



Physics Tempo

The Newsletter of The St. Louis Area Physics Teachers
an affiliate of the American Association of Physics Teachers
September 1992

Vol. 3 No. 1

Notes and News from the June Meeting *Social Event at Laumeier Park*

by Paul Discher

The June meeting of the St. Louis Area Physics Teachers was our first social event and was held at Laumeier Sculpture Park on June 6, 10:00 a.m. to 2:00 p.m. Debbie and Rex Rice brought the hot dogs, and the small group that attended enjoyed the breezy day and lunch together reminiscing about the past year, and discussed possible activities for the upcoming year.



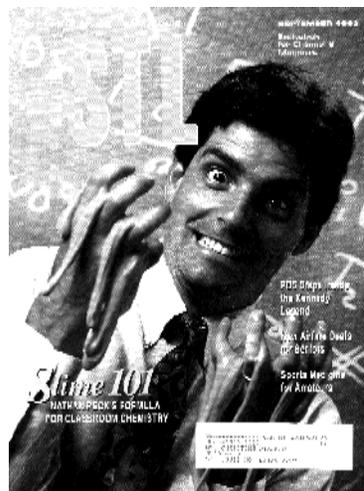
Laumeier Sculpture Park is a 98 acre St. Louis County Park and is located at the intersection of Geyer and Rott Roads in Southwest St. Louis County.



Nathan Peck, gets celebrity status on the cover of STL Magazine, September 1992

by Paul Discher

Nathan Peck, Chemistry Teacher at Country Day / Mary Institute, and member of the St. Louis Area Physics Teachers, was featured on the cover of the September 1992 issue of STL, the magazine for KETC Channel 9 members. Mr. Peck was named Chemistry Teacher of the year by the St. Louis Section of the American Chemical Society. He has received the Missouri Presidential Award for Excellence in Teaching, this being one of only three such honors in science given that year. In addition, Nathan Peck's picture graces the walls of the St. Louis Science Center, where Peck is one of 25 local scientists spotlighted in the Human Adventure Gallery.



The article "Mr. Science", written by Kim Plummer Krull, details the character of a talented and innovative science teacher. Peck is dedicated to the "work" of making learning a pleasant experience, even "fun". This story details methods that include the use of an amusing material called "Slime". The combination of some innovative methods and

strange substances make an environment richly rewarding for his students.

Special congratulations to Nathan Peck from all of your friends at the St. Louis Area Physics Teachers.

Notes and News on the May Meeting *SIUE-Sky Night, an evening of stargazing.*

by Rex & Debbie Rice

"Sky Night" was the theme for the astrophysics workshop of the St. Louis Area Physics Teachers held at the SIUE Sky Lab Complex, on the evening of May 8, 1992. Shortly before sunset, the attending members assembled at the outdoor viewing area as this program was hosted by Dr. Fred Zurheide and Bill Wielder.

Several of the University's telescopes were made available for personal viewing. Special protective equipment was arranged on a telescope used to view the setting sun and observations of sunspots were made. Other telescopes were trained on celestial bodies that included the moon, stars, and planets. Four of Jupiter's moons were visible that evening, as well as many constellations. Bill Wielder also demonstrated a computer program that allows the user to plot the star chart for that particular date. It was a small but enthusiastic group of stargazers. We would like to reiterate our thanks to Fred and Bill for bringing the greatest show beyond the earth into our sights.

Brief History of "Slime"

by Paul Discher

"Slime", originally a product of the Mattel Toy Corporation, was marketed from 1976 to about 1979. Slime was described by Dr. Maki Papavasiliou, of the Mattel Materials Laboratory, as a reversible cross-linking gel made from guar gum, a vegetable gum used as a protective colloid, stabilizer, and thickening agent for foods, cosmetics and lotions. The cross-linking in the material is accomplished by the addition of borax, making:



Slime is a non-Newtonian fluid that is dilatant. Under physical stress, the material dilates or expands. More on the weird Physics of Slime can be gleaned from the March 23, 1987 article in *Science World Magazine*, "Slime, Glop, Putty, and Goo: Amazing Fluids that defy even Newton" by Jim Killgore. The article gives much research credit, as do I for the information in this column, to Dr. David Katz, Community College of Philadelphia. In 1983 Dr.

Katz researched and explained much of the science of such items as, Slime, Silly Putty, Shrinky Dinks® and Magic Sand® in a paper titled “Chemistry in the Toy Store”.

“Slime” can be made in its real form using guar gum and borax. Alternative simpler recipes include using cornstarch. The chemists really start to get serious about slime when they get out the polyvinyl alcohol and borax as described in: “Colloids, Slime and Some Non-Newtonian Fluids: Some Demonstrations”, Sixth International Conference on Chemical Education, University of Maryland, August 1981, by David R. Weill (current address: Shady Side Academy, 423 Fox Chapel Road, Pittsburgh, PA 15238.)

Photocopies of select “Slime” articles and recipes can be obtained by sending a self addressed and stamped business envelope to: Paul Discher, Washington University Department of Electrical Engineering, Campus Box 1127, St. Louis, MO 63130-4899. Just add a note that you want the “slimley stuff”.

Next Meeting — September 1992

Curriculum sharing session, and talk by Keith Bradley.....First Meeting at BAC

Date: Saturday September 19, 1992

Time: 8:30 a.m.

Place: Belleville Area College

Host: Frank Cange

The first meeting of the 1992-1993 academic year for the St. Louis Area Physics Teachers will be held Saturday September 19, 1992, 8:30 a.m., at Belleville Area College. Frank Cange will be your host. A short business meeting will precede the morning’s events.

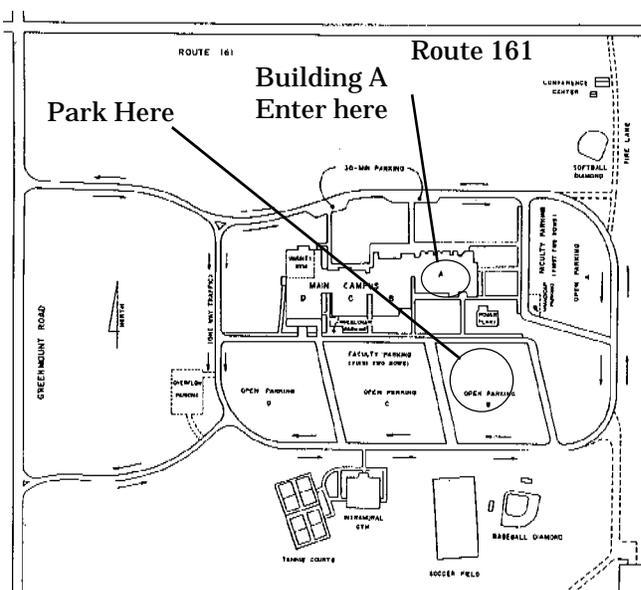
Featured will be talk by Keith Bradley, a senior, at Parkway North Senior High School, and his Physics Instructor, David Lay. Keith was one of the twenty students nationwide named as a member of the U.S. Physics Olympiad Team. Eliminations to 5 member U.S. International Team were held this summer at the Olympiad training camp held on the campus of the University of Maryland. Actual international competition was held in Helsinki, Finland, on July 5-13, 1992.

Five members of the U.S. Physics Team won awards, including 2 gold medals, 1 silver medal, and two honorable mentions. This year 177 competitors from 37 countries won a total of 13 gold medals, 19 silver medals, 25 bronze medals and 33 honorable mentions. The U.S. Team was sponsored and organized by the **American Association of Physics Teachers.**

XXIII International Physics Olympiad U.S. Team members as follows: Carwil James (Hawken School, Gate Mills OR, Robert Shurtz) **Honorable Mention:** Dean Jens (Ankeny High School, Ankeny IA, D. F. Savage) **Honorable Mention:** Eric Miller (San Francisco University High School, San Francisco CA, Tucker Hiatt) **Gold Medal:** Szymon Rusinkiewicz (Bellaire High School, Bellaire TX, John E. Beam) **Gold Medal:** Michael B. Schulz (Baldwin High School, Baldwin NY, Dominick J. Capozzi) **Silver Medal..**

Following the talk the teachers will be participating in a curriculum sharing session. We request that all teachers participate in this first sharing session on how we teach the topics of physics. Each participating teacher should bring 25 copies of their current syllabus or curriculum guide for their current high school Physics lab classes. These copies will be distributed to other attending teachers and we will discuss the differences or similarities of topic selection, scheduling, and application of hardware in each lab. This session can be beneficial to all, so please come prepared to participate in this half of our program.

Directions to Belleville Area College are as follows: From St. Louis, proceed over the Popular Street Bridge east. The PSB can be accessed from I70 from north I55 from the south and US40/I64 from west St. Louis & St. Louis County. After crossing into Illinois you will be on I55/I70/I64, look for the Exit I64 East and exit. Follow I64 East and leave at Exit 19A, Illinois Route 158, labeled “Scott Air Force Base”. You should be exiting towards the right. Travel on Illinois 158 south passing through two traffic lights. The intersection of Illinois Route 158 at Illinois Route 161



will form a “T”. Turn right onto Route 161 and continue to the first traffic light, turn left on Greenmount Road (Campus Access Road). Continue on Greenmount Road and make a left turn accessing the main campus and parking area. Now refer to the map: be aware of one way traffic patterns and seek out Parking Lot B. This is located on the Southeast side of the campus across from the baseball diamond and soccer fields. Parking lot B is just south of the power plant and the building section marked “A”. We will be meeting in Building A Room 2083 which is up one flight from the level of entry.

October 1992 Meeting “Laboratory Experiment Sharing”

Date: Saturday, October 17, 1992

Time: 8:30 am

Place: Mehlville Senior High School

Host: Gene Fuchs

A regular meeting of the St. Louis Area Physics Teachers will be held 8:30 a.m., October 17, 1992, at Mehlville Senior High

School, 3200 Lemay Ferry Road, in south St. Louis County . Gene Fuchs will be hosting this program which will meet in room 202. A short business meeting will precede the meeting event.

The meeting event topic is “Laboratory Experiment Sharing”, a program which will be augmented with an optional presentation by Gene of PTRA Materials. Participating teachers are requested to select from their student Physics Laboratory experiments a single experiment to share and possibly perform at this meeting. If it is not possible to perform the experiment, a video of the experiment would be useful. All requirements for your experiment need to be coordinated in advance by contacting Gene Fuchs at 631-4682.

Participating teachers should plan to bring at least 25 photo copies of of the experiment writeup instructions for distribution to the present membership. We plan on sharing the successful laboratory experiments with other teachers. This can be an extremely enriching and rewarding program for members and encourage all attending teachers to plan their participation as soon as possible by contacting Gene Fuchs.

All attendees will be encouraged to remain for the optional portion of this event which will include the presentation by Gene Fuchs of PTRA Laboratory Sharing materials from the summer program which he attended this year. The optional program is anticipated to run at least 3 additional hours, so plan on staying the rest of the day for extremely useful materials and a day with your friends. You are welcome to bring a sack lunch, or if you choose there are several fast food stores in the vicinity of Mehlville Senior High School.

Later this year the St. Louis Area Physics Teachers will present more materials from the PTRA sessions, so keep watching *Physics Tempo* for these important announcements.

Written directions for Mehlville Senior High School are as follows: Mehlville Senior High School is located in South County on the east side of Lemay Ferry Road about 1.5 miles north of South County Shopping Center.

Directions, for attendees coming from Illinois(South):

Cross the Jefferson Barracks Bridge via I255 (west). Take the third (3rd) Missouri exit past the JB bridge, which is “Lindbergh Blvd. (north), Proceed on Lindbergh until you reach Lemay Ferry Road, turn right onto Lemay Ferry Road, and proceed about 1.5 miles (second stoplight at Will Avenue) and then turn right, onto the driveway to the parking lot.

Directions, for attendees coming from Illinois (North):

Cross the Poplar Street Bridge, exiting to I-55 (south). Continue on I-55 south for about 15 minutes (at speed limit) exit at Reavis Barracks Road. Turn left onto Reavis Barracks Road continue to Lemay Ferry Road (3rd Light), turn right onto Lemay Ferry Road, continue to (3rd Light , Will Avenue), turn left onto the driveway to the parking lot.

Directions, for attendees coming from North & West County:

Take I-270 (South). The Lemay Ferry Road Exit is first exit after I-55. **Please be very cautious of the construction around I55 and I270, construction speed limit is 40 mph, two people have**

already been killed in auto accidents in this construction zone.

Turn right onto Lemay Ferry Road, follow Lemay Ferry Road (4-stop lights) to Will Ave. Turn right onto the driveway to the parking lot.

Campus Directions:

Enter the second door (with steps and canopy) follow signs to room 202. For questions, contact Gene Fuchs, Mehlville Senior High 314-892-5000 at home 314-631-4682.

Demonstration of the Lorentz Force

by Semyon Volshteyn

Normandy Senior High School



The purpose of this experiment is to demonstrate the Lorentz force as asserted on the ionic charge in a solution. An overhead projector is used in this presentation and therefore is suitable for large classroom group.

This demonstration requires an overhead projector, power source 3-6volts DC, a “U” shaped magnet, bottom half of a petri dish, one circular copper electrode, one straight wire electrode, 2 each-copper or aluminum electrode supporting posts, a switch, connecting wires, deionized water, a weak acid solution or salt (ion source), an eyedropper, and ink.

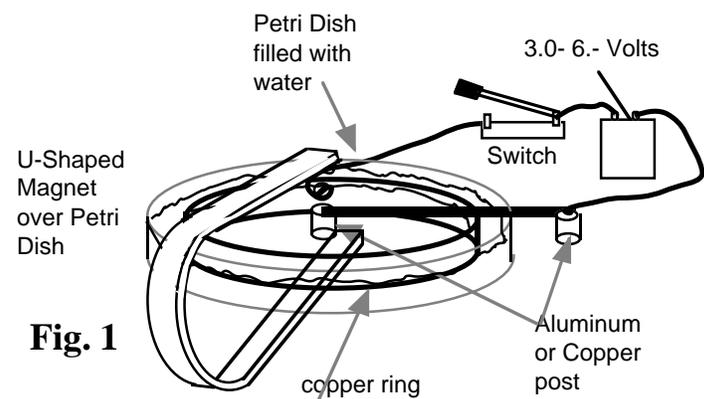


Fig. 1

Set up the apparatus as in figure 1. Place an electrode copper ring of smaller diameter than the petri dish inside the dish and connect it to one side of the switch. The other end of the switch should be connected to the battery. The other end of the battery should be connected to the horizontal electrode. Fill the petri dish with deionized water. Activate the switch, and place a couple of drops of ink in the water. You should observe no motion. Add 4-6 drops of weak acid or salt solution to the petri dish. You should immediately see the presence of motion in the water by the displacement of the ink clouds. The ink should swirl in a circular motion. This indicates a force being exerted on the solution via the presence of ions.

The force can be explained by the equations of the Lorentz force formulas for magnetic field. $F = q v B \sin(\alpha)$, where q is the electrical charge on the ions, v is the velocity of the ions, B is the magnetic induction of the magnetic field, and (α) is the angle between $(vector) v$, and $(vector) B$.

Mission Statement

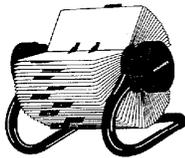
Physics *Tempo* is the newsletter of and by the St. Louis Area Physics Teachers, an affiliate of the American Association of Physics Teachers (AAPT), and is intended as an organizational support group for the betterment of Physics and Physical Science teachers throughout St. Louis and Illinois.

Subscription cost is \$10.00 per academic year, September through June. Collected donations are entirely used to print and mail the newsletter. Please make checks payable to Paul L. Discher.

Physics *Tempo* is dedicated to report achievements and announce the activities of the St. Louis Area Physics Teachers. In addition, Physics *Tempo* is intended to help disseminate useful and innovative information for teaching Physics and Physical Science. Physics *Tempo* is your newsletter. Editorial contributions are encouraged and welcomed. No idea is too small. Send articles, as well as subscription requests to: Physics *Tempo*, Editor / Paul Discher, Washington University-Electrical Engineering Campus Box 1127 St. Louis, Missouri 63130-4899. You can also FAX articles or ideas to Washington University- Electrical Engineering Fax Line: 314-935-4842. Please mark your fax mail to the attention of the *Tempo* Newsletter Editor, Paul Discher.

The Physics Teachers Rolodex

Back again is the Physics Teachers Rolodex the place where you find the places to get the things that you really didn't know you needed.



Laser Institute of America

12424 Research Parkway, Suite 130
Orlando, Florida 32826
1-800-34- LASER

The institute has made available its 1991-92 products and services catalog. This includes materials on ANSI Laser safety standards and the proceedings of the International Laser Safety Conference with available safety videos. The catalog also includes information on lasers and their applications in the fields of materials processing, medicine & biology, sensing, measurement, as well as flow and particle diagnostics.

Arbor Scientific

P.O. Box 2750
Ann Arbor, MI 48106-2750
1-800-367-6695

This scientific catalog has all sorts of interesting demonstration apparatus. Arbor includes the full selection of Paul Hewitt video tapes as well as access to the Conceptual Physics Scientific Catalog which is a special catalog supporting the Conceptual Physics Lab Manual by Paul Robinson

Oriental Trading Co. Inc.

P.O. Box 2308
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Unusual catalog of science related toys, candy, gift items, and holiday decorations intended for the classroom.

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