



Don Makowiecki with two harpsichords he built. In the foreground is the Italian model, weighing only 35 pounds. The other is a larger concert model of Flemish design. Both follow designs from and pre-dating the 17th Century.
—photo by Humphrey

Soundboards and Centerboards

If you ask Don Makowiecki what he does for a living, you get a description of a new data gathering standard that streamlines assembly of BNL computer data. That's his job, designing the new standard.

But man doth not live byte by byte. Away from floppy disks and blinking diodes, Makowiecki builds harpsichords, keeping alive the days when music was Bach and mathematics meant Leibnitz.

Makowiecki works in his damp but cool basement in Bellport. His tools are neatly aligned on the wall, and the work area is clean. A plain, unfinished wood box sits on the workbench under fluorescent lights. It is a partially finished harpsichord.

"These struts," he says running a finger along a diagonal brace, "are oak and support the soundboard, so they have to be strong. The others are spruce, and the box itself is popular. The ones upstairs are Sitka spruce and Alaskan cedar."

Upstairs refers to the living room, where two completed harpsichords are parked next to each other. The Flemish model is chocolate brown and about 11 feet long. The Italian model is smaller, about eight feet long, and of unstained cedar. They are the two of his four harpsichords he doesn't rent. The others are out visiting other homes, bringing in about \$70 per month in rental fees.

Going Baroque

Makowiecki turned to the harpsichord about four years ago to accompany Birgit, his 12-year-old daughter, who began playing the recorder. He was starting from scratch. Up to that time, the extent of his musical menu included some French horn in high school, and plucking a string bass in a polka band in New London, Conn. in the early 1960's. But keyboard, that was something new.

Intrigued by a magazine ad for a harpsichord kit, he decided to build one and learn to play. It was difficult at first, since he and Birgit were living in a cramped, none-too-private apartment near Zurich, where he was working at the Swiss Federal Institute's Laboratory of High Energy Physics.

But struggling with the kit and studying the ways of the harpsichord, curiosity grew into interest, interest into enthusiasm. He attended concerts, visited builders and frequented music museums in Antwerp and Munich.

In 1978, he returned to the U.S. "ostensibly to build harpsichords, but I sort of chickened out. It would take too much time. I'd be working 15 hours a day, and Birgit, who I'm raising alone, would have to be by herself."

He had developed a modest reputation as a builder and received some offers to turn professional - the Boston Center for the Arts asked him to build harpsichords - but he decided against it. Rather, he became one of 40 nationwide representatives for the Zuckerman Harpsichord Company of Stonington, Conn. The arrangement is a loosely structured franchise. On his own time, Makowiecki builds, sells, rents and maintains Zuckerman harpsichords, which are available as \$940 kits.

"People tend to think kits have funny, cheap connotations. Actually, 90 percent of all harpsichords are made from kits," he points out. Harpsichord kits are not the equivalent of painting-by-number or U-Bolt-Em toys, but require quite a bit of skillful jointing and fitting. Assembly location is critical. An instrument to be used in Islip, for example, must be built in a place that has a similar humidity range, otherwise, the soundboard will crack. For this reason,

(Continued on page 2)

Meteorologist Eyes Eclipse

Last February, S. SethuRaman traveled 24,000 miles to do a two and a half hour experiment.

SethuRaman is a meteorologist with the Atmospheric Sciences Division of DEE. He went to India with the 1980 Solar Eclipse Expedition, sponsored by the National Science Foundation, to study the total solar eclipse that occurred on February 16.

Most of the team was made up of astronomers, who are interested in movements of celestial bodies. As a meteorologist, SethuRaman studies the earth's atmosphere. The eclipse gave him a unique opportunity to study the boundary layer - that portion of the atmosphere close to the earth's surface. According to SethuRaman, this was the first time such an experiment was done during a total eclipse.

Total solar eclipses occur 69 times every 100 years. Even though dates, times and locations of eclipses are predictable, they usually happen over remote areas, making experimentation difficult. The last one extensively studied was in Africa ten years ago.

The eclipse in February began in the central Atlantic Ocean and ended in the Szechwan Province of The People's Republic of China. Traveling at over 2000 miles per hour and covering a swath of the earth nearly 100 miles wide, it passed over the southern part of India, where the solar expedition conducted most of its experiments. At that time of year in India, skies are usually clear day after day. Also, the path of the eclipse passed directly over an observatory, an ideal situation for astronomers in the group.

In collaboration with the Indian Institute of Science, SethuRaman did his experiment in Raichur, a small inland town of 100,000 population. Raichur is the second largest producer of cotton in India, and SethuRaman set up his equipment in a cotton field.

To make sure that his observations during the eclipse were free from local effects, SethuRaman conducted his experiments two days before and two days after. He used balloons to carry instrument packages aloft and a tower with instruments attached at

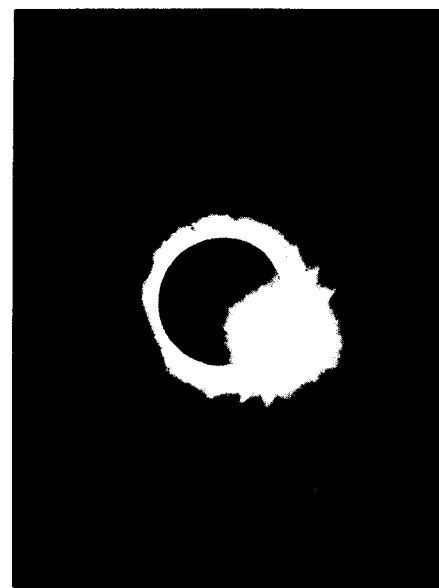
different elevations.

A total solar eclipse is described in what are called contacts. The first contact is when the moon moves in to "touch" the sun. The second contact is when the moon is totally in front of the sun. The third contact is when the moon first begins to leave the sun, and the fourth contact is when the moon has passed across and is touching the sun on the other side.

SethuRaman said that the time interval between the first and fourth contact was 2 hours and 30 minutes. The duration of totality, when the sun was totally behind the moon in the second contact, was 2 minutes and 42 seconds.

Most of the changes in the boundary layer occurred in the first hour. Reporting one qualitative observation, he said, "Cumulus clouds normally developed in the afternoons. When the eclipse began at 1425 Indian Standard Time, the earth started cooling, the convective boundary layer collapsed and the clouds fizzled out before contact. When the sun reappeared, they reformed."

Since February, he has been analyzing data gathered during the eclipse. Preliminary results showed variations in heat flux and turbulence before, during and after the eclipse.



During a solar eclipse in India, this picture was taken just before the second contact, with the moon not yet totally in front of the sun. An astronomer with the solar expedition from the United States used a 35 mm camera equipped with a 500 mm lens.

Also, cooling of the air, with surface-based inversion, occurred over the entire thickness of the boundary layer.

SethuRaman described the eclipse as an astounding sight. He observed Bailey's beads (pearly bright spots caused by sunlight peeping through valleys and crags around the rim of the moon), celestial diamond rings (sunlight sparkling through a lunar valley), shadow bands (just before totality, shadows that wave across the earth's surface), and the corona (the halo of the sun's atmosphere around the moon).

Before and after totality, he used a sheet of mylar to watch the eclipse. During totality, he viewed it with his bare eyes, the only time it is safe to look at the sun without eye protection. "The totality was quite eerie," he said. "It was not the complete darkness of night. I could see light on the horizon."

Weekend Tour

Visitors to the Lab this weekend will learn about BNL's program in solid state structural chemistry. This research may have future implications in such diverse areas as energy, where new catalysts might allow more efficient use of fossil fuels, and medicine, where an understanding of exactly how a drug works could lead to the development of more effective drugs which have fewer side effects.

The complete tour of the Lab also includes a viewing of "Brookhaven's Quest," a guided bus tour of the site, and a visit to the Exhibit Center.



Students in a health physics training program check out their gear as they prepare to respond to a simulated emergency.

Health Physics In The Field

The smoke seemed to swallow them up as they stepped into the warehouse. It was sticky hot and they could barely see. They wore coveralls, face masks and air tanks, and carried radiation survey instruments, all used for their protection. They didn't know what they would find, but they had been trained to search first for victims.

Within minutes, they struggled out with a body.

A scene out of a TV series about an emergency rescue squad? No, it happened right here on site. But not the way it reads.

The victim was Annie, a ten pound mannequin. The smoke came from several smoke bombs. And the rescue team was going through an emergency drill.

The drill simulated an emergency response in which the team also had to identify and control chemical and radiation hazards. It was a final lab exercise, which required them to use skills developed all summer long.

The rescue team is made up of 13 students enrolled in a ten week summer training program in health physics, funded by DOE, through the Safety and Environmental Protection Division. Eleven are graduate students in environmental health programs from universities all over the country, and two are BNL employees.

Mary Pat O'Brien, Training Supervisor for the division, coordin-

ates the program. In operation for over 20 years, it offers broad training in health physics or radiation safety. It also includes some training in industrial hygiene.

"The program stresses application," said O'Brien. "It gives the students hands-on experience and a chance to apply what they've learned in school."

The curriculum is divided into four parts. The first week, they visit different facilities to learn about health physics operations at BNL. During the next nine weeks, their time is divided between lab exercises and individual projects. They also spend weekends and evenings preparing seminars on topics ranging from nuclear waste disposal to the evaluation of risk.

The students work closely with their project advisors, who are predominantly division staff. But some of the projects are done with scientists in other departments. "The emphasis here," said O'Brien, "is to take a problem, develop a method to solve it, and do experiments or collect data to work toward a solution. We expect professional thinking and critical evaluation."

"The intent of the program is to provide the students with operational skills to help them develop into competent health physicists. We show them a slice of the real world."

Soundboards

(Cont'd)

most of Makowiecki's instruments go to places with humidity like Bellport's.

Finishing, of course, is an exhaustive repetition of painting, sanding, painting, sanding and more painting, until the final polish with pumice and an oiled leather strop.

But the product isn't complete once the strop has imparted a satin gloss. Since the builder must know the subtleties of how each instrument plays, Makowiecki pulls out a sheet of Bach or Scarlatti and adjusts the action. As he constantly strives to improve his building skills, he does the same with his playing and is now in his third year of lessons, for which he travels to New York several times monthly.

Out of the Parlor, Down to the Bay

Don Makowiecki's woodworking doesn't end with harpsichords. Applying skills he picked up building harpsichords, he last year purchased and started rebuilding *Marie*, a 24½ foot Great South Bay Cat Boat, built in 1890. He refers to her original condition as a "basket case - you put all the pieces in a basket and carry it away." It was in sad shape. The more he poked, the more rot he found, so

he began, patiently, from scratch, replacing all 26 sets of ribs. Then he reworked the hull boards and sealed the ribs and boards with epoxy, giving the hull the seaworthy integrity of a monocoque construction. And he replaced the heavy steel centerboard with a lighter plywood one. "This way, you don't need a winch. You can handle it alone." It was one return to authenticity.

He also arranged the planking on the aft deck in a pleasing herringbone pattern. Another return to authenticity. Altogether, when *Marie* is ready for launching in a few weeks, she'll have a few touches of custom fit, finish and appointment.

That's the way Makowiecki moves through his projects - following the authentic design, except when he thinks of something better, then he adds it in a style that merges unobtrusively with the original lines.

—James Kent

Selected Reading

Am. Sci. 68 (4), July-August 1980
How we perceive depth from flat pictures. R.N. Haber. 370-80

New Sci. 87 (1212), July 31, 1980
The New Scientist Interview: Fang Lizhi. J. Hall. 378-80

Scholarship Alert

Up to ten 1981 AUI Trustee Scholarships will be awarded to children of regular employees of Brookhaven National Laboratory. Awarded competitively, the scholarships are renewable for up to four years of study toward an academic degree. In addition, up to three scholarships may be awarded to minority group children of employees of BNL and NRAO; eligibility will be determined by applicable federal criteria.

To qualify for a scholarship, the applicant must be a son or daughter of a regular employee of BNL who began full-time employment no later than January 1, 1980, or a son or daughter of a retired employee or of an employee who died when in regular service at the Laboratory. In the case of stepchildren, eligibility will be established if the employee regularly claims the child as a dependent for income tax purposes.

Eligible applicants must be secondary school seniors who will be graduated during the current academic year and entering college in the fall.

Each scholarship will be in the amount of \$1,500 per year and is paid directly to the college.

Selection is made by an independent committee appointed by the Educational Testing Service. Criteria for selection include academic record and school recommendation, scores of the SAT and three Achievement Tests, and other factors deemed appropriate by the selection committee such as school and community activities, evidence of leadership, and creativity expressed through a variety of avenues.

Applications are due December 1, 1980. For more information, application forms and Critical Date Schedules, contact the Office of Scientific Personnel, 40 Brookhaven Avenue, Ext. 3338.

Register For SCCC

Suffolk County Community College will again offer a number of courses on site during the fall semester. Friday, August 22, is registration day, and counselors will be at Berkner Hall. Tuition is \$28 a credit (no additional school fees are assessed) and Master Charge and Visa are accepted. Tuition refund forms are available from the Personnel office. The courses to be offered, and information, may be obtained by calling Renee Flack on extension 3316.

Right On Target



Last month the BNL Police Group held its first annual Police Shooting Tournament on site. "B" Squad captured the High Team Award with (from left) Capt. George Baer in first place, P.O. Richard Conklin, second, and P.O. Gail Lukas, third.

The pistol shoot consisted of both the "Bull's-eye" and "Combat" courses. The former course consists of firing at a fixed bull's-eye target from a distance of 75 feet. The latter is a silhouette target at which the shooters must aim five separate times, starting at a distance of 21 feet and increasing to 150 feet. They must fire 12 rounds in 25 seconds each time, for a total of 60 rounds on the course.

Trophies were also awarded to the highest shooter in the other squads: P.O. Richard Baulch ("A"), P.O. Patricia Cahill ("C"), and Capt. James Goode ("D").

Arrivals & Departures

Arrivals

John T. Benante.....Accelerator
Jaime O. Chua.....Energy & Env.
Patrick J. Coogan.....Central Shops
Joseph A. D'Ambra.....Accelerator
Donald L. Kazmark, Jr.....Accelerator
Vincent A. Mirizio, Jr.....Accelerator
Robert J. Piterniak.....Accelerator
Maurizio Ribera D'Alcala.....Energy & Env.
John F. Slavik.....Accelerator
Warren G. Voegelin.....Safety & Env. Prot.
Susan Monteone.....Nuclear Energy

Departures

Beverly E. Clark, Jr.....Nuclear Energy
David W. Grill.....Energy & Env.
Kuo-Chih Hong.....Energy & Env.
Jory A. Yarmoff.....Chemistry

Retirees



Albert G. Holtz

Paul Simack

Albert G. Holtz, a Technical Associate in the Dept. of Energy and Environment, will retire today. He has been at BNL since October 11, 1954. Now he will relax at his home in Bellport and get in a lot of fishing.

Paul Simack, a Nuclear Emulsion Specialist at Photography and Graphic Arts, will also retire today after nearly 33 years at the Lab. He does not plan to relocate, but will stay at his home in Manorville and work on his garden.

Addendum

Many people contributed to the successful development of *Tristan* at BNL, and we did not manage to cover everyone in last week's Bulletin story. Others who deserved special mention are Stanley Ulc, the engineer who designed shielding, designers Jud Diener and Ed Sperry, and technicians Bill Lenz, Jr. and Al Minn.

BROOKHAVEN BULLETIN

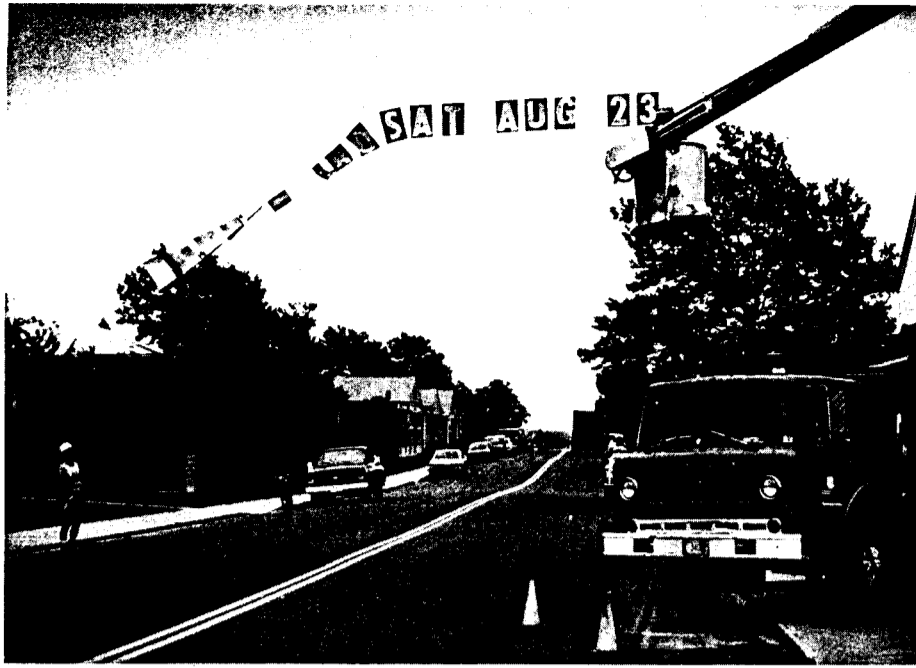
Published weekly
for the employees of
BROOKHAVEN NATIONAL LABORATORY

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CARL R. THIEN, Public Relations Officer

Announcing The Event Of The Summer



The banner is up over Brookhaven Avenue! Saturday, August 23, should ring a bell in your mind. But don't wait until then to buy tickets to the employee picnic. Today is the your last chance. Get your tickets from department secretaries or receptionists.

Reports Available

The following reports are now available to the Laboratory Staff and to Affiliates of the DOE, AUI, and NRC. Others may purchase the reports from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. Staff members should call Ext. 3484.

- BNL 50994** \$7.25
Annual Abstracts of the National Center for Analysis of Energy Systems. Department of Energy and Environment
- BNL 51009** \$5.25
"Rim Analysis" Statistical Techniques Applied to the Evaluation of the National Energy System by Multiple Criteria. Y. Draper, et al
- NUREG/CR-1007**
BNL-NUREG-51044
Evaluation of Selected Signal Processing Methods for the Characterization of Steam Generator Eddy Current Signals. S.D. Brown and D.T. Hayford
- BNL 51057** \$8.00
Data Report - Oceanographic Data from Moored Instrumentation Velocity, Temperature, and Salinity off Shinnecock, Long Island, in May 1977. T.S. Hopkins, et al
- BNL 51068** \$5.25
New Techniques for Analyzing Relationships Between Energy and Water Quality. E. Kaplan, et al
- BNL 51070** \$4.50
Hydrogen/Halogen Energy Storage System: Safety, Performance, and Cost Assessment. Final Report. P.M. Spaziant, et al
- BNL 51076** \$6.50
Physical Aspects of the U.S. Oil and Gas Systems. J. D. Acerno, et al
- BNL 51095** \$4.50
The Time-Stepped Energy System Optimization Model (TESOM) Overview and Special Features. A.S. Kydes and J. Rabinowitz
- BNL 51098** \$14.50
Data Summary for Evaluation of the Transport and Diffusion Climatology of the United States East and Gulf Coasts. G.S. Raynor and J.V. Hayes
- NUREG/CR-1126**
BNL-NUREG-51101 \$5.25
Properties of Radioactive Wastes and Waste Containers Progress Report No. 12, January - March 1979. P. Colombo and R.M. Neilson, Jr.
- BNL 51103** \$4.00
Beam-Beam Effects in Curvilinear Interaction Regions in ISABELLE. M. Cornacchia and G. Parzen
- BNL 51109** \$5.25
Compatibility of DOE Energy Data Bases with EEMIS Data Requirements. J. D'Acerno and A. Hermelec
- BNL 51111** \$4.00
Data Report - Design Construction, and Initial Operation of the BNL-Coastal Transport and Diffusion, Air/Sea Interaction Research Buoy. D. Huszagh, et al
- BNL 51112** \$6.00
Economic Assessment of Using Nonmetallic Materials in the Direct Utilization of Geothermal Energy. Final Report. Burns & Roe Industrial Services Corporation
- NUREG/CR-1167**
BNL-NUREG-51113
Evaluation of Isotope Migration - Land Burial. Water Chemistry at Commercially Operated Low-Level Radioactive Waste Disposal Sites. Progress Report No. 11, October - December 1978. P. Colombo and A.J. Weiss
- NUREG/CR-1168**
BNL-NUREG-51114
Properties of Radioactive Wastes and Waste Containers. Progress Report No. 13, April - June 1979. P. Colombo and R.M. Neilson, Jr.

Children's Program

Pool Special

Winners of the races held at the pool last Friday were:

Ages 4-6

- 1st - Neesha Sing
- 2nd - Kathleen Holden
- 3rd - Nicole Palmer

Ages 7-9

- 1st - Keith Holden
- 2nd - Alyse Holden
- 3rd - Noel Ehrenkauffer and Jennifer Frabizio

Ages 10 and older

- 1st - Maurisa Holden
- 2nd - Don Shea
- 3rd - Greg Holden

Coming Events:

- This Friday - balloon and ping-pong races
- Wednesday, August 27 at 2:00 p.m. Water Carnival for all kids over four.

On-Site Program

Festivities for the Halloween Party began with an elaborate display of costumes on parade. This was followed by games and contests and a special appearance of Darth Vader direct from outer space.

Coming Events:

Next Friday - Carnival Day

Again this year the staff of the Children's Recreation Program hosted an International Picnic for families residing on site. The event was a huge success featuring dining on foreign delicacies combined with good old U.S. favorites. The showing of a first-rate movie and the serving of dessert completed a happy evening.

Tennis Program

Tournament winners will be announced in next week's Brookhaven Bulletin.

Soccer

The annual New York Oldtimers Vs. BNL soccer match will be played at the Recreation Park on Saturday, August 16.

Cafeteria Menu

Week Ending August 22, 1980

Monday, August 18	
Corn chowder	(cup) .45 (bowl) .55
Beef chop suey on rice	1.45
Apple pancakes & sausage	1.40
Hot Deli - Roasted turkey breast	(on bread) 1.45 (on roll) 1.55
Tuesday, August 19	
Cream of tomato soup	(cup) .45 (bowl) .55
Roast chicken w/stuffing & 1 veg.	1.50
Beef liver & onions & 1 veg.	1.40
Hot Deli - Bar-B-Qued beef	(on bread) 1.45 (on roll) 1.55
Wednesday, August 20	
Beef noodle soup	(cup) .40 (bowl) .50
Broiled filet of fish & 1 veg.	1.45
Salisbury steak & 1 veg.	1.45
Hot Deli - Grilled Reuben	1.45
Thursday, August 21	
Pork and cabbage soup	(cup) .45 (bowl) .55
Manicotti & 1 veg.	1.40
Sauerbraten & potato pancake	1.50
Hot Deli - Smoked baked ham	(on bread) 1.45 (on roll) 1.55
Friday, August 22	
Billy Bee soup	(cup) .50 (bowl) .60
Spaghetti w/clam sauce & garlic bread	1.35
Breaded pork chop w/apple sauce & 1 veg.	1.55
Hot Deli - Fried filet hero	1.45

Sanchez Uses Push Power

Eduardo Sanchez is quick to say that he is not a hotshot skateboarder. He does it because he has too far to go by foot and not far enough by bike.

Sanchez commutes daily by skateboard between his dorm and the Chemistry building, where he works as a BNL summer student. "Most

people keep a briefcase in their desks," he said. "I keep a skateboard in mine."

Even though he doesn't claim to be an expert, Sanchez is not new to skateboarding. It's how he gets around in Boston, where the one-and-a-half mile distance between home and Boston University is too far to walk, but not far enough to warrant the expense of a bicycle.

A senior this fall, Sanchez is majoring in biomedical engineering and chemistry. At BNL, he works with Richard Lambrecht in the Chemistry Department, developing an automated method to make technetium-92. This highly radioactive isotope is too hazardous to handle manually. Sanchez said that an automated process would make it possible to produce technetium-92 for use in brain scans.

When Sanchez is on his skateboard, he is easy to spot, even at a distance. He moves with a distinct push and glide rhythm that must be peculiar to serious skateboard commuters. For all the traveling he does, however, Sanchez uses what he calls an "el cheapo" model, which is narrower than trick skateboards. "It's mostly good for going in a straight line," he said. "I have a little trouble with corners."

Sanchez thinks he has a good thing going. "When I get to my destination," he said, "I just pick up my skateboard, tuck it under an arm, and take it with me. I never have to worry about where I've parked it or if I've locked it."



Eduardo Sanchez on his way to work.

Softball

League I

Blue Jays 24 - Six Pax 5

For the Blue Jays, Danny Oldham was 5 for 5, Tony Kossiakoff 3 for 3, Hank Strelicki 4 for 4, Larry Musso 3 for 4 with a home run. For the Six Pax, Ken Asselta and Brian Briscoe were 2 for 3 and Ralph Brown had a home run.

Source I 5 - Deegenerates 2

Source I scored all their runs in the first inning and the Deegenerates were unable to mount an offense. "Choo Choo" Flannigan had a home run for the Source.

Raves 21 - Phoubars 10

League II

Titans 11 - Dirty Sox 4

AMD 7 - Cardinals 4

Roga 9 - Moles 7

Makeup Games:

Titans 11 - Dirty Sox 3

Roga 4 - Moles 2

League III

Big Sticks 24 - Lights Out 9

Nuke Powers 9 - Brewmasters 5

Medical 7 - Binary Bombers 4

Huff & Puff 13 - Ice Pops 12

League IV

Balls & Strikes 12 - Thrids 5

Diamonds 8 - Turkeys 7

E-Z Riders 6 - Nads 5

Dennis Hall had two home runs and was responsible for 4 runs batted in. B-J Mingo knocked in the winning run. The E-Z Riders turned over two double plays and a triple play. Both teams played excellent ball - the game went into extra innings.

Survivors 8 - Random Sample 7

League V

No Feedback 11 - Who's On First 3

TNT 15 - Underalls 7

Mudville Sluggers 13 - Source III 5

Who Cares 9 - No Names 6

Makeup Game:

No Names 7 - Who Cares 6

What state celebrates its admission to the Union today?

