BROOKHAVEN BULLETIN
Vol. 39 - No. 11 March 15, 1985
BROOKHAVEN NATIONAL LABORATORY

On Site

Update on the Tandem/AGS Heavy Ion Project

Almost five months ago, ground was broken for the heavy ion beam transfer line between the Tandem Van de Graaff accelerator and the Alternating Gradient Synchrotron (AGS). The beam transfer line will be commissioned in about 12 months, and recently, Horst Foelsche, head of the Tandem/AGS Heavy Ion Project, spoke about its current status and what's coming up.

"In general, things are progressing rapidly, thanks to the fine cooperation between the people at the AGS and the Tandem," said Foelsche, who is working closely with Deputy Project Head Peter Thieberger. "Our vendors have been very responsive and have promised good deliveries."

Such promises are critical because, Foelsche said, "In ten months we must be finished installing magnets and other equipment in the tunnel, and begin testing components. Although it is a little early to tell right now, the construction company has promised to give Brookhaven beneficial occupancy of the first half of the tunnel at the end of July, which means we can go in then and make plans for installation."

Conventional construction, which is being coordinated by Jack Feldman and Paul Mohn, involves several steps: excavating the site, laying the tunnel outline, pouring a concrete floor to provide a level surface for equipment, installing electricity and erecting two equipment buildings, one at the tunnel's midpoint and one near the AGS. The contractors must also build an opening for the tunnel to penetrate the Tandem building. As for entry to the AGS, said Foelsche, "That was done before groundbreaking, during an AGS shutdown, so as not to interfere with the physics program."

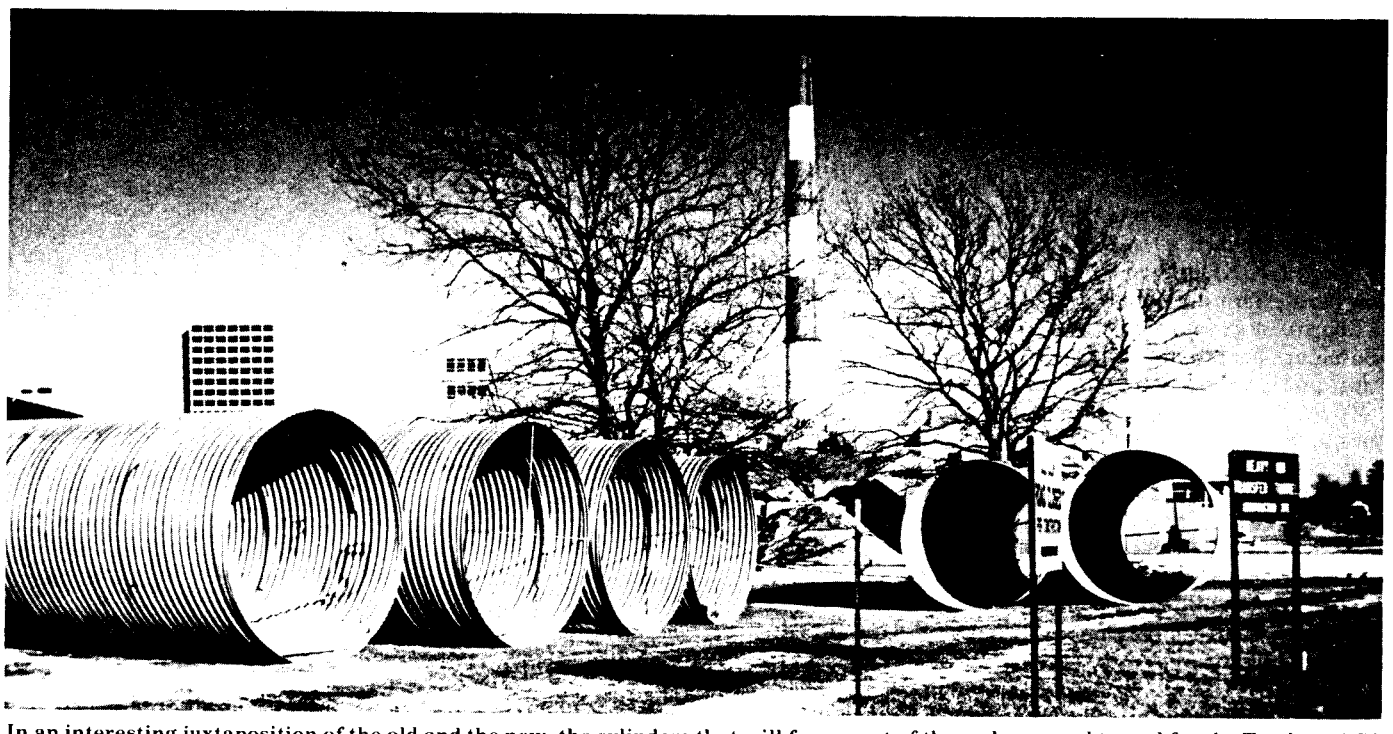
The whole tunnel will be underground, and two techniques are being used in its construction:

- Cut-and-refill — This method makes use of the 40-foot-long, ten-foot-wide spiral sections dotting the Tandem hillside. To accommodate them, the earth is scooped out, or cut. Then the tunnel sections are dropped in place and joined together, and the earth shielding is refilled over them.
- Tunneling underground — For the first 380 feet of the tunnel, cut-and-refill won't work because that area is already occupied by gas storage tanks for the Tandem, and the tunnel must go beneath them. Boring through the earth below the tanks requires a special ten-foot diameter shield. Its hydraulic systems are all connected, and the shield has begun to push through the earth, scooping out the earth like a round cookie cutter. Following right behind the moving shield, workers are installing the tunnel's supporting linerplate shell.

When construction of the tunnel is complete, the southern end of Rutherford Drive will be permanently rerouted through the forest to the west of the present road.

While conventional construction is the most visible aspect of the project, much is going on in other areas. Under the direction of Thieberger, the Tandem team has installed a high voltage intershield, which will make it possible to reach a higher accelerating volt-

(Continued on page 2)



Mort Rosen

In an interesting juxtaposition of the old and the new, the cylinders that will form most of the underground tunnel for the Tandem/AGS Heavy Ion Project stand in front of the building and stack of the Lab's first experimental facility, the Brookhaven Graphite Research Reactor.

Mort Rosen

This shaft is located on the north side of the Tandem Van de Graaff and was dug as a point of entry for the ten-foot shield, which will bore out the first 380 feet of the heavy ion beam transfer line. The shield will advance underground westward, through the earth behind the boarded up rectangular area in the center of the photo.

bnl Lecture

Mystery Solved

"Why grasse is greene, or why our blood is red..." was a mystery to poet John Donne in 1612, but it is a mystery no longer. In the 213th Brookhaven Lecture on Wednesday, March 20, at 4:30 p.m., chemist Louise Hanson will discuss how scientists have come to understand these phenomena.

It turns out that the difference in color between chlorophyll (the green pigment in grass) and the heme of hemoglobin (the red pigment in blood) arises from the addition of two hydrogen atoms across a double bond. And chlorophylls and hemes belong to the family of molecules known as porphyrins. In her lecture, Hanson will describe the electronic structure of porphyrins to provide a basis for discussion of the similarities and differences between these two pigments.

Peter Horton

Louise Hanson

For both hemes and chlorophylls, small differences in either the molecules themselves or the environment provided by the protein can result in substantial changes in their function, chemistry and electronic properties.

Hanson says that their properties can be computed with a remarkable degree of accuracy, using what is known as molecular orbital theory. Properties that are amenable to calculation by this theory include optical spectra, the ease with which a given molecule can give up or accept an electron and, once this has happened, the distribution of the odd electron over the atoms in the molecule. The lecturer will illustrate the interplay between theoretical calculations and experiments, primarily with examples involving photosynthetic pigments.

Hanson received her B.S. and M.S. degrees from the University of Michigan and her Ph.D. in chemistry from the University of Washington. For her Ph.D. thesis she studied the luminescent properties of porphyrins. As a postdoctoral fellow at the Laboratory of Chemical Physics, National Institutes of Health, she worked on the polarized absorption spectra of single crystals of hemoglobin and cytochrome P450. In order to interpret her results, Hanson started doing molecular orbital calculations. Before coming to Brookhaven in October 1977, she taught analytical chemistry at American University in a course designed to retrain women chemists who had left the workforce and wished to return.

Hanson has been on the staff of the Porphyrin Chemistry group, Chemical Sciences Division of the Department of Applied Science for the past seven years. There she has been almost exclusively involved with theoretical calculations.

All those interested in getting together after the lecture are invited to go with the lecturer to a restaurant off-site. If you want to be part of the group, call George Rabinowitz, Ext. 7637.

Inside BNL's Auto Shop

John Doscinski runs the ideal service station. He and his staff repair everything on a vehicle that needs repairing, as quickly as possible. And there's never any need to worry that you're going to be overcharged. They send their customers away without a bill.

Before you start revving up to go over to this paragon, there is one hitch. The service station that Doscinski supervises is the Automotive Repair Shop on site. It's not open to the general public; it's there to maintain and service the more than 400 licensed, government vehicles and trailers that are managed by the Staff Services Division.

Though Staff Services is responsible for all the Lab passenger vehicles and trucks bearing the Department of Energy (DOE) logo, most of them are on permanent assignment to various Laboratory groups and organizations. Some are assigned to the transportation pool run by the Transportation Office, and a few belong to the Auto Shop, where they are maintained as loaners.

No matter to whom it's assigned or what kind it is, each of the vehicles returns to the Auto Shop at least every three months. "On the average we see between 110 and 150 vehicles each working month for routine maintenance," says Doscinski, "plus all of the road calls that come in daily and our normal repairs."

To handle this work, Doscinski is aided by six mechanics: Roland Baillargeon, Robert Caulfield, Dennis Fuzie, Junie Langhorn, Richard Reeve and James Vogel. Helper Wilbur Bailey and Automotive Office Clerk Claire Zahra, for whom Nancy Concadoro is temporarily filling in, round out the group.

The Auto Repair Shop is located in Bldg. 423, near the junction of Princeton Avenue and Yale Road. It's easily recognizable by the gas pumps outside, ready to dispense fuel to any government vehicle.

Inside, the Auto Shop is much larger than the average service station, and the vehicles being worked on are more diverse. While some service stations specialize, the Auto Shop handles almost anything: domestic and foreign cars, pickup trucks, refuse trucks, tractor trailers, snow plows, a fuel oil truck and electric vehicles.

—Roger Stoutenburgh

Gathered around one of several brand-new Datsun pickups that were recently being prepared for Laboratory use at BNL's Auto Repair Shop are (seated on tailgate, from left) Richard Reeve, Nancy Concador and Wilbur Bailey; (back row, from left) John Doscinski, Dennis Fuzie, James Vogel, Robert Caulfield, Roland Baillargeon and Junie Langhorn.

Thirteen electric vehicles came to BNL in the early 1980's under a three-year DOE demonstration project. The project ended in 1983, but four electric vehicles are still on the Lab's roads. "Parts availability has diminished to the point that we have to terminate the vehicles," says Doscinski. When parts are available, however, the Auto Shop crew has no problem repairing the electrics. "We all had training," he says, "and there haven't been any problems that we haven't been able to solve."

The Auto Shop has several stockrooms. One was designed for storage of the hundreds of batteries needed for the electric vehicles, but once they're phased out, Doscinski will simply use it to store batteries for other vehicles.

In the Auto Shop recently was a 30-foot trailer holding helium tanks, which must be refilled in Pennsylvania. To keep it in top shape, the trailer was in the shop for a complete overhaul. This 24 to 30 hour treatment takes place every five years, in addition to routine maintenance.

At another lift was a K car, while a Datsun pickup sat over a fourth lift. But the fifth was out of commission. "We're waiting for a new replacement, a power lift which will allow us to remove engines from front wheel drive vehicles. We're getting more and more of them so this lift is going to be essential."

When parts are available, Doscinski says, "There hasn't been anything here that we haven't been able to repair. Everybody pulls together and makes the shop run smoothly."

He does have a few pet peeves, however. One concerns loaner vehicles. Though a few are assigned to the Auto Shop, "Most of those are out on 30-day loan, or longer, to different organizations," he says. "At the end of that time, the borrowers are often reluctant to return the vehicle, but meanwhile it's promised to someone else. This makes our job difficult because there are certain groups that have to have a loaner."

Doscinski also shakes his head over the fact that "even though gasoline is readily available, we have to go on out-of-gas calls every day in the week." Then there are the folks who can't drive a standard shift but won't admit it. Doscinski's tales of broken shift handles and burned out clutches explain why the trend in Staff Services is towards automatic transmissions.

Trip checks are sometimes another source of frustration. People taking a vehicle on a long trip should bring it to the Auto Shop ahead of time for a check. "Some groups are very good and call in a week or two ahead of time," says Doscinski, "while others call at 9 a.m. for a 2 p.m. departure they knew about for weeks. This disrupts the timing promised to other customers."

Of course, there are times when the travelers have no control over short notice. Doscinski recalls, "When there was trouble at Three Mile Island, two vehicles had to be ready to go in three hours, and one of them required a brake job. We had four people working on the vehicles, and they were ready to go with time to spare."

—Anita Cohen

On Site (Continued)

age than has been available so far. Also at the Tandem, new ion sources are under test, which will provide the short, high current bursts of beam required for injection in the AGS.

The Tandem group, working closely with the AGS team, is also handling the purchase and installation of beam transfer line equipment, an effort that is being coordinated by Ted Robinson. Power supplies have been ordered, and major magnet purchases have been placed.

Magnets will not only transport the heavy ion beam down the 2,000-foot-long tunnel, but will also help the beam negotiate three sharp turns on its way to the AGS: a 180-degree bend where the transfer line meets the Tandem (because the Tandem is really aiming in the wrong direction), a 48-degree bend at the tunnel's midpoint and a 138-degree turn for the tunnel to enter the AGS.

It won't be difficult for the beam to negotiate these turns, Foelsche explained. Like light going through a prism, the beam particles will fan out after passing through a bending magnet. The trick is to recapture the particles in such a way that two halves of the bend compensate for each other, and whatever spread there is gets recombined into a small, well focused beam for the long, straight-ahead sections. "It's completely routine," he said. "In fact, that's a feature of this project. It's a high quality design based on existing capabilities and straightforward additions to them. That's why we can move so fast."

Inside the tunnel, the beam will be transported through a novel vacuum system. This idea by Dick Hseuh is being brought to fruition by a team headed by Irv Feigenbaum, who is also working with Dick Witkover to develop beam diagnostic instruments for determining the properties of the beam.

Don Barton is coordinating modifications to the AGS. He is assisted by Andy Soukas and Gene Jablonski, who are the project's chief electrical and mechanical engineers, respectively. Among the AGS additions are a new injection system and another radio frequency (RF) cavity.

The AGS's present RF system consists of ten cavities that boost protons to higher energies. Said Foelsche, "The heavy ions will arrive at the AGS at a slower speed than the protons do, so we first have to bring those very slow particles up to a speed where they can be handed over to the regular acceleration system. That's the job of the auxiliary RF." Design of that system has made good progress under the supervision of Ralph Sanders, and parts are now beginning to be assembled for tests late this summer.

The entire beam transfer line will be connected to a new AGS computerized control system via a BNL-developed cable system called RELWAY, for RELiable process data highWAY. Alan Stevens heads the AGS Computer Control Group, while Bob Frankel and his team, with help from the Tandem group, provide the RELWAY expertise. To accommodate the control system, new computer consoles will be introduced at both the AGS and the Tandem.

In actual practice, Tandem operators will run the Tandem and the beam transfer line, while AGS operators will handle injection and acceleration. From either end of the line, however, operators will be able to control every aspect of heavy ion beam transfer to the AGS. The entire beam line can be commissioned separately from the AGS ring, so it will literally be waiting on the doorstep when the AGS finishes other parts of its diverse experimental program. Most of the time when the AGS is not running heavy ions, it will accelerate protons, either polarized or unpolarized.

—Anita Cohen

Patent Awarded

U.S. Patent #4,479,931 was issued to **Richard M. Lambrecht**, Chemistry, and **Samuel Packer**, Medical, for developing a new procedure for diagnosing eye tumors. Both accurate and non-invasive, the procedure uses a novel instrument that contains two radiation detectors, which can be moved vertically and horizontally for accurate placement before a patient's eyes. After taking a tumor-localizing drug two or three days before examination, the patient looks into the detectors, and a measurement is made of the radiation level in each eye. A different level of activity may indicate the presence of a tumor.

The new procedure was evaluated in a small clinical study on patients with pathologically confirmed tumors, using gallium-67 as the tumor-localizing drug. A positive differential result was found for tumors having a volume greater than 600 cubic millimeters. Smaller tumors were distinguished by lower gallium retention.

Employee Seminar

As most employees know, the use of automobile safety belts by front seat passengers is now required by law in New York State. Safety belts reduce the chance of being killed or seriously injured in a car crash by at least 50%. Since motor vehicle accidents are the leading cause of death in this country for Americans aged one to 44, the use of seat belts will save a significant number of lives.

Motor vehicle passengers are 15 times more likely to die if ejected from a vehicle in a crash. Since seat belts restrain passengers within a car, they are less likely to be thrown from the auto.

"Unfortunately, there are many misconceptions surrounding safety belt use," says Laura Sbarra, director of the Occupational Medical Clinic. "Many people are falsely convinced that using safety belts increases the chance of being fatally trapped in a vehicle. They also wrongly believe that being thrown clear of the crash is safer than being restrained within the car by a seat belt. As well, they have the incorrect notion that pregnant women should not wear safety belts, and that children are safe when sitting on the lap of an adult who is wearing a seat belt."

To educate employees on how seat belts can save lives, a lecture on the new safety belt law will be given by Suffolk County's Highway Safety Specialist Suzanne Balduzzi on March 27 in Berkner Hall at noon. Balduzzi will present a short film, discuss the new law, answer questions and distribute literature on safety belt use. The seminar is open to all employees.

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CREF Values

March	65.37	April	65.34
May	60.81	June	61.71
July	60.35	August	66.91
September	66.75	October	66.70
November	65.69	December	67.04
January	72.01		

February $72.38

Stockroom Closing

Building T-90 will be closed for inventory on March 28 and 29. Please make all necessary withdrawals of stock before 3 p.m., Wednesday, March 27. This will give the Supply and Materiel Division sufficient time to prepare for the inventory. Emergency requirements should be processed through John Scharpeger, Ext. 2974.

PC Users Meeting

The PC Users Group will meet on Tuesday, March 19 at 10:30 a.m. in the Applied Mathematics Department Seminar Room. Richard C. Melucci will talk about the PC2622 communication package and its use in accessing MIS facilities such as IPAP, file transfer between different computers, and, generally, as a flexible communications package.

Arrivals & Departures

Arrivals

Joseph F. Carbonaro ..... DNE
Ralph R. Fullwood ..... DNE
Sharleen T. Galbraith .. Contr. & Proc.
Stephen E. Gushue ..... Chemistry
Stewart Mandell ..... AGS

Departures

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

Herbert M. Bell ..... Plant Eng.
Mark F. Finnerty ..... Plant Eng.
Joseph W. Zahra ..... S&ES

Nuclear Data Cards

Nuclear wallet cards — wallet-size handbooks containing nuclear data such as isotope mass, half-life, abundance, decay modes, some elemental properties and other useful information — are available free from the National Nuclear Data Center, Bldg. 197D. Contact Jag Tuli, Ext. 5080.

BERA News

Team Walk for March of Dimes

Again, this year, Laboratory employees are invited to make up a team to participate in WalkAmerica '85, sponsored by the Long Island Chapter of the March of Dimes Birth Defects Foundation.

The walkathon starts at 8:30 a.m. on April 28 at Eisenhower Memorial Park, East Meadow in Nassau, and at Smith Haven Plaza, Lake Grove in Suffolk. The distance is 25 kilometers (15.5 miles).

Walkers are asked to find sponsors among friends and relatives who will pay them a certain amount of money for each kilometer they walk. At the end of the race, the money earned is donated to the March of Dimes.

Those who wish to participate should call Blanche Laskee, the Team-Walk coordinator, at Ext. 2873.

BERA Election

Voting Schedule:

Cafeteria

Mon.	Mar. 18	11:30 a.m.-1:00 p.m.
Tues.	Mar. 19	11:30 a.m.-1:00 p.m.
Wed.	Mar. 20	11:30 a.m.-1:00 p.m.

Bank

Thurs.	Mar. 21	Noon-2:00 p.m.
Fri.	Mar. 22	9:00 a.m.-2:30 p.m.

Absentee votes will be accepted for employees who will not be on site election week. Ballots, in the form of signed memos with candidate selections, must be received by the Recreation Office before noon on Friday, March 22.

Swim Club

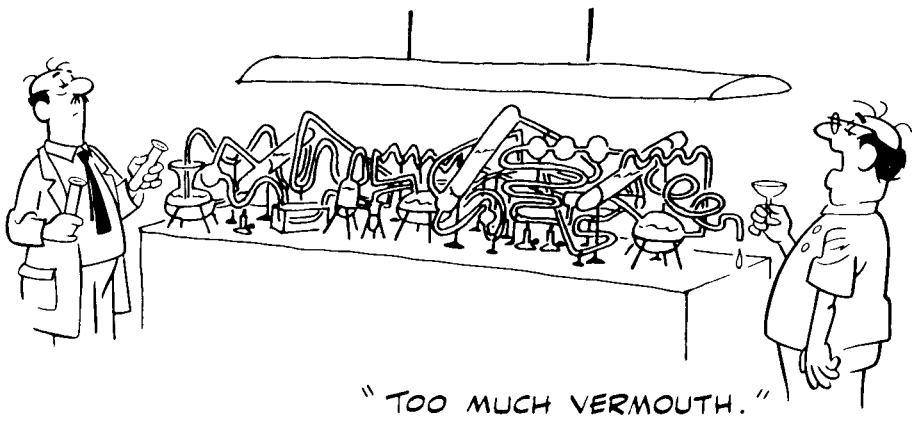
The BNL Swim Club will meet at the pool on Thursday, March 21, at 5:15 p.m. for a 3/4 mile workout. An optional time trial will be held afterwards. The Swim Club meets the first and third Thursday of each month, and all those who can swim at least two laps of the pool using the crawl stroke are invited to attend. For more information, call Marsha Belford, Ext. 3327, or Mark Catan, Ext. 2504.

Equipment Demo

The Allen-Bradley Company will be displaying some of its products, including Programmable Controller and AC + DC Drives, in Berkner Hall lobby, March 18 and 19 from 9 a.m. to 4 p.m. each day.

I.B.E.W. Meeting

Local 2230, I.B.E.W., will hold its regular monthly meeting on March 25 at 6 p.m. in the Knights of Columbus Hall, Railroad Avenue, Patchogue. On the agenda will be regular business, committee reports and the president's report.



Theater Group

The Theater Group will meet on Friday, March 22 in the North Room of the Brookhaven Center. Socializing starts at 7:30 p.m., followed by a business meeting and readings from "The Actor's Nightmare," and "The Marriage Proposal."

Volleyball

	W-L
A League	
Dinkers	37-5
Upfagrabs	27-15
Semi Tough	23-19
Teddybares	19-23
Mixed Ups	13-29
Nuts & Bolts	7-35
B League	
TNT	33-9
Phoubars	30-12
Fossils	27-15
Set Ups	13-29
Chunga's Revenge	13-29
Servers	10-32
C League	
Tigers	31-11
Captain Midnight	29-13
Screwballs	26-16
CRAW	15-27
Quirks	13-29
Couples	12-30
Open League	
Phoenix	45-0
Odds & Sods	26-19
Half Lifes	21-24
Team Six	19-26
Rowdy Radicals	16-29
Generic	7-38

Bowling

Purple League

High games were bowled by Ed Meier 221, Bob Jones 213/207/605 scratch, Mary Scheidet 211, Rich Eggert 210, Fran Brown 181, Ellie Adams 179, Mary Grace Meier 178, Maria Apelskog 178, Pat Manzella 176.

Pink League

M-G Meier rolled a 180, Kathy Kissel 185.

Red/Green League

B. Kristiansen bowled a 230, T. Prach 225/604 scratch, L. Schairer 222, C. Neuls 220, E. Meier 212, G. Meinken 206, N. Combatti 205, E. Sperry IV 202.

White League

Vogel 216, Ben Belligan 201, Joyce Pinelli 223/184, Caryl MacDougall 199/181, Sandy Asselta 197, Lee Barberich 194, Kay Conkling 182.

High games were bowled in the Industrial Tournament by R. Larsen 236/247/662, E. Sperry IV 237/613, K. Riker 200. Team is now 7th in standings.

Basketball

First Game	
Hollywood — 74	
G. Grigg	16
R. Kowalski	4
G. Mack	15
E. Meier	27
D. Nordstrom	12
Coasters — 73	
R. Doty	18
M. Fulkerson	15
B. Allen	5
L. Snead	6
A. Washington	2
M. Williams	23
K. D'Amico	4
Second Game	
Longshots — 84	
P. Brown	6
J. Gaffney	11
J. Garrison	9
L. James	17
B. Jasper	2
R. Seymore	20
E. Taylor	4
L. Walcott	12
R. Rowley	2
Runaways — 73	
S. Gilbert	19
T. James	15
P. Johnson	28
T. Mooney	2
G. Sheperd	9

Singer Linda Sandberg is one of the artists who will appear in the March 23 concert which will benefit the Renate W. Chasman Scholarship Fund. Other Long Island musicians who will join her at 8 p.m. in Berkner Hall are mezzo-soprano Florence Hechtel, pianists Maria Heger and Laurine Elkins-Marlow, clarinetist Joseph DePalo and violinist Daniel Trueman. Tickets are $5 and will be available at the door, or in advance from the BERA Sales Office in Berkner Hall. If ordering by mail, checks should be made payable to Chasman Scholarship Fund and sent with stamped self-addressed envelope to Concert Tickets, P.O. Box 183, Upton, N. Y. 11973.

ANSYS Users Group

An ANSYS users group is being formed and its first meeting will be held on Thursday, March 21 at 1:30 p.m. in the Applied Math seminar room. ANSYS is a large, general purpose finite element program capable of static and dynamic analysis of structures, including heat transfer. ANSYS also has capabilities in 2D and 3D magnetic analysis. (See December 1984 Computing Newsletter, page 89). Information on the program and its Lab-wide implementation will be given at the meeting which is open to all who use ANSYS or plan to use it.

Diners Note

The Cafeteria will be closed on Saturday, March 16. On that day, snack bar service will be available from 9 a.m. to 2 p.m. at the Brookhaven Center.

Cafeteria Menu

Week Ending March 22

Monday, March 18		
Cream of chicken soup	(cup)	.65
	(bowl)	.85
Veal patty Parmesan & 1 veg.		2.20
or/w spaghetti		2.45
Cheese omelet & 1 veg.		2.10
Hot Deli — Top round of beef	(bread)	2.10
	(roll)	2.30
Tuesday, March 19		
Vegetable beef soup	(cup)	.65
	(bowl)	.85
Roast turkey w/bread stuffing		2.15
Broiled flank steak & 1 veg.		2.30
Hot Deli — Baked ham	(bread)	2.00
	(roll)	2.20
Wednesday, March 20		
St. Patrick's Day Special		
Split pea soup	(cup)	.65
	(bowl)	.85
Corned brisket, cabbage & parsley potatoes		2.35
Braised beef liver w/onions & 1 veg.		2.00
Hot Deli — BBQ chicken	(bread)	2.15
	(roll)	2.35
Thursday, March 21		
Pork & cabbage soup	(cup)	.65
	(bowl)	.85
Turkey chow mein on rice		2.10
Baked meat loaf & 1 veg.		2.10
Hot Deli — Italian meatball hero		2.20
Friday, March 22		
Manhattan clam chowder	(cup)	.65
	(bowl)	.85
Old fashioned beef stew on egg noodles		2.20
Tuna noodle casserole & 1 veg.		2.10
Hot Deli — Pastrami	(bread)	2.05
	(roll)	2.25

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, 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.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

2200. ASSOCIATE STAFF ENGINEER - Requires BS in engineering or in a physical science discipline (physics, chemistry, etc.) or equivalent. Must have a good background in either engineering, mathematics or physics sufficient to handle the instrumentation and calculation involved with radioactive half-life, shielding, self-absorption and gamma spectroscopy. Will be involved in reactor fuel procurement, quality assurance, regulating issues, specialized accounting and bookkeeping. Must be able to obtain a "Q" clearance. Safeguards and Emergency Services Division.

2201. SCIENTIFIC ASSOCIATE - Requires BS in the physical sciences or equivalent to participate in research and development activities in the beam line research and development section at the NSLS. Must have specific experience in one of the following: ultra high vacuum, soft x-ray, or computer programming. The job will include work in all of the above. (Term appointment, two years). National Synchrotron Light Source Department.

2202. ADMINISTRATIVE POSITION - Requires BA/BS degree in accounting or management and three to four years' pertinent experience. Under minimum supervision will be responsible for establishing inventory requirements, their budgets and maintenance of the physical inventory. Will also monitor user accounts and coordinate plant projects. (Reposting of Job #2184). National Synchrotron Light Source Department.

2203. TECHNICAL POSITION - Requires AAS degree in mechanical technology or equivalent and five years' technician shop experience. Must be able to work from drawings and sketches with little supervision. National Synchrotron Light Source Department.

Autos & Auto Supplies

74 BLAZER - p/s, p/b, a/t, am/fm, $2,000. 289-8253 after 5 p.m.

84 CORVETTE - like new, loaded, silver, $19,500. 744-1081 after 5 p.m.

79 CJ7 RENEGADE JEEP - 8 cyl., 304 automatic, many extras, excel. cond., 70k miles. 286-3865.

80 YAMAHA 650 - Special, black 6k mi., mint, helmet, $950. Peter, 475-8406.

THEFT SENTRY PAGING SYSTEM - auto page, AP/4500, new, boxed, cost over $280, sell for $210. Ext. 2981.

75 FIAT 128 - am/fm, good engine, (2) new tires, needs work, $350. Ext. 3714 or 3208 after 7 p.m.

80 DL SUBARU WAGON - low mi., fine cond., no prob., std. shift. 288-3104 eves.

76 BUICK REGAL - 2 dr., V8, as is $500. Rich, Ext. 4216 or 475-0330.

76 FORD TORINO - p/s, p/b, a/c, 350, V8, $1500. Al, Ext. 4636.

80 DATSUN 200SX - excel. cond., high mi., two-tone blue, w/moon roof. Ext. 3960.

76 CHEVY MALIBU - 2 dr., blue, 3 spd., 6 cyl., a/c, $1,200 or best offer. 744-9677.

71 OLDS WAGON - V8, a/t, p/b, p/s, a/c, many new parts, best offer. Al, Ext. 4645 or 744-0354.

BENCH SEAT - for 1978 Datson pickup, $25. 286-8448.

73 FORD STA. WAGON - very reliable, many new parts, good rubber, a/t, p/s, p/b, 351 CID, just inspected, $950. 475-6981.

72 CADILLAC - (4) new tires, good running cond., asking $675; 76 Matador, excel. cond., good tires, asking $1,300. Ext. 4597 or 924-8213 after 5 p.m.

79 CHEVY CHEVETTE - clean, 60k mi., needs motor, $1,000 or best offer. 924-8143.

72 DATSUN WAGON - new tires, clutch, well maintained and clean, $875. 331-2229 after 6:30 p.m.

83 FORD ESCORT - sta. wagon, HO engine, 5 spd., p/s, p/b, 16k mi., excel. cond., $5,500. 282-3134.

80 FORD MUSTANG - 53k, new tires, am/fm stereo, garaged, excel. cond., $3,500. Ext. 4531 or 331-3785.

VESPA MOTOR SCOOTER - 200 cc, 50 mpg, 50-55 mph, white, must sell, $500. Nick, Ext. 2490.

63 CORVAIR VAN - 6 cyl., 4 spd., good cond., $500. Frank, 399-4480.

83 HONDA MOTORCYCLE - Shadow 500, wrecked but good for salvage. Bob, 283-1752.

78 HONDA HAWK T2 - 400 cc, plexifairing, luggage rack, engine guards, nylon bike cover, $550. Sam, Ext. 4749.

PARTS - 70 Toyota Corona, doors, hood, glass, wheels and other parts. Hank, Ext. 3848 or 472-0553.

73 FORD - sta. wagon, a/t, p/s, p/b, 351, new tires, ball joints, springs, alt., volt. reg., water pump, windshield, alignment, $850. 475-6981.

73 CHEVY MALIBU - 350, 4 dr., runs well, bent flywheel, best offer over $100. 744-5069.

73 TRAVEL TRAILER - 22', Banner, self-contained, w/shower, oven, refrigerator, 4 burner stove, sleeps 6, asking, $3,500. 744-7574.

78 OLDS CUTLASS SALON - 8 cyl., p/s, p/b, a/c, a/t, low mi., $2,500 neg. Katherine, 281-8021.

81 HONDA GOLD WING INTERSTATE - excel. cond., 17k mi., $4,500. Charlie, 475-9719.

79 SHASTA TRAILER - 21', 30 lb. gas tanks, self-contained, excel. cond., $5,500. Otto, 472-0339.

78 CHEVY VAN - insulated, carpeted, paneled, radar detector, 8 cyl., p/s, p/b. 475-1254.

73 WINNABAGO MOTOR HOME - 26', full bath, mint cond., 5 kw gen., built-in vacuum, $11,800. 744-8672.

76 CHRYLSER CORDOBA - a/c, p/s, p/b, a/c, all power, $1,800. 924-6724 after 7 p.m.

75 CHRYSLER - 2 dr., high mi., runs well, asking $600 or best offer. 727-5912.

VW PARTS - generators, starters, clutches, flywheels, assorted engine parts for the bug. Fred, Ext. 4407.

75 VW RABBIT - 138k mi., runs well, $700 neg. 727-7796.

70 MONTE CARLO - runs well, looks good, $800. Dan, Ext. 4987 or 698-7322.

71 VOLVO - 164E, 6 cyl., a/t, 125k, 4 dr., a/c, am/fm stereo, p/s, p/b, very clean. Ext. 3565 or 878-2233.

81 KAWASAKI 250 KDX - like new, 300 miles, never raced; 73 Plymouth Satellite, 6 cyl., high mi., new brakes, tires, am/fm, runs well, $350. Dave, 475-7891 after 5 p.m.

75 OLDS CUTLASS - 2 dr., p/s, p/b, p/w, a/t, new whitewall radials, very reliable, $800. 727-3115.

71 DATSUN - sta. wagon, body rusty, runs well, $450. Ext. 4168 or 286-3675.

82 TOYOTA TERCEL SR5 - 5 spd., hatchback, am/fm cass., orig. owner, log kept, alum. alloy wheels, a/c, $5,100. Henry, Ext. 4547 or 924-6688.

75 VW BUG - am/fm, snows, new muffler, rebuilt engine, 2 extra rims, excel., $1,100. Ext. 2906 or 929-6189.

73 FORD TORINO - good cond., $995. 654-5585 after 6 p.m.

TIRE - Goodyear, G78-14, w/rim, very good cond., $25. Tony, Ext. 7772.

73 GOLD DUSTER - good in/out, alt., exhaust, brakes, all new, good tires, must see. Ext. 4527.

82 CHEVY CAVALIER HATCHBACK - 2 tone, a/c, am/fm, p/s, p/b, excel. cond. $6,000. Rick, 399-4552 after 6 p.m.

68 VW - w/72 engine, looks good, runs great, $500; Baja kit on '72 body, needs motor and assembly. 821-0379 after 6 p.m.

80 HONDA CIVIC HATCHBACK - 1300 DX, 5 spd., am/fm, garage kept, very good cond., $2,550. Ext. 4752 or 669-0549.

77 HONDA - excel. mech., 30k mi., new engine, trans., clutch, 35 mpg, am/fm, $1,375. Ext. 3164 or 744-5954.

Boats & Marine Supples

7' COBIA - w/100 HP motor, swim ladder, dilly trailer, cover, complete, $3,000. Marlene, 744-5801.

23' PUMA SLOOP - deep keel, sleeps 4, privacy, head & galley, 6 HP, many extras, $8,500. Walter, Ext. 4605.

14' SPINDRIFT SAILBOAT - 1981, galvanized trailer, 4 HP, Evinride, fitted cover, extras. Paul, Ext. 2017 or 744-7708.

13' SCAMP - fiberglass, sailboat, 2-3 person, good cond., w/trailer, $375. 475-3415 after 5 p.m.

17' KAYAK - Folbot, 2 adults, good cond., 2 double paddles, $150. 941-4328.

30' ULRICKSON CABIN CRUISER - 1963, wood, sleeps 6, flying bridge, good cond., seen at Matt-A-Mar Marina in Mattituck, asking $2,500. Barbara, 744-7574.

19' FIBERGLASS CRUISERS - 11 VC, w/90 HP Chrysler, trailer, many extras, excel. cond. 325-0447 after 6 p.m.

14.2' CAPRI BY CATALINA - 1982, multi-colored sails, trailer, fully rigged, $2,500. Otto, 472-0339.

MUSHROOM ANCHOR - 100 lb., w/chain and pickup buoy, $75. Joe, 369-0432.

27' TARTAN AUXILIARY - documented cruise and race equipped, lt. blue hull, white/gray top, 12 sails, Atomic 4, F.W. cooled. Ext. 4251 or 4258.

19' GRADY - white, 1983, 115 HP Evinrude, power trim and tilt, full camper, canvas, w/1985 Cox E-Z Load trailer. John, Ext. 4668 or 324-0220.

21' GALAXY - 1983, deep V cuddy cabin, 120 HP Volvo, 30 hours, port-a-potty, am/fm cass., compass, depth, full swim platform, full cover, like new, extras, $10,000. Ext. 3589 or 281-3635.

18' ALUM. BOAT - 1981, 30 HP Chrys., 81 trailer, excel. cond., $2,200. Eddie, Ext. 2021 or 727-4925.

Miscellaneous

OAK TABLE - chairs; desk; double bed; Jacobean armoire; hide-a-bed; dog's air crate. Ext. 5038 or 928-8379 eves.

TEN-SPEED BICYCLE - Ross, excel. cond., 3 yrs. old, 25" frame, blue, $120. 286-3865.

SHELLS - coral, costume jewelry, rings, wind chimes, shell craft. Whitey, Ext. 2913 (Bldg. 197B).

BED RAILS - 40" long, 16" high, almost new, $10; bicycle training wheels, $6; elect. fan for window, (24"-26"), twin fan, $10. Inan, Ext. 3370.

TENNIS RACKET - Davis classic, gut strings, w/press, $30. Georgia, Ext. 2342.

WORLD BOOK ENCYCLOPEDIA - 1984, $150 (less than new). 744-5801.

DINETTE PEDESTAL TABLE - almond formica top, w/leaf, (5) padded swivel chairs, vinyl print, good cond., $100. 744-8659.

ORGAN - Electronic Wizard, Spinet model, rhythm section, magic chord and more, $550. 369-2716.

DUMBBELLS - $10; Electrolux floor polisher; assorted new door knobs, masonry blade, new, $3. Paul, Ext. 4156.

PLUMBER'S TOOLS - for cutting and threading pipe, galvanized fittings, make offer. Joe, Ext. 2975.

CORNET - Olds Ambassador, w/case, $100. Jim, Ext. 3372.

CAMERAS - Konica T3, Auto Reflex, 35 mm, w/75-150 zoom lens, $200; Russian 35 mm w/case, $50. 286-8448.

MOVIE PROJECTOR - 16 mm, sound, Singer model, new cond., $225. 878-9256.

RADIO CASSETTE RECORDER - $40; 19" Admiral color TV, $75; hair dryer, $5; clock radio, $10. Gunilla, Ext. 3134.

TENNIS RACKETS - Spalding Jr., wood frame, very good cond., $10; Spalding Rebel, metal frame, never used, $16. 744-4792 eves.

BIKE - BMX Mongoose, alloy cranks, proneck, KKT lightning pedals, zap pads, $115. Dave, 821-0250.

ATARI 2600 - w/8 tapes, $70; girl's tricycle, $10. Fran, 399-4822.

STAMPS - first day covers, over 570, Appolo Flights etc., best offer. John, 581-5323.

TICKETS - (2) for Prince at Nassau Coliseum, 3/22 at 8 p.m., "Delsener Club" seats, $30/ea. Toni, Ext. 5257 or 821-0379 eves.

RUG - kelly green, 13'x13', good cond., used in low traffic area, $25. 744-2404.

DACHSHUNDS - standard, champion blood lines, tops in temperament. Ext. 4040 or 286-8249 after 6 p.m.

PICNIC TABLE - alum. fold-up, for 4 people, new, in box. Chuck, Ext. 5317.

CARPET - red w/black and brown, 15'x20' and 12'x12' w/padding, best offer. Bob, Ext. 4672 or 929-4753.

HYDRO HEARTH - use in fireplace, heats water, new, $100. Hank, Ext. 3848 or 472-0553.

BABY SWING - battery powered, excel. cond., $20; humidifier, cool mist, excel. cond., $15. 736-3573 after 5 p.m.

WOOD STOVE - w/12' of triple wall pipe, $20. 878-9534.

DINING ROOM SET - table w/4 chairs, china closet, and buffet, good cond., must sell, $325. Ext. 7732.

COMPUTER - TRS-80, Model-3, 16k, Z-80 based, expandable, CRT display, never used, $235. 542-1078.

LAMP TABLES - (2), $10. 727-5912.

SNOW THROWER - Sunbeam, 12 in., electric, like new. $150. 878-4285 after 5:30 p.m.

BATHROOM VANITY - ceramic circular sink, white 30" formica cabinet, all plumbing, $35. Sue, Ext. 3675 or 473-6570.

VICTORIAN BATHTUB - 60" x 30", white, best offer. Linda, 924-4872.

EARLY AMERICAN SOFA - like new, orig. cost $899, sell for $300; gold chair, orig. cost $350, sell for $100; both $350. 924-6415 after 5 p.m.

SOFA W/MATCHING CHAIR - end tables, lamps, coffee table, wall fixtures, drapes etc. Ext. 3675 or 744-2581 eves.

ORIENTAL DINING ROOM SET - dark oak and red crushed velvet, excel. cond. 286-8740.

COUCH - country style, $75; dinette and 6 chairs, $50; $100 takes all, will deliver. Joe, 369-0432.

REFRIGERATOR - GE, harvest gold, 3 yrs. old. 924-7723 eves.

BABY ROCKING CHAIR - $8; electric vaporizer, $4; baby scale, $3. Annette, Ext. 3190.

SKIS - Kastle, 190 cm, Spademan bindings, Hanson boots, fits woman's size 8 1/2, $150. Ext. 3393.

BASEBOARD HEATER - elect., portable, w/thermostat, like new, $35. Ext. 4490.

BASEBALL SHOES - size 8, white Nike, used one season, $10. Elzinga, Ext. 2364 or 929-8944.

PVC DARKROOM SINK - corrugated bottom, 18", splashboard, 72"x24", like new, $250. 324-7643.

HIGH RISER - w/cover and new mattress, 75" x 30" x 20", $25. 722-4489.

CHANDELIER - 2-tier, 10-light, elegant bronze and crystal, $25. Al, Ext. 2160 or 273-5574 after 4 p.m.

COLONIAL CONSOLE STEREO - beautiful piece of furniture, excel. cond. Larry, Ext. 2021 or 281-7240.

POOL TABLE - 4' x 8', slate. 281-7039.

Free

BED - California King, no frame. 289-8253 after 5 p.m.

DOG - large, needs room, mixed Great Dane and collie, very friendly. Ext. 2050.

CATS - (2) one male and one female, altered. Ext. 5148.

ELECTRIC DRYER - needs some work. 589-8394 eves.

Yard Sale

BAYPORT - Sat., March 16, 9-2, 16 Bogel Rd., lots of toys. Debby, 472-4196.

RIDGE - Sat.-Sun., March 16 & 17, 37 Smith Rd., 10-5. Ken, Ext. 5110.

Car Pools

BAYPORT/BLUE POINT/SAYVILLE - need two driver/riders. Rick Wilke, Ext. 3932.

Real Estate

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

For Rent

SHOREHAM - 4 bdrm. colonial, l/r, d/r, den, f/p, carpeting, country kitchen, dishwasher, washer/dryer, 2-1/2 baths, garage, excel. location, avail. April, $1,250 pays all. 744-8659.

CORAM - Birchwood, 3 bdrm., 2-1/2 bath, new townhouse, all appliances, in/out pool, golf, tennis, bowling, health club, $1,100 plus util. 331-4768.

MYRTLE BEACH - oceanfront condo, 2 bdrms., 2 full baths, sleeps 6, indoor/outdoor pools, spa, golf and tennis in area. 584-7258 for more info.

YAPHANK - 4 bdrm. house, 1-1/2 baths, l/r, d/r, large kitchen, completely renovated, 10 min. from Lab. avail. April 1, $800/mo. + util. 924-4872.

CENTER MORICHES - 3-1/2 lg. rooms, full bath, refrigerator, carpet, own zone heat, private entrance, cable, no children/pets, April 1 occupancy, 1 mo. security, $525/mo. includes all. 878-0480 eves.

STONY BROOK - 4 bdrm., 2 bath house, l/r, den, full bsmt., garage, walk to university, immed. occupancy, short term lease poss., $875/mo. + util. 751-8240 eves.

NORTH PATCHOGUE - immac. 2 bdrm. apt., $575/mo. + elec. 289-0405.

For Sale

SHOREHAM - 3 bdrm. ranch, basement, above ground pool, prop. 75' x 150', OHW baseboard heat, cedar shakes, excel. cond., asking low 90's. Barbara, 744-7574.

MILLER PLACE - 4 bdrm. ranch, new kitchen, new baths, firepace in l/r, 2 car garage, covered porch & patio, fence and shrubs. Ext. 2022.

YAPHANK - 2 bdrm., 1-1/2 bath condo, oil heat/hot water, new w/w carpet, like new, bsmt., pools, tennis, playgrounds, $82,990. Henry, Ext. 4547 or 924-6688.

E. PATCHOGUE - large Cape Cod, landscaped, 4/10 acre, 4 bdrms., one w/kitchenette, l/r, dining area, 2 baths, study w/fireplace, full bsmt., attic, garage, 400 yds. from Great South Bay, walk to full service marina, $153,000. 289-9724.

CORAM - Birchwood at Bretton Woods, 3 bdrm. condo., Dalton model, den, l/r, formal d/r, 1-1/2 baths, patio, gas heat, central a/c, like new, many extras, 1/2 block to Clubhouse. Ext. 7338 or 324-7643.

Lost & Found

LOST - silver and turquoise earring. Kane, Ext. 3841.

Wanted

COLOR TV - 13"-19", for use as CRT; front end fenders, etc., 77 Gremlin. Joe Medina, Ext. 7636 or 924-6971.

BEGINNER FLUTE STUDENTS - Carol, Ext. 2907 or 698-8510.

SMALL HOUSE - 20 min. from BNL; furn. rm., 15 min. from BNL. Otto, Ext. 3448, 5 to 7 p.m.

SLIDE PROJECTOR - "Slide Cube" type only, reason. price & cond. Bill, Ext. 2378.

DISHWASHER - reason. price, good working cond. Lin, Ext. 3047 or 732-6776.

STUDENT MICROSCOPE - good quality. Ext. 4575.

BOYS - to play Little League football, registration April 13 & 20, Port Jefferson Moose Lodge. Mike, 473-8762.

TRAINS - Lionel, American Flyer, accessories, any condition brings good price. Carole, Ext. 3362 or 924-4097 eves.

DEPENDABLE INDIVIDUAL - w/knowledge of photography. Ripp, Ext. 4672.

4-CYCLE ENGINE - B&S or similar, 5 HP or up. Dan, Ext. 4987 or 698-7322.

PLUMBER - or plumbers helper, local business. 698-3578 for interview.

TENNIS INSTRUCTOR - for two girls, ages 11 and 13. Lil, 286-8740.

INFORMATION - about 1965 Massapequa High School alumni for reunion in August. Dave, 698-2256.

RUGBY PLAYERS - no exp. nec., practice, Tuesday and Thursday 5:00. Pierrick, Ext. 3464.

CAR SEAT - light stroller; blender; toaster; iron; tv set; car under $900. Ext. 5150 or 3009.

INVESTORS - to pool money to buy secure mortgages. Richard, Ext. 4134.

Classified Ad Policy Deadline is 4:30 p.m. Friday for publication Friday of the next week.