Brown Inauguration Today

by Paul Levin

Today the Caltech community will experience a very rare event: the inauguration of a new President. Only one other inauguration has occurred in the history of the school, that of Lee A. DuBridge, and that didn’t even happen on campus.

The One and Only

Since Robert Millikan refused the title of president, DuBridge’s inauguration on November 11, 1946, is the only precedent for today’s activities. Since rain was a definite possibility at that time of the year, all planning was made for an in-doors ceremony at the Pasadena Civic Auditorium (at Green and Garfield Streets) because Caltech had no large auditorium. This planning was justified; it was really pouring that day. As it was, 1500 people showed up and forty-four schools were represented at the ceremony. Officials from the City and County of Los Angeles and from the U.S. Armed Forces were present, too. The principal speaker of the afternoon was Karl T. Compton, then the President of the Massachusetts Institute of Technology.

Today’s event has been in the planning stage for several months. The date, November 11, was chosen to respect the memory of the Armistice Day of 1918. The day is one of solemnity, reserved to recall the sacrifices of the armed forces. At 10:00 a.m. at the Beckman Mall, but it might be advisable to get there a little earlier (say 9:00 or 9:30). While there will be 4526 seats, the latest attendance estimate is 4653. That figure has got to be low; only 205 students are expected. (This number is based on the assumption that they counted the cards the students filled out at registration.) In order to accommodate many people, the seats will extend from the steps of Beckman to the far corner. Anyone sitting at the back would be advised to bring a pair of binoculars with him.

You Can’t Get ‘Em Up

Activity started bright and early this morning with breakfast at Chandler for the student car parkers, the guides and hosts. Those people were instructed by Bill Bradbury, vice president of the Student Activity Board. Next come the speeches, and then Harold Brown himself will make it suitable for the race (or vice-versa).

Please turn to page eight

The Great Electric Car Race II

Plans for a transcontinental race of low pollution cars are now being made by engineers at Cornell, MIT, and Caltech. Scheduled for September of 1970, the race hopes to be more broadly based than the 1968 Electric Car Race. Entry will be open to any university sponsored car employing “novel means of propulsion, control, or construction” to substantially lower pollution levels due to automobiles. To permit competition between a wide spectrum of vehicles, there will be no unique winner. Instead winners will be announced in several categories such as Transcontinental Time, Minimum Pollution, and Performance.

At the present time, Cornell plans to enter Wally Rippel with an improved version of his Electric VW Bus which narrowly edged out MIT in 1968. MH is working on a hybrid car which will carry a small internal combustion engine for now-urban areas recharging of its batteries. Caltech participants, who do not yet have a car, indicate that they will pin their hopes on modifying an internal combustion engine to make it suitable for the race (or vice-versa).

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Please turn to page eight
More On Moratorium

Throop Lives On!

Problems Worked Over

by Etatios Schroedlu

Did you know that there is an Institutional and Service System now? It is chaired by Dr. Ireland in Chem and includes two. It was an effective and healthy position, larger, under Unger. This is the third year that the number of a draft card society. Among its goals is now being done. Peter Marx, Woodward residence has been through the mill and he can tell you all about it. [ sic] Mr. Marx is currently holding evening sessions on the topic and a third Tuesday of every month in 151 Cell. Stop by and rap with him on your own problems.

There is a special session on December 2 on the problems of the graduating seniors in particular.

Lyman Bonner thinks that all classes on Inauguration Day should be cancelled. The situation with female admissions is still up in the air. This knows exactly what will come out or who will come in. The Admissions Office has been working on a plan to increase the number of female students. The Institute feels that $750 per room will be enough to retrain, rewire, replumb, and the undersigned writers. All letters received by 6:00 p.m. Monday evening will be considered for publication on a FIRST BASIS.

Barber Shop

The Drive is being run by the Teamster's Caltech Physical Plant Organizing Committee, with Vigil Farnsworth, a carpenter, as chairman. The unionization drive began with the following letter, dated July 22, 1969:

Dr. Lee A. Dufraid, President [ sic] California Institute of Technology
1201 E. California Blvd.
Pasadena, California

Dear Sir:

Please be advised that the following listed employees of your organization are members of the Teamsters Cal Tech Physical Plant Organizing Committee and shall perform acts in accordance with their legal rights in an effort to establish the Teamsters as the appropriate representative. Virgil E. Farnsworth—Chairman George Sopko—Vigil Jimmie Childress Henry F. Engly Frank Wheeler Ruel Ocel Parvin Harpster Ronold Kibbee

Monroe Kirkpatrick

This Committee's objectives shall be concentrated among employees classified as: Electrician, plumber, carpenter, laborer, heat & vent, paint shop, grounds and heavy equipment.

We further request that your firm post copies of this communication on employee bulletin boards in the following listed areas of the Plant:

请转到第7页

LETTERS

More On Moratorium

Security Officers Defended

by Carroll Bowrell

About three weeks ago I wrote an article on the Security Officers at Caltech, I had intended to follow it up immediately but the scene has taken longer than I expected.

The letter by Mr. Strook in the Tech two weeks ago said many things I would like to clarify. Mr. Strook would have me take a limited view of the Honor System as a whole. He seems to be saying that the Honor System is a method of establishing good relationships within the student body.

However, the Honor System is non-simply a way students relate to one another or to the faculty. It is not a Caltech concern which is concerned mainly with Caltech itself. The Honor System is to survive in all, it must be virtually a way of life, on campus and off; it must be a way of relating to the outside world as well as to Caltech itself.

There was a time when Caltech was a world in itself. This is no longer true. The entire Caltech, or at least the Institute is admitting that the admission of women is still up in the air. No one knows exactly what will come out or who will come in. The faculty needs student input on this question of this kind and welcomes it from interested individuals and through their elected governments.

-R. F. Chitty Chairman of the Faculty
Is That Where I Said I Lived?

by Larry Goldman
Did your job acceptance arrive on campus three weeks late, two weeks after you told your "boss" where to go? Did Aunt Jane's cookies taste like concrete because they too were way past due? If these are your problems, cheer up, they're shared by many on campus. Just don't make any bets that they're the fault of the Caltech mailroom.

This receiver and sender of good and bad news is located in the Business Services Building on California near Wilson. They annually handle some three million pieces of mail, going to and coming from the furthest extremes of the Tech campus. And contrary to popular belief they make few blunders.

Headache Houses

The mailroom's biggest headache tends to be the students houses. (Isn't everyone's?). Mr. Paul Bradford, the mail room supervisor, said that he cannot overemphasize the importance of using the correct addresses provided for students on campus three weeks late, two weeks after you told your "boss" where to go? Did Aunt Jane's cookies taste like concrete because they too were way past due? If these are your problems, cheer up, they're shared by many on campus. Just don't make any bets that they're the fault of the Caltech mailroom. This receiver and sender of good and bad news is located in the Business Services Building on California near Wilson. They annually handle some three million pieces of mail, going to and coming from the furthest extremes of the Tech campus. And contrary to popular belief they make few blunders.

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End of Laugh-In In Sight

by Bruce Reznick

All signs point to the demise of Laugh-In, possibly as soon as next fall. This startling observation is the only conclusion which can be drawn by several recent events. First, and, by far, most importantly, Paul W. Keyes, head writer, and producer, resigned last week in protest of what he called "Laugh-In's vulgarity and slantedness." The importance of Keyes' departure can not be overestimated. In addition to the obvious decline in morale, Laugh-In will lose a needed balancing voice, and great influence in Washington. Paul Keyes in a conservative whose viewpoints have kept Laugh-In from swinging so far to the left as to lose a great part of its audience.

(Contrary to popular belief, the Smothers Brothers were axed because their ratings had slipped to the point where their opinion needed no longer to be tolerated by the CBS brass.) Paul Keyes was also a very close friend of President Nixon and was at one time rumored to be in line for a post with the FCC. Undoubtedly Keyes' influence kept Laugh-In from being harmed by the Pastore investigations.

In addition to the Keyes' departure, several other key performers have already left, and several others are indicating a readiness to leave. Dave Madden, Dick Whittinghill, and Chelsea Brown are already gone; and Judy Carne is not filling any more episodes. Artsy Johnson is preparing his own show for January; Jo Anne Worley is dusting off her old night club act. (She has already appeared on Ed Sullivan.) Finally, Goldie Hawn has made "Cactus Flower" with Walter Matthau and Ingrid Bergman, to be released in December, and is now asking $150,000 (!!) for her next film.

These are the key holes in the wind which indicate to me that the days of Laugh-In are numbered.

You DON'T??

by Phil Neches

"Every father's daughter is a virgin" proclaims the subtitle to Goodbye, Columbus but Philip Roth, the author of the novela from which the film was made, knows differently. Goodbye, Columbus deals with the foibles of the Jewish nouveau riches. All of the sub-stereotypes can be found in it: the over-eaters, the fawners, and all of the rest.

Goodbye, Columbus amalgamates the snide comments Jews make about one another into a single film. Every character in the movie probably has dozens of equivalents in reality, but the entire atmosphere of the film reflects the positive things people can do: the characters, or many of them, are little more than stereotypes which one sees and then says, "How gross.

The film is also wildly funny in parts, sardonic in others, and blackly farcical in still others. Sometimes, it seems that Roth's humor resorts to the broadsword when it should use the rapier.

Goodbye, Columbus will soon be released for general distribution after a long and successful exclusive run at the Comix Theatre in Westwood.

GIGANTIC SWEATER SALE

Gold Room
Civic Auditorium
Green & Garfield
November 6, 7, 8
10 a.m. - 9 p.m.
Prices $1.99 - $3.99

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State of the art is where we start... you take it from there.

Because systems are our only product, futures are our stock-in-trade. The jobs we like are not cut-and-dried problems with textbook solutions within easy reach, but jobs with a tough creative challenge. And they're coming to us in increasing numbers...long-pull civilian and military contracts for the design, development and integration of complex systems. Like the Navy's Poseidon, the Coast Guard's

SYSTEM ANALYSIS AND DESIGN ENGINEERS
PROGRAMMERS
FIELD ENGINEERS
PUBLICATIONS ENGINEERS and EDITORS

B.S., M.S., Ph.D., or E.E. in Engineering, Science, Math, Physics, or Computer Technology

Become a part of a professional staff that regards continuing education as the essence of success. You'll have access to the many graduate schools in our area; you'll participate in our over fifty in-house graduate-level courses; you'll enjoy sailing, fishing and swimming on suburban Long Island; and you'll delight in the exciting entertainment world of nearby Metropolitan New York. We are an equal opportunity employer.

INTERVIEWS ON CAMPUS

NOVEMBER 6, 1969

We're looking forward to meeting you!
Thursday, October 30, 1969

THE CALIFORNIA TECH

Page Five

Jennings Lectures

At Beckman

Last Monday, at Beckman Auditorium, Dr. Paul C. Jennings of Caltech, an internationally known expert on earthquake engineering, gave another lecture in the Monday omni series, entitled, “Earthquakes and Toll Buildings.” According to Dr. Jennings, tall buildings are not as great earthquake hazards as are generally believed. Much research has been done due to the effects of earthquake stress on buildings of more than 30 stories, research which has been hampered by the lack of much actual data. Known and simulated earthquake stress patterns are placed upon a computer and acted upon models of known buildings. Buildings designed to withstand completely earthquakes of a size which can be expected several times during the life of the structure. The extraordinary shock, minor structural damage of buildings can be easily repaired in situ practice, wind stress can be twice as great as proposed earthquake stresses. In conclusion, Dr. Jennings said that tall buildings are generally safe and that more research is needed to determine whether or not the safety of a building can be improved.

By Pearl Fleischman

A contemporary rock group comes to Caltech’s Beckman Auditorium on Thursday, October 30, beginning at 8:30 p.m. Four young men with a little of musical talent and calling themselves The Harpers Bizarre, will sound off with some early rock hits and then move into the “soft rock” sound which the group made so popular.

The Harpers Bizarre, comprising Ted Templeman (lead singer), Dick Yount (bass guitar) and John Peterson (drums), shot into the national charts with their first record “59th Street Bridge Song” in January, 1967, and have not stopped since. This West Coast group has gone out on a limb for good contemporary music with much flair, and they have made it successful.

As a continuation of the inaugural festivities, Harpers Bizarre, shown above, will invade Beckman tonight at 8:30.

— pearl fleischman

MAD Strategy?

Reprinted from Ramparts.

For more than twenty years, the U.S. and the Soviet Union have been trying to outdo each other in piling up more and bigger nuclear weapons against which there is no defense. Their military strategy has been grounded in defense by “deterrence.” The phrase of this modern military game is the “Mutual Assured Destruction” or MAD strategy.

As some defense scientists have had the wisdom to point out, the dilemma of steadily increasing military power and steadily decreasing security…has no technical solution. After spending the incredible sum of $1,300,000,000,000 and diverting uncountable human and physical resources to “defense,” the former assured power is less secure against catastrophe with every passing year.

Technical Solution

But the dream of a technical solution dies hard. A few years ago it was the fallout-shelter; today it is the ABM. According to all the available evidence and systems capable of meaningful protection is pure myth. But even if it were a dream that was possible, how long would it only be the beginning—not the end of an even more self-defeating arms race (in the context of circumventing any nuclear defense ready to go)?

Although nuclear arms hold center stage today, more novel and menacing weapons are waiting in the wings—CBW and soon geophysical, “environmental wrecking” missiles of warfare. The existence of true nuclear invulnerability would almost certainly make open warfare, frightful thought it to be, water over the dam. The real issue is the existence, “instantaneously obsolete; but military strategy could then be based on silent, subtle techniques of subjugation. The bomb could be concealed by the aerosol spray, mixed with replacements by weapons modeled on natural cataclysm. A vast new terrain, only scouted as yet, could then be justifiedly explored by the “strategic calculators,” or those thinkers-about-the-unthinkable.

It is highly likely that an effective ABM, far from being an insurance policy would usher in a nightmare era of stupidity, insensitivity, and psychologically devastating horror, a million times the international paranoia, for it would be impossible to know whether to use it or not. The CBW armory is essential as a “deterrent.”

In a technological anamol, all chess are cheap, easy to make, and easy to use. Should the shaky refuge of the nuclear arsenal be cheap, easy to use, and heat the collapse of mutual deterrence, such weapons would be a tempting option, especially for a weak or desperate nation?

But a new and more terrifying option is a second option as a means either of outright subjugation, or of poisoning economic supremacy—the option of insuring a peaceful environment for itself while disturbing the environment of its competitors through geophysical warfare. Talk of geophysical weapons sounds like science fiction today, but such weapons are foreseeable within the next 15 or 20 years. It is already clear that in principle it might be feasible to trigger an earthquake of the magnitude of the 1964 Alaska quake by setting off remote explosions in the China Sea; to create tidal waves by ripping holes in the continental shelf; to create a new ice age by redating the Antarctic ice cap. In the 1960’s it may well be possible to use chemical or physical means to destroy the protective ozone layer of the atmosphere over a selected area, thus allowing it to be harassed by the intense ultraviolet rays of the sun. Natural low-frequency electrical oscillations in the earth’s atmosphere could be increased, decreasing the efficiency of electrical activity in the brain is concentrated at certain frequencies, an adversary could seriously impair brain performance in a very large segment of a population.

It is tempting to close one’s eyes to such a sinister prospect. It is tempting to look for arguments that prove it false. One such argument is that no nation would dare use such a physical assault on another for fear of endangering itself. That argument is hollow. Out of sheer carelessness and greed, flushed with technological insecurity, irrational national obsessions are already polluting the entire earth’s biosphere in ways that are not only permanent and permanently damaging than mere drought, flood, or other natural disasters, but which may be more likely, then that the defense technologies.

Please turn to page seven

Petition to Control Pollution

Petition to

Control Pollution

PEOPLE’S LOBBY, INC.

558 S. Hill St.
Los Angeles, California 90012

Phone: (213) 461-3071

County, State of California. All of the signatures were made in my presence and upon the date shown after each signature, and were solicited by me in the above named County.

An Amendment to Article I of the Constitution of the State of California, relating to pollution. The People of the State of California do enact as follows:

SHALL NOT BE PLACED ON INDIVIDUALS.

1. All persons have the inalienable right to live in an environment which the group made so popular.

2. Control Pollution Petition to

Initiative Measure to be submitted directly to the electors

INSTRUCTIONS FOR COMPLETING THIS PETITION

1. Circulator must be a registered voter in the county in which he/she obtains signatures.

2. Each petition to be signed for shall be in the county where the petition is prosecuted.

3. Petitioners must sign the petition at date and place of signing.

4. The address should be printed. Do not use P.O. Box Numbers.

5. Petitions are circulated for invalid purposes shall not be printed.

6. Signer must sign own name and date in his/her own handwriting.

7. The address should be printed. Do not use P.O. Box Numbers.

8. Date, Phone, Address, Town, County, State of California. All of the signatures were made in my presence and upon the date shown after each signature, and were solicited by me in the above named County.

I am the person who circulated the attached and foregoing section of the petition of which said section is a part and who solicited the signatures to said section. I have circumscribed the section in County, State of California. All of the signatures were made in my presence and upon the date shown after each signature, and were solicited by me in the above named County.

I declare under penalty of perjury that the foregoing is true and correct.
Gridders Hand San Diego 20-6 Victory

The Caltech Beavers football team was defeated by the University of San Diego by a score of twenty to six Saturday in the Beavers’ first game away from home.

The Beavers opened up to be evenly matched with the Toreros early in the contest. However, San Diego managed to block two of Caltech’s punts in the first half and convert each of them into a score. San Diego took advantage of one of the blocked punts to score a first period touchdown. In the second quarter the Toreros gained a safety to lead eight to nothing at half time.

Caltech’s opponents from down South scored one more touchdown in each of the last two periods, yet they continued to fail in their attempts at conversions. The toreros ended with a final tally of 20 points.

The Beavers scored their touchdown on a spectacular 39 yard pass play from quarterback Bob Blake to halfback Gary Stormo. Stormo’s pass for the extra point fell incomplete. Tech’s score came in the final stanza.

Looking at some statistics, we find that San Diego had 16 first downs to the Beavers’ eight. USD gained 112 yards on the ground and 176 in the air. Tech lost four yards rushing but gained 91 passing. Caltech travels to La Verne this Saturday for its fifth attempt at winning a football game this year. The contest will begin, as usual, at 1:30 p.m.

Pomona Trips Cross-Country Runners 22-33

by Martin T. Smith

Pomona defeated the Caltech cross country team Friday 22-33 in the final Caltech home meet of the season.

Bob Johnson and Rich Johnson tied for first for Pomona. Gary Pope led the Caltech team, taking third, despite having a sore knee. Close behind Pope followed Watson of Pomona, Smith, and Higgins (both Caltech), respectively. Tarantino (9th) and Almquist (10th) completed the Caltech scoring.

Four of the top six Beaver runners ran their best times this year for the home course, and Pope came quite close in view of his painful knee.

Dave Evans, a promising frosh, led the Pomona team in the race. Evans was the third man finished this week with a foot infection and was unable to run, spending the weekend in the health center.

Tomorrow the Caltech team travels to face a very tough Redlands team.

Beavers Resurface to Beat Pomona After Loss to CHM

by Mike Stefanko

The water polo team once more split the work into the bad and the good (always the ugly?). Wednesday, Tech let themselves be manhandled by an aroused squad from CHM. Tech grabbed the first score on a fine offensive play by Steve Sheffield, but a laggardo defense and poor passing enabled CHM to bounce back and dominate the second quarter. Tech fought back and played evenly the second half, but couldn’t make up the deficit, losing 6-2.

Friday at Pomona, the whole story changed, although the score stayed tied for nearly three quarters. Tech completely dominated in passing, swimming, and hall control. Only the fantastic playing of the Pomona goalie, prevented Tech a rout. With Stefanko stymying the opponent’s hole man, and Coates, Tyson, and Hall pressuring the passers, Sheffield and Larry Watkins were able to shoot often. The final score was Tech 5, Pomona 3.

Coins Collect

On Wednesday, October 15, Walter Fritsche and Edward Tarantino of Football Coin Shop in Tujunga, Calif., presented a numismatic travelogue to the assembled members and guests of the Caltech-JPL Numismatic Society. Mr. Fritsche and Mr. Tarantino described a recent two-month tour of Europe, with a particular emphasis on their visit to the USSR. Coin and currency specimens were displayed and slides of both general and numismatic interest were shown.

On Wednesday, November 19, Elizabeth Case will speak on “Tokens and Medals.” Mrs. Case is Vice President of the California Exonumist Society, Recording Secretary of C.O.I.N., and Recording Secretary (soon to be President) of the West Valley Coin Club of Los Angeles.

Membership in the Caltech-JPL Numismatic Society is open to all Faculty and Students of Caltech and to all employees of Caltech and JPL. In addition, associate memberships are available to members of the families of the above. The Society meets on campus in Church Lab at the corner of Wilson and San Pasqual. Meetings are held on the third Wednesday of each month at 7:30 p.m. Visitors and guests are always welcome (whether eligible for membership or not) and refreshments are free. Door Prize drawings and a coin auction are held each month.

Truth is, it would be comparatively easy.

But we want somebody with more than a pot answer for everything.

We need electrical engineers, physicists, mathematicians and systems analysts who can think creatively and speak their minds.

People who can think logically about solving communications, radar or information systems problems for the defense of the free world. Or technical men who can think creatively about solving problems in air traffic control or urban mass transportation systems.

You won’t find any yes men coming up with the answers to these complex problems.

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November 11, 1969.

If we want a robot who answers "yes" all the time, we’ll build one.
The seldom told troll tale

Once upon a time a troll named Todd and his wife Beverly lived under a couple of bridges. Todd made his living by collecting a toll from those who used the bridges to cross the river. Many of the common folk were so poor, however, that they could only afford to pay him a few pennies. One day, Beverly got fed up with his meager earnings. "Todd," she said, "I'm fed up with your meager earnings. Why can't you collect quarters like normal trolls do? Or dimes, or even nickels instead of just pennies. I mean, come on, let's do this properly!"

So Todd grudgingly collected quarters from the travellers and stored them in a crock under his bed. But Beverly, who was a real ogre, continued to nag him. "Todd," she nagged, "why don't you take your slack down to Security Pacific Bank?"

"What would they want with my crock?" he asked. "I mean take the money down there. It'll be safe, and we'll get interest. Maybe you can even open a joint checking account."

Well, Todd may have been a troll but he was no doper. So he hied himself over to the bank with his crock of quarters and opened an account. Soon their standard of living rose. They refurnished their dwelling in Early Swamp and began eating more than just stray goats. Then one morning Todd arose to go to the bank and crashed through the bridges. But that was to be expected. For as everyone knows, if a troll gets a little extra weight, he's bound to get too big for his bridges.

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Liquefy Petroleum!

Continued from page one

Caltech's decision to use a modification of a conventional engine came at a meeting on October 21. Students Mike Lineberry and James Henry presented results of conversions to Liquefied Petroleum Gas (LPG). Because of the more simple chemical structure of this fuel, cleaner combustion is achieved. In addition to the clean exhaust, LPG offers improved engine life, better economy, smoother operation, and virtually no reduction of power. Calling the very substantial existing technology for the conversion, Lineberry and Henry easily convinced listeners of the potential of the approach. Faced with the short time remaining for development, the Tech group voted to move forward quickly with an LPG or similar conversion.

Currently involved in Caltech's effort are about 10 graduate and undergraduate students and professors Sabensky, Shapiro, and Welch as faculty advisors. Rumors that Ambassador College will make a dark horse entry with a stage coach are being denied by all concerned.

I.H. Softball Results

The final standings in the Interhouse softball competition are as follows:

<table>
<thead>
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<th>Team</th>
<th>Points</th>
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<tr>
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<td>Lloyd</td>
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<td>Ricketts</td>
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<td>Ruddock</td>
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Coffeehouse doings

Thursday, October 30.
The Coffeehouse will be open one hour later for those who want a place to sit in after Harper’s Bizarre.

Friday, October 31.
Free drinks for those in costume. Free trick-or-treat candy for all.

Help Wanted

Great opportunities available for eager young reporters capable of writing large quantities of news. News does not need any basis in fact—only to fill space.

Earn graft, corruption, fame, fortune.

See your name in print

Prevent stupid space filler like this

Venture: Purify water with the fiber that made men whistle.

Nylon. Reverse osmosis.

A fiber that started making girls’ legs more beautiful some 30 years ago. And a process that’s been around a lot longer. But when Du Pont scientists and engineers look at them in a new way, they combine into an idea that can change the world.

Reverse osmosis is a purification process that requires no phase change. It’s potentially the cheapest way to desalinate water.

Du Pont’s innovation? Hollow, semipermeable nylon fibers much finer than human hair. Symmetrical, with an outer diameter of .002 inch and a wall thickness of .0005 inch, with an accuracy of manufacture maintained at close to 100%. Twenty-five to 30 million of them encased in a precisely engineered unit 14 inches in diameter by 7 feet long.

The result: a semipermeable surface area of about 86,000 square feet—the size of a 3-acre lot—and up to 10,000 gallons of desalted water per day.

So far “Permasep” permeators have been used experimentally to purify brackish and polluted water, and in various industrial separations. But the potential to desalt seawater, too, is there.

So Du Pont scientists and engineers are even now working toward improved fibers, units and plant designs that should make it possible to get fresh water from salt at a price that any town or nation can afford.

Innovation—applying the known to discover the unknown, inventing new materials and putting them to work, using research and engineering to create the ideas and products of the future—this is the venture Du Pont people are now engaged in.

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An Equal Opportunity Employer (M/W)
Dr. Murray Gell-Mann, professor of physics at the California Institute of Technology, was awarded the Nobel Prize in Physics, the Caroline Institute in Sweden announced Thursday, October 30.

Dr. Gell-Mann, who is Robert Andrews Millikan Professor of Theoretical Physics has made major contributions to understanding what matter is made of. He has sought to bring order out of the chaos generated by the recent discoveries of some 100 particles of the atom's nuclei.

His Nobel award, according to the Royal Swedish Academy of Science, is for his "contributions and discoveries concerning the classification of elementary particles and their interactions." He is credited with doing "fundamental..."
Only Your Quantum Mechanic Knows For Sure

Caltech's Previous Nobel Laureates

Robert A. Millikan .... 1923, physics
Thomas Hunt Morgan .... 1933, medicine
Carl D. Anderson .... 1936, physics
Edwin D. McMillan .... 1951, physics
Linus Pauling .... 1954, chemistry
William Shockley .... 1956, physics
George W. Beadle .... 1958, medicine
Donald A. Glaser .... 1960, physics
Rudolf Mössbauer .... 1961, physics
Charles H. Townes .... 1964, physics
Richard Feynman .... 1965, physics
Max Delbrück .... 1969, medicine

What is strangeness?

There are "four kinds of forces, which are presumably responsible for all natural processes. Two have been familiar for a long time: gravitation and electromagnetism. Then there are the two forces or interactions discovered in the twentieth century: the weak interaction, and the strong interaction." So said Dr. Murray Gell-Mann, who has devoted his intellectual life to understanding "microscopic" physics: the science of the universe in its smallest units.

Dr. Gell-Mann has been in the forefront of one of the most exciting fields of human knowledge: elementary particles. His list of accomplishments in that field is impressive, indeed, it reads almost like a roster of the advances in particle physics in the last fifteen years. Dr. Gell-Mann and Dr. Ya'el Ne'eman independently arrived at the "eight-fold way," which represents a first major step in making sense out of the profusion of sub-atomic particles.

The "eight-fold way" is sometimes compared to the periodic table of Mendeleev, which probably amounts to an overstatement. The eight-fold way does not make the same complete sense of nuclear interactions that the periodic chart made for chemical ones; rather, it is a step towards organizing known data. Just as quantum theory explained the why's and wherefore's of the periodic chart, physicists are now seeking a theory which will explain why the eight-fold way works.

One explanation may be quarks, which, for the moment, are just mathematical conceptions. A quark has 1/3 unit of mass, and a charge of either 2/3, 1/3, or -1/3. One experimenter claims to have actually detected a quark, however, his results have not been duplicated.

The greatest triumph of the eight-fold way has been the prediction of the existence and properties of the omega minus particle. Dr. Gell-Mann predicted its existence in 1961, and the Brookhaven Laboratory discovered it in 1964.

The omega minus particle has a strangeness of +3, which leads to an interesting question: just what is strangeness? Nobody quite knows for sure. Particles can be assigned "strangeness numbers" and generalizations can be made about how these strangeness numbers behave in interactions, but the whole concept of strangeness can only be comprehended as another mathematical conceptualization, one which Dr. Gell-Mann was prominent in formulating.

To add to the snow job, Dr. Gell-Mann has worked in the fields of dispersion relations and the structure of weak interactions. He developed the theory of strangeness, the theory of natural K mesons, and the eight-fold way theory of approximate symmetry.

The list of honors which have come Dr. Gell-Mann's way seems equally impressive. He holds a BS from Yale and a PhD from MIT, and has won the Lawrence Award, the Franklin Medal, the Research Corporation Award, the Curtis Medal of the NAS, and doctorates from Yale, the University of Chicago, the University of Illinois, Wesleyan University, and the University of Turin.

Dr. Gell-Mann has been with Caltech since 1955, and has been a professor here since 1956. He serves as a consultant to the Institute for Defense Analysis, RAND Corporation, and Los Alamos, and is a member of the President's Science Advisory Commission.

At forty Dr. Gell-Mann has earned the respect and admiration of his colleagues, and of the world at large. His life has been an intellectual adventure to the frontier of human knowledge and beyond. Yet many fundamental questions remain unanswered. Some of the questions have been raised by Dr. Gell-Mann himself. What is the fundamental unit of matter? How do particles interact? What is the mechanism behind the eight-fold way?

The prospects are exciting, the way uncertain. Perhaps there is only one certainty in the field: Dr. Gell-Mann will be there, seeking an ever deeper understanding of how our world is put together.

---

Dr. Murray Gell-Mann prepares for Harold Brown's inauguration as Institute president.
Gell-Mann Meets the Press

by Ira Moskatef

"Well, I have a vague recollection of a bell ringing, and somebody mumbling something about Sweden and Elementary Articles." That was what Murray Gell-Mann, Professor of Theoretical Physics and Caltech's most recent addition to its list of Nobel Laureates, answered when asked how he was notified of the prize.

The Caroline Institute was even more inconsiderate in their notification, than in their last announcement, forgetting about the Daylight Saving time and allowing the wire services to notify him at 3:30 in the morning. Dr. Robert Bacher, provost and former chairman of the Department of Physics, introduced Dr. Gell-Mann at a 9:00 a.m. press conference, remarking that Dr. Gell-Mann was noted for his "sense of timing."

The prize, given to Dr. Gell-Mann, was for "his contributions to the examination of the classification of elementary particles and their interactions." He described his work as "trying to explore the building blocks of the universe ... which make up the laws underlying all of the natural sciences." If the final goal of his work could be characterized, he said, it would be "trying to find the relations between the laws governing macroscopic and microscopic phenomena."

A television reporter asked "Dr. Quark" (really!) how one went about seeing the particles. "You would have trouble seeing them results of his experimenting colleagues. He reported that the Soviet Union now has the most powerful accelerator and that in 1972, in Illinois, the United States would have an even more powerful device.

The last part of the conference was devoted to the applications of his discoveries. Dr. Gell-Mann expressed the hope that his colleagues would make an effort to consider the possible ill effects of applications of high energy physics in the future, but stated that none of his work was concerned with the development of weaponry. Dr. Gell-Mann is subsidized by grants from the Atomic Energy Commission, as are many of the Theoretical and Users group members on campus.

How would the recent cutbacks in Federal spending affect him? Dr. Gell-Mann only expressed the concern that such cutbacks might hinder the progress of his research.

When asked what he had been doing, he replied, "There seems to be a conspiracy to keep people who know things from doing anything more.

"If my research would have to the world was "We can all remember that we're made of all these particles. There'll be no new electric shoe polishers, if that's what you mean."

His final remark: "I hope I'm not upstaging Harold Brown."

It's In The Dictionary!

Quarks For The Common Man

The following is a synopsis of the work for which Dr. Murray Gell-Mann won the Nobel Prize:

One of the most baffling phenomena of modern physics is the multiplicity of subatomic particles generally described as "elementary." For many years the term was reserved for the proton, the electron, and the neutron, but in the past two decades, high-energy accelerators—employed in the bombardment of atomic nuclei—have produced something over a hundred particles that are still regarded as "elementary."

In an attempt to bring some order out of this chaos, physicists have searched for relationships that would at least enable them to classify the particles. The hope has been to produce a theoretical structure comparable with Mendel’s periodic table of the elements. By far the greatest breakthrough in this effort is Dr. Murray Gell-Mann’s theory known as the Eightfold Way. (This theory was advanced independently in 1961 by Dr. Gell-Mann and Dr. Yuval Ne’eman of Tel-Aviv University). It provides a scheme for classifying certain of the subatomic particles into several families of eight or ten members each, according to such characteristics as spin, parity, and electrical charge.
not, and could not account for all the properties known. Specifically, the reasons for strong and weak interactions were not fully understood. Dr. Gell-Mann mathematically analyzed the situation, and discovered that a fifth quantum number was needed. This quantum number was directly related to the "strangeness" of a given particle. Dr. Gell-Mann and Dr. Kahuziko Nishijima of Japan independently determined this quantity which they called strangeness.

Quark" (really!) how one went about seeing the particles. "You would have trouble seeing them with the naked eye." The same reporter asked him to describe the "quark," one of his inventions. "The quark may not be," he said, continuing on to explain that it was a mathematical tool which proved extremely useful. Whether or not it exists, he explained, was immaterial.

Gell-Mann described himself as working "with pencil, paper, and a wastebasket," trying to predict the properties for strong and weak interactions were not fully understood. The quark may not be," he said, continuing on to explain that it was a mathematical tool which proved extremely useful. Whether or not it exists, he explained, was immaterial.

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When the known particles were arranged according to this scheme, one family that should have had ten members was found to have only nine; one particle required by the theory was missing. A team of 33 scientists at the Brookhaven National Laboratory set out to look for the missing particle, using the 33 BeV proton accelerator, and since the theory predicted all the properties of the missing particle, they knew exactly what to look for and where to look. Their discovery in January, 1964, of the missing particle, called the Omega Minus, was widely hailed as a striking confirmation of the Eightfold Way theory — indeed, as a "crucial test" of a theory that could mark a turning point in particle physics.

From The American Heritage Dictionary of the English Language: quark (kwôrk) n. Physics. Any of three hypothetical subatomic particles having electric charges of magnitude one-third or two-thirds that of the electron, proposed as the fundamental units of matter. Also called "ace." [From a line in Joyce's Finnegans Wake, "three quarks for Mr. Marks."]