BROOKHAVEN BULLETIN
Vol. 42 - No. 29 July 29, 1988
BROOKHAVEN NATIONAL LABORATORY

X-Ray Lithography Yields First Computer Chips at NSLS

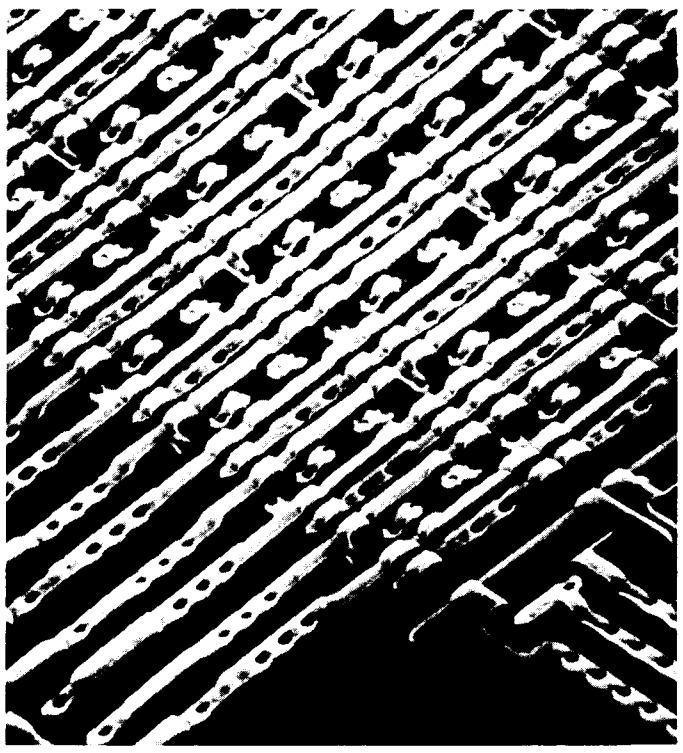
Some of the most densely packed, working computer chips in the world were completed at BNL's National Synchrotron Light Source (NSLS) in May. As announced by IBM this week, these are the first chips ever to be made solely using x-ray lithography.

Stationed at the NSLS vacuum ultraviolet (VUV) ring, IBM researchers have made test chips with only 0.5-micron spaces between components — two to three times denser than the most tightly packed, mass-produced chip today.

The smaller the component spacing — called the line widths — the denser the computer chip. Denser computer chips add up to faster, more powerful and more economical computers. The immediate goal of computer chip makers is to fabricate a miniaturized memory chip to hold 64 megabits of information.

The densest chip commercially made today, however, is the one-megabit dynamic random-access memory (DRAM) having 1.2-micron line widths. The thinnest line widths in working circuits have been reported to be 0.1 microns — but those circuits were not fully scaled, that is all their dimensions were not reduced proportionally.

In making a fully scaled, working chip having 0.5-micron line widths, IBM has demonstrated the feasibility of x-ray lithography as a manufacturing technique. Of several being investigated, x-ray lithography is the experimental technique that holds the most promise to replace optical lithography, the presently used method of making chips.



One of the most tightly packed, working computer chips in the world, as magnified under an electron microscope, made by IBM at NSLS beam line U6. Transistors are buried beneath the metal connection lines, which are less than one micron wide or about one hundredth the width of a human hair. The metal lines connect to the transistors at the small, dark circles, which are 0.5 microns in diameter.

X-ray lithography is a printing process borrowed from the graphic arts. To print high resolution circuit patterns on silicon wafers, IBM exposed masked wafers to the VUV's soft x-rays, at their x-ray lithography station on NSLS beam line U6.

IBM began their x-ray lithography research in 1982, as one of the NSLS's first participating research teams. IBM's U6 research facility was the first synchrotron-based station dedicated to x-ray lithography in the nation, one of the first in the world.

In addition to continuing their research at the NSLS, IBM has ordered a superconducting compact synchrotron dedicated to x-ray lithography, which is being designed and manufactured for them in England.

To bring America's computer chip industry to the forefront of technology and to establish domestic vendors of compact synchrotrons, the NSLS is at present developing the first U.S. compact synchrotron. As part of a $21-million, five-year grant from the Department of Defense, the superconducting X-Ray Lithography Source is scheduled to be completed in 1992.

"As a national resource for industry, universities and other labs, the NSLS is proud to host IBM and to have contributed to this technological breakthrough," says NSLS Chairman Michael Knotek. "In addition to supporting this kind of research, the NSLS has expanded its role — by developing and transferring compact synchrotron technology for x-ray lithography to American industry, we will help ensure U.S. competitiveness in the world computer chip market and enhance our security at home."

— Marsha Belford

Laying the Foundation for DNA Replication

Imagine a mason constructing one row of a wall with only a certain number of bricks.

The mason begins the job by laying the first brick. One by one, the bricks are lined up in two directions — left and right — giving new character to the growing wall. Finally, at each end the mason puts the last brick into place, finishing the row.

When Jack Van't Hof imagines this bricklaying scenario, he's really picturing the way in which a replicon works. And Van't Hof, a Senior Cytologist in the Biology Department, knows replicons: Last year, he and his associates were the first to identify and isolate a replicon origin and termini from a chromosome of a higher organism.

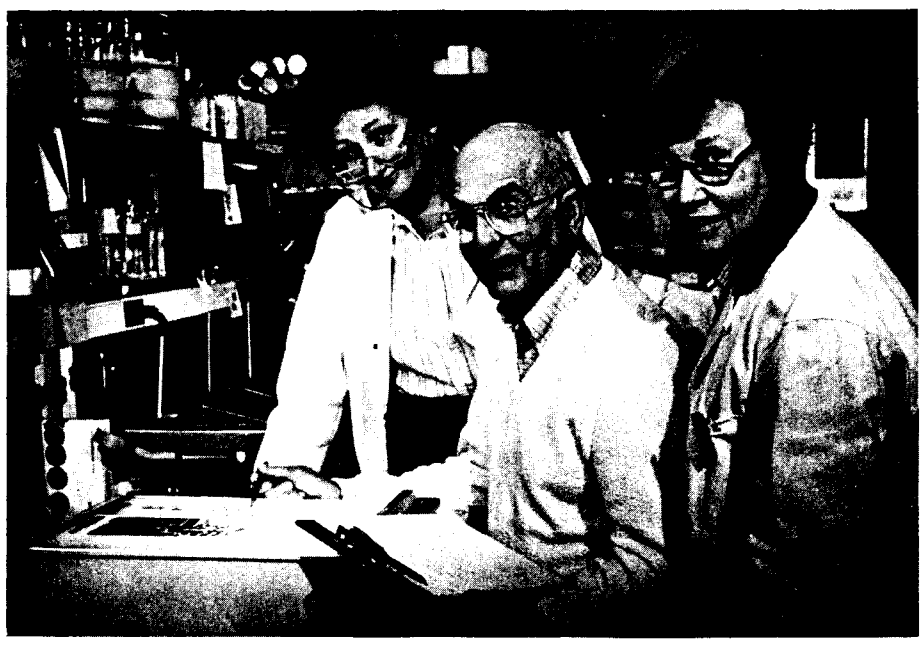
They have broken further ground by removing an origin and two termini from a replicon in a chromosome, then inserting them into a self-replicating genetic element, called a plasmid, for research.

The Role of the Replicon

Found inside chromosomes, replicons are part of DNA, the substance that carries the genetic code. Replicons control the duplication of DNA — a vital process called replication. Normally, DNA replicates in dividing cells, perpetuating the genetic code.

Understanding the intricate process of replication requires understanding the replicon that initiates it. As Van't Hof's research helps unravel the details of replication, his bricklaying analogy makes the replicon easier to understand.

In this comparison, the first brick the mason lays is analogous to the beginning of a replicon, or its origin. The mason completes the replication of the row just as the termini complete the replication of a DNA fragment. The other bricks the mason lays are comparable to the genes that give living things their distinctive characteristics.



Roger Stoutenburgh

Jack Van't Hof and his assistants, Susan Lamm (left) and Clara Bjerknes, examine nucleotide sequences of the replicon origin after cloning DNA for the study of DNA replication.

Long-Term Project

Isolating the origin and termini of the replicon didn't happen overnight. In fact, Van't Hof has spent almost 15 years working on DNA replication, particularly in pea plants, with the help of his assistants Clara Bjerknes and Susan Lamm, both Biology Associates.

His first step was to understand how the replicon functions. By measuring the distance between the origins of two different replicons on a chromosome during replication, Van't Hof could see that the replicons operate in units.

A replicon unit, or cluster, stops its work when its alloted section of DNA has finished replicating and another cluster begins replication on a different part of the chromosome. This happens in a specific sequence in time, called temporal ordering. In terms of Van't Hof's analogy, this means the mason would construct the brick row in a preferred order and not all at once.

Temporal ordering intrigued Van't Hof. Wondering if the replication process could be altered, he tried to manipulate the replicons to replicate at the same time. "To see if we could force the replicons to work simultaneously, we accelerated the rate at which a chromosome is made by increasing the temperature," he said.

The Sequence Never Changes

In this study, Van't Hof used a technique called DNA-fiber autoradiography, in which nuclei of cells are opened and their labeled DNA spread on slides and studied under a light microscope.

He found that, even though replication can be forced to happen faster, it still occurs in a preferred sequence. This suggests that temporal ordering is biologically inherent within the replicon. Depending on the size of the genome, the process of chromosomal replication is either lengthened or shortened.

(Continued on page 2)

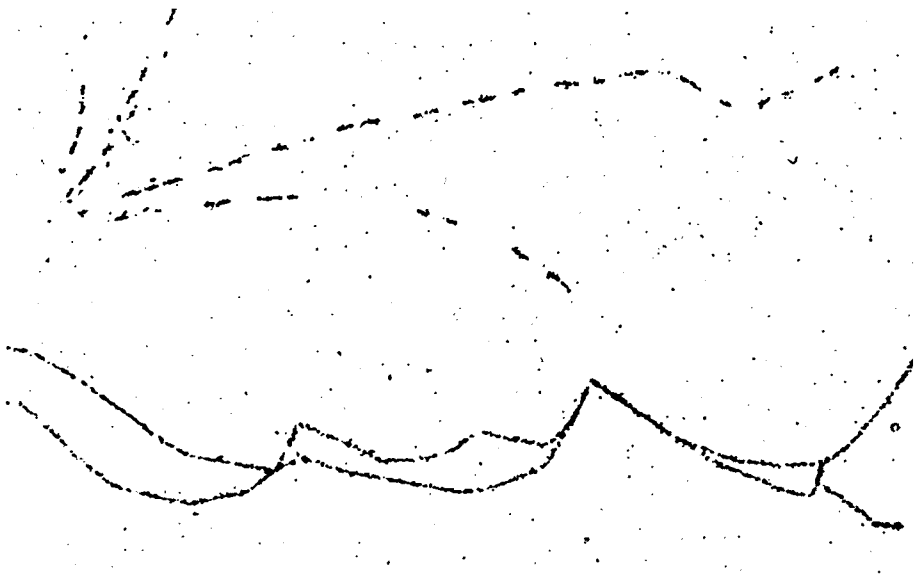
Search for New Applied Science Chairman

Bernard Manowitz has stated his intention not to serve another term as Chairman of the Department of Applied Science after his present term expires in June 1989. A search committee has been appointed, chaired by Herbert Kouts, to recommend to the Laboratory's Directorate the names of a few individuals who are qualified and interested in serving as Manowitz's successor.

The Chairman of the Department of Applied Science should have a Ph.D. in engineering, environmental sciences, materials science, chemistry or physics, with at least 20 years of experience. It is preferred that candidates have experience in both research and industrial environments. The proposed candidates should be recognized authorities in their fields and have contributed to the literature.

Qualified candidates should be proven managers of research or engineering organizations. Candidates should have successful records of working with U.S. governmental agency program managers, at such agencies as the Department of Energy, Department of Defense and Environmental Protection Agency, as well as with universities and industry. The chairmanship appointment is for five years, starting June 1989.

The search committee will consider individuals from both within and outside the Laboratory. Qualified individuals who wish to be considered for this position should advise Herbert Kouts, Bldg. 197C, Ext. 2918. Suggestions of qualified persons from outside the Laboratory should also be directed to Kouts.



DNA-fiber autoradiogram showing clustered tandem replicons while replicating chromosomal DNA (above) and after replication is completed (below). A radioactive isotope called tritiated thymidine is incorporated into the DNA sequence as one of the nucleotide bases to trace the replication of DNA by the replicons. Silver grains in the photographic emulsion produced by tritium incorporated in the DNA marks the trail of the replication.

DNA Replication (cont'd)

Once Van't Hof understood how the replicon functions within its own chromosome, he was curious to see how it would operate when inserted into a new environment.

So, over six months ago, with the aid of molecular biology and cloning techniques, and particularly Pablo Hernandez, a postdoctoral fellow from Spain, Van't Hof sucessfully isolated the origin and termini of a replicon, using specific sequences of genes as probes. He then inserted these replicon parts into the world's first plasmid containing a chromosomal replicon obtained from a higher organism.

This summer, the new plasmid is aiding Van't Hof in the study of gene replication, as he looks for new insights into this intricate process. His mini-chromosome made in vitro may lead to new breakthroughs in genetic research. — Suzanne Cybart

Updating Radiation Protection Standards

A task force of the International Commission on Radiological Protection (ICRP) met at BNL on July 11-14 to revise its most basic set of recommendations on radiation protection. Made up of ICRP officers and committee chairmen, the task force held its third meeting since 1985, its first at the Lab.

Last having published its basic recommendations in 1977, the task force has until the early 1990's to decide on new dose limits for people exposed to ionizing radiation, by examining recent radiobiological data, such as the cancer incidence in the Japanese atomic bomb survivor population. The ICRP will then use its new general dose limits to formulate specific guidelines for radiation workers, who are exposed to radioactive materials and radiation sources in the workplace, and for the general public, who are exposed to environmental radiation. ICRP basic and applied recommendations have been adopted internationally as the basis for radiation protection standards.

Roger Stoutenburgh

The officers and committee chairmen of the International Commission on Radiological Protection (ICRP): (from left) Bo Lindell, Sweden, Chairman Emeritis; Hylton Smith, United Kingdom (U.K.), Scientific Secretary; Julian Liniecki, Poland, Protection in Medicine Committee Chairman; ICRP Chairman Dan Beninson, Argentina; Charles Meinhold, BNL, Secondary Limits Committee Chairman; Henri Jammet, France, ICRP Vice Chairman; John Dunster, U.K., Applications Committee Chairman.

Come to Soho — at BNL

***Ecstasy,* a cast bronze by the Korean sculptor Wonjung Choi.**

If you enjoy art, but hesitate to go into the city to visit the galleries in the middle of summer, here's good news: Soho is coming to BNL, in the form of an exhibit of some 40 artworks from the Pindar Gallery.

Sponsored by the BERA Art Committee, "Soho Comes to BNL" will open on Monday, August 1, with a wine and cheese reception in Room B, Berkner Hall, from 5 to 7 p.m. The exhibit will continue August 2-5, from 11:30 a.m. to 1:30 p.m.

Clare Sheppard, who chairs the Art Committee, says, "The Pindar is at the center of the newest and most interesting modern art in New York."

The art that will enhance Berkner Hall the first week of August includes two-dimensional pieces — monoprints, watercolors, oil paintings, pastels, collages, silkskreens, drawings, acrylics and photographs. Several three-dimensional works — sculptures in bronze, walnut and steel — will also be on display.

The art was selected mainly by committee member Susan Chrien. She was assisted by Robert Chrien and Sheppard. Garman Harbottle, who made the Art Committee's initial contact with the Pindar Gallery, chose the photographs for the display.

"There's nothing *outre* or even terribly avant garde," said Sheppard. "We picked out works that we would like ourselves." In fact, the committee likes one steel sculpture —*Double Falls* by Cherie Reichgut — so much, they are considering acquiring the work permanently, to hang over the Reception Desk in Berkner Hall.

Temporary hanging of the artworks in Room B will be done on Monday morning, under the supervision of Elaine Lowenstein. Vivian Aronson is making arrangements for Committee members to greet visitors to the exhibit.

Most of the artworks on display are for sale. Contact Sheppard, Ext. 3946, for price information.

Att: Summer Visitors

Today is the last day to sign up for a "New York City Experience." This bus tour to the city on Saturday, August 6, will include visits to the Statue of Liberty, the South Street Seaport and the Intrepid Sea-Air-Space Museum. The modest cost of $18 includes luxury coach ride and breakfast served on the bus. The bus will leave from the Brookhaven Center at 7:30 a.m. sharp.

To sign up, bring your payment — cash only — to Renee Flack or Duane Hinds, Bldg. 185A, Ext. 3316, today.

Computer Seminar

IBM will demonstrate its Computer-Aided Engineering Design System (CAEDS), using an RT workstation, on Thursday, August 4, from 2 to 4:30 p.m. in Physics, Bldg. 510, second floor conference room 2-160.

CAEDS is made up of a solids modeler, finite element modeler and an integrated finite element solver. Prior to the CAEDS demonstration, the new IBM RT system will be described. Also, Chris Goggin, Accelerator Development Department, will show some models created on the system and discuss the FEA process on a workstation. Call Ted Daniels, Ext. 5555, for details.

BWIS Meeting

Brookhaven Women in Science (BWIS) will hold their summer supper meeting on Thursday, August 11, at 5:15 p.m. in the Chemistry Conference Room 101, Bldg. 555. The guest speaker, Victoria McLane, Department of Nuclear Energy, will talk on "International Data Exchange and a Junket to China."

All female summer students are invited to be BWIS's dinner guests, free of charge. Others in the Laboratory community are also invited, at a $5.00 charge per person for the catered dinner. To make reservations, please contact Stephanie Lamontagne, Ext. 7141, Bldg. 1005S, before Friday, August 5.

Softball

Week of July 18
Standings

League I

	W	L
Phoubars	8	2
Blue Jays	8	2
Six Pax	6	4
Light Source	6	4
Ravens	5	5
Bandits	5	5
Cool 'n Gang	4	6
Sudden Impact	3	7
Cutting Edge	3	7
Magnuts	2	8

Games

League IV

Mudville Sluggers 10 - Sandboxers 6
Underalls 11 - Turkeys 9
Far Side 16 - Who Cares 15
Spacekadets 14 - Seventh Inning Stretch 6

team safety

Two weeks into the season and all Division teams are still at bat. The players must be getting hungry, as all have played the game so far with no errors.

The unconfirmed rumor this week is that several Plant Engineering players are negotiating to buy a local pizza palor. Rest assured, however, we'll investigate this rumor for potential conflict of interest.

Word around the field is that some players have been traded in Supply & Materiel. The commissioner's committee will check this out with George to make sure these trades are on the up and up.

In the meantime, keep up the safe work.

Arrivals & Departures

Arrivals

Joseph A. DeCicco ..... AGS
Allen K. Jones ..... AGS
Jeffrey L. Rothman ..... NSLS
Joseph Rubino ..... Photo. & Gr. Arts

Departures

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

John M. Doorhy ..... S&EP
Stephen A. Klaeren ..... Chemistry

Scoop of the Week

SCOOP of the Week

Kathy Tuohy, Physics, is this week's winner of the Scoop of the Week contest, for her suggestion for the story on Jane and Tom Throwe and their baby boy William.

If you wish to enter this summer's Scoop of the Week contest, rush your news and feature scoops to the Bulletin, Bldg. 134, or call Ext. 5053. If you scoop the Bulletin's informed sources and a story based on your idea is published, you'll win an official certificate for soft-serve, frozen yogurt, redeemable anytime at the Cafeteria.

Oh Boy! It's a Baby!

Introducing William Throwe

While the first Laboratory newspaper, *Isotopics*, did announce employees' engagements, weddings and children's births, the Brookhaven Bulletin has never done so. Thus, with the Bulletin's hereby announcing the birth at 10:40 a.m. on February 5, 1988, of William Thomas Throwe, the 7-pound, 20-inch-long son and first child of Jane and Tom Throwe, Physics, a precedent is being broken.

However, William is a precedent-breaking baby: He was conceived in a laboratory petri dish from Jane's egg and Tom's sperm, the product of a technique called in vitro fertilization. In other words, William is what is known as a test-tube baby.

William looks like any other infant, and he looks like his father. When he is awake, he looks around with his baby blue eyes, staring at lights and other bright objects. He spends most of his time, however, with his eyes closed, sound asleep. As do his peers, he wakes up to sound off when he's hungry or wet or wants to be comforted.

Because William is so unexceptionally normal, his unusual start in life is all the more miraculous. Not only are the Throwes overjoyed by the conception and birth of their son, but they are thankful for the help and support of the Particle-Solid Interactions Group of the Physics Department and the Occupational Medicine Clinic during Jane's pregnancy.

"I didn't want to sit home, and my doctors were amazed about the tremendous cooperation I received from absolutely everyone, which allowed me to keep working through my pregnancy," says Jane Throwe. "Everyone — from my boss Kelvin Lynn, to my coworkers, to the secretary in my group, to the custodian in my building — was very understanding and very flexible."

William's in vitro conception and Jane's high-risk pregnancy resulted from two separate medical conditions: Jane's having endometriosis and being a DES daughter.

William was conceived in vitro because, as Jane explains, "Nothing was working — though in 1982 we had been told to get to work on having a baby if we wanted one, and we had been trying ever since."

At that time, Jane had undergone surgery for endometriosis, a condition in which the tissue that lines the uterus is found growing outside the uterus, within the pelvic cavity. No one is certain what causes this condition: Most cases are reported in women 25-45 years old. In addition to pain, endometriosis can cause infertility.

After additional corrective surgery and trials with fertility drugs, Jane became a candidate for in vitro fertilization (IVF).

In June 1987, the Throwes were accepted into the IVF program at the Yale-New Haven Hospital. With "only one practice shot into a pillow," Tom was instructed to give his wife injections of the fertility drug Perganol for five days before she was scheduled to ovulate.

As a result of the drug, Jane produced nine eggs, and they were recovered during minor surgery at Yale-New Haven Hospital. "The next day, June 3, which was our ninth wedding anniversary, we were told that we had fertilized eggs," recalls Jane, "but they wouldn't tell us how many over the phone."

The next day, the fertilized eggs — two of them — were implanted into Jane's uterus, and the Throwes went home to wait — to see if Jane became pregnant.

To determine this, Jane had to have blood drawn two or three times a week for three weeks, the serum of which was then sent to New Haven. As they do for other physician-ordered laboratory tests, BNL's Occupational Medicine Clinic was happy to draw and process Jane's blood.

"Then one Saturday I got a call from New Haven telling me that I was pregnant — and, boy, I felt great," recalls Jane.

Still, more blood work was needed to monitor Jane's pregnancy, so the Clinic continued its service to her for another six weeks.

Two months into her pregnancy, Jane and Tom returned to New Haven for an ultrasound to see if one or both of the embryos had implanted. "We could see one fetal heart — it was proof positive that I was pregnant with one, and that it was implanted well," says Jane.

Successfully pregnant, Jane was discharged from the IVF program. However, carrying that pregnancy successfully to term became another concern, one having nothing to do with the IVF procedure.

Jane explains, "I was at high risk for going into labor prematurely because I have an unusually shaped uterus as a result of my mother's having taken DES while pregnant with me."

Diethylstilbestrol, or DES, is the first man-made estrogen. From 1941 to 1971, DES and similar drugs were prescribed for over one million pregnant women in the hope of preventing miscarriages. In 1970, it was first recognized that females exposed to DES in utero were at higher risk for gynecological and obstetrical problems, including cancer and infertility.

Tom and Jane Throwe and William, at six weeks.

Mort Rosen

Because she is a DES daughter, Jane was forced to lie down on the job and use two days of sick time a week — both of which her boss approved.

Twenty weeks into her pregnancy, Jane began being monitored for two hours a day with a portable device, and a nursing service would call her so the signals could be sent over the phone and read. "As I was having a large number of uterine contractions much too early in this pregnancy, my doctors began restricting my activity more and more," Jane explains.

"By the end of October, though my doctors were in favor of my continuing to work, they told me to spend my days lying down," adds Jane. "So, Tom would drive me door to door, carry all my things to my office, I would walk in, lie down in a reclining chair and would not get up except to go to the bathroom. I could answer the phone, but I couldn't pick up my mail, xerox a paper or get a drink of water.

"Obviously, because I was totally incapacitated, I couldn't do what I normally would have been expected to do — build an experiment," Jane continues. "But fortunately, I have a very understanding boss — Kelvin Lynn — and work in a very cooperative group, so I was given papers to write and allowed to take sick time while I was being monitored at work."

Three weeks before her due date, Jane birthed William after three days of slow labor. Jane comments, "William's making his way into the world is a real BNL story with a happy ending — the doctor who delivered him is Deborah Davenport, the wife of Jim Davenport in Physics."

Out of sick time and wanting extra time with her long awaited newborn, Jane was on leave of absence from the Lab through May. Now, she is back at work half-time.

Tom and Jane haven't decided yet, but William may be an only child. As Jane concludes, "Tom and I are very happy with the results, but I don't know if I'd have the fortitude to do it all over again."

— Marsha Belford

BROOKHAVEN BULLETIN

Published weekly
by the Public Affairs Office
for the employees of
BROOKHAVEN NATIONAL LABORATORY

ANITA COHEN, Editor
MARSHA BELFORD, Assistant Editor
LIZ SEUBERT, Reporter

35 Brookhaven Ave., Upton, N.Y. 11973
(516)282-2345

Summer on Long Island

Beaches — From the Bay to the Sound

If you're not in the mood for the ocean's rough waves, but you're looking for a place to swim, the area around BNL has plenty of beaches to satisfy anyone's taste.

On the North Shore, there's the **Long Island Sound.** Steep dunes protect the rocky beaches that frame this long, broad inlet from the Atlantic Ocean. On a clear day, you can see across the Sound's ten-mile expanse, to the Connecticut shoreline. The Sound's deep, cool, clear waters are wonderfully refreshing. You can swim in them at:

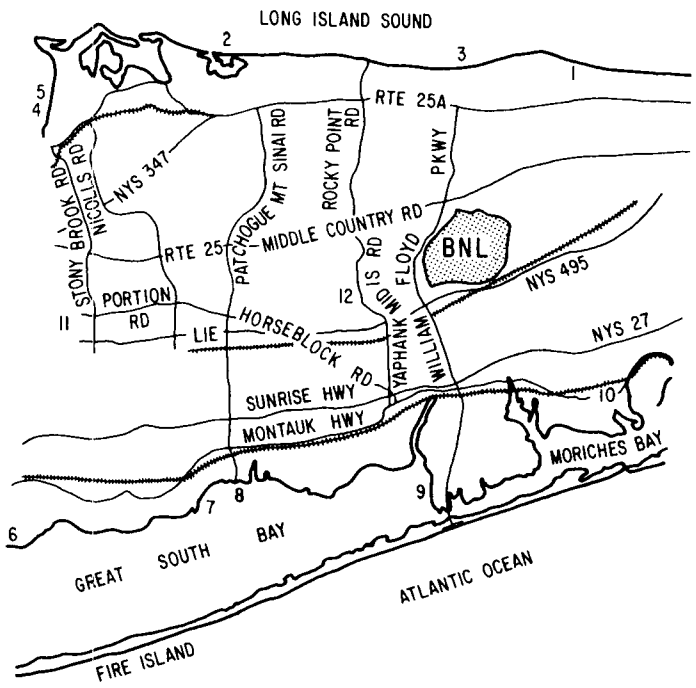
- **Wildwood State Park** — Located in Wading River, at the end of North Wading River Road (see map, no. 1). Entrance fee: $3.50. Open through Labor Day.
- **Brookhaven Town Beaches** — Open from 10 a.m. to 6 p.m., through September 5, these include: *Cedar Beach* (map, no. 2), Harbor Beach Road, Mt. Sinai; *Shoreham Beach* (3), North Country Road, Shoreham; *Stony Brook Beach* (4), Sand Street, Stony Brook; *West Meadow Beach* (5), West Meadow Beach Road, Stony Brook.

On the South Shore, there's the **Great South Bay.** Lying between Long Island's mainland and Fire Island, the Bay is also fed by the Atlantic. Where the Ocean and the Sound are both cool and deep, however the gentle Bay tends be much warmer and shallower. You can swim at:

- **Heckscher State Park** — Located in Great River, off the Heckscher Spur of the Southern State Parkway (6). Entrance fee: $3.50. Open through Labor Day.
- **Brookhaven Town Beaches** — Open from 10 a.m. to 6 p.m., through September 5, and include: *Corey Beach* (7) Corey Avenue, Blue Point; *Sandspit* (8), Brightwood Street, Patchogue; *Shirley Beach* (9), Westminster & Grandview Drives, Shirley.

Between the Sound and the Bay lie many **lakes,** where shady shores provide a pleasant place to relax before or after a swim:

- **Brookhaven Town Beaches** — *Kalers Pond* (10), Montauk Highway, East Moriches; *Lake Ronkonkoma* (11), Shore Road, Lake Ronkonkoma; *Yaphank Lake*** (12), Main Street, Yaphank.



* Parking permits are required at Brookhaven Town Beaches:

- **Permanent residents** of Brookhaven Town can obtain free parking stickers at all beaches, upon presentation of resident vehicle registration plus driver's license, tax bill or voter registration.
- **Temporary residents** living on site can obtain a free parking permit card. You need a copy of your automobile registration, even if the vehicle is registered out-of-state, and a statement that you are employed at BNL, written on Lab stationery. You can mail that to Box A, Town of Brookhaven, Parks & Recreation Office, Coram, NY 11727, or visit the office at 1130 Old Town Road, Coram, Monday-Friday, from 9 a.m. to 4 p.m.

** No facilities for the handicapped.

Summer T-Shirts and Sweatshirts

Good news for anyone who still wants to order a "Summer '88" BNL T-shirt or sweatshirt: The deadline has been extended through August.

The shirts are 50% cotton and 50% polyester. They are available in unisex adult sizes (small, medium, large, extra large) and unisex children's sizes (small, medium, large). T-shirts cost $6 each, while sweatshirts are $12 each; prices include tax.

Orders and payments can be mailed or brought to Renée Flack, Affirmative Action Office, Bldg. 185A., Ext. 3316. Each order should be accompanied by cash or a money order made payable to "Renee Flack — T-Shirts '88." No personal checks please. Allow two weeks after placing order for delivery.

Cafeteria Menu

Week of August 1

Monday, August 1

Beef noodle soup	(cup)	.75
	(bowl)	.95
Veal roulade cordon bleu w/1 veg.		3.10
Chicken pot pie w/biscuit		3.05
Chef salad (lite-weight)		2.35
Hot deli: Pastrami	(bread or roll)	2.85

Tuesday, August 2

Cheesy vegetable chowder	(cup)	.75
	(bowl)	.95
Beef short ribs Madeira w/1 veg.		3.10
Pork Polynesian over rice		3.10
Baked fish supreme w/1 veg. (lite-weight)		2.95
Hot deli: Chicken patty sandwich on a bun		2.85

Wednesday, August 3

Minestrone	(cup)	.75
	(bowl)	.95
Chicken breast smitane w/1 veg.		3.10
Piñata Casserole		3.00
Farmers' omelette (lite-weight)		2.95
Hot deli: Baked ham	(bread or roll)	2.85
	(hero)	2.95

Thursday, August 4

Navy bean soup	(cup)	.75
	(bowl)	.95
Roast loin of pork w/gravy & 1 veg.		3.10
Polish-style cabbage rolls w/1 veg.		3.00
Macaroni & cheese w/1 veg.		2.85
Hot deli: Sloppy Joe on a bun		2.85

Friday, August 5

Manhattan clam chowder	(cup)	.75
	(bowl)	.95
Cuban-style steak w/1 veg.		3.10
Turkey-broccoli divan w/1 veg.		3.10
Fresh fish New Brunswick		2.95
Hot deli: Corned beef	(bread or 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.

2906. DIVISION HEAD, COMPUTATION AND COMMUNICATIONS DIVISION - Responsible for the overall management and direction of professional computer systems personnel and support staff. Determines technical research and development needs in computer science and communications, and develops and implements applications to meet these requirements. Requires a B.S. degree in computer science and/or engineering; advanced degree in one of these disciplines is highly desirable. Extensive experience in the management of a scientific computing operation and knowledge of sophisticated communication systems is also required. Please submit resume to Robert D'Angio, Personnel Division, Bldg. 185.

2907. RESIDENCE CUSTODIAN - Staff Services Division.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

2908. REACTOR TRAINING POSITION - Requires BS in engineering or equivalent experience and previous background in training. Qualification as a senior reactor operator required. Will conduct training and coordinate, write, revise and maintain a variety of training materials and operating documents. Ability to obtain "Q" clearance necessary. Reactor Division.

2909. TECHNICAL POSITION - Requires AAS in electronic technology or equivalent experience with a solid background in analog circuits and digital controls. Should be skilled in troubleshooting at both circuit and system levels. Job will involve fabrication and testing of circuits from electronic schematics, verbal instruction and sketches. Alternating Gradient Synchrotron Department.

2910. P&GA SPECIALIST - (Dark Room) Requires AAS in Photography or equivalent and 3-5 years' experience in both color and black & white photographic printing and processing. Experience in the use of copy camera and the production of color slides as well as maintaining and servicing equipment necessary. (Reposting of Job #2842). Photography & Graphic Arts Division.

2911. OFFICE SERVICES ASSISTANT POSITION - Will perform complex and diversified clerical functions. Requires accurate typing skills and extensive filing experience. Familiarity with library procedures and a working knowledge of PC's and word processing helpful. Previous OCLC experience highly desirable. Technical Information Division.

Motor Vehicles & Supplies

88 TRAVEL TRAILER - 32', sleeps 5, master bdrm., a/c, full bath, $15,000. Ext. 4685 or 929-8673.

87 TRAVELMASTER MOTOR HOME - 24', a/c, TV, awning, rear bed, bath, excel. cond., $26,000. 929-8772.

86 GAJIVA DIRT BIKE - 924-1038.

86 MONTE CARLO S.S. - black, w/gray interior, every option, including T-roof, 5-yr. warranty, mint. 758-4919.

86 MAZDA B2000 LX - am/fm cass., bedliner, rear window, bucket seats, cruise control, black/gray, mint cond. Dorry, Ext. 2103 or 286-8689 eves.

84 CAMARO Z28 - black, black & gray int., 5-spd., T-roofs, am/fm cass., 350 eng., p/s, p/b, 45k mi., asking $6,500. Tim, Ext. 5222 or 732-5305.

84 RENAULT ENCORE - a/t, low milage, new brakes, very good cond. Ana, Ext. 3110 after 6 p.m.

84 TURISMO - 5-spd., am/fm stereo, a/c, red, 74k mi., very good cond. 878-6822.

84 TRANS AM - 5 ltr. H.O., 5-spd., black & gold, alum. wheels, T-tops, loaded, $8,000 neg. 360-0841 after 6 p.m.

84 OLDS CUTLASS - 4-dr., 8k mi., p/b, p/s, a/c, garaged, rust proofed, spoke wheels, mint cond., $8,000. Frank, Ext 3531 or 281-7578.

84 NISSAN SENTRA DLX - a/t, a/c, p/s, am/fm cass., velour, 22k mi., front left end damaged, make offer. Ext. 2679 or 472-6922.

83 EXP - 51k mi., sunroof, a/c, am/fm cass., good cond., $1,800 or best offer. Fritz, Ext. 4049.

83 DODGE D50 PICKUP - 4 cyl., 4-spd., am/fm cass., 27 mpg, 65k mi., w/cap, $2,500. 281-6745.

82 VW RABBIT - many new parts, come & take a test drive, asking $900, neg. 475-1608.

82 YAMAHA 400 MOTORCYCLE - 12k mi., excel. cond., $600. Ext. 4629 or 929-4258 after 5:30 p.m.

81 SHASTA POP-UP - lightweight, sleeps 6, stove, sink, heater, cooler, good cond., $2,175. 727-7711.

81 PLYMOUTH RELIANT - 4-dr., a/c, a/t, p/s, p/b, 66.8k mi., am/fm cass., 25 mpg, very good cond., $1,950. Ext. 7766 or 757-2645.

81 SKYLARK - V-6, 4-dr., high mileage, new CV's, $1,000. Bob, Ext. 5286.

81 CHEVY CHEVETTE - needs work, but great station car, best offer. Debbie, Ext. 2602 or 467-4036.

80 BUICK SKYLARK - full power, stereo, excel. cond., new trans., 4-dr. Ext. 3593.

80 HONDA PRELUDE - silver, excel. cond., $2,000. 475-4199.

80 HONDA CB900 MOTORCYCLE - custom, excel. cond., must see. Vinny, 395-1228 after 8 p.m.

79 COUGAR XR-7 - fully loaded, must sell, new car arriving, make offer. Tony, 698-9274 after 6 p.m.

79 CHEREKEE - good engine, new tires, good work truck. Dan, Ext. 7518 or 929-3195.

79 STATION WAGON - white, 90k mi., new trans., good cond., asking $700. Bob Lombardi, Ext. 2239 or 924-7316.

79 HONDA - good around-town car, excel. cond., asking $300. Joe, 736-1651.

78 CAMARO - 8 cyl., 305 eng., a/t, p/s, am/fm cass., excel. cond., $2,700. 369-9329 after 5 p.m.

78 JEEP CJ-5 - new drive train, needs body work, great on the beach. Rich, Ext. 2043 or 435-4316.

78 HONDA HAWK - very low mileage, garaged, great buy, $400. Ray, Ext. 3624 or 929-3860.

78 MOTOR HOME - 23', 360 motor, a/t, a/c, generator, 24k mi., $14,000. 732-8904 after 6 p.m.

76 WILDERNESS TRAVEL TRAILER - 18', fully self-contained, excel. cond., $3,200. 588-8268 after 3 p.m.

75 BMW R-90 MOTORCYCLE - 900 cc, very good cond., $1,700. Roger, Ext. 7518 or 878-8847.

71 FORD TORINO - 2-dr., a/t, p/s, p/b, 76k mi., $500. Pete, Ext. 2498.

AIR DEFLECTOR SHIELD - for '81-'86 Ford pickup & Bronco, full-size, red, $25. Dan, Ext. 4987 or 698-7322.

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

UNIVERSAL BUMPER JACKS - 2, $7.50/ea.; 2 new 3-ton jack stands, $10/ea. Bill, 298-4172.

TIRES - 4, Sears Roadhandler G.T., w/w, 225/70R15, very good cond., 4 for $80. Larry, Ext. 3942.

MONTE CARLO SS RIMS - for sale, $125/ea., cash only. Ralph, Ext. 2238.

305 CHEVY V-8 ENGINE - complete, low mileage, excel. cond., $650; 350 Chevy V-8 parts available. Tom, Ext. 4084 or 878-1060.

Boats & Marine Supplies

34' HOUSEBOAT - fiberglass, all new interior, F/W cooled, excel. engine, excel. cond., must see, $20,000. Ext. 2939 or 732-1243 after 6 p.m.

22' CATALINA SAILBOAT - swing keel, trailer, $4,950; 15' Catamaran, furling jib, trailer, $1,150; 8' sailing dinghy, new sail & rig, $375. 744-7406.

12' MINI SUNFISH - good cond., roof rack, $475. P. Hichborn, 929-4133.

MOTOR - 7.4 h.p., Mercury O/B, 3 hrs. running time, gas tank, excel. cond., $450. 473-0178.

ELECTRIC START - 50 h.p., 1976 Mercury, w/controls & cables, $600; 50 h.p., 1975 Mercury parts, $125. 281-4337.

MORSE TWIN ENGINE - single lever, control & cables, $65 neg. Ernie, 588-4937.

MOTOR - 65 h.p., Mercury, controls, prop, power head needs repair, $95. Charlie, Ext. 2317 or 754-2471 eves.

Yard Sale

MASTIC BEACH - July 30, 132 Lynbrook Road, 9:00 a.m., misc. items, furniture, china, vanity set.

Miscellaneous

COFFEE TABLE - 20"x54", $15; 21"x43" solid mahogany coffee table, $35; swivel rocker, $45. 281-8943.

LOUNGE CHAIR - & ottoman, brown, $74; Eureka up-right vacuum w/attachments, $40. Ellie, Ext. 3395 or 325-1537.

RUG - 10'x12', gray/green, short shag, jute pad, very good cond., $25. 289-1883.

LAMP TABLE - Duncan Fyfe, 1930's, $50; metal file cabinet, safe inside, $30; RCA, 19', color TV, $50; antique wood decoys, 60 yrs. old, 1 doz. 924-3082.

AIR CONDITIONER - 11,200 Btu, $100. Ext. 2254.

FURNITURE - sleeper couch, china closet, chairs, etc., best offer. Alice, 281-5152.

HOME BAR - 7'x18" top, 42" high, fine for rec/family room, $125. 281-8685.

DRESSER - hardwood, w/mirror, 9 drawers, pecan finish, good cond., $125. Ext. 3369.

HOUSEHOLD ITEMS - furniture, garden tools. 473-4668.

HOUSEHOLD ITEMS - moving sale. 744-7642.

REFRIGERATOR - Amana, 20 cu. ft., white, w/ice maker, very good cond., $95. Ext. 2703.

FANS - box fan, 20", 3-spd., $10; 22" rev. thermo control, 3-spd., window fan, $35. Ernie, 588-4987.

WINDOWS - alum., misc. sizes, make offer; boys' bike, Huffy, 20" or 24", $55. Jerry, Ext. 7427 or 475-5591 eves.

LAWN MOWER - Simplicity ride-on, 8 h.p., 30" blade, grass catcher, excel. cond., $895. 584-7970.

FENCE - 2 ea., 50' rolls, 3' high, 15 gauge, green plastic over galvanize, new, $12.50/ea. 298-4172.

FLOWERS - mixed colors, hybrid day lilies, also mixed variety of hostas. 732-5451.

WELL PUMP - Gould, shallow, 2 mos. old, $25. Dan, Ext. 7518 or 929-3195.

BASEBOARD HEATERS - electric, various sizes, used but guaranteed. 722-4821.

LAWN MOWER - 20" cut, tech. engine, new blade, $50; cyclone fence, hardware asst., cost $60, sell for $20. Dan, Ext. 4987 or 698-7322.

TANDEM BIKE - have a conversation while you ride. Joel, Ext. 5038 or 751-3408.

AQUARIUM - 10 gal., iron stand, hood, filter, pump, 2 large fish, accessories & instructions, $100 value, sell for $50. 929-3795.

MUSICAL EQUIPMENT - basses, amp, porta-studio, microphone, all excel. cond. 758-4919.

HANDCRAFTED FLIES - for fly fishing. Sean, 289-8323.

BICYCLE - women's, 5-spd., AMF, $35; girls' 20" Columbia, $30; dining room set, $125. Ext. 4156.

CAMERA - 35mm, Olympus Infinity S, auto load, rewind, focus, film speed, self-timer, never used, $110. Rich, 435-4316.

WORD PROCESSOR - Brother, 1-year-old, w/3½" disks, $600. 286-0969 after 6:30 p.m., leave message.

STEREO COMPONENTS - Fisher tape deck; Radio Shack turntable, $15/ea. or 2/$25. Al, Ext. 2023 or 758-2023.

COMPUTER - Commodore Amiga, 512 Ram exp., add. disk drive, NX10 star printer, software, extras incl., $850. 924-5419.

STEREO - AR2AX speakers, $50/ea.; receiver, $70; turntable, $40. Ext. 4238 or 286-3509.

TICKETS - 2 for U.S. Open, Wed., Sept. 7, 11:00 a.m., $24/ea. Ext. 7112.

WEDDING PLANNER - Wedding Pages, paid $12.95, asking $10. Ext. 5136.

Free

CYLINDER HEADS - Chevy 327, you pick up. Dan, Ext. 4987 or 698-7322.

KITTEN - caring home needed for Sushi, 13-weeks old, black w/white spots. 924-0496.

KITTENS - adorable, calico, tabby. 472-1314.

CATS - 2, female, spayed, 1 angora, must find homes by Aug. 5. Colleen, Ext. 4563 or 929-3573.

73 OLDS CUTLASS - needs windshild & battery, take it away. Skalyo, Ext. 2509.

Car Pools

PATCHOGUE - van pool, seat open. Ext. 4669, leave name & number.

PLAINVIEW - 4th driver needed. Elliott, Ext. 2495.

STONY BROOK - van pool, needs riders. Paul, Ext. 2476 or Sid, Ext. 4125.

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

BAYPORT - large upstairs studio, furn., carpet, priv. ent., single non-smoker, no pets, refs., req. $495/mo. incl. util., 1 mo. sec., ready July 15. 472-1734, 10 a.m.-8 p.m.

HUNTINGTON - 1 bdrm., l/r, eik, bath, 2nd floor, priv., suitable couple, no pets, $450/mo. + util. Walt, Ext. 2907/2913 or 698-0576.

MEDFORD - large 2-rm. apt., full kitchen, l/r-bdrm. combo, w/w, cable, priv. ent., single person, $550/mo. incl. all. 654-5411.

PORT JEFFERSON - Harbor Hills, 3 bdrm., 2½ baths, l/r, d/r, eik, encl. patio, fully furnished, P.J. schools & beaches, starting Oct. 1988, $950/mo. + util. Ext. 4932 or 928-8993.

SHOREHAM - 1 bdrm. apt., clean, large, kitchen, l/r, full bath, priv. ent., working person, avail. August 1, $550/mo. all. 744-8659.

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

For Sale

BLUE POINT SOUTH - custom Cape, 4 bdrm., 2 full baths, screened porch, f/p, full basement, 2½-car gar., closets & storage, walk to beach, low taxes, move-in cond., $169,900. 363-9527.

MASTIC BEACH - 5 rms., 3 master bdrms., country kitchen lined w/cabinets, formica, oil-hot water, cast iron radiators, 5 blocks to marina, $120,000. 281-8685.

MEDFORD - low down payment, owner financing, no closing fees, 4 bdrm. Colonial, m/d, w/3 rm. apt., 3½ baths, fenced ½ acre, in-ground sprinkler, FL rm., extras, $180,000. Ext. 7814 or 475-8456.

MIDDLE ISLAND - Artist Lake condo, 1 bdrm., l/r, kit., full bath, a/c, new w/w, dishwasher, clubhouse, sauna, pool, gas heat, 5 min. to Lab, $82,500. Ext. 3144 or 234-2240, 698-5046 eves.

MIDDLE ISLAND - handyman special, 2 bdrm., l/r, kitchen, bath, on 2 acres, close to school & shopping, 7 mins. to Lab by car, $95,000. 351-1017.

MILLER PLACE - Scotts Beach, 4 bdrm. ranch, ½ acre plus, private beach community, sunroom, spa, pool, city water, $190,000. Judy, 473-6631 after 5 p.m.

PORT JEFFERSON - Harbor Hills, 4 bdrm., split ranch, d/r, eik, family rm. w/fp, brick patio, oak floors throughout, 24'x44' basement, reduced to $189,900. Ext. 4483 or 929-5699.

RIVERHEAD - 4 bdrm. 2-level ranch, 2 baths, possible m/d, ⅔ acre, large l/r, den, deeded beach rights, quiet neighborhood, 5 appliances, $150,000. 727-0499.

SHOREHAM - 3 bdrm. ranch, garage, above-ground pool, fenced yard, ½ acre, 10 min. to Lab, SWD school, $137,000. 821-3373.

SHOREHAM - 3 bdrm. ranch, carpeted, coal stove, priv. fenced backyd., 2½-car garage, low taxes, SWR schools, clean, move-in cond., $135,900. 744-9677.

SHOREHAM - 4 bdrm. Colonial, 2½ baths, 2,000 sq. ft., 2-car garage, taxes $1,660, SWR schools, good neighborhood, north of 25A, $182,500. 744-0960.

SHOREHAM - 4 bdrm. Colonial, 2½ baths, in-ground pool, ⅓ wooded acre, f/p, 2-dr. garage. 744-7642.

SOUTHAMPTON - 3 bdrms., 2 baths, library, cathedral ceilings, skylights, fp, bay windows, patio, 1.5 acres, beach pass, $225,000. 369-1363.

YAPHANK - beautiful 3 bdrm. townhouse condo, priv. end unit, brick front, full bsmt., attached garage, cent. a/c, w/w, 5 appl., pools, tennis, clubhouse, many extras, $123,900. 924-0612.

KISSIMMEE, FL - 7½ acres, Disney/Epcot area, close to proposed horse race track, build your own home, $35,000. (407) 260-1921.

PALM COAST, FL - ¼ acre lot, 80'x125', Greenbelt backyard, 5 mi. to ocean 24 mi. no. of Daytona Beach, water, drainage, & sewage util. in, $3,995 & assume payments, must sell. Thomas Nolan, Ext. 5265.

ROCKLEDGE, FL - block & stucco, 2 bdrms., 2 baths, fam. rm., 11x25 porch, carpet, shades, some drapes, extras, good loc., $64,500. (407) 631-2840.

Wanted

NAME OF PERSON(S)- who left the gifts on my workbench for my 2 new arrivals. If you're remaining anonymous, thank you! Henry & Carol.

CANOE - in good condition. Ext. 4846 or 363-6940 after 5 p.m.

ICE CREAM CHURN - for summer youth church program. Bob, Ext. 2350 or 732-9517.

TRAILER - for 12' row boat. Betty, Ext. 2937.

OUTBOARD LOWER UNIT - for Mercury 80 h.p. 722-4821.

SAILBOAT - Zuma or Force 5, any condition, reasonably priced. 744-7406.

DOCK SLIP - or private space for 30' boat on North Shore. Ext. 3084.

HOUSEMATE - non-smoker, 3 bdrm., 2 baths, high ranch, 10 min. to Lab, all appliances. Ext. 4023 or 929-3721.

CEMENT MIXER - Wet Saw/Bobcat, to buy or rent. Tony, 698-9274.

COMMODORE 64 COMPUTER - w/disk drive, wanted for my son. Ext. 7529 or 331-9771.