



American Association of Physics Teachers
AAPT Ontario Section
NEWSLETTER Vol. IX No. 1

REPORT ON THE ANNUAL JUNE MEETING

On June 12-14, 1986, the Ontario Section of the AAPT held its annual meeting at Guelph University in Guelph, Ontario. Approximately 140 members, a record for Ontario, attended the main part of the meeting. They were treated to several stimulating presentations, both invited and contributed, and displays by book publishers, equipment supply companies, and other members.

On Thursday afternoon, Ernie McFarland of Guelph University and Tony French of MIT conducted a superb 5-hour workshop on relativity attended by 34 teachers. Using a variety of media, they brought the teachers up to date on a topic that is included as one of the options in the new educational guidelines for senior high school physics. This was followed in the evening by a cordial reception for AAPT members at the Guelph University President's House.

On Friday, the Dean of Science at Guelph University, Jack McDonald, officially welcomed the members. Then the invited papers began with a presentation by Tony French of MIT titled "Using History in Teaching Physics". He shared with us many reasons for including historical aspects, as well as humorous anecdotes of misleading history and useful examples of correct history.

William McGowan, director of the National Museum of Science and Technology in Ottawa, Ontario, followed with an informative talk which answered the question "Has Canada a Past and a Future in Science and Technology?". He cited many examples of scientific developments in Canada's past and present, and he expressed cautious optimism for the future as well as hope for increased financial input.

Gabriel Karl of Guelph University gave an enlightening talk called "Elementary Review of Elementary Particles". He presented a balance of historical developments, information about current elementary particle research, and projections for the future of this important area of physics.

Gregg Herken, an American author and historian, gave detailed information on a controversial subject in his presentation titled "Thick Smoke and Rubber Mirrors: Origins of SDI". He examined the political, technological, and human origins of "Star Wars", and prepared us for the panel discussion on the same topic held Friday evening. (Gregg was one of the members of the panel.)

Bob Stasko of the Canadian Fusion Fuels Technology Project talked about "Canada's Contribution to Fusion Technology". He discussed Canada's expertise in tritium production, handling, and safety, and Canada's role both nationally and internationally in the future of nuclear fusion research.

The invited papers ended with an inevitable voyage for any 1986 meeting, "What Did We Learn about Halley's Comet", given by Murray Alexander of Guelph University. He used exciting visual aids to share the findings of the space probes that came within close range of the comet.

A variety of contributed papers, each 15 minutes in length, were interspersed among the invited papers. Following is a list of these papers and the presenters.

- "Rutherford and Radioactive Decay"; Don Stephen, Barrie, Ont.
- "Understanding Fusion Energy: A Filmstrip for Science Teachers"; Jim Hunt, Guelph, Ont.
- "Hazards, Risks, and Their Management"; Eknath Marathe, St. Catharines, Ont.
- "Science Anxiety - A Preliminary Report"; Patricia Hughey, Lansing, Michigan
- "Brainstorming, Changing Gears, Pre-testing, Conceptual Gaps, Applicability and Good Teaching"; Doug Fox, Essex, Ont.
- "The Search for Halley's Comet Flight"; Steve Dodson, Sudbury, Ont.
- "Statistics of Counting with a Microcomputer"; Stuart Quick, Toronto, Ont.

The invited and contributed papers were followed by the traditional session called "My Favorite Demonstration". This year, 7 useful and sometimes entertaining demonstrations were presented by teachers. This was supplemented by a tour of the modern computer lab run by the Physics Department at Guelph University.

A highlight of the meeting was the Friday evening banquet followed by a 3-person panel discussion on "Star Wars". The panel consisted of a research physicist, a military expert, and a historian, each of whom was articulate and well informed.

Congratulations to Ross Hallett of Guelph University for organizing our annual meeting, and many thanks to all the hosts at Guelph.

Alan Hirsch

Section Representative

MEET SCIENCE NORTH, AAPT!

Steve Dodson

Six years ago, while a physics teacher in North Bay, I took on a challenge of a lifetime: to propose and develop exhibits from Alchemy to Astrophysics that would form an exciting part of a visitor's participation in a new "open science lab" coming into being in Sudbury - Science North. Having been a full-time staff member since 1982, I am both operating a range of public programs that you won't see elsewhere and developing new ones at an ever increasing rate. I am hoping in the next few paragraphs to whet your appetites for some hands on physics fun that I hope you will experience next spring when AAPT-Ontario comes to Sudbury.

All visitors encounter a hint of things to come on the path from the parking lot to the entrance building: two 10-foot parabolic dishes 35 meters apart so well coupled you could swear your friend at the other focus was inches from your ear.

The tunnel, cavern, and spiral ramp that take you to the main exhibit areas constitute between them one of the best "indoor" geology exhibits in the world, clearly displaying the faulting, intrusion, and glaciation that shaped the site:

From the very top of the ramp a colourful 14-foot geodesic dome is seen suspended a few feet off the floor. This is our new "starspace", a radical departure in planetarium design which allows the people inside to see the solar system from the inside out (Geocentric) or from the outside in (Heliocentric), thus reconciling visually the two views of the "universe". The key to this is a solar system model that is correctly oriented in space using tonight's sky as a frame of reference. The planets are frequently advanced to their correct positions, and when a new bright comet appears its orbit will be added to the model.

A few steps from the dome is our solar observator theater. As a theatre it presents a brand new type of presentation rain or shine about the sun, using real objects and instruments arrayed in front of the seating area that are operated or illuminated each in turn. Following this 10 minute "object theatre" presentation the sun, when available, is brought right into the darkened theatre by three separate lens and mirror systems which penetrate the outer skin of the building. While still seated you will see an intense slanting beam of sunlight rising from floor to ceiling before reflecting back down to an 8-foot diameter rotating screen, where it forms a large image of the suns disc and any sunspots present. Beside this white-light solar image you will see a brilliant solar spectrum which is over 15 feet long when the 2nd order is considered. You will be invited to step around behind the rotating screen to look through our hydrogen alpha telescope at solar prominences and prolific disc details seen in this narrow-band red light.

The Solar observatory was the first project I introduced to Science North and it has been the longest in the making. Volunteers from the Sudbury Astronomy Club worked with me to set up an Optical Workshop (which you will see on the exhibit floor) and there we made the major optical components, with over 2,000 hours of work being contributed by the Club. Without them the observatory would not exist in anything like its present form.

Exhibits nearby demonstrate lenses, mirrors, and telescope making. Two one-meter square concave mirrors make the focus of this area clear while mystifying and baffling most people with puzzling aerial images. Also nearby you can climb on a rotating platform to try a variety of experiments or "float" on a pneumatically operated bed of nails.

Next the Faraday Lab awaits you with a variety of electrical, magnetic, electromagnetic and wave analogy hands-on activities. Also in the Faraday area we have built a charcoal-fired bellows aspirated forge similar to the one Faraday used for metallurgical experiments. Once a day we demonstrate the preparation of sand casts, and pour molten brass.

More than two years after opening Science North is still growing and developing rapidly. There is a great deal to try out and enjoy and great things just around the corner!

GRADE ELEVEN CONTEST RESULTS

This year the AAPT-Ontario Section Grade Eleven Contest was written on Tuesday, May 6th. The credit for the organization goes to Don Murphy of Sydenham H.S., Sydenham.

This year the number of schools participating rose to 240 and the list of the top 27 contestants are shown below. Although the contest is run by the AAPT-Ontario section it is open to everyone outside Ontario too and you will see Winston Churchill High School in Vancouver on the list (as it was last year). So join the fun and contact Don for next year's contest.

Our list shows the top contestants, their mark out of 25, their school and, in brackets, their teacher's names. We should all congratulate these students, and their teachers, on their fine achievement.

23	B. Freedm	Nepean H. S., Ottawa (D. Ramsden)
22	J.D. Chrisen	Malvern C.I., Toronto (W. Prior)
20	R.F. Paigt	Lord Elgin, Burlington (K. Allan)
20	R.J. Bodki	Nepean H.S., Ottawa (D. Ramsden)
20	M. Ho	Riverdale C.I., Toronto (F. Mustoe)
20	A. Wickman	Woburn C.I., Scarborough (D. Bell)
19	Z. Margalic	A.B. Lucas S.S., London (E. Hill)
19	O.K. Dahlbe	Glebe C.I., Ottawa (D. Gault)
19	G.C. Chong	Laura Secord S.S., St. Catharines (E. Umbrico)
19	J.R. Levitt	North Toronto, Toronto (R. Raymer)
19	A.A. Low	Paul B. Smith, Willowdale (L. Lemmer)
19	T.H. Cheung	Upper Canada College, Toronto (P. Crysler)

EDITORIAL

It's Time To Remind You about "The Forgotten Fundamentals of the Energy Crisis"*

Gas is cheap! Large automobiles and campers are once again clogging the highways during holidays and vacation times! Has the world suddenly acquired a new plentiful supply of petroleum? . . . How easily we forget!

At no other time in the history of the world has there been a greater need for a scientifically literate citizenry. This is the age of uncertain world energy supplies, social disruptions, economic problems, overpopulation, and outright starvation of a significant portion of the population. This is also the age of an unprecedented rate of scientific and technological advancement. The energy factor plays an important causal role in the continuation of many of these problems and achievements.

With an adequate scientific knowledge base and an awareness of the varied and complex linkages between energy and environmental, political, economic, health, and social issues, tomorrow's adults will be better equipped to participate in helping to solve their nations' energy problems. This may be through the participation in decision-making processes or through some energy conversion technological breakthrough.

Teachers will play a significant role in ultimately solving energy problems. Attitudes along with technology are

important in working towards solutions. Studies have shown that attitudes and ideas instilled in childhood can easily become habits. It is likely that the students entering our primary schools will be the first generation to feel the full impact of the approaching era of energy shortages. It is important that they, unlike a large segment of today's adult population, respond in a rational way based upon a realistic appreciation of the many and often related factors which are now beginning to govern national energy policies and the search for and development of alternate energy sources.

The teachers' responsibility is a critical one in teaching about the sources and uses of energy, the multifaceted energy problem and the energy conservation and environmental preservation ethic.

The use of energy conversion technologies and physics-related principles make effective examples when used as enhancements to elementary physics courses. Why not use them? There is still a wealth of educational material available! Let's not forget. . . the "Forgotten Fundamentals."

*A.A. Bartlett, *Amer. J. Phys.* 46, 876(1978).

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AAPT-Ontario
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1986-87

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SATELLITE PHYSICS

YOU SAY YOU DON'T UNDERSTAND WHY SATELLITES ORBIT --- WATCH THIS --- TELL ME WHAT YOU SEE WHEN I DROP THIS ROCK

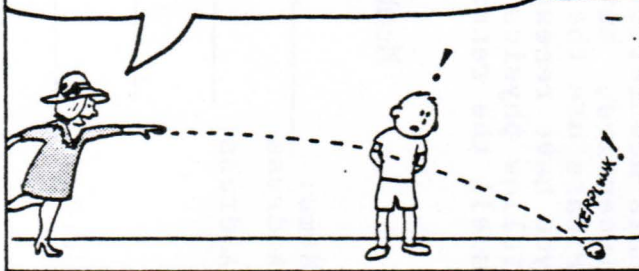


CORRECT! NOW I'LL MOVE MY HAND SIDEWAYS WHEN I DROP IT --- WHAT DO YOU OBSERVE?

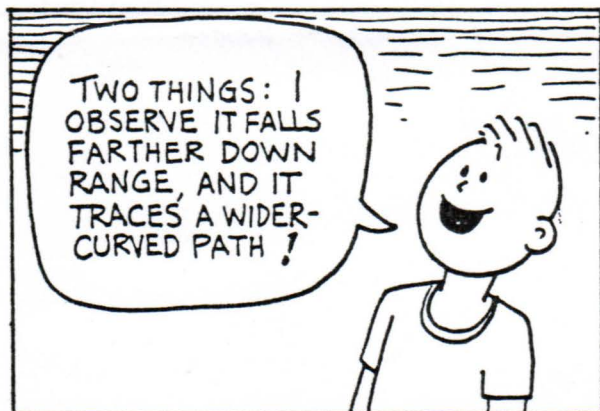
AHA! IT FALLS AGAIN --- ONLY THIS TIME IT FOLLOWS A CURVED PATH



CORRECT! WHEN I DO IT AGAIN AND MOVE MY HAND EVEN FASTER WHEN I DROP IT, WHAT DO YOU OBSERVE?



TWO THINGS: I OBSERVE IT FALLS FARTHER DOWN RANGE, AND IT TRACES A WIDER-CURVED PATH!



EXCELLENT! NOW WHERE WOULD IT LAND IF IT MOVES FAST ENOUGH SO THE CURVED PATH IT TRACES MATCHES THE CURVATURE OF THE EARTH?



I GET IT! IT WILL STILL BE FALLING, BUT DUE TO THE MATCHING CURVE OF THE EARTH, IT WILL FALL AROUND THE EARTH RATHER THAN INTO IT. IT WILL BE AN EARTH SATELLITE!



... BUT IS IT REALLY THAT SIMPLE?

YES! THERE ARE VARIATIONS TO CONSIDER, BUT THE BASIC PHYSICS OF SATELLITE MOTION IS THAT SIMPLE =SIGH=



FROM :

AAPT

c/o A. McEachern

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Membership Renewals

On your mailing sticker is the date of expiry of your membership; all those paid up have a date of June '87, any others are in need of renewal. If your membership has expired we are sending you this Newsletter as a reminder and hopefully an incentive, but we cannot afford to keep doing so! Please use the attached form to renew TODAY! (If you have renewed, why not give this form to a fellow physics teacher and encourage them to swell the ranks.)

Membership Form

Name: _____

Address _____

Address: _____

Code: _____

Affiliation:

Secondary School

University

College

Other

The membership fee is \$5.00 (Please make cheques or money orders payable to AAPT-Ontario) and send to:

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