

CORNELL Chronicle

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ODOR-FREE COMPOST

Cornell scientists can detect when compost will start to smell, which could reduce odors from garbage recycling.

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OUT OF AFRICA

Professor Michael Latham co-authors a book with his late mother on life in E. Africa from the 1920s.

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Cornell sets 1995-96 statutory college tuition rates

Tuition rates for Cornell's statutory colleges were approved Tuesday by the Board of Trustees Executive Committee at a meeting at the Cornell Club in New York City.

Provost Malden C. Nesheim, in presenting tuition figures to the committee, noted that the final 1995-96 tuition rates are at the "top end" of ranges authorized by the committee in April.

Finalization of 1995-96 tuition rates was delayed because of the state's uncertain financial situation, legislative failure to pass a state budget until mid-June and negotia-

tions between SUNY and Cornell about the extent of expenditure reductions and tuition-related revenue increases for SUNY, Nesheim said.

The Executive Committee approved 1995-96 statutory college tuition rates of:

- For undergraduate resident students, \$8,490, a 9.7 percent increase over the 1994-95 rate of \$7,740.
- For undergraduate non-residents, \$16,460, a 10.5 percent increase over last year's rate of \$14,900.
- Graduate (non-veterinary), \$10,000, a 10.5 percent increase over \$9,050 last year.

• Doctor of Veterinary Medicine (D.V.M.), resident student, \$13,080, an 8.1 percent increase over \$12,100 last year.

• D.V.M., non-resident student, \$17,610, an increase of 10.8 percent over \$15,900 in 1994-95.

• Veterinary graduate student, \$10,650, an increase of 8.7 percent over \$9,800 last year.

• Graduate reduced, \$7,000, an increase of 16.7 percent over \$6,000 in 1994-95.

Nesheim reported that the most significant factors producing the tuition hikes are annual increases in the statutory college share of central Cornell services and sup-

port; the need to preserve financial aid at a level that protects historical opportunities for access; the need to fund annual operating increases for programs and positions supported by statutory college tuition revenues; and large adjustments in the SUNY income contribution components of statutory college tuitions.

The four statutory colleges on the Cornell campus are the College of Agriculture and Life Sciences, College of Human Ecology, School of Industrial and Labor Relations and the College of Veterinary Medicine.

Study shows need to teach kids about consumerism

By Susan Lang

With American children assaulted by more than 15,000 advertisements a week and living in probably the most materialistic society in the world, it's no wonder they equate material well-being with personal happiness, Cornell experts say.

To counter the intense efforts that advertisers put into marketing to children and teens, it's critical for parents to educate their children on consumer issues, say two consumer economists.

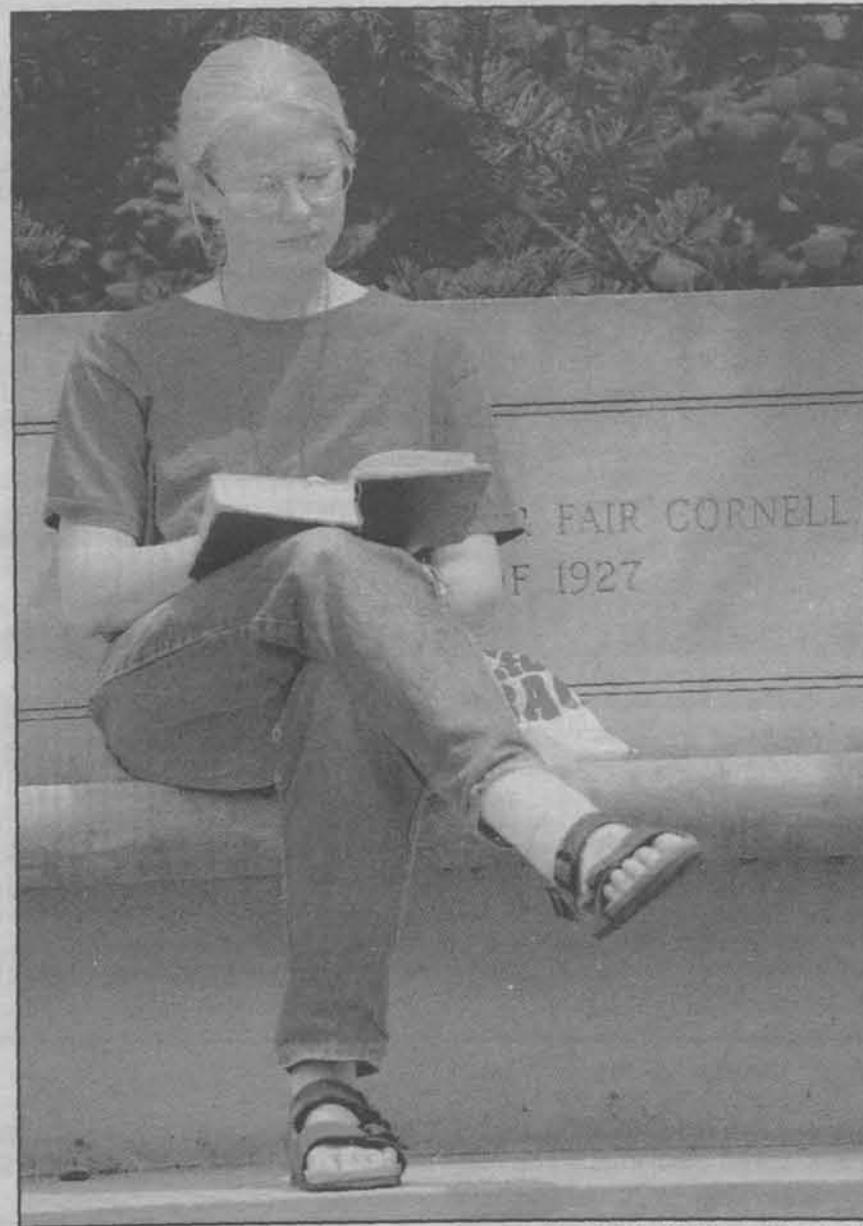
"Even though the population of children is shrinking in this country, spending by youth continues to increase," said Lois Morton, an expert in consumer decision-making in Cornell's Department of Consumer Economics and Housing, and the author of a series of Cornell Cooperative Extension publications called *Kids in the Marketplace*.

American children ages 4 to 12 spend some \$9 billion annually and influence their parents to spend \$130 billion; teens spend another \$95 billion annually. And most of that money is discretionary spending. It's no wonder that advertisers invest billions of dollars in bombarding children and teenagers with advertisements, infomercials, in-school promotions, thousands of licensed products, kids club offers, product use in television programs and movies, and celebrity endorsements.

Advertisers intentionally promote envy and insecurity and have been so successful in this quest that some children have even murdered other children over a jacket or

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Summer reading



Frank DiMeo/University Photography
Michelle Tupesis, collections assistant at Olin Library, relaxes in the sun with Tolstoy on a bench behind Uris Library on June 23.

University names two vice presidents

By Jacquie Powers

The appointments of two Cornell vice presidents were announced Tuesday.

The announcement was made by President-elect Hunter Rawlings and Provost-elect Don M. Randel, who assume their posts July 1.

Rawlings and Randel recommended to the Executive Committee of the Board of Trustees that Ronald G. Ehrenberg, acting vice president for academic programs and planning, be named vice president for academic programs, planning and budgeting; and that H. David Lambert, acting vice president for information technologies, be named vice president for information technologies.

The Executive Committee approved the appointments, which are effective July 1, at its June 27 meeting in New York City.

Both vice presidents will report to Randel.

Rawlings and Randel also announced that Inge T. Reichenbach, acting vice president for public affairs, will continue in that role.

"These internal appointments round out the vacancies created during the past academic year by the departures of John Wiesenfeld and Stuart Lynn to other institutions. I want to express my appreciation to Provost Mal Nesheim for his leadership in bringing these appointments to conclusion. Ron Ehrenberg and Dave Lambert bring longstanding experience and judgment here at Cornell to our new administrative leadership team, and I look forward to working with them in their new capacities," Rawlings said.

Randel said of the appointments of Ehrenberg and Lambert: "Academic planning and the provision of top-quality information resources are at the heart of the



Ehrenberg



Lambert



Reichenbach

Scientists help butchers create leaner cuts of meat

By Blaine P. Friedlander Jr.

The meat from cattle, sheep and pigs that Americans eat today is substantially leaner than the fatty slabs available 15 years ago, a Cornell meat expert says.

Not only has diet changed, but animals bred for slaughter have changed as well, thanks to metabolism modifiers, improved feeds and new genetic makeups.

"There is 31 percent less fat in today's

retail cuts of pork than say 15 years ago," said Donald H. Beermann, Cornell professor of animal science. Much of the reduction in fats occurs on the butcher block, but scientists are helping the butcher out. "Less intramuscle lipid concentrations (fatty deposits) means a reduction in saturated fat."

Food scientists at Cornell and elsewhere are working to reduce the amount of fat on animal tissue, making for even leaner meat. They have been testing the use of the natural

hormone somatotropin to reduce the intermuscular, subcutaneous and intramuscular fat by about 50 percent, Beermann said. Somatotropin is a natural hormone secreted from the anterior pituitary gland in response to a peptide called somatotropin releasing hormone (SRH).

In animals somatotropin is essential for normal growth. Higher-than-normal concentrations are needed for the rapid growth

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BRIEFS

■ **Explore the Internet:** A hands-on, two-part workshop on using the World Wide Web to explore the Internet will be offered by the Olin/Kroch/Uris Reference Services Division on Wednesday, July 5, and Wednesday, July 12, from 2 to 4 p.m. in the Uris Library Computer Instruction Lab. The series will be repeated Wednesday, July 19, and Wednesday, July 26, from 2 to 4 in the same location. Contact Bob Kibbee at 255-3774 for more information.

■ **Road closed:** This weekend Campus Road between Central Avenue and Sage Avenue will be closed to allow routing of a steam line to Olin Hall. This section of Campus Road will close at 6 p.m. on June 30 and reopen by 6 p.m. on July 2.

■ **Plant Path guide:** The newly published *Cornell Plantations Path Guide* is now on sale at the Campus Store, where it broke all records for books sold at Reunion weekends, as well as at other Ithaca locations: The Bookery, Borealis Bookstore, Corner Bookstore and the Bear Necessities shop on North Campus. Mail orders of the guide are available from the Resource Center, 7 Cornell Business and Technology Park, Ithaca, N.Y. 14850, phone 255-2080. Mail-order price is \$8.50, including shipping and handling.

■ **ESG sponsors:** The Ithaca Organizing Committee is seeking sponsors to provide cash or in-kind contributions for the Empire State Games Aug. 2-6. Sponsorship levels are: platinum, \$5,000; gold, \$3,000; silver, \$2,000; bronze, \$1,000; patron, \$750. Depending on their level of support, contributors can receive a variety of benefits. Call Ezra Cornell at 273-1190.

■ **Summer permits:** Summer parking permits (valid through Aug. 25) are available at the Transportation Office. Call 255-PARK for more information.

CLARIFICATION

A story in the June 22 issue of the *Chronicle* on bus driver stress contained a transcription error in the last paragraph. The second to last sentence should read: "Most other stress research focuses on social or physical environmental factors or characteristics of the individuals studied."

CORNELL Chronicle

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Cornell in times past



A view of the Farm and Home Week cattle show on Tower Road, with the original College of Veterinary Medicine building on the left, in the early 1900s.

Division of Rare and Manuscript Collections/Carl A. Kroch Library

Countdown to fireworks begins with hourly booms

By David Stewart

Booming sounds from South Hill will be the all-clear signal for the 48th annual Ithaca Community Fireworks Show set for Monday night, July 3.

Beginning at 2 p.m. Monday, a salute that can be heard for miles around will be fired every hour on the hour by fireworks technicians as a reminder that the show is a "go." If weather conditions for Monday night are not favorable, area radio stations will carry an announcement of the rain date, which is Wednesday, July 5.

Fran Benedict, chairman of the community volunteer committee that organizes the shows, said: "We're about \$10,000 short of our fund-raising goal. We need \$25,000 and are still hopeful that area residents who want to see this community tradition kept alive will chip in before and after the show."

Donors of \$125 or more get reserved parking and seating, a barbecue buffet, pre-fireworks entertainment by country-western singer Alice Detrick and DJ Bobby Comstock, and tickets to the Ithaca Laker's

baseball game against the Schenectady Mohawks. "That's a VIP package that's hard to beat," Benedict said.

Benedict said American Fireworks Manufacturing Co. of Ithaca and Utica plans an aerial display that will last about 25 minutes.

"Once again, Ithaca College has opened up its campus parking lots, fields and facilities for the annual fireworks show, which will be visible from various points surrounding Ithaca," Benedict said. "Spectators — even VIPs — should arrive early to avoid traffic congestion, which hits its peak at about 7:30 p.m."

Motorists are reminded that there is no parking on state and county highways, especially on routes 13 and 96-B. Police and public safety officials will help direct traffic, and firefighters will be on standby.

Members of the Ithaca Sertoma Club will be on South Hill to seek donations from the public, Benedict said.

"I can't stress enough the importance of donations to support this annual event. A volunteer committee organizes the show,

and the show belongs to the community, but we can't guarantee future shows without donations. Just \$1 from each person who watches the show — whether it's from South Hill or surrounding hillsides, parks and backyards — would cover the cost of this year's show and guarantee one for 1996," he said.

Benedict added, "We'd also like to build a reserve account for the 50th anniversary show in 1997."

U.S. flag decals and pins and 3-D glasses to enhance the fireworks display are on sale at all Tompkins County Trust Co. branches. Individual, group and business donations can be sent to the attention of Benedict at the Ithaca Commons office of the Tompkins County Trust Co. by June 29.

Corporate support to promote the fireworks show is provided by Tompkins County Trust Co., radio stations WHCU and Lite 97-FM (WYXL), *The Ithaca Journal* and Time Warner Cable. Baseball tickets have been donated by Bob Dean Inc. Radio stations WHCU and Lite 97-FM will broadcast live from the Monday night show, which includes a fireworks "sky concert."

Leadership Tompkins program seeks nominees

Leadership Tompkins, a program conducted jointly by the Tompkins County Chamber of Commerce and Tompkins Cortland Community College, is designed to ensure the continuing vitality of our community by identifying and developing individuals for future leadership roles.

Each year, Cornell sponsors two university employees to participate in Leadership Tompkins.

The eighth year of the program will run from October 1995 through June 1996 and will introduce participants to the services, resources and issues facing the community, and will enhance their leadership potential through seminars, retreats and field trips.

The Office of Community Relations is seeking nominations of employees who want to develop their leadership skills

and potential, who have a strong continuing interest in and commitment to Tompkins County, and who desire to emerge as a community leader.

If you know of someone who might benefit from and contribute to the 1995-96 Leadership Tompkins program, please submit nominations to the Office of Community Relations, 110 Day Hall, by Friday, July 21.

Leaner meats *continued from page 1*

of leaner tissues. "Regulating the metabolism in the animal through use of a naturally occurring hormone — without any adverse effects on the animal — improves the animals we raise for food," he said.

"Improved nutritional composition of the meat means increased value of the meat, a reduction in the amount of nitrogen that goes back into our environment and a reduced cost of production," Beermann said. "There is less animal waste, and reduced resource input. Metabolism modifiers enhance lean meat production."

His research into metabolism modifiers has been funded by the National Livestock and Meat Board, Monsanto Co., Pittman-Moore and Merck Co. Beermann teaches courses in meat science and animal growth biology. His chapter "Carcass Composition of Animals Given Partitioning Agents" appeared in the book, *Low-Fat Meats*, (Academic Press, San Diego, 1994). A citation he wrote on growth regulators appeared in the *Kirk-*

Othmer Encyclopedia of Chemical Technology (4th edition, John Wiley & Sons, New York, 1994).

Through previous studies, Beermann

'Lean meat is a nutrient-dense food in a very desirable, palatable form. Today's leaner cuts fit very well in harmony with new dietary guidelines.'

— Donald H. Beermann

has learned that leaner cuts do not necessarily translate into higher protein meat. In some cases, the distribution of muscle weight did not change, the amount of protein was raised slightly. But, in most cases, Beermann indicated that lipid con-

centrations are replaced by water.

When comparing them to cattle and sheep, pigs lose the most fat and gain the most protein when somatotropin is administered.

"The use of partitioning agents [to get rid of the fat] should result in less fat being trimmed and removed by the packer-processors," Beermann said. "A reduction of non-trimmable fat may also occur. These benefits in conjunction with the amount of lean meat produced per animal could potentially reduce the price of meat for the consumer."

The U.S. Food and Drug Administration (FDA) regulates the uses of somatotropin. In 1993, the FDA approved use of somatotropin for use in dairy herds to increase milk production. But the FDA has not approved the use of somatotropin for fat reduction in pigs, cattle or sheep.

"Lean meat is a nutrient-dense food in a very desirable, palatable form," Beermann said. "Today's leaner cuts fit very well in harmony with new dietary guidelines."

Cooperative Extension's BUC\$ program is a winner

The Cornell Cooperative Extension program BUC\$—Building an Understanding of Credit Services—is this year's recipient of the Family Economics and Resource Management Education Award from the American Association of Family and Consumer Sciences (AAFCS).

The award was presented last Friday at the AAFCS annual conference in New Orleans.

BUC\$ is a research-based program that trains community-based volunteers to teach credit management to low-income families. Volunteers across New York state (Albany, Allegany, Chemung, Delaware, Erie, Nassau, Orange, St. Lawrence, Schenectady,

Steuben, Tompkins, Wayne and Westchester) and sites in Iowa and Colorado have been trained to lead sessions and workshops within their communities.

The program was developed under the direction of Jeanne Hogarth, associate professor; Jo Swanson, a senior extension associate and program leader for Cornell Cooperative Extension; and Jane Baker Segelken, an extension support specialist, all in the Department of Consumer Economics and Housing in the College of Human Ecology. Its scope includes financial planning and management methods, credit options, credit decision-making, shopping for and acquir-

ing credit, family communication and consumer rights and responsibilities.

The video was produced and uplinked by Media Services Educational Television Center at Cornell. The guidebook was produced by Media Services editorial and design.

The program was developed in response to 100 intensive interviews and focus group discussions with limited resource families that identified the constraints such families face. In all, more than 1,000 individuals have been through or have been affected by the program.

"We have found that BUC\$ participants reduce their monthly payments by an aver-

age of \$48 (\$576 per year), are able to pay their bills on time, trim their spending and know where to get information on credit and how to comparison shop for credit. BUC\$ has succeeded in helping participants move from the welfare rolls to the taxpayer rolls," said Cynthia Needles Fletcher, associate professor at Iowa State University.

"I have found the BUC\$ material superior to any I have used in teaching financial management," said Anne Codey, director of Family Financial Counseling Program in Nassau County.

BUC\$ is funded by the National Coalition for Consumer Education and the AT&T Consumer Credit Education Fund.

Researchers churn solutions for large-scale composting odors

By Blaine P. Friedlander Jr.

Cornell scientists have found a way to detect when compost will start to smell, a breakthrough that could significantly reduce the noxious odors that come from large-scale organic garbage recycling.

The researchers say that signature gasses appear up to 36 hours ahead of the smell, giving operators the chance to adjust water and air levels to stabilize the mix and avoid the odors.

This discovery could renew the municipal and commercial-grade composting industry, which has suffered due to complaints about odors, the scientists say.

"If we understand the process better, we can manipulate it better. Composting was once practiced as an art, now it's being made into a science," said Larry P. Walker, Cornell associate professor of agricultural and biological engineering. "We think we can provide information on a better design for moisture management and managing the aeration."

The stench is largely due to organo-sulfur compounds, such as methanethiol, dimethylsulfide and dimethyl-disulfide. Antecedent compounds such as hydrogen and carbon monoxide appear about 24 to 36 hours before the odor. By using gas chromatographs, composting operators predict the odor problem by the type of gas being emitted from the compost mix, knowing in advance what type of gas precedes what type of odor. To stave off the noxious fumes, operators can adjust their water and aeration ratios to biologically stabilize the composting mix.

Walker, James M. Gossett, Cornell professor of civil engineering; and Thomas L. Richard, Cornell senior research support specialist, are determining which gasses precede which odors.

Composting is an excellent method for handling organic waste. It reduces waste material, destroys human pathogens and provides a way of recycling valuable plant

nutrients. New York produces more than 20 million tons of municipal solid waste annually, of which about 70 percent is organic. Since 40 percent of that is moisture, that translates into 5.8 million dry tons of compostable waste, according to the researchers. Combining that waste with organic sewage sludge, New York has the potential to compost more than six million tons annually.

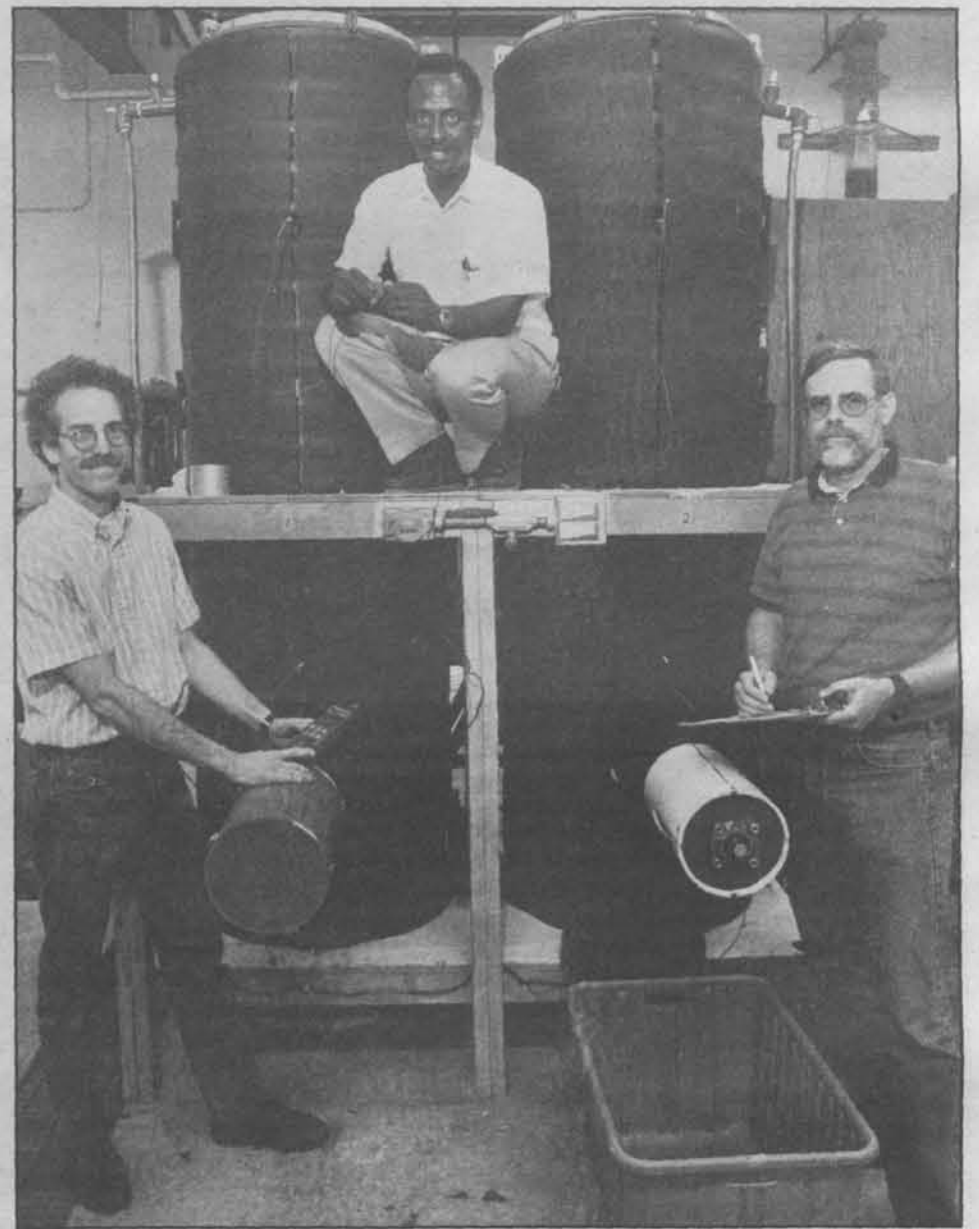
When the study started, there were 18 full-scale municipal solid waste composting plants in operation nationwide. These plants can handle between 5 and 600 tons of waste a day, and since landfill development costs are escalating—\$500,000 an acre—few real alternatives to composting exist. The researchers found in New York, for example, that there were 1,600 landfills 35 years ago. By 1997, officials predict that there will be fewer than 100 landfills in the state. New York has more than 200 composting facilities now.

Compost operators regard odor management as among the biggest problems facing the industry, the researchers said. Major facilities have spent millions of dollars trying to contain odors. In some cases, the cost of managing odor takes as much as 20 percent of a facility's annual budget.

Even with odor management, composting has other challenges: leachate formation and development of markets for the final products, for example.

Composting is a complex biological process that demands time, aeration, moisture content, porosity and some degree of biological stabilization. The process becomes much more complex than a backyard compost pile when municipalities need to compost up to 100 tons at a time.

Companies like food processors and pharmaceutical manufacturers stand to benefit, as do the energy manufacturers and localities, since they have an enormous amount of organic waste, the scientists said. Their research is sponsored by the Cornell Waste Management Institute, Rochester Gas and



Charles Harrington/University Photography

From left: Thomas Richard, senior research support specialist; Larry Walker, associate professor of agricultural and biological engineering; and James Gossett, professor of civil engineering, pose in front of a compost reactor at the pilot plant off Game Farm Road.

Electric, New York State Electric and Gas Corp., Niagara Mohawk Corp. and the New York State Energy Research and Development Authority.

"We think we can provide information on better composting design, moisture and

aeration management," Walker said. "In decomposition, everything is changing. The players are changing, the chemical composition of waste is changing and the physical structure of the waste changes. It's a dynamic process."

Tornado survivors have warning, a sturdy shelter, CU study shows

By Blaine P. Friedlander Jr.

Scientists affiliated with Cornell have learned that solid communication networks and sturdy structures hold the key to why some people survive potentially killer tornadoes. For mobile-home residents searching for shelter, the study indicated that motor vehicles offer an effective alternative to remaining in the trailer.

Survivors in the path of deadly twisters almost always had enough advance notice to seek shelter in a sturdy frame structure, the researchers said.

"Our study relates closely back to where these people were at the time of their deaths, what they knew about the impending tornado and how much time they had to seek a sturdy shelter," said Thomas W. Schmidlin, a meteorologist formerly with the Northeast Regional Climate Center at Cornell and now at Kent State University.

Schmidlin and Paul King, an environmental biologist with the Boyce Thompson Institute for Plant Research at Cornell, sifted through circumstances surrounding the deaths of 40 people in the wake of six tornadoes. Their study, *Risk Factors for Death in the 27 March 1994 Georgia and Alabama Tornadoes*, will appear in a forthcoming summer issue of the journal *Disasters*. Their research was funded by the Natural Hazards Research and Applications Information Center in Boulder, Colo.

If a mobile-home park is in the path of a tornado, a good deal of destruction might be expected, the researchers said, and individuals may be better off in a car than in a mobile home. But to really increase your survival chances, people should seek shelter in a secure frame structure.

"The wood-frame structure fared much better than the mobile home," King said. "Mobile homes are lighter, often built with

lumber of smaller dimensions and often less-securely anchored than the typical wood frame house. The result is a structure that fails at lower wind speeds."

The wooded, rural mountain region of southern Appalachia has a thin population density of 20 persons per square kilometer. In that vicinity, the National Weather Service counted six major twisters and several smaller tornadoes that touched down over an eight-hour period. Warnings had preceded the tornadoes by 10 to 20 minutes, but getting the word out in such a rural region was inefficient. Schmidlin and King found that many of the deaths occurred in areas generally out of range of the National Oceanic and Atmospheric Administration (NOAA) weather radio broadcast stations.

Among the seven people who died for which this information was available, all knew about the impending twister less than a minute before it struck. King said they apparently had

no time to react or get out of the way.

Of the dead, 20 died when an unbraced, brick wall collapsed at the Goshen Church in Cherokee County, Ala. As for the 20 other deaths, 15 were in mobile homes, two were in frame houses, one was in a motor vehicle and one was outside. On the other hand, 74 percent of the survivors interviewed, other than those in the church, were in frame houses.

Among the survivors, nearly 30 percent knew of the impending twister when they first heard the roar of the storm, about 23 percent saw it approaching and 16 percent heard the warning on television. A friend, relative or neighbor had warned another 16 percent, and 13 percent more heard the warning on the radio and 10 percent did not know about it.

The researchers also found a statistically significant survival rate among those who watched television versus those listening to the radio.

Biocontrol fungus ready to battle farm flies, entomologists say

By Roger Segelken

Special formulations containing selected strains of the fly-killing fungus, *Beauveria bassiana*, appear to be a safe and effective control for filth flies in dairy and poultry facilities, a study in Cornell's Veterinary Entomology Program has shown. If commercially produced, the fungal treatment could replace insecticides that are about to be withdrawn from the market.

"There's really nothing new about *B. bassiana*," explained D. Wes Watson, a research associate in veterinary entomology at Cornell. "It's a common soil-inhabiting fungus that was first observed attacking silk worms, and it caused great losses to the silk industry in the 1860s. There are hundreds of strains of *B. bassiana*, but few really work on house flies."

The same house flies (*Musca domestica*)

that annoy people are one of two major pests to confined livestock (the stable fly is the other). They can breed wherever moist organic material is present, especially in manure, soiled bedding and wet feed. Besides annoying animals, the flies have the potential to transmit diseases and parasites. Fly infestations may increase bacterial counts in milk, and in poultry facilities, they may contribute to the spread and transmission of salmonella.

Effective management of flies is becoming increasingly difficult because of insecticide resistance and the loss of insecticides to regulatory concerns, Watson said. He noted that chemical manufacturers are not expected to attempt the costly recertification process (as required by a 1988 amendment to the Federal Insecticide, Fungicide and Rodenticide Act) for insecticides that are marketed for "minor-use crops," as live-

stock and poultry are regarded. Many farmers are looking for alternatives to conventional fly management, Watson said, and biological control could be the answer.

In the meantime, Cornell researchers led by Donald A. Rutz, chairman of the Department of Entomology in the College of Agriculture and Life Sciences and director of the Pest Management Education program, were on the trail of pathogenic fungi. After extensive screenings of several *B. bassiana* strains, they found the most virulent one in 1993. Then they began testing various formulations to contain the fungus as well as strategies to lure flies and stimuli to make them feed on fly baits containing the fungus.

B. bassiana, like other pathogenic fungi, invades the fly host by penetrating the exoskeleton or by ingestion, Watson said. Flies can pick up fungal spores just by walking on

a fungus-treated surface, and they inadvertently spread the spores over their bodies by grooming. Germinating fungal spores produce an enzyme that allows them to penetrate the flies' bodies. Once inside, the fungus replicates and consumes the insects' internal organs and blood-like fluid, the hemolymph.

"It takes as little as five days, from penetration to death, and 100 percent (of fungus-infected flies) are dead by day seven," Watson reported from Cornell's Schwardt Laboratory, where 300,000 flies a week are raised for testing purposes. As the insect dies, the killer fungus emerges through the exoskeleton to produce a white-colored mycelial mat on the outside of the body. The mycelium contains the next generation of spores, which may be grown on artificial media and harvested for further fly control.

Consumers *continued from page 1*

pair of sneakers, Morton pointed out.

"As consumer economists, we are particularly worried that as advertisers try to persuade young children they want or need their products, children don't have the experience or cognitive sophistication to perceive the messages accurately," said Rosemary Avery, Cornell associate professor of consumer economics and an expert in consumer saving and finance.

Morton and Avery presented their concerns at the Cornell Cooperative Extension conference, Kids as Consumers, in April.

"And there's good evidence that kids, with all that money to spend, do not make as adequate decisions as we'd like," she added.

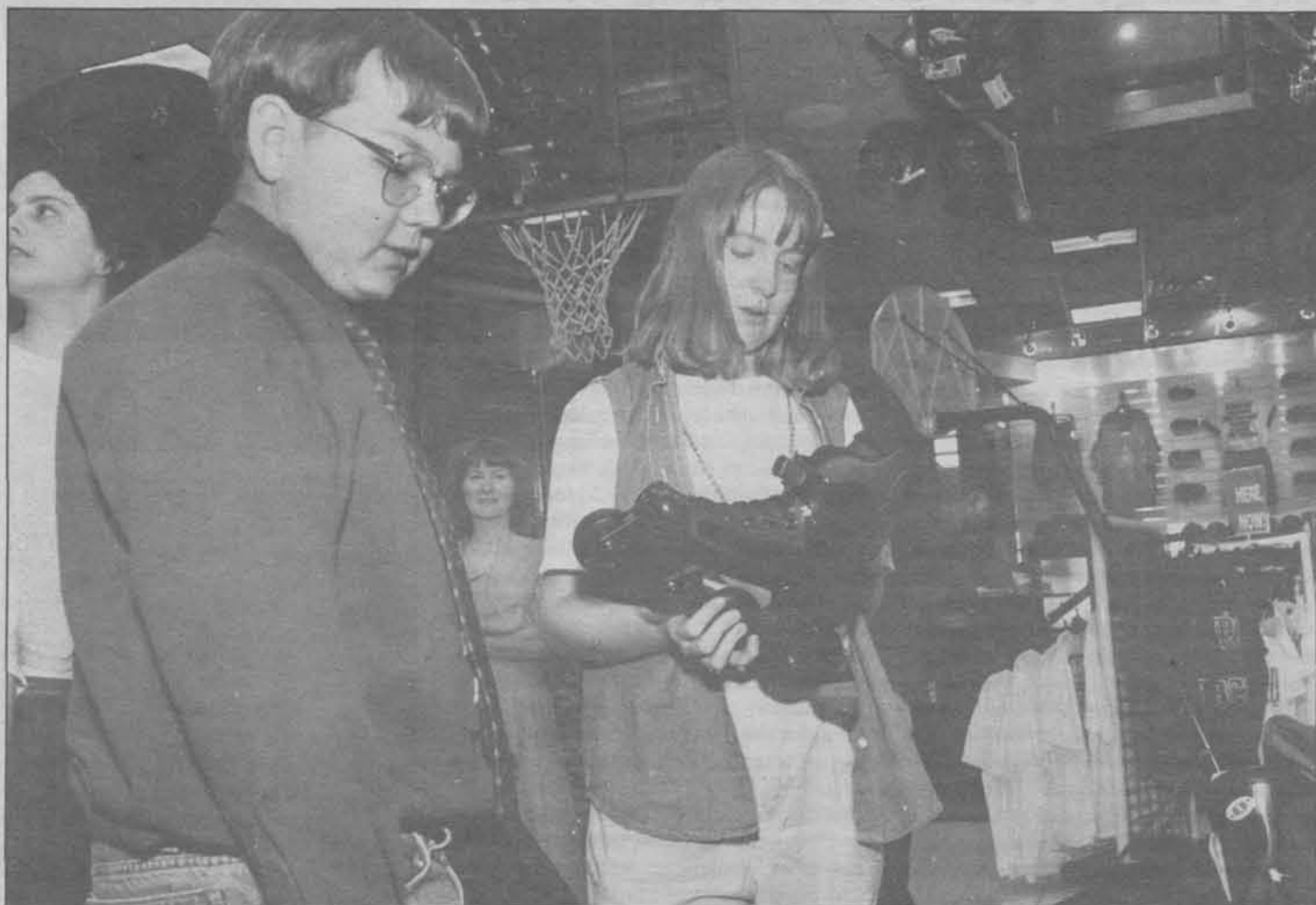
Morton and Avery called on parents to take an active role in their children's consumer education to help them become more savvy consumers and better attain their financial goals in life. Among their suggestions:

- Take advantage of "teachable" moments and talk about buying, money and product attributions, about what's appropriate or not, the concept of a good price and the intent of ads.

- Lead discussions about products after they've been purchased: Is the product what the child expected? Is he/she disappointed? Was the advertising accurate? Help your child provide negative feedback to the store or manufacturer.

- Be aware of how you are a role model. Are you a conspicuous consumer? Think about cues you give your children about your "need" for products.

- When your child wants to buy something in a store, talk about comparative shopping, quality, nutritive value and safety



Adriana Rovers/University Photography

From left: Becky Hampton, Casey Dyer and Kari Steger, from Moravia Central School, shop at Champs in the Pyramid Mall while attending a Kids as Consumers workshop on campus April 26. Lois Morton, center background, presented several of the workshop sessions.

and discuss trade-offs. "If we buy this then we won't have the money to buy that."

- Allow mistakes; let the child tell you what

the mistake was without you getting angry.

- With 27 percent of teens regularly grocery shopping, half of it at food specialty

and convenience stores, they need good guidance and better decision-making skills more than ever.

ESG tickets on sale

Nearly 20 area non-profit organizations and agencies have begun selling Master Passes for the 1995 Empire State Games, to be held in Ithaca Aug. 2-6.

At \$13 for adults and \$6 for children ages 7-12, the Master Pass is the best admission ticket for viewing competition in all 28 sports as well as the opening ceremony at Cornell's Schoellkopf Field.

"The sports fan gets a bargain by buying a Master Pass good for every event on every day of the Empire State Games, while the participating non-profits raise money by keeping a portion of the revenue from each ticket they sell," says ticket sales co-chair Jill Ciccone.

The Master Passes are now being sold by: Alcoholism Council of Tompkins County; Ithaca-Cayuga Rotary Club; Cayuga Chamber Orchestra; Ithaca Sunrise Rotary; Community School of Music and Art; Ithaca Youth Bureau; Covenant Love Community School; Kiwanis Club of Ithaca; Hobasco Lodge #716; Youth Mission; Homes Inc.; Firehouse Theatre; Ithaca Elks Lodge 636; Trumansburg All-Sport Booster Club; Ithaca High School-Rotary Interact Club; Trumansburg Boy Scout Troop #13; Ithaca Rotary Club; YMCA of Ithaca and Tompkins Co.

The special sales period will end July 23, after which Master Passes will be available through several local ticket outlets. Once the Games begin, Master Passes and Daily Passes will be available. The Daily Passes will cost \$6 for adults and \$3 for children ages 7-12. Children 6 years of age and younger will be admitted free. For information, contact Jill Ciccone at 257-8500 or Melissa Seigel at 272-6286.

Vice Presidents *continued from page 1*

agenda for Cornell faculty and students. I have great confidence that Ron and Dave will soon be recognized for their major contributions to strengthening our academic and administrative missions."

Ehrenberg, the Irving M. Ives Professor of Industrial and Labor Relations, was named acting vice president March 31. In addition to his endowed faculty post, Ehrenberg is professor of economics, director of research for the School of Industrial and Labor Relations (ILR) and director of ILR's Institute for Labor Market Policies.

A member of the Cornell faculty for 20 years, his fields of teaching and research have been labor economics and the economics of higher education. He has regularly taught a course titled "Economic Analysis of the University."

Ehrenberg's most recent book is *Labor Markets and Integrating National Economies* (Brookings Institution, 1994). Currently he is pursuing research on issues relating to the race, gender and ethnicity of American teachers and students under grants from the William H. Donner and Andrew W. Mellon Foundations, and is working on a book on historically black colleges and universities to be published by Brookings.

Active in administration and faculty governance at

Cornell, Ehrenberg has served as chair of the Department of Labor Economics (1976-1981), is active in the Faculty Council of Representatives and is co-chair of the "Faculty of the Future" subcommittee of Cornell's Strategic Planning Advisory Committee.

Lambert, formerly director of network resources, was named acting vice president July 1, 1994. He has more than 20 years of professional experience in information and communications technology.

Before coming to Cornell in 1989, Lambert was assistant director for network services at Indiana University. He has a B.A. and an M.A. in political science from West Virginia University in 1971 and 1972, respectively.

Reichenbach, formerly director of university development, has been serving as acting vice president for public affairs since the death of Vice President Richard M. Ramin May 27.

Reichenbach joined Cornell's development office as a corporate researcher in 1979. She became assistant director of capital projects and directed development and alumni affairs for the College of Arts and Sciences.

Reichenbach became director of development at Wesleyan University in 1986 and in June 1988 rejoined Cornell as director of development.

DNA workshop explores issues, offers new skills

By Roger Segelken and Larry Bernard

If the O.J. Simpson trial still needs expert witnesses, the graduates of "DNA in the Real World," a three-day, hands-on workshop conducted here last week by Cornell staff and scientists, are ready to go.

DNA fingerprinting, PCR (polymerase chain reaction) and genetic transformation are now more than exotic terms for some two dozen members of the news media, college and high school teachers and other interested individuals who learned new skills and pondered weighty issues in the second annual Josephine L. Hopkins Foundation Workshop at Cornell.

Financial support from the Hopkins Foundation provided tuition and room and board for participants in the three-day workshop, which was organized by the Department of Astronomy, Division of Biological Sciences, Department of Science and Technology Studies, University Relations and the Cornell News Service.

After a welcome by Henrik N. Dullea, vice president for university relations, participants were immersed in a world of DNA.

Laboratory sessions and lectures ranging from plant genetic engineering and 3-D structures of DNA binding proteins to electrophoresis and the transformation of *E. coli* were conducted by faculty and staff members of the sections of genetics and development and biochemistry, molecular and cell biology.

Instructors Rita Calvo and Jim Blankenship made it fun, too, by adding some suspense. They separated the participants into two groups, and each group had a "murderer" who had to be fingered by matching DNA fingerprints.

"We made it a crime scene, and they had to compare genetic fingerprints," Blankenship said. "This is what really happens."

The closest that Salle E. Richards gets to DNA fingerprinting is writing about criminal cases for the *Elmira Star-Gazette*.

"The value is in the hands-on workshop," Richards said. "To actually go through the steps gives you a feel for how the research is done. After you deal daily with police reports, it's great to suddenly be in the lab to see how it's done."

"Doing the bench chemistry brings these concepts home in a way that no amount of reading background can provide," said Steve Mirsky (M.S. Chem '85), a freelance writer for *Scientific American* and other publications.

Attending were writers who contribute to *Scientific American*, *Audubon*, *The Scientist* and *Science* magazines; newspapers such as the *Christian Science Monitor*, *Ithaca Journal* and *Elmira Star-Gazette*; and broadcast outlets such as *Nova* and WXXI in Rochester.

Also participating were teachers from Hamilton College, Colgate University, Manhattan College, St. Lawrence University and high school science teachers from around the Northeast.

Yervant Terzian, chairman of the Astronomy Department and principal organizer of the program, said the Hopkins Foundation provides a critical need.

"In the spirit of informing the public on the most recent developments, discoveries and understandings of the physical, biological and applied sciences, the Hopkins Foundation has been sponsoring workshops for journalists, TV news reporters, schoolteachers and school administrators. These are the people who communicate most effectively with the public. In the future, we plan also to invite politicians. Education is the most important virtue at any age. At Cornell the faculty has done an outstanding job in leading these workshops, and I hope the excitement generated by these workshops can spread out to other subjects."

"Our goal was to reach people who influence other people, especially teachers and journalists," said Bruce



Photos by Charles Harrington/University Photography

Participants in the "DNA in the Real World" workshop made their own DNA fingerprints through polymerase chain reaction and manipulated DNA molecules on 3D workstations in Stimson Hall. In top photo, Louise Barr, right, and Joyce Henniger learn how to manipulate a 3D crystalline model of a DNA molecule wrapped in a protein. In bottom photo, Steve Mirsky, left, author and freelance writer, gets instruction on PCR from Jim Blankenship, lecturer in biochemistry, molecular and cell biology.

Lewenstein, associate professor of communication and of science and technology studies who helped organize the workshop. "The sessions were a really good introduction to DNA and population genetics, and we had extended discussions of the social issues related to the science."

"This is important for Cornell, because not only are we a top teaching and research university, but as a land grant university we have an obligation to take things we know and talk about to people off campus, so they can use that information. Our teachers are really good teachers, not just for our own students, but for the world at large."

Between lab sessions, workshop attendees took part in discussions on the genetic basis of behavior, extraterrestrial life, DNA evidence in the courtroom and inherited intelligence. They also viewed the 3D classroom and took a tour of crystalline DNA samples provided by Steve Ealick, professor of biochemistry, mo-

lecular and cell biology.

Two specialists in human intelligence, Urie Bronfenbrenner, the Jacob Gould Schurman Professor Emeritus of Human Development and Family Studies, and Stephen Ceci, the Helen L. Carr Professor of Developmental Psychology, reviewed the book, *The Bell Curve*, while emphasizing the role of learning environments for I.Q. scores.

The controversial 1994 book by Richard Herrnstein and Charles Murray, which is subtitled *Intelligence and Class Structure in American Life*, misuses generally accepted data and is filled with contradictions, Bronfenbrenner said. Worse than promoting debate about children's intelligence along racial lines, the book distracts attention from a factor just as important as genetics — the environment in which intellectual capacity develops, said Bronfenbrenner, a longtime advocate of early education programs such as Head Start. Single-parent homes and chaotic

classrooms are not conducive to developing intelligence in children of any race or genetic potential, he said.

The dual roles of environment and genetics also were emphasized by Rita Calvo, senior lecturer in genetics and development, in discussing the causes of human behavior. Genes are not destiny, or at least not the sole determinant of destiny, Calvo observed. She pointed, as an example, to the inherited potential for PKU retardation, which can be almost completely overcome with a prescribed diet during PKU kids' growing years.

Gene tests at birth for PKU retardation are now routine in most states, but more extensive genetic screening for disease predispositions will raise ethical issues as more of the human genome is plotted, Calvo said. The genetic screening issue prompted further discussion following the geneticist's lecture. Among the debated questions: Should states mandate treatment for treatable, inherited diseases? And should medical schools deny costly educations to students with the potential for Parkinson's disease, knowing that the graduates almost certainly will have brief lifetimes?

Sheila Jasanoff, professor and chair of the Department of Science and Technology Studies, gave the banquet address on Thursday night. Titled "Seeing Is Believing," she discussed the way in which the two cultures of science and the law "see" things differently.

"There are problems clearly in translating DNA fingerprinting from the lab and into the courts," she told the group. "'Seeing' in the courtroom entails other problems." For example, in the O.J. Simpson criminal trial, prosecutors claimed a videotape of the crime scene would not give an actual portrayal of the scene, because of the biases of the person taking the pictures.

"In other words, it's not replicating human sight. So here you have sight and representation a problem in a court. You wouldn't think it would be a problem," she said.

Commenting on the defense attorneys who would not accept the DNA evidence by the prosecution's laboratory, she said, "Even if you standardize (laboratory) procedures, there still will be conflicts if both sides don't trust each other. If you begin to distrust the prediction of scientific data, you can question any area of science . . . There is a culture clash between law and science. But the deeper problem is who we are going to trust in our society."

CU food scientists help winemakers sweeten mead

By Linda McCandless

GENEVA — After a hard day pillaging and plundering, Celtic warriors in 500 A.D. would help themselves to robust tankards of mead, or honey wine, a drink that probably tasted as harsh as their lifestyle. Today's mead drinkers may be fighting holiday traffic and a shrinking dollar, but they won't be fighting taste. Food scientists at Cornell's Agricultural Experiment Station in Geneva have transformed mead into a drink so improved that it is quickly gaining acceptance in upscale wine markets across the country.

The technique of ultrafiltration of honey was developed by Bob Kime, research support specialist, who is working with food scientists Mark McLellan and C.Y. Lee. They published their first paper on the process in 1991 and are waiting to hear about the patent they applied for under the aegis of the Cornell Research Foundation. In the meantime, though, requests for information about ultrafiltration have been pouring in from all over the world.

'It is great to see the successful transfer of our research results and knowledge into a new product in New York state's food industry.'

— Mark McLellan

"It is great to see the successful transfer of our research results and knowledge into a new product in New York state's food industry," McLellan said. He points to the recent adoption of the method by Lakewood Vineyards in Watkins Glen as "a good example of cooperation between the university and a small company."

Chris Stamp of Lakewood Vineyards, 14 miles north of Watkins Glen, is one of five winemakers in the country to commercially apply the ultrafiltration technique to mead. The Stamp family has been growing grapes for four generations and crafting wines from Vinifera, French-American and Lambrusca grapes for six years.

Two years ago, they started investigating the idea of making mead. Stamp (a Cornell graduate) processed his first 50 gallons of honey juice at the Experiment Station's Food Pilot Plant in cooperation with the three scientists from the Food Science & Technology Department. He processed another 100 gallons at the Station to create product for a test market and, in March 1994, produced his first 500-gallon batch on his own using the ultrafiltration equipment he bought used from a grape juice company in Alabama. He finished

bottling his second 500 gallons on the farm last September.

The conventional way of making mead is to boil it for at least an hour to destroy the proteins that cause haziness and instability. "Prolonged boiling results in a harsh flavor that has traditionally been masked by the addition of more sugar," said Kime, a beekeeper who first got interested in the ultrafiltration of honey after Robert Stevens of Odin's Mead in Greenwich, N.Y., asked him if boiling honey affected the flavor of mead during a New York Honey Producers Meeting. Using the traditional method, fermentation takes five or six months, and it can take another five to seven years to age out the bitterness and the astringency. "Some monks and mead companies still age it that long," Kime said.

The semipermeable membranes in the filter cartridges of the ultrafiltration unit separate out the larger proteins without heating, leaving in flavor components, sugars and small peptides. After the honey is filtered, yeast, acid (either malic, citric or tartaric) and a yeast nutrient are added to produce a crystal-clear honey wine that can be bottled and drunk in just 10 days — a product that "people rate right up there with the finest grape wine," Kime said.

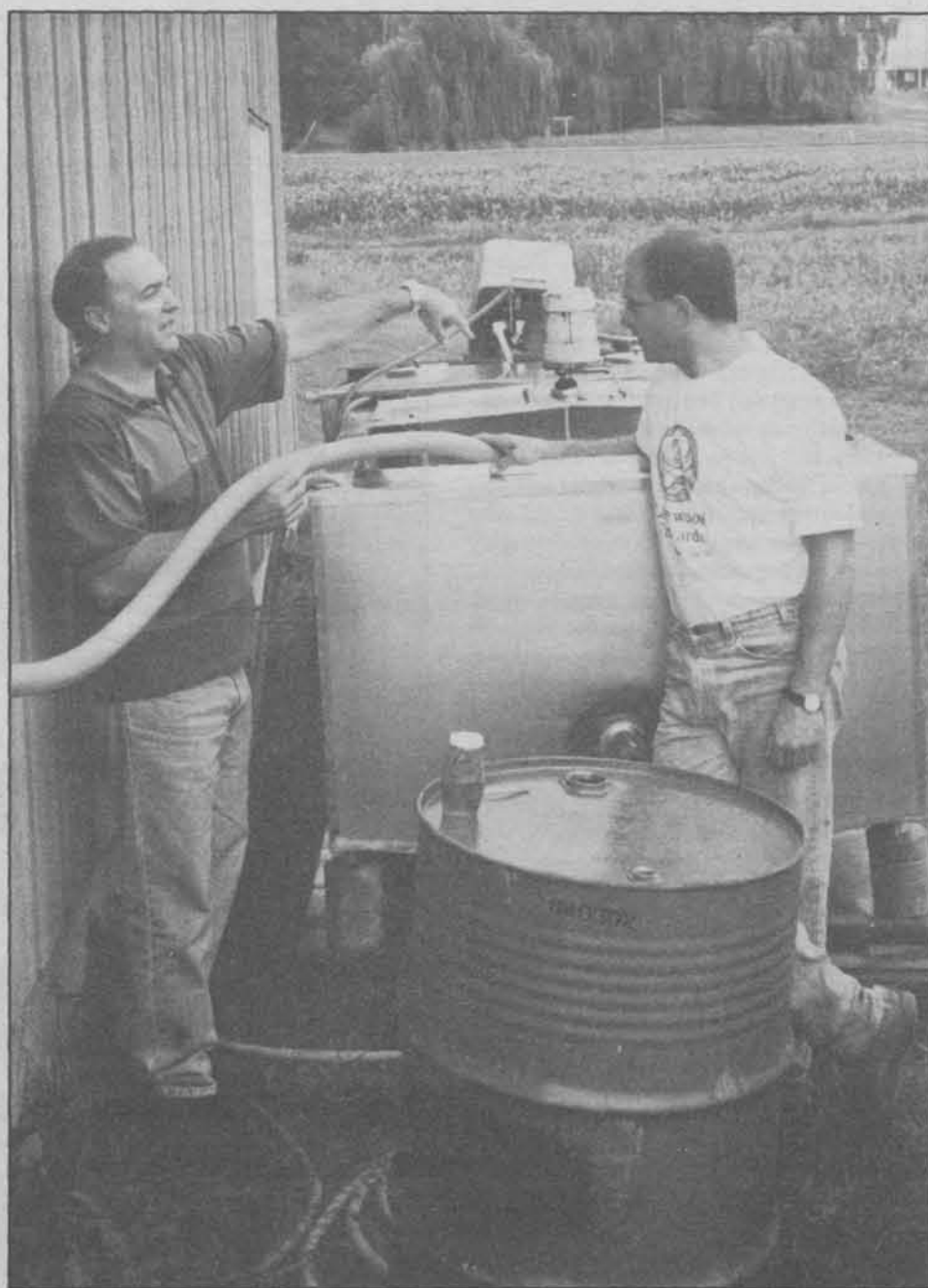
A paste-like sludge that contains all the protein constitutes the five gallons of waste after ultrafiltering 500 gallons of honey. "The waste probably also contains an anti-oxidant agent, which means it may have potential use in clarifying fruit juices," Kime said. "Additional research is being planned jointly with the Enology Program in Geneva in order to expand our understanding of the mead-making process." Among other things, the scientists are investigating meads made from particular flavors of honey, including clover and buckwheat.

"We were interested in this filtration unit and making mead because our production facility was underutilized six months of the year," Stamp explained during a visit to his facilities last December.

Because this was only the second batch ever filtered on the farm, Stamp was being extremely methodical and careful in the startup and operation of the stainless steel ultrafiltration unit. Filtering honey and water at 30 psi requires tightly clamped hoses and valve lines that are open so filtration cartridges valued at \$1,500 (there are 20 of them) don't blow.

Fruit juice companies have been applying ultrafiltration commercially to apple and grape juice since the 1970s. The membrane crossflow technique was developed in 1959. New ultrafiltration equipment retails for \$100,000.

"Ultrafiltration processing directly benefits the rural economy," said Stamp. "Not only does it benefit farm wineries by allowing us to diversify our product line with a



NYS Agricultural Experiment Station/Cornell
Bob Kime, left, research support specialist, consults with Chris Stamp of Lakewood Vineyards about the honey being pumped into the ultrafiltration unit to make mead.

new and unusual type of wine, it also benefits our neighbors who keep bees, because they can count on marketing honey to us." On this particular day, Stamp planned on ultrafiltering 500 gallons of honey from Wixon's, a neighboring bee company, turning it into a saleable product within 10 days.

In addition to bottling straight honey mead, Stamp combines the mead with raspberry or cherry juices that he buys from local fruit farmers to make fruit mead, or Melomel, which also is gaining acceptance with consumers.

The Stamps have been test-marketing the 12 percent alcohol wine in New York under the name "Mystic Mead." "We sell it for \$6.99 for a 750 ml. bottle," said Liz Stamp, who runs the tasting room at Lakewood. She runs taste-tests to determine which foods go well with mead. "So far, mead is a good accompaniment to ham, barbecued foods and Oriental foods, particularly sweet and sour dishes," she said. Sweeter meads, like those flavored with fruit juices, can be sipped as dessert wines.

Buckwheat mead, which has a stronger taste, goes well with sharply flavored hors d'oeuvres.

Of the 15 U.S. companies that currently produce mead, three are located in New York state. Odin's Mead in Greenwich and Earle's Mead in Locke also are working on ultrafiltration in collaboration with the Food Science & Technology Department at the Experiment Station in Geneva.

By improving the taste of mead so that it competes well in upscale wine markets and decreasing the amount of time it takes to produce, farm wineries can expect to make year-round use of their equipment and take advantage of honey, which is a plentiful and undermarketed commodity. Current production and use of honey in the United States is steady at about 200 million pounds per year.

Meanwhile, the outlook is good for the "new" mead, whose growing popularity among wine drinkers has much to do with its improved taste. As Liz and Chris Stamp happily admit: "We can't keep up with the demand!"

Herbert F. Johnson Museum's activities are heating up this summer

Summer programming at Cornell's Herbert F. Johnson Museum of Art heats up this summer with activities for the entire family.

Visitors of all ages may enjoy an afternoon of free demonstrations and hands-on activities as the Johnson Museum presents "Brush Up! Articipation at the Museum," Saturday, July 15, from 11 a.m. to 3 p.m. Artist Kathy Taylor will discuss oil painting and the importance of the right brush, from 11 a.m. to 1 p.m.; Jim Hardesty will demonstrate Chinese brush-painting techniques from 11 a.m. to 3 p.m.; and Lora Arbrador will show visitors how to master egg tempera painting from 1 to 3 p.m. Visitors also will have the opportunity to see videos and create pictures to take home. Children must be accompa-

nied by an adult.

Adults are invited to discover a variety of expressive interpretations of the landscape in the studio workshop, "Landscapes: Real, Imagined and Remembered," on Tuesdays and Thursdays, July 11-27, from 10 a.m. to 1 p.m. Participants will work outdoors and in the galleries with several media, such as painting, drawing and collage. All skill levels are welcome. The workshop will be led by Linda Price, the museum's coordinator of school programs and an exhibiting painter.

Fees are \$75 for members and \$85 for non-members. Materials are not included in this fee. Call 255-6464 before June 30 to register.

Price will lead a workshop on "Color Woodblock Printmaking" Saturday, July

22, from 10 a.m. to 4 p.m. Fees are \$35 for members and \$45 for non-members, plus an additional \$15 materials fee. Call 255-6464 before July 14 to register.

Thursday talks and Sunday afternoon tours help to enrich the adult visitor's experience of art. The "12 O'Clock Sharp": Thursday Noontime Gallery Talks are 40-minute tours that highlight the museum's exhibitions and permanent collection. Artwork collected by Ithaca-area residents is the topic of the July 6 talk with Matthew Armstrong, associate curator of painting and sculpture, who will discuss the current exhibition "Ithaca Collects." Armstrong also will give the July 20 tour of "The Fires of War: Paintings by Susan Crile," which includes images of the Gulf War. The noontime talks feature

printroom assistant Carolyn Peter on the exhibition "In Celebration: Women's Rights and Women's Art" Aug. 3, and curator Nancy Green on the exhibition "Fakes and Forgeries" Aug. 17.

Sunday Afternoon Artbreaks will take place in July at 2 p.m. These talks and performances include "Portraits of Women: Dances by Jill Becker," an afternoon of modern dance pieces based on women from history, July 9; San Francisco painter Lora Arbrador on "Egg Tempera: Past and Present" July 16 at 2 p.m.; and artist and teacher Gillian Pederson-Krag on "Looking at Paintings: The Experience of Being Moved" July 23. Concluding the Sunday afternoon series is a discussion of "The Islamic Collection" July 30 with docent Maryterese Pasquale.

New book depicts life in E. Africa from 1920s

By Susan Lang

In 1924, a young British doctor and his new wife answered an ad to run a hospital in remote Tanganyika (now Tanzania) in East Africa. Little did they expect the three-room shack that served as home, hunters maimed by lions, long walking safaris to bring medical treatment to remote villages and a "wild west" gold rush or the myriad of "large hairy" spiders and scorpions lurking near the "yawning 10-foot pit" that served as their latrine.

Bewildered, bemused and soon be-

'I think my mother captured the essence of tribal Africa, of nature untamed, of eccentric whites who "escaped" from Europe or North America for different reasons and of exotic tropical diseases. And [the book] shows how a strong and intelligent woman dealt with all this.'

— Michael Latham

Africa (Radcliff Press, 1995, and distributed in the United States by St. Martin's Press in New York, \$39.95), co-authored by mother and son, Gwynneth Latham and Michael Latham.

"I think my mother captured the essence of tribal Africa, of nature untamed, of eccentric whites who 'escaped' from Europe or North America for different reasons and of exotic tropical diseases," says Michael Latham. "And it shows how a strong and intelligent woman dealt with all this."

Gwen writes of how she was guided in the early months by a 7-year-old local girl who served as her translator and cultural interpreter, how she became her husband's surgical assistant despite her complete lack of medical background, of women who were supposedly "kidnapped" by trained crocodiles to serve as slaves to their masters and of the 10 stations the couple lived in during their 20 years in Africa.

Michael Latham, who worked in Tanzania from 1955 to 1964, includes chapters interspersed with his mother's that put his parents' lives in historical context as well as fill in missing details. His father, for example, was the first Englishman to reach the summit of Kilimanjaro, Africa's highest mountain, and the first to scale one of the mountain's five main peaks (which today is named Latham Peak).

Latham also describes his experiences in Tanzania as a young doctor in the 1950s before and after independence and his role as director of the nutrition unit in the Ministry of Health in Dar es Salaam in Tanzania's fledgling government.

The book provides a fascinating picture of a peaceful transition from colonial rule to independence. Most of this family saga describes a British family's 50-year love affair with Africa and its people.

Latham, who has been a professor of international nutrition at Cornell for 25 years, is an expert in international nutrition and tropical public health. The author of several books, including *Human Nutrition in Tropical Africa* and forthcoming *Human Nutri-*

witched by the splendor of the land and people living in the shadow of Mount Kilimanjaro, Gwynneth and Donald Latham spent 20 years in East Africa, raising two sons and serving as the only medical resource for miles around.

One of those sons, Michael Latham, professor of international nutrition at Cornell who was born in Tanganyika in 1928 and later also served as a physician there in the 1950s, discovered his mother's journal upon her death in 1972. It depicted her pioneering life in rural areas and small African towns in the 1920s and 1930s. Those writings now are the basis of the new book, *Kilimanjaro Tales: The Saga of a Medical Family in*



Robert Barker/University Photography

Michael Latham, professor of international nutrition, in his office in Savage Hall with his new book.

tion in the Developing World and more than 350 journal articles, Latham frequently serves as a consultant in Africa, Asia and Latin America for WHO, FAO, UNICEF, the World Bank and the White House. Recently, he consulted with Fidel Castro on how to curb Cuba's neuropathy epidemic.

In 1965 at age 37, Latham was awarded the Order of the British Empire by Queen Elizabeth II for his work in developing the nutrition unit. The award also recognized his leadership in establishing the International School, an integrated primary school in Dar es Salaam.

Researchers make major advance in string theory of the universe

By Larry Bernard

Cornell researchers have made a major advance in the long-sought effort to find a grand unifying theory of the laws of nature describing the universe.

The advance in so-called string theory — the closest theory yet that would unite the laws of gravity with quantum mechanics — establishes that space and time can evolve in a manner far more radical than allowed by Einstein's general theory of relativity.

According to general relativity, space-time can stretch — leading to the familiar notion of an expanding universe — but it cannot "rip."

Thus it had been thought that the universe could not evolve in a way analogous to a doughnut evolving into a sphere. "You have to rip the doughnut in at least one spot in order to make that transition," said Brian R. Greene, Cornell associate professor of physics who led the work. "It had been thought such a rip could not occur in the fabric of space and time."

But Greene, with David Morrison, a Duke University mathematician visiting Cornell this semester, and Andrew Strominger of the University of California at Santa Barbara, found that not only is such a transition possible, but it's "no more exotic than the phase transition of water to ice," Greene said.

The mechanism behind this phase transition involves a certain kind of black hole, one that carries a charge (analogous to elec-

tric charge). During the phase transition, these black holes condense into particles that are very much like the known fundamental particles of nature — quarks, leptons, electrons, protons and so forth. This phase transition from a black hole to what appear to be fundamental particles defied the known laws of physics.

But the researchers have shown that black holes and elementary particles, at the quantum level, are just two different descriptions of the same physical object — each being natural in a particular phase.

"The findings are quite basic to the essential nature of space and time themselves," Greene said. "When you follow the transition in detail, what appear to be black holes in the first phase — analogous to water — evolve into fundamental particles in the second phase — analogous to ice. That is, the black holes reappear as more conventional elementary particles, such as electrons or quarks. You can watch a black hole evolve from what appears to be something vastly different from a particle of matter, into an elementary particle."

Greene, Morrison and Strominger presented their findings June 9 at a conference in Trieste, Italy, "S-Duality and Mirror Symmetry" at the International Center for Theoretical Physics. They have submitted their paper to the journal *Nuclear Physics B*.

Although their work is a major step, Greene cautioned that string theory, a way to reconcile what happened after the big bang with the laws of nature, still is a long way from being proved.

"Many of us believe the string theory is the final grand unified theory. But our present understanding of it is far from being able to establish it as fact, and there certainly is no

way to experimentally test it yet," he said. "This work takes us forward in the overall program of trying to extract physical features of string theory that really characterize its most fundamental aspects. It's a very satisfying development."

A major obstacle to testing string theory is the large number of solutions that can be found to its basic equations. The present work, by establishing a new class of space-time transitions, shows that many of these solutions are not really distinct but rather are different phases of the same solution — again, just as water and ice have the same molecular composition, H₂O.

Said Morrison: "This restores the hope that there will be just a few solutions to the string theory equations. We don't know what the number of solutions are or what they will look like. But this is a major advance, giving us hope that there are only a handful of solutions that we can ultimately test to find out which one is the model for the universe we're living in."

String theory is an attempt to reconcile all the known minuscule particles of nature with the forces that control them. The theory supposes that all matter, from subatomic quarks to gigantic supernovae, are made of extremely tiny stringed loops that, when vibrated like the string of a violin in 10 dimensions, give rise to a variety of particles. The dimensions are the four known, plus six unknown. This work is in the context of the six other dimensions.

This latest work, funded by the National Science Foundation and the Alfred P. Sloan Foundation, means that there is no distinction between these kinds of black holes and strings, or, for that matter, between elementary particles and black holes.

"In the context of string theory, there are configurations which are naturally associated with elementary particles, the electrons, quarks, protons, etc. And there are also other configurations naturally associated with black holes," Greene said. "What wasn't clear, but becomes obvious with this work, is that black holes and elementary particles really are one and the same thing as they smoothly change from one to another."

The findings came about after Greene and Morrison, frequent collaborators, viewed in an electronic archive a paper Strominger wrote about situations in which including charged black holes solved some problems where the physics previously seemed to "go bad," Greene said. The troika immediately began a collaboration and, in what Morrison calls "an intense eight days," came up with the new work.

Their next step is to see if the unification they propose applies to other portions, or types, of string theory, and how those portions interact with each other.

"This work allows for far more drastic changes in the basic structure of space-time than any of us really thought would be possible," Greene said.

A grand unified theory is a holy grail of theoretical physics. Such a theory would "unite" nature and all its laws, bringing gravity and other forces, such as the weak force and the strong force, under one umbrella with known particles of nature. So far, the only theory that attempts to do that is string theory.

Said Morrison: "Although we're far from being able to test it in a lab, our view is that, at present, there is only one viable proposal for unifying quantum mechanics and gravity, and that is string theory."



Greene

CALENDAR

June 29
through
July 13

All items for the Chronicle Calendar should be submitted (typewritten, double spaced) by campus mail, U.S. mail or in person to Chronicle Calendar, Cornell News Service, Village Green, 840 Hanshaw Road.

Notices should be sent to arrive 10 days prior to publication and should include the name and telephone number of a person who can be called if there are questions.

Notices should also include the subheading of the calendar in which the item should appear.

dance

Cornell International Folkdancers

Open to the Cornell community and the general public. All events are free unless otherwise noted. Beginners are welcome; no partners are needed. For information, call Edilia at 387-6547 or Marguerite at 539-7335.

July 2, 7:30 p.m., Greek dances; 8:30 p.m., open dancing and requests, Maplewood Community Center.

July 9, 7:30 p.m., tango; 8:30 p.m., open dancing and requests, Maplewood Community Center.

Israeli Folk Dancing

Thursdays through Aug. 17, 8 to 10 p.m., Maplewood Park Community Center; instruction and request dancing, free and open. For information, call 272-4623.

exhibits

Johnson Art Museum

The Herbert F. Johnson Museum of Art, on the corner of University and Central avenues, is open Tuesday through Sunday from 10 a.m. to 5 p.m. Admission is free. Telephone: 255-6464.

- "Ziet, de dag komt aan: Dutch Landscape Prints and Drawings," through Aug. 6. These scenes from the permanent collection are by artists such as Jacob van Ruisdael, Jan van de Velde, Adam Pynacker and Isaac de Moucheron.

- "Paintings From the Boissier-Leviant-Smithies Collection," through Aug. 27. This collection presents important works by renowned Latin American painters of the late-1940s and 1950s.

- "Ithaca Collects," through Aug. 6. This group of works borrowed from residents of the Ithaca area range from Asian ceramics to contemporary American painting.

- "The Fires of War: Paintings by Susan Crile," through Aug. 13. Crile spent several months in Kuwait after the Persian Gulf War and observed the ecological devastation of that country's burning oil fields. Her large-scale paintings and works on paper capture all the terror and awe of modern warfare and its consequences. Crile will hold a lecture on her series July 12 at 4:30 p.m. Visitors are invited to stay for a public reception from 5 to 8 p.m. following the lecture.

- "In Celebration: Women's Rights and Women's Art," July 1 through Aug. 27. This exhibition recognizes the 75th anniversary of the passage of women's voting rights, featuring works by women artists who were active during the late-19th and early-20th centuries, when the suffragist movement began to gather strength.

- "12 O'Clock Sharp: Thursday Noontime Gallery Talks": On July 6, Matthew Armstrong, associate curator of painting and sculpture, will lead a tour of the "Ithaca Collects" exhibition.

- Sunday Afternoon Artbreak: July 9, 2 p.m., "In Celebration: Women's Rights and Women's Art" with Amy Oliver, curatorial assistant.

Cornell Plantations

Council for the Arts grant recipient Erin Caruth's sculpture, "Hope's Threshold," is on display in the Zucker Shrub Garden, F.R. Newman Arboretum, through June 30.

Kroch Library

"Cornell History Exhibition," through September.

Tjaden Gallery

"New Lives on Old Land: Picturing Life in the Afar Rift Valley of Ethiopia," a work in progress by Nanci Kahn, visiting assistant professor of photography, is on view through July 1.

graduate bulletin

• **August degree deadline:** Friday, Aug. 25, is the deadline for completing all requirements for an

August degree, including submitting the thesis/dissertation to the Graduate School.

• **Publications on TurboGopher/CIINFO:** Several publications of the Graduate School are now on the electronic internet server and are accessible both on campus and worldwide. The application booklet, a complete description of the fields with the 1,600 faculty members and their research, the fellowship notebook, and this weekly announcements column are available. Prospective applicants also can request an application packet through the Internet. Check under "Academic Life" and then "Grad School." This information also will be available on the World Wide Web within a few weeks.

lectures

Summer Sessions

- Perry Ground, Cornell alumnus and Native American, presents "Iroquois Stories," traditional narrative that has been told for hundreds of years, July 5, 7:45 p.m., Alumni Auditorium, Kennedy Hall.

- Fund for Animals founder Cleveland Amory takes a humorous look at the job of animal protection in his talk, "Domestic Policies, Foreign Policies and Cats," July 12, 7:45 p.m., Alumni Auditorium, Kennedy Hall.



Marlene Dietrich portrays a seductive nightclub singer in Josef von Sternberg's *The Blue Angel*, playing at Cornell Cinema July 5 at 7 p.m.

films

Films listed are sponsored by Cornell Cinema unless otherwise noted and are open to the public. All films are \$4.50 (\$4 for students), except for Tuesday night Cinema Off-Center (\$2) and Sunday matinees (\$3.50). Films are held in Willard Straight Theatre except where noted.

Thursday, 6/29

"L. 627" (1994), directed by Bertrand Tavernier, with Didier Bezace and Lara Guirao, 7 p.m.

"True Lies" (1994), directed by James Cameron, with Arnold Schwarzenegger, 10 p.m.

Friday, 6/30

"Before Sunrise" (1995), directed by Richard Linklater, with Ethan Hawke, 7:30 p.m.

"Gimme Shelter" (1970), directed by David Maysles, with Mick Jagger, 9:45 p.m.

Saturday, 7/1

"True Lies," 7:15 p.m.

"Before Sunrise," 10:10 p.m.

Sunday, 7/2

"Before Sunrise," 7:30 p.m.

Monday, 7/3

"Open City" (1945), directed by Roberto Rossellini, with Aldo Fabrizzi, Anna Magnani and Marcello Pagliero, 7 p.m.

"True Lies," 9:30 p.m.

Tuesday, 7/4

"The Wild Bunch: Director's Cut" (1969), directed by Sam Peckinpah, with William Holden and Ernest Borgnine, 7 p.m.

"Outbreak" (1995), directed by Wolfgang Petersen, with Dustin Hoffman, Morgan Freeman and Donald Sutherland, 10 p.m.

Wednesday, 7/5

"The Blue Angel" (1930), directed by Josef von Sternberg, with Marlene Dietrich and Emil Jannings, with an introduction by Professor Sander Gilman, 7 p.m.

"The Shawshank Redemption" (1994), directed by Frank Darabont, with Morgan Freeman and Tim Robbins, 9:30 p.m.

Thursday, 7/6

"The Shawshank Redemption," 7 p.m.

"Outbreak," 10 p.m.

Friday, 7/7

"Mamma Roma" (1962), directed by Pier Paolo Pasolini, with Anna Magnani and Ettore Gaofolo, 7:15 p.m.

"The Wild Bunch: Director's Cut," 9:45 p.m.

Saturday, 7/8

"Twitch and Shout," with guest filmmaker Laurel Chiten, 7:15 p.m.

"Outbreak," 9:30 p.m.

Sunday, 7/9

"The Shawshank Redemption," 7:30 p.m.

Monday, 7/10

"The Seven Year Itch" (1955), directed by Billy Wilder, with Marilyn Monroe and Tom Ewell, 7 p.m.

"Outbreak," 9:30 p.m.

Tuesday, 7/11

"Mamma Roma," 7:10 p.m.

"The Wild Bunch: Director's Cut," 9:30 p.m.

Wednesday, 7/12

"Morocco" (1930), directed by Josef von Sternberg, with Marlene Dietrich, Gary Cooper and Adolphe Menjou, 7:30 p.m.

"Forrest Gump" (1994), directed by Robert Zemeckis, with Tom Hanks, Gary Sinise and Mykelti Williamson, 9:30 p.m.

Thursday, 7/13

"Leona's Sister Gerri" (1995), directed by Jane Gillooly, 7:30 p.m.

"Exotica" (1994), directed by Atom Egoyan, with Bruce Greenwood, Mia Kirschner and Don McKellar, 9:15 p.m.

music

Summer Sessions

- Local singer/songwriter Nancy Learn will kick off the outdoor concert series June 30 at 7:30 p.m. on the Arts Quad.

- Classical chamber music, July 4, 7:30 p.m., Barnes Hall: Cornell's Geoffrey Burgess (oboe) and Tom Beghin (fortepiano) join Ryan Brown (violin), Melissa Stucky (viola) and Laura Kramer (violin/cello) to present Franz Danzi's Pieces detachées, for oboe and string trio nos. 1, 4 and 5; Mozart's Sonata Movement in B-flat Major, K400, and Quartet in E-flat Major; and Haydn's Sonata in A-flat Major.

- The Burns Sisters Band will perform July 7 at 7:30 p.m. on the Arts Quad. The sisters have been performing rock, pop, gospel, R&B, country and folk together since their childhood in Binghamton.

- Les Petits Chanteurs de Lyon will perform a wide variety of sacred music including Gregorian chants and pieces dating from the 16th through 20th centuries July 11 at 7:30 p.m. in Sage Chapel.

- The Hylands, performing a broad spectrum of traditional and contemporary Irish songs in English and Gaelic, will play July 14 at 7:30 p.m. on the Arts Quad.

Bound for Glory

July 2 and 9: live sets are at 8:30, 9:30 and 10:30 p.m. in the Commons Coffeehouse, Anabel Taylor Hall. Admission is free, kids are welcome and refreshments are available. Bound for Glory is broadcast from 8 to 11 p.m. on WVBR 93.5 FM.

religion

Sage Chapel

The Rev. Roger A. Badham from the Graduate School of Theology at Drew University will give the sermon July 2 at 11 a.m. The Rev. Robert L. Johnson, director of Cornell United Religious Work, will give the sermon July 9 at 11 a.m. Sage is a non-sectarian chapel that fosters dialogue and exploration with and among the major faith traditions.

African-American

Sundays, 5:30 p.m., Robert Purcell Union.

Baha'i Faith

Fridays, 7 p.m., firesides with speakers, open discussion and refreshments. Meet at the Balch Archway; held in Unit 4 lounge at Balch Hall. Sunday morning prayers and breakfast, 7 a.m.

Catholic

The summer Mass schedule, June 3 through Aug. 20, is: Saturday, 5 p.m., and Sunday, 10 a.m., Anabel Taylor Auditorium. Daily Masses will be announced weekly.

Christian Science

Testimony and discussion every Thursday at 7 p.m., Founders Room, Anabel Taylor Hall.

Episcopal (Anglican)

Sundays, worship and Eucharist, 9:30 a.m., Anabel Taylor Chapel.

Friends (Quakers)

Sundays, 11 a.m., meeting for worship in the Edwards Room of Anabel Taylor Hall. Discussions most weeks at 9:50 a.m., 314 Anabel Taylor Hall.

Jewish

Morning Minyan at Young Israel, 106 West Ave., call 272-5810.

Saturday Services: Orthodox, 9:15 a.m., Edwards Room, ATH; Conservative/Egalitarian, 9:15 a.m., Founders Room, ATH.

Korean Church

Sundays, 1 p.m., chapel, Anabel Taylor Hall.

Latter-day Saints (Mormon)

Discussions on the Book of Mormon: Wednesdays, 7:30 p.m., 314 Anabel Taylor Hall. All are invited to come and discover the religious writings of ancient American cultures.

Sunday services: Cornell Student Branch, 9 a.m., Ithaca ward, 1 p.m. For information, call 272-4520, 257-6835 or 257-1334.

Muslim

Friday Juma' prayer, 1:15 p.m., One World Room, Anabel Taylor Hall. Daily Zuhr, Asr, Maghreb and Isha' prayers at 218 Anabel Taylor Hall.

Sri Satya Sai Baba

Sundays, 10:30 a.m., 319 N. Tioga St. For details call 273-4261 or 533-7172.

Zen Buddhist

Tuesdays, 5 p.m.; Thursdays, 6:45 p.m., chapel, Anabel Taylor Hall.