

Edward Teller Speaks

Envisions Fusion-powered Space Flight

Imagine fusion-powered space craft reaching Mars in 90 days or less, the moons of Jupiter within a year. For Edward Teller, Director Emeritus of Lawrence Livermore National Laboratory (LLNL), such a possibility is more than a vision—it's a likelihood.

Speaking here at a colloquium in March, Teller described a dipole reactor design for a fusion-powered rocket propulsion system which could put fusion to work powering space ships using a special form of helium (^3He) that could be mined from the moon. Said Teller, "I believe the fusion research being done here at PPPL will lead to travel beyond our solar system, to a star—ideally a star with planets!"

The 85-year-old Teller, who is currently a Senior Research Fellow at the Hoover Institution, is a great advocate of space travel, placing a space station as a very high priority. "The need to *go and see* has always motivated mankind. To look at the earth from another place will give us knowledge we can't now imagine," Teller told a near-capacity crowd in the LOB auditorium.

Said theorist Hamid Biglari, who hosted him during his visit, "Professor Teller is both eloquent and creative—a remarkably active person. It was most stimulating and interesting to have him with us." According to Biglari, during the morning of his visit, Teller was given two hours of presentations on such topics as TFTR physics, PBX-M, PX, and fusion theory issues. He also met with Nobel Laureate and

Princeton University Professor Emeritus Eugene Wigner. The two were acquainted when in high school during the 1920s in Hungary.

Born in Budapest in 1908, Teller worked at the University of Leipzig as a graduate student under Werner Heisenberg and received his Ph.D. in physics in 1930. With the rise of the Nazis, he left Germany, worked in London, and subsequently in Copenhagen at the Niels Bohr Institute.

Teller came to the United States in 1935 and became a citizen in 1941. The possibilities of fission, together with the menace of Nazi Germany, led him to work on the Manhattan Project, through which the atomic bomb was developed.

Teller later became Assistant Director of the Los Alamos Scientific

Laboratory (now the Los Alamos National Laboratory). In 1952, at the time of the first test of the hydrogen bomb, he joined the University of California at Berkeley and started work at the newly-founded Lawrence Livermore Laboratory (now LLNL) where he served as Associate Director and then as Director during the 1950s.

Teller Answers Questions

During an hour-long informal question and answer session before the colloquium, Dr. Teller answered questions on topics ranging from national science policy to interactions with other famous physicists, such as his teacher Werner Heisenberg and Albert Einstein.

Opening the session on a humorous note, Teller warned the audience, *continued on page 2*



Physicist Edward Teller answers questions after his colloquium on space flight. Pictured along with interested students are (rear) Hamid Biglari, Teller's host while at PPPL, and Jane Murphy (closest to stand), also of the colloquium committee. Thanks to the woodshop for their last-minute construction of a stand on which Teller's chair could be placed.

Teller Speaks

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"Although I may not know the answer, I'll respond to all questions easily; then you'll have to decide if I'm right."

Asked to assess the quality of students entering American graduate physics programs today, Teller said, "For those from outside the U.S., the quality of students is getting better; for those inside, it's worse." His explanation was that teachers are implying to children that science is dangerous, "and why would they want to become dangerous?"

He added, "In America, we are afraid of everything—of change, of progress. For example, there's opposition to applying the gene theory. Our recession is related to our not taking advantage of new technology, and it's having an enormous impact."

No More Nuclear Secrets

Noting that North Korea has announced withdrawal from the Nuclear Nonproliferation Treaty, a questioner wanted to know how the International Atomic Energy Commission should respond.

Said Teller, "What we need is a complete turnaround—instead of nuclear secrets, we need a world-wide policy of openness." Noting that such a policy has been advocated in the United Nations after World War II, but nixed by Stalin, Teller said, "We can't go back to this plan with 50,000 nuclear weapons in existence. However, while there is a need for some privacy, it's absurd that I can't tell you about things that happened with the hydrogen bomb 40 years ago."

Concluded Teller, "Only if we guarantee publication of such information can we enforce a policy of openness world-wide. The fact that any country has secrets will isolate them. By being open, we can encourage others to be open."

Heisenberg

Teller was asked whether he believed there had been a plot to kidnap Werner Heisenberg in order to curtail possible development of a nuclear weapon by Germany during World War II. Responding that he did not believe such a plot existed, Teller said, "In any case, kidnapping Heisenberg would have been a great mistake, because I am sure that he was not seriously working on a nuclear project."

As evidence, Teller noted that in the privacy of a garden, Heisenberg

had confided to Niels Bohr, "I'm working on nuclear explosives, and I hope I will not succeed."

Teller also cited as evidence conversations that British intelligence recorded during the internment of Heisenberg and other German physicists after the war. "When they heard about the atomic bomb being dropped on Hiroshima, they were incredulous. And when Heisenberg tried to describe how such a bomb might have worked to his fellow physicists, his ideas were so inaccurate that he

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An animated Edward Teller responds to questions during a fascinating question and answer period before the colloquium.

otos: Dietmar Krause

Teller Speaks

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couldn't possibly have been working seriously on such a project himself."

New Mission for National Labs?

Asked whether the end of the cold war calls for changes in the mission of national laboratories, Teller responded, "We're at a point in history where big changes are occurring of necessity. Because of technologies that allow accurate targeting of missiles, we no longer need *big* explosives; we need weapons that can be ever more *accurately delivered*. Therefore, to cut back stockpiles makes sense, but to cut back research makes no sense."

Teller noted that war prevention needs to be addressed as an international question, as do issues such as weather prediction and pollution control. One project he suggested for national laboratories was the development of many low-flying satellites to monitor pollution and natural disturbances such as hurricanes. "Whatever we do," Teller concluded, "we always need to fund basic research. That's what keeps us thinking."

Teller the Author

Edward Teller has been a prolific author, and books have been written about him as well. For those who want to pursue the thinking of this eminent physicist further, among his books are: *The Legacy of Hiroshima*, *The Reluctant Revolutionary*, *Energy from Heaven and Earth*, *Pursuit of Simplicity*, *Better a Shield Than a Sword*, and *Conversations on the Dark Secrets of Physics*.

Videos Available

Videotapes of both the Teller colloquium and the question and answer session are available for borrowing from the PPPL Library. ♦

Teens Compete for Spot in National Science Bowl®

28 PPPL Staff Members Judge, Moderate

The first-ever New Jersey Regional Competition of the National Science Bowl® was very successful, thanks to the organizing efforts of PPPL's Bill Davis, the Science Education staff, and 28 Lab volunteers.

The Competition, held on March 6 at the North Brunswick Township High School, included teams made up of four high school students and one alternate each. Altogether, 16 teams from New Jersey, eastern Pennsylvania, and Connecticut participated.

Davis, Lab volunteers Rush Holt, and Ron Hatcher, and Princeton University Physics majors are now helping prepare the winners, the East Brunswick High School Team, to compete in the Third Annual National Science Bowl® April 16-19, in Washington, DC. Davis will accompany the students on their all-expenses-paid trip. The Bowl is sponsored by the Department of Energy (DOE) and Cray Research Foundation.

"We're delighted with how smoothly the regional event went and how much the students seemed to enjoy it—even those who didn't place," said Davis. "I'm particularly grateful for the excellent support of the many volunteers from the Lab who gave their Saturday to be scientific judges and moderators and to play other roles. They took the event very seriously and spent a lot of time studying the questions and preparing for their roles."

"Special thanks go to Sharon Sherman and her husband Alan. In addition to volunteering, they were instrumental in securing a site and locating specialists to be judges in areas not represented at the Lab. Also a vote of appreciation to Rush Holt, who championed the idea of the contest and supported our organizational efforts," added Davis.

"Like a lot of people, I've complained about the state of math and science education in this country, and organizing this competition has

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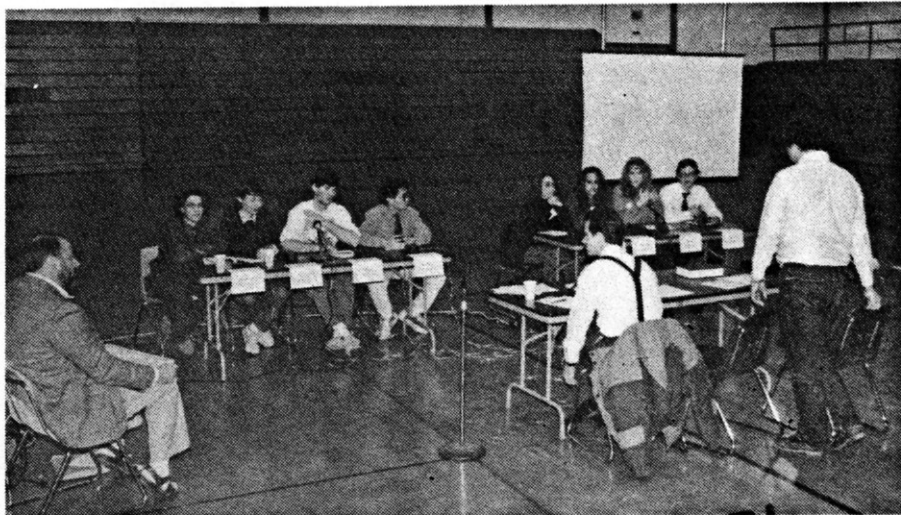


Photo: George Barnes

The East Brunswick team, first place winners (left table), face off against Highland Regional, the third place winners during an early round of the competition. PPPL volunteers (backs to camera) time and monitor the event. They are Jim Strachan (left), Darren Stottler, and Tim Bennett.

Science Bowl®

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given me and the many Lab volunteers a way to support students' scientific interests," added Davis.

Davis was loaned by the Computer Systems Division to the Lab's Science Education Program to organize both this project and the National Undergraduate Fellowship Program with funds from the DOE.

Volunteers from PPPL who participated as scientific judges or moderators in the regional competition included: Jennifer Allman, Jo Barbour, Dori Barnes, Ron Bell, Tim Bennett, Diane Carroll, George Christianson, Mike Diesso, Ron Hatcher, Paul Hagar, Rush Holt, Steve Jones, Charles Karney, Michael Keller, Jim McEnerney, Jack Mervine, Bob Mika, Don Monticello, Jane Murphy, Chris Ritter, Jim Rogers, Phyllis Roney, Sharon Sherman, Darren Stottler, Jim Strachen, Marilee Thompson, and Dick Wieland.

Competition Sparks Enthusiasm

Teams faced off in a double-elimination tournament to answer short answer and multiple choice questions in biology, chemistry, physics, astronomy, and mathematics, as well as earth and computer sciences. The same approach, but



Photo: George Barnes

The East Brunswick team jubilantly display their first prize certificates. They are (left to right) Duy Nguyen, Ephraim Tsalik, Zoltan Maliga, Team Captain, Joshua Scribner, and alternate Yi-Jun Wu. Coach Paul Kimmel shows off the trophy.

with more difficult questions, will be used in the National Science Bowl®. Questions were developed by scientists from across the country and verified by the Argonne National Laboratory in Illinois.

Said Davis, who is a software engineer at PPPL, "I'm very excited by the general principle that kids in academics can be motivated and taught to work harder through competition and recognition for their achievements in the same way kids are motivated in sports."

His observation was echoed by student Zoltan Maliga, captain of the winning team, who is also cap-

tain of the East Brunswick High School cross-country team. Maliga, who says that "science is my thing," remarked that he got the same kind of rush—or even more so—out of this academic competition that he gets out of running.

National Competition Awards

Along with national recognition, the winners and finalists of the National Science Bowl® in Washington DC. will be awarded prizes such as science trips to Australia, England and within the States; school link-ups to the National High School

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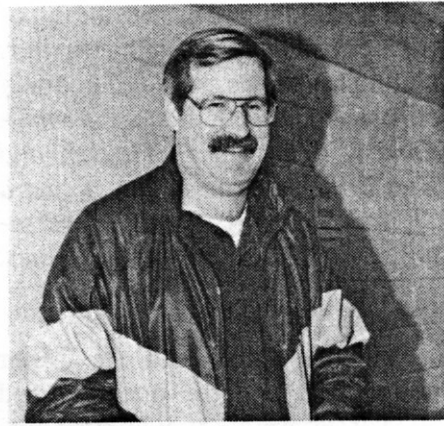
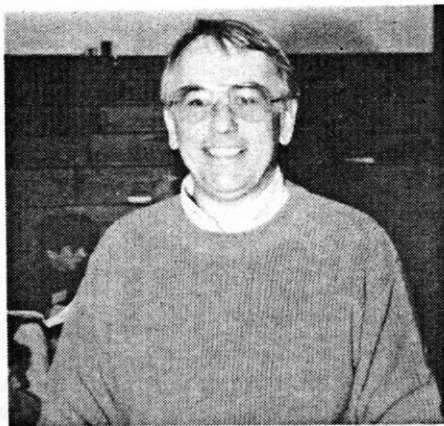
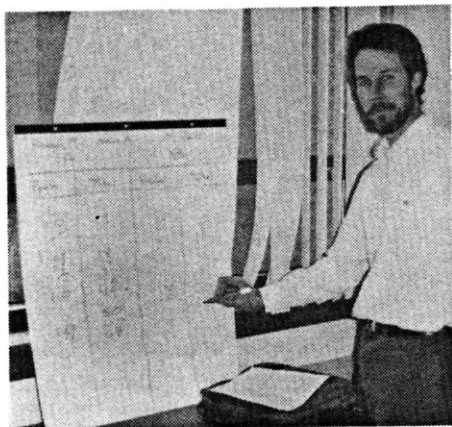


Photo: George Barnes

Among Lab volunteers serving as rules judges and scorekeepers were (left to right) Jim Rogers, Bob Mika, and Jim McEnerney.

Science Bowl®

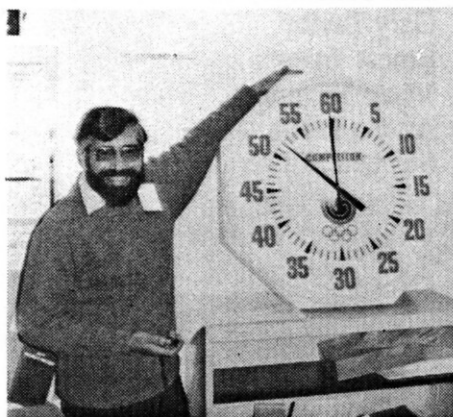
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Supercomputer at Lawrence Livermore National Laboratory; computer hardware and software; and teacher scholarships.

Secretary of Energy Hazel O'Leary commented, "I am proud and pleased that the Department of Energy is involved in mathematics, engineering, science and technology education programs such as the National Science Bowl®. Clearly, education is the key to the future. If our country is to remain at the world's forefront of technological development and economic prosperity, all of America's youth must be inspired to excel in math and science."

High School Competitors

High schools teams who participated in the NJ Regional Competition included: Carteret High School, Carteret, NJ; Council Rock High School, Newtown, PA; East Brunswick High School, East Brunswick, NJ; Edison High School, Edison, NJ; Ewing High School, Ewing, NJ; Greenwich High School, Greenwich, CT; Highland Regional High School, Blackwood, NJ; J.P. Stephens High School, Edison, NJ; Montgomery High School, Montgomery, NJ; Neshaminy High School, Neshaminy, PA; Ridgewood High School, Ridgewood, NJ; Rutgers Prep School, Somerset, NJ; South Brunswick High School, South Brunswick, NJ; Stuart Country Day School, Princeton, NJ; Union High School, Millburn, NJ; and West Windsor-Plainsboro High School, West Windsor, NJ. ♦



Mike Diesso (with clock) and Rush Holt (above, right) acted as scientific judges. Diesso and Marilee Thompson (below, left) were among PPPL volunteers acting as timekeepers.



PPPL's Bill Davis (right) organizer of the first annual New Jersey Science Bowl joins Science Education staff members Diane Carroll (left), Jo Barbour, and Sharon Sherman at the event.

Photos: George Barnes

Take Me Out to the Ball Game!

Join Softball League

Everyone is welcome to join the PPPL Softball League. Come on out to Tuesday practice after work (as soon as the weather cooperates). Practices and home games are held at the fields behind the Emergency Services Unit Building. The season got under way April 6 with double headers to continue every Tuesday between 5:30 and 8:00 p.m. Schedules will be posted next to the stockroom on the C-Site bulletin board.

Says long-time organizer Tom Holoman, "We encourage all Lab employees and subcontractors to play, and we welcome men and women regardless of experience level. With both A and B level teams, everyone can find a challenging position to play."

As part of the Princeton Softball League, PPPL teams face off against teams from such businesses as Sarnoff, Cyanamid, and McGraw Hill.

For more information and to sign up, call Tom Holoman, 3221 or Rich Meagher, 2172. ♦



CLASSIFIED

For Sale

Women's ten-speed bicycle; red Schwinn bike in good condition; call Deanna Herrington at 3377.

Employees Honored for Years of Service

Congratulations and a vote of thanks to the large number of staff members who have worked at PPPL for many years! Those whose service anniversary came in 1992 were honored with an awards ceremony in the LOB Auditorium in February during which each honoree received a gift of appreciation for their years of service. A reception was held afterwards in the cafeteria.

Five Years of Service

Dwight Bashore
Steven Cowley
Charles Kessel, Jr.
Jerry Levine
Elaine Lu
David Neuman
Karen Ossmann
Richard Rossmassler

Ten Years of Service

William Allard
Joseph Bartzak III
William Bergin
Robert Brown
Patricia Buggs
Thomas Clayton
Connie Cummings
Peter Del Gandio
Robert Dempsky
Michael Diesso
James Faunce
Jakov Gavrushenko
Gary Gibilisco
Lawrence Guttadora
Egidio Mazzuca
Betty Ng
Robert Parsells
Ronald Pullem
Allan Reiman
Sylvia Reissman
Delmar Reynolds
William Reynolds
Keith Sapp
Steven Sesnic
Garry Stevens
Ronald Strykowski
John Wertenbaker
Raymond Whitley
Robert Wilson

Fifteen Years of Service

Dori Barnes
Ronald Barrett

John Bauer, Jr.
Manfred Bitter
Joyce Bitzer
Michael DiMattia
John Edwards
William Edwards, Jr.
Philip Efthimion
Victor Garzotto
Thomas Gibney
Linda Harmon
Russell Hulse
David Ignat
Charles Karney
Stephen Kemp
George Kolinchak
Thomas Kozub
Robert Kress
Long-Poe Ku
Joyce Lawton
Gregory Lemunyan
Dennis Mansfield
Marilyn McBride

Sidney Medley
David Mikkelsen
Marion Mincarelli
Alexander Nagy III
Erik Perry
Marijan Petravic
Nelson Rainier
Lewis Randerson
William Rauch
Robert Reed
John Sadovy
Gerd Schilling
Carl Scimeca
Jerome Siegel
Paul Snook
Joseph Stencil
Carl Szathmary
Gary Taylor
Ernest Valeo
Verna Weyman
Arlene White
Stephen Wilson



Thirty-five year employees Thomas Devine (second from left) and Ellis Simon (second from right) were honored at the recent Awards Ceremony. PPPL Director Ronald Davidson (far left) and Deputy Director Dale Meade (far right) were on hand to join in the celebration. Warren Class and William Walker were also recognized for their 35 years of service.

Photo: Dietmar Krause

Service Awards

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Twenty Years of Service

Olga Bernett
Norton Bretz
Thomas Carr
Joseph Cecchi
Morrell Chance
Edward Gilsenan
Carl Lindemuth
Brendon Monahan
Gary Oliaro
William Stanton
William Tang
Claud Yarborough, Jr.
William Zimmer

Twenty-Five Years of Service

Spencer Holcombe
Athene Kan
Jack Mervine
John Opperman, Jr.

Twenty-Five Years of Service (cont)

Earle Shaeffer
Edwin Tolnas

Thirty Years of Service

Halsey Allen
Frank Anderson
Charles Bushnell
Robert Delany
John Gumbas
Richard Terhune
Walter Weyman
Richard Yager

Thirty-Five Years of Service

Warren Class
Thomas Devine
Ellis D. Simon
William Walker

One Female Cat Yields 80,000,000 Kittens

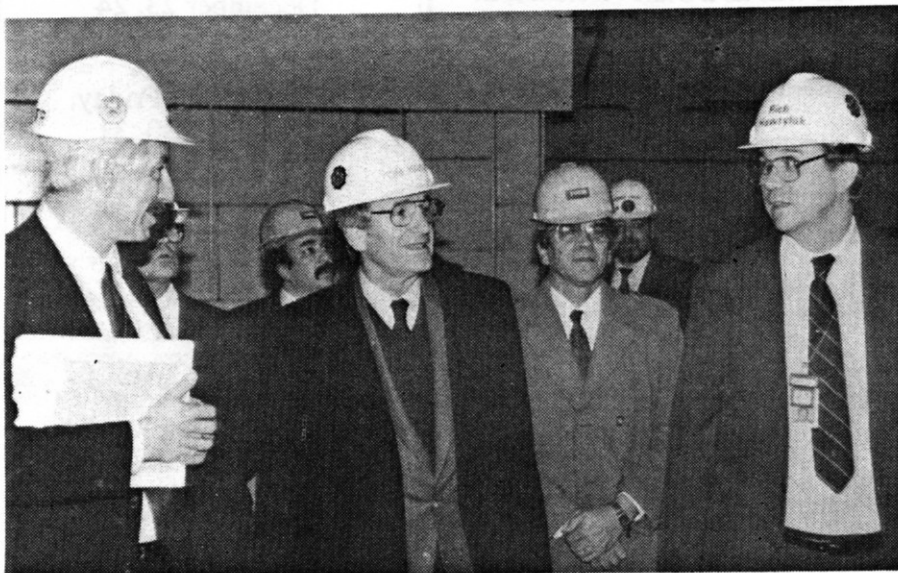
Low-Cost Spaying, Neutering Available

Puppies and kittens are sooo cute and playful! But hungry, homeless stray dogs and cats are just plain miserable. Yet in any given year 40 million unwanted dogs and cats roam our cities. So many stray animals exist that pounds and shelters are being forced to kill them at the rate of one per minute.

Statistics

The statistics for the population explosion of cats that can develop within ten years from just one female cat are staggering. If two litters are born per year, and less than three kittens per litter survive, all of which breed, by the third year, 382 kittens would be born. By the sixth year 73,041 would exist, and by the tenth year, the number could reach over 80 million cats. Although less prolific than cats, dogs also suffer from the results of uncontrolled population growth.

Celebrate April as **National Spay and Neuter Month** and help put an end to this population boom! Application forms for low-cost spaying and neutering for your dogs and cats are available by contacting Marilyn Hondorp, ext. 2656, LOB368. ♦



Senator Tom Harkin, a Democrat from Iowa (second from left) came by for a tour of PPPL during a trip to take his daughter to visit Princeton University. Dale Meade (left), Ron Davidson (second from right), and Rich Hawryluk were among those accompanying him to see TFTR.

Dr. Meade Testifies

On Thursday, April 1, PPPL's Deputy Director, Dr. Dale Meade, testified before the Energy and Water Development Subcommittee of the House Committee on Appropriations. Copies of the text of Dr. Meade's testimony may be found in the LOB Lobby.



TRANSITIONS

Births

Best wishes to **Philip Efthimion** and his wife Deborah on the March 10 birth of their twins Charles James and Christina Joy.

Congratulations to **Suzanne Homer** of Tokamak Operations and her husband Bob on the birth of their daughter Emily Ann on March 4.

All the best to **Larry Lagin** of the Computer Systems Division and his wife Donna on the birth of baby girl Deborah Less on March 16.

Belated congratulations to **Barbara Nini** of the TFTR Project Office and her husband Joe on the birth of their daughter Melissa Renee November 14.

Best wishes, a little late, to **Beth Reardon** of the Computer Systems Division and her husband Tom on the arrival of daughter Corinne Louise last October 21.

Retirement

Bernard Giehl, a Technical Associate in the Mechanical Engineering Design Group, retired from PPPL on February 1, after more than 38 years at the Laboratory.

In Memory

Louise M. Tindall died on February 22. She was employed at PPPL from 1974 to 1985. Her most recent position was as a Staff Assistant in the Engineering Department.

Celebrate Professional Secretary's Day April 21st



Holidays Coming Up!

Get out your calendar and plan your vacation. Here's the 1993-94 Holiday Schedule to help you out.

Memorial Day,
Monday, May 31

Independence Day,
Monday, July 5

Labor Day,
Monday, September 6

Thanksgiving,
Thursday and Friday,
November 25, 26

Christmas,
Thursday and Friday,
December 23, 24

New Years,
Thursday and Friday,
December 30, 31

Memorial Day,
Monday, May 30, (1994)

Two Additional Optional Holidays.

HOTLINE

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