



Ontario Association of Physics Teachers

Vol. X No. 4

Annual Conference
University of Toronto—Scarborough
26 - 28 June

As the time for the annual conference approaches, here is an update of events finalized since the last newsletter.

Geraldine Kenney-Wallace, Professor of Chemistry and Physics at the University of Toronto, and Chairperson of the Science Council of Canada will be guest speaker at our annual banquet on Monday evening, June 27. Geraldine has kindly agreed to take time out from her busy schedule to speak on the topic "From Research to Markets: The Challenges for Science for 2001". She is keen to meet with teachers at the pre-banquet reception.

Contributions for posters, my favorite demonstrations and short talks are still coming in. Here are a few that will give you an idea what to expect (and which might encourage you, too—its not too late!). Pauline Plooard, from Fenelon Falls Secondary School, will display a poster of a collection of puns on the word ohm and its symbol Ω as created and drawn by her Grade 11 Physics students. Alan Hirsch, from Brampton Centennial Secondary School, has a number of favorite demonstrations including "Happy and Sad Balls". (He says don't miss this one—some pairs will be given away and others will be available for \$3.50 per pair.) There will be at least four video presentations. Douglas Cunningham, from Bruce Peninsula District School, will show "Using Video Segments to meet the New Curriculum Objectives". Edward Gregotski, from Midland Avenue Collegiate Institute here in Scarborough, will show one describing the National Science Olympics. Sound interesting? Do you have an equally interesting idea? Then let us know!

This is just an update. Don't miss the talks on high temperature superconductivity, the supernova, the chemistry and physics of archaeology, the tour of the Darlington nuclear power station, and the computer demonstrations in the Scarborough Physics labs on Sunday evening, which were described in the previous newsletter. As regards the demonstrations, 9 Macintosh Plus computers will be available for hands-on workouts throughout the entire conference period. Software running will include the "Calculus" and "Physics" packages by Brøderbund, simulations in mechanics, electromagnetism and modern physics from Blas Cabrera's group at Stanford University, space-time software in collisions and special relativity from Edwin F. Taylor's group at MIT, and HyperCard stacks in electric circuits and astronomy. And much more.

Registrations will be received in the Student Village Centre from 12 noon to 6 pm Sunday, and outside room S309 (in the "S" wing), the main lecture theater, from 8 to 12am Monday. With reference to the map attached, take the Morningside exit from the 401 and go south on Morningside to Military Trail (first traffic light). Once in the main entrance follow the "OAPT" signs to the Student Village Centre. Parking is FREE on all lots. The tour bus leaves at 12:30.

Remember, this is the tenth annual conference of the OAPT (formerly AAPT-O!). This organization exists for the support of teachers of physics in the province at the high school, community college, polytechnic and university levels. It can only develop with the interest and efforts of its membership. If you believe in the aims of the organization spread the word. Pass on a copy of the registration form to a colleague who is interested in good physics and good talk!

Stuart Quick
Vice-President



Agenda
Tenth Annual OAPT Conference
University of Toronto—Scarborough
26 - 28 June 1988

Sunday - 26 June

- 12:00 - Registration at Student Village Centre, Scarborough College
- 12:30 - 4:00 Tour of Ontario Nuclear Power Plant, Darlington, and talk at Pickering
- 7:30 - 8:00 Reception
- 8:00 - Demonstrations of applications of computers in physics teaching, physics labs Scarborough. Participation by Apple Canada, Merlan Scientific

Monday - 27 June

- 7:30 Breakfast
- 8:00 - 12:00 Day registration, Room S309 ("S Wing"), Scarborough College
- 8:45 Welcoming Remarks
- 9:00 - 10:00 **Thomas Timusk**, Department of Physics, McMaster University
"High Temperature Superconductivity" (talk and demonstrations)
- 10:00 - 10:30 Refreshment break, publishers, displays, poster sessions
- 10:30 - 12:00 Contributed talks and "My Favorite Demonstrations"
- 12:30 - 2:00 Lunch
- 2:00 - 3:30 **Ian Shelton and John Percy**, Department of Astronomy, University of Toronto
"Supernova Shelton 1987A"
- 3:30 - 4:00 Refreshment break, publishers, displays, poster sessions
- 4:00 - 5:00 Contributed talks and "My Favorite Demonstrations"
- 6:30 Pre-Banquet Reception
- 7:00 - Annual Banquet. Speaker: **Geraldine Kenney-Wallace**, Department of Chemistry, University of Toronto and Chairperson of the Science Council of Canada
"From Research to Markets: The Challenges for Science for 2001"

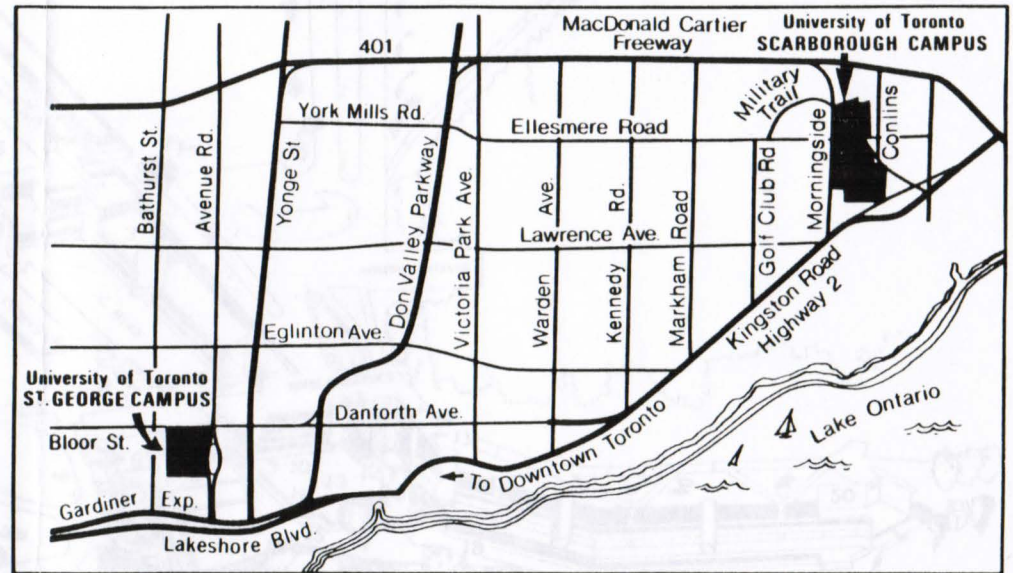
Tuesday - 28 June

- 7:30 Breakfast
- 9:00 - 10:00 **Ron Hancock**, Director, Slowpoke Nuclear Reactor, University of Toronto
"The Chemistry and Physics of Archaeology"
- 10:00 - 10:30 Refreshment break, publishers, displays, poster sessions
- 10:30 - 12:00 Contributed talks, "My Favorite Demonstrations", Results of the Prize test
- 12:00 Lunch

University of Toronto
Scarborough Campus

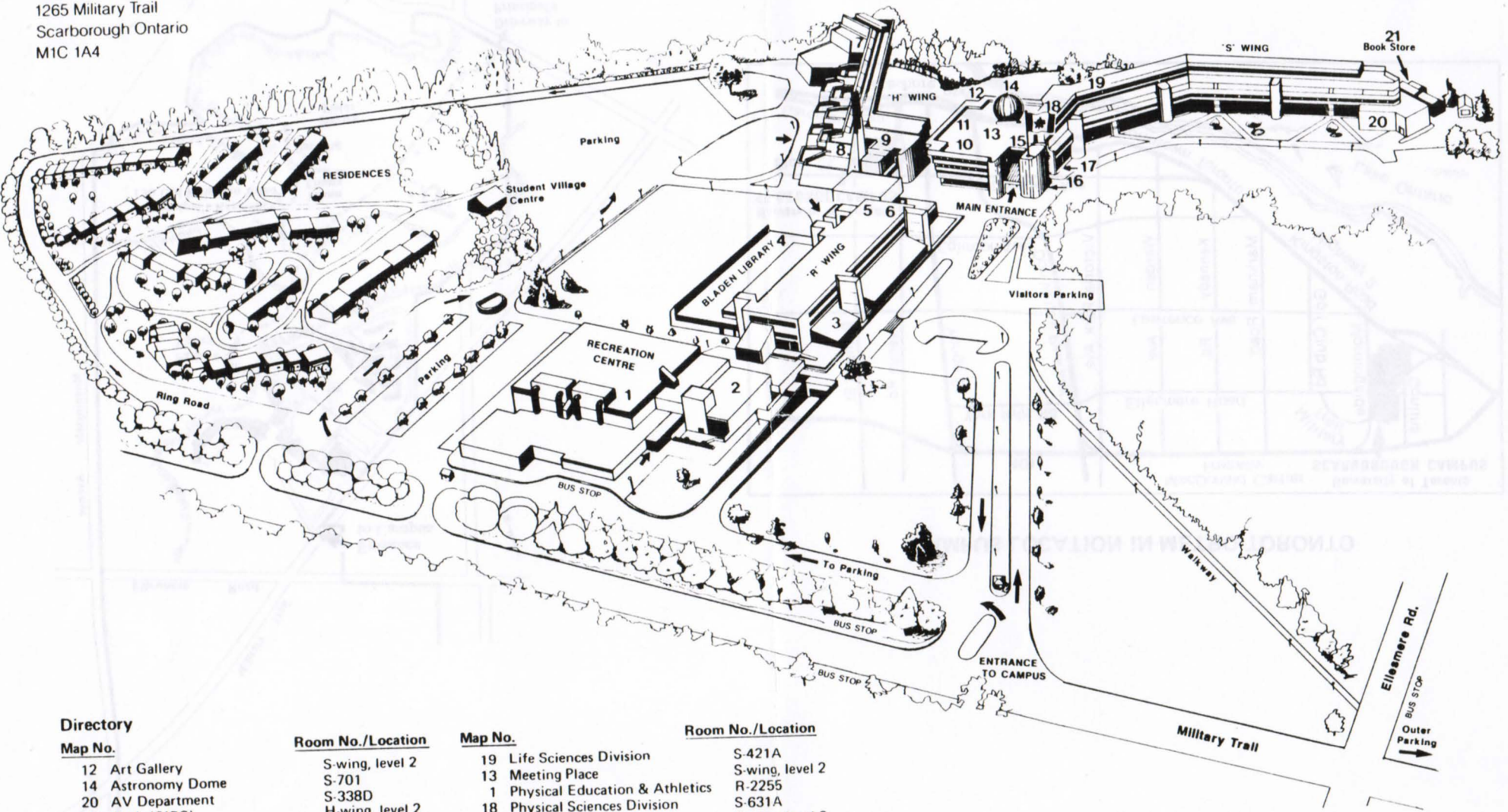


CAMPUS LOCATION IN METRO TORONTO



Scarborough Campus

1265 Military Trail
Scarborough Ontario
M1C 1A4



Directory

Map No.	Room No./Location	Map No.	Room No./Location
12	Art Gallery S-wing, level 2	19	Life Sciences Division S-421A
14	Astronomy Dome S-701	13	Meeting Place S-wing, level 2
20	AV Department S-338D	1	Physical Education & Athletics R-2255
8	Bank (CIBC) H-wing, level 2	18	Physical Sciences Division S-631A
21	Bookstore S-360	17	Post Office S-wing, level 2
9	Cafeteria (main) H-206	2	Pub R-3268
16	Campus Police/Information S-624-628	11	Registrar/Admissions S-417
15	Computer Centre R-5008	5	Social Sciences Division R-5111
6	Co-op Programs S-302-304	3	Students Council Office R-3042
10	Counselling & Student Services H-525A		Passageways on level 2 connect all wings
7	Humanities Division L-208		Room location: First letter indicates wing
4	Library		First number indicates Floor level

➔ Entrance

Section Representative Report on the AAPT/APS Joint Winter Meeting

January 25-28, 1988, in Washington, D.C.

Following are my comments on the events and general trends observed at the Winter Meeting, and some indications of future plans that will affect the Ontario Section of the AAPT.

1. I am happy to report that I met with representatives from Ohio and Michigan and they are excited about a proposal to have physics educators from those states join their counterparts from Ontario at our annual June Meeting in 1989. The proposed meeting will take place in Windsor, Ontario, on dates that will be announced later. The timing for this event is appropriate because the annual Summer Meeting of the AAPT will take place out west, and few of the eastern teachers will be attending it. Plan in advance to join us for what promises to be a unique opportunity and experience.
2. Alberta and Quebec are the most recent provinces to join the AAPT, following the lead taken by Ontario and British Columbia.
3. The executives of the AAPT have indicated a trend to becoming less "American" and more international. For example, mention was made of a possible name change. Also, some section representatives expressed concern that certain workshops and side trips were closed to non-U.S. citizens.
4. In the past, the APS portion of the Joint Winter Meeting was larger and more important than it is now. Currently, the APS meeting later in the spring has a much greater attendance. The AAPT appears to want to continue its affiliation with the APS, so the AAPT executives have indicated that they may choose to alter the Winter Meeting dates to coincide with the larger APS meeting.
5. A government-sponsored program in the U.S. titled the Physics Teachers Resource Agents (PTRA) appears to have been very successful. The program provides funding for qualified teachers to attend workshops and seminars, then share their knowledge and experiences with other teachers back in their home regions and at conferences. Several PTRA's have travelled abroad and many gave presentations at this Winter Meeting. The ultimate goal of this program is to try to solve the problems common throughout North America of having too few physics teachers and students. (On a personal note, I think we in Canada could benefit by the experiences gained in setting up and operating the PTRA program. We do have isolated examples of professional development, such as the SEEDS Shell Fellowships, the Guelph University Physics Workshops, and the Chalk River Seminars. However, certainly we could use more funding and opportunities. Any ideas?)

- continued

6. As usual, the workshops and presentations at the conference were varied, but there were four general themes that seemed to predominate.
- The crises in physics education are not yet solved and may, in fact, be getting worse. The main crises are a lack of well-qualified physics teachers and low enrollment in physics courses. Researching the causes and cures of these crises is continuing, as are the attempts to solve them.
 - Computer use continues to be developed more each year, and laser-disc use is becoming more common.
 - Superconductivity is a relatively hot (or at least warm) topic. Scientific supply companies now have available various kits that can be used to demonstrate this phenomenon.
 - The supernova of 1977 and other topics in astronomy were popular items at this conference.
7. Various physics educators from Ontario attended the conference, including Ernie McFarland who gave a talk on Guelph University's MPC² program which combines elements of math, physics, chemistry, and computer science.
8. Anyone who has visited D.C. need not be told of the benefits of visiting the Smithsonian National Museums. A highlight of particular interest is the Air and Space Museum.
9. The AAPT Summer Meeting will be held June 22-25, 1988, at Cornell University in Ithaca, New York. This location, in the beautiful Finger Lakes Area, is probably the closest the Summer Meeting will be to Ontario for a long time, so if you have ever wanted to attend the Summer Meeting, this would be a good opportunity.

Alan Hirsch
Section Representative



"Hurry up, Archimedes! Stop yelling 'Eureka' and let someone else in the bath!"

THE DEMONSTRATION CORNERReal Image Demonstration

by Don Murphy,
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Many demonstrations can be made not just interesting but truly memorable by "setting up" the students a bit beforehand. A rather well-known demonstration involves a real flowerpot and a flower suspended upside down inside a box placed 2 focal lengths in front of a large concave mirror. The viewer sees an illusion of the flower being on top of the box but the image disappears when the viewer approaches too close. The apparatus on hand at our school for a similar demo is illustrated below, but in this case a real image of a light bulb is formed.

The box portion of the apparatus is commercially available¹ or could easily be made. Large concave mirrors (40 cm diameter, 28 cm focal length) are also available for about \$45.

The students are set up by first having the box sitting on the teacher's desk at the front of the room with the open side of the box away from the students. A low power light bulb is already in place in the dummy top socket. A marker may be used to doodle a face on the bulb with a few hairs on top. The students are then sent from the classroom. (The doodling could be done at the end of the class the day before the actual demonstration is to be done.)

While the students are out, the bulb is placed in the live socket inside the box and the concave mirror set in place. (The apparatus is set up across the room from the entrance door.) The students are then let in, a couple at a time, and asked if they can sketch a few more hairs on the top of the bulb. They usually say "Sure!" and grab the marker handed to them only to have the bulb "disappear" as soon as they get within "drawing distance". The first students to enter the room gleefully await the reaction of those to follow.

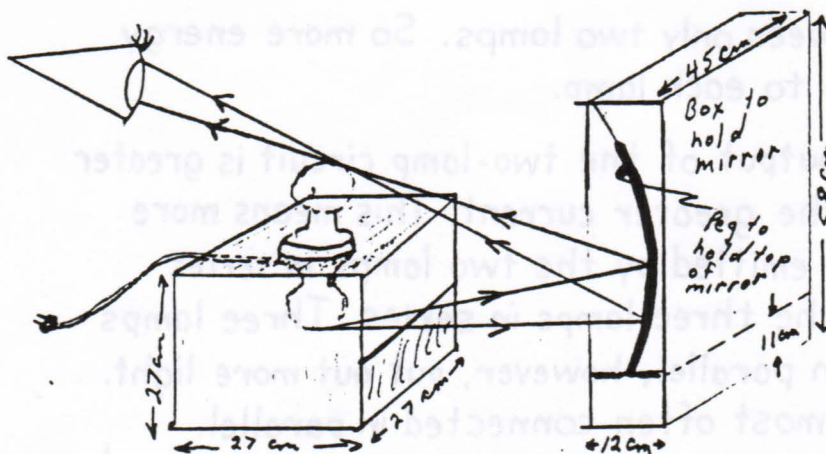
It is interesting to note that, when surprised in this way, all students say that they see the image in front of the mirror. The fact that a real image is formed is readily shown by placing a piece of paper at the top socket. However, in past years, when the mirror has been clearly shown to students and an object placed at a location to give an image in front of the mirror, many students would still say they see the image behind the mirror. Perhaps we are too accustomed to "behind-the-mirror images" to see otherwise.

References

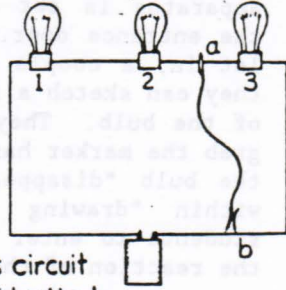
¹ Available from Sargent-Welch. It is incorrectly described in the catalogue as forming a virtual image.

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



FIGURING PHYSICS



The simple series circuit consists of three identical lamps powered by battery. When a wire is connected between points *a* and *b*.

- what happens to the brightness of lamp 3?
- does current in the circuit increase, decrease, or remain the same?
- what happens to the brightness of lamps 1 and 2?
- does the voltage drop across lamps 1 and 2 increase, decrease, or remain the same?
- is the power dissipated by the circuit increased, decreased, or does it remain the same?

Answers:

- Lamp 3 is short circuited. It no longer glows because no current passes through it.
- The current in the circuit increases. Why? Because the circuit resistance is reduced. Whereas charge was made to flow through three lamps before, now it flows through only two lamps -- $\frac{2}{3}$ the resistance results in $\frac{3}{2}$ the current (neglecting temperature effects).
- Lamps 1 and 2 glow brighter because of the increased current through them.
- The voltage drop across lamps 1 and 2 is greater. Whereas voltage supplied by the battery was previously divided between three lamps, it is now divided between only two lamps. So more energy is now given to each lamp.
- The power output of the two-lamp circuit is greater because of the greater current. This means more light will be emitted by the two lamps in series than from the three lamps in series. Three lamps connected in parallel, however, put out more light. Lamps are most often connected in parallel.