BROOKHAVEN BULLETIN
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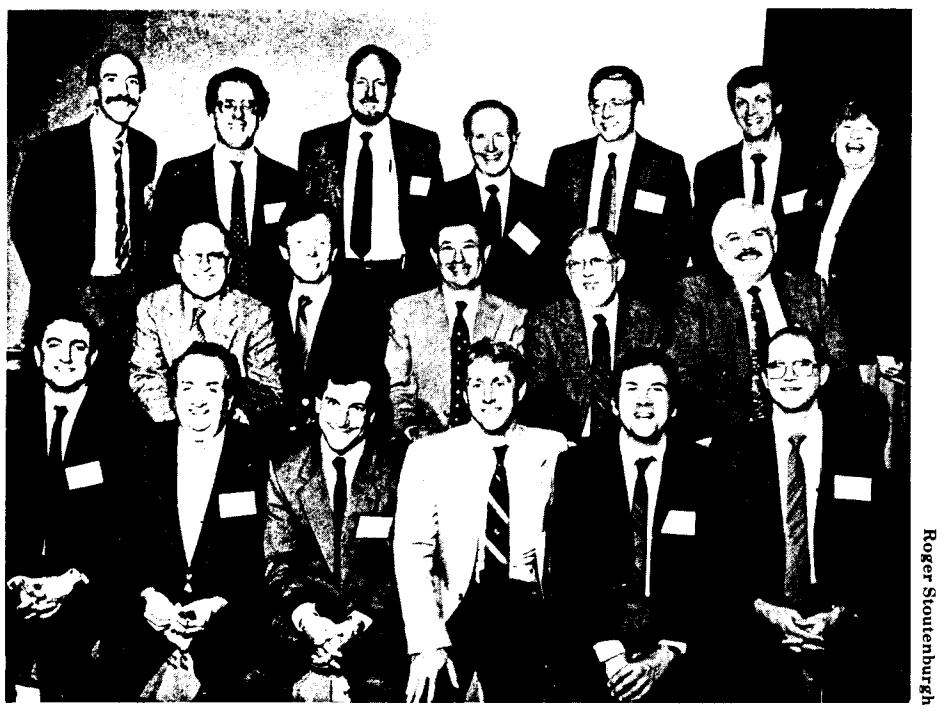
BROOKHAVEN NATIONAL LABORATORY

Workshop Takes Hard Look At X-Ray Lithography



Roger Stoutenburgh

Among the attendees of the Fifth BNL Workshop on X-Ray Lithography were (top, from left) Gwyn Williams, Samuel Krinsky, Richard Heese and Jules Godel, all of BNL; William Siegle, IBM; Robert Dynes, AT&T Bell Labs; Dory Tooker, BNL; (center, from left) Robert Botwin, Grumman Aerospace; Richard Freeman, AT&T Bell Labs; Martin Blume, BNL; Alan Wilson, IBM; David Patterson, DARPA; (front, from left) David Andrews, Oxford Instruments; Robert Hill, IBM; Dan Seligson, Sematech; Shane Palmer, University of Wisconsin; Michael Green, Brobeck Division of Maxwell Labs; and Keith Cooper, of Karl Suss. Co-chairmen of the workshop were Gwyn Williams and Jules Godel, of the National Synchrotron Light Source, with planning support from William Marcuse and Dory Tooker of the Technology Transfer Office.

The U.S. is taking a hard look at where it stands today in the international race to manufacture high-density computer chips using x-ray lithography. Such was the thrust of the Fifth BNL Workshop on Synchrotron X-Ray Lithography, held at the Lab on November 16 and 17.

The discussions were vigorous and the language opinionated and frank among the 104 workshop attendees, representing industry, government agencies and research laboratories. They spent the two days of the workshop reviewing progress in the field since the last workshop two years ago and reestablishing priorities and a timetable for the next decade.

So far, says BNL Deputy Director Martin Blume, "IBM has made a major commitment to x-ray lithography, and there are certain aspects of the technology — for example, the development of the x-ray source — in which government labs have the essential expertise and can play a major role. But it remains to be seen whether the federal government will make a long-term commitment to what has been a year-by-year funding process."

In the steady push to make smaller and smaller computer chips, x-ray lithography shows great promise as the successor to optical lithography, the current manufacturing method. Using conventional optical lithography, the present manufacturing standard is 0.8 microns between circuit features and the limit is 0.4 microns. X-ray lithography has the potential to produce chips with only a tenth of a micron space between components, and more likely even smaller.

In May of 1988, IBM announced its success in making a 0.5 micron chip, at BNL's National Synchrotron Light Source (NSLS). That chip represented a breakthrough, not only because of its increased capacity, but also because it demonstrated the potential of x-ray lithography, as well as its cost-effectiveness.

IBM's chip and the U.S.'s advanced sources, beam lines and other devices necessary for the x-ray lithography process are elements of the program that have done well in this country, according to Gwyn Williams, an NSLS physicist and co-chairman of the workshop. He also cites the progress on the compact synchrotron being designed and built by BNL in collaboration with Grumman Aerospace Corporation and its subcontractor, General Dynamics.

Those parts aside, however, "The workshop focused on what more we should be doing," says Williams. "For example, the future of the whole U.S. x-ray lithography program is based on superconducting rings, for which no proof of principle really exists. And all of the effort in the area of beam lines has no industrial partner — it is being done only by the

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BNL Lecture: A Fish Story

What happens when you cross a platyfish with a swordtail?

You get a small tropical fish that may play a big role in determining which wavelengths of ultraviolet (UV) radiation from the sun contribute toward melanomas — the most deadly of skin cancers. You may also gain new insights into whether recent increases in incidence of melanoma are related to depletion of the ozone layer in the stratosphere.

Such are the concerns of Richard Setlow and his colleagues in BNL's Biology Department. Setlow, who is BNL's Associate Director for Life Sciences, will discuss "Ozone Depletion and Melanoma: A Fish Story" when he delivers the 257th Brookhaven Lecture on Wednesday, December 13. His talk will begin at 4 p.m. in Berkner Hall, following an introduction by Avril Woodhead, of the Biology Department and the Technical Information Division.

The sun emits a broad range of UV radiation, but, before it enters the earth's atmosphere, most of the shorter wavelengths are absorbed by ozone in the stratosphere. Today, however, the ozone layer is threatened by chlorofluorocarbons that act as catalysts for its destruction.

As Setlow will relate, the depletion of the stratospheric ozone layer 30 kilometers above us can have a direct effect on the life-encoding DNA in our cells, each piece of which is only 20 nanometers (nm) by 45 centimeters long.

As the ozone is depleted, more UVB radiation, with wavelengths ranging from 280-320 nm, will get through the stratosphere. As this happens, more DNA will be affected.

From epidemiological data and studies of families with genetic susceptibilities, it is already known that exposure to UV radiation can cause skin cancer. Most skin cancers are basal cell carcinomas, which are generally not life-threatening. Others, however, are melanomas. Though these cancers arise much less frequently, they have a very high fatality rate.

Statistics show that melanoma is already on the rise. How will the increase of UVB radiation affect melanoma rates?

One way to answer that question, Setlow will explain, may be to identify the UVB wavelengths involved in triggering the DNA response that leads to melanoma.

With this in mind, Setlow and his colleagues have identified the platyswordtail cross as an appropriate model of sunlight-induced melanoma. Platyfish have incipient melanoma genes and repressor genes; swordtails have neither. But about one-quarter of their offspring have a combination of genes for tumor production and repression that is ideal for studying the effects of various wavelengths.

Setlow will discuss the experiments that he and his colleagues have done

(continued on page 2)

Richard Setlow with some of the fish that he and his colleagues are using to determine the ultraviolet radiation wavelengths contributing toward melanoma.

— photo by Robert Reichert

Alfred Wolf Receives Honorary Degree

Following the awarding of his honorary doctorate from the University of Rome, BNL's Alfred Wolf (right) is pictured with the dean of the university, Romano Cipollini.

For his pioneering contributions to the field of radiopharmaceuticals and the biomedical use of short-lived radioisotopes, BNL Senior Chemist Alfred Wolf was awarded an honorary doctorate from the University of Rome on November 15.

Within the Chemistry Department, Wolf heads the positron emission tomography (PET) program, which uses radiopharmaceuticals to study metabolic processes and the movement of drugs through the human body. His collaborative research has increased the understanding of brain disorders such as schizophrenia, Alzheimer's disease and tumors, and recent work has included the study of cocaine abuse.

Since 1969, Wolf has been a scientific advisor to the Italian National Research Council on programs involving isotopes, hot-atom chemistry and tracer applications. As well, he has collaborated with scientists at the University of Rome and the Montelibretti Laboratory in Italy.

After joining BNL's Chemistry Department in 1951, Wolf was awarded his Ph.D. in chemistry from Columbia University in 1952. He served as Chemistry Department Chairman from 1982 to 1987.

This is Wolf's second honorary degree: the first, a Doctor of Philosophy, was awarded in 1983 by Uppsala University, Sweden. A member of the National Academy of Sciences, Wolf has won numerous other awards, including the Javits Neuroscience Investigator Award from the National Institute of Neurological and Communicative Disorders and Stroke, and, with BNL Senior Chemist Joanna Fowler, the 1988 Gustavus John Esselen Award for Chemistry in the Public Interest.

Give in December To Beat November

As the BNL Food Drive entered its second year, Lab employees were more generous than ever before — donating 2,460 pounds of food for the needy in Brookhaven Town.

This November donation helped assure that many people would enjoy a happy Thanksgiving. Please remember that December is also a holiday month when you bring in your donations from December 11-18, and let's make December another record-breaker!

The BNL Food Drive is run in conjunction with Brookhaven Town and the INTERFACE Coalition of Corporations. The food that Lab employees donate is distributed through food pantries throughout Brookhaven. One such pantry is at the Trinity Evangelical Lutheran Church in Rocky Point, where Carol Moor is Social Ministries Chairperson. Recently, Moor wrote to BNL Food Drive Chair Carole Kerr:

". . . I must commend you on your sustained collections of food. Usually after a few months, enthusiasm wanes and people lose interest and go on with their busy lives. Through your efforts, you have kept the food collections going. This is so important to our food pantries as hunger knows no season . . ."

Revised Deadlines Next Few Weeks

The Bulletin's publication schedule for the next few weeks requires the following revised deadline schedule:

Issue	Deadline for Ads	Deadline for other submissions
Dec. 15	noon today, 12/8	noon Monday, 12/11
Dec. 29	4:30 p.m., Thursday, 12/21	noon Tuesday, 12/26
Jan 5	4:30 p.m. Thursday, 12/28	noon Tuesday, 1/2

There will be no Bulletin published on December 22.

Note to Employees:

Attendance to lectures, meetings and other special programs held during normal working hours is subject to supervisory concurrence.

Traffic Light to Work at Noon Starting Monday

Like any other small community with roads, traffic and pedestrians, BNL sometimes experiences accidents. And, like any other small community, the Lab is always on the lookout for ways to reduce the number of accidents on site.

That is why, as of Monday, December 11, the traffic light at the intersection of Brookhaven Avenue and Upton Road will be programmed to operate from noon to 1 p.m., when traffic is similar to that encountered during the morning and evening rush hours. The change was suggested by Barbara Cox, Alternating Gradient Synchrotron Department, through the Employee Suggestion System.

Patricia Williams, Safety & Environmental Protection Division (S&EP), chairs BNL's Traffic Safety Committee. She explained that New York State (NYS) traffic regulations apply at the Lab, just as they do in any NYS community. For instance, anyone driving on site must come to a full stop at stop signs or flashing red lights, yield the right-of-way at yield signs or flashing yellow lights, and maintain the posted speed limit or the site speed limit of 30 mph where not posted.

NYS driver's manuals are available at S&EP, Bldg. 535A, and Personnel, Bldg. 185, as well as in apartments and dormitories on site.

Williams also offers these tips for the safe use of the Lab's roadways:

- On-site drivers should remember that they share the roads not only with other vehicles — some large, some slow-moving — but also with pedestrians, joggers, cyclists, deer and other animals.
- With darkness falling earlier, joggers and cyclists should make themselves more visible to drivers by using reflectors or reflective clothing.

Patricia Williams (left) and Barbara Cox at the soon-to-be reprogrammed traffic light at the intersection of Brookhaven and Upton.

Photos on this page by Roger Stoutenburgh

- Drivers should reduce speed during inclement weather.
- Drivers should not rely on mirrors for backing out of driveways or parking spaces; they should look through the rear and side windows of their vehicles.

BNL Lecture (cont'd)

so far — what they have revealed about the relationship between sunlight and melanoma, and what further work lies ahead.

Richard Setlow received his A.B. from Swarthmore College in 1941. From 1941-60, he taught physics and biophysics at Yale University. After earning his Ph.D. in physics at Yale in 1947, he became part of the new biophysics group in the Physics Department there.

In 1961, Setlow joined the staff of Oak Ridge National Laboratory's Biology Division. There, in the early 1960s, he discovered the processes of DNA repair in cells.

Setlow left Oak Ridge in 1974 to come to BNL's Biology Department, where he was Chairman from 1979 to 1986. Since 1986, he has served as Associate Director for Life Sciences.

In January of this year, Setlow received the 1988 Enrico Fermi Award from the U.S. Department of Energy for his contributions to the fields of radiation biophysics and molecular biology.

Setlow is a member of numerous societies, including the American Association for Cancer Research, the American Society for Biochemistry and Molecular Biology, the American Society for Photobiology, the Biophysical Society and the National Academy of Sciences (NAS). He has served on various advisory boards to the NAS, the Office of Technology Assessment, and the Food and Drug Administration. He has also been president of both the Biophysical Society and the Comité International de Photobiologie.

After the lecture, those attending are invited to join the speaker for discussion and hors d'oeuvres. In addition, anyone interested in joining the lecturer for a dinner at a restaurant off site should call Avril Woodhead, Ext. 3395 or 3482.

X-Ray Lithography (cont'd)

University of Wisconsin with support from DARPA [Defense Advanced Research Projects Agency]."

Inevitably, discussions also turned to the Japanese and the amount of research dollars they are spending on x-ray lithography, believed to be already in the hundreds of millions of dollars.

At the conclusion of the workshop, reports Williams, "People felt that the U.S. needs a national, industrial x-ray lithography center, which must be ready by the mid-1990s." There were also renewed calls to build a warm, non-superconducting ring based on proven technology and to set up a collaborative beam line development group, involving industry.

— Mona S. Rowe

Sharing Nuclear Safety Info

A delegation of 12 scientists and engineers from the Soviet Union visited BNL on Monday, November 6. Headed by Academician Nicolai Ponomarev-Stepnoy (fifth from left), the First Deputy Director of Kurchatov Atomic Energy Institute (KAEI), the delegation came to the Lab under the U.S. Nuclear Regulatory Commission (NRC)-Soviet nuclear safety information exchange program.

In addition to KAEI, other U.S.S.R. institutions represented by the group's members were the Applied Geophysics Institute, the Atomenergoproekt Institute, the Biophysics Institute, Hydropress, the Power Energotechnology Institute, the State Committee for the Supervision of Nuclear Power Safety and the State Committee for Utilization of Atomic Energy.

The delegation's busy day at Brookhaven concluded with tours of the High Flux Beam Reactor and the National Synchrotron Light Source. This followed talks on a variety of subjects, ranging from an introduction to BNL's Department of Nuclear Energy (DNE), given by DNE Chairman Walter Kato (second from left), to a discussion of probabilistic risk assessment with DNE Deputy Chairman Robert Bari (right). Representing the NRC was Edward Shomaker (fourth from right), and U.S. interpreter Paul Grenier (second from right) helped communications proceed smoothly.

A Positive Look at Negative Ions

How much progress has been made in the development of negative-ion sources over the past three years? During this period, what has been learned about the fundamental processes of these ion sources and the production of neutral beams?

For answers to these questions, over 100 researchers from 11 countries came to BNL October 30-November 3, to attend the Fifth International Symposium on Production and Neutralization of Negative Ions and Beams. BNL has hosted such meetings every three years since 1977, and they have become recognized by the world community as the most important meetings in the field.

Chairman of this year's symposium was Ady Hershcovitch (right), who said, "There were some very impressive results presented, particularly by the Japanese and Russian participants who reported on record-high, steady-state, negative-ion currents in the multi-ampere range."

In addition to Hershcovitch, the members of the local organizing committee were (from left) Krsto Prelec; Marion Heimerle, symposium secretary; Ron Clipperton, symposium coordinator; James Alessi, co-chairman; Ahovi Kponou; and Barbara Cox, assistant coordinator.

Calling All Carolers

Plan to sing with the BNL Choral Group on Wednesday, December 20, at the Christmas special luncheon and at one or two other places around the Lab.

The next rehearsal will be today, December 8, in the North Room of the Brookhaven Center, at noon sharp (not flat, please)! Subsequent rehearsals will be on Tuesdays and Friday, December 12, 15 and 19, in the North Room of the Center. Rehearsals must end by 12:45 p.m., so please be on time!

Singers are needed in all parts. For more information, call John Weeks, Ext. 2617, or Janet Sillas, Ext. 2345.

Cooking Exchange

The dishes of Israel will be demonstrated and sampled at the next meeting of the BERA Cooking Exchange, on Wednesday, December 13, at 12:30 p.m., in the Recreation Building in the apartment area.

All BERA members and their families may attend and are welcome to join the Cooking Exchange. A charge of $2 per person covers the cost of the cooking ingredients, and babysitting is provided at 50¢ per child.

Arrivals & Departures

Arrivals

George J. Falcone .....Sfgrds. & Sec.
Kevin J. Linkletter .....Sfgrds. & Sec.
Jack Perez .....Chemistry
Mircea S. Popeanos .....Biology
Siegfried Schindler .....Chemistry
Helmut Thiel .....Sfgrds. & Sec.
Christopher T.C. Wong .....Medical

Departures

This list includes all employees who have terminated from the Laboratory, including retirees:

Gaetano R. Serra .....Plant Eng.

TID Demo Series

In November, the Technical Information Division's (TID) data-base research service kicked off a series of demonstrations of systems now accessed by the Research Library.

The second demonstration in the series will feature STN International. It will be held on Tuesday, December 12, at 10 a.m., in the Computing & Communications Division conference room, Bldg. 515. All are welcome to attend.

STN is sponsored and offered ,ointly by Chemical Abstracts Service, a division of the American Chemical Society; FIZ Karlsruhe, a scientific and educational organization located in Karlsruhe, Federal Republic of Germany; and the Japan Information Center of Science and Technology (JICST), an information organization headquartered in Tokyo, Japan.

Correction

In the special edition of the Brookhaven Bulletin, dated November 21, 1989, retiree Daniel D. Zelem's address was inadvertently changed. So don't change your address book; Zelem can still be reached at 17 Colony Drive, West Sayville, New York 11796.

BROOKHAVEN BULLETIN

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Aspen Wind Quintet To Give Next BERA Concert

The melodious sounds of the Aspen Wind Quintet will fill Berkner Hall on Wednesday, December 13, as the accomplished chamber music group performs the third concert in BERA's 1989-90 series.

Members of the quintet are Bärli Nugent, flute; Claudia Coonce, oboe; David Krakauer, clarinet; Céleste-Marie Roy, bassoon; and Kaitilin Mahony, horn.

The members of the Aspen Wind Quartet have appeared extensively as orchestral soloists, on radio and television, and in concert series at colleges and universities across the U.S. They have gained critical and popular acclaim abroad for their performances in England, Switzerland, Denmark, Finland, Holland and Germany, and they also won the distinguished Naumberg Chamber Music Award in 1984.

The quintet has just returned from the U.S.S.R., where they performed at the invitation of the official Soviet Concert Agency, making them the only group so honored besides the New York Philharmonic.

Collaborating with today's important composers, the quintet has chosen mainly contemporary selections for the BERA concert.

On the program are Jacques Ibert's Trois Pieces Brèves; Renaissance Suite transcribed by Ronald Roseman, an oboist and composer who is a performing artist in residence at the State University of New York at Stony Brook; Paul Hindemith's Klein Kammermusik für fünf Bläser; Samuel Barber's Summer Music; and Carl Nielsen's Kvintet.

The concert will begin at 8 p.m., and tickets will be available at the door for $9, general admission; $6, students and those over 65; and $5, children under 18.

Cafeteria Menu

Luncheons

Monday, December 11

Soup: Mushroom barley (cup/bowl)	.75/.95
Entree: Macaroni & cheese w/veg.	2.85
Entree: Shepherd's pie w/veg.	3.10
Fitness fare: Chicken sesame w/veg.	3.25
Carvery: Pastrami	2.85
Grill special: Reuben	2.85

Tuesday, December 12

Soup: Chicken gumbo (cup/bowl)	.75/.95
Entree: Veal Parmesan w/veg.	3.10
Entree: Chicken Teriyaki over rice w/veg.	3.10
Fitness fare: Marinated fish w/veg.	3.10
Carvery: Roast beef	2.85
Grill special: Monte Cristo	2.85

Wednesday, December 13

Soup: Cream of tomato (cup/bowl)	.75/.95
Entree: Breaded pork chop w/veg.	3.10
Entree: Shrimp w/red sauce & linguini	3.45
Fitness fare: Beef Bourguignon over rice	3.10
Carvery: Corned beef	2.85
Grill special: The BNL'er (corned beef, pastrami, swiss & kraut)	2.85

Thursday, December 14

Soup: Chicken rice (cup/bowl)	.75/.95
Entree: Moussaka w/veg.	3.10
Entree: Codfish fillets w/veg.	3.10
Fitness fare: Green peppers vegetarian w/veg.	2.95
Carvery: Ham	2.85
Grill special: Reuben's brother	2.85

Friday, December 15

Soup: Seafood bisque (cup/bowl)	.75/.95
Entree: Lasagna w/veg.	3.10
Entree: Chicken cacciatore over linguini	3.10
Fitness fare: Fish Creole over Spanish rice	3.10
Carvery: Turkey	2.85
Grill special: Tuna melt	2.85

Breakfast Specials - all w/juice, coffee or tea 2.65

Mon.: 2 eggs, 2 strips of bacon, 2 pancakes
Tue.: Western omelette, french fries & toast
Wed.: Spanish omelette, home fries & toast
Thu.: Scrambled eggs, cheese & chopped ham on a croissant
Fri.: 2 eggs any style, 2 slices French toast, grilled ham, hash browns

Dinner Specials:

Mon.: Chicken cordon bleu w/veg.	3.10
Tue.: Broiled fish w/veg.	3.10
Wed.: Pork chops w/apple sauce & veg.	3.10
Thu.: Sausage & peppers over rice	3.10
Fri.: Vegetable lasagna w/veg.	3.10

Medical help is a lifesaver. . .

. . . but it needs help, too:

Please give blood!

The Lab's two-day winter holiday blood drive will be held on Wednesday and Thursday, December 20 and 21. Two pledge cards have been sent to each employee so that friends or relatives may join the campaign. Please sign up as soon as possible.

For more information, call Susan Foster, Blood Drive Chair, Ext. 2888, or contact the Blood Program Captain for your department or division.

P-CAD Users

The next P-CAD Users Group Meeting is scheduled for Thursday, December 14, at 10 a.m., in the seminar room of Bldg. 515, Computing & Communications Division.

Doug Marks of Doug Marks Associates will demonstrate the new releases to the P-CAD software. All are invited to attend. Coffee will be served at 9:45 a.m. For more information, call Pam Mansfield, Ext. 7286.

Dinner Is Served — At the Brookhaven Center

If you're planning to eat dinner on site, beginning Monday, December 18, your dinner will be served at the Brookhaven Center.

On that date, the Cafeteria will begin closing at 4 p.m. The Center will open as usual at 5 p.m., serving all the items on its regular menu until 10 p.m. In addition, each day a different dinner special will be offered until 7 p.m. or until the dinner crowd subsides. This new approach to dinner at the Lab will be evaluated after two months.

Center patrons are greeted with snacks and table service. The regular menu includes appetizers, omelets, grilled sandwiches and burgers, sandwiches, side orders and soups — including a French onion soup, served daily.

The dinner menu for the first week will include:

Monday: Chicken cordon bleu w/ rice pilaf	$3.65
Tuesday: Minute sirloin steak w/maitre d'hotel butter w/grilled tomato	$4.25
Wednesday: Boneless roast loin of pork w/new potatoes	$3.65
Thursday: Barbecued fresh spareribs w/garden salad	$3.55
Friday: Fish & chips platter w/coleslaw	$3.10

All dinner entrees include the vegetable du jour and dinner rolls.

Mountain Club

The Mountain Club will meet to elect new officers on Wednesday, December 13, at noon, in the lobby of Berkner Hall. Anyone interested is welcome to attend the meeting. Most club activities are geared for family participation.

Calendar Caution

If you use the Lab's standard-issue, loose-leaf desk calendar pad, be aware that, for each day in December 1989, the small January 1990 reference calendar is incorrect. Though the reference calendar indicates that January 1990 begins on a Saturday, that month will actually begin on a Monday.

Aviation Club

The BERA Aviation Club will conduct a ground school for the instrumentation rating in Jan.-Feb. 1990. Anyone interested should contact the club's secretary, Vincent Castillo, Bldg. 911B, Ext. 3772.

Dining Coupons At BERA Store

For the second year, BERA is offering a choice of two discount dining books, which include coupons for travel and informal dining.

The books are on sale now at the BERA Sales Office in Berkner Hall, where you'll also find such possible gift items as T-shirts and sweatshirts, for $6 and $12, respectively. Stop by weekdays from 9 a.m. to 2 p.m.

Classified Advertisements

Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position, with consideration given to candidates in the following order of priority: (1) present employees within the department and/or appropriate bargaining unit, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

Each week, the Personnel Office lists new personnel placement requisitions. The purpose of these listings is, first, to provide open placement information on all non-scientific staff positions; second, to give employees an opportunity to request consideration for themselves through Personnel; and, finally, for general recruiting purposes. Because of the priority preference policy stated above, each listing does not necessarily represent an opportunity for all candidates. As a guide to readers, the listings are grouped according to the anticipated area of recruitment.

Except when operational needs require otherwise, positions will remain open for one week following publication date.

For further information regarding a placement listing, contact the Employment Manager, Ext. 2882.

The vacancies listed below have been exempted by the Director's Office from the current freeze on open requisitions.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees only.

4132. AUTOMOTIVE OFFICE CLERK - Performs diverse office duties, which include heavy telephone work, computations, preparation and maintenance of purchase requisitions and service reports. Must be proficient with typing and data entry. Staff Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

4133. SCIENTIFIC ASSOCIATE POSITION - Requires BS/MS in biochemistry or other related science field. Will label proteins with metal clusters for use in the scanning transmission electron microscope (STEM) and medical applications. Experience with HPLC and PAGE preferred. (Reposting of job #4118). Biology Department.

Motor Vehicles & Supplies

84 CAPRICE CLASSIC - s/w, 8-cyl., a/t, ac, fully loaded, am/fm cass., asking $4,900. Sorin, Ext. 2765.

83 RABBIT - diesel, 147k mi., runs well, trailer hitch, $500. Ext. 4474 or 929-5699.

83 NISSAN SENTRA - 5-spd., new Bridgestone tires, clutch & brakes, excel. in & out, $1,500. Ext. 2077 or 698-1184.

82 DODGE ARIES - s/w, p/s, p/b, a/t, am/fm cass., v.g. cond. in & out, asking $2,100. Tim, 727-7741.

82 PONTIAC GRAN PRIX - ac, a/t, elec. windows & door locks, $2,200. Bert, Ext. 5156 or 581-4436.

82 NISSAN STANZA - 4-dr. h/b, 5-spd., excel. mech. cond. K. Fuchel, Ext. 4116 or 821-0104.

81 SUBARU WAGON - 4wd, 5-dr., 4-spd., good cond., well maintained, asking $1,800. David, Ext. 3640 or Lisa, 345-0326.

81 COUGAR LS - 4-dr., p/s, p/b, a/t, p/w, ac, new transmission, runs well, $1,000. 363-6447.

81 VW RABBIT - diesel, 4-dr., m/t, sunroof, asking $1,500. Mort, 286-8448.

80 HONDA ACCORD - h/b, 3-dr., 5-spd., a/c, am/fm cass., body good, v.g. cond., $1,600. Jennifer, Ext. 7586.

80 BUICK CENTURY - a/t, p/b, p/s, 4-dr., 100k mi., excel. running cond., moving, asking $1,500. Lee, Ext. 3104 after 5:30 p.m.

79 BUICK REGAL - V-6, full power, very clean, good mech. cond., $1,100. Ext. 4558 or 325-0013.

77 PLYMOUTH FURY WAGON - 360 eng., many new parts, new tires, body rust, high miles, runs well, $500. 821-0469.

74 MERCURY COUGAR - engine good, trans. slips, $75. 821-0250.

73 VW SUPER BEETLE - good motor, fair body, good transportation, $200. Augie, Ext. 3639.

73 NOVA - parts. Bob, Ext. 5286 or 298-9594.

68-72 CHEVY PICKUP - windshield, hood, front fenders, heater. Ext. 4597 or 924-8213 after 5 p.m.

55 BUICK ROADMASTER - black, wide w/w tires, excel. cond., asking $3,000. Alice, 286-9483.

70 PLYMOUTH CONVERTIBLE - factory purple, 318 V-8 engine, Road Runner body, new tires, collector's car, $4,000. 929-4198.

57 OLDS - two cars, one 2-dr. w/hardtop, one 4-dr. sedan, both a/t, V-8, lots of extras, both for $5,500 or best offer. Ext. 3536 or 289-7615.

TIRES - 2, 950x16.5, Ford 8-lug rims, $50/both. Ken, 281-8458.

CHEVY PARTS - 72 Chevy 350 4-bolt main engine, $150; 74 Chevy 350 2-bolt main engine, $100; more. Ext. 4597 or 924-8213 after 5 p.m.

ENGINE - Chevy block, 350 cu. in., transmission, other parts, $100. Rich, 878-1580 after 5 p.m.

TIRE - new, 721 Firestone 235/75R15, Eldo rim, $35. Ernie, 588-4987.

PICKUP LIGHT BAR - & bed liner, used on 88 Dodge Ram 50 for 1 yr., make offer. Ext. 2253.

AUTO-TOP CARRIER - Sears X-Cargo, large size, like new, used twice, $75. Larry, Ext. 4295.

TIRES - 4, P235/75R15 Uniroyal Tiger Paw radials on '89 Chevy, 6-lug rims w/hubcaps, rotation marked, $400. 744-3289 eves.

ROOF RACK - made to fit Volks Beetle, very strong basket type, $20; Volks repair manual, $5. Carl, Ext. 4986.

TIRES - G-78 14 snow tires, white wall, brand-new $60. Walter, Ext. 3457 or 732-1913.

TIRES - 3, 195/75R14, one new, 2 w/plenty of tread, all on 5-hole wheels, $100. Tony, Ext. 3658.

TIRES - complete set for Ford 250, ¾-ton, mounted on rims, good cond., many miles left, $50 ea. neg. Joe Mead, Ext. 2148.

TIRE - Firestone Supreme, 235R75X15, extra-load, Blackwall, $25. Ext. 2799.

Boats & Marine Supplies

19' BOWRIDER CRUISER - 1972, w/1976 115-h.p. Johnson, Coast Guard pkg., trailer w/electric winch, $3,000. Frank, Ext. 2314 or 567-5131.

19' BAYLINER BOWRIDER — 1988, 125 h.p. Force, p/trim/tilt, am/fm cass., low hrs., full canvas, galv. Escort trailer. Ext. 7125 or 929-8641.

16' SPORTCRAFT BOWRIDER - 1984, 50 h.p. Mercury, df, dual battery, extras, must sell, $2,500 neg. Ext. 7125 or 929-8641.

16' STRADFORD DORY - 1977, 25 h.p. '84 Evinrude, w/Tenee trailer, $1,800. Ext. 7774 or 929-6235 after 5 p.m.

ENGINE - Johnson 40 h.p., leftover, 1984, long shaft, very low hours, extras, excel. cond., $1,280. 298-4172 after 6 p.m.

Furnishings & Appliances

FLOOR BUFFING MACHINE - 17", w/driver. Oscar, Ext. 2043.

PORT-A-CRIB - walnut wood finish, w/mattress, like new, $45. Frank, Ext. 3121.

LIVING ROOM CHAIRS - 2, French Provincial, blue, $15/each or $25/both. 878-6637.

GLASS TABLE - 42" round, w/4 cane-backed chairs, gray/mauve cushions, asking $60. Linda, Ext. 4863 or 874-2675.

SOFA - long enough for sleeping bed, all cloth, yellow, good cond., $20 or best offer. Ext. 7897.

DINING ROOM TABLE - wrought iron, 2 leaves, formica top, 4 red velvet chairs, $450; black couch w/table; more. 589-2681.

RECLINER/ROCKER - wall hugger, gray velour, new, $150; chair, gray velour, like new, $100. Penny, Ext. 2625 or 467-8297 eves.

SOFA - loveseat, ottoman, dark blue, excel. cond., willing to sell separately, $125. 862-8182.

CHILD'S DESK - & chair, wood, for children up to 8 yrs. old, good cond., $20. Diane, Ext. 2347.

MATTRESS FRAME - king-size, $60; garden table chairs, $40; Gorilla guitar amplifier, 30 watts, $60. Veronique, Ext. 3396.

KITCHEN PEDESTAL TABLE - w/4 chairs, solid wood, good cond., $150. 821-1827 after 6 p.m.

MATTRESS & BOXSPRING - Stearns and Foster, twin, excel. cond., $125. Susan, Ext. 7716.

DRESSER - w/mirror, $50; twin-size bed w/boxspring, $50; rocker/recliner, $30; desk, $30. Carrie, Ext. 2073 or 924-1383.

DESK - wood, 3'x5', drawers w/middle drawer, painted, old but good cond., $40. John, Ext. 3292 or 286-1348.

WALL OVEN & COOKTOP - Roper, coppertone, oven needs new ignitor, repair cost approx. $135, otherwise excel., $250/both. Margaret, Ext. 2529.

REFRIGERATOR/FREEZER - GE, 2-door, harvest gold, needs compressor. Joe, pager 0925 or 728-1859 eves.

DISHWASHER - GE, portable, brown front, wood top, excel. cond., $75. L. Kukacka, Ext. 3065.

DISHWASHER - GE, portable, good cond. Tom, Ext. 5350.

BED - queen size, 2 yrs old, $170; twin bed, $80; small tables, $5-$20; bridge table w/4 folding chairs, $45; lamps; more. Lisa, 345-0326.

COFFEE TABLE - & 2 end tables, $100. 369-9879.

DISHES - ovenproof stoneware by Heath, service for 6, extra pieces, design awards, beige w/brown trim, $25. Ext. 4240 or 286-0295.

MATTRESS & BOXSPRING - twin size, extra firm, slightly used, new frame, linens & pillow, $125/all. Ext. 4695 or 744-1917.

GLASSES - Norman Rockwell, $10; LL Bean cookbook, $20; silk flower arrangements, $15; arctic world book, $30; more. Kathy, 744-2203.

COFFEE GRINDER - antique, from 1850's, $40; rowing machine, $65. Mack, Ext. 7978.

LOVESEAT - Rattan, newly covered cushions, $100; handcrafted desk, excel. cond.; chain saw w/extra chains, gas powered, $75. 286-8554.

DINING ROOM TABLE - w/6 chairs, buffet, china closet, pad & mirror light, neutral wood, good cond., $650. 821-1827 after 6 p.m.

HUTCH/SECRETARY - provincial, bubble glass, $50. 286-0243 eves.

SHOWER BASE - 36" x 36", $20. Ext. 2543.

Tools, House & Garden

SIDE LIGHT - new, unfinished wood, clear glass, 12" x 81", $15. Dan, Ext. 3282.

LATHE - 14" swing, metal cutting, complete, needs work, $200. Dick. Ext. 3457 or 589-9103.

TUNE-UP CENTER - Snap-On, 3 meters, $250; Snap-On brake bleeder, $150; 20-ton air-assisted hydraulic jack, $200. 475-5715.

Sports, Hobbies & Pets

PIANO - Lester Betsy Ross, spinet, w/bench, excel. cond., $700. Tony, Ext. 3658 or 929-4903 after 6 p.m.

DRYSUIT - Poseidon, man's large, like new, hardly used, must sell, asking $500. 474-5715.

BICYCLE FRAME - Dowes "Atlantis", 23½", 531 tubing, excel. cond., $85. Mark, Ext. 2599.

GRAND PIANO - Steinway, 1925, model M, 5'7", ebony finish, recently rebuilt, asking $12,000 neg. John, Ext. 751-2655.

SEWING MACHINE - Brother, portable, deluxe, programmable stitches, digital instructions, auto buttonholer, more, $150. Jane, Ext. 5406.

CAMERA - revolutionary 3-D, uses standard 35mm film, w/twin-light flash, case, strap, $40 worth of free film, $270. 661-7054 eves.

BASKETBALL BACKBOARD - $50. Ext. 4447.

HOCKEY SKATES - CCM 650 Tacks, size 7, excel. cond., used 5 times, $175. Eric, Ext. 5793.

SNOW SKIS - & poles, Lange, 170cm, men's Solomon bindings, $100. Ken, 281-8458.

BMX BIKE - 16", boy's, kickstand and/or training wheels, $30; treadmill/exerciser, hardly used, $40. Mary, Ext. 2815 or 472-4087.

LOVE BIRDS - pair, exotic colors, w/bronze house shaped cage, great Christmas gift, $150. 744-3069.

ANTIQUE CAMERA COLLECTION - 1850 to 1900s, make offer. Doug, Ext. 2272 or 732-7634.

SOLOFLEX - must sell, $300 firm. Maria, Ext. 2439.

CLARINET - student model, excel. cond., $125; Signet, $250. woman's ice skates, size 6, excel. cond., $5. Jim, Ext. 3372.

CROSS COUNTRY SKIS - metal-edged, 190cm, Fischer, $50; children's downhill boots, size 12, mint cond., $15. John, Ext. 4203.

ROWING MACHINE - Bodyguard, model 605, $40. 878-2421.

FERRET - tan w/mask, neutered, de-scented, tame & affectionate, w/cage, $50. Don, Ext. 3510 or 929-5521.

Audio, Video & Computers

COLOR TV - Emerson, 19", 12 station pre-set, $180. Harris, Ext. 7898.

COMPUTER - Macintosh 512K, SSFD internal/external, works but needs servicing, $200. Jack, Ext. 4447 or 744-3919 after 5 p.m.

COMPUTER KEYBOARD - Macintosh, regular, new, $80. Ext. 3104 after 5:30 p.m.

REEL-TO-REEL TAPE DECK - Teac, 3-motor, 3-head, excel. cond., $200. Brian, Ext. 2799.

COLOR TV - RCA, 19", good cond., $90. Carlos, Ext. 4528.

COMPUTER - Apple II Plus, monitor, 2 drives, Z-80 coprocessor, joystick, many programs. Shu, Ext. 2419.

Miscellaneous

SEAFOOD BISQUE - thick, delicious and fattening, $12/quart. Ruth Ann, Ext. 7774 or 929-6235.

CHRISTMAS GIFTS - gourmet chocolates, gift baskets, candy gift trays, collectible dolls, custom-made, will ship. Goodys, 795-3083.

CLOWNS - for Christmas, handmade, fabulous, sit on shelf. Bob, Ext. 2314.

CHRISTMAS GIFTS - decorated baskets, wreaths, photo frames, guilted albums, wall-hangings, custom made. Victoria, 399-6390.

CLOTHES - infants & childrens, sneakers, shirts, dresses, decorated w/rhinestones, lace & paint, great for Christmas. Donna, 563-1940.

MASON JARS - about 3 doz., best offer. 286-3742 eves./wknds.

GLASS SIAMESE CAT - $10; Weil Bilt space heater, $20; glass birds, $10 & $15; glass deer, $10; china plates, $1. Kathy, 744-2203.

CRYSTAL FOX COAT - full length, tuxedo front, 3 yrs. old, good cond., $1,200. Darcy, Ext. 3362.

BABY PRAM - Prego, brown velvet, good cond., $25. Ken, 281-8458.

MEN'S CLOTHES - new, sports jacket, size 40, $20; wool sweaters, medium, $10/each; jeans, brown, size 36, $10. Susan, Ext. 7716.

BABY ITEMS - dressing table, $40; stroller, $10; booster-type car seat, $8; activity center, $5; take all for $55. Lisa, 345-0326.

TICKETS - New York Islanders, Jan. 6, 13 & 28, Feb. 17, 24 & 25, March 10, 18 & 27, 2 good seats, $30/seat. Michael, Ext. 7909 or 325-0447.

TICKETS - New Kids On The Block, Meadowlands, March 25, 1990, 4 for $100. Walt, Ext. 7154 or 754-1392 eves.

MONOGRAMS - computerized, in time for Christmas, low prices. Ext. 2077 or 698-7621.

Free

WATER BED - queen size, top-of-line Somma, like new, you pick up. 473-1732 after 5 p.m.

GIRL SCOUT LEADER UNIFORM - size 20, belt, hats, blouse. 744-3069.

HEALTH PHYSICS JOURNALS - 1983 to 1989. Susan, Ext. 7716.

CAT - affectionate year-old female, litter trained. Janet, Ext. 4049.

Yard & Garage Sales

MOVING SALE - dressers, beds, small appl., lamps, TV, housewares, close to Lab, stop on way home. Lisa, 345-0326.

Car Pools

BOHEMIA-OAKDALE-SAYVILLE - need 2 more drivers for car pool, also can meet at Exit 59 LI Expressway. Frank, Ext. 2314.

Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, creed, sex or national origin of the applicant.

For Rent

BELLPORT VILLAGE - secluded, charming home, French windows & doors, outside hot tub, 2 full baths, new appl., $1,000/mo. + util. Susan, Ext. 2888 or 286-0422 eves.

CORAM - Bretton Woods condo, 2-bdrm. 2 baths, l/r, d/r, eik, w/w, cac, 5 appl., golf, tennis, i/o pool, clubhouse, no pets, $875 + util. sec. 289-0413.

LAKE RONKONKOMA - 3 large rooms, eik, l/r, bdrm., bath, own therm., w/w, cable, priv. ent., ½ mile LIE Exit 60, 1 mile LIRR, 20 min. BNL, $700/mo. incl. all, 1 mo. sec. Virginia, Ext. 4953.

MEDFORD - furn. studio apt., 1 room + priv. bath, priv. ent., small refrig., microwave, oven, $100/week + sec., includes all, no pets, non-smoker. 475-7250.

MIDDLE ISLAND - Coventry Manor, 3-bdrm. condo, 2 full baths, all appl., a/c, fenced patio, tennis, pool, avail. Nov. 15, $950/mo. + util. Ext. 3922 or 878-2604 eves.

MILLER PLACE - 1-bdrm. apt., full bath, $550/mo. incl. util. Don, Ext. 2808 or 331-9424 after 6 p.m.

NORTH SHIRLEY - 2½-rm. apt., furn., bdrm, l/r, kitchen, w/w, priv. ent., util. incl., single person, nonsmoker, no pets, 5 min. from Lab & stores, $500 pays all. 281-8044.

PORT JEFFERSON VILLAGE - Harbor Hills, 4-bdrm. split ranch, d/r, eik, fam. rm. w/fp, patio, beach & country club privilges, no pets, $1,050/mo. + util., sec. Ext. 4474 or 929-5699.

RIDGE - new studio apt., nonsmoker, no pets, priv. ent. and driveway, $525/mo. includes all, 1½ mo. sec. Monica, 473-1730 days or 345-3922 eves.

SAYVILLE - 3-bdrm. Colonial, 1½ baths, eik, d/r, l/r, quiet res. st., walking distance to village, $950/mo. 589-5187 Mon.-Thurs., 924-8455 eves.

SHIRLEY - 4-bdrm. Colonial, M/D, sunken l/r, den. fam. rm. w/woodstove, eik, fdr, igp, decks, gar., bsmt., appl., rent w/opt. to buy, $1,250/mo. 399-1868.

STONY BROOK - share Colonial house w/professional, $350/mo. + util. Jim, Ext. 2183 or 689-8284.

WADING RIVER - cozy 3-rm. apt., eik, full bath, one person, no pets, nonsmoker, $500/mo. incl. util., avail Jan. 1. Janet, Ext. 2345 or 929-3910.

WADING RIVER - 4-rm. house, large, shaded backyard, close to Lab, near beach, immed. occupancy, $600/mo. 437-2881.

CATSKILLS, NY - 3-bdrm. chalet w/sleep. loft, furn., near Hunter & Windham Mts., great for hunting, skiing. Bea, Ext. 3642 or Kay, Ext. 4501.

KISSIMMEE, FL - 2 bdrm., 2 baths, full kit., sleeps six, 2 mi. to Disney, 2 pools, playground, week of April 15-22, 1990. John, 924-4262.

HILTON HEAD, SC - 2-bdrm. condo, sleeps six, 2 baths, pool, beach, tennis, golf, $300/wk., Nov.-Mar., 689-5378.

For Sale

MASTIC - 3-bdrm. ranch, ¼ acre, 1½ baths, den, fin. bsmt., deck, appl., house fan, 3 ceiling fans, shed, fence, near school, shopping, 15 min. to Lab, ask. $115,000. 265-2366 after 6 p.m. wknds.

MASTIC BEACH - wooded lot, future investment, 100'x100', paper street, near water, $18,500. Betty, 758-2653.

MASTIC BEACH - 3-bdrm. contemp. on the marina, waterviews of bay, Fire Island, deck, Andersens, oak floors, jacuzzi, f/p, oil heat, Euro kitchen, $175,000. Mike, Ext. 2500.

MIDDLE ISLAND - 3-bdrm. ranch, 18'x24' great room, l/r w/fp, d/r, eik, 1½ baths, skylights, ig pool, sprinklers, deck, more, 5 min. to Lab, $144,990, mint. 924-8426 eves.

PORT JEFF VILLAGE - Harbor Hills, 4-bdrm. split ranch, d/r, eik, fam. rm. w/fp, oak floors, brick patio, 24'x44', bsmt., beach & country club priv., $175,000, red. Ext. 4474 or 929-5699.

SELDEN - Village in the Woods, 1-bdrm. co-op, upper unit, eik, d/r, l/r, pvt. balcony, ask. $75,000. 696-5386.

SETAUKET - 9 rms., 3 baths, 2-car gar., beautiful ½ acre, mint cond., N. of 25A, $269,000. 751-1401.

SETAUKET - Strongs Neck, 7 rms., 2 baths, 0.86 acre, landscaped, deeded beach rights, passive solar energy. 473-4666.

WADING RIVER - contemp., multilevel layout, pool, decks, woods, f/p, etc. SWR Schools, rent by month or sale, $230,000. 283-0155 or 929-4168.

WEST SAYVILLE - 3-4 bdrm. ranch, 2 full baths, gar., cac in all rms., full bsmt., eik, d/r, l/r, w/w, fam./rec. rm., pvt. patio, Sayville SD, walk to Bay, $149,500. 589-2681.

ADIRONDACKS - 2 wooded, waterfront properties 20 min. from Lake George; one, 590' on water, $57,000; other, 290', $55,000; terms avail. for both. Pat or Barbara, 288-5576 or Ext. 4960.

MADERIA BEACH, FL - 1-week time share in Commodore Beach Club, Gulf view, pool, jacuzzi, sleeps 4 adults, asking $5,000, must sell. 474-5715.

WINDHAM SUMMIT, PA - A-frame cabin, mt.-side 12 wooded acres, cath. ceil., loft, furn., sleeps 6, p/b stove, elec., no plumb., 30 mi., west of Binghampton, NY, $30,000. Janet, Ext. 4049.

Wanted

LIONEL/AMERICAN FLYER TRAINS - and access., good price. Bruce, 924-4097 after 5 p.m.

DOLLHOUSE - for young girl, must be in good cond. & reasonable. Doreen, Ext. 2456.

KERO-SUN MONITOR HEATER - any cond. Ext. 4823 or 475-7241 eves.

SKIERS - days trips to Windham, Jan. 3 & 31, $38; to Hunter, Jan 17; Feb. 3, $42. Augie, Ext. 3884 beteen 12-1.

REPAIR PERSON - to repair Yamaha electric organ. Ext. 2419.

WINDSHIELD - for 1972 VW Super Beetle. Fred Kuehl, Et. 7947 or 588-2268.

SECRETARIAL HELP - exp., 3-5 afternoons/wk., to help retired BNL guest scientist on interesting project, flex. hrs. Ext. 3451 or 473-0586.

HEAD - for 84 Ford Escort. Frank, Ext. 2314 or 567-5131.

On-Site Services

FRIENDLY GULF SERVICE STATION - unleaded gasoline: reg., 99.9, plus, 112.9; super, 124.9; full service, cash/credit card. Ext. 4034.

In Appreciation

I would like to thank all my friends in P&GA for their support and sympathy in the loss of my stepfather, Dan. It is very hard to lose someone so dear, and during this difficult time it is nice to know there are those who care.

— Phyllis D'Avanzo & Family

Ads left out of this issue due to lack of space need not be resubmitted to appear in the next issue.