HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 1 October 6, 1980

Satellite Data Link In The Offing

Two satellites that have been orbiting the Earth since 1974 will soon be used to transfer data between PPL and the National Magnetic Fusion Energy Computer Center (NMFECC) at the Lawrence Livermore Laboratory in California.

Starting in January 1981, the satellite hookup will link the PPL User's Service Center PDP-10 with the Cray-1, the world's fastest computer, at the NMFECC. The connection enables processing of programs much faster than would be possible using PPL equipment alone. The NMFECC serves as a central computer facility for all DOE contractors engaged in magnetic fusion energy research.

The satellite link will replace presently used overland cables, since the volume of information being transferred, particularly computer graphics, is filling these lines. The satellite hookup will also be less expensive than using terrestrial facilities.

At first, the satellites will transmit data only between PPL and the NMFECC at a rate of about 56 kilobits (56,000 computer bits) per second. After about six months, computer links to Oak Ridge National Laboratory, Los Alamos Scientific Laboratory, and General Atomic Corporation will be added.

Use of the satellites will require the installation of two 5-meter antenna stations at PPL. The dish-shaped antennas will be located adjacent to the Lab/Office Building at C-Site. According to Paul Funk, Head of Hardware and Special Projects in the Computer Department, the location had to be chosen carefully so as not to interfere with already established satellite communications, particularly those from the nearby RCA plant.

The satellites that will be used were manufactured by the American Satellite Corporation, a subsidiary of Fairchild Industries.

Candelori Named Business Manager

Angelo V. Candelori, formerly Manager of Compensation, has been named to the position of Business Manager of the Administration Department. In his new position, Angelo provides management and administrative support in the budget, cost, and personnel areas of the Administration Department. He reports to Dick Rossi, Associate Director and Head of the Administration Department.

Angelo's new office is room 340 of the LOB, and his extension is 2813.

Angelo Candelori

Art Groups Combined

Effective October 1, the Graphic Arts and Technical Illustrations Sections of the Communications Office have joined to form a new Graphic Services Section, headed by Bernie Giehl. The group is responsible for laboratory-wide art services including the production of technical graphs, miscellaneous line-art, 3-D perspective drawings, artist renditions, exhibit and publications design and layout.

Requests for graphics services should be directed to Bernie Giehl, Room 177, Module II, C-Site.

Princeton University League

A sherry party, a trip to an art exhibit and a gargoyle tour of main campus are just three of the activities on tap for the Princeton University League in October.

The League will provide an opportunity for wives new to the university to meet at a Morning Coffee Oct. 7 at 9:30 a.m. in the Hibben-Magee Apartments. The following day, a family trip to Doylestown, PA will visit the Mercer Museum of Early American Living and Fonthill, Dr. Mercer's 'castle'. A trip to the Montclair Art Museum to view the John Sloane exhibit is scheduled for Oct. 15.

The monthly wine and cheese party for university singles will be held in Murray Dodge Hall on Oct. 22. Then you'll get the opportunity to meet the university's own goblins during the League-sponsored campus tour of gargoyles on Halloween.

Formed in the 1920's, the League offers a myriad of services to university families. Programs are held frequently, with numerous trips and social events slated throughout the year. The League also publishes a newcomer's guide to Princeton, runs a furniture exchange, and provides volunteer workers to the university Art Museum.

League membership is open to everyone officially associated with Princeton University. For further information on any October events, or on the League itself, call the League offices at 452-3650 weekdays between 9 a.m. and 1 p.m.

Softball Champs

Led by the pitching of John Gumbas and Len Halvorsen, the hitting of Bob Raimond, Frank DiBella and Tom Painter, and all-around solid defensive play, the RF Heaters capped an undefeated season in the PPL Softball League by dethroning defending champions, Vacuum Shop, 7-4.

The victory, which gave the RF team possession of the championship trophy, preserved the team's season record at 6-0.

Members of the championship team include Top row, l. to r. Rich Martinez, Dave Miller, John Gumbas, Frank DiBella, Mike Vocaturo, Dick Moore, Bob Raimond, Bottom, l. to r. Tom Painter, Steve Duritt, Pat Walker, John Lekko, Darrel Young, Len Halvorsen, Paul Karitis, Dave Ciotti and Dennis Jones.

PPL HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 2 October 22, 1980

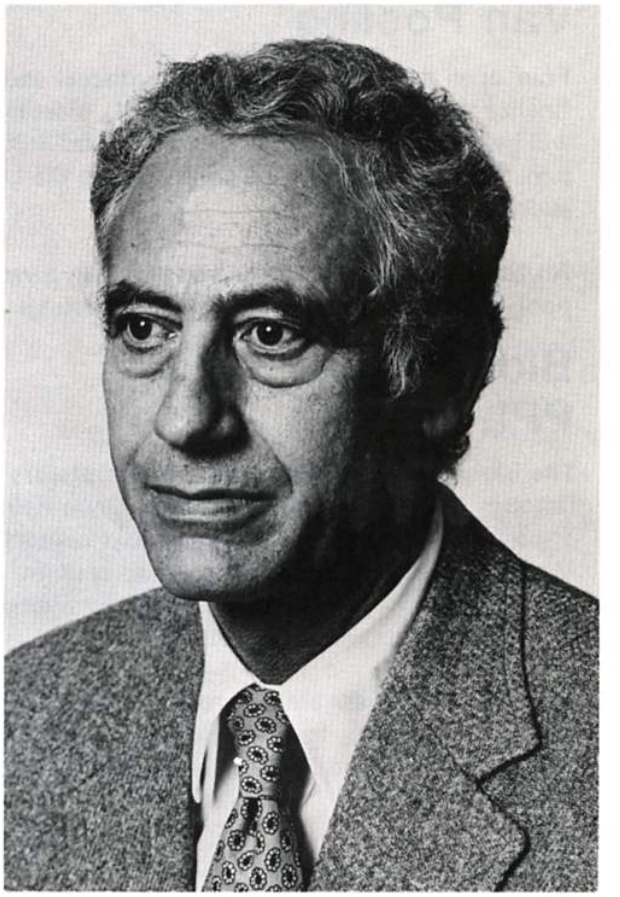
Maxwell Prize To Dr. Stix

Thomas H. Stix, Associate Director of Academic Affairs at PPL, has been awarded the 1980 James Clerk Maxwell Prize in Plasma Physics by the American Physical Society. The citation accompanying the award reads: "For his contributions to the development and formalization of the theory of wave propagation in plasmas and for his pioneering research on radio frequency plasma heating. His work has played the guiding role in the understanding of waves in space plasmas and in the development of advanced plasma heating methods for controlled fusion devices."

Dr. Stix, Professor of Astrophysical Sciences at Princeton, is the sixth recipient of the prize, which is sponsored by Maxwell Laboratories, Inc. Past recipients include Princeton University Professor Lyman Spitzer, Jr. and Institute of Advanced Study Professor Marshall Rosenbluth. The prize will be awarded in November at the American Physical Society's Division of Plasma Physics meeting in San Diego.

Professor Stix has been associated with PPL since 1953. In the late 1950's his work with ion cyclotron frequency heating showed impressive results even on the relatively small devices in use at the time. Additional development of rf methods was continued by PPL physicists William M. Hooke, Shoichi Yoshikawa, Joel Hosea, Stefano Bernabei, Hironori Takahashi, Patrick Colestock and David Hwang, and by PPL engineers Homer Hill, Anthony Sivo and John Lawson. This work has helped bring ion cyclotron heating and other rf methods to the point where they are foreseen today as practical methods for igniting reactor plasmas.

Professor Stix served as Chairman of the APS Division of Plasma Physics in 1962-63, and was a Guggenheim Fellow in 1969-70. He has served in an editorial capacity for a number of physics journals and is a current member of the American Physical Society Panel on Public Affairs.



Dr. Thomas Stix

President Signs Fusion Bill

The Magnetic Fusion Energy Engineering Act (MFEEA) of 1980, which recommends an intensified program of research into nuclear fusion technology, became law October 7 when President Carter signed the bill.

The act recommends that approximately $20 billion be spent on fusion research over the next ten years, although Congress must appropriate funds on a yearly basis. In addition, it recommends the establishment of a National Center for Fusion Engineering which would coordinate intensified efforts toward achieving an operating Fusion En-

(cont. on pg. 2)

Fusion Bill *cont. from pg. 1*

gineering Device (FED) by 1990. The recommended target date for a demonstration fusion power generating plant was set at the year 2000.

For a more detailed analysis of the provisions of the MFEEA, read "Debate on Fusion's Future" in the next issue of *PPL NOW.*

Van Pooling

Four open meetings will be held to discuss and finalize the van pooling program at PPL. Meetings will be held in Sayre Hall at 10:30 a.m. and 3:30 p.m. October 27, and at the same times in the LOB auditorium October 30.

All those interested in driving or riding in a van pool should attend one of the four meetings.

Bloodmobile Wants PPL Plasma

The Bloodmobile will again visit the laboratory October 29 from 10 a.m. to 3 p.m. at Sayre Hall. Those wishing to donate blood should contact Meg Gilbert at ext. 2036 to set up an appointment. Donors will be scheduled every 15 minutes, and refreshments will be served.

Although employees are covered for blood needs under a group plan, the university must meet its yearly quota of blood donations to continue to offer this benefit.

Fusion Features

PPL staff should be on the lookout for feature articles on fusion energy which will appear in the following magazines:

December: *Discover, New Jersey Monthly;* January: *Omni;* February: *National Geographic.*

Safety Shoes

Iron Age Shoe Co., the laboratory's safety shoe vendor, will have its Iron Age Shoemobile van at C-Site from 9 a.m. to 4:30 p.m. October 29. The van will be parked at C-Site, adjacent to Receiving 4.

Although the procedure for buying or ordering safety shoes remains as before, the amount PPL will pay toward the shoes has been increased to $25. Brochures concerning the shoes and withdrawal authorization forms are available at PPL stockrooms.

PPL Calendar

Amid the profusion of new calendars on the market these days, there's one every laboratory employee should know about —— the PPL Calendar.

The calendar is a weekly compendium of the seminars, meetings, colloquia and special events scheduled throughout the laboratory community. Items intended for inclusion in the calendar should be received by Mary Dyson no later than noon on the Friday preceding the event.

The calendar is published under the auspices of Associate Director for Academic Affairs Thomas Stix. It is distributed by mail, and copies are posted on laboratory bulletin boards.

For further information about the calendar, contact Mary at ext. 2489.

Stop Smoking Program

Approximately 32 employees are trying to quit at PPL —— and the laboratory is encouraging their efforts, since the quitting involves smoking.

The group is the first class in a stop smoking program offered by the Personnel Department and Blue Cross/Blue Shield. The free classes are based on the American Cancer Society's methods for kicking the smoking habit, which has a 50% success rate to its credit.

The eight one-and-a-half hour sessions run from 4:30 to 6 p.m. A second class will be established if sufficient employee interest is shown. Enrollment will be on a first come, first serve basis.

For further information about this program itself or about future classes, call Joyce Lafharis at ext. 2685.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

Note-worthy Action

Three members of the laboratory's emergency services unit are receiving letters of commendation from fire chief Jack Anderson, thanking them for their efforts in rescuing an injured construction worker in June.

Gregg Tompkins of Transportation Services, Joe Pownall of the Tech Shop and Jerry Faul of DOE came to the aid of a construction worker who fell approximately 40 feet down an air shaft while working on TFTR June 18. The trio crawled through a 46 inch connecting tube, immobilized the man's injuries, and brought him out of the shaft safely.

Chief Anderson said the worker suffered a concussion in the fall, as well as fractures of the leg, foot, ankle and vertebra. His injuries required hospitalization for two weeks, according to Anderson.

Gregg Tompkins, Joe Pownall and Jerry Faul (left to right)

In his letter of commendation, the chief cited the "competence and ability" of each man. "It is a great pleasure to know we have dedicated individuals of your caliber as members of the emergency services unit." He added that the three "did a remarkable job, and they deserve a little credit!"

Takahashi Tops Tournament

Lane Roquemore (right) congratulates Hiro Takahashi, the winner of the fourth annual Melvin B. Gottlieb Trophy tennis tournament. Takahashi defeated Roquemore in the finals to take the tournament title.

Hiro Takahashi became the first two-time winner of the Melvin B. Gottlieb Trophy tennis tournament when he took the 1980 championship recently. He last topped the tournament two years ago.

Hiro defeated this year's spoiler, Lane Roquemore, in the finals to take the trophy. Roquemore had gained the final match by defeating the second and third seeds, Jim Bialek and Myron Norris, while Takahashi beat David Eames in his semi-final match.

Twenty-seven PPL tennis players came to the tournament kickoff September 22, but by the end of the first two rounds the field had been whittled down to eight competitors. The final three rounds were played over the next two weeks, with the consolation finals still remaining to be played.

A picnic was again provided for attendees at the fourth annual edition of the tournament. The event was organized by John G. Edwards and Marilee Thompson.

Run For Fun Results

Dennis Mueller was the first man to cross the finish line in the rescheduled PPL Run for Fun, held October 2 at 12:15 p.m.

Mueller outran his 26 competitors, navigating the two-and-a-half mile course in 13:09. He was followed by Dave Johnson, who turned in a time of 13:59. Jack Conner took third place with a time of 14:59.

Beverly Laffin led the women finishers, completing the circuit in 20:14. Second place went to Marilee Thompson with a 20:34. Anne Golden turned in a 22:30 run to capture third spot.

Betty Klank hands a timing stick to another runner as he crosses the finish line in the recent PPL Run for Fun. Dennis Mueller came in first in the men's division of the race, while Beverly Laffin paced the women's division.

Approximately 45 people signed up for the run, which organizer Bruce Brilliantine termed "a real success" despite rescheduling and gloomy weather. Lemonade was served to the racers as they crossed the finish line.

Bruce thanked Ann O'Day, Betty Klank, fire chief Jack Anderson and the laboratory's emergency services unit, Jim Kopliner and his security staff, Connie Stout and the maintenance department, Jules Nemeth and Jerry Williams for their help in the event. He expects to schedule another "Run for Fun" in the spring.

D&R Canal Bike Crossing

Progress toward a proposed D&R Canal crossing to serve cyclists coming to Forrestal Center is continuing slowly. The construction application has been completed by the state Parks Department, and will be signed by several groups, including the Canal Commission, the Historic Preservation Commission, and the Department of Water Quality. The application will then be submitted to the regional and federal officers of the Army Corps of Engineers.

A&E proposals for design of a bridge and adjoining recreation area have been received, and design will start soon. Once the design work is complete, the job must be advertised and bids received before construction can take place. Funding for the project has been approved.

The number of regional, state and federal agencies involved in the project has been cited as a contributing factor in delaying completion of the project.

Credit Card Fraud

PPL employees with credit cards are urged to be wary of anyone contacting them by telephone and asking for information concerning their credit cards. Recently thieves posing as bank or company representatives have been calling individuals, asking for credit card numbers to "double check your account". Callers have also represented themselves as sweepstakes officials, offering a prize for credit card numbers that match a fictitious contest number.

Once thieves have your credit card number, they can charge purchases to your account —— and leave you with a mountain of bills.

Never give information about your credit card accounts over the telephone unless you are certain who you're talking to. If you do receive such a call, tell the caller you'll check the information he wants and call him back. If the telephone number you're given doesn't match that of your bank or credit card company, report the call to the bank or company.

For Sale

FOR SALE -- 1969 Rambler American, 62,000 miles. Best offer. Call ext. 2755.

Hobie Gates Retirement

Over 70 people gathered in the Cedar Gardens Restaurant in Hamilton Township September 18 to honor Hobie Gates Jr., who retired from the laboratory staff September 30 after more than 18 years of service.

The dinner was a testimonial to Hobie, whose most recent post was that of internal auditor. He was presented with an artist's rendering of C-Site as a retirement gift.

Laboratory director Dr. Melvin Gottlieb attended the dinner, along with various PPL officials and employees who have worked with Hobie throughout his tenure at PPL. Also present at the dinner were Hobie's wife, his three children, and their spouses.

The dinner was organized by Business Manager Angelo Candelori.

Hobie Gates Jr. accepts a round of applause, led by laboratory Director Melvin Gottlieb, Associate Director Richard Rossi and Raymond Clark (right to left) during a dinner in his honor. He recently retired from PPL after more than 18 years of service.

Members of the PPL emergency services unit use the Jaws of Life to help 'rescue' a 'victim' trapped in a car. The demonstration, conducted at C-Site following a fire drill, was held in conjunction with National Fire Prevention Week.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 3 October 28, 1980

HAROLD FURTH NAMED NEW PPL DIRECTOR

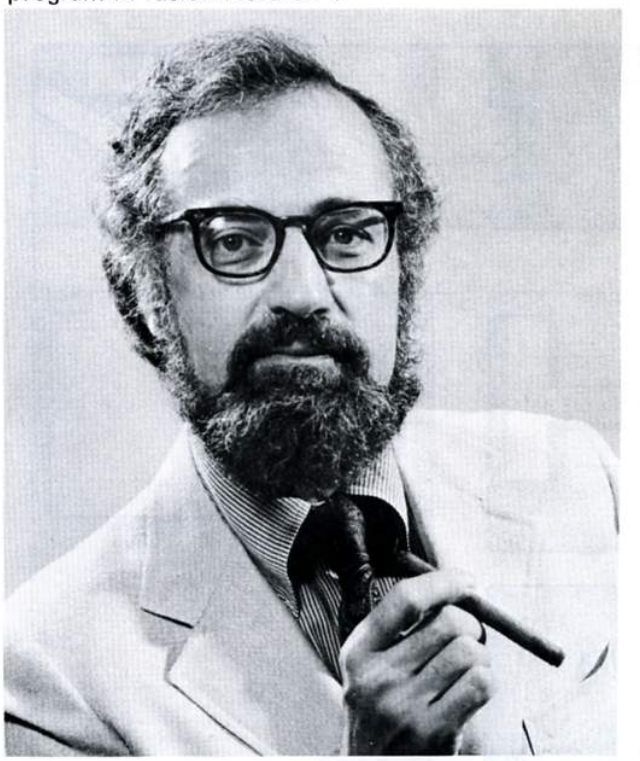
On Friday, October 24th, Princeton University's Board of Trustees announced the appointment of Harold P. Furth as the next Director of PPL. Dr. Furth, PPL Program Director and Professor of Astrophysical Sciences, will succeed Dr. Melvin B. Gottlieb when Dr. Gottlieb retires January 1.

Dr. Furth, who earned his B.A. and Ph.D. at Harvard, joined the staff of the Lawrence Livermore Laboratory in California in 1956. He came to PPL in 1967, where his theoretical and experimental work have led to significant advances in the understanding of plasma physics.

Dr. Furth received the E.O. Lawrence Memorial Award in 1974 for his contributions in atomic energy, and is a Fellow of the American Physical Society. He is also a member of the National Academy of Sciences.

Provost Neil L. Rudenstine, coordinator of the six-month search for a new laboratory director, said Furth had been selected from a field of 50 candidates from universities, research institutes, government and industry throughout the nation and abroad.

According to Princeton University President William G. Bowen, "We are extremely fortunate in having Harold Furth succeed Melvin Gottlieb as director of PPL. The laboratory has done outstanding work under Professor Gottlieb's direction during the past decade, and I know that Professor Furth will be an extraordinarily effective leader as we look toward the 1980's. He is a superb scientist and is one of the chief architects of the nation's program in fusion research".



Harold P. Furth

After-Hours Log

The recent installation of a card entry system for after-hours access to the laboratory eliminated the need for the log in—log out procedure at the Security Desk. Some employees have requested reestablishment of the log, however, in order to confirm their entry and exit and to provide Security with verification of the presence of people in various buildings.

Therefore, a log will again be available at the Security Desk for voluntary use. Those who choose to check in are asked to be certain to log out when they leave.

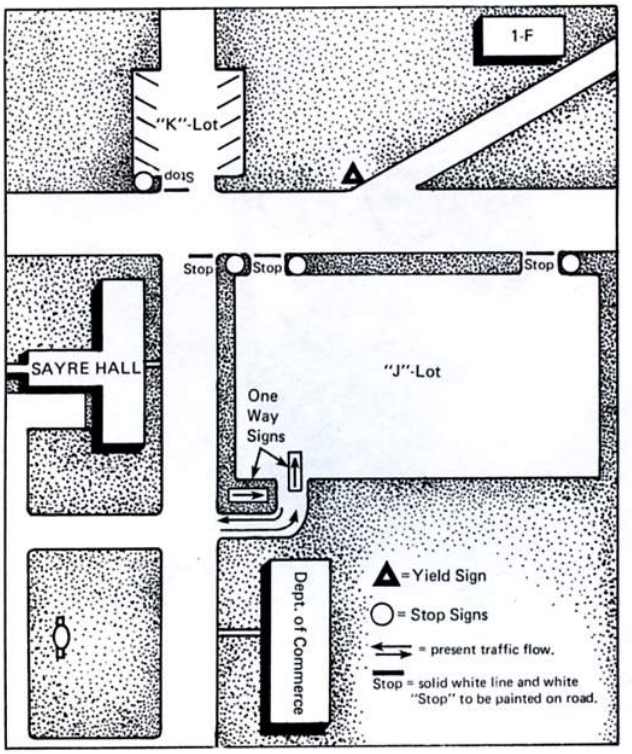
Sign Relocation

In an effort to ease traffic flow in the area, the traffic sign pattern in the vicinity of Sayre Hall will be altered in the near future.

Stop signs will be installed at two exits to the "J" parking lot, which is located across the street from Sayre Hall. The entrance to the "J" lot closest to the Commerce Building, currently open to two-way traffic, will be made a one-way street.

Stop signs will also be installed on the corner directly across from Sayre Hall, and on the road leaving the "K" parking lot. A yield sign will be placed on the road leading into the Sayre Hall area from Building 1-F.

The changes are a result of an August traffic flow study of the area by the Security Department. The new traffic signs are indicated on the map printed below.



Courses Begin

Two courses for engineers or physicists being offered at PPL by the New Jersey Institute of Technology will start at the end of the month.

One course, Discrete Systems, will begin October 31 and will continue on Fridays from 2 to 4 p.m. for 14 weeks. Classes will deal with the fundamental aspects of discrete signals and systems, including state-variable representations; the Z-transform; frequency-domain analysis; sampling in continuous systems; discrete Fourier transforms; introduction to digital filter design; and classical sampled-data control system design methods.

The second course, Power System Steady-State Analysis, will cover steady-state analysis of power system networks, particularly real and reactive power flows under normal conditions and current flow under faulty conditions. It will be offered from 12 to 2 p.m. Thursdays beginning Oct. 30.

For futher information concerning either course, contact Larry Holpp in the Personnel Office, ext. 2401.

Check Cashing

Employees who find themselves short of cash can now get up to $15 by cashing a check at the receptionist's desk in the LOB lobby.

Personal checks should be made payable to Assistant General Accounting Manager Harold Phelan for a maximum of $15. Checks will then be cashed upon presentation of a campus identification card.

The same rules apply at the Accounting Department, Building 1-E, where checks may be cashed in Room 104.

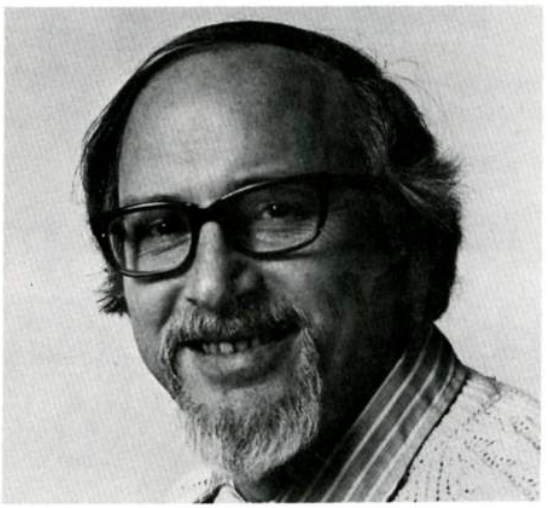
Laboratory Director Dr. Melvin Gottlieb shared his thoughts on present and future developments in fusion research with Secretarial and Office Support Staff personnel last Tuesday. Dr. Gottlieb was the featured speaker in the group's seminar series.

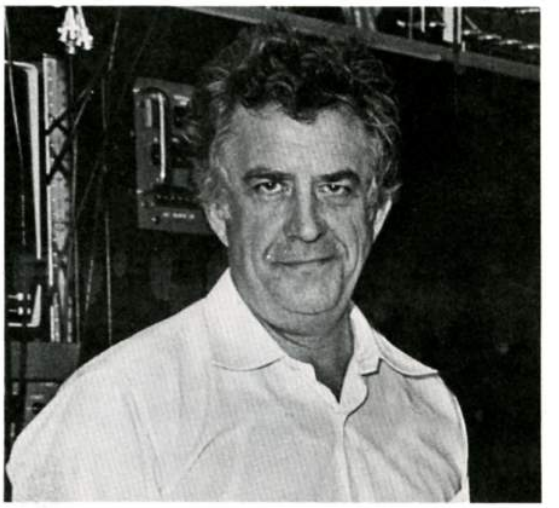
HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 4 November 10, 1980

Stodiek Named To FED Project; Hosea To Head PLT





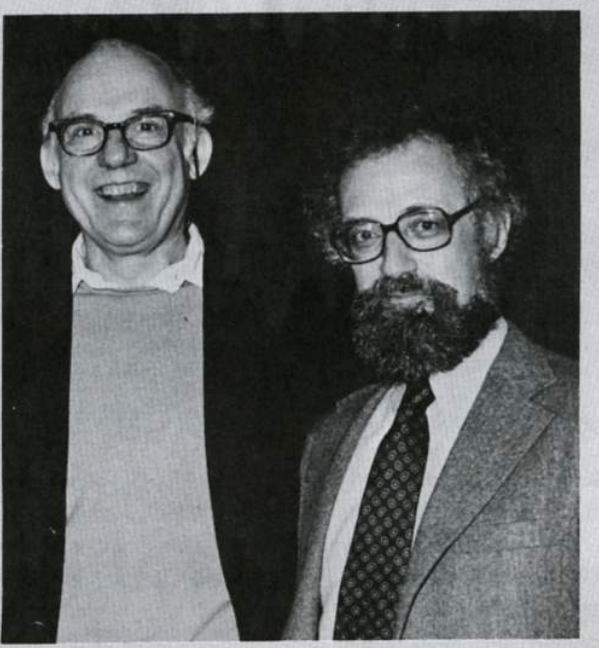
Dr. Wolfgang Stodiek has been appointed Engineering-Physics Coordinator for the Fusion Engineering Device (FED) project. In this new 50%-time position, he will provide an interface between a national FED physics effort and the engineering design work carried out mainly at the Fusion Engineering Design Center at Oak Ridge National Laboratory. He will report to John Gilleland, Executive Director for the FED Technical Management Board.

In announcing the appointment, PPL Associate Director Paul H. Rutherford indicated that Dr. Stodiek would work closely with him in his capacity as head of "a national effort to help define the physics characteristics of the FED."

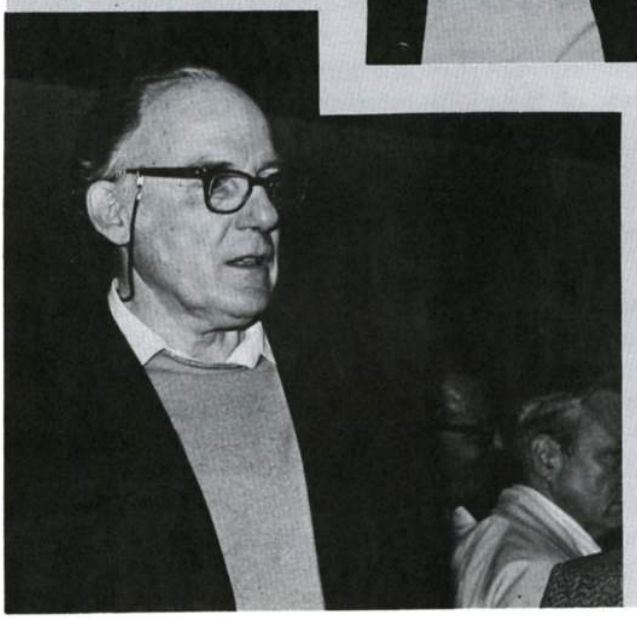
The remaining 50% of Dr. Stodiek's time will be devoted to PPL in the position of FED-PPL Experimental Physics Coordinator. In this capacity, Dr. Stodiek will be responsible for ensuring that the laboratory's experimental program is suitably addressing FED needs. He will be a member of Experimental Division Management.

As the next step in the national fusion energy research program after TFTR, the FED has been recommended by the Energy Research Advisory Board of the Department of Energy. This recommendation has been endorsed by Congress and the authorizing legislation has been signed into law by President Carter. According to Paul Rutherford, "The impact of the FED on the prospects of magnetic fusion research in general, and on PPPL's programs, will be very large...It will be part of Wolfgang's role to help ensure that...PPPL contributes in a major way to the necessary supporting research."

Dr. Joel Hosea will replace Stodiek as Branch Head of PLT. Hosea's new position will also incorporate a newly formed Radio-Frequency Heating Branch that will be responsible for an eventual RF program on TFTR. Dr. Hosea joined the laboratory in 1968. He has been active in RF heating research since 1962.



Hail To The Chief



Act-1 Observes First Anniversary

In August 1980 the Advanced Concept Torus (ACT-1), a small non-tokamak research device of toroidal configuration, observed its first anniversary.

ACT-1 has only a toroidal field, which by itself cannot confine a plasma. However, the machine is designed to use the vertical plasma current (created by the toroidal field) to maintain a steady-state plasma discharge with a 1-millisecond confinement time.

ACT-1 permits easy access to its interior through 26 port sections, allowing quick testing of new ideas. The experimental program, under the direction of Masayuki Ono and King-Lap Wong, is dedicated to radio-frequency-induced plasma waves. One of these waves is the ion-Bernstein wave, which has a frequency double that of the ion gyrofrequency. Another is the lower hybrid wave, which in a deuterium plasma has a frequency about 60 times the ion gyrofrequency. The ion gyrofrequency is the rate at which ions spiral around in the magnetic field.

In one ACT-1 experiment, a waveguide directs radio signals of 50-200 MHz into the plasma to generate ion-Bernstein waves. These waves then give up their energy to the plasma and heat it.

Ion-Bernstein waves have been created in plasmas before, but their generation required conducting coils in the ionized gas. ACT-1's system places the waveguide and rf generating equipment far away from the plasma. In a reactor, this would reduce neutron irradiation of the rf-components, giving them a longer useful lifetime and permitting easier repairs.

The program's second major accomplishment is the generation of a poloidal field (PF) current by radio waves. A 500-watt, 160-MHz signal enters the plasma and generates lower hybrid waves, which selectively accelerate electrons initially moving in the direction of wave propagation, leaving others unaffected. The result is a PF current of about 10 amps. Researchers are now installing 100-kilowatt rf equipment, which may generate currents up to 10,000 amps.

In present-day tokamaks, the PF current is created by changing the amperage in the ohmic-heating coils. Since such changes cannot be continued indefinitely, all tokamaks must now operate in a pulsed mode. In the future, ACT-1's system may allow steady-state tokamak operation, which would simplify many reactor engineering problems, and allow a continuously burning plasma.

Several graduate students are involved in the ongoing ACT-1 experimental program. Robert Horton will be working with the high power rf generator, and Glen Wurden is using a CO_2 laser to study fundamental properties of plasma waves. Several first and second year students are aiding in these efforts.

The various ACT-1 experiments are to continue for at least one more year.

Symposium Scheduled

Donald N. Cornish of Lawrence Livermore National Laboratory will speak on "Application of Superconductivity to Mirror Fusion Systems" when the 1980-81 Technology Department Symposia series begins November 14 at 10:45 a.m. in the LOB auditorium.

The Livermore 12-Tesla high field test facility, and a description of the superconducting magnet system of MFTF-B, will be discussed.

Auditorium Reservations

All Sayre Hall auditorium reservations should be made by contacting Joyce Lafharis at ext. 2685.

Meeting Slated

A meeting with Dr. Sally Anne Hansen, chairwoman of the Mercer County Community College Electrical Engineering Technology Department, will be held in the Safety Office Conference Room, November 14 from 10 to 11 a.m.

The meeting will help develop recommendations for future courses to be taught at PPL by Mercer County Community College staff. All those who have attended such courses in the past are urged to attend this meeting.

The Safety Office Conference Room is located in the Gas Dynamics Building, B-Site.

Holiday Schedule

Employees fatigued by their Thanksgiving feast will have a day to recover this year. The laboratory will be closed on November 25, and will remain closed the following day, giving employees a four-day weekend.

The Christmas and New Year's holiday calendars have also been structured to provide four-day holidays. The laboratory will be closed December 25 and 26, as well as January 1 and 2.

Siren Signals

When the PPL siren blows, do you recognize it and what it signifies?

Two cycles of the siren indicate a siren test, normally held each Wednesday at noon. Six cycles indicate a drill evacuation, usually publicized in advance. Six cycles of the siren repeated continuously indicates an emergency evacuation situation.

During an evacuation, employees should vacate their buildings immediately by the closest exit. Once outside, go to a designated area well clear of the building and await further instructions. Elevators must not be used during an evacuation.

The A/B and C-Site sirens work independently of each other. For an evacuation of only one site, only one siren will sound.

The PPL siren should not be confused with the Plainsboro air raid siren and fire alarms, the LOB fire alarm bells for evacuation of the LOB only, or with construction site horns signalling the start and stop of work.

An expanded and upgraded P.A. system, additional alarms or bells within specific areas, and an all-call telephone system capability for emergencies are under consideration as additional emergency warning methods.

Stop Smoking Program

Six of the 12 employees who successfully completed the first stop smoking program offered at PPL pose with their teacher, Anne Morham of Blue Shield of New Jersey (center). The students pictured are (left to right) Mike Quigley, Rich Vorusovic, Dick Reny, Anne Morham, Jo Lumberger, Larvale Hurley and Ray Gernhardt. Those who completed the course but are not pictured include Joyce Lafharis, Louise Reny, Lydia Miller, Rani Sahu, Jill Green and Mounir Awad. To sign up for the next session of the program, due to get underway in the near future, contact the Personnel Office at ext. 2685.

Service Awards

Approximately 300 PPL employees have been honored for their service to the laboratory through the Service Awards program run by the Personnel Office.

Awards were presented during July, September and October to employees whose terms of service ranged from five to over 24 years. Any employee who feels he is eligible for a service award but did not receive one should contact the Personnel Office.

Those employees who received awards but were unable to attend the awards ceremonies should pick up their gifts at the Personnel Office.

Energy Conservation

Regardless of the dictates of the fashion industry, sweaters are still "in" at PPL. They'll help employees keep warm this winter while the laboratory conforms to the Emergency Building Temperature Restrictions, imposed by President Carter and extended through January 16, 1981.

The restrictions call for setting thermostats to maintain temperatures of 65 degrees Fahrenheit. A specific amendment to PPL's Department of Energy contract mandates energy conservation goals, and DOE is required by regulation to conduct unannounced inspections to insure compliance with temperature restrictions.

To help meet its energy goals, the laboratory will turn off or cut back heat at night and on weekends on a weather permitting basis. Exceptions will be made for designated experimental areas.

Space heaters, which can only be purchased with the approval of Plant Engineering, or individual room controls should be set to maintain the 65 degree level. Unneeded lights should be turned off.

If you have an office or space you feel needs supplemental heat, call Plant Engineering. If you know of any energy-wasting situations, call Plant Maintenance at ext. 3092.

Christmas Dance

Mark December 12 on your calendar; that's the date of the PPL Christmas Dinner-Dance, to be held at Cedar Gardens in Hamilton Square. Further details on the event will be announced in future issues of the Hotline.

Recruitment Program

The Personnel Office is initiating a PPL college recruiting program. Personnel recruiters and interested technical recruiters from the laboratory will visit 10 college campuses this fall and winter. Recruitment will be conducted through college placement centers.

An ongoing recruitment program is expected to establish long-term relationships with the colleges involved in the program. Suggestions on the program should be directed to the Personnel Office.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 5 December 9, 1980

ERC COMMITTEES FORMED

The Employee Representatives Committee has formed a number of sub-committees to study various employee concerns throughout the laboratory. Sub-committees and their members are listed with the committee chairman first.

Adequacy of Representation: Sam Pellitteri, John Anastasio, Sally and Bob Popp; Communications: Marilee Thompson, Don Muschal and Mary Ann McBride; Safety: Dave Maruso, Mary Ann McBride, Hector Morales and Alan Upperco; Benefits: Greg Schmidt, Larry Michaels and Sam Pellitteri; Agenda: Pam Csira, Mike Capone, Dan Huttar, Leon Jackson, Greg Rewoldt and Alan Upperco; Transportation: Greg Schmidt, Mary Ann McBride, Len Thomas and Marilee Thompson; and Morale: John Anastasio, Pam Csira, Leon Jackson, Mary Ann McBride and Dave Maruso.

The ERC was instrumental in convincing the Executive Council to vote a special adjustment so that bi-weekly employees benefitted fully from the October 4.5% pay raise. It was also involved in getting the laboratory to increase the allowance for safety shoes to $25.

The committee is currently concentrating on trying to improve the benefits package, as well as reviewing sections of the new employee handbooks being prepared by the Personnel Office. The committee is also working with Len Thomas, Employee Relations Manager and a permanent member of the ERC, in trying to form a van pooling system. Committee members termed his participation a valuable asset.

Employees are urged to contact their ERC representatives regarding any matters they feel should be discussed by the committee, or to find out what topics are under discussion.

Convervation Kudos

Energy conservation does pay off at PPL!

As a result of concentrated efforts by many people, the laboratory has made major reductions in its energy consumption. While building square footage at C-Site increased by 205,000 square feet between 1975 and 1979, the fuel oil used dropped from 446,000 gallons in 1975 to 342,000 gallons in 1979. This year's consumption is expected to be under 320,000 gallons; when compared to old consumption rates, PPL is now saving over $425,000 per year on C-Site fuel oil alone.

Plant Engineering realizes that many buildings have poor temperature controls and may be drafty. The

division is doing the best it can, with severely limited resources, to solve these problems.

Please bear with them; the payback to PPL is considerable.

Benefit Seminars

Benefit seminars for all monthly employees were held the week of December 1. Roberta Gernhardt explained the laboratory's benefit program, and answered employee questions about it.

Due to a mixup, many monthly employees were unaware of the seminars and did not attend them. Employee Relations Manager Len Thomas apologized for the omissions, and pointed out that similar seminars for those who missed the recent ones will be held in January.

Dispensary Hours

Due to her attendance at health care-related meetings on Tuesday and Thursday mornings, the PPL dispensary nurse may not be available to treat employees during those hours.

The nurse will be on duty in the dispensary from 9 a.m. to noon and from 1:30 to 4 pm. Monday, Wednesday and Friday. Her Tuesday hours are from 10:30 a.m. to noon and from 1 to 4 p.m., with her Thusday hours running from 1 to 4:30 p.m.

Employees are advised to call the dispensary at ext. 3200 prior to arriving for treatment, since the nurse may have been called to treat an on-site emergency. If immediate treatment is needed and the nurse is unavailable, report directly to the McCosh Infirmary on Washington Road or call the Health and Safety Office at ext. 2526.

If you call the nurse and Health and Safety answers, don't hang up; the nurse has put her phone on call forwarding.

Glasses Found

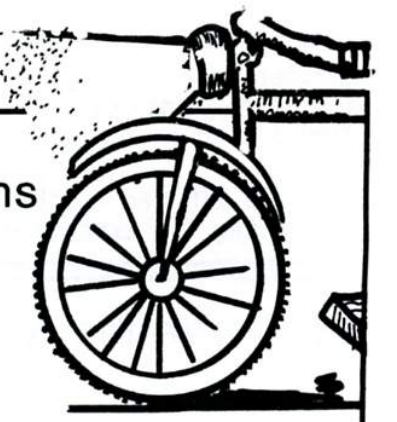
A pair of glasses has been found on the grounds near the B-Site Print Shop. They are salmon-colored clear plastic, and the maker is Oscar de la Renta No. 103. To claim them, contact Barbara Norton in Personnel at ext. 2050.

Recreation Register

The following people are in charge of sports activities for the laboratory. Anyone interested in the sports listed should contact the appropriate person for further information.

Archery: Joe Ignas, ext. 3279; softball, Sylvester Vinson, ext. 3028 or Ray Pressberger Jr., ext. 3263; volleyball, Anne Golden, ext. 2444; tennis Marilee Thompson, ext. 3422; basketball, John Edwards, ext. 3305; canoeing, Lewis Meixler, ext. 3764; and soccer, Charles Daughney, ext. 3156.

Biking Regulations



Bicyclists are reminded that under state law they are required to have a white light in the front of their bicycles and a red light in the rear when riding after dark. The lights increase the rider's visibility to oncoming motorists.

Hosts Needed

The International Center of Princeton University is seeking "hosts" or "host families" for many of the foreign graduate students, visiting fellows and faculty at the university this year. Hosts are not required to house the foreign guests; rather, they provide friendship by inviting their guest to their home on a regular basis.

For further information on the host family program, or to volunteer as a host, contact Mrs. Peter Grosz at 924-6019 or Caroline Phinney at 924-7428 after 1 p.m.

Bulletin Board Distribution

The following roster of people and places comprises the Personnel Department's list of "official" bulletin boards throughout the laboratory. Only official notices should be posted on these boards, and all items must be approved by Len Thomas in Personnel prior to posting.

Attendant	Location
Edna Willis	1-K
Roseanne Wurst	Data Acquisition, C-Site
Rose Zinetti	LOB East Wing
Virginia Arnesen	Aero Lab
Muriel Strohl	LOB-E-319
Sara Paterson	Module 2
Barbara Baker	1-N
Stella Reid	Rec. #4 Warehouse
Joseph Hengeli	1-F
Dottie Pulyer	1-P
Jean Hurley	Gas Dynamics
Pat Pugliesi	Matterhorn
George Beauregard	1-K, Rm. 204
Lilly Olson	Theory
Letty Wohar	Guggenheim
Joyce Lawton	1A West
Sharon Berson	Sayre Hall
John Pacuta	Main. Bldg., Boiler Rm.
Athene Kan	Rec.#3, Warehouse
Helen Livernoche	Accounting, I-E
Kim Prutky	Experimental, C-Site
Pat Zeedyk	Motor Pool
Pat Melsky	LOB East Wing, 2nd fl.
Linda Marcinano	C-Site
Millie Willerton	LOB 2nd fl.
Ann O'Day	Plant Eng'g, C-Site
Mary Alice Eubank	C-Site
Ben Velivis	MG ROOM, C-Site
Paula Greenberg	C-Site, RF Balcony
Bob Majeski	Coil Shop, 1-K
Verna Weyman	Chem. Science
Helen Quinn	1-E
Nina Byron	1-O
Joyce Bitzer	Forr. Bldg. 1-A 207

ppl people

Skiing's the Sport for Dr. Suckewer

The exhilaration of a downhill ski run, or the idyllic peace of a cross-country skiing excursion. Dr. Szymon Suckewer has known both feelings, and has introduced others to those experiences during his days as a ski instructor.

Dr. Suckewer came to this country in March 1975 from Poland, where he received his Ph.D. in 1966 and his associate professor's degree in 1971 from Warsaw University. He joined the PPL staff in 1975, initially working on FM-1 and following that with work on ATC, PLT and PDX. A member of the spectroscopy department, he is currently involved in preparing various spectroscopy diagnostics for TFTR. He is also conducting an X-ray laser development experiment.

He became interested in skiing as a child in his native Poland. "Every child went outside and did something," he recalled. "Some went out and made forts in the snow, and others went skating. But I found skiing the most enjoyable winter sport."

"If someone lived in the mountains, he did downhill skiing," he continued. "Otherwise you learned

cross-country skiing, as I did. There were several competitions held at my school, and I began skiing in them when I was in high school in Poland. I also competed in skiing at Moscow University, where I studied physics and later plasma physics under Professor L. A. Artsimovich." Dr. Suckewer skied competitively for a few years, but "as I got too lazy and too old" he decided to switch to downhill skiing.

Although such a transition might sound easy, it was far from it. "To learn to ski downhill, I had to start from the beginning again," Dr. Suckewer explained. "I always tried to understand why you should move your body a certain way during a complicated turn. I had a very good instructor, a man who was also a biophysicist. Although he wasn't a very advanced skier, he understood the 'why' about downhill skiing very well. Once he explained it to me, it made it much easier for me to improve my downhill skiing immediately."

Despite that insight, there was still a lot of simple drudgery in those early lessons. "To learn to ski well, you have to work on one turn in one direction dozens of times, for example. The next day, you have to practice the same turn dozens of times in the other direction. You must keep working until you feel the combination of turns you have to put together on the slopes is perfect. It's hard work at the beginning, but as you improve you begin enjoying what you're doing."

Through the boredom, Dr. Suckewer perservered. "If you want to play a violin, you have to learn a lot of very elementary procedures first. You can't start off playing a Mendelssohn concert on violin. You have to spend many hours practicing first. It isn't pleasant to watch everyone skiing while you practice turns, but it's the only way you can improve."

In fact, Dr. Suckewer was such an apt pupil that he became a teacher himself. "I was practicing the skiing elements my teacher taught me. I was working very hard, because most downhill skiers start as children, and I was starting out at age 26. But I kept improving, and one year I was helping the instructor when I suddenly found myself instructing classes on my own."

To progress to that level took quite a bit of intense skiing for about six years. Dr. Suckewer remembered that while working on theoretical plasma physics at Warsaw University, he often took his theoretical papers to a small cottage on a mountain. There he skied during the day and worked on his physics during the evenings, skiing about six weeks per season.

For a thumbnail description of the differences between downhill and cross-country skiing, listen to Dr. Suckewer. "For downhill skiing, the equipment can be compared to a knight in armor. Conversely, cross-country skiing equipment is like that used by a running soldier -- very light. In downhill skiing, you have to have heavy boots and skis to provide stability. In cross-country, you have to be as light as possible, because you're essentially running on skis. In downhill, you're just using electricity to get you up the hill and gravity to get you down."

> "At a scenic place you can really enjoy cross-country skiing. For example, just to relax I began going skiing in the mountains in the evening. It's very romantic there, and very peaceful."

Downhill or cross-country makes no difference to Dr. Suckewer, who enjoys both types of skiing simply for the beauty of the sport. What could engender such steadfast devotion? "The problem with other sports, like sailing for example, is that you have time to think about your work. Even after work, you're still thinking about what you're doing; about physics, about

everything. With skiing, especially downhill skiing, you haven't the time for that. You have to concentrate on different turns, or on avoiding obstacles, so fast that it becomes very relaxing. It is especially good for physicists and mathematicians. And it's a very beautiful sport."

Some of those skiing physicists and engineers are right here at PPL. Dr. Suckewer cited Hironori Takahashi, Tom Stix, Masaaki Yamada, Hans Hendel, Francis Perkins, Charlie Daughney and Ed Meservey as very enthusiastic skiers. Meservey, in fact, was a member of the U.S. national ski team in 1940.

"Skiing is a very active sport," Dr. Suckewer contends, "very good for relaxing. You are outside from five to eight hours, and active for that entire time. The fresh air of the mountains makes the sport very profitable from the health standpoint. You get a lot of pleasure from going up, looking at a beautiful view and traveling the trails or slopes with good ski control. Of course, you're also skiing on difficult (and sometimes very difficult) slopes, where your skills are constantly being tested. It's the same impetus that makes people climb mountains; there's some kind of challenge."

Due to the increasing popularity of downhill skiing, Dr. Suckewer finds himself turning more and more to his first 'love' -- cross-country skiing. "Down-hill skiing has become very popular, very crowded and very expensive. It's so popular that when you get some vacation time, all the pleasure you gain from skiing is ruined by having to stand in line for a chair lift. And I hate having to stand in line!"

Nowadays, when it's snowy you'll find Dr. Suckewer doing cross-country skiing at Vernon Valley-Great Gorge, at the Institute for Advanced Study grounds, at Washington Crossing State Park -- or even on a frozen Lake Carnegie. "Three years ago, Carnegie Lake was frozen and covered with snow for a month. For an hour before work every morning, I skied from here to Kingston and back!"

Dr. Suckewer has skied in the Tatra Mountains in Poland and in Russia. In America, he's tried the slopes at Stowe, Sugarbush, Killington, Mount Snow, Vail, Snowbird and various places in New Hampshire and Colorado. He enjoys skiing in the United States, "because here you can go to various parts of the country and find different kinds of skiing or conditions."

His favorite place? Taos, a town on the New Mexico-Colorado border. Why? "Because it's not yet commercialized, so people go there because they love skiing. And there's usually a small line for the lift!"

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 6 December 23, 1980

Grant Announced

The Princeton University Department of Astrophysical Sciences recently announced receipt of a grant to support graduate study in plasma physics from the Westinghouse Educational Foundation.

According to foundation Executive Director Dr. George E. Moore, foundation trustees approved a grant of $16,000 payable in 1981 and 1982 at their November meeting. The monies will fund six two-year graduate prizes in plasma physics at Princeton, with three awards made each year. Each prize grants $2,650 to be paid to the recipient during the first two years of his or her studies.

PPL's Associate Director for Academic Affairs Dr. Thomas Stix was strongly enthusiastic about the grant. He noted that the prizes, which supplement students' assistantship support, can play a critical role in attracting outstanding students into plasma physics and to the Princeton program.

Dr. Stix added that the Westinghouse Corporation has been active in plasma physics research continuously since 1953, and that there has always been close cooperation between Princeton and Westinghouse.

Energy from Heaven and Earth

He admits that Enrico Fermi called him "The only monomaniac with several manias." But in speaking at PPL, Dr. Edward Teller was single-minded in his message: We need more energy.

In a wide-ranging discussion of a variety of energy sources —— oil, wind, ocean thermal energy conversion, solar cells, synfuels, nuclear energy, fusion —— he kept hammering home his central thesis that the U.S. and its Western allies face grave fuel shortages that would, according to Dr. Teller, make the "energy problems of today negligible compared to those we will face in the near future." Only more energy production now can lessen the impact.

In a Research Department colloquium held December 11 before a standing-room-only audience, Dr. Teller reiterated his strong support for nuclear

power and stressed the need for advance planning for energy emergencies.

As for fusion, Dr. Teller said that "There is little doubt in my mind that fusion will work." But for him, the economics of fusion power are yet to be proved.

Course Offered

A five-day course, "Introduction to Analog Programming", will be offered at PPL during the week of January 12 in the auditorium of Building 1-N. The course, which includes demonstration and workshop activities, is being offered for members of the engineering, scientific and research staffs.

The course will cover concepts, techniques and procedures necessary to simulate continuous systems on an analog computer. Programming, scaling and checking techniques will also be discussed.

For further information or to register for the course, contact Training and Development Manager Larry Holpp at ext. 2401.

Deadline Approaching

All employees are reminded that their 1980 year-end Major Medical bills must be submitted to Personnel by January 1, 1981. If you have any questions on the program or the procedure for submitting bills, contact Eleanor Schmitt at ext. 2035.

We Get Letters.....

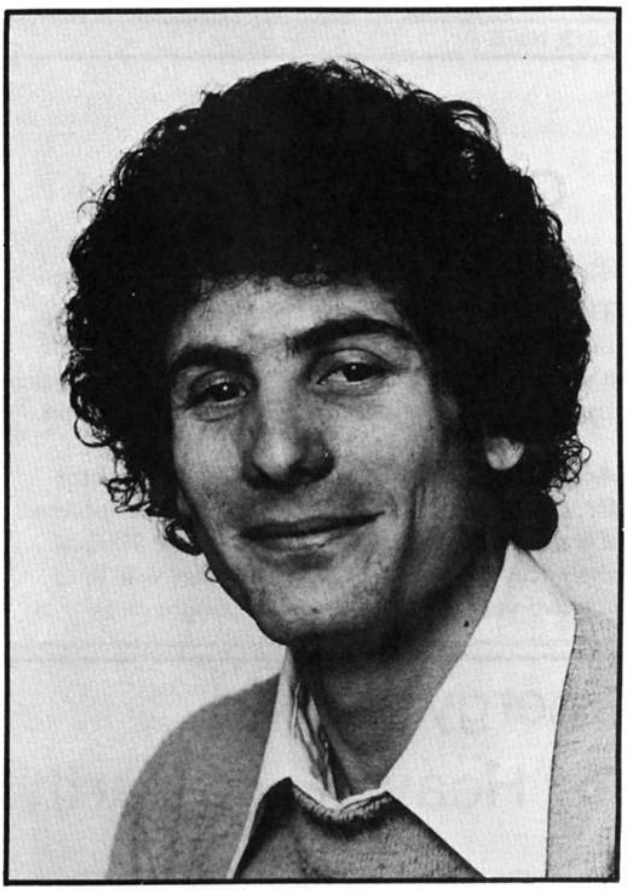
I would like, personally, to express thanks and commend the HOTLINE staff for an outstanding job in the preparation of our employee newsletter. It is an effective communications vehicle that is both informative and knowledgeable reading.

Keep up the good work!

Leonard S. Thomas
Employee Relations Supervisor

New Hires

If an ounce of prevention is worth a pound of cure, then Ken Semel has been providing those ounces for the laboratory since he became PPL's industrial hygienist in October.



Ken earned his bachelor's degree in environmental science from Cook College, a division of Rutgers University. After working as a sanitarian, he enrolled in Temple University, where he received his master's degree in occupational health and safety. Prior to joining the laboratory staff, Ken worked as an occupational health consultant for the New Jersey State Department of Labor and Industry.

In his job as PPL industrial hygienist Ken will apply "the science or art of recognition, evaluation and control of workplace hygiene hazards." A hazard can be described as any chemical, physical or biological agent which may cause discomfort, disease or impair the health and well-being of a worker.

His job in actuality isn't always so clearly defined, however. He deals with a "whole spectrum of hazards," many of which have long-term cumulative effects. His investigation begins with a survey of the work area, gathering data from the physical environment and the workers involved. That on-site inspection helps determine whether further testing for potential or real hazards is necessary.

"It's a hybrid science," Ken explained, "combining chemistry, physics, statistics, biology and so on. You're a jack of all trades, but it's an interesting position; you're dealing with something different every day."

There is no 'typical' day for an industrial hygienist. Ken may find himself giving instructions on the use of a respirator one day, evaluating the protective value of specific work gloves the next, and attempting to track down a mysterious odor the third.

"Mysterious odors are the hardest things to deal with," Ken believes, "because our instruments can only measure concentrations in parts per million, while the nose can sometimes detect parts per billion. You can often get combinations of smells as well, smells that individually might go unnoticed."

Often substitutions can be made for substances causing specific problems. In other cases (such as noisy environments), hazards can be engineered out or (in the case of certain chemicals) workers can be protected with gloves or a respirator. But Ken admitted that sometimes he's stymied by a problem, and in certain situations his findings and recommendations can only go so far. "Unfortunately, I don't have any magic bag that I can pull solutions to problems out of."

For the future, Ken would like to institute a regular respirator program. Each employee receiving a respirator would be given a short course in its use and maintenance.

Also in the offing is a hearing conservation program, which would test workers' hearing and keep them informed of available protection equipment. Ken would like to establish an ongoing program, so that new employees could be 'plugged into' the program and trained as they join the laboratory community.

Ken emphasized that his job is service-oriented; "I'm here for the people, to let them know about potential hazards, provide options and direction. An industrial hygienist provides a different way of looking at things."

Employees with questions are urged to contact Ken at the Health and Safety Office, ext. 2531.

Tree-nappers Beware!

Although this may be the season of giving, PPL is not giving out free Christmas trees. No employees are permitted to cut down trees under any circumstances. Violators will be prosecuted, according to Security.

Crane Failure

On Thursday, December 11, a crane failure occurred during assembly of the second motor-generator being constructed for use on the Tokamak Fusion Test Reactor (TFTR). No one was injured in the mishap.

The failure allowed a 350-ton 25-ft. diameter cylindrical stator to fall 15 feet while it was being positioned around a rotor assembly on the second of two motor-generators which will be used to store energy for use on the TFTR experiment. An assessment of the extent of damage is now being made by officials of the U.S. Department of Energy.

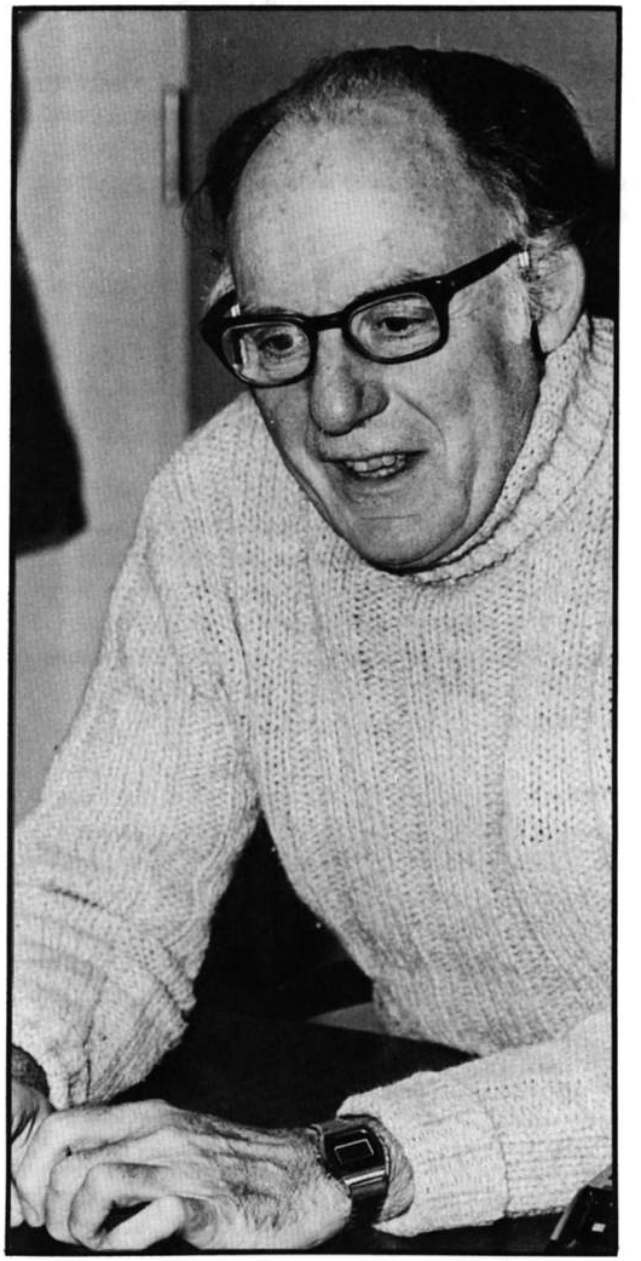
Since the first motor-generator has been completely installed, researchers will be able to operate the TFTR while repairs are performed on the second set. The second motor-generator will not be required for several years when break-even experiments will commence. Hence, Thursday's accident should not delay the TFTR program.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

ppl people

An Interview with:

M.B. GOTTLIEB



December 31 marks the end of the year, and the end of an era at PPL. Laboratory director Dr. Melvin B. Gottlieb will be retiring from the position he has held since succeeding Dr. Lyman Spitzer Jr. in 1961.

During his 26-year association with PPL, Dr. Gottlieb has seen the laboratory grow from a small contingent of investigators to a full-blown experimental facility on the leading edge of magnetic fusion research. The fusion concept itself has matured along with the laboratory: rather than the distant dream it once was, the TFTR, currently under construction here, is expected to achieve the breakeven point, Q=1.

Dr. Gottlieb recently took the time to reflect on the past and to offer some predictions for the future during an interview for the HOTLINE.

Q. How have you perceived the job of PPL Director?

A. The director organizes the lab to establish and then to achieve its objectives, gets the people who are needed, and works with the University and Washington in an effort to define PPL's role in the national fusion effort. The director deals with a thousand and one "people problems."

Public speaking is another aspect of the job that I have found particularly rewarding. I have felt for a long time that it is indeed possible to explain to the layperson what we're doing and why we're doing it, without using highly technical language. Since we are publicly supported, we have a duty to the public to make our ideas clear, our hopes clear, our dreams clear. Since I've been fairly

successful in doing this, I try to fit in requests to speak a couple of times a month. My position has always been that I can't really convince anybody else unless I'm convinced myself. I've always had the feeling that in this lab we can do what we set out to do.

Q. As laboratory director, how have your duties changed over the years?

A. I would say I've become more a scientific advocate than a scientist. I used to try to get into the laboratory once a week, but I don't even succeed in doing that anymore. Over the past decade, PPL has expanded rapidly from budgets of $7 million in the early 70's to $100 million today. When that rapid expansion started, my involvement as an experimentalist was doomed.

Q. When was the high point of your tenure at PPL?

A. One evening in July 1978, the PLT temperature was going up and up. I was in the control room watching the data come in. Finally, I was making people too nervous, and was chased out.

Q. What would you identify as your greatest personal achievement?

A. Putting together a superb, well motivated staff.

Q. Do you see a shortage of trained people as a future problem for the lab?

A. We train people here, but there is an overall shortage of physicists throughout the country and an even more extreme shortage of engineers. The nation must reach all the way into grammar school to make sure adequate training is provided, particularly in mathematics. Most of the students I've encountered who had serious problems in science, who feel its's beyond them, simply had difficulties with their early training in mathematics.

Q. What was the scientific significance of the 1978 milestone?

A. We have to get very high temperatures, up to 100 million degrees, which is hot even compared to the center of the sun. To get this temperature and to keep heat losses to a tolerable level, we have to provide excellent insulation. We can neither reach high temperature nor make use of that high temperature if the insulation is not adequate.

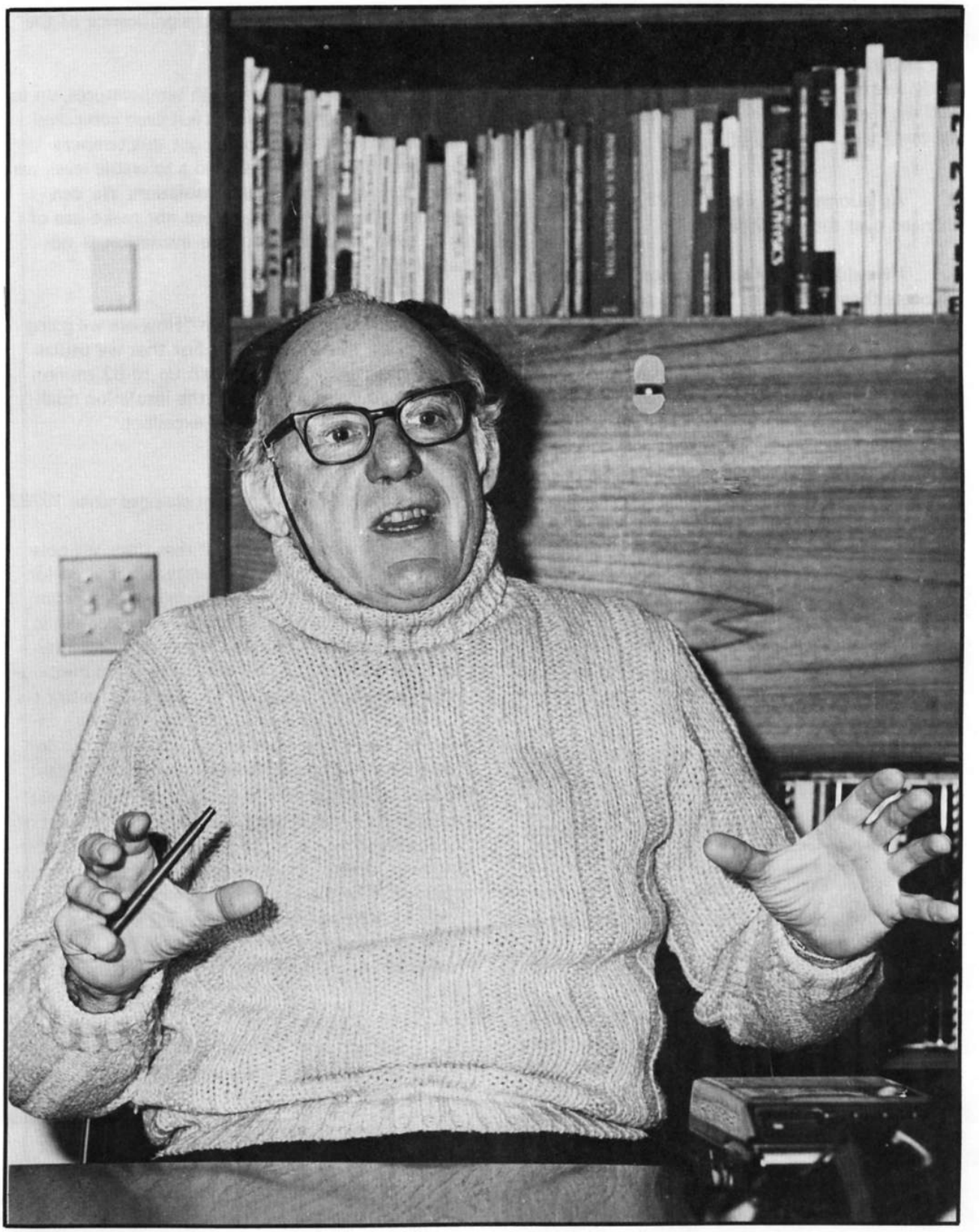
The question has always been "How are we going to provide this insulation?" For that we utilize a magnetic field. We've gotten up to 82 million degrees now and shown that the insulation qualities of the magnetic field are excellent.

Q. How has PPL's program changed since 1978?

A. We changed our path at that time. We now know we can reach the temperatures required for fusion using neutral beam heating. The question has shifted to one of "What's the most economic, or the simplest, method of heating the plasma?" We have one method that works, and that method is certainly quite adequate for laboratory purposes, but it has some disadvantages. Neutral beam injectors have to be located right up against the confinement device itself; this makes them very hard to maintain. In theory, we should be able to heat the plasma in other ways, particularly by means of radiofrequency waves. RF generators can be put in the next room or blocks away, with the RF energy piped in. There are a whole number of different ways of heating by radiofrequency waves. We've been trying some of the methods on PLT and the results are quite encouraging.

Q. Getting back to your personal involvement in the program, have there been things that have discouraged you?

A. The last few years have been quite encouraging. There are certainly questions that remain open. I wish we could pin down more exactly the nature of the energy loss processes.



Q. Are there any decisions you would alter in hindsight?

A. I can look back at individual choices which now appear not to have been the best, but we didn't know enough at the time to do better. The basic ideas had been exposed, but there were enormous gaps that had to be filled in.

Of course, you're never satisfied. You always say that if your intuition had been a little better, we might have gotten around many problems. Total satisfaction is not to be achieved.

Q. What do you see as your role in the fusion program after January 1?

A. I will stay on at PPL for a six-month transition period. Beyond that time, I hope to work with government officials and economists on matters of energy policy. . . . I would like to sort of taper off, but I would not like to vegetate!

Q. In talking to Congress, would you advocate an "Apollo program" for fusion energy development?

A. The Magnetic Fusion Energy Engineering Act of 1980 did not recommend an "Apollo program"; it calls for a gradual expansion. I envision an Apollo program as a big pot of money for you to spend without detailed justification.

I am opposed to that kind of "Apollo program". The way to proceed is to examine what it is you are waiting to do. Are you fund limited, or are you idea limited? It is clear to us that we are indeed fund limited. We've been waiting to do many things that are needed for our program, that we couldn't do because there wasn't enough money. A 50% increase in one year would be soaked up very quickly. That level of increase would not represent an Apollo program.

To put it another way, in an Apollo program you say "I have a problem and six ideas to solve it". Instead of choosing the best one, you do all of them just to make sure one of them works. There's no way that can happen within the recommendations of the new law.

Q. Is the tokamak approach the only way to commercialize fusion energy?

A. Certainly not! After 25 years we have found a way of doing it, but there are undoubtedly other ways. So how should the program proceed? We have to keep alternate approaches going in the hopes of finding something even better.

The tokamak program is further advanced than other forms of fusion. For that reason, it has been chosen as the means to get into questions of engineering feasibility.

Q. In addition to fusion, what are the nation's other significant energy options?

A. The long term solutions for energy are: fission, fusion, and solar. The question has always been: How much is it going to cost? If it costs 10 times existing levels, you're obviously going to have a great deal of trouble supporting present population levels at the present standard of living. If we don't solve that problem, we'll have a much bigger problem than just an energy shortage; namely, we'll have disorder, a breakdown in our socio-political system —— anarchy! I regard that as the critical matter now. Can we provide at least hope that there will be a reasonable standard of living in the future? The attainment of an economic, environmentally acceptable energy source is of enormous importance for the future of mankind.

Q. What about future involvement of industry in fusion?

A. In a certain sense, our task is over when industry takes over; then we'll begin working on improvements, and working to switch from D-T fuels which will last tens of thousands of years to a D-D system which would last till the end of our solar system . . . . There's a lot yet to be done.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 7 January 19, 1981

Outgoing director Melvin B. Gottlieb displays the sextant he received as a retirement gift.

Auditorium Renamed

The LOB auditorium officially became the Melvin B. Gottlieb auditorium during a party given for the outgoing director last month.

In remarks prior to the auditorium dedication, Nelson Grace, director of the Princeton Fusion Program office of DOE, called Gottlieb a "constant inspiration" to the fusion program worldwide. He also praised the retiring director's tireless dedication to the fusion concept.

Provost Neil Rudenstine, who represented the university at the dedication, commended Gottlieb for an "absolutely extraordinary job . . . for this field of science worldwide."

Gottlieb was also presented with a sextant during the day's festivities. He thanked the entire PPL staff, pointing out that many of the achievements of the laboratory belonged to the PPL community. He concluded his term as PPL director by saying "it was wonderful working with all of you."

Benefit Seminar

Roberta Gernhardt and a representative from TIAA/CREF will hold a benefit seminar for all monthly employees January 21 from 1 to 2:30 p.m. in the M.B. Gottlieb auditorium.

Waste Disposal

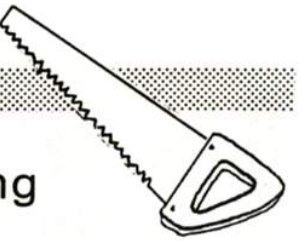
Contrary to the belief of many PPL employees, the proper method for disposal of chemical waste is not down the sink!

The laboratory has a hazardous waste disposal program, involving a contractor hired to take waste chemicals away. Waste material should be sealed in a glass or plastic container, and labeled with the name of the chemical. Whether the chemical is flammable or not should also be indicated on the label.

The original container for the chemicals should be saved and used to hold any waste material.

Employees should call Ben Rogaski of Materials Control (ext. 2716) to have the bottled chemicals removed for storage. If you have questions about the waste disposal program, contact industrial hygienist Ken Semel at ext. 2531.

Tree Cutting



In the past, the removal of trees for firewood was an accepted policy. In the future, this will not be permitted because of insurance reasons. Please do not remove any trees from laboratory property; this is not permitted for any reason.

Symposium Scheduled

Mr. Phil Heitzenroeder of the PPL FOM Division will be the speaker at the Technology Department Symposium January 22 at 4 p.m. in the M.B. Gottlieb auditorium.

Mr. Heitzenroeder will discuss "Superfluid Helium Cooling of Superconducting Magnets." His talk is based on conversations with personnel involved in fusion research with association EURATOM-CEA and Grenoble Fontenay-aux-Roses, Paris and Saclay, France.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

Training Courses Slated

The following courses will be offered at PPL during the first part of this year. Times and dates for some of these courses have not been finalized, but unless otherwise noted they will be held during working hours.

Charges will be billed to the cost centers of those enrolling and will vary based on the cost of the course, equipment, books and supplies and the number of people signing up. Courses will be run only if there is sufficient enrollment.

In general, these courses are open to any PPL employee if there is a need for the training in the individual's job. The employees's supervisor must approve course attendance.

To register for classes, fill out the attached application form and return it to Joyce Lafharis, B-site, Bldg. 9-A. For further information, call Joyce at ext. 2685.

Course Number	Title	Sessions	Description
EE148	SSI	14	Introduces the basic concepts of digital electronics. First in 3-course sequence of SSI, MSI, LSI.
EE249	MSI	14	This course looks at the components in digital circuitry.
EE250	LSI	20	This final course studies the use and assembly of an actual micro processor.
EE229	Electrical Codes II	14	More complete coverage of the national electric codes for those who have taken NEC I.
FS201	Hazardous Materials	14	Study of chemical characteristics and reactions related to storage, transport and handling of hazardous materials such as flammable liquids, combustible solids, oxidizing and corrosive materials and radioactive compounds.
MA109-110	Basic Trigonometry and Algebra	20	This course is intended as a brush-up for technicians who wish to continue their education in areas which require math.
ME	Tool and Die Drafting	20	The detailing and practical design of basic jigs and fixtures, as well as fundamental piercing and blanking dies. Various types of tools, terminology, components, drawing procedures and design criteria will be discussed. Design projects through the study of similar examples will be the primary thrust of the course.
I1	Vacuum Technology	3 full days	Basic high vacuum theory, measurement systems commonly used, pumping systems, sealing methods, materials, instrumentation, standards and procedures in use at PPPL.
I2	Management Skills for Women	8	Open to both professional and non-professional women. This course examines a variety of technical and human relations skills as they apply to women.
I3	Smoke Enders Clinic	6	This self improvement course will be held after hours at PPL and is open to all smokers. Last year, 10 people at PPL quit smoking following this program.

IA	Technical Writing	2	This course examines the various aspects of technical report writing and provides individual counseling for each participant.
I5	Public Speaking	6	This course is designed for any employee whose job requires presentations to groups of people. Course emphasis planning a speech, overcoming nervousness, mechanics of presentations and handling questions.
I6	Supervision and Foremanship	10 (½ day each)	This is a "basics" of supervision course which emphasizes the fundamentals of first-line management. Topics will include organization, delegation of duties, controlling, and handling complaints and problems, performance issues, policies and selected topics.
I7	Computer Basics for Management	6 (3 hrs. each)	Subjects to be covered include information files in business organizations, equipment and programming, conversion to an EDP system, computers at work and advanced systems.
I8	Electronic Wiring and Workmanship	10	NASA level wiring and soldering skills both in theory and practice.
S1	Interview Workshop	2-day	This workshop trains administrators and other supervisors to effectively organize, conduct and evaluate interviews. Segments of this program deal with Equal Employment Opportunity provisions and their implications for the interview process and university hiring procedures.
S2	Time Management	2-hour	This program introduces participants to a technique for organizing their time, based on the principles in the book "How to Get Control of Your Time and Your Life" by Alan Lakein. Participants should be supervisors or managers.

Admission Form

Name_____ Ex.#_____

Location_____ Division_____

Supervisor_____ Cost Center_____

Course #	Title

*Return to J. Lafharis, Personnel, B-site

Engineering and Scientific Staff Advisory Committee Formed

Personnel Director Steve Iverson poses with members of the newly-formed Engineering and Scientific Staff Advisory Committee. Seated are Marilee Thompson and Sandy Dreskin; standing (l. to r.) are director Iverson, Dan Huttar and Larry Michaels. Not pictured is committee member Pete Bonanos.

PPL has established a new advisory committee for the engineering and scientific staff, elected by the members of that staff. The committee will meet monthly, and advise the laboratory director and council about matters of concern to the staff at PPL. Larry Michaels, Sandy Dreskin, Pete Bonanos, Dan Huttar, and Marilee Thompson are now serving as committee members until new elections are held.

This committee has assisted in the development of PPL personnel policies, and has advised management regarding implementation of the new classification system. The committee will be an adjunct to the ERC, and will concern itself with specific items of concern unique to engineering and scientific staff.

Art Exhibit

Paintings by Jon Schueler and sculptures by Peter Chinni are on display at the Squibb Gallery through February 22. The exhibition is presented with the cooperation of the Peter Rose Gallery, New York.

Schueler's oil paintings depict the sky of Scotland, conveying the drama and beauty of the Scottish coast. Chinni is represented by a brass sculpture and several maquettes in mixed media.

The Squibb Gallery is located in the world headquarters of E. R. Squibb & Sons, Inc., three miles south of Princeton on Route 206. Gallery hours are from 9 a.m. to 5 p.m. Monday through Friday, with hours extended until 9 p.m. on Thursday. Weekend hours are from 1 to 5 p.m.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 8 February 2, 1981

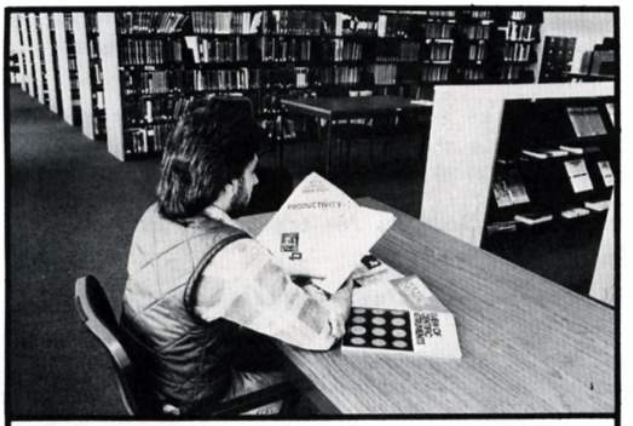
New Library Opens

Laboratory Director Dr. Harold Furth cut through a blue ribbon January 19, officially opening the renovated PPL library.

The library's new quarters are located across from the east entrance to the computer wing. Approximately 3,300 gross square feet of space were added when alterations were made to its existing 2,500 gross square feet. The increase provides shelving space for 17,000 volumes, with additional shelving and display space for periodicals.

The library also houses a media room for viewing of microfilm and microfiche, a card catalogue, lateral files, two offices, a conference room and a staff room. The main area of the library can seat 50 people at any one time.

Construction on the library, which was designed by the Princeton architectural and planning firm of Holt and Morgan Associates, was begun in mid-June by the Truesdale Construction Company.



Employees using the newly renovated library can take advantage of additional seating areas, as well as increased shelf space for books and periodicals.

Laboratory Director Dr. Harold Furth prepares to cut the ribbon opening the expanded PPL library as head librarian Betty Graydon looks on. The library was renovated and expanded to more than twice its original size.

Attending the ribbon cutting ceremony were Dr. Furth; Truesdale Construction Co. head, Robert Truesdale; construction superintendent, Al Wohar; principal member of Holt and Morgan, Philetus Holt; and project architect, David Stoddard. Also present were head librarian, Betty Graydon; library committee chairman, Joe Cecchi; former library committee chairman, Dr. Thomas Stix; library committee member, Dr. Katherine Weimer, who was also the laboratory's first librarian; and Glenn T. O'Dell, Princeton University associate librarian and director of special libraries within the Firestone library system.

Workshop Scheduled

As part of a series of U.S.–Japan workshops, PPL will host a four–day meeting on "Impurity Control, Divertors and Plasma–Wall Interaction" February 2 through 5.

Approximately 50 people are expected to attend the workshop, including representatives from Japan, Germany, MIT, General Atomic, and Oak Ridge National Laboratory. Topics to be covered include "Reactor Compatibility of Impurity Control Systems," "Tokamak Experiments With and Without Divertors," and "Surface and Edge Physics."

PPL's Shoichi Yoshikawa will chair the first day's session, and David Ignat will preside over the second day of the workshop. Joseph Cecchi will chair the final two sessions of the meeting.

First Aid Lockers

The PPL Emergency Services Unit has installed first aid lockers in the following locations:

A & B SITES

Matterhorn Building	next to small machine shop
Sayre Hall	First floor
1–F Building	First floor
1–K Coil Shop	First floor
1–N Building	Power Engineering
1–P Building	
1–O Building	

C SITE

Laboratory Wing	First floor Second floor
Tech Shop Building	First floor
RF Building	First floor
Motor Generator area	Basement First floor

LOB
- First floor elevator area, west wing
- Second floor lounge area, east wing
- Third floor lounge area, east wing
- Basement, CICADA computer area

These lockers are identified by the "Star of Life" emblem on the front doors. They are filled with emergency medical equipment, for use by PPL first aid squad personnel.

The cabinets are equipped with breakaway locks so that, in cases of extreme emergency, employees with first aid knowledge may use the medical equipment inside. However, the lockers are not for general use under normal circumstances.

Small first aid kits are mounted on top of these lockers for treatment of minor injuries. Please take only what is needed for each emergency.

If you take the last of any item, or find something missing, contact Mark Cropper at ext. 2581 or Gregg Tompkins at ext. 3110.

Dinner–Dance Date

Before the Christmas season becomes a memory, circle December 11, 1981 on your calendar. That's the date of the next PPL Christmas dinner–dance! Further information will be announced in future editions of the HOTLINE.

Blairstown Weekend

Responding to the great success of the first family weekend last winter, the Princeton Education Center at Blairstown will be open to the university community for two winter weekends, February 14–15 and Feb. 28–March 1.

University staff, their families, and friends are invited to the Center (65 miles northwest of Princeton, near the Delaware Water Gap) to enjoy a weekend in wood-heated log cabins. Meals will be served family style in the skylighted chestnut dining hall, which features a solar hot water system (as does the solar bathhouse).

Activities available include skating, cross-country skiing (weather permitting), guided exploration of the winter woods, game playing and ice fishing. Special activities such as instruction in woodstove operation, and woodchopping and splitting on a one-for-the-Center, one-for-the-splitter basis will also be held. An evening session of music and the history of the guitar is planned, and a telescope and starfinder will be available for viewing the winter sky.

A shared outing in the snow was part of last year's Blairstown family weekend. This year's weekends at the Center are scheduled for Feb. 14–15 and Feb. 28–March 1.

The cost of the weekend ($25 per person for adults, $18 for children 12 to three, and $5 for two-year-olds and younger) includes lodging and meals from Saturday noon through Sunday brunch. Those interested in arriving Friday evening after dinner may do so at an additional $8 per person charge for lodging and Saturday breakfast.

Reservations must be postmarked by Feb. 5 for the Valentine's Day weekend and by Feb. 19 for the second weekend. All reservations are accepted on a first-come, first-serve basis, and weekends are limited to 50 people.

For further information, contact the Center's office at Maclean House, Princeton University at 452-3340.

Bowling News

As the PPL women's bowling league nears the halfway point in its' season, the Bouncers remain at the top of the four-team field with a record of 28-1/2 – 19-1/2. The Strike 4 (23-25), the Guttersnipes (23-25), and the Alleycats (21-1/2 – 26-1/2) round out the competitors.

Ilse Gusciora had a 206 game and a 517 series this week, while Terry Temkin posted a 211 high game and a 519 high series.

Each four-member team bowls Wednesday evenings at Colonial Lanes from September 3 through May 30. The league will hold its annual awards banquet in June.

For further information about the league, contact league president Mary Alice Eubank at ext. 2555 or league secretary Bobbie Cruser at ext 2101.

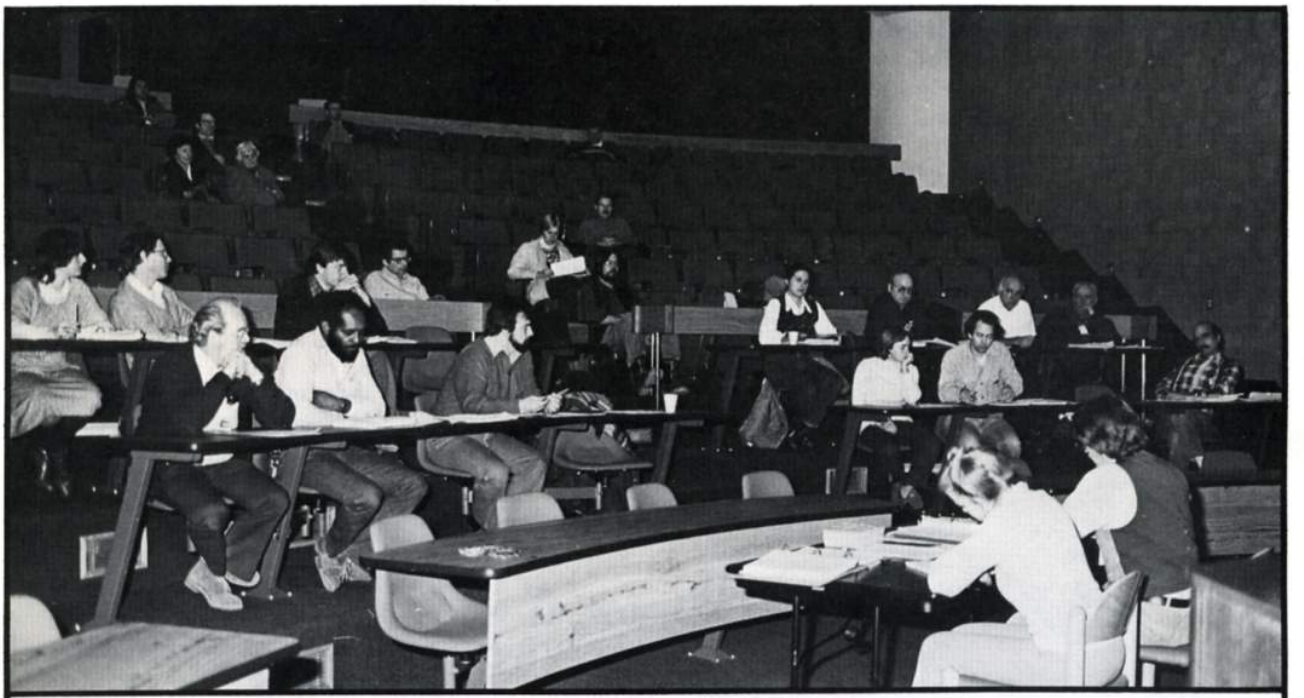
The PPL Heroes, who led the PPL men's bowling league through the first half of the season, dropped into a five-way tie for

second place this week. The Security team now tops the 14-team field with an 18-6 record, followed by PPL Heroes, Bigawatts, Tech 2, PJ's and CJ's, and the School of Engineering, all knotted at 16-8; Powerhouse, Power Engineering and Tech 1, all at 12-12; The Old Men, at 10-14; Castoro and Controllers, at 8-16; Crescents, at 6-18; and COB with a 2-22 record.

Although Dave Sutton had this week's high game with a 248, Joe Pfister still holds season high game honors with a 278. Bob Popp rolled a 691 series this week, good for the highest series of the year and the highest series in league history

Teams compete each Monday night at Colonial Lanes. Only five team members may bowl each week, but each team may have up to 10 members. The 34-week season is climaxed by an awards dinner in June.

Anyone interested in substituting, or in bowling in the league next year, should contact league secretary Mike Knorr at ext. 2522.



The first open meeting of the new Employee Representatives Committee (ERC) was held Jan. 14 in the M.B. Gottlieb auditorium. Topics discussed at the meeting are now under consideration by the committee, which will hold another open meeting in the future. Employees are urged to contact their ERC representatives with any questions or problems that might arise.

Mercury Handling

The Health and Safety Office is reminding PPL employees of the toxic qualities of mercury.

Mercury, the only metal that exists in liquid form at room temperature, is no threat when properly contained. If mercury at room temperature is exposed to air, however, it readily volatilizes and can be inhaled or absorbed through the skin. Insomnia, headache, irritability and tremors are all symptoms of overexposure to mercury.

Further information on the hazards of mercury, as well as assistance in cleaning up and decontaminating spills, can be obtained from Ken Semel at the Health and Safety Office, ext. 2531.

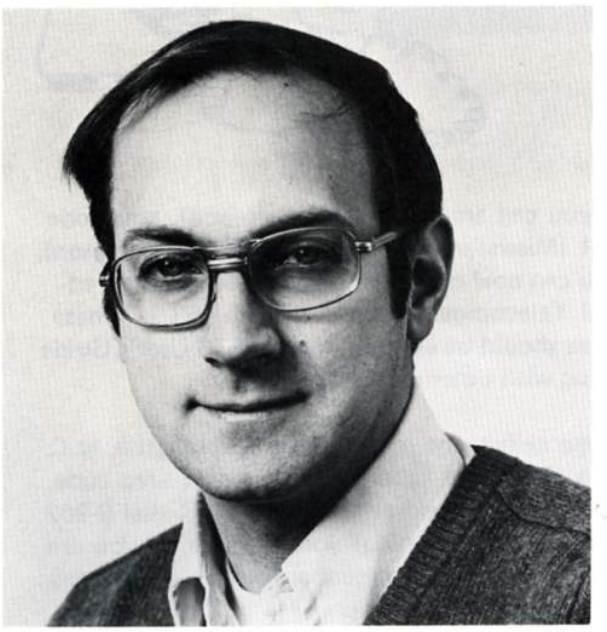
The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2 No. 8 February 18, 1981

ENERGY CONSERVATION



Nicholas Stecky

Robert Gulay

Nicholas Stecky and Robert Gulay were recently appointed Project Engineers by Plant Engineering Division Head Conrad Stout. Both men will be primarily involved in PPL energy conservation.

Nick will be responsible for the implementation of major energy retrofit projects which receive special funding from DOE (over and above PPL's normal operating funds). Three projects that will begin this year include extension of the new central chilled water system into the original C-Site buildings, where old chillers will be dismantled or placed on standby service; installation of a "free winter cooling" system into the central chiller plant; and installation of a computerized energy monitoring and control system.

One of Bob's main tasks will be to chair a Committee on Energy Awareness, made up of six to eight people. This committee will have two subcommittees, which will be formed over the next month.

The Electric Power Subcommittee (EPS) will deal with questions such as how to control PPL electrical demand during peak use periods (greatly affecting our bill from PSE&G); and how to identify and control KWH (kilowatt hour) consumption, for which we pay directly as one does at home. The panel will be made of approximately six members.

The Building Energy Monitoring Subcommittee (BEMS), consisting of up to 20 members, is being organized to provide a vehicle to get everyone at PPL more involved in conserving energy and saving dollars.

Energy awareness is a program that will pay big dividends at PPL. It becomes even more important

that everyone does their part in a tight budget year. Continued cooperation in this important effort is needed to make it successful.

Fire Fund

A collection is being taken up for Crayton Miller of the PPL janitorial staff, who recently lost his home in a fire. Anyone wishing to make donations should contact Employee Relations Supervisor Len Thomas at ext. 2052.

TFTR Program

Don Grove has replaced Paul Reardon as Head of the TFTR program. Robert Papsco has been appointed Deputy Head of the project, and has taken over as head of the TFTR operating division.

Paul Reardon is continuing as TFTR construction manager during the phase-out of that effort. He will be examining areas of construction and installation which require interface resolution between Ebasco/PPL and DOE. The Ebasco Grumman effort, being managed by Jim French of Ebasco, reports directly to Dr. Grove.

Organization charts reflecting these changes are being prepared and will be distributed shortly.

Safety Sessions

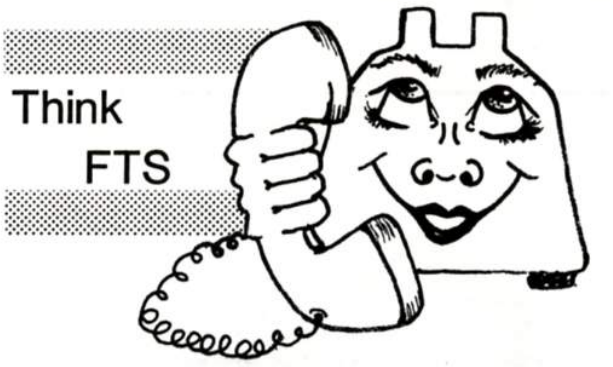
If you handle chemicals . . . . if you are a technician, lab assistant, maintenance worker or engineer . . . . if you want to bone up on the procedures for working with that compound you've been using all these years . . . . a training session in chemical safety and health procedures may be what you need.

The training will be given in duplicate sessions, one held February 24 at B-Site and the other on February 26 at C-Site. Topics to be discussed include the toxicity, reactivity, storage, handling and disposal of chemicals and personal protective equipment.

Interested personnel should see their supervisor or division head for training scheduling.

Van Pooling

All employees interested in joining a van pool to the laboratory from Willingboro should call Laura Steer at ext. 2102 for further information.



If you call area code 303 (Colorado), area code 601 (Mississippi) or area code 206 (Washington), you can now dial these states direct on the Federal Telecommunications System (FTS). These areas should be entered in your FTS User's Guide along with other direct dial places.

When calling the metropolitan Washington, D.C. area (including suburban Virginia at area code 703 and Maryland at area code 301), dial 8-202 and the seven digits of your number. If you are calling a U. S. government agency, it is not necessary to dial the area code.

Using the FTS system saves the laboratory money on its telephone bills. Additional expansions of the direct dial capabilities of the system are planned, and the quality of the service is being improved. Should you have any trouble using FTS, call the laboratory operator at once for assistance in completing your call.

For more detailed information on the FTS system, call Helen Pesce at ext. 2462.

C.U.Meeting

The ninth annual meeting of the Princeton University Employees' Federal Credit Union will be held February 24 at 4:30 p.m. in Bowl No. 6, Woodrow Wilson School.

The annual meeting allows the Board of Directors to report on the progress of the credit union, and

gives members the opportunity to elect officers for the coming year. Members may also voice opinions and suggestions at the session.

All credit union "share owners" are invited to take part in the meeting.

Work Compensation Claims

Effective March 1, 1981, the Traveler's Insurance Company, the laboratory's Workers' Compensation carrier, will deny any work compensation claims submitted any later than 30 days after the date of the injury. It is the employee's responsibility to complete an accident report and submit it to his supervisor immediately following an accident. If the employee is incapacitated and cannot complete the accident report, the supervisor should complete the form. It is the supervisor's responsibility to review the accident report and forward it to the PPL Safety Office immediately.

If a blank accident form is not obtained from your supervisor or the dispensary, the form may be obtained by contacting the Health & Safety Office at ext. 2526.

Roland Snead (left) helps ERC Morale subcommittee chairman John Anastasio measure a no smoking sign for the C-Site cafeteria as Debbie Anastasio looks on. The ERC has established a no smoking area of approximately 11 tables near the LOB entrance to the cafeteria.

Furth on Sakharov

Andrei Sakharov's contribution to physics was the topic of a series of presentations at the American Institute of Physics meeting in New York on January 26-28. In discussing the well known Soviet dissident's involvement in the concept of the toroidal magnetic fusion reactor, PPL Director Harold Furth stated that Sakharov's 1951 paper "contains a number of basic physical insights

that have retained their validity to this day." The paper, which became available to U.S. scientists in 1958, was written with Academician I.E. Tamm, and, according to Furth, is "the fundamental scientific paper of the Soviet controlled-fusion research effort."

Dr. Furth outlined Sakharov's portion of the paper, which he said, contained "the self-ignition condition for deuterium, a suprisingly 'modern' estimate of the parameters required for a toroidal fusion reactor," as well as a description of a solution to the problems inherent in toroidal magnetic confinement. Sakharov's "solution" is a device now known as a tokamak.

Also participating in the session was Sakharov's daughter, Tanya Yankelevitch, who expressed her appreciation to the APS for conducting the program.

DOE Appointment

J. Nelson Grace, Director of the Princeton Fusion Program Office of the Department of Energy, recently announced the appointment of Jerry W. Faul as Chief of the Resource Management and Acquisition Branch of the Princeton Fusion Program Office. Mr. Faul has assumed the duties and responsibilities of John D. Hart, who recently retired after 30 years with DOE and its predecessor agencies.

Princeton, A Good Place to Live

To the Editor of Hotline:

In the past twenty-five years, while working in and around Princeton, I have attended numerous retirement dinners, sometimes followed years later by a note in the paper that the retired colleague had died.

But lately, the order seems to be sadly reversed. I have already been to funerals for several co-workers who were still years away from retirement. Something is badly wrong, but there is no point saying that the figures for Princeton are comparable to those for the USA as a whole, because those data are nothing to write home about either (home in this connection meaning Sweden, where the average life expectancy at birth for men is 5½ years higher than in the USA).

Most of us do our work meticulously, read our voltmeters, count our neutrons, seal our vacuum chambers and compute our expenses with great professional care. Maintenance schedules and safety rules are often followed "to a T". Many of my colleagues are real wizards in fine tuning their cars.

But we are incredibly sloppy with our own bodies, in part due to the mistaken belief that the internal organs are self-healing just because they are out of sight. So we subject them to overstress, overload, underuse, overeating and oversmoking far beyond the original design specifications – something which we would never do to our cars or the physics equipment that is in our care.

I realize that these are strong statements. In future issues of Hotline, I shall be pleased to back up the statements with numbers.

E. de Haas, P.E., Fellow, Academy of Medicine of New Jersey

ppl people

MODELERS ENJOY THE SCENERY

His train platform, surrounded by displays of railroad memorabilia, is the focal point of Dick's basement.

Model trains are just a pleasant childhood memory for most of us, but they're much more than that for Dick and Howard Holzbaur. For the two brothers, technicians in the Spectroscopy Lab, their childhood passion has blossomed into a lifelong avocation.

The brothers began collecting HO gage trains when the line came out in the early 1940's. Howard has at least 70 engines, the earliest of which is 35 years old. Painted red and green to match the Christmas train it pulls, the engine is one of three Howard has built from kits. A myriad of railroad cars, Matchbox cars, and small scale buildings, people and animals rounds out their collections.

Dick's train platform has five tracks, while Howard's sports four. All the trains are interchangeable, and each of the separate track loops can be interlinked. Dick and Howard prefer to run the trains on single loops, however, so they can forget about switching and just enjoy the sight!

Although they also have substantial collections of railroad memorabilia, both brothers agree that their trains take a back seat to the sceneries they painstakingly construct in the center of their platforms. They've both enjoyed that hobby since they

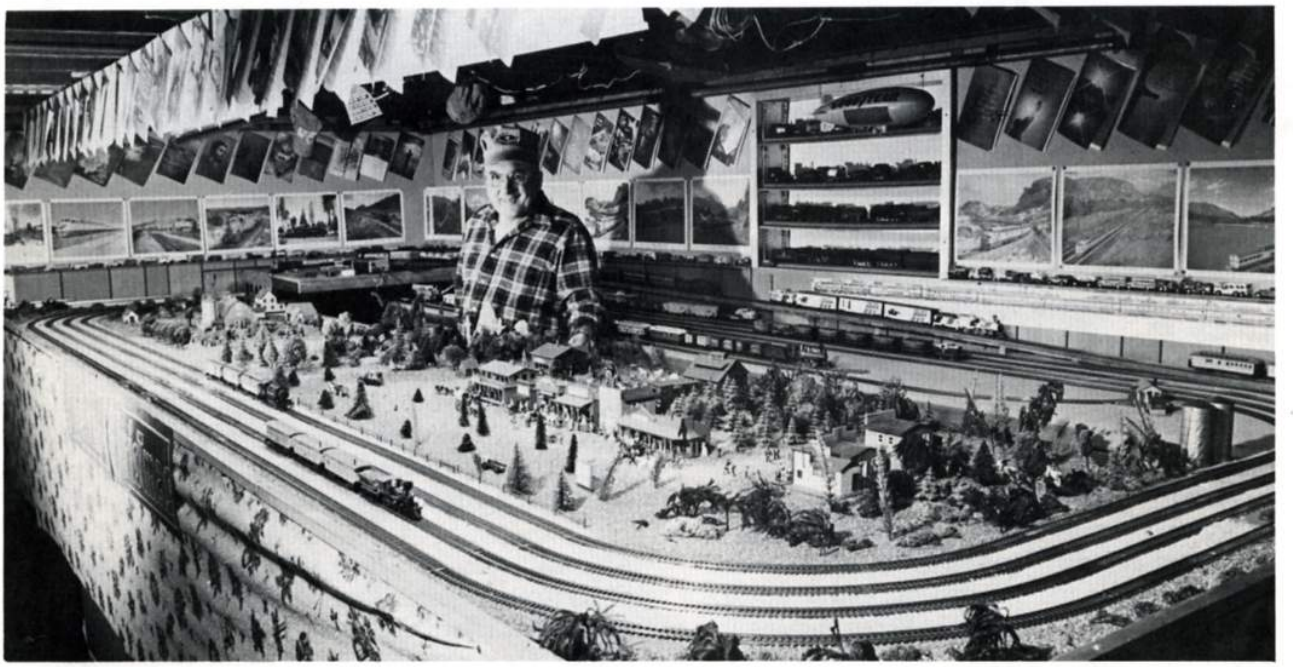
were young, and took the idea for creating "sceneries" from their father's Christmas tradition.

"To us, it wasn't Christmas unless you had a scenery," Howard explains. He recalled his father constructing an entire miniature circus that filled the family living and dining rooms at Christmas. The tent was built on a screen door frame, and included wild animals, a sideshow and a circus train in the setup.

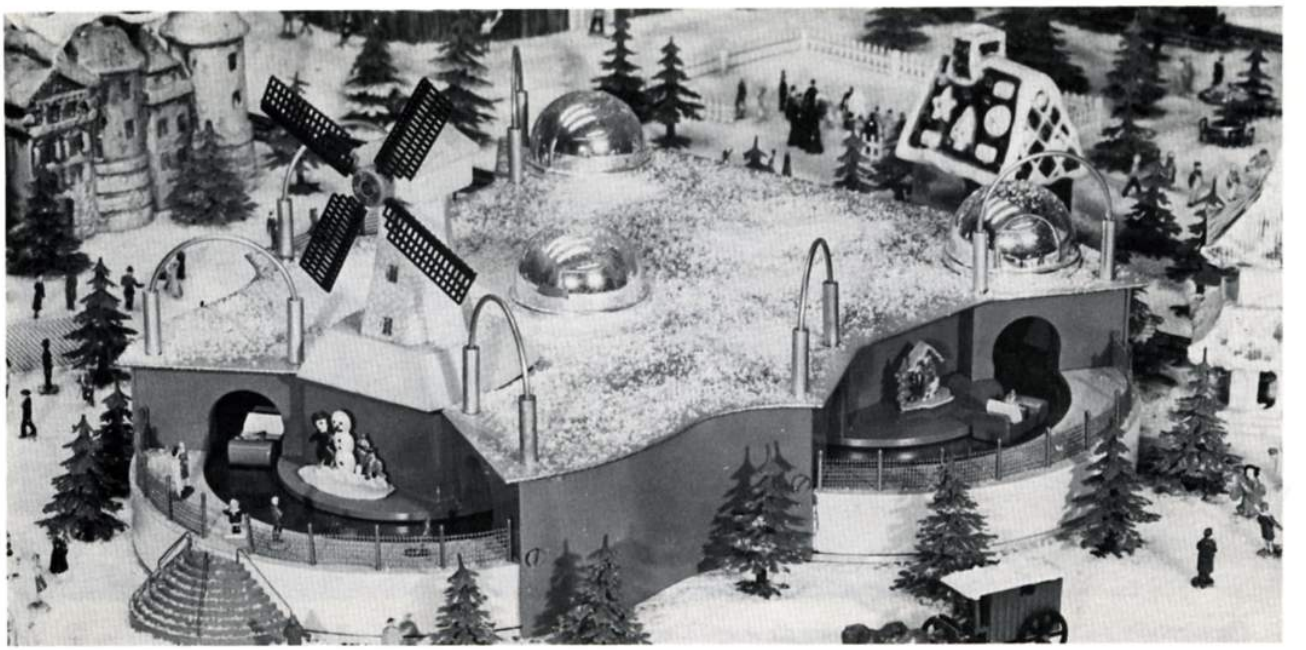
Their father was forced to rely on his ingenuity and mechanical ability to create realistic scenes, and he passed those qualities on to his sons. Howard remembered, for example, the three-inch-high people his father created out of bits of celluloid film and painstakingly painted. There was also a series of water-filled canals sailed by tiny boats, entirely hand-made by his father.

Both Howard and Dick have been bitten by their dad's tinkering bug, since both buy bits and pieces of material throughout the year that will eventually make up a scenery. Each also buys materials with the other in mind. Howard said that he usually buys two of an item, giving one to Dick. "We're not competing," he asserts, "because we've got so much that's different. My scenes are always made with green grass, for example, and Dick always has snow. But we do give each other ideas."

Dick makes minor adjustments to his rolling stock. His miniature balloon ride is visible at right.



Dressed like a true railroad man, Howard proudly displays a small part of his extensive collection.



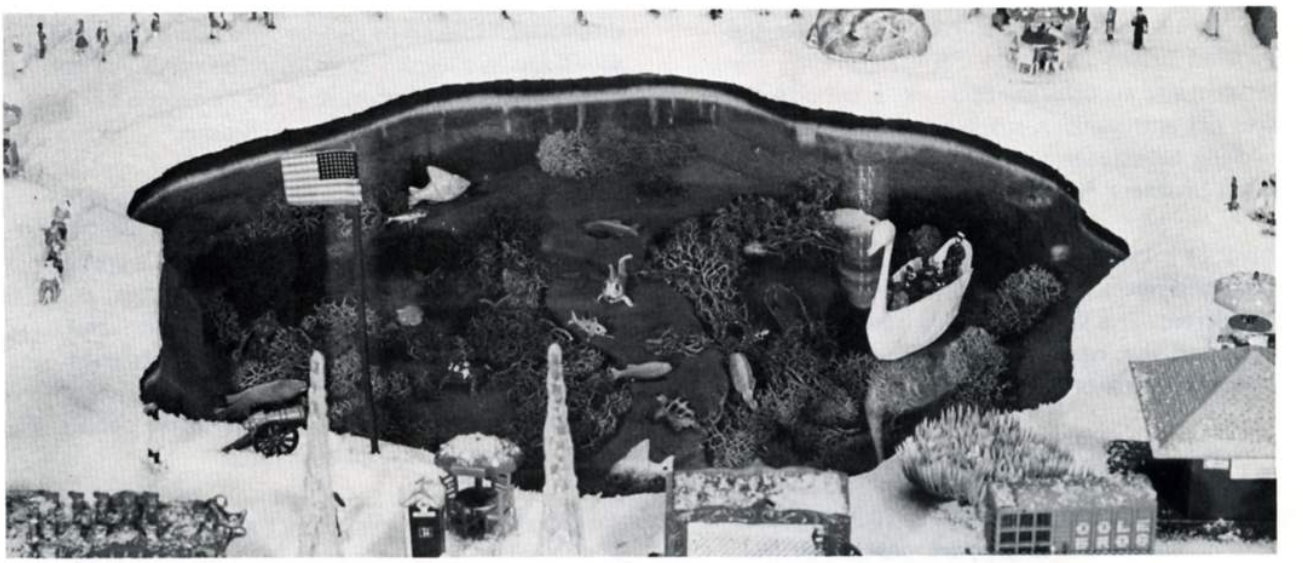
Couples sail in tiny boats as the windmill blades turn slowly on Dick's Tunnel of Love.

The Holzbaurs' sceneries aren't solely composed of pre-fabricated materials; they are liberally furnished with imaginative ideas, as their father's sceneries were. For example, restaurant coffee stirrers became lights at Howard's amusement park; straws topped with inverted birthday candle holders became the pillars of a circus tent.

The impetus to create movement in the sceneries began when Howard automated small portions of it to avoid a "dead" look. Dick started making animated sceneries about 20 years ago, beginning with a moving Ferris wheel with a frame constructed of train tracks.

Since that time, Dick has built an amusement area, with several rides, moving cable cars and a number of other amusements. One of his most impressive works was a drive-in he built in 1946. Through a complex series of films and mirrors, it actually ran a movie on its screen at the touch of a switch!

In Dick's current scenery, small boats sail in and out of the Tunnel of Love, which runs under the base of a moving windmill. Nearby is a dance hall



Dick based this stately swan boat, gliding on a crystal lake, on an Asbury Park amusement ride.

The carefully painted figures peopling Howard's western movie set seem to be awaiting the director's command to move.

where tiny dancers mounted on tacks whirl around the floor. In reality, the dancers are moved by a track of magnets mounted beneath their feet.

There's also a swan boat sailing sedately on a lake. The piece puzzles visitors, who watch the boat move with no visible pulleys or motors. The secret is that the swan, a duplicate of an Asbury Park ride, is attached to the acrylic lake surface —— and the entire surface revolves!

No belts are used to drive the amusements; they're all motivated by friction. The only belt in the whole setup, in fact, is the one that operates the overhead pieces in Dick's display. Circling his platform are an orbiting Sputnik; a balloon that takes off and lands; a stork carrying a baby; a hovering helicopter with whirling blades; and the Wright brothers' first plane.

Howard's present layout features a Western town, with gunslingers facing off for a showdown on Main Street. The impending shootout is explained by a small sign nearby, telling "tourists" that a movie is being shot on location.

Howard's current project is reproducing Great Adventure, the amusement park in Jackson. He began work on Christmas 1979, painting over 100 animals for the safari park portion of the project, finishing the painting last spring. Dick has several new motorized amusements currently under construction.

Regardless of what's on the platform or in the workshop, though, both brothers strive to create even more realistic scenes. "I want you to see what you'd see if you looked at someplace from far away," Howard explains.

"I look at something, and try to duplicate it in miniature," Dick says. "Sometimes you have to cheat a little to get it working, though!"

And how does he gage the fidelity of his reproductions? "I listen to people who come over and see it. On eye level, I want it to look like you can walk down the street in it. If other people say it looks real, that's when *I* know it does."

Dick reports that his wife bought him a majority of his collection "but she refuses to by me any more!" Howard estimated that he has perhaps $1,000 worth of materials on his platform, and twice that amount below. To those who feel that's an unnecessary extravagance, Howard points out that he and Dick "are probably spending about the same amount that other people spend over the bar or in cigarettes."

Anyone interested in visiting the Holzbaurs' basement fantasylands can contact Howard or Dick at ext. 3174 to arrange a trip.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 10 March 9, 1981

Safety Concerns

Satellite Data Link

Several employees have expressed concerns over potential microwave radiation hazards from the soon to be installed antenna dish next to the LOB described in a recent article in the PPL Digest. The Occupational Safety and Health Act (OSHA) of 1970 defines the maximum power density of non-ionizing radiation for continuous exposure of personnel as 10 milliwatts per square centimeter (mW/cm^2) averaged over any six minute period. All areas subjected to radiation densities above this level must be prominently posted with appropriate warnings. As an additional safety precaution, the Federal Communications Commission (FCC) requires all earth station licensees to measure the levels of the radio-frequency radiation in and around their stations to confirm that safety levels are not violated.

Health and Safety's initial hazard analysis, based on information supplied by American Satellite, the installing company, indicates that power density levels should be less than 0.1 mW/cm^2 in any area outside the immediate antenna site. This is a factor of 100 below current safe occupational standards.

In addition to American Satellite's survey for conformance with existing Federal regulations, Health and Safety will be conducting an independent survey to ensure safety. Any employee having any further questions on this topic may contact Joe Stencel at ext. 2529.

DOE Health Hazard Alert

Recent reports from the Chicago Operations Regional Office of the DOE have labeled 2-nitropropane (2-NP) and di-sec octyl phthalate (DOP) as carcinogenic substances.

2-NP is used in many coatings, printing inks and adhesives. DOP is used as a plasticizer in polymers, as well as in quality assurance programs testing high efficiency particulate air filters, respirator cartridges and assembled respiratory protective equipment.

If you have any knowledge of the use of either substance or their compounds at PPL, please contact Ken Semel at Health and Safety, ext. 2531.

Hotel Fire Safety

In light of the recent rash of hotel fires, PPL Fire Chief Jack Anderson offers the following tips to employees staying in hotels while traveling:

- Find two exits nearest your room; be sure they are unlocked and unblocked. Count doors between your room and the exits so you'll have a reference point in the event of a smoky fire.
- When you hear an alarm, act —— don't investigate.
- If the fire is in your room, get out and close the door. Report the fire once out of the room.
- If the fire is not in your room, leave if you can. Feel your door; if it's cool, open it slowly and go to the nearest exit. Take your room key so you can go back if you can't use your exits. If it's smoky, crawl at floor level; that's where the fresh air is.

continued on page 2

- If your room door is hot, don't open it; your room may be the safest place to be. Seal all cracks with wet towels, and shut off fans and air conditioners. Signal at your window. Call the fire department and wait to be rescued.

- NEVER use elevators during a fire; they could stop at the fire floor.

Plan what to do in case of fire when you check into your hotel or motel. You won't have time to plan during a fire, and your advance planning could save your life.

Military Leave Credit

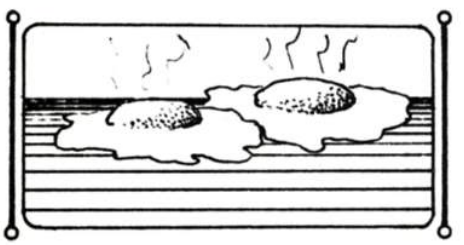
The main campus Personnel Office is concerned that some employees who left for military service may not be receiving credit for the leave period. If you left the university to enter the military service and returned to work within 90 days of discharge, please inform Roberta Gernhardt, Clio Hall, in writing as soon as possible. If you have any questions, you may contact her at 452-3315.

TIAA Claim Change

Effective immediately, TIAA, the University's Major Medical carrier, will not accept xerox copies of medical bills. TIAA will only accept original and carbon copies of such bills; xerox copies will only be accepted if the bill has first been submitted for payment to another company.

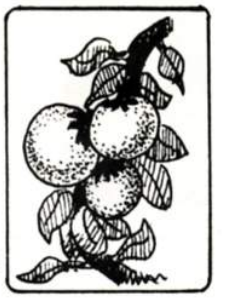
If you need assistance in filing a claim, contact Eleanor Schmitt at ext. 2046.

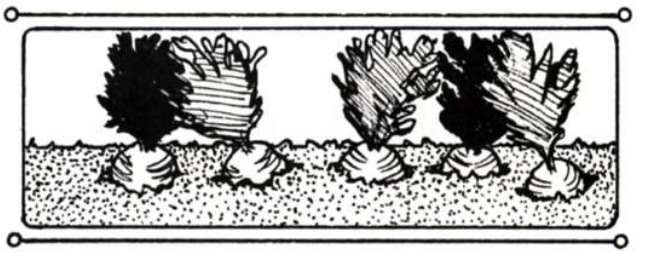
B-Site Breakfast



Effective immediately, the B-Site cafeteria will be serving breakfast from 7:30 to 10:30 a.m.

Plot Preparation





Plowing of PPL's garden plots in preparation for another season of growing is scheduled for the near future. Before plowing can be done, however, past gardeners must clean out their plots.

Employees who used a garden plot last year are asked to remove all stakes, sticks, screening or fencing from their plots as soon as possible. Details on this year's garden plot program will be published in upcoming editions of the HOTLINE.

Cafeteria Returns

If any china, silverware, trays or salt and pepper shakers "borrowed" from the B-Site cafeteria have taken up residence in your office, please return them to the cafeteria. In the future, carry-out meals will be served on disposable paper products.

Art Auction Slated

The Princeton University League has scheduled its annual art auction for March 20 at Cottage Club, 51 Prospect Street. All proceeds from the auction benefit the University League Nursery School Scholarship Fund.

Previews will be held at 8 p.m., with the auction beginning at 9 p.m. Auction pieces will be presented by the Bruce Andrew Galleries of Fort Lee.

The three dollar admission fee includes an assortment of desserts and wine punch served during the auction.

Exceeding Design Specifications

When the Lord designed us eons ago, He doubled up on certain organs with the provision that each time we could manage with one unit missing. He kept the heart single, presumably because He did not want the complexity of synchronizing two variable frequency pumps. Instead the heart, like the liver and other one-of-a-kind organs, received spare capacity for infrequent occasions when the load exceeded design specifications (such as when running after a hare or before a bear). And, if there was plenty to eat, the body could store the excess as fat for use during lean days.

In the beginning, life was harsh and the average life expectancy at birth hovered in the low thirties at most. Gradually conditions improved and the life expectancy went up dramatically. In the USA, it increased from 50 years in 1900 to 70 in 1950 and could reasonably have gone to the high seventies in 1980. Instead it stopped at 72, while in the same 30 years since 1950 medical costs went up ten times. This mismatch between small increases in average benefits and large increases in costs has led many people to ask what has gone wrong.

I think the answer is simple. We are not living by the Lord's specifications anymore. Storage of extra food was meant as a *temporary* expediency for Cro-Magnon Man. But Supermarket Man has made that extra weight a *permanant* part of his anatomy. That makes no sense, least of all at PPL, where pulsed operation is an established fact of life.

PLT, PDX and TFTR are specified to operate a few seconds every few minutes. If we ran them continuously at full power, none of the three would last out the day. That would be irresponsible, to say the least. It is equally bad to take a fine instrument like the human heart and subject it to permanent overload from overweight, as if every day is the last day for Shop Rite and Foodtown.

It is unrealistic to expect that the Lord will change His design at short notice. We have to make the change and lose weight. Ten pounds should be good for starters.

E. deHaas

Dodging The Draft

The high cost of the home heating season is again upon us. What can be done to reduce those costs? Perhaps the simplest and least expensive solution is control of air leakage through infiltration.

Look at your windows, doors and sliding glass doors. Can you see daylight around the frames and at the seals? That's where drafts are sneaking in, robbing you of precious heating dollars. Settling of your home over the years may also have opened cracks which are difficult to detect —— especially behind paneling or where walls and foundations meet.

To find leaks, turn off all lights inside your home. Send one person outside with a flashlight, while a second remains indoors. Any light visible inside when the flashlight shines on the house outside indicates a crack. Note its location and repair it with weatherstripping or caulking material.

Use cigarette smoke to detect the airflows indicating leaks. Wait for a windy day, turn off equipment that would distort air movement, and direct smoke into suspect areas around walls, windows, doors and foundations. Air currents will quickly point to problem leaks.

Repair of these leaks will result in improved comfort and lower heating costs through the remainder of the winter.

Human Behavior

In almost any operation, unsafe conditions and mechanical failures are the easiest to control. Unsafe physical conditions can be seen and positive action can be taken to correct them. Eliminating or controlling unsafe conditions also helps to control unsafe work practices or unsafe acts by

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making workers increase their awareness of personal work habits that could cause injury.

Human behavior is complex. Ten principal factors which contribute to unsafe work practives or acts by an individual are:

1. *Did Not Know Hazard Existed:* This may be from lack of experience, inability to recognize a hazardous condition, a temporary hazard created by a fellow employee, a chain of circumstances or a lack of job training.
2. *Indifference:* The individual may know the safe method but may not care. This can be a temporary or a continuing attitude. It is necessary that supervisors insist that certain standards be met by employees under their supervision.
3. *Daring:* This type of behavior blinds an individual to hazards that exist. Such an individual might also be classified as a clown, and there are enough problems on a job without clowns!
4. *Poor Work Habits:* Poor work habits are often formed from doing the same job day after day. Some may be formed early in the job; others may develop later. This is best illustrated when an individual works many years and suddenly becomes an accident victim. He may have had poor work habits all along and the law of averages finally caught up with him.
5. *Poor Example Set:* A new employee may follow the example of an older employee who has unsafe work practices or habits.
6. *Laziness:* All persons are lazy in some way; it's the degree that becomes critical.
7. *Haste:* The desire to get something done fast can cause an injury or an unrealistic speed-up on the job.
8. *Temper:* This can also be classified as impatience or lack of emotional control, which can lead to an unsafe act.
9. *Physical Failure and Fatigue:* The individual may have physical limitations, or be on a job they cannot handle properly.
10. *Lack of On-the-Job-Training:* This can be the most glaring cause of accidents. Supervisors should be certain that employees know their jobs. If they do not, supervisors are failing in their jobs.

Lack of job training is a handicap. A supervisor has a responsibility to the employee as well as to the company in carrying out necessary job training.

Many unsafe practices or acts cause damage to materials, products and equipment but cause no injury. If an employee is injured, it is a safety problem; if not, it is a production problem. Basically, though, it is the same problem: an unsafe work practice or act.

These problems are production problems whether you ruin the machine, the product or the person. Eliminate the unsafe work practices or acts from the production process, and there will be an improvement in production and a reduction in costs and injuries.

As a supervisor or a new worker, you should:

- Have a system or procedure for instructing each new worker about the work.
- Point out the pride your crew has in their ability to do a job right.
- Emphasize the point that there is always time to do the job safely.
- Point out that an accident or injury is a result of someone's failure.
- Do your best to make the new worker feel that you want them to make good.
- Encourage them to ask questions about the job and about safe procedures.

If you are the new worker:

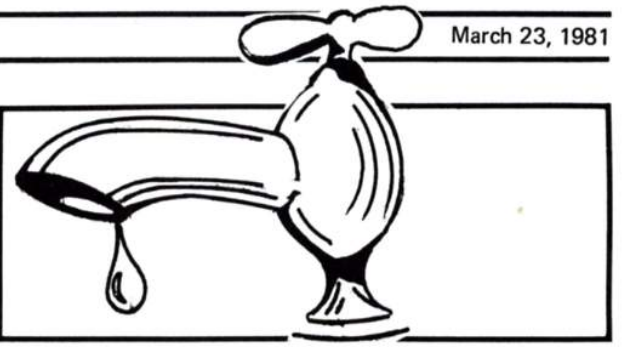
- Ask questions when in doubt. The only stupid question is the question that is not asked.
- Do your part and more to show you want to be a good, safe-working employee.
- Be willing to take the lead in the on-the-job safety meetings.
- Observe and learn from others.
- Remember the supervisor's instructions and always follow safe working procedures.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2 No. 11 March 23, 1981

Water Conservation



In spite of the recent rain and snow, the laboratory's section of New Jersey is under a binding water restriction imposed by the Governor. Due to lowering water tables, the restriction includes not only users of public water supplies, but also those with wells – like PPL. In addition to banning car washing and watering of lawns, the restriction requires all industries to cut water consumption by at least 25% over past use or face heavy penalties and water shut-off.

Because of reduced activities in the experimental area, PPL has been able to meet this quota over the past month. No one can predict how long the restriction will last, however. Over an extended period, it will require us to redo some projects to reclaim and recycle water and, in general, throttle our consumption.

Engineers will be doing a survey of laboratory water use and talking to many employees, in an effort to identify areas of heavy use and develop ways to cut back long-term consumption. If you see an area that is leaking or wasting water, please report it to Plant Engineering, ext. 3092.

These restrictions are not expected to adversely affect PPL operations at this time. We do not expect to substitute Chablis for water in the cafeteria! However, all employees should be aware of this problem; treat water as a limited resource, don't waste it.

Blue Cross Billing

A six-year-old wrangle between Blue Cross and 43 hospital-based radiology groups was recently settled. The radiologists had been boycotting Blue Cross claims for service, claiming that Blue Cross rates were unrealistically low. Many radiologists billed subscribers directly for services, while others sent subscribers "balance due bills" in order to recoup the difference between Blue Cross rates and the higher fees.

State Insurance Commissioner James Sheeran has ruled that since the Blue Cross contract covers in full in-hospital radiological services, any balance due billings were improper. Any subscribers who received and paid a full bill for in-hospital services from a radiologist since July 17, 1980, then notified Blue Cross, will be receiving a check from the plan. A fee schedule worked out with the radiologists is expected to settle the $1.5 million in disputed back claims made by 30,000 subscribers.

Eleanor Schmitt has sent in numerous radiology bills from PPL employees to Blue Cross. If the bills were paid, subscribers can expect to be reimbursed by Blue Cross during the next few months. Any future radiology bills should be submitted to Blue Cross of New Jersey, P.O. Box 420, Newark, NJ 07101. Indicate on each your 10-digit ID number and your group number.

Contact Eleanor Schmitt at ext. 2046 with any further questions.

Coming Soon

Do you want to understand French films without reading the subtitles? Talk to Elke Sommer in German? Read "Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki" in the original? The next issue of the HOTLINE will tell you about PPL's newest facility, the Language Laboratory.

Benefit Hours

Beginning March 25, Eleanor Schmitt will be available each Wednesday morning to answer questions about Blue Cross, Blue Shield, Major Medical and the filing of claims. Employees with questions should see Eleanor in Room B-336A LOB between 9 a.m. and noon each Wednesday.

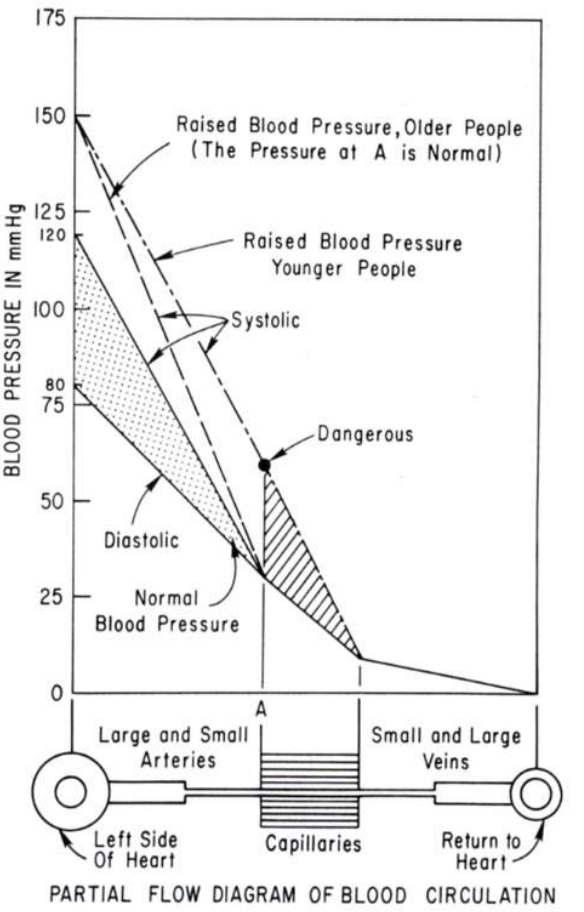
Reading Under Pressure

It is no exaggeration that warning lights, flow switches, voltmeters and similar devices outnumber people at PPL more than ten to one. Even so, their total is smaller than the number of protective devices in the human body.

It is therefore surprising that the Lord left out both a gauge and a safety valve for blood pressure when He designed us. He did put in a regulator, though, which He set at "120 over 80" for most people. The first number refers to systolic pressure which occurs at the peak of the heartbeat. The second figure indicates diastolic pressure, which occurs in between beats. Both readings are expressed in millimeters mercury.

The flow diagram and the graph I have drawn show that at the exit of the heart and in the large arteries, the pressure moves up and down between the solid lines. When the blood reaches the capillaries, the pressure becomes steady at about 30 mm Hg.

The diagram applies to a person at rest. The values are higher for a person doing physical work, and could easily reach 180 mm Hg systolic for somebody who has just run from B-Site to C-Site. In healthy individuals, the pressures would revert to normal in a few minutes, and the body is well equipped to handle those pressure excursions. For somebody with hypertension, however, the pressure stays up continuously, even at rest. Among the types of hypertension, one is related to age and one is not.



PARTIAL FLOW DIAGRAM OF BLOOD CIRCULATION

When we get older, our arteries lose some of their elasticity, which causes a higher flow impedance and a higher pressure drop in the system elements to the left of point A in the diagram. That may boost the systolic pressure to 150 mm HG, as is shown in the graph. If a physician finds that value in someone who is 65, he will normally not be overly concerned; the larger arteries can withstand that extra pressure. But if 150 mm Hg is found in a young person, whose arteries have not yet had time to build up extra impedance, the extra pressure drop must be located in the capillary bed. That is typically represented by the double hatched line.

Certain very small arteries and their transfer points to the capillaries may then be permanently

exposed to 60 mm Hg – twice the design value. Sooner or later, a small artery may break or become clogged, causing part of an organ to receive no blood. When that occurs in the brain, the technical term is cerebral hemorrhage and the common term is stroke.

The remedy is simple in principle: let a doctor or nurse apply the missing gauge (a blood pressure check) once every year or every second year. If the figures are normal, so much the better. If they are not, the physician has a number of methods to bring the pressure down, including such simple prescriptions as telling you to put less salt on your food. In most cases (nothing in medicine is absolute), lowering blood pressure will dramatically reduce the risk of a stroke, lowering the risk to perhaps 25 or 33% of what it would be if you let things slide.

Nationally, deaths from stroke number about 177,000 per year, which corresponds to one per year among the 1100 staff members of PPL. Many PPL staff members read meters for a living and take appropriate actions thereafter. All of us ought to put reading our own blood pressure and that of our family members at the top of our "reading" list.

E. de Haas, D.Sc., P.E., Fellow, Academy of Medicine of New Jersey

True-False Quiz

-- 1. Taxis are more expensive than rental cars in major cities.

-- 2. Flying out of Philadelphia Airport to Atlanta is cheaper than flying from Newark Airport to Atlanta.

-- 3. Some hotels give "educational" discounts.

-- 4. Half of all business travel itineraries are changed at least once prior to departure.

-- 5. PPPL has corporate agreements with some hotel chains.

-- 6. The auditors seldom check or cross-check individual vouchers.

-- 7. Auto rental insurance should always be accepted.

-- 8. Eat and drink it up; you're on an expense account.

-- 9. DOE requires the names of dinner guests who are not PPL employees.

-- 10. PPL's average cost per domestic trip rose 38% from January 1980 to January 1981.

Answers on page 4

Safety Tips For Women

Muggings, purse snatchings and other street crimes point up a need for women to increase their safety awareness when walking or driving at night. Attention to just a few common sense safety rules can vastly reduce fear and avert a possible tragedy.

- When possible, don't travel alone. Walk on better lighted main streets; avoid walking near bushes, alleys and other shadowy areas.
- Carry your purse close to the body or under your coat. Hold it so the clasp will open to toward your body, not away from it.
- Make sure your car is in good repair and that the gas tank is filled.
- Don't hitchhike, and do not pick up any hitchhikers. That free ride may cost you more than you bargained for.
- Before leaving your parked car, roll up the windows and lock all doors.
- Keep your car locked and the windows up while driving and while the car is stopped at traffic signals or other traffic-flow blocks (such as train crossings or in a traffic jam).

- If you see someone stopped along the highway and decide to help out, keep your doors locked and your windows up high enough to prevent anyone from reaching in. Quickly find out what assistance is needed, then drive to a well-lighted service station and notify an attendant, the police, or emergency service.

- Carry the telephone number of the police, a local garage, and your automobile service club in your billfold in case emergency aid is needed.

True-False Answers

1. False. For one or two passengers especially, you could take 5+ taxi rides each day for the cost of a rental car. (Don't forget to add in hotel parking, gas, mileage, to rental car costs).

2. True. Generally, Philadelphia costs $10 less than Newark when flying *south,* $10 more when flying *north,* and about the same for westerly travel. However, Philadelphia usually has fewer flight options.

3. True. But you must *ask* and show your Princeton University I.D. Some hotels require you to ask about such discounts when making reservations and/or when registering. See the Travel Office for details.

4. True. At PPPL the percentage is usually higher – and some travellers can't seem to get off the ground until they've changed tickets three times!

5. True. For some you need a special reservation number, so be sure to check with the Travel Office.

6. False–False–False! It might take a year or two, but the auditors *DO* check, cross-check and sometimes ask for return or reimbursement money.

7. False. Princeton University has travel accident insurance which covers you while traveling on business. They will also pay the deductible in case of damage to the rental vehicle.

8. False. There is flexibility to University policy, allowing for variation in expense costs in different areas. But the policy states you are expected to be moderate and reasonable in selection of restaurants and submission of claims. DOE policy will not allow reimbursement for alcoholic beverages.

   In general when spending travel money, you should be as prudent as you would be spending your own. After all, through taxes that's exactly what it is – your money!

9. True. If there is a group, it's often simpler for one person to pick up the check. When all diners are from the same contract, fine. But don't play the big spender; you could get stuck with the check. And don't forget the receipt.

10. True. January was the lowest rise for this fiscal year. Although the number of trips decreased from January 1980, total costs for January were up 7%.

Travel policies, discount cards, and other fine services are available free at the Travel Office. Check with the office before your next trip.

A Thank You

Christine Schuster wishes to thank everyone for their thoughtful expressions of sympathy.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

ppl people

For Mary Alice:

The Play's The Thing

Shakespeare tells us that "all the world's a stage, and all the men and women merely players. . . and one man in his time plays many parts."

Mary Alice Eubank took the Bard's words literally. The C-Site receptionist by day, evenings often find her vocalizing during rehearsals for her next appearance in a musical or a Gilbert and Sullivan light opera.

Always musical as a child, Mary Alice learned to sing and play the piano and viola while in high school. Listening to a soloist's performance in her church, she felt she could do a better job and determined to try out for the solo spot. Her audition won her the job.

It was then that Mary Alice began taking lessons in singing, since she'd never had any formal voice training before. Those lessons taught her to use her muscles in breathing while singing, as well as how to project the voice. She believes that serious lessons shouldn't begin until the singer is mature, however, in order to let those important diaphragm muscles develop.

While still in her native Philadelphia, Mary Alice got very interested in a Gilbert and Sullivan light opera company there. "I love to do Gilbert and Sullivan," she enthused, "because no matter when you do their operas, they always relate to the times."

Another reason for her affection for Gilbert and Sullivan is the treatment they give alto and mezzo-soprano voices. "Altos usually have so little to do in normal productions," she explained. "But with Gilbert and Sullivan, there's always something to do, even if the part's a little gross!"

Mary Alice is ready for a day at the Ascot Races during the PJ&B production of "My Fair Lady", done at McCarter Theatre in 1979.

She played in "The Gondoliers," "Princess Ida," and the "The Pirates of Penzance" with the Gilbert and Sullivan Society of Philadelphia. When she relocated to Princeton, she joined the Princeton Gilbert and Sullivan Society, with Lee Bristol and Goerge Gallup. Among other productions, she appeared in "The Yeomen of the Guard" and "H.M.S. Pinafore" with the group.

"They always did top-notch performances," Mary Alice recalled. She remembers a specific evening of Gilbert and Sullivan, presented to a black tie audience at the Gallup Research Foundation. "Everyone was so familiar with the pieces we did that they knew all the words, and at times even sang along with us!"

Mary Alice has also appeared several times in the Washington Crossing State Park outdoor theatre. She was part of the Princeton Opera Company troupe that 'christened' that outdoor stage 15 years ago. Her various roles have included Hansel in "Hansel and Gretel"; a nursemaid in "Street Scene"; the Fairy Queen in "Iolanthe"; Sylvaine in "The Merry Widow"; Lizette in "Naughty Marietta"; and a chorus member in the Princeton Junction and Back (PJ&B) production of "My Fair Lady" at McCarter Theatre in 1979.

Most recently, Mary Alice lent her voice to the chorus of PJ&B's "Kiss Me Kate" at McCarter Theatre. One of her fondest performance memories, however, centers on her portrayal of the Mother Abbess in the Lawrenceville Players' 1977 production of "The Sound of Music". "That was a nice part to do, but it's also a demanding one. 'Climb Every Mountain' has a 2½ octave range, and it also ends the first act. If you don't get it right, the audience won't come back!"

Another high point in her career was playing the major role of Abigail Adams in "1776" with PJ&B —— one of only two female parts in the entire production!

Those successes were bought by years of vocalizing and practicing, preparing to be the best at each audition. After having sung professionally for some time, Mary Alice no longer goes to every audition available. She restricts herself to parts that really interest her. But there's one aspect of auditioning that's never gone away: the nervousness.

"I'm always nervous," she explained, "because you want to be the best, and at times you're not physically up to it." Auditions can be closed (where one sings for the show's director) or open (where one sings in front of everyone, including

In 1976, Mary Alice portrayed Lizette In "Naughty Marietta" for the Princeton Opera Association.

Mary Alice (left) turned in numerous performances as Hansel in the Princeton Opera Association's production of "Hansel and Gretel" between 1965 and 1970.

your competition for the role). Although auditioners are usually asked to sing a song from the show being cast, they may be asked to sing something different on the spot —— which only increases the tension level.

Mary Alice has found the competition fiercer among women than men. "So many more women try out for each part," she says, "and that may be because women have more time to rehearse than men do. But in auditions, you have to strive to be tops."

After winning a role comes the sheer hard work of rehearsals. Mary Alice has never "gone up" on any lines or songs during an actual performance, but rehearsal blank-outs are another story. "When you begin rehearsals for a show, you learn the part and then begin thinking about it. That's usually where blanking out happens; in that second stage, when you're rethinking your character."

Pre-performance "butterflies" are also a part of life on the stage. And things are doubly difficult for the singer, who must be sure her voice can

Mary Alice (right) compares notes with her fellow nursemaid in the 1971 Princeton Opera Association production of "Street Scenes"

The picture of Edwardian elegance, Mary Alice poses in another of her costumes from PJ&B's "My Fair Lady".

stand the rigors of the evening's performance. The vocal chords are some of the strongest muscles in the body, but they're also one of the hardest places to get blood to circulate freely. That's what singers mean by 'warming up' —— increasing the blood flow to the vocal chords.

Mary Alice explained that although each individual singer may have her own problems warming up, experience tells one when the blood is pumping and you're ready to perform. "You're really like an athlete," she contends. "There's a lot of effort involved in professional singing, although it may look easy. You have to project, and that causes physical exertion. It's not at all uncommon to have a weight loss during a performance."

She pointed out that good singers try to do as little talking as possible before and between their performances. "For some reason, the normal talking voice tends to 'fuzz' the throat. And the throat is an instrument; you can't abuse it."

At times, it becomes very difficult to fine-tune that instrument. Besides the obvious differences between indoor and outdoor singing, Mary Alice says the singer has very little idea how he sounds when performing outside. "There are no walls to bounce the sound backto you," she says. "You have to be careful not to fall into the trap of trying to sing harder when you're outdoors."

There's also the problem of humidity or dryness bothering the throat outdoors —— and the problem of inhaling small bugs every time you take a breath!

Mary Alice has faced audiences ranging from McCarter's 1,500 to Washington Crossing's approximately 3,000. She's also sung at private parties and been more nervous. Why, when the audience is so much smaller? Because another singer may be in that small audience, creating anxiety for the performer to turn in a good performance.

Since most of her roles have been part of a group effort, Mary Alice thinks it's difficult to feel you have done well as an individual when the group hasn't been as successful. "But everyone who's picked for PJ&B, for example, is top rate. And we're all a little shaky and scared together on opening night!"

In fact, neither peer approval nor audience applause are really necessary for a performer to know she's done well. "You know yourself when you've been successful," Mary Alice contends. "When you're in a production, you find yourself spending a lot of late nights, and I sometimes think I'm not going to do any more performances. But there's such fun in a production, such a sense of camaraderie that develops closeness. You find you get hooked, and you keep coming back."

Another reason for returning is that next "right" part. "There's always another part, one you feel you can really do justice to," Mary Alice concludes. "There's always another audition, and another chance."

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 12 March 30, 1981

CARTER VISITS PPL

PPL Associate Director for Research Paul Rutherford (left), describes the Princeton Large Torus (PLT) experiment to former President Jimmy Carter as laboratory Director Dr. Harold Furth (right) looks on. Mr. Carter visited PPL for an hour-long tour as part of his Princeton visit last week.

PDX UPDATE

After a four month shutdown, PDX is coming back to life. The last two of four ORNL beam lines have been installed by H.P. Eubank's neutral beam group. The total injection capacity is now 6 MW.

To protect the inner wall of the vacuum vessel from direct bombardment by the neutral beam, the wall has been armored by arrays of graphite tiles. The tiles, coated with titanium carbide, are mounted on water cooled copper slabs. This design was developed by H. Kugel, who is also responsible for the PDX injectors.

Les Gereg, who is responsible for all the work inside the PDX vacuum vessel (and who practically makes his home there during a long vacuum vessel opening), was in charge of the actual installation. "Installation" usually means modification as well, since it is rare that pieces supplied to Les fit in place with no alteration.

In addition to neutral beams, two major new diagnostics have been installed on the machine. Both search for fine grained plasma instabilities by observing the scattering of CO_2 laser radiation in one case, and of 2-mm microwaves in the other.

Since the inside of a tokamak is a harsh environment, a wide range of repairs were also made to the internal divertor hardware and to some important diagnostics (such as the TV Thomson Scattering apparatus, the waveguides for the microwave interferometer, magnetic loops, and so on). The old titanium limiters were also replaced by graphite ones.

In the coming six months, the main experimental effort on PDX will center on getting beam power up to full rating and resolving the questions that arose last fall regarding the heating efficiency of near-perpendicular beam injectors.

Chain Letters

PPL facilities, including Xerox copiers and the mail service, are for official Laboratory/Princeton University business only. Personal chain letters, even though they may be well-intended, are not to be copied or distributed with the use of PPL facilities.

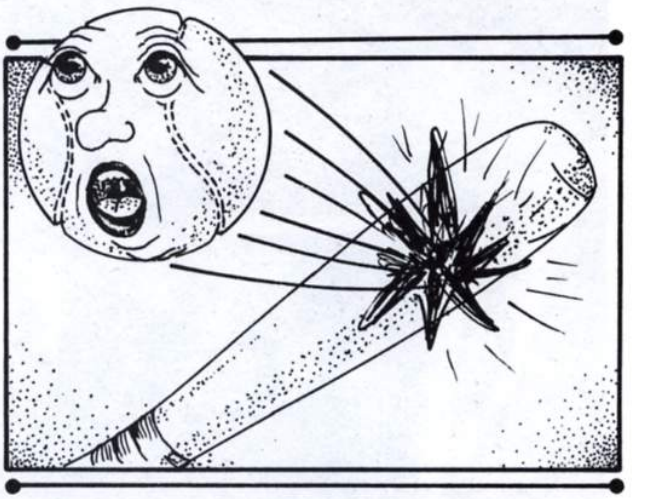
Check Valves

Reverse flow safety check valves will be required on all oxygen and acetylene cylinders used with a torch set as of March 30, 1981.

These valves, which are now a safety requirement, are available at the stockroom for $7.49 each. Equipment without check valves after March 30 will be tagged out of service.

If you have any questions concerning this requirement, contact Ray Jeanes in PPL Health and Safety at ext. 2532.

Softball Signups



Players are needed for PPL's entry into the 32-team Princeton Industrial Softball League, according to organizer Tom Holoman. The league will be split into several divisions, with the PPL team playing slo-pitch softball against teams such as RCA, FMC and other area research or industrial firms. PPL finished last season with a 10-6 record.

Teams consist of between 15 and 20 members. The PPL team will play Tuesdays at 5:45 p.m. beginning April 28. Games are played on the softball field near the airstrip, and spectators are urged to attend the games to cheer the team on.

Anyone interested in playing on the team should contact Tom at ext. 2748.

Language Lab

Approximately 25 people joined Associate Director of Academic Affairs Dr. Thomas Stix in wishing the PPL Language Lab "many years of *reel* happiness" at the lab's grand opening last week.

The group heard a short speech by graduate student Kevin Brau, who called the lab "an intellectual oasis" for "the amalgam of scientist and humanist . . . who reads 'War and Peace' between PDX discharges." Brau helped organize the lab, with the aid of fellow grad student Jim Glanz. Opening 'ceremonies' also included the splicing of two 600-foot reels of magnetic tape, and the recording of "testing, testing" in three languages by Dr. Shoichi Yoshikawa.

The brainchild of Dr. Stix, the laboratory is open on a 24-hour basis and is available to all PPL personnel. The lab currently contains two reel-to-reel tape recorders with headphones, allowing users to listen to elementary college level German, French and Russian tapes. The tapes and their accompanying texts are available in Mary Dyson's office, C-Site, Room AD9.

Those interested in using the lab should sign up on a sheet in Room AD9, get the required materials, and go to the lab, housed in LOB Room B-142. A set of operating instructions is posted on the tape recorders for first-time users.

Other language tapes will be added to the laboratory as user interest and available funds allow. Suggestions for improvements or additional languages should be sent to the lab in care of Mary Dyson.

Grad student Kevin Brau tests his command of foreign languages in the newly opened PPL Language Laboratory. The lab, housed in LOB Room B-142, offers all employees the opportunity to learn French, Russian or German.

Electronic Wiring and Workmanship

These 12 employees recently completed the Electronic Wiring and Workmanship course held at PPL. The week-long course, taught by technical consultant Maurice Wells, covered NASA-level sodering and welding skills with integrated circuits. Pictured are (front row, left to right) Dave Ciotti, Pete Haney, Mel Gensammer, Wesley Reese, Charlie Sule, and Training and Development Manager Larry Holpp; (back row, left to right) Gary D'Amico, Ray Gernhardt, Pat Murray, Howard Richter, instructor Maurice Wells, Technical Training Coordinator Joyce Lafharis, Rich Frankenfield, Carl Szathmary and Jim Greenhough.

Safety Glasses

The laboratory provides a service for purchasing prescription safety glasses and safety shoes at considerable savings. Any employee who wishes to purchase corrective industrial safety glasses through the laboratory service may do so by calling Health and Safety at ext. 2526.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2 , No. 13 April 9, 1981

FED Design Taking Shape

In 1980, the U.S. Department of Energy charged its Energy Research Advisory Board (ERAB) to appoint a panel to recommend a future course of action for the magnetic fusion program. One of the ERAB panel's recommendations called for the construction of a Fusion Engineering Device (FED) as the next major step in that program.

The FED will be a deuterium-tritium fueled tokamak somewhat larger than the Tokamak Fusion Test Reactor (TFTR). Physicists and engineers will use it to help solve the various problems commercial fusion power plants pose. FED will integrate the subsystems needed for a working reactor (such as superconducting coils and tritium breeding blankets) into a single machine. Physicists will study the machine's long pulses, which will last at least 100 seconds compared to about 1 second for TFTR.

The machine will confine a toroidal plasma with a D-shaped minor cross-section, a major radius of 4.8 m and minor radii of 2.1 m vertical by 1.3 m horizontal. The mean plasma density will be about 8×10^{13} particles/cm^3, the ion temperature 100-130 million °C, and the plasma current 5 million amperes.

The ionized gas will be confined by a toroidal field of 36,000 gauss. This field will be generated by ten superconducting coils, operating at the same magnetic field as those tested in the Large Coil Program at Oak Ridge. They will be made from a niobium-titanium alloy, and cooled to -269°C by liquid helium. Stainless steel will shield the coils from neutrons.

Each TF coil will be associated with a section of vacuum vessel and its integral tritium-breeding blanket module. There will be two types of modules. One type will be used to calculate the tritium yield of the breeding compound, probably lithium oxide. Engineers will use the second type to study heat transfer in the blanket, where most of the energy will be deposited. The combination of FED's long pulses, high duty cycle (40 seconds between pulses) and neutron power flux of about 500 kw/m^2 will heat the modules to temperatures comparable to those attained in a commercial reactor's blanket.

Impurities in the plasma will be controlled either by divertors or advanced limiters. If a poloidal divertor is used, the divertor coil will be placed outside the vacuum vessel and shield for protection from the neutron flux. Limiters would be equipped with exhaust vents to remove helium created by the fusion reactions.

The most likely means of auxiliary heating for FED is radio-frequency (rf) waves, with neutral beams a second choice. RF sources are preferred because they are easier to shield from neutron flux; the rf generator can be located away from the tokamak, and the energy piped into the plasma by waveguides. Scientists propose to use a 30 MW source at 55 megacycles/sec, which is twice the deuterium ion-cyclotron frequency.

The basic FED machine will be updated as new techniques are developed, becoming the center for reactor-scale tests of many new ideas. Of particular interest are induction of plasma currents by rf waves (permitting steady-state operation) and the use of charged particle beams for auxiliary heating.

Present plans assume a total cost of about 1 billion (1980 dollars). The ERAB panel recommended that FED be operational by the end of the 1980's. PPL personnel are involved in the activities of the Technical Management Board, which was established by DOE to provide design and direction for the FED. In addition, PPL will contribute in a major way to the necessary supporting reasearch for the FED. Specific FED relevant experiments will be carried out on PLT, PDX, and TFTR.

The site for FED has not yet been chosen.

Relocation

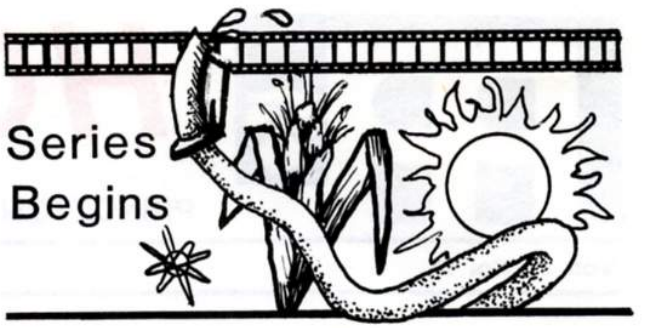
The Security Department has moved its main headquarters to the second floor of the Chem Science Building at B-Site. Although the department will maintain one office at C-Site, all parking permits and ID cards will now be issued at B-Site.

The general department number is 683-2893, while Jim Kopliner's number is ext. 2894. The captain's office number is ext. 2895, and the proctors may be reached at ext. 2896.

Thank You

Crayton Miller and his family thank all PPL employees for their kindness and donations. God bless you all.

Crayton Miller



An Energy Awareness lecture and film series, sponsored by the Training and Development section of the Personnel Department, will begin April 14 at noon. The series, to be held in the Melvin B. Gottlieb auditorium, will continue at noon every Tuesday and Thursday throughout April and May.

The first speaker in the series will be Dr. Rob Goldston, who will present an informal talk on the basics of fusion plasma physics. Following Dr. Goldston's talk, a short videotape of one of the first experiments in atomic power, "The Day After Tomorrow", will be presented.

The goal of the series is to maintain a level of awareness of energy issues. Films for future programs include "Energy Update" on April 16; "The Ultimate Energy", April 21; "The Great Energy Freeze", April 23; "Gasohol", April 28; "Rethinking Tomorrow", April 30; "Running on Empty", May 5; "The Superconducting Dipole Magnet", May 7; and "The Silent Power", May 12.

All PPL employees are invited to attend.

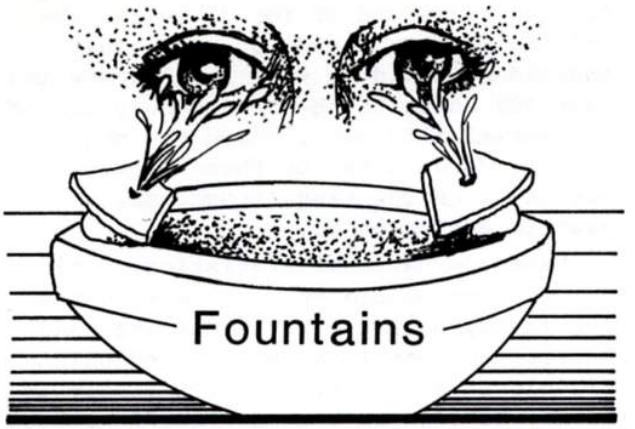
Cashier Hours

In order to facilitate cash procedures and better organize the workflow, the A-Site cashier's hours have been changed. The new hours, which are effective immediately, are from 9 to 10 a.m. and from 2 to 3 p.m.

All travel advances, petty cash reimbursements and check cashing services will take place during these hours on all normal workdays. Emergencies will be handled as they arise, but will require the approval of Harold Phelan.

C-Site check cashing procedures remain the same.

Emergency Eye Wash Fountains



Several new eye wash stations were recently installed at PPL. Like any piece of emergency equipment, it is important to know how to use them. If you forget to wear splash goggles, the use of an emergency eye wash may be your last line of defense against permanent eye damage.

To use this equipment, there are several steps to remember:

1. When an individual gets a chemical splash in the eyes, the eyes involuntarily clamp shut. The patient must therefore be led to the nearest eye wash fountain without delay; the first minute or two following the splash is crucial. Ideally, two people should assist the patient to the emergency unit. This is no time to be proud: GET HELP!
2. The eye wash unit should be turned on and the patient's face positioned in the water stream. The eyes must be opened, and held open until both eyes are thoroughly flushed. This can be accomplished by using the thumb and forefinger of each hand to keep the eyes open.
3. While irrigating, the eyes should be rolled so that water flushes around the entire eyeball.
4. The recommended time period for flushing is 15 minutes. Since it is difficult to time and flush at the same time, it is advisable that someone else time and monitor the patient.
5. Contact lenses should NEVER be worn when working with chemicals. If this type of emergency occurs with contacts, they MUST be removed before flushing begins.
6. Water -- and only water -- should be used for flushing. Leave further treatment to a qualified physician.

During an emergency is no time to start looking for an eye wash. Familiarize yourself with the location and operation of the unit nearest your work area now.

If you work with corrosive chemicals and liquids and have any questions, contact Ken Semel, Health and Safety, ext. 2531.

Loan Rates

The interest rates on loans obtained through the Princeton University Employees' Federal Credit Union were revised as of April 1.

Borrowers will be charged a 13.5 percent interest rate on unsecured personal loans and used car loans. A 13 percent interest rate will be charged on new car loans, where the maximum repayment period is up to three years. For new car loans, with a maximum repayment period of four years, the interest rate is 14 percent.

FHA home improvement loans will carry a 13 percent interest rate, while a 10 percent interest rate will be charged on loans in which a member's shares are used as collateral.

Loan protection life insurance is provided at no extra charge on loans of $10,000 or less, as is 100 percent disability insurance.

To The Editor Of HOTLINE

You have probably heard about that young Cro-Magnon man, who through a freak of Nature was able to come to Princeton recently. After trips to a

barber and the U-Store, where he picked up some clothes, he regularly walked on campus and attended classes. Nobody ever gave him a second look.

The whole thing is probably just a story, but it could have been true. The body has not changed materially from Cro-Magnon Man to Supermarket Man. As a result, we still have to abide by specifications that were promulgated 15,000 years ago. If we don't, we pay the penalty of faulty tissues, broken down organs and death itself.

Take smoking as an example. Cigarette smoking was not among the Mesolithic design criteria. If Cro-Magnon Man occasionally inhaled smoke while sitting at a camp fire, his lungs would suffer no permanent damage. Lung cells were continuously being replaced, with the worn out cells moved up and out by the cilia in the windpipe. A few extra cells due to smoke damage now and then would not overload the repair system.

The trouble with some modern individuals is that they believe the repair capacity of their own lungs is much greater than it really is. They ignore the amber and red lights past the point of no return.

The de Haas Rule of One Thousand

From 1972 to 1974, I performed studies (Transac. N.Y. Ac. J. of Sciences, Nov. 1974) which led to a rule for smokers as simple as Ohm's Law:

If the product of D and Y exceeds 1000, the individual runs a risk of 10% or more of contracting lung cancer (which in itself has a five-year survival rate of only 8%)

where D = the number of cigarettes smoked per day and
Y = the number of years that the person has smoked at the D level.

If the Smoking Product (DY) is less than 500, the risk of contracting the disease is vanishingly small.

The total Smoking Product is the sum of partial products to date. If somebody has smoked ten cigarettes per day for ten years and 20 for 15 years, the Smoking Product stands at 400. That individual would do well to allocate the last 100 units to the remaining years of the normal life span, which may mean cutting down to two or three cigarettes per day - or quitting altogether, whichever is easier to do.

Based on national statistics, between one and two people per year within the PPL family will break the One Thousand Barrier and get into serious medical trouble as a result. The PPL family is hereby defined as the 1200 staff members and their 3200 relatives, producing a population sample of 4400 with the standard age distribution.

Besides causing lung cancer, oversmoking also contributes to heart disease. However, the numbers cannot be formulated as clearly as in the D.Y. product above, except by stating that the number of cases of heart trouble due to smoking exceeds those of lung trouble. One might call that a negative bonus added to the rule of One Thousand.

PPL is fortunate to have a strong Safety group, which is augmented as needed by the zealous Plainsboro Fire Inspector. If those people find a circuit breaker for 300 MVA exposed to 310, or they notice that a fire lane is less straight than an arrow, they may close down an experiment or chase occupants out of the building - as they should. But they ignore the fires that burn less than 100 millimeters from staff members' lips, and rightly so, because those fires are not or not yet within their charter.

In a way, that is an inconsistency that costs us a few lives per year, every year. If the cause were anything other than cigarette smoking - say radiation exposure - OSHA would have shut down PPL a long time ago and we would all be looking for work.

I am very interested in getting a reaction from you and the readers of Hotline about what can or should be done about this inconsistency.

E. de Haas

ppl people

Farewell to a Friend

This edition of PPL PEOPLE is devoted to Millie (Willerton) Lefler. Millie recently retired from the laboratory, but we couldn't let her go without this fond farewell from her co-workers.

That most employees knew Millie was no accident. No matter how busy she might have been, Millie could be counted on for a helping hand or a sympathetic ear. She always knew what was happening throughout the lab, because she took a sincere interest in the people behind the projects.

Everyone was important to Millie. Her enthusiasm helped fire the enthusiasm of others, forging those she worked with (whether on the ERC, the SOSS, the picnic committee or PDX) into an effective team. Work was more pleasurable with Millie around.

Her thorough knowledge of the people and the past of PPL made it seem as if she'd been with the lab for years. Many people will be surprised to learn that Millie joined PPL as a research department project secretary in February 1975, followed by her promotion to office coordinator in October 1978.

But titles and dates aren't the way to measure Millie's impact on PPL. She touched a lot of people here, and we asked some of them to tell us about Millie.

Dale Meade (Head of Experimental Division): Millie came at a time when we were just starting PDX up, and she was a great help to us. She worked with Jim and me during this period, and her concern extended to the laboratory, to that program, and to Jim and me. When there was anything that needed doing,

she'd come in early or stay late. I never had to ask her; she came in on her own initiative.

She set up a number of committees, and got the bowling league going. She created a family-like atmosphere for us, and she was the glue that held it together. I think she did that for the entire laboratory too; in this spread-out place, she helped people come together and have some fun.

It's hard to come up with enough superlatives to describe Millie. She never gave us a day of difficulty; she was always working like mad here... Millie is extremely conscientious.

Millie is interested in the laboratory, not just as a job but as part of her life. She is certainly not the kind of worker who comes in from 9 to 5, just putting in time. She seemed to think of the laboratory as her home, her extended family.

Her biggest concern (when she was leaving) was what we were going to do to carry on; she was worried about the job, and about me. I can't say enough about Millie; I was extremely sad to see her leave.

Jim Sinnis (S-1): Mildred always hustles and bustles; she has to be busy. She'd always take on a great deal of work...Even when she went for a walk at lunch, she was picking up acorns, pinecones and dried flowers for her plaques and arrangements. She is a very dynamic individual.

Mildred is like the Royal Canadian Mounties -- she always gets her man. Once, when Dale was a meeting in Europe two or three years ago, something came up at the lab and we had to get in touch with him. Millie got hold of a program for the meeting, found out when the coffee break was scheduled, made allowances for the time differences, got a lab employee who spoke German to stand by in case she got a German operator, placed the call -- and within an hour, we were talking to Dale. Millie had gotten her man!

Dick Palladino (Experimental Group -- Laser Diagnostics): Millie is one of the best organizers to come along; she was more the den mother to our group than the secretary. She got along quite well with everyone.

Millie... took all the little burdens off people; she did a lot of things she didn't have to do, things that weren't in her job description. She really kept the machinery going!

Millie also has a maturity that you don't find in many people; she is a very stable person. She dug right in and got

to work. Many people want authority, but not the responsibility that goes with it, but Millie tended to go the other way -- a refreshing change.

She was always a bundle of energy. Her natural pace is to go full speed ahead... She has more imagination and ideas than one person can exploit in a lifetime.

(Although she's only been here since 1975), she carried the impact of someone who'd been here for 15 or 20 years. She certainly blessed a lot of us!

Dick Holzbaur (Laser Lab): We swapped ideas, and talked about various kinds of crafts. She was always our 'informant'; since she left, we don't know what's going on around the lab. I hope they can send us another one like Millie!

Howard Holzbaur (Laser Lab): Millie was one of the nicest gals I ever met. If she could do a favor for you, she'd do it without batting an eye. She helped everyone; I guess she just liked people. She organized just about everything that went on here.

She was interested in everything that was going on. She gave everyone a lift just to see her; she'd always pick you up, not push you down. We liked her over here, and she's always welcome in T260. In fact, we'd be mad if she came back and didn't come to see us!

Millie's a well-liked individual; I don't think there's anyone who can say anything bad about her. She's gonna leave a big gap in this organization. We miss her candy jar -- but not as much as we miss Millie herself.

Bernie Giehl (Picnic committee member, 1979-80). Millie really entertained the kids at the picnic. She worked hard to keep them amused...she was there when the gates opened, and she circulated through the crowd the entire day. Millie was one of the outstanding members of the committee; she worked very hard organizing things, and she also served as secretary for the committee.

Mary Ann Brown (Chairman of the SOSS during Millie's tenure): As chairman of the Secretarial and Office Support Staff, I had considerable contact with Millie regarding meetings and SOSS programs. Millie was always very enthusiastic -- most helpful and always cheerful.

Sara Paterson (ERC secretary): Millie... was especially looking out for secretaries' rights. She organized the typing course here...She also started the women's bowling league by contacting the alleys, organizing teams, holding meetings, persuading the lab to donate a team trophy, and organizing the awards banquet.

Mary Alice Eubank (President, women's bowling league): Millie started it all (the league), and provided the impetus for us. Every week now, we have a good time because of her.

I'll miss Millie's supply of information and knowledge; I depended on it to help me do my job. She is one of the best secretaries around; she is very interested in the laboratory, and she took her job seriously. And personally, she's a neat person!

Chris Ritter (Alleycat Captain): We were on the same bowling team, and... Millie helped us keep our sense of humor. When things were going badly, and we weren't bowling our averages, she told us to "kiss the ball" so we'd get a strike or a spare. And surprisingly, it often seemed to work!

Ilse Gusciora (Travel Services) When (the women's bowling team) started, we were all "green", and Millie was very patient with us. We all grew with the league, and it's been running smoothly ever since. We won't forget who got us started, and I'll miss Millie. She is very vivacious, and has a lot of enthusiasm.

Debbie Anastasio (Photo Lab): Millie gave me lots of confidence I didn't really have when I started here. I appreciate everything she did for me; she's always been really nice...she always went out of her way to help you, to get things done for you. If you needed anything, you just had to ask her. She always had something nice to say; I never heard her say a bad word about anyone.

Gloria Pokwrya (Millie's replacement in PDX): When I first came here, I was a Kelly Girl, and I had never done technical typing before... Millie... really taught me everything I know today about technical typing.

Everyone is familiar with Millie's creativity, her arts and crafts. In fact, Millie had tried to form an arts and crafts club here at work, where everyone would have the opportunity to display their arts and crafts in the cafeteria.

She always told me she tried to do one kind thing every day. She was also a confidante of some of the people here, and anything they told her was always held in strictest confidence.

She was the dynamo that kept PDX going in its early days...I've never seen anyone work as hard as Millie -- she never sat down!

Sandy Dreskin (chairman of the ERC Committee during Millie's tenure): Millie is the type who tried to get involved, who is extremely sincere in her efforts to help. She did whatever she could to smooth out the daily problems that popped up in the laboratory. She could sense when things needed to be changed, and she tried to improve them.
She has a much greater sense of civic duty than most employees here...Millie recognized problems, and attempted to solve those problems without being abrasive or offensive...she is an active member of the ERC.

She felt we needed to help the secretarial people, and provide an opportunity for the secretaries to improve their skills. She was involved in starting courses for technical typing, and in any number of other programs on the committee. She always helped out...she is a nice lady!

Betty Cary (Experimental Group): Millie is such a warm, considerate, understanding person. She helps others without taking any credit herself, and she's

got such a sparkling personality! When she bought "Bingo" (the monkey puppet she used at last year's picnic) in San Francisco, she put on a show for the children on the plane coming back!

I think Millie loves and enjoys every minute of life. She also loves flowers, and has beautiful roses in her yard. I think I'll miss picking her up in the morning and evening, never knowing what... I never knew what I was going to be lugging home or bringing in with me for Millie.

Sallie Young (Applied Physics Division): I met Millie when I started to work at the lab, some six and a half years ago. I think we started within a few months of each other. Our careers took vastly different paths, however, as... Millie plunged into the turmoil of helping PDX get off the ground.

What a time that was for her! I recall I would see her on my infrequent visits to C-Site, almost always trying to track down an elusive physicist late for a meeting.

I have always felt that Millie embodied what some people have left behind, in that she was constantly willing to help in any way she could with any project, always with a cheerful heart and a sunny smile.

Gloria Pollit (Former Captain of the Alleycats, Millie's bowling team): Millie is so helpful and enthusiastic, at work at the lab as well as in personal contact with her. She's thoughtful, and always willing to help...I haven't had a great deal of contact with Millie at work, but any contact I have had with her has been a pleasure!

"MILLIE"

Though to some it sounded silly
She would answer "This is Millie"
When you dialed Dale Meade's number on your phone.
With her manner light and airy,
She's a perfect secretary
She puts you at ease and makes you feel at home.

If you needed a suggestion,
Or an answer to a question
A call to Millie got results without a story.
We all know she wasn't fired
It's just that she's retired
And for sure we'll miss her at the laboratory.

A better friend you could not find,
She was gentle, warm and kind
And with those with whom she worked, she sure was fun.
Now she's walking down new paths,
Working on her arts and crafts
Hope her future days are bright. This poem is done.

"A Friend"

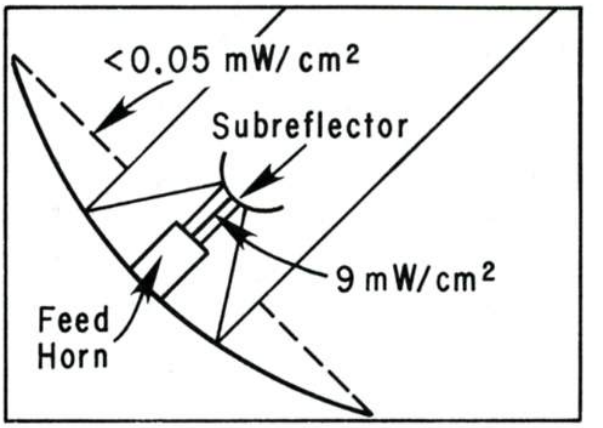
The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 14 May 4, 1981

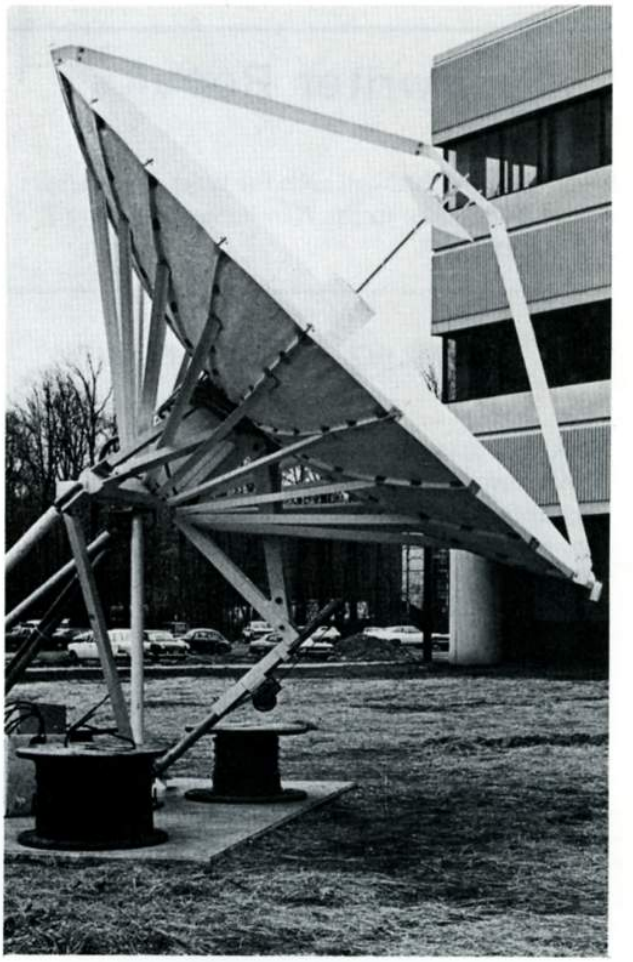
Antenna Survey



An initial microwave radiation survey of the two new antennas for the laboratory's satellite data link was conducted by Health and Safety on the evening of April 10. The system was operating at its expected power output of one watt.

A measurement was made between the output of the feedhorn and the subreflector (see diagram), an area not normally surveyed. The maximum power density in this region was 9 mW/cm^2.

At the plane of the dish (see diagram), the levels were below the detection levels of the measurement instruments (less than 0.05 mW/cm^2). Since the maximum predicted level in this near field was 0.02 mW/cm^2, Health and Safety is confident that any area accessible to PPL employees will be far below 0.01 mW/cm^2, the most conservative standard for continuous exposure.



At the edge of the antennas, as pointed out in a recent Safety session, the power densities are calculated to be less than 0.0002 mW/cm^2 for a one watt transmission.

Health and Safety will continue to do periodic surveys of the antennas as part of its inspection and monitoring programs. Special surveys will be conducted if operating parameters change. A fence will also be installed around the area to eliminate the attractive nuisance hazard (the temptation for anyone to climb on the antennas).

Employees requiring further explanation of these antennas from a safety standpoint are encouraged to contact the Health and Safety office at ext. 2526.

Dance Class Begins

All PPL women employees are invited to join their co-workers in toning their muscles to music in the lab's new jazzercise/aerobics dance class.

Classes, which will run for at least six weeks, began April 21 and will continue every Tuesday and Thursday in the LOB Commons. Classes are held from 5 to 6 p.m.

The sessions will cost less than $20, depending on the number of registrants. Participants should bring comfortable clothing and a mat to class.

For further information, contact Helen Pesce at ext. 2462 or Shirley Owens at ext. 3711.

Typewriter Repairs

Effective April 20th, all calls for typewriter repairs should be directed to the Warehouse Receiving 3 Office, ext. 3396.

Award Winners

Mark and Brian Brown, the sons of PPL's Mary Ann Brown, won a number of awards in the 29th annual Greater Trenton Science Fair. The event, sponsored by the Trenton Engineers' Club and The Trentonian, was recently held in the War Memorial Building in Trenton.

Mark, a junior at Notre Dame High School, entered a project entitled "Measuring Molecules Using the Langmuir Molecular Film Balance." The project received first place awards from the Junior Engineering Technical Society, the New Jersey National Bank, and the National Council of Mathematics. It also took second place in the Senior Physical category, and won additional awards from NASA, the Air Force and the Navy.

Mark Brown, who recently received a number of awards in the Greater Trenton Science Fair, poses with his mom, Mary Ann Brown (right) and his science teacher, Richard Gusciora (left).

Mark, 17, plans to major in engineering when he enters college. His hobbies include science, jogging, bike hikes, golf, flying model airplanes, fishing and water skiing.

Brian, a 12-year-old sixth grader at St. Paul's School, entered a project called "Surface Tension Experiments" in the science fair. The project received a first place award in the Elementary "A" Division, a third place award from the Junior Engineering Technical Society, and the Pitman-Moore Award.

Brian, who also plans to attend college, shares most of his brother's interests. Both boys are also accomplished organists, according to their proud mom.

Thank You

Employee Relations Supervisor Len Thomas expressed special thanks to George Clark, Jack Haggerty, Gerry Hart and Ed Gilsenan for their assistance in preparing the garden areas for use this year. "The speedy manner in which they performed their tasks has given our growers an early planting season," Thomas added.

Seminar Slated

Roberta Gernhardt from the main campus Personnel Office and Don Betterton, director of undergraduate financial aid, will present a seminar on "Financing Children's Education" in the M.B. Gottlieb auditorium.

The seminar, which will cover University-provided benefits and other financial sources available, will be presented May 19 for employees whose last names begin with A through M. Employees whose last names begin with N through Z should attend the May 21 session.

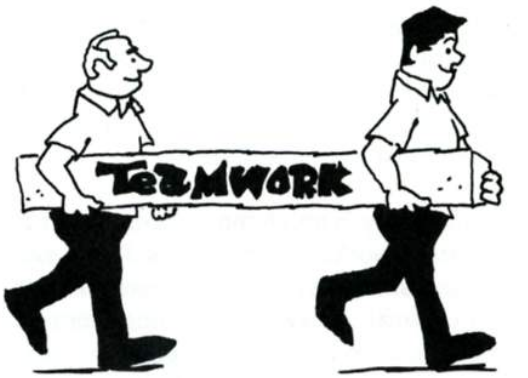
Both sessions will be held from 3 to 4 p.m. in the auditorium.

Getting A "Lift"

To be sure lifting and carrying doesn't become a real pain, follow the simple safety guidelines listed below:

Before lifting, consider the load's weight, size and shape —— and your ability to handle it. Then step close to the load, placing your feet 8 to 12 inches apart for good balance. Bend at the knees, get a secure handhold on the load, and lift straight up using leg and back muscles. Keep the load close to your body as you lift it into carrying position. Reverse the procedure when setting the load down.

Be sure to turn by moving your feet while carrying the load, avoiding twisting motions that may cause back injuries. Strain can also be eliminated by storing heavy objects at least 12 inches above the floor, and by using a ladder rather than chairs or stacked boxes to reach overhead objects. And when stacking objects to be lifted, make sure your view will remain clear while you're carrying them.



Teamwork counts when two people are lifting and carrying, especially in the case of a long object. Make sure the load is evenly distributed, and coordinate lifting and turning motions. The load should be held on the same side of the body at the same level for both people carrying it.

Art Exhibit

An overview of contemporary North Carolina art is currently on display at The Squibb Gallery. The exhibition will continue until May 27.

Works represented in "The Art of North Carolina" were selected by a jury of North Carolina Museum of Art staff members. The works of 30 artists are displayed, including pieces by George Bireline, Peter Plagens, Robin Lehrer, Frank Faulkner, Maud Gatewood and McDonald Bane.

The Squibb Gallery is located in the world headquarters of E.R. Squibb & Sons, Inc. three miles south of Princeton on Route 206. Gallery hours are 9 a.m. to 5 p.m. Monday through Friday, with hours extended to 9 p.m. Thursday. Weekend hours are from 1 to 5 p.m.

Great Adventure Tickets

The Employee Relations section has recently acquired free family discount tickets from Great Adventure. If you are interested, stop by the Personnel building, B-Site, and pick up your ticket.

Obituary

Ridgeway L. Challiner, 73 of Trenton died April 23 in Mercer Medical Center. Born in Trenton, he was a lifelong area resident. Mr. Challiner worked in the PPL Vacuum Shop, and retired in 1970 after eight years of service.

To The Editor Of HOTLINE:

It was said recently that TFTR had better work, or the Federal government would want our heads on a serving tray. One might add that if such a general disaster were due to erroneous operation of a minor subsystem, the lead engineer would be keel-hauled and quartered besides.

The human body is much more complicated than TFTR, but it works surprisingly well —— except that we sometimes let it go to pieces through failure in a small subsystem. An obstruction of less than one gram in one of the coronary arteries can ruin a body weighing 100,000 times as much.

Sadly enough, this operational error occurs frequently. Some 120 of the present PPL staff may die from it prematurely (before retirement age) unless something is done. That 'something' requires no new research, simply an application of what has been known for a long time.

Figure 1 is a mechanical engineering view of the cardiac system. The two main arteries sit on top of the heart, and from a distance they look somewhat like a crown (hence the name coronary arteries). They are the first taps off the aorta and conduct blood to the heart muscle itself, taking about 5% of the total blood flow in the body. They are of fairly small bore but short, making the pressure drop minor and the blood flow adequate. If the owner of the heart is exerting himself, the heart will pump faster and the heart

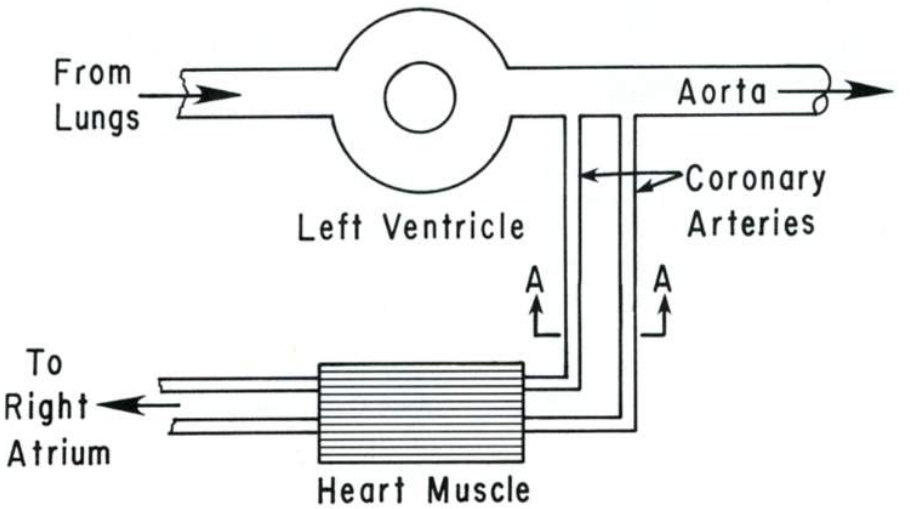


Fig.1 THE HEART AS A PUMP–PARTIAL AND SCHEMATIC

muscle will need more blood per unit of time. The system is designed so that normally there is always sufficient blood for the heart muscle's own use.

When the owner of the heart gets older (i.e., above 20), tiny deposits may form on the inside of numerous arteries, gradually obstructing the flow. This is particularly undesirable in the coronary arteries, because of their small bore and their important function in the body. But since they are located at the point of highest pressure in the system and the deposits are local, the pressure drop is manageable and the blood flow remains ample. The owner is seldom aware of the deposits, even if they get as extensive locally as shown in Figure 2B.

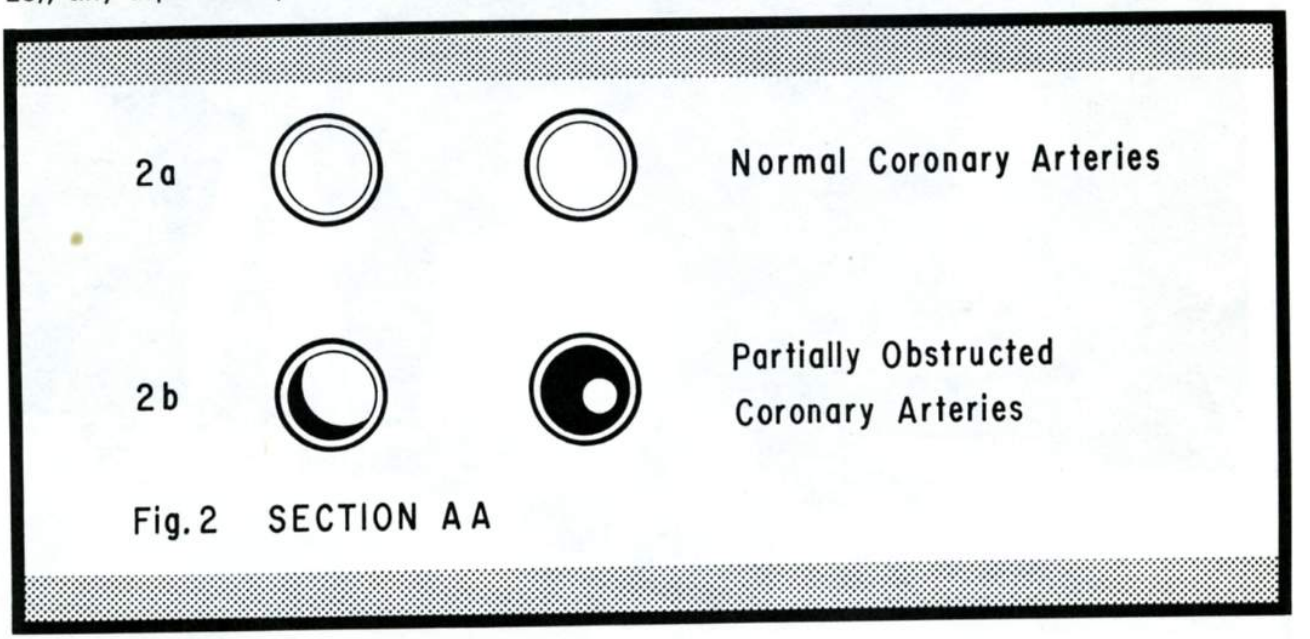


Fig. 2 SECTION A A

On a bad day, a small clot may become lodged in an obstruction and interrupt the flow completely. The technical term is *ischemic heart disease:* the common word is heart attack. It can be mild (meaning that the patient recovers) or of the other kind. The prognosis depends in part on the location of the blockage: the further downstream the better, because less of the heart muscle is affected.

A patient who has recovered from a heart attack can often go back to work, even very demanding work. LBJ had a heart attack in 1955 and was President of the USA from 1963 to 1968. But the underlying cause of the disease is not eliminated after recovery: the deposits, once formed, do not disappear. One may just hope that actual conditions for a blockage will be few and far between. A radical improvement can come from surgically cutting out the offending tube and replacing it by a healthy one at a cost of $10,000 and upwards.

Angina is an intermediate situation where the pressure drop across the narrow artery becomes too large and the blood flow becomes insufficient, although there is no complete blockage. Relief follows engineering rules: take a rest to reduce the demand on the system and take medicine to widen the arteries. Avoid smoking, because nicotine has the opposite effect: it causes the arteries of the body (including the coronaries) to constrict.

Since I started at PPL the year before last, I have noticed a sizeable number of skilled technical people (among them a number of highly respected colleagues) who have behaved as if the laws of physics, mechanical engineering and fluid flow apply to TFTR and everything else —— except to their own internal piping system. The human body is too complicated, they say, and besides, blood is not a Newtonian fluid, so why worry?

I hope to give some practical suggestions in rebuttal in another letter to the Editor.

E. de Haas

Graphic artist Jerry Motyka, his wife Lorraine, and laboratory director emeritus Melvin B. Gottlieb share a chuckle while reminiscing during Jerry's retirement dinner recently. Jerry, who retired after 23 years with PPL, received a hand-made card commemorating his artwork, and a gift certificate for art supplies.

Electrical Fire Rules

PPL Fire Chief Jack Anderson offers these guidelines for dealing with a minor electrical fire:

If an electrical appliance you are using emits a burning odor or begins to smoke, turn it off *immediately* and pull its plug from the electrical outlet. DO NOT attempt to use the appliance again until repairs are made.

An appliance on fire is also an electric shock hazard. DO NOT touch the appliance. Attempt to extinguish the flames with a dry chemical or carbon dioxide (CO_2) extinguisher; DO NOT ATTEMPT TO EXTINGUISH ELECTRICAL FIRES WITH WATER!

Remember to pull the appliance's plug from the electrical outlet. If this is not possible, turn off the electricity at the main power switch (the circuit breaker or fuse box).

If you receive a shock from an appliance, immediately remove the plug from the electrical outlet. If the appliance is small —– an iron, toaster or mixer, for example —– attach a tag saying "Don't Use – Shock Hazard" to the plug. Then store the appliance away so no one else will attempt to use it until it has been repaired.

For large appliances, contact your repairman promptly.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Volume 2, No. 15 May 19, 1981

PPL Information Meeting

An overview presentation of research and technology at PPL will bring approximately 150 guests to the laboratory for an Information Meeting Wednesday and Thursday, May 27-28. Talks, exhibits, tours, and demonstrations will fill the two-day program for delegates from other fusion laboratories, industry, universities, and government.

This Information Meeting is viewed as an important means of keeping the fusion community aware of PPL's progress. It is the second in what is expected to be a continuing series. The first was held May 9-10 of 1978.

When you come to work on Wednesday, May 27, you will find guards stationed at strategic points. Proceed towards your regular parking place; if it is full, the guards will redirect you.

The meeting will begin with a series of general-interest talks Wednesday morning in the Melvin B. Gottlieb auditorium. On Wednesday afternoon, separate parallel sessions will address the more specialized interests of physicists and engineers. There will be tours for the engineers on Wednesday afternoon. A reception is scheduled from 6 to 8 p.m. at Prospect. Thursday will feature general tours plus a total of 77 poster exhibits displayed on all three floors of the LOB.

While we would like to invite all interested PPL staff to the auditorium sessions, it is obvious that our out-of-town guests have first call on the limited seating. Auditorium session and reception tickets for PPL employees will be available through departmental offices.

All interested staff members are cordially invited to visit the poster sessions during the meeting. In order to minimize crowding, staff members should try to schedule their visits on Wenesday or between noon and 3 p.m. Thursday.

At 12:45 on Wednesday (if we keep to schedule), about 285 hungry people will come out of the Melvin B. Gottlieb auditorium and head for the cafeteria. To cope with this problem, the organizing committee asks that regular users of the cafeteria plan to FINISH lunch a little before 12:45. The cooperation of all supervisors in rescheduling lunch hours on that day will be appreciated.

PLEASE NOTE:

Cafeteria Hours Changed

In order to accommodate visitors during the upcoming information meeting at the laboratory, the C-Site cafeteria will open for PPL staff at 11:15 a.m. and close at 12:45 p.m. May 27. Employees are requested to arrange for an earlier lunch on that day.

Appointment Announced

Professor Thomas H. Stix has been appointed Associate Chairman of the Department of Astrophysical Sciences at Princeton University. Professor Stix's responsibilities will be in the department's plasma physics program, where he will continue to serve as Director of Graduate Studies.

Dr. Stix succeeds Professor Melvin B. Gottlieb, who had held the post since 1967.

PPL Annual Picnic

The annual PPL Picnic is scheduled for June 20 from 1 to 8 p.m. Further information on the picnic will be announced in upcoming issues of the HOTLINE.

Help Available

Employees with questions about Blue Cross, Blue Shield, Major Medical and the filing of claims can get help from Eleanor Schmitt. Eleanor is available for consultation each Wednesday morning from 9 a.m. to noon in Room B-336A, LOB. She will be on vacation May 20 and 27.

Missing

LOST — A pink coral ring, left in the Theory Wing ladies' room. Great sentimental value. Please return to S. Bayer, Module II. No questions asked.

Ice Cream Truck Regulations

As we move toward the hot days of summer, PPL fire chief Jack Anderson reminds laboratory motorists that new state traffic laws are now in effect regarding ice cream trucks.

The new regulations require ice cream vendors to display flashing red lights (similar to those used on school buses) on the front and back of their vehicles when stopped to sell ice cream. A stop signal arm equipped with similar warning lights must also be extended from the left side of the truck.

Drivers approaching or overtaking a stopped ice cream truck must come to a stop, then proceed slowly past the truck. Motorists need not stop, but should proceed with caution when approaching an ice cream truck on a divided highway.

Violators of the new law are subject to a fine of up to $100 for each offense.

Nursery School

Classes are filling now for the 1981-82 school year at the University League Nursery School, 171 Broadmead, Princeton.

The co-operative school offers classes for three to five year old children. Classes meet three, four or five mornings each week from 8:45 to 11:30 a.m. An optional two, three, four or five day non-co-op extended day program is also available from 11:30 a.m. to 1 p.m. Children bring their own lunches and enjoy a relaxed meal and after-lunch activities.

Since the school is organized on a co-operative basis, parents have the opportunity to contribute their own special talents, both in the classroom and in the maintenance and running of the school. Parents are welcome to visit during the school day to observe classroom activities.

Admission is open to both university and non-university families, and scholarship aid is available. To arrange a visit, or for more information on the remaining openings, call the school at 924-3137 or Lynn Geison at 921-6157.

Season Passes

PPL employees ready for a Great Adventure can purchase discount season passes to the Great Adventure amusement complex through the Personnel Office. The passes (which cover unlimited season admission to the safari park, the amusement park, and all shows) are available for $34.95, a five dollar savings, if purchased before May 31.

Further information and applications for the season passes are available in the B-Site Personnel Office.

Tennis Picnic

PPL tennis buffs can get their tennis elbows in shape for the season while enjoying a day of family fun at the second annual PPL Tennis Picnic, set for May 30 at the Princeton University tennis courts.

The picnic offers players the opportunity to meet each other on a competitive basis. Tournament entrants will be assigned to one of four teams, representing the Theoretical, Experimental, Engineering and Administrative areas of the lab. An effort will be made to match players of similar ability.

Each entrant will play two singles matches and one doubles match during the event. Each match consists of a 10-game set; if a match is incomplete at the end of its one hour time slot, the player ahead

at the end of the hour will be declared the winner. Singles matches will be played in the morning and early afternoon, and will be followed by the doubles competition.

A picnic lunch will be provided, with a barbecue for players and their cheering sections beginning at 11 a.m.

The Tennis Picnic is open to all lab employees and their families. To enter the tournament, fill out the attached form and return it to Marilee Thompson (A-133, C-Site) or Masaaki Yamada (L-225, C-Site) by May 27. Each entrant must bring four dollars and a can of new yellow tennis balls to the tournament. A tentative playing schedule will be posted on the central bulletin board at C-Site on the Friday preceding the tournament.

The rain date for the Tennis Picnic is May 31.

Tennis Picnic Entry Form

Name: _____

Mail stop: _____

Phone: _____

Times you can/cannot play: _____

To The Editor of Hotline

Most people at PPL will probably divide their life roughly in quarters: one quarter to prepare for a career, two to practice it and one to enjoy the fruits of it. Many personnel policies reflect that norm.

It is sad to note, though, that based on national statistics, some 120 present staff members may be called out in the third quarter, due to tiny obstructions in the coronary arteries. When I mentioned the number 120 in an earlier letter to the Editor, one reader said it gave her the creeps. She inquired if there was anything one could do to reduce the incidence of heart attacks.

Fortunately, the answer is yes. Although Americans probably spend more money per capita on health care than anybody else, the national statistics of many other countries are better than ours. For example, in a laboratory identical to PPL but located in Greece, the above number of premature coronary deaths would be 30 instead of 120.

A logical first step towards the reduction of premature heart attacks would be to ask all PPL staff to have a chest X-ray. After all, chest X-rays have contributed significantly to a reduction in tuberculosis and other serious lung problems. Unfortunately, the same technique cannot be used for cardiology diagnostics since there is too little contrast between obstructions and normal artery tissues.

A second suggestion would be to inject iodine in the bloodstream prior to the X-ray. The blood in a healthy coronary artery would show up as a line of uniform width, while obstructions would cause the line to be narrower in spots. The idea works only if the iodine is injected directly into the heart immediately before the photograph is taken, and that requires that a catheter be inserted in an artery in the arm and pushed up to near the heart. An incision in an artery (on the high pressure side of the blood stream) is not a trivial procedure. That, coupled with the $1,000 plus price tag, make coronary X-ray impractical for general diagnostics on individuals who otherwise appear healthy.

Since direct measurements are rather difficult, indirect methods are called for. Studies have been done on large groups of people who have stayed in one place for decades. Examples are the studies on about 5000 inhabitants of Framingham, Mass., which started in 1948; on railroad workers in seven countries; and on patients in two Finnish mental hospitals.

Several conditions each seemed to add a few per cent to an individual's chance of getting a heart attack in the future. These so-called risk factors were found to be progressively additive, meaning that a person with more than one risk factor carried total odds higher than the sum of the individual odds for each factor.

The chart lists the risk factors that have been indicated to-date. The first five are not controllable; the other six are. The numbers in the first

column on the right represent a man in his early fifties. Four near relatives and the man himself have had heart trouble before. His odds of having a heart attack in the next six years are 14:100.

If this same man had kept four risk factors under control for the past several years, as indicated in the column on the far right, his odds would now be 5:100.

If one assumes for the sake of argument that the staff at PPL contains one hundred members who are in roughly the same situation as this sample individual, then a shift in their controllable risk factors could save nine heart attacks (four to five deaths) in the next six years. That is worth thinking about.

E. deHaas

THEORY ON HEART ATTACKS
SAMPLE APPLICATION OF THE RISK FACTOR

Risk Factors		Values for a Sample Individual	
		Present	Improved*
1.	One or more near relatives has had a heart attack	4	4
2.	The individual is a male	Male	Male
3.	Age (risks increase with age)	51	51
4.	Previous heart trouble	Yes	Yes
5.	Diabetes	No	No
6.	Elevated systolic blood pressure	140	130
7.	Elevated blood lipid (fat) count (Unit: mg/100ml)	320	260
8.	Smoking	10/day	0
9.	Overweight	10%	0
10.	Little exercise**	Projected risk of a heart attack	14%	5%
11.	Rushed life**	in the next six years.		

*See Text

**Item 10 and 11 are believed to contribute to the rate of heart attacks, but numerical data are not sufficiently well established to include them in the above chart.

Seminar Slated

Roberta Gernhardt from the main campus Personnel Office and Don Betterton, director of undergraduate financial aid, will present a seminar on "Financing Children's Education" in the M.B. Gottlieb auditorium.

The seminar, which will cover University-provided benefits and other financial sources available, will be presented May 19 for employees whose last names begin with A through M. Employees whose last names begin with N through Z should attend the May 21 session.

Both sessions will be held from 3 to 4 p.m. in the auditorium.

SOSS Party

A party, sponsored by the Secretarial and Office Support Staff (SOSS) to celebrate National Secretaries' Week, was held in the cafeteria April 24.

The party honored those PPL employees "who make good sense out of nonsense," according to laboratory Director Dr. Harold Furth. Dr. Furth added that the laboratory secretaries "make this whole enterprise work. . .we keenly appreciate what you do."

During the entertainment portion of the party, Dee Hurley sang a song she composed in honor of secretaries. SOSS chairwoman Flo Short then presided over a drawing for several hanging plants. Winners included Mary Dyson, Joyce Lafharis, Helen Livernoche and Linda Sue Wilkinson. The SOSS also presented a plant to the cafeteria staff for catering the party.

The event was organized by party chairwoman Anne Golden, with help from co-chairwoman Ann O'Day.

Holiday Schedule

Lab employees will enjoy a total of four four-day weekends under the 1981-82 holiday schedule recently announced.

Holidays include Thanksgiving and the day after (November 26 and 27); Christmas Eve and Christmas Day (December 24 and 25); and New Year's Eve and New Year's Day (December 31 and January 1). July 3, September 7 and May 31 are also on the holiday schedule, as are two additional optional holidays.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Communications Office, Module 2, C-Site, James Forrestal Campus, ext. 2754.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Volume 2, No. 16 June 12, 1981

Appointments Announced

Two subcommittees that will investigate energy conservation schemes have been established by the Energy Administration Committee, according to committee chairman Robert Gulay.

Ramon Pressburger has been appointed vice-chairman of the In-House Energy Awareness Subcommittee, with Larry Holpp serving as public relations officer. Other members of the committee include Mary Ann Brown, Captain Robert Goodwin, Mary Ann McBride, John Hirthler, Carl Jones, William Walker, Joseph Wood and Pat Zeedyk. The committee is responsible for developing, organizing, implementing and monitoring the in-house energy awareness plan for PPL.

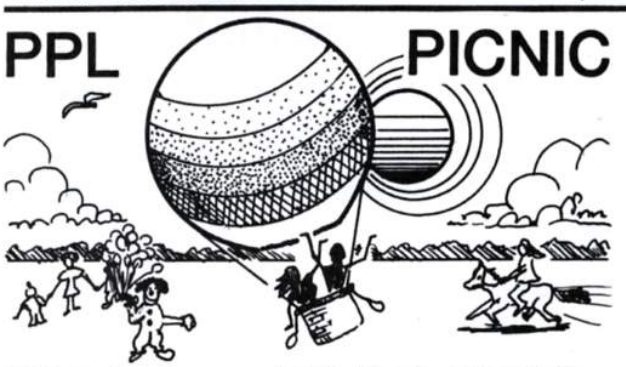
A parallel group, the Electric Power Subcommittee, has been charged with developing, organizing, and implementing energy conservation methods to reduce the laboratory's energy bills. David O'Neill serves as vice-chairman of the committee, whose members are John Edwards, Don Harnsberger, Richard Farley, Marvin Richey and Richard Terhune.

The group is currently identifying locations throughout the laboratory for installation of metering equipment. Power consuming points and equipment will also be established, with strategies devised to control power usage.

The Energy Administration Committee, consisting of John Edwards, Ray Pressburger, David O'Neill and Don Harnsberger, will supervise and administer related energy conservation projects. The committee serves to aid the two subcommittees in furthering their projects.

Conrad Stout and Frank Fumia are observing management coordinators for the administrative committee. Gulay, chairman of the administrative committee, is also chairman of the two subcommittees.

The energy conservation program, a pilot program at PPL, is required by the DOE. Its purpose is to develop energy conservation attitudes in PPL staff.



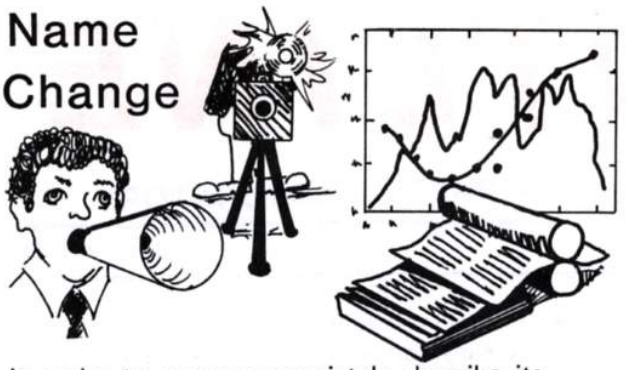
Tickets for the annual PPL Picnic, which will be held June 20 from 1 to 8 p.m., are on sale at the C-Site reception desk through June 18. Ticket prices are five dollars for adults and children 11 years of age or older. Children under 11 will be admitted free.

This year's edition of the picnic will feature a hot air balloon on a weather permitting basis, pony rides and a fish pond for youngsters, and hay rides. Games scheduled during the afternoon include an egg and balloon toss. Dinner, which will be served from 3 to 6 p.m., will include a picnic menu, beer and soda.

In accordance with the laboratory's DOE contract, the PPL picnic is limited to the PPL "family". Single employees may bring a guest, and married employees may purchase tickets for their spouse and their children. Unauthorized guests will be refused admittance to the picnic.

If you did not fill out a request form, you may still purchase tickets.

Name Change



In order to more appropriately describe its functions, the name of the Communications Office has changed to Information Services, effective June 1.

The Information Services branch is composed of the Photographic Services section, headed by John Peoples; the Graphics Services section, headed by Bernard Giehl; the Printing Services section, headed by George Geherty; and the Public and Employee Information section, headed directly by Anthony DeMeo, Manager of Information Services.

Call For Conservation

A single telephone call recently saved the laboratory approximately $13,000 in additional electric bills.

According to Robert Gulay, chairman of the Energy Administration Committee, PPL power demand was heading toward an all-time peak in mid-May. Marvin Richey of the M-G Room noted the rise, and called Plant Maintenance to advise them of the situation. By shutting off space cooling chillers amounting to 1,050 horsepower, the demand rise was significantly curtailed.

Gulay commended Richey's action and urged other PPL employees aware of high power load or energy wasting situations to call him at ext. 3255.

HOUSE FOR SALE——Two story colonial, four bedrooms, full basement, attic storage. Walking distance to PPL. Oil heat, 2½ bath, two-car attached garage. City water and sewer; redwood deck off family room. Price $115,000; availability negotiable. Call Russ Sinclair, 799-2297, after 5 p.m.

Tennis Tourney Results

The Administrative team emerged victorious at the conclusion of the second annual PPL Tennis Picnic, held May 31 at the university tennis courts.

All participants in this year's tourney were assigned to one of four teams. In the first set of matches, the Experimental physicists trounced the Theorists, while the Administrative team squeaked by the Engineers. In second round play, the Administrators overcame the Experimentalists to take the top tournament spot.

Members of the Administrative team included John Edwards, Chris Gillars, Simon Stonescu, Joe Winston, Diane Carroll, and Bob and Marilyn Middlebrook.

Guinea Pigs

Meg Gilbert, Employee Relations secretary, raises guinea pigs as a hobby. She usually sells the young to pet shops, but she prefers to place them "among friends." Guinea pigs are friendly, talkative, and odorless. They make excellent pets for responsible children age seven and up. Currently, Meg has a frisky litter of six available for adoption. If anyone is interested, please call her on ext. 2036.

FOUND — An article of feminine jewelry. To claim it, call Security at ext. 2893 and describe the article.

PPL Softball

Despite a recent 10-1 loss to the Carter Wallace team, the PPL softball squad has compiled a 3-1 record in the Princeton Industrial Softball League. The team is composed of 20 laboratory employees, and plays Tuesday evenings at 5:45 p.m.

The squad still has the majority of their 18-game season ahead of them, and spectators are urged to attend games to cheer the team on. Season schedules are posted at each of the stockrooms, with "home" games played on the softball field near the airstrip.

For further information on the team, contact Tom Holoman at ext. 2748.

Storm Warnings

Thunderstorms are one of nature's most powerful forces, one that can easily turn deadly when accompanied by lightning. PPL Fire Chief Jack Anderson offers the following tips to avoid storm danger:

If you are indoors during a thunderstorm, stay away from doors, windows and fireplaces; these things create a pathway that might attract lightning. Also avoid radiators, stoves, sinks, pipes, and electrical appliances, which act as conductors if lightning strikes. Remove the plug and antenna wires from your TV set, and don't use electrical appliances or telephones.

A thunderstorm is no time to take a bath! A single lightning bolt carries a charge of over one million volts. Even a lightning strike on a household water main could transmit current through the water pipes, causing electrocution.

If you are caught outdoors, don't stand near the highest object in the area, since it will act as a natural lightning rod. Don't become the highest object, either: crouch or lie flat, and avoid touching any metal objects. If you're at the seashore, get out of the water or off small boats and into a car or a building.

If your skin tingles or your hair stands up, drop to the ground immediately —— these are signs lightning may be about to strike you.

Persons struck by lightning carry no electrical charge, and can be handled without fear of shock. Persons "killed" by lightning may be revived by immediate cardiopulmonary resuscitation (CPR).

Information Meeting

PPL played host to 137 representatives of industry, government, other laboratories and universities during its May Information Meeting. Participants were brought up to date on the laboratory's progress, and toured PPL facilities during their two-day stay.

A number of posters, highlighting various facets of PPL's program, were on display during the meeting. Information Services is interested in preserving many of these posters for installation as permanent wall displays throughout the laboratory. Participants who displayed posters are asked to contact Information Services at ext. 2751.

The meeting was organized by PPL Assistant Director, Earl Tanner.

ppl people

NO OPTICAL ILLUSIONS FOR PALLADINO

Dick Palladino is keeping busy these days, trying to improve the fiber of the laboratory. Dick, who came to PPL in July 1955, is a project physicist currently working on the use of fiber optics for TFTR.

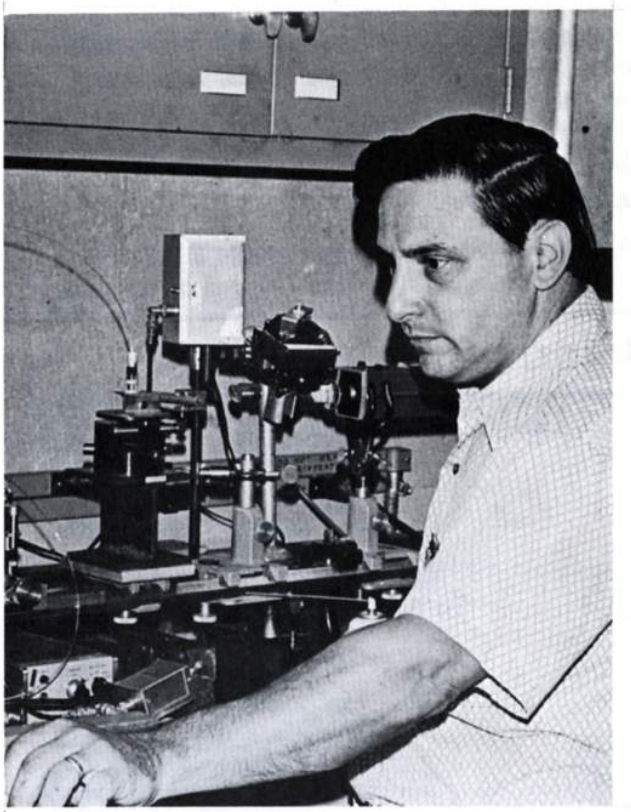
Fiber optics involves the transmission of light through thin strands of plastic or glass. Light moves down the fiber's length, "bouncing" along in a richochet pattern by reflecting from the fiber's surface.

Dick's work, in addition to the fiber optics program, at present involves optical calibration of various pieces of diagnostic equipment. "Traditionally, the Bureau of Standards rated detectors on how sensitive they would be to a given quantity of available light. We are purchasing equipment to establish that capability ourselves."

The fiber optics project is in the developmental phase. "Fiber optics is a huge field," according to Dick, "so we've had to define specific areas for our research." The investigation centers on taking light from one place (near an operating tokamak) to another place (a spectrometer) very efficiently.

The fiber bundles are instrumental in the use of the TV Thomson Scattering diagnostic. A laser beam passing through the plasma is scattered by the plasma particles. The light is then transmitted through fiber optic cables to a spectrometer, where the width of the spectra lines is analyzed. The data from the spectrometer is presented to a TV camera tube, which digitalizes and displays it on a TV camera. The fiber optic component of the process is "one little link in the chain," according to Dick.

Fiber optics can transmit the light in digital signal form, and can eliminate the "static" or "noise" that might occur with electrical conductors. Light



from the plasma is detected as a pulse and transmitted along the fiber bundle through various lenses to the spectrometer.

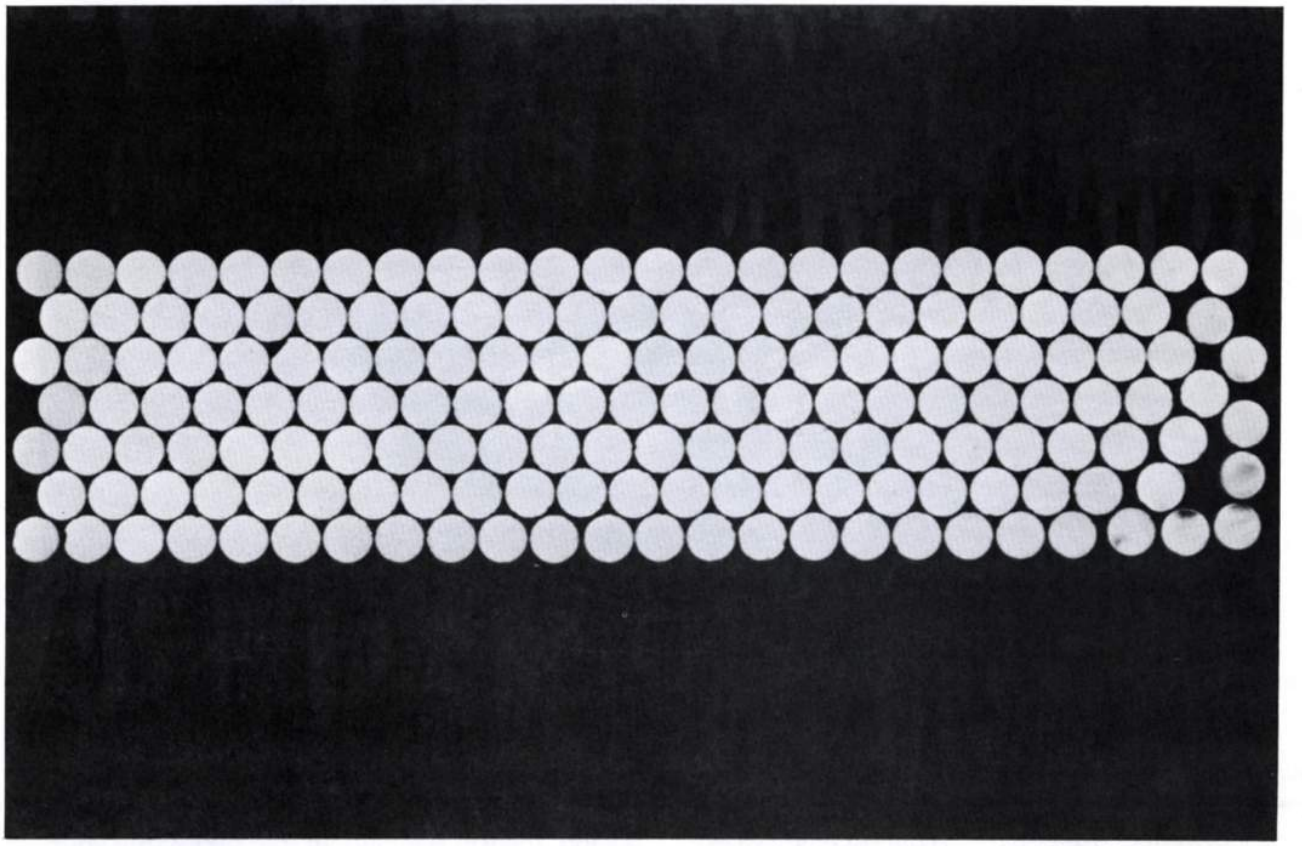
Use of fiber optics allows scientists to change the shape of the light image they receive from the plasma. A group of fibers bunched into a circular cable at the plasma end, for example, can be spread into a line at the spectrometer end. This flexibility, which Dick likened to the difference between a rigid pipe and a hose, permits easier 'squeezing' of gathered light into a spectrometer slit for analysis. It also makes fiber cables relatively immune to the vibrations produced by the tokamak during operation.

The fiber optics program dovetails with the TFTR diagnostic program. Dick perceives special problems with TFTR, since the fiber cables will have to withstand much higher radiation levels than on PLT and PDX. Dick will be helping test materials and techniques that will allow the fibers to survive use on TFTR diagnostics.

Dick is working with the optics materials portion of the research, rather than the design of the diagnostic systems themselves. "Even that is quite a development program," he says.

Dick's inveterate curiosity about things is what drew him to Princeton in the first place. After earning his physics degree from Case Tech in 1955, "There were a lot of job offers that year. I found out about this place through the head of my department, who'd visited here. It triggered my curiosity; I sent a letter out, and got an interview with Mel Gottlieb and Tom Stix, among others. The program was still classified, so they couldn't tell me what they were working on, but I was very impressed with the people here. I might not have known what they were doing, but they were very enthusiastic about it. I felt they had a tiger by the tail."

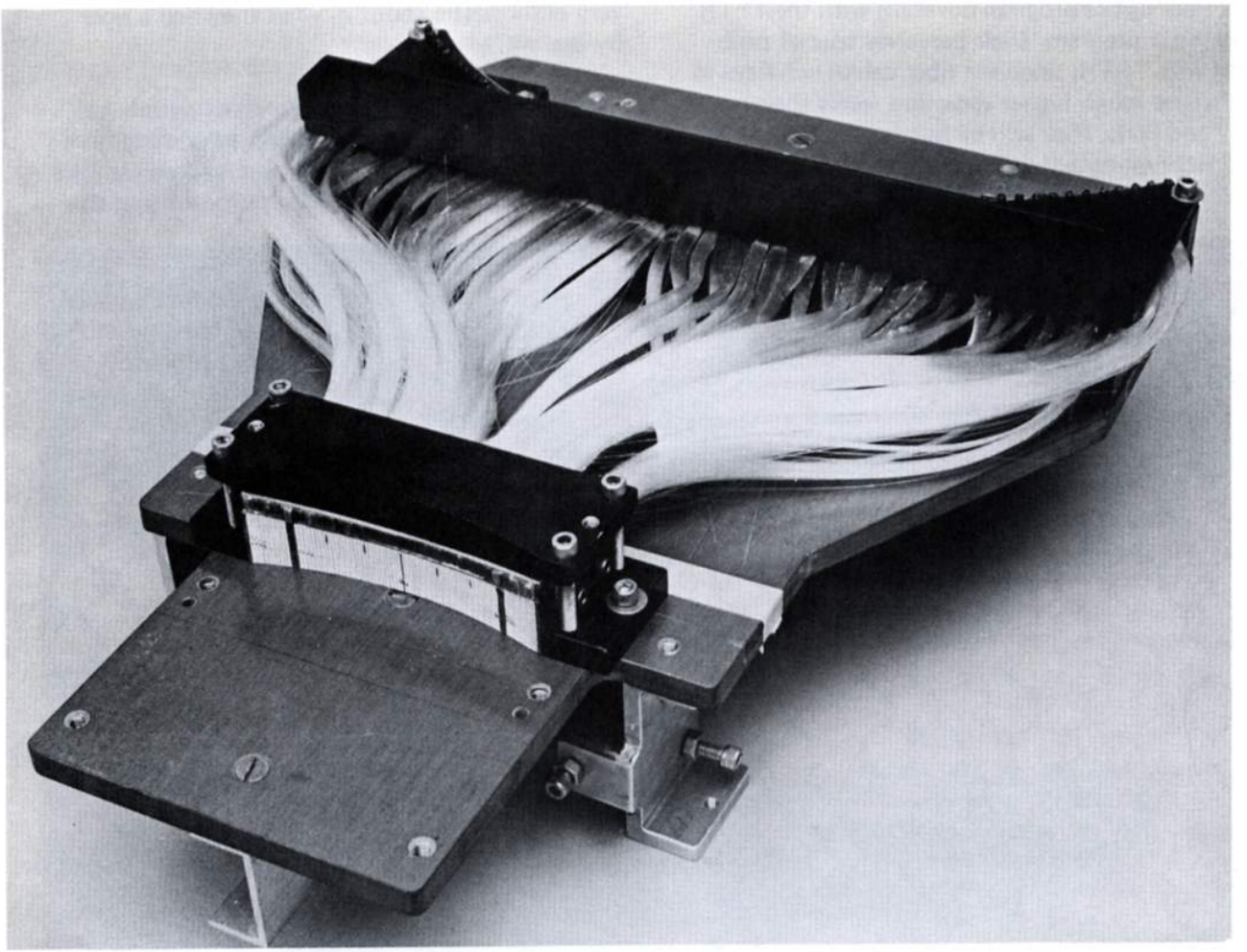
"They seemed like a great bunch of people to work with," he continued, "and something here just seemed to fascinate me. I was assured that the research would be for peaceful purposes, and this was the kind of environment I wanted to work in. And I haven't been disappointed."



One end of a fiber bundle, highly magnified. The bundle is 1/4" wide by 1/16" thick, tightly packed for efficient transmission.

Dick recalled the days in the mid-50's when attaining the goal of breakeven seemed right around the corner. "There was a lot of optimism back then. If we had harnessed the fission process in 10 to 15 years, there seemed no reason why fusion should be all that difficult. We had a lot to learn!"

His tenure at PPL has been an educational experience in Dick's eyes. "I'm always learning something new," he contends. "I worked with Tom Stix 20 years ago on some small fusion devices, when Tom began working on !CRH (ion cyclotron res-



An assembly of fibers for TV Thomson Scattering on PLT. Seventy-six bundles are shown in the array.

onance heating). He tested the concept, and proved that it worked. He's a real pioneer, the dean of ICRH."

Dick also worked for Shoichi Yoshikawa on multipole systems. He's had a hand in model building, and developed a hydrogen cyanide laser for density measurements on PLT. "It's since been dismantled," he admits. "That's one thing you learn in research: how to be a good loser when things you work on don't work or are surpassed by something better."

Dick credits his schooling with "teaching me to become a good student, teaching me how to learn. You have to be a perpetual student, research what's already been discovered, then build on someone else's stuff. I was taught how to dig facts out of the underbrush, and that being a student is a job; the trip is important, not necessarily your ultimate destination."

That journey has changed Dick along the way. "I initially saw science as a means to get to the truth," he recalls, "and I've found that that belief hasn't resulted in a completely satisfying romance (with science). I wanted to find the truth, but I found that some scientists didn't love the truth that much. They'd rather hang onto their model of the world than get to reality."

Dicks says that "since I've gotten my priorities straight, I enjoy work more. I like being part of the team; I don't need to be the hero. I enjoy a supporting role more, working with leaders who set the pace. I seem to be best suited for "hands-on" technology, and this is a very fertile soil I've been planted in!"

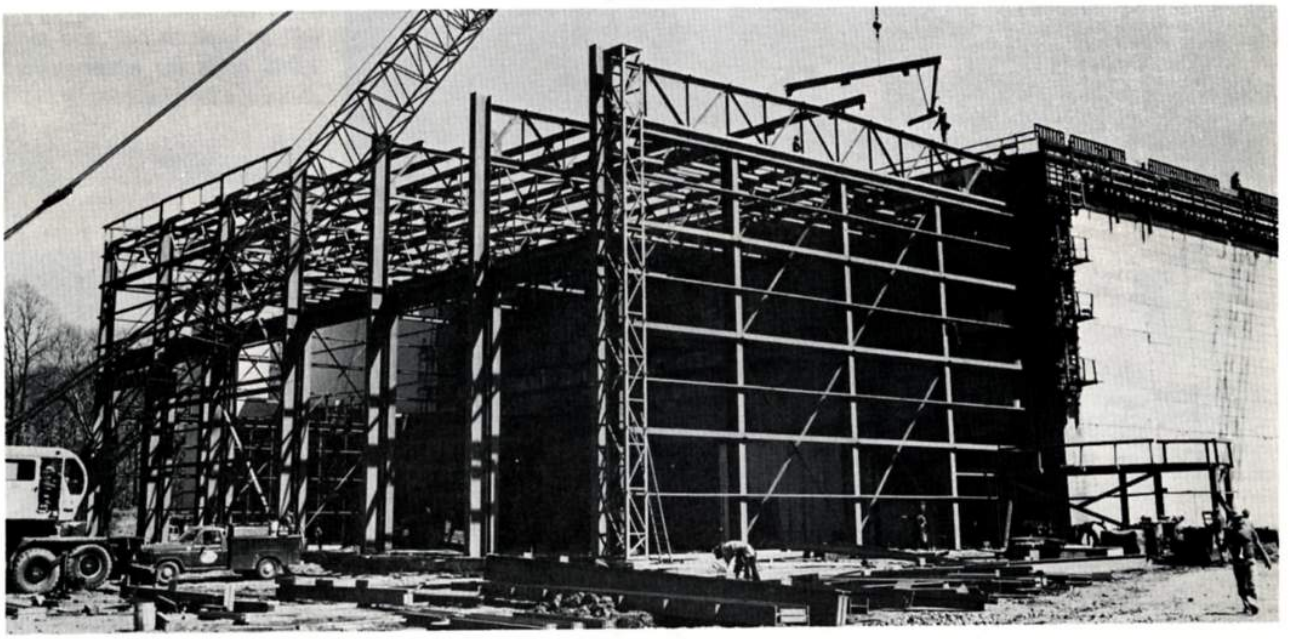
HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 17 June 16, 1981

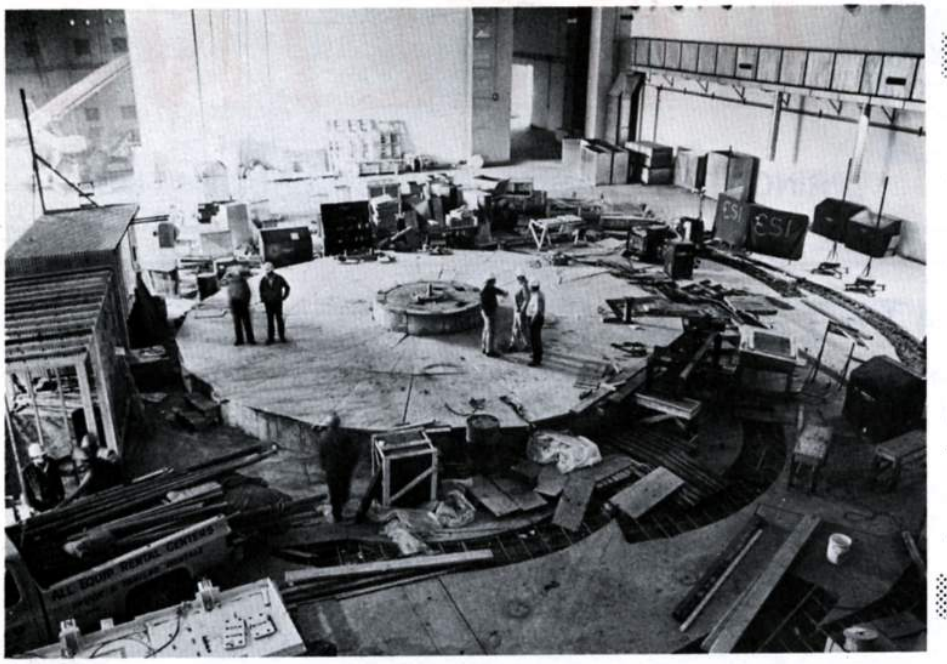
TFTR FACILITIES

Rapid progress continues on the facilities for TFTR. Given the continuation of good weather, outside work is expected to be completed on schedule for the arrival of machine components.



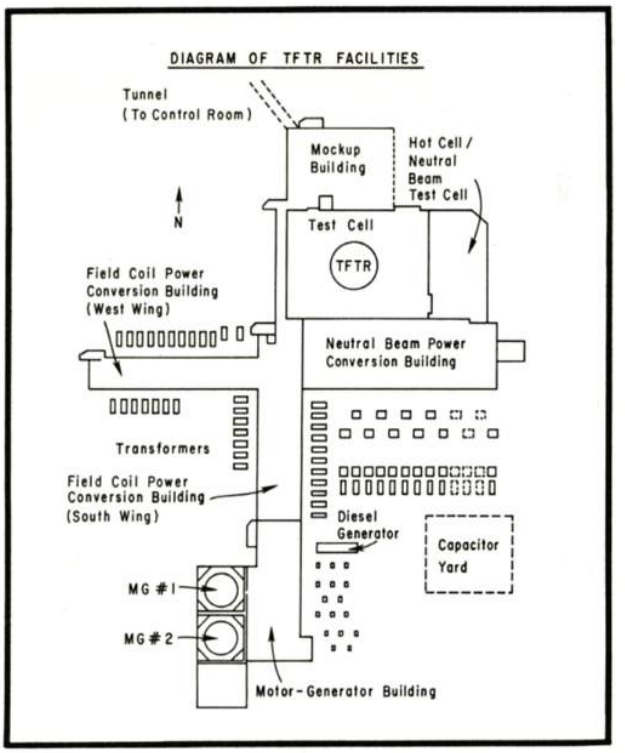
Framing of the Mock-up Building is shown above with the Test Cell in the background. The building will house the M-3 mock-up, now at A-Site, which will be used for remote handling and assembly testing. The floors in the building are finished, and siding is being installed on the east wall. Completion will be early this summer.

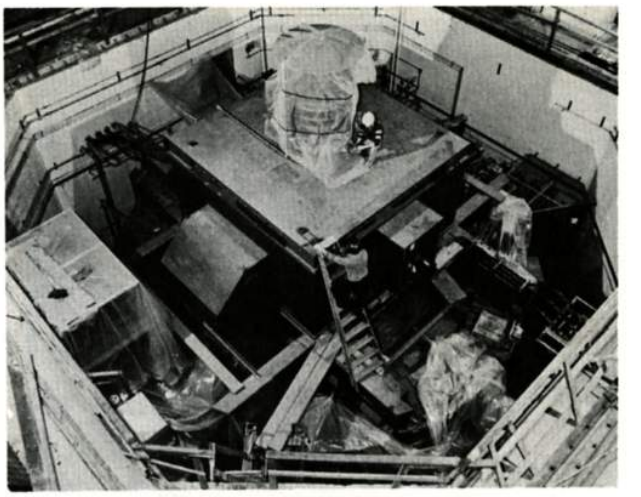
The photo at left, taken in February, shows work on the tunnel that connects the TFTR control room in the Lab/Office Building to the Mock-up Building. Now over 95% complete, the 600-foot-long tunnel has been covered over and the area regraded. Cable trays and permanent lighting are now being installed.



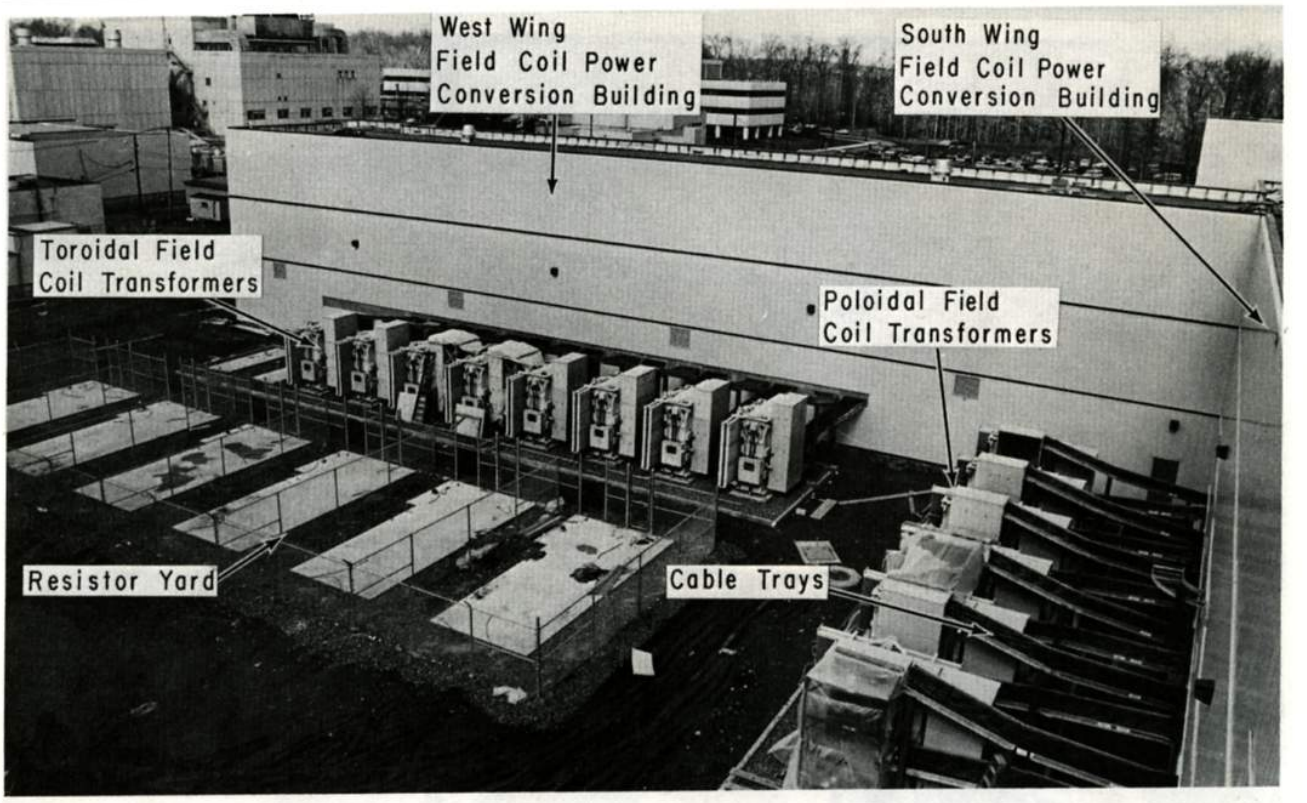
Inside the Test Cell. The TFTR substructure is shown covered with temporary wooden platforms. Machining of the substructure is now going on. There are 181 separate areas to be milled to tolerances of 0.030-inch. The pin shown protruding from the center of the substructure will serve as a pivot point for a drilling jig that will be used to drill and tap 1,096 holes for attachments above the substructure.

Workmen are machining the central plug that will serve as a base for the TFTR central column.



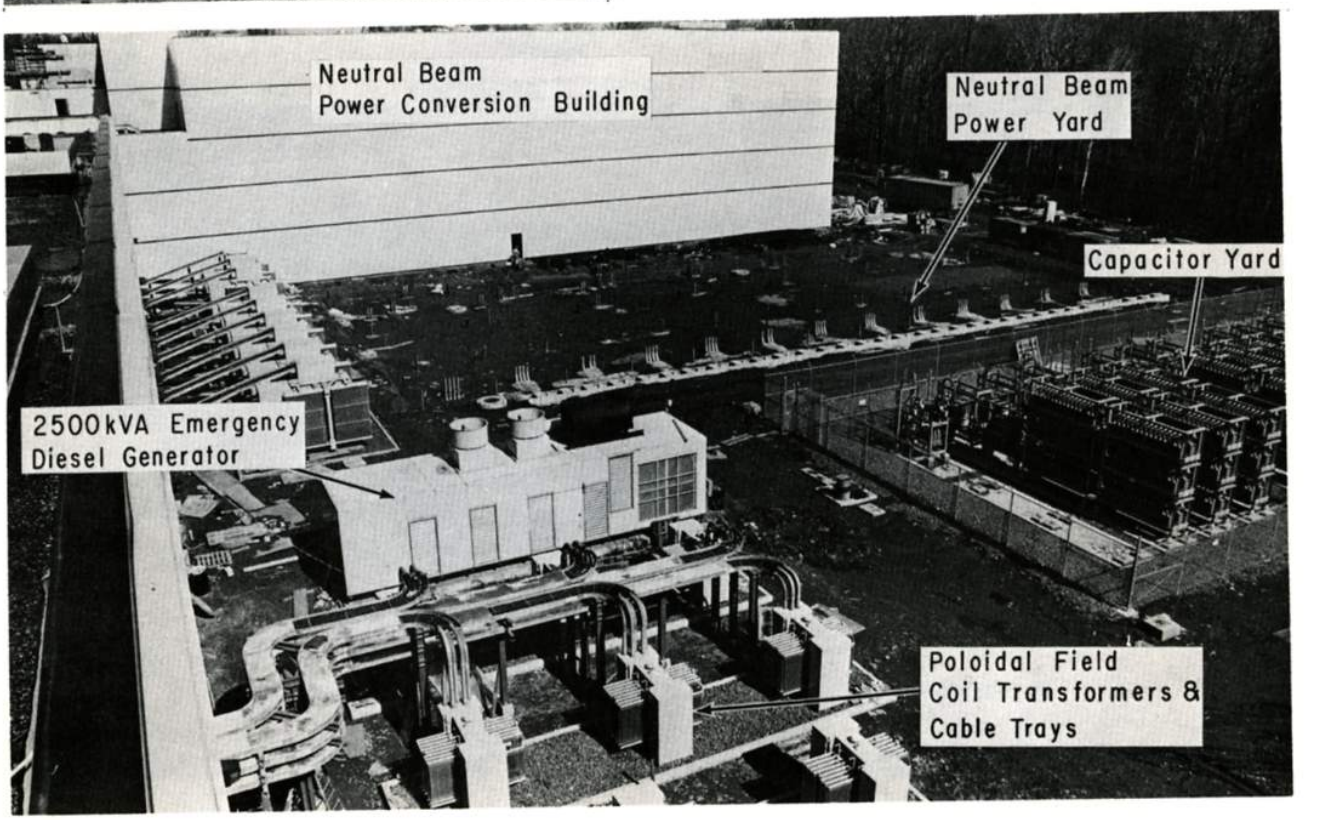


Motor/Generator Set No. 1. The box-like structure in the center is a 15,000-hp induction motor that will drive the 600-ton rotor, which is directly below it. On top of the induction motor is an exciter that will be used for testing. Since this photo was taken, floor plates have been installed over the unit. Damage evaluation is continuing on the other MG set, which was involved in last December's construction accident.



This view of the electrical equipment yard between the two wings of the Field Coil Power Conversion Building shows the toroidal and the poloidal field coil transformers. The west wing of the building will house the rectifiers for the toroidal field coils. Rectifiers for the poloidal field coils will be in the building's south wing. Resistors will be installed within the fenced area.

The cooling towers are complete and have been turned over to PPPL from the Department of Energy. The TFTR cooling towers will circulate up to 13,520 gallons per minute. They will be used to cool water from the bearing oil coolers and the air coolers for the motor-generator sets; the field coil cooling water chillers; the component cooling water chillers that are used to cool diagnostics and other equipment; the neutral beam power supply heat exchangers; the cryogenic compressors for the neutral beam lines; and the facility air conditioning chillers.



On the south side of the Neutral Beam Power Conversion Building, the 2500-kVA emergency diesel generator is in place, as are additional poloidal field coil power transformers. Capacitors are in the yard at right. Since this photo was taken, concrete pads have been installed within the Neutral Beam Power Yard for the 15-kV switch gear, tap changers, and transformers/rectifiers.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 18 July 7, 1981

HOTLINE Survey

We asked you what you thought, and you sure told us!

The results are in in the first HOTLINE reader pool, and we've tallied the responses. Approximately 250 of you sat down and filled out a questionnaire; that adds up to a 17.6 percent response rate. We'd like to thank those individuals who took the time to answer our questions —— we appreciate your help.

And what answers! While some people were hesitant about revealing their names, 104 hardy souls signed their forms. Comments ranged from simple answers to our multiple-choice questions to a two page, full-blown critique of our publishing efforts.

Most respondents gave HOTLINE an average grade in both usefulness and accuracy. Articles are clearly understandable to a large majority of respondents.

Regarding what readers would like to see more of, most respondents want more general information. That was an expected result, but the strong interest in reading about other laboratories' programs came as a surprise. A substantial number of respondents asked for more technical articles, as well as a general increase in the overall informational content of HOTLINE. We will attempt to satisfy many of our readers' requests with our future editions.

Remember, however, that there will always be items of a "bulletin board" nature in HOTLINE. Due to our wide distribution, many departments use HOTLINE for dissemination of important news to the laboratory at large. Often these articles are followed (or preceeded, as in the case of the PPL picnic) by bulletin board notices or flyers on the upcoming event. There's no way to prevent such duplication, and we hope the disgruntled members of our audience will understand.

As the responses to our survey clearly indicate, PPL employees are a very diverse group. Readers must realize that we can't please everyone all the time; we must pick and choose what is suitable for HOTLINE. But with the guidance your questionnaire answers have provided, we will be attempting to tailor future HOTLINEs to better serve your needs.

While most respondents had never suggested a story idea to HOTLINE, we hope those figures will change in the future. HOTLINE is your publication: don't hesitate to call us at ext. 2754 with story ideas, news or comments. We also encourage PPL staff to submit articles, especially ones they've written themselves.

So if you've got a story that you think needs telling, let us know about it —— we can help get your message across.

Symposium Slated

The Technology Department Symposium will be held July 8 at 4 p.m. in the Melvin B. Gottlieb auditorium.

Dr. W. O. Wuster, Project Manager of the JET project located in Culham, England, will speak on "The Status of JET". Dr. Wuster's talk will describe the recent advances of the JET device, as well as construction and assembly schedules.

Refreshments will be served.

Cost-Cutting Commended

News of the recently established Employee Energy Awareness Committee actions has brought to light the individual cost reduction program of Art Chaykowsky.

Art, the Scheduler/Expediter of PPL plant facilities, has monitored the costs and supply of fuel on hand for firing the many on-site boilers used for heating and air conditioning. Through Art's individual efforts of delaying purchases for the best price, a $1,300 saving was realized in a recent fuel oil delivery.

Art was commended for his action by Manager of Project Engineering Frank Fumia.

Secretarial/Clerical Pool

The Personnel Office is in the process of recruiting permanent/part-time secretarial and clerical personnel to become members of a PPL temporary office pool. These positions will be on an "on-call" basis to fill in for vacation relief, illness and other emergencies.

Secretarial and office assistants with good typing and steno skills are being sought. Members of the laboratory community are encouraged to inform friends and relatives of this new program.

Direct all inquiries to Al Drake, Personnel Office, ext. 2047.

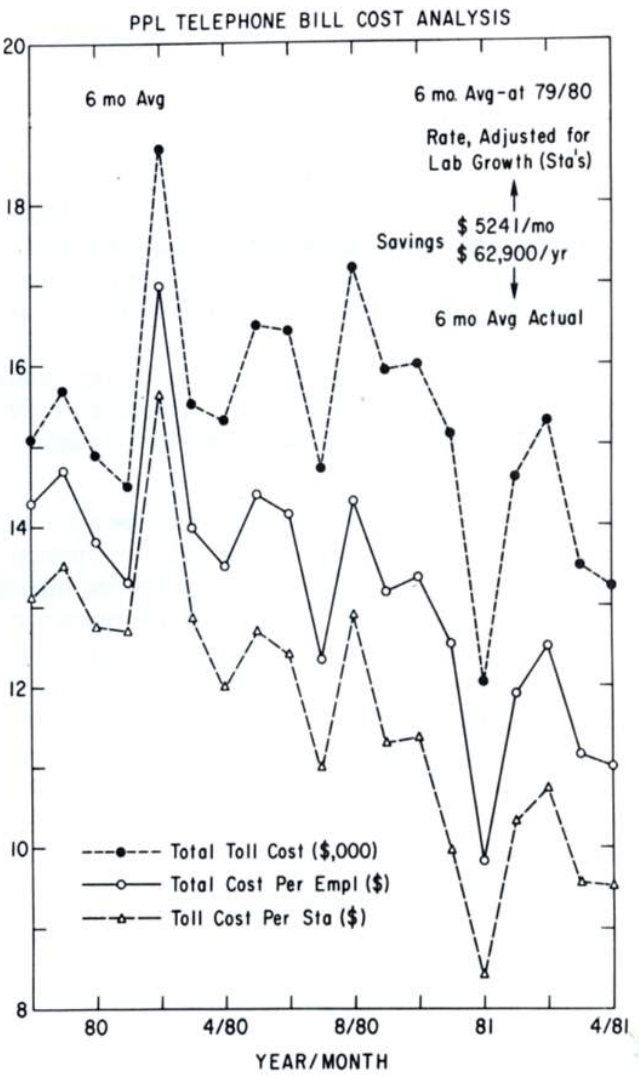
Telephone Costs

Over the past year, the Telecommunications Office has been working closely with telephone users to help reduce PPL toll charges. These efforts appear to be working.

As shown in the chart at the right, the laboratory's monthly toll cost has dropped from an average of $15,775 to an average of $13,976 in spite of laboratory growth. If PPL placed commercial toll calls at last year's rate, the monthly bill would be over $19,000, not under $14,000. This $63,900 per year savings provides monies that can be used for other programs at PPL.

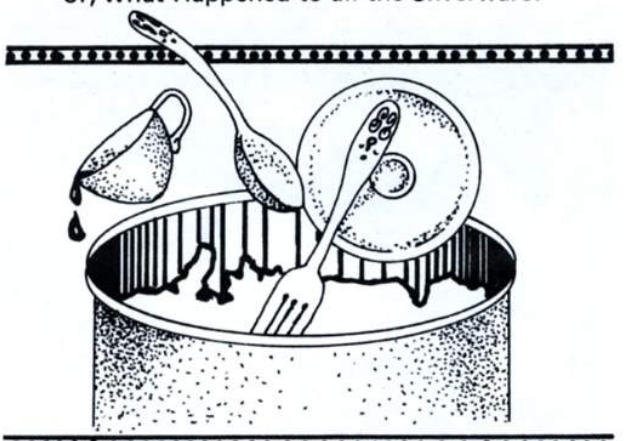
Additional FTS lines have been added at PPL to improve access to the system. FTS is continuously expanding direct-dial access to commercial area codes to simplify use of the system.

Robert Smart and Marjorie Barnett welcome suggestions on how to further reduce these toll costs. Laboratory support of these efforts is appreciated.



And The Dish Ran Away With The Spoon

or, What Happened to all the Silverware?



Utensils that aren't plastic
Just seem to disappear
Into offices and trash cans,
And their cost is getting dear.

So please won't you be careful
To return what you have borrowed?
Or we'll be living in a plastic world
Tomorrow and tomorrow.

Addendum

Robert Gulay, chairman of the Energy Administration Committee, recently commended operating technician Ed Rogers and supervisor Ben Velivis for the part both men played in saving the laboratory almost $13,000 in electric bills.

Rogers, on duty in the MG control room in mid-May, noted a power demand rise and notified Velivis of the increase. Velivis in turn called Marvin Ritchie, a member of the Electric Power Subcommittee, who informed Plant Maintenance of the situation. Turning several space cooling chillers off throughout the lab helped curtail the demand increase.

Gulay thanked all three men for "caring enough to advise each other of the problem, and to talk to the right person to get something done about it."

Energy Library

A library for the collection and dissemination of energy saving information throughout the laboratory has been established in the stockroom area of the A-Site Coil Shop. The major oil companies, Jersey Central Power and Light, Public Service Electric and Gas, and DOE headquarters in Washington have all contributed various materials to the collection.

The library is expected to be in general use by the first week of August. Persons interested in using the collection should call J. Charles Wood at ext. 3061 between 10 and 10:15 a.m., between 12 and 12:30 p.m., or between 3 and 3:15 p.m. Monday through Friday. Written material requests should be sent to J. Charles Wood, Coil Shop, A-Site.

To The Editor Of HOTLINE:

Among the life-shortening diseases, cancer is number two. Although it has no cure as yet, there are numerous ways to save the lives of its victims.

Cancer is a disease whereby cells in an organ begin to grow wild, no longer performing their normal tasks. From a small beginning, the problem spreads – sometimes slowly – to adjacent cells. If this process is allowed to continue, the organ will eventually drop below its specified minimum performance. If the organ is necessary for life, death will follow.

The other grave risk involves numbers of cancer cells that may become detached from the original site and be carried to another part of the body. These cells may start a colony and eventually become a severe problem at the new site.

The reason the cells depart from their normal behavior pattern is not known, except that repeated irritation of an organ seems to be a general cause. That is a major help in combatting the most severe cancer of them all: lung cancer.

This disease is caused almost exclusively (some leave out the word "almost") by cigarette smoking.

One cigarette per day does not do any harm, but smoking 30 per day for 30 to 35 years gives one a 10% risk of contracting lung cancer. Apparently, after the lungs have been irritated by smoke 365,000 times, their repair mechanisms become overwhelmed and symptoms appear. By then, mortality is 92% overall. The solution is obvious to anybody with a technical bend: do not overload the system.

Skin cancer is the other cancer with a clearly indicated source: ultra-violet radiation. The suggestion there is to go easy on sun bathing.

What the irritants are, if any, in other types of cancer is usually not known. The watchword is removing the tumor while it is still small and localized. Individuals age 40 and over should submit to a physical every year, those aged 30 to 39 every two years. One should also go easy on sun bathing and limit cigarette smoking to a smoking product D · Y not to exceed 500 for life,

where D = number of cigarettes smoked per day

Y = number of years smoked at rate D.

In the early part of the twentieth century, cancer was a very bad disease with little hope of survival. In the 1930's, the U.S. survival rate had risen to 20%, then to 25% in the 1940's. Currently it is approaching 45-50%. PPL could exceed a 75% survival rate before the end of this decade.

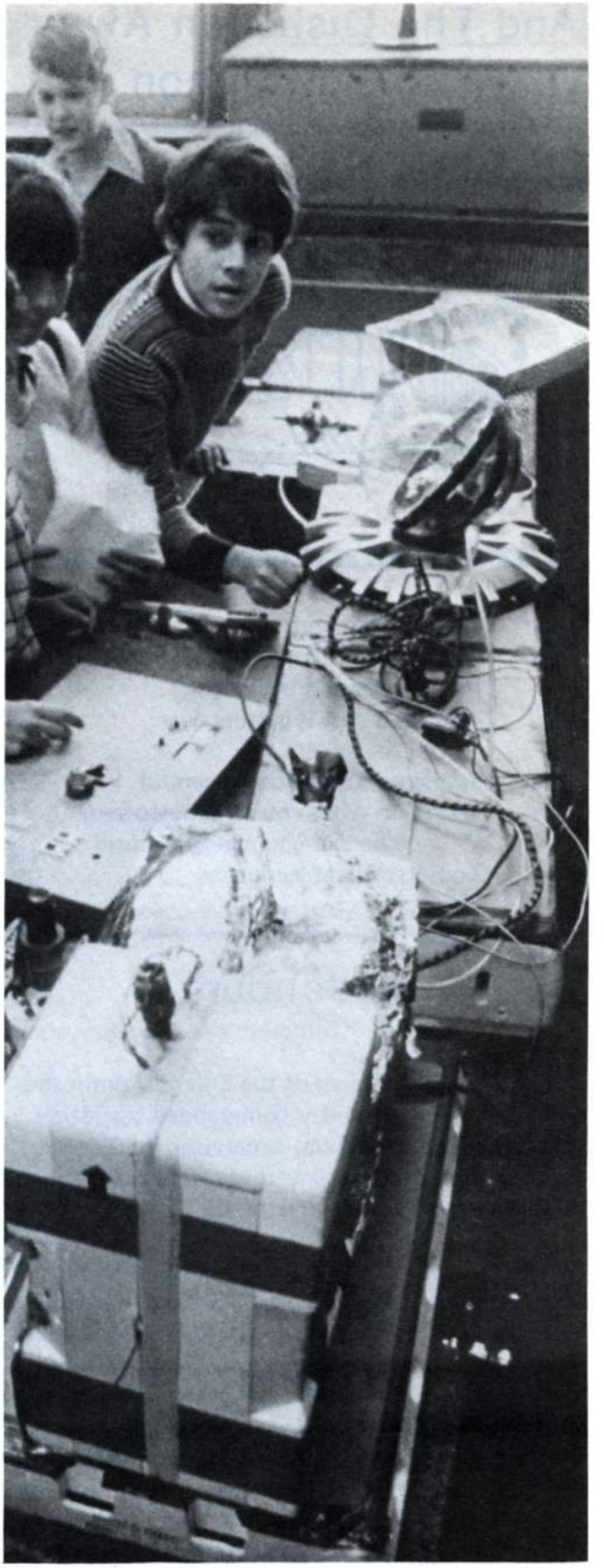
Good grief, what are we waiting for?

E. de Haas

Junior SEERs Tour PPL

Yaroslav Shoikhet and Michael Masterov got a chance to see their science project enlarged to real life proportions when they toured PPL recently. The boys won the National Energy Foundation's SEER-USA competition by constructing a tokamak mock-up.

Yaroslav was born in Odessa, Russia 13 years ago, and is a seventh grader at IS 187 in Fort Washing-



The boys' mock-up of a tokamak and its attendant systems.

ton, Manhattan. Michael, his 13-year-old classmate, hails from Leningrad. Both have been in the United States for approximately eight years.

Michael's interest in science dates from the time he saw a microscope in a shop window as a child, becoming fascinated with it. Yaro, as a youngster, saw the back of a radio opened and was surprised to see electrical wires and tubes. "I always thought there was a person in there!" he recalled wryly.

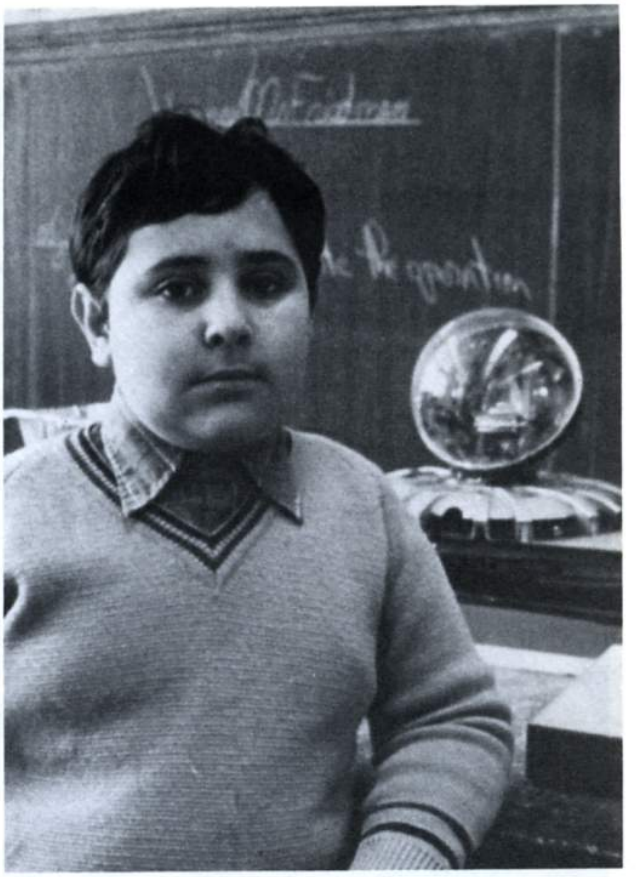
Both named science as their favorite school subject, so it seems natural that both were attracted to the NEF's Student Exposition and Energy Resources (SEER) program. SEER provides secondary school students with the opportunity to construct projects demonstrating new energy sources, or new ways to obtain and use energy. The projects, which range from dioramas through full-blown mock-ups, are judged on a local and national level. A national grand prize is awarded, and many prize-winning entrants are selected to visit energy-related industries around the world.

Although this was Michael's first time in the competition, Yaro was SEER's youngest participant last year. Why did the two decide to join forces on their project? Michael explained that "I couldn't find a project, and Yaro didn't think he could finish his in time. We thought that by working together we could get everything done."

The idea of building a simulated tokamak stemmed from an article on the subject, published in the Fusion Energy Foundation's student magazine "Young Scientist". A meeting with NEF staff also provided impetus, as did the help of the boys' science teacher, District Science Coordinator Herb Friedman.

"Once I decided to build the reactor," Yaro said, "I began the research in October and the heavy work in December. We worked on it a lot prior to construction, planning finishing touches. Every step sparked a new idea, and I got some ideas while working —— or even while watching TV!"

The tokamak features a 10 switch control board, manual and computerized operation, memory disk drive, and a monitoring system constructed from washing machine parts. The entire mock-up, in



Michael Masterov

fact, is an amalgam of bits and pieces the boys scrounged from everywhere.

Old irons, toasters, guitar strings, small missile parts, a bird's toy, a hairdryer and Christmas lights all found their way into the reactor —— as did a bit of the kitchen sink, in the form of piping for the water flow. The boys pointed out that only specific parts of each "cannibalized" item were used, and estimated the total cost of construction at approximately $100. If the parts had all been purchased new at an electronics store, the project might have cost over $1,500.

The mock-up itself consists of a 3'2" reactor and its attendant systems. The reactor sphere was a globe in its former life, and now has a simulated tesla coil (courtesy of the hairdryer) imbedded in it. The "lasers" are Christmas lights reflected through chandelier prisms. The entire structure is plated with metal transformer parts.

Five 45 volt batteries are used to power large magnets for the reactor, which also includes its own

Yaroslav Shoiket

water cooling system. The entire set-up is mounted on hubcaps, which are mounted on a styrofoam fruit case. Cables and wires "run everywhere!", according to Yaro.

The current mock-up is the fifth incarnation of the project. The first was a small showcase model that simply flashed lights to illustrate its function. Always thinking of improvements, the boys expanded that model to six feet long. That size was later reduced when they discovered a shorter length increased coil heat. After coping with various pressure, temperature and power output problems, the final model was completed. Yaro and Michael report that their final product is the most efficient of the five.

The boys won the top SEER-USA award after five rounds of competition. Round one came at their school, where they took first prize after competing against approximately 150 entrants from kindergarten through eighth grade. The duo also placed first out of 400 entrants in the Manhattan Borough Science Fair; first out of 30 entrants in the District 6 Science Fair; and first in SEER-NY, which encompassed approximately 300 entrants on the junior high level from throughout the New York area.

Then came the final test: SEER-USA, where students from California, Virginia, New York, New Jersey, Connecticut and Virginia vied for top honors. Eighteen projects were entered in the competition, and the boys placed first in the junior division June 2. They were among those honored at a SEER dinner, joining speaker William F. Buckley on the stage. The pair will be visiting Washington in the near future, flying there on a turboprop plane commemorating Wiley Post's flight. They will also meet President Reagan, schedule permitting.

Were the boys nervous before the national competition? "We were nervous before every one," asserted Yaro. Michael added that "we were the most nervous about our school competition, and that's the one we should have been the least nervous about!"

The two expect to collaborate on their SEER project next year, since Michael's theoretical bent seems to complement Yaro's more practical electronics talents. Future plans for Yaro lean toward electronics or engineering, while Michael's interested in genetic or nuclear engineering as a career.

And their impression of PPL? Both boys report being "very impressed" by the lab. "We thought our project was extremely complex," Yaro exclaimed, "but this is incredible!"

Course Planned

A technical typing course will be offered at the laboratory in the near future. Anyone interested in taking the course should contact Judy Duffy at ext. 2602 by July 17.

HOUSE WANTED —— PPL employee interested in renting a three bedroom unfurnished house in the East Windsor/West Windsor area. Kids and pets should be allowed. August 1 or September 1 availability required. Contact Judy Duffy, ext. 2602.

Stockroom Notes

DOE has regulated the amount of stores inventory the lab is authorized to stock during this fiscal year. The stores inventory has already been drawn down from a January high of $1.2M on-hand and on-order to the current level of $848K on-hand and on-order. A further reduction of $109K is required to meet mandatory year-end ceilings.

The stockroom wishes to provide the best possible support within available resources. During a recent meeting with the ERC, one area pinpointed for improvement was communications between the stockroom users and Material Control. To this end, forms and cards have been developed to provide input from the stockroom and catalog users.

A Stockroom Inquiry Card, Catalog Inquiry Card, Daily Out-of-Stock sheet and a New Item Request form have been placed in the stockrooms for your use. Prompt action will be taken on your inquiry; you will be notified by phone of the results.

Another avenue open for user communications is the Stockroom Users Committee. The committee was formed in 1976 to serve as an interface between stockroom management and users. Each division/branch is authorized to have representatives on the committee. The committee meets on the third Thursday of the month in the 1-N conference room at 9:30 a.m.

Current user representatives include chairman Paul McCann of the Electronic Division; vice chairman John Garde of the Neutral Beam, NBS-TFTR; and members L. Hurley, Engineering Services; A. Chaykowsky, Plant Maintenance and Operations; D. DeBonis, AC Power Section; J. Frankenburg, Fabrications/Operations/Maintenance; N. Greenough, Engineering Division; G. Katona, Mechanical and Aerospace Engineering Department; J. Mayercak, Computer Division; W. Mycock, PLT; and M. Oldaker, Control Section.

If your division/branch would like to be represented, please contact Chris Gillars at ext. 2853 or Paul McCann at ext. 2513.

PPL employees interested in playing volleyball can join the group of enthusiasts already playing on Thursdays after work. There are not set teams; the competition is "just for fun".

All those interested in participating should contact Anne Golden at ext. 2444 or Sheryl Cargill at ext. 3277.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Information Services, Module 2, C-Site, James Forrestal Campus, ext. 2754.

PICNIC "81"

Over 1,100 people partook of the hayrides, the hot air balloon, the food and the fun at the annual PPL Picnic June 20.

Six clowns (Millie Lefler and her two granddaughters, Debbie and John Anastasio and Joyce Lafharis) helped entertain the youngsters during the afternoon. The kids also enjoyed the sandpile, space walk, pony rides and a magic show by Mike Goldman.

Their parents danced to music played by a deejay, tossed horseshoes and helped themselves to the picnic fare provided. According to picnic committee chairman Len Thomas, 23 barrels of beer were consumed during the afternoon, along with nine barrels of birch beer.

In addition to Len, the picnic committee was composed of Mary Alice Eubank, Anne Golden, Sheryl Cargill, Kris Mann, Ed Gilsenan and John Anastasio.

Pictures from the picnic appear on the following page.


N76PU

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 19 July 21, 1981

PDX Update

In experiments conducted during April 1981, the PDX tokamak achieved plasma ion temperatures of 5.6 keV (about 65 million degrees Celsius) by utilizing its four energetic neutral beam injectors, which delivered up to 7.0 MW of heating power into the plasma. In PDX, the beams are injected at an angle nearly perpendicular to the direction of the plasma current. To achieve the high temperature, deuterium beams at 50 keV energy were injected into an undiverted hydrogen target plasma at a plasma current of 500 kA and a toroidal magnetic field of 2.2T. The line-average electron density reached $4 \times 10^{13} cm^{-3}$ during the heating pulse and the central beta value (the ratio of plasma pressure, including the fast beam component, to the magnetic pressure)was estimated to be about 5%.

In a letter to PPL Director H.P. Furth, Edwin Kintner, Associate Director for Fusion Energy, USDOE/OER, stated "The recent neutral beam heating results on PDX are cause for congratulations, both to the operations group on PDX and to those who brought the PDX neutral beam project from design through engineering and fabrication and finally to successful operation on the tokamak."

The letter was also addressed to Dr. Murray Rosenthal of Oak Ridge National Laboratory (ORNL), in recognition of that laboratory's contributions to the PDX neutral beam systems.

The successful design, fabrication and operation of the PDX injectors is a credit to numerous PPL staff members. Most significant were the roles of the following personnel: R. Applebaugh, D.L. Ashcroft, J. Carson, W. Cary, F. Dahlgren, R. Dierenback, A. Dutton, J.W. Edwards, H. Eubank, P. Karitis, F. Kloiber, T. Kojieb, H. Kugel, G.D. Martin, M. Mozeleski, R. Newman, F. Polom, G. Rossi, E. Ryan, G. Schilling, R. Shoemaker, E.D. Simon, W. Sproul, J. Smolinski, T. Topoleski, A. Von Halle, M. Williams, R. Yager.

PLT Update

Investigations of radio-frequency (rf) heating, begun on PLT in 1978, are now assuming the central role in the PLT program. Lower hybrid heating experiments at 800 MHz and ion cyclotron resonance heating (ICRH) experiments at 25 MHz and 42 MHz are being conducted.

Physicists have been experimenting with ion cyclotron resonance heating of plasmas made up of two types of ions: a majority species, usually deuterium, which comprises about 90% of the plasma ions, and a minority species, usually hydrogen or helium-3, making up the remainder. The rf waves are used to heat the minority species, which, through collisions, heats the majority ions.

At 25 MHz, about 900 kW of rf power has been added to the plasma for pulse lengths of 150 msec. At these powers, the minority hydrogen ions were heated to 7-10 keV (in the high energy range) and the majority deuterium ions to 1.7 keV. At lower densities, 650 kW of rf power was added to the plasma, heating the helium-3 minority ions to 10 to 20 keV and the deuterium majority ions to 2.4 keV.

The 42-MHz system, used for second harmonic heating of majority ion species, was completed in May, 1980. Rated for power input of up to 4 MW, the system has to date reached levels of about 700 kW. Experiments over the next several months will focus on raising the power to the 4-MW level.

Other plans for ICRH studies include the addition of two or more antenna coils to supplement the four already on the machine. These will be used for studying second harmonic hydrogen heating at fields of 14 kG, second harmonic helium-3 heating at 21 kG, and heating of deuterium-majority hydrogen-minority plasmas at 28 kG.

This summer, investigators plan to conduct experiments using the 25 MHz and the 42 MHz systems in consort. This would involve heating the two minority ion species at their fundamental frequencies. A combined power input of 3 MW is planned.

Other avenues of research will involve the combined use of ICRH and neutral-beam injection for plasma heating. Also planned are studies of the use of waveguides to replace the antenna coils for ICRH experiments.

Lower hybrid heating, another form of rf plasma heating, has been in use on PLT since January. A six-waveguide array coupler, mounted on a bellows and inserted into a pump port on PLT is used to introduce 800-MHz waves into the plasma. The system, rated at 1 MW, has achieved power levels of about 200 kW and pulse lengths in the 400 to 500-ms range. The lower hybrid coupler is under investigation and is expected to be upgraded to the 1 MW level by the end of this year.

Future plans call for combining lower hybrid heating with neutral beam injection and for studies of current drive by lower hybrid waves. If all goes well, another waveguide coupler, one that will introduce waves at a 90^{o} phase difference, will be installed for current drive experiments sometime this autumn.

Design and construction of the rf heating equipment was done by the Radio Frequency Section of the Engineering Division, under John Lawson. The key engineers for the ICRH systems are Tony Sivo, Nevell Greenough, and William Newman; those for the lower hybrid system are Nelson Bowen, Frank Schnabl, and Allen Martin.

Chemical Spill

Prompt action by the PPL Emergency Services Unit (ESU), and the Health and Safety Branch (H&S), coordinated by Emergency Coordinator Jack Anderson and his Deputy Harry Howe, averted any health hazard from a recent fire and chemical spill in the Matterhorn Building.

The fire and spill occurred between 5 p.m. June 26 and 7 a.m. June 29, according to Jack. The fire was apparently caused by a resistive heater submerged in a solution of chemicals in a segmented vat in a printed circuit plating lab.

Chief Anderson said the fire probably built up a "high temperature" in the closed room, causing the plastic legs of the vat to collapse. The vat then tipped over, and the chemical solutions and water that it held extinguished the fire. This was not the end of the problem, however, since several of the chemicals in the vat (which included hydrochloric and sulfuric acid) emitted toxic chemical vapors into the room.

Fire Chief Jack Anderson checks the seals on Joe Pownall's face mask during cleanup operations after a chemical spill in the Matterhorn Building.

Jack thanked FMC fire chief John O'Neill for allowing PPL's ESU to use FMC's chemical and acid suits for protection during cleanup operations. FMC made the first entry into the building with Ray Jeanes of PPL H&S to take air samples in the room.

The ESU installed a smoke ejector into a ventilation pipe outside of the room, in order to clear the room prior to the beginning of cleanup operations. At no time during the incident was there any danger to C-Site personnel, although buildings on B-Site were evacuated as a precaution until the extent of the emergency could be evaluated.

Two three-man search and rescue teams (equipped with turnout gear and Scott air packs) entered the building. Cleanup crews hand-pumped each section

of the vat out into separate 55 gallon plastic lined drums to prevent chemical mixing. Crews were rotated into the building in 15 minute shifts, with half hour rest periods between shifts. Approximately 78 bottles of breathing air were used during the operation.

The quarter-inch sponge rubber flooring in the lab was cut into sections and disposed of in separate drums. A total of 18 hours was spent in cleanup, with the cooperation of Health and Safety, Maintenance and Security. Jack also commended Ben Velivis and Bill Perseley of the MG Room for their aid in de-energizing the Matterhorn Building.

The lab was reopened at 9:30 a.m. June 30 after air samples were taken in the area. An investigative committee, composed of Health and Safety's Harry Howe, John Lawson (ENG), Marvin Richey (FOM) and Frank Fumia (PE), will determine the cause of the incident and make recommendations for prevention of a recurrence.

Jack had the highest praise for the performance of the emergency crews during the cleanup. "They were working in a potentially hazardous situation," he emphasized, "and they came through with no injuries. We never trained for anything like this, and it goes to show the caliber of our people. You throw them a curve, and they hit a grand slam!"

"They had real confidence in themselves and their equipment," the chief concluded, "and they did one fantastic job! It's a great privilege to work with such people."

Chief Anderson asks that anyone dealing with hazardous substances call him at ext. 3166.

TFTR Tours

Have you ever wondered what they're doing "out back" at C-Site? Now's your chance to find out!

Although construction is continuing at a rapid pace, TFTR Construction Coordinator Al Swain will be conducting tours of the TFTR construction site for PPL employees. Tours will begin each Wednesday at 3:15 p.m., leaving from the LOB lobby, where hardhats will be issued. To ensure your safety, these regulations are in effect:

- Hard hats will be provided and must be worn at all times.
- Appropriate footwear is imperative for both men and women: NO SANDALS, NO OPEN-TOED SHOES, NO HIGH HEELS.
- Stay with the group; do not wander away.

Because TFTR is an active construction area, groups will be limited to 15 people. No more than three people from the same department should sign up for a single tour.

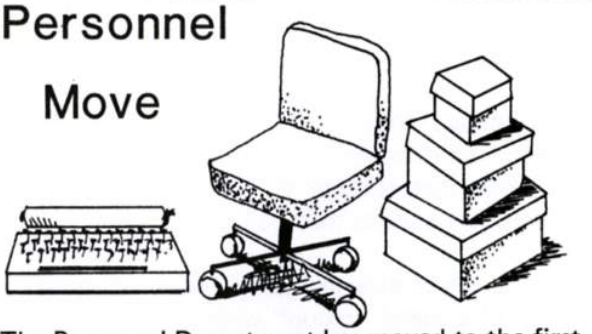
To reserve a tour spot, call Suzen Bayer, Information Services Department, ext. 2751. Reservations are a must.

Van Pool

Two seats are currently available in a van pool which leaves Mt. Holly and arrives at PPL at approximately 7:30 a.m. The van's schedule is flexible according to passenger need. The cost will vary from $65 per month per rider for 11 passengers to $82 per month per rider for 9 passengers.

Those interested in this van pool, or in pools for other areas, should call Stephen May of Van Pool of NJ, 882-5900, for further information.

Personnel Move



The Personnel Department has moved to the first floor of the Sayre Hall Building. The telephone extensions will remain the same.

John Schivell

What do physicists do to relax? If they're like PPL physicist John Schivell, they relax by thinking about offshoots of their main interest in physics. Consideration of one such offshoot—non-magnetic divertors—produced the concept that has humorously been dubbed the Schivell Shovel.

John came to PPL from Fermilab eight years ago "because fusion was growing." He started as an assistant to Don Grove on PLT; now he's a project physicist on the Engineering and Scientific staff, responsible for developing bolometers for TFTR.

A bolometer is a device which monitors the plasma, absorbing radiation over a wide range of wavelengths. Analysis of the bolometer readings can reveal the total radiation being emitted by the plasma.

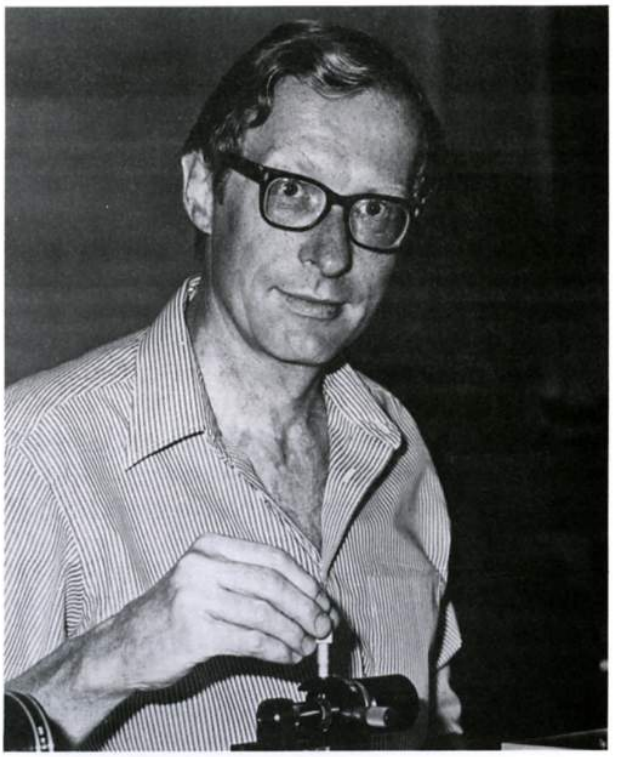
His side interest, however, is what led him toward the concept of a mechanical divertor. "When I came here," he explained, "I became interested in impurity control, limiters and divertors, as a sideline to my work on PLT. I started thinking about and developing the idea of a functional divertor which wouldn't require the magnetic fields of a coil divertor."

Divertors are one method of controlling impurities entering the plasma. A sufficient concentration of impurities (which can arise from various sources) could prevent ignition of the entire plasma.

Divertors, as generally used on a tokamak, are shaped magnetic fields located at the outer layer of the plasma. As particles lose their energy through collisions, they drift toward the outer edge of the plasma and are led into a disposal chamber by the divertor. The drawback to the system lies in the complexity that another set of magnetic fields (the divertor) adds to tokamak geometry.

The mechanical divertor/pump limiter concept consists of a metal "scoop" with a duct in the back, which would be inserted into a port on the tokamak. The scoop extends into the plasma scrape-off layer, diverting ions onto a neutralizer plate. An attached pumping system cycles the neutral atoms into a disposal chamber.

The original concept was developed in 1976, and only dealt with cleaning the plasma. Getting rid of helium "ash" (a byproduct of the fusion process which can cool off the reaction) is also an important consideration. A cyclic flow pattern is therefore being considered for use with the limiter. The helium would be extracted at the same time as fresh fuel is injected into the plasma, either by pellet injection or infusion of additional gas.



Development of the mechanical divertor/pump limiter presently centers on finding out how efficiently it collects plasma from the scrape-off layer. It is also being integrated into plasma modeling to predict its effect on future reactors.

John may have introduced the concept, but the idea has since acquired a life of its own. John Schmidt, Michael Ulrickson and Harold Furth all developed the scheme further. Dr. Furth's suggestion, according to John, involves a blanket of light impurities at the very outside edge of the plasma. The impurities should cool the plasma edge sufficiently to reduce the heat load on the neutralizing plates to manageable levels.

A limited trial on PDX (consisting of setting a box with a slot cut into it against the plasma) showed that the scoop does collect plasma fairly well. A more involved test with a pumping system is being planned for the future.

Bowling News

The Guttersnipes, winners of the PPL Women's Bowling League, pose with their trophy. Pictured left to right are Pat Melsky, Madge Curtis and Mary Alice Eubank. Not pictured is Sara Paterson

The Guttersnipes finished at the top of the PPL Women's Bowling League this year, compiling a season record of 56½-45½. The team, which consists of Mary Alice Eubank, Sara Paterson, Madge Curtis and Pat Melsky, was honored at the league banquet held recently at the Renaissance Restaurant in Hopewell.

Second place in the league standings went to the Bouncers (Ilse Gusciora, Mary Jane Hollendonner, Bobbie Cruser and Kim Prutky), with Strike 4 (Sue Wilkinson, Beth Crosby, Anne Golden and Patti Pugliesi) finishing third. The Alleycats (Chris Ritter, Terri Temkin and Betty Cary) rounded out the four-team field.

Terri Temkin won awards for having the high series (529), the highest number of pins over her average (83) during the season, and for rolling a 211 game.

Trophies went to Bobbie Cruser as the most improved bowler, and to Kim Prutky as the bowler with the highest average. Ilse Gusciora, who bowled a 206 game, and Madge Curtis, who rolled a 200 game, also received awards at the banquet.

Mary Alice Eubank is the outgoing president of the league, with Bobbie Cruser serving as secretary and Terri Temkin as treasurer. Anyone interested in participating in the league next year should contact Mary Alice at ext. 2555 or Bobbie at ext. 2101.

Terri Temkin

In the PPL Men's Bowling League, Castoro's capped the 35-week season with a rolloff win against the PPL Heroes, the league's first half victors. Members of the league champion Castoro's team are Sal DiMeglio, Alberto Petrella, Vince Baldino, Doug Bosley and Jeff Mulford.

The PPL Heroes consists of Bill Dix, Ken Emley, Bob Barbour, DickYager, Frank Polom and Mike Knorr. The remainder of the 14-team league in order of finish includes Power Engineering, Security, PJCJ's, Tech 2, Powerhouse, Bigawatts, Controllers, School of Engineering, Tech 1, The Old Men, C.O.B., and the Crescents.

Joe Pfister and Fran Dodd won high individual game honors with a 278 and a 267 respectively. Bob Popp's 691 series and Rich Huston's 677 series took high individual series awards, and Ken Strine was named the most improved bowler.

Awards were presented at the league's banquet June 1 at the Italian American Sportsman's Club in Trenton.

Outgoing league officers are president Ken Emley, vice president Dave Marusco, secretary Mike Knorr and treasurer Gill Ireland. Anyone interested in bowling on the league next year should contact Dave Maruso at ext. 3068.

To The Editor Of Hotline:

Our present outmoded casual approach towards chronic diseases causes about ten premature deaths per year among the readers of HOTLINE and their families, ten times more than accident fatalities.

The Engineering Approach

Deaths from the big three killers (stroke, cancer, and heart disease) can be reduced in numbers by the application of existing medical knowledge. About one hundred lives can be saved within the PPL family in the next ten years, as shown in the chart.

In earlier letters, I have shown that the big three each need their own preventive method.

Stroke is an obstruction or blowout in a small artery in the brain, caused by an errant pressure regulator. The defense consists of reading and controlling blood pressure.

Cancer can be fought through early detection and moderation in cigarette smoking.

Heart trouble can be minimized if Supermarket Man alters his life style.

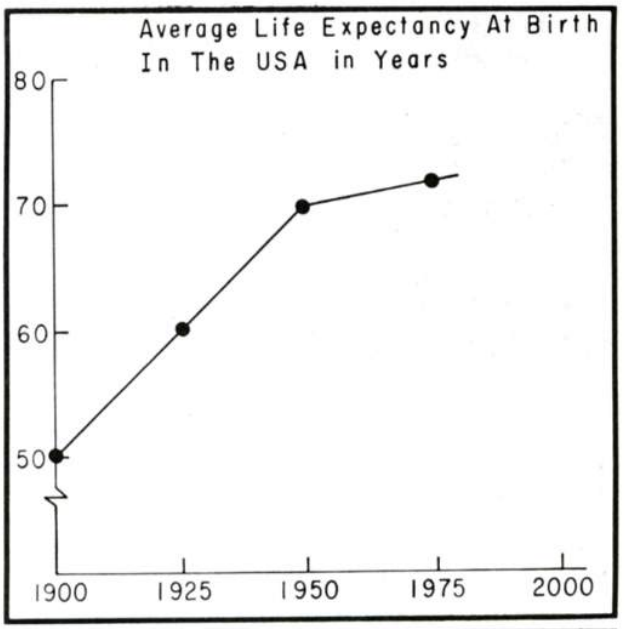
Group Reinforcement

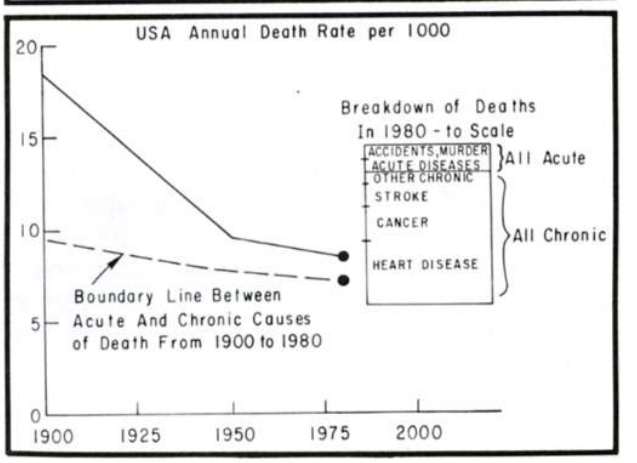
If the technical solutions are so straightforward, why then do we have the problem in the first place?

I think that it is in part a matter of timing. Someone who spoils an expensive instrument may lose his job right away. But if he spoils his body by oversmoking, Nature may wait twenty years before she fires him for good. Not every individual has the will power to stay with a proper health plan when the visible pay-off is decades away. However, for a large number of people improved health becomes statistically visible very quickly. We should therefore take advantage of the fact that we are members of the PPL family and let the group guide us towards better health.

The Shift in Causes of Death Since 1900

From 1900 to 1950, the average life expectancy at birth in the U.S.A. climbed from 50 to 70 years. Presently it is 72* (see figure 1). The companion graph of death rates shows an equally impressive change: from 17.6 to 9.6 in 50 years (figure 2).





Note that most of the improvement in death rates since 1900 has occurred on the acute side of the boundary line, until by now there is little left to squeeze. Even so the acute situations, including accidents, continue to receive the bulk of our attention. It would make sense if we now privately and publicly go after the chronic diseases.

*This relatively small improvement in the last 30 years stands in contrast to the ten fold increase in medical expenses—from $80 per person per year in 1950 to $800 in 1980.

What is really interesting is that the ratio of acute to chronic causes of death has shifted from an even split in 1900 to a ratio of 1:8 in 1980. Most of the improvements in medicine and public health since 1900 have reduced the acute sector, so much that there is now little left to squeeze out.

The ratio of deaths from accidents to deaths from chronic diseases is 1:16. If we ignore the potential reduction in deaths from chronic diseases, we lose ten members of the PPL family needlessly each year.

The Blurred Borderline

At one time, work-related illnesses were considered "employer problems", while chronic diseases and lawn mower accidents were "personal". We can still make that distinction as to causes, but no longer as to results. The fringe benefits, sick leave, health insurance and so on have changed all that.

The disturbance at work caused by an employee's absence is the same, no matter what the cause. The only difference left is the name of the insurance company that covers the cost, but even they are not overly concerned. The company that has the larger claims (bad experience) simply raises the rates for PPL (and the company with the good experience lowers its rates, one may presume). What is more, there is less and less difference between the employee and the family members. "I have to take my wife to the hospital" is about as compelling a reason for absence as "I am sick".

At one time acute health problems—be it accidents or diseases—were considered aberrations or unnatural conditions, while chronic diseases were considered "natural". I hope the data I have presented in the charts demonstrates that we do not have to accept the latter statement passively.

Specific Recommendations

Improvements are possible only if individual employees are fully committed to better health and longer life, and if such commitment is centrally supported by management. The following recommendations can be implemented independently; the more that are adapted the better the results.

As is normal, there is no free lunch. Better health requires effort and (minor) sacrifices, but then what else is new?

1. For staff members over 40, an annual physical examination would be obligatory; one every second year for those from 30 to 40. For spouses and retirees, such physicals would be optional. All physicals to be free of charge, with results remaining confidential. (And while the physical may be obligatory, there will be no requirement that the staff member do something about negative findings. My experiences with screenings of 5000 people with the Somerset County Heart Association has shown that almost all people who learn about a problem will take treatment.)

2. Staff who place themselves in high risk categories through a wrong life style would pay a proportionally higher health insurance premium. Increases could be hefty, as much as 50 to 100% over present rates. Health insurance premiums for those who are more physically fit than average would be lowered.

3. Cigarette machines would be phased out at PPL and cigar machines phased in. Cigarette smoking should be discouraged at lab sites.

4. If an insured completely flouts medical advice and becomes very ill as a result, his major medical deductible would be raised from $100 to $1000.

5. Smoke Enders and Weight Watcher courses would be encouraged.

6. We should encourage people working at C-Site to walk or bike to the B-Site cafeteria for lunch and vice-versa. Walkers can take the shuttle back if they so desire.

7. Courses in longevity would be made available.

The Eighties and Nineties

Nuclear projects generally have an excellent safety record because safety is almost a way of life there. Some of that lifestyle carries over to the home; I wear my safety shoes when I mow my lawn.

Because of the success with safety, chronic diseases now stand out as our major hurdle in reaching and enjoying old age. If we collectively put our organizational and technical skills to work on health, PPL can become the healthiest work place in the nation.

(1)	(2)	(3)	(4)	(5)
	TOTAL	PROJECTED DEATHS PRESENT CONDITIONS	PROJECTED DEATHS IMPROVED CONDITIONS	LIVES SAVED
A. PPL Staff	1400	86	48	38
B. Spouses	1025	50	25	25
C. Children	1875	1	1	0
D. Retirees and others 75 and over	450	100	75	25
E. Retirees and others 75 and over	250	187	175	12
TOTAL	5000	438 (note 2)	338 (note 3)	100

Notes

1. The PPL Family consists of staff, spouses, children and sufficient retirees and others over 65 to make a sample of 5000 persons with the same age distribution as the nation as a whole. For the purpose of this chart, the staff is assumed stable at 1400, which is about 125 above the present level.

2. The figures in column 3 are national rates applied to the sample. An indication that this practice is permissable comes from the seven deaths among PPL staff in 1980, which equalled the national rate times the approximately 1100 PPL staff in 1980.

3. "Improved Conditions" means that all existing realistic ways to precent death from chronic diseases have been applied. Medical breakthroughs are not included, and the amount of money per person (in 1981 dollars) spent on health care is the same throughout the 10 year period.

E. de Haas

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Information Services, Module 2, C-Site, James Forrestal Campus, ext. 2754.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 20 August 5, 1981

TFTR Neutral Beam Passes Test

A successful test of the cryopumping system for the TFTR neutral beams was accomplished on June 10 and 11. Liquid nitrogen and helium were used to lower temperatures in the vacuum chamber to -450° Fahrenheit.

According to Rolf Brocker, who was in charge of vacuum enclosure assembly, the test "verifies and duplicates the results Berkeley (Lawrence Berkeley National Laboratory) obtained in the operation of the prototype neutral beam. We got the results we expected, which proves that the whole thing works. The painstaking, tender loving care that has gone into the building of the TFTR neutral beam has paid off."

The beam cryopumping system consists of two arrays of cryocondensation panels installed along two sides of the vacuum enclosure. Liquid nitrogen and helium are pumped through the panels, cooling the interior of the vacuum enclosure. Stray particles 'stick' to supercold baffles in the panel array, allowing the neutral beam to pass unhindered from the source into the TFTR plasma.

Brocker said work on the beams is continuing on schedule. Beamline Number 1 (the subject of the test) will be moved to the TFTR site approximately in September of this year as the first component for the three source test setup.

Current Drive Experiments Successful On PLT

In the most successful current drive experiments to date, lower hybrid waves were used on PLT to drive a 200-kA plasma current for one second. In the series of experiments on Saturday, July 25th, 100 kW of lower-hybrid-wave power at a frequency of 800 MHz was injected into the plasma using an

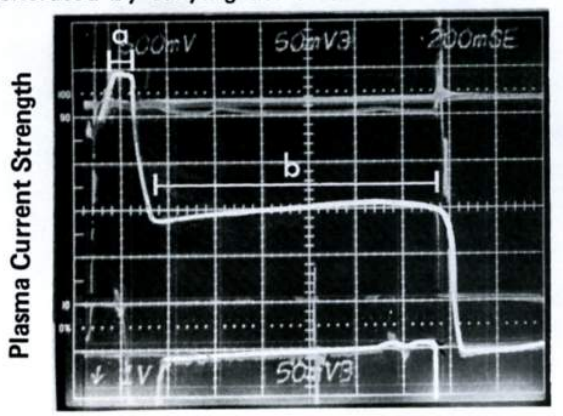
array of six waveguides. Central electron densities were about 5 x 10^{12}, and electron temperature was in the range of 1 keV.

The entire machine pulse lasted about 1.3 seconds. Ohmic current was used for the first 0.3 second; wave-generated current was used for the remainder.

According to physicist Bill Hooke, the significance of these experiments lies in the length of time the current was generated and in the efficiencies that were achieved. It was predicted that a current of only a few tenths ampere per watt of radio-frequency power input could be achieved for driving bulk electrons, but these experiments reached a significant 2 amperes per watt of input by driving tail electrons, those energetic electrons that are moving faster than the bulk electrons. The experiments were carried out on low-density plasmas. The next big step will be to achieve comparable results at higher densities, and for even longer times.

Lower hybrid waves generate a current in the plasma when all of the waves are propagated into the vacuum vessel in the same direction. The waves selectively accelerate those electrons already moving in the direction of propagation. With proper phasing of the waves, a current is generated.

In previous experiments, the plasma current was generated by varying the electric current in the ohmic heating coils. The plasma acts as the secondary coil of an air-core transformer, and a current is generated. The need to rapidly change the current in the coils, however, limits the length of a machine pulse. Using radio-frequency waves rather than ohmic coils to generate the plasma current eliminates this need and could lead to steady-state operation of tokamaks, an important development in fusion reactor technology.



This photograph of an oscilloscope reading shows the plasma current strength over time during a machine pulse. Ohmic current was applied during period A. When it was terminated, the plasma current dropped rapidly. During period B, lower hybrid waves were injected and the plasma current was maintained. Each square represents a time period of 0.2 second. The bottom line on the graph represents the loop voltage, which stayed near 0 or even below, indicating that the plasma current was attributable entirely to lower hybrid waves.

Benefit Changes

The University Benefits Committee has approved two improvements in the university's medical plans.

The monthly $50 limit on major medical reimbursement for treatment of mental or nervous disorders has been changed to a yearly reimbursement limit of $600. The change is intended to assist those needing more intensive therapy over a short time.

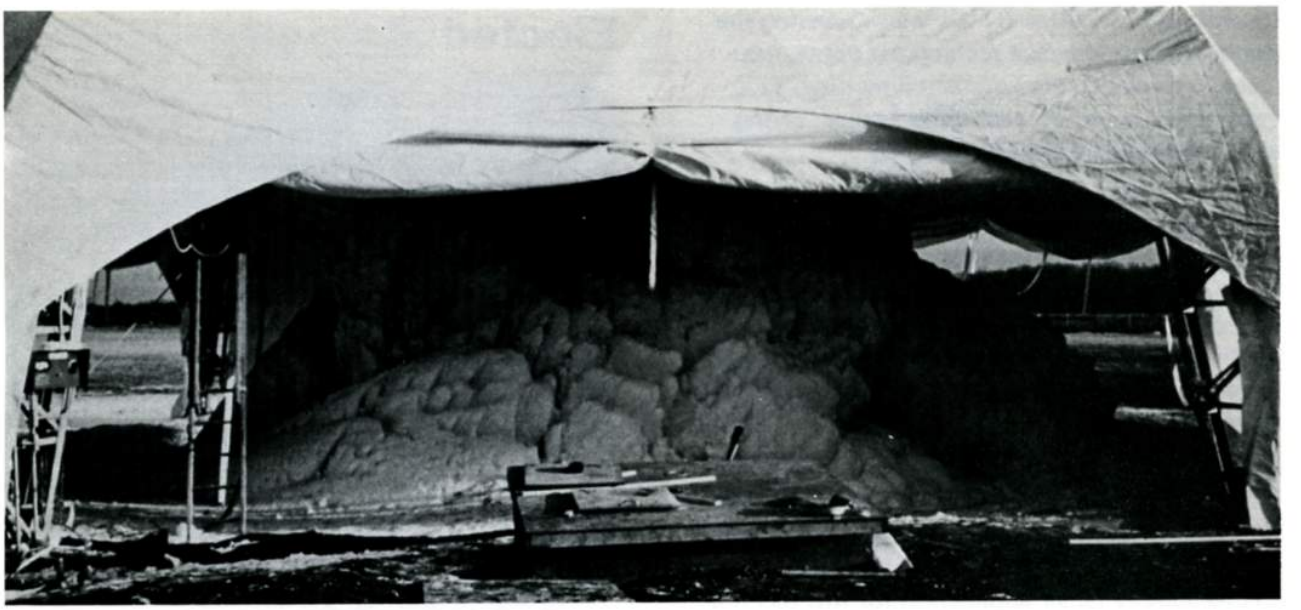
The definition of eligible dependents for Blue Cross/Blue Shield 750 series has also been changed. Spouses and unmarried children (either through the end of the benefit month in which they marry, or through the end of the calendar year in which they turn 23) qualify as eligible dependents. Unmarried children are no longer required to be dependent on their parents for support to be eligible for coverage.

Questions on either of these changes should be directed to Eleanor Schmitt, ext. 2035.

Environmental Dome

A 22-m diameter dome at B-Site is proof that nuclear fusion is not the sole energy option being pursued at the Forrestal campus. The dome is part of an experimental solar-powered air-conditioning system, conceived by Dr. Ted Taylor of Princeton University's Center for Energy and Environmental Studies. The project is managed by Prof. Robert Socolow, consulting engineer Don Kirkpatrick and graduate student Marco Masoero.

The cooling system is a reincarnation of the old ice house, which stored winter ice for summer cooling. A PVC-lined pond, 18-m in diameter and 3-m deep, stores ice produced by a commercial snow-making machine. The snow maker sprays small (0.1-m diameter) water drops, which quickly freeze and settle into the pond. In sub-freezing



The dome with its flaps open, revealing the large pile of snow.

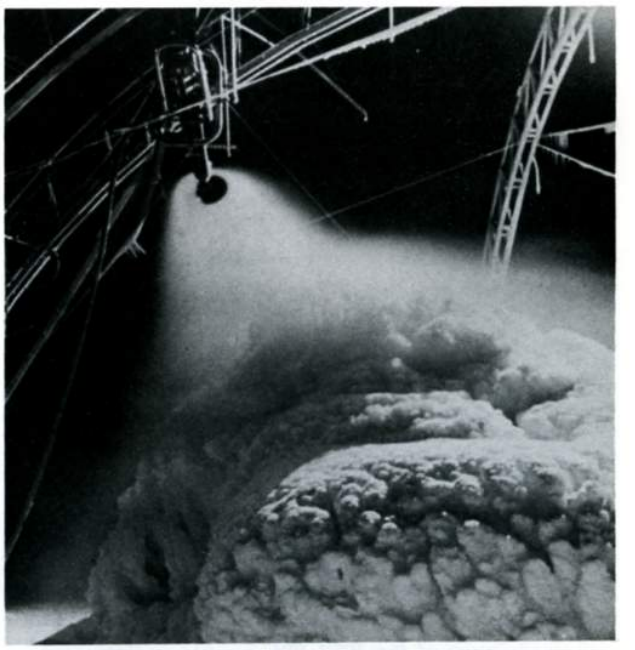
weather, flaps on the dome are opened to aid air circulation.

At the close of the snow-making season, the flaps are closed to block warm winds, and an insulated blanket is placed over the ice. During the air-conditioning season, melt water from the reservoir is pumped into a building, where it absorbs heat through an air-cooling heat exchanger and flows back into the pond. The remaining ice cools the warmed water back to 32° F. Each ton of ice provides 288,000 BTU's of cooling.

Efficiency is the main advantage of this system. The seasonally-averaged coefficient of performance (or COP: the ratio of heat removed to electricity consumed) of a conventional air conditioner is usually less than 3. During the relatively warm 1980-81 winter, the ice pond had a COP of about 9; seasonal COP's greater than 20 are theoretically achievable. As an additional bonus, major energy use is shifted away from the summer peak load period, reducing expenses for utilities and users.

Ice ponds, however, have higher capital costs than conventional chillers. Since ice-making depends on cold winter weather, the technique is most practical in climates that have a "balance" of winter cold and summer heat. Additionally, large reservoirs are required to achieve acceptably low melting rates, suggesting ice pond use for office buildings and clustered houses; fixed costs for isolated homes presently appear to be excessive. Some of these problems may be alleviated by properly incorporating the system into new construction.

An office building under construction at Forrestal Center will utilize the first full-scale ice pond system. The 36-m x 49-m x 6-m deep reservoir will store up to 5,000 tons of ice, with a cooling



A nighttime shot of the snowmaker in operation. The dome, not present in the photo, is supported by the curved members.

capacity of 1.4 billion BTU's/year. Covering the pond will be a low-cost rectangular dome, insulated to minimize environmental melting. This system will approach cost-effectiveness, saving about $12,000 of electricity a year.

In urban areas, land could be saved by placing the snow maker on a roof (where adequate air flow exists), and allowing the snow to fall down a shaft to a basement reservoir. Ice for entire cities might be stored in lakes or flooded quarries, with the cooling water transported long distances through large pipes. Storage ponds that big will need little or no insulation.

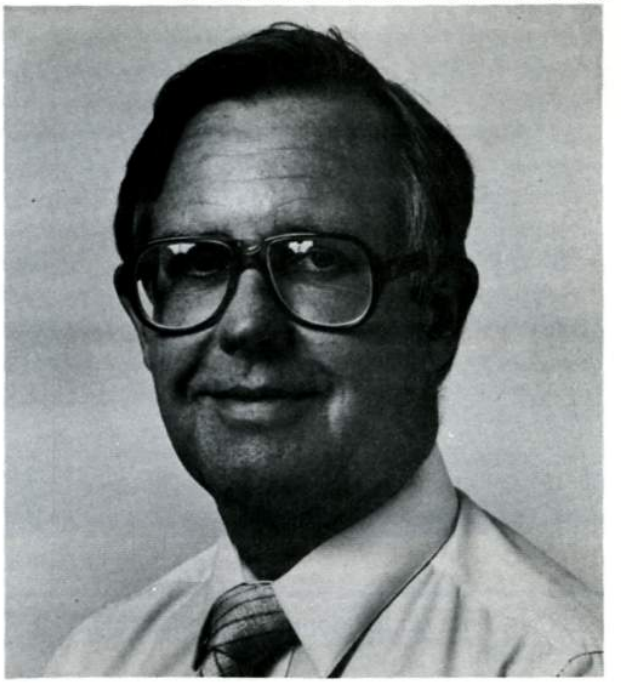
Ice ponds may eventually provide a majority of space cooling, which accounts for 4% of present U.S. energy requirements. Industrial and commercial refrigeration and process cooling could provide a considerably larger application for this technology. Users will benefit from reduced costs; utilities will benefit from reduction of expensive peak loads; and both groups will benefit from reduced dependence on fossil fuels.

Bicycle Racks

In order to encourage and facilitate the use of bicycles, storage racks have been provided at key locations around Forrestal Campus. Everyone is requested to use the racks, due to a variety of problems that result from random parking of bicycles around the laboratory.

Sheryl Cargill and Anne Golden (foreground, left to right) are co-chairmen of the 1981 PPL Blairstown Potpourri ticket committee. John Anastasio and Jim Turley (background, left to right) are members of the committee, as are Joe Cecchi and Robert Applebaugh (not pictured).

Elected



Russ Winje of the PPL Advanced Projects Design and Analysis Division (APDAD) was recently elected a senior member of the Institute of Electrical and Electronic Engineers, the major professional organization for electrical and electronic engineers.

In a letter commending Russ on his appointment, Associate Director Paul Reardon said "The experience you have across the board in power transmission, switch gear, high power RF modulator systems and high power rectifier systems is relatively unique, and we are indeed fortunate to have you so effectively coupled into the fusion power development activities of our laboratory and our country."

Russ came to PPL five years ago, after having worked for Fermilab and the Argonne National Laboratory. He is currently involved in work on the TFTR neutral beam power supply.

Thank You

To all of "vous" who helped to make my Birthday special: "Thanks!" —Moi

Fire Safety

Flame itself is not the only killer in a fire. Fire needs oxygen to start, and consumes oxygen as it burns. The normal oxygen content of the air we breathe is about 21 percent. During a fire, that level drops rapidly. If it falls below 17 percent, clear thinking and muscle control are impaired; your attempts to escape become irrational. When the oxygen level drops below six percent, breathing stops. If the brain is deprived of oxygen for four to six minutes, brain death occurs.

The heat a fire generates can also be deadly. The human body can tolerate temperatures between 150°and 250° Fahrenheit for only moments. In a serious fire, superheated air with temperatures in excess of 1000° F rises to the ceiling, then fills the entire room.

In addition, most fires generate a number of gases which can have drastic effects on the body. These include:

- Carbon Monoxide -- a tasteless, odorless, colorless gas that hampers oxygen flow to the brain
- Carbon Dioxide -- over-stimulates the breathing rate, increasing the intake of other toxic gases
- Hydrogen Sulfide -- affects the nervous system, causing dizziness and respiratory system pain
- Nitrogen Dioxide -- an extremely toxic gas which numbs the throat and causes asphyxiation by displacement of air

Fire's major threat, however, is smoke. Smoke may contain some or all of these toxic gases, and may interfere with vision or obscure light. Smoke particles irritate the respiratory system, causing coughing and sneezing. The impairment of breathing, seeing and thinking clearly often lead to panic -- which can easily lead to death in a fire.

In a smoky fire, crawl close to the floor where the air is cooler and less smoky. GET DOWN ON YOUR HANDS AND KNEES AND GET OUT!

The best protection available against the hazards of smoky fires is a smoke detector. Everyone in the family should be familiar with the sound of the detector, and a family meeting place outside the home should be established. Practice evacuation procedures regularly, until the procedures become habit.

There are several things to remember if you have a smoke detector:

- Sleep with bedroom doors closed; smoke detectors have a high decibel level that will penetrate into the room.
- Be sure everyone realizes the smoke detector siren means GET OUT NOW! Test this by activating the alarm while family members are sleeping and observing the results.
- Never waste time getting dressed or gathering valuables during a fire. They are replaceable; your life is not.
- Feel every door before you open it. If the door feels hot, or smoke is seeping past its bottom or sides, DON'T OPEN IT! Leave the room by an alternate exit.
- Use windows for escape and rescue.
- If there's smoke, crawl near the floor.
- If your clothing catches on fire, STOP, DROP AND ROLL to put it out.
- Once you are out of the house, go immediately to your meeting place.
- Call the fire department. Make sure you give your complete address, and say whether you think someone may be trapped in the fire.
- Once out of the house, STAY OUT! NEVER return inside a burning structure, and don't let anyone else back into the building.

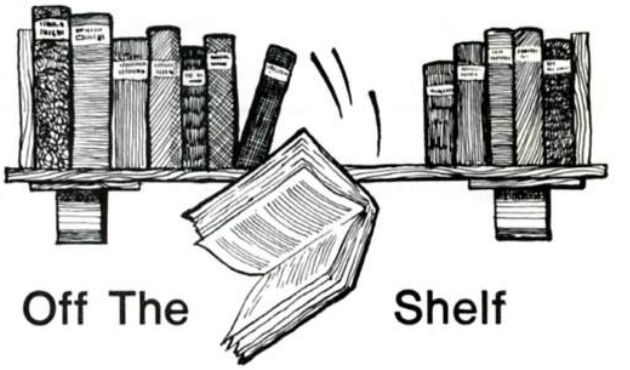
New Hires

Jane Holmquist joined the PPL staff as assistant librarian on July 1. Jane, who holds a M.L.S. from Rutgers University, received a B.A. in biology from Gustavus Adolphos College in Minnesota. She also earned a M.S. in biology from the University of Waterloo in Ontario.

She has been working in Princeton University's geology library, as well as in Firestone Library's microfilm division, for the past two years.

Jane is responsible for answering reference questions and conducting literature searches using the DOE/RECON and other data bases. Her duties also include abstracting journals and technical reports.

Jane replaces Tom Conkling, who has become the librarian at the University of Pennsylvania's engineering library.



Off The Shelf

With this issue, the HOTLINE introduces a new column called OFF THE SHELF. Written by PPL Head Librarian Betty Graydon, the column will feature new publications of general interest that are currently available in the library.

NEW JERSEY'S GOT IT–

An all inclusive list of events being held throughout the state. Provides information on hunting, fishing, summer theatre, the Garden State Arts Center, flea markets, antiques and much, much more. Published quarterly by the New Jersey Division of Travel and Tourism, Trenton, New Jersey.

RAND McNALLY ROAD ATLAS–

Plan your trips by consulting the newest edition of this very popular atlas. The volume includes maps of the United States, Canada, and Mexico, 250 city maps and both a mileage and driving time map. New York: Rand McNally Co., 1980.

NEW INTERNATIONAL ATLAS–

Latest edition of this classic volume of international maps. Greatly expanded in scope, this atlas now includes place names in local language as well as in English, a glossary, abbreviations of geographical terms, a world information table, and a section on metropolitan area maps. New York: Rand McNally and Co., 1980.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Information Services, Module 2, C-Site, James Forrestal Campus, ext. 2754.

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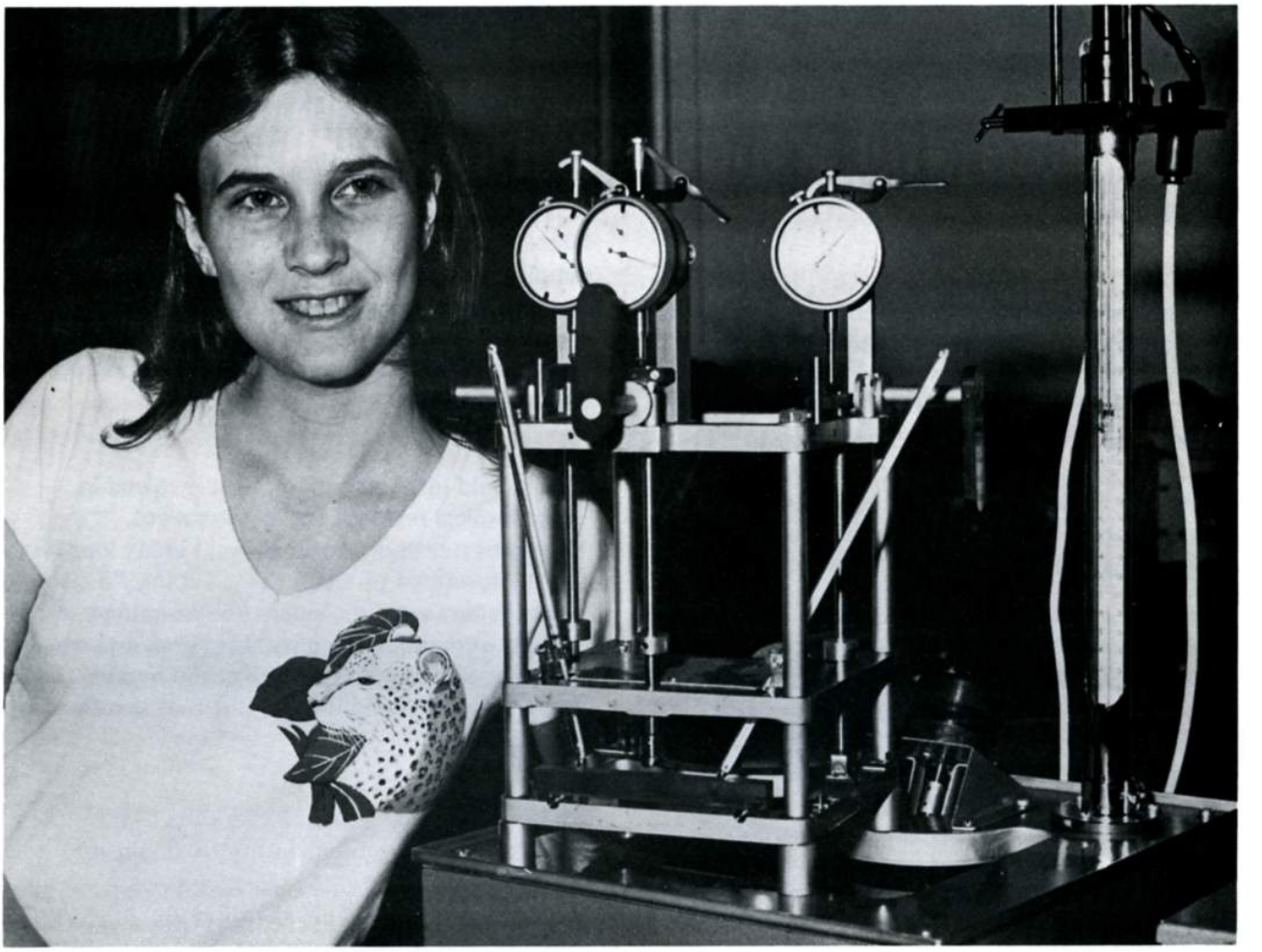
ppl people



Metals Spark Student's Interest

The next time you watch a welder raise his mask on a break, don't be suprised to see a woman's face. It might be Kristine Richter, a metallurgical engineering student who is working at PPL for the summer.

Kristine, a 21-year-old from Warren, N.J., is entering her senior year at Lafayette College in Easton, PA. Her major is metallurgical engineering, an interest that, oddly enough, she became aware of during a discussion at band camp.

"A friend of mine first mentioned it to me," Kris explained. "She said it was much easier to switch out of the program than to switch into it, so I thought I should try some of the courses."

She did, and found herself engrossed by a demonstration given by Dr. McGready, presently the director of engineering at Lafayette. "He was like the Wizard of Oz, pulling pieces of metal out of his bag. He explained that his job was to determine why metals fail (in auto accident cases, for example) and to testify as an expert witness in court. I was fascinated by that; it seemed much like detective work."

Kris says she took the "roundabout" way towards her career choice. "First I studied civil engineering, and worked as a surveyor for a while. Then I took chemical engineering for a semester, but it's a very broad field. I narrowed my study to metallurgy because I'd always been curious about what things are made out of. My father (an engineer himself) and I have a lot in common, and often discuss our work."

Metallurgists get involved in a number of areas, according to Kris. Her preference, however, involves analyzing metals' structures with a microscope to determine their properties. This knowledge is then applied to other metals to create new alloys. Metallurgists are often instrumental in the design phase of machinery, suggesting old metals or designing new alloys to meet specific applications.

Kristine applied to the summer program at the suggestion of her uncle, Harold Richter (a technical specialist in the electronics section). "This is a colorful place," she asserts. "I've had a variety of jobs during the two summers I've worked here. Last summer I worked as a computer programmer for Dr. John Coonrod, and I really enjoyed working on the simulation of the tokamak. I was also here for two weeks in January, doing computer work in addition to doing the layout necessary for the fabrication of metal parts. This summer I began working in the Tech Shop, and ran the drill press and other machinery."

She's being exposed to several aspects of metallurgy. Kris spent a week with Hector Morales, who showed her the fine points of welding. "Hector's a good teacher," Kris feels. "I learned a lot from him; he kept me working all the time, but it was very interesting."

Kris says she hasn't run into any discrimination on the job. "I haven't had any trouble," she reports. "My co-workers are eager to share their knowledge and expertise with me. They treat me like one of the gang!"

Kris is now working in Dr. Graham Brown's Metals Testing lab, mounting and polishing metal samples for analysis and testing various materials. She enjoys being switched from job to job by supervisor Joe Csenteri, considering the experience beneficial. She'll remain at PPL through the end of August.

Kris would ultimately like to get involved in metallurgical research and development. "I'd like to be developing new alloys; I enjoy working on the forefront of technology. I think I'd also enjoy failure analysis, where you examine a small sample of metal, tracing its history back to how it was cast and formed to discover the reasons for imperfections it might have. But that takes a lot of experience."

She's gaining that experience at PPL. "At school, there's not enough opportunity to go out into the field and learn something. When you learn on site, you take things into consideration you might not have thought of in school—like the fact that metal stretches considerably upon forming."

She might even make her career here. "I'd consider working here," she quickly asserts. "The atmosphere is friendly, the people are nice—I really like it here!"

Suggestions for future PPL PEOPLE features are always welcome. Send your ideas to HOTLINE, Module 2, Room 160 or call ext. 2754.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 21 August 21, 1981

CICADA Acceptance Tests

The CICADA (Central Instrumentation Control and Data Acquisition) computer system for TFTR has passed the test phase of the acceptance procedures with flying colors.

In the first test, the hardware and software features of the 14 computers were demonstrated by System Engineering Laboratory (SEL), the computer vendor. This was followed by a one-month system performance test to measure availability. All 14 computers were required to be available as a system 90 percent of the scheduled time, and a subset of 12 computers necessary to operate TFTR was required to be available 98 percent of the scheduled time. The final phase of acceptance testing, correction of outstanding problems, is currently underway by SEL.

The CICADA system will control all TFTR operations. It will include 14 SEL Model 32/75 computers, a control room, inter-system hard-wired interlocks, CAMAC (Computer Automated Measurement and Control) modules and fiber optic links that carry signals between the computers and CAMAC modules. The CAMAC modules, which will be located in the test cell, will translate signals back and forth between the computers and the machine diagnostics or control hardware.

Currently, all but one of the computers are installed in the TFTR control area in the LOB east wing basement. The remaining unit is being used in the PLT x-ray imaging experiment run by Dr. S. von Goeler, and will be moved to the basement later this year.

The computers are presently configured in two separate systems: a development system and an on-line system. The former is used to develop programs and test users' center hardware. The latter supports present user requirements, such as calibration of TFTR instrumentation and pre-operations testing. Next year, the computers will be reconnected into a single on-line system.

The CICADA (Central Instrumentation Control and Data Acquisition) complex for TFTR, as seen from the LOB visitor's gallery overhead.

The security and fire alarm system for both B and C-Sites, the TFTR/MG Room, and the pumphouse are now hooked into the computers.

The computers use a software (programming) operating system furnished by SEL. An updated version, both faster and more convenient than the present software, will be installed in November or December 1981 as part of the continuing software updating process.

The control room presently has more than half of its required hardware, which includes CRT terminals for data display, computer controls and television screens for visual inspection of TFTR. Color display terminals will be used by machine operators, since colors capture attention faster. This allows operators to react quicker to phenomena, thus avoiding damage to TFTR. The resolution of the color terminals was recently doubled, and equipment testing is continuing.

Half of the estimated 2000 CAMAC modules have been delivered. CAMAC modules that will interface with diagnostics have special requirements; the diagnostics are expected to use 12 to 15 kinds of modules. Specifications for three of these modules have been completed and placed on order. Specifications for the remaining modules are being developed, and additional non-diagnostic CAMAC modules are on order.

Fifty fiber optic cables have been installed between the computers and the TFTR building. The cables are run through the connecting tunnel, which links the LOB to the test cell. If placed in one group, the cables would be about one inch in diameter. If coaxial cables were used instead, the collection would be at least five inches in diameter.

Several of the optical cables are now in use to control portable consoles and CAMAC equipment located in the TFTR/MG building. Each fiber optic cable is capable of transmitting five million bits/sec, which is comparable to 500 to 600 pages of an average book.

During August, pre-operational testing of the TFTR/MG system and the first energy conversion power supply with the CICADA system will begin.

ERC Nominations

Elections for ERC members to serve for fiscal year 1982 will be held September 22, 1981. Nomination forms will be sent to all employees during the last part of August and nominations will be accepted during the first week of September.

Now is the time to start thinking about who you want to represent you on the ERC next year.

See future issues of the *Hotline* for more details.

Women's Softball

Players are being sought for a women's softball team now being organized. The team will compete in a women's league next season, and would play one night per week after work.

All women employees of the laboratory are invited to participate. For further information, contact Pat Pugliesi at ext. 2127.

Perceptions of Fusion

While the characteristics of fission and fusion differ in many respects, the two have been closely linked in the minds of the public.

That is the major finding of a study conducted by John A. Hebert and Richard Shikiar, prepared for the Program on Commercialization of Magnetic Fusion Power of the Battelle Pacific Northwest Laboratory. The report, "Perceptions of Fusion Power", measured how four groups feel fusion energy stacks up against other energy schemes.

Sampled groups included the "pros" (groups favoring nuclear power and economic growth); the "cons" (those favoring strict energy conservation and environmental protection); the "neutrals" (those assumed to have no strong predilection on the question); and the "experts" (those involved in the nuclear and fusion fields).

The 198 survey respondents were asked to rank a number of energy strategies (fusion, oil, coal, nuclear fission, biomass, solar, hydro and wind) in relation to their similarities and attributes (such as hard versus soft technologies, polluting versus non-polluting, and so on). Each method of energy production was defined in terms of producing electricity.

The study found that the con group's emphasis was heaviest on the hard/soft technology distinction, resulting in a "slightly unacceptable" rating for fusion. The expert group rated fusion first in acceptability, grouping it with nuclear, hydro, wind and solar options. The pro group favored all ways of producing electricity, while the neutrals found fusion "slightly acceptable".

The study concludes that fusion and fission are seen as very similar by all four groups, and cautions that public attitudes toward fission might be transferred to the fusion effort. While passive tolerance of fusion may be anticipated, the report pointed to topics of health, cost, necessity, risk, pollution and fuel availability as possible points of contention in the future.

Extension Change

All questions on employee benefits should be directed to Eleanor Schmitt at her new telephone number, ext. 2046.

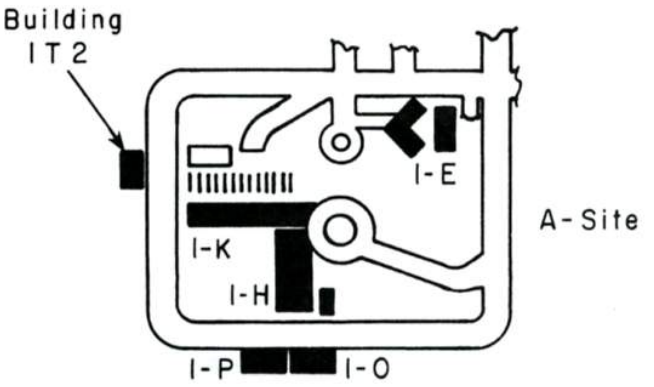
Relocation

Current PM&O renovations have caused the Transportation Services office, Dispatcher and vehicle fleet to be temporarily relocated to the 1T2 Building at A-Site. The 1T2 Building is on the periphery road around A-Site, off the west end of Building 1K (next to the vehicle maintenance garage). The building is directly on the shuttle route.

To arrange for a vehicle or any other services (such as material handling, rigging, material pick-up or delivery and so on), come to or call the new location. The phone numbers remain the same: Supervisor Henry Miller, ext. 3109; Group Leader Pat Zeedyk, ext. 3736; Dispatcher Patricia Olsen, ext. 3108; and the maintenance garage, ext. 3110.

During this interim period, it will not be necessary to call the PM&O scheduler-expediter at ext. 3092 to arrange for transportation services.

Fuel may still be obtained from 8:30 to 9 a.m., 11:30 a.m. to noon, and 3:45 to 4:15 p.m. Monday through Friday at the pumping facility behind the Maintenance building.



Credit Union Changes

The Board of Directors of the Princeton University Employees' Federal Credit Union recently voted to revise two loan policies. Both actions became effective on August 5.

Applications for loans will now be considered by the Credit Committee only for those who have been members of the Credit Union for at least three full months.

The Credit Union has also discontinued student loans, which had been available under the aegis of the Department of Higher Education of the New Jersey Higher Education Assistance Authority.

Several circumstances prompted the halting of student loans, according to Credit Union president Bruce Finnie. Recent legislation has imposed new restrictions on the loans, including a means test and a fee. Problems that lending institutions have encountered in collecting student loans were also a determining factor in discontinuing loans.

Finnie reported that some lenders continue to grant student loans, and the Credit Union will be happy to direct potential borrowers to them. The Credit Union will supply to members who currently hold a student loan through PUEFCU a letter releasing them to borrow elsewhere.

The Credit Union board noted that Princeton University makes low-cost educational loans available to employees to help with the costs of their children's postsecondary education.

Bus Trips Slated

The Princeton Get-Away Club has planned two bus trips to the Garden State Arts Center for the end of the summer.

Tickets are available for Anne Murray's August 30th show. The bus will leave lot 23 at the university at 6:45 p.m. Tickets are $14.45 each, which includes transportation to the Arts Center and admission to the show.

Tickets are also available for the performance of the New York Philharmonic Orchestra, under the direction of Zubin Mehta, on September 9. Tickets are $16.95 per person, including transportation to the Arts Center and admission to the performance. The bus leaves lot 23 at 6:45 p.m.

For reservations, send your check to the Princeton Get-Away Club, Dod Hall Mail Room, Princeton University, Princeton, NJ 08540. For further information, call 921-6620 after 5:30 p.m.

New Fire House

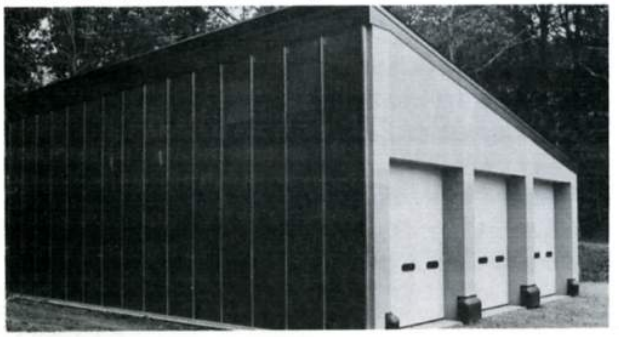
Five former PPL fire chiefs helped the PPL Emergency Services Unit open their new fire house on C-Site recently.

Former chiefs John Hirthler, Walt Weyman, Bob Sylvester, Ray Pressburger and Dick Carlese joined present chief Jack Anderson at the dedication ceremonies for the 45 ft. x 61 ft. building. Laboratory Director Harold Furth, Associate Director Richard Rossi, Assistant Director Mary Shoaf, and members of the Emergency Services Unit were also present at the dedication.

The new fire house features three bays and a shop area, with capacity for parking all of the laboratory's emergency vehicles. Solar heating is incorporated into the building through a trombe solar heat wall on the south side of the structure. Louvers on the wall can be opened or closed to control the interior temperature.

Chief Anderson is expected to move his office into a trailer adjacent to the new fire house later this month.

Former fire chiefs John Hirthler, Walt Weyman, Bob Silvester, Ray Pressburger and Dick Carlese (left to right) joined laboratory Director Harold Furth, Associate Administrative Department Head Robert Smart, DOE-PFPO Director J. Nelson Grace, present fire chief Jack Anderson, and laboratory Associate Director Richard Rossi at the opening of PPL's new firehouse (above). The building features a trombe solar heating wall (below).



Bloodmobile

The Bloodmobile will again visit the laboratory, September 1 from 10 a.m. to 3 p.m. at Sayre Hall. Those wishing to donate blood should contact Meg Gilbert at ext. 2036 to set up an appointment. Donors will be scheduled every 15 minutes and refreshments will be served.

Although employees are covered for blood needs under a group plan, the university must meet its yearly quota of blood donations to continue to offer this benefit.

Blairstown Potpourri

Something old and something new will be featured at the annual Blairstown Potpourri, scheduled for September 19 in Jadwin Gym.

As in past years, the Potpourri will offer a large selection of house and outdoor plants for sale. A craft sale will include wall hangings, macrame, and other handcrafted items. Books and baked goods will also be on sale during the Potpourri, and the annual raffle will feature a $500 "trip of your choice" donated by the Kuller Travel agency.

Tickets for the raffle are available from any ticket committee member, or from Ellie Weed, ext. 2438. Those interested in purchasing table space for the day should also contact Ellie.

The new activity at the Potpourri is a games festival for students, youngsters and adults. Group fun, rather than competition, is emphasized; there will be no winners and losers in the festival.

All proceeds from the Potpourri go to support the Princeton University's summer camp program in Blairstown, N.J. The camp conducts an outdoor adventure program, mainly for youths from the center cities. Camp counselors are mostly Princeton University undergraduates with extensive outdoor experience.

Those wishing to make a donation of items for sale at the Potpourri should contact Ellie Weed to arrange for pickup of the items.

ppl people

Soaring

From the dawn of time, man has always envied the birds for their ability to fly. Although one can now cross the globe in the Concorde in record time, many still long for the silent, swooping flights of eagles lazily riding the air currents. For these people, the desire for "pure" flight can only be satisfied by soaring.

Soaring enthusiasts, such as Applied Physics Division head John Schmidt, regularly climb into planes resembling overgrown versions of children's toys. The wings seem almost unnaturally long, and there is but a single wheel directly under the body. The glider must be towed into the air by a motored plane, but when the towline linking them is cut, the glider pilot can soar with the eagles for as long as the forces of nature—and his skill—will permit.

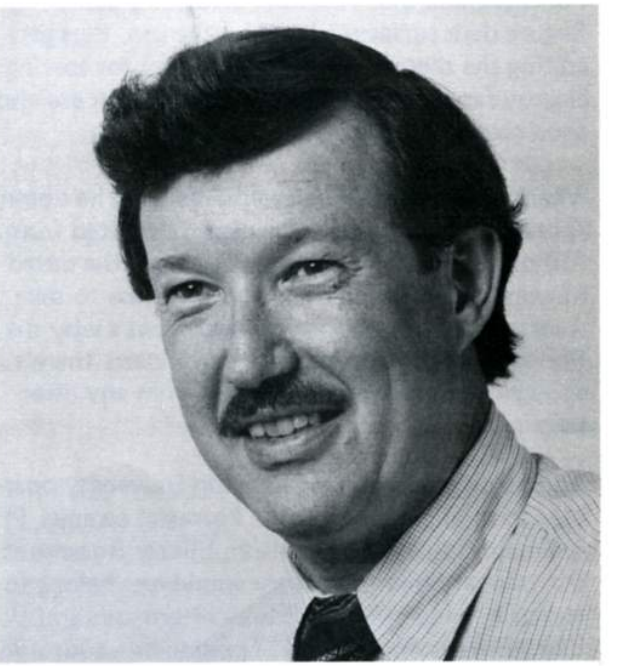
John recalled he's always been interested in flying, "but I never had the funding to do it. (Soaring is) a way of flying without making the tremendous financial and time commitment that you have to to fly a motored airplane."

What's the allure of riding the wind without a propeller, using only a set of wings? Pilots contend that gliding is to flying a power plane as canoeing is to a motor boat. A motor powered pilot is trained to operate with a motor; when he loses that, that's an emergency situation. A glider pilot has no motor to worry about; there's just one less thing to break.

There's also the peace that makes soaring a definite plus for some pilots, who feel very serene and peaceful when they're flying.

John fully agrees. "You can be going through all kinds of problems on a Friday, then go out at noon, go up to 3,000 feet, and find a great way to relax."

While the motored pilot may be concerned with



John Schmidt

his gas reserve, the glider pilot's main concern is where to land his aircraft. The glider is pulled aloft by a motorized towplane connected to the glider by a rope. At a designated height (usually between 2,000 and 3,000 feet), the glider pilot pulls the knob that releases his craft from its "umbilical cord". From that point until he returns to the ground, he must use his knowledge of weather patterns and his flying skill to keep himself airborne. He utilizes lift (provided by thermal currents, certain cloud formations or updrafts of air created by land masses) and sink (air being channeled downward instead of upward) to manipulate the height of his plane. If he makes a miscalculation, he may be forced to land very quickly—and unexpectedly.

That's part of the challenge, according to John. "You versus the thermals (maintains the challenge). You never know, when they drop you off at 3,000 feet, whether you're going to come down in 15 minutes or whether you're going to get a thermal and stay up for 2½ hours—and that's a chal-

lenge...Why do you climb mountains? In part because you can see a long way, but in part because you may fall off!"

The PPL area offers a variety of good sources of thermal currents. The laboratory parking lot, the TFTR construction site, Forrestal Center construction sites, and the Princeton Shopping Center all feature dark surfaces heated by the sun, thus generating the thermal updrafts necessary for soaring. Nearby farms with sun-baked brown earth are also good sources of thermals.

When a glider pilot does eventually land, he doesn't necessarily land in the same place he started from. Although the planes are launched from the paved runway, pilots usually land on the grass to save wear and tear on the single wheel. That's why the Forrestal airstrip is very safe for gliders: there's enough room to land in the grass from any direction.

The Soaring Society of Princeton University operates four sailplanes from the Forrestal campus. PPL graduate students Lynn Olson, Eliezer Rosengaus, and several other laboratory employees belong to the club, which flies on Friday afternoons and all day Saturday and Sunday. Training procedures for prospective pilots are parallel to the procedures motor power pilots follow, and both groups are regulated by the Federal Aviation Administration (FAA). More than half the club's members who hold their private glider pilot license also hold a private power plane license.

"It's not a particularly cheap sport," John emphasized, "although flying from this airfield with this club is relatively cheap compared to other organizations. It's a well-run, economical undertaking. They don't charge you to learn; you don't get billed for the instructor, and that's a big savings."

"The big problem with learning is developing confidence," John believes. "Otherwise you're so stiff that you don't do anything right. But pretty soon you realize that you really can fly this thing, and get it to do what you want it to do, and that it's safe. That's the biggest step in learning."

John pointed out that although soaring may seem like a dangerous sport, the dangers are easily minimized. "In power planes, you run into the most accidents when people try to fly when they shouldn't. They're forced to go from one place to another on a day when they shouldn't be up. In a sailplane, you just don't do that; if the weather's lousy, you don't even want to go up. You never end up forcing yourself into conditions you shouldn't be flying in."

Although John hasn't flown in some time due to increasing travel on the job, he maintains that "certainly the risk I take if I were flying every week are exceeded by orders of magnitude by the risk I would take driving a car during a week....In a sailplane you're up there at 3,000 feet and there's nothing near you to run into. In a car, you're going 60 miles per hour and two feet away from you is something that, if you make a mistake and turn into, will kill you....People associate danger with height, but height doesn't kill; it's the relative velocity of the impact with something. Being 3,000 feet is very safe; there's not much to run into up there!"

For John, the risks are more than balanced by the beauty of the flights spent in the silent realm of the eagles.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 22 September 18, 1981

ERC ELECTION ISSUE

ERC elections will be held Tuesday, September 22, 1981.

Polling locations and times will be:

C-Site LOB Lobby	6:00 am to 4:30 pm
B-Site Cafeteria	7:30 am to 1:30 pm
Sayre Hall Auditorium	2:00 pm to 4:30 pm

The purpose of this election is to select representatives from each classification group to serve on the Employee Representatives Committee (ERC). The committee serves to channel concerns and suggestions from laboratory employees to PPPL management, as well as relay information from management to employees.The committee meets twice a month to discuss issues that have a bearing on employee safety, morale, and benefits.

The ERC was first formed four years ago. Since that time, the committee has dealt with a wide variety of issues. The ERC has been involved in the revamping of the overtime pay policies for bi-weekly employees, the reinstatement of a lab infirmary, van pooling, day care proposals, improved cafeteria service and much, much more.

All of the nominees running for office have indicated that they are able and willing to serve their classification group to the best of their ability.

Be sure to bring your identification card when you vote; ID's will be checked at the polls. Show your support for the ERC by voting in the election September 22.

Administrative

Marjorie Barnett
C-Site, LOB

Pam C. Johnson
C-Site

Kathleen Lane
Idg. 1-A

Irene Long
C-Site

Roberta Marlowe
C-Site

Doug Steacy
Bldg. 1-E

Ellie Weed
Bldg. 1-A

Nominated, but not pictured:

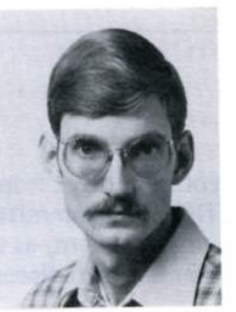
Irene Giersing
C-Site

Carol Hirschman
Bldg. 1-E

Lab & Shop/Drafting/Maintenance

John Anastasio
C-Site, PLT

Tim Bennett
C-Site



Bill Brinkworth
Computer Center

John Byaesko
Tech Bldg.

Terry Cost
RF Balcony

Lab & Shop/Drafting/Maintenance (con't)

Greg Czechowicz
C-Site

Lee Ellingham
Machine Shop

Janet Felt
C-Site DAS

Leon Jackson
Tech Shop

Greg Lemunyan
C-Site

Mary Ann McBride
Gas Dynamics

Henry Moreau
Bldg. 8-I

Bill Pointon
Power Engineering

Steve Ragolia
Maint. Bldg.

Nelson Rainier
Tech. Bldg.

Albert Saboski
Tech. Bldg.

Roland Snead
C-Site, PDX

F. Van Reymersdal
Aero Lab

Nominated, but
not pictured:

Jerry Hart
Maint. Bldg.

Tom Hurley
Bldg. 1-HA

Jack Hynes
Bldg. 1-F

Eugene Kearns
Bldg. 1-F

John Sadovy
Maint. Bldg.

Silas Snead
Bldg. 1-L

Office/Secretarial/Clerical

Suzen Bayer
C-Site, Mod. 2

M.J. Hollendonner
C-Site, Mod. 2

Sonja Patterson
C-Site

Chris Ritter
C-Site, Mod. 2

Eleanor Schmitt
Sayre Hall

Patricia Pugliesi
Matterhorn Bldg.

Barbara Sobel
C-Site

Research

Charles Karney
C-Site

Nominated, but not pictured:

Kingston Owens
C-Site

Greg Schmidt
C-Site

Fred Tenney
C-Site

Engineering & Scientific Staff

Mounir Awad
Bldg. 1-N

Sal Cavalluzzo
Bldg. 1-P

Ernst De Haas
TFTR-MG

Stuart Foote
Bldg. 8-I

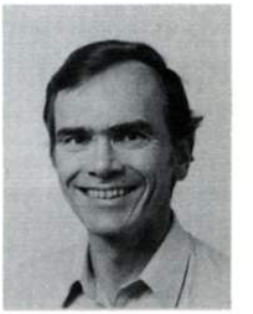
Don Hay
Bldg. 8-I

Fred Kloiber
Aero Lab

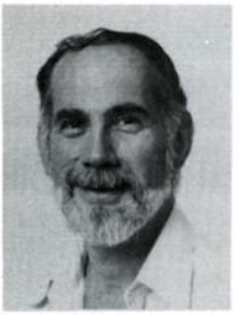
Judy Malsbury
C-Site

Larry Michaels
C-Site

Ed Moshey
Bldg. 8-I



Tom O'Connor
Bldg. 1-P



Charles Staloff
C-Site

Nominated, but not pictured:

Mike Pereira
Bldg. 1-K

Julie Rossmassler
C-Site

Mike Williams
C-Site

Technical Associate/Unit Supervisor/Specialist

Charles Beach
Aero Lab

George Beauregard
Bldg. 1-K

Mike Capone
Bldg. 8-I

Don Carter
Aero Lab

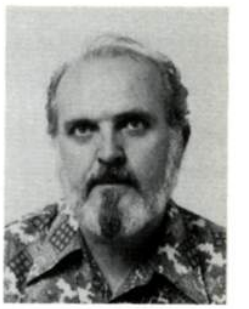
David Colburn
Bldg. 1-N

Jim Cook
Bldg. 8-I

Mel Gensamer
Aero Lab

Sam Hand
C-Site

Kris Mann
C-Site, PLT



Don Muschal
C-Site

Earle Sheaffer
Bldg. 1-N

Nominated, but
not pictured:

John Gumbas
Matterhorn Bldg.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 2, No. 23 September 22, 1981

Neutral Beam Moved To Test Cell

The first TFTR neutral beam was moved from the 1-H building to the TFTR neutral beam test cell recently, culminating a concerted effort by several laboratory departments.

The neutral beam unit was moved with its interior components intact. A crew from McHugh Brothers of Andalusia, PA, supervised by Don Kling, used a 175-ton mobile crane in the 1-H building to lift the unit onto a 75ft. long flatbed tractor trailer. The loading was completed September 2.

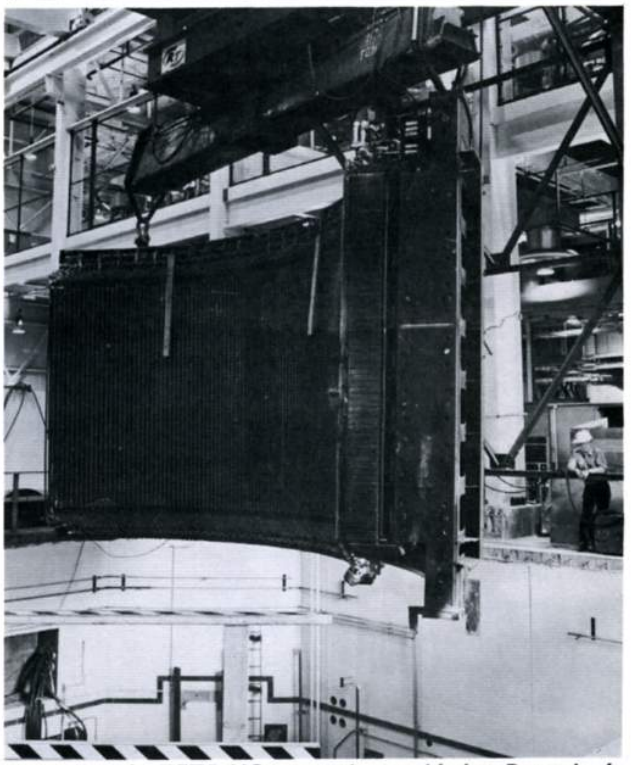
The 70-ton unit, which sat 20 ft. 6 in. high above the road bed, began its journey to C-Site at 9:30 a.m. Sept. 3. Al Swain, construction coordinator for PPL, explained that the procedure was "a very delicate move, because the equipment inside the neutral beam is delicate, and the entire unit is topheavy. It was a very high consequence move."

Al emphasized that the operation was not a one-man job. "The trailer was escorted by men in front and in back. PPL Transportation Services laid down steel plates over bad areas of the road. The University landscaping crew went with us to cut down low branches. Safety and Security were escorting the entire move. It was like a plan for an invasion, where each group knew exactly what to do at all times."

After "several tight turns", according to Al, the unit was backed into the neutral beam test cell room. It was removed from the trailer by the 75-ton bridge crane within the building, and placed in temporary position. It will next be used in the three-source power test.

Al offered his thanks to Ben Prichard , head of the TFTR neutral beam branch; Rolf Brocker and the neutral beam assembly group; Harry Howe of Safety; Jim Kopliner and Captain Goodwin of Security; Henry Miller, Pat Zeedyk, John Kessler and the crew of Transporatation Services; Lou Pizzarello and the University landscaping crew; Jim Ruddy of Procurement; and the Vacuum Shop.

(Pictures on next page)



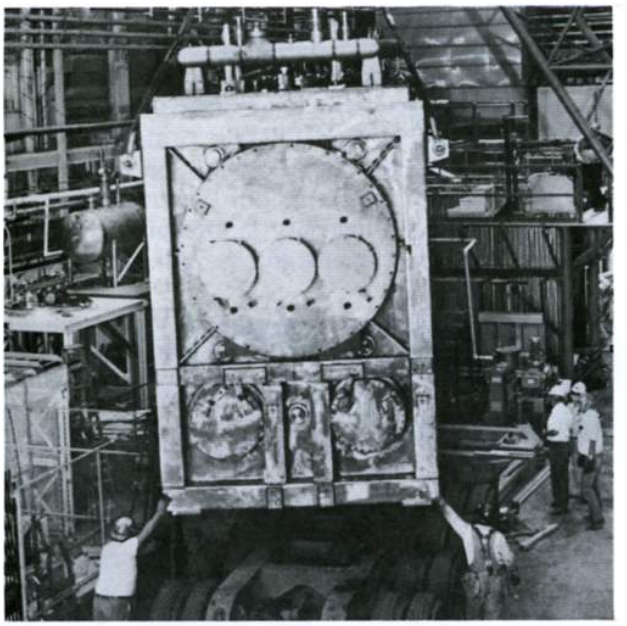
A section of a TFTR MG stator, damaged in last December's accident, is lifted from the pit in the TFTR MG area. All three segments of the stator have been removed from the site. Engineers from General Electric are assessing possible damage to the rotor of the set.

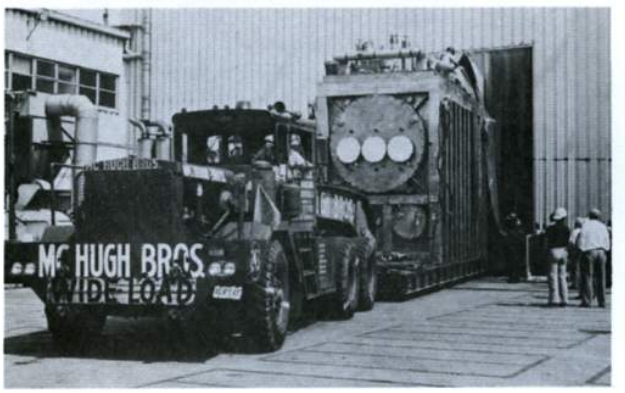
Symposium Scheduled

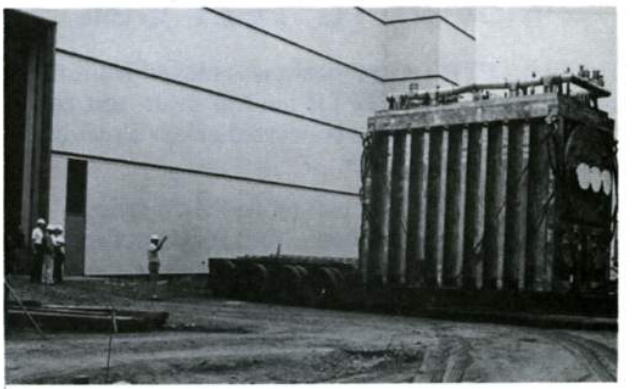
The Technology Department Symposium will be held on Tuesday, September 22 in the Melvin B. Gottlieb auditorium, LOB at 4 p.m.

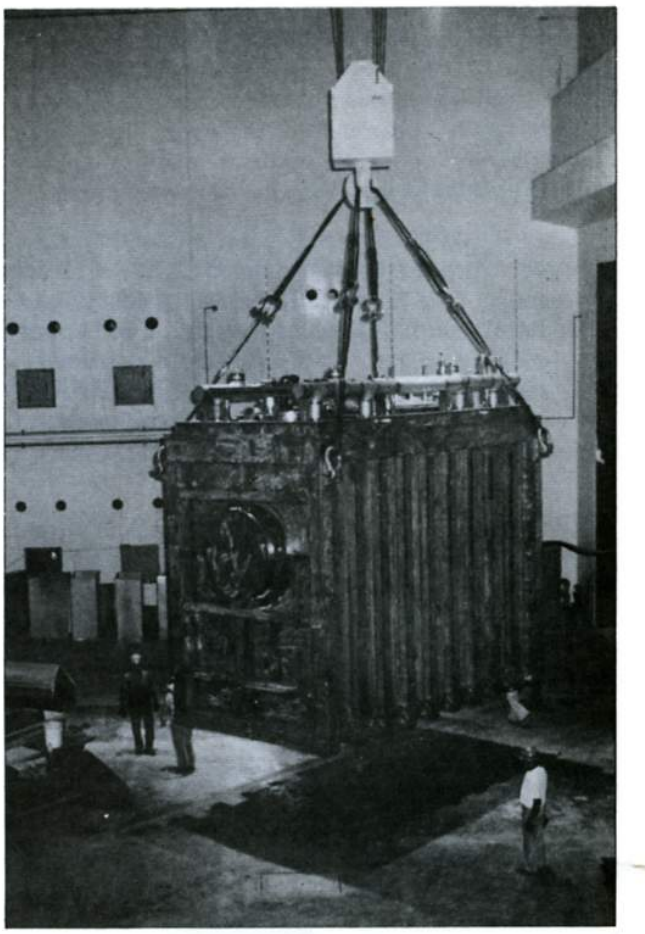
Dr. Kees Bol, Head of PDX at PPL, will speak on "The Poloidal Divertor Experiment Results to Date and Further Plans." In addition to the scientific results that have been attained, Dr. Bol will also discuss some of the engineering problems that have cropped up.

The moving of the TFTR neutral beam. (Counter-clockwise from left) The unit is lifted by crane and placed on a flat-bed tractor-trailer. After squeezing through the door at the 1-H building, the trailer gingerly made its way through several tight turns on the way to C-Site. The entourage, including the escort walking beside the trailer, stopped on the road to clear tree branches before proceeding. At the TFTR site, the unit was backed into the neutral beam test cell, and taken off the trailer by the crane within the building.









Loan Rates Rise

Personal loans obtained through the Princeton University Employees' Federal Credit Union will now carry an interest rate of 17 percent.

The increase in interest rates was approved by the credit union's Board of Directors. Car loans will carry 16 to 17 percent rates, while used car loans will include a 17.5 percent interest rate.

Loan applications are available to employees who have been credit union members for three full months. A schedule of the new rates is available at the credit union office.

Course Begins

A new course in experimental plasma diagnostics began at PPL September 14.

Nine guest lecturers from PPL's experimental staff will cover topics ranging from plasma probes to fusion reactions, with approximately three lectures devoted to each topic. Lectures in the course are open to all students and the laboratory public.

The course meets twice a week on Mondays and Thursdays, from 1:15 to 2:15 p.m. in the Melvin B. Gottlieb auditorium. Dr. Norton Bretz will speak on laser scattering Sept. 21, with Kevin McGuire beginning a series of three lectures on electric and magnetic probes Sept. 24.

The idea for the course was proposed last spring by plasma physics graduate students who noted a major gap in the regular curriculum. Students instrumental in suggesting and planning this promising new course were Fred Wysocki and John Goree, who enlisted organizational help from Dr. S. von Goeler and Dr. T.H. Stix.

Energy Conservation

Did you know that each 40 watt light costs approximately $10 per year to operate during working hours? That may not seem like a major expense, but PPL has over 20,000 40 watt lights. That amounts to quite a lighting bill!

The laboratory's Energy Awareness committee urges all employees to concentrate on turning off electric lights when not in use.

Lost and Found

An unspecified amount of cash was found in the C-Site parking lot near the modules September 7. To claim it, contact Security with the exact amount involved.

Luncheon Planned

Former Secretarial and Office Support Staff (SOSS) chairwoman Flo Short passes the gavel on to the group's new chairwoman, Muriel Strohl, during the SOSS's luncheon meeting September 15.

The Secretarial Office Support Staff (SOSS) held their annual luncheon meeting September 15 in the Melvin B. Gottlieb auditorium.

Laboratory Director Dr. Harold Furth discussed future laboratory plans at the luncheon, and Dee Hurley provided special entertainment.

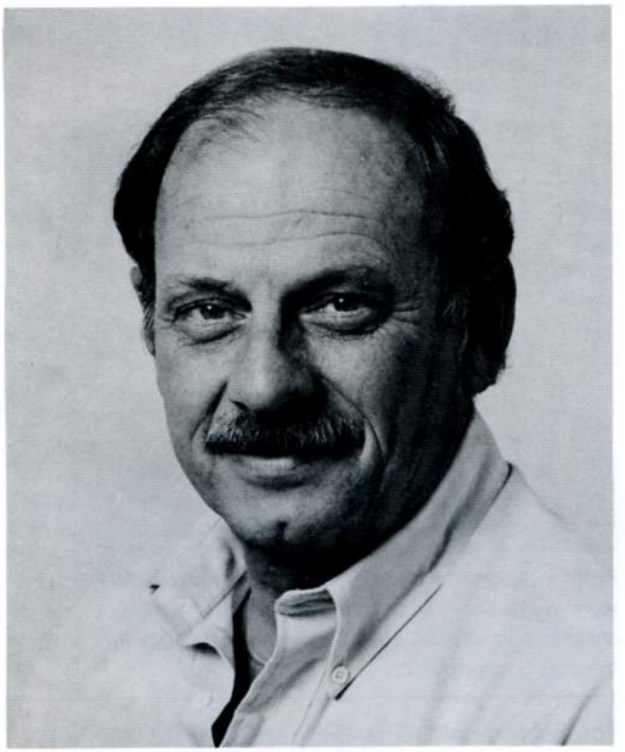
The new SOSS officers were introduced during the meeting. Muriel Strohl is chairwoman of the organization, with Ann O'Day as vice-chairwoman, Anne Golden as recording secretary, and Dolores Bergmann as corresponding secretary.

Seminar committee members include Edna Willis, Leigh Ann Fares, Gloria Pollitt, Mal Pulaski, Dottie Pulyer, Helen Quinn and Flo Short.

Soaring Openings

The Soaring Society of Princeton University has limited openings for its fall flying season. Society membership is open to all Princeton University employees, and entitles members to use of society soaring facilities at the Forrestal airstrip. A membership fee is charged per semester, with an additional charge made per tow when flying. Flying instructions are also available through the society.

Anyone interested in membership should call society secretary Howard Strauss at 452-6045 for further information and an application.



Terry Birch joined the Information Services Branch as a technical specialist in the Graphic Services Section September 14. He attended Duke University, and was employed as a senior artist/designer for Educational Testing Services for 15 years. Terry's duties include airbrush work, artist's renderings, and the design and layout of brochures and other publications.

Bowling News

Two full-time members and several substitutes are needed for the PPL Women's Bowling League. Teams bowl every Wednesday evening at Colonial Lanes in Lawrenceville. Interested bowlers should contact league president Kim Prutky at ext. 2559 or league secretary Bobbie Cruser at ext. 2101.

Off The Shelf

The PPL library offers the resources you need for locating people and places.

ENCYCLOPEDIA OF ASSOCIATIONS, 15th EDITION—

This large volume is the major source for detailed information on American and several European organizations. It is a guide to specific subjects, including nonprofit, commercial, and volunteer organizations. Athletic, hobby, fraternal, cultural, legal, scientific, and many other organizations are also covered. Information includes addresses, telephone numbers, directors, size, scope and functions of each organization. An extremely useful book to consult for information in this subject. Detroit: Gale Research Co., 1980.

NATIONAL ZIP CODE AND POST OFFICE DIRECTORY—

Some of the most interesting subjects covered are special postal services, organization information, Army and Air Force post offices, Navy FPO's, parcel weights and limits, Mailgram services and a great deal more. Many new zip codes have been added, and some deletions have been made; it is therefore useful to consult this volume for the latest information and regulations pertaining to speeding up your mail. Washington: U. S. Postal Service, 1980.

TELEPHONE BOOKS—

The library now houses a very complete collection of New Jersey telephone books, sixteen books of major cities throughout the United States and books for London, Rome and Munich. Through the cooperation of the Telecommunications Department, we shall increase the scope and size of this collection as reader demand requires.

Al Swain, coordinator of construction at PPL, greets former astronaut Neil Armstrong during his recent visit to the laboratory. Armstrong interviewed Lyman Spitzer and former laboratory director Melvin Gottlieb as part of a fusion energy film being made by the Slaner Foundation.

Art Display

Portraits in a variety of media are part of an art exhibit by Liz Schweber on display through October in the B-Site cafeteria.

Liz is the fourth artist to display her works in the cafeteria. Other exhibits have featured art by Peter Allen, Gary Saretzky and Jan Olmez. Artists interested in future exhibits should contact cafeteria manager Terri Temkin at ext. 3471.

The cafeteria is open from 7:30 to 10:30 a.m. and from 11:30 a.m. to 1:30 p.m. daily.

Recreation Activities

If you are in charge of any recreation activity (golf, softball, bowling, etc.), or if you plan to organize a group that will be requesting money from the FY 82 Morale Fund, please call Meg Gilbert in Personnel, ext. 2036.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Information Services, Module 2, C-Site, James Forrestal Campus, ext. 2754.

ppl people

HEROIC USS LAFFEY PRESERVED

This photograph of Ray during his days on the Laffey will be part of the built-in exhibit on the ship, now permanently enshrined in Patriot's Point, South Carolina.

Ray Pressburger of Plant Maintenance went to a Navy reunion recently, a reunion that was much more than old buddies seeing each other again. The reunion coincided with the enshrinement of Ray's ship, the Laffey, at Patriot's Point, South Carolina.

The ship, the subject of the book "The Ship That Would Not Die", became famous in World War II for surviving a withering attack by Kamakazis near Okinawa. Her performance, and that of her crew, earned the Laffey the Presidential Unit Citation, the highest honor the Navy can bestow on a ship.

The Laffey was towed by tugboats from Charleston to her berth at Patriot's Point, a ride that was especially emotional for Ray. He was on the Laffey

when she steamed out of the Bath, Maine shipyard "so I was on her first and her last ride." Ray reported that some 95 World War II crew members and their families attended the enshrinement ceremonies. They were joined by Laffey crew members from before and after the war, making the day a truly "family" affair. Ray's daughter and son accompanied their dad and his shipmates on the trip.

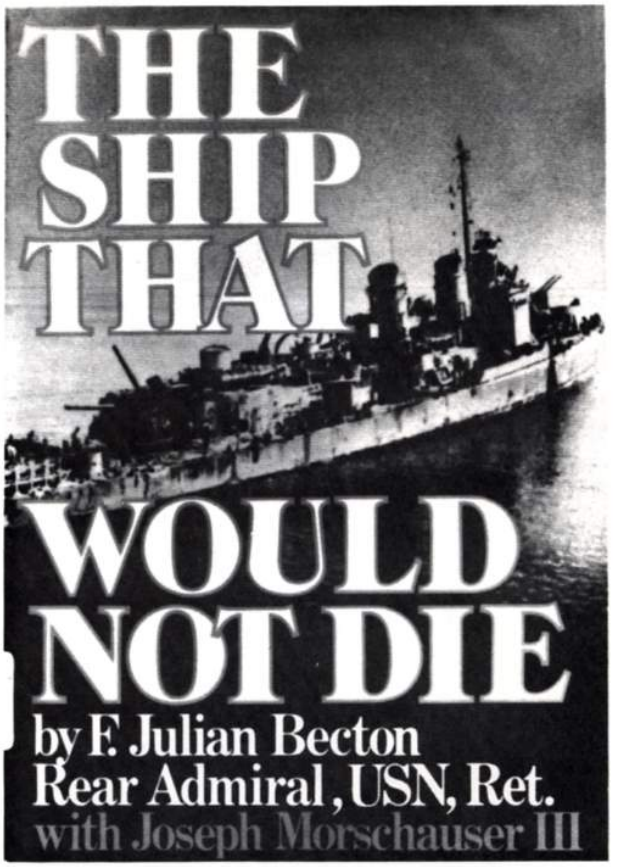
The Laffey is berthed at the heart of what will eventually be a recreation complex. Approximately two million dollars is being spent to renovate the Patriot's Point pier area ,and plans call for a motel complex, golf course and park to surround it. Each ship enshrined there will serve as its own museum, with built-in displays chronicling the deeds of their crews.

Ray was just 20 years old when he was assigned to the Laffey as a coxswain. His duties involved sailing the ship's launch on various missions. One memorable trip is included in Rear Admiral F. Julian Becton's book, "The Ship That Would Not Die".

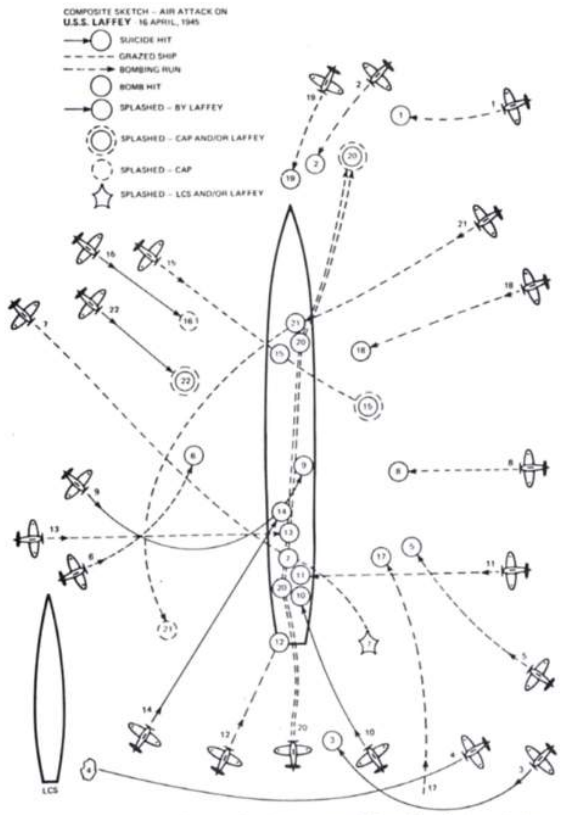
The Laffey had docked off the coast of Leyte Island in the Pacific, just prior to the invasion of Ormoc Bay. Ray was asked to ferry the Laffey's doctor to the hospital ship HOPE, which was in port nearby. As he waited for the doctor to finish his business on the HOPE, Ray was requested to pick up several HOPE doctors from a barge full of wounded troops. The light was fading as he reached the barge, which was several feet above his boat. To prevent injury to his passengers, he caught and steadied each one as they jumped into the launch. The final jumper landed unsteadily, and Ray clasped him across the chest to keep him upright. Only it wasn't a "him"—it was a Navy nurse!

"I didn't think anyone remembered about that nurse," Ray chuckled recently, adding that he was suprised to find himself mentioned—several times—in Admiral Becton's book. There is a good relationship between the two men, dating from Ray's days as then-Captain Becton's private boatcoxswain. "I got to know the admiral very well," he explains. "When we have our reunions, we always set aside one evening for just the two of us to meet and reminisce."

A good deal of the reminiscing at any Laffey reunion mainly concerns the events of April 16,1945. On that day, the Laffey was attacked by 22 Kamakazis within 79 minutes as she steamed toward



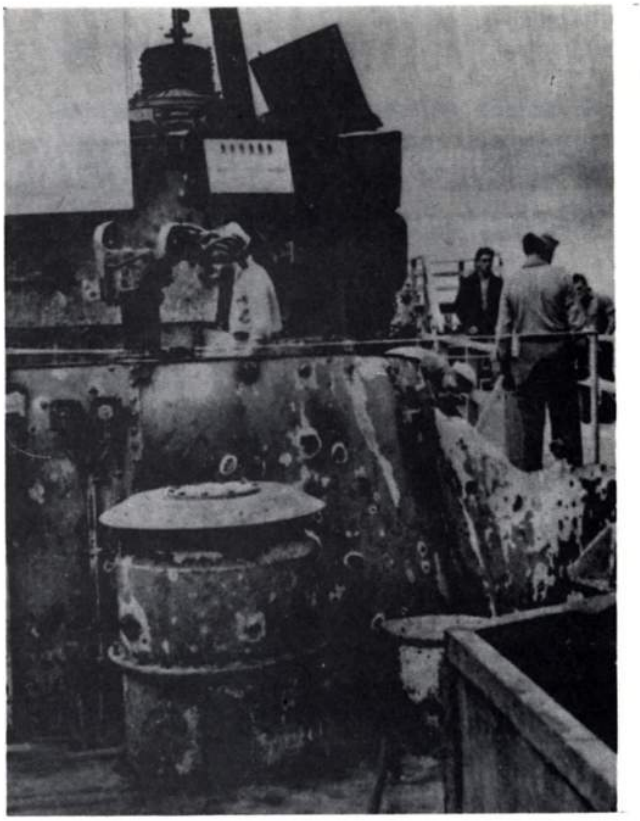
Okinawa. She was part of a "picket" line, a group of ships stationed in front of the Navy's main fleet to detect enemy planes on radar and shoot them down before they reached the bulk of the naval forces. No other ship of its size in U.S. naval history had ever been subjected to such an onslaught and survived, but the Laffey managed to stay afloat and return to port.

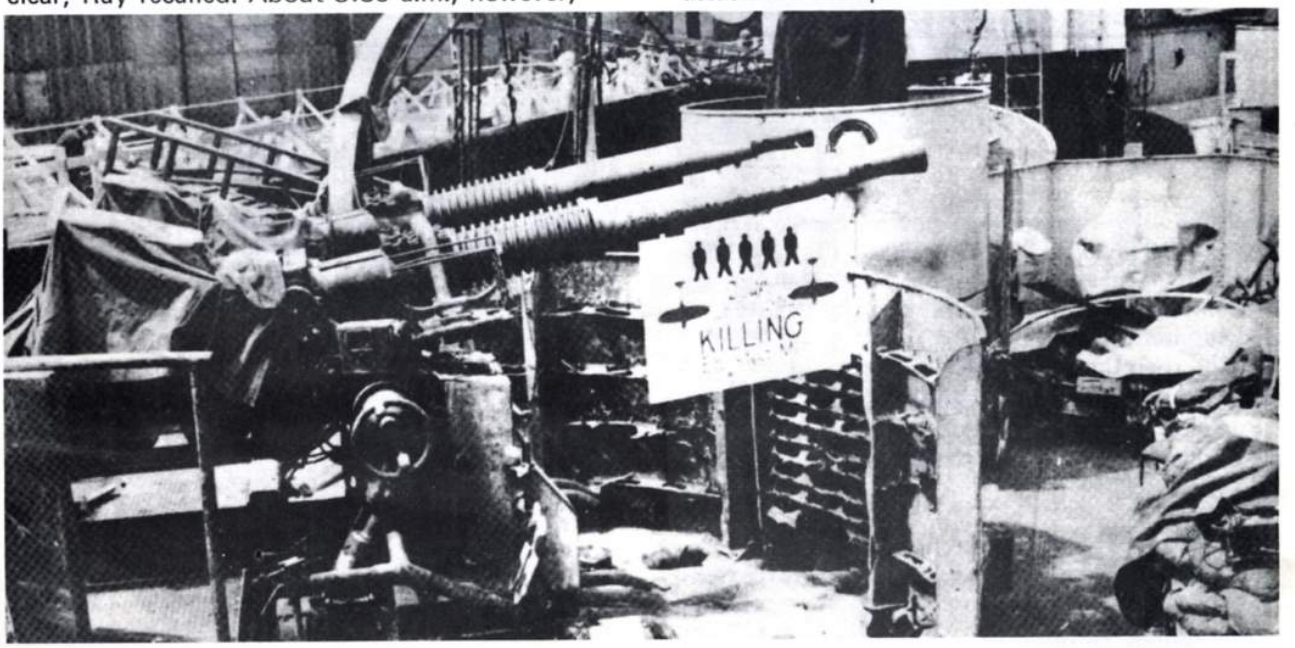


Overhead diagram illustrating the courses followed by the twenty-two Kamikazes that attacked the *Laffey* at radar picket station number 1 north of Okinawa on April 16, 1945. Overall, about fifty Japanese planes were in her area on that terrible morning.

(From the book "The Ship That Would Not Die" by F. Julian Becton, Rear Admiral, U.S.N., Ret. with Joseph Morschauser III. Published by Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.)

The early morning hours on that day had been clear, Ray recalled. About 8:30 a.m., however, things took a radical change for the worse: a cloud of Kamakazis decended on the ships. Massed too thickly to be counted individually on radar, a portion of this group broke away and headed towards the Laffey. Four planes were shot down as the Kamakazis approached, but approximately 22 planes broke through the Laffey's air cover and attacked the ship.



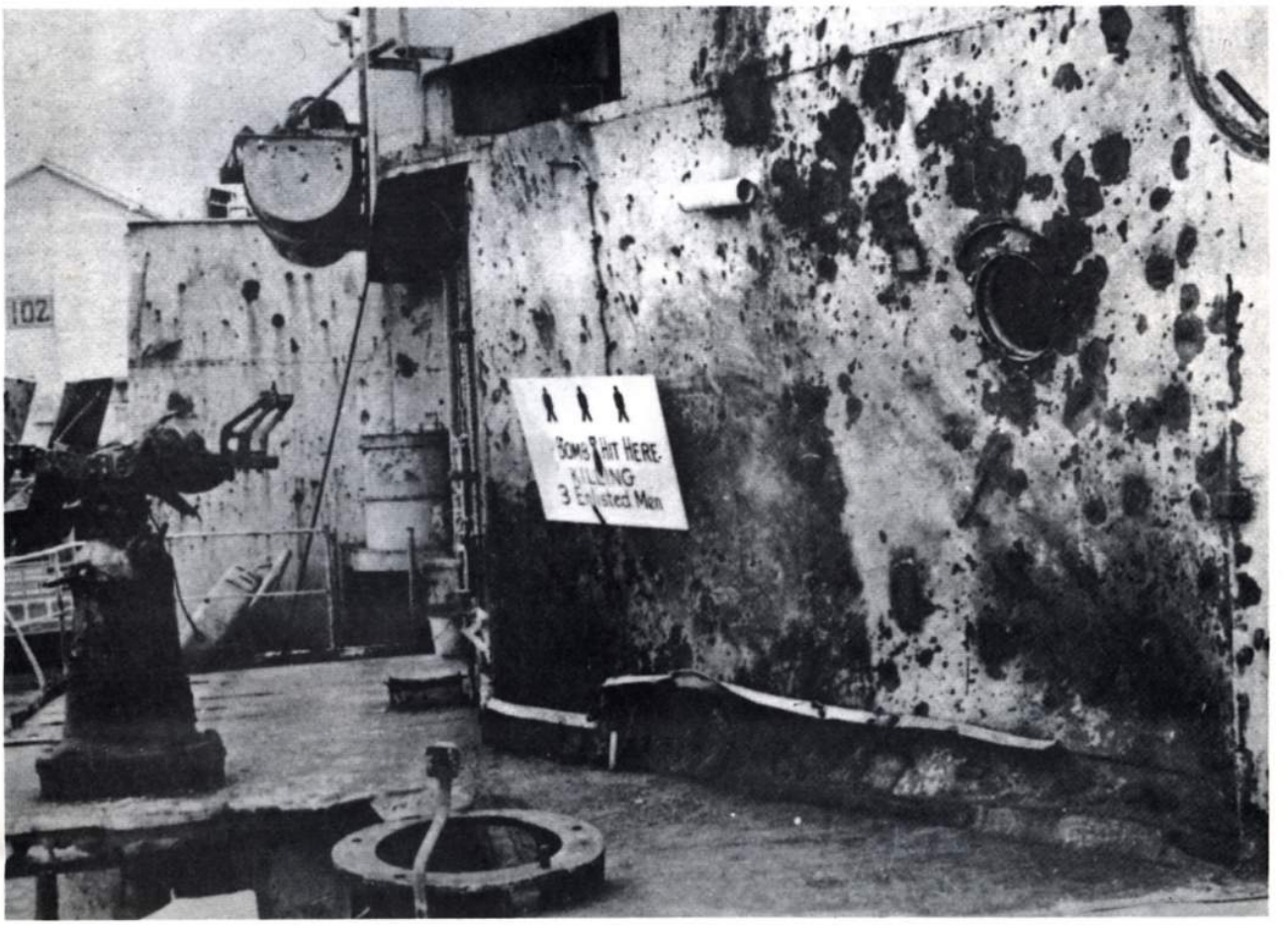


Ten planes in all were shot down, and seven crash dived into various sections of the ship. Many of the planes carried bombs, which went off on impact with the Laffey's decks. The ship also took four direct bomb hits.

Flaming gasoline from the planes was strewn across the ship, and flaming debris caused numerous injuries. The ship's rudder became jammed, limiting her to steaming in circles, and flooding occurred belowdecks. Most of her gun mounts were destroyed severely curtailing Laffey's firepower. In fact, Ray's gun was the only one on the starboard side of the ship that remained firing.

If damage to the ship was considerable, the injuries to her crew were more serious. Thirty-two men were killed in the attack, with 70 more sustaining serious injuries.

The attack was especially tragic for Ray, whose best friend was killed in the fighting. George Falotico was firing a gun only a short distance from Ray's when an on coming plane dropped a bomb directly at his feet. Falotico was killed



instantly, and the flash from the explosion burned most of the exposed skin on Ray's body. Ray also suffered a severe schrapnel wound in his arm.

In recognition of the "extraordinary heroism in action" of both ship and crew, the Laffey was awarded the Presidential Unit Citation. The citation concludes that "the courage, superb seamanship and indomitable determination of her officers and men enabled the Laffey to defeat the enemy under almost insurmountable odds, and her brilliant performance in this action reflects the highest credit upon herself..."

Ray's Laffey was the second ship of that name to receive a Presidential Unit Citation in the same war. The first Laffey was sunk by the Japanese during the Battle of Guadalcanal in 1942. The second Laffey, commissioned in 1944, had her first combat mission off the Normandy beaches, providing pre-invasion fire support to landing troops. Prior to her assignment at Radar Picket Station No. 1, she saw action at Cherbourg and at the Normandy landing. Laffey also participated in combat in the Phillipines, at Mindaro, Lingayen Gulf, Iwo Jima, Okinawa, and in the first two carrier raids on Japan.

The Laffey served as an observation ship for the Bikini Atoll nuclear bomb tests, and was active in the Korean conflict. The ship received a Meritorius Unit Citation for its work as a screening destroyer and radar picket ship with the Sixth Fleet during the Jordanian civil war.

When the Laffey was decommissioned in 1975, her crew was determined not to let her be forgotten. Forming themselves into the Laffey Association, they began investigation the possibility of enshrining the ship at a suitable location. That dream became a reality when the Laffey joined the Yorktown, the submarine Claymore, and the nuclear ship Savannah at Patriot's Point.

With enshrinement accomplished, the group wants to restore the ship to its "fighting trim". That task includes replacing a gun that was removed, as well as other renovations required to return the Laffey to her commissioning condition.

Ray feels the common goal has helped keep old crew members united. "We find as the years go by that we do more and more together," he contends. "We all have a good time together."

He hopes to one day unite his entire family with his Laffey "family." "I'd like to take my entire family down there when the motel is opened. Then my kids and grandkids can see the Laffey, go through her and get a feel for what it was like, and put names to faces. It will make what we did back there mean that much more."