Aging City Landmark to Undergo Earthquake Protection Renovation

By ZHIYUN GUAN

For many decades, the Pasadena City Hall building has been a beloved local landmark. Now, renovations are under way to secure it against earthquakes, explained Provost Paul Jennings, chair of the City Hall Restoration Oversight Committee. Designed by architect John Bakewell and built in 1927, City Hall was constructed “well before the modern earthquake codes,” Jennings said.

Professor Gilles Laurent presented a talk Wednesday night on the sense of smell and how our noses interact with our brains. The talk, part of the Watson Lecture Series, was held in Beckman Auditorium.

He was introduced by Professor Michael Dickinson, who previously presented another talk in the Watson Lecture Series on the research in his lab regarding the motion of flies. Dickinson stated that Professor Laurent “is the Tiger Woods of biology. He can make the impossible seem easy.” He explained that Laurent had inspired a generation of experimentalists, including Dickinson himself, to try more daring experiments.

Professor Laurent explained his interest in noses by showing a parallel to his wife’s interest in photography. He showed a photo of the close-up of a mysterious object. Explaining that the object was his nose, the audience laughed merrily.

“Most odors are complex,” explained Professor Laurent. Typical perfumes contain only alcohol and water, but the fragrance itself is made of a “complicated mixture of oils.” Brown coffee, for example, has more than 300 components for odor.

He also emphasized that odor perception is singular. To explain, he showed a chart explaining an experiment that Livermore and Laing conducted in 1998. Ordinary humans were asked to identify odors, and when there was only one odor, the test subjects were correct half the time. With two odors, the success rate was at 80% and with more simultaneous odors, the accuracy dropped to almost zero. Professor Laurent noted that even trained noses have difficulty detecting multiple odors.

An interesting aspect of odor is its invariance with regards to strength or concentration. For example, anopheles gambiae, the mosquito, depends on this property to locate sweet compounds because it needs human blood.
Numerical Results Delayed by Protest

Continued from Page 1, Column 5

In a closely watched election, Peter Foley ousted challenger Melody Grabb for the office of Interhouse Committee Chairman. Promising to accurately represent student and house policy to both the BoD and the Institute administration, Foley adopted a stance that many believed helped lead to President-elect Warner Leedy's victory in the first round of elections. Foley also promised to keep undergraduate community, traditions, and autonomy strong as the students enter the disruptive period of renovations. Foley also offered ideas to keep important resources available, including the coffeehouse, the DDR machine and the screening room.

Board of Directors newcomer Dima Kernasovskiy triumphed in the Social Director race. There was little differentiation between the platforms of the two candidates. Kernasovskiy promised to improve on the number of ASCIT Social events both on and off campus, noting in particular that there is a huge surplus due to the recent dues increase that could be used for social events.

In an election of relative unknowns, Todd Gingrich was victorious in the race for Freshman Director at Large. Gingrich may have had appeal as the organizer of a prank on MIT, though the prank never ended up being carried out. He produced a generally uncreative statement, offering the usual promises to increase communication between students, and especially freshman, and the BoD, as well as suggestions of ways to use the budget surplus like more social events.

Current Freshman Director at Large Kelly Lin swept the Treasurer election, largely riding on her experience on the BoD as an ARC rep and as interim director. Fu also parleyed her experience working on the Big 7 as an asset given the recommended relaunch of the offices by the current BoD. Under the proposed changes, the Treasurer will take over oversight of publications from the Upperclass Director at Large.

In the race for Director of Academic Affairs, former Interim Director Meng-Meng Fu successfully regained her seat on the BoD. With another Student-Faculty Conference coming up, students voiced their confidence in Fu's past service as an ARC rep and as interim director. Fu also pledged to hold ARC reps accountable for getting more feedback from their constituencies.

The Senior Class co-Presidents race was won by outgoing Interhouse Committee Chair Kim Popeendorf and her running mate Angelina Crans. Offering to make senior year "as carefree as possible," Crans and Popendorf made common senior class co-president promises such as having a super graduation speaker and an impressive class gift.
Aquatics Produces Final Splash with Broken Records, Basketball Teams Face Losses Despite Improvement

By MIKE RUPP
Caltech Athletics Weekly
Roundup
February 21, 2005

Swimming & Diving closes season with record-breaking finale

The Caltech Swimming & Diving team broke four school records this past weekend as it finished its season at the SCIAC Championships.

On Saturday, the team broke the 200 Yard Medley Relay record of 1:42.07 that had stood since 1989, shattering the previous record of 1:42.03. The new record was set by the relay team of Jason Lee, Jurczak, and Dan Oliver. Each member of the relay team dropped faster than 25 seconds, finishing with a record-breaking time of 1:40.23.

On the women's side, Senior Bekah Eason came in third overall in the one-meter diving competition with a score of 343.10. Eason also placed first in the three-meter diving competition with a score of 383.63. The women's team finished the meet with a score of 153, tying for fourth place with Scripps College.

The men's team finished the meet with a score of 147, tying for fifth place with Pomona-Pitzer. Despite the loss, the team was pleased with its performance and felt that they had made progress throughout the season.

The Caltech Swimming & Diving program has been steadily improving over the past few years, and the team is looking forward to next season with renewed energy and determination.

Please join the American Friends of the Hebrew University and Professor David J. Gross
2004 Nobel Prize winner in Physics
Director, Jerusalem Winter School in Theoretical Physics
Hebrew University of Jerusalem

Dr. Harold E. Varma
1989 Nobel Prize winner in Physiology or Medicine
President & CEO, Memorial Sloan-Kettering Cancer Center
Former Director, National Institutes of Health

In celebrating the 100th Anniversary of Albert Einstein's Annus Mirabilis (his Miracle Year)
A Little Bit of Inflation Wouldn't Hurt A Fly

BY TAMMY MA

It's a ques time of year for us seniors who are trying to figure out what we're doing next year. Applications (and re-applications) to grad schools, medical schools, law schools, and the like, are due. When choosing among all these options, jobs are starting to trickle in. Interviews are being held and offers are being made. Life decisions are contemplated as Caltech prepares to drop the name Caltech out of our heads and we enter the real world (or in the case of those of us who have decided to continue school, we search for another classroom where we can hide from the world outside for another couple of years.)

Today I got my first rejection letter (or more accurately, email.) I have come MIT. No hard feelings, di, we really want to go there anyway (jets). However, I have to admit the letter got me from them was quite amusing.

"If you want to re-apply for admission into the Aeronautics and Astronautics Department, you can submit a new application online. If you've already submitted an application, circumstances have dramatically changed, it is highly unlikely that you will receive a better offer. An additional reason to be considered is that you would be required to pay a $75 fee. It is believed that the fee is necessary to cover the costs associated with processing your application. That would be a win-win situation for Caltech."

"What's wrong with a little grade inflation, any way? If other schools are doing it, doesn't it put us at a disadvantage when it comes to writing down our GPAs on our applications or resumes?"

As spring approaches, time at Caltech is dwindling for the Class of 2005. It seems everything we do is for the last time. When we contribute to the Senior Gift, we no longer be spending on gruel night Donuts and the last Ditch ever again. How's that for a win-win situation for the students? The Senior Gift looks like it's producing smarter students; students are happier. How will we differentiate the smarter student from the more mediocre ones, you say? Give the smart super geniuses A++es, and hey, I'd settle for a B+

"It's true I came to Caltech expecting to be a chemist, but I'm proud of my GPA, because though it's true it could probably be higher, I really enjoy the way to hard I've worked to make it to graduation. However, I can say that this hasn't been the case with many of my classmates. Over four years, my class has lost a good number of people. Not just that people that transferred to other schools, but people who quit college completely. How do people then that people who are obviously interested in math and science simply decide to leave school?"

"Caltech does everything it can to make our lives outside of academically as easy as possible. We have one of the best dining programs, the house system makes having a family, they cater to our food needs, our rooms are cleaned bi-weekly, and friends, deans, and professors constantly watch out for our academic progress. And still, many people are very unhappy with the life that Caltech offers. Why? This is what posed to be the best time of our lives? Part of the reason is not just the difficulty of the competition, the feeling that we just can't do as well as we'd like to.

Most Caltech students here for the challenge. We enjoy pushing our mental abilities to their limit. But on the top of the almost impossible problem sets, do you really think that we can deal with depressing grades too?"

"I'm not trying to whine about my grades, I simply want to know in what way they in any way help us in whatever comes. In terms of academic ability. What's wrong with a little grade inflation, any way? If other schools are doing it, doesn't it put us at a disadvantage when it comes to writing down our GPAs on our applications or resumes?"

"Grade inflation would be a win-win situation..."

"Some might disagree on the teaching in schools of math, science, and other subjects. However, they are objective and don't really contain any elements of individuality. The point of this argument is not to dictate what sort of education students should receive, but that there is not such thing as a purely objective education..."

The Pledge of Allegiance. Education, and the Sign of False Issues

BY SIMON QUE

Michael Newdow came to national attention when he brought forth a legal challenge to the public school in which his son was attending. Over her saying the Pledge of Allegiance with the words "under God" in it. The main argument of his challenge was that the recitation of the pledge signifies separation of church and state, and that it constituted a state-promoted reli­ gion, which he considered to be unconstitutional.

"The debate over the Pledge of Allegiance has been both rational and ridiculous. Both sides are arguing over two words in the pledge while ignoring the bigger picture."

In his latest case, Newdow presented the "daily indoctrination of religious beliefs" into public schools when his son was receiving school. He has a good point. If he wins, the case in school is "daily indoctrination" of a religious thesaurus. Not even the student is learning. That includes the pledge itself.

What's the point of this argument? Is it not to dictate what sort of education students should receive, but to define a purely objective, value-free education. When students graduate from a school, they pick up a certain set of values and views, whether intended or not. Newdow's in the first place, for compelling us to be in school at all. He's contesting the necessity of church and state, that it be taken from the classroom. But he wants it to be taken for the sake of the students themselves. Nevertheless, the God in the pledge is not an impediment to what we want to do with our country for the first time. He has a good point. If he wins, the case in school is "daily indoctrination" of a religious thesaurus. Not even the student is learning. That includes the pledge itself.

It is worth noting that whether or not there is an objection to the phrase of under God. The point of this argument is not to dictate what sort of education students should receive, but that there is not such thing as a purely subjective, value-free education. When students graduate from a school, they pick up a certain set of values and views, whether intended or not. Newdow's in the first place, for compelling us to be in school at all. He's contesting the necessity of church and state, that it be taken from the classroom. But he wants it to be taken for the sake of the students themselves. Nevertheless, the God in the pledge is not an impediment to what we want to do with our country for the first time. He has a good point. If he wins, the case in school is "daily indoctrination" of a religious thesaurus. Not even the student is learning. That includes the pledge itself.

The debate over the Pledge of Allegiance has been both rational and ridiculous. Both sides are arguing over two words in the pledge while ignoring the bigger picture. In his latest case, Newdow presented the "daily indoctrination of religious beliefs" into public schools when his son was receiving school. He has a good point. If he wins, the case in school is "daily indoctrination" of a religious thesaurus. Not even the student is learning. That includes the pledge itself.

What's the point of this argument? Is it not to dictate what sort of education students should receive, but that there is not such thing as a purely objective education..."
The Art of Becoming a Man: A Guide Toward Achieving Greater Masculinity for the Inexperienced Caltech Male

By HAMILTONY FALK

When females, or perhaps males who prefer an “alternative” lifestyle (1), view the male populace of Caltech, the first thing they seem to think is “gosh, where are they?” This is because they tend to be around during the daylight hours, when most male Tech- ers are either sleeping or taking a nap. If they were to discover the Tech boys though, it is likely that their thoughts would not be those of someone impressed by the masculinity of most men here. I’ve decided to try to do something about this my way (2).

I’ll offer a few suggestions for the guys so they can try to make themselves a little more manly (if they so desire), as well as a few ways for all the gals out there to make themselves believe there is a little bit more macho in the lo- cal fellas.

My first suggestion to guys is to show off your muscles. This can mean wearing tight cloth- ing (make sure it’s the right type though. Under armor is manly, Hello Kitty T-shirts are not). My second suggestion would be to either lift heavy-looking things, or flex. Since the first requires ac- tual muscle tone and/or strength, flexing is often your best choice. Try pointing to things using both arms while tensing all the mus- cles in your upper body, or yawn­ ing while making a fist to show of your rippling upper body. If this quickly exhausts you, don’t wor­ ry, there are other options. While flexing biceps and pecs may tra- ditionally be considered the stan- dard things to flex (and they are), you can also stunt the ladies with a particularly powerful thumb flex or an intense furrowing of brow muscles. Notice stunting is not al­ ways a good thing to do to ladies (sometimes it can even land you in prison!) so be careful to make sure girls are prepared if you’re going to offer these examples of your masculinity.

My first suggestion for the girls is to pretend you agree when a male friend claims that the knowledge of how to build some­ thing more powerful than human muscle is a much more attractive than actually being able to move things with one’s body alone.

Another thing that guys should do to transform themselves from scrawny, pale nerds into strong, sensitive jerk.

Girls, try to think of the male macho image as being a homosexual if you spend too much time with women, so avoiding them can be key.

Women, I recommend avoiding any man who takes humor col­ umns in the Tech seriously.

For my final piece advice for the boys out there on being a “Real Man,” I’d like to suggest taking an almost religious inter­ est/obsession with the National Football League. There’s Noth­ ing like watching large men in tight clothing touch each other. Ok, let me rephrase that. There’s nothing like being involved (3) in a fast-hard-hitting sport to make you feel as if you, too, are big, strong, and making millions of dollars.

Ladies, my final piece of advice if you really want to show off your muscles. This can mean wearing tight cloth- ing (make sure it’s the right type though. Under armor is manly, Hello Kitty T-shirts are not). My second suggestion would be to either lift heavy-looking things, or flex. Since the first requires ac- tual muscle tone and/or strength, flexing is often your best choice. Try pointing to things using both arms while tensing all the mus- cles in your upper body, or yawn­ ing while making a fist to show of your rippling upper body. If this quickly exhausts you, don’t wor­ ry, there are other options. While flexing biceps and pecs may tra- ditionally be considered the stan- dard things to flex (and they are), you can also stunt the ladies with a particularly powerful thumb flex or an intense furrowing of brow muscles. Notice stunting is not al­ ways a good thing to do to ladies (sometimes it can even land you in prison!) so be careful to make sure girls are prepared if you’re going to offer these examples of your masculinity.

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I feel a little bit coming on right now.

---

This leads me to my next topic: dueling with yak bones. This gesture either means "hello" or "I'd like to see your mittens on my bed-room roof, baby."

Crumple it up and put it in your mouth. Chew slowly.

---

I think we should talk and try to work out our problem.

---

Rats! I sat down and gave myself a little bit of relief.

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I don't disrespect women's culture.

---

This gesture either means "hello" or "I'd like to see your mittens on my bed-room floor, baby."

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Elbonian Culture Class

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Elbonian has no landing strips. You'll have to jump out of the plane.

---

This leads me to my next topic: dueling with yak bones.

---

We don't respect my work. I can tell by the way he's sitting.

---

They can play this game. I will hate you with the fury of a thousand suns.

---

I'm referring to your utter disrespect for me.

---

Elbonian Culture Class

---

Elbonian has no landing strips. You'll have to jump out of the plane.

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I hate landing in Elbonia.

---

Jeans explore the nature and implications of this disconnect between fantasy and reality.

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The Beckman Political Internship

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The Beckman Political Internship will be available again this summer. The internship, supported by friends of Arnold O. Beckman, will pay a stipend of $5,000. It allows a selected intern to spend the summer working in the office of a politician or a government agency and to see from the inside the process of government. The applicant is expected to make arrangements with the appropriate political persons or organizations. The internship is open to any Caltech undergraduate who intends to be a student next year.

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If interested, submit a proposal describing where and how you would use the stipend along with one faculty recommendation, to the Deans' Office, 210-87, or email machang@caltech.edu, by MONDAY, MARCH 28, 2005.

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decided to use the technique of base isolation. Base isolation, Jennings explained, is analogous to the shock absorbers of a car, and works by reducing the impact or frequency motion. There are two schemes of base isolation, one of which will be selected for the City Hall building. In one scheme, base isolators take the form of large, alternating steel and rubber pads, four feet in diameter. "They can take a large amount of shear horizontally and retain their vertical strength," Jennings said. As a result, base isolation "reduces the natural period of the building significantly, so the high-frequency motions are much reduced." Hundreds of base isolators are placed under the building in this plan. The second type of base isolation uses a stainless steel dish with an angle, and the structure rests on a Teflon pad. During an earthquake, the "building slides, and it goes up, and slides back" due to the restoring force of gravity, Jennings explained. The base isolation technique works on buildings "up to a moderate height," he said. Some people have favored an alternate method: shear wall construction. "There are two problems with that," Jennings pointed out. It does not provide the same earthquake resistance as base isolation did, and it also lacks the seismic components of the building in jeopardy. "People are concerned that the building goes through all this and still looks nice," he said. In spite of its higher initial cost, base isolation proved to be the most appropriate and economical choice. As the time goes on, became more formal, Jennings was appointed chair, and other experience in construction joined. They included Allan Penuih, a Caltech graduate, and a local engineer. "These were people who strengthened the committee," Jennings said. Still, the project was not without complications. "Things were going quite well until a couple of years ago, when the [economic] boom in China changed the price of construction materials," he said. The cost of large construction projects went up about 20 to 30%. In the meantime, new specifications meant more construction to help build­ings meet code requirements. As a result, "there's a lot more business for contractors now, so the bidding environment isn't as competitive as you might hope." Ultimately, for the project, one of which was too high. The consequence was from Clark Con­struction, which had experience with base isolation. "They had done basing for the [City Hall]," Jennings said. In fact, the city hall building projects in cities in California, including San Fran­cisco and Oakland, have undergone base isolation projects. As Jennings explained, "it indicates that the type, base isolation offers itself to be the preferred method of protection, because it does the least damage to the fabric of the building itself." By now, the City Hall renovation project has begun, with con­struction and site preparation are
Unexpressed Smelling Genes Hurt Humans

Continued Page 1, Column 2

to survive. Honeybees also use this property when they release octyl acetate from their nasonov glands. Professor Laurent showed a video clip of a bee shaking its abdomen in order to release this chemical.

Professor Laurent then went over the actual process of odor detection. Air is treated in such a way that it then goes to the nasal cavity, where there are receptors. He explained that one reason for the famous odor-detection abilities of dogs is that their nasal cavity is especially convoluted, increasing the surface area. Cells with cilia line the nasal cavity and send out electrical signals when triggered. In 1991, Linda Buck and Richard Axel proposed that the receptor might look like. There are, indeed, c-gated receptors containing 7 trans-membrane domains. The receptors range in specificity. The most specific receptors tend to be associated with pheromones, or other compounds whose smell are used as signals. The majority of receptors, however, sense a family of chemicals. These receptors then output their results to glomeruli. In addition, one odor can actually trigger multiple families of receptors, leading to a set of activated glomeruli. Professor Laurent then discussed some of the tools available that allow researchers to monitor the neuron activity. He showed a photo of silicon recording arrays, which are essentially micron-sized circuits, which allow the neurons to be part of the circuit. Thus, these arrays are able to monitor when the neurons are triggered. Researchers are also able to use glass micro-pipettes, which can penetrate individual neurons and stain them, allowing the researchers to record their activity.

With these tools, the next question that researchers wanted to answer was whether odors are recognized. Professor Laurent explained one method they devised to use with honeybees. The bees were placed in a harness and then exposed to a puff of odor. They recorded the bees’ initial response to the mysterious odor. They then focused on the odor while simultaneously delivering a reward, a drop of sucrose in this case, equivalent to the nectar on flower. Later, the bee would search the down odor with a reward by moving its antennae toward the odor. This movement of the antennae allowed the team to “quantify the degree of recognition.” A videoclip of this process was shown to the audience. A notable event was when the bee stuck its tongue out in anticipation of the reward. In parallel, a graph of the position of the antennae was measured. One reason that the fly’s antennae also moved towards the odor.

After the neurons, messages are transferred to the Kenyon cells, which are cells in the brain associated with memory. There are more Kenyon cells than neurons, but there are many more possible sets than Kenyon cells. On average, each Kenyon cell has about 900. If there are 900, then each Kenyon cell has about 900 choose 400 combinations, about 10 raised to the 240. At the same time, there may only be about 50,000 Kenyon cells. The temporal patterns, however, actually point to the time that the Kenyon cells were activated.

Professor Laurent also noted that the research on dynamical patterns from the neurons and the Kenyon cells have been done in the past 10 years. In contrast, there has already been decades on olfactory receptors. Professor Richard Axel and Professor Dickson then explained the opportunity to ask any questions. The first question asked whether the olfactory process was different among species, and the answer was that the same receptors are the same, except that some names are different.

Another question centered on the proportion of unexpressed genes. Professor Laurent explained that humans indeed have a high proportion of olfaction genes that are not expressed. In addition, the high variability of the unexpressed genes partially explains the poor smelling abilities of humans. Also of interest was the cause of temporal patterning. The recent finding that the biology of the cells and the membrane properties caused this. In particular, the thin membranes act as capacitors. Continuing with his previous analogy, “Like the billiard balls hitting each other, they bounce back against each other before being stopped.”

Gilles Laurent is the Lawrence A. Houson Jr. Professor of Biology and Computation and Neural Systems. The next Watson lecture, titled “The Language of the Brain”, will be on March 9th and will discuss the infrared universe.