From Balloon

[OPR]—Using a sensitive gamma-ray camera hanging from a balloon floating 120,000 feet over Alice Springs, Australia, a team from Caltech has observed a very bright gamma-ray object near but not at the center of our galaxy. The results were announced on Wed-
nesday at the annual meeting of the American Astronomical Society in Boston.

The authors of the paper are Walter R. Cook, a Caltech elec-
tronic engineer; graduate student D.M. Palmer; Thomas A. Prince, associate professor of physics; staff scientist S.M. Schindler; graduate student C.H. Starr, and Edward C. Stone, Jr., professor of physics and vice president for astronomical fa-
cilities at Caltech.

The gamma-ray source has been tentatively identified with a previously known X-ray object, with the designation 1E1707.2-
2942, and which appears at least 340 light years from the galactic nucleus. (The uncertainty about the object’s exact location is simply the fact that it may be in front of or be-
hind the galactic center.) “It’s been known for some time that there is a great deal of gamma-ray emission in the galactic center region,” said Prince. “But we haven’t been certain whether it was due to one object or many, or whether the emission was coming directly from the galactic nucleus or from just nearby,” said Stone. “It’s very important that we now suppose that most astronomers would agree that the bulk of the gamma-ray emission is coming directly from the galactic nucleus, but our observations clearly show a single source located at 0.7 degrees—about 340 light years—away from the nucleus. The object emits copious amounts of radiant power in the energy range from 30 to 200 keV, an energy range including hard X-rays and soft gamma rays. This object is only slightly less luminous than the brightest galactic object known at those energies—Cygnus X-1. Cyg-

nus X-1 is believed to be a black star system in which one of the ob-
jects is a black hole.

“We are not exactly sure what the object we have observed near the galactic center is,” said Cook, who delivered the paper at the AAS meeting. “One possibility is that it’s a stellar mass black hole similar to Cygnus X-1—one with a mass of 5 to 10 times that of our sun. Another possibility is that it’s a neutron star onto which material is acc-

Hand of God removes terms

Makes Sense of Science

by Craig Volden

During one of the algebraic cancellations, I used the ‘Hand of God’ to take out some terms, actu-

aly I used a drawing of my own hand.

Being a creator is right up Dr. James Blinn’s alley, as he explained at Wednesday’s Watson Lecture entitled “Making Science Under-

standable.” Now the Associate Director of MATHEMATICS at Caltech, Blinn spoke of his philosophy toward education, told some anecdotes about The Mech-

anical Universe, his well known computer-

animation projects, and talked about his hopes for the future.

Dr. Blinn was introduced by Professor David Goodstein, with whom Blinn had worked on The Mechanical Universe. Goodstein pointed out that Blinn’s work thus far could be valued at tens of mil-

lions of dollars, but that Blinn’s de-

vention toward making science understandable allowed the pro-
gram to be a success at a lower cost.

Dr. Blinn’s devotion to this cause can be seen both in his words and actions. As both his parents were teachers, Blinn quickly came to the conviction that “education is the highest human endeavor.” He added that unfortunately our soci-
y “thinks nuclear weapons are the highest human endeavor.”

“I feel that to learn something, students need many different in-

puts.” Computer animation has proved to be a significant attract-
ing feature, bringing students closer to the understanding of science at various levels.

The Mechanical Universe ser-

ies has been used in various col-

leges and broadcast on national television. Thirty-eight-fifteen minute versions were then made for high schools across the United States. Japan picked up the idea, and the series, which will be translat-

ed and shown in half of all the Japanese high schools.

Blinn sees the learning process as having three levels: “I don’t understand.”

“Okay, if you say so;” and “Of course, how could it be other-

wise?”

By presenting difficult ideas (up through relativity) in a medium that kids relate to, Blinn has seen many students pass to the third level “with much less difficulty than [he] had.”

In addition to making things un-

derstandable Blinn keeps them in-

teresting and fun. For complicated calculations, he introduces and in-

triguing technique known as “al-

gebraic ballet,” which is even more fun to watch than it is to do the al-

gebra yourself.

Hard to imagine? It’s true. With

moving variables, lightning bolts, and explosions, Blinn has been able to solve nearly all of the important proofs in physics, never before able to be tolerated by the viewing public.

Various shapes and animations are used to keep the programs ex-

citing. When asked about his use of the teapot, one of Blinn’s favorite shapes (which even pro-
vides the answer to the ultimate question of life, the universe, and everything in one episode), he ex-
plained that he picked up this shape at graduate school at the Universi-

ty of Utah. Showing Blinn’s in-

fluence on the industry, many other computer artist have used the teapot shape since.

In addition to having the Hand of God, Blinn was able to bomb Russia from London in one epi-

sode, when in a Newton’s thought experiment on orbits, a couple of cannonballs didn’t quite make it into space.

Other fun ideas of Blinn include the creation of a “10” ball on a pool table collision simulation [or was it “61”?] and a parody called the Quantum Mechanical Universe. Another amusing event happened when Blinn wasn’t able to claim credit for his computer work on one project, he played trumpet in the background, so his name would be listed on the film.

The Mechanical Universe show on relativistic has earned many awards and has gained the title of THE Show among students at Tech.

Even though Blinn has complet-
ed The Mechanical Universe, his devotion remains as strong as ever. He is now working on Project MATHEMATICS! with Professor Tom Apostol. After this mathematic-
elian endeavor, Blinn would like to work on computer animations for chemistry and molecular biology.

He, however, classified the fu-
ture funding of such projects as see UNDERSTAND page 3

Van Using Discouraging

by Marty O’Brien

The potential of Caltech’s transportation policies has forced ASCIT to change its policy regard-
ing the ASCIT CAT, or make its status as an insured vehicle under Caltech’s insurance program.

Under a revised version of Reso-

lution XII of the ASCIT By-laws, also passed, ASCIT CATs, as with other institute vehicles, is restrict-
ed to use only “in the broad in-
crease efforts, the Mosh and Deans have proved willing to give authorization for things like getting to a job inter-
view, moving belongings from one residence to another, etc. If you have any other questions or con-

cerns, feel free to come talk to me or any other of your friendly neighbor-
hood ASCIT BOD members.

Thus beginning this year, use is more restricted. Students representing ASCIT sub-

committees, ASCIT-sponsored clubs, sports teams, or student house events will still be able to use the van. Personal use will only be authorized with written permission from the Deans or the MOSH.
An Ex-Editor's rant at Everything

Lack of Trust and Respect

From the Caltech Catalog, 1988-1989.

The primary purpose of the undergraduate school of the California Institute of Technology, as stated in the original trustees, is "to train the creative type of scientist or engineer so urgently needed in our educational, governmental, and industrial development." It is believed that this purpose is best served by the Institute for both undergraduate and graduate students because of contacts between a relatively small group of students... and the members of a relatively large research staff.

There seems to be a lack of respect between the students and the faculty. Because of the concern of our relations, we believe that this problem is finally being openly discussed and solutions finally emerging.

How was the current state of affairs in previous years? During the years it was forgotten that this mighty Institute was once a meager group of students at school and that great dreams and efforts were utilized to convert it into a school where the bright young minds of the world could come and study. Sure, much outstanding research is done here today, but the faculty have become so enmeshed into their work that graduate students are regarded as less important than the research itself. Is this attitude that is the root of the problems of faculty/student relations or the root of student life that we have witnessed? I suspect predict my three years of attendance here before the very problems (now free off these pages)!!

As a consequence Caltech is realizing that it could lose its place among the top colleges in the United States because both our high school seniors are being hired to other campuses. Finally, we have totally struc-ute undergraduate life? One of the benefits that would benefit under-graduates in favor of established in the system is that the students really get to govern themselves. This system will be the engine of the system. There are still many feelings among students regarding the influence of the Government of the States and there is a general uneasy feeling towards the potential power that government holds over us. I suspect there is a feeling among the faculty and administration that the students are only transients for four years and therefore for whom do we do for us. These feelings cannot help to solve any of the perceived problems, we must work together in a spirit of trust and respect.

-Mike McDonald

The TECH CALIFORNIA

Volume XI • Number 12
January 13, 1989

EDITORS OF THE WEEK
Steve "Ones Hau 19 cents" Low
"Josh "Not so Smart"

REPORTERS
Mary "Boombot" Olfrin
Craig "Bricklayer" Volkin

PHOTOGRAPHERS
James "The Bobo" Delgigion

ENTREPRENEUR
Andrew "19 cents" Bu, ed

PRODUCTION
Jennifer "Giggles" Low
Nick "The Little Engineer" Smith
Mike "Inside Scoop" Mc Donald

BUSINESS MANAGER
Mike McDonald

ADVERTISING
Gavin "Late Night" Claypool

MANAGING EDITOR
Advertising
Mike McDonald, mgr.
Gavin Claypool

CIRCULATION
Jennifer "Giggles" Low
Nick "The Little Engineer" Smith
Mike "Inside Scoop" Mc Donald

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- 50-58 SAC
California Institute of Technology
Paciﬁc State 91153
(818) 356-6554
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More Gamma-rays! from front page

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 350 separate parts, or pixels. Most
previous gamma-ray detectors were only able to identify a general
direction for gamma radiation. Such gamma-ray detectors first
discovered the emission coming from the region of the galactic center.
The camera must be sent aloft on a large high-altitude balloon
since Earth's atmosphere absorbs most gamma rays. But since the
camera hangs freely beneath the balloon, it requires an elaborate
pointing system to keep it trained on a single object. The pointing
system uses Earth's magnetic field, detected by an internal magnetom-
ter, as its guide. In addition, two CCD (charge-coupled device)
cameras view the sun in the day and the stars and planets at night
to measure the telescope's pointing direction accurately. The data is
recorded digitally on a series of eight commercial videotape record-
ers and is also recorded to the
ground.
The observations were made last April from a balloon launched
from Alice Springs, Australia. The galactic center is readily observed
only from the southern hemisphere. Seven hours of the
30-hour flight were devoted to the
galactic center area.
The team plans to continue its
gamma-ray observations, with another camera launch set for
March or April, 1989. "There's a very exciting story developing
about positron-annihilation emis-
sion starting and stopping and start-
ing again in the region of the
galactic center," said Prince. "We
want to find out whether it's
1E1740.7-2942 or the galactic
nucleus that's responsible for this
positron-annihilation emission."

Positron-annihilation emission
is thought to be produced when
large amounts of material fall onto
a neutron star or a black hole. Such
an event produces large numbers of
gamma rays, which in turn can
produce large numbers of positrons.
When such a positron meets up with an electron, they an-
ihilate each other and produce two
other gamma rays, each with an
energy of precisely 511 keV.
Positron-annihilation emission was
first observed coming from the
region of the galactic center in the
1970s, but then, between 1979 and
1980, the emission was observed to
switch off mysteriously. The
Caltech team observed no positron-
annihilation emission coming from the
newly imaged object during the
April 1988 flight.

However, Crawford MacCal-
lum of Sandia National Laborato-
ries was expected to report this
week that his group's observations
from May and October, 1988, show
that positron-annihilation emission
from the region of the
galactic center may be starting up
again. One possible explanation
for this is that a new batch of material
is falling into a black hole and
producing positron-annihilation
emissions in the process. The
Caltech group is eager to learn
whether the positron-annihilation
emissions are coming from their
newly imaged object or directly from
the galactic nucleus, which may
harbor a black hole far more
massive than the one that may be
responsible for objects like Cygnus
X-1 and possibly 1E1740.7-2942.

NASA supported the Caltech
team's research. Development of the
gamma-ray cameras was fund-
ed by NASA, Caltech, and the
Ralph B. Lloyd Foundation.

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Understand
from front page
"not real promising." MATHEMATICS! will be
$800,000 short of its proposed budget for each of the next five
years. Blinn is hoping to be saved by donations and other contri-
butions.
Any student who has gone through The Mechanical Universe
program (or those who did not—and are still confused) can under-
stand the contribution Dr. James
Blinn has made to the teaching of Physics. Indeed, the computer an-
imation "creator" has met the topic of his lecture—by making science
understandable.

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3
The California Tech 13 January, 1989

This image, made by the Caltech gamma-ray imaging telescope, shows the region of the galactic center. The galactic nucleus is located at the center of the cross, and the bright gamma-ray source, tentatively identified with 1E1740.7-2942, is centered at the dot in the image and is at least 340 light years away.

Sunday CRIMES
1-6: Attempted car theft at IPAC
on S. Wilson
1-9: Attempted car theft (damaged
doors and ignition) on Wilcox
of 3 Los Angeles
Tip for the law abiding public
from Hal Ginder: "Do not prop
open doors that are supposed to be
locked."
Bloom County by Berke Breathed

You don't need your parents' money to buy a Macintosh.

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DATE: Monday, January 16, 1989

TIME: 11:30 a.m. – 1:00 p.m.

PLACE: Winnet Lounge

Interviews will be held February 10, 1989. Please submit resume, transcript, and GMAT score (if taken) between January 15 and February 3, 1989. Send all materials to:

McKinsey & Company, Inc.
400 South Hope Street, Suite 600
Los Angeles, California 90071
Attention: Ed Lambert
Marathon!

Heavy-duty sports schools take note: Caltech's faculty and staff are trying for their third straight athletic championship in the marathon!

For the third consecutive year, Caltech and JPL are planning to enter the United States Corporate Athletics Association marathon championships. This winter's race is scheduled for Sunday, January 15 in Houston, Texas.

According to Elliott Andrews, division administrator in Engineering and Applied Science at Caltech, the team hopes to attract as many as a dozen marathoners from the campus and lab ranks to compete in the men's and women's open competition and various age categories. Staff employees at JPL and Caltech—as well as representatives of the faculty and graduate student body—are expected to participate in the upcoming marathon.

In 1987, Caltech/JPL finished seventh overall in the corporate marathon. Last year, the team ended up eleventh in a field of thirty teams—besting corporate giants including Toyota, Continental Airlines, Dow Chemical, and IBM. In both years, the team finished first in Division II (small employers).

The Disciples of Aram

It's been a tough week for the Beaver basketball fan. After a long winter break, the Battling Beavers have suffered three straight losses as they struggle to regain their pre-break form. The Beavers fell to the Pacific Christian College Eagles 60-45 and twice to the Loma Linda University Golden Eagles by scores of 64-57 and 69-56.

Despite these three losses, all is not bleak for Beaver basketball. George Papa has emerged as the team's offensive leader, averaging 22 points over the three games. George followed a season high of 28 points against Loma Linda at home with an equally impressive output of 26 points against Loma Linda on Wednesday night. After Wednesday's game, George remarked "It's hard to be happy with 26 points if the team loses and you don't even score with the babs." Whereas George scored 26 points and 0 babs, it is rumored that forward Aram Kaloustian scored 0 points and 26 babbles.

The stellar efforts of George Papa and Aram Kaloustian was backed by the consistently strong performances of Jason Karczki who led key plays on both offense and defense. Sean Hillyard, Scott Bradley, Randy Ralph, and Larry Able also turned in solid if at times spooky play. Bill Swanson, whose excellent post play helped stabilize the Beavers in the early season, played erratically early in the week, but in Wednesday's game showed encouraging signs of re-establishing himself as a dominant post player. He also managed to keep his eyes and his googles attached to the rest of his face ending a streak of 7 games in which he lost both googgles and temper.

The Beaver's exciting basketball season continues next week with a road game against Occidental on Tuesday and a home game against LaVerne on Friday. Come catch the Beaver fever!

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Saturday-Monday 4:30, 7:00 pm

Nobody's Fault

Tuesday-Friday 6:00, 9:30 pm
Saturday-Monday 4:30, 7:30 pm

LA Film Critics' Best Picture
Charles Dickens' Little Dorrit

Sports

WEEKLY SPORTS CALENDAR

Day  Date  Time  Sport  Opponent  Location
Sat.  1-14  11:00 am  Swimming (M-W)  Pomona-Pitzer & Occidental  Caltech
Fri.  1-20  7:30 pm  Basketball  Occidental JV  Occidental
Sat.  1-21  11:00 am  Swimming (M-W)  Redlands  Redlands

by The Disciples of Aram

AUDIENCE DISCRETION ADVISED. THE FRENCH REEL COMPANY, INC. AND THE NOHO CINEMA<TResult(1,108,1000,129)
what goes on the back page

Seven Samurai, Cheap! This Saturday, January 14th at 2 and 7 p.m. at the American National Theater and Film Festival, you can see the classic film "Seven Samurai," a story about a group of farmers who band together to defend their village from bandits. A classic of Japanese cinema. Contact 708-500-0000 for more information.

Right-Brain Drawing Class An art class teaching students to draw from the right side of their brains will be offered by the Natural History Museum, 1100 S. Michigan Avenue, every Saturday from 10 a.m. to 1 p.m. for six weeks. The class is open to all ages and no prior art experience is necessary. For more information, call 332-5000.

Yet Another Totem Poll for Art Afghan writers, poets, and artists The second Totem in many years will appear this spring and will contain a diverse collection of Tassan expressed in various forms. Address your submission to Glenn James, 1100 S. Michigan Avenue, 60605.

Folk Dancing The CalTech Folkdancers will have a be- ginner's night on January 17. Everyone welcome, with teaching 7:45-9:30 p.m. Dance to follow in open dancing until 11:30 p.m. in Danse Hall. No partner needed. For more information, call 390-5599 or 390-5559.

Noontime Briefing The CalTech Management Association presents a "Noontime Brief" monthly. Managing Partner, John M. Murphy, will speak on "How Do They Do That?" on the 15th of the month. For more information, call 390-5599 or 390-5559.

Express Your Art! CalTech artist needed for poster design If you are an artist, please contact the admissions office at 390-5599 or 390-5559.

Work in Japan! A CalTech alum is offering two paid internships in the Japanese factory for the summer. Travel, room and board are paid. Students will be expected to work up to 40 hours per week. If interested, please write to Dr. Jerry Brown, 1100 S. Michigan Avenue, 60605. For information, contact the Career Center at 390-5599.

Journalism Class for Credit CalTech undergraduates interested in enrolling in a "Cardboard Box" class can receive Institute credit for successful completion of the course. Contact the City College, PCC for registration. The course is limited to 20 students and meets in the PCC Learning Center. In return for a fee of $150, the class meets on the PCC campus. If offered, either the days or times will be 7-11 a.m. or 1-5 p.m. If interested, contact Halley Hall in the CalTech Alumni House, or at 390-5599.

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German Films: Eisenhans There will be a showing of Eisenhans (Saturday, January 14, 7:45 and 10:30 p.m. in Bates Lecture Hall). There will be a reception following the screening. The film is shown in conjunction with "The Jack Film," which was shot in Eisenhans. Both films are scheduled to be shown as a part of a well-trained film. The film, which refers to the nickname of the main character (tightly: "from Eisenhans"). It is about the collapse of a nuclear family and the breaking of the "law" of a self-styled strong man.

Folk Music in Danby Hall The CalTech Folk Music Society presents "Folk Music in Danby Hall," January 21 at 8:45 p.m. and Friday, January 22 at 8:45 p.m. in Danby Hall. Doors open at 8:15 p.m. The concerts feature folk music from many countries and are presented in the folk style. For more information, call 390-5599 or 390-5559.

Wind Ensemble Goes Pop The CalTech Wind Ensemble (Concert Band) will present a program of contemporary music, Saturday, January 21 at 8:45 p.m. in Danby Hall. For more information, call 390-5599 or 390-5559.

Career Development Tidbits The City of New York is sponsoring the NYS/CalTech Career Development Tidbits series. This series will include outstanding students who have completed or are in the process of completing in New York City. The series is offered to NYS and CalTech students and is open to the public. For more information, contact the Career Center at 390-5599.

AIDS Awareness The AIDS Awareness Program of the University of California, Berkeley will host an AIDS awareness program on January 21st. The program will include a discussion of the AIDS epidemic and an overview of the AIDS virus. For more information, contact the AIDS Awareness Program at 390-5599.

Summer Biomedical Program of the Jackson Laboratory The Jackson Laboratory, 1660 South Street, Bar Harbor, Maine, will offer a summer biomedical program for high school students. The program will be held June 17 - August 31. For more information, contact the Career Center at 390-5599.

Carneige Summer Bio Program The Carneige Summer Bio Program of the Lamar University is offering a summer program for high school students. The program will be held June 17 - August 31. For more information, contact the Career Center at 390-5599.

Winter Break CalTech students interested in participating in the Winter Break program should contact the Career Center at 390-5599.