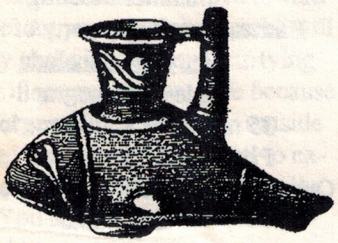
NJAAPT

NEWSLETTER

New Jersey Section American Association of Physics Teachers
Dedicated to the improvement of physics teaching

GLASSBORO STATE COLLEGE

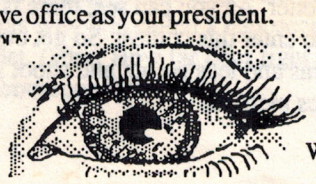
May, 1990



President's Message

I WAS RECENTLY PRIVILEGED to be one of ten secondary school science teachers in New Jersey who were selected as recipients of the Stevens Institute of Technology First Annual Award for Leadership in Science Education. The award consisted of a lovely plaque commemorating the occasion and a grant of $1000 to my school to be used for my physics program.

As part of the public forum preceding the awards dinner and ceremony, I was asked to participate on a panel which was to discuss "Critical Issues in Science Education." Each participant spoke for five minutes and then a discussion was held. What I said may not represent a critical "issue," but it is something I strongly believe in and I wanted to share it with you before I leave office as your president. >>>



Wonder?

Keeping the Wonder Alive

Before we can institute any reforms in Science Education, we need to ask ourselves just what are the goals of our system of education. In Japan, for example, the goals of the public schools clearly reflect the goals of most of the citizens. That is, to prepare youngsters to go on to institutions of higher education. Awareness of this primary goal drives much of Japanese society.

In Japan, most women in the work force, whether at the blue collar or at the professional level, are there only temporarily. They see their futures as one in which they will marry, bear children, and then devote themselves completely to the education of these children. Toddlers as young as three and four years old, accompanied by their mothers, are coached and taken to classes to prepare them to enter a "good" kindergarten. More intensive preparation is then needed so that the child will be able to get into the right elementary school. By the time the child becomes a young teen, his or her day consists of long hours of school and then special cramming sessions to get ready for the examination hell, that is, the entrance exams for college.

All the while, mother is there in the background prodding, pushing, and yes, pampering the child as he studies. In Japan, even the child's boxed lunch is a work of art, designed carefully and >>>

conscientiously by his mother. Students there do not usually receive homework from their regular school. But what would be after school time here is spent studying or attending a cramming school.

For years now, we have heard about the efficiency of such systems as this one of the Japanese and some of those in eastern Europe. Especially in the areas of science and math. Students from these countries consistently score significantly

Continued on page 4, col. 1 >>>

Constitution & By-Laws

Last year the NJAAPT constitution was modified and the changes voted on and passed. So that all members may have access to our constitution and by-laws, a copy is reprinted on pages 6 and 7 of this issue of the NJAAPT Newsletter.

If you have any questions, please direct your inquiry to Yvette A. Van Hise at 2 Horse shoe Court, Colts Neck, NJ 07722.

Innovation Seminar

On May 10, 1990 at 4 PM, the Physics Department of Stevens Institute of Technology will conduct an "Innovation Seminar." The main event will be a computer-aided laboratory experiment performed by the seminar participants. The entire experiment and final report will be produced without the participant having to enter data by writing.

If interested, call Dr. Martin Brin at 201-420-5659 at the Physics Department of Stevens Institute of Technology, Hoboken, NJ 07030.

Physics Olympics Results

The NJAAPT 1990 Physics Olympics took place this year on March 31. Thirty teams participated on that day. Six events were used this year: Paper Tower, Bridge, Barge, Bike Race, Egg Drop, and Wind Mill. A trophy for these events was given to the first place team in each event:

Paper Tower	Watchung Hills Reg
Bridge	Bound Brook
Barge	Belleville
Bike Race	Edison
Egg Drop	Highland
Wind Mill	Hunterdon Central

In addition, the first, second, and third place team **overall** (total of six events), each received a trophy:

First - Southern Reg. H. S. (**Ron Nawojazyk**, Teacher)

Second - Lacey Township H. S. (**Susan Ryan**, Teacher)

Third - Cherry Hill West (**H.K. Chatterjee**, Teacher)

Energy Trivia

Yvette Van Hise attended the Princeton "Science on Saturday" program recently and gathered the following bits of trivia:

Annually, Americans spend:
- $90 billion on gasoline
- 5 billion on dog food
- .5 billion on fusion research (for a total of only $8 billion in the last 40 years, just 1.6 years worth of dog food!)

Access NJIT

Have you considered Access NJIT? Learning at a distance. Bring the power of education into your home! Through telelearning, you may be able to complete the key requirement you never had time to schedule before. The following is the **CTN Cablecast** for the Summer 1990 schedule:\

Calculus II. (Math 112) 4 cr.
Mon., 1:00-2:30 pm
Wed., 1:00-2:00 pm
Classes start May 14 and end August 15

Principles of Operating Systems (CIS 332) 3 cr.
Tues., Thurs.: 1:00-2:30
Classes start May 15 and end August 9

Business of Management (OS 471/ 472)
Fri.: 1:00-2:30 pm
Classes start May 18 and end August 10

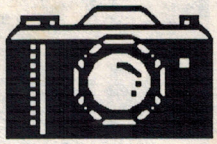
VHS tapes available by special arrangement

For more information, call the **Center for Distance Learning** at 596-3177

Senior Citizen discounts available for specified courses.

High School Physics Photo Contest

Sponsored by
AAPT Instructional Media Committee



CONTEST RULES

Open to any high school physics student or class
Original photograph related to physics
Entry deadline 5/1/90
Selection of winners at AAPT 1990 Summer Meeting
Entries become property of AAPT
Entry must include
Title of photograph
35 mm slide with name label
Print (9x11) with name label
Original essay (100 words or less) related to photo
Send entries to:

John Park
School of Math/Science Ed, Box 7801
North Carolina State University
Raleigh, NC 27695-7801

or

David Winch
Physics Department
Kalamazoo College
Kalamazoo, MI 49007

Entries will be judged on:
The quality, originality, and appropriateness of photo and essay.

Winners and prizes will be announced 7/1/90.

(The above is a copy of a similar announcement in our December 1989 newsletter. As you can see, there is still time to enter this contest. So get out your cameras and let's go out and shoot some physics pictures!)

Demonstrations

The following demo descriptions have been taken from the Spring 1990 issue of *Spectra*, the Kentucky Association of Physics Teachers Newsletter.

The Body Bag

A dramatic way to demonstrate the concept of electrical shielding is to make a body bag to use with your Van De Graff generator. Buy two rolls of unpainted aluminum screening wire 48" x 84" each. Use a strand of handy wire to thread the two pieces together around 3 of the edges. Using the open 48" side as the bottom, slip the bag over your head until it touches the floor. Turn your Van De Graff on full blast and move toward the sphere. As you get close, sparks will start to fly to the bag in an electrifying manner. Of course, you are safe because all the charge will reside on the outside of the bag. You can then proceed to explain the principle in a very convincing manner. You are also in a unique position to field any questions.

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Student Flasher

Here's one more quickie for your Van De Graff. Charge up a student by having him keep his hand on the generator will turning it on and letting it run. You, meanwhile, have torn a bulb out of Flip-Flash and bent two wires outward. You hold onto one wire and touch the other wire to the student's ear. You will have one bright student and an enlightened class!

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Nanosecond Bracelet

Make a simple bracelet out of colored string, cloth or whatever, so long as it can be taken apart and made straight. Make it exactly 30 cm long. Ask your students why it is called a nanosecond bracelet. (Hint: How far does light travel in a nanosecond?)

Baby, Baby, Baby

Many of you have seen the neat index of refraction demo in which a test tube or small beaker is made to "disappear" by placing them inside a larger beaker and filling it with an appropriate liquid. The catch is to match the index of refraction of the glass with the index of refraction of the liquid. A perfect match is Pyrex glass and Johnson and Johnson baby oil!

Try it with a 400-ml beaker and either a 100-ml beaker or small test tubes. If you are a bit of a showman, try this: Start with a test tube already in the beaker full of baby oil. Wrap another test tube in a towel and break it into small pieces in front of the class. Dump the pieces into the beaker. Stir the solution and then use a pair of tongs to pull out the" reconstructed" test tube!

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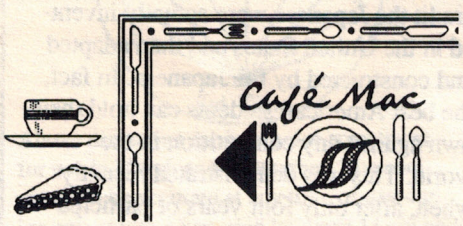
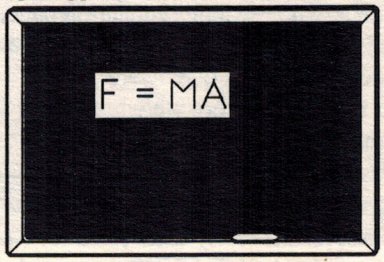
What's Cookin'

This is a two-part demo dealing with electrical current. The key piece of equipment is homemade. Take an old piece of lamp cord about two meters long with a two-pronged plug on one end. Pull the two insulated strands apart for a length of 50 cm from the end and attach an alligator clip to each strand. Place an uncooked hot dog on a plastic plate and stick a metal fork in each end. Use the alligator clips to attach the wire to the forks. When you plug the cord into a wall socket, the juice in the hot dog will conduct current until the hot dog is fully cooked. Be sure to unplug the cord before disconnecting the wires. You may want to place an ammeter in the circuit and let the students see how the current rapidly drops to zero. (Why?)



Experimenting With Weights

This article has been taken from the *the Departmental Newsletter* of the Physics-Geoscience Department of Montclair State College, Upper Montclair,NJ 07043.



As an experiment to demonstrate Newton's Second Law, I have my students in the freshman physics classes take a bathroom scale into the elevator in the Math-Science building. After designating one member of the group to stand on the scale, they are instructed to record the scale reading when the elevator is stationary and also when the elevator is accelerating, decelerating, and moving at constant speed. The fact that the scale reading depends on the state of motion of the elevator is a direct consequence of the Second Law.

At all times, the scale reading is equal to the downward force which the person exerts on the scale. Newton's Third Law requires that the upward force which the scale exerts on the person be equal in magnitude to the scale reading. In the stationary elevator the person on the scale is in a state of equilibrium under the action of the force exerted by the scale and the downward force, his weight, exerted by the earth. Thus the scale reading is equal to his true weight. However, the downward force which the person exerts on the scale is not equal to the weight of the person when the elevator (and the person inside it) is accelerating. Readings are taken while the elevator is both ascending and descending, and the results analyzed by applying the second law to the forces acting on the person. In each case one can calculate a value for the acceleration of the elevator.

The readings during acceleration are somewhat difficult to take, because the time during which the acceleration takes place is short compared to the time required for the scale reading to stabilize. The trend of the results, however, is unmistakable, with the reading noticeably higher during upward acceleration, and lower during downward acceleration.

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higher than those from the United States on standardized exams. This is an undeniable fact, an item that can be read regularly on any newspaper's education page. It has led to an outcry for drastic changes in America's system of science education. I think that before we wholeheartedly embrace any alternative techniques, such as those of the Japanese, we must stop and ask ourselves: first, just what do these test results really mean, and second, just what is it that we want our science education to accomplish?

To answer the first question: the results of the standardized examinations are just that, results of standardized tests. In many instances they measure the facts that these students have managed to commit to memory. Yes, the Japanese score higher than our children and indeed they should. They have been trained their entire lives for just such tests. Learning science in Japan, in almost all cases, is not learning as we know it but memorization.

I had the opportunity to attend a conference in Tokyo in 1986 at which the dozen or so high school teachers from the United States who attended made friends with a group of Japanese high school teachers. The Japanese had formed a sharing group which they called the "Stray Cats." Why? Because they were looked upon as being avant garde, out of the main stream of Japanese. What was it that made them such an anomaly? Why, they were attempting to introduce humanistic ideas from the United States into the physics classroom. They were enthralled with the PSSC program and its emphasis on higher order thinking skills. They used lots of experiments and demonstrations which they made themselves out of low cost materials. These were used to reinforce the concepts of physics.

In 1989, we were able to arrange for a group of the "Stray Cats" to attend the American Association of Physics Teachers Summer Meeting at California Polytechnical University. They shared their work with over two hundred high school teachers from the United States, all of whom shared the same views. That is, that we are here to help our students understand the underlying principles of physics, not simply to memorize facts and formulas, repeat them on a test, and then forget them. It is somewhat ironic to note that as we try to make our education more rigid, the more forward looking of Japanese educators are attempting to emulate parts of our American system.

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Which brings me to my second question: just what is it that we want our science education to accomplish? Assuming that the Japanese techniques could be successfully transplanted to America (although I personally believe that the structure of our society precludes this), do we want an understanding of science to be the province of an elite few? Do we want to test our children at the age of twelve as some European countries do, saving the fruits of higher education for the select and shunting the others off into some"useful work?" Isn't one of our goals an informed citizenry?

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" ... It is somewhat ironic to note that as we try to make our education more rigid, the more forward looking of Japanese educators are attempting to emulate parts of our American system."

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Or do we want to turn out a cadre of little robots who have all obediently memorized Newton's laws without any idea of how they work? Yes, the Japanese have many talented engineers in their society. What they lack, however, is the pool of creative scientists that we have in the United States. Many of the technological innovations with which we credit the Japanese were actually invented in the United States and then adapted and constructed by the Japanese. In fact, the best American students can hold their own against any competition in the world. This was demonstrated recently when, after only four years of participation, a high school student on the United

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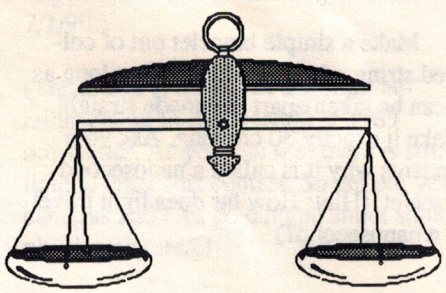
I have always found this to be a gratifying.illustration of the usefulness of free body diagrams and of the second law.

As one of the discussion questions following the data analysis, I ask the student to consider whether the reading of a triple beam balance would be affected by the acceleration of the elevator. The argument that it would not be affected is quite simple, but it does require a comparison of the torques on both sides of the balance point. I have yet to see it in toto in a student lab report, but I keep hoping.

In the lab instructions, I did not ask the students to make the beam balance measurements, because I assumed that the short acceleration times would make this impractical. However, this semester one lab group, after coming to an impasse in their discussion of the question, requested a triple beam balance for an experimental verification. Thus equipped, they hied themselves to the elevator once more. They were gone a long time; so long, in fact, that I began to wonder whether they had been set upon by irate elevator riders with more mundane purposes in mind, such as getting from one floor to another.

When they did return, in full strength and with the balance, they explained that the reason it took so long was that they could not believe their eyes. They kept riding up and down waiting for the balance to waver during acceleration. The balance, however, was steady as a rock. They were impressed. So was I.

Mary A. Derengowski-Stein
Montclair State College



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States International Physics Olympiad team won first place in worldwide competition.

These children certainly represent the fact that something else must be going right with the American system of science education. Yes, our system has problems and yes, our system is different, but let's emphasize some of the differences that make our education uniquely American. Lets's stress the two C's of science education: Concepts and Creativity.

On a statewide level, I see our education system leaning more and more towards becoming test driven. Even in my own classroom, I catch myself wondering if my advanced placement students will be "ready" for their test in May. Do we need to move faster? Will I have been able to feed them enough facts and formulas that they can memorize to do well on this examination? What if they don't really understand the concepts underlying these formulas they are using? Must quantity replace quality? Do I have time to slow down and answer their questions, to explain why things work the way they do? If I am so bold as to call myself a physics teacher, how can I not?

Ralph Waldo Emerson said, "Men love to wonder and that is the seed of our science." What has happened to the wonder in our classrooms? Is a fourth grader reading about the way light behaves in her textbook and memorizing terms and definitions learning about science?What has happened to the time for free play and exploration? When do we get to look through a magnifying glass? See light broken into colors by a prism? Make our own rainbows with an old garden hose? Facts? Truths? Anyone who still believes that this is what science is all about has never heard of quantum mechanics or seen a scanning tunneling microscope. Richard Feynman, one of the most brilliant theoretical physicists of our time, likened doing science to trying to learn the rules of a chess game by watching someone else play. After a while, >>>

you might notice that the bishop always moves on a certain color and so you make that a "law", the bishop maintains its color. Then later on you might discover that the reason this happens is that the bishop moves on the diagonal.. This doesn't invalidate the first law, but now you understand the nature of the game on a deeper level. All of a sudden, in the corner, you notice something unexpected happening: Perhaps castling has occurred and you had never seen it before. Now you have something new to explore. Examining and trying to understand these quirks of nature was what physics meant to Feynman.

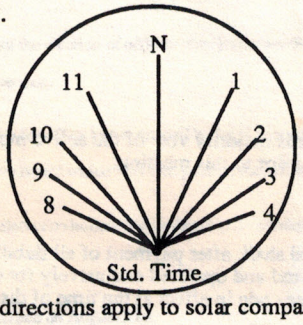
Finding meaning in the natural world requires more than formulas and the mechanics of the scientific method. It calls for creativity, the freedom to explore, to exchange ideas, to play.

To close with a quote from Albert Einstein: The most beautiful experience we can have is the mysterious. It is the fundamental emotion which stands at the cradle of true art and true science. Whoever does not know it and can no longer wonder, no longer marvel, is as good as dead and his eyes are dimmed.

As scientific educators, perhaps we should make our **first** "core proficiency" to encourage our students to wonder and help them to understand.

Solar Compass or Clock

Paste paper onto a base of heavy cardboard or wood. Put toothpick into black dot. Angle between noon line and hour line as follows: 1, 20 1/3°; 2, 38 1/4°; 3, 52°; 4, 64 1/4°.



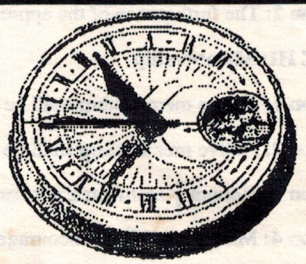
Above directions apply to solar compasses for use in March and September. The compass will be accurate at any time of day during any month when used between 11 am and 1 pm. Any inaccuracy can be eliminated >>> if the base is tilted toward the north by an angle equal to the sun's declination on the day used.

Dr. John N. Shive

Dr. John N. Shive

Electrical engineer, Bell Labs, retired in 1974. Faculty at Georgian Court College in physics department, 1974 until his death in 1984.

Author of five books, published 20 articles in technical journals. Held a number of U.S. patents. Gifted teacher.



BALLOT

The following is the slate of officers duly nominated at an Executive Board meeting recently. Please mark the box next to the name of each elective office if you wish to vote for the person shown. Otherwise write in the name of your choice in the box below it. Send your completed ballot to: Yvette Van Hise, Marlboro H. S., Rte. 79, Marlboro, NJ 07746.

❑ President: Barbara Wolff
Livingston High School

❑

❑ Vice President: David Maiullo
Rutgers University

❑

❑ Treasurer: Charles Bresnahan
Pequannock High Sch.

❑

❑ Corresponding Secretary:
Peter Lindenfeld, Rutgers Univ.

❑

❑ Recording Secretary:
Jessie Blair, Monmouth Reg. H.S.

❑

CONSTITUTION AND BY-LAWS

AMERICAN ASSOCIATION OF PHYSICS TEACHERS
NEW JERSEY SECTION

ARTICLE I: Name and Incorporation

Section 1: The name of this organization shall be the American Association of Physics Teachers, New Jersey Section, hereinafter referred to as NJAAPT.

Section 2: NJAAPT is organized as a non-profit association. Upon incorporation, it will fall under Title 15, Section 1-12 of Revised Statutes of the State of New Jersey.

Article II: Purpose

Section 1: The advancement and integration of the teaching of Physics at all appropriate levels.

Section 2: The furtherance of the appreciation of the role of Physics in our culture.

ARTICLE III: Membership

Section 1: Active membership shall be open to all individuals interested in Physics education.

Section 2: Active membership shall be continuous until the member resigns from the NJAAPT or fails to pay membership dues.

Section 3: Honorary membership is reserved for individuals who have rendered outstanding service to NJAAPT.

Section 4: Members shall be encouraged to join and support the American Association of Physics Teachers.

ARTICLE IV: Officers and Election

Section 1: The officers of the NJAAPT shall consist of: President, Vice President, Corresponding Secretary, Recording Secretary, Treasurer, and Immediate Past President.

Section 2: Officers shall hold office for a period of two years, beginning September 1st and ending August 31st.

Section 3: The election of officers shall take place in accordance with the By-Laws.

Section 4: In the event of a vacancy in the Presidency, the Vice President shall succeed to the Presidency. Should a vacancy occur in any other office, the vacancy shall be filled by appointment by the president with approval of the voting members of the Executive Board.

ARTICLE V: Representative to the Council of AAPT

The NJAAPT Representative on the Council of the American Association of Physics Teachers shall be appointed each biennium by the President, with the approval of the
executive Board, from among those members of NJAAPT who are also members of AAPT.

ARTICLE VI: Executive Board

Section 1: The policy forming and executive body shall be the Executive Board.

Section 2: The voting members of the Executive Board shall consist of the officers, the Section Representative, and active members invited to serve by the President, with the advice of the officers.

Section 3: All active members of NJAAPT are invited to attend and contribute at all Executive Board meetings.

ARTICLE VII: Dues

The dues shall be set by the Executive Board.

ARTICLE VIII: Amendments

Amendments to this Constitution may be made by a two-thirds majority vote of the active members attending a scheduled meeting. Copies of the proposed Constitutional changes must be mailed at least four weeks prior to this meeting.

ARTICLE IX: Dissolution

Upon the dissolution of the Association, the Executive Board shall, after payment of all liabilities, dispose of all assets of the Association exclusively for the purposes and in such a manner to such organization(s) organized and operated exclusively for educational or scientific purposes as shall at that time qualify for exemption under Section 501 (c) (3) of the Internal Revenue code in effect at the time of dissolution.

ARTICLE X: Rules of Order

The rules of Parliamentary Procedure set forth in the latest revised edition of Robert's Rules of Order shall apply in all the instances not covered by the Constitution and By-Laws.

BY-LAWS

AMERICAN ASSOCIATION OF PHYSICS TEACHERS
NEW JERSEY SECTION

ARTICLE I: Meetings

Section 1: Executive Board
The Executive Board shall meet at least three times during the year. At the request of any member of the Executive Board, additional meetings may be scheduled.

Section 2: General Membership
a. At least one General Membership meeting shall be scheduled by the Executive Board.
b. Additional General Membership meetings may be scheduled by the Executive Board or at the request of fifteen percent (15%) of the membership.

Section 3: Order of Business
The order of business at any meeting shall be as follows:
a. Call to order
b. Approval of minutes
c. Correspondence
d. Reports of the Officers
e. Reports of the Standing Committees
f. Reports of Special Committees
g. Old Business
h. New Business
i. Adjournment

ARTICLE II: Quorum

Section 1: Five members of the Executive Board shall constitute a quorum for Executive Board Meetings.

Section 2: Twenty percent (20%) of the general membership shall constitute a quorum at the General Membership meetings.

Section 3: A quorum for committee meetings shall be determined by the individual committee.

Section 4: Business may be conducted only at meetings at which a quorum is present.

ARTICLE III:Duties and Responsibilities of the Executive Board

Section 1: The Executive Board shall establish the duties and responsibilities of the Officers, Section Representative, and Committee Chairpersons. These duties and responsibilities shall be kept on file and distributed to the new Executive Board each biennium.

Section 2: The Executive Board shall
a. Be responsible for the management of the Association.
b. Take the initiative in determining the policies of the Association.
c. Manage the properties of the Association.
d. Execute policies established by the general membership.
e. Report to the members its transactions.
f. Establish special committees as may be necessary.
g. Set the agenda for the General Membership meetings.
h. Act on reports of committees.

ARTICLE IV: Committees

Section 1: Appointment
The president, with the advice of the Executive Board, shall appoint the Section Representative and members of the committees at an Executive Board meeting and shall fill all unexpired terms as vacancies occur.

Section 2: Standing Committees
a. The Standing Committees shall be Membership, Nominating , Public Relations/Newsletter, and Program.
b. Each Standing Committee, except for the Nominating Committee, shall meet according to the calendar developed by the committee.

Section 3: Duties and Responsibilities
The duties and responsibilities of the Committees shall be established by the Executive Board and updated when necessary.

Section 4: Special Committees
a. Each term the President shall appoint, with the approval of the Executive Board, an Audit Committee, an Election Committee, and other such committees as shall be necessary.
b.The Special Committees shall disband upon the completion of their duties.
c. All active members of the Section are eligible to be committee members, except that no candidate for officer shall serve on the Elections Committee.

ARTICLE V: Elections

Section 1: Nominations
a. During the first Executive Board Meeting of the calendar year of the election of officers, the Executive Board shall act as a Nominating Committee which will name one or more candidates for the offices.
b. The Executive Board shall present all nominations to the membership.

Section 2: Voting
a. In the spring of the election year, the General Members shall vote for office by secret mail ballot in accordance with procedures developed by the Elections Committee and approved by the Executive Board.
b. The Elections Committee shall report the results to the Executive Board which will then publish the results to the membership.

ARTICLE VI: Honorary Membership
By two-thirds vote of the Executive Board, an individual may be elected to honorary membership for rendering outstanding service to the Association. Only yearly dues shall be waived for those individuals.

ARTICLE VI: Fiscal Year

The fiscal year of the Association shall begin on September 1st and end on August 31st.

ARTICLE VIII: Amendments

Section 1: Amendments to the By-Laws may be made by a majority vote of the membership at a scheduled business meeting.

Section 2: Copies of the proposed amendment shall be mailed to the membership at least two weeks prior to the meeting.

Shenandoah College Presents

The Eighth Annual

Summer Computer Institute For Science and Math Educators

Leading toward the Master of Science Degree in Computers in Education

The Program
A comprehensive program of graduate courses utilizing computer and modern media technology will be offered specifically for science and math teachers. Courses are three graduate credits each and emphasize classroom and laboratory teaching applications. Courses are part of the Masters of Science degree program in Computers in Education at Shenandoah.

The Location
Shenandoah's location in the scenic and historic Virginia country- >>>

side 75miles west of Washington, DC affords the participants the best of two worlds: the quiet and peace of a small town, with easy access to all that a major world center provides.

The Costs: $150 per graduate credit hour; $475 for meals and private accommodations/session; $370 for >>>

meals and double occupancy room/session; $50 lab fee for EDUC 560, 565, 610.

For More Information: Please contact: Dr. Thomas N. Layne
Summer Computer Institute
Shenandoah College
Winchester, VA 22601
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NEW JERSEY SECTION
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