BROOKHAVEN BULLETIN
Vol. 42 - No. 12 March 25, 1988
BROOKHAVEN NATIONAL LABORATORY

Step-By-Step Through the D-Zero Factory

Hidden within the Major Facility Hall, a factory is operating in full swing. It is manufacturing three lines of products and, by the end of the year, total factory output should be about 64 — give or take a few spares. At that time, the factory will cease its production forever.

The limited edition of 64 products is not for collectors, but for a calorimeter. Though it will be the latest thing for counting calories, this merchandise will not be available to consumers for any price.

The factory is turning out the 64 modules that will make up the central calorimeter of a particle physics detector called D0 (D-zero). The D0 factory was opened in the collider ring during the summer of 1986 by the Omega Group of BNL's Physics Department.

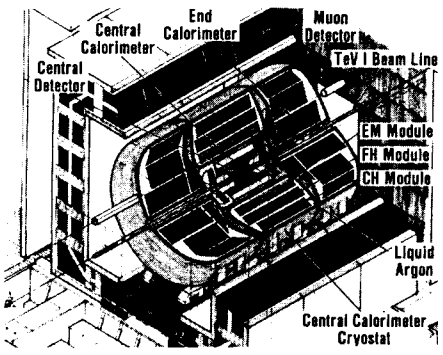
Physicist Samuel Aronson, who is Associate Physics Department Chairman, and Senior Physicist Howard Gordon, who heads the Omega Group, are in charge of the central calorimeter effort at BNL. The D0 factory is supervised by Associate Physicist Włodek Guryn.

The D0 detector gets its name from the experimental hall in the Tevatron I (TeV I) ring at the Fermi National Accelerator Laboratory (Fermilab), where the 4,700-ton apparatus will reside. Scheduled to be in place for a first run at the (TeV I) proton-antiproton collider at the end of 1989, the D0 detector is under construction by a 160-physicist, 21-institution collaboration. It includes eight BNL physicists in the Physics and Alternating Gradient Synchrotron (AGS) Departments.

"D0 is optimized to detect leptons, missing transverse energy and jets of particles generated by the interaction of quarks or gluons contained within the colliding protons and antiprotons," explains Guryn. "As part of the system to detect these phenomena, a uranium-liquid argon calorimeter is under construction, and we are building the central part."

The Omega Group is responsible for the 315-ton central calorimeter. In addition, group members are creating software for data acquisition and analysis.

Surrounding the central detector, which is wrapped around the (TeV I) beam line, the central calorimeter will measure the energy and direction of particles emerging at angles greater than 45°. Complementing the central calorimeter are two end calorimeters, under construction at Fermilab, which will measure the energy and direction of particles coming off at smaller angles.



Cutaway Schematic of D0 Detector

To distinguish between different types of particles, the central calorimeter will be made of three concentric rings of wedge-shaped modules — 64 in all.

An inner ring of 32 electromagnetic (EM) modules is sensitive to the energy of electrons and photons. A middle ring of 16 finely segmented hadronic (FH) modules and an outer one of 16 coarsely segmented hadronic (CH) modules together will measure the energy of hadrons, strongly interacting particles made of quarks and gluons.

The only particles that should make it through this three-ring calorimetric circus are muons and neutrinos: Neutrinos are too weakly interacting to be detected, but muons will be identified in another detector.

As explained in the accompanying pictures and captions, each module is hand-made and tested in a six-step process in the D0 factory.

— Marsha Belford

1. Guest Mechanical Technicians Robert Grego (left) and Robert Taylor inspect a plate of depleted uranium, shipped directly from the commercial manufacturer. Using a dial indicator, they make sure that each plate is flat and has the correct dimensions — in this case, 102.5" in length × 20" in width (on average) × 0.236" in thickness. If all reads well, then this uranium slab is destined to become one of the 50 absorber plates within an FH module.

These uranium plates are the central calorimeter's absorbing medium — they will absorb the energy of particles created in the proton-antiproton collisons within Fermilab's TeV I collider. As each particle traverses the calorimeter and its energy is absorbed by the plates, a shower of more particles — mostly electrons, photons and pi mesons — results.

Each EM module contains only 20 uranium absorber plates, each measuring 102.5" × 7" (on average) × 0.118" — half the thickness of those destined for the FH modules.

Depleted uranium was selected as the absorber for these two central calorimeter modules because it is very dense and relatively inexpensive. By combining uranium with liquid argon, the central calorimeter will respond equally to electrons and hadrons of the same energy. This equal response results in improved resolution of the energy measurement of jets of particles emerging from the proton-antiproton annihilations.

Rather than uranium, nine copper slabs are used as the absorber within the CH modules, which will measure the small amount of hadron energy leaking from the FH modules. The copper absorber plates measure 102.5" × 28" (on average) × 1.83".

2. Pins for electrical connections to the plates are welded to those that pass inspection. Guest Senior Technician Albert Langhorne fuses 16 niobium connection pins in the notches of a uranium absorber plate for an FH module.

For this procedure, he uses a percussion welding technique — the first time this technique is being used to weld to uranium.

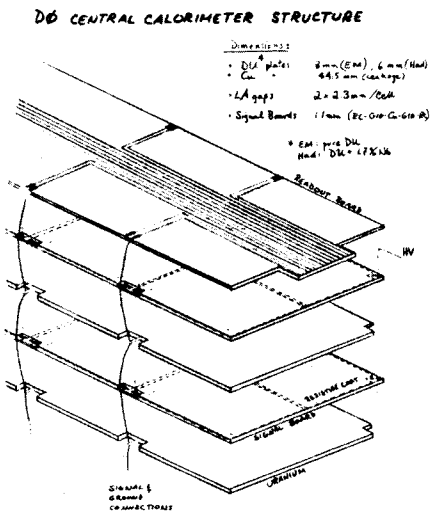
Each uranium plate for an EM module requires 48 welded pins, while each copper plate within a CH module has 12 pins welded to it.

3. With pins attached, absorber plates are passed through a window into the dust-free D0 factory clean room, where module construction takes place. Construction starts with the orderly stacking of the module components — absorber plates and signal boards.

Sandwiched between every two absorber plates is one signal board. Insulating spacers attached to the signal boards maintain gaps between each signal board and the plates above and below it.

When the central calorimeter is installed in its cryostat, these gaps will be filled with the central calorimeter's active medium — liquid argon, kept at about -312°F.

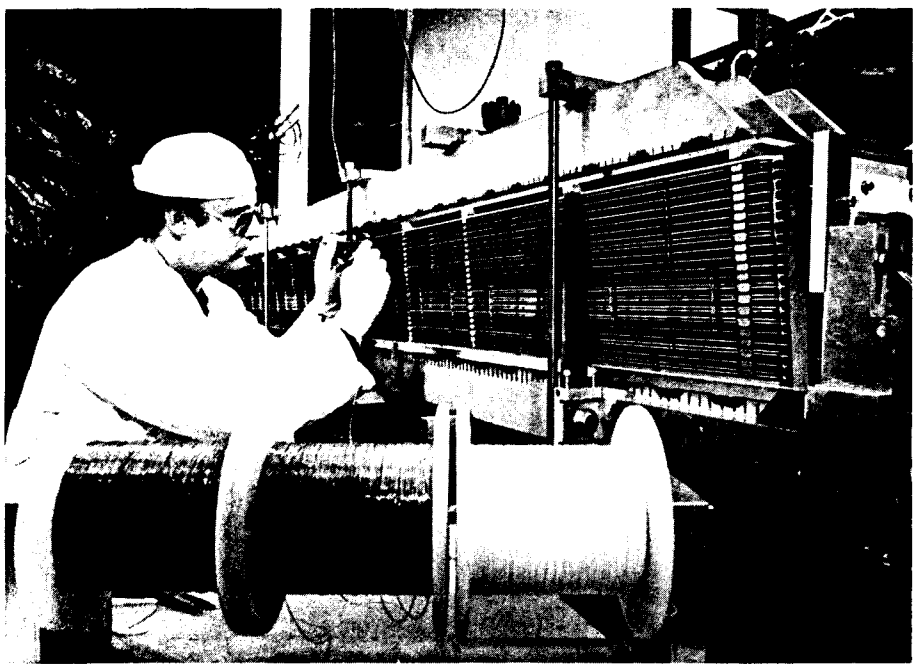
Particles showering in the absorbing medium — either uranium or copper — will ionize argon in the adjacent gaps, producing electrons and positive argon ions. Within the argon gaps, these charged particles will then be collected by the signal boards, which are made by D0 collaborators at Fermilab.



Photos for this story by Mort Rosen.

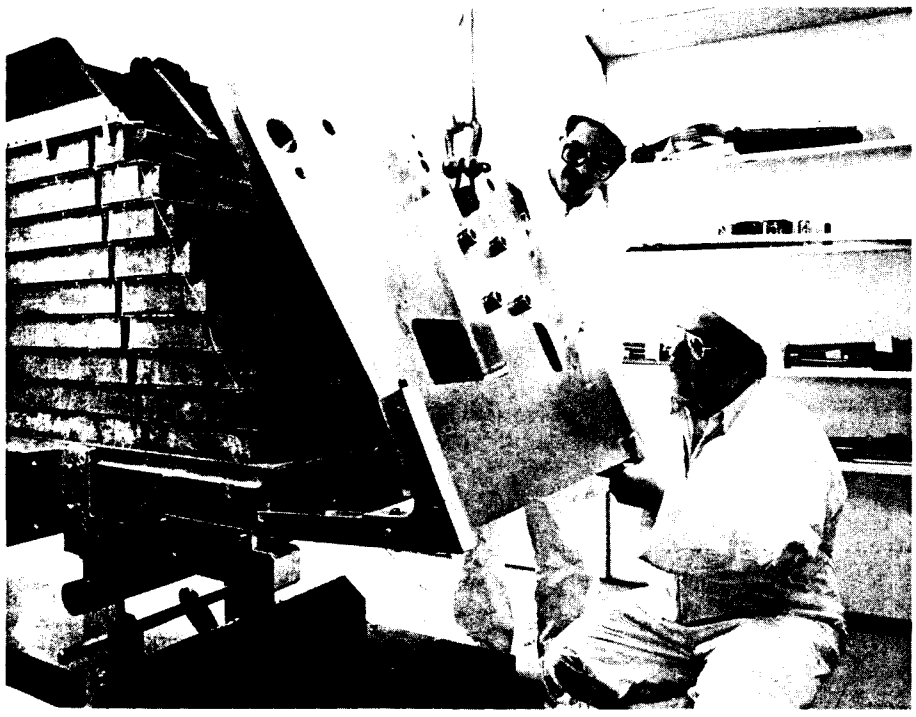
(Continued on page 2)

D-Zero Factory (Cont'd)



4. In the next construction step, the absorber plates and signal boards of a stacked module are wired. The pins in both the plates and boards serve as connection points, and the notches in both allow room for the wires.

Wiring an electromagnetic module, Guest Mechanical Technician Kenneth Jones uses one line of wire to connect a "tower." Towers are electronic segments of the calorimeter that will measure particle direction.



6. Guest Senior Technician Frank Ayala (left) and Guest Technician John Najdzion install an end plate on a CH module that has passed all electrical tests. Each pair of end plates, machined at BNL's Central Shops Division, supports the weight of its module: an EM module weighs 0.6 tons; an FH module, 8.3 tons; and a CH, 7.2 tons.

After final electrical tests, each module is enclosed by four stainless steel "skins." The skins on the sidewalls are thin, perforated sheets allowing a continous sea of liquid argon to exist within all of the modules.

After the skins are welded, the modules are shipped to Fermilab. There, some are calibrated for their response to beams of electrons and pions of known energies. To date, one fine hadronic and twelve electromagnetic modules have made the truck trip to Batavia, Illinois.

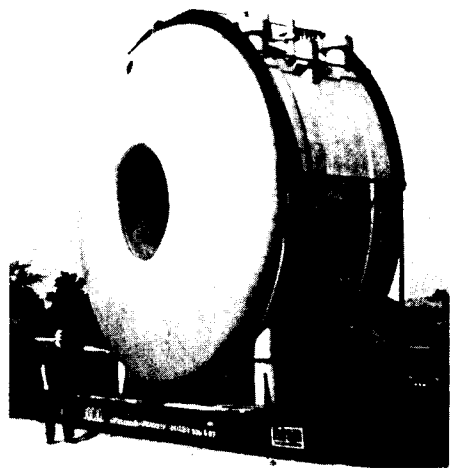
8. Gathered around a liquid nitrogen tank used for module testing are some of those Omega Group members most immediately responsible for the design and construction of the central calorimeter modules.

From left, in the front row, they are: Guest Research Associate Joan Guida from the State University of New York at Stony Brook, module testing supervisor; Senior Technical Specialist Salvatore Marino, technician supervisor; Mechanical Engineer Mordechai Montag; Project Engineer Peter Kroon, head engineer; and Senior Drafter Richard Ruggiero.

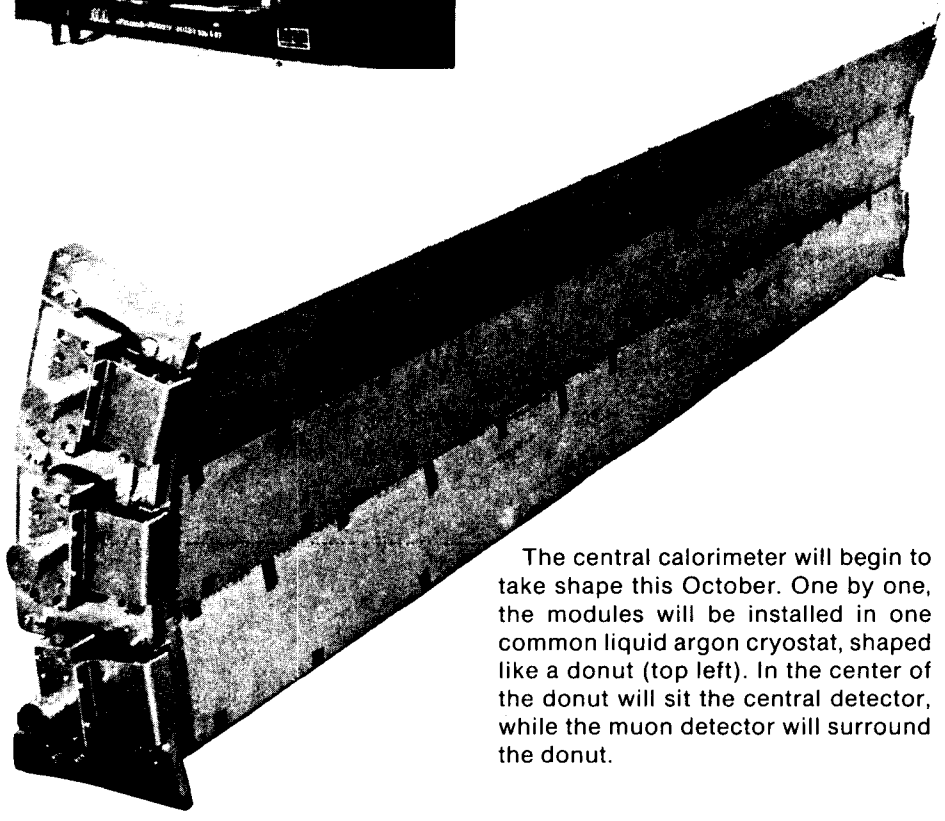
In the back row are, from left: Senior Technician John Aloi Jr., radiation safety coordinator; Technical Associate Eugene Hassell, quality control supervisor; Associate Physicist Włodek Guryn, D0 factory supervisor; Project Engineer Martin Howard, head designer; and Research Engineer John Koehler.

Absent from the picture are Physicist Peter Yamin, AGS, who is responsible for the cold-test apparatus, and Physics Associate Jonathan Lee, module testing team member.

5. Still within the clean room, each module is tested at various stages of its construction to assure that it has been properly stacked and wired. Physics Associate Hayden Brownell (foreground) and Guest Mechanical Technician Paul Sampson are measuring the capacitance of a tower using a meter connected to a microcomputer.



7. Fastened together by brackets attached to their end plates, three identical EM modules form the beginning of an arch (below). With the wedge-shaped modules attached in this manner, the central calorimeter will evolve from three, concentric circular arches into a cylinder.



The central calorimeter will begin to take shape this October. One by one, the modules will be installed in one common liquid argon cryostat, shaped like a donut (top left). In the center of the donut will sit the central detector, while the muon detector will surround the donut.

To Your Health: Not for Women Only

The mortality rate from breast cancer is 44 percent higher in Suffolk County than in the rest of the country. According to health officials, this disturbing statistic is related to late detection: Compared to the rest of New York State, Suffolk County has the highest incidence of malignant breast cancer tumors diagnosed at advanced stages.

Most breast cancers are first discovered by the woman herself, which is why breast self-exam is the first line of defense in the fight against this disease. Studies have shown that tumors discovered by self-exam tend to be diagnosed in an earlier stage than tumors discovered otherwise.

Another important diagnostic tool is mammography — a special type of x-ray procedure that can detect the presence of abnormal breast tissue. While all women should practice breast self-exam, not all women are recommended for routine mammography screening, and the medical community has debated between the merits of the different types of mammography.

These issues will be discussed in the talk "Mammography: Facts & Myths," on Tuesday, March 29, from noon to 1 p.m., in Room B, Berkner Hall. Sponsored as a Health Promotion activity of the Occupational Medicine Clinic, the talk will be presented by Tina Rowan, a radiologic technician in private practice. All BNL women and men are invited.

Weight Watchers

Register at the first meeting of the on-site Weight Watchers' group for the spring session, on Wednesday, March 30, at 5:15-6:15 p.m., in the Conference Room, Bldg. 535. The registration fee is $60 for continuing members; as the Laboratory splits the fee with new members, first timers pay only $30. The session continues for seven more consecutive Wednesdays.

Coming Up

The Composers String Quartet will perform an all-Beethoven concert in Berkner Hall, on Wednesday, April 6, at 8:30 p.m. The three quartets to be featured are: Op. 18, No.2; Op. 74; and Op. 59, No. 1.

Tickets can be purchased at the door: $9 for general admission; $6 for students and those over age 65; $5 for those under 18.

Tax Law Change

Until now, employees who currently have reportable group-term life insurance earnings itemized on their paycheck statement were required to pay federal income tax on that insurance. Under the new tax law, however, this insurance must also be reported as income for FICA withholding. This new withholding will show up in both the weekly and monthly paychecks of March 31, and it will be retroactive to January 1, 1988.

Speaking Out: About Stretch Class

Reporter: Anita Cohen
Photographer: Peter Horton

With every change of seasons, the Aerobic Dance Club announces a new schedule of classes in aerobic dance and stretch.

Everyone knows how aerobics emphasizes cardiovascular improvement through vigorous, choreographed exercise. But what about stretch? What does the class involve? Why would you want to take it? Here, some enthusiastic participants in Instructor Pat Campbell's latest stretch classes answer those questions.

Jinny Weston (wife of Ralph Weston, Chemistry) — You don't have to have a bad back to benefit from stretch. The rest of your body will benefit, and it's so-o-o relaxing. It's good for men as well as women.

Susan Pepper (Nuclear Energy) — It's a great way to stay in shape over the winter, and it's very convenient being at the Lab. You always feel refreshed when it's over.

Carol Kraner (Physical Review; wife of Hobart Kraner, Instrumentation) — Stretch class is particularly good for those of us who are not young anymore, who spend work hours sitting and then expect to dash out to the tennis courts or the ski slopes and not do bodily harm. I tore two calf muscles and hurt my lower back before I took action.

Progressive stretch routines have really helped since, in class, we not only stretch out muscles, but work on strengthening them as well. Pat Campbell is a careful teacher. She is very much aware of individual problems and tailors routines accordingly. I find the hour each week invaluable.

Karin Karlstrom (Chemistry) — Anything that makes you move is good. Even if you don't like exercise, you'll probably enjoy this, and it keeps you flexible. It makes me feel good at the end of a long day.

Elinor Norton (Chemistry) — I come to stretch class every Monday for an hour of total relaxation when I have to think of absolutely nothing! Also, Pat's program of static [no bouncing] stretching is good for my aging joints. It's fun and beneficial.

Donna Cunningham (Supply & Materiel) — Quite often, working behind a desk on a VDT can leave you with aches and tension at the end of the day. Stretch class helps me to unwind and relax those muscles that bother me. I have also gained more flexibility, which helps a lot in my aerobics class.

Sign Up Next Week

The Aerobic Dance Club's next session begins next week. Classes in aerobic dance will be held on Tuesdays and Thursdays, while stretch classes will be held on Mondays. All classes run from 5:15 to 6:15 p.m. Participants may take any or all of these classes. Mats are recommended for floor exercises.

The fee for each ten-week session (M, T or Th) is $30, payable at registration, which will precede the first classes and be held in the North Room of the Brookhaven Center, as follows:

- Stretch — Monday, March 28.
- Aerobic Dance — Tuesday, March 29, and Thursday, March 31.

For more information, call Bill Leonhardt, Ext. 2378; Elinor Nortin, Ext. 4355; or Janet Sillas, Ext. 2345.

BERA to Join in WalkAmerica

The annual March of Dimes WalkAmerica will take place on Sunday, April 24.

What is WalkAmerica? — A national walkathon held in more than 1,000 local communities to raise money for the March of Dimes.

Who Walks? — Men, women and children of all ages, representing all walks of life, will step out at WalkAmerica '88 to help fight birth defects.

How Does it Work? — Walkers get sponsors (friends, relatives, businesses, etc.) to pledge money for each kilometer completed at WalkAmerica. Participants can also earn free gifts based on money collected.

Where Does the Money Go? — Money raised helps support research, medical services and educational programs aimed at protecting the unborn and newborn.

How Can You Help? — Join the BNL team. Pick up a registration form and route information sheet at the Recreation Office in Personnel, Bldg. 185, or at the BERA Sales Office in Berkner Hall. Show them that BNL cares: We will walk as one big team, wearing BNL/AUI T-shirts, which BERA will give to all BNL walkers.

Equipment Demo

The new Gerber Model 44 Photoplotter will be demonstrated by Joe Donati, of Gerber Photo Products, and Sal Danna, of Entrix, on Tuesday, March 29, from 10 a.m. to 12:30 p.m., in the Applied Math Seminar Room, Bldg. 515.

Interest in this machine has been primarily for printed circuit board photo artwork, but there may be other applications. Bring your ideas and questions, and let us know your needs. If you have any questions, contact Richard Carlsen, Ext. 4172.

Journals Needed

If you're trying to decide what to do with old copies of scientific journals, you might consider donating them to the library of the State University of New York's College at Old Westbury. Your contribution might help fill in some of the gaps in the College's collection of over 180 journals, which range from the *Accounts of Chemical Research* to *Virology*.

For information about which publications are needed, call BNL's Public Affairs Office, Ext. 2345, or Old Westbury's Periodical Librarian Barbara Walsh, 876-3164.

Golf

The season-opening BGA golf tournament will be held on Tuesday, April 12, at the Heatherwood Golf Club (par 60). The tournament will be run using the "Callaway" scoring system.

Starting times can be obtained by contacting Joe Carbonaro, Ext. 5139. First priority will go to completed foursomes, with at least two BGA members.

The greens fees for 18 holes will be $11. Tournament entry fees are $1 for BGA members and non-members. Riding carts can be obtained for $17 each; pull carts are $2. Tee-times are reserved for 10:30 a.m. through 12:30 p.m., so sign up as soon as you can. The deadline for sign-up is April 6.

Reminder: Don't forget that today is the deadline to mail your BGA membership applications to Bob Mills, Bldg. 901.

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Local Users Group

Presentations on "File Management and Backup on BNLVMA (IBM3090)" and "DEC Compatible Products Such as Printers, Terminals, Etc." will be featured at the next meeting of the Upton Local Users Group (LUG), to be held on Wednesday, March 30, at 11 a.m., in Room B, Berkner Hall. A question-answer session will follow the presentations.

All computer users are welcome to attend. For more information, call LUG Chairperson Zohreh Parsa, Ext. 4748.

Service Awards

The following employees received service awards during the month of March:

Forty Years

Richard T. Adams ..... Reactor
Ernest D. Courant ..... Physics
George A. Schoener ..... Sfgrds. & Sec.

Thirty-Five Years

Theodore R. Johnson ..... Medical
Helen J. Kelly ..... Biology
N. Blair Munhofen ..... Chemistry

Thirty Years

Robert P. Alvino ..... AGS
Henry Boomer ..... Plant Eng.
Chester J. Bubka ..... Central Shops
Joseph W. Mead ..... Instrumentation
Carlyle Murray ..... AGS
Morton Rosen ..... Photo. & Gr. Arts
Elizabeth K. Shaw ..... Biology
Anthony J. Wisowaty ..... AGS

Twenty-Five Years

John M. Dunning Jr. ..... AGS
Robert H. Hannel ..... Sup. & Mat'l.
Charles M. Johnson ..... Plant Eng.
William H. Kollmer Jr. ..... Accel. Dev.
Arnold Kreisberg ..... Accel. Dev.
Hugh R. McNeill ..... Accel. Dev.
Robert A. Scheetz ..... Physics
Robert L. Schuman ..... Applied Math

Twenty Years

Virginia E. Diebel ..... Nuclear Energy
Norman M. Fewell ..... Light Source
Junie I. Langhorn ..... Staff Services

Ten Years

Curtis L. Bergh ..... Applied Math
Juan Castillo ..... Central Shops
Jai H. Lee ..... Applied Science
Alessio Mezzina ..... Applied Science
Robert L. Sabatini ..... Applied Science
John F. Smalley ..... Applied Science
Sharon L. Smith ..... Applied Science
Frank Terrano ..... Light Source

IBEW Meeting

Local 2230, IBEW, will hold its regular monthly meeting on Monday, March 28, 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.

Bowling

Red/Green League

High games were bowled by J. Mayeski 243, T. Holmquist 210, E. Meier 204, J. Morris 201.

Purple League

Caryl MacDougall rolled a 224/191 for a 592 scratch series, Joe Sheehan 222, Sharon Smith 204, Annamarie Spira 182.

White League

Jim Petro had a 202, Elaine Zukowski 189, Karen Vogel 181.

Scotch Doubles

The first place winners were Denise Monteleone and Ed Sperry IV, and second place was won by Annamarie and Gil Spira.

L.I. Bowling Tournament

Ed Meier had a 241, Ed Sperry IV 204. The BNL team remains in seventh place.

Basketball

First Game

Penetrators	45	Longshots	53
J. Cyr	15	F. Thompson	15
T. Abbott	10	J. Garrison	10
T. Comstock	10	T. Mayo	10
G. Smith	7	F. Malone	6
R. Domenech	3	S. Springston	6
		J. Wells	4
		B. Rowley	2

Three-point shots: Domenech, Garrison

Second Game

Celtics	33	Hollywood	39
P. Browne	8	D. Nordstrum	11
J. Gaeta	8	B. Gunther	9
O. Aliefendioglu	7	G. Mack	8
P. Ratzke	6	J. Monroe	7
M. Fulkerson	4	B. Kowalski	4

Three-point shots: Aliefendioglu (2)

Arrivals & Departures

Arrivals

Wahfun Eng ..... Accel. Dev.
JoAnn B. Morris ..... Tech. Info.
Kenneth E. Robins Jr. ..... Accel. Dev.
Paul W. Sampson ..... AGS
Sung-Leung Ivan So ..... NSLS

Departures

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

Jonathan M. Wachtel ..... NSLS

Cafeteria Menu

Week of March 28

Monday, March 28

Chicken noodle soup	(cup)	.75
	(bowl)	.95
Turkey broccoli Mornay w/1 veg.		2.95
Hungarian goulash over noodles		2.95
Julienne salad plate (lite-weight)		2.25
Hot deli: Breast of turkey	(bread)	2.75
	(roll)	2.85
	(hero)	2.95

Tuesday, March 29

Navy bean soup	(cup)	.75
	(bowl)	.95
Roast top round of beef au jus w/1 veg.		3.05
Baked ravioli w/sauce & garlic toast		2.85
Seasonal fresh fruit plate (lite-weight)		2.25
Hot Deli: Grilled Reuben sandwich		2.85

Wednesday, March 30

Beef noodle soup	(cup)	.75
	(bowl)	.95
Veal scaloppini w/noodles		2.95
Shrimp fried rice w/1 veg.		2.85
Baked fresh fish w/1 veg. (lite-weight)		2.95
Hot deli: Pastrami	(bread)	2.75
	(roll)	2.85
	(hero)	2.95

Thursday, March 31

Beef barley soup	(cup)	.75
	(bowl)	.95
Hunan chicken w/1 veg.		2.85
Skinless baked chicken w/1 veg. (lite-weight)		2.85
Paprika veal stew over noodles		2.95
Hot deli: Baked ham	(bread)	2.75
	(roll)	2.85
	(hero)	2.95

Friday, April 1

Falmouth chowder	(cup)	.75
	(bowl)	.95
BBQ spareribs w/1 veg.		3.05
Baked fresh fish w/1 veg. (lite-weight)		2.95
Baked macaroni & cheese w/1 veg.		2.75
Hot deli: Corned beef	(bread)	2.75
	(roll)	2.85
	(hero)	2.95

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.

LABORATORY RECRUITMENT - Opportunities for Laboratory employees only.

2920. MATERIAL HANDLER - (2 openings) Supply and Materiel Division.

2821. BUDGET POSITION - Requires BS/MS in an appropriate field and extensive experience in accounting or business administration. Must have excellent analytical, written and oral communication skills and be knowledgeable of Laboratory policies and procedures. Will prepare, coordinate and control budgets for AGS and ADD operating, capital, and/or construction projects. Requires ability to exercise a high degree of initiative and professional judgement in the review and coordination of budgetary matters with Department and Budget Office personnel. Familiarity with MIS systems highly desirable. Accelerator Development Department.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

2822. TECHNICAL POSITION - Requires AAS degree in electro-mechanical technology or equivalent background and experience in the construction, testing, and leak checking of vacuum systems. Will work in the vacuum group on the modification and maintenance of the new AGS vacuum system. Alternating Gradient Synchrotron Department.

2823. ENGINEERING POSITION - Requires BS in mechanical engineering or physics and a minimum of 15 years' experience in the construction of major equipment, experimental facilities or research apparatus. Must possess a solid background in the principles of mechanical design, be innovative, knowledgeable in shop procedures and adept at interacting with professional coworkers. Responsibilities will include supervision and participation in the design, construction, and testing of superconducting magnets and related apparatus for major accelerator programs. Accelerator Development Department.

Motor Vehicles & Supplies

CHEVY ENGINE - 350 w/auto trans. plus extra parts, $250. Ext. 4446 or 363-5051 eves.

85 DODGE COLT E - 4 speed, hatchback, a/c, 67k mi., tinted windows, excel. cond. RoseMarie, Ext. 3555 or 878-6431.

81 CAPRI - a/t, a/c, hatchback, good cond., $1,500. 924-1038.

77 CADILLAC SEDAN DEVILLE - white/red roof, leather interior, new tires, $2,300. Jim, Ext. 4040 or 289-0876.

77 DODGE RAM CHARGER - 4x4, 64k mi., good cond., $2,700. 447-1098 after 5 p.m.

78 PINTO - factory custom "youth van," 80k mi., runs well, body good, no rust, asking $525. Walter, Ext. 3499 or 757-6392.

76 CORVETTE STINGRAY 350 - a/c, leather, a/t, T-top, am/fm, $7,900; 75 Chevy Vega, fuel injection, 4-speed, $3,500. Mark, 731-3629.

70 HOLIDAY TRAVEL TRAILER - 22', dual axle, self-contained, sleeps 6, 12 V converter, excel. cond. Ext. 3270 or 758-4018 after 5 p.m.

85 HONDA CIVIC - mint, 2-door hatchback, 4-speed, FWD, am/fm cass., $4,000. 874-8675.

82 DATSUN 200SX - hatchback, 5-speed, a/c, loaded, excel. cond., asking $2,600. John, Ext. 7770 or 4480.

80 CHEVY C-10 PICKUP - $3,000; 1975 Duster, $300; 1977 Buick Century, V6, parts. Dave, Ext. 4669.

76 SUZUKI 250GL - runs well, $200. Ext. 7699 or 821-1435 eves.

84 RENAULT ENCORE - a/t, am/fm, new tires, very good cond., $3,200 neg. Ext. 3134 after 6 p.m.

85 HONDA ODYSSEY - used 20 hrs., mint cond., asking $1,900. Steve, Ext. 2310.

30 MODEL "A" FORD - 4 door, sedan, good cond., Garry, Ext. 5289.

FORD F-250 - 4-speed, $200-300; 5 h.p. electric motor, $150. 744-3968.

9½' SLIDE-ON CAMPER - ice box, stove, heater, bathroom w/toilet, holding tank, $300. 281-0380 after 6 p.m.

84 MONTE CARLO - p/s, p/b, p/w, tilt, bucket seats, mint in/out, must sell, $5,400. 732-2309.

77 CHEVROLET CAPRICE CLASSIC - 4 dr., V8, a/c, p/s, p/b, good transportation, asking $850. 475-2509.

86 SUZUKI SCOOTER - excel. cond., $300. 821-0250.

TIRES - new, Goodyear Vector 235-75R/215, 4 for $250. John, Ext. 5152 or 281-2471.

82 SUBARU - 5 speed, 4 cyl., good cond., $2,000. 929-4259.

74 VW SUPER BEETLE - runs well, $275. 821-0686.

80 KAWASAKI 250KLX - new rear tire, new chain, $600. 744-3284 after 5 p.m.

68 MUSTANG 302 - runs well, excel. restoration car, good cond., $1,200. 744-6967.

74 TOYOTA CELICA - $100; 1972 Pinto, $100; Dodge Aspen, $350. 744-2203 or 928-5230.

83 NISSAN SENTRA - 3 dr., 5-speed, 46k mi., cass. deck, very good cond., $3,500. 369-1571, leave message.

83 BUICK REGAL - a/c, p/s, am/fm, beige landau top, excel. cond., $5,800 neg. Ext. 2964.

79 OLDS DELTA 88 - 350 eng., a/t, a/c, am/fm/tape, new tires & exhaust, Ext. 2335 or 821-9834.

75 PLYMOUTH FURY - 2 dr., a/t, 440 Interceptor eng., non-catalytic, former Maryland unmarked police unit, $1,500. Al, Ext. 2043.

78 CAPRICE CHEVY WAGON - high mi., needs some work, good cond., $600. 543-8247.

78 PONTIAC - 8 cyl., a/t, p/s, p/b, new muffler, $500; 77 Volare, p/b, a/t, good mpg, $250. Richie, 689-2820 eves.

84 MUSTANG - hatchback, red, 4 cyl., a/c, p/s, p/b, am/fm, low mi., a/t, $4,800. Ext. 4536 or 929-8807.

84 FORD MUSTANG - console am/fm/tape, p/s, p/l, a/c, sunroof, alum. wheels, s/t, excel. cond., asking $5,700. Ext. 4846 or 363-6940.

74 CHEVY VEGA - bad transmission, new tires, engine just serviced, $50. Ernesto, Ext. 3869 or 475-7569.

68 CHEVY CAMARO - parts. Steve, Ext. 2310 or 929-6877 after 8 p.m.

84 BUICK REGAL LTD - a/c, p/w, alarm, cass., equalizer, black, 57k mi., excel. in/out, $6,800. 345-3970 eves.

73 MERCEDES BENZ 280 - 4 dr., white, dark green interior, $3,000. Ext. 4099 or 689-9214.

70 CHEVY PICKUP - ½-ton, 350 V8, 71k mi., good cond., $1,000. Jeff, Ext. 4407 or 924-2865.

NOMAD GOOD TRAVEL TRAILER - 1969, sleeps six, 2 tables, shower, bathroom, new 3-way refrig., new awning, $2,000. 878-6637.

Boats & Marine Supplies

32' CHRIS CRAFT SEA SKIFF - 1965, hull as is, $500. Bob, 654-3206.

17' BOAT & TRAILER - w/100 h.p. Johnson, all needs work. Doug, 732-1868.

10' GW INVADER - 1980, 70 Mercury, power trim, hot-foot gauges, gas tank, extras, $1,000. 399-3598 eves.

25' SARATOGO BAYLINER - 1975, w/225 h.p. Volvo stern drive, galley, head, tabs, camperback, more, asking $8,500. 281-5364.

MOORING CHAIN - ½" Prod-coil, galvanized, $2.25 per foot. Ext. 5314.

18'8" BAYLINE - 1985, cuddy cabin, 140 h.p. OMC motor, 1985 Magic tilt trailer, $6,000. 981-6248 after 6 p.m.

16' SEASPRITE BOWRIDER - 1981, 35 h.p. Johnson, elec. start, $2,600. 281-0380 after 6 p.m.

22' SEAFARER SAILBOAT - 1974, 3 sails, Volvo O/B, full keel, asking $4,000. Fred, Ext. 4407, 4435 or 499-1214.

BAYLINER BOWRIDER - 1984, mint, 125 h.p., Volvo I/O, used 100 hrs., fully equipped, $7,000. Ext. 2981 or 424-6916 eves.

GAS TANKS - outboard, 2, 12 gals., 1 yr. old, $25/ea. Bob, 584-7350.

19' CAPE DORY - 1972, sleeps 4, 1985 Evinrude 4 h.p., 7 sails, fully equipped. asking $4,500. 265-6204 eves.

Car Pools

BABYLON/BAYSHORE - need 2 riders to form 4-person car pool, 8:30 a.m.-5:00 p.m. Mike, Ext. 2061.

BAYPORT/BLUE POINT - need 1 driver. Phil, Ext. 3500 or 363-2070.

Wanted

DINGHY - 8 to 10 foot. 928-9440 days.

BASEBALL CARDS - any cond., young boy wants to start collection. 924-4070.

HOUSE RENTAL - 2-4 bedrooms, starting June, summer or all-year, North Shore/Fork, prefer Mattituck-Cutchogue School District. Ext. 7657.

VIOLIN - want to borrow child-size violin for 3½ yr. old. Ext. 3389.

INFANTS - 3 mo. old for PhD study of infant memory, pleasant play task in your home. 929-6495.

HOUSEMATE - 4 bdrm., waterfront house, furnished, Center Moriches, prefer non-smoker. Richard, Ext. 4245.

BABYSITTER - for 20-mo.-old girl, 8 a.m.-4 p.m., Mon.-Thurs. Miriam or Jon, Ext. 3186 eves., no calls Fri. night to Sat. night.

HOUSE TO RENT - by non-smoking couple, 2-3 bdrms., 2 baths, garage. Marty, Ext. 2521 or 924-2134 eves.

BIDDERS - auction at K of C Patchogue, sponsored by Bellport Kreamer Street PTA, March 28 at 7:00 p.m.

PART BOARDER - English thoroughbred, Mid-Is Arena, Ridge, daytime rider. Pat, 744-8512.

BOAT SLIP - South Shore location for Hobie-Cat, directly on water, June through Sept. Richie, 924-3307.

SOFTBALL GLOVE - Joan, 796-3416.

SUMMER HOUSING - for visiting couple, furnished, 1-2 mos., starting May or June. Tang, Ext. 3869 or 5186.

OUTBOARD MOTOR - 25, 30, or 35 h.p., good cond. 878-2702 eves.

OLD LAWN MOWERS - gas type, complete only. Dan, Ext. 4987 or 698-7322.

WOOD LATHE - for home use. Ext. 2674.

INFANT CARE - reliable, mature person to care for infant, starting Oct., during weekdays. Paula, Ext. 3293 or 751-8240.

HOST - family w/son, send him to French Riviera in exchange for 14 yr. old French boy. Anne or Pierre, Ext. 2963 days or 3097 eves.

Miscellaneous

SEARS MICROWAVE OVEN - w/cart, family size, $180. George, 924-9656.

SCREENS & STORM WINDOWS - wood, 9 each, good cond., $35. Cliff, Ext. 3794.

STERLING SILVER - heirloom, w/"G" monogram, service for six, 8 pc. ea., 4 pc. missing, assorted serving pieces (2 matching). Ext. 5054 or 3969.

GRANDFATHER CLOCK - moving moon dial, triple chime movement, $400. Joe, Ext. 2898.

KENMORE WASHER - Heavy Duty Plus, excel. cond. Ext. 2710 or 331-7350 eves.

SOFA & CHAIR - $100; coffee & end tables, $100; lounge chair & ottoman, $75; punch bowl, $25; blender, $20. Ellie, Ext. 3395 or 325-1537.

CRIB - $100; chest, $50; corner hutch, $50; night stand, $20, all pine. Ext. 2410

HAYES 1200 BAUD MODEM - w/SmartCom II, $275. Elaine, Ext. 5329.

IBM COLOR GRAPHICS CARD - $35; 63 watt p/s for PC. Marty, Ext. 2521 or 924-2134 eves.

WELLINGTON STOVE - wood/coal, $75. 924-1038.

MOVING SALE - white mica Parsons dining table, 4'x8'; 4 black chairs; 2, 1'x8' black mica Parsons tables; assorted wicker furn., more. 821-0840 eves.

BASEMENT TAG SALE - 3/26, 3/27, 9 a.m.-4 p.m., 30 Laurel, Holbrook, 3 blocks west of A&P.

TWIN BED - mattress, spring w/frame, $60; glass top coffee table, $25; charcoal grill, $20. all excel. cond. Ext. 5076 or 744-4615.

WEIGHT-LIFTING BENCH - medium size, $35; stereo/t.v. console, old, wood, good cond., $50. Tim, 281-7813 days.

BICYCLE HELMET - Bell V-I Pro, medium/large, new, white, $35. Bill, Ect. 4434.

WALNUT LEATHER BRIEFCASE - w/suede interior & brass trim, never used, $75. Darcy, Ext. 3362.

PINE BAR - 7', w/3 bar stools, $250. 929-4850 after 5:30 p.m.

BABY CRIB - excel., $60; oval picnic table, $100; trunk, $20; lawn chairs, $6. 928-5230 or 744-2203.

IBM TYPEWRITER - model C, long platen, good cond., recent overhaul, $125. Dave, Ext. 2622 or 941-9022.

FORSYTHIA BUSHES - 4' to 5', ready to bloom, $6/each; some 2' hemlocks avail. Chris, 878-0621.

SNOW BLOWER - 5 h.p., excel., $700; gas leaf blower; weed wacker; other power tools. 821-0840 eves.

HOT WATER HEATER - electric, 52 gallon, good cond., $75. Ext. 2621 or 286-9390.

SATELLITE DISH SYSTEM - complete 11' dish, good cond., you pick up, $700. 281-6070.

PICTURE FRAMES - assorted, 16"x20" & 20"x24", $3/ea. Pat, Ext. 2452.

MATTRESS - Simmons, full, firm, good cond., $20. 751-3551.

ANTIQUE PEDESTAL TABLE - oak, w/six chairs, refinished, $500. Ext. 5221.

SWIMMING POOL - 3'x12', w/filter, vacuum, chlorine, pH test kit & skimmer, all new. Ext. 2434.

PING-PONG TABLE - folds to 4½", $55; compact refrigerator, dorm-style, $50. 727-0499.

DINING ROOM TABLE - w/2 leaves, 5 pieces, colonial, excel. cond., $250. Gary, 929-6031 after 5 p.m.

WHIRLPOOL REFRIGERATOR - 19.1 cu. ft., 6-months-old, excel. cond., $575. Ext. 4020 or 581-7656.

FIREWOOD - cheap. 375-4737.

LIVING ROOM CHAIR - good cond.; Farberware convection turbo oven. 475-0509.

HOSPITAL BED - w/mattress, $500. Pete, Ext. 4574 or 878-1225.

MOVIE CAMERA - B&H Super 8, w/power zoom, $40; Polaroid 220, w/flash & case, $10. Sal, Ext. 2460.

ROUND MAPLE TABLE - 48", w/1 leaf & 4 chairs, $250. Pete, Ext. 4574 or 878-1225.

IBM PC - 256K, two 360K floppies, color, Hayes modem w/SmartCom II microspooler, mouse, $800. Elaine, Ext. 5329.

CALCULATOR - HP28C, excel. cond., 4-months-old, all manuals, $100. John R., Ext. 4662.

BMX BICYCLE - 16", w/pads, raced in '87 season at Shoreham, $25. Pete, Ext. 4819 or 289-7218.

BUNNY RABBITS - $6. John, Ext. 3675 or 924-3528.

STAMP REPLICAS - gold leaf, w/first day of issue stamps, 2 handsome albums. Ext. 3846 or 4493.

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

MIDDLE ISLAND - 3 bdrms., 2 baths, eik, fp, 2-story, carport, wooded 2 acres, avail. April 1, John, Ext. 3675 or 924-3528.

BELLPORT VILLAGE - 1 bdrm. cottage, w/sleeping loft, couple preferred, walk to beach & stores, non-smoker, references required. Ed, Ext. 2700.

BAITING HOLLOW - 5 bdrm. contemporary, new, $1,500/mo. + util. 821-2002 or 331-7060 eves.

RONKONKOMA - new 1 bdrm. apt., l/r-kit. combo., full bath, priv. ent., w/w, cable, $600/mo. Ray, Ext. 4248 or 467-8297.

CLEARWATER, FL - 2 bdrm. condo, 2 baths, tennis, pools, near golf, beach, schools, avail. May 1, rent neg. Jim, 732-3698.

HILTON HEAD, SC - 2 bdrm. condo, sleeps 6, beach, pool, golf, tennis, March $320/wk., April-Sept. $420/wk. 585-9149.

BROOKHAVEN HAMLET - 3 bdrms., l/r, eik, fenced yard, quiet area, $775/mo. + util. 281-3479.

SOUND BEACH - spacious 2 bdrm. apt., 3 blocks from beach, new kitchen, avail. immed. 821-6883 or 223-1261.

MIDDLE ISLAND - 1-2 bdrm. apt., 3 miles to Lab, $700/mo. +. 924-2205.

For Sale

MASTIC - 3 bdrm. ranch, eik, Florida room, fp w/built-in bookshelves, part. finished bsmt., brick front, brick patios front and rear, on ½ acre, $115,000; will consider rental. Ext. 5054 or 3969.

PORT JEFFERSON - Harbor Hills, 3 bdrm. ranch, 3 baths, wooded golf course setting, balcony, deck, patio, 2-car garage, 3-zone gas heat, $259,900. Ext. 3791 or 928-7154 eves.

PORT JEFFERSON - Harbor Hills, 4 bdrm. split ranch, d/r, eik, family room w/fp, brick patio, winter waterview, 24'x44' bsmt., excel. cond., $199,000. Ext. 4483 or 473-3689.

HILTON HEAD, SC - 3 bdrm. condo, sleeps 8, 2 baths, washer/dryer, wet bar, 6 tennis courts, 3 pools, whirlpool, golf, ocean view, asking $89,000 or will rent. 929-8912.

SHOREHAM - 3 bdrm. ranch, l/r, d/r, partially finished bsmt., detached 22'x24' 2-car garage, patio, a/g pool, city water, fenced 1/3 acre, SWR school district, low taxes, $150,000. Judy, Ext. 5263 or 821-3290 eves.

SETAUKET - north of 25A, 6 rm. cape, 2 baths, 2-car garage, wooded area, 3 Village schools, asking $190,000. 751-1401.

BELLPORT - 4 bdrm. Colonial, 3½ baths, l/r, d/r, kitchen, pantry, sunroom w/jacuzzi, 3 screened porches, attic, 2-car garage, walk to village & bay, asking $675,000. 286-0269.

SETAUKET - north of 25A, 3 bdrm. ranch, 2 baths, open l/r, fp in den, 2-car garage, patio, beautiful landscaping, hilltop setting. Ext. 7560 or 689-7494.

SHOREHAM - 4 bdrm. cape, 2 baths, l/r, d/r, finished bsmt., garage, low taxes, $140,000. Ext. 4374 or 744-7831.

POCONOS, NY - 1 acre on cul-de-sac, water & elec., Hemlock farms, four-season community, 4 lakes, 3 pools, private, security, $20,000. 698-8514 after 5 p.m.

HOLIDAY, FL - Sandpiper, 3 bdrms., 2 baths, oversize garage, corner lot, cathedral ceilings, laundry rm., clubhouse facilities, asking $80,000. 744-3968.

EAST MORICHES - unique, "contemporized" 2-unit home w/income potential, great location, i/g pool, $160,000. 878-8875 after 6 p.m.

MOUNT SINAI - north of 25A, 3-4 bdrms., 2 baths, l/r, d/r, eik, prof. landscaping, sprinklers, covered patio, garage, den w/fp, a/c units, 1/3 + acre, excel. schools, near beaches, $169,000. Ext. 2494.

CLEARWATER, FL - 2 bdrm. condo, 2 baths, mint cond., pool, spa, tennis. 475-0690.

STONY BROOK - 4 bdrm. ranch, 2 baths, central a/c, w/w, European gourmet kitchen, Pella family rm., fp, i/g pool, 2-car garage, ½ acre, fenced, mint cond. 751-7023.

HANCOCK, NY - 22 & 23 acres, great hunting & the best fishing in the nearby Delaware River, $18,999/each. 447-1098 eves.

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