Former Food Chair *Dave Tytell* impeached for having too much

FOOD WITH FOOD

see page 7

CULTURE WATCH: *Fred Hersch, piano/Jeffrey Kahane, piano* Friday, March 5, 1999 at 8:00 p.m. Beckman Auditorium A classical/jazz jam session, featuring two pianos and two of today's most versatile pianists. *Laura Frautschi, violin.* Sunday, March 7, 1999 at 3:30 p.m. Dabney Lounge. Laura Frautschi, who holds degrees from Juilliard and Harvard, is a soloist and chamber musician who has appeared with orchestras and at major festivals in the United States and Japan. She made her Japanese debut in 1994 with a solo recital in Tokyo's Casals Hall, followed by a national tour with the Festival Strings Lucerne. Ms. Frautschi has received numerous awards, including a gold medal at the Cours Superieure of the Conservatoire Nationale de Nimes, France, at the age of 12, at the Japanese International Violin Competition, and from the Newberry Library in Chicago. She has collaborated with such artists as Andr Previn, Yo Yo Ma, and Anu Kavafian. Admission is free; no tickets or reservations are required.

THE FUTURE IS HISTORY

7:30 and 10:00pm
Baxter Lecture Hall

BONUS!!! ASCIT Movie Team meeting on *Sunday, 2pm* SAC Club Room A

THE CALIFORNIA TECH

VOLUME C, NUMBER 20 | PASADENA, CALIFORNIA | FRIDAY, MARCH 5, 1999

LEADERSHIP RETREATS TO ARROWHEAD

BY ERIK DILL

Last weekend, 33 undergraduates fled campus for a Leadership Retreat at UCLA's Lake Arrowhead conference center. The event was sponsored by Residence Life and the Caltech Y, and was planned by Sue Borrego, Athena Castro, Sue Friedman, and Kim West. Costs were covered by a grant from the Crawford Fund, which provided money last year to promote student leadership activities.

The seminar opened with an address from Dr. Sheldon Solomon, Professor of Psychology at Skidmore College. He stressed the importance of leadership for solving current social crises, including food shortages and the dearth of health care coverage. Other guests included Kevin Colaner, an assistant dean at California State University, Fullerton. Colaner presented a session about self motivation.

Tom Mannion, the Director of Campus Auxiliary and Business Services, Kathleen Bartle-Schulweis, Director of the Caltech Women's Center, and Denise Nelson Nash, Director of the Office of Public Events, also presented sessions. Mannion delivered an in-depth session about leadership styles, including administration of the Myers-Briggs personality indicator. He also discussed how interaction between different personality types can increase or reduce a group's effectiveness.

In addition to the seminars, participants enjoyed the conference center's luxurious accommodations. The hot tubs, fine cuisine, and semi-private condolets were all highly praised. Overall, students noted that the event was a great way to relax, learn about leadership, and network with key campus figures.

Eisenstein observes electron states

BY SHANNON STEWMAN

In the field of condensed matter physics, a number of multibody phenomena have been found in two dimensional electron gases. Two of the most noteworthy, the integer quantum Hall effect and the fractional quantum Hall effect, have been so unexpected as to warrant Nobel prizes.

Recently, Caltech physicist Jim Eisenstein appears to have uncovered another unexpected multibody phenomenon in two-dimensional electron gases. When electrons trapped in a two-dimensional plane are lowered to 25-150 milli-Kelvin, or within tenths of a degree above absolute zero, and subjected to a magnetic field of 1-3 Tesla perpendicular to that plane, they obtain a directional preference for current flow within that plane.

Dr. Eisenstein, along with postdoctoral scholar Mike Lilly and graduate student Ken Cooper, have conducted experiments measuring the resistance of current flow of a two-dimensional electron gas trapped between two semiconductor crystals. The electron gas is created by a process known as molecular beam epitaxy, where a semiconductor crystal of gallium arsenide doped with aluminum is grown directly on top of a uniform surface of a crystal of undoped gallium arsenide. The two-dimensional electron gas exists at the interface of these crystals.

To conduct the measurements, indium contacts are placed around the 5-mm square crystals, obtained from Dr. Eisenstein's collaborators at Lucent Technologies, Loren Pfeiffer and Ken West, so current can be circulated in different directions through the electron gas.

When these crystals are lowered to 25 milli-Kelvin, and subjected to a 1-3 Tesla magnetic field, the resistances measured when running current in perpendicular directions is dramatically different, indicating an anisotropy in the electron system, or a moment preference.

When electrons are subject to a magnetic field, they begin to circulate, as predicted by classical electromagnetic theory, in circular orbits. When the temperature is lowered enough, quantum considerations come into play and these orbits are quantized at electron energy levels, or Landau levels, which function in a manner conceptually similar to a hydrogen atom's energy levels.

As the magnetic field increases in strength, the electron orbits decrease in radius, but the quantization of the electron orbits forces the electrons into the lowest Landau level, or the electron ground state. In this lowest Landau level, effects like the fractional quantum Hall effect are seen, which is an effect of many electrons functioning in a uniform manner, or electrons engaged in cooperation.

Eisenstein and his colleagues have found this anisotropic behavior when the electrons of the two-dimensional gas are induced into a state where the third, or higher, Landau level is half full.

The anisotropic effect may be similar to that of ferromagnetism. A ferromagnetic substance consists of many small domains of magnetism which are oriented in random fashion, statistically negating any mag-

PLEASE SEE ELECTRONS ON PAGE 2

Koonin Lectures on Supercomputing

BY LEXI BAUGHER

On March 3, Professor Steven Koonin gave a lecture on supercomputer simulations as the latest installment in the ongoing Earnest C. Watson lecture series. He discussed recent advances in supercomputing technology as well as some of the problems that scientists use supercomputers to solve.

The term 'supercomputer' generally refers to any of the fastest computers currently produced. A supercomputer has many different processors that can communicate at high speeds (unlike most PCs, which have only one processor). Some supercomputers, like the Beowulf system, are just several PCs wired together with megabit ethernet, each with its own processor and RAM. Caltech's Beowulf system has over 100 such units. Other supercomputers, such as Cray's Origin 2000, consist of many processors that share memory directly. Both types of supercomputers have one main processor that divides up the work for the other processors and assembles the data into meaningful output after computation is completed.

Supercomputing has advanced rapidly since Caltech physicist Geoffrey Fox and Charles Seitz began development of the first 64-processor computer in 1981. Today's state-of-the-art supercomputers are capable of computing three teraflops ($3*10^{12}$ operations per second), use gigabytes (10^9) of RAM, and can store petabytes (10^{15}) of data.

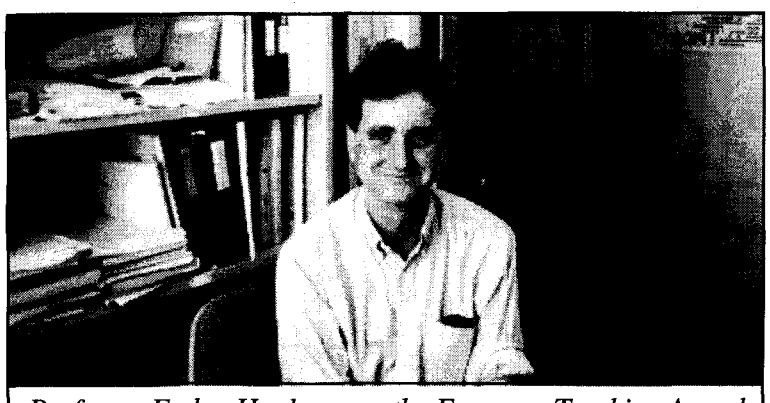
Professor Koonin's talk addressed the question of what all that raw power is good for. There are many potential uses for supercomputers in all scientific fields. Chemists at Caltech use supercomputers to simulate the folding of amino acid chains. Given a sequence of amino acids, the computer can render a 3D graphic of the physical structure of the protein. Conversely, the computer can also determine what sequence of amino acids will fold into a particular shape. For lengthy sequences, there can be trillions of possibilities to examine.

Supercomputers can also be used to simulate ocean currents. Yi Chao's group at JPL is using a Cray T3D to process satellite data of sea levels, wind, and temperatures to generate working models of currents. The results of their simulations can be confirmed by observation of the actual phenomena. Through these

PLEASE SEE KOONIN LECTURE, PAGE 2

COURTESY CACR

Tom Sterling shows off the Beowulf supercomputer.



COURTESY KRL

Professor Emlyn Hughes won the Feynman Teaching Award for his presentation of Physics 2b to Caltech sophomores.

IN THIS ISSUE

THE USUAL STUFF

THIS WEEK'S FEATURES

EISENSTEIN ELECTRONS

CONTINUED FROM PAGE 1

netic dipole in the substance. However, if a slight magnetic dipole preference is induced and the temperature of the substance is lowered, the domains align in a fashion which gives the ferromagnetic substance a large combined magnetic dipole. In the case of the electron gas, Eisenstein believes some small directional preference is given to the electrons as they are cooled, causing them to align in a similar matter.

What the factor is has not yet been determined, and currently Eisenstein's group is looking for preferential alignment of defects on the surface of the crystal with an atomic force microscope.

Condensed matter theorists have yet to fully explain the phenomenon, but at least one theory has been proposed; that electrons form ribbons where their density is linearly uniform in one direction but is modulated in the other, which may explain the differences in resistance. However, as Eisenstein and his colleagues indicate, the leap from this anisotropic effect to the theory of "ribbons" is large, and this is just one possibility.

KOONIN LECTURE

CONTINUED FROM PAGE 1

simulations, scientists hope to better understand how the earth's climate works.

Koonin's lecture also touched on the problem of representing computed data. For some problems, like the ocean current research, a two-dimensional graphical result is suitable. The data from these simulations can be turned into a movie that shows the movement of ocean currents over time to make the data easily understandable. Other problems, such as the amino acid folding simulations, require a three-dimensional graphical model that can be rotated or moved onscreen.

Peter Schröder's group at Caltech has developed a Responsive Workbench for viewing complex data sets like these. A user sits at the workbench and wears a set of goggles. The workbench tracks the user's head movements, renders the data set from an appropriate perspective, and projects the data onto the tabletop in 3D. This allows the user to view the data set from any perspective, even from "inside" the bounds of the set.

Koonin cited Moore's Law as an indicator that supercomputer development will continue to grow at a remarkable rate. Gordon Moore, the founder of Intel, postulated in the early 1960's that chip capability would double every two years. This theory has held true for more than 30 years, and is expected to continue for some time.

The Outside World

by Cheryl Forest

Camp LenJeune, North Carolina / Italy: Marine pilot Capt. Richard Ashby was found innocent of involuntary manslaughter and other charges this past Thursday. Capt. Ashby's jet flew into a gondola cable last year; twenty people died as a result of the cord severing. Italian Prime Minister Massimo D'Alema was quoted as saying "the verdict is disturbing. We expected that justice would be done." According to another Italian official, the verdict is a "provocation."

Lagos, Nigeria: General Olusegun Obasanjo won an overwelming victory in Sunday's presidential election. He is the first elected president in Nigeria in sixteen years. In the past, Nigeria has suffered under oppressive military dictatorships; Gen. Obasanjo was released from jail only eight months ago for criticizing the then-current military regime.

Jasper, Texas: A Texas jury, with the sole black member leading as foreman, awarded the death penalty to John William King late last week. King was found guilty of capital murder in the case of James Bryd Jr., a 49-year-old black man whose body was ripped apart when he was dragged behind a pickup truck down a rough rural road last year. Mr. King, along with two other white men, had allegedly wanted to gain notoriety and attract new members to their white supremecist gang.

Somewhere over Iraq: A British jet attacked an Iraqi military radar site in the southern no-fly zone this past Thursday. According to U.S. Central Command, the attack was in response to "two Iraqi violations in the no-fly zone." This latest attack comes on the heels of Monday's bombing blitz; allegedly, U.S. jets dropped more than thirty bombs on various communication and air defense sites.

Yugoslavia: Kosovo is again awash in blood.

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Announcements (Mints):	noon Monday
Letters to the Editor:	6 p.m. Tuesday
Unsolicited Articles	noon Monday

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LETTERS TO THE EDITOR

A bit of clairification of copyright law

I would like to respond to Dean Revel's article in the February 19th *Tech*. While most of what he said is technically accurate, I feel it might leave some people with misunderstandings about the role of intellectual property in society.

Intellectual property does not act like physical property — if you want a chair that I have you have to deprive me of it in order to use it. This is not at all true for ideas, songs, etc., because we can easily make a copy that is as good as the original. Because of this inherent difference with physical property, copying *by itself* should not be considered wrong.

Society has found it useful to place certain restraints on copying, not because of some inherent right of authors, but solely due to their possible use to society. The three most common restrictions are copyrights, patents, and trademarks. The first two are designed to encourage authours and inventors to share their works and discoveries by providing incentives in the form of limited monopolies. The third category, trademarks, serve to reduce market friction by ensuring that consumers can readily distinguish between competing brands. I'll be focusing on copyright in this article.

Congress derives its powers to regulate copyright through section 8 of the Constitution, in particular:

"To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

On the face of it, it may seem counter-intuitive that limiting copying (and hence use) of a particular work would be beneficial to society; this limiting the rights of others to copy everything lets authors exert control over who may use a work to profit more handsomely from it. Monopolies are generally considered bad for society, however. Society limits these monopolies by making copyright expire after a certain period of time has passed. Once that period has passed, everyone's right to copy the material is restored; society benefits by having more works freely available than would otherwise be true, and authors benefit by being able to make more money than otherwise possible.

Unfortunately, no system is perfect, and copyright is no exception. Recently these imperfections have become more and more annoying. With the rise of current digital technology, the costs of making copies has fallen to practically nothing, while at the same time the fidelity of digital copies is high enough that they are virtually indistinguishable from the original analog work (and are exactly the same if the original were digital as well.) This means that society is losing more by prohibiting copies than it has in earlier times.

At the same time the span that copyright covers has been increasing as well. What use to society are works that are a hundred years out of date? These increases in copyright span seem to benefit the authours of copyrighted material, but usually they do not... they benefit large publishing houses that have bought all the rights to use a particular work. This can be seen most blatantly in the music industry, where both small artists and consumers complain bitterly about the big labels. Because small artists can't get good deals without exposure, and can't get exposure without making a deal with the large labels, they are caught between a rock and hard place. In an attempt to get around this many small bands (and even a couple of large ones) have taken to releasing single songs as mp3s on the Internet. Some even wish them to be freely copied. They Might Be Giants and The Grateful Dead have both released music on the net as mp3s.

Another large problem with the way copyright law is currently codified has to do with the way computers work. Whenever a computer starts up an application, it copies it from the disk to main memory. If the computer is low on memory it might start "swapping" or writing the application elsewhere on disk. And yes, courts have ruled that similar situations do constitute copyright infringement. Similar situations crop up whenever one uses the Internet. The data is broken up into a few small pieces which pass through many computers to reach its destination. In doing so each intermediate hop has to examine and copy the data. Copying data is part of the inherent architecture of current computers. Society needs clarify what operations do fall under acceptable use in these cases.

Given these problems with copyright, do I think it should be abolished or ignored? Of course not. I don't think that this is a situation calling for civil disobedience. But I do think it should be reformed — decreasing terms would be a good start, as would including "intended use" in fair use exceptions. Mail your congress critters.

A few of the phrases Dean Revel wrote seem to show misunderstandings about the nature of copyright law.

"One of the ways in which Society has tried to insure [sic] that each of us can enjoy the fruits of our own labor, has been to establish a copyright system..."

Well, this is more of a convenient side-effect.

I also object to the term 'property being taken', as copying is a far cry from taking property. Similarly 'piracy', boarding, then looting ships at sea, and often killing innocent passengers is quite a bit different than illicitly copying material. If you want to open a reasonable copyright discussion, then it would probably be best to avoid such sensational terms as 'piracy'. Perhaps 'sharing' would be a better term.

I have glossed over some of the details like fair use, which complicate things enormously. The url the dean referenced last week (*fairuse.stanford.edu.*) is a good reference for more information.

— Aaron Denney

Students form movement to end war with Iraq

Dear Editors and Students:

For more than a century, student movements have had an important place among the agents of social change. Students have a history of fighting for peace and justice. In the 1960s, students spurred debates in Congress about the war in Vietnam and led the protests for peace. Students also struggled against discrimination and racism — both in the civil rights movement in the U.S. and in the fight to end apartheid in South Africa. Now, in the 1990s, there is another war we must end; another struggle for peace and justice in which we, as students, must make our voices heard.

For more than eight years, our government has been waging a silent war against the people of Iraq. This month, the US-led sanctions will kill 4,500 infants and toddlers, according to UNICEF reports. Today, this policy will kill 250 people in Iraq, as it did yesterday... and as it will tomorrow. Since 1991, more than one million people have died due to the scarcity of food and medicine and the spread of water-borne diseases - all direct consequences of the sanctions.

Since 1991, United Nations agencies and independent human-rights organizations have been reporting on the devastating impact of the sanctions on human life in Iraq. Four years ago, UNICEF reported that: "Sanctions are inhibiting the importation of spare parts, chemicals, reagents, and the means of transportation required to provide water and sanitation services to the civilian population of Iraq. What has become increasingly clear is that no significant movement towards food security can be achieved so long as the embargo remains in place."

And what is our government's response? When asked on "60 Minutes" about the death of half a million children in Iraq - more children than died in Hiroshima, Madeline Albright responded "we think the price is worth it."

We say NO! The death of one child is a death too many.

As Noam Chomsky, Howard Zinn, Edward Herman, and Edward Said recently stated, in their national call for action, "The time has come for a call to action to people of conscience. We are past the point where silence is passive consent — when a crime reaches these proportions, silence is complicity."

We refuse to be silent in the face of this war.

We denounce the trade sanctions against the people of Iraq as immoral, illegitimate and contrary to fundamental principles of humanity and human rights. We demand that Congress and the President immediately end the ongoing sanctions war against the people of Iraq.

We support the University of Michigan's Student Assembly which passed a resolution in January condemning the sanctions against the people of Iraq.

We call upon all students dedicated to peace to join the growing movement to end the war against Iraq. Get more information on how you can help end the war by sending an e-mail to *studentinfo@leb.net* Check our website at at *http://leb.net/iac/students.html* .

It was the collective voice of the students that woke our nation to the horror of the Vietnam War. We must once again issue the wake up call to the conscience of our nation.

Sincerely,
Byron Philhour
Committee of the Iraq Action Coalition

Record industry should adapt to proliferation of mp3 format

Dean Revel seems to have missed part of the point in his article (as he is often wont to do). It would behoove the recording industry to embrace the mp3 format rather than fight it. Moral implications of hoarding mp3s aside, the record industry has so far been ignoring a message that is being displayed wordwide with neon lights. They could and should use this to their advantage. This is far from the first time this has happened with technology and won't be the last. The recording industry should learn from similar situations in the past. If they handle things properly, the situation with this particular format should eventually be moot.

—Mason A Porter
Class of '98

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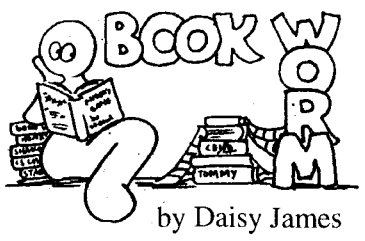


by Daisy James

Neverwhere
Neil Gaiman
◍◍◍

I picked this book up because I've heard such good things about the comic books by the same author. "Groundbreaking" seems to be the obligatory adjective. I won't be using that word here. The novel is creative enough, but there seems to be some sort of convergence of creativity that makes all mediocre fantasy taste the same. Which is a shame, because with a bit more courage on the author's part this book could have a lot of potential. He has a nice knack for wording and visuals, and some very good ideas, maybe a few too many.

The story is set in London, and the hero a very ordinary man named Richard Mayhew. The premise is that there is another world coexisting with the real one, a kind of combination slum and fantasyland. Natually, Richard gets sucked into this one, and from that moment on everyone who has ever read anything knows that he is going to discover incredible inner strength and end up adored by all. Hope I haven't spoiled it for you. It seems like Gaiman thought at one point, "What if all the names of places in London had literal meanings in a parallel world?" Blackfriars becomes an order of monks, Knightsbridge to Night's Bridge, etc. It sounds interesting, but too many and it comes off as contrived, like a writing class exercise. Still, it could have worked if he had only focused on it. The real problem with the book is that it suffers from a surfeit of ideas; it's a sting of vignettes and images strung together with strong characters but a weak plot. When I was reading it I could go through at a breakneck pace (~300 pages in 4 hours) but I was also able to put it down for several months and not care.

Is there some sort of rule in fantasy writing that requires an end-of-the-world emergency and an unbeatable monster? This book would have been so much better if it had kept its focus inward; pressed the question of whether this was real or the hero was losing his mind. If the inevitable final choice had been between sanity and madness, rather than safety and adventure, I would have been much more impressed. As it is, this is nice, lightweight, readable fare, but not much more. Maybe if Kurt Buisek writes a novel it will be something.

Adam Villani: Media Guy

Rushmore

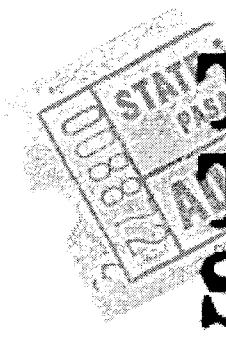
This new black comedy from *Bottle Rocket* director Wes Anderson is sure to become a favorite around Caltech. Newcomer Jason Schwartzmann plays Max, an extremely ambitious yet academically challenged prep school student who finds himself on the losing side of a love triangle with a first-grade teacher and a self-loathing industrialist played to perfection by Bill Murray. This movie challenges our sympathy as the geek-with-an-attitude struggles with his passions and the demands of society. Though the story kind of moves in fits and starts, *Rushmore* never loses its edge and is hilarious throughout.

Blast From the Past

Blast From the Past is predictable and doesn't always work, but it is amusing and likable nonetheless. The first act, in which the Brendan Fraser character is growing up in a time-capsule bomb shelter, might sound good if described, but as it is, the jokes seem forced. Once there's some grounding in the present-day world, the fish-out-of-water humor begins to click. Brendan Fraser is pretty good at playing affable dopes, Alicia Silverstone and Dave Foley do OK with thinly-written characters, and Christopher Walken was perfectly cast as Fraser's paranoid ex-Caltech professor dad who drinks hot Dr. Pepper and has engineered every detail of the family's underground home. Don't go out of your way to see this, but there is stuff to like in it for when it arrives on video.

Naive and Sentimental Music

Two weeks ago I had the pleasure of watching one of the premiere performances of John Adams' new masterwork *Naive and Sentimental Music* at the Dorothy Chandler Pavilion. This mammoth, 48-minute symphony for a 120-piece L.A. Philharmonic, vigorously conducted by Esa-Pekka Salonen, was welcomed by a roaring ovation by the mostly elderly Sunday matinee crowd. Words I heard from the other patrons describing the show included "exciting" and "thrilling," and those are apt indeed. As Adams described it, the piece starts off with a simple, spare melody which, like a Dickens character venturing out into the world, then goes on many adventures and strange encounters before finally coming to a finish, much older and wiser. While retaining some characteristics of Minimalist music and echoing earlier Adams compositions like *Grand Pianola Music* and *Harmonielehre, Naive and Sentimental Music* is his longest, largest, most complex composition yet. After the concert, I asked the guard nicely at the artists' entrance and was able to speak briefly with the composer, who was eager to talk to fans and beaming at the positive reception. No wonder; his newest work will surely be one of the artistic and popular high points of the decade.



The Ticket Stub

by Justin Ho

October Sky (***+1/2)

--The real life story of Homer, who does the science thing, though not in a nuclear plant, and probably sans donuts and Duff. And, it's a movie which actually casts West Virginians in a good light— no conjectures about incest here, 'cause it's rated PG.

The film *October Sky* is based circa 1957 as the United States braced for a very scary basketball-like beep-beep object circling overhead, scribbling in the sky the message "Soviet airspace." It's a bit difficult now to envision the paranoia of those late 1950's, beginnings of the Cold War when the Soviet Union launched Sputnik into space. But the eyes facing skyward offers a nice contrast between the ponderances of space even as Coalwood, WV sends its breadwinners, men and boys into the depths of coal mines underground. The landmark event is marked by a day of serenity in front of radios before a return to the routine of daily mining in a town whose only commodity is the self-same soot which darkens the countenances of its blue-collar work force.

But along comes an upstart, who can't imagine his descent into the depths of darkness and likewise can't make it out of the town via the only ostensibly available alternative— a football scholarship. After a grueling football practice, Homer shows that he is definitely not the lucky tye, but he is adamant in not becoming just another product of the education system, shooing students into the coal mines. What may have been an industry years before has faded under the exhausive efforts of the miners and growing minions of union supporters. Almost everyone knows it, and it is most distressing to be dragged along something which is already dying.

What is initially a silly hobby becomes a means of escape. The Sputnik orb of light, resplendent in the night sky, becomes Homer's infatuation, even though his first attempts at rocket propulsion go bust.

In these most unfortunate circumstances, *October Sky* is not patterned after the 1950's "Partridge Family" or "Father Knows Best" genre of spiffy times, peachy days, or happy households. As Homer's family concedes, the family atmosphere is definitely disrupted with the tension between ultra-grassroots/laboring for American dream-radical dad and starry-eyed Homer. It's almost an embarrasment to Homer's dad that neither son will follow his footsteps into the mines, but his vexation is targeted more toward Homer, since his dreams of science aren't the manly football endeavors of his brother. Their father is almost absurd in wanting his kinds to pattern their lives after him, but such were the days before cancer research, and science in the mainstream in a place like West VA. There is, however, a cathartically pleasing finale to the movie, when Homer's dad accepts the gauntlet of scientific neatness.

Today, our perceptions of what constitute a landmark achievement are upgraded from the machine shop process and reward which Homer gets at the end of the movie for engineering a high-flying home-made rocket. Little kids nowadays are quite capable of making little bombs, and launchable rockets come in the toy store. But in the film, it's not so much the end-product which matters as the means of its attainment. It isn't ingenuity which is stressed in the film so much as perserverence, even in the face of opposition from a stubborn father and a local social microcosm which stresses livelihood through rough labor over education. But the film presents a nostalgic significance to the days when the US depended on the factory-type work, coal and steel industries, and just the general notion of strength through labor. It is intriguing to see the transitory epoch to technology through a teenager's relationship to a rocket.

October Sky also proffers a wonderful group of supporting characters: Homer's brother, an attractive though dim-witted football "scholar"; Homer's mother who seems patterned after the '50s "Leave it To Beaver" matriarch who isn't distraught with the explosion of her white picket fence but still evinces at times a rebelliousness which almost foreshadows the feminist movement; Laura Dern as the talented Ms. Riley who inspires Homer to pursue his hobby to the point of distinction; and Homer's trio of unconsciously begruding teens likewise faced with the drudgery of manual labor.

In the course of rocket constructing, the rocket boys resort to clever means of fund-raising for supplies, only to witness failure upon failure of their vertically travelling-challenged capsule of metal and gas. These four determined youths are a nice juxtaposition to those of us bred in the immediate-gratification/MTV generation, and in its portrayal of innocence, *October Sky* presents itself as a refreshing crowd-pleaser.

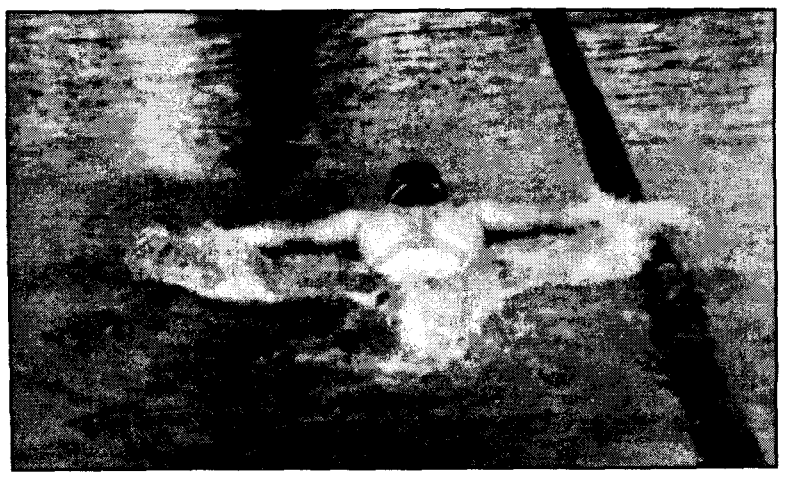
Caltech Hockey Gets First Win of Season

BY BIFF YAMAZAKI

The Caltech Hockey team earned its first victory of the season, blowing outSan Jose State Spartans 7-0. The team got on the board early and quickly,with three first period goals including a power play goal by Mark Stewart(BS '97) with 3 seconds left in the first period, which gave them a 3-0 leadgoing into first intermission. Joe Danzer and Pavel Svitek accounted forthe other two first period goals.After a scoreless second period, Hafen McCormick's goal early in the thirdincreased the lead to 4 goals, and the Beavers scored three times in thelast 5 minutes of the game, on Svitek's second goal of the game, and twogoals from Mark Guman. Frank Monzon set up 4 of the game's goals.The Caltech strategy of placing some of their prolific scorers on defenseworked to perfection, as the defensemen were able to penetrate the Spartanzone with speed. On their own end, the team protected their goaleffectively, outshooting the Spartans 43-17, giving Biff Yamazaki the easy shutout.

Scores

First Period:	1. Svitek CT Interference 13:48
1. CT Svitek (Guman, Monzon) 12:26	Third Period:
2. CT Danzer (Stewart) 3:54	4. CT McCormick (Guman) 13:04
3. CT Stewart pp (unassisted) 0:03	5. CT Svitek (Guman, Monzon) 4:59
Penalties:	6. CT Guman (Monzon, McCormick) 4:11
1. Barbas SJ boarding 9:31	7. CT Guman (Monzon, Svitek) 0:44
2. Jabin SJ tripping 1:37	Goaltending:
Second Period:	SJ: Vu 43 shots 36 saves
None	CT: Yamazaki 17 shots 17 saves
Penalties:	



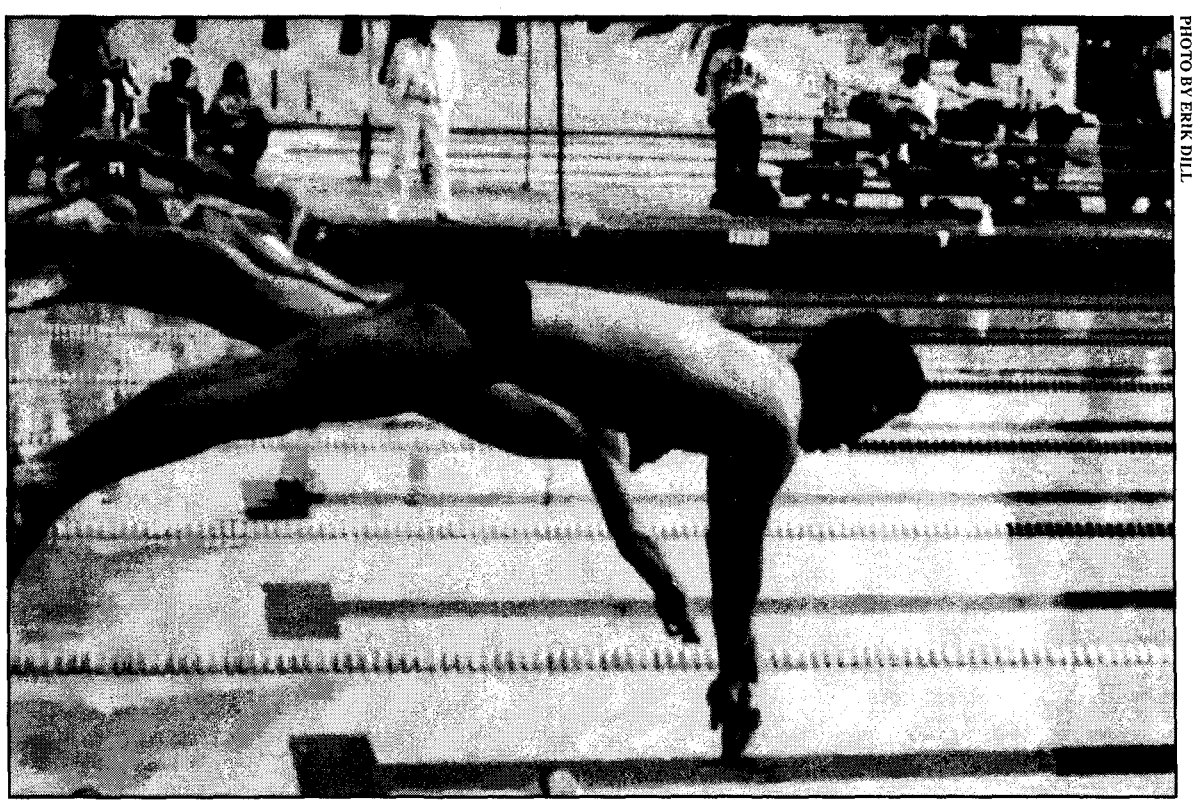


PHOTO BY ERIK DILL

Swim season ends with a splash

BY GERALD PALMROSE AND TIM RAUB

The Swim Team finished their season making a splash at the SCIAC Conference Championship. The three day meet went along extremely well for the first day when the men were in fourth, just one point behind La Verne for third place. The women held on to a strong sixth place position that they kept thoughout the meet, keeping Whittier College at bay. However, the second day, Caltech was disqualified in a relay, and the 14 points that was lost opened the door for Occidental to catch Caltech in the final race, handing the Beavers an excruciating meet loss 138-137. Because the Beavers had soundly thrashed Oxy during the regular season, though, the teams shared the fifth position in the year-end conference tallies.

Remarkably, the team finished with a total of nine Caltech Swim Records. Individual records were broken by Kristen Cook and Eagle Jones. Eagle broke the 500 yard freestyle record with a time of 4:52.86 previously held by 1983 All American Chris McKinnon (4:53.42). He also rewrote his own record in the 1000 yard freestyle (10:07.83) and kept swimming to set a new mark in the 1650 yard race (16:49.28).

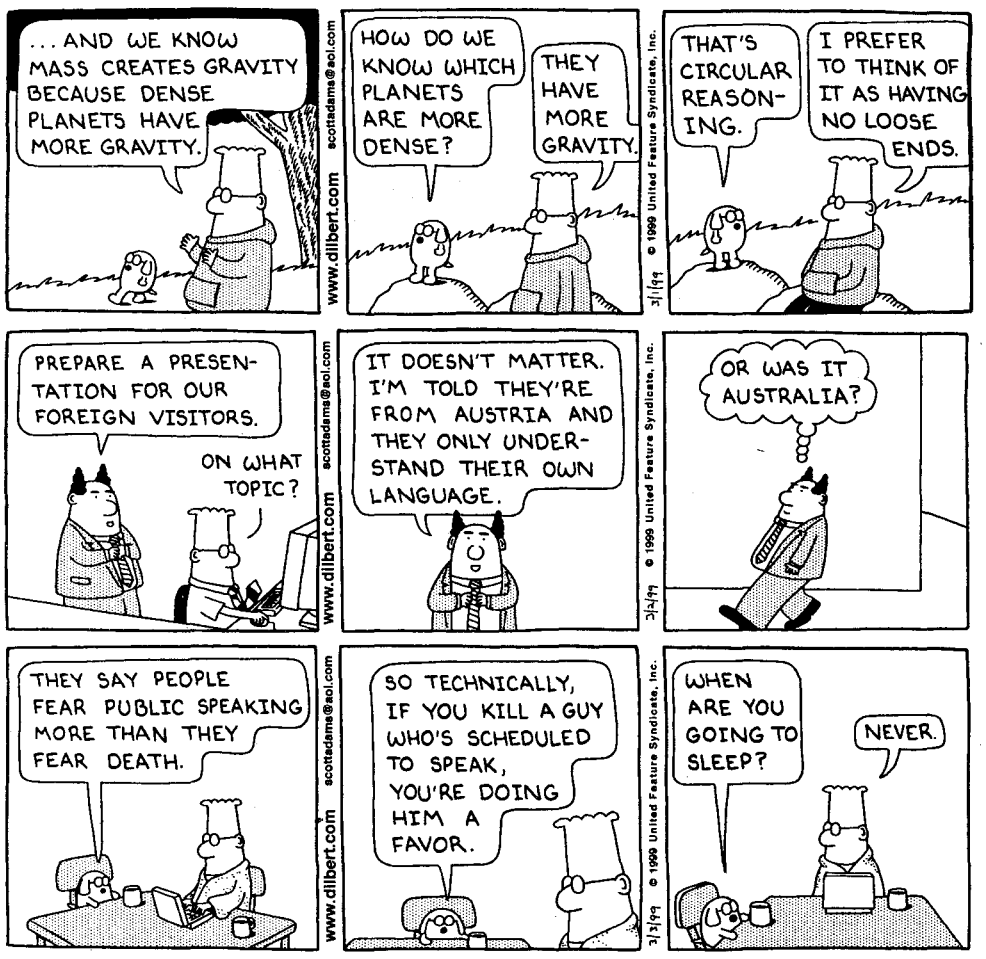
Cook did the same in her mile swim with a finishing time of 19:18.39 to set another Caltech record. She nearly broke another mark in the 400 IM (5:10.74) in the prelims.

The rest of the records were set in the women's relays. The team of Captain Phyllis Chen, Emma Huang, Sarah Mahoney, Paula Whitten and Linda Soo all took part in record breaking swims to write some Caltech history.

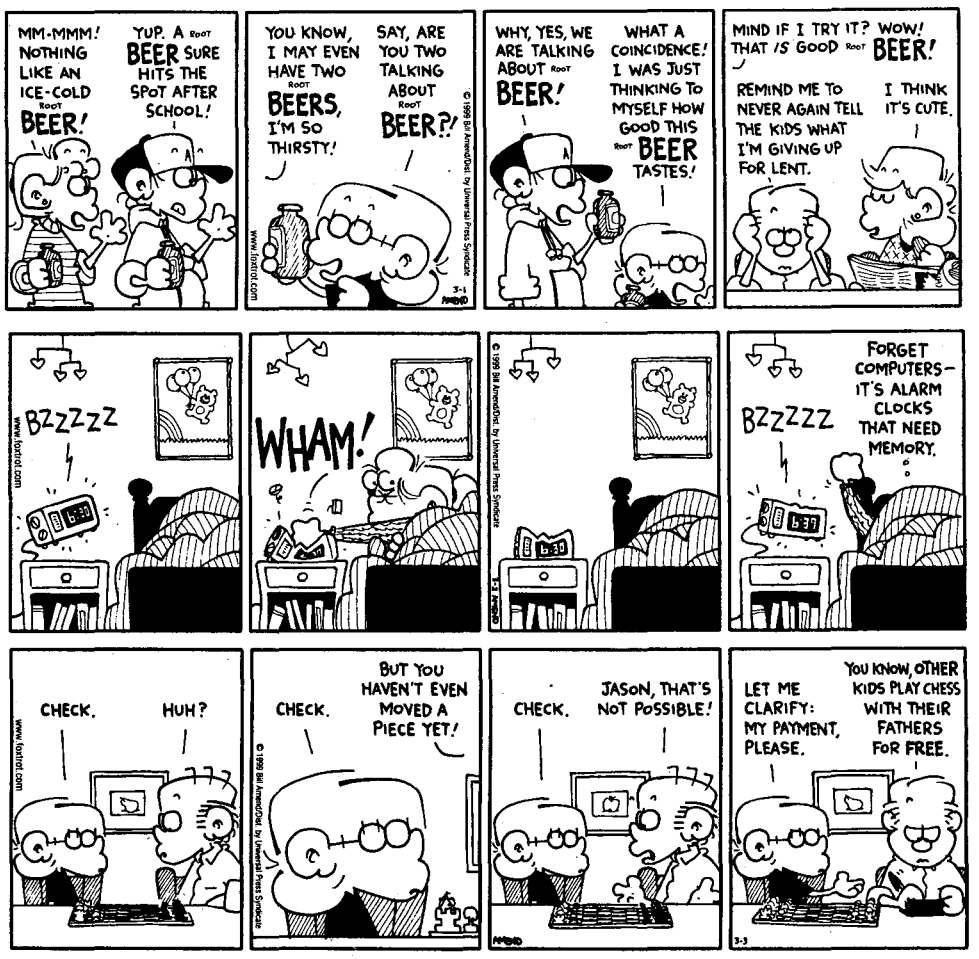
The rest of the team all swam extremely well, dropping huge amounts of time and improving their lifetime bests. Singled out by Coach Dodd, "Captain Koen Verbrugghe dropped 20 seconds in his 400 IM while Tory Sturgeon and Jeanette Hagen were impressive in the sprints." Tory dropped into the "sub 30 club" popping a 29.89 in her last 50 yard sprint of the year. Hanna Kim and Mandy Booth also had nice races in the 500 yard swim, both achieving season bests.

Finally, a passing of the guard happened in Springboard Diving as three seniors competed in their last meet. The event has been a Caltech strength for the past four years, and this meet was no exception. As it turns out, only freshmen Katherina Kohlner is left to carry on the tradition. The seniors went out strong with Mike Fisher finishing second on both boards (1m and 3m) and Robert Osada finishing 4th on 1m and 2nd on 3m. Fisher was first team All-Conference in both events, while Osada earned the honor for 3m. Finally, Rachel Steinberger finished her diving career by competing a full list on 1m, while Kohlner competed full lists on both boards. Said diving coach Adam Burgasser, "Mike [Fisher] has been a strong and consistent diver for the team." All three seniors will be missed.

DILBERT® by Scott Adams



FoxTrot by Bill Amend



Dean's Corner

Wheelies first in Szigetszentmarton

by Jean-Paul Revel

It is common to belittle someone else's achievements by stating that he is reinventing the wheel. I guess the wheel is such a basic tool in everyday life that it is seen as a very mundane part of the technical armamentarium of everyday life. The wheel and its derivatives are being used in many devices. From wheeled vehicles to wheels of fortune, from fans, through gears to ballpoint pens, even circular thinking.

For a long time it was thought that wheels were a unique invention of our brains. That too has proved to be a myth. Even biological organisms (never mind dogs chasing their own tails) are now known to have evolved rotating devices.

One such molecular device, called the F-ATPase is in fact central to life. In the synthesis of ATP (which stores energy needed to power many biochemical reactions) a shaft made of protein is allowed to rotate on a hub made of other proteins, placing the various reactants in position to interact. Like an old-fashioned gristmill, the whole thing is powered by the flow of material, in this instance the flow of protons from a region of high concentration to one of low. That gradient in turn is maintained by pumps, which get their energy from the transfer of electrons from one molecule to the next, electrons ripped away from what we consumed as food.

The other example is the flagella of bacteria, which rotate, also powered by a flow of protons, through a kind of biological turbine, embedded in the cell membrane. Oh well, I better stop...this is not meant as a substitute for Bi1.

Since reinventing the wheel seems to be considered such a trivial step, I started to wonder whom the people were, who had invented it in the first place. And so I turned to the web, this most convenient of Encyclopedias. I found it hard to find information about the wheel and its history on the web. I did find a few tidbits in a site devoted to the horse, but beyond that, surprisingly little.

I had more luck with hard copy Encyclopedias. The Britannica illustrates a clay model of a wheeled cart discovered in a tomb at Szigetszentmarton (Hungary) dated to the end of the 4th millennium BC. The Americana on the other hand says that wheels originated in the Near East or perhaps inner Asia. A two wheeled cart from the Bronze Age (3500BC) was found in Sumer, and there is evidence for wheels having been used in Assyria about 3000 BC, in the Indus Valley 2500BC, in central and northern Europe 1000BC and in Britain ca 500 BC.

Looks like the use of the wheel spread only slowly. While the time scale does not prove it, this slow pace makes it unnecessary to suppose that the wheel was invented more than once in the Old World. The wheel seems to have been invented independently in ancient Mexico, however, but there is no evidence that it was used for transportation there.

By now the only modes of transportation that don't use wheels are sailboats, sailplanes, balloons and skis, skates and related contraptions. I suppose one must include rockets, especially solid fuel rockets. If the propellant is liquid though, they include pumps where rotary motion is essential. That is also true of jet engines. Of course climbing aboard another creature such as a horse, donkey or elephant also does not involve the use of wheels, unless spurs are used. But wheeled vehicles are the swiftest and often the most convenient.

Herein however lies a problem for our Campus. It is not very large and even a slow walker can get across it in less than 10 minutes. But because there is little traffic, riding a bike on the grounds is most pleasant, and so are in line roller skates, the rage. They all save a few minutes in going from class to class, and allow a modicum of exhilaration, a dance like trance, which uplifts the heart, and generates a refreshing breeze. And so too, seem to be the carts (a.k.a. Daihatsu et al.). Odd, because they are much less swift and not very elegant, not allowing the near silent glide of the skates or bicycles.

Now the problem is that all of these wheeled devices generate not just pleasant exhilaration in their users, but a great deal of anxiety among bystanders, potential ten pins to the bowling ball of wheeled riders.

I heard that there are complaints among Caltech's neighbors, who share sidewalks with some of us. I don't know if the protests come from the archetypal "little old ladies in tennis shoes" that are supposed to populate our fair city, or brawnier types. It makes no difference. Riding on sidewalks is verboten, and even if it were not, there is no legitimate reason to threaten other people's right to a safe and relaxed walk.

The same can be said of course about the use of more massive wheeled vehicles such as cars. So far as I know they have no business on campus, except as the lugubrious announcer at LAX reminds us, "for loading and unloading only".

When we use wheels we are using a technology that is some 5-6000 years old perhaps more if one includes the rollers that were likely the precursors of wheels. As long as oxen powered the wheels, the dangers from unexpected encounters were low, but probably not zero. Just as many of his (and our) Neolithic ancestors, Pierre Curie, in the last century, died in an encounter with a horse drawn vehicle. Starting towards the end of the XIXand increasingly in the XXth century, speeds have increased, and so have the chances of catastrophic collisions. Slow down, slow down please, and watch out for human ten pins. Come to think of it, perhaps someone should design airbags for pedestrians.

A bientot

Jean Paul Revel

Fun With Food

This week I will be stepping down as IHC Food Chair. By the time you read this, the IHC will have selected the new chairman and I will be a mere mortal once again. For this, my final article, I thought I would recap all the changes that have happened under my tenure as food chair.

As chairman, I began by instituting a policy of both taking minutes and meeting with the IHC monthly. With the resignation of Lee Reavis, I personally insured that undergraduates were part of the interview process for his replacement, Patrick Gannon. Under my tenure we saw the return of the In N' Out van, the first ever vendor fair, waffle machines, and the introduction of two new bars to augment omelette day, wrap/pasta day and sushi day. The first ever comprehensive survey of Dining Services took place, and we saw the introduction of a Summer Board Plan. And of course, Fun With Food.

This year, the menu has been completely altered, moving from a five to six week cycle. The number one complaint against the board plan, monotony, have been alleviated with the addition of many newer, lighter, healthier entrees. Caltech also saw the introduction of a Rabbinically Certified Kosher Board plan which I helped to establish.

Although I did help to facilitate each one of these changes, I cannot take sole credit for any of them. My job was made easy thanks to the cooperation of Andre Mallie, Patrick Gannon, Tom Mannion, and Debbie Walker. I would also like to thank the entire CDS staff. Without their help and genuine interest in making students happy, none of the changes you saw would have ever happened.

One year ago when I came to the IHC to interview for the position of food chair, I promised to do what I could do to make dining at Caltech better experience for everyone. I hope that you feel that things are better than they were. I know I do. Thank you for giving me the opportunity to serve for you.

Dave Tomlett

Mints

Announcements

If you have the time we have the need. Goodwill industries of Southern California is a non-sectarian, not-for-profit organization whose mission is to enhance the quality of lives of people who have disabilities and other vocational disadvantages by helping them to become productive and self-sufficient through education, training, and job opportunities. Goodwill helps more than 2000 people each year and is nearly 90 percent self-supporting through its 24 retail stores, education, and job-training programs, computer recycling center and its Industrial Services contracts with local businesses. For more information on how you can help Goodwill help others through volunteering, call Robin Braislin at 323-223-1211 ext. 230.

In honor of March as National American **Red Cross Month, the San Gabriel Valley Chapter encourages organizations to **dress the part** on Thursday, March 11, to acknowledge the work of the organization. The chapter has designated the day as **Red and White Day**, asking people to wear the signature Red Cross colors. This is a great way to show support in a no-cost, fun fashion!

Are you bright, motivated, fun, and energetic? Do you want to make a difference on campus? Join the **undergraduate Women's Leadership Group! This group is dedicated to promoting campus-wide, inter-house, leadership for undergraduate women. The group is forming now, and a planning meeting will be scheduled for early Spring Term. If you are interested in joining, contact Janna Horowitz in the Counseling Center, x8331 or *janna@cco.caltech.edu*, before the end of winter term.

Mark your calendars! **Prefrosh Weekend 1999** is scheduled for Thursday, April 15th, through Sunday, April 18th. If you are interested in helping out with Prefrosh Weekend, please contact Dina Figueroa, Assistant Director of Admissions, at *dina@admissions.caltech.edu*.

Looking for a safe and supportive place to discuss issues such as coming out, being out, dealing with family, coping with a homophobic culture, and being GLB at Caltech? The **Gay/Lesbian/Bisexual Discussion Group** meets on the first and third Tuesday of each month from 8:15 P.M. until 10:15 P.M.in the Health Center lounge. This is a confidential meeting and does not imply anything about a person's sexual orientation -- only that s/he is willing to be supportive in this setting. The group usually discusses a particular relavent topic and then moves on to general discussion. Call x8331 for more information.

Free anonymous HIV testing is available every Monday evening using Orasure oral testing at the AIDS Service Center, 1030 S Arroyo Parkway. Appointments by calling 888-448-9242 are preferred; walk-ins are welcome. Last appointment at 8:00 pm. For more information call Craig Petinak at 626-441-8495.

Looking for summer work in one of the nation's last examples of pristine wilderness? **Glacier National Park**, located in the northwest corner of Montana, is looking for students to fill more than 900 summer jobs in all segments of the hotel and hospitality areas. Positions range from hotel front desk clerks to tour guides to guest entertainment roles. For details on jobs and salaries call Glacier Park, Inc. at 602-207-2620, write to them at 1850 North Central, Phoenix, AZ, 85077-0924, or visit *www.gpihr.com*.

Events

Caltech Hillel invites you to celebrate the Jewish holiday of **Purim** on Sunday, March 7th, in Steele house at 6 PM. There will be good food, music, and the humorous "Latke/Hamentashen debate." Curious? Join us on Sunday!

The Human Resources, Employee Services office will sponsor a **Red Cross Blood Drive on Thursday, April 8, from 12:15 till 5:30 pm and Friday, April 9, from 10:15 a.m. till 3:30 pm in the Winnett Lounge. For an appointment please contact Kim at ext. 6001 or*kim.goodfriend@caltech.edu*. Walkins are also welcome.

Join Hans Hornung, C.L. "Kelly" Johnson Professor of Aeronautics, and director of Graduate Aeronautical Laboratories at Caltech, for a **fluid mechanics seminar entitled "Oblique Shock Reflectopm from an Axis of Symmetry: A New Class of Self-Similar Solutions in Gasdynamics." The lecture will take place at 3:00 pm, Friday March 5, in room 306 Firestone. Refreshments will follow the talk.

On Thursday, March 11, at 8:00 pm in Dabney Lounge, the Caltech Folk Music Society presents a **New England-style contra dance, welcoming newcomers and experienced dancers alike. Pre-dance instruction begins at 7:30 pm. Musicians are encouraged to join in the tunes with the Bungalow Band, and Barbara Stewart will share the caller's mike with anyone wishing to teach and prompt a dance. No partner necessary. This event is free; a donation of $3.00 is appreciated. Call Andy Cameron at 626-798-8619 for details.

Come watch **Jorge Mester and the Pasadena Symphony continue its 71st season with a concert featuring pianist Seung-Un Ha. The program will include Alfven's Swedish Rhapsody No. 1, piano concerto No. 3 by Bartok and Symphony No. 3 Brahms. The concert will be held at 8:00 pm on Saturday, March 20 at the Pasadena Civic Auditorium, 300 E. Green Street. Student tickets are availble for $7.50 at the door with student ID or for $6.00 through the Caltech Y. For more information call 626-793-7172, 626-584-8833, or Ticketmaster at 213-480-3232.

One of the largest and best attended art shows in the area will open on Saturday, March 13 at Pasadena Presbyterian Church, 54 North Oakland Ave. The 25th **Annual Community Art Show attracts top artists from all over Southern California vying for several prizes. An awards ceremony will open the show at 3:00 pm Saturday in Gamble Lounge honoring the winners with a reception and viewing of the show which will run through March 28. There is no admission charge and most paintings are for sale.

The Mariachi Heritage Society presents **"The Divas of Mariachi" at 7:00 pm on Saturday, March 13 at the Pasadena Civic Auditorium, 300 E. Green Street. This 8th Annual concert features Reyna de Los Angeles, America's first all female Mariachi. Other special guests include the majestic sounds of Mariachi Las Alondras, Tejano legend Little Joe, and the nation's premier mariachi, Sol de Mexico de Jose Hernandez. For more information call 626-449-7360 or Ticketmaster at 213-480-3232.

Join Patricia Cheng, associate professor of psychology at UCLA for the William Bennet Munro Memorial Seminar **"Causality in the Mind." The lecture will be held at 4:00 pm, Friday, March 5 in Judy Library, room 110 Baxter.

Two of today's most versatile pianists, Fred Hersch and Jeffrey Kahane, team up for a **classical/jazz jam session on Friday, March 5 at 8:00 pm in Caltech's Beckman Auditorium. The first half will feature the duo performing Bach's Concerto for two keyboards in C Major and Kahane playing classical solo pieces. The second half will feature Hersch playing jazz solo pieces with the duo performing jazz duets, Barber's Hesitation Tango, and Strayhorn's Tonk. Tickets are priced at $35.00, $31.00, and $27.00; student/senior rush tickets will go on sale for $10.00 one-half hour befor the show. Tickets can be purchased at the Caltech Ticket Center, 332 S. Michigan Ave., or through Ticketmaster. For more information call 1-800-2CALTECH.

Caltech SEDS will be holding its fifth **telescope contruction meeting** beginning Sunday, February 28 at 2:00 pm in the SEDS lab (0011 Thomas). No prior experience is necessary. For detailed contruction plans follow the Construction Instructions link from *http://www.cco.caltech.edu/~seds/telescope.html*. For other information contact Loren Hoffman at *loren@cco.caltech.edu* or Leon Torres at *leon@ugcs.caltech.edu*.

The annual **FOCAL (friends of Caltech Libraries) **Booksale** will be held on Friday, April 23 from 8:30 am till 2:30 pm in Dabney Hall Lounge and Gardens. The booksale is open to the public; everyone is welcome. Come and see what treasures there are to be discovered!

The **Distinguished Speaker Series of Southern California** continues its successful encore season with **The Motley Fool** at 8:00 pm on Thursday, March 11 in the Pasadena Civic Auditorium, 300 E. Green Street. As internet financial advisors and best-selling authors, brothers Tom and Dave Gardner use today's latest technology to revolutionize the way people obtain financial advice. Their wildly successful web site is consistently rated one of the best sites in cyberspace. In addition to three best-selling books and a nationally syndicated radio program, their column can be read weekly in the *LA times*. Tickets may be purchased at the Pasadena Civic Box Office (626-449-7360) or Ticketmaster (213-480-3232).

William Stockdale will narrate the **Armchair Adventures travel film** *Pilgrimage Across Europe* on Friday, March 12, at 8:00 pm in Caltech's Beckman Auditorium. One of America's foremost travelers and lecturers, Stockdale devotes all of his time to writing and lecturing. He has written for prominent national magazines and The New York Times, and his films have appeared on television and are available on video. Tickets to this film are priced at $9.00 and $7.00, and can be purchased at the Caltech Ticket Office, 332 S. Michigan Avenue, or through Ticketmaster. For more information call 1-888-2CALTECH or 626-395-4652.

Earthquake Preparedness Training will be offered by the Pasadena Fire Department from 9:00 am to 12:00 pm in Baxter Lecture Hall on Tuesday, March 23. Learn what to do before, during, and after an earthquake. The session is limited to the first 100 people who sign up. For reservations call Caprece Anderson at 626-395-6727.

Fellowships and Scholarships

The **Beckman Internship** will be available for the summer of 1996. The internship, supported by friends of Arnold Beckman, will pay a stipend of $4,000. It allows a selected intern to spend the summer working in the office of a politician and to see the inside process of government. The intern is expected to make arrangements with the appropriate political persons. It is open to any undergraduate who intends to be a Caltech student next year. If interested, submit a brief proposal describing where and how you would use the stipend, to the Deans' Office, 102 Parsons-Gates, by Monday, April 5, 1999.

Green Hills Software annually awards merit-based scholarships and fellowships to Caltech undergraduates who have demonstrated ability and special aptitude in computer science. The award for the junior year consists of a $2,500 scholarship. The award for the senior year may consist of either a $2,5000 or $5,000 scholarship. In addition, one or two applicants are invited to become Green Hills Fellows. Applicants should be second term sophomores with a GPA of 3.2 or higher. The selection criteria include programming ability, academic performance, and faculty and peer recommendations. To apply, applicants must submit an application form, current academic transcript, and three letters of recommendation, preferably from faculty or employers familiar with the student's work. Applications are available in the Financial Aid Office. Entries must be submitted to the Financial Aid Office by April 16, 1999.

The **National Society of Public Accountants Scholarship Foundation** (NSPA) is now accepting applications for financial assistance for the 1999-2000 academic year. Applicants must be Canadian or U.S. Citizens, full-time undergraduates, majoring in accounting at an U.S. accredited 2 or 4-year college, and have a "B" or higher overall grade point average. Applications are available in the Financial Aid Office. To apply, applicants must submit an official transcript and application form to the NSPA website at *http://www.nsacct.org* or write to: NSPA Scholarship Foundation, 1010 North Fairfax Street, Alexandria, VA 22314-1574. Entries must be submitted to NSPA by March 10, 1999.

The **National Institutes of Health (NIH) Undergraduate Scholarship Program** offers scholarship awards to undergraduate students from disadvantaged backgrounds that are committed to careers in biomedical research. In return, recipients are obligated to serve as paid employees in NIH research laboratories during the summer and after graduation. The scholarships pay for tuition and reasonable educational and living expenses up to $20,000 per academic year. Applicants must be full-time for the 1999-00 academic year, have a 3.5 or higher GPA or be ranked within the top 5% of your class, and classified as having exceptional financial need. Applications are available in the Financial Aid Office. To apply, applicants must submit application form; official transcript; undergraduate institution certification form, and three letters of recommendation, preferably from professors familiar with the student's academic qualities. For more information, visit the NIH website at *http://ugsp.info.nih.gov*. The deadline for receipt of completed applications is March 31, 1999.

The **John Gyles Education Fund** is offering scholarship awards up to $3,000 for the 1999-2000 academic year. Applicants must be Canadian or U.S. Citizens, have a 2.7 or higher GPA, and demonstrate financial need. Criteria other than strictly academic ability and financial need are considered in the selection process. To obtain an application, send a self-addressed, stamped envelope to: The John Gyles Education Fund, Attention: The Secretary, P.O. Box 4808, 712 Riverside Drive, Frederiction, New Brunswick, Canada E3B 5G4. Filing dates for mailing documents in 1999 are April 1, June 1, and November 15.

Fellowships Advising and Resources has received information on a number of **summer undergraduate research fellowships**. Students receive a stipend and sometimes travel and room fees are paid. Stop by our office and check through the summer fellowship files for information on these and other summer fellowship opportunities.

For information on the listed fellowships, assistance with essays, for clarification of questions, contact:

FAR - The Fellowships Advising and Resources Office. To make an appointment, call x2150.
For more information, please email lauren_stopler@starbase1.caltech.edu.

UFA - The Undergraduate Financial Aid Office. For information, call x6280, or stop by 515 S. Wilson for an appointment.

To submit an event for the Mints, contact mints@tech.caltech.edu or Mail Code 040-058 by noon on the Monday prior to its inclusion. Submissions must be brief and concise. Please do not send Mints in difficult formats like Binhex or Word document. ASCII and rtf are best. The editors reserve the right to edit and abridge all material. Solicitations will be referred to the business manager.

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