

DAS Division Helps Poland In Cleaning Up Kraków's Air Pollution

At the Church of Saint Peter and Paul in the Old Town of Kraków, Poland, stone statues of the 12 apostles carved in the 18th century have become faceless — silently testifying to the destructive power of 20th-century air pollution.

Like other historic stone monuments and structural elements throughout Kraków, the statues that had survived three centuries untouched have dissolved over the past 40 years or so, as the increasing air pollution has aged the stone faster than usual.

A hub of Polish culture that was not destroyed during World War II, Kraków is now an industrial center with one of Eastern Europe's largest iron and steel plants — and one of Eastern Europe's largest air pollution problems. The air pollution is so bad, in fact, that tourists to Poland are warned not to visit this city in winter if they have respiratory problems.

Built in 1954, Kraków's steelworks are the city's most visible source of air pollution — but that industry is not the worst offender as far as particulates and hydrocarbons are concerned.

Rather, the nearly 2,250 boilers and roughly 100,000 home stoves that burn coal and supply almost half the city's heat are Kraków's major sources of particulates and hydrocarbons.

Though individually each boiler or stove emits only a small amount of pollution, collectively these low-emission sources produce an estimated 10,000 tonnes per year of particulates and 14,500 tonnes per year of carbon monoxide.

Testing Kraków's low-emission sources to quantify how much pollution they are dumping into the air and

assessing how to reduce this pollution from these low-emission sources by increasing the clean use of fossil fuel have become the concern of BNL Scientist Thomas Butcher and his colleagues in the Energy Efficiency & Conservation Division within the Department of Applied Science (DAS).

Working with Butcher on this project are: Wai Lin Litski and C.R. Krishna, on engineering assessment; Richard Krajewski and Yusuf Celebi, on stove and boiler testing; and Barbara Pierce and Jerome LaMontagne, on economic assessment.

In addition, Monica Mazurek of DAS' Environmental Chemistry Division is serving as a testing-methods consultant, Atsushi Kobayashi of the Nippon Steel Corporation is helping to analyze the testing results, and student collaborator Thomas Kirchstetter from the State University of New York at Albany analyzed the composition of Kraków's boiler population and the relative contribution of each boiler type to the city's air pollution.

SEED is Sown

"Because it is located in the Vistula River valley," Butcher says, "Kraków has poor ventilation and is subject to natural thermal inversions. In addition to the pollution created within the city by the steelworks and the coal-burning stoves, pollution is blown into Kraków from other industries within the Upper Silesia region, from Czechoslovakia and from what used to be East Germany."

Butcher and company became involved in the U.S. effort to improve Kraków's air quality as a result of the Support for Eastern European



Roger Stoutenburgh

Gathered round a coal stove under test as part of the Kraków Clean Fossil Fuels & Energy Efficiency Project: (from left) Monica Mazurek, C.R. Krishna, Jerome LaMontagne, Richard Krajewski, Thomas Butcher, Barbara Pierce and Yusuf Celebi, who is kneeling by the flue-gas analyzer. Missing from the picture: Wai Lin Litski, Atsushi Kobayashi and Thomas Kirchstetter.

Democracy (SEED) Act of 1989.

Passed by Congress following the political upheaval in Poland, SEED authorized the U.S. Department of Energy (DOE) to spend \$30 million in undertaking two projects. The funding comes to DOE through the U.S. Agency for International Development.

The first project involves \$10 million for retrofitting two of the 11 boilers within one of Kraków's two power plants, with U.S.-made scrubbers to reduce sulfur dioxide emissions in the flue gases.

The second — the Kraków Clean

Fossil Fuels & Energy Efficiency Project (CFEPEP) — includes \$20 million for first assessing the fuel-burning status of Poland's stoves, boilers and furnaces, and then developing ways to modify the heating equipment so that it will burn fossil fuels — including Poland's abundant supply of coal — more cleanly.

With project management from DOE's Pittsburgh Energy Technology Center, Brookhaven is involved in the first phase of the Kraków CFEPEP, working with a team of researchers in Poland to perform engineering assessments, stove and boiler testing, and economic analysis.

The results from both projects are expected to be useful to the rest of Poland and Eastern Europe. By encouraging joint U.S.-Polish ventures to carry out the studies' results, the projects aim to open the door to Poland and the rest of Eastern Europe for U.S. private firms specializing in air pollution-control technology.

Clean Fossil Fuels

As part of the Kraków CFEPEP, Butcher has made a half dozen trips so far to Kraków. In taking on the air pollution created within the city's limits, Butcher and his colleagues have undertaken the assessment of four subprojects, all dealing with clean fossil fuels.

First, they are considering the conversion of small basement boilers to natural gas or the replacement of the older boilers with more advanced and cleaner-burning ones. The second subproject is looking into eliminating some home stoves in the Old Town of Kraków by increasing the use of electric heat.

Third, Butcher and company are considering how to modernize large boilers, either by retrofit or replacement. Finally, they are examining the possible use of cleaner coal fuels, such as briquettes, in present-day home stoves and/or in home stoves of improved design.

Explains Butcher, "Each of our four subprojects has three elements — an engineering assessment to develop information on how much the proposed options will cost; testing to come up with baseline emissions and

(continued on page 2)

BWIS Presents Scholarship to Re-Entry Woman



Roger Stoutenburgh

At a ceremony held in Berkner Hall on Tuesday, August 18, Janice McCarthy (center) became the 1992 recipient of the Renate W. Chasman Scholarship for Women.

Presented each year by Brookhaven Women in Science (BWIS), the one-time, \$1,000 scholarship is named in honor of the late Renate Chasman, a noted BNL nuclear physicist and accelerator theorist, who codiscovered the Lab's National Synchrotron Light Source.

The scholarship is intended to encourage women to pursue scientific research careers in the natural sciences, engineering or mathematics. Since its inception in 1986, the award has been presented each year to a re-entry woman — one whose college education was interrupted, but who has returned to pursue a degree on a half-time or greater basis.

This was the case with McCarthy, who will be a junior this fall at the State University of New York at Stony Brook. While she is pursuing a B.S. in biochemistry and mathematics, her long-term goal is to earn a Ph.D. in molecular biology and enter the field of research.

McCarthy entered college for the first time in 1983, at the age of 17, as a theater major. A year and a half later, she left school to reconsider her career choices. After working full-time as a waitress for about a year, she went back to school for computer programming, a skill she applied in business for four years, but did not find fulfilling. So, McCarthy returned to school again in 1989 — as a freshman at Suffolk Community College.

After two impressive years at Suffolk, McCarthy says, "After searching down so many blind alleys, I have finally found the courage to admit to myself and to others that I want to be a scientist. If I had more than one lifetime, I would want to study all the major sciences. Since I'm limited to only one, I've decided to focus on molecular biology."

Shown with McCarthy are members of the BWIS Scholarship Committee (from left): Mary Wood; Harriet Fadern; Patricia Giacalone; Anita Cohen; committee chair Victoria McLane; Mildred Laster; Mary Kingsley; Edith Thornhill, liaison with BNL's Office of Scientific Personnel; and Ruth Kempf. Not shown: Eva Bozoki and Gail Williams.

Poland

(cont'd)

efficiency data, which then will be used in selecting from among the proposed options; and an analysis of the economic incentives that can be used to implement the options that are selected."

As part of the engineering assessment, which is being performed by Polish researchers, the City of Kraków has discovered that some 1,671 of its 2,248 boilers do not have pollution-control devices that collect particulates.

Baseline Test Results

The emissions and efficiency testing of stoves is being conducted in a lab designed by Butcher's group and set up this February in the Polish Academy of Mining & Metallurgy. Meanwhile, tests have been completed on one boiler and are ongoing on three more located in Kraków boiler houses and basements.

To date, stove-testing results have shown that the old type of masonry units used in Kraków are about 65 percent efficient and emit a great deal of carbon monoxide, as well as particulates. However, when clean-burning briquettes are used instead of unprocessed coal, the particulate emissions are reduced by a factor of ten or more — making briquettes a very attractive fuel option.

"We are very pleased with the stove-testing results to date," says Butcher. "We are also pleased with the knowledge, skills and resourcefulness of the Polish engineers and scientists with whom we've been working. Poland is a very equipment-poor country, so we had to bring over a lot of test equipment, which we helped our Polish colleagues turn into a state-of-the-art laboratory."

Lastly, the incentives analysis has found, for instance, that, while the prices for natural gas and coal are close to world levels, the price of electricity is unnaturally low due to government subsidy. When it is no longer subsidized under a market economy, the price of electricity will skyrocket — so it may not be an attractive heating option.

These assessments will continue through next summer. Meanwhile, DOE will hold public meetings in both countries, to interest Polish and American firms in forming partnerships to undertake the subprojects themselves using the results of phase-one assessments.

For the subsequent phases of the Kraków CFFEEP, DOE will make funding available to interested firms, for studies of the feasibility of such joint ventures. Feasible partnerships will then carry out the four subprojects. — Marsha Belford

Shoe Shop Shutdown

The on-site safety shoe shop on the northeast side of Bldg. 88 will be closed on Thursday, August 27, and Monday, August 31. During this time, call Ext. 2300 with questions about safety shoes.

Softball

Standings as of 8/14

League 1		League 2	
Blue Jays	11-2	Titans	12-2
Phoubars	8-5	Cocoon	9-4
Ravens	8-5	Dirty Sox	9-5
Up & Atom	6-6	Scram	8-5
Cool 'n Gang	5-8	Phase Out	7-6
Magnuts	5-8	Lights Out	4-9
Revised Edition	5-8	Antiques	3-10
Six Pax	3-9	Lunatechs	1-12
League 3		League 4	
Big Sticks	10-0	Sting Rays	11-2
Surefire	8-3	Roustabouts	9-3
Bombers	6-4	Personnelities	9-4
Quantum	6-3	Snakebites	8-5
Medical	3-8	Simply Awesome	6-7
DOE Nuts	2-9	Just 4 Fun	4-9
Dangerous Curves	2-10	Source	2-11
		Park Avenue	2-10
League 5			
Good Timers	8-2	Lead Bottoms	3-7
Molson Express	9-3	Snafu	2-10
Ha Has	8-3	Jerry's Kids	1-10
What's on 2nd?	8-4		

Saluting 40 Years of Strong Focusing

Forty years ago today, on August 21, 1952, the discovery of the alternating gradient focusing principle, also known as the strong focusing principle, was announced at BNL.

Co-discovered at Brookhaven by scientists Ernest Courant, M. Stanley Livingston and Hartland Snyder, this revolutionary breakthrough in accelerator design came at a time when much of the most important research at the Lab's existing Cosmotron had been done, and a



In 1952 at BNL, scientists (from left) Ernest Courant, M. Stanley Livingston and Hartland Snyder, who codiscovered the principle known as alternating gradient focusing or strong focusing, gathered around a quarter-scale model of the Cosmotron magnet.

new, much higher energy machine was a primary concern. As it turned out, strong focusing had been independently proposed earlier by Nick Christofilos, in Greece, but no results had been published.

Before the discovery of strong focusing, to build a proton accelerator ten times more powerful than the 3.3-billion-electron-volt (GeV) Cosmotron would have required 100 times as much steel, making it prohibitive in cost.

In ring-shaped accelerators, particles travel in a circular path, confined by a magnetic field made by two types of magnets: bending and focusing. Since the bending power of the magnetic field was limited, increasing the particles' energy required that they travel in larger diameter circles, using bigger and more magnets.

In the Cosmotron and similar machines of the day, the bending magnets were all built with a weak focusing strength. But, in light of the new principle, calculations showed that by dramatically increasing the focusing strength and alternating the magnets — one focusing vertically, the next horizontally, and so on — the particle beam could be strongly focused both vertically and horizontally.

The beam could then pass through magnet apertures as small as one or two inches in diameter, as opposed to 8 by 24 inches in the Cosmotron.

Alternating gradient focusing was quickly transformed from an idea to the foundation stone of BNL's 33-GeV Alternating Gradient Synchrotron (AGS) and the CERN 24-GeV Proton Synchrotron, which were commissioned in 1960, as well as all the large proton accelerators built since.

This discovery led to such Nobel Prize-winning findings as the muon-neutrino, CP violation and the J/psi particle at the AGS in 1962, 1963 and 1974, respectively. The same principle is fundamental to the next generation of accelerators now under construction, BNL's Relativistic Heavy Ion Collider and the national Superconducting Super Collider. — Liz Seubert

A Team of Their Own

It's not quite a league of their own, but women at BNL have the next best thing: a team of their own in League 3 of the Employees' League of the BERA Softball League.

Known as Dangerous Curves, the team is co-captained by Kathy McNaught and Denise Miesell, who is also secretary of the Softball League.

At present, BERA Softball is divided into five sub-leagues. Players in the Mixed League, which has two of those subleagues, can be either employees or spouses. The other three subleagues are in the Employees' League, where players must be BNL employees. Though participation in both leagues is open to both sexes, teams in the Employees' League have traditionally been all men.

Over the years, Miesell observed, "The Softball League has tried to put together an all-female league — with no success at all." But this year, BNL women made their first foray into the Employees' League — with Dangerous Curves.

Unlike the teams in the all-female baseball league portrayed in the film *A League of Their Own*, BNL's all-female softball team faced all-male opponents in their freshman year — and compiled a 2-10 record for the season.

One win was an uncontested forfeit, but the other — an impressive 10-7 victory — came in the season's eighth week against the Bombers, the team that eventually finished third in the seven-team league.

"We weren't doing too well in the beginning," said Miesell, "but we started to do better after about six weeks. Defensively, we've improved 100 percent."

McNaught agreed. "We have gotten a lot better," she said. "We have only been shut out in two games."

Concerning their reception by the rest of their league, Miesell said, "I've had to have the umpire inform the other team not to play games with us, but as far as their giving us a break — absolutely not!"

That was obvious during the last game of the season, when Dangerous Curves lost to Big Sticks — the team that leads League 3, with a 10-0 record. But what was also obvious was that both sides — and even the umpire — were having fun while playing exciting softball.

In the top of the sixth inning, for example, Dangerous Curves showed some snappy pitching and fielding, as pitcher Marsha Kipperman induced the first Big Sticks batter to ground out to Miesell at first base and the second to fly out to Anette Meier in left center field.

After giving up a single, Kipperman had the next batter fly out to Latesha Smith in left field. Seeing little action in this efficient inning were catcher Lois Marascia, Barbara Royce at second base, McNaught at shortstop, Nancy Ohlmann at third base, Michi Miura in right center field and Sydell Lamb in right field, the position played by Patti Bender in the next inning.

Dangerous Curves sent seven batters to the plate and scored one run in the bottom of the sixth, but in the top of the seventh inning, Big Sticks lived up to their name, winning the game. But the women of Dangerous Curves were not dispirited. They recognized how much they had achieved in a single season and also took the opportunity to recognize the efforts of two others who helped them along the way — coaches Bob Brown and Izzy Garcia



Dangerous Curves, BNL's first all-female softball team in the Employees' League with their coaches, Bob Brown (kneeling, left) and Izzy Garcia: (front, from left) Michi Miura, Anette Meier, Marsha Kipperman, Patti Bender; (back, from left) Sydell Lamb, Lois Marascia, Kathy McNaught, Barbara Royce, Nancy Ohlmann and Denise Miesell. Missing from photo: Pat Cahill, Joann Giambalvo, Renée Holaday, Terri Lacker, Barbara Langhorne, Sue Sally, Latesha Smith and Diana Toledo.

— who were thanked "for all their encouragement and never yelling at us!"

All of the women on Dangerous Curves have previously competed in the Mixed League. And about half of them were teammates on the BNL softball team that competed last year in Brookhaven Town's Snowflake League.

Organized by Patricia Cahill and Marsha Kipperman, the Snowflake League team was aptly named — playing in weather as cold as 29 degrees. Last year, the BNL team came in third out of six all-female teams in that league.

Despite that successful season, McNaught recalled, "It wasn't easy convincing everyone to form an Employees' League team. In the beginning, there were comments like, 'I'll come out and play the first night, but, if I don't like it, you'll never see me again!' But everyone came back."

With their Employees' League season now over, many members of Dangerous Curves are looking ahead to the Snowflake season. "All the practice we've had throughout the summer has definitely improved us for the Snowflake League," said Miesell. "I don't think we'll run into any teams that will hit nearly as hard as these teams did!"

— Anita Cohen

In Memoriam

Anthony P. Meade, a senior project engineer and Deputy Head of the Production Engineering Section (PES) of the Magnet Division within the Accelerator Development Department (ADD) died of a heart attack on August 6, at the age of 58.



"Tony had a very diversified engineering background and was very knowledgeable in high vacuum and cryogenic technology, properties of materials, and mechanical fabrication methods," recalls his supervisor, Eugene Kelly, Head of PES. "All of his capabilities and knowledge, as well as his honest engineering attitude were a great asset to the Laboratory."

Meade came to Brookhaven 29 years ago, on December 1, 1962, as a development engineer II in the former Mechanical Engineering Department.

From the mid-1960s through the 1970s, he led the refrigeration and cryogenics efforts during the construction of a liquid hydrogen moderator for the production of low-energy or "cold" neutrons at the High

Flux Beam Reactor (HFBR). When the cold-neutron moderator was completed, he was in charge of its operation. The HFBR remains the only research reactor in the U.S. equipped with such a moderator.

After being promoted to development engineer I in July 1969, Meade moved to the Physics Department in November 1976. There, he was named research engineer I and senior research engineer in October 1980 and 1981, respectively.

In May 1988, Meade transferred to ADD, as Deputy Head of PES. As such, he became involved with the development of superconducting magnets for the national Superconducting Super Collider and BNL's Relativistic Heavy Ion Collider.

In doing so, not only was he noted for expanding his engineering expertise into a new area, but he was also commended for passing on to younger engineers and designers the knowledge that came from his years of experience. In June 1988, he was promoted to a senior project engineer.

Having resided in Commack, Anthony Meade is survived by his wife Katherine Meade, their daughters Kathleen Quartararo and Eileen Rothmeier, their sons Gerard Meade and James Meade, and eight grandchildren.

Valerie Bridgett, a high school trainee clerk who worked in the Accounts Payable Section of the Fiscal Division, died Wednesday, August 19, along with her aunt, Lucy Dewese, and cousin, Evangeline Chadwick, following a car accident at the intersection of Longwood Road and William Floyd Parkway. Bridgett was 18 years old.



A 1992 graduate of Longwood High School, Bridgett took part from October 1991 to May 1992 in BNL's High School Cooperative Program, whereby students from Longwood and other area high schools are provided with part-time jobs after school to help prepare them for the working world.

Bridgett returned to the Lab on July 6 in the same position, but full-time, as part of the Youth on Campus Program.

According to Accounts Payable Supervisor Anne Corr, Bridgett had said that she was working at the Lab to save money for college. She had planned to go to Norfolk State University in Virginia this fall, to major in computer science or psychology.

In remembrance, says Corr, "Valerie was a super worker, a fine lady who was loved by all. Everybody loved her smile. This is a terrible shock for us."

A former resident of Medford, Valerie Bridgett is survived by her uncle, Herman Dewese. Funeral arrangements were incomplete at press time. Contributions in Bridgett's memory may be made through April Donegain, Bldg. 134A, Ext. 2459.

A former custodian, **Santoria Fountaine**, who retired from the Plant Engineering Division on April 15, 1989, died on July 19 of cancer. He was 66. Fountaine began his 22-year association with the Lab on August 29, 1966, as a janitor in the former Plant Maintenance Division. Having resided in Coram, Fountaine is survived by his wife Ruth; three sons: Tracy Fountaine of BNL's Safeguards & Security Division, Conrad Fountaine and Kevin Fountaine; three daughters: Brenda Fountaine, Judith Clark and Crystal Trollinger; and eight grandchildren.

Retiree **Charles J. Lyons** of Sag Harbor died on July 22 at the age of 70. He had started work at the Lab on May 5, 1952, as a patrolman trainee, and, 32 years later, retired on March 2, 1984, as a storeskeeper in the Supply & Materiel Division. He is survived by two sons: Carl Lyons and Charles Lyons Jr.; a daughter: Frances McArdle; and five grandchildren.

On Display: Tapestries By Pakistani Children

From lions, tigers and peacocks to camel caravans; from women carrying water on their heads on the slopes of the Himalayas to fishermen dragging their nets on the shores of the Arabian Sea — these amazingly varied, children's-eye views of jungles and Pakistani village life will be on display in a tapestry show sponsored by the BERA Art Society, in Berkner Hall, Room B, all next week, including Sundays.

Each tapestry, known as a gabba, is designed and made entirely by the children in hand-dyed wool backed with cotton. The traditional chain stitch they use traces back 2,000 years to Kashmiri embroidery found along the silk route. A video made in Pakistan of gabba crafters and their surroundings will also be shown.

Exhibition hours will be 10 a.m. to 3 p.m. on the two Sundays, August 23 and 30 — hours that coincide with the Lab's free public tours. From Monday through Friday, August 24-28, hours will be 11:30 a.m. to 1:30 p.m., and on Monday, August 24, from 5 to 7:30 p.m. Homemade refreshments will be offered at the lunch and evening receptions on Monday.



Equipment Demos

On Tuesday, August 25, representatives from Keithley Instruments will be in Berkner Hall from 9 a.m. to 4 p.m., to consult on electrical measurement applications. They will demonstrate their new digital multimeter model 2001, as well as digital voltmeters; current amplifiers; sinks, sources and electrometers for such uses as IV characterization; direct digital-function generators; LCZ analyzers; and an 80-channel, half-rack matrix/mux controller. Literature will be available.

Tektronix, Inc., will host a product show on Wednesday, August 26, from 10 a.m. to 2 p.m., in Berkner Hall. Products to be demonstrated will include oscilloscopes, logic analyzers, spectrum analyzers, FFT analyzers, color printers and x-terminals. Free coffee and doughnuts will be served.

Zenith Data Systems and Atlantic Business Systems will display notebook computers that can do double duty as desktop PCs, in a demonstration in Berkner Hall on Thursday, August 27, from 10 a.m. to 2 p.m. Products shown will include the Z-Note series, and technical experts will be on hand to answer questions.

Arrivals & Departures

Arrivals

Radoslav R. Adzic.....App. Science
Jane L. O'Brien-Fox.....Staff Serv.
Frederick P. Orsatti.....Accel. Dev.
Mark Peragine.....Accel. Dev.

Departures

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

Susan P. Lees-Miller.....Biology
Paul D. Levin.....Biology
Joseph T. Rogers.....NLS
Virender K. Sharma.....Chemistry

Sybase Meeting

BNL's Sybase Local Users Group will hold its first meeting on Wednesday, August 26, at 1:30 p.m., in the CCD Seminar Room, Bldg. 515. The agenda includes accessing the Sybase server from the various platforms on site and discussing today's third-party user interfaces. Users are invited to come prepared with suggestions and problems.

For more information, contact Susan Eng, Ext. 7988, or send E-mail to sge@bnl.gov.

Ticket Sales Are Heating Up!

for

**BNL's
45th
Anniversary
FAMILY
PICNIC**

Saturday, September 19

for just \$3

Tickets include:
soda,
beer,
popcorn,
ices,
ice cream,
parade,
face painting,
magic, games,
contests,
D.J., dancing,

Ticket sales end September 1, so HURRY!

cotton candy, and the Fun Olympics



The picnic will be held, rain or shine, from 11 a.m. to 7 p.m., with refreshments, games, races, softball, tennis, volleyball and all sorts of fun. Bring your own food or buy hot dogs, hamburgers, etc. Tickets are \$3 (free for kids under three) and are now being sold first come, first served, at the BERA Sales Office at Berkner Hall, Ext. 3347; and by Michelle Cummings, Ext. 2077; Renée Flack, Ext. 3316; Liz Mogavero, Ext. 3940; Betty Pergan, Ext. 2937; and Rosalie Piccione, Ext. 3160. Sign up for the Fun Olympics with Mogavero, Bldg. 510A, or Pergan, Bldg. 179A.

Catch a glimpse of
GLANCE

playing in Berkner Hall
weekdays, 11:30 a.m. to 1:30 p.m.
Show changes every Tuesday.

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