

Physics	2
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Volume LXXII

Pasadena, California, Thursday, March 11, 1971

by Paul Levin

Systems Engineering will be the

What makes this course truly

Number 21



Professor Norman Daivdson makes a point in yesterday's Chemistry and Society seminar on "The Future of Chemistry." -Photo by Fisher

News Briefs

Vista Information Available

Dr. Donald S. Clark, Director of Placements, announced yesterday that complete information about, and information for, Volunteers in Service to America (VISTA) is now Center (23 Throop).

VISTA is holding a recruiting

session will be to adopt a budget for the new fiscal year, from March 1, 1971 until February 29, 1972.

All clubs, organizations and BOD members who desire to receive available at the Student Information funds from ASCIT are required to treasurer, Tom Matoi, in care of

Applications for Resident

Dr. David Smith, Master of Student Houses, announced that applications for the positions of Resident Associates in the undersubmit a budget request to the graduate student houses for next year. Faculty and graduate students, married or single, may apply. All interested parties should contact Dr. Smith at the office of the Master of Student Houses on the Olive Walk by Lloyd House before March 20. The extension there is 2194.

Auditorium is named), will speak at the first session, Tuesday evening March 31 in Ramo Auditorium.

Star-Studded Cast

On the following Tuesdays speakers will include Dr. C. West Churchman, Professor of Business Administration, University of California at Berkeley; William Pickering, Director of Jet Propulsion Laboratory; Dr. Ronald Howard, Professor of Engineering-Economic Systems, Stanford; Dr. Ward Edwards, Head of Engineering Psychology Laboratory, University of Michigan; Dr. Robert Machol, Professor of Systems, Northwestern University; Dr.

at a daily charge of 10 to 50 cents

per record. Members will also be

able to obtain records for their own

collections at wholesale prices

self-supporting; all dues and fees

will be used to buy more records.

These will be purchased according

to the member's suggestions and

wishes. To help start the library off

ASCIT and GSC have donated \$280

albums and is adding to its collection at the rate of ten per

week. It is also receiving free

samples from major recording firms.

members should contact David

MacQuigg or inquire at the YMCA

Persons interested in becoming

Currently the library has 30

The library is non-profit and

through the library.

to buy records.

office.

Pop Record Library Formed

Lovers of popular music and the stereo system, or check albums out

Henry Rowen, President of Rand Corporation; Dr. George Mueller, Senior Vice President of General Dynamics Corporation; Dr. Philip Morse, Professor Emeritus of Physics, Massachusetts Institute of Technology; and Dr. Robert Boguslaw, Professor of Sociology, Washington University.

Systems What?

Systems engineering differs from 'ordinary engineering" in the scope of its concern. Because it attempts to consider the benefits and costs to the firm, the customer and to society in general, one might think of it as humanized engineering.

For example, if you merely design a supersonic passenger aircraft, you are doing engineering. If, in addition, you add to your group experts to consider its usefulness and cost (present and future) to the airlines and to society, its safety, its air and noise pollution levels, its psychological impact on the crew, passengers, and others who will have to put up with it, you are doing systems engineering. You are designing a whole, considering all of its interactions. As a further example, systems engineering would concern itself with the "optimum" allocation of expendable natural resources such as oil or helium.

All this and credit too?

With no midterm, no term paper, and no final, Ae 241 will have its grade based on attendance and performance on forty homework problems. Even so, it will not be a cinch course. It will, however, guarantee those enrolled a seat for the lectures (attendance is expected exceed seating capacity) and to Continued on Page Six

Kitchen Chemistry

Associates Being Accepted

Membership in the library is

be entitled to listen to any of the

library's records on the YMCA

program which will last through March 19th. The organization offers the opportunity of doing some actual good, working with the nation's disadvantaged for a year. Volunteers receive living expenses and an additional \$50 per month, paid at the end of service.

Dr. Clark stated that there were no requirements for eligibility, but said that persons under 20 usually were not considered qualified.

BOD Accepting Third **Term Budget Requests**

The recently elected ASCIT BOD will meet for a budget-planning session during the first week of third term. The purpose of the Page House, by Monday, March 29. Greater consideration will be given to those requests which are accompanied by tentative budgets which outline the need for ASCIT money. At the meeting, the BOD will decide whether or not it will curtail funds to clubs in order to place more emphasis on other areas, e.g., increased funds for house activities.

Eat It Dig Department **Closed for Finals**

The Caltech Coffeehouse will be closed starting Sunday, March 14, for the duration of finals week and spring vacation. It will be open for third term starting Registration Day, according to the managers.

Earth Day Victim of Apathy

We have received the following communication: "OBITUARY Earth Day, 1971. Age: 1, of Caltech, Pasadena, passed away March 4, 1971. Cause of death: Apathy. Was beloved child of Ecology Movements World Wide and CEAC.

"Memorial services have not been requested as yet."



Speaking to a mixed audience in Winnett Lounge vesterday, Mrs. Marjorie Caserio described her life as a chemist and a housewife as part of the Women in Science Series sponsored by the Caltech Y. -photo by Fish

The Third Wing

Guest Editorial Continued Rapport Urged

Dear Mr. Suber,

We regret the loss of Ken Charles to the Security Force. We feel that officers such as Ken and Russ Thyret have done much to improve and maintain good student relations. It is heartening to note that this good relationship is being maintained by the remaining officers even through this period of change.

We are particularly interested in seeing that Ken's successor continues the trend set by the current security force. It is of the greatest importance that the new head of the force be a man who has as good a rapport with the student body as any of our present officers. Without the kind of concern for the students that presently exists, our security force would be much less effective than it is now. Our present officers are sociable, efficient and dedicated. Any candidate for Ken's position who does not meet or exceed our officers in all these qualities will be a poor choice, no matter how well qualified he may otherwise seem to be.

We would like to see any members of the student body who have comments about the present or future security force to express them at this time. We have always had (and still do have) good communications with the security force. Now is the time to exercise this rapport.

> Sincerely, Alan Stein Phil Neches Paul Levin

Now You Have to Hate Them All

by Nick Smith

For those of you who failed to notice, the U.S. Supreme Court made a major decision on Monday, and I don't mean the one about "I Am Curiouss, Yellow." By an 8-1 vote, the court ruled that proper interpretation of the Selective Service laws requires a conscientious objector to be opposed to all, repeat ALL wars, in order to be granted an I-O status.

The implications of this ruling are significant in that it will be even more difficult to get conscientious objector status. In addition, this new ruling stated that Congress could change the law such that specific wars could be objected to, if it so wished. The Justice Department did not like that last part, since people might start objecting to specific taxes, too. Unfairly Worded?

The ruling is going to make it nearly impossible for Roman Catholics or Mohammedans and Muslims to gain CO status, since it is my understanding that both the Pope and Mohammed condone fighting in just or holy wars. If you look at the history of both churches, just or holy wars have included some impressively imperialistic land-grabs, but that is not the point. The new ruling states (in effect) that if you would be morally able to defend the United States from attack, you must also be willing to conquer on behalf of the President.

Does that sound unfairly phrased? Well, it's not. For example, just suppose the United States got itself into a combat situation (not even necessarily a war) and the President sent in troops in such a way that the United States was clearly in the wrong. (That isn't too farfetched, since it was done to Mexico, Cuba, Spain, the Phillipines, and others at different times in American History.) THIS NEW RULING STATES THAT YOU COULD NOT REFUSE TO SERVE IN THAT SPECIFIC CONQUEST! Either Way

It makes a farce of the various war trials held at the end of World War Two, since the new ruling basically says "You must serve, even if you think your country is in the wrong. However, if it really was in the wrong you'd better be able to prove you hated every minute of

it."

This leads to interesting twists on future My Lais, since the Army can get you for disobeying an improper order as well as for obeying it. If Lt. Calley really was ordered to kill the civilians at My Lai, he was "had" either way, because disobeying a direct order in combat is a serious offense.

Rematch

It is interesting to note that this ruling was made only hoursbefore the Ali-Frazier fight, since it directly affects Muhammed Ali's court appeal of his draft case as a Muslim CO. The rematch may have to be held in a Federal prison.

Honest conscientious objectors are going to have to undergo a large amount of soul searching now, to determine if they really oppose all wars. Others, must figure ways to convince their draft boards that they oppose all wars. In either case, the court ruling makes things a little harder. I just wish Congress could be convinced not to renew the draft at all-but then I always was an incurable optimist.

The Ides Of March

Beware the Ides of March, for evil times are upon us. The food is terrible. The middle east seems on the verge of open war. America's own war in Vietnam continues without end or hope. Millions of people all over the world live on the verge of starvation. And most terrible of all, finals are coming.

Oh woe, ill begotten earth, for dark days are upon us.

<u>Throop Beat</u>

Freshman Reassessment?

by millikan troll

A freshman reassessment session may be held early next term according to our sources. The program will include freshmen, upperclassmen, and faculty, and presumably would cover such topics as the relative merits of on-campus freshman orientation as compared to the traditional freshman camp in the mountains.

The program is being revived (we are told that a sort of freshman reassessment session used to be traditional third term) largely through the efforts of the YMCA. We will bring you more details as they become available.

Top of the Week

The Humanities Division is getting ready to ask the Faculty to approve graduate work in the social sciences at Caltech for next year. . The protracted search for a chairman for the Committee on Independent Studies has ended. Dr. Barry Barish (ext. 2684; 267 Lauritsen) is eager to get the Independent Studies program launched third term. Those interested are urged to see Dr. Barish before third term starts.

Dr. Bohnenblust now chairs the newly-organized Committee on the Ideal Size of the Student Body. Continued on Page Three bevelow rental housing plan for poor. Develow rental housing plan for poor. Netfare rights counseling. Tutoring projects. Family counseling and child care. Family counseling and child care. Car repair and garage cooperative. Car repair and garage cooperative. Development of food cooperative. DURING THE NEXT TWO WEEKS, FIND OUT ABOUT OPPORTUNITIES IN VISTA, (volunteers in Service To America) FROM: Dr. D.S. Clark



Staff Bob Bresler, Patricia Clabaugh, Pat Dunn, Emden Gansner, Roger Goodman, Malcolm Handte, Bob Kieckhefer, Philip Massey, Ralph McGee, Terry O'Neil, David Peisner, Etaoin Schroedlu, Alex Seita, John Tristano, millikan troll.



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Page Three

David Miller

Browns SALT Vienna

Continued from Page Two

Since the Admissions Committee gets into high gear in the weeks to come, any inputs on what sort of class size we want had better be soon...Reportedly, the Browns will be in Vienna starting this weekend for the next round of the SALT.

Ask Not What Your Dean.. So far, only a very few students have expressed serious interest in the newly-organized informal exchanges program according to Dr. Huttenback. If you have any interest in taking between a term and a year away from Tech, see Dr. Huttenback about this program soon.

The Genial Dean will shortly abandon his residence at Arden House for greener pastures a half-mile east. Dr. Huttenback has plans for a house-warming party sometime early third term, but wonders how Techers will make the half-mile trek. We are checking into the rates for rental of a small herd of elephants...

In This Corner Former California Tech editor Michael Meo has started serving a two-year sentence for refusing induction at the federal prison at Lompos, California.

Members of the Admissions Committee will start to scatter all over the map by the end of this week and early next...Rumors of possible changes to Physics 1 have started to fly.... The winner of the Clay-Frazier fight was really J. Kent Cook.

And In This Corner

California's Senator Alan Cranston claims that the Republicans may try to dump Nixon much the way the Democrats dumped Johnson in 1968. Will wonders never cease This week's Etaoin Shrdlu Award goes to Mr. millikan troll, for finally getting around to writing this column.

In case it isn't mentioned elsewhere, the Tech will disappear for "examination and vacation period" effective immediately. Our next issue comes out on April Fool's Day (highly appropriate). Until then, good luck with finals, and enjoy your vacation.

Mnemonics For Fun And Mney

For frosh who are not computer trolls (and anyone who has managed to survive at Tech for an extended time without being hooked by the blinking machines), I should explain that mnemonics are usually -unpronounceable acronyms which are used in systems programming to indicate machine commands which are just strings of numbers (in this case, "hexadecimal," or base-16 numbers where the digits have values from 0 to 15 and are written 0 to 9, A,B,C,D,E,F) so that a command which might be described as "add the contents of register 15 to register 8; keep the result in register 8," is a little easier comprehended as AR,8,15 than as

1A8F. AR stands for Add Register; others are BSLE, Branch if index is low or equal; TRT, Translate and Test, etc. There are about 150 different ones on the IBM System/360 instruction set. (Anyone actually interested in finding out about such things should ask a friendly computer troll.) Naturally, it has long been a favorite pasttime for programmers to think up mnemonics with strange and wonderful meanings, and new meanings for old mnemonics. A varied selection of mnemonics I have not seen before:

BAL Burn Assembler Library CR Confuse Royally

ZAP	Destruct System				
DDR	Distribute Data at				
	Random				
AWR	Add Within Register				
HIO	Heap Insults on				
	Operator				
TS	That's a Shame				
BB	Bypass Buffers				
PMT	Punch Magnetic Tape				
GD	Gouge Disk				
SM	Simplify Multiplexer				
DOS	Delete Operating				
	System				
SPS	Scramble Protected				
	Storage				
SC	Swim Channels				
EC	Eat Cards Whole				
FLCK	Go to the Beach				
SOC	Suicide of Citran				
~~~					

# **The Critical Ear Annex**

Love Story Johnny Mathis Columbia 30499

Johnny Mathis sings from his heart. His ability to set a mood brings on a tranquil serious feeling in the listener. Johnny gives the Carpenters a lot of competition with "We've Only Just Begun," but his version of "My Sweet Lord" is a poor attempt at copying the Harrison arrangement.

Little Feat, Warner Bros., WS 1890 Little Feat play the coming style of music that is found on progressive rock radio stations, such as

gressive rock radio stations, such as local rock station KPPC. At least



one of their songs, "Hamburger Midnight," has reportedly been played there. The group is definitely a comer and the album is of fine enough quality that "straights" as well as "freaks" may enjoy having a copy.

–John Tristano

### T-REX, Reprise 6440

T-Rex is a two-man (more money when split two ways?) English group which puts out a soft rock which is somewhat similar to that of Mungo Jerry. Marc Bolan and Mickey Finn are versatile enough to make a balanced and diversified album. All told it is worthwhile listening.

### Raiders Greatest Hits Volume II, Columbia C30386

It amazes me to think about how much rock music has changed during the past five years. This album has sounds that would have been extremely popular in the mid-sixties. Unfortunately it is now 1971 and this album tends to sound more like a New York City subway ride than a musical masterpiece. I would recommend this album only to those who don't see progression in rock music and those who wish to return to the early Beatle era.

### CRUEL SISTER, Pentangle, Reprise 6430

The Pentangle is generally acknowledged as a highly competent group but rather unemotional as performers. The first part of this is amply demonstrated in their latest album. The second part cannot be verified on a record. All the material is traditional ballads, and while the arrangements are not historical since electric guitars and sitars are included, the flavor of the material is brought across. If you are into traditional ballads or the Pentangle, this album should not disappoint you.

-James Henry

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Dr. Beadle received the 1958 Nobel Prize in Physiology and Medicine for his work on the genetics of Drosophila, making him one of twelve Caltech faculty members who have become Laureates. As a former president of the University of Chicago and as a Nobel Laureate, he brings unique qualifications to the Board of Trustees.



Featuring this week March 9th thru 15th "Illegal Entry" Caltech students — \$1.50 off regular admission with this ad Starting March 16 "Dynamite Blow" A completely new show every Tuesday Seeing is Believing!

# **Dr. Beadle Rejoins Caltech**

### by Phil Neches and Paul Levin

Most of the members of Caltech's Board of Trustees come from the world of business and industry. However, in the past few years, the Board has diversified its membership to include figures from government, education, and even science.

Dr. George W. Beadle, the subject of this interview, brings several unique qualifications to his position as a trustee. He is a scientist, and won the Nobel Prize in Physiology and Medicine in 1958 for his efforts. He was Chairman of the Division of Biology, and a professor here for many years. He is, except for Harold Brown, the only trustee who has been a president of a university.

Born in Wahoo, Nebraska, in 1903, Dr. Beadle holds an MS from the University of Nebraska and a PhD from Cornell, as well as numerous honorary degrees. He is a member of the National Academy of Sciences, the American Philosophical Society, the Genetics Society of America, and on the Advisory Panel to the Dreyfuss Foundation. He has been a trustee since November of 1969.

He has been president of the University of Chicago, and recently retired as Director of the Institute for Biomedical Research of the American Medical Association. He still lives in Chicago, near the University.

Considering his long experience with Caltech, we started by asking him what it was like to be here back in the Institute's early years.

**BEADLE**: The Athenaeum was here then, and groups of younger people, postdoctorates and some graduate students, used to get together there and play penny poker, which was a very good change from normal work and study. Then often a number of us would go over to the old High Voltage Lab. At that time, maybe 1931, or shortly thereafter, Charles Lauritson, Tom Lauritson's father, was building the first million volt X-ray tube. It was in the basement, and went clear to the top of the building.

It was made with glass gas station tubes, the kind through which you could see the gas flow. He got those in various sizes and sealed them up, and thus made a giant X-ray tube, used initially in cancer research.

The boys would work nights over there. A number of us would go over there and sit around, watch what they were doing, generally gab, and usually have coffee. It was a great mixture, mathematicians, biologists, physicists, engineers—so



Dr. George Beadle [far right] joined Drs. Carl Anderson, Murray Gell-Mann, Max Delbruck, and Richard Feynman at the Nobel dinner last year.

as I say, it was a pretty exciting place for a young fellow—as I think Caltech still is.

TECH: Is Caltech still as "exciting?"

**BEADLE**: Maybe more exciting, but larger, and a little less informal, just because it is larger.

**TECH:** What was the most exciting thing for you personally during those years?

**BEADLE:** I guess the most exciting thing in my life was initiated when Boris Ephrussi-who was originally Russian but left during the revolution and went to Paris-came here to work in biology as a postdoctoral fellow. He was an embryologist-tissue culture biologist.

In those days we spent a lot of time talking about what genes do in development. We knew about genes in the formal sense of transmission, but nobody knew what they were or how they acted in development.

It was obvious to us that the reason for this was simple, that organisms geneticists used at that time, corn and Drosophila, were organisms about which development was not understood. For example, the fly undergoes metamorphosis from a larva to an adult, which is a complicated business. We decided that what was needed was either to do the genetics of an organism well suited for embryology, or, alternatively, take an organism well known genetically and work on the development of it. We decided upon Drosophila.

With the help of the Institute (and I always assumed that this was Dr. Morgan's personal financial support) I was given leave of absence to go to Paris to work with Ephrussi. There we developed the methods of transplantation of embryonic buds in Drosophila larvae. As a result we were able to work out the relations of specific genes to specific chemical events. We didn't know the chemistry of the events, but we knew that they were chemical transformations in the

formation of pigment. In our minds, this was the beginning of the concept of the specific relations of genes to specific chemical reactions by way of controlling enzymes.

We didn't know at the time that back at the turn of the century, an English physician and biochemist named Garrod had worked out similar relations in man, particularly with the disease alcaptonuria. On that basis, he postulated the relationship between genes and what he called ferments (enzymes). He used this disease, a genetic block, as a biochemical tool. For its time this was remarkable, but like many other discoveries, especially in the early days, people didn't appreciate it. It was some forty years later before they did. We therefore did not realize that we had only rediscovered a relation well known to Garrod.

Nevertheless, those were pretty exciting days for us.

**TECH:** It sounds as if you had a great deal of freedom in pursuing your research. How general is this sort of freedom?

**BEADLE:** I recently read a speech by a fellow who emphasized that many of the social problems we now face are soluable-that we have the technology and the knowledge to do so, if we would just devote our resources and our will to doing it. He emphasized the insistence on conformity and the rigidity of the system. Suddenly, I realized that in my life I had never known these difficulties-that all of my life I had been academic.

In the academic world we don't normally face restraints. I think that's something people don't fully appreciate. You fellows don't have to conform in dress: we didn't forty years ago. Nobody told us what we had to do. It isn't a system in which you have to do what is expected of you, where you have to conform. Nobldy checks on your hours, for example.

Although I suppose there were some kinds of conformity that were expected, I couldn't help thinking that in the academic life we have everything that this fellow said we ought to have more generally. For the first time in my life I realized why I couldn't understand some of the resulting problems. I'd never experienced them. Of course this freedom is a characteristic of top institutions. Caltech is certainly an outstanding example of this kind of freedom, of this freedom to do what you want to do as long as you're doing something sensible and reasonable. You're allowed tremendous leeway in your way of going about it. TECH: Where are the areas of biology in which we can expect most rapid progress? **BEADLE:** I believe the directions Continued on Page Six

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THE CALIFORNIA TECH



their triumph last year in Farquar's The Beaux' Stratagem to take the starring roles in Sir Noel Coward's Design for Living, opening at the Ahmanson March 16. This should provide a royal way to forget finals.

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By O

Story Theater's production of plot your entertainment for the Ovid's Metamorphoses will close within about 10 days, and is well worth the effort to see. The Mark Taper Forum sells all of the remaining tickets in the house for \$2.50 each to students (you must bring student i.d.) starting a half hour before curtain time.

The Huntington Hartford (1615 Vine St. in Hollywood) has Jack Weston in Neil Simon's Last of the Red Hot Lovers, through April 3. Nearby, the Lindy Opera House (Wilshire at La Brea) has Fiddler on the Roof with Bob Caroll as Tevye.

Two Feiffer plays currently grace (?) the L.A. theater scene. The blackest of Feiffer's black comedies, The White House Murder Case, is currently running at the Century City Playhouse (10508 Pico Blvd) in West L.A. A few miles east, Brewster McCloud follows zanily Feiffer's People, a revue based on his cartoon characters, is running at the Factory (622 Lapeer Drive) in Beverly Hills.

1776 opens at the Pasadena Civic on March 23 for a two-week run. With this and many other productions listed above, you can buy tickets through either Ticketron or Mutual, both of which are as close as the Beckman Ticket Office up on Michigan.

BECKMAN AUDITORIUM has a concert by the Caltech band this Saturday, March 13th. The concert has a circus theme. (Please notice that I didn't make one single snide remark about Beckman publicity this week).

DABNEY HALL OF THE HU-MANITIES has the Valley String Quartet this Sunday, the 14th.

The DOROTHY CHANDLER PAVILION at the Music Center has

The ANAHEIM CONVENTION CENTER is featuring James Taylor, Carole King, and Jo Mama on March 21st, after having Merle Haggard and Bonnie Owens on the 20th.

The FORUM in Inglewood features Santana, Jose Feliciano and Tower of Power on March 23rd.

The MARK TAPER FORUM at the Music Center has the L.A. Chamber Orchestra in concert on Monday, the 15th.

Richie Havens is at the SANTA MONICA CIVIC on Sunday night, the 14th. Most of you have probably never heard of him, which is unfortunate for you.

The VALLEY MUSIC THEATRE has Lifetime (featuring Jack Bruce) and PG&E on Friday the 12th.

With the Ides of March almost upon us, there is a distinct Shakespearean flavour to the plays available to the public for the next few weeks.

BECKMAN AUDITORIUM, for example, has the play "Much Ado About Nothing" this Friday, the 12th. It required tremendous restraint not to use that fact as the basis for a joke.

The Cal State L.A. Arena Theatre, for another example, is "Twelfth Night" from offering (naturally) the 12th to the 14th.

The third example is at the PCC LITTLE THEATRE (or whatever it's called) where "As You Like It" is being performed March 18-20, and 25-27.

Last but definitely not least, the PASLA Community Players present "East of Jordan" at their Little Theatre at 8801 South Vermont in Los Angeles. (A most excellent play.)

SO DO SOMETHING!



### Gansner Gabs on Gesualdo

Brave little mosquito, bite the one who crushes my heart and causes me these cruel pains. Fly away then but return to that fair breast that has stolen my heart; latch on to her and give her death for her happy fate. I, too, will bite you, sweet love, and if you clutch me to your breast, I shall swoon from the sweet taste of venom. Gesualdo: Madrigals, Book VI,-The Singers of Venosa; Robert Craft, Conductor (Columbia MS7441)

The above lyrics were written by Don Carlo Gesualdo, Prince of Venosa, in 1611 as part of his sixth, and final, book of madrigals. The late madrigal, highly popular in Europe in the late 16th century, is basically a fournal lyric poem.

Gesualdo is mainly responsible for bringing the madrigal to its stylistic peak. He has molded the music around the text, forcing it to fit the words, accenting their meanings. If the word is 'joy,' the music soars through the word. A stylistic Mannerist, his music does not flow freely. Each note is purposefully where it belongs.

One of the devices he used to obtain such exact musical expression is heavy chromaticism. The next composer to surpass Gesualdo in the use of chromaticism was Wagner, 250 years later.

**Page Five** 

This album contains the culmination of Gesualdo's madrigal art: his complete Book VI. As the madrigals were written in the youth of the modern tonal system, it takes a little while to get used to the harmonics. However, Gesualdo's genius soon becomes apparent, as do the musical implications, pointing the way for the late contrapuntalists and for 19th century chromaticism.

Robert Craft, mainly known (at least to me) for his interpretations of modern music, is one of the leading proponents of the works of Gesualdo, having recorded Gesauldo's music over a decade ago. The technical craftsmanship that he has always applied to modern works is apparent in this recording. Under his direction, the Singers of Venosa do a masterly job, at worst, sounding like a good barbershop quartet. At their best they bring forth Gesualdo in his fullest, filled with rich musical lyricism, yet contained in strict contrapuntal form.

You get five extra points if you can figure out the cover. -E. Gansner





the kleenex wet at the Village in Westwood, mainly due to Love the Glendale Symphony Orchestra Story, but partially due to the on the 13th, Carmen Dragon onion bagels being sold across from conducting. the theater. Zacharia will stick around at the Fox in Hollywood. The Music Lovers is at the Fine Arts in Beverly Hills. Check back issues of the Tech for reviews of these flicks, and don't say I didn't warn you about some of them.

Other films of interest which have gone city-wide include Diary of a Mad Housewife, There's a Girl in My Soup, Five Easy Pieces (playing with Getting Straight ), and the inimitable Little Big Man. The daily papers should keep you posted

time soon hence when finals have been laid to rest. The spring vacation season usually proves to be a prime time for diversions, especially in the Los Angeles area. Besides things to do in town,

Gaze into the magic mirror and

About Town

don't forget skiing (although the main resorts are likely to be crowded), the beaches (sunny Southern California often warms up just for the term break), and mainly, the greatest scenic beauty around (California girls). So with this in mind, here we go.

With the academy award balloting virtually completed, many films formerly sequestered in exclusive showings will go city-wide. Also, a number of last year's winners have returned, so cinema should prove interesting this vacation.

in the footsteps of  $M^*A^*S^*H$ . Both Robert Altman flicks are very funny and showing city-wide. Comedy fans unite!

Cromwell, an excellently done film about the Lord Protector Oliver of the same name is still running exclusively somewhere in Beverly Hills. Richard Harris is superb in the title role. Speaking of history-type films, Charleston Heston, Jason Robards, and Diana Rigg appear in the latest film of Shakespeare's Julius Ceaser, which will be around for a one week run starting March 24. It's even showing at the Academy right here in smog-bound Pasadena.

Several new films will most likely continue their exclusive runs at various locations in town. The lines are still staggering in

as to nearest locations of these films. Be warned-they can move fast.

Of course, if you're interested in the more lurid sort of cinema, just drive along Santa Monica Blvd. in central and central-west Los Angeles, or check the advertising in this issue.

For the devotees of live theater, several worthwhile prospects may be found over the upcoming vacation. Contrary to popular belief, Los Angeles has a significant amount of good theater, provided you know where to look for it.

If you look no farther than the Music Center, you may cash in on a double jackpot. Maggie Smith and Robert Stephens are back, after





# Track Team Beats Harvey-Mudd

#### by Martin T. Smith

Despite being handicapped by the absence of three distance runners, Caltech's trackmen squaked past Claremont-Harvy Mudd at Tournament Park last Saturday 74-71. The meet began well with the Beavers winning the  $4 \times 110$ yard relay, but was undecided until the end of the 4 x 440 yard relay, the final event, as freshman Al Kleinsasser hit the finish line in first for the third time that day. Kleinsasser's earlier victories came in

the mile (in 4:30.3) and in the half-mile (1:59.8).

Gary Stormo managed three firsts, running 10.3 in the 100-yard dash, 23.9 in the 220, and in a key effort late in the meet, triple jumping 44 ft. 5¼ inches. Dave Holmes won the pole vault at 10 ft., Steve Watkins won a very close quarter mile in :52.8, and Charlie Almquist won the intermediate hurdles in :58.3.

With only the mile relay remaining, the Beavers trailed 69-71. C-HM

Of course in actual fact that

doesn't happen. We are changing as

a species, and we have no way of

knowing whether the change is for

inheritance in some ways also

applies to cultural inheritance. We

transmit cultural inheritance from

generation to generation through

the nervous system. We now have

great cultural diversity, and this

makes the world from our point of

view a most interesting place. If we

were all alike culturally and genetic-

ally, life would be much more

We need many kinds of people

genetically; we need many kinds of

people culturally. I say let's keep it

What I have said about biological

know.

the good or not.

monotonous.

that way.

then tried a psyche by running their best runners first, but the trick failed as Jeff Hurn, Almquist, and Watkins kept up the chase, leaving Kleinsasser an apparently easy task when the Stags ran out of quartermilers one man too soon.

On the previous Wednesday, the Caltech trackmen had opened their dual meet season, traveling to Redlands and losing 100-44.

This Saturday, Caltech hosts Pomona in a conference battle which will be tougher than the Claremont-Harvey Mudd meet, but the Beavers are hoping to put up a somewhat stronger effort. Next Wednesday, Caltech visits Occidental, the conference track powerhouse, in the final meet of second term.

One minor note: There is some confusion as to what the Caltech three-mile record really is, especially as there is no listing in the "Little T" or on the record board in the gym (in the men's locker room). Most likely the record should properly belong to Peter N. Cross (1967), whose one-mile and twomile records still stand. Although the records have not yet been searched, it appears his best time was no worse than 14:53.

# Ae 241

### Continued from Page One elimination of the \$100 fee.

You'd better take advantage of this course. For most of you it will probably be your last chance to have a 200-level aeronautics course added to your transcript!



#### **Continued** from Page Four

Caltech is taking now are right down the line of the important areas in which we expect progress. Molecular biology is certainly moving very fast and is an area in which Caltech is extremely strong. Another area in which everyone agrees we are going to move rapidly is the behavorial sciences. Again Caltech is right out in fromt with a sound group on the biological side and with groups outside biology interested-and active. These two areas are moving rapidly, and I assume they'll continue to do so for a long time.

TECH: Can you give us a specific example?

BEADLE: In the field of neurobiology, one of the big problems is how does the brain work. We store, rearrange, and retrieve information. We're doing it now. This is a pretty remarkable feat. How is it done?

This is an area in which we want to know just for the sake of knowledge; that is one characteristic of man that makes him different from all other organisms, his ability to do this in kind and to a farther extent than any other organism we know.

TECH: What of the social implications of this sort of research? **BEADLE**: Of course the social implications are tremendous. What goes on in the brain is obviously determined both genetically and environmentally. It is influenced environmentally from the very early stages of development of the nervous system-before birth and after birth. We're now recognizing, for example, what a tremendous amount happens before the first exposure to an educational system.

This is certainly the basis of many of the social problems of our time. There are many persons who have had a limited kind of exposure of the nervous system during the first several years of life-a very poor cultural environment. We have tended to think that we put a youngster in school at five and straighten it all out. We now know that you can't do it that easilu, that much is already set. We know this experimentally in animals; we are beginning to understand it in man. Not only is this important fundamentally-scientifically-but in some ways it is even more important in its social applications. Exactly how we can make use of this knowledge we don't know yet, but we know that we must have that knowledge if we're going to do a better job of conditioning people in a desireable way. What the desireable way is, is of course itself a tough question.

change except by mutation, which is a very slow process. With genetic diversity, you can not only have change, but the diversity itself is important. In man we don't want everyone to be alike. We want and need variety.

What do we do with this new knowledge of genetics? Some things are obviously desirable. We would like to minimize genetic defects, for example. But even that isn't the simplest problem in the world because there is some evidence that some of these conditions in the heterozygous state - in the carrier condition – confer advantages. Heterozygocity in a cross-breed-

ing, cross fertilizing organism can in itself be an advantage. We strongly suspect that some genetic defects in man, such as cystic fibrosis, confer an advantage in the carrier condition. The reason we believe that is that something like one in twenty of us is a carrier. That means that in one in four hundred couples, both parties will be carriers, and one in 1600 children will be affected and essentially eliminated by natural selection. To counterbalance this elimination there must be mutation in this gene at a pretty good clip. Mutation to counterbalance this elimination would be at such a high level that many of us believe that there must be another explanation, for example, that reproductively the carriers have a selective advantage.

genetically you wouldn't have the selective advantage of the carrier. Well, that is hypothesis, we don't know it for a fact. However, we do know that organisms like corn, that are normally cross-fertilized and that in fact do out-cross much as in man, close in-breeding invariably leads to a reduction in vigor. You regain it by hybridizing inbred strains. That's the basis of hybrid corn, which produces a large part of the corn of the world today. No one has ever obtained a pure strain as good as one of these hybrids.

> One could make a good guess that this is also true in man. Thus if you make a man homozygous for all of the good genes you might imagine, he'd probably be a pretty poor specimen.

> That's only one of the difficulties. Another is who determines in what direction do you make the change? Obviously we can eliminate some genetic types in our population, and we have. The Tasmanians, for example, no longer exist. Was that good, or was it not? - we can never know.

Thus in the absence of much more knowledge than we now have, it's pretty risky to deliberately intervene in ways that decrease or significantly alter the genetic omposition of our own species. Until we know a tremendous amount more, I believe it is best to preserve the diversity we have. This means that all segments of the population, from a genetic point of view, might Thus if you eliminate the best reproduce equally, at least until defective gene, you also eliminate we learn much more than we now



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TECH: What are your thoughts on what is "desireable?"

BEADLE: Genetic evolutionbiological evolution-depends on diversity. You can't have evolution without it. If everybody were alike

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MARCH	28	29 General Registration *** 8:30 – 3:30 ***	30 First Day of Classes	31	APRIL 1	2	
APRIL.	4	5	6	7	8	9	
APRIL	11	12	13	14	15	16 Last day to add courses	Examinations for removal of conditions and incompletes.
APRIL	18	19	20	21	22	ADD DAY	
APRIL.	25	26	27	28	29	30	MAY
MAY	2	Midterm Week Grindge!	р Такон 	5	6	Midterm Week Sigh!	
		Mid-Term Deficiency Notices Due — 9:00 am				Last Day to Drop Classes Exams for admission to upperclass status, '71–'72 DROP DAY	Exams for admission to upperclass status '71—''
MAY	9	Today has been cancelled due to lack of interest	11	12	13	14	
MAY	16	17 Pre-Registration for First Term [all week]	18	19	20 The CALIFORNIA Tech is possibly the world's best newspaper.	21	
MAY	23	24	25	26	27	28	2 Final Examinations for Seniors and Grad Students Start
<b>NAY</b> memorial da	<b>30</b> Y	31 Memorial Day Holiday for employees	JUNE 1	2	3	<b>4</b> Final Examinations for Seniors and Grad Students End	
JUNE	6	7 Final Grade Reports Due for Seniors and Grad Students	Blark! It's 8 Tuesday After Lunch Again	9 Curriculum Committee 10:00 am Faculty Meeting 2:00 pm	10 The CALIFORNIA Tech snakes too, occasionally	11 commencement	End of Third Term 1 September 23 – Registration of Freshme September 25 – 25 New Student Orientatio September 27
F		Wagner Festival 7:00 a.m. 120 dB	N	A	Class Day	S	General Registration September 28 Classes Begin

1

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# **Swimmers Place Fourth in SCIAC Meet**

#### by Bob Kieckhefer

In the SCIAC All-Conference swimming meet, held in balmy weather at Pomona last week, Caltech swimmers narrowly missed placing third, as some upset victories allowed Redlands to outscore them by eleven points.

In the diving events, held last Thursday, Tech divers fared poorly in the tough competition. Greg Beall missed his bid for second place off the 1-meter board by 0.30 points, and had to settle for a third and a fourth. Alan Rice received sevenths off both the high and low boards.

### **Accumulates 35 Points**

Bob Coleman led the team through Friday's swimming finals, accumulating 35 points in his three events. After cruising to an easy

PASADENA

sixth place in the 1000-yard freestyle, he broke his own Caltech freshman record in the 200-yard individual medley. Unfortunately, Matteson of Occidental broke Caltech's Henry DeWitt's meet record to score an upset victory over Coleman by 3.1 seconds. Bob broke another Caltech freshman record with his third-place finish in the 200-yard backstroke in 2:13.1.

Jim Jakway was the only other Tech medal-winner, as he placed fifth in the 200-yard butterfly. He also placed fifth in the 200-yard individual medley and swam the butterfly leg of our third-place

Other Top Sixer

The only other Techer to finish in the top six was Bob Hall, with a fourth in the 200-yard individual medley. Bob also finished eighth in the 200-yard breaststroke and swam the breaststroke leg of the medley relay.

THE CALIFORNIA TECH

Tech's other high point-scorer was Tim Hight, with a seventh, ninth, and tenth in the 200-, 100-, and 500-yard freestyles, respectively. Also, Tech's "All-Star" relay team finished fourth, despite the fact that their anchor man had a sprained ankle.

CHM, Oxy Sweep The final score of the meet was

Student travel discounts

Claremont 516, Occidental 316,-Redlands 172, Caltech 161, Pomona 65. Swimmers from CHM and Oxy won every event en route to their sweep of the meet.

Bob Coleman and Jim Jakway will fly to Pennsylvania next week to swim in the NAIA national meet. Bob will swim in the 200- and



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