a closet—it is about bones in a natural cemetery. The reason I like to talk about these in particular is that I discovered the deposit myself and that these strange morphological characters will perhaps add one more chapter to the history of life. It also broadens the vision of man to have to stretch the imagination to the conditions of life during the time these strange creatures roamed the earth. It also stretches the intellect to conceive of geologic time, especially when it is known that it has been only a few hundred years since Columbus



discovered this country of ours, and that I'm going to speak of things that happened in the tens of thousands of years, yes, even in tens of millions of years ago.

The oil interests in their search for existence and profit have uncovered many of the facts relating to the age of these sediments and have established for their own reference many of the terms and time schedules for their own convenience, but this much is easily understood, that it must have been a long time since these old bones had flesh and skin on them. Another reason I like to talk about these materials is that they were once alive, breathing, and fighting just like the rest of us. Sometimes I dream at night and envisage hills rolling with bones or monsters crawling over each other and I try to make out their form and habits

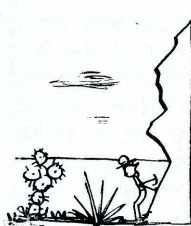
to see if we were right in our surmises.

It is yet a mystery to me how these could have lain down to die, could have been covered with thousands, yes tens of thousands of feet of sediments and detritus, squeezed flat with the thousands of pounds of pressure, replaced with burning and destroying chemicals until in some cases they are even made over into another substance entirely, folded with the uplifts and recessional waves of geologic movement and finally been exposed to the view of man, still recognizable as a part of something that once was.

Why, for a matter of fact, (if we are to believe the evidence of our own eyes) skeletal remains of the last breakfast is sometimes found lying in position, together with the stones used to grind it up with.

One of the strangest things about these finds though, is the fact that no young have been found! Perhaps there was insufficient bone hardening materials (such as the medics are howling about) calcium and phosphorus to hold them up until they could be preserved for the inspection of posterity.

To give you a more definite picture of this discovery, suppose you go along with me while the location is found. While roaming over the hills in search of a good spot to do a piece of magnetic research, my partner and I were struck with the odd appearance of several of the rocks found in that locality, and it was while we were waiting for our instruments to settle down and get into temperature equilibrium that we had time to break into a few.

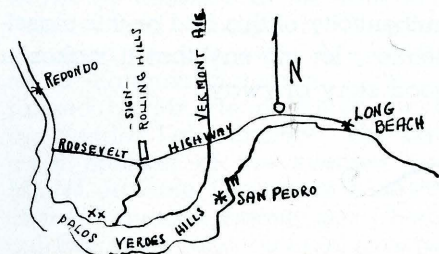


One was very hard to break because of its toughness and finally when the side was broken off it revealed this old fracture which of course looks exactly like

bone. I threw it away and started taking our readings, but the next day I went back and picked it up again.

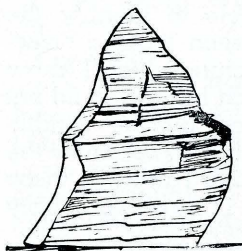
The sediments in which these fragments are found, lie with only slightly dipping and nearly in the plane in which they were laid down, likely, early in the Pliocene Age and are mostly of a form of diatoms locally called dactalite. They are mined by the open cut method with steam shovels just over the hills in the adjoining claims. I have been told that it is used as a filler in the manufacture of plastics but I think it would be more valuable in the filtration and clarification of oils. This bedding material is very frangible and easy to break out with the regular pick which is carried by most of you on field trips. I think that half the fun of this hobby of ours is in getting out our own material, and as I said before this is easy to do here. All you have to do is to spot the piece you want and start cutting steps up to it in the inclined wall of the road cut. After you are up there it is easy to chisel out the piece without breaking it.

If you will look on this small map which I have drawn I think that many of you could drive right to

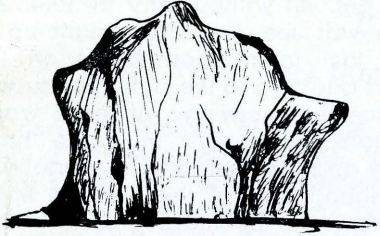


the deposit without any trouble. As you will see, you drive right up to the last intersection found on the road and turn to the right. If you will notice there are two of these water troughs or gutters from the highway and the best of the material will be found around them in the spots marked on the map. I believe that this is on County property but I have never had to find out and no one has ever said anything to me except one couple driving by said, "I guess they are nuts" and I didn't even have time to tell them that they might be right.

If you will notice, the specimens shown in the drawings seem to be of two different kinds and I think that is why there has been some confusion as to just what these are. I have been to considerable trouble to find out exactly and have asked several authorities. They seem to agree that the type having the dark centers is some sort of mammalian fossil but do not agree on these striated forms. Some authorities expressed the opinion that they were likely some form of fish eating mammal and the other type was silica gel in concentration. It is possible that unless some of us uncover a skull that we will never know just what these old boys were, except that they were very big. Well, who am I to say what they were?



One kind shows more or less stratification of the layers composing it and the other seems to be shaped in more or less concentric layers as though they were pieces of one old-timer although none have been found (that I know of) in any such sequence in the bedding that they could be said to have any connec-



tion to one another. Chert Nodules are often formed and found in bedding of this sort. In other words, the first piece of material I picked up looked exactly like bone, and some of the others do too, but not all of it. Attention is drawn to the color of one, which is distinctly black, or at least very dark brown on the inside, while the outer layers are greyish to white. When polishing it there is a very noticeable odor of fish.

I have done some work on the identification of these materials by making some thin pieces of the various kinds. These were not the ultra thin kind of only a fraction of a thousandth of an inch thick such as are made and examined by Mr. Roy Martindale, (I am not that smart yet) they were just some very thin specimens which I ground on a plate of glass with some No. 600 fine carborundum powder and mounted on microscope slides. These were illuminated by transmitted light and examined through a Wratten filter and through a system of polarizers which I have in my microscope. With this setup it is possible to identify the tiny, oval, wheatseed looking osteoblasts in the structure which I know for bone and which I know could not have been formed by the solidification of silica gel. I do not know the magnification which I used in these experiments but it was probably more than 200X.

Digressing from the subject for a moment I might say that there is a very fertile field for experiment and pleasure for those who have a microscope. Equip it with a set of polarizers and see what luck you have in identifying the minerals. I have had pretty good luck cutting and polishing this material, and for those who cut and polish their own specimens, I will say that you will find it easy to cut and easy to polish, as it is not too hard and it is not sensitive to burning on the sander. I should judge that it has a hardness of five or five and a half on the average and there are no tricks which I can teach any of you as I have only been grinding for three years. I mount



ed these specimens on bases of bakelite and an attempt has been made to decrease the brilliance of them so that the bone looks better. These pieces were cut on an eight inch diamond saw and lapped on a horizontal lap twelve inches in diameter. The sanding which followed was done with number 220, then number 400, then on the leather wheel with tin oxide.

I do not claim that these specimens are beautiful, but I do know I had fun and added to my store of mineral knowledge with them. I think the element of great age and the fact that here at last is something that was once alive makes for more interest in these old timers.

If there is any doubt about the authenticity of this find or this classification, let me say that it makes a good story anyway.



THREE THOUSAND MILES TO COLLECT MINERALS

By A. J. McARTHUR

Through the assistance and advice of the following committee: Dale Meyers, Ernest Chapman, Roy Martindale, George Craighead, Henri Withington, O. U. Bessette and Dick Mitchell, the LAMS society enjoyed a successful year of field trips in spite of much rainy weather. Altogether the society covered a total of approximately 3,000 miles. There doesn't seem to be any limit as to how far a Rock Hound will go to pick up a pretty rock.

The following field trips were outlined by the committee and successfully carried through:

Sunday, Dec. 1, 1940. Red Rock Canyon and Inyokern, meeting at Ricardo at 9:30 A.M., collecting zeolites, sand crystals and jasper. At Inyokern, wollastonite and grossularite garnets. We were met at Ricardo by members of the Searles Lake Society who joined us on our trip.

Sunday, Dec. 29, 1940. The trip to Palos Verdes hills was called off on account of rain.

Sunday, Jan. 26, 1941. Alpine, (on highway 80), 30 miles east of San Diego. Here we collected sillimanite and dumortierite. Started for Julian and Banner mining district but were stopped by rain.

Saturday, Feb. 22, 1941. 12 noon, Trona, Calif. Overnight trip. A tour of Searles Lake Potash and Soda works by courtesy of the American Potash and Chemical Company occupied the afternoon. We attended a banquet Saturday night arranged by Mr. Henri Withington of the Searles Lake Society. The principal speaker of the evening was Mr. W. A. Gale, Director of Research of the American Potash and Chemical Company who outlined process-

es for reduction of sodium and potash chemicals and described several of the rare minerals found in Searles Lake. Mr. Don Mulvey added color to the evening by showing several reels of colored pictures.

Sunday morning there was a mineral swap between the members of the Los Angeles Mineralogical Society and the Searles Lake Society, followed by a trip to Panamint Valley collecting chrysoprase in basanite, stibnite and onyx. Collected at Trona were hanksite, hopper halite, pirssonite, trona, gay-lussite and other soda and potassium minerals.

The members of the Searles Lake Society are to be very highly commended for their hospitality.

March 29-30, 1941. Coyote Wells, Saturday noon. Visited Yuha Mesa, collecting petrified wood, limonite, pseudomorph after pyrite, and the oyster beds near the Yuha wash, collecting *ostrea henmani*, *ostrea iridescense*, *ostrea vespetina*, and *ostrea veachii*, (the last two named being the same).

These fossils are tropical Atlantic and are called middle miocene or approximately 12 million years old. The *ostrea vespetina* has just recently been found living in the Gulf of California.

Camping in Shell Canyon the group collected the following known fossils: Brain coral (*Solemastra fairbanksi*) and *Lucina acutilineata*. The brain coral is also found in the Bahamas Islands. The *Lucina acutilineata* is found living on the sea coast of Southern California today. Other fossils were found but have not as yet been identified. This is one of the largest fossil areas in the United States covering approximately 250 square miles.

Sunday, April 27, 1941. Palmdale, 9:30 A.M. Visiting Blackbird Canyon, a small canyon extending south from Ana Verde Valley into the Sierra Pelona Range. Ana Verde Valley is part of the great San Andreas fault. The following minerals were found there: actinolite, Steatite, manganite, and garnierite; also some very good crystals of a mineral that is not yet identified. Those making this trip saw one of the finest displays of wild flowers seen in years. The next stop was Portal Ridge where we found piedmontite in a schist outcrop. This is all new country for collectors to work.

Three Day Trip

May 30-31, June 1, 1941. Through the courtesy of the Los Angeles Lapidary Society we were permitted to join them on a three day trip to a new geode deposit about 35 miles southeast of Harvey's Well on highways 60 and 70. This was a dry camp in the low mountains. A three days' supply of water and eats had to be carried by all cars. The quality and quantity of material collected exceeded all expectations. Several fine amethyst geodes were brought back.

Sunday, Sept. 28, 1941. Santa Fe Station, Barstow, 9:30 A.M. at the ghost town of Calico with its Wall Street Canyon, we visited the old silver mine which produced over 60 million dollars in the '80s and early '90s. At the present time Larry Coke is operating some of the workings and maintains a museum of minerals and relics of Calico. He has collect-

ed considerable history of the ghost town which is both variable and interesting.

The next stop, or rather scenic drive, was Odessa Canyon, a seven mile ride through the Calico Mountains. There one may see the old drifts and tunnels of some of the old mines.

The next stop was Borate, another ghost town, the scene of some of the activities of "Borax" Smith. It is reached via Mule Canyon although in the '80s it boasted a narrow gauge railroad connecting with the Santa Fe's main line at Daggett. Minerals collected there were satinspar, priceite, colemanite, selenite crystals, celestite crystals, chert, and jasper.

Sunday, Oct. 26, 1941. Sharktooth Hill, situated about seven miles northeast of Bakersfield.

Since its discovery eighty years ago it has been the scene of diggings of many paleontologists and many papers have been written about it. The **Pacific Mineralogist** for December, 1936 has a paper by Mr. Paul VanderEike of Bakersfield which is as good a condensed history as can be found anywhere.

The 3000 miles covered on these field trips brought not only added pleasures and new friendships, but revealed many of nature's wonders in canyons, streams, valleys and mountains of our own outdoor country—and proved profitable in added stores to collections and much fine material that will keep the lapidary wheels turning for sometime to come.



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WHITE MAGIC WITH BLACK LIGHT

By THOMAS S. WARREN

The commercial application of ultra-violet light to minning, while only about five years old, has a number of noteworthy successes to its credit. It has proved to be of particular value in the prospecting for scheelite because scheelite is the most important commercial mineral which fluoresces.

Imagine operating a gold mine for 50 years and then to find that there was enough scheelite in the tailings to have paid the operating expenses of the mine!

Imagine, too, the disappointment of the lone prospector in Arizona who had dug a tunnel for 50 feet along a vein (always hoping that the gold values would increase and that his prospect some day would become a mine) when he learned that he had thrown a fortune in scheelite on the dump.

Or again, imagine the prospector on a California desert who dug six prospect holes in the side of a mountain, three of which uncovered an extensive deposit of scheelite, but abandoned the holes as there was not enough lead in the property to warrant further assessment work. Yet the next man was in line for a fortune, because he used a fluorescent lamp and discovered the scheelite which had been discarded.

There are innumerable such cases which might be used to illustrate the value of an ultra-violet black light for mining purposes. Scheelite is used here as the example because scheelite is the most common fluorescent commercial mineral, but there are hundreds of other uses for the Mineralight black lamp.

Night prospecting is an unusual but a very profitable development of recent years. The old-time prospector considered his work done when the sun had set, but many modern prospectors are just beginning their work when the sun goes down. The instrument which has changed this procedure is the ultra-violet black light.

It might be best at this point to explain why certain lamps are of val-

ue and others are practically useless. In the first place, ordinary light will not create fluorescence. Fluorescence is the result of a stimulation to the atoms of the mineral. There are two general groups of ultra-violet wave lengths — the long wave lengths and the short wave lengths. The long wave length ultra-violet will stimulate fluorescence in a few materials, such as dakelite, semi-opal, wernerite, benitoite, and fluorite. On the other hand, the short ultra-violet wave lengths will cause fluorescence of over 300 minerals, including all the minerals listed above that fluoresce by means of the long wave lengths. Among these many minerals are barites, calcites, colemanite, hackmanite, halite, hydrozincite, kunsite, opal, pectolite, scheelite, wollastonite, and smithsonite.

While there are a number of ultra-violet light sources, there is only one source of the short wave lengths and that is a genuine quartz light equipped with a special filter which screens out the visible light and allows the transmission of only the ultra-violet. None of the other ultra-violet light sources transmits the short wave lengths, and for this reason their use is very limited in the mineral field. The only type of light which can be used in prospecting for scheelite is the coiled quartz tube lamp.

Many prospectors have attempted to make their own black light lamp by using a filter in front of an ordinary flashlight bulb. This filter screens out the visible light, but there are none of the short ultra-violet rays formed by the bulb. As a result, the lamp is useless in the detection of scheelite. These long wave ultra-violet rays do not cause the fluor-

escence of any minerals which have commercial value and though this light source is the cheapest it is the most expensive in the end, because a person would walk over a rich scheelite deposit and not know it was there.

Bulb lamps are used sometimes by collectors, but they have no value in commercial ores because they generate only the long wave length light.

The explanation of fluorescence and phosphorescence is technical and involves a high degree of mathematics, but if we eliminate all technical details for the present and attempt to explain the problem in its main essentials we can secure a fairly good idea of how these phenomena are caused.

It is well known that all minerals are made up of atoms, and each atom is composed of smaller particles such as protons, electrons, neutrons, positrons, etc. The electrons are supposed to circulate around the nucleus and the simplified theory of fluorescence is that the ultra-violet energy which strikes the atom is absorbed in the electron, causing it to change its orbit around the nucleus. Once it has changed its orbit it proceeds to lose its energy and returns to its original orbit. This releases energy which comes to us in the form of light. The wave length of this light determines the color of the fluorescence.

While the entire process of collecting energy, moving into new orbits, giving up the energy, and returning to the original path takes place in a very small fraction of a second, we only see the light while the substance is being exposed to the stimulus of the ultra-violet rays, and this is the phenomenon we call "fluorescence."

Some minerals are much slower in their reaction, and the electrons remain in their unnatural orbits for an appreciable length of time. In

such cases we continue to see the light after the ultra-violet light source has been removed. This is the explanation for "phosphorescence," and is illustrated by the minerals which glow after the light is taken away, the glow gradually diminishing. This simple explanation of "fluorescence" and "phosphorescence" is not technically correct, but it is near enough to give anyone an idea as to how the fluorescence does occur.

We have made considerable mention of the prospecting for scheelite because this is the most important commercial mineral which fluoresces. In most cases the scheelite fluoresces a bright blue and it is possible to determine instantaneously the probable extent and quality of the scheelite ore. The Mineralight lamp, which preferably is used at night, causes each scheelite crystal to fluoresce brilliantly and in locations where the ore is very rich a rock wall will stand out as though it were studded with millions of stars or diamonds.

In the prospecting for scheelite it is extremely difficult to locate the ore because of the wide variety of rocks in which it appears. Ordinarily, it is found only in locations where a limestone-granite contact exists, but often these contacts are difficult to locate. It is strange, indeed, the type of rock in which scheelite is found. In the office of the Ultra-Violet Products, Inc., of Los Angeles are specimens of scheelite covering a larger variety of formations and deposits than are found in any other single collection.

The scheelite is found in limestone . . . in granite . . . in green matrix . . . in rusty colored matrix . . . in copper bearing ore . . . in iron, lead and molybdenum bearing ore. Some of the specimens include scheelite found in quartzite. One specimen has scheelite in gneiss. The fluorescent response varies from the usual light



(Left)—This pile of ore was erected as the discovery monument of the Shadow Mountain Tungsten Mines. By daylight it appears to be a most unpromising heap of very ordinary rocks. (Right)—A picture of the same pile of stones as it appears when photographed at night by means of light emitted by a Mineralite. Note the heretofore overlooked values in these stones. Each light spot is a deposit of rich scheelite crystals.

blue to dark blue, with at times cream and golden yellow. Some specimens are greenish yellow and some are decidedly pink. In this collection are specimens that look white and fluoresce blue; some that are cream and fluoresce yellow; some that are green and fluoresce yellow; one is black and fluoresces blue. The usual color, however, is gray with a blue fluorescence.

Before going too far on the assumption that a new discovery is scheelite, the fluorescent material should be checked by an assay to determine the exact composition. After the presence of scheelite has been proved by an assay or by the acid test, the characteristic fluorescent color of the scheelite can be noted and the ultra-violet rays used as an accurate means for the development of the area.

Other substances that fluoresce similar to scheelite and which should be guarded against, are powellite,

a calcium molybdate that fluoresces a golden yellow color, and some forms of calcium carbonate which fluoresce light blue.

The distribution of scheelite is from Mexico to Canada on the west coast and from Connecticut to Nova Scotia on the east coast. Many prospectors today are finding valuable deposits in unsuspected places entirely through the use of the ultra-violet black light.

In order to see the fluorescent rocks the lights must be used at night or in a darkened room. In the day time there is too much visible light which outshines the fluorescent effects caused by the ultra-violet rays. When using these lights at night the wise prospector is careful in his handling of fluorescent specimens. It has been said that all is not gold that glitters and it is equally true that all that fluoresces is not necessarily scheelite. There have been several actual instances where pros-

pectors have reached over to pick up what appeared to be a shining nugget of scheelite, only to have the nugget come to life and squirm out of his grasp. Scorpions, horned toads, lizards, and snakes have a bright blue or cream colored fluorescence and can be mistaken for fluorescent rocks if a person is not careful. For this reason it is a wise precaution to step on the specimen before picking it up.

Fluorescent analysis may be used in many mines which do not contain scheelite. There are many forms of zinc which fluoresce, and in certain gold mines the use of the Mineralight has proved of great advantage in grading the zinc and throwing it out. There are other mines which contain fluorescent calcites or minerals associated with the ore which is being mined, and in such cases the ultra-violet rays are used as a guide to locate the vein that contains the valuable ore. Hydrozincite, as well as powellite, is mined by means of the fluorescence in many cases. Hubnerite and wolframite are forms of tungsten and in nearly every instance there are small areas of scheelite associated with these minerals.

In years of experience with ultra-violet rays used for mining purposes there have been many interesting stories told concerning the application of ultra-violet rays. Four mining companies have discovered larger and more extensive deposits within a mile of the properties that they once had thought to be the best in the locality. Another group had stockpiled 60 tons of what they considered to be their best ore. After this work had been done they purchased a short-wave ultra-violet quartz lamp and found they had been working 40 feet from the richest part of the vein and they could have tripled the return from their labors if they had had a lamp to show them where the richest areas



For underground work a compact assembly for a Mineralight is provided by a Hot-Shot battery and a 6-volt transformer suspended from the shoulders. The picture illustrates an assembly of this kind being used in examination of a tungsten property.

were located. Another company actually placed over 100 tons of non-bearing ore in its mill because it failed to use the ultra-violet light to check operations.

The presence of an extremely small quantity of mercury can very easily be determined with the Mineralight, a Willemite screen and a small flame for heating the substance to be tested. The method was discovered by Dr. Wesley G. Leighton of Pomona College in 1935. He came upon this discovery by an analytical line of reasoning. After theorizing what should occur, he carried on the experiments and found that the facts actually were as he expected them to be. As little as 1/1000 of 1 per cent of mercury can be located by this very sensitive test.

Ultra-violet or black light fluorescence is a fascinating subject. It has long been used in crime detection and in many laboratory problems. Its use in mineralogy has been known for about 15 years, but its application commercially covers only the past five years. New substances and rocks are being constantly discovered and undoubtedly the commercial application of ultra-violet to mining will be greatly extended in the coming years.

**PARTIAL LIST OF FLUORESCENT ROCKS AND MINERALS FROM THE
ROCKY MOUNTAIN REGION OF THE UNITED STATES**

Mineral	Location	Color under MINERALIGHT fl.—fluoresces phos.—phosphoresces
Amber in Lignite	Texas	fl. cream yellow
Moss Agate	Sweet Water, Wyom.	fl. blue green
Aragonite	{ Lovington, New Mex. Crestmore, Calif Randsburg, Calif .	fl. red fl. pale yellow & phos. white
Autunite	{ South Dakota White Mt., New. Hamp.	fl. yellow green
Barite	Palos Verdes, Calif.	phos. yellowish white
Benitoite	San Benito Co., Calif.	fl. deep bright blue
Calcite	Texas	phos. a strong blue
Calcite	{ Mt. Hollywood, Calif. Franklin, N. J. Lower California	fl. usually a red or orange de- pending on location & structure fl. yellow
Calomine	Good Springs, Nev.	fl. yellow green
Cassiterite impurity	Washington	fl. blue green
Cerussite	Good Springs, Nev.	fl. light blue
Chalcedony	Barstow, Calif.	fl. light green
Cinnabar impurities	Lake County, Ore.	fl. green
Colemanite	Death Valley, Calif.	phos. white
Curtisite	Skaggs Springs, Calif.	fl. patches of yellow & blue
Dakeite	Wamsutter, Wyom.	fl. strong yellow green
Dolomite	Lake County, Calif.	fl. pale yellow
Elaterite	Utah	fl. brown
Hakmanite	Bancroft, Ont., Can.	fl. salmon & turns pink
Halite	Amboy, Calif.	fl. red
Howlite	Lang, Calif.	fl. brown and yellow
Hyalite	Stone Mt., Ga.	fl. strong yellow green
Hyalite	Mojave Desert Region	fl. green
Hydrozincite	Good Springs, Nev.	fl. blue
Inyoite	Death Valley, Calif.	phos. pale white
Limestone	San Bernardino Mts., Calif.	fl. blue
Locust Wood	Seattle, Wash.	fl. yellow
Meyerhofferite	Death Valley, Calif.	phos. yellow white
Nephrite Mixture	San Diego Co., Calif.	phos. light green
Opals	Humboldt Co., Nev.	fl. green
Opalized Wood	Nevada	fl. green
Pectolite	Pennsylvania	fl. yellow & phos. white
Petroleum		fl. blue
Powellite	Nev. and Calif.	fl. orange
Quartz Geode	Lower Calif.	fl. & phos. bluish white
Rubelite	Pala, Calif.	fl. lavender
Scheelite	{ Mont., Utah, Wyo., Ore., Colo., Nev., Ariz., Calif., Idaho, Conn. N. Mex., Canada, Nova Scotia, Alaska, Malay Sts., Venezuela	fl. blue, white or golden yellow
Sphalerite	Utah	fl. white & yellow
Smithsonite (zinc carbonate)	Inyo Co., Calif.	fl. green
Vivianite	Washington	fl. & phos. golden yellow
Willemite	Franklin, N. J.	fl. bright green
Wollastonite	Kern County, Calif.	phos. yellow



Many amusing and interesting events that helped to make Calico's history are told in the booklet "Calico." by Mr. and Mrs. Larry Coke. Mr. Coke writes: "Silver was first discovered in Calico Mountains in 1881 The news of the rich strike spread rapidly and newcomers arrived daily, buildings went up in all directions; some made temporary homes in tunnels, tents, over-hanging rocks, any place for shelter. They came by horse back, on foot, and stage. Calico became a bee-hive of activity.

"Shrewd business men were quick

to see the opportunity and establish themselves in Calico, to supply the miners varied wants. Restaurants, hotels, general stores, lodging houses, dance halls, and more than a dozen saloons that never closed their doors, were soon doing a flourishing business along Main Street. Calico grew rapidly and by 1886 boasted a population of 3500, a new school house, a newspaper, the well named "Calico Print" edited by John J. Overshiner, about 200 neat little homes, and two solid blocks of business houses on both sides of the street."



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PRACTICAL MINERALOGY IN THE SCHOOLS; AND MINERALS OF MINT CANYON

(Continued from page 7)

Selenite. White gypsum mineral formed in file faced flats and planar cleavage xls.

Jasper. Some few fragments of jasper of gem quality may be found; red moss predominates.

Bloodstone. Some very fine pieces of dense green, red flecked bloodstone of gem cutting quality are in the vicinity. A sample of what to look for should be on hand.

Moss Agate Gemstone. Very high quality green (copper oxide) moss agate, red (iron oxide or limonite moss), and black moss agate (fine fernlike xline deposits of manganese dioxide in silicon dioxide) are to be found. The latter are very scarce but well worth the hunt. Iron agates shade into fine red moss jaspers that are beautiful in the extreme. Green copper stained agate is plentiful, but usually too dense to class as moss agate. Careful chipping and selection yields fine small gemstones. A ledge of fine quality moss agate ten inches thick was found on one trip.

Griffithite. Green cuprous coating on agate nodular deposits in basalt voids.

Copper Stained Quartz. This is a mineral specimen of itself, showing copper oxide coatings. The material verges into a close approach to Californite and Chrysocolia.

California Opal. A type of hydrous silicate having a greater amount of water of crystallization, and having an opalescent but opaque white glassy appearance. It is not gem material but is possible genuine opal in a state of dehydration and decomposition. Genuine gem opals are to be found in this area, of fine luster and color, which are not from Paradise Valley, California, or Lightning Ridge, Australia. The disintegrated opal will fluoresce and

phosphoresce, and may be spotted by ultra violet light in night prospecting.

Colmanite Borax. Fine specimens of borax but with earthy impurities in most instances are to be found. Single and massive or stratic deposit materials are available in generous quantities.

Howlite Gemstone. Finest quality howlite or "cauliflower ore," a very dense grayish white mineral with gray streaks in crystalline surface junctures is to be found in single pieces of sufficient size to cut bookends. Single specimens of good quality are still available but the location is rapidly disappearing or being picked out.

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Mica Schist. Schist of a more recent origin and having fine silver sheen. Being mined for flagstone due to weathering and ready cleavage into thin sections.

Graphitic Schist. Graphite and kaolin bearing schist, very dark and slick but with so low a graphite content as to be of no commercial significance. There has been a recent graphite claim located near Pacoima Dam.

Hematite Coated Pebbles. Mineral specimens of fine polished quartz pebbles having a high polishable coating of hematite, or magnetite. Red hematite Fe_2O_3 surrounding the pebbles, which are coated with metallic lustered magnetite, an iron oxide of another valence of iron, Fe_3O_4 , which is attracted by a magnet and may possess magnetic properties and is known as lodestone.

Hematite Boulders Bearing Gallium. Hematite boulders deposited by the Los Angeles river, in its old bed are to be found. They are almost pure hematite, metallic of shiny stove lid appearance of crystalline structure, and containing 2/100% gallium, a rare metal of value several times that of gold. These boulders are

being mined on top of Mount Baldy in what was once the old river bed.

Pegmatite. White quartz of feldspathic granite known as the mother of gems and minerals exuded in dikes from cooling magmas after they have broken out of the case-ment formed of minerals, solidifying at higher temperatures. The metals and minerals held in solution by aqueous igneous fusion at profound depths beneath the earth's surface, are extruded by the enormous forces of compression of the solidifying outer layers, and when they solidify are separated. The pegmatite identifies or locates the zone of change, and the trained mineralogist knows that where he finds pegmatite he may expect to find any other precious metallic minerals which were contained in the magma, also crystallized out in a pure or isolated state. Pegmatite marks the spot to look. Fine garnitic pegmatites are to be found on Angeles Crest highway cut off, and below Pacoima dam. The world famous Pala mines in San Diego County are located in pegmatite veins, which were originally worked for their metallic contents in gold and silver.

Titanite. Titanium ores are to be found in the area. Many claims are held by the DuPont Company. Titanium Oxide is used to give paint sunlight resisting properties.

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CLEANING SELENITE

The July, 1941 issue of the Pacific Mineralogist carried a request from readers for information on how to clean marble and selenite and gypsum without damaging the pattern. Bob Foster, student mineralogist, comes forward with the answer.

Marble is composed of calcite, so of course it cannot be subjected to acid cleaning because it would be etched with acid in a few minutes. The best way I know is to use soap and water and a scrub brush. The luster of the polished surface might be restored by tin oxide rubbed vigorously with a cloth, or a power buffer. I have seen a high polish produced on marble by rubbing it on the carpet. (beware of grit).

Selenite is gypsum which is clear and crystallized, in distinction from other forms of gypsum such as satin-spar gypsum, alabaster, gypsite (rock gypsum). I soak my gypsum specimens in a pan of water for a day or two, then scrub them with a vegetable brush or toothbrush, and pick off any adhering mud with a knife blade, scrubbing again.

Many collectors think gypsum will dissolve in water like salt. I have soaked specimens for a week or two with no noticeable change. It takes constantly changing water months or years to dissolve gypsum. Some experiments have shown about .03 inch of surface thickness dissolved in a week, but I have never had any gypsum show this fast a solution rate; even so, a day's soaking would not be noticeable.

Some of the fragile selenite must be scrubbed gently to prevent breaking, but a scrub brush will not scratch, even with pressure. I tried soaking selenite in dilute acid for about six hours. No bad effects were noticed, in fact the specimen seemed to have a somewhat improved sheen. This specimen was from Newport Beach, where the crystals

are most delicate and have the most tenacious mud clinging to them. The acid treatment did not loosen the mud any more than water does. I find that these specimens can be dried several weeks, and the mud shrinks away from the crystals, when it may be picked off gently, taking care not to break the delicate fins or projections, and being careful not to separate the twinned ones at the middle. Follow by soaking in water and scrubbing, a small paint brush with stiff bristles being useful in the hollows.

Soaking in dilute acid a few hours will remove mud or sand that is cemented with calcite, but I don't believe it is worth the mess it makes otherwise. A drop of acid on the dirt adhering to gypsum will fizz if

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the cementing material is calcite. After the acid bath, it should be washed and scrubbed in fresh water.

Never attempt to dry gypsum by heating—the mineral will be decomposed and fall apart. Dry in the air or sunlight.

I tried soaking gypsum in dilute acid, (Hydrochloric), taking out a specimen every day or two. In four days etching was noticeable and in eight days it was objectionable. Stronger acid would work faster, but the point I learned was that the clinging mud was not loosened any more than if water were used.

Concentrated sulphuric acid was tried and of course it ruined the specimens almost at once, turning them white in less than an hour. In two days of this they fell to pieces. This is caused by loss of water from the gypsum to the acid.

I can see no advantage in using acid to clean gypsum; it is best to soak in water, and scrub with a brush. The soaking should not be for weeks, as moss will grow and it makes extra work to get it off.

Skill is required to pick mud off with a knife as the mineral is easily scratched or broken. A sharp stick or toothpick may be used without scratching but is slower.

I always scrub my minerals in a stream of running water, usually a stream from the garden hose nozzle, just enough to flow the dirt off.



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DINNER IS SERVEDBy **BLANCHE L. ANDERSON**

Shall we start off with a cocktail—say a fruit cocktail? To attract our attention and to stimulate our appetites it must be both attractive and tasty. This cocktail from our mineral world may have for its ingredients the gem stones and gem materials. In it we find such titles as:

- "Beauty In Rocks;"
- "Turquoise and Ceramic Art;"
- "Kunzite;"
- "Color In Gem Materials;"
- "The Determination of Gems;"
- "The Romance of Chinese Jade;"
- "Benitoite;"
- "Tourmaline;"
- "California's Jasper;"
- "The Lure and Romance of Gems."

Intriguing titles? The articles carrying these titles tell many an interesting fact about the gem stones. We have been going through the back numbers of the PACIFIC MINERALOGIST and we were suddenly struck with the thought that it is downright wicked to feed at this sumptuous mineral banquet without giving others the privilege of partaking, especially when the more we devour the more our craving increases, and unlike other banquets, the food never diminishes.

Many excellent articles on special subjects are to be found in these issues. These informative articles, contributed by able writers, provide fine text material for students of mineralogy.

Salad

Our appetites are now whetted to the stage where we want to handle and work with these gem materials and so take our salad course with:

- "Cutting and Polishing Minerals;"
- "Working with Minerals;"

- "The Home Cutting Outfit;"
- "Cutting and Polishing Rocks by the Amateur;"
- "Cutting the Jonker Diamond;"
- "Cleaning Specimens."

Entree

On with the feast. We now get our teeth into the meaty course of Geology and Mineralogy with such titles as:

- "Minerals Deposited During the Various Geological Ages;"
- "Physiographic Changes During California's Geologic History;"
- "Minerals and Their Place in Our Civilization;"
- "Man Made Geology;"
- "California Petroleum Developments in 1938;"
- "What to Look for in an Oil Field;"
- "Geology's Influence on Location and Growth of Los Angeles;"
- "Oil Fields of the Bakersfield Area;"
- "California's Mineral Wealth;"
- "Gold Mining and Gold Discovery in California;"
- "The Geologic Occurrence of Oil and Exploration Methods;"
- "Some Salient Facts Relating to the Production of Oil;"
- "Petroleum Refining;"
- "Color Key to Minerals & Rocks."

To accompany this course we offer a number of choice side dishes:

- "Mercury;"
- "Aluminum;"
- "Borax, Its History and Uses;"
- "Zolarite;"
- "Woodhouseite;"
- "Equisetum;"
- "Howlite from Borate;"
- "Bottled Specimens;"

"Gold;"
 "Copper;"
 "Gypsum;"
 "Petrified Wood;"
 "Some Problems of Mining;"
 "Metals of The West Coast;"
 "A Portable Wet Analysis Laboratory."

Condiments have not been omitted. The spread is spiced up with relishes and sauces of: LAMS Activities, 1934 to 1941;"

"Annual Conventions of California Federation of Mineral Societies."

Desert

Coming to this lighter part of the repast we may indulge in story and song and easily digested facts like:

"Hard Rock Fables, She'll get Rich As We Go Down;"

"Heischt the Bugget Down;"

"Mineralitis;"

"Lost Mines of the West;"

"Rockhounds on the Prowl;"

"Mineral Mire;"

"Reckless Rockhounds;"

"Future Possibilities of Prospecting;"

"Sun Baked Yarns."

Our banquet is spread upon charts and maps as:

"Chart of Geologic History;"

"Oil Maps and Road Guides.

The whole scene is lit up with:

"The Fluorscope;"

"Luminescence, the King of Hobbies;"

"Construction of an Ultra Violet Spark Lamp;"

The hum above us is made by:

"Aerial Mapping In Relation To Geological Exploration;"

"Why not from The Air?;"

Throughout the whole ambitious offering, the banquet is enlivened by a peppy orchestra presenting marches, fox-trots, etc. on Field Trips, Locations and what they offer. Some titles are:

"Notes on the Lithium Pegmatites of Pala, California;"

"A Field Trip to Tick and Red Rock Canyons;"

"The Crestmore Locality;"

"Goose Lake Siderite: California's Largest Known Meteorite;"

"The Cerro Gordo Mining District;"

"Hieroglyphic Canyon;"

"Crestmore Minerals;"

"Sharktooth Hill;"

"Found in the Santa Monica Mountains;"

"A Little Known Mineral Locality."

If perchance some one over-indulges in all these delectables, the medicine to take is:

"The Psychology and Medicinal Value of Gem Stones."

Here are presented some of the titles of material published in back numbers of the PACIFIC MINERALOGIST. The 1937 and 1938 issues are out, but while the remaining issues last we will be glad to send them upon receipt of price. Rates: Single copies, 20c; 3 issues 50c; 6 issues \$1.00. Geological History Chart, 25c; Road Guides and Oil Maps, 10c each. Address: THE PACIFIC MINERALOGIST, 4918 Riverton Ave., North Hollywood, Calif.



THE LIBRARY

Our library has continued in its satisfactory growth during the year, and has received many publications in exchange for our magazine. Several excellent donations have also been received.

A list of about 350 titles in our library was published in the July issue of the Pacific Mineralogist. In addition to these we have over 500 magazines covering mining, minerals, metallurgy and chemistry. A number of maps are available. Nearly 100 new publications were added to our library this year.

CERAMIC CLAYS**Formation-Deposits-History***(Continued from page 4)*

around hot springs of that area. Due to these springs this deposit is quite hot a few feet below the surface, and the clay is spotty and variable.

In San Bernardino County, near the old mining town of Hart, a white plastic clay has been mined and used in the manufacture of tile and pottery for a number of years.

In spite of progress already made, ultimate perfection in the use of clays in Ceramics has not yet been reached. In certain of its applications it seems near perfection, but in others much remains to be done. So as we progress in other phases of civilization, so will clays and their uses be more fully developed and fitted to the uses of our ever changing world.

References:

- A Treatise on Ceramic Industries. E. Bourry
The chemistry and Physics of Clay. Alfred B. Searle
The Collected Writings of Hermann A. Seger., Vol. 1 & 2
Ceramic Cyclopedia. 5th Edition
Clays of West Tennessee. Geo. Whitlach
Calif. Mineral Bulletin. No. 119
Ceramic Industries
Vol. 33 No. 5—Vol. 34 No. 2.

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ULEXITE

By **BOB FOSTER**

A simple means of recognizing Ulexite may be of interest to many collectors, and I am glad to pass along some results of my efforts along that line.

I looked it up and found that of course the blowpipe and chemical reactions are distinct. The one important physical feature which seems to set it in its place is the low hardness, 1. Gypsum has a hardness of 2. I experimented with some of my ulexite and found that like all minerals of hardness 1. it readily rubs off on the fingers. Gypsum will not do this. This affords a simple method of distinguishing these two,

Now by simply rubbing your specimens from Borate you can readily tell if they are gem ulexite or satin-spar gypsum. A piece of gypsum may be used for hardness test—it will scratch the ulexite easily and deeply, but will barely mark satin-spar gypsum. The finger nail cuts a deep gouge in ulexite, while it only makes a surface scratch on gypsum unless severe pressure is used.

The silky, fibrous appearance of the white ulexite, the lack of any taste (insolubility in cold water), and its association with boron minerals should suffice to tell it otherwise.

Ulexite-hydrous sodium and calcium, $\text{Na}_2\text{O} \cdot 2\text{CaO} \cdot 5\text{B}_2\text{O}_3 \cdot 16\text{H}_2\text{O}$. Hardness 1; Sp.Gr. 1.65; White; silky; insoluble in cold water; (tasteless) but slightly soluble in hot water. Sol. in HCl; fusible easily (1) giving yellow sodium flame; H_2O in closed tube; tests for calcium and borate test: some powdered mineral and a drop of concentrated sulphuric acid are mixed on a watch-glass or dish. After a few minutes add one-half teaspoon of alcohol, light and observe a distinct clean green color is given the flame by borates.

Much howlite from Borate is soft but it is scaly, not fibrous. Howlite is often mistakenly called priceite (pandermite) which does not occur here.

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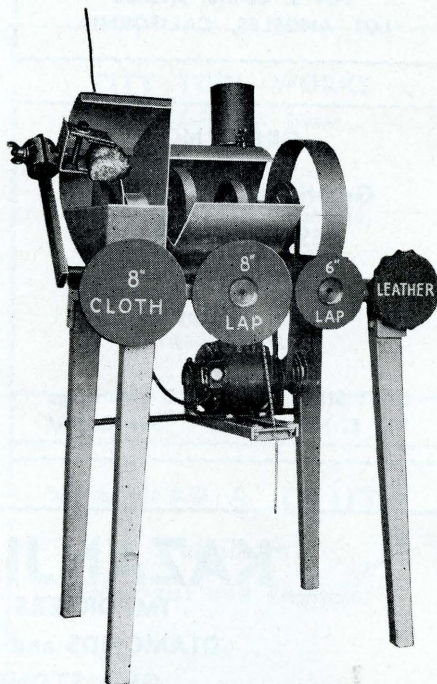
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