



Physics

The Newsletter of The St. Louis Area Physics Teachers

Tempo

March 1994 Vol. 4 No. 4

an affiliate organization of the American Association of Physics Teachers

Notes and News from The PTRA

Dynamics

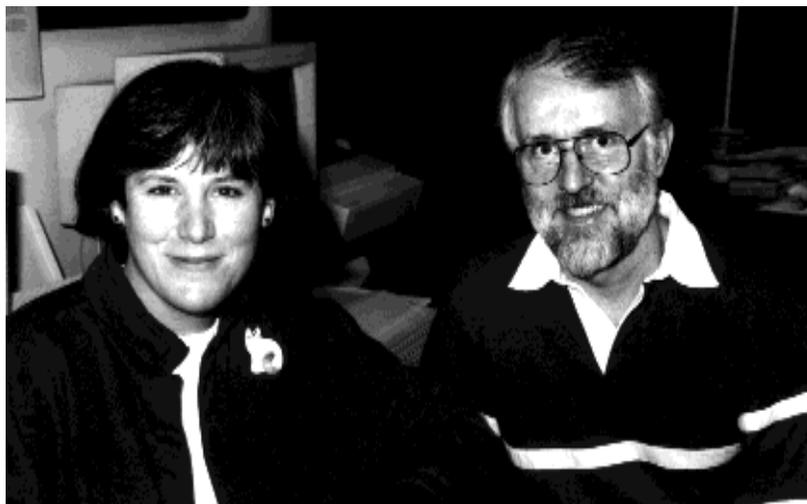
Workshop

February 1994

by *Debbie & Rex Rice*

No regular meeting of the St. Louis Area Physics Teachers was held in February, instead, the second of this year's (PTRA+) Physics Teaching Resource Agents-Plus Workshops, *Teaching About Lightwave Communications* was presented by Missouri PTRAs Debbie & Rex Rice. This meeting was held at Clayton High School on Saturday, February 12, from 8:30 a.m. to 2:30 p.m. Seventeen teachers from local as well as outlying school districts in Missouri and Illinois participated in this "hands-on workshop"

The materials used in this workshop had been refined from original optical communications workshops presented at Rutgers in the summer of 1990. Gary Shepek attended the Rutgers workshop that year and subsequently demonstrated materials he acquired at the regular meeting of the St. Louis Area Physics Teachers, March 16, 1991, Mehlville Senior High School, which was hosted by Gene Fuchs. Later an "Optical Communications Workshop" was held at the campus of Vianney High School, Saturday February 8, 1992, hosted by Gene Allard and Gary Shepek. At this workshop participants constructed an optical transmitter and receiver system for classroom demonstrations. The transmitters were built from Eveready flashlights donated by the Eveready Battery Company, and the receivers were modified AM-transistor radios purchased from Radio Shack.



Val Michael, Parkway Central and Bill Brinkhorst, John Borroughs were elected as New Co-Editors for Physics Tempo at the March 1994 Meeting. (article on page 2).



Dave Bross, Parkway West, elected as Membership Chairman

Many improvements and additional lightwave investigation activities were added to the Rutgers concepts as incorporated into the PTRA program: *Teaching About Lightwave Communications*

Participants in this workshop built a "photophone" from PVC pipe and a balloon. This variation of the original 1880 photophone demonstrates the basic and historically significant concepts of light wave communications.

The "photophone" was originally invented jointly by Alexander Graham Bell and Sumner Tainter February 19, 1880. In June of

1880 Tainter and Bell were able to transmit intelligent voice with the photophone across a distance of 213 meters. Several patents were granted to Tainter and Bell covering the Photophone and its variations. Until his death in 1922, Bell considered the photophone to be his most important invention, even more so than the telephone. An exciting article commemorating the 100th anniversary of the photophone written by Forrest M. Mims can be found in the spring 1980 edition of *Optical News*, a publication of the Optical Society of America.



Tainter and Bell's 1880 Photophone. (Bell Labs Archives)

The photophone and other lightwave communications devices built and studied by the participants in this PTRA workshop demonstrated the principles of transmitting information by "modulating" a stable carrier wave, light. The participants used photocells, modulated laser beams as well as other test equipment to explore and discover the fundamentals of light wave communication, all of which has exciting potential teaching applications in their classrooms.

Notes and News from The March 1994 Meeting, Parkway Central High School

by Paul Discher

A regular meeting of the St. Louis Area Physics Teachers was held on a sunny Saturday, March 12, 1994, 9:00 am at Parkway Central High School. Twelve teachers were present at this meeting which was hosted by Val Michael and Bill Brinkhorst. A short business meeting preceded the day's event; "High Speed Photography Workshop."

The members present voted by acclamation to defer the election of new executive officers until the April Meeting at St. Louis University. However, nominations were submitted for executive office and included Frank Cange and Rex Rice. The members agreed to leave the nominations open until the next meeting.

Paul Discher outgoing founder & editor of *Physics Tempo* presented his final membership, financial, and newsletter report to the attendees. Dave Bross presented Paul Discher with a commemorative plaque acknowledging the 4-years of service Paul provided in this position.



Dave Bross presenting Paul Discher with a plaque for acknowledging 4-years editorship of *Physics Tempo*.

Elections for officers to fill the vacancy Paul left followed. Dave Bross was nominated and elected to a new position of "membership coordinator" for the 1994-95 academic year. Val Michael and Bill Brinkhorst were nominated and elected to the position of "newsletter co-editors" for the 1994-95 academic year.

Membership Drive now under way. Dave Bross now will be handling all membership matters including the collection of dues. If you are interested in the continued support of the St. Louis Area Physics Teachers organization and its publications, you can help by sending \$10.00, **payable to Dave Bross** to:

Parkway West Senior High School -Science Department
St. Louis Area Physics Teachers *Membership* - David Bross
14653 Clayton Road
Ballwin, Missouri 63011

The new newsletter of the St. Louis Area Physics Teachers will be published by Bill Brinkhorst and Val Michael. If you are interested in submitting editorial material for the newsletter you can contact the editors at:

John Burroughs School
St. Louis Area Physics Teachers

Physics Tempo - Co-editor, Bill Brinkhorst
755 South Price Road
St. Louis, Missouri
63124-1899

Chris Geisert from Six Flags over Mid-America was on hand at our meeting to distributed new *Physics & Math Day* Workbooks to all of the teachers and to promote attendance of the Six Flags over Mid-America *Physics & Math Day* 1994, April 29, 1994. A variety of new events have been incorporated into the program. This includes the unusual opportunity to ride the



Chris Geisert, Six Flags Over Mid-America with new *Physics & Math day* Workbooks.

Scream in Eagle backwards. NASA Astronaut Bob Overmeyer will talk about his experiences in space and there will be a special "International Space Center" exhibit from NASA. Tom Fitzgerald will be on hand to do a Boomerang workshop. Chris fielded questions from the participants. After a short recess the main program resumed.

Bill Brinkhorst and Val Michael presented their workshop on High Speed Sound activated photography. Much of the background information on this workshop came from the collected published materials of Loren M. Winters.

Bill Brinkhorst acknowledged the potential applications for sound activated photography in quantitative physics laboratory exercises. This included measurement of the speed of sound, as previously published by Loren Winter. Bill also explained the needed environmental conditions for this type of photography. You will need to be able to completely darken the room which you choose use for high speed photography and equip the back drop of the subject area with a black non-reflecting material.

Val Michael provided a explanation of camera equipment needed for sound activated photography. Cameras used with the sound trigger devices must possess a "bulb" type shutter release. This shutter feature allows one to manually hold the shutter of the camera open for an indefinite period of time. Some Polaroid cameras with photoelectric controlled shutters can be "tricked" into this mode by opaquing the photoelectric sensor with black tape. This allows the operator of the camera to manually hold open the shutter as long as the shutter release button is depressed.

Finally, Val discussed the sound trigger circuits and the type of electronic flash needed for this type of photography.

Almost any type of electronic flash unit could be used. The better "auto - thyristor" flashes cost more but are much more reliable. The flash units must have a "PC" cord connector, which is the method the flash connects electrically to the camera under normal use. Instead of connecting the "PC" cord into the camera, connections are made directly to the flash from the sound trigger circuits. The sound trigger circuit now controls the flash.

The sound trigger circuits are small printed circuit boards that you can purchase for a modest cost from Loren M. Winters in quantity. Bill Brinkhorst and Val Michael also have purchased an extra supply of units for this workshop and are available for the paltry price of \$3.00. If you are interested, contact Val Michael directly at Parkway Central: 314-851-8251 or at home at 314-394-6946.

Next Meeting —April 1994
“ St. Louis University Physics Competition and General Meeting of the St. Louis Area Physics Teachers”

Date: Saturday April 12, 1994
Time: Coffee: 8:30 a.m. Meeting: 9:00 a.m.
Place: St. Louis University
Ritter Hall Room 320
Host: St. Louis University Physics Department
Dr. Larry M. Stacy, Associate Professor

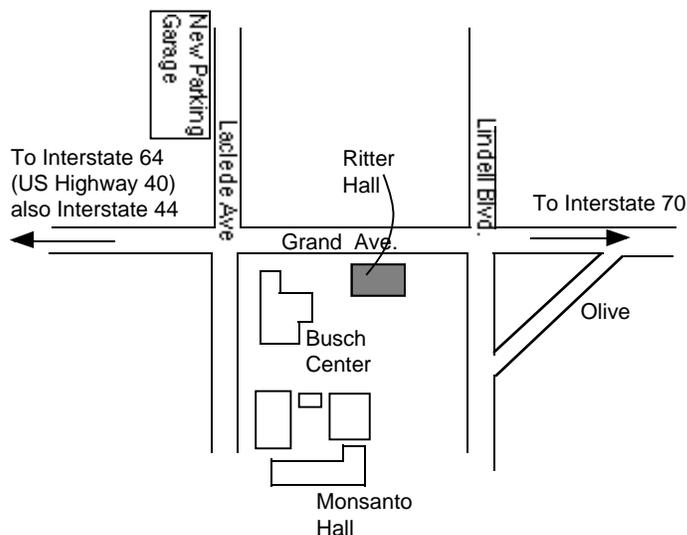
The next regular meeting of the St. Louis Area Physics Teachers will be held on the campus of St. Louis University, Saturday April 12, 1994, and will coincide with the annual St. Louis University Physics Competition. This meeting will be hosted by the St. Louis University Department of Physics and Dr. Larry M. Stacy, Associate Professor of Physics. The meeting will take place in Ritter Hall Room 320. A short business meeting will precede the day's event.

Important business will be conducted at this meeting, as the nominations for executive officers remains open and will close at the time of voting. Frank Cange and Rex Rice are current nominees.

The main event of this meeting is the student Physics Competition, and while the students will be competing in this program the teachers will be able to attend talks presented by Dr. Larry M. Stacy, Associate Professor of Physics, St. Louis University, "Magnetism in Superconductors". Attending teachers are invited to make presentations at this meeting as well. It is not necessary to register in advance for your presentation. Please consider making a short talk at this meeting.

St. Louis University is located between Lindell and Laclede Ave. at Grand Ave., in mid-central St. Louis City. The meeting will be held in Ritter Hall, Room 320, coffee at 8:30

a.m. meeting to commence at 9:00 a.m. Driving on US Highway 40 (Interstate 64) from either the east side (Illinois) or west St. Louis county, one should proceed to the Grand Ave. Exit, and leave the highway. Exit and drive north on Grand Ave. turning left at Laclede Ave. Park in the newly constructed Parking Garage. Parking tickets will be validated at the meeting, make certain to bring your ticket with you. Walking from the parking lot, you will need to walk a short distance north on Grand to Ritter Hall.



Next Meeting —May 1994
“Physics Laboratory Practicum and Laboratory Practicum Sharing Session”

Date: Saturday May 14, 1994
Time: 8:30 a.m. - 12:00 noon
Place: SIU -Edwardsville
Science Laboratory Building
Rooms SL-1217 and SL-1218
Host: Fred Zurheide & SIUE-Physics Dept.

The next regular meeting of the St. Louis Area Physics Teachers will be held on Saturday, May 14, 1994, 8:30 a.m., at the campus of SIU-Edwardsville. The SIU-Edwardsville Physics Department and Dr. Fred Zurheide will be our host. The meeting will be held in the Science Laboratory Building, Introductory Physics Labs, room SL-1217 and 1218. Free parking will be available in Lot A, on the north side of the building. The main topic for this meeting is: "Physics Laboratory Practicum". Following the host's presentation, there will be a "laboratory practicum sharing session". Attending teachers are invited to participate by bringing their own write-ups and equipment for sharing. If you have special requirements for your presentation contact Fred Zurheide directly at 618-692-3148 (office) or 618-259-2109 (home).

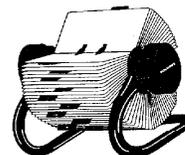
Dr. Craig Parman, Assistant Professor of Physics, chairman of the Physics Laboratory Committee, and Fred Zurheide will conduct the main program on "Physics laboratory Practicum". In this portion of the program, copies of laboratory exams used for SIUE undergraduate Physics instruction will be distributed along with write-ups for selected laboratory experiments. Multiple student lab stations will be set up for participant use as well as examples of apparatus used in the Physics portions of the recent Science Olympiad. Discussion of the students results on these materials and possible changes will be included in this portion of the program. Teachers will be invited at this time to present their materials.

SIU-Edwardsville campus is located Northeast of St. Louis on Illinois Rt. 157. The campus is a few miles east and north of the intersection of Interstate 270 and Interstate 255. Either interstate routes could be used to get to the Illinois 157 exit (north) to the SIU-Edwardsville Campus. Once on the campus proceed north on South University Drive. Drive north and turn left on Circle Drive. Continue on Circle Drive and then turn right on Whiteside Road. Continue on Whiteside Road and use Lot A on the North side of the Science Laboratory Building. The meeting will take place in Room SL-1217 - SL-1218.



The Physics Teachers Rolodex

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



Signals

100 Westgate Drive
St. Paul MN 55114-1631
1-800-669-5225

This company carries the video tape, "A Brief History of Time". Also ask them for their complete science teaching supplies catalog.

Loren M. Winters
1010 N Gregson St.
Durham, NC 27701

Loren M. Winters published several articles on the construction and use of sound activated photoflash systems used for high speed sound activated photography. You can purchase sound trigger circuit boards directly from him.

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