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Rochester Academy of Science
BULLETIN



"An organization of people in the Natural Sciences"

February, 2008 - Vol. 62, #2

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ABOUT THE **ACADEMY** - The Rochester Academy Of Science, Inc. is an organization which has been promoting interest in the natural sciences since 1881, with special focus on the western New York state region. Membership is open to anyone with an interest in science. Dues are minimal for the Academy, and are listed in the membership application. Each Section also sets dues to cover Section-related publications and mailings.



For applications and/or more information contact membership chairman Stephen Busschaert, 54 Keswick Rd., Rochester, NY 14609; by telephone 288-5683; or by e-mail <sbusschaert@msn.com>.

The *Academy* Internet web page is <http://www.rasny.org>

The *Astronomy Section* Information phone number is (585) 987-5330. The *Astronomy Section* Internet web page is <http://rochesterastronomy.org>

This "**BULLETIN**" is produced monthly, *except July and September*, by the *Astronomy Section, Rochester Academy of Science*. The editor is Frank Bov, 16 Gladbrook Rd., Pittsford, NY 14534 Phone (585) 422-9910 (days) and (585) 385-1518 (evenings), e-mail <editor@rasny.org>

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PRESIDENTS MESSAGE
FEBRUARY 2008
Our first joint meeting

This is the morning after our first all-section meeting and I think everyone that attended had a good time socializing with people from other sections along with hearing two lectures. We should consider having a joint lecture every year in the Winter just as our regular meetings, if we can find a topic we would all like to hear about.

For me, the gem of the night was the second, short lecture presented by our own Jeff Gutterman on alternative fuels. Jeff threw-in a bonus; his self-developed program comparing home heating cost options. If nothing else, his presentation was the subject of much discussion at the after-meeting stop at Applebee's.

I'm not sure I have seen such a concise table comparing home heating costs in our area as his chart did. Some people were quite surprised by the conclusions the data supports. Jeff's talk is now an article in this issue, so all of the RAS can see it, and those of us that saw it for a moment on the screen, get a closer review.

There was also a lot of after-meeting discussion on the GREET model by Argonne National Laboratory that Jeff

presented which shows how much energy goes into the production of any transportation fuel. Of current concern is the buzz going around that ethanol produced from corn uses more energy to produce than it can produce in a vehicle. That was true a few years ago but not now. Jeff has also put a summary of all of the energy uses that feed into that equation of energy used to produce the ethanol from the farmer's tractor fuel and oil to make his fertilizer to the fuel used to transport the ethanol to our local gas stations.

This all leads up to a big event that RAS would like to sponsor in spring of 2009 to try to provide the members and the community with an update on *Sustainable Energy Solutions*. I think it will help bring all of our thinking up to 2009 answers since we see that, with all the research going on in alternative fuels, the 2006 answer may be all-wrong in 2009. I'm sure we will be looking for help in planning this event, so if you would like to get involved, contact me at <president@rasny.org> and let me know how you can help out.

Stan Spector
President, RAS

PEAK OIL, ALTERNATIVE FUELS AND YOUR HEATING BILL

I gave a presentation on this topic at January's All-Section meeting at RIT. A 30-minute "short talk" does not allow for much detail, so my purpose was to give only an overview, to get people thinking about the subject matter while taking away a few key points for later discussion.

After the meeting, conversations were quite lively with two main questions garnering the most

HELP WANTED

The RAS is in need of a volunteer Website content coordinator. This volunteer would decide what should be published on the site, collect the information from the relevant parties and submit it to the Webmaster for publication. This information includes the Section calendar events and Academy announcements. Other ideas for content are articles from Section newsletters, articles submitted by RAS members, RAS photographs (e.g., depicting section activities or a photograph of the month taken of a scientific subject by an RAS member) or any other content the coordinator feels will help increase visits and usefulness of the Website. If interested, contact Stan Spector at <president@rasny.org>

attention. "Is Ethanol production really worth it?" and "What energy source should I use to heat my home?" I will try to give more detail here.

Before we can answer the first question, we need to decide what our priorities and ultimate goals are. Are we trying to reduce our dependence on foreign oil? Find a cheaper alternative to oil? Reduce greenhouse gases? The answer to the ethanol question will be different depending upon our priorities. To aid in the determination, the US Department of Energy, DOE, contracted with Argonne National Lab (ANL) to develop a model that can be used to provide rational and quantitative information. Dr. Michael Wang of ANL is the primary researcher responsible for

the development of the GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) model. It contains a massive database that is constantly updated with verifiable data from academia, industry, independent labs, and peer reviewed research. The model determines emissions of CO₂, CH₄, and N₂O, the primary greenhouse gases, and estimates the emissions of five atmospheric pollutants in urban and rural settings. To assure fuels are compared fairly, all values are standardized by considering their energy content (in BTUs) and energy consumed getting it to the fuel pump. The results of the model are used by the DOE to influence US energy policy.

As an example, I have attached an

analysis that considers the production of 1 million BTUs of ethanol from corn and compares it to the production of an equivalent number of BTUs of gasoline delivered to the fuel pump. It is important that we consider all aspects of the production and delivery of each fuel. For ethanol, we start with the fuels used in the manufacture of fertilizers and pesticides and the energy used in farming. We then add the energy used to ship the corn to the ethanol manufacturing plant. This is added to the energy used in the manufacturing of the ethanol. Finally, the ethanol is shipped to the filling station and the sum of all these fossil energy costs is totaled.

We now compare this with gasoline produced from oil taking into account heating value of the oil itself as well as the energy used to extract it from the ground, deliver it to a refinery, and refine it to gasoline, and ultimately deliver it to a filling station.

If we only consider the fossil energy consumed, this example shows that converting petroleum to gasoline takes 1.23 million BTUs of fossil energy to deliver 1.0 million BTUs to the fuel pump. However, the process of growing corn and converting it to ethanol only takes 0.74 million BTUs of fossil fuel to deliver 1 million BTUs to the fuel pump. Ethanol is not the least expensive solution but it does reduce our fossil fuel usage and thus reduces greenhouse gas production.

Next Month: "Your Heating Bill".

Jeff Gutterman
Director, RAS

EVENTS for FEBRUARY 2008

(For updates to events, check the Academy web site, <http://www.rasny.org>, or appropriate Section web site.)

Fri 01 ASTRONOMY GENERAL MEETING

7:30 PM at RIT, Gosnell Hall, room A300. This month's meeting features Chuck Spoelhof on the history of the Hubble Space Telescope plus short talks by members. Chuck Spoelhof was a member of the 6 member committee appointed in 1990 to investigate the optical failure of the Hubble Space Telescope. Visitors are always welcome. Come early and socialize. For information, contact Carol Latta at 230-9548, or <cosmos@rochester.rr.com>

Tue 05 FOSSIL MEETING

7:30 PM in the downstairs Community Meeting room at Brighton Town Hall, 2300 Elmwood Ave. Ursula Smith, from Cornell University, will talk about her research with New Zealand turrillids.

Fri 08 LIFE SCIENCES MEETING,

7:30 pm, St. John's Lutheran Church, 800 Ridge Road East. We will join the Burroughs Audubon Nature Club at their meeting for a talk by Wayne Howard on *Great Lakes Problems*. He is the head of the Sierra Club's Great Lakes committee, and will tell us about the problems that have affected the Great Lakes, and how the Sierra Club is helping to restore them. Contact Karen Wolf, 670-9709 for more information.

Tue 19 MINERAL MEETING

7:30 PM Brighton Town Hall 2300 Elmwood Ave., Rochester NY Downstairs Conference Room. Paul Dudley, Mineral Section member, will give a talk entitled "Pseudomorphs". Refreshments. Visitors welcome. For information, call Al Mura at 227-9931 or check the Academy web site, above, for updates.

Tue 19 LIFE SCIENCES HERBARIUM WORKSHOP

10:00 AM to 2:00 PM, in the basement of the Rochester Museum and Science Center (RMSC, directions available by request). No experience needed! Possible activities include filing herbarium specimens returned from loans, repairing and re-mounting of specimens, and entering data on specimens into our computer. The herbarium contains an amazing variety of plant specimens, some collected in the 1800's. Plan to come and help with this valuable collection – and learn about plants in the process. For more information, contact Elizabeth Pixley, herbarium curator (334-0977 or epixley@rochester.rr.com). You can either bring a lunch or purchase food at the RMSC café.

Thu 21 DISTINGUISHED SCHOLAR LECTURE

7:30 PM in Eisenhart Auditorium. Kara Masaschi will speak on *Polar Bear Conservation: An In-Field Perspective*. Masaschi is the

Polar Bear Keeper at Seneca Park Zoo. Tickets are \$15 for non-RMSC members, \$8 for students. Call (585)697-1942 for more information and reservations.

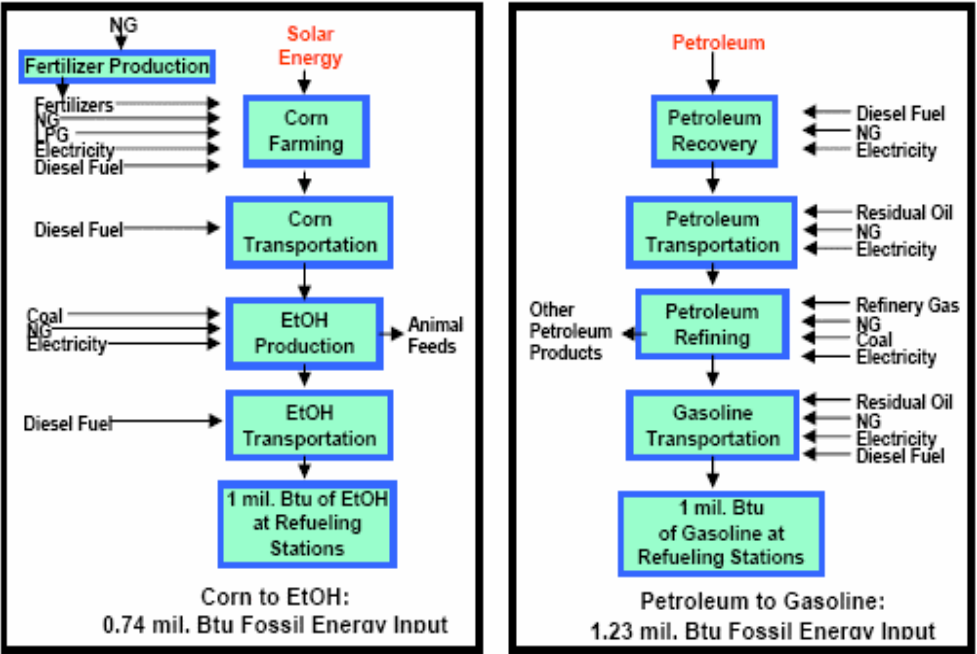
Wed 27 DISTINGUISHED SCHOLAR LECTURE

7:30 PM in Eisenhart Auditorium. Roger L. Easton, Jr., Ph.D. will speak on: *Archimedes CSI: Recovering the Ancient Text*. Dr. Easton is a faculty member in RIT's Chester F. Carlson Center for Imaging Science. Tickets are \$15 for non-RMSC members, \$8 for students. Call (585)697-1942 for more information and reservations.

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Fossil Energy Requirement: Ethanol vs. Gasoline (GREET results)



Argonne National Lab Study 2005 Results:

0.74 M BTU Fossil energy consumed to deliver 1M BTU of Ethanol
1.23 M BTU Fossil energy consumed to deliver 1M BTU of Gasoline, both to the pump