BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

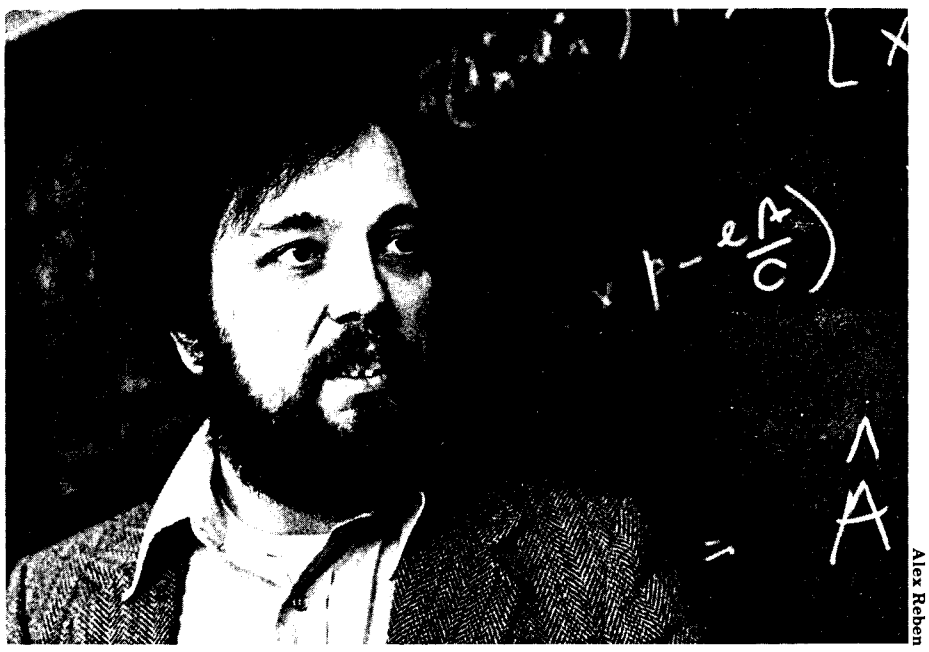
Beyond the Fourth Dimension

Characters in science fiction often walk through doorways to other dimensions. But everyone knows that in real life there are only four dimensions. ...Aren't there?

Not according to the Kaluza-Klein (K-K) theories, which describe a universe of more than the four standard dimensions of time and space. Today's theories evolved from work by Polish mathematician Theodor Kaluza and Swedish physicist Oskar Klein in the 1920's. According to the original K-K, curvature in the four standard dimensions (time, height, width and depth) describes gravity, while electromagnetism (the only other interaction then known) is associated with a compact fifth dimension, one so tiny we are never directly aware of it.

Today, theorists trying to unify all the fundamental interactions via K-K find that they need even more of those minute dimensions. For example, with 11 dimensions there is just enough symmetry to account for gravity and electromagnetism, as well as the more recently discovered strong and weak interactions.

"I have a favorite 13 dimensions, though some people might consider that unlucky," says William Marciano, theoretical physicist in the Physics Department. By going to 13 dimensions, he explains, K-K encompasses all the important predictions of Grand Unified Theories, including proton decay and magnetic monopoles. Grand Unified Theories alone, however, view the electromagnetic, weak and strong interactions as fundamental while ignoring gravity. But with its extra dimensions, K-K unites all four interactions, treating gravity as fundamental and the others as residual.


Alex Reben

William Marciano

As satisfying as this unification is, Marciano asks, "Are there really extra dimensions, or is this just mathematics? After achieving unification via K-K are we to forget about the extra dimensions, or are they a real part of our universe?"

That's where K-K becomes somewhat unsatisfying. The extra dimensions are so small (with a ratio of 10^{-32} cm), that it is impossible to test for their presence with conventional experimental methods. "To directly probe the extra dimensions by high energy collisions, the experimenter would have to accelerate particles to about 10^{18} GeV," says Marciano. "With conventional technology that would require an AGS scaled up by 10^{17} in radius. That's like reaching out to stars more than a light year away. Such a machine is certainly not feasible."

But Marciano believes that there's more than one way to test a theory. As he suggested in a paper entitled "Time Variation of the Fundamental 'Constants' and Kaluza-Klein Theories," in the February 13 issue of Physical Review Letters, one way would be to measure constants associated with the various interactions to see if they indeed remain constant over time. The basic idea is that a change in the radius of the extra dimensions would manifest itself as a change in the fundamental constants linked to them. But why should the size of the extra dimensions change? As Marciano explains, "From red shifts [Hubble's constant] it is known that the ordinary three spacial dimensions are expanding. Incorporating that expansion in a K-K cosmology generally leads to expanding, contracting or even oscillating extra dimensions."

The idea of varying constants originated in the 1930's with the English physicist P.A.M. Dirac who suggested that the gravitational constant, G, is decreasing with time. (Such a variation has been searched for but not observed.) A few years ago, Yale physicists Alan Chodos and Steven Detweiler showed that Dirac's time-varying G could naturally arise in K-K theories. Marciano has shown how all fundamental constants could be varying, and he has derived relationships among them in the K-K framework. He has also urged experimenters to vigorously expand the search for such variations, particularly in the proton to electron mass ratio.

Although good bounds already exist for the variation of G, alpha (the fine structure constant) and the proton to electron mass ratio, Marciano suggests that the experiments be reexamined, updated and expanded. Astrophysics and nuclear physics are two places to search for variations.

In this search, astrophysicists go to the edge of our universe. "By comparing spectra lines emitted by quasars 20 billion light years away, and lines presently measured in the laboratory," Marciano explains, "the physics of now and 20 billion years ago can be compared. This procedure already yields good bounds, but now more recent data needs to be examined."

What can nuclear physics reveal about time-varying fundamental constants? In a conversation with visiting physicist Freeman Dyson last year, Marciano learned about the Oklo phenomenon. About two billion years ago, the first known natural nuclear reactor that ever went critical occurred in Gabon, Africa. "By examining residual elements that came out of that reactor, we can determine thermal neutron capture cross sections two billion years ago and compare them with present BNL measurements of those same parameters," Marciano says.

So far, all such comparisons have yielded no variable constants and rather stringent bounds. But Marciano is not discouraged by those results. "When people first studied Oklo, they didn't have a real theory of strong interactions," he explains. "Now we have quantum chromodynamics, and the Oklo data should be reexamined in the framework of that theory.

"However, I don't know enough

(Continued on page 2)

BNL Lecture

DNA Manipulation in Plants

Barring floods, or some other disaster, Daniela Sciaky, Associate Geneticist, Biology Department, will present her Brookhaven Lecture on May 16 at 4:30 p.m. in Berkner Hall. Sciaky's lecture was first scheduled in January, but she was unable to deliver it because of heavy snow. In "Crown Gall: A System for Genetic Engineering in Plants," she will describe how a bacterium is used to introduce desirable foreign genes, such as those responsible for disease resistance, into plants.

Mort Rosen

Daniela Sciaky shows crown gall tumors on plants in her lab.

Agrobacterium tumefaciens, the bacterium responsible for crown gall, a disease of many plants marked by abnormal enlargement of the stem near the root crown, causes permanent genetic change in the cells it infects. When tumor cells of the plant are grown in culture without the bacteria, the infected cells display new characteristics which continue over many generations. As a result of being infected, plant cells can grow in a petri dish without the hormones they usually require for *in vitro* reproduction. Therefore, the plant tissue derived from the crown gall tumor is said to be genetically transformed.

A. tumefaciens induces crown gall in plants through natural genetic engineering. The strain of *A. tumefaciens* able to induce these tumors in plants contains a large circular piece of DNA, or a plasmid. When infecting a plant stem near the root crown, the bacterium inserts a portion of its plasmid into the genetic code of the plant cells. The DNA transferred from bacteria to plant cells changes the genetic expression of those cells, thereby causing crown gall in plants in nature, and other changes in plant tissue culture.

Sciaky is using this DNA manipulation method to artificially engineer plant DNA, in hopes that the changes in genetic expression will tell how plant genes function.

She came to the Laboratory in 1980 after spending three postdoctoral years at Cold Spring Harbor Laboratory where she worked on adenoviruses. Sciaky received her Ph.D. in genetics from Washington State University.

All those interested in getting together after the lecture are invited to go, with the lecturer, to a restaurant off site. If you would like to be part of this group, call George Latham, Ext. 3372.

Alex Reben

Robert Dorado Zamorano, Chief of Cabinet to the Prime Minister of Spain, visited the Light Source, the HFBR and the Department of Nuclear Energy, recently. At DNE, Mr. Dorado (right) talked with Joseph Hendrie (left) and Walter Kato (second from right) through his interpreter, Pedro Erviti. Dorado was interested in nuclear power and how energy problems are handled in the U.S. After their discussions, talk centered on places in Spain, brought to mind by a book Mr. Dorado had presented to Hendrie.

Alex Reben

Ed Kaplan (foreground), Les Fishbone and their trusty transportation.

Pooling the Car

Les Fishbone and Ed Kaplan are in the same car pool. When it's Fishbone's turn to drive, he takes a 1969 Chevy Bel Air. And when it's Kaplan's turn, he drives a 1969 Chevy Bel Air.

It's no coincidence that both Fishbone and Kaplan drive the same kind of car. They're actually driving the same car, purchased jointly just over three years ago for $450.

The original partnership included three people who traveled together from Stony Brook to BNL. "Each of us only had one car in the family, and we were using the family cars to go to work," explains Kaplan, who works in the Department of Applied Science. "The idea of buying a car together started as a casual conversation, almost as a joke. We talked about it for a while. Then it happened that a car became available and we bought it. Otherwise we might still be talking about it."

When the third partner left after about a year and a half, Kaplan and Fishbone paid him the $37.50 equity he still had in the car. Since then, says Fishbone, of the Department of Nuclear Energy, "There have been others in the car pool on more conventional terms." With the "old clunker," as Kaplan calls it, not in use every day, and resting on weekends, who knows how many miles the partners may get out of it? So far, they've added 35,600 to the 87,435 it had accumulated when they bought it. Still, says Fishbone, "We figured when we got it, it would last two years and we'd be happy. It's now more than three, and if anything, the expenses of running it have gone down."

According to their calculations, the car costs about 12¢ a mile to run and has been getting 16 miles to the gallon. But as Kaplan points out, "The car is almost always used with two or more passengers, so we're getting 32 passenger miles, or more, per gallon."

Fishbone and Kaplan share all expenses and do minor repair work themselves. They have a written agreement, but not a legal partnership; it turned out that no insurance company would insure a partnership. So to satisfy legal requirements, Fishbone is the owner and insurer of record.

Not only has the partnership been a financial success, but, Fishbone says, "It eliminates the need for both of us to have a second car." In fact, things have worked out so well that both partners agree that they will definitely see about doing it again — if the present car ever stops operating.

ASME to Meet at BNL

Roger Klaffky (NSLS) and David Rorer (HFBR) will discuss the experimental programs at their respective facilities at a meeting of the American Society of Mechanical Engineers at the Laboratory on May 16. A cash bar at 5:30 p.m. and dinner at 6:30 p.m. will precede the presentations. A tour of the facilities will complete the evening. Dinner prices are $10 for ASME members, $14 for non-members, and $8 for ASME student members. For reservations call Bob Baldwin, Ext. 4044, or Ron Reyer, Ext. 4852.

Stony Brook Events

May 6

Concert. Chamber Singers, 8 p.m., Recital Hall, Fine Arts Center.

May 7

Univ. Distinguished Lecture. "Preparing for the 21st Century," Patricia Roberts Harris, Prof. of Law, George Washington Univ., and former Carter Cabinet member, 8 p.m., Main Stage, Fine Arts Center.

May 10

Film. "S.O.B.," 7 p.m., Stony Brook Union Auditorium. 50¢.

May 12

Field Walk. At Caleb Smith State Park, Smithtown. 10 a.m. - noon. Fee $3. Info, Carol Duron, 246-8666.

Concert. Danish National Orchestra, 8 p.m., Main Stage, Fine Arts Center. Tickets $10, $12, $14; students and sr. citizens, $2 discount.

PC User Meeting

The next meeting of the PC/Workstation Group will be held on Tuesday, May 15 at 10:30 a.m. in the Applied Mathematics Department Seminar Room. Gordon Smith will talk on "Graphics on the PC."

Noon Lecture on Drug Abuse

From the streets of Silicon Valley to the canyons of Wall Street, there's a problem spreading throughout America's workforce. It's called drug abuse, and it's costing U.S. employers upwards of $16 billion annually in lost productivity.

According to recent reports in Newsweek and the Harvard Business Review, in hospitals, in offices, in airlines — in all types of industry thoughout the country — workers are smoking marijuana at lunch, snorting cocaine behind closed doors or otherwise "doing drugs" on the job.

Many of these drugs, particularly cocaine and heroin, enter the country through New York City and Long Island. A recent report in Outlook, a publication of the New York State Division of Substance Abuse Services estimated that "...there are 247,500 narcotic users in New York State, most of whom use heroin as well as other drugs including cocaine. In addition, there are more than 450,000 residents who have used cocaine in the past six months. Consequently, about one of every 20 New York State residents, 12 years of age and older, is currently involved in this serious drug problem..."

In the midst of all this, BNL's statistics are much better. In responding to the question of what the drug problem at BNL is like, Judith Katsin, who heads the Lab's Employee Assistance Program, said that, compared to other personal problems being presented to her, drugs ranked quite low. However, she said, "There has been a gradual increase in the incidence of drug problems reported to me, and there is no reason to think that the BNL employee population is any less susceptible than the general population of Long Island."

Employers like BNL are working hard to combat the national trends before they become a local problem. One approach is education. Towards that end, the second seminar in the Laboratory's Employee Wellness Program will center on drugs in the workplace. The seminar will be held on Wednesday, May 16, at noon, in rooms A/B of Berkner Hall.

Chris McLaughlin of the Suffolk County Division of Drug Abuse Services will join Katsin at the seminar to discuss the problems that can arise in the workplace when people are on drugs and to talk about the effects that various kinds of drug use have on the body. A question and answer session will follow the showing of a film called "Drugs in the Workplace."

The seminar program is open to all employees, provided supervisory approval is obtained beforehand.

Dimensions (Cont'd)

about nuclear physics to do it myself," he admits. So Marciano is working with his wife Zohreh Parsa, a nuclear physicist, to develop a theory of neutron capture based on quantum chromodynamics. "When the Oklo phenomenon is analyzed with our new techniques," Marciano says, "it will provide a bound for the proton to electron mass ratio that may be more stringent than any other experiment. If the bound is very restrictive, it would suggest that extra dimensions must be rather static. In that case, we would have to find a way to stabilize their size.

"I've always been interested in testable consequences of theoretical ideas," says Marciano. "Although K-K theories are theoretically appealing, they have several outstanding problems. If those problems are not solved, and no experimental evidence for extra dimensions emerges, then K-K theories will eventually be abandoned."

Marciano would like to see experimental tests of K-K theories pushed to their limits. "If theorists suggest that time-varying constants come naturally from K-K, experimentalists might have additional motivation to search for such effects, even if they seem a little far out," he says. "Sometimes you motivate an experimentalist to do something he either wouldn't have thought of, or wouldn't have felt there would be support for. That was really my main reason for writing the paper — to make experimentalists more aware of K-K and variable constants. The payoff for finding a variation makes a long shot like this worth taking a chance." — Anita Cohen

More Take-Home Pay

The installation of the Exact Calculation Method to figure the amount of New York State tax to be withheld from employees' pay is now being completed by MIS. This replaces the Approximate Method currently in use.

The changeover to the new method will result in less tax being withheld and consequently more money showing up in paychecks. Weekly employees will spot the difference in the May 10 paychecks, and monthly employees on May 31.

Doug ...phrey

THE 1984-85 BROOKHAVEN COUNCIL: Seated (from left) Joseph Pasciak (SLIM), Stanley Seltzer (Chem.). Vance Sailor (DNE & Reactor)—*chairman*, Carol Creutz (Chem.), Laurence Passell (Physics)—*secretary*, Donald Lazarus (Accel.), Myron Ledbetter (Biology), James Reilly (DAS). Standing (from left) Ralph Cerbone (DNE & Reactor), Samuel Krinsky (SLIM), Claire Shellabarger (Medical), Hugh Brown (Accel.), Joseph Wall (Biology), William Marciano (Physics), and Stanton Cohn (Medical). Missing from this photo are Robert Chrien (Physics) and Gilbert Rowe (DAS). SLIM members represent S&EP, NSLS, Instrumentation and Applied Math. The Council advises the Director on scientific staff matters. Staff members who are aware of situations that should be called to the attention of the Council, are asked to contact their Council representative.

BROOKHAVEN BULLETIN

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Addled Addresses

Over the years, mail has been sent to Brookhaven National Laboratory under many names. Lou Harson, principal architect, has been collecting some of the better ones:

Brook Haven Marine Laboratory
Brookhaven Natl. L
Apton, NY 11973
Jackson Utility Division
Bldg. 326
Upton, N.Y. 11973
Brookhaven Lab
Utopia, New York
Brookhaven Lab
National Brookhaven
Upton, Long Island, N.Y. 11973
Brooklyn National Labs
Brookhaven Navy Lab
Camp Upton Nat. Atomic Lab
Camp Upton, L.I., N.Y.
Brookhaven Ntl Liborator
Pres Maxwell M Brookhaven
National Laboratory
Upton, New York
Mr & Mrs Brookhaven Natl Lbrtry

NYC Train Trips

The Hospitality Committee is planning two group railroad trips to the city in the next two weeks.

One is a special on Saturday, May 12, leaving at 8:31 a.m. Round-trip fare is $6.50, and must be received no later than Wednesday, May 9. Reservations will be accepted on a first-come, first-served basis.

The second is a regularly scheduled trip on Wednesday, May 16, leaving at 7:55 a.m. The round-trip fare is $5.00 and must be received by Thursday, May 10. Refunds will be made only if cancellations are received by the Monday morning preceding the trip.

Children under five years ride free on both trips. All departures are from the Patchogue LIRR station. To reserve a ticket send your fare through the U. S. mail to BNL, P.O. Box 322, Upton, New York 11973. Checks or money orders should be made payable to BNL. Do not send cash. Put the date of the trip, your telephone number and BNL life number on the check. Tickets will be given to you on the train.

Arrivals & Departures

Arrivals

Arthur J. Anderson ..... Plant Eng.
Karen C. Cone ..... Biology
Paul R. Simonetti ..... Mgt. Info. Sys.

Departures

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

R. Christian Anderson ..... Dir. Ofc.
Donald A. Davis ..... Accelerator
Stephen V. Evola ..... Biology
Parviz Farahzad ..... DNE
Georgina A Fuld ..... Accelerator
William Gefers ..... Accelerator
Dorothy K. German ..... S&EP
David E. Gough ..... Accelerator
Fred B. Griswold ..... Reactor
Woodrow W. Hobson ..... S&M
Amy E. Kahn ..... DAS
John J. Green ..... Central Shops
Ranjini P. Kale ..... Medical
Marie L. Kalousek ... Instrumentation
Henry J. Kapfer Jr. ..... NSLS
George Kuzmack ..... Accelerator
Morris Laffer ..... Central Shops
James W. McIntosh ..... Central Shops
Douglas C. Mitchell ..... Accelerator
David Morris Jr. ..... DAS
Edmund E. Okula ..... Plant Eng.
Howard D. Olson ..... Accelerator
William M. Ross ..... Central Shops
James J. Ryan ..... Central Shops
Lawrence Schiro ..... Central Shops
Arthur B. Wright ..... Accelerator

Cafeteria Menu

Week Ending May 11

Monday, May 7

Vegetable beef soup	(cup)	.65
	(bowl)	.85
Veal patty scallopini w/ egg noodles		1.95
Broiled chicken livers & 1 veg.		1.80
Hot Deli: Pastrami	(bread)	1.85
	(roll)	2.00

Tuesday, May 8

Cream of broccoli soup	(cup)	.65
	(bowl)	.85
Hungarian noodle bake & 1 veg.		1.90
Broiled London broil w/mushroom gravy & 1 veg.		2.15
Hot Deli: Chili dogs		2.00

Wednesday, May 9

French onion soup	(cup)	.65
	(bowl)	.85
Roast pork loin w/baked apple		1.95
Ham & potato au gratin w/1 veg.		1.85
Hot Deli: Barbecued chicken breast	(bread)	2.00
	(roll)	2.15

Thursday, May 10

Split pea soup	(cup)	.65
	(bowl)	.85
Spaghetti and meatballs		2.00
Roast turkey w/bread stuffing & giblet gravy		2.00
Hot Deli: Top round of beef	(bread)	1.95
	(roll)	2.10

Special

Top your own baked potato served with cheese sauce & chili & 2 toppings	.75
Each extra topping	.25

Friday, May 11

New England clam chowder	(cup)	.65
	(bowl)	.85
Chinese pepper steak on rice		2.00
Tuna noodle casserole & 1 veg.		1.85
Hot Deli: Breaded fish fillet	(bread)	1.90
	(roll)	2.05

SCCC Courses

Personnel is in the process of selecting on-site Suffolk County Community College courses for the Fall '84 semester. You can help in this selection by indicating below the courses you are interested in taking. Please return form to Pat Knisely, Bldg. 185 by May 31.

Name: _____ Mail Drop: _____ Tel. Ext.: _____

Course No. Title

1. _____ _____

2. _____ _____

3. _____ _____

4. _____ _____

Would you be interested in taking a course during intersession if it was offered on-site?

Alex Reben

Jeanine Rebecca (left) is sworn in as Postmaster of Upton, New York, while her sister Donna holds the Bible for her. Administering the oath is Anthony Gadzinski, Sectional Center Manager for the Riverhead section of the U.S. Postal Service. Rebecca, who had earlier served for six months as acting postmaster for the 11973 zip code area, officially began her new assignment on April 27.

A Ryegrass Lawn

The bad news: If you'd like to establish a permanent lawn this late in the spring, your chances of success are very slim.

The good news: You still don't have to go through the summer with bare soil around your home.

According to the Cooperative Extension Association of Suffolk County, you can solve your problem by seeding a temporary lawn with annual or common perennial ryegrass now, then start a permanent lawn in late August or early September, when growing conditions are more favorable. Ryegrass seed germinates quickly and will provide an attractive lawn in about four weeks.

To start your ryegrass lawn, spread 40 to 50 pounds of ground limestone, and 40 to 50 pounds of 5-10-5 or similar fertilizer, per 1,000 feet. Then sow seed at the rate of five to six pounds to the same square footage. After the lawn is established, do not mow closer than one and a half inches.

But don't forget to seed your permanent lawn. A ryegrass lawn will decline rapidly after the first year or two. Dig it into the soil in August, as part of your preparation for the permanent lawn.

BERA News

Cooking Exchange

The "Silver Palate" by Julie Rosso and Sheila Lukins was chosen as the cookbook from which a menu was planned for the next demonstration session of the Cooking Exchange on Wednesday, May 9. The meeting will begin promptly at 12:30 p.m. in the Recreation Building.

For a $1.00 donation, those attending will receive copies of the recipes, a sample of all food prepared and coffee or tea. Employees, family members and guests are invited. Babysitting will be available for 50¢ per child.

Call Exchange chairperson, Dee Polychronakos, 744-3578, for more information.

Soccer

The soccer club will start its outdoor season on Monday, May 7. Pickup games are played on Mondays starting at around 5:15 at the BERA soccer field. Everyone is welcome to play. For further information, call Enrique Abola at Ext. 4383.

Basketball

Playoff Games

Longshots — 81		Runaways — 64	
J. Gaffney	14	S. Gilbert	20
L. James	8	T. James	13
J. Garrison	11	P. Johnson	16
D. Harris	34	G. Smith	2
J. James	14	G. Shepherd	13

2nd Game

Coasters — 79		Hollywood — 67	
R. Doty	18	E. Meier	24
M. Fulkerson	8	M. Colon	8
B. Jasper	3	G. Mack	21
L. Smith	26	B. Woodsen	4
K. D'Amico	8	D. Nordstrom	6
M. Williams	16	R. Kowalski	4

(Final game next week)

Bus Stop on Stage

The next production of the BNL Theater Group will be "Bus Stop" by William Inge. Curtain time is 8:30 p.m. on May 18, 19, 25 and 26 in Berkner Hall.

This popular American play, which opened on Broadway in 1955, presents a composite picture of various kinds of love. The action revolves around the relationships among eight people who are stranded in a bus stop diner during a blizzard. (The play covers a broader range than the movie which concentrated on just one of these relationships).

The top-notch cast includes Bob Kinsey as an amorous bus driver with an eye for Jane Love, the earthy proprietress of the diner. Rose Milone plays her innocent assistant and Kurt Fuchel is a dissolute vagabond professor. Peggie Woody portrays the "chanteuse" who fascinates Neil Baggett, the brash young cowboy. Bill Love provides a steadying influence as his loyal sidekick, while Karl Swyler straightens things out in his role as the strong but fatherly sheriff.

Advance sale tickets at the special prices of $3 for general admission and $2 for students under 18, or senior citizens, can be purchased from members of the cast or at the BERA sales offices in Berkner Hall. Tickets bought at the door will cost $4 and $3, respectively.

Bowling

Pink League

D. Johnson rolled a 184, S. Asselta 188/178.

White League

High games were bowled by P. Manzella 213, M-G Meier 198, M. Scheidet 191, V. Manzella 214, R. Eggert 205, J. Griffin 205, E. Sperry 202.

Red/Green League

E. Meier rolled a 240, R. Larsen 236/600 scratch series, L. Jacobson 236, L. Schairer 223, F. Griswold 219/201, J. Petro 212, C. Neuls 210, H. Arnesen 209, K. Asselta 209, H. Marshall 204, G. Spira 200, E. Sperry IV 200.

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 Personnel Placement Supervisor, Ext. 2882.

LABORATORY RECRUITMENT — Opportunities for Laboratory employees.

2052. MATERIAL HANDLER - Supply and Materiel Division.

2053. SECRETARIAL POSITION - Requires AAS degree in secretarial science or equivalent and excellent clerical skills. Will be responsible for word processing on a microcomputer and heavy data entry work. Will function as secretary to the Site Planning Office. Plant Engineering Division.

OPEN RECRUITMENT — Opportunities for Laboratory employees and outside applicants.

2054. DRAFTER POSITION - Requires AAS degree in drafting technology or equivalent and 3-5 years' experience working in an architectural-drafting environment. Ability to do conceptual and ink drawings, as well as Leroy lettering necessary. Plant Engineering Division.

2055. SCIENTIFIC ASSOCIATE - Requires BS (MS preferred) or equivalent, in optics, optical engineering or in an optics-related field. Will be involved in experimental research activities in optics for synchrotron radiation research. Must have experience or knowledge in computer ray trace design, programming and numerical analysis, optical components and systems design, vacuum technology and interferometry and holography. Instrumentation Division.

Autos & Auto Supplies

HONDA - 200cc, excel. commuter, with fairing and windshield. Kristin, Ext. 3372 or 744-6287 after 6 p.m.

81 MERCURY CAPRI - 5 spd., am/fm tape, sunroof, 3 dr. hatchback, $4,500. Ext. 4846 or 363-6940 after 5 p.m.

78 THUNDERBIRD - 302-V8, Town Landau, all power, auto., stereo, mags, new radials, brakes, battery, etc., $3,500. Ext. 2492 or 475-8658.

OLDS CUTLASS SUPREME - auto., p/s, p/b, just inspected, best offer. Ext. 7921 or 298-8195 eves.

79 SUBARU DL - wagon, 4 wd, asking, $1,000. Ext. 2027/360-4970 days or 928-0433 eves.

76 SUZUKI GT500 - blue, low miles, new parts, extras, must sell, $700. 289-1941 eves.

78 HONDA MOTORCYCLE - 750-K, fairing, radio, 11,000 miles, excel. cond., $1,500 firm. Ed, 929-6798 after 6 p.m.

82 HONDA MOTORCYCLE - 450 Custom, burgandy, low mileage, under 10K, windshield, cruise control, excel. cond., $1,000. 878-4307 after 5 p.m.

HONDA XR80 DIRT BIKE - excel. cond., new back tire; BMX Mongoose, racing parts, zap pads, excel. cond. Neal, 286-2435.

68 CHEVY MALIBU - good for racing car, needs eng., best offer. Ext. 3671 or 736-2131 eves.

78 PONTIAC GRAND PRIX - power window locks, steering, brakes, air, cassette, black, excel., $3,500. 924-7035 eves.

MOTORCYCLE PARTS & ACCESS. - discount prices; 1983 Mako 250 Motocross. 325-9580 after 6 p.m.

79 CHEVY MONZA - 4 spd., am/fm stereo, digital clock, runs excel., $2,275. 821-9280.

75 HONDA MOTORCYCLE - CB400F Super Sport, 6 spd., 6 cyl., rollbars, fairing, sacrifice, $595. Kevin, 467-8563 bet. 7-10 p.m.

80 TOYOTA - 4x4 longbed pickup, with cap, extras, $6,500. 878-8255 eves.

80 KAWASAKI - 650 LTD, red, crash bars, excel. cond., $1,400. Bob Johnson, 475-2305 or 283-4741 after 6 p.m.

TIRES - (4), P185R75/14, steel belted radials on Peugeot rims, like new, $150. Fran, Ext. 3536.

69 CHEVELLE MALIBU - 4 dr., 307-V8, engine, at/ps/pb, 98,000 miles, very good running cond., $500. Ext. 4219.

74 CHEVY BEL-AIR - 4 dr., V8, am/fm cass., runs well, good second car, $550. 821-0758, 6 to 8 p.m.

76 CHEVY MALIBU CLASSIC - runs well, many new parts, best offer. Ext. 2926 eves or 744-3298 days & weekends.

69 CHRYSLER WAGON - V8, auto, reliable transportation, $300; Pinto parts, V6 including auto. trans., starter & more. Dave, Ext. 4428.

CHEVY 350 ENGINE - & transmission, excel. cond., 80,000 mi. 588-0280 after 4 p.m.

74 HORNET SEDAN - auto., 55,000 mi., good cond. Kale, Ext. 4224.

VESPA BRAVO MOPED - Super Deluxe, Class B, excel. cond., used very little, $500. Lloyd, Ext. 3381 or 286-1024.

69 TOYOTA COROLLA WAGON - new radials, exhaust, struts, timing chain, $450. David Cook, Ext. 4254.

79 HONDA MOTORCYCLE - CX500, Custom, shaft drive, water cooled, $1,100. Chris, 929-6542 after 6 p.m.

82 HONDA MOTORCYCLE - CM250, Custom, 1,000 mi., saddle bags, windshield, luggage rack, helmet, $1,200 firm. John, Ext. 4417 or 929-8748.

80 HONDA MOTORCYCLE - CB750K, 1,300 orig. mi., full dress, cruise control, excel. cond., $2,000. Ext. 2886 or 878-8008.

81 CAMARO - grey/silver, p/s, p/b, a/t, T-top, sports mirrors, Ralley wheels, am/fm stereo cassette, 17K mi. Ext. 2272.

81 HARLEY DAVIDSON - 1000 cc, Sportster, low mi., like new, customized, $4,300. 929-3455.

TOMOS MOPED - 5,000 mi., 2 baskets, 30 mph, 90 mpg, $200. Tony, Ext. 3637.

56 MERCURY MONTERAY - 312 cu. ft. eng., restored, all original, p/s, p/b, $2,950. 589-6151.

81 HONDA MOTORCYCLE - CM400E, 370 orig. mi., cruise control, windshield, luggage rack, excel. cond., $1,000. 878-8008.

70 VW SQUAREBACK - auto., $500. 289-8253.

73 FORD WAGON - am/fm, a/c, p/s, p/b, 4 new tires, needs body work, $750. 744-5143.

82 DATSUN - B210, 5 spd., standard trans., 19,000 mi., excel. cond., $4,500. 698-3724 eves.

77 MERCURY COUGAR XR7 - good cond., V8, auto., p/s, p/b. Mark, 286-4150.

74 CHEVY PICK-UP - 6 passenger, attached cap w/sleep-in insert, am/fm, a/c, p/s, p/b, 98,000 mi., $1,500. 744-9027 or 924-6435.

74 DATSUN 260Z - new engine, tires, carburetor, paint, must sell, asking $3,000. 744-3968 leave message.

74 PINTO - low mi., a/c, good running cond., $500. Ext. 3641 or 698-8623.

71 GREMLIN - standard, good running cond., many new parts, good mileage, $450. 281-0072.

77 CAMARO PARTS - wrecked, seats, tires, bumper, radio, etc.; 1983 Camaro louvres. Jaime, Ext. 3716.

82 KAWASKI DIRT BIKE - KDX175, excel. cond., $950. 821-1042.

82 KAWASKI MOTORCYCLE - 440, belt drive, mint cond., low mi. Richard, 924-3476 after 6 p.m.

73 DUSTER - runs, needs some work. Rich C., Ext. 3499.

SLIDE-ON TRUCK CAMPER - sleeps 4, stove, oven, sink, needs new water tank. P. Bender, Ext. 4613.

TOW CHAINS - all sizes, $1/ft.; 1972 Ford Thunderbird wheels, 15", $10 ea. 732-3338.

55 FORD ENGINE - 272-V8, $75. Ext. 4662.

83 HONDA ACCORD - hatchback, low mi., excel. cond., am/fm, $8,200. Joyce, Ext. 2456 or 929-4268.

72 VW SQUAREBACK - runs well, good transportation, $350. Rich, Ext. 4363 or 924-7238.

70 DODGE PARTS - trans., radiator, water pump, altenator, tire, 14" radial. Bob, Ext. 7521.

74 DODGE COLT - station wagon, 4 spd., needs engine., $285 firm. 732-3338.

77 OLDS CUTLASS SUPREME - excel. cond., new tires, brakes, $2,750. 363-7032.

76 MERCURY MONARCH - excel. running cond., many extras, $1,700. 744-6423.

76 HONDA MOTORCYCLE - CB200T, good cond. Marj, 924-4502.

74 VW SUPER BEETLE - rebuilt engine, good cond., radio, $1,100. Ext. 7311 or 286-0918 eves.

CAR STEREO - Sears Dashmate, am/fm cassette, never used, in box, $65. Lou, Ext. 4087/4468.

82 PLYMOUTH RELIANT K-CAR - am/fm, auto., dealer maintained, excel., must see, must sell, asking $4,500. Ext. 7130 or 744-9611 after 6 p.m.

73 CADDY - runs well, many new parts, driver's door out of line, $400. 654-8438 eves.

TIRE - (1) steel belted radial, P195/75R14, good for spare. Ext. 3919.

SUZUKI DIRT BIKES - (2), 1979 & 1980, PE185 & RS185, perfect cond., make offer. Ron, Ext. 7696 or 289-1003.

Boats & Marine Supplies

17' DURANAUTIC - aluminum, flotation, console, C.B. tach., spedo., 1977, 50 hp, Merc., 82 trailer. 298-4243.

SEASPRITE 23 - good cond., 6 hp, Evinrude, main jib. Genoa, VHF radio, spinnaker, dinghy w/oars, anchor, much more, $7,000. 286-0259 anytime.

LASER SAILBOAT - w/new alum. trailer, excel. cond., $1,200. Joe, 261-7825.

GALVANIZED PROFF COIL CHAIN -150', 3/8", new, $1.50/ft. Ext. 7197.

16' WOOD BOAT - w/40 HP outboard & trailer, needs work, best offer. Ext. 2018 or 928-1053.

21' STARCRAFT - 1975, w/motor, trailer w/electric winch. 744-9475 eves & weekends.

12' DURANAUTIC SKIFF - galvanized Holsclaw trailer & 1981 7- HP Evinrude, like new, $1,000. 744-9832.

Miscellaneous

WOOD STOVE - airtight, 2 yrs. old, Garrison, you remove, cost $500 new, asking $200. Cheryl, Ext. 5061.

VAN SEAT - high back, tan naugahyde, w/swivel base, never used, $75. 473-1456.

RADIO/CASSETTE RECORDER - Panasonic, compact, am/fm, battery and ac volts 120/240, suitable for Europe, $65. 727-3608 after 5 p.m.

END TABLES - Mediterranean style, $100/pr.; hi-riser w/head and foot board & 2 mattresses, $125. 289-5607.

FLOWERS & VEGETABLES - 4 and 6 pack, large selection, delivery week of 5/14. $.75/pack. Ray, 727-6818.

STEREO RECEIVER - amplifier, Pioneer SX-636, $75. Ext. 2041.

ALUMINUM STORM & SCREEN DOOR - 32-1/2"x33" wide, 80" high, $20; Slant Fin baseboard radiators, $2/ft. Ext. 4532.

GUITAR - beginner's acoustic, excel. cond., $20. Nick, 286-2435.

CLOTHES - for Cabbage Patch dolls, boy or girl, $3.50 and up. Rose, 737-0246.

BIKES - boy's 26", $60; girl's 27", $100. Ext. 7587.

CLOTHES LINE - umbrella type heavy duty, $20; assorted aquarium access., pump, plants, filters, $10 take all. Ext. 7509.

FRAMED WINDOW PANELS - for enclosed porch, 9 panels, 92"H x 38"W, (matching screens also avail.), 1 solid wood door, 80" x 32", make offer. D. Borg, Ext. 3568 or 286-0428.

CHESS SET - hand carved onyx, inlaid onyx board, $30; suitcase, 9x19x28, blue/red trim, used once, $15. Lou, Ext. 4364.

MAGNAVOX STEREO - hi/fi console, good cond., nice piece of furniture, good sound, $150. Lloyd, Ext. 3381 or 286-1024.

SEARS HUMIDIFIER - almost new, $50; Sears submersible pump, for fountain or fish pond (175 gal. per hr.), $20. Jerry, 281-5667.

SPALDING CATCHER'S MASK - like new cond. $5. 727-3608 after 5 p.m.

YAMAHA BABY GRAND PIANO - ebony gloss, 5'7", mint cond. 878-0717.

GE CIRCUIT BREAKER BOX - 50 amp, $20. Ext. 4532.

BICYCLE - 10 spd.; Fuji, very good cond. Ext. 2705 or 286-1062.

RIDING MOWER - Ariens Fairway, new 5 HP motor, $100. G. Williams, 286-3863 eves.

FLIGHT CAGES - breed your own canaries; also some birds left. Whitey, Ext. 2913 or 928-3088.

ATARI 2600 - w/about 20 game cartridges, many exciting games, $150 or best offer. Divadeenam, Ext. 5076.

BEDROOM SET - full size, all wood, $300; Colonial wood framed chairs, $75 ea. Jackie, 929-4382.

BROADCAST ROTORY SPREADER - central. Ted, Ext. 4030.

BICYCLE - 12 spd., Fuji S12-S, 17" wheel, 24" frame, $100 firm. Paul, Ext. 4045 or 289-5770 after 6 p.m.

WURLITZER ORGAN - Spinet, solid cherry, model 4300D, multimatic percussion, excel. cond., $900. Lloyd, Ext. 3381 or 386-1024.

LADIES BICYCLE - coaster brake, balloon tires, basket, good cond., $40. 929-3455.

HELMET - full face, white, size 7, Snell rating 75, excel. cond., originally $150, now $90. 289-1705 after 6 p.m.

DOG HOUSE - large red, well insulated, $40. 361-8567.

CHAPPEE COAL STOVE - $100. 589-6151.

LIVING ROOM COUCH - like new, gold, $100; master bdrm. chest, triple dresser, night table, all wood, excel. cond., $300; 6' picture window, $100. 563-2847 after 5 p.m.

WOODBURNING STOVE - Efel, w/pipe, $250; Rattan birdcage chair w/ stand, very good shape, $125. 653-6694.

FLEXIVENT WINDOW - Anderson, W-3', H-2', $10. Ron, Ext. 7696 or 289-1003.

KITCHEN SINK - 25 x 22 x 7, 3 hole, good cond., $10. 732-7288.

SPOTTING SCOPE - w/tripod, $20; adult size crutches, $12; canning jars & freezer containers. Ext. 7509 or 924-0569.

TELESCOPE - Tasco, 320 power, 19T, hardly used, $100. 472-1922.

SANDBOX - used one summer, $10. 744-9677.

RAQUETBALL EYE GUARDS - Carrera Viper II, new, $20. 472-1922.

MINI CLOTHES DRYER - G.E., electric, new cond., $200. Victor, Ext. 2395.

BABY CLOTHES - up to 2 yrs., very cheap. Chandra, 924-0582.

PORTABLE WASHER - Hoover, $65; electric dryer, $50; air conditioner, needs charging, $20. Ext. 5177 or 698-6120.

LAWNMOWER - Locke, 25", professional reel-type, $100. Tom, Ext. 2613 or 281-4080.

AIRTIGHT STOVE - Federal, used 1 season, $75. 758-9430 after 5 p.m. Mon.-Thurs.

WASHER & DRYER - G.E. heavy duty, excel., $375. 751-0061.

HAND TRUCK - w/hydraulic lift platform, heavy duty, 500 lb. capacity, $100. Joe, 261-7825.

ELECTRIC ORGAN - Bontempi, w/bench & music, single keyboard, $125. 286-8517.

OIL TANK - 275 gal., $75; stove pipe, 8" dia, triple wall, 16', $150. 331-2228.

RIDING MOWER - Sears, 7 HP, w/leaf catcher, needs tune up, $225. 751-0061.

MEN'S BICYCLE - 26", 10 spd., new cond., $75. Richard, Ext. 4332 or 3079.

ACCORDION - mint cond., made in Italy, make offer; oak desk secretary, $65 firm. 732-3338.

DINING TABLE - w/4 chairs, $100. 928-6930.

CONSOLE STEREO - Magnavox, w/remote speaker, good cond., $50. Joe, Ext. 2575 or 281-2767 eves.

WHITE BRICKS - 36. Marj, 924-4502.

CAPTAINS BED - mattress, bolsters, $100; Perego baby carriage, $50. Ext. 2341 or 331-4282.

TENNIS RAQUETS - (3), Wilson Prostaff, wood, $20 ea.; Adidas triple raquet bag, $15. 744-6423.

COLECO SWIMMING POOL - complete outfit, used 1 season, includes chemicals, $65. Bruno, Ext. 3369.

FRENCH LOP EAR RABBITS - show quality, (3) males, great pets. 654-5682 eves.

HANDCRAFTED MACRAME WREATHS - baskets & silk roses in colors; zebra finches in excel. health, $11 ea. or $20/pr. 928-6457 eves.

Yard Sales

WADING RIVER - corner of Wading River Road & Benjamin St., Sat., May 5, 10 a.m., raindate May 12.

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

WADING RIVER - sublet, 4 rm. apt., 1 person, non-smoker, no pets, Aug. 1 thru Nov. 30, $400/mo. Janet, Ext. 2345 or 929-8152.

S. SETAUKET - 4 bdrm. colonial, furnished, for the month of Aug. 698-0135 after 6 p.m.

ROCKY POINT - 2 or 3 bdrm. house, spiral staircase, new w/w carpet, big yard, $550/mo. 744-5442.

SAYVILLE - cottage/studio, furn., woodburning stove, close to all, $400 incl. all. 563-2847.

VERMONT CHALET - on large pond, 4 bdrms., 3 baths, new w/stone fireplace, woodland trails, swim, fish, canoe on nearby lake, nearby summer theatre, music festival, antiques, rent by week. 757-5599.

SMITHTOWN PINES - prime area near highway, sunny new apt., 1-2 bdrms., lg. living room, nice eik, dishwasher, a/c, private, yard, $625 incl. all. Ext. 2830 or 543-0487.

FLORIDA - Springhill, north of Tampa, 2 bdrm. house, golf, tennis, lake, gulf beaches, Disneyland 72 miles, weekly or monthly. Ext. 4530 or 261-2719.

For Sale

LEISURE VILLAGE - Greenbriar, 2 bdrm., good location. 744-7140.

CORAM - Birchwood at Bretton Woods, 3 bdrm. condo, 1 bath, den, formal d/r, patio, central air, gas block to Clubhouse. 732-6822.

Wanted

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

RENTAL - moderate rent in Southold town. Ext. 7921 or 298-8145 eves.

AIR CONDITIONER - 11K-15K btu. Pete, Ext. 4819 or 289-7218.

APARTMENT - studio or 1 bdrm. w/equip. kitchen for single female, may be willing to house share, need immediately for June 1. Debbie, Ext. 3420 days or 736-4280 eves.

TRAP - for medium sized animal. Bob, Ext. 4656.

HOUSE TO SIT - single male on Sabbatical leave, Sept. to Dec., terms neg. Jim, Ext. 2364.

TO RENT - small house or quiet apt., close to Lab, married couple.

Ext. 3091 or 7603.

HOUSE TO SIT - free, responsible & caring, any duration, May 21 until Oct. 15. J. Allentuck, Ext. 2412.

UTILITY TRAILER - any cond. Ext. 7130 or 929-8323.

ROOM - North Shore, garage for car. Janet, Ext. 2345 or 929-8152.

Car Pools

BELLPORT - individuals to increase existing 2 person carpool, 8:30-5:00. George, Ext. 7654.

MASSAPPEQUA/FARMINGDALE - points west on Southern State Pkwy., leave vicinity Exit 32, S.S. Pkwy. Plotkin, Ext. 4717.

RONKONKOMA - 2 drivers to join pool, meet at LIE Exit 59, 8:30-5 p.m. Victor, Ext. 2395.

Free

COLOR TV - 19" RCA, about 12 years old, no picture, take it away. Ext. 4745 or 744-3225.

KITTENS - ready for adoption about mid-May, make your selection early. John, Ext. 3292 or 286-1348.

MANURE - off William Floyd Pkwy., loaded free. 924-6095.

BLACK & WHITE CAT - affectionate, good personality, needs home, 3 yrs. old. Carol, Ext. 2907.

Services (published monthly)

JEWELRY REPAIR - gold and silver repaired. Dan, Ext. 2319 or 938-3051.

CHIMNEY SWEEPS - fireplace, wood, coal and oil flues, certified sweep, dustless removal, insured, Lab discount. 821-9690.

MARINE BOATS TRANSPORTED - mechanics, engine repair, painting, supplies, parts. Jim, 666-6783.

GENERAL CONTRACTOR/CARPENTER - extensions, dormers, garage conversion, basements, decks, kitchens, licensed. Jim, 698-2501.

CHILDCARE - responsible mother wants to care for your child(s), playmates, lunch, snacks, anytime, fenced yard. 399-0039.

ALARMS INSTALLED - burglary and fire alarms professionally intalled, systems installed can save you money and prevent losses. 269-4417.

ASPHALT PAVING - and sealing. Bob, 475-4382.

KAYAK LESSONS - open water trips, starting May, equipment supplied. Tim or Ernie, 281-7873.

WATCH & CLOCK REPAIRS - all types. George Hrabak, 589-0819.

YARD WORK - lawns mowed. Vinny, 821-1042.

PAINTING - interior, exterior, reasonable rates, BNL references. John, 924-5012 eves.

HOME & OFFICE CLEANING - reasonable rates. 732-4885.

MAGICIAN - make your childs party special, clown and ballon sculpture also avail., reasonable rates. 654-9094 eves/wkends.

CARPET & FLOORING - professionaly installed, sales & service, new & old, repairs, restretches, shop at home service. John Hope, 289-8089.

SOLAR ROOM ADDITIONS - Tony, Ext. 3198 or 924-5248 after 6 p.m.

BURGLAR & FIRE ALARMS - equipment only or installed, free survey. 924-5329.

ROTOTILLING - lawns, new or established gardens. 929-3209 after 5:30 p.m. or weekends.

ELECTROLYSIS - permanent removal of unwanted hair, physician, trained, licensed, free consultation, appointment. 331-4768.

CALLIGRAPHY - for all occasions, invitations, poems, choose from many different writing styles. 928-6457 eves.

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