Ontario Association of Physics Teachers

NEWSLETTER

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March, 1989

AAPT WINTER MEETING

(report by Alan Hirsch, Section Representative)

San Francisco was the site of the Annual Winter Meeting of the AAPT/APS (American Physical Society). The meeting was held from Jan. 15 to Jan. 19, 1989, and was combined with the meeting of the AAAS (American Association for the Advancement of Science), resulting in a total registration of nearly 10 000. I would like to share with you some general observations of the themes and events of this meeting.

Increased Number of Workshops

The trend at recent winter and summer meetings has been to offer more workshops prior to the start of the formal sessions. At this meeting, a large portion of workshops related to the use of computers in the classroom. Other workshops included the use of digital timers, teaching electricity with capacitor-controlled light bulbs, and the usual selection of commercial workshops.

Invited and Contributed Papers

Most contributed papers in the sessions lasted for 15 minutes, while invited papers lasted for 15 minutes to one hour. Several papers were presented on astrophysics, synchroton radiation, educational research, and women and minorities in physics. At the high school level there were numerous papers related to teaching methods and demonstrations. Many of these were given by the "graduates" of the highly successful PTRA (Physics Teachers Resource Agents) program. These teachers have taken workshops in physics education and are expected to "spread the good word" to other physics teachers by giving presentations at conferences and workshops in their local regions.

Ontario members will be pleased to learn that Doug Fox was one of the presenters. Although he is no longer directly involved in physics, his heart is still in the right place, as revealed in his talk, which was titled "Ten Timely Tips Toward Terrific Testing."

In one session a summary of the *National Survey of Teachers of Physics*, which had been conducted by the American Institute of Physics, and reactions to it by the chairperson of the AAPT High School Committee and other teachers were given. (See the note below for more information about this major survey.)

THE Highlight

Undoubtedly, the highlight of the winter meeting was the Memorial Session devoted to Richard Feynman who devoted much to physics and physics education. (He shared the Nobel prize in physics in 1965 with two other physicists for work in quantum electrodynamics.) An estimated 1500 to 2000 people filled the auditorium where speeches about and in honour of Feynman electrified the air. Included among the speakers were Nobel prize winners John Wheeler, Julius Schwinger, and Murray Gell-Mann, all of whom knew Feynman, as well as Freeman Dyson from Princeton who also knew Feynman and delivered a magnificently entertaining talk. The February, 1989, issue of *Physics Today* is devoted to Feynman, with articles written by the same people mentioned here. If you are interested in reading more about Richard Feynman, look for two books written by him called *What Do You Care What Other People Think?*, published by W. W. Norton and *Surely You're Joking Mr. Feynman*, published by Bantam Books.

Publications and Equipment

Because the AAPT and AAAS had joined together for this meeting, the number and variety of books, magazines, software, and physics equipment displayed were greater than usual. A few new college and university physics texts are now available as well as new editions of old favorites.

OAPT is affiliated with the American Association of Physics Teachers

AAPT Future Meetings

June 26-July 1, 1989: San Luis Obispo, California
January 22-25, 1990: Atlanta, Georgia
June 25-30, 1990: Minneapolis, Minnesota
February, 1991: San Antonio, Texas
June, 1991: Vancouver, B.C. (proposed)

Survey of Secondary School Teachers of Physics

In 1986/87 the AIP in collaboration with the AAPT surveyed nearly 20 000 teachers of physics in the USA to discover details regarding their schools, training, experiences, and attitudes. The results of the survey have been published; they are interesting and informative and, it is hoped, they may lead to understanding ways that can be used to increase the number of physics students and teachers. There appears to be a chance that the AIP may consider helping to conduct a similar survey in Canada and other countries outside the USA.

A few of the many facts found in the survey are:
-96% of all high school students are in schools where physics is available, but only 20% of all high school graduates take physics.
-About 33% of the teachers were trained initially in physics.
-Over 80% of the teachers are the only physics teacher in their school, and fewer than 10% have personal or professional contact with science teachers at other high schools or universities.
-About 1% of high school students in USA take 2 years of physics.
-23% of the teachers were female, 77% were male.
-The mean school-year salary was $24 500 (US).

The survey report is available from AIP, Division of Education and Employment Statistics, 335 East 45th St., New York, NY 10017-3483 USA

Laser and Lightwave Sciences

Summer Workshop for High School Science Teachers, 21-25 August, 1989

Apply to: Suite 331, McLennan Physical Laboratories, 60 St. George St., Toronto, Ont., M5S 1A7 by April 15, 1989. tel. (416) 978 3923

OAPT JUNE CONFERENCE

Information about the June conference is given on the opposite page. If you or your family would like some variety during the conference, consider the following possibilities:

Stratford Festival

Stratford, Ontario, is a short drive from London. You may wish to attend the Stratford Festival. An early booking is advisable both for theatre tickets and hotels. For further information, write to

The Stratford Festival,
P.O. Box 520,
Stratford Ontario,
N5A 6V2

Blyth Festival

Also a short drive from London is the Blyth Festival in the town of Blyth. This festival features Canadian plays. For further information, contact

Blyth Festival,
Box 10,
Blyth, Ontario,
N0M 1H0

Camping

There are two large campgrounds in the London area.

Fanshawe Conservation Area - 650 sites
10 km N of Hwy 401 at 100. P.O. Box 6278, Station D, N5W 5S1. tel. (519) 451 2800

London-401 KOA Kampground - 120 sites
8 km E on Hwy 401 at 74. RR7 N6A 4C2
tel (519) 644 0222

Membership Application and/or Renewal

NAME _____

ADDRESS _____

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$5.00 per year, payable to OAPT
Send to Prof. Ernie McFarland, Dept. of Physics
University of Guelph, Guelph, Ont., N1G 2W1

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PLAN **NOW** FOR THE ONTARIO

ASSOCIATION OF PHYSICS TEACHERS

(OAPT) CONFERENCE TO BE HELD IN

LONDON AT UWO

ON JUNE 25, 26 & 27, 1989.

MARK IT DOWN!!

- Reasonable Costs
- Sunday Afternoon Workshop (Low–cost Electrostatics)
- Demonstrations; Featured Speakers; Short Contributions
- Tours of UWO Laboratories
- Meet teachers from Michigan & Ohio

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For more information:
Bill Konrad, Kent Cty. Bd. of Ed.,
Chatham, Ont. (519) 354 3770 or
Dean Gaily, Physics, UWO, London
(519) 661 2111 x 6426

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THE DEMONSTRATION CORNER

Overhead Projector Wave Simulator

by Bill Konrad,
Kent County Board of Education

The demonstration described in this column is one I learned as a teacher in summer school at the beginning of my teaching career. It is one that I have found to be very useful in teaching a number of concepts related to waves.

I would stress that it is important for students to see and experience a number of real waves such as those on slinkies, in water, or on a Bell Wave Demonstrator, and so this demonstration is not meant to replace any of these hands-on activities. However, the overhead projector model described below is very useful in teaching concepts such as vibrating in phase, direction of particle motion versus direction of wave motion, and the universal wave equation. To make your own overhead projector wave demonstrator, first make a transparency of the sheet of parallel black lines found on the sheet attached to this newsletter. Next you will need to draw a sine wave on a sheet of Bristol board that is about 80 cm by 20 cm. Use a wavelength of 10.2 cm (4 inches). After drawing the wave on the Bristol board, cut it out so that a gap is left on the sheet. Now use acetate transparencies (a portion of a roll from an overhead is best) to cover the gap. If you have access to a laminating machine, it is even better to laminate the sheet that has the sine wave cut out of it.

Tape the transparency consisting of alternate black lines to the top surface of the overhead. When the opaque Bristol board (with the sine wave cut out of it) is moved across the transparency, a moving transverse wave will be seen on the screen.

Some suggestions for using the wave simulator are as follows:

1. Colour two blank spaces on the transparency that are one wavelength apart with an overhead projector pen. Colour another space that is a distance other than one wavelength from the two previously coloured spaces. (Use a different colour for each of the spaces.) Now when the wave motion is simulated, the terms "vibrating in phase" and "not vibrating in phase" can easily be illustrated.

2. To emphasize the difference between particle motion and wave motion, ask one student to follow the motion of a specific coloured particle with the end of a metre stick. (One of the particles created by the coloured spaces mentioned in step 1 can be used.) Another student could be asked to follow the motion of the crest of a wave. The difference between particle motion and wave motion is clearly illustrated.

3. To teach the universal wave equation, proceed as follows. Ask a student to say "STOP" after a particle on the wave has gone through exactly one complete vibration. Repeat this a few times and ask students to note how far the wave itself moves as the particle goes through one vibration. Students should see that this distance is one wavelength. It becomes clear then that, if a specific particle goes through f vibrations, then the wave will move f wavelengths. If f represents the frequency or the number of vibrations per unit time, then the distance travelled in that unit time is the speed of the wave.

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Submissions describing demonstrations will be gladly received by the column editor.

DIAGRAM OF OVERHEAD PROJECTOR WAVE SIMULATOR

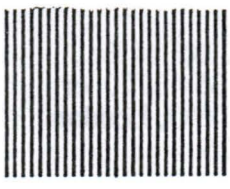

Diagram of transparency that is placed on overhead.