

NETWORK

A Publication of

TEAM

Technology Education Association of Maryland



TECHNOLOGY EDUCATION -- Education For The Future

FALL, 1994

VOLUME 6 NUMBER 2

TEAM Nominates Many Worthy Professionals For Special Recognition

TEAM is pleased to announce the 1994-95 nominees for teacher excellence and program excellence awards. Awardees will be announced and recognized at the TEAM business meeting at Conference '94, Oct. 21st.

MALEY TEACHER EXCELLENCE AWARDS

High School Nominees

Alan Arnold, Catonsville High School, Baltimore County
David Buddenbohn, Leonardtown High School, St. Mary's County
Donald Gable, Sherwood High School, Montgomery County
Beth Hastings, Thomas Stone High School, Charles County
Gary Rabe, C. Milton Wright High School, Harford County
Edmund Stabler, Eleanor Roosevelt High School, Prince George's County

Middle School Nominees

William Dame, Dwight D. Eisenhower Middle School, Prince George's County
William Falatko, White Oak Middle School, Montgomery County

Middle / High School Nominees

Chad Deckert, Poolesville Middle/High School, Montgomery County
Jim Roberts, Kennedy Krieger Institute, Baltimore

PROGRAM EXCELLENCE AWARDS

High School Nominees

Bowie High School, Clyde Draughn, Prince George's County

Catonsville High School, Alan Arnold, Ken Bradshaw, William Gibbs, Baltimore County

Montgomery Blair High School, Leonard Clay, Mark Curran, Scott Drugo, Edward Heyman, Robert Hopkins, Edward Johnson, John Kaluta, James Redos, Robert Segreti, Montgomery County

Middle School Nominees

Earle B. Wood Middle School, Kathleen Fulcomer, George Haney, Montgomery County

TEAM congratulates and thanks each of the nominees for exemplifying excellence and advancing Technology Education. Awards will be presented at Conference '94.

In This Issue

	page
TEAM, Teachers and Program Award Nominees	1
What We Can Say To The Engineers	2
Regional Teacher Workshops On Advanced Technology Education	5
ITEA To Increase Legislative Activities	5
Foundation For Technology Education Offers Grants	6
RE/TEAM For Retired TEAM Members	7
Baltimore Sun / Technology Education Project	7
An Overdue Tribute To A Colleague	8
UMES Technology Education Workshop	10
Technology Resource: Fiber Optic Communication	11
Conference '94 Preview	12

TEAM CALENDAR

Executive Board Meetings-- To be announced at the TEAM business meeting at conference '94

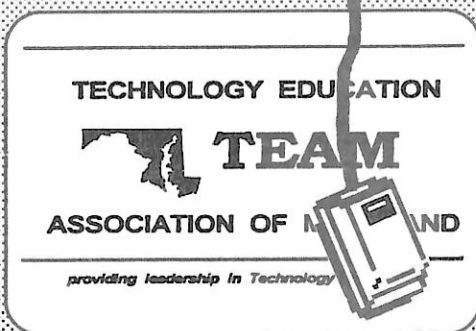
Nominations for TEAM Recognition due April 1, 1995

ITEA Conference in Nashville
March 26-28, 1995

TEAM Executive Board

Dr. Kenneth Andrew Executive Director	District 2 Mark Lastova
Brigitte Valesy President	District 3 Paul Skellchock John Good
Chris Scholtz President-elect	District 4 John Myers
Paul Dunford Vice President Professional Development	District 5 Quinn Patterson
Dr. Charles Beatty Vice President Professional Relations	District 6 Joe Baker David Buddenbohn
H. Mike Shealey Vice President Public Relations	District 7 Dennis Hearn
W. Harley Smith Vice President Publications & Resources	District 8 Verdell Adair
Paul Elwood James Roberts Vice Presidents Student Affairs	District 9 Ron Querns
	District 10 Ray E. Chapman Charles Craig
Rick Avondet Secretary	District 11 Patrick Lieb
Thomas Milans Treasurer	District 12 Robert Saunders
District 1 Allen Shively	

TEAM Mouse Pad



TEAM mouse pads are now available for purchase for \$5.00 each. Checks may be sent to Tom Milans

4704 Power House Drive
Rockville, MD 20853

MAKE CHECKS PAYABLE TO TEAM

What Can We Say To The Engineers In Our Communities?

by W. Harley Smith

Much is being said about strengthening our school programs in science as a way of enhancing our nation's competitiveness in the world economy, and indeed our standard of living. There are some, I believe, who have seen the solution to our economic security dilemma with a little more clarity. One such person is J. Myron Atkin. Writing in Education Week, September 26, 1990, Atkin indicates that science is not the basket into which we should put all of our educational eggs.

The public is often told that science education in the schools must be strengthened if the country is to maintain and improve its position economically. But while there are plenty of good reasons to improve science education, enhancement of America's global competitiveness is probably not one of them.

Economic competitiveness is about serving human needs and wants. It is about conceiving, designing, manufacturing, and distributing products or ideas that have direct impact on how people get things done. That is not the central job of science, and claims to the contrary by advocates of science education can be misleading. ...If we want to get serious about using the schools as an agent for maintaining and improving the American standard of living, let's consider placing greater emphasis on technology in schools. (1)

Atkin's choice of the word "technology", as opposed to "engineering", is insignificant when we consider the relationship between technology and engineering. The word "engineering" is almost always interpreted as a career title. Of course, it is a career title with a multitude of specializations. However, in the larger picture, engineering is not just a career. Engineering is a basic human activity in which problems of all magnitudes, great and small, are solved by developing and applying technology. As such, it is a process by which most of our human needs and desires are met, or at least attempted to be met. The chairman of Sony Corporation, Akio Morita, describes the relationship between technology and engineering, and adds to it a clarification of their linkage with science.

Basic scientific research provides us with information which, though previously unknown, only offers hints at the future. It is the engineer who can take these theories and

See ENGINEERS on page 3

ENGINEERS, continued from page 2

basic building blocks and from them create technology. I believe that technology comes from employing and manipulating science into concepts, processes and devices. These in turn can be used to make our life or work more efficient, convenient and powerful. So it is technology, as an outgrowth of science, which fuels the industrial engine. And it is engineers, not scientists, who make technology happen. (2)

There is a new curricular area evolving in the public schools across the nation. It is called Technology Education. It has emerged out of the roots of what had previously been known as industrial arts. It focuses on what Roland W. Schmitt, president of Rensselaer Polytechnic Institute, refers to as, "engineering-based liberal education" (3). Addressing the Sixth Convocation of Professional Engineering Societies and the National Academy of Engineering on May 31, 1990, Schmitt said the following.

...educators should be challenged to devise an engineering-based "liberal education" for students of the next century. Engineering principles and modes of thought should be the centerpiece of what the liberally educated person should be expected to know in the world of the future.

An engineering-based liberal education will have many advantages. First, we will produce many more leaders-- in politics, banking, industry, law, medicine, education, administration-- with an education attuned to the issues and challenges of the century, most of which have dominant technical themes. Second, with the vastly larger number of students that such an orientation would undoubtedly attract, many will emerge who want to pursue professional engineering as a career. Women and minorities, especially, might find a "liberal engineering" education more attractive than the traditional one. (3)

Schmitt's message reveals that he is unaware of the emergence of Technology Education in our public schools. Yet, his vision of what is needed is in complete harmony with this new program.

The Maryland State Board of Education has also recognized the significance and importance of Technology Education. It has adopted a credit requirement in Technology Education in order to graduate from high school. The first class to meet this requirement is the graduating class of 1997 (entering 10th grade in the Fall, 1994). Maryland is the first state to have such a requirement. The Board has specified the following outcomes which students must meet in fulfilling the technology credit requirement. The Technology Education learner outcomes describe what students should be able to do, think and feel as the result of a technology education experience.

1. *Application of Technological Systems-- Students will apply knowledge and skills of the function and application regarding diverse technological systems.*

See **ENGINEERS** on page 4

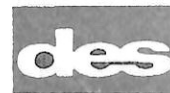
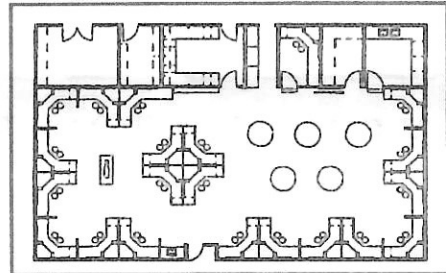
**Let us do the work
for you...**

We have over 25 years experience in the development of educational laboratories.

**Our qualified representative
can help you with:**

*detailed planning, lab design,
curriculum development,
installation, and technical support*

**for your
Middle School Technology
Education and Life Management
Laboratories or High School
Design and Technology
Laboratories.**



**DIVERSIFIED
EDUCATIONAL
SYSTEMS, INC.**

*For more information, contact us at
P.O. Box 388, Wickliffe Lane
Berryville, Virginia 22611
Phone: (703)955-2782
Fax: (703) 955-1519*



**INTERNATIONAL
TECHNOLOGY
EDUCATION
ASSOCIATION**

AFFILIATED ASSOCIATION

ENGINEERS, continued from page 3

2. Nature, Impacts and Evolution of Technology-- Students will demonstrate knowledge of the relationships of technological achievements and their impact on the environment, the advance of science, the individual, and society. The context for his awareness shall be historical, current and futuristic.

3. Problem Solving Using Technology-- Students will demonstrate the ability to solve problems with technology using a systems approach, higher order thinking skills, individual and collaborative ingenuity, and a variety of resources including information, tools and materials.

4. Informed Decisions about Technology Resources-- Students will make ethical decisions about technology-related issues, including the development and use of technology and technology resources in terms of economics and consumer practices.

5. Use of Technology Resources-- Students will demonstrate in an experiential setting the safe, effective and creative use of technological resources--including tools, machines and materials--in performing technological processes.

6. Application of Science, Math and Other Areas-- Students will apply science, mathematics, language arts, social studies, and technological concepts to solve practical problems and extend human capabilities.

7. Career Information-- Students will apply knowledge of technology-based careers in terms of: personal interests and abilities; educational opportunities and requirements; career opportunities, trends and requirements; and other factors for employability and advancement.

8. Multicultural and Gender Diversity-- Students will recognize the multi-cultural and gender diversity included in past, present and future uses of technology.

Technology Education is the "engineering education" connection in the public schools. The engineering process is an appropriate focus in Technology Education. More than that, it is an important emphasis for this program. In addition to engaging students in the application of technology, it facilitates the teaching and practice of thinking skills. Furthermore, it enables students to apply concepts and skills learned in science

See **ENGINEERS** on page 9

PAXTON ACTION LABS®
Technology Education Modules

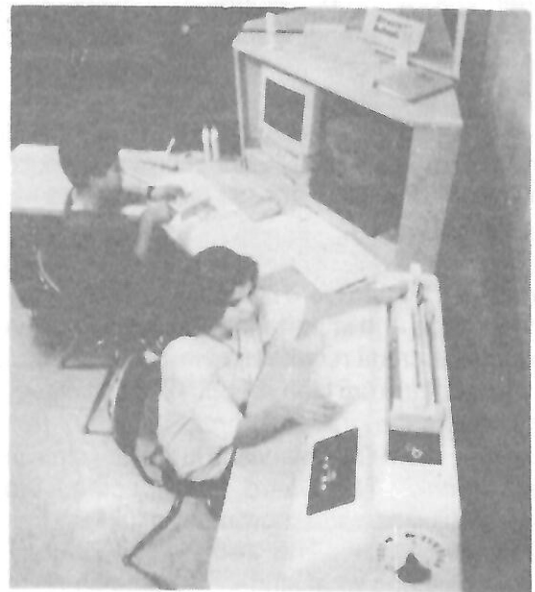
The study of beams, cantilevers, trusses and bridges is an integral part of construction technology in today's modern infrastructure. This exciting **PAXTON ACTION LAB®** covers the building and destructive testing of a variety of beam sections, cantilevers and trusses which lead up to the final challenge of constructing a bridge. This **ACTION LAB** is complete with our unique Paxton Structural Tester which operates mechanically (no messy hydraulics or air lock) with digital readout in either pounds or kilograms. Video instruction is provided for the hands-on beam, cantilever and truss construction projects.

- Understand design and structural concepts
- Understand spatial visualization
- Utilize problem solving skills
- Reinforce mathematic skills
- Develop motor skills

Dan Linnehan — Jim Morehouse — Ralph Ebersole
 Maryland Sales / Service

Technology

Structural



Call Toll-Free ☎ 1-800-336-5998

GRAVES-HUMPHREYS

Regional Teacher Workshops On Advanced Technology Education

by Bob Gray, State Specialist For Technology Education

Four regional workshops were conducted during the summer to prepare a core group of teachers to be leaders in their school systems for the development and implementation of "Advanced Technology Education" courses. The workshops were sponsored by the Division of Career Technology and Adult Learning of the Maryland State Department of Education. A special thanks is expressed to Allegany, Charles, Montgomery and Wicomico Counties for hosting these events.

Advanced Technology Education is one of three course options students, beginning with the class of '97, have to choose among in order to meet all of their new State graduation requirements. This is in addition to the Technology Education basic requirement for all students in this group. The three options for students are: 1) complete a college preparatory academic program including two years of foreign language, or 2) complete a college preparatory academic program including two years of Advanced Technology Education, or 3) complete a career preparatory program in a State-approved career and technology program.

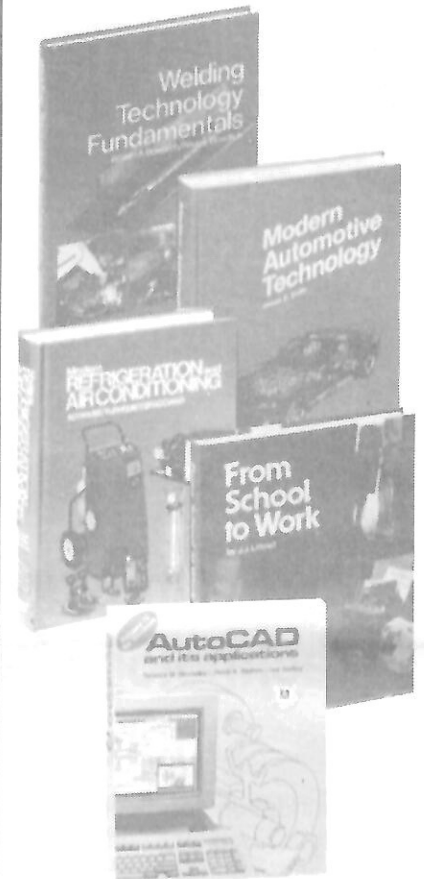
The Western Regional Workshop, coordinated by Thomas Elliott of Allegany County, featured a presentation by Mr. Gary Bolyard and Dr. Leonard Colelli of Fairmont State College titled, "The Technology Education Concept, Theory and Practice". One activity on optics was facilitated by Dr. Glenn Hider of California State College of Pennsylvania. The Eastern Shore Regional Workshop was held in Salisbury under the direction of Andy Buchanan, Technology Education Supervisor in Wicomico County. This workshop was highlighted by a series of problem-solving activities directed by middle and high school technology teachers. The North-Central professional development activity, directed by Barry Burke (Montgomery County), Bill Securo (Harford County) and Mike Shealey (Baltimore County), included a session at the Baltimore Museum of Industry. The South-Central workshop was coordinated by Ken Smith of Charles County, Joe Baker of Saint Mary's County, Kevin Michael of Calvert County and Harley Smith of Prince George's County. Participants in this activity produced an excellent series of transparency masters based on the Learner Outcomes For Technology Education. ■

ITEA To Increase Legislative Activities

William "Ed" Ball, President of the International Technology Education Association recently announced efforts on behalf of the association to further develop effective government relations programs. Ball indicated that- "It is time to create a long-term effort to place technology education in the same legislative arena as math and science.

The ITEA has hired a consultant to work on Capitol Hill to provide information to help elected leaders in their efforts to better represent the needs of technology teachers. The consultant will also advise the ITEA on making effective use of its resources to impact government decision-makers and work as an advocate for the profession. This is another significant step by the ITEA to make a difference for technology education professor als. ■

PREPARE YOUR STUDENTS FOR THE FUTURE



**Make a difference in
your classroom.
Choose a text from
Goodheart-Willcox!**

We offer complete teaching packages for Industrial/ Technical classes to aid both the student *and* instructor.

**Call today for more
information or to receive
our free catalog.**

1-800-323-0440



Goodheart-Willcox
123 W. Taft Drive
South Holland, IL 60473

If you were not one of the 2,000 people who attended the 1994 ITEA Conference, you WILL NOT want to miss . . .



Join your colleagues for an educational experience you won't forget.

The conference will be 3 days of educational opportunities including: exhibits, technology festival, poster sessions, special interest sessions, award presentations, networking and more. Technology Education and the Multicultural Society will be the theme of the conference. Plan to attend this exciting event, March 26-28, 1995 in Nashville, Tennessee.

For more information, contact:

International Technology Education Association
1914 Association Drive
Reston, VA 22091
703-860-2100
Fax: 703-860-0353

Foundation For Technology Education Offers Grants

The Foundation for Technology Education is offering grants sponsored by Hearlihy and Company and by Kelvin Electronics. Some information is provided below, but criteria and application information may be obtained by contacting Tom Hughes, Foundation for Technology Education, 1914 Association Drive, Reston, Virginia 22091; tel/fax (804) 559-4226.

\$2,000. Hearlihy Grant for Excellence in Teaching Technology. Hearlihy and Company proudly announces the \$2,000 Hearlihy/ FTE Grant for Excellence in Teaching Technology. The grant is for a technology teacher at any grade level (K-12); and is given in honor of Tom and Mary Hearlihy, Founders of Hearlihy and Company, Springfield, Ohio. Criteria used to determine the recipient includes: 1) successful integration of the technology program with other academic subjects, 2) evidence of success, and 3) plans for professional development via the anticipated grant. Applicants must be a teacher, elementary or secondary, who is successfully integrating the study of technology into the school curriculum. All secondary applicants must be technology teachers and a member of the International Technology Education Association. The

grant is provided directly to the teacher and will be presented at the "ITEA Awards and Banquet Night" during the Annual Conference of the International Technology Education Association in Nashville, Tennessee, convened March 26 - 29, 1995.

Kelvin Grants for Excellence in Promoting Technology Education. Kelvin Electronics is proud to announce the availability of the Kelvin/ FTE Grant Awards for Excellence in Promoting Technology Education. Kelvin sponsors the awards in honor of Marian and Merrill Skeist. Award applicants may be technology teachers or supervisors at any grade level (K - college) and must be an ITEA member. Criteria includes: (a) successful program promotion as shown by increased enrollment and public awareness, (b) success of the technology education program, and (c) recommendations. Grants will be provided at four levels: \$1,500, \$1,000, \$500, and ten gift certificates of \$100 value for related technology education supplies from the Kelvin catalog. Grant payments can be made to the individual or school. Awards will be presented at the "Foundation Spirit of Excellence Breakfast" during the Annual Conference of the International Technology Education Association in Nashville, Tennessee, convened March 26 - 29, 1995. ■



**FOUNDATION FOR
TECHNOLOGY
EDUCATION**

RE/TEAM-- Keeping Track of REtired TEAM Members

by Roland "Al" Phelps

In an effort to keep in communication with our retired colleagues, TEAM would like to mail to retired members each issue of the *NETWORK*. TEAM is also initiating a new column devoted to retirees. It is hoped that the information will be of interest to all *NETWORK* readers.

Since many of our retired members are not currently on our mailing list, we need your help. If you are a retiree or know someone who is, please contact our RE/TEAM editor so that we can follow up with keeping in touch with them. Please provide name, address and phone number to: Roland "Al" Phelps, 5706 Carroll Dale Drive, Eldersburg, MD 21784 (410-795-1987).

RE/TEAM Report: Al Myers

Al retired in March, 1990, from the Maryland State Department of Education where he was State Specialist for Technology Education since 1966. Al and his wife live in a home they designed and built on the eastern shore. Al was one of the founders of TEAM, then called the MIAA. A sharpening and machine repair service, as well as a distributorship for DELTEC modular homes, almost keep Al out of trouble. Al invites anyone traveling near Salisbury to stop by to see him at 2104 Riverview Park Drive in Pocomoc, Maryland 21851. Call Al at 410-957-1851.

RE/TEAM Report: Clarence Clawson

Clarence retired in 1992 as Supervisor of Technology Education in Baltimore County, but continues to work as a part-time consulting engineer. Travel is consuming some of Clarence's time, but so are some antique cars he is restoring. He's working on a '66 Mustang convertible and a 1930 Model "A" Ford. Clarence lives at 13400 Manor Road in Baldwin, Maryland. If you would like to contact Clarence, call him at 410-592-6577.

RE/TEAM Report: Karl Gettle

Dr. Gettle retired in 1992 from the Baltimore County Public Schools where he was Coordinator of Career and Technology Education for 18 years. He also was an Associate Professor at College Park for several years. Karl still lives at 419 Range Road in Towson, Maryland 21204. He expects to move back to his original home area in Lebanon County, Pennsylvania. Karl continues to consult for Baltimore County and also is involved with the Landis Valley Museum in Lancaster. The things he sees happening in Technology education are really exciting to Karl. You can call Karl at 410-337-057.

RE/TEAM Report: Bob Norris

Bob has kept his home at 2409 Chetwood Circle in Timonium, Maryland. His telephone number is 410-252-7069. Since Bob retired in 1989, he has been teaching at the Hannahmore School. He is planning to retire for keeps this year and move to North Carolina. Bob served several years as an officer and Board member for our association, and was president in 1975. He was also recipient of the Teacher Excellence award during his teaching career in Baltimore County. ■


Baltimore Sun/ Technology Education Project

by Bob Gray

The Maryland State Department of Education, Division of Career and Adult Learning and the Baltimore Sun Newspapers will distribute a special supplement on biotechnology this Fall. All middle and high schools will receive this publication.


The Biotechnology issue is the last of four technology publications and marks the end of a joint effort with the Baltimore Sun's *Newspaper in Education* Department. The earlier issues dealing with Manufacturing, Transportation, and Communication were well received by students and teachers around the state.

Each issue has focused on an enterprise that utilizes technology to provide us with the goods and services we need and desire. The tabloids include information as well as activities that can be incorporated into Technology education courses. More information about the Biotechnology issue will come to you shortly. ■




INDUSTRIAL ARTS SUPPLY CO.
5724 WEST 36th St. MPLS, MN 55416
PHONE (612) 920-7393 FAX (612) 920-2947
TOLL FREE 800-328-4827, ext.2662


NEW INJECTION MACHINE
#58M



BUDGETRON
5/8 OZ., 110VAC / 550 W
USES MOST HONA, EMCO & CRYSTAL ALLOY MOLDS



Co2 POWERED CARS
DRAGSTER WHEELS MADE IN USA



MODEL ROCKETS

TECHNOLOGY SUPPLIES
CALL OR WRITE FOR FREE CATALOG

ONLY \$495.00

COMPLETE

An Overdue Tribute To A Colleague

We have a colleague who is an excellent ambassador and advocate for Technology Education. Our colleague's writing and speaking abilities are greatly effective in enabling others to comprehend the technology education movement. He has communicated and left a very positive impression with teachers, school administrators, local system administrators, representatives from business and industry, Maryland State Department of Education staff, and members of the State Board of Education. His knowledge of education in general and his knowledge of Technology Education in particular have brought him the respectability needed to represent our field well.

Among our colleague's many strengths, he is especially effective at getting people to follow his lead. His great leadership is partly derived from his manner of relating to people. He is always encouraging to others, making them feel included and valued. His kindness and friendliness is of such genuineness that even the most traditional teacher will concede to view education differently to avoid disagreeing with him.

Our colleague is able to lead so effectively in a profession that is characterized by significant change because he

has a clear vision of where we can go. His philosophy related to education and to Technology Education is extremely well founded. He is attuned to the needs of our youth and our society. He recognizes the potentials of Technology Education to address those needs. He has a viable, creative vision of a curricular structure, teaching/learning strategies and the resources necessary to deliver an instructional program that will benefit our students and society. He is a leader who knows where to lead.

Our colleague is a faithful and persistent laborer for our profession and educational programs. He works regularly after hours at home and on weekends. He never misses an event in a local school system where his presence would be either constructive or an encouragement, even when weekend time is required. His labors are an indication of his commitment and dedication to his profession and the importance he assigns to its mission.

He is an inspiration to the professional technology educators in our state. He is Bob Gray, our State Specialist for Technology Education. ■

Technology Education Products, Modules and Labs!

Modern School Supplies features hundreds of products for technology education for grades K-12. Topics covered include CAD, CNC, electronics, fiber optics, robotics, weather, power and energy, communication and multimedia. The resource materials for these products emphasize hands-on problem-solving using state-of-the-art equipment and computer technology. Modern also offers modules to teach students about different types of technology and their real world applications.



Please call 800-243-2329 to receive your FREE Technology Education Catalog and Modern Technology Lab brochure.

Modern School Supplies, Inc.
PO Box 958
Hartford, CT 06143



Strengthen Your Professional Association

ASK A COLLEAGUE IF THEY ARE A TEAM MEMBER

If Not, Encourage Them To Join Us And Support

The Advancement Of Technology Education In Maryland

ENGINEERS, continued from page 4

and math. It involves collaborative effort in learning on the part of students and it can be a great stimulus for learning. Engineering activities provide a rich opportunity for students to explore by first-hand experience that vast group of technology-based careers ranged from trade, to technician, to technologist, to professional engineer.

A teaching-learning strategy employed in Technology Education for engaging students in problem-solving and the engineering process is called the "Ingenuity Challenge". In these activities, students are required to employ their creativity and ingenuity to solve problems using technology. Some problems are designed for individual effort and others for team effort. Student solutions to problems are usually performance-tested in a competitive setting. As in all engineering activities, feedback from testing becomes the basis for students to improve their problem solutions. The student experiences in the Ingenuity Challenges develop their ability and confidence for employing higher-level thinking skills and for solving problems, especially when technology is involved.

It is vitally important to our young people that they have the Technology Education advantages that have been discussed so far. But, the engineering community also derives benefit from the emergence of Technology Education as the engineering connection in the schools. Consider the following three points.

1. Engineering enterprises need increasing numbers of people to lead and support their productivity. Demand is expected to grow in the years ahead. Many of the needed people will need to be engineers. Others will need to be

scientists, technologists, technicians and trades persons. Interest and aptitude for all of these careers needs to be developed with students in high school, middle school and earlier. The delivery of a public school curriculum relating to engineering processes and technology systems through the application of technological resources, math skills, science concepts and ingenuity represents a viable way of initiating the development of the human resources needed by engineering enterprises

2. The increasing complexity of decision-making concerning the selection of technology resources, and the development and use of technologies in a democracy requires a technologically literate citizenry. This is necessary to avoid the willful relinquishing of democratic control by an electorate which feels inadequate to decide. It is also necessary to avoid obstruction of necessary technologies by an electorate acting out of fear derived from ignorance. The delivery of a public school curriculum relating to technological systems and issues represents a viable way of developing the technological literacy of our citizens and assuring appropriate freedoms and controls for engineering enterprises.

3. There is great misunderstanding and lack of understanding among high school students concerning engineering professions. Many students who would have interest in engineering are unaware and do not consider it as an option. Some students who decide to study engineering in college find that their interests and engineering are not a good match. The delivery of a public school curriculum relating to engineering processes and technological systems represents a viable way of developing awareness of and interest in the engineering profession. See ENGINEERS on page 10

Legislators and policy makers want to know who an organization represents! Let it be known that we represent you in issues of Technology Education. Your membership today is a commitment to Technology Education in this state.

TEAM Dues: \$14.00 Professional, \$4.00 Student, \$140.00 Life
Joining is easy. Just fill out the application, enclose a check made payable to TEAM, and mail to:

Robert C. Gray
4323 Lord Fairfax Court
Upper Marlboro, Maryland 20772

TEAM MEMBERSHIP APPLICATION

Last Name _____ Fist _____ M.I. _____

Home Address _____ City _____ State _____ ZIP _____

Job Assignment _____ Employer _____

Work Address _____

University of Maryland Eastern Shore Technology Education Workshop

by Bob Gray

The University of Maryland Eastern Shore, Department of Technology and the Maryland State Department of Education hosted a five-day professional development activity for Maryland technology education teachers this past June. The purpose of the workshop was to enhance teachers' technical knowledge base and to develop skill in facilitating the problem-solving teaching/ learning strategy.

Utilizing UMES state-of-the-art laboratories and highly qualified instructors, participants from 15 Maryland school systems received instruction in structural systems, statics, fluidics, electronics, and computer control and data acquisition. Rick Avondet, Technology Education teacher at Oxon Hill High School in Prince George's County facilitated a week-long technology challenge designed to familiarize teachers with the long-term group problem-solving teaching strategy. This strategy should be the predominant activity in advanced technology education courses.

This workshop was coordinated by Dr. Leon Copeland, Chairman of the Technology Department at UMES. Plans are now being made for next summer's UMES Technology Education Professional Development activity. Look for more information about the 1995 UMES Technology Education Workshop in the new year. ■

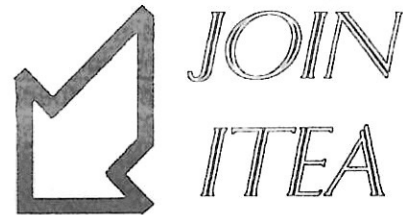
Engineers, continued from page 9

Technology Education has received a great boost from the engineering community across the nation. Professional engineers under the auspices of institutions of higher education, government agencies, private enterprise and professional societies have given great support to the advancement of this new curricular area. The community of technology educators is grateful to the community of professional engineers for your support.

In many respects, Technology Education is in its infancy. The engineering community is needed to play a significant role in nurturing it to fulfill its great potential. Through a strong engineering and education alliance, both professions can be winners. More importantly, shareholders of the winnings are our young people, our communities and nation. ■

Bibliography

1. Education Week, September 26, 1990, "Teach Science For Science's Sake; For Global Competitiveness, Try Technology", J. Myron Adkin.
2. Technology Commercialization, April, 1992, "Akio Morita On Innovation", Interview.
3. Schmitt, Roland W., address before the Sixth Convocation of Professional Engineering Societies and the National Academy of Engineering, May 31, 1990.



Membership Application

INTERNATIONAL TECHNOLOGY EDUCATION ASSOCIATION
1914 ASSOCIATION DRIVE ■ RESTON, VA 22091

Professional Member \$50
An individual in the profession

Student \$25
An undergraduate college student

Retired \$25
An individual no longer active in the field

Sustaining Technical Representative \$30
An employee of a firm serving the profession

PAYMENT MUST BE IN U.S. CURRENCY AND ACCOMPANY THIS FORM

Please charge my membership dues to VISA MasterCard

CARD NUMBER _____ EXPIRES _____

SIGNATURE _____

Home (Check if preferred address)

NAME _____

HOME ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____ / _____ New Renew MEMBER NO. _____

School/Business (Check if preferred address)

SCHOOL OR BUSINESS _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Membership dues include a \$30 The Technology Teacher subscription

Profile Male Female
General Position Classroom Teacher CT Supervisor SP Teacher Educator TE College Students CS Retired RT
Age Range 18-25 A 26-40 B 41-55 C Over 55 D

Please send me more information on

- Teacher educator association CTTE
- Supervisor association ITEA-CS
- State association officers association CTEA
- Elementary level technology education TECC
- College level student clubs TECA
- Secondary school student clubs TSA

TECHNOLOGY RESOURCE:

Fiber Optic Communications

by: Dr. George Simonis, Charles Toth, W. Harley Smith

BACKGROUND INFORMATION

Optical communications has been with us a long time. In ancient times signal fires were used to send signals over long distances, especially at night. Mirrors were used to reflect sun light toward distant observers to send information. The native Americans sent smoke signals over great distances -- a form of optical communication. Ships at sea, the U.S. Army and many other organizations have used a flag alphabet to send optical messages. We optically communicate with oncoming cars on the highway at night. Flashing our lights tells an oncoming driver to dim their headlights, and turning our lights on and off tells another driver that they forgot to turn on their headlights. Flashing our lights may also mean, "speed trap ahead", or "let me pass".

Our most modern advances in communications technology have their origins over 150 years ago (1844) when Samuel Morse put the finishing touches on his telegraph. He gave us our first practical means of almost instantaneous long-distance communication. Thirty-two years later (1876), Alexander Bell put the finishing touches on his telephone. The telephone soon gave us long-distance communication throughout the United States and then throughout the world. Both the telegraph and the early telephone had one thing in common: they used electricity to carry information on copper wires. The next major breakthrough in communications came as a technology that did not need wires.

In 1895, just 24 years after Bell's telephone, Guglielmo Marconi developed radio communications based on work done by many physicists in the late nineteenth century. All modern radio, television and cellular telephone communications are based on Marconi's pioneering work. They use radio waves invisible to the human eye. These waves of energy are sent into the air usually in all directions. Even though the radio waves are invisible to the eye, radio receivers can pluck the waves out of the air and use them.

We are experiencing a communications revolution that will use a new type of technology. The new technology is fiber optic communications. You have seen the telephone company advertisement that shows a pin dropping on a table in front of a telephone. This ad tells you that a person on the other end of the telephone call could hear the pin drop. This high quality telephone sound is the result of using fiber optic cable instead of metal wire cable.

WHAT IS FIBER OPTIC CABLE?

Fiber optic cable has wire made of very pure glass. It is made by squeezing melted glass through a small hole. The glass comes out of the hole and quickly cools so that it looks like a wire or "fiber". This is why the word "fiber" is used in its name. The word "optic" is also used in its name because "optic" has to do with vision and light.

This process of making the glass fiber is called "extrusion". It is much like what you do when you squeeze tooth paste from its tube. The fine, extruded glass fibers can even bend an amazing amount without breaking. Light can travel very well through the glass fiber.

HOW DOES LIGHT CARRY A VOICE MESSAGE?

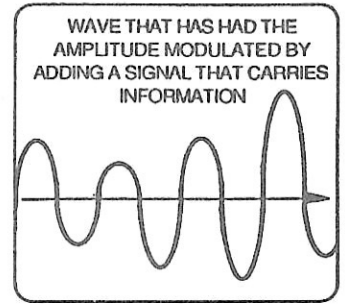
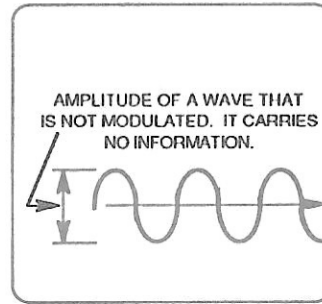
Fiber optic cable carries information on light waves. For the best results LASER light is used. Ordinary wires carry information on electrical energy. Sending information on light waves has several advantages. You can send 1,000 to 10,000 times more information through a fiber optic cable the size of a human hair than you can through a metal cable that is much larger. The quality of the message is also much better.

A microphone in your telephone handset converts sound waves from your voice into electrical energy. The amount of electrical energy changes as the sounds change in your voice. The electrical energy changes affect the strength of a LASER beam that goes through a fiber optic cable. At the other end of the fiber optic cable, there is an electronic device (light detecting diode) that detects the LASER beam coming through. The LIGHT DETECTING DIODE changes light energy back into electrical energy. As the LASER beam strengthens with sound changes, the LIGHT DETECTING DIODE produces stronger electrical energy. As the LASER beam weakens with sound changes, the LIGHT DETECTING DIODE produces weaker electrical energy. The changing electrical energy connects to a speaker, which changes electrical energy back to sound in the other person's telephone.

We are familiar with the word "signal". It is a way of communicating without using words that we could either read or hear. The traffic "signal" tells a driver when to go and when to stop. A bell may "signal" us that the school day has ended. A turning "signal" on a car tells other drivers that we are going to turn. When a radio wave or a light wave is modulated by mixing a signal with it, the signal contains information. However, this information is not in a form that is understandable. The information remains hidden from us until it is converted to something we can understand by a device such as a radio, a telephone, computer, a television set or a FAX machine. When the signals are converted, they become either something we can see, something we can hear, or information we can save and process. Signals that bring us something we can hear, such as radio and telephone, are called "audio signals". Signals that bring us something on a video screen are called "video signals". Signals sending information to FAX machines and computers are called "data signals".

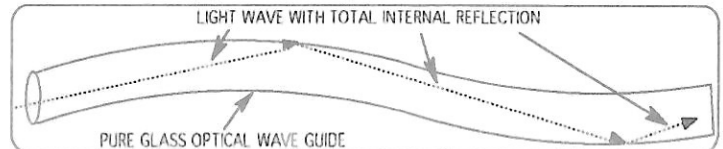
Electromagnetic waves such as light and radio waves do not carry information in their natural form. They have to be changed to add information to them. This change is called "modulation". Wave modulation is achieved by mixing a "signal" with a wave such as a radio wave or a light wave. Once the signal is added, we call the wave a "modulated wave".

One method of wave modulation is called "amplitude modulation". "Amplitude" in a wave has to do with how high and low the wave rises and falls as it goes along. In "amplitude modulation", a wave would change its rise and fall according to the information that is added to it. (See the examples at the top of the right hand column.)



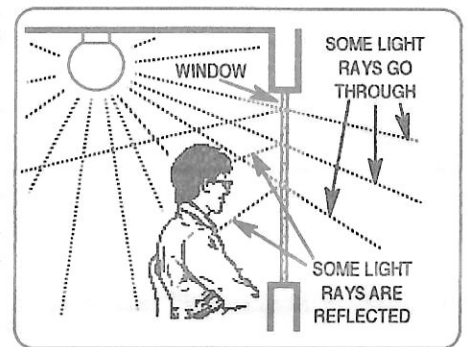
HOW DOES LIGHT MAKE TURNS WITH THE FIBER OPTIC CABLE?

The fiber optic cable acts like a guide for the light waves as they travel from one telephone to another. Another name for fiber optic cable is "Optical Wave Guide". The light even follows the cable when it bends and loops. Whenever the light hits the side of the cable, it reflects back into the cable. This is called, "Total Internal Reflection" (See the illustration below.)



WHAT IS TOTAL INTERNAL REFLECTION?

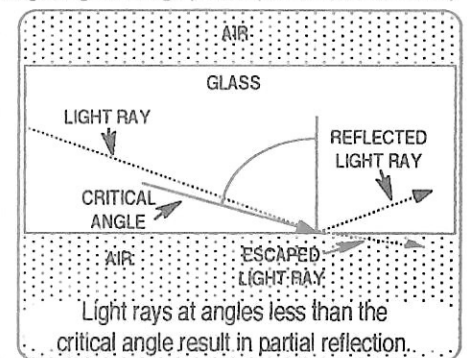
If you shine a light on a smooth surface of a material that permits light to pass through it, much of the light will pass through. But, some will reflect off of the smooth surface. This is most obvious if we are inside at night and look out the window. If the room is lighted, we can see some of the light goes through the window because we can see the light brighten something just outside. We also can see a reflection on the window when we focus our eyes on the glass. (See the illustration at the right.) Since this is only a partial reflection of the light back inside, we could call it a "partial internal reflection". It could not be called a "total internal reflection" because we see that some of the light passes through the window to the outside.



"Total internal reflection" is possible when light rays meet a surface at a low angle. A "critical angle" is reached at which light passing through is no longer possible (see the illustrations below).

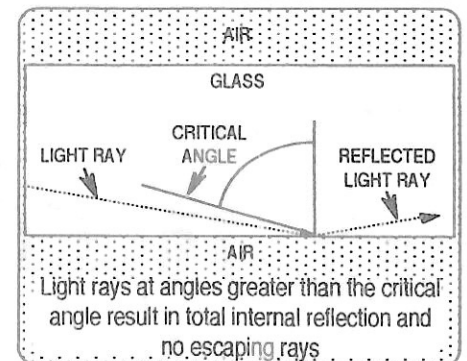
At that critical angle and beyond, only reflection takes place. It is correct to say that this reflection is "total" and we can call it "total internal reflection". This is correct because all of the light reaching the surface is reflected back inward and no light escapes.

We can take advantage of the phenomenon of "total internal reflection" to guide a light wave over great distance. If we shine a light into the end of a glass rod or clear plastic rod, the light will stay within the rod and go where the rod leads it, even when turns are made. Whether we use a large rod or a thin glass fiber to guide light waves in this way, we call it an "optical wave guide".



WHAT ABOUT THE FUTURE?

In the future, fiber optic communication will bring first-run movies into your home when you want to see them. It will bring banking, magazines, newspapers and books when ever you want. It will make true home shopping a reality because you will be able to choose the types of products you want to see on the screen and make your purchases through the computer. Fiber optic communications will also enable you to see the person you are talking to on the telephone, if that person allows you. The high definition television you may have heard about on the news will probably be delivered to your home on fiber optic cable.



Conference '94

**OCTOBER
21**

Martin's West-- on the west side of the Baltimore Beltway (I-695) Take EXIT 17, Security Blvd.-Woodlawn. West on Security Blvd., Right on Belmont Ave. to Martin's.

Register early by Oct. 10th,
Save \$5

Conference '94 is fast approaching. Mark your calendar. You won't want to miss this opportunity for professional and personal development. The conference, entitled "Piloting the Future - A Turn Towards Success", will take place on Friday, October 21, 1994, at Martin's West.

The program will include vendor exhibits, a Technology Fair, and over 23 concurrent sessions on such topics as: INTERNET computer resources, a new biotechnology curriculum, Maryland Engineering Challenges at the Baltimore Museum of Industry, Resource Round Robin, Tech. Ed. Integrated Learning Lab., and Optical Communications On A Budget. In addition, the Technology Education Association of Maryland (TEAM) will hold its Annual Business Meeting and Awards Program. This is an excellent opportunity for you to meet with your fellow teachers from across the state. ■

Conference Brochure and Registration Form Enclosed

NETWORK

A Publication of

TEAM

Articles and Advertisements Welcomed.

Please correspond to
W. Harley Smith, Vice President For
Publications and Resources
367 Friar Trail
Annapolis, Maryland 21401
(W) 301-808-4002 (H) 410-849-8756

Published for TEAM members by the
Technology Education Association of Maryland

TEAM

W. Harley Smith
367 Friar Trail
Annapolis, MD. 21401



Brigitte Valsey
10024 Durango Drive
Damascus, MD 20872



CONFERENCE '94-- OCT. 21
Details in this issue