

Blind

THE CALIFORNIA TECH

No More

VOLUME LXXXVII NUMBER 1 PASADENA, CALIFORNIA THURSDAY 26 SEPTEMBER 1985

Ground Broken For Keck Observatory

by Diana Foss

Construction of the world's largest optical telescope officially began on 12 September as six important men with leaves around their necks, wielding gold-painted shovels, dug into the volcanic ash of Mauna Kea, Hawaii. The W. M. Keck Telescope, with its innovative computer-controlled mosaic mirror, will be completed in 1991. At twice the diameter of the 200-inch Hale telescope on Mt. Palomar, the new telescope has four times the light-gathering power, giving access to a volume of space eight times greater than any other ground-based telescope.

Some 160 guests attended the ceremony, including members of the Keck Foundation board of directors, astronomers and administrators from the three universities involved with the project, Hawaiian business and government leaders, and members of Caltech's board of trustees. The Keck foundation is providing Caltech with \$70 million for the observatory, the largest private gift ever made for a single scientific project. Caltech's total share of the cost is the \$87 million for construction; the University of California will provide funds for instrumentation and operating costs for 25 years, and the University of Hawaii is leasing the Mauna Kea site to the

observatory.

The official groundbreakers were William Frazer, senior vice-president for academic affairs at the University of California, and chair of the California Association for Research in Astronomy (CARA), the non-profit corporation that is constructing the telescope; George Ariyoshi, the governor of Hawaii, Caltech's own Marvin L. Goldberger, David P. Gardner, president of the University of California; Albert Simone, president of the University of Hawaii; and Howard B. Keck, president of the Keck Foundation.

The telescope is exciting for reasons apart from its unprecedented light-gathering power. The segmented-mirror design, the brainchild of Dr. Jerry Nelson and his colleagues at U. C.'s Lawrence Berkeley Laboratory, needs a much lighter support structure than usual, making the 158-ton Keck Telescope less than one-third the weight of the Hale Telescope. The Mauna Kea site is also considered the best astronomical site in the world. Its extremely stable, dust-free atmosphere provides for beautifully sharp images, and the cloud-free sky allows for maximum observing.

Additionally, the 13,600 foot altitude puts the Keck Telescope in an excellent position for infrared



ATOP MAUNA KEA FOR THE KECK TELESCOPE GROUNDBREAKING (L TO R): U OF HAWAII PRESIDENT SIMONE, HAWAII GOVERNOR ARIYOSHI, FOUNDATION PRESIDENT KECK, CALTECH PRESIDENT GOLDBERGER, UC PRESIDENT GARDNER, CARA PRESIDENT GARDNER

observations, opening up the center of our galaxy to scrutiny, as it is almost completely opaque to visible light. Infrared observations will also give us pictures of the in-

terior of the vast dust clouds where stars are born.

The new telescope will also benefit from the most advanced light-detectors. Digital detectors,

called charge-coupled devices, can now detect 80 photons out of every 100, as opposed to photographic plates, which can detect only one out of every 100.

Tech Launches First Gamma-Ray Camera

A camera that can scan the heavens at gamma-ray wavelengths with far higher resolution than ever before achieved was to be launched by Caltech scientists at press time. The 1½-ton camera, the first of its kind, was to be launched from beneath a 20-million-cubic-foot research balloon from the Scientific Balloon Facility in Palestine, Texas.

During the 30-hour flight, the camera is to examine gamma-ray emissions from pulsars, black holes, and the center of our own galaxy, as well as emissions from distant galaxies.

The Caltech team is led by Assistant Professor of Physics Thomas A. Prince, and includes staff scientists Alan Cummings and Stephen Schindler; electronics engineers William Althouse, Rick Cook, and James Weger; and graduate students Mark Finger, David Palmer, and Chris Starr. Development of the gamma-ray camera is a project of the Caltech Space Radiation Laboratory. The project has also been aided by the efforts of Edward Stone, professor of physics and chairman of the Division of Physics, Mathematics and Astronomy. The camera was built almost entirely at Caltech, with major contributions from Caltech's Central Engineering Services.

The Caltech gamma-ray camera is basically a flared cylinder three meters long and one meter in diameter mounted on a pointing platform. The camera's gamma-ray detector is a large circular plate of sodium iodide crystal 40 centimeters in diameter and 5

centimeters thick. Gamma rays striking the crystal produce faint scintillations of light, which are detected by photomultiplier tubes behind the crystal.

The key component of the camera is its unique "lens," which consists of an array of 1000 small lead hexagonal blocks, arranged in a pattern that creates a series of apertures through which the gamma rays pass. Each of the apertures in this mask is like the hole in a pinhole camera, creating a separate image of the sky in the sodium iodide crystal. The hexagonal blocks are arranged, or coded, so that a computer can unscramble the faint overlapping "images" of the gamma-ray source, combining them into a single, more intense image. The entire 300-pound mask rotates at one rpm, causing the view of a source to be turned off and on at every point on the detector. This "chopping" or modulation of the source signal allows precise subtraction of the large gamma-ray background.

The result of this "coded aperture mask" system is a camera that can divide up the field of view into 1,000 separate parts, or pixels. Most previous gamma-ray detectors were essentially "gamma-ray buckets," able to identify only a general direction for celestial gamma radiation. The best resolution previously obtained by such devices was by a University of New Hampshire system that could resolve the field of view into 35 pixels.

In this flight, the gamma-ray camera will go through a series of pre-programmed observations, its motorized pointing system bring-

ing it to bear on one astronomical object after another. The pointing system uses the earth's magnetic field, detected by an internal magnetometer, as its guide. The data will be recorded digitally on a series of eight commercial videotape recorders and will also be radioed to the ground.

The objects to be studied include:

The Crab Nebula, the remains of a supernova that has a spinning pulsar in its depth;

Geminga, a mysterious object that is among the brightest objects in the sky at high-energy gamma-ray wavelengths;

the active galaxy NGC 4151, whose nucleus shines brightly at gamma-ray wavelengths;

the center of our own galaxy, the Milky Way. The galactic center very likely harbors a massive black hole and should show gamma-ray emissions from the region near the black hole;

Cygnus X-1, believed to be a binary star system in which one of the objects is a black hole;

Cygnus X-3, believed to be a double-star system with a neutron star that emits ultra-high-energy cosmic rays and gamma rays.

The gamma-ray camera will study the spectrum of gamma rays being emitted from these objects with energies ranging from 30,000 electron volts to 5 million electron volts. Such studies will yield insights into very high-energy particle interactions going on within the objects. Development of the camera is funded by NASA, Caltech, and the Ralph B. Lloyd Foundation.

BaxArticle

by Diana Foss

Tech Society Columnist

On the evening of 5 September, some 200 friends of the Baxter Art Gallery gathered together for its farewell party. The theme was "Over the Rainbow," and, while all expressed regret at the end of Caltech's involvement with contemporary art, the purpose of the party was to raise funds to give the gallery a new beginning in another space.

Treated to sumptuous food, beautiful decorations, and the cool sounds of a jazz combo, the guests contributed \$20 each to enable director Jay Belloli to hire a secretary during the gallery's period of transition. Yellow "bricks" led the partygoers down to Baxart's sunken courtyard, where a splendid rainbow rope of helium balloons arched over the festivities. And at the end of the rainbow lay a soaking pile of witch's clothes.

At the close of the evening, the Pasadena Art Alliance presented Jay Belloli with two bound volumes: the catalogs from all the shows that he had presented at Baxart. He countered with the announcement that the gallery's

Board of Directors had found a suitable new home for Baxart.

Only One Casualty Y Backpackers Back

by Huston Horn

Under the sponsorship of The Caltech Y, twenty-six Techers—frosh, undergrads, and one alum—hiked into the Sierra highlands last week, and early this week twenty-five hiked out.

The other, freshman Tom Bewley, was airlifted out with a broken shoulder and a hairline skull fracture, but is doing fine.

Thus, if a little more traumatically than usual, The Y opened its 1985-86 season. Upcoming will be tamer pursuits: noon concerts in front of the

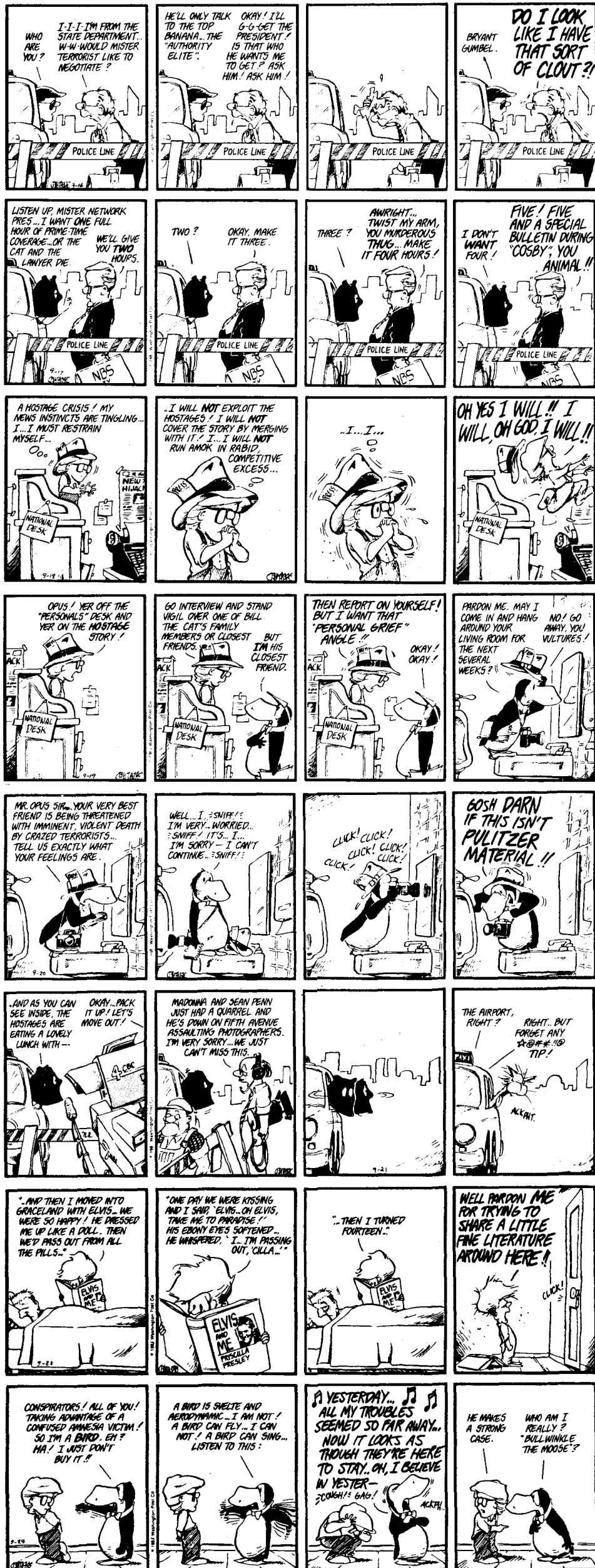
bookstore every Friday; sailing trips to offshore islands; ski trips to Mammoth; culture enhancing trips to the Music Center; speeches, forums, and seminars; the famous 30-day, interest-free \$30 loan; a book exchange; and the open-all-night, card-carrying Xerox® machine on the second floor of Winnett.

The city is required to find a new home for the Badminton Club, but is reportedly very eager to have a contemporary art gallery of Baxter's sterling reputation occupy the space. The Armory, located at 145 North Raymond, is too big for just the gallery, so Belloli is exploring the possibility of sharing the space with the Pasadena Art Workshop, forming the Pasadena Modern Art Center, and including room for classes and studios.

Jay Belloli is very enthusiastic about the gallery's prospects. He considers the new site ideal, located as it is in an historic building across the street from a park. He says, "we don't have a name yet, we don't really have a building yet, we're not incorporated yet, but otherwise everything's fine."

The Caltech Y is always open, too, to helping students enjoy themselves or resolve coping problems. And membership on the student board of directors is one access to power around here.

LETTERS



Bloom County by Berkeley Breathed

Sponsored by the Caltech

To the Editor:
There has been no progress toward the destruction of apartheid since students left their respective universities for the summer. I do not believe opponents of apartheid should become too confident about the shallow and hypocritical efforts being made by the Reagan administration and the Pretorian government. Opponents of apartheid must not be diverted by gradualism and reform. The establishment of one man, one vote in all of South Africa is a non-negotiable objec-

tive, and it must be achieved now, and not "trickled down with deliberate speed."
The Pretorian government will refuse and delay voting rights as long as companies from the United States and other countries are there. To seek changes while these companies remain in South Africa is nonstrategical. The only leverage is the withdrawal of those companies until full voting rights are established country-wide.

I believe a real opportunity falls on the shoulders of scientists in the major research universities throughout the country. If a company refuses to withdraw from South Africa, scientists engaged in research and development (R&D) for them should discontinue further research on their behalf.

Just as this country selectively employs economic sanctions against certain countries, intellectual sanctions should be employed against companies that continue to operate in South Africa. R&D is the lifeline for any major industrial company that wishes to be competitive and remain in the forefront; without R&D such companies falter.

Indeed, faculty disassociation has at least two attractive components. The first is that it does not require institutional endorsement by university presidents or boards; it is an individual faculty member's decision that he or she has a right to make. The second is that disassociation avoids the question of divestiture and the issue of financial losses, etc., even though I do not believe losses are inevitable.

One can imagine the impact disassociation would have if scientists at Caltech were joined by their colleagues at Berkeley, Chicago, Columbia, Harvard, MIT, Princeton, Stanford, Yale, and other major research institutions.
-Henry P. Organ
Menlo Park, CA

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-Peter Alfke, Personnel Manager

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THE CALIFORNIA TECH
Volume LXXXVI Number 25
Friday 26 April 1985

Published weekly except during examination and vacation periods by the Associated Students of the California Institute of Technology, Inc. The opinions expressed herein are strictly those of the authors and do not necessarily reflect those of the editor.

Letters and announcements are welcome. All contributions should include the author's name and phone number and the intended date of publication. The editor reserves the right to abridge letters, so please keep them concise.

Turn in copy to the Tech office mailbox, room 107 Winnett. The deadline for copy is Wednesday at 5 p.m.; for announcements, Tuesday at 5 p.m. Late copy may not be printed unless previous arrangements have been made with the editor.

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The offices of the California Tech are located in Winnett Center on the Caltech campus.
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Business Manager: Room 107 356-6154
Production: Room 115 356-6153

The California Tech, Winnett Center, Caltech 107-51, Pasadena, CA 91125
Printed by News-Type Service, Glendale, California. Subscriptions should be directed to the attention of the circulation manager.
\$6.00 per year (three terms) \$100.00 per life
ISSN 0008-1582

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CONFUSED ABOUT CALTECH? THE LITTLE T WILL BE OUT SOON!

Patrick Moraz Review

Flying Colors

by John Fourkas

Flags
Patrick Moraz and Bill Bruford
E.G. Records

As readers familiar with this space will have gathered by now, Patrick Moraz has become a rather prolific musician as of late. Besides working with and touring with the Moody Blues, he has released quite a few albums in the last two years: *Music for Piano and Drums* (with Bill Bruford), *Future Memories*, *Timecode*, *Future Memories II*, and now *Flags* (again with Bill Bruford). Inquiring minds want to know: has the quality of his music suffered from this barrage of

albums? The style of these newer albums is certainly different from that on *i*, *Out in the Sun*, and *Patrick Moraz*, but for the most part the music is very good. Interestingly enough, the worst of these newer albums, *Future Memories* (his first attempt at "instant composition"), was recorded in 1979 and only released in 1984. Thus, in the long run I would not say that his music has suffered at all. Of course, saying that he has released four albums in the last two years is still rather deceptive, for Moraz often does cover versions of songs from previous albums. For instance, *Music for Piano and Drums* has a new version of "Eastern Sundays" ("originally" from *Future Memories*), and *Timecode* has a new arrangement (slightly renamed) of "Blue Brains" (from *Music for Piano and Drums*). Nonetheless, a cover version here and there hardly reduces the workload.

Flags might be more appropriately titled *Music for Piano, Kurzweil, Drums, and Electronic Drums*. It indeed seems at times to be "merely" an extension of Moraz and Bruford's first album, with a few new toys thrown in (although the Kurzweil and electronic drums should count for many toys each...). It is more fair to say that *Flags* simply picks up where the previous album left off. While *Music for Piano and Drums* shows just how much can be done with the instruments of the past, *Flags* gives a hint as to the capabilities of the instruments of the future. In many ways, however, *Flags* is also a step back. The earlier album was quite experimental. Structure and coherence seemed more important than melody. While Moraz and Bruford got nowhere near as far out of the normal realms of music as, say, Ornette Coleman has, they were still pushing on a new frontier. It was this very innovation that made *Music for Piano and Drums* such a wonderful album. *Flags*, on the other hand, reveals a much more restrained duo. Melody is given a much greater emphasis, as if the musicians were afraid of being accused of playing with toys and selling their playtime to the public (which I think is a fair description of *Future Memories*; thus, any fear that exists in that direction is not baseless). But if Bruford and, more especially, Moraz play their instruments as though with training wheels, it only serves to make *Flags* more easy to

listen to than the previous album. *Flags* is indeed an incredibly likable album which mixes a great sense of melody with often frightening rhythms, all to an imposing and wonderful effect.

Just as Moraz's incredible piano intricacies drove *Music for Piano and Drums*, Bruford's magical percussion variations carry the day for *Flags*. The most notable of these complex rhythmical showpieces is "The Drum also Waltzes", a cover version of the Max Roach drum solo in three time. Bruford's wrists are like rubber, and his musical and rhythmical intuition is unequalled. Also amazing is "Split Seconds", which features one of the most innovative and subtle patterns I have ever heard in four time. Although this piece contains some fantastic piano work, Bruford steals the show.

All of this is not to say that Moraz's work passes by entirely unnoticed. In fact, *Flags* contains some of the most pleasing melodies Moraz has ever written. The new version of "Temples of Joy", for instance, is probably even better than the original, due in part to the wider range of sounds and melodic devices available to Moraz now. "Karu" is a sad and beautiful song in which the Kurzweil has a texture somewhere between piano and bells. It comes across as sounding rather French intermingled with Baroque, and it is one of the best pieces on the album. The title song also has a catchy yet sad melody. These sad melodies are really a rather new thing for Moraz, who has written mostly upbeat compositions in the past. He handles the nuances of emotion well indeed, and I hope that he will write more music in this style in the future.

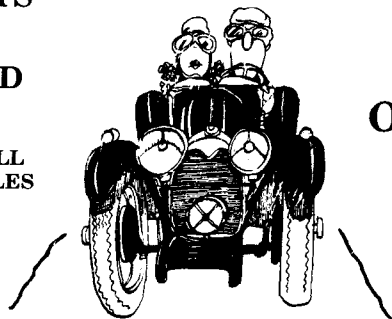
More haunting (and reminiscent of the previous album) is "Infra Dig", a piano and drum tune with strong jazz overtones. It is here that Moraz shows that he is truly a piano virtuoso. "Infra Dig" ranks with the best from *Music for Piano and Drums*. Along the same lines is "A Way with Words", a song strongly suggesting a Ginastera influence. This song is short, powerful, and anything but sweet. "Impromptu, Too" has a promising title, also, but really is far too much like "Time for a Change" (from *Out in the Sun*) to be given much credit for the originality I would expect from a song with "impromptu" in the title.

Moraz and Bruford really go out on a limb, experimentally speaking, in two songs: "Everything You've Ever Heard" and "Machines Programmed by Genes". The former would fit well onto *Future Memories II*. It is well structured and fairly interesting, but it cannot hold a candle to "Machines". This song is calculated to cause technological nightmares, and it does its job well. It is the only song on the album which shows anything but the tip of the iceberg that synthesizers have created, and I think that it is better we become accustomed to them slowly... "Machines" is a fine introduction to this new world.

Flags, as you have probably gathered by now, is an album well worth owning. With any luck, it will not take another two years for this creative pair to release another album. At any rate, until that time the trick is going to be finding copies of *Flags*, which I suspect will be hard to come by.

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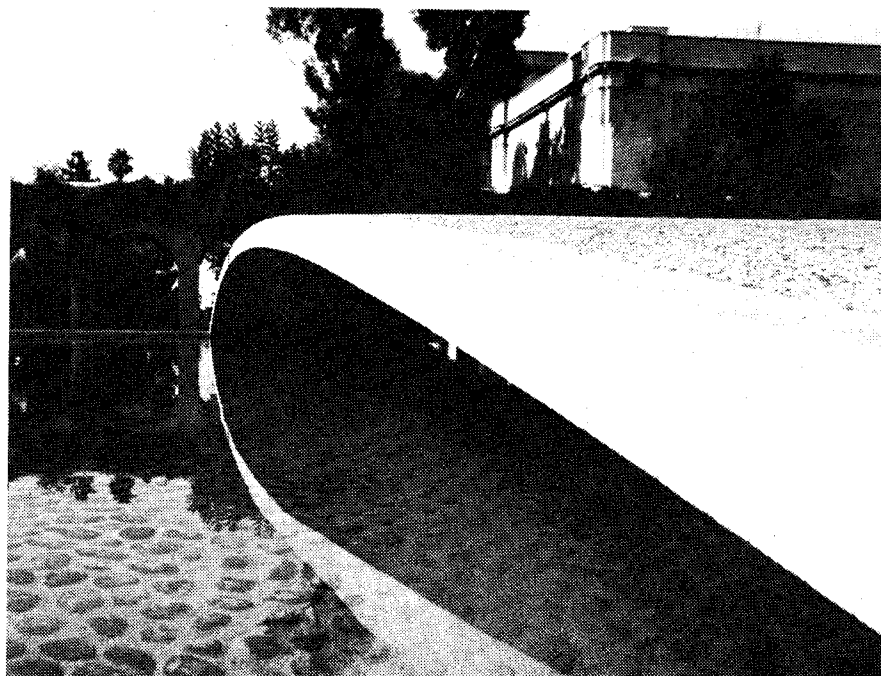
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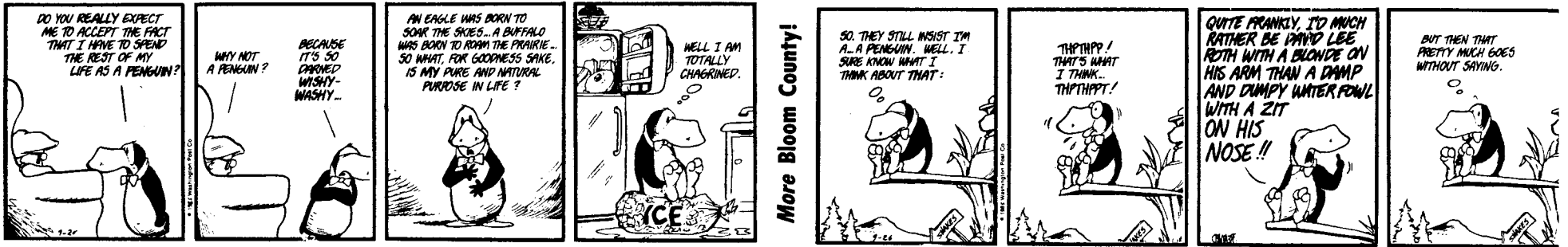
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Abid, Amin	RU	FL	RI	BE	LL	PA	Da	Chung, Johnson	PA	Da	BE	LL	RU	FL	RI
Adams, Brian	BE	FL	Da	PA	RI	RU	LL	Clark, Rachael	BE	Da	PA	LL	RU	RI	FL
Adler, Martin	LL	FL	BE	PA	RI	RU	Da	Cojot-Goldberg, Oliver	BE	RU	Da	PA	LL	RI	FL
Afridi, Khurram	RI	BE	LL	RU	PA	FL	Da	Colder, Brian	Da	RU	PA	FL	BE	RI	LL
Akbar, Raza	Da	LL	RU	FL	RI	BE	PA	Cole, David	LL	Da	BE	RI	FL	RU	PA
Anderson, Heidi	RI	PA	Da	BE	LL	FL	RU	Colello, David	Da	PA	RU	BE	RI	LL	FL
Andrews, Elisabeth	RU	FL	Da	BE	LL	RI	PA	Coon, Brett	PA	Da	LL	BE	FL	RU	RI
Archer, Timothy	RU	BE	LL	Da	RI	PA	FL	Crusc, John	RI	FL	BE	RU	Da	LL	PA
Athanasopoulos, Alexandros	LL	RI	BE	PA	Da	FL	RU	Danck, Susan	LL	FL	RI	BE	RU	Da	PA
Ayazifar, Babak	BE	RI	FL	PA	LL	Da	RU	Dave, Vivek	PA	RU	RI	BE	FL	LL	Da
Ball, David	BE	RI	FL	PA	RU	LL	Da	Dekany, Richard	RI	Da	RI	FL	PA	LL	BE
Bangerter, Boyd	RI	Da	PA	LL	RU	BE	FL	Diab, Samer	LL	PA	RI	Da	FL	BE	RU
Banks, Jerome	FL	PA	BE	Da	LL	RU	RI	Dorsey, George	RU	FL	RI	BE	LL	Da	PA
Bansal, Ashok	RI	LL	RU	PA	Da	FL	BE	Duran, Oscar	PA	RI	Da	RU	BE	FL	LL
Baron, Randy	RI	FL	BE	RU	Da	LL	PA	Ebersohl, Jay	PA	RU	BE	RI	FL	LL	Da
Bassiri, Farid	Da	RI	BE	RU	LL	FL	PA	Errea, Miguel	RI	BE	RU	Da	LL	FL	PA
Bell, Bruce	Da	PA	RI	FL	LL	RU	BE	Essen, Andrew	Da	LL	PA	BE	RU	LL	Da
Bergman, Oren	PA	FL	RI	Da	RU	BE	LL	Estermyer, Thomas	FL	RI	RU	BE	PA	LL	BE
Bewley, Thomas	RU	PA	Da	BE	LL	RI	FL	Evans, Mark	LL	RU	FL	RI	PA	Da	BE
Bhatti, Munir	RU	BE	PA	Da	LL	FL	RI	Fahlgren, Catherine	RU	Da	RI	PA	BE	FL	LL
Biernacki, Rafal	PA	RU	EL	BE	RI	Da	FL	Farris, Stephen	BE	RU	PA	RI	FL	Da	LL
Bishopberger, Brooks	RU	RI	PA	FL	LL	BE	Da	Fierro, Joseph	RI	RU	LL	Da	BE	FL	PA
Bloomberg, Gary	Da	FL	RI	BE	LL	RU	PA	Finnell, Donald	RI	PA	RU	BE	Da	FL	LL
Bonenfant, Paul	RI	RU	Da	FL	PA	BE	LL	Fischman, Mark	PA	RU	BE	LL	FL	RI	Da
Bowers, John	Da	PA	LL	BE	RI	FL	RU	Flick, William	PA	LL	Da	RU	BE	RI	FL
Breaden, Matt	FL	LL	Da	PA	RU	RI	BE	Flint, Jeffrey	FL	LL	BE	RI	Da	RU	PA
Brenier, Patrick	PA	FL	Da	RU	LL	BE	RI	Flowers, David	RI	BE	RU	FL	Da	PA	LL
Brewer, Paul	RU	BE	LL	PA	Da	RI	FL	Freimanis, Diane	Da	RI	BE	RU	LL	PA	FL
Broberg, Timothy	FL	RI	RU	PA	Da	BE	LL	Fukuda, Michael	BE	RI	Da	LL	FL	PA	RU
Bronski, Jared	Da	BE	PA	FL	LL	RU	RI	Gaidos, Eric	RU	BE	PA	Da	FL	RI	LL
Burleigh, James	FL	LL	Da	RU	BE	RI	PA	Garretson, William	PA	LL	RI	BE	RU	FL	Da
Byers, Robert	BE	LL	RI	PA	Da	RU	FL	Garza, David	LL	Da	BE	RI	FL	RU	PA
Campbell, Cameron	FL	RU	Da	BE	RI	PA	LL	Gates, Michael	Da	BE	PA	RU	LL	RI	FL
Campbell, Matthew	PA	BE	FL	Da	RI	RU	LL	Gillham, Jeff	LL	BE	PA	Da	FL	RU	RI
Capofreddi, Peter	PA	BE	RU	RI	Da	LL	FL	Good, Nathan	PA	RU	Da	RI	BE	FL	LL
Castillero, Francisco	FL	LL	RI	BE	Da	RU	PA	Groff, Shane	PA	Da	RU	RI	BE	FL	LL
Chan, Kayec	RI	Da	LL	FL	RU	BE	PA	Ha, Chikin	RI	FL	RU	Da	LL	BE	PA
Chan, Victor	PA	RU	RI	FL	BE	Da	LL	Ha, Yuk	RI	BE	LL	Da	RU	PA	FL
Chang, Carole	PA	BE	RU	Da	LL	FL	RI	Haba, John	Da	RU	PA	RI	FL	BE	LL
Chang, Ha-sok	PA	RU	Da	FL	LL	BE	RI	Habecker, Chris	BE	RI	PA	RU	Da	LL	FL
Chantasiriwan, Somchart	RI	RU	LL	PA	Da	BE	FL	Hall, Joseph	LL	PA	RU	RI	FL	Da	BE
Chen, Daniel	LL	Da	PA	FL	BE	RI	RU	Hanson, Keith	RI	Da	PA	BE	RU	FL	LL
Chen, Irene	LL	FL	RI	PA	RU	Da	BE	Harling, Daniel	RI	LL	RU	Da	BE	PA	FL
Chen, Kay	Da	FL	RI	LL	BE	PA	RU	Harry, Gregory	Da	RU	PA	FL	RI	BE	LL
Chen, Stanley	RI	Da	RU	LL	FL	BE	PA	Hart, John	FL	RU	BE	PA	RI	Da	LL
Chiu, Raleigh	RU	PA	RI	LL	BE	FL	Da	Hartt, Jeff	FL	LL	RI	RU	BE	Da	PA
Choi, Garrett	Da	BE	FL	LL	RI	PA	RU	Hawley, Robert	BE	Da	FL	LL	RI	RU	PA
Chong, Walter	RU	Da	PA	RI	FL	LL	BE	Hayes, Brian	FL	RU	PA	RI	Da	LL	BE
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Chu, Christopher	RI	PA	RU	LL	Da	BE	FL	Hillyard, Sean	FL	RI	LL	RU	PA	Da	BE
Chu, Diana	LL	PA	BE	FL	RU	Da	RI								
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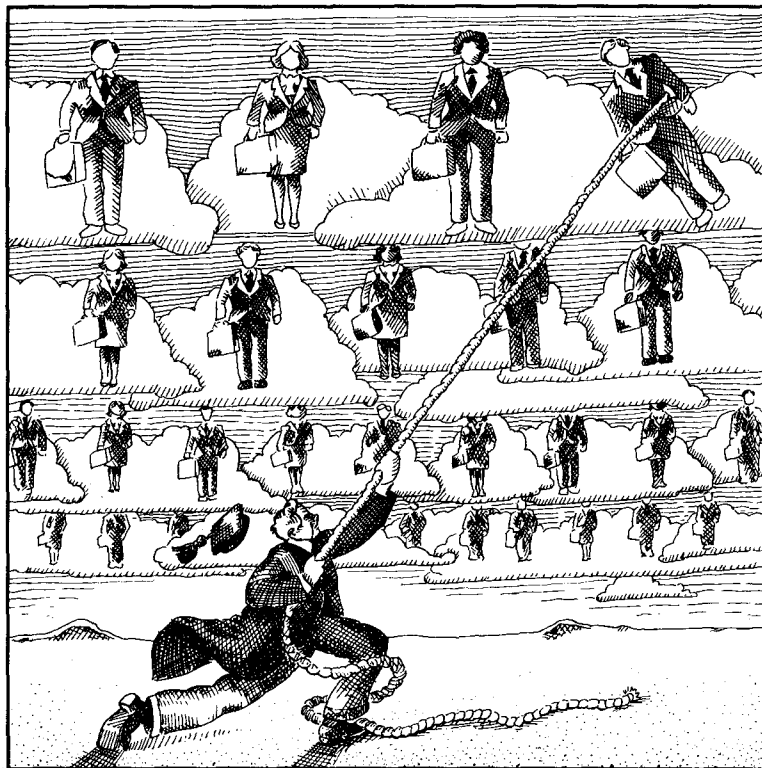




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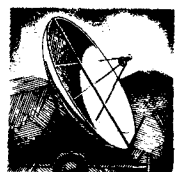
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Commission, Garrett Pneumatic Systems Division, NASA, GTE Government Systems, TRW and others. You'll hear about their philosophies, training and job opportunities on our large projection screens. And participate in a live question-and-answer period on our Satellite Career Network with company representatives.

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For a presentation schedule or more information, visit your placement office or call 1-800-328-4032. In Minnesota call 612-370-0550.



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BPI SCAN's free teleconference will be held at 10:00 AM (PDT) at Dabney Hall-Dabney Lounge, California Institute of Technology

SPORTS

ENTERTAINMENT

Weekly Sports Calendar

Day	Date	Time	Sport	Opponent	Location
Sat.	9-28	All Day	Water Polo	Riverside Tournament	Bond Park
Sat.	9-28	5:00 pm	Cross Country	Occidental & La Verne	La Verne (M/W)
Sun.	9-29	2:00 pm	Football	Scrimmage	Caltech
Sun.	9-29	2:00 pm	Soccer	Alumni	Caltech
Wed.	10-2	3:00 pm	Soccer	Claremont-Mudd	Claremont-Mudd
Wed.	10-2	4:00 pm	Water Polo	Chaffey College	Caltech
Thu.	10-3	3:00 pm	Soccer	So. Calif. College	Caltech
Sat.	10-5	9:30 am	Cross Country	Chris College	Caltech (Men Only)
Sat.	10-5	10:00 am	Water Polo	Alumni	Caltech
Sat.	10-5	11:00 am	Soccer	L. A. Baptist	L. A. Baptist
Sat.	10-5	1:30 pm	Football	Cal Poly	Caltech
Sat.	10-5	2:00 pm	Women's V.B.	Pomona-Pitzer J.V.	Caltech

Sing! Sing!

by Jung Im

The choral activities at Caltech are the only club activity on campus with a normal male-to-female ratio. Achieving this improbable state in spite of the excruciatingly unfavorable and painfully obvious circumstances is really something for all of us to recognize and appreciate. How does this thing called the choral activities at Caltech manage to attract guys, gals, and more gals to become one of the oldest and the largest clubs on campus?

It's not because the women are given a preferential treatment out of desperation. Anybody who wants to relax in an artistic and friendly atmosphere can join, and we mean *anybody!* Witness the fact that the current president of the Men's Glee Club had never sung when he first joined the club as a freshman.

It's also not because the women are more interested in special opportunities like performance with the hated P. D. Q. Bach, since they had to perform in robes and pajamas in front of thousands of people, whereas the men just dressed as they always do on campus.

And it's certainly not because the members get to meet and perform with students from other schools in exotic productions like

the multimedia extravaganza *A Snake, A Peach, and A Monkey* at Harvard during the Annual Spring Tour of 1984.

Maybe it's because of the annual spring tours and Christmas concerts, during which we sell records, tapes, musical appreciation, and, most of all, joy.

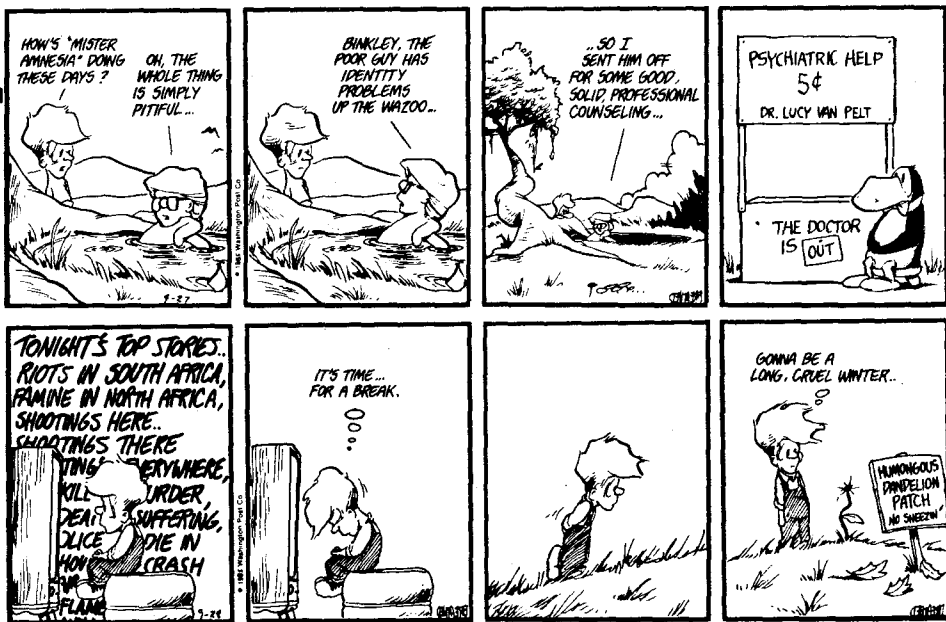
Or maybe it's only because we have knee-slapping, foot-stomping fun at parties after concerts with local artists and friends.

Or maybe it's because we are called in to do respectable and yet outrageous things for the institute at some of its memorable occasions, like singing "Surfin' C.I.T." at Mr. Baum's retirement party and the Hallelujah Chorus at Commencement.

Or maybe it's because of the excitement of performing with professional artists like the Los Angeles Grand Opera Company.

Whatever the answer may be, the Glee Clubs provide their members some of the most rewarding and memorable experiences that collegiate years have to offer, and they are holding organizational meetings from 2pm to 5pm on Sundays 29 September and 6 October in the Fleming Basement (Men's) and from 1pm to 4pm on Sunday 29 September and from 4pm to 5pm on Monday 30 September (Women's).

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GSC Report

by Steve Salyards, GSC Chairman

This is the first of what the Graduate Student Council hopes will be a regular column appearing here in *The California Tech*. The purpose of this column is to let the members of the GSC, the graduate students, know what your representatives are doing. When meetings are, what will be and was discussed at them, GSC sponsored events, and items of interest to grad students and the Caltech community.

So here is the list of your Graduate Student Council representatives for this year:

DEPARTMENT	NAME	ADDRESS	PHONE
Aeronautics	Steve Schneider	205-45	x4764
Applied Math	James Rotenberry	205-45	x4746
Applied Mech.	Xiaomin Deng	104-44	
Applied Physics	Chris Lindsey	128-95	x4823
Biology	Micheal King	156-29	x4958
	Paul Meyer	216-76	x6838
Chemistry	Brenda Baker	164-30	x6074
	Warren Kibbe	147-74	
	Jose Onuchic	164-30	x6064
	Tony Stirk	127-72	x6556
Chem. Eng.	Anthony Skjellum	206-41	
	Vice-Chairman		
Comp. Sci.	Craig Steele	256-80	x4840
Elec. Eng.	James Ng	116-81	
Env. Eng.	Sue Larson	138-78	x4818
Geo./Plan. Sci.	Steve Salyards	252-21	x3825
	Chairman		
	Richard Stead	252-21	x6974
Hum. & SS	Glen George	228-77	x4093
Mathematics	Joe Rushanan	253-37	x4343
At-Large	Lynn Hildemann	318-40	x6672
	Secretary		
	David James	138-78	x6294
	Roger Wagner	156-29	x4958
	Treasurer		

Also, there will a meeting of the Graduate Student Council on Thursday 3 October at Noon in the Red Door Cafe. On the agenda for this meeting is the report of the budget committee on the GSC budget for this year. Also, the GSC will be discussing how to allocate graduate student housing in the future when there is a waiting list for spaces in the Holliston houses and the Catalina Apartments.

Next week in this space there will be a report on the new developments in graduate housing that happened over the summer.

WHAT GOES ON

Material for What Goes On must be submitted typed on or with an Announcement Form, available at the offices of The California Tech, by the Tuesday preceding the Friday of publication.

Software Scholarship

A scholarship for up to \$5,000 for students enrolled in a computer science or computer technology program is being offered by International Computer Programs, Inc. of Indianapolis, Indiana.

To qualify for the 1986-87 scholarship, a student must be a full-time sophomore or junior who is maintaining a "B" grade point average and who has financial need.

Selection of the scholarship finalists will be based on the student's grades in his/her field of study as well as in electives, financial need, participation in data processing-related activities, school activities and leadership roles.

The finalists will then be asked to write a software-related essay which will be judged by a committee of data processing professionals. ICP will announce the winner in early April, 1986.

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Guitar Classes

The Beginning Guitar Class (no experience necessary) has been reformulated to include not only classical repertoire but a new jazz and folk chord system as well. This will give the student a strong classical technique and enable him to branch into other forms of guitar if he desires. For further studies in classical and flamenco, Intermediate and Advanced Guitar classes are also offered. Classes are free to Caltech students (and other members of the Caltech community, space permitting). Undergraduates can receive 2 units of credit if they choose. Classes will be on Tuesdays, starting October 8, in the Fleming Music Room, as follows:

Beginning Guitar, 4:30-5:30 pm
Intermediate Guitar, 3:30-4:30
Advanced Guitar, 5:30-6:30

Private instruction can also be arranged on any level with instructor Darryl Denning, who has an international background in recording and performance. For further information call Mr. Denning at (213) 465-0881.

Watson Fellowships

Essays for the Watson Fellowships are due on Friday, October 21. Seniors interested in applying for these travel fellowships should talk to Gary Lorden or Jean Noda, Associate Dean, in the Deans' Office, 102 Parsons-Gates.

Musicians Wanted

On Monday, September 30, from 11:00 am to 2:00 pm, and from 7:00 to 10:00 pm, anyone interested in playing in the Caltech wind ensemble, jazz band, or chamber music groups should drop by with their instrument to the instrumental music office at Caltech. The instrumental music office is located in the basement of Fleming House.

The music groups are open to any member of the Caltech of JPL community. The jazz band and wind ensemble meet on Thursday nights, and the chamber music groups meet once a week as arranged by the members of the group.

The first rehearsals of the year for the Caltech Wind Ensemble and Caltech Jazz Band are on Thursday, October 10. The wind ensemble rehearses from 7:15 to 9:00 pm, and the jazz band rehearses from 9:30 to 11:00 pm.

If you have played in one of these groups in the past and wish to play again this year, registration can be accomplished by calling William or Delores Bing at (213) 684-8964. If you have any questions, please phone the above number for further information.



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New Humanities

The following courses will be offered this term:

Lit 180-Modernist Poetry-taught by Lawrence Rainey on MW 2-3:30. A survey of the major modernist poets (Yeats, Eliot, Pound, Williams) and the characteristic forms and concerns of their work.

Lit 180-Poetry and Painting Between the Two World Wars-taught by Jacqueline Ollier, a visiting Professor from the University of Nice, France.

PS/SS 12-Introduction to Political Science, taught by Rod Kiewiet.

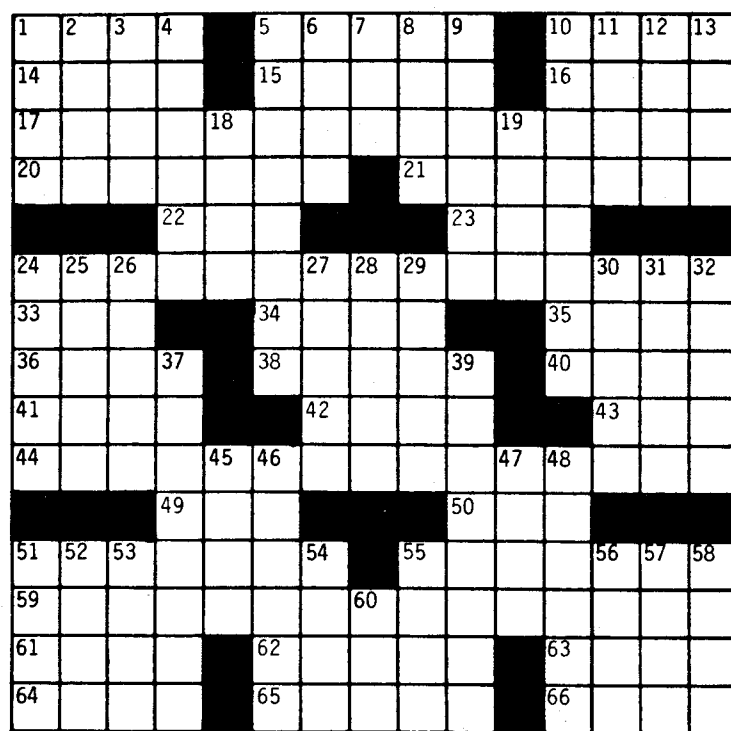
Undergrad Check-In

All Undergraduate students living in On-Campus Houses, Off-Campus Houses, Marks House 150 South Chester, and 1170 East Del Mar are required to check in with the Housing Office no later than October 7 (Monday) or the housing contract may be canceled. Students should plan on checking in with the Housing Office upon their arrival to campus. Continuing students (students who were here during the summer period) are welcome to check in immediately.

At the time of check-in students will be required to make a decision concerning their board program plans for first term.

Thank you for your cooperation!

collegiate crossword



© Edward Julius

ACROSS

- Paleozoic, Mesozoic, etc.
- Car accessory
- Soviet news agency
- Function
- Parenthetical comment
- Jai
- Principle of economics (3 wds.)
- Provide evidence
- With 60-Down, house pet
- volta (once, in music)
- Suffix for diction or honor
- Promissory note, e.g. (2 wds.)
- Ms. Gardner
- Sea eagles
- French resort
- Poet Teasdale
- Novelist Philip and actress Lillian
- Type of restaurant, for short
- Seed covering
- school
- Was a candidate
- EDP personnel (2 wds.)

- Map abbreviation
- Company bigwig (abbr.)
- Alleviate
- Chemical catalyst
- EDP equipment (2 wds.)
- Subject of the movie, "Them"
- South American animal
- Home
- Nearly all
- Like some breakfast foods
- Mah-jongg piece

DOWN

- Formerly, formerly
- Debauchee
- European range
- Deviated
- Traveler on foot
- British phrase
- Wrestling maneuver
- Actor Byrnes, et al.
- Phone again
- 1957 movie, "— the Bachelor"
- Winglike parts
- souci
- Beef quantity
- The bottom
- O.K. Corral participant
- Houses, in Hermosillo
- Reproductive organ
- 1961 baseball MVP
- Farmer's concern
- Prefix for mural
- Extremely pale
- Seashore structures
- Brilliance of success
- Bridle attachment
- Unselfish person
- Astronaut
- "L"—, c'est moi"
- Prefix for maniac
- China's "Great — forward"
- Cultured milk
- Economist Smith
- Japanese War
- Bilko and York (abbr.)
- First name in jazz
- Site of 1960 Olympics
- Toilet case
- Ms. Carter
- Subject of Kilmer poem
- See 21-Across

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