

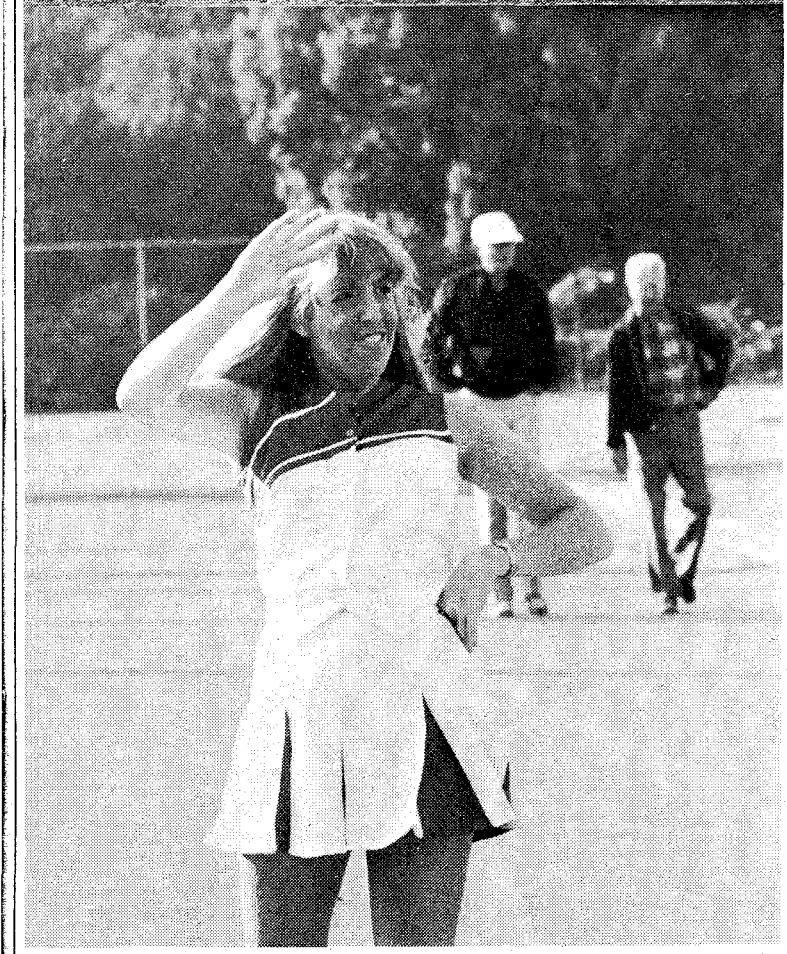
**Cheers!**

The Caltech Cheer and Yell Leaders in and out of formation.

Above, Dave Wertz (center) is surrounded by (clockwise from top) Debbie Pinck, Clare Stassen, Nancy Drehwing, and Laura Wilson.

Left, Debbie Pinck looks at the game.

They had something to cheer about, too. See page 7 for details.



**SIGGRAPH Held at Tech**

**by Compuwhiz at Large**

The Los Angeles branch of the Special Interest Group for Computer Graphics (SIGGRAPH for short) held a conference entitled "Visual Dynamics: Showcase '83" at Caltech on the weekend of November 19-20. This two-day conference was held to provide art and design professionals with a unique opportunity to increase their knowledge about the expanding field of computer graphics.

This year's showcase included a series of seminars discussing Computer Animation and Simulation, Computer Aided Product and Industrial Design, Directing and Developing Computer Graphics Teams, and New Frontiers in Computer Graphics. Among the speakers at these seminars were Caltech's Professors Jim Kajiya and Jim Blinn, both of whom

spoke about new methods of implementing computer graphics and also about possible future computer graphics technology.

Another feature of the showcase was an exhibition of computer generated artworks, held in Winnett Student Center. This exhibition, which was open to the general public, featured works designed with both the high powered computer (i.e. Cray-1) and the insignificant microcomputer (i.e. Apple II). The subject portrayed in these works varied greatly from the commonplace to the fanciful. This exhibition proved that works of artistic merit could be produced from mindless number-crunchers.

The highlight of the showcase was a two hour video and laser show which featured

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**House System Is Discussed**

**by Ken Whang**

A discussion of undergraduate housing and social structure at Caltech involving six speakers of various viewpoints and an audience of students and faculty was held Tuesday evening, November 22, in Ramo Auditorium.

The meeting, sponsored by the Caltech Y and the Master's Office, was in response to recent criticisms of the current house system.

Some of the main points discussed were the level of social homogeneity, the two-way nature of the Rotation procedure, and the apparent social barriers between the different houses.

Moderated by Jim Morgan, Vice President for Student Affairs, the discussion was fairly informal and attracted a large audience. The speakers were, in order, Lily Wu, John Krehbiel, Behzad Sadeghi, Michael Chwe, Aaron Roodman, and Robert Hill.

The audience, which included about 80 undergraduates, the Deans, the Master of Student Houses, and a few other faculty and alumni, addressed the speakers on a first name basis during question-answer periods and freely brought up ideas of their own. The floor was opened for questions and

comments after the third speaker and after all six had presented their ideas.

Lily Wu, the first speaker, enumerated in a prepared statement what she saw as the good and bad points of Rotation, and proposed a simple, concrete change in the current procedure. Her first point against the present system was that the "medieval" nightly meetings during which upperclass discuss and rate new students are unfeeling and fundamentally unfair to the freshmen.

Second, she said that the current selection process takes an already homogeneous student body of science and engineering majors and further homogenizes it "to a degree that is undesirable."

The good point she saw was that it gives the freshmen a chance to meet the upperclassmen and see all of the houses.

Given these good and bad points, her proposed solution was to base freshman house assignments entirely on their own preferences. Freshmen would still tend to pick into houses with compatible characters, but within those bounds, some heterogeneity would be introduced through

continued on page 3

**"It's Still the Day Before"**

**by Biff Yamazaki**

"It's Still the Day Before," a community forum concerning nuclear disarmament, was held in Ramo Auditorium on Monday, November 28, 7:30 pm. The public event, reacting to the TV program "The Day After," a visual presentation of the destructive power of the nuclear bombs and of life after the disaster, was sponsored by the Caltech Y. It attracted a myriad of concerned citizens of Pasadena, varying from housewives to high school students, not to mention the numerous members of the Caltech community.

The event was divided in two parts: a discussion of the nuclear arms race as seen by a panel of experts and their views on the appropriate government policies, and an introduction to several local organizations devoted to the matter of nuclear disarmament.

The first part featured a series of presentations by four experts: Richard Feynman, Caltech's distinguished physicist, and JPL's Robert Nelson, host of the show "Wizard," presenting the scientists' point of view; Bruce Cain, Caltech professor of political science, with the political viewpoints; and Helga Bruchner, a member of the Society of Friends in East Ger-

many (German Democratic Republic) representing an angle of the people in close range and in constant contact to the nuclear weapons.

The theme of the experts' discussions, although varying in viewpoints, was nuclear freeze. Furthermore, the experts denied their title of "experts," indicating that there are no experts, or all informed are indeed experts concerning this matter.

Dr. Feynman opened the talks by indicating that he was neither surprised nor shocked by the visual interpretation of the nuclear holocaust in "The Day After," himself well aware of the destructive power of the nuclear bombs. He brought up two possible directions for building nuclear arms: to strengthen the present line of weapons in order to achieve "first strike" capabilities, or disarmament, to put an end to the threat of ever having a nuclear war. However, he believes that strengthening is not a smart option, for there are already enough weapons to destroy the world several times over, and besides, despite the possibilities of space stations that could redirect missile courses to outer space, the effect of fallout is too great. He therefore recommended, first, a nuclear freeze; even though

this is not a solution to the problem, it is a step in the right direction. At this point, negotiation is possible. In a nuclear freeze, he does not see a danger, but does see a small hope.

Dr. Nelson followed with a similar viewpoint. However, he emphasized the importance of responsibilities of individuals, and in particular, scientists. Citing events from history concerning scientists' attempts to properly warn and inform citizens of the dangers and results of a nuclear war, he again stressed that a freeze is necessary, considering that there is no defense against these weapons.

Dr. Cain discussed the objectives and methods of effecting a nuclear freeze in the political circles. He centered on two points: the requirements of political candidates to best assure nuclear freeze, and the methods in which the citizens pressure for a freeze. He indicated that politicians must make calculated risks for peace, and that the first step towards this movement must be made by the United States. A genuine trust between U.S. and U.S.S.R. must be established. Furthermore, citizens must be sensitive in

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letter

Caltech — Why It's My School

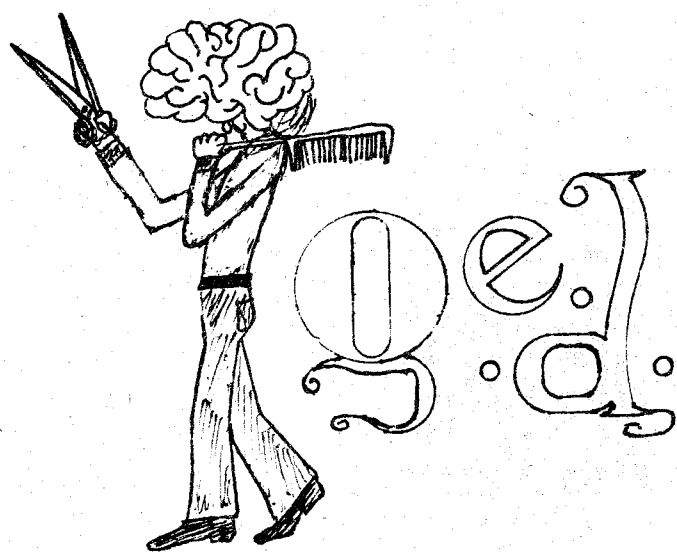
To the Editor (& all of Caltech)  
 There is a rumor going around that Caltech is too demanding—that going here is like drinking from the proverbial firehose, from which we either snatch a sip of knowledge or get our heads blasted off. Okay, so it's true, but frankly, that's the whole fun of it. If it weren't for such character building classes as AMa 95 and Ph 106 and workloads that boggle the imagination, Caltech would lose most of its charm.

I ask you—what could equal the sheer exhilaration of waking up an hour before your Ma 1 final is due and realizing that you haven't started it yet? What could match the human drama of asking your Lit professor for that fifth extension? What could be as spine-tingling as a date with UASH? Life may be tough here, but it is seldom dull.

That which does not flame us out makes us stronger. Take the all-nighter, for example. We all complain about having to stay up all night in order to do an assignment, but look how good we're getting at it! This is a valuable skill that will be useful for the rest of our lives. When I was a frosh, the concept was virtually unthinkable, but now I can pull an all-nighter without batting an eye.

So why are we doing this to ourselves? Let's face it: science is fun, and if we didn't think so, we wouldn't have even applied here, much less attended. Even though a "normal" schedule is as demanding as it is, many of us take fifty or sixty units because we just can't get enough. In fact, I know one person whose idea of a "culture" class is biology lab.

Around finals week, we often muse over the possibility of going to an easier school. Well, the awful truth is that it wouldn't be any better. Do you



by Zobi-Wan

To continue our discussion of methods to derive the interesting formula

- (1)  $1=2$ ,  
 we look first at a proof based on a lemma attributed to Smullyan. Given that
- (2) Nothing is better than eternal happiness, and also the quite obvious fact that
- (3) A peanut butter sandwich is better than nothing, we apply the Transitive Property to conclude that
- (4) A peanut butter sandwich is better than eternal happiness.

But it is universally agreed that eternal happiness is better than a peanut butter sandwich. The conclusion we must draw is that, for any member  $\epsilon$  of the set  $E=\{\text{eternal happiness}\}$  and any member  $\pi$  of the set  $P=\{\text{peanut butter sandwiches}\}$ , under the transformation  $G(x):x \rightarrow y \in \mathbb{J}$ , which assigns a relative "goodness" rating to  $x$ ,

know how miserable life would be, carrying a 4.5 and partying every day of the week? And imagine your panic as you try to decide what color polo shirt to wear to the frat party or how to get that nasty little water spot off the chrome of your Porsche. Aren't you glad you're safe from the real world?

Sure, there are times that I wish that I were someplace else, or that I had half the work that I did, or that there were more women here, and so on and so forth, but then I remember just what a special place this is. Caltech may be a tough school, but it's still *my* school, and I can't imagine myself anywhere else.

—Jim Cser

The Caltech Y Fly-by

Friday...December 2

Noon Concert—Hammersmith, presented by the audiophilic Y.

Art Workshop—Break the Tech Blues. Participate in creativity awareness. 3 to 6 pm in the Y Workroom.

Saturday...December 3

Creative Initiative—Is war between America and Russia obsolete? Two short films designed to inspire a desire to lead the world beyond war are presented: 'No Frames, No Boundaries' and 'Beyond War'. Clubroom 1, Upstairs Winnett, 2 pm.

Wednesday...December 7

Noon Update—'The State of the Audio Art', Jim Boyk, artist in residence, Winnett Clubroom 1, bring a hedonist and a lunch

For more information, call 356-6163

$$\begin{aligned} G(\pi) > G(\epsilon) > G(\pi) \\ G(\pi) > G(\pi) \\ 0 > 0. \end{aligned}$$

(5) Now, we can specify inequality (5) more precisely by observing that there exists a non-zero value,  $\zeta$ , such that

$$0 = 0 + \zeta.$$

Since  $\zeta$  is non-zero, we can multiply through by  $1/\zeta$  to find

$$\begin{aligned} 0 &= 0 + 1 \\ 0 &= 1. \end{aligned}$$

And finally, simple addition yields

$$(6) \quad 1 = 2.$$

Another proof of this by-now-not-unusual theorem is due to Headwaiter. We know that

(7) The love of money is the root of all evil.

That is, all  $x_0 \in \{\text{the love of money}\}$  are solutions to

$$(7') \quad (x - x_0)^n = e, e \in \{\text{all evil}\}.$$

Choose any such  $x_0$ . Since it is a solution of equation (7'), it makes  $e$  equal to zero. For all  $e$ , at least one such  $x_0$  can thus be found. But this can be restated as

$$(8) \quad \forall e \in \{\text{all evil}\}, e = 0,$$

which means the set of all evil consists of only  $\{0\}$ . That is,

(9) There is no evil.

But the conclusion expressed in statement (9) is clearly erroneous; there is evil, and the set of all evil contains at least one non-zero element:

$$(10) \quad \exists v \in \{\text{all evil}\} \text{ such that } v \neq \{0\}.$$

To avoid a contradiction between (9) and (10), we must conclude that  $v = \{0\}$ , which, by the logic in lines (5) and (6) above, yields the equation which should, by now, be taken for granted:

$$(11) \quad 1 = 2.$$

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THE CALIFORNIA TECH

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## Houses Discussed

from page 1

freshmen who picked "out of the mold" and through randomly resolved ties. The unfairness of house Rotation meetings and strategies would be eliminated, while the opportunity for freshmen to see the houses would be preserved.

Wu ended her speech with a quote from Robert Huttenback, who after serving as Master of Student Houses for most of the sixties, wrote about many of the current concerns with the house system. "I write in the above vein not because I am bitter or because I don't think Caltech is a wonderful institution, but rather because I am very much a part of the place and want to see it grow and prosper more than it ever has in its already illustrious history."

The second speaker, John Krehbiel, looked at many of the same characteristics of the house system that Wu and other critics have mentioned, but saw them as being primarily good rather than bad. Among the good things he saw in the system were that it helps to maintain house characters and that it provides some automatic friendships for new students.

A new idea that he brought up was that the house system encourages some respect for upperclassmen and thereby helps to maintain the honor system.

Krehbiel also noted that the current house system is flexible. A student can move to a different house or to off-campus housing if he desires, and many people have broken down the social barriers between the houses, so they must not be so formidable.

Problems arise, he said, "when the seven houses turn into seven opposing factions," and that is not inherent in the house system.

Krehbiel described the Rotation procedure as "a two-way street." Both the houses and the new students have

some say in the current process, and the system has been functioning well. Krehbiel considered the amount of say by each party to be about right in the current procedure.

The next speaker, Behzad Sadeghi, focused first on the concept of house traditions. He seemed a bit reluctant to be straight and to the point, but did eventually communicate his message effectively. He began, "It's not to say that we're 'molded', but it is true that a set of traditions, attitudes, and feelings is passed along to the freshmen." He then proceeded to describe what he saw wrong with Caltech students following traditions to the degree that they do.

In one of his more effective examples, he noted that in the fifties, freshmen were customarily "swirled," rather than showered, into a house. "Swirling" involved placing a person's head into a flushing toilet. It was discontinued after a freshman was emotionally hurt and his parents complained to the Master, but Sadeghi feared that if that freshman had not been hurt in his initiation, we would still be "swirling" people in today.

He also spoke for some time about how he found the general social attitude here discouraging. He referred to "very energetic, very positive" who eventually left Caltech for social reasons.

Michael Chwe, the fourth speaker, questioned why houses should have character at all and proposed random distribution of freshmen. According to Chwe, the reason houses have character is the insecurity of freshmen and upperclassmen.

"The house," he said, "is a backdrop of insecurity and superficiality." The houses also encourage stereotyping and what he called "face-name-house" identification. The characters of houses help students exclude things from

their lives and tend to reinforce insecurities rather than help them grow up.

Chwe proposed random room assignments as a way to minimize house characters and encourage individual characters.

The next speaker, Aaron Roodman, listed several points in defense of the current house system. First, he said that the traditions of a house are a product of the house members, citing traditions that have appeared in his house within the last few years. He also noted that there is no coercion to make anyone participate in any traditional activities against his will.

Second, he said that there are no real social barriers between the different houses. People can meet people in other houses, and it was his opinion that "if the house system gets in the way then it's their own fault." In addition, the houses are the base of all social life, so in that respect, they fill a necessary function by making the social life less dull than it might otherwise be.

Finally, he defended the rotation system as a pretty good way of taking house and freshman preference into account in housing assignments. He saw the houses as being very heterogeneous as they are.

Robert Hill, the last speaker, did not evaluate the house system; instead, he said that any changes students could make would have little overall effect and that students should be happy with what they have here.

He noted that because of the small size of Caltech, a few students could effectively bring about change. In 1967, a few undergraduates examined living conditions in various schools across the country and found them to be about the same.

Given the academic pressures and the small size of the houses at Caltech, he called on the theory of group dynamics to predict that little could be done to change the living conditions here. He said that Rotation is a fairly random process

of house assignment already.

The questions and comments from the audience included other proposed house assignment plans, discussion of how much homogeneity or heterogeneity is desirable, and proposals to try to break down social barriers between the houses.

Several audience members thought that Lily Wu's proposal did not leave the houses with enough say. Teresa Solberg proposed that ties should be resolved by house preferences. John Krehbiel, responding to a question, thought that the houses can judge the freshmen more effectively than the freshmen can judge the houses, so the houses should definitely have some say.

Sergay Mnatzakanian strongly supported the idea of random room assignments to make houses as heterogeneous as possible. David Marvit commented that with the undergraduate student body already fairly homogeneous, random room assignments probably would be agreeable.

An alumnus commented that of what he missed of his experience at Caltech, "diversity was probably at the top of the list."

Several proposals were made to try to minimize the social barriers that exist between the houses. It was generally agreed that these barriers do exist to some degree or another. As Jim Morgan put it, "Don't kid yourself. There are barriers. It's the eyes of a stranger."

Proposed changes in social events included money set aside for parties involving more than one house, an general emphasis on social activities with houses you don't normally deal with, and the publication of social calendars by all houses, graduate and undergraduate.

Chris Hull proposed that a real student center be built that would attract people from all of the houses. This would help to break down social barriers every day, not just during social events.

## SIGGRAPH

from page 1

the leading edge of computer graphics technology. This show, which was held in Beckman Auditorium, displayed a wide range of computer graphics application in the everyday world. Included in this video potpourri were parts of technical films, bits of the feature film *TRON*, music videos, video game commercials, television title sequences, and demonstrations of state-of-the-art graphics techniques.

It is truly amazing how often computer generated video appears in today's television. Many of the TV station identification spots are currently done with computer animation. Many of the more popular commercials are now done by computers instead of by human animators. Some of the spots advertising NCAA football and NBA basketball were done, contrary to popular belief, using computer animation. More and more music videos include computer graphics sequences.

Also included in the SIGGRAPH video were three animation sequences done by Caltech students. Both "A Ride Through the Mountains" and "Caltech Flyby" drew wide applause from the audience although in retrospect they were among the more primitive in appearance. On the other hand, the sequences shown done by James Blinn were among the more sophisticated and more appreciated.

Although previously people believed in the reality of photographs, since they were not dependent upon an artist's interpretation, this SIGGRAPH showcase gave evidence that soon this will no longer be true. With the increasing sophistication of computer graphics techniques, reality and fabrication are becoming harder and harder to discern.

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Folk Music

Old Mother Logo

The Caltech Folk Music Society brings to the campus tonight (Friday) Old Mother Logo, an all-woman old-time country stringband who will appear in concert at 8 pm in Dabney Hall. Tickets for the concert are available to the public for \$5 in advance or \$6 at the door, but Tech students (both grad and undergrad) can purchase \$3 tickets (subsidized by the GSC). Tickets are available through the Caltech Office of Public Events box office, 356-4652.

Old Mother Logo is a Los Angeles based, five member group, who perform old-time country and Appalachian mountain music. While this music has a unique style and flavor, its heritage can be traced through to its roots in the British Isles. In fact, the group's name is derived from an Appalachian fiddle tune originating in 16th century England.

The group is personed by: Monika White, best known for her frailing banjo playing, but who also can be found behind a guitar, mandolin, spoons or

kazoo; Gitta Morris, who the group touts as "the liveliest string bass player in the West" (she just may be), and who also plays guitar, dobro, and harmonica; Barbara Slade, the lead singer who performs on guitar and banjo; Jude Biggs, who describes herself as a "frustrated fiddler", plays mandolin, banjo and fretted dulcimer; and Laura Kass, their fiddler, performs only on the fiddle (but quite well indeed, as she won first prize in the professional fiddling category at the 1983 Topanga Contest).

Another upcoming Folk Music Society event will be our fourth Hootenjamanany, a BYOI (bring your own instrument) get-together on Saturday, Dec. 17. The 'hoot' is being organized by Judy Ruggles and will feature a Christmas theme. It will be at 7 pm in Winnett and as always should be a lot of fun. The hootenjamanany is free, and the entire campus is invited, but RSVP's are requested. To RSVP or for more information call Judy at 289-3149.



Old Mother Logo will perform their country and Appalachian mountain music tonight.

High-Res Camera Developed at Tech

Caltech News Bureau

A camera that would allow astronauts in orbit to obtain high resolution radar pictures of the terrain beneath them has been developed by engineers at Caltech. The device would enable astronauts, or unmanned space probes, to image ground structures through clouds, fog or precipitation, any time of day or night.

Assistant Professor of Electrical Engineering Demetri Psaltis described the camera—which processes in real time data from Synthetic Aperture Radar (SAR) systems—in a paper delivered last week at the fall meeting of the American Physical Society in San Francisco.

SAR is a method of imaging from orbit by directing a beam of microwaves obliquely onto the earth. As the radar dish moves along its orbit, it detects backscattered radiation and uses the information in that radiation to synthesize a high-quality image. An imaging radar system developed at Caltech's Jet Propulsion Laboratory has been flown successfully on the *Seasat* spacecraft in 1978 and on board the Space Shuttle *Columbia* in November 1981. SAR proved in those missions that objects as small as 25 meters could be resolved, and that in some cases, the radar could even see beneath the ground surface, to image buried structures. Theoretically, with improved instruments, resolutions of a few meters could be achieved, say experts.

However, the data from those flights of SAR instruments could not be analyzed in real-time, but had to be processed on earth, using primarily optical processors. These are arrangements of lenses that transform the stream of data from the SAR film records into synthesized images. Optical processing is chosen for such a task because of its speed advantage over digital processing. For instance, the powerful digital minicomputer used at JPL typically requires hours to process a single frame, while real-time processing is possible with optical systems.

The SAR camera described by Dr. Psaltis uses in place of the film normally used in SAR systems an "acousto-optic" device, which is a tellurium oxide crystal transducer that accepts the radar signal. The changing radar signal alters the optical properties of the crystal, modulating the beam from a small solid-state laser shined through it. This crystal acts to focus the image in the range direction. The modulated beam is detected by an array of electronic light detectors called charge-coupled devices, which focus the image in the azimuth direction. The output of the scanning charge-coupled device is displayed on a television screen as the synthesized image.

The camera can be constructed to give a sharply focused image, regardless of rapid variations in the velocity and altitude of the vehicle carrying it, or the direction in which the antenna is pointed, said Dr. Psaltis. This involves the use of an additional acousto-optic device to adaptively focus the laser light onto the CCD, according to changes in the SAR parameters.

"The SAR camera we have developed has a number of advantages," said Dr. Psaltis. "The fact that it synthesizes the images on board in real-time can eliminate the need for large amounts of data collection and transmission. And, of course, the availability of real-time images also allows investigators to immediately adjust their experiment to allow for the results being obtained. Finally, its low power consumption, size, weight, and cost make it a practical device for use on the Shuttle and on unmanned space probes."

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# The Inside World

**Blacker:** Lets see... Blacker... hmmm. Well, I suppose you all have a right to know that this column is not going to be about Blacker House any more. —Sigmund B. Fernmeister

**Dabney:** Today is Drop Day. —Nuff Sed

**Fleming:** Thanks to some help from the powerhouse big maroon machine, Fleming captured the Interhouse Soccer championship last week (pending protest by our friends across the way at Page house).  
The party of the century will be held tomorrow in the penthouse. All females are personally invited by Charlie Miller, who will pay for all of their drinks.  
Special thanks to the Fleming exterminators who spread bug killer at Page house. Pesky little Page boys. —Al Fansome

**Page:** Weight Alley squeezed by N.D.J. Alley to retain the bowling pin in a heated bowling competition. Vacation was great, but when we all returned, we found that 28 people had different roommates because President Erik Fernandez needed privacy. It seems that the triple was no place to work on his 72, uh, 63, uh, I mean 54 units.  
The Farrell's flick Wednesday was an enormous success, so I guess we'll do it again next term. —Sean Moriarty

**Lloyd:** The entire house got high earlier this week in a house wide alley challenge. Each alley provided several members who inhaled large quantities of helium and provided rousing renditions of a variety of songs.  
The high point of the event was Jeff Clayhold's vocal solo in Cave's version of "Cum on, Feel the Noise."  
Other major events of the past two weeks include the reopening of the hot tub, which is now operating at a comfy 108 F. —Rod Van Meter

*P.S. —Creek won.*

**Ricketts:** Ricketts house achieved a stunning moral victory in soccer against Page by tying them last week. The defense held the game scoreless until the game was called due to darkness.  
Due to carelessness on the part of the President of Social Vice, Ricketts actually held a social event this week. The only redeeming fact was that the event (Pie Night) was two weeks late

George Kavas remains a frosh, and the frosh remain wimps. Although they can't even shower a 5'11" 135 lb. reporter, at least they finally tried. —Bob Bolender

**Ruddock:** No entry.

## Inside Information

### Libraries Go Computing

Caltech's library system—right along with the rest of the library world—has both matured and reached out. You might say we are becoming hooked on computers. With systems now online we can catalog, request interlibrary loans, check holdings across libraries and access bibliographic information on the world's literature. During 8 years Caltech's 25 engineering and science databases have expanded to more than 200 covering all fields of knowledge. In this column, over a

period of time, we will describe some of the data bases and their coverage among other library goodies. Comprehensive Dissertation Index, for example, covers virtually every American dissertation accepted at an accredited institution since 1861. Many Canadian dissertations also are included, with increasing numbers from institutions abroad. Masters' theses have been included selectively since 1962 and all subject areas are covered. This online data base is roughly equivalent to the

printed Dissertation Abstracts, which are located on the second floor of Millikan Library. The printed volumes may be better if you are looking for a thesis whose author you know. Some theses will be abstracted online but not in the printed index. When you need to search a wide data range or a unique combination of subjects or concepts, the online database tends to be more efficient. Online searches may be requested by anyone on campus. To check out a data base, a search or costs, you may call or stop by to talk to:  
Dana Roth, Chemistry Library, x6423  
Jean Anderson, Aero Library, x4521

### Moore Named a Trustee

Gordon E. Moore, chairman and chief executive officer of Intel Corporation and a pioneer in the semiconductor industry, has been named to the Board of Trustees of Caltech, as announced by R. Stanton Avery, Chairman of the Board of Trustees. Dr. Moore is the co-founder of the Intel Corporation and of the Fairchild Semiconductor Corporation, which became the Semiconductor Division of the Fairchild Camera and Instrument Corporation. As director of research and development of Fairchild during the late 1950s and 1960s, he supervised much of the work on which today's semiconductor industry is based. At Intel, he led in creating many of the semiconductor memories and microprocessors that are now mainstays of the computer industry. He received his PhD in chemistry from Caltech in 1954, after which he did research at Johns Hopkins University and the Shockley Semiconductor Labs. In 1957, he co-founded the Fairchild Semiconductor Corp. and in 1968 co-founded Intel Corp. In 1974, he was the recipient of Caltech's Distinguished Alumni Award, the highest award the Institute can confer upon a graduate. His other awards include the 1978 McDowell Award of the Institute of Electrical and Electronic Engineers (IEEE) Com-

puter Society, the Harry Goode Award of the American Federation of Information Processing Societies, and the 1979 Frederik Philips Award. He is a Fellow of the IEEE and a member of the National Academy of Engineering. He and his wife, Betty, are also members of the Caltech

Associates, an Institute support group. In 1975, he endowed the Gordon and Betty Moore Professorship in Computer Science at Caltech, which is now held by Dr. Carver Mead, a leading innovator in developing techniques for designing complex integrated circuits.

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# Day Before

from page 1

order to raise public consciousness towards the issue, and in cooperation with key influential groups, to effectively promote freeze and disarmament. Ms. Buchner closed the first part of the program by representing an overseas viewpoint of the matter. Fearing future battles in Europe, she emphasized the public's removal of unjustified fear and mistrust between nations that allows the acceptance of nuclear arms. She stressed the necessity of cooperation to establish a partnership for security, and to find a common goal, politically and economically. The discussions were followed by a question/answer session by the audience. Issues such as economic influences, effects of disarmament, the idea of "overkill" in having so many weapons, and the impact "The Day After" had on the general public. The second part of the program consisted of an introduction to several local organiza-

tions devoted to peace. Representatives from American Association of University Women, American Friends Service Committee, The Community for Human Development, Creative Initiative, Interfaith Center to Reverse the Arms Race, the Nuclear Freeze Campaign, United Nations Association and The Caltech World Affairs Forum (though not directly a peace movement group) presented the individual groups' goals, activities, beliefs and how one could join the organizations. The groups also made themselves available after the program to provide details about their organizations and upcoming events. The program successfully presented the importance of nuclear disarmament, and encouraged the audience to get involved in these movements. The overall goal and theme of the program was probably best represented by Richard Feynman: "Today is still the day before; wouldn't it nice if we could freeze the day before... forever?"

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## sports

## Basketball Wins Two

by Ath Man at Large

The Caltech Beaver basketball team is 2-2, and has already won as many games as it did in the last two seasons combined. This miraculously successful team is an attraction not to be missed, so come on out tonight at 7:30 and see the Beavers in action against LIFE College at the Caltech gym.

The Beavers opened the season with an exciting 74-64 win over Pacific Coast Baptist Bible College before an ecstatic crowd of Techers in Brown Gymnasium. As expected, the new tandem of starting guards, John Krehbiel (17 points), and Ed Zanelli (15) sparked the best Beaver fast break attack in several years. Their gressiveness, along with Helgren's 20 first half points sparked the Beavers to a 46-33 halftime lead, a margin created by a Beaver spurt which saw them outscore the Eagles 19-2 to close out the first half. In the second half, Caltech staved off the Eagles' comeback efforts and grabbed their first victory since November, 1982. The Beavers' frontcourt triumvirate of Jim Helgren (11 rebounds), Bill Gustafson (10), and Stewart Peebles (9) were instrumental in triggering the deadly fast break as they dominated the Eagles on the boards.

The next night, Caltech blew a 36-29 halftime lead and lost to Christ College

72-64. The defeat was largely due to poor Caltech rebounding and the inability of the Beavers to break the Christ College full-court press. The only bright spots for Caltech were Jim Helgren (21 points, 9 rebounds) and Ed Zanelli (14 points).

The Beavers raised their record to 2-1, with a 94-68 posting of an outclassed (that's right, outclassed) Pacific Christian College team. Ed Zanelli tied the Clatech record by scoring 36 points, and Jim Helgren added 19 and Stewart Peebles netted 15. Bill Gustafson grabbed 16 rebounds and Peebles snagged 11 to lead the Beavers on boards. Caltech plays Pacific Christian again this Tuesday at Caltech at 7:30 pm.

The Beavers had their chance for revenge against Christ College on Tuesday, but fell just short, losing 71-69. The Beavers played a horrendous first half, but came back strong in the second frame, and almost pulled even. The comeback was sparked by tenacious defense by Ed Zanelli, and Tom Heer (playing his first game of the season) on the Christ College guards. Baskets by Zanelli and Chris Kyriakakis tied the game at 69, with 15 seconds left, but Christ College netted the winner with three seconds to go. Zanelli finished with 22 points, trailing only Jim Helgren's team high 25.

## Weekly Sports Calendar

Day	Date	Time	Sport	Opponent	Location
Fri.	12-2	8:00 pm	Basketball (Varsity)	L.I.F.E. College	Caltech
Sat.	12-3	2:00 pm	Basketball (Varsity)	Alumni	Caltech
Sat.	12-3	4:00 pm	Basketball (JV)	Alumni	Caltech
Tue.	12-6	7:30 pm	Wrestling	Pierce College	Pierce College
Tue.	12-6	10:15 pm	Ice Hockey	Pierce #2	Conejo Ice Rink
Wed.	12-7	7:30 pm	Basketball (Varsity)	Pacific Christian	Caltech
Wed.	12-7	7:30 pm	Wrestling	Whittier College	Whittier

## Fencers Meet Long Beach, UCLA

by Perry Ripost

The Caltech fencing team met Cal State Long Beach (CSLB) and UCLA on November 19th.

The women's foil team did an excellent job of improving their record by defeating both CSLB and UCLA. The team is now in second place in the Southern California Intercollegiate Fencing Conference. Against CSLB, Barbara Turpin won all four of her bouts. The next leading scorer was Phyllis Li, who won three bouts. Daniella Bonafede won two, and Kathy Sheedy won one. Overall the women's team won the match 10-6. Against UCLA, the women did just as well. Barbara Turpin and Phyllis Li both won three bouts each. Kathy Sheedy won two, and Daniella Bonafede won one. The total score was 9-7. The women's foil team are on a winning streak.

The men's foil team lost to CSLB 1-8. Scott Grossman was the only scorer. Andre

Burgoyne and Kurt Anderson did not win any, but performed well by making good parries and having several good touches against their opponents. The team also lost to UCLA, 3-6. This time Scott, Andre and Kurt all won one bout each. This is Kurt's first win of the season.

Against CSLB, the epee team lost 2-7. Both studly men, James Bell and Kenny Bell, won one bout each. Both of them tried their best and performed well against their more experienced opponents. The team also lost to UCLA 3-6. Ken Bell won two bouts, and James Bell won one. James could have beaten all three of his opponents, but lost two very close bouts. Although the epee team lost, they made a good effort.

The saber team got creamed 0-9 by an experienced CSLB team. Chien-Wei Han came close to beating one of his opponents. The team did better against UCLA, beating them

5-4. They had a very exciting and close match. After the first eight bouts the score was tie 4-4, with Chien-Wei the last man to fence. Tensic mounted because the last bout would decide the match, and the two fencers were very evenly matched, both giving and receiving touches. However, Chien-Wei won the last touch and therefore, the match. The saber team made an effort and took all the close bouts. L. Sunderlin and Peter Konopl both won one bout each, and Chien-Wei Han won all three.

The next fencing match will be held on January 14, 1984. The Caltech fencing team will meet Stanford University at Cal State Fullerton at Fullerton. This meet will be a no conference match because Stanford is in the Northern California Intercollegiate Fencing Conference. The Caltech fencing team are looking forward to fence Stanford's fencing team and are glad to have this opportunity to prove which is the superior school.

## GSC Volleyball Scores

## Results of Wed. Nov. 23

## A LEAGUE

Kong's Killers klobbered Page 15-10, 15-12  
Tapir topped Six Hitters 15-7, 15-11  
Brute Force destroyed Ruddock 15-0, 15-0  
Up-Setters upset Aesops 15-6, 15-9  
HP's and Fleming may finish someday

## B LEAGUE

Overpaid Amateurs ate Chow Dogs 15-8, 15-6,  
Smashers bashed Tire Irons 15-4, 15-1,  
Face nosed We're Mudd 15-8, 15-7  
Reynolds Numb-ers beat Besops 15-4, 15-13  
Scurves didn't beat Jerry's Kids  
Strange Bruise blunted Magnum Force 15-2, 7-15, 15-7  
Gangbusters broke Hydraulic Jumps 16-14, 15-12

## Results of Wed. Nov. 30

## A LEAGUE

Fleming and Ruddock are still scoreless  
Page popped Aesops 15-8, 15-7  
Up-Setters upset Brute Force 15-12, 15-5  
Jet Setters set up Tapir 15-3, 16-14  
Six Hitters outredundanced HP's 15-11, 15-11

## B LEAGUE

Tire Irons tormented Strange Bruise 15-4, 8-15, 15-11  
Gangbusters sneaked past Jerry's Kids 15-7, 14-16, 15-6  
Overpaid Amateurs blunted Hydraulic Jumps 15-6, 15-5  
Reynolds Numb-ers splattered We're Mudd 15-4, 15-7  
Besops beset Face 15-10, 15-13  
Scurves bit Chow Dogs 15-9, 9-15, 10-3  
Smashers maimed Magnum Force 15-8, 15-3

## The Body Shop

## Aerobics!

Aerobics! The latest fad—or an important issue relating to health and fitness? And what does the word "aerobic" mean?

The word "aerobic" means air, but more specifically refers to the oxygen in the air. The muscles need oxygen to function, and the harder we work them the more oxygen they need, which makes the heart rate go up. Aerobic exercise makes the muscles work hard enough to need a lot of oxygen but not so hard as to exceed the ability of the heart and blood to deliver it.

Exercise such as this, hard but not too hard, and continuous for a minimum of 12 minutes, does more to tone and firm muscles than other kinds of exercise. Aerobic exercise is the most efficient way to remove marbling fat.

And what is it that makes 12 minutes of nonstop exercise aerobic? The key here is your pulse rate. Your pulse should be at your training rate all through your exercise period, no higher and no lower. Your training rate is figured by taking 80% of your maximum heart rate (training rate is 160 for a 20 year old). This training rate is very important. If your pulse rate is lower than this during exercise you aren't

working hard enough to get the maximum benefit. If it is higher than your training rate you are overworking and can cause more damage than good. So be sure and monitor your pulse during exercise. This is most easily done by taking your pulse rate for 6 seconds and multiplying by 10.

There is something magical about doing 12 minutes of aerobic exercise, and we can't classify an exercise as aerobic unless it lasts for a minimum of 12 minutes—nonstop. You can get as much benefit from 15 minutes of jogging as from 2 hours of tennis! Is it any wonder in this day and age—with everyone in such a hurry—that aerobic exercise is so popular?

Good forms of aerobic exercise, and those you can do alone, are jumping rope and running in place (minimum 12 minutes), jogging and cross country skiing (minimum 15 minutes) and walking, bicycling and swimming (minimum 20 minutes). Or, if you prefer to have company while you work out, you can join any one of the many aerobic classes offered today. Just be sure that they stress the importance of monitoring your pulse!

—Sheri Ripley  
Health Center Staff

## Hockey Wins Again

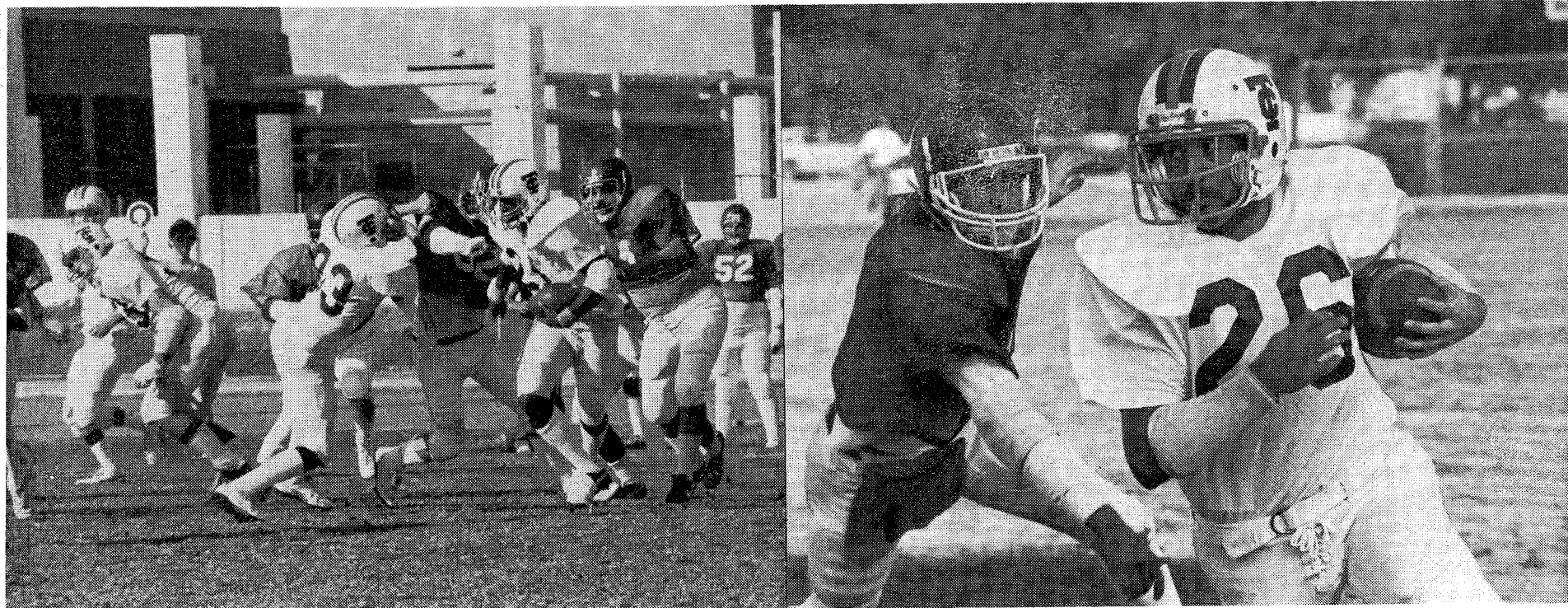
by Christ of Stork

The Caltech hockey team faced an improved U.C. Irvine last Wednesday over the one it beat 16-2 two weeks ago.

Caltech managed to win easily again by a score of 10-0 but did not dominate the game as in the last one. The score was close until midway through the third period when Caltech broke the game with five goals. The team's record now stands at 2-1.

These wins were especially welcome following the disappointing 11-0 loss in the opening game against Pierce. In the victories, the young team has been able to practice passing, setting up an offense and organizing on defense—something that was not possible in the game against Pierce since Caltech had control of the puck for only short time. In addition, the young team has gained confidence with their skills and aggressiveness with their hitting.





# Football Finishes at 7-1

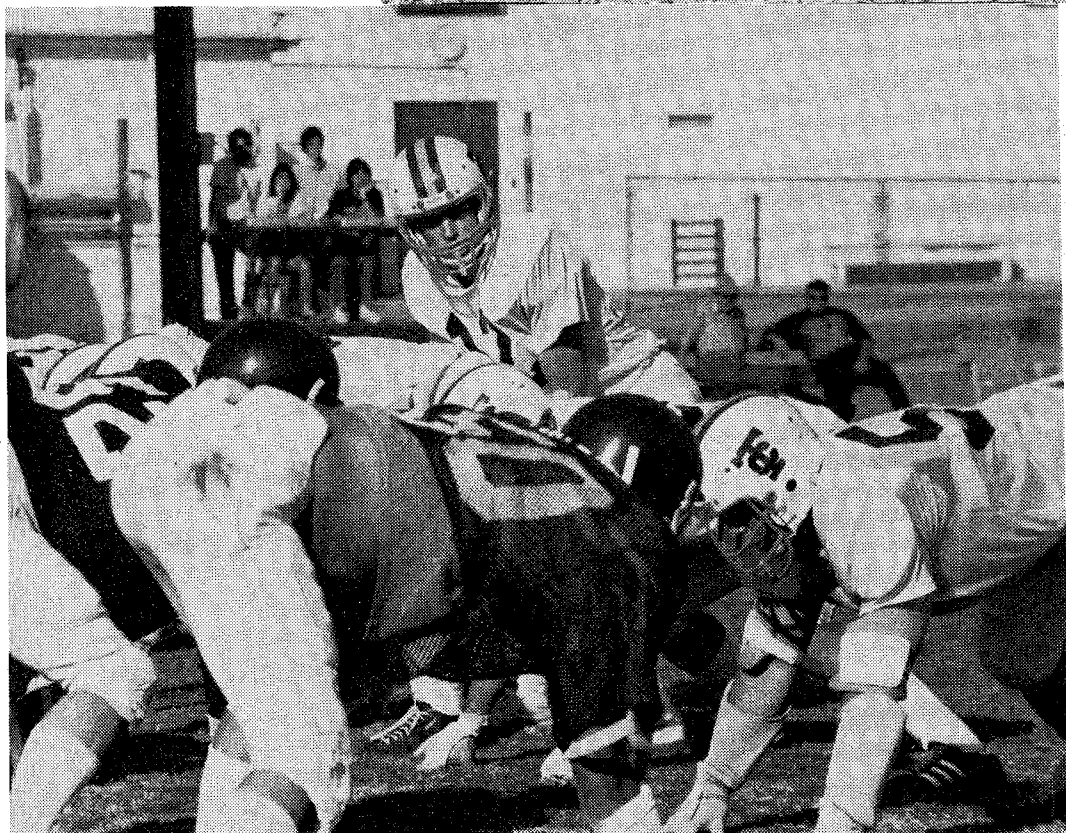
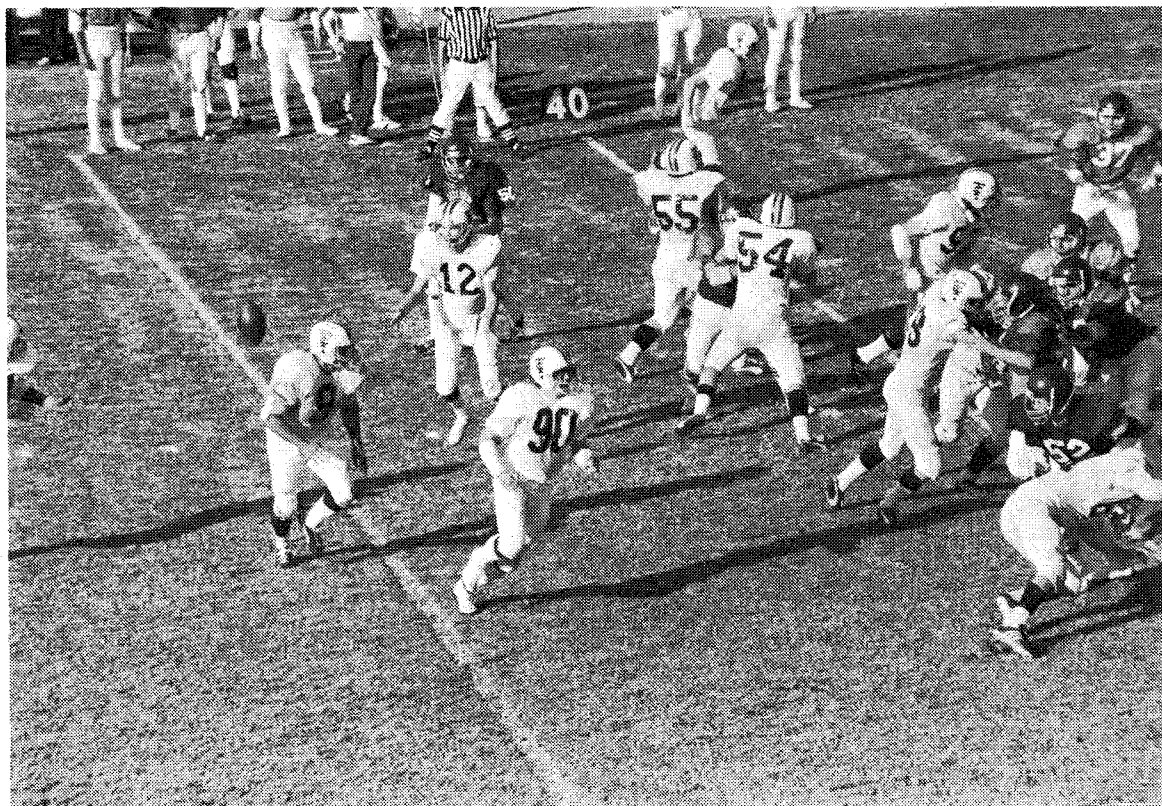
## Another Win Ends Best Season Ever

by Ath Man at Large

The Caltech football team defeated the Desert Warriors, 15-6, on November 19 to finish the season with a 7-1 record, the best in Caltech history. The Beavers scored 9 points in the first quarter on a 37-yard run by Andre Johnson, Bob Mostert's conversion, and a safety by Tim Magee. Darren Casey scored the Beavers' final touchdown by catching a 14-yard pass from Phil Scott.

The Beaver defense held the Warriors without a score until late in the game, when the Warriors tallied on a short pass to complete the scoring.

The Beavers ended their season ranked sixth in the nation by the National Collegiate Football Association, one notch ahead of MIT.



Photos by Brian Tsai

### The Stars of the Show

Top Left, Andre Johnson while Tom Tysinger blocks  
 Top Right, Dwight Evard  
 Middle, No.21, Andre Johnson; No.9, George Kailiwai; No.90, Coach Gene Tushima; No.12, Phil Scott.  
 Left, Quarterback Phil Scott and Tackle Dave Kudler.  
 Right, Darren Casey catches the ball. No.83 is Tom Tysinger.





## Putnam Exam

The Putnam Exam takes place this Saturday, December 3, 1983 in Baxter. Contestants should meet in the Baxter first floor foyer at 8:45 am. The morning session begins at 9 am. The afternoon session begins at 2 pm. Each session is three hours. Bring pencils, erasers, and/or pens. A watch is handy. Scratch paper will be provided. Caltech team members are Bradley, Brock, Alan Murray, Charles Cuny. Alternates include James Liu, Pang-Chieh Chen, and Mark Purtil.

The Bell and Ward prizes, by the way, are funded by money won by Caltech teams in the Putnam Exams over the years.

## Tau Beta Pi Tutors

Following a noble tradition, certain members of Tau Beta Pi (the national engineering honor society) have offered their services as tutors in selected advanced courses. For convenience the volunteers have been listed below by course. If you need help, these people claim to have what it takes.

AMa 95—Bradley W. Brock, Pang-Chieh Chen, Eric Kawamoto, Ned Wingreen.

AMa 101—Bradley W. Brock, Pang-Chieh Chen.

Aph 105—Wuwell Liao.

CS/EE 181—Morry Katz, Ted Williams.

EE 114—John Chang.

Ma 5—Pang-Chieh Chen, Bradley W. Brock.

Ma 108—Bradley W. Brock.

Ph 98—Bradley W. Brock, Mark D. Lindsay, Ned Wingreen.

Ph 106—Bradley W. Brock, Wuwell Liao, Mark D. Lindsay, Ned Wingreen.

Addresses and Phone Numbers: Bradley W. Brock, Page 212, 578-9755.

John Chang, 234 Chester, x3957.

Pang-Chieh Chen, 150 Chester #203, 793-6075.

Morry Katz, Ruddock 104, 578-9696.

Eric Kawamoto, Lloyd 212, 578-9166.

Wuwell Liao, Ricketts 50, 356-9387.

Mark D. Lindsay, Ricketts 64, 356-9387.

Ted Williams, Lloyd 125, 577-8789.

Ned Wingreen, O.C., 282-8045.

## Women's Soccer

There will be an organizational meeting for the 1983-84 Women's Soccer Club at 4:30 pm on Monday December 5 in the classroom at the gym. If you know of anyone else that might be interested, please bring them along.

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# announcements

## Flyers Wanted

The Caltech Flying Club, more formally known as the Aero Association of Caltech, Inc. (AACIT) has several openings for new members. AACIT was formed in 1966 by a group of Caltech students who were interested in flying at reasonable cost; its charter is to promote interest in aviation in the Caltech community (campus, JPL, and alumni) and to provide flight training.

The club operates six airplanes, ranging from two 2-place training airplanes to two 4-place, 150 mph airplanes with retractable landing gear. The airplanes are based at the El Monte airport, about eight miles from the campus. Ten flight instructors (many of whom are Tech alumni or JPL staff) are affiliated with the club, and provide instruction at all levels, from the first steps of learning to fly through advanced ratings and aerobatic flight. The club holds an evening meeting and seminar once each quarter on campus.

If you are interested in learning to fly, or already have a license and would like to use the club aircraft, AACIT would welcome you. For information on membership contact the club secretary, Marilyn Winsor, at JPL extension 5751, or the club president, Ivar Tombach, at his business phone, 449-4392.

## Arms Race Films

"No Frames, No Boundaries" and "Beyond War," two short films concerning the nuclear arms race and war as a means of resolving conflicts between the U.S. and Russia, will be presented by the Caltech Y on December 3 at 2:00 pm in Clubroom 1, upstairs in Winnett. The films will be followed by a group discussion led by Jack Overall of Creative Initiative. Refreshments will be served.

## 'Innovation' Conference

Any undergraduate interested in attending a conference on "Improving American Innovation" at the Air Force Academy in Colorado Springs, Colorado on March 6-10, 1984, should see either Chris Wood or David Wales in 102 Parsons-Gates. All expenses will be paid.

## Skiers Needed

The new Caltech Ski Team is looking for skiers. The first meeting of team will be in the Y Lounge on Wednesday, December 7, at 10:00 pm. The meeting will be to organize the team for the seven races this season to be held in Southern and Central California. If you have any questions, or if you can't make it to the meeting, call Mickey Spiegel at x6274.

## Olympics Need You

The Los Angeles Olympic Organizing Committee will be accepting applicants interested in working during the Olympic Games next summer. While most of the positions are volunteer, there are paid positions available. Among the volunteer jobs are athlete escorts, translators, result runners, clerks and host/hostesses. Some of the paid positions include food and beverage concession operators, security, housekeeping, and bus drivers. "We're looking for people who are willing to be flexible," said Buddy Taylor, Manager, Games Staff Recruiting. "This is a once-in-a-lifetime experience and an excellent opportunity for students to gain a valuable perspective outside of the academic environment."

Students with questions can call the Olympic Hotline number, 305-8300. The Olympic Games will be held July 28 through August 12, 1984.

## Model U.N. Meets

The Caltech Model United Nations Club will meet on Wed. Dec. 7 at 10:30 pm in Winnett Clubroom 1. This will be an introductory meeting, and anyone interested in Model U.N. should attend. If you cannot attend, contact Aaron Roodman at 449-0712.

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## Morgan Ward Prize

Any Caltech freshman or sophomore may enter this contest. An entry may be individual (submitted by one student) or joint (submitted by a group of two or more students). Each student is entitled to at most three entries, of which at most two may be individual.

An entry is to consist of a mathematical problem, together with a solution or significant contribution toward a solution. The problem may have any source, but this source should be stated in the entry. The entries will be judged on the basis of the nature of the problem and originality and elegance of the solution. Any outside references used should be indicated. (The Honor System applies here.)

Entries from each contestant or group must be placed in an envelope and delivered to the Mathematics Office, 253 Sloan, during the fourth week of the third term. The name of the contestant, or the names of all participants in the case of a joint entry, must be written on the envelope only, not on the entry. The Judging Committee will consist of three volunteers, approved by a vote of the Caltech Mathematics Club. Each judge must be a junior or senior and a member of the Mathematics Club. The judges will select a group of finalists and submit their entries to the Mathematics Department faculty who will make awards to the winners. Prizes will ordinarily be awarded for the 2 to 4 best entries, the value of each prize being \$75. Prizes for individual entries will be limited to at most one to a contestant, and no group may receive more than one prize.

## Bell Research Prize

The E. T. Bell Undergraduate Mathematics Research Prize is a cash prize of \$500 awarded for the best original mathematics paper written by a Caltech junior or senior. Contestants for the Bell prize must be nominated by a faculty member familiar with their work. Students who wish to be considered for this prize should contact a member of the Mathematics faculty prior to the end of the second term to discuss the nature of the research. If the entry is sufficiently worthy the faculty member will nominate the contestant and act as sponsor. Each student is entitled to only one entry. All contestants nominated must submit their papers in final form to their faculty sponsors by the end of the fourth week of the third term. A faculty committee will then judge the papers and announce its decision before the end of third term. The committee may award duplicate prizes in case of more than one outstanding entry. The name of the winner (or winners) will appear in the commencement program.

## Fellowships

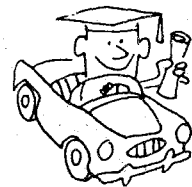
The Josephine de Karman Fellowships are sponsored by the Aerojet Corporation. The Fellowship is awarded annually to students entering their Senior Undergraduate year and Graduate students entering their third year or after of Graduate School in fall of 1984. For further information come by the Career Development Center, 08 Parsons-Gates or write directly to the company at: Mr. T.E. Beehan, Secretary Fellowship Committee Josephine de Karman Fellowship Trust c/o Aerojet-General Corporation 10300 North Torrey Pines Road La Jolla, CA 92037  
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