**ARD in ARPs Clears Air on Smog**

By Alan Stein

There are at least 100 problems discussed for every problem solved at the YMCAs planning conference, but for Lloyd, a Lloyd home resident, there was no short address by Dave Perasso, Jim Peters, and Larry Brown of Center and Mike Garet on the project proper.

An hour earlier, the Research Center is an extension and a generalization of the project, a permanent funding and coordination base for several projects.

Funding is being invested in a Lloyd house, a Lloyd home resident, and should know about the outcome in a week or two. Some projects already suggested are research into means of improving the Defense Department, the U.N., and other international bodies. After a Lloyd home resident always looking into providing means for undersized living conditions, the second group is still open to suggestions.

Perasso pointed out the difficulties in such advertisement, as well as in advising questions on Federal agencies, on which private pressure groups often have more effect than the public interest.

It is optimistic about the final outcome of the project. However, it feels it is already serving a useful purpose within the Institute. In this connection he spoke of the "family groups," joint sessions in which members of the various work groups could come together, as a personal, as well as academic level.

Lengthy discussion of solutions to pollution, greenhouse problem, technical problems, social barriers to implementation, and limitations of projects were suggested. Solutions suggested included curricular and non-curricular programs. (Continued on page 2)

**Caltech to Have Its Own Fanny**

Dear Students,

In next week’s edition of the California Tech, I will be starting a special column, mentioning the various problems I will be facing in my future work. In my column I will provide answers to your questions concerning any of your problems. If you have any specific problems you would like to have answered and choose to remain anonymous, I will supply advice in this column both for you and your friends. I am looking forward to hearing from you soon.

Fondly,

Fanny

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**Y Planning Group Asks What’s Wrong With Tech?**

by Alan Stein

There are at least 100 problems discussed for every problem solved at the YMCA planning conference, but for Lloyd, a Lloyd home resident, there was no short address by Dave Perasso, Jim Peters, and Larry Brown of Center and Mike Garet on the project proper.

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Lengthy discussion of solutions to pollution, greenhouse problem, technical problems, social barriers to implementation, and limitations of projects were suggested. Solutions suggested included curricular and non-curricular programs.
Little T, Rah!

Derry Hormack gets our belated plaudits for the unsurpassable job he did on this year's Little T. The varied and many changes in format he has introduced make the finished product much more useful to the owner. Changing the size makes it easier to stack with the rest of our papers. The section on other campuses is a good summary of Tech folklore, usually handed down from soph to frosh, capturing the life of the dorm humorist and amuteur anthropologist. Unique in this edition of the Little T, Derry presents us with bus schedules and route descriptions — compiled for the first time in the history of the human race. His list of restaurants is less than complete, but he claims this is due to the best Chinese restaurant in Pasadena's Song Inn — unopened as of today.

For the social animals, the Girl's Phone Numbers section is more complete, and closed to the public. The next step in the construction for using the campus dialing system, and the list of handy campus extensions, is an invaluable aid in failing Bell Tell and getting the message through. The only complaints we have are in the graduate department section, but even this was better than in years past. Although the book arrived later than usual, it was the printer's fault and not Derry's. We hope that future editors of the Little T will follow Derry's example and do half as well.

dave lewin
alan stein
Jim Cooper

Derek Geller

East would have made a higher preempt then three clubs, and West would have made a higher preempt five clubs. However, East and West did not want to risk going down 500, so they would pass. At match-point level, the score they would have received had they been allowed to play out the contract, at match-point level, the result of a sacrifice is determined by the results at the other tables in the game. In duplicate games each partner sacrificed for every other partner holding the best duplicate hand, for a lower score, and half a match-point for each other pair they tie on each hand. Small differences in score are more important in duplicate than in rubber bridge. No rubber bridge player will chortle with glee after sacrifice of his team. Arlo Guthrie is possibly one of the few players from a team who can make a vulnerable score, while in duplicate in 500 might be a top score on the board. Conversely, going down 500 may be a disaster. A rubber game would not be a great loss in duplicate level, but in duplicate this result would probably at best be a tie for bottom score. The effect of match-point scoring and the unfavorable vulnerability might make it worthwhile for Arlo Guthrie to sacrificing a makeable five club contract and score 500 points in high cards between them. At any other vulnerability

Art Show

Paintings, sculpture, graphics, andinstallation art, ranging from the most traditional to the most avant-garde, are featured in the art faculty of Occidental College on display in Doheny Library throughout the month of October. The exhibit from the neighboring college will be shown through November 2.

Artists included in the show are: painter Robert Hirota, a member of the American Indian Art Committee; photographer John V. and Janice B. Jarvaise, who will show "leaf paintings" and three-dimensional pictures of the American West; and Jack Dalton, painter and instructor at Occidental College, who will show "art in education and teaches at Art on South Pasadena High School.

The directors of the show are: Dr. J. M. Scott, public Monday through Friday 10:30-5:00, and Saturday from 9 until 12.

Talk Style Talk

"The Dramatic situation is not alive in our culture."

Dr. Thorpe, director of the Huntington Library and Art Gallery, Los Angeles, will give a series of talks about the modern English Language and its dramatic nature in the first of the Caltech Lecture Series for fall 1968. Dealing with the topic "Responsibility." Dr. Thorpe outlined the elements of style and attempted to sum­marize the variety of styles, analyzing the style of the various literary periods.

The major part of the lecture was devoted to a comparison of archaic style of the King James Bible and the Modern English of the 20th Century. Selecting the individual elements of style — punctuation, diction and usage, Dr. Thorpe read selections from both transla­tions and compared them. After reading one selection, the mod­ern version, Dr. Thorpe referred to the laughing which followed: "To repudiate one's own lan­guage is to repudiate one's own sensibility." In the opposite man­ner, he continued, by rejecting the assertion that archaic style was "literary," "Each particular form of language has in it's own style, it's own human­ity."

Dr. Thorpe concluded the lec­ture by ribbing at the mature adults who try to emulate the "archaic" forms and suggested that us would like to be part of Sock-IT-To-Me.

Dr. Thorpe received his PhD. from Harvard University in liter­ature. He was formerly a visiting fellow at the Huntington Library after a position as literate and literary critic from 1957 to 1960. Dr. Robert E. Ireland, professor of English at Occidental College will speak on the topic: "From Strife to Harmony," the story of the synthesis organic chemistry. The lectures are at 830 pm at Beck­man Auditorium, Monday even­ings.

Califonia Tech

Published weekly during the school year by the Associated Students of the California Institute of Technology The opinions contained herein are sole­ly those of the newspaper staff.

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NSF Fellowships

The National Research Council has been called upon again to advise the National Science Foundation in the selection of candidates for the Foundation's program of graduate and regular postdoctoral fellowships. Panels of advisors selected by the Research Council will evaluate applications of all candidates. Final selection will be made by the Foundation, with announcements expected by March 15, 1969.

Graduate fellowships will be awarded for study in the mathem­atical, physical, medical, biological, social and cultural sciences, and in the history and philosophy of science. Applications are invited for graduate fellowships in the field of biological and social sciences, and in the history and philosophy of science, and shall not be made in clinical, edu­cation, or business fields, nor for work toward medical or law de­grees. Application may be made by college seniors and graduate students, preferably those who have a degree in a specific field.

Postdoctoral awards are open to individuals who have completed study or work in the mathematical, physical, biological, social, and cultural sciences, and in the history and philosophy of science. Applications are invited for postdoctoral fellowships in the field of biological and social sciences, and in the history and philosophy of science. Application for fellowships may be made by individuals who have completed postdoctoral work, or who are about to start such work, or who have completed or who will complete such work within a year. Applicants may apply for additional years of support in any year for which they are qualified.

Further information and applica­tion materials may be obtained by writing to the National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. The dead­line date for the submission of applications for graduate fellowships is December 6, 1968, and for postdoctoral fellowships, December 9, 1968.
**Frosh Squashed**

by Larry Westerman

Well, Initiation Week has ended, albeit somewhat curtailed by certain administrative
problems. The frosh have been variously subjected to showering, lock-out meetings, and other
developments of goings-on. The Frosh especially indicated "good fun" by the upperclass students
in all cases. Looking back however, one can see some good coming out of all the confusion.

Taking showering, for example. Some frosh refused to be showered,
and, deputizing on the house. If they did so politely, they were generally left alone. The frosh
who did participate in this custom, they have gained a new
sense of belonging to being a member of the group. They know that
every member of the Frosh house bade to them.

In the next section meetings after
in the section meetings after
This is the true purpose of
It's the true purpose of

According to Mr. Paul Bradford,
director of the campus mail room, the problem of delivery de-
lisher arrives
(Continued on page 7)

The mail room

The mail room

The mail room

At Tech, it is a real one. Small, In

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Would You Teach Mathematics to Grad Students?

Dr. William Johneta, head of project SEED, gave a demonstration Wednesday, October 10, of the discovery method of teaching in Kerchoff Laboratory.

The letters SEED stand for Special Elementary Education for the Disadvantaged, a program started by Dr. Johneta at the University of California, Berkeley, California to help improve the education of disadvantaged children in the United States. A study of two Berkeley junior high schools showed a 70 per cent difference in scores on an achievement test between a school with disadvantaged children and a school with white, middle class children, although the facilities were almost identical.

Dr. Johneta feels that the main problem of the disadvantaged child is that he feels inferior, and therefore, behaves in such a way that the teacher cannot understand him. He recognizes this by giving each child a goal which will give the child a sense of self-worth. The students themselves are interested in the teaching of new elementary algebra to elementary children. Dr. Johneta provides the students with the opportunity to take responsibility and shows that the students are capable of the work.

The teachers in project SEED spend one period a day with a class teaching them mathematics by a discovery method. They do not tell the students what to do, but ask questions that lead the students to find answers for themselves.

Dr. Johneta believes that the main reason for the success is that it generates an excitement and sense of discovery in the student which is lack-participation together as a house into the basic teaching process in colleges and universities throughout the world.
C A L I F O R N I A  T E C H

Thursday, October 17, 1968

DuBridge Cont.

that's what they are here for. You've paid for the privilege—now make them yours. You will learn about a university other than the lectures you hear, the bull sessions you have—you will learn the things you are going to need. What is your favorite subject? Math, physics, astronomy, chemistry, biology, geology—IRI, ME, aeronautics, computers—high temperatures, low temperatures, the inside of the earth, the inside of the sun, the surface of the moon or Venus or Mars, bridges, dams, transistors, lasers? You name it and Caltech is there.

Caltech is not only there—but it has pioneered the field. Basic supersonic aerodynamics started here. The study of cosmic rays started here. The alpha-beta of the protein molecule started here. Modern genetics learned here. Modern seismology started here.

The 200-inch telescope is here—and so are a dozen other unique astronomical instruments. For 60 years Pasadena has never had only the second largest telescope; once it had the largest, the second largest and the third largest nuclear structure. You will learn more about cosmic rays, the nature of DNA, the biological role of proteins and enzymes, the structure of the center of the earth... as we have just seen. We've been talking about what makes a star shine! How were the elements created? What is a quasar? A quasar is the first position? The first scientific question? Where are we going in an expanding universe? Ask someone at Caltech.

But this is all past history—are we just sitting on the glories of past achievements? Let's look around.

If anyone knows any more about nuclear theory, gravitation, quark or proton or electron or quantum physics or Dick Feynman, no one has found who he is. He has already departed! The founders of modern genetics were Mendel and a very active Caltech, Max Delbrueck. Max is still here, joined by Bob Steinshelm, Jim Bonner, Ray Owen—and a few others. Pauling proposed the modern theory of the chemical bond and he and Corey discovered the basic protein structure—the alpha-beta. Pauling has gone. Corey has just retired—but his students and followers Roberts, Dickerson, Grzybowski and billion Hammon keep the Caltech in the forefront of the world.


If you get more practical matters of interest to you? I hope so—for I trust half of you may end up being engineers—putting scientific knowledge to use for the benefit of people. Airplanes? Ask Sechler, Liepmann, Lees. I could take up a copy of the catalog. Go down the list of professors. They are here to ask you. Ask them what they do. Ask them what they do. They'll probably have a list of names ready to show you. I'll tell you this each person in this room, because he was judged to have exhibited unusual talents both for teaching and research and creative teaching is encouraged. You are here to sit at the feet of some of the leading scientists and engineers of the nation.

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You may be searching for a current style and ask whether the educational environment you are in is relevant to the modern world.

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BEAVERS LOSE

by D. Dixon

The Caltech offense could not get started and Anna Pacific downed the Beavers, 27-0 last Saturday at the first home game of the season.

Caltech played a fine first half and held Anna to just 6 points. This score came at the end of the first quarter on a long pass. Anna had two for points but were stopped. The Beavers then marched downfield and moved into good field position on an 18 yard Burton-Martin pass. Burton attempted a field goal but it was wide. For the rest of the half the Caltech defense played except for one set of downs. The defensive line was able to contain Anna runners which shows a remarkable improvement. However, the pass defense was terrible, the line did rush hard and the Anna quarterback often had 10 seconds in which to get the ball off. Also the secondary men left their men wide open and allowed Anna to pass. The Beavers were lucky that the half ran out because Anna was very close to scoring.

The second half started off with a twenty-five yard kickoff return by Buron. Burton then threw an interception. The defense held and forced Anna to punt. Anna, however, recovering Sturmod's fumble of the punt. The defensive line held. The offensive line blocked poorly and Burton threw another another interception. This time Anna scored and added a two point conversion. Burton, on the first set of plays, fumbled on the Beavers twenty. Anna again scored but did not convert.

The Beavers went into the fourth quarter on their only sustained drive of the game. This drive was highlighted by Burton's running and his passing to Martin. Tech was on the Anna five with first and goal but could not score. Anna held and showed Tech's offensive weakness. They then marched from the two to score on a long pass just as the game ended.

Caltech's offensive team played poorly. The line did not block well and Burton was often forced to run from his pocket. He was brought down ten times by Anna for losses. Also, Martin did not bother to run his patterns when the pass was not to him. This allowed Anna to lay on him-and know where the pass was going. This helped to cause some of Burton's losses. However, even with all of the mistakes it was a very close game. This time Anna scored and only got 6 points. The Caltech offense could not get started and held Anna to just 6 points. For the rest of the half the Caltech defense played except for one set of downs.

Harriers Run

The Caltech Cross Country Team went to Mt. San Antonio College Cross Country meet at Tournament Park. Pomona is at each home game.

Pomona Outplays Tech

This past Saturday, the Caltech undergraduate soccer team lost to Pomona by the score of 3-1. This makes the team 11-1 so far for the season. Pomona was all ready to play a third game of the previous week's victory over Rio Hondo. In the Pomona game, Caltech was outplayed by a strong and first team. Once again, one goal for the opposing team was preceded due to errors by the defense, as both the center halfback and goalie misjudged a ball. Overall, the Tech offense was not strong, making fewer shots than usual, and not breaking through the Pomona defense. The Tech goal was scored by Jerry Eisman, during the third quarter. Dick Burton played well, and made a number of excellent plays on both offense and defense. Neither the Tech offense nor defense did not receive sufficient help. Five freshmen played for Tech in the game, and for the most part they showed promise, but they will need some seasoning before they can play their best in this league.

Caltech's play has suffered from injuries to two of last year's players, Bruce Penrose and Ralph Graham. Ralph's speed and endurance were sorely missed last Saturday, and Bruce Penrose was not able to bolster Tech's running defense.

Water Poloers Win Six With Total Team Effort

by Mike Stefanko

After last year's dismal 5-15 record, it was generally acknowledged that it had been a "building year" for the Caltech water polo team. Such a statement is often an excuse, but this year the all-new, powerful Techers have proved what a little building can do.

Tech has combined swimming,ball control, tight defense, and teamwork to produce a 6-2 record going into Wednesday's game.

Behind the amazing goalkeeping of sophomore Kirk Hanson, and the defensive play of Bob Hall, Mike Stefanko, and Mabry Tysen, the offense of even the quickest opponents has been consistently stopped. Tech's scoring panel is packed by seniors Gregg Wright and Larry Hathaway. The Caltech cross country team went to Mt. San Antonio College Friday, expecting to beat Claremont-Harvey Mould and to get a crack at the difficult, hilly four-mile course. Half of their expectations were realized, as Lane Mason pulled away from the field, leading Caltech to a 19-38 victory on an obscure, exotic course in Claremont. The race began with a Le Mans start, and had 10 seconds in which to get one set of downs. The Irvine 906 went into the game with a 80-44 record, and held Azusa to just 6 points. The Caltech offense could not get started and held Anna to just 6 points. For the rest of the half the Caltech defense played except for one set of downs.

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Pomona Outplays Tech

Over UCSD and CHM

Harriers Run

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Pomona Outplays Tech

Over UCSD and CHM

Harriers Run

The Caltech Cross Country Team went to Mt. San Antonio College Cross Country meet at Tournament Park. Pomona is at each home game.

Pomona Outplays Tech

This past Saturday, the Caltech undergraduate soccer team lost to Pomona by the score of 3-1. This makes the team 11-1 so far for the season. Pomona was all ready to play a third game of the previous week's victory over Rio Hondo. In the Pomona game, Caltech was outplayed by a strong and first team. Once again, one goal for the opposing team was preceded due to errors by the defense, as both the center halfback and goalie misjudged a ball. Overall, the Tech offense was not strong, making fewer shots than usual, and not breaking through the Pomona defense. The Tech goal was scored by Jerry Eisman, during the third quarter. Dick Burton played well, and made a number of excellent plays on both offense and defense. Neither the Tech offense nor defense did not receive sufficient help. Five freshmen played for Tech in the game, and for the most part they showed promise, but they will need some seasoning before they can play their best in this league.

Caltech's play has suffered from injuries to two of last year's players, Bruce Penrose and Ralph Graham. Ralph's speed and endurance were sorely missed last Saturday, and Bruce Penrose was not able to bolster Tech's running defense.

Water Poloers Win Six With Total Team Effort

by Mike Stefanko

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Water War
(Continued from page 1)
The Ricketts courtyard was completely cleared, and Dean Ballard, cited twice for bravery during the Lloyd campaign and leader of the occupation forces, was captured by Ricketts. An accident occurred in the Ricketts yard, however, and Ballard sustained some injuries that, though not serious, were extremely painful. Ballard bore these quite well, and withdrew to safety.

Renewed Lloyd activity recalled most of the Axis occupation forces to the field, the rest retiring under renewed Ricketts fire. Some Ricketts volunteers took the field as well. Once again the Lloyd forces fled the field, only to reappear at the east door as the Fleming-Hubbard forces came by on their way to Ruddock, to which they had transferred their attention. The Axis forces shouted challenges to Ruddock, the Lloyd forcesaplashed to Ruddock for help, but Ruddock would not appear. Finally, the Axis, after an unsuccessful peace parley with Lloyd, retired for supplies.

Lloyd then marched on Page, and the returning Axis forces (much reduced) joined them, as did volunteers from Blacker and Ricketts. Page, however, barricaded its doors and could not even admit newcomers for a statement. Lloyd tried a submarine route into Page but were thwarted by the effective, if overindulgent, Page security forces. These, however, could not stop Special Operator Joe Lewis, who succeeded in entering and attempted to open a door to his comrades, but was caught in the act. He did manage to escape from Page.

Thus, at 9:20, the battle died away. The forces drifted off into the night, leaving only a few frustrated Blacker House members shouting off their mouths and ammunition equally and looking for suspense to fight. By 9:30 they had gone home.

Water War of 1968 ended, leaving only wet ground and Page’s musical challenge to Lloyd.

CESAR GRAPE
(Continued from page 4)

Last year more than 100 graduates came to our campus at TRW Space Park in Redondo Beach, or to our Houston or Washington, D.C. operations. Of the more than 16,000 men and women in TRW Systems Group, over 7000 are college graduates. Their major fields of interest are as varied as your own: Engineering, Behavioral Sciences, Physical Sciences, Computer Sciences, Life Sciences, Management Sciences, and the Humanities.

It’s characteristic of TRW Systems Group that many of our employees continue to do advanced and applied research in the same area of specialization they worked on in college. For our challenges are much like yours. We’re deeply involved in the exploration of space and the defense of the Free World. We’re also applying these advanced technologies to the complex social problems of today: transportation, health, urban renewal, land planning, water and air pollution, global communication, ocean sciences.

As they work to meet these diverse challenges, many of our employees are continuing their study for advanced degrees with TRW’s blessing and financial help. That’s just one of the reasons so many people have found the move from their campus to ours a natural and rewarding one.

Perhaps you’d like to consider the same move. Make an appointment to see us when we’re on your campus (see below), or write to Dr. W. D. Molvers, College Relations, Room 7001-J, TRW Systems Group, One Space Park, Redondo Beach, California 90278. TRW is an equal opportunity employer.

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From your campus to ours...

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ENGINEERS AND SCIENTISTS

TRW CAMPUS INTERVIEWS
Tuesday and Wednesday
October 22 and 23, 1968

SEE YOUR PLACEMENT OFFICE

APR-in
(Continued from page 3)
discussion and population control, Mexican-American education and cultural understanding, and teaching in the university.

While there was an excellent turnout, more volunteers are always welcomed. For a list of the ongoing and planned meetings of the various groups, the Research Center office is at 67 Cecilia.

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Marketing at IBM

"Working with company presidents is part of the job."

"I'm pretty much the IBM Corporation in the eyes of my customers," says Andy Moran. "That kind of responsibility's not bad for an engineer just two years out of school."

Andy earned his B.S.E.E. in 1966. Today, he's a Marketing Representative with IBM, involved in the planning, selling and installation of data processing systems.

Plenty of business experience

"Engineering was my first love," Andy says, "but I still wanted good business experience." So far, he's worked with customers involved in many different computer applications, from engineering to business. His contacts go from data processing managers all the way up to the president of his largest account.

"At first I was a little nervous about working at that level," says Andy. "But then you realize you're trained to know what he's trying to learn. That gives you confidence. You're helping him solve his problem."

With his working partner, the data processing Systems Engineer, Andy has helped many customers solve their information handling problems. "I get a broad overview of business because I run into every kind of problem going. Sometimes I know the solutions from experience. Other times I need help from my manager. "That's one of the best things. My manager is more of a backup than a boss. He's there when I need him. Usually, I pretty much call my own shots."

Andy's experience isn't unusual at IBM. There are many Marketing and Sales Representatives who could tell you of similar experiences. And they have many kinds of academic backgrounds: business, engineering, liberal arts, science.

They not only sell data processing equipment as Andy does, but also IBM office products and information records systems. Many of the more technically inclined are data processing Systems Engineers.

Check with your placement office

If you're interested in the opportunities for engineers and scientists at IBM, ask your placement office for more information. Or send a resume or letter to Harley Thronson, IBM Corp., Dept. C, 3424 Wilshire Blvd., Los Angeles, Calif. 90005. We'd like to hear from you even if you're headed for graduate school or military service.

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