Ontario Association of Physics Teachers

NEWSLETTER

Volume XIV, Number 2
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OAPT Contest

The OAPT contest for Grade 12 physics students will be held on Tuesday, May 12, 1992. The contest committee is composed of the following people:

Peter Scovil	Waterford District H.S.
Malcolm Coutts	C.A.L.C., Toronto
Chris Howes	Pickering H.S.
Dianne Ness	Humberside C.I.,Toronto
Pauline Plooard	Fenelon Falls H.S.
Ron Taylor	Woburn C.I., Toronto

The format of the contest will be the same as in the past. In response to requests from several teachers, there has been a change in the procedure for sending out the results. Provincial winners and statistics will be sent out in June as in past years. However, the answers to the questions will be sent out shortly after the contest so that schools can determine local winners at an earlier date.

Students taking physics in the first semester are encouraged to write the contest, unless they are taking OAC physics in the second semester. in which case they will be ineligible. However, they may wish to write the SIN test which will be held on May 7.

June Conference 1992

Plan to attend the OAPT Conference at Ryerson Polytechnical Institute, Toronto, in 1992. The theme of the conference will be Physics and the Arts. Secondary school teachers who have found that our conference frequently conflicts with final examinations and other year-end activities will be pleased to note that the 1992 conference takes place after the end of the school year, June 28 - 30. More details will be available in the February newsletter.

An Introduction To Ryerson

In this issue of the newsletter, we have included some background information about the Ryerson Polytechnical Institute, the host of this year's conference. The following material has been prepared by R.J.Stagg and F.N.Hainsworth.

The Name

Egerton Ryerson, born into a United Empire Loyalist family in Norfolk County, Upper Canada, in 1803, developed a strong interest in Methodism early in life. Accepted on trial as a minister in that faith in 1825, at age 22, he was ordained in 1827. Soon he became recognized as the foremost speaker for the large Methodist sect in its struggle to gain recognition from the provincial government, which favoured the Church of England. While his reputation was established by his writings in the late 1820's and the 1830's, Ryerson is chiefly remembered today for his work in building the Ontario school system. As Superintendent of Education, from 1844 to 1876, he did much to make elementary education universally available and tuition free. Ryerson also introduced compulsory attendance and teacher training, improved the quality of secondary education, and introduced textbooks which he hoped would provide a high quality education, stressing moral and nationalistic values.

The Location

Under Ryerson's supervision in 1850, a parcel of semi-rural land, St. James Square, was purchased. The noted architects F. W. Cumberland and T. Ridout designed a classical building, with a vaguely Roman look, to house the Department of Education, and the Normal School which trained teachers. In 1857, a model elementary school and, for a brief period, a model grammar school were added to give practical

experience in teaching. Also housed in the building were a Department of Education library, and Education Depository which sold school materials at cost to local schools, and a museum and art gallery. The extensive grounds around the building were the site of early agricultural experiments.

When the Depository was phased out in 1882, an art school replaced it. In this century, the various activities associated with the building were gradually transferred elsewhere until 1941, when the Normal School was moved, the model school closed, and the building was used for air force training. In 1944, the old building and several temporary buildings erected during the war became the headquarters for a province-wide program which had been established in 1940 to train men and women for war industry, and to teach service personnel various trades. At the end of the war H.H. Kerr, who had headed this program, was put in charge of retraining returned service personnel at the Normal School building and elsewhere. In 1948, this program in turn was phased out, but the government decided that technical training was needed to improve the quality of the Ontario work force. The old building and the wartime structures became Ryerson Institute of Technology, with H. H. Kerr as its first principal. With all the buildings decaying, replacement was begun in 1958. In 1963, the original education building, except for the central facade which provided a link with the past, was demolished. Howard Kerr Hall (the Quadrangle) was erected in its place.

The Institute was renamed Ryerson Polytechnical Institute and transferred to the department of colleges and universities in 1967. It was now governed by an independent Board and an Academic Council was responsible for all academic matters. The big question to be addressed was; whether to become the flagship of the community colleges or to become Degree-granting and eventually a complete university. Gradually it became clear that Ryerson was following the latter route; the first degrees were conferred in the early seventies and just this fall a team from CEAB formally considered the Engineering school for accreditation. Several new or renovated buildings were opened in the seventies and eighties, including an Arts and Administration building, Library, the school of Architectural Science, CATE, the underground athletic facility, and most recently the Rogers Communication Centre and the first major residence.

With the opening of the Centre for Advanced Technology Education, the faculty confirmed its desire to embark on relevant applied research. In order to obtain a mandate and funding for research it was necessary first to show interest and capability. Professors from geography, community services, applied arts and engineering sought and received grants totalling several millions of dollars. The formal request for full university status is now before the Minister and his response is expected sometime in spring of 1992. If positive, Ryerson could look forward to many more exciting changes in the nineties.

In 1948, principal Kerr opened his trade school with a clear vision for its future. Now in 1991, president Grier will open a state-of-the-art computer and communications centre, confident that the vision is being fruitfully pursued. Ryerson has come a long way in 43 years and is still on the road. We would like to welcome you in June of '92.

The **OAPT newsletter** is published four times a year by the Ontario Section of the American Association of Physics Teachers.

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Ivars Peterson Wins Award

Some of our members may remember Ivars Peterson, a physics teacher who was active in the OAPT in its early days. At that time, he published a student newsletter, PHOTON: PHYSICS FOR FUN. Ivars left teaching in 1980 to pursue a career in journalism in the United States.

Ivars has recently been named as the recipient of the Mathematics Communications Award for "his exceptional skill in communicating mathematics to the general public over the last decade." The citation referred to his "fascinating, yet down-to-earth writing style in SCIENCE NEWS and his two books, *The Mathematical Tourist: Snapshots of Mathematics* (1989) and *Islands of Truth: A Mathematical Mystery Cruise* (1990).

No Calendar

In recent years, a calendar has accompanied the December newsletter. However, inflation, G.S.T., etc. have caught up with us. The calendar has become too expensive and the executive has decided that we can no longer afford it.

Membership Due?

The date on your address label is the expiry date for your membership. If it says June 91, your membership has already expired and you will not receive further copies of the newsletter. You may use the coupon below to renew your membership.

Membership Application or Renewal

Name _____

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THE DEMONSTRATION CORNER

A NOT-SO-SERIOUS PARALLEL CIRCUIT

by
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This idea was born while watching the Tonight Show. A popular entertainer demonstrated a wooden board upon which four coloured light bulbs in sockets were mounted along with a corresponding set of four coloured switches. No matter how the bulbs were rearranged in the sockets, the blue switch turned the blue bulb on and off, the red switch operated the red bulb, and so on. Johnny examined the bulbs, found them to be "normal" and was convinced that it was magic. Unable to determine how the four-bulb unit operated, we designed a simpler two-bulb version for use as a discrepant event in current electricity. Our unit used two white bulbs but coloured ones could be used as in the original unit. The only skills required to construct the unit are an ability to solder and the willingness to tinker a little.

Figure 1 shows the circuit diagram of the setup. Ordinary household 40 W bulbs (modified as described below) are used. The bulb sockets are standard flush mounting fixtures and the switches S1 and S2 are normal momentary-contact push buttons (rated for 120 V AC). The entire assembly is mounted on a small piece of plywood with the switches and sockets visible on the front and the wire and diodes D3 and D4 hidden on the back.

Diodes D1 and D2 are placed inside the base of the light bulbs B1 and B2 by first removing the centre contact on the bulbs using a disk sander. Once the metal is removed, the insulation is chipped away leaving one of the filament leads free. The other end of the filament remains attached to the threaded base of the bulb. The diodes in the bulbs are connected with their banded ends (cathodes) in opposite directions and pushed into the space inside the base. Be careful not to have any wires touch in the base when crowding everything in. Use a glue gun to fill the base and hold the leads in place so that only the free lead of the diode sticks out from the end of the bulb. Solder a brass washer to this lead to form the new centre contact of the bulb. Using more glue, put the washer in the centre of the base and restore the cone-shaped appearance of the insulator. Colour the visible glue with a black marker to further disguise your work.

Because of the orientation of the diodes, only one bulb will light up when the switches are closed one at a time. The alternating current will flow in only one direction through the switch, and only the bulb with its diode in the same orientation as that in the switch path will light. In order to throw a further red herring into the demonstration, put false wires on the front of the plywood which would lead the students to believe that the components are connected in a normal series/parallel circuit.

One way to introduce the demonstration is to start with the bulbs inserted in the opposite sockets. After an embarassed pause, "fix" the circuit by switching the bulbs around, show surprise at the result, and ask for an explanation. Students will probably ask you to try the bulbs in different sockets and to close different combinations of the two switches. You can explain the operation of the circuit by drawing the diagram of the connections, stating that the sockets are electrically identical, and explaining that the alternating current can only flow through the diodes in one direction.

This demonstration can be used in a Grade 12 Advanced Physics class to stimulate interest and in technology or electronics classes to illustrate the concept of the diode as a one-way electrical valve.

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

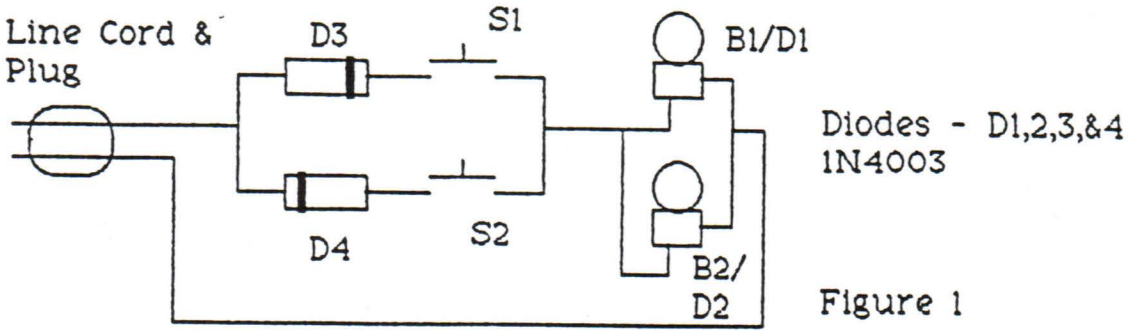

Figure 1