NMSR *REPORTS*

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The Newsletter of the New Mexicans for Science and Reason

NMSR *Reports*, David E. Thomas, Editor, 1201 N. Avenida de Chamiso Pl., Socorro, NM 87801 © 2020

AUGUST MEETING:

NEW MEXICANS FOR SCIENCE AND REASON will hear

Tom Solomon on

"A Sustainable Economy Without Fracking"

==>August 12th,2020 7:00PM<==

=>Attend at your discretion!<=

FUTURE MEETINGS ANNOUNCED!

August 12th, 2020 NMSR Meeting: Tom Solomon on "A Sustainable Economy Without Fracking"

Our August 12th, 2020 will feature Tom Solomon. Tom is a co-coordinator of 350.org New Mexico, and is a retired electrical engineer. During his 34 year career at Intel he led the team which built and ramped Fab 11X in Rio Rancho, the $2B expansion that doubled the size of their microprocessor Fab in 2001. He also led the efforts to build Intel's first (10kW) solar array in NM in 2008, and a larger 100kW rooftop installation in 2011. After retirement, Tom became a full-time activist. He was a field organizer for OFA in 2012 and now co-leads the NM chapter of 350.org, fighting global warming to ensure a safe climate for his 3 children. 350NM's campaigns include UNM divestment, large public climate rallies, public education forums on methane leakage, rooftop solar advocacy at neighborhood associations and coalition efforts at the PRC to replace the power from PNM's San Juan coal plant with Wind and Solar energy.

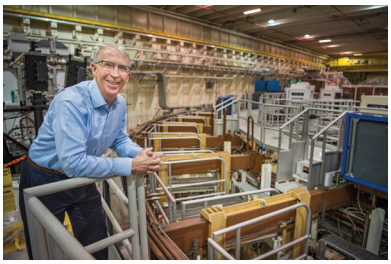
Tom will discuss the basics of our ongoing climate emergency, and the Resource Curse, and how it affects New Mexico. He'll show that fracking is unsustainable, and is clearly un-economical at its core. Tom will address electric vehicles, and how they destroy oil demand and pricing. His conclusion will include recommending a path by which New Mexico can have a just transition to a sustainable economy without oil or gas.

Because of the ongoing Corona virus crisis, this meeting will be held online, and members can attend from their homes or offices. It will be hosted on Zoom. A Zoom Link will be sent out to all members and potential attendees before the meeting. To get added to the attendee list, simply email nmsrdave@swcp.com.

If all goes well, members will be able to interact, "raise their hands", ask questions, and so forth. And, if you missed the meeting, you'll still be able to watch the video later. Tune in at **7:00 PM August 12th, 2020**, On Line!

Fall 2020 NMSR Meeting: Keith Matzen of Sandia National Laboratories, on "High Energy Density Science with Pulsed Power -- From Fundamental Science to National Security Applications"

Location and Date ***TBD.***



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.

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

Cyber-Cypher Clue: V = B, Y = P.

Bonus Puzzle Clue: What operation is ¤ ?

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 **ONLINE, Aug. 12th 7PM!**

Zoom Meeting info will be emailed out, ask nmsrdave@swcp.com for a copy.

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.

```
" V L N     Z M I H E     B L W H     L
E A M H K Z M X M A   W L G C H .   Z B H E H
L U H   J A A L E M J K E   L   D J J N
G H L U K H U   T J C G N   K J Z   I M E E . "
-  U L G Y B  T L G N J  H I H U E J K
```

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!

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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
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JULY CYPHER SOLUTION

"WE SHOULD BE TRYING TO UNDERSTAND, WELL, WHAT'S THE PROBLEM? WHY DON'T YOU LIKE WEARING THEM?" - JOHNS HOPKINS EPIDEMIOLOGIST KATE GRABOWSKI, ON OPPOSITION TO FACE MASKS.

Esteemed July Code Crackers: Mike Arms*, Austin Moede*, and Terry Lauritsen*!
*Secret Word: "GO ASK WHINY TRUMP"

SOCORRO STUMPER

Need more Secret Word Cryptograms?

New puzzles every week at
www.nmsr.org/SocorroStumper.htm

August Bonus: "Bazinga!"

Submitted by Dave Thomas

The August Bonus:

Solve for ??.

$$1 \text{ ¤ } 3 = 5$$
$$5 \text{ ¤ } 7 = 45$$
$$8 \text{ ¤ } 10 = ??$$

July Bonus: "Multiple Protection"

Submitted by Dave Thomas

(A) If a bandana is 60% effective in preventing transmission of the coronavirus, and a paper face mask is 80% effective, how effective is the combination (mask and bandana together)?

(B) If a bandana provides 40% probability of allowing transmission of the coronavirus, and a paper face mask provides 20% probability, what is the probability of allowing transmission for the combination (mask and bandana together)?

(C) What is the mathematical relationship of the two answers (A) and (B)?

Answer: (A) 0.6 + 0.8 – (0.6 x 0.8) = 0.92 = 92%

(B) 0.4 x 0.2 = 0.08 = 8%

(C) As efficiency E goes up, transmission T goes down.
For T = 1 – E, product of transmissions = T_1 x T_2.
T_1 x T_2 = (1-E_1)(1-E_2) = 1 – E_1 – E_2 + E_1 x E_2 , so
1 - T_1 x T_2 = E_1 + E_2 - E_1 x E_2 =
1 – 0.4*0.2 = 1 – 0.08 = 0.6 + 0.8 - 0.6x0.8 = 0.92

Congrats: Mike Arms (NM), Paul Braterman (UK), Keith Gilbert (NM), Rocky S. Stone (NM), Terry Lauritsen (NM).

August Skeptiverse Haiku! by Keith Thomas

Watch out for high speed 5G wireless transmission Of COVID bullcrap!	Might that mystery Corona carrier be The mighty Yeti?
Hawaii is where Space aliens/Could play with Ukeleleans.	In Scotland, home of Nessie's fables/One will see More lochs than bagels.
Herbal remedy - Can garlic facilitate Social distancing?	Decibel alert! Hubris tends to be louder Than humility.

Continuing Discussion on COVID-19"

Coffee Brown, M.D. supplied some estimates of specificity and sensitivity for the two main types of Covid19 tests, and there have been articles in Time and The Washington Post that discuss the practicalities of both tests, and recommend an urgent and reasoned approach.

As discussed in last month's *Reports*, "Sensitivity" is the measure of a given test's accuracy for positive results, i.e. the percentage by which the test correctly gives a positive result. "Specificity" is the measure of a given test's accuracy for negative results, i.e. the percentage by which the test correctly gives a negative result. This chart shows how the givens (Population size N, prevalence of the disease in the community R, Sensitivity V and Specificity C) can be used to calculate numbers for True Positives (TP), False Positives (FP), True Negatives (TN) and False Negatives (FN). The upper chart shows the actual numbers for a population size N, while the lower chart gives normalized percentages for TP, FP, TN and FN. So, "TP/Pos" in the lower chart represents the percentage of correct positives, while "TN/Neg" represents the percentage of correct negatives.

	Sick	Healthy	Total
Positive Test	TP = V*Sick	FP = (1-C)*Well	Pos = TP + FP
Negative Test	FN = (1-V)*Sick	TN = C*Well	Neg = FN + TN
Total	Sick = R*N	Well = (1-R)*N	Given Pop, N

	Sick	Healthy
Positive Test	TP / Pos	FP / Pos
Negative Test	FN / Neg	TN / Neg
	TP = True Positive	FP = False Positive
	FN = False Negative	TN = True Negative
Givens:	Population = N	Prevalence = R
Givens:	Sensitivity = V	Specificity = C

Here are the results for a COVID19 test with 90% sensitivity, 90% specificity, and with 1% of the population infected. Even though the test is 90% accurate (if you have the disease, there's a 90% chance it will be detected), the True Positive detection rate is only 8.3% (if you test positive, the chances you are actually infected are just 8.3%). The reason is the high number of False Positives; out of 10,000 people, 9,900 are healthy, and 10% of these (= 100% - specificity of 90%) will have False Positives. There are 1,080 positives overall (90 for sick people, 990 for healthy ones), so the chance that someone who tests positive is actually sick is 90/1,080 = 8.3%.

Antibody Test Sensitivity: 90%
1% prevalence Specificity: 90%

	Sick	Healthy	Total
Positive Test	90	990	1,080
Negative Test	10	8,910	8,920
Total	100	9,900	10,000

P(Sick|+) = P(TP) = 90/1080 = 8.3%
P(Sick|-) = P(FN) = 10/8920 = 0.1%
P(Healthy|+) = P(FP) = 990/1080 = 91.7%
P(Healthy|-) = P(TN) = 8910/8920 =99.9%

	Sick	Healthy
Positive Test	8.3%	91.7%
Negative Test	0.1%	99.9%

If the disease is more prevalent in the population, the end results can vary dramatically. For a 10% infection rate (one out of ten has the virus, on average), at the same sensitivity and specificity of 90% each, the True Positive

detection rate is 50%, the same as flipping a coin.

Antibody Test **Sensitivity: 90%**
10% prevalence **Specificity: 90%**

	Sick	Healthy	Total
Positive Test	900	900	1,800
Negative Test	100	8,100	8,200
Total	1,000	9,000	10,000

P(Sick|+) = P(TP) = 900/1800 = 50% P(Healthy|+) = P(FP) =900/1800 = 50%
P(Sick|-) = P(FN) =100/8200 = 1.2% P(Healthy|-) = P(TN) = 8100/8200 = 98.8%

	Sick	Healthy
Positive Test	50.0%	50.0%
Negative Test	1.2%	98.8%

Now, the antigen (antibody) test needs higher levels of virus in comparison to the more-accurate, but much slower, nucleocapsid test ("DNA test"). These tests always give positives if the DNA of the virus is present – which means the sensitivity is 100%. Even at a relatively high specificity of 99%, however, there can be some false positives, about 16% for 5% disease prevalence.

Nucleocapsid test **Sensitivity:100%**
5% prevalence **Specificity: 99%**

	Sick	Healthy	Total
Positive Test	500	95	595
Negative Test	0	9,405	9,405
Total	500	9,500	10,000

P(Sick|+) = P(TP) =500/595 =84% P(Healthy|+) = P(FP) =95/595 =16%
P(Sick|-) = P(FN) = 0/9405 = 0% P(Healthy|-) = P(TN) = 9405/9405 = 100%

	Sick	Healthy
Positive Test	84.0%	16.0%
Negative Test	0.0%	100.0%

Now, the United States has spent most of its efforts on the more accurate, but much slower, DNA tests. As an article in Time states (by Dr. Ashish K. Jha, July 29, 2020), "*Antigen [antibody] tests require higher levels of virus than qPCR to return a positive result. There has been a significant pushback from those who believe it would be irresponsible to widely use a test that might miss many positive cases. But the frequency of testing and the speed of results counters that concern. The qPCR tests are currently slowing laboratories to a crawl. If everyone took an antigen test today—even identifying only 50 percent of the positives—we would still identify 50 percent of all current infections in the country – five times more than the 10 percent of cases we are likely currently identifying because we are testing so few people. Accuracy could be further increased through repeated testing and through the recognition that quicker test results would identify viral loads during the most infectious period, meaning those cases we care most about identifying – at the peak period of infectiousness—are less likely to be missed. Even better, we would be identifying these cases while they are still infectious, rather than in 10 days when the virus may have already been transmitted repeatedly. Mina and colleagues have shown through modelling that this logic holds up; speed matters much more than test sensitivity in controlling a pandemic.*"

Likewise, Leana S. Wen opines in the August 6th Washington Post "*Why not invoke the Defense Production Act to immediately mass produce these less accurate — but much faster and cheaper — screening tests? ... Imagine if we had enough of these tests that, every morning, all children and teachers could take one at home. Imagine if restaurants and other retail establishments required them as a condition of entry. Imagine if one could take a home test before getting together with extended family. How much safer would we all feel — and be?*"

Videos of past meetings are available on the NMSR meetings page, http://www.nmsr.org/meetings.htm.

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).

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!

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New Puzzles!
More COVID19 Discussion
New Haiku!

August Meeting
Solomon on Fracking
Weds 12th 7PM
Online/Zoom