



NMSR Reports

The Newsletter of the
New Mexicans for Science and Reason

NMSR Reports, David E. Thomas, Editor, 801 Fitch Ave., Socorro, NM 87801 © 2019

AUGUST MEETING:
NEW MEXICANS FOR SCIENCE AND REASON will hear
Dr. Stewart Thompson, on “Fluoridation”
7:00 PM August 14th, 2019
==>CNM MAIN CAMPUS, Student Resource Center<==
==>Room 204<==
Bring a friend!

CAMPUS, Student Resource Center, Room 204.

Coming later this year:

Anay Hightower on Fire Science



The Flying Saucers of New Mexico: an Illustrated History

Saturday, August 17, 2019, 2:00 - 4:00 PM
Los Lunas Transportation Center
101 Courthouse Rd. Los Lunas



Join physicist and mathematician Dave Thomas for a scientific examination of the Roswell, Socorro, and Aztec, New Mexico UFO stories. Dave will discuss the complexities of space travel, including traditional rockets as well as teleportation ("Beam me up, Scotty"), warp drive, relativistic effects, and wormholes, and will also describe what scientists really think happened during New Mexico's famed UFO sightings.

Free and open to the public.

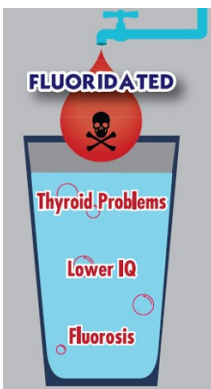
FUTURE MEETINGS ANNOUNCED

August 14th, 2019 NMSR Meeting:
Dr. Stewart Thompson on Fluoridation



What are the downsides of too much fluoride? Why has fluoride been banned in many European

countries? With fluoride included in many dental products, what is a safe level for fluoride in public drinking water? Stewart Thompson, from the Psychology department at New Mexico Tech, will tackle this thorny topic at our August 14th meeting. Join us at 7:00 PM August 14th, 2019, CNM MAIN



New Mexicans for Science & Reason (NMSR)

NMSR is a non-profit group with the goals of promoting science, the scientific method, rational thinking, and critical examination of dubious or extraordinary claims. NMSR meets at 7 PM on the second Wednesday of each month, in Albuquerque, New Mexico, at CNM's Student Resource Center, room 204 (@ Richard Barr Boardroom). NMSR Reports is its official newsletter.

NMSR officers:

Dave Thomas, President

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Marilyn Savitt-Kring, Science Mom

Membership: \$25/year (hardcopy newsletter), or \$15/year (downloadable PDF), make your check payable to NMSR, send to treasurer (Debbie Thomas).

NMSR Advisors:

- **Mark Boslough**,
Physicist (Impacts, Climate Change,
Global Warming). Sandia National Labs.
- **Kendrick Frazier**
Editor, Skeptical Inquirer
- **John Geissman**
Professor of Paleomagnetism, UNM
- **Alan Hale**
Southwest Institute for Space Research
- **Randy Thornhill**
Professor of Biology, UNM

Cyber-Cypher Clue: T = K, V = Y.

Bonus Puzzle Clue: Use the vis-viva equation, $v^2 = GM(2/r - 1/a)$, where r is distance from the sun to the orbiter, and a is the semi-major axis of the orbit, and v is the orbiter's velocity. Plug in r for perihelion and aphelion.

WANTED: READER ARTICLES & COMMENTARY

Got something to share with NMSR members? Send it in! ATTN: Dave Thomas, Editor, NMSR Reports.

REMEMBER, our next NMSR meeting is at 7 PM on **WEDS., AUGUST 14th, 2019**, at Student Resource Center, room 204 at CNM!

PUZZLE TIME!

[Please send solutions to Dave Thomas at: nmsrdave@swcp.com, or at 801 Fitch Ave., Socorro NM 87801.]

Cyber-Cypher: AUGUST PUZZLE

(Submitted by Dave Thomas)

The following letters are a simple substitution cypher. If R stands for L, R will stand for L everywhere. Your Cyber-Cypher Clue: Clue? Oh, well - if you must, see p. 2.

" F I L B D N N L B F D B H L U F J X
Z O X L E O P I F K J Y O B F I D F
B U O L K U L P D F I L E B T K J Y Z L N P L
X D B F L E F I D K B J U O L F V
P D F I L E B Y O B N J C . " - O B D D U
D B O C J W

SUPER SECRET WORD!

However you prefer to do the cypher itself (above or below), simply duplicate those actions on the alphabetized row of cypher letters below. You'll build an answer key, and you'll also reveal - the Super Secret Word!

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

JULY CYPHER SOLUTION

"SCIENCE AND TECHNOLOGY REVOLUTIONIZE OUR LIVES, BUT MEMORY, TRADITION AND MYTH FRAME OUR RESPONSE." - HISTORIAN ARTHUR M. SCHLESINGER.

Esteemed July Code Crackers: Mike Arms* and Austin Moede*!

*Secret Word: "IMPEL BRANCH OF STUDY"

SOCORRO STUMPER

Need more Secret Word Cryptograms?

New puzzles every week at

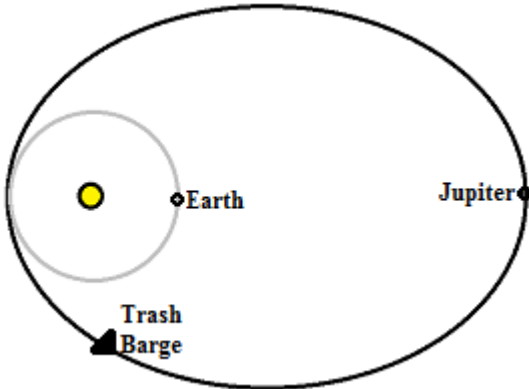
www.nmsr.org/SocorroStumper.htm



July Bonus: “Pricy Trash Run”

Suppose you have a rocketload of undesirable trash (perhaps radioactive sludge, or vain politicians’ tweets), and you’ve managed to get it off Earth, and into an Earth-like circular orbit (radius $R \sim 1.5 \times 10^{11}$ meters, orbital speed $\sim 30,000$ meters/second $\sim \sqrt{GM/R}$). Now, you want to dump the trash barge right into the Sun.

The August Bonus: Of the two methods outlined below, which is the most economical approach? Also, estimate how many joules per kilogram of barge will be required for both methods?



(A) Fire the trash barge’s rockets in the opposite direction of its orbit around the Sun, bringing it to a standstill, from which it would plummet directly into the sun. (*This is the inner orbit shown above.*)

(B) Briefly fire the barge’s rockets in the same direction of motion as the rocket, giving it an elliptical orbit with the perihelion near Earth’s orbital radius, and an aphelion near Jupiter’s orbital radius ($\sim 7.8 \times 10^{11}$ meters). Once the barge reaches aphelion, then fire the rockets in the opposite direction of its orbit around the Sun, bringing it to a standstill, whereupon it will plunge into the Sun. (*This is the outer orbit above.*)

Note: assume both Earth and Jupiter are considered “elsewhere” in the solar system for the entire duration, and are shown for scale only. They will not affect the barge in its orbit around the sun. In other words, sun and barge are a 2-body problem.



July Bonus : “Takes a Licking, Keeps on Ticking...”

Submitted by Dave Thomas



	Radius R (m)	Mass M (kg)
Earth	6,371,000	5.97×10^{24}
Moon	1,737,000	7.34×10^{22}
Jupiter	69,911,000	1.90×10^{27}

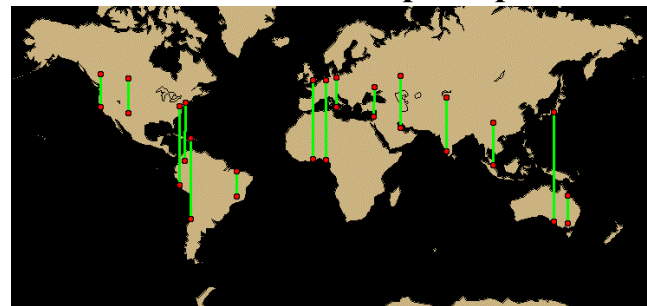
Suppose you could take an Earthly pendulum clock, of pendulum length $L =$ one meter, to (A) the Moon’s surface, or to (B) Jupiter’s surface. Use the figures above to calculate gravitational acceleration on the surfaces of the Earth, the Moon, and Jupiter.

The July Bonus: How slow or fast would the clock run on the Moon and on Jupiter, compared to Earth?

Answer: The Moon's clock is ~ 2.4588 times slower than on Earth, and Jupiter's clock is ~ 1.6257 times faster than on the Earth.

Congrats: Allen Robnett (NM), Earl Dombroski (NM), Keith Gilbert (NM), Gene Aronson (NM), Harold H. Gaines (KS).

“Crowd Source The Shape” Update

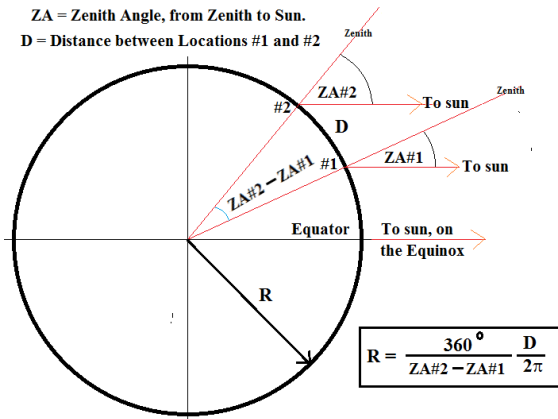


As discussed in the June issue, NMSR is gearing up for a world-wide crowd-sourced effort to determine, with confidence, the shape of our planet. Upon reflection, the 60-city suite originally planned was a little unwieldy, so it’s been reduced to 30 cities, in 15 pairs.

The locations are:
 Prince George/British Columbia/Canada, Santa Rosa/California/United States W122.7
 Saskatoon/Canada, Albuquerque/NM/US W106.6
 Lima/Peru, Washington DC/United States W77.0

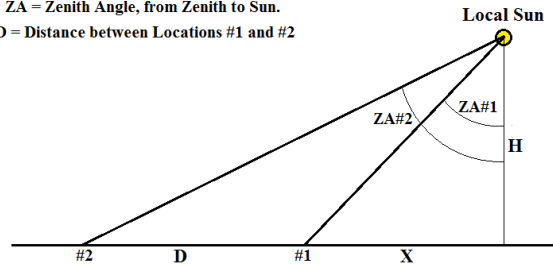
- Santiago/Dominican Republic, Santiago/Chile W70.667
- Bogota/Colombia, Manhattan/New York/US W74.0
- Sao Luis/Brazil, Sete Lagoas/Brazil W44.25
- Accra/Ghana, London/United Kingdom W0.2
- Palermo/Italy, Berlin/Germany E13.4
- Port Harcourt/Nigeria, Essen/Germany E7.0
- Haifa/Israel, Dnipro/Ukraine E35.0
- Damman/Saudi Arabia, Samara/Russia E50.1
- Almaty/Kazakhstan, Coimbatore/India E76.9
- Johor Bahru/Malaysia, Leshan/Sichuan/China E103.7
- Kofu/Yamanashi/Japan, Adelaide/Australia E138.6
- Townsville/Australia, Albury/Australia E146.8

ZA = Zenith Angle, from Zenith to Sun.
D = Distance between Locations #1 and #2



DUES check the date on your mailing label. If it's time for you to renew, or to make a contribution, please make your check payable to NMSR, and send it to Debbie Thomas, NMSR Treasurer, 3205 Alcazar NE, Albuquerque., NM 87110
Name _____
Address _____
Membership \$25 per annum (hard copy newsletter), or \$15 per annum (online newsletter).

ZA = Zenith Angle, from Zenith to Sun.
D = Distance between Locations #1 and #2



$$x = H \tan(ZA\#1), \quad x + D = H \tan(ZA\#2)$$

$$x = H \tan(ZA\#1) = H \tan(ZA\#2) - D$$

Therefore

$$H = \frac{D}{\tan(ZA\#2) - \tan(ZA\#1)}$$

August Skeptiverse Haiku!—by Keith Thomas

Nutrition Alert! Many weight loss guides contain Lots of baloney.	Yes, someone could be Both Scientist and Sasquatologist.
Health spas are selling Tasty deals/For magical, Gourmet detox meals.	Some keyboard players Qualify as authentic Organ theft victims!
Here's your exclusive, Official, rock-bottom price Junk mailing haiku!	One more awkward plan For Brexit./How long 'til sheer Confusion wrecks it?

The NMSR e-mail list is fun! It's an e-mail list with news announcements of interest to NMSR members, discussions about news of the times, and more. To join, send a request to nmsrdave@swcp.com.

Thanks to: John Covan, Eddy Jacobs, Debbie Thomas, Keith Thomas and all our Puzzlers!

IN THIS ISSUE:

Future Meetings
Announced
New Puzzles!
New Haiku!
Crowd Source the
Shape Update

**Stewart
Thompson?
Flouridation?
Weds. Aug.
14th, 7PM**

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