

# San Diego Lapidary Society

5654 Mildred Street  
San Diego, California 92110  
(619) 295-6905

email: [info@sandiegolapidarysociety.org](mailto:info@sandiegolapidarysociety.org)  
[www.sandiegolapidarysociety.org](http://www.sandiegolapidarysociety.org)

Dedicated to the advancement of the earth sciences by stimulating interest in and encouraging the study of geological and mineral science and lapidary arts.

Oath of membership:

I will abide by the Society's constitution and by-laws and conduct myself in such a manner to be an honor to the Society.

## SHOP SCHEDULE

**\$5.00 – adult / \$2.00 – Junior**

**CABACHON  
CABOCHON**

**Saturday 9:00-12:pm  
Monday 6:00-9:00pm**

*\*\*\*\*\*By Appointment: \*\*\*\*\**

**FACETING  
JUNIORS**

**Thursday 6:00-9:00pm  
Wednesday 12:00-3:30pm**

**Jim Porter  
Mary Linam**

**SILVER FABRICATION:  
PMC / SILVER ART CLAY:  
WIRE WRAPPING:**

**Saturday/Monday  
Saturday/Monday  
Open**

**ALL CLASSES ARE OPEN TO THOSE WITH FULL MEMBERSHIP**

**NEW APPLICANTS ARE ENCOURAGED TO JOIN**

**NEW CLASSES MAY BE FORMED AS NEEDED**

General Meetings 2<sup>nd</sup> Wednesday 7:00 pm  
Board Meetings 3<sup>th</sup> Saturday 12:15 pm  
Everyone is welcome to come to the Board Meetings

San Diego Lapidary Society  
Wednesday \*\* 6/10/09 \*\* 7:00PM  
General Meeting

## Oregon Sunstones

Details on a field trip to collect Sunstones by Bill Horning

After the fair is over I'm taking a much needed vacation to look for Sunstone in Oregon and to dig for opalized wood in Nevada. It's been almost 14 years since my last sunstone trip and a few more than that for my last dig in Virgin Valley.

My plan is to leave San Diego on Thursday July 9<sup>th</sup> and drive north of Sacramento (about an hour) on I-15 to Williams and spend the night there. The next day, (Friday) I'll stay on I-15 to Weed and take US 97 to Klamath Falls. From there I'll take 140 east to Lakeview. There's a Best Western Motel there, a Safeway, gas stations and several restaurants.

The next morning (Saturday) it'll be off to the Sunstone area about an hour and a half north east through the town of Plush.

I plan to camp over night and stay till noon or so the next day (Sunday). Then back to Lakeview for gas, groceries and lunch/dinner. From there is an hour and a half to the Virgin Valley turn off on State 140. Just off the turn-off is a CCC campground where I plan to camp.

On Monday, I'll go to one of the fee dig claims. Last time it was the Royal Peacock. But there are others – at least 13 that I know of.

I'm not sure what my plans are for Tuesday, maybe dig for opal or back to Sunstone, Davis Creek or Class Butte. Kinda depends on how successful the digs have been and how much energy I have left. Wednesday night I'll motel in Lakeview. On Thursday early AM I'll head for home probably taking the same route but spending the night (Wednesday night) in Sacramento or south of town. Thursday is an all day drive home.

If any one wants to meet in Lakeview or at Virgin Valley you can contact me on my cell phone (858) 922-1352. *Come to the meeting to get more details on the agenda and what you may be able to find.*

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### San Diego Fair is almost here

Do you want to be able to attend the fair for FREE?

Help us out by volunteering 2 hours of your time on a Wednesday, and you get the rest of the day at the fair to spend as you wish. Check with Bill Horning to see what dates and times are available. You can reach Bill at (858) 748-0069.

Our club has Wednesdays to man the booth. We will have juniors demonstrating on a flat lap and can use adult supervisors.



## Junior's Class News

By the time you are reading this the clubs junior class will have been out to the fairgrounds and entered up to 72 different lapidary and jewelry projects into Kids Best and a class project display on Mohs hardness scale in the Gem and Mineral building at the San Diego Fair. Please be sure to head out to the infield at the fairgrounds to find the Kids Best tent where all of the work will be on display. This year the juniors have again raised the bar on the level of creativity and workmanship they will have on display. If you don't make it out to the fair you will have another chance to see all the kids work at the July general meeting where the juniors will be the program that night and you will have the chance to see their work up close and personal and help them celebrate their success at this years fair!

With our fourth year of offering a lapidary/science class on Wednesday afternoons to homeschool children it is easy to say that this class is a solid success story. In no small part to the love and dedication of our classes teachers, Bill Horning, Kim Hutsell, Julie Sih and our newest club member to get in the fun, Tim Thomas, who has been helping this last semester. Thanks so much to each of these people for their investment in the kids at SDLS!



**PMC GUILD**

### **The San Diego County PMC Guild News.**

We held a successful two day workshop in May. Patrik Kusek, a Saul Bell award winner in 2007 came to San Diego to teach his award winning botanical bracelet. There were 12 students and we all had a great time. We are looking forward to Patrik returning to San Diego. Our May meeting was about hollow forms and how many different ways you can create a hollow form. We shared the makings of the workshop and discussed plans for next

months meeting. There will be an educational display at the San Diego County Fair in the Gems and Minerals Building. If you are going to be at the fair please stop by and take a look.

June is the last month to attend our meetings for free, in July we will be asking for a \$15 membership fee to cover the rest of the year. If you have not attended one of our meeting please be our guest your first time.

At our June meeting we will have a discussion about the new Copper clay that is coming out and a short demo on reconstituting your clay.



## Shop News & Notes by email

[www.sandiegolapidarysociety.org](http://www.sandiegolapidarysociety.org)

If you would rather receive the newsletter by email, please let me know. This will help save on Postage.

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*If you would like to see more information in the newsletter please feel free to send articles to*  
[info@sandiegolapidarysociety.org](mailto:info@sandiegolapidarysociety.org)

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## Shows coming up

### **JUNE 2009:**

5-7--WOODLAND HILLS, CALIFORNIA: Show, "Rockatomics Rockhound Roundup"; The Foundation of Pierce College, Rockatomics Gem & Mineral Society; Pierce College, Victory Blvd. and Mason St.; Fri. 10-5, Sat. 10-5, Sun. 10-5; free admission; gems, jewelry, tailgate selling, dealers; contact Linda Ralph, (818) 887-9791; e-mail: [show@Rockatomics.org](mailto:show@Rockatomics.org); Web site: [www.Rockatomics.org](http://www.Rockatomics.org)

6-7--LA HABRA, CALIFORNIA: Show, "Jubilee of Gems"; North Orange County Gem & Mineral Society, City of La Habra; La Habra Community Center, 101 W. La Habra Blvd.; Sat. 10-5, Sun. 10-5; free admission; dealers, demonstrators, exhibits, youth activities, gold panning, geode cutting; contact Richard Schirer, 14602 Calpella St., La Mirada, CA 90638, (562) 944-9445; e-mail: [rich477@ca.rr.com](mailto:rich477@ca.rr.com)

6-7--SAN FRANCISCO, CALIFORNIA: Show, "The Great San Francisco Crystal Fair"; Pacific Crystal Guild; Fort Mason Center, Bldg. A, Laguna and Marina Blvd.; Sat. 10-6, Sun. 10-4; adults \$6, children under 12 free; gems, jewelry, crystals, beads, psychics; contact Jerry Tomlinson, (415) 383-7837; e-mail: [sfxtl@earthlink.net](mailto:sfxtl@earthlink.net); Web site: [www.crystalfair.com](http://www.crystalfair.com)

13-14--CAYUCOS, CALIFORNIA: Show; San Luis Obispo Gem & Mineral Club; Cayucos Veterans Memorial Hall, 10 Cayucos Dr.; Sat. 9-5, Sun. 9-5; free admission; gems, minerals, fossils, lapidary rough, jade, meteorites, moldavite, beads, cabochons, jewelry, carvings, crystals, micro-mounts; contact Michael Lyons, 1200 Camino Del Roble, Atascadero, CA 93422, (805) 610-0757; e-mail: [jadestar@charter.net](mailto:jadestar@charter.net)

19-21--SAN DIEGO, CALIFORNIA: Show; Gem Faire Inc.; Scottish Rite Center, 1895 Camino del Rio S.; Fri. 12-7, Sat. 10-7, Sun. 10-5; \$5 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: [info@gemfaire.com](mailto:info@gemfaire.com); Web site: [www.gemfaire.com](http://www.gemfaire.com)

### **JULY 2009:**

11-12--CULVER CITY, CALIFORNIA: 48th annual Fiesta of Gems, "The Wonderful World of Amber"; Culver City Rock & Mineral Club; Veterans Memorial Auditorium and Rotunda, 4117 Overland Blvd.; Sat. 10-6, Sun. 10-5; free admission; hourly prizes, grand prize, exhibits, dealers, demonstrations, jewelry, stones, books, tools, minerals, fossils; contact Robert Thirlaway, 28602 Mt. Whitney Way, Rancho Palos Verdes, CA 90275, (310) 213-7677; e-mail: [thirlawr@gmail.com](mailto:thirlawr@gmail.com); Web site: [www.CulverCityRocks.org/fiesta.htm](http://www.CulverCityRocks.org/fiesta.htm)

### **AUGUST 2009:**

1-2--SAN FRANCISCO, CALIFORNIA: 55th annual show, "Jade"; San Francisco Gem & Mineral Society; County Fair Building/Hall of Flowers, Golden Gate Park, 9th Ave. and Lincoln Way; Sat. 10-6, Sun. 10-5; adults \$6, seniors and students \$5, children under 12 free; demonstrations, jade carving, precious metal clay modeling, bead stringing, chain maille weaving, faceting; contact Carleen Mont-Eton, 4134 Judah St., San Francisco, CA 94122, (415) 564-4230; e-mail: [publicity@show.sfgms.org](mailto:publicity@show.sfgms.org); Web site: [www.sfgms.org](http://www.sfgms.org)

# Mineralogy of Eruptions

by Andrew A. Sicree

## Sticky or runny lava

Mauna Loa, on Hawaii, erupts and a river of crimson lava wells up and out of the caldera on the summit of the volcano. Flowing briskly and smoothly, the incandescent river pours down the side of the mountain and stretches toward the sea. The landscape is covered with acres of black *basalt*; some is smooth and ropey, some is rough with jagged edges.

Two thousand miles east of Hawaii, in the Cascade Mountain Range, Mt. St. Helens erupts violently. Ash and dust are blown out of the volcano with terrific force. The side of the volcano, built of the volcanic rock known as *dacite*, is blasted open. A cubic mile of rock is blasted into the air and traces of the dust rain down a thousand miles away. As the eruption ceases, dacitic lava piles up on the steep side of the volcano once again. The volcano sleeps, fitfully. Another major explosion will occur, perhaps even bigger than the last, but we do not know when.

Two volcanoes. Two very different styles of eruptions. The differences arise from the different mineralogies of each volcano's lava.

## Magma and lava

Molten rock beneath the surface of the Earth is called magma. Magma varies with factors such as the source material (i.e., the rocks that were melted to form the magma), the depth of melting, and how the magma changes as it moves toward the surface (e.g., olivine crystals might form and settle out of the magma). Also, magmas are not always fully melted – they may entrain unmelted rock fragments or mineral crystals. These unmelted fragments are called *xenoliths* (“strange stones”).

When magma flows out onto the surface, it is known as lava. Lava applies to the pools, rivers, and fountains of molten rock that flow from volcanic vents. In addition, when the melt “freezes” solid, the resulting rock may be commonly called “lava” or “lava rock.” Lava from Mauna Loa produces basalt, a dense black volcanic rock, while Mt. St. Helens produces a volcanic rock called dacite.

## Lava on Mauna Loa

A wide variety of volcanic rocks make up the Hawaiian Islands. This is not meant to be an exhaustive discussion of their types. Rather, our purpose is to compare how mineralogy affects the drastically different styles of eruptions that we observe between Mauna Loa and Mt. St. Helens.

Much of Hawaiian “lava rock” is basalt while lava from Mt. St. Helens solidifies to produce mostly dacite. Technically, basalt is an extrusive (i.e., volcanic) igneous rock that is “silica-poor” compared to dacite. Note that silica-poor means relatively low in silica, not that silica is absent. Hawaiian basalts are typically about 48.4%  $\text{SiO}_2$  compared to about 63.5%  $\text{SiO}_2$  for dacite from Mt. St. Helens.

Basalts are richer in iron and magnesium than dacite. Chemical analyses show Hawaiian basalts to be about 11.2% FeO and 9.7% MgO, compared to about 4.2% FeO and 2.0% MgO for Mt. St. Helens dacite. Hawaiian basalts are also lower in alumina than are Mt. St. Helens dacites (13.2% vs. 17.6%  $\text{Al}_2\text{O}_3$ ). Due in part to higher iron content, basalt tends to be black in color while dacite is more often light gray or tan. Color, however, is not very useful in differentiating the two rocks because dacite can also be dark gray, red, or even black.

Basalts are also denser than dacites, but the apparent density of a volcanic rock can be deceptive because many eruptive rocks contain open space – vugs and vesicles formed from gas bubbles during cooling.

Basaltic lavas erupt with substantially higher temperatures than dacitic lavas. The normal temperature range for basaltic lavas is about 1100-1250°C (2012-2282°F), versus that of dacitic lavas at about 800-950°C (1472-1742°F).

### **Mineralogy of a lava**

If we look into the crystal structures of the above silicate minerals, we can see why basaltic lavas behave so differently from dacitic lavas.

Mineralogically, basalt is composed mostly of calcium-plagioclase and pyroxene minerals with additional minor amounts of olivine. The principal minerals in dacite are quartz, feldspar, pyroxenes, and hornblende. The pyroxenes are a group of related minerals that include augite, diopside, and enstatite. Hornblende (more properly ferro-hornblende or magnesium-hornblende) is an amphibole mineral. Note that both dacite and basalt have pyroxenes, but only dacite has quartz.

Silicate minerals are built of silica tetrahedrons – each silicon atom is surrounded by four oxygen atoms. In framework silicates (also called tectosilicates) like quartz, each silica tetrahedron attaches to four other silicon atoms, which are themselves surrounded tetrahedrally by four oxygen atoms. Thus, quartz's structure is much like a tetrahedral jungle-gym. Inter-connectedness of the silica tetrahedrons gives the quartz structure great strength and rigidity.

In olivine, each silica tetrahedron is by itself, unattached to any other silicon atoms. The silica tetrahedra are surrounded by a sea of magnesium or iron ions. This is why

olivine belongs to the class of nesosilicates, or “island silicates.”

Pyroxenes and amphiboles are composed of chains of silica tetrahedra (chain silicates are called inosilicates). In these minerals, the tetrahedra are linked at their corners to build long chains of tetrahedra. The principal structural difference between pyroxenes and amphiboles are that the former are built of single chains, while the latter have double chains (two chains linked side-by-side).

The behavior of a lava is related to the mineralogy of the rocks that it will eventually form. A molten lava is not simply a soup of unattached atoms. Rather, within the molten lava, silicon and oxygen atoms are already bonded together, and to a certain extent the silica tetrahedrons are also beginning to connect (or “polymerize”). A lava with a higher content of silica will have a higher degree of interconnectedness.

When silica tetrahedra are linked together, they make the lava “sticky” and less fluid. Molten lavas in which the silica tetrahedra are not well connected tend to flow readily. Basaltic lavas, which will form chain silicate crystals (pyroxenes and olivine), are less “sticky” than lavas such as dacitic lavas, from which framework silicates like quartz will form. Dacitic lavas, with substantially higher silica contents, are less fluid than basaltic lavas, which have lower silica contents.

### **Characteristics of eruptions**

In silica-rich magmas such as those that produce the dacitic lavas of Mt. St. Helens, the “stickiness” of the lava prevents gases from escaping easily. As dacitic magma rises upward within the volcano, the confining pressure (from the weight of the overlying lava and rock) decreases. Dissolved gases begin separating from the magma as bubbles, but the “stickiness” of the magma prevents the resulting gases from escaping easily. When the confining pressure decreases

sufficiently, the pressure exerted by the confined gases grows greater than the confining pressure, the gases expand rapidly, and the overlying lava and rock is blown upward. This, in turn, decreases the confining pressure of deeper magma, and it too releases gas, which expands and is also blown upward. Thus, the eruption takes off violently.

When it erupts, Mt. St. Helens kicks out a great amount of ash and dust. Lavas that escape being blasted sky-high tend to pile up in sticky masses near the lava vents. Dacitic lava does not flow well. This is why stratovolcanoes (volcanoes made of alternating layers of lava and ash) like Mt. St. Helens have steep sides compared to those of Mauna Loa.

Contrariwise, fluidity of Hawaiian basaltic magmas allows dissolved gases to escape from the molten magma before an eruption occurs. The resulting lava flows quite readily and smoothly. Hawaiian basaltic lavas have been clocked at flow speeds up to 6 mph (9.6 kph). Fluidity allows basaltic lavas to flow great distances and the resulting pile of volcanic rock can be quite broad – more than one hundred miles across at its base. These large broad volcanoes are called shield volcanoes because they resemble a giant round shield lying on the ground.

The fluidity of Hawaiian basalts allows the volcanoes to create lava caves. The lava caves found in Hawaii are actually the tubes through which molten lava flowed during an eruption. Rock is a good insulator. During an eruption, the exterior (exposed to air or water) of a lava flow will cool and solidify forming a rock crust. This crust then insulates the remaining molten lava, which continues to flow. Lava flows can create their own “pipes” or tubes. The walls of these tubes form from solidified lava, and molten lava flows downhill through the tubes

for considerable distances (many miles). Some tubes extend into the sea. When the eruption ceases, the tubes may drain completely, leaving a lava tube cave behind. The last bits of lava in an otherwise empty tube solidify as dagger-like “icicles” of basalt hanging downward from the ceiling.

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*Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA. This Popular Mineralogy newsletter supplement may not be copied in part or full without express permission of Andrew Sicree. Popular Mineralogy newsletter supplements are available on a subscription basis to help mineral clubs produce better newsletters. Write to Andrew A. Sicree, Ph.D., P. O. Box 10664, State College PA 16805, or call (814) 867-6263 or email [sicree@verizon.net](mailto:sicree@verizon.net) for more info.*

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## *Greisens, Granites, and Tin*

Greisen is an altered granitic rock of interest to mineral collectors and prospectors alike. A greisen is composed principally of quartz, mica, and topaz. The mica is usually either muscovite or lepidolite (lithium-bearing mica).

Associated minerals formed in greisens during the alteration process include tourmaline, wolframite, rutile, and fluorite. The presence of cassiterite (SnO<sub>2</sub>, tetragonal tin oxide) is characteristic of greisen, to the extent that greisen has been defined by some as a tin-bearing rock.

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## *Solid-Solution Series*

Mineral formulas represent an effort to write down, in “chemical shorthand,” the composition of a mineral. You may see more than one mineral formula for a mineral because it is sometimes difficult to pin down the exact composition of a mineral. Olivine is an example of mineral that occurs as a solid solution series. Mineral species lists usually report that olivine is not an accepted mineral species and they will refer you to forsterite and fayalite.

Olivine does exist, however. It is a mineral with the formula (Mg,Fe)<sub>2</sub>SiO<sub>4</sub>. The difficulty arises from the fact that magnesium (Mg) and iron (Fe) substitute completely for each other. This means that the (Mg,Fe)

portion of the olivine formula could represent 80% Fe and 20% Mg, or 100% Fe and 0% Mg, or 0% Fe and 100% Mg, or any other possible ratio of the two elements. We call the magnesium-rich (>50 mole% Mg) side of the solid solution series *forsterite*, while the iron-rich olivines (>50 mole% Fe) are called *fayalite*. The “end-member” composition for forsterite is represented by  $Mg_2SiO_4$ , while the formula for the magnesium-free end-member fayalite is  $Fe_2SiO_4$ .

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#### The Mohs hardness Scale

1. Talc
2. Gypsum
3. Calcite
4. Fluorite
5. Apatite
6. Feldspar
7. Quartz
8. Topaz
9. Corundum
10. Diamond

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### For Sale

**MDR 101 Faceting Machine \$250.00**

**The machine is mounted on a desk with motor.**

**(Desk has 3 drawers for storage)**

**Included:**

**64 & 96 index**

**100 lap**

**600 lap**

**1200 lap**

**2 X copper laps (charged to 100 and 1200)**

**16 dops**

**Diamond roller**

**Polishing compounds**

**Missing: fine height adjustment**

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Attention members...

We all know about the rock outside the building and we all know that, as members, we can use all we want. “As members” is the operative word here. Over the years, we’ve all allowed family and friends to share a bit of the bounty. But there is a problem that has stemmed from our generosity. Now and then, we’ve arrived at the building to find one or more people helping themselves to our “landscaping.” On three separate occasions, an actual landscaping contractor from El Cajon has been asked to empty the bed of their pick-up truck and told that, if they’d like to take some of the rocks, they could join the society. They have never joined.

There are other examples. The latest of which was a few Sundays ago when Linda and I found a couple filling up the trunk of their car. Their excuse was that a friend (whom they declined naming) told them the society allowed anyone who wanted to take as much as they like. We informed them otherwise.

We all need to be aware of “poaching” as it takes away one of the benefits of being a member. If and when the opportunity arises, please let non-members know that if they would like to share our bounty, they should apply for membership. Otherwise, they should leave the rocks...our landscaping...where it is.

# Crystal Matrix Crossword

## Z Minerals

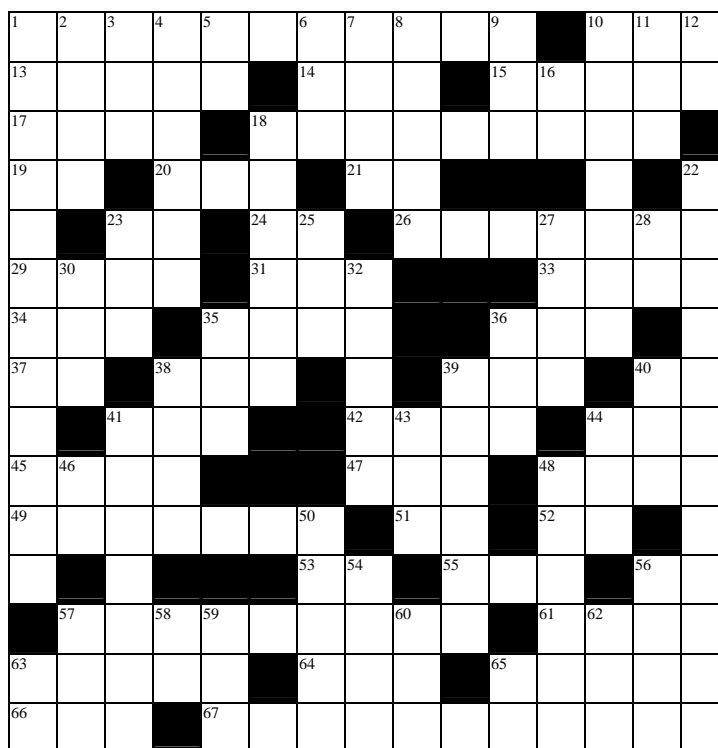
### ACROSS

- 1 Z mica
- 10 opposite of zag
- 13 what gold comes in
- 14 long, long time
- 15 not experts, not priests
- 17 large crucifix
- 18 white wash
- 19 bumper element
- 20 maybe a flying saucer?
- 21 lanthanum
- 23 very common in Earth's crust
- 24 element used in sun block
- 26 more than one nautilus
- 29 Kemo \_\_\_\_, the Lone Ranger
- 31 International Monetary Fund
- 33 college in England
- 34 Indians in Utah
- 35 great enthusiasm with Z
- 36 African Methodist Episc.
- 37 French article
- 38 \_\_\_\_ annum
- 39 what Z does to bugs
- 40 state with Z
- 41 another Zero
- 42 said to a horse, of course
- 44 day to thank God for
- 45 length times width
- 47 South to the Spanish
- 48 found in road to mine
- 49 element in Zirkelite
- 51 element in Pepto-Bismol
- 52 by-product of U decay
- 53 feather-weight element
- 55 letter 19 Greek alphabet
- 56 not found in selenite
- 57 lead antimony Z mineral
- 61 Southeast Asian
- 63 dug by mineral collectors
- 64 Geological Soc. America
- 65 where earthquakes move
- 66 big primate
- 67 Z phyllosilicate mineral

### DOWN

- 1 zircon sulfate mineral

- 2 Ethiopian language
- 3 Non-Governmental Org.
- 4 lump of mineral
- 5 weight (ab)
- 6 girl's name
- 7 girl's toy
- 8 South American culture
- 9 killed by Dutch disease
- 10 red Z oxide mineral
- 11 the end of a mineral
- 12 giga-year (ab)
- 16 artificial intelligence
- 18 more comfortable
- 22 zinc uranium mineral
- 23 Honest \_\_\_\_
- 25 National Mining Assoc.
- 27 what thermometer gives
- 28 not too hi
- 30 did to a sandwich
- 32 lava beds
- 35 yet another zero
- 36 car-crazy group
- 38 wood for crystal models
- 39 rose-color titanium min
- 40 connected to hand
- 41 group of trap minerals
- 43 in center of wheel
- 44 what minerals are



- 46 factor in blood
- 48 how Caesar died
- 50 tropical fruit
- 54 problem with Z and S
- 56 a halide mineral
- 57 what a zipper does
- 58 emerald state
- 59 kilohertz (ab)
- 60 Tahitian (ab)
- 62 Chinese ethnic group
- 63 prosecutor
- 65 fluorescence (ab)

LAST MONTH'S SOLUTION: Franklin

H	E	T	A	E	R	O	L	I	T	E		B	I	T		
A	L	O	U	D		R	I	N		S	L	A	T	E		
R	A	N	G		F	E	L	D	S	P	A	R	S			
D	N		I	B	O		I	E					I	C		
Y		E	T		S	W		X	Y	L	I	T	O	L		
S	A	L	E		S	A	W					B	E	R	I	
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S	I	T	K	A		M	O	P		H	O	I	S	T		
O	N	E				F	R	A	N	K	L	I	N	I	T	E