

NJAAPT Newsletter

April 2006

President's Message

Spring has sprung and thoughts of beautiful weather punctuate our thoughts. But, there are some other thoughts with which we should concern ourselves. They revolve around the NJAAPT. Please take a little time to reflect on the following that have been brought up in discussions at executive board meetings:

Membership – Over the past few years members have not renewed their affiliation with the section. There are fifty-nine teachers with a Membership expiration date of 2005 that did not renew. We ask, “Why?” It certainly cannot be the dues nor the lack of activities, so what reason is there to explain the non-renewals? Do you know any other physics teachers who are not part of NJAAPT? Why not approach them and get them to join us?

Participation – What can be done to increase the numbers at workshops or the Sectional meeting? Everyone knows that all of us have commitments that place serious demands upon our free time, but is it possible to give up a few hours during the year to become actively engaged in some form of activity? We always can use help at Holiday Treats or some other workshop which pays many benefits to those who attend. How about becoming a member of the executive board to help serve the section by planning the type of events that our members can attend?

These are just two areas of concern for the section to work on during the coming year and we hope to be successful, but this can only be accomplished with your assistance. Please give us a hand in meeting our goals.

Something to consider – according to our constitution, we need to hold **elections** for officers in June. If there is a person that you would like to nominate for any of the offices, contact me and that individual will be placed on the ballot. The terms are for two years and each officer is a member of the executive board.

In the next newsletter, I will address other issues facing the NJAAPT.

Ray Polomski

Mapping the Electric Field of a Weakly Electric Fish

Eight teachers attended an electrifying workshop on weakly electric fish on a beautiful Saturday morning on March 4, 2006. Tom Lawrence hosted the workshop at his school, West Morris Central HS. Tom explained the physiology, ecology and care of electric fish. He demonstrated lab activities/demos that “show” the electric field these fish use to sense their environment. Using a Radio Shack amplifier and two wire leads, which John Valente showed the group how to assemble, the electric field produced by these fish can be ‘heard’. Tom demonstrated to the group how the electric field intensity changes as the fish change their activity levels. Each participant was provided with a weakly electric fish called an elephant nose, a video about weakly electric fish and the amplifier/wire lead apparatus to take back to their classroom as teaching tool relating electric fields to biological systems.

Physics Olympics

The annual Physics Olympics was held at Monmouth Regional High School on January 15, 2006. Thirty-two six-member teams from 20 High Schools participated. Many schools brought student and parent observers to cheer on their school's team. All together, 250 students, teachers and parents joined together to do physics on a beautiful Saturday. The students competed in six events, which were: The Fermi Question, the Tower of Cards, the Zero Impact Vehicle, the Egg Throw, the Lightest Support Tower and the Catapult. The first place winner was J. P. Stevens; second place went to Chatham and Bergen County placing third. First place teams in each event are: Fermi Question, Lightest Support Tower and Egg Throw-Chatham, Zero Impact vehicle-J. P. Stevens, Catapult-Monroe. Sponsored by NJAAPT since the mid-1970s, the event was organized by Dr Fred Pregger and Mr. Jud Fink, two physics professors from The College of New Jersey, and was held there until the mid-1990s when it moved to Rutgers University. From 2000 until the present, Monmouth Regional HS has sponsored the event. Jessie Blair of Monmouth Regional HS and John Valente of the Marine Academy of Science and Technology as well as the executive Board of NJAAPT organize the Physics Olympics. For Information about the 2007 Olympics contact John Valente at John_Valente @ mast. mcvsd. org. Consider volunteering to help organize the 2007 Olympics.

First place- J.P. Stevens HS

Second place- Chatham HS

Third place- Bergen HS

Try This Demo

When asked at our sectional dinner if he could contribute something to the newsletter, Fred Pregger, one of the original NJAAPT members and retired teacher, volunteered immediately with the promise to supply a demo. The following is exactly what we are looking for from other members – something to share.

I like to show students simple examples of physics principles, things that they can see or do in everyday life. For example when studying rotational inertia or moment of inertia ask your students to try the following on their next visit to the supermarket. Get a shopping cart that is free rolling, not one that has a mind of its own. Put two or three heavy articles in it such as gallon containers of water. Compare the torque you have to use to turn the cart around a corner when: (1) the load is in the back of the cart under the handle and (2) the load is way out at the front of the cart. The difference in the rotational inertia of the system is very obvious. Does this suggest the smart way to load a shopping cart if you have a large number of items?

Thank you Fred for the contribution.

Tentative Schedule of Events For 2006 -07

Sept. 29 – Make n’ Take – Monmouth Regional HS

Oct 11 -12 – NJSTA Convention – Demo Dens & Workshops

Nov. 17 – Edmund’s Scientific Make n’ Take

Dec. 2 – Holiday Treats – Rutgers University

Jan. 13, 2007 – Physics Olympics – Monmouth Regional HS

Feb. 9, 2007 – Dave’s Dazzling Demo Night – Rutgers University

Mar. 31, 2007 – Electrostatics Workshop – Chatham HS

Please visit www.njaapt.org for further information and updates relating to events for the rest of this school year and for the next school year.

Section Meeting Report
March 17 – 18, 2006
Princeton University

On Friday evening, March 17, 2006, Tom Greenslade, Professor emeritus of Kenyon College, spoke to those attending dinner that opened the NJAAPT's Sectional Meeting. His topic was: "Electricity and Wave Machines". Tom Greenslade is a renowned collector of antiquarian physics demonstration equipment. Using a series of slides to illustrate the devices used to demonstrate the phenomena, he actively and humorously traced the history of some of the items. His personal collection numbers over two thousand and his home has become a museum. As he recounted his fascination with the antique materials, he mentioned how indebted he was to his wife, Nora, who would attend his talks and be that gentle voice that corrected errors or provided information that escaped him for a moment. The presentation was a special event since Tom Greenslade was a graduate student of Peter Lindenfeld's at Rutgers University in the 1950's.

Following the dinner and talk, those attending were invited to the Princeton University Observatory for a viewing of the night sky. Ed Groth provided a very informative background history of the telescope and was our host for viewing the Orion nebula and Saturn.

Vice President for the Franklin Center at The Franklin Institute Philip (Bo) W. Hammer and actor Dean Bennett came to Princeton on 18 March 2006 to commemorate the tricentennial of Benjamin Franklin's birth with the New Jersey Section of the American Association of Physics Teachers (NJAPT). Hammer described why Franklin was "America's First Civic Scientist" and Bennett brought the persona of that first civic scientist to life.

Hammer characterized Franklin as a civic scientist according to the criteria used by former National Science Director Neal Lane in his October 2003 *Physics Today* article, "Benjamin Franklin, Civic Scientist." In addition to being a scientist, Lane wrote, "a civic scientist is one who uses his or her special scientific knowledge and skills to influence policy and inform the public." Other attributes of a civic scientist which Lane subsequently added to his criteria are "wisdom," "ability to communicate effectively with -- and communicate science to -- the public," "consensus building," and "compromise." Hammer then went on to list some of Franklin's most famous inventions: bifocals, the Franklin stove, the glass harmonica and the odometer. Hammer then went on to discuss some of Franklin's science: the discovery of the Gulf Stream, the causes of Nor'easters, and, of course, electricity.

Hammer continued by citing others carrying on Franklin's tradition as a civic scientist -- Rachel Carson, Hans Bethe, and Linus Pauling came to mind -- and pointed out that teachers can develop more civic scientists by getting students to think about science in terms of societal issues, which include evolution, global warming, global pandemics, energy resources, and nuclear energy. Hammer concluded with a memory of his own civic scientist mentor -- his eighth grade science teacher Ed Hodges.

In bringing Franklin to life, Bennett elaborated on many of the historic details to which Hammer had alluded. Dressed in period costume, Dean Bennett

embodied the essence of the man Franklin became. He traced the early life and experiences that shaped the inquisitive eighteenth century thinker from his life in Boston to his journey as a young man to Philadelphia and finally to the ghost writer of the Declaration of Independence.

Using humor to punctuate his story of the amazing life of Benjamin Franklin, Bennett regaled the audience with the accomplishments of a man who at the age of seventy was sent to France by the Continental Congress to secure funding for a grand experiment in the way people are governed. Franklin established the first Free Public Library, the first hospital, the Associators – today's Pennsylvania National Guard, the first fire department, and the Philadelphia Academy – better known as the University of Pennsylvania, the nation's oldest university.

After a great lunch, it was back to the auditorium for John Johnston's "Candy Store of Physics". John has been retired from teaching physics at Nanuet High School in New York for nine years, but is very active in both the New Jersey and New York Sections. John's presentation covered the areas of electrostatics, electricity, and light. His demonstrations consisted of equipment that he has made and used in the classroom to aid student understanding. For electrostatics John showed the use of acrylic and vinyl rods to produce electrostatic effects that can be seen easily in the largest of classrooms. His wave models could be used to demonstrate the nature of em waves, the polarization of light off of a surface, and how a polarizing filter works. John also demonstrated the use of an acrylic inverted prism that can be used to show the effect of different indices of refraction. Lastly, John used his version of the ring flinger to illustrate induction.

Following John's presentation, Ed Groth assisted by Ye Ma thrilled the audience with a demonstration show. The program's theme was related to energy and Ed encouraged audience participation to illustrate the concepts. Some of the demos included: riding a bicycle to provide electricity to light bulbs, the fire extinguisher car, heat generated by lifting a mass and letting it fall, the energy content of various materials, and an RLC circuit.

To conclude the day's events, staff and graduate students from Princeton University who conducted tours of the physics laboratory facilities.

Most of the information in this article was submitted by John L. Roeder and I appreciate his fine summary of the meeting.

RU Physics and NJAAPT: Partnership for 2006-2007

The Rutgers University Physics Department would like to identify teachers to participate in one or more of the following outreach activities in the coming year. Interested teachers should contact either Dave Maiullo (maiullo@physics.rutgers.edu; (732) 445-3872) or Steve Schnetzer (steves@physics.rutgers.edu; (732) 445-5035) for more information. We are planning the following three separate activities. The first two are meant to be

very flexible. Our primary concern is to make them useful to you, the teacher. We very much welcome suggestions regarding their format and content.

1) A series of workshops starting in the fall to present and develop ideas on ways to assist teachers in introducing particle physics into their classrooms. These workshops will draw on material that has been developed by the QuarkNet outreach program sponsored by the US Department of Energy and the National Science Foundation. Emphasis will be placed on providing teachers with access to material, both web-based and demonstrations that can be used in the classroom. These workshops could be held on either on weekends or on weekday nights depending on what is most convenient for the majority of the participants.

2) A set of informal monthly meetings in which important ideas of current interest in physics will be discussed. As you know, quite often presentation of the currently important ideas of physics is lacking in high school classes. This is partly due to the need to cover the standard material which doesn't leave enough time for the really interesting stuff and partially because teachers may not have ready access to information on the latest developments. The former may be hard to solve but we hope to help address the latter by means of these meetings. Each month we will discuss a different topic and have a brief presentation by a Rutgers faculty member. The format will be informal with pizza and refreshments. Each month we will decide, based on interest, what topic we will discuss in the following month. The emphasis will be on presenting material that is accessible to the teachers and in a way that will then be readily transferable to their students.

3) We anticipate having openings for up to two high school teachers and four high school students to participate in a high energy physics research project in the summer of 2007. The teachers and students would work with our group in the Rutgers Physics Department to construct and test a luminosity monitor for an experiment at the Large Hadron Collider under construction at the CERN laboratory outside of Geneva, Switzerland. Although the luminosity monitor will be part of a large detector facility, the device itself is small providing the students and teachers with real hands-on experience. The teachers and students will also gain experience with state-of-the-art detectors based on diamond sensors and on state-of-the-art pixel electronics. Stipends of \$2,500 for each teacher and \$1,500 for each student will be available. We would expect each participant to work for a four-week period although a longer period could be accommodated if there were interest. There is a possibility of renewal for the summer of 2008 with one or more of the teachers and students going to CERN to help us install and commission the luminosity monitor and acquire the first data from the device.



Physics Workshop

Constructing a soda can Van de Graaff generator

Sponsored by: the New Jersey Section of AAPT

Presenters: Andrew Serge, Jessie Blair and John Valente

Date: Sat, April 29, 2006

Time: 9:30- 12:00

Place: Monmouth Regional H. S.

Cost: \$20, which includes the material to build a soda can Van de Graaff generator. Breakfast (coffee and bagels) provided.

Program: Andrew Serge will show you how to construct a soda can Van de Graaff generator using mostly throw away objects. The generator will charge sufficiently to cause tinsel to rise off the can and discharge when touched. It will **not** charge to a level that will produce a spark. It is suitable to be use as a make-n-take lab activity for your students.

Registration: E-mail John Valente at...John_Valente@mast.mcvsd.org or call 732-291-0995 by April 21, 2006. Limited to 15 participants.