

The Clean Air Car Project Will Tune Your Car

by James Henry

Caltech's Clean Air Car Project is gearing up for its most ambitious program to date: testing the value of disconnecting the vacuum spark advance and retuning for low emissions on used cars. The program is being undertaken to answer questions raised by recent efforts to gain State Air Resources Board approval for various used car emissions control devices. Such devices, when approved, will be required on most of the pre-1971 cars in the State.

The most promising devices so far proposed all involve modification of the vehicle's spark timing. This approach to reduced emissions was discovered by Bob McJones, an engineering consultant to the gas

company, while working on reducing emissions with natural gas powered cars. His modification was simply to disconnect the vacuum advance. He noted that emissions were also reduced when the cars were using their back-up supply of gasoline, an effect that could only be attributed to the modified spark advance.

1970 Race

In the Clean Air Car Race of 1970, Caltech's team worked with McJones in preparing their natural gas engines. They thus became acquainted first hand with the value of disconnecting vacuum advance in reducing emissions.

The vacuum advance provides ignition earlier in the combustion cycle during cruise conditions when the engine is less susceptible to

knocking. This extracts more power from a given amount of fuel and hence improves fuel economy. In so doing it also increases emissions of hydrocarbons and oxides of nitrogen. Retuned and operating without vacuum advance, however, most cars will produce about 50% less hydrocarbons, 30% less carbon monoxide, and 35% less oxides of nitrogen.

Overheating Roadblock

The main roadblock at this point is that Detroit claims disconnecting the vacuum advance may promote overheating in some cars. McJones, relying on his experience with about two thousand gas company vehicles, says this is nonsense. The Car Project, which has disconnected the vacuum advance on about ten cars, tends to agree with McJones.

GM is the major force voicing the Detroit view. Car Project members, noting that GM is trying to market a device which would reconnect the vacuum advance in an overheating engine, feel GM may have its heart in its pocketbook. It is estimated that GM's device would cost the owner \$25 to \$35 while the Car Project's procedure would cost about \$10.

Test Data

To effectively refute GM's claims it will be necessary to produce laboratory data for a substantial number of cars showing reduced emissions and no adverse effects. The Car Project feels it is unique in its ability to undertake a project of this type which has no economic incentive.

In the course of the program it is hoped that over 150 cars will be tested. This will be a tall order since each car will have to be tested for emissions and overheating before and after the advance is disconnected and the car retuned. In addition two emissions inspection procedures will be run on each vehicle. These procedures have been proposed for use in statewide inspection programs and are quick tests.

Your Help Needed

Since project manpower requirements will be high, the project is trying to arrange an engineering lab course in emissions testing and control. The course will feature work with the used cars. Natural gas

Continued on Page Two

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Done

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Wednesday
After
Deadline

Volume LXXIII

Pasadena, California, Thursday, January 6, 1972

Number 12

Murray To Fill In For Archambeau At Beckman

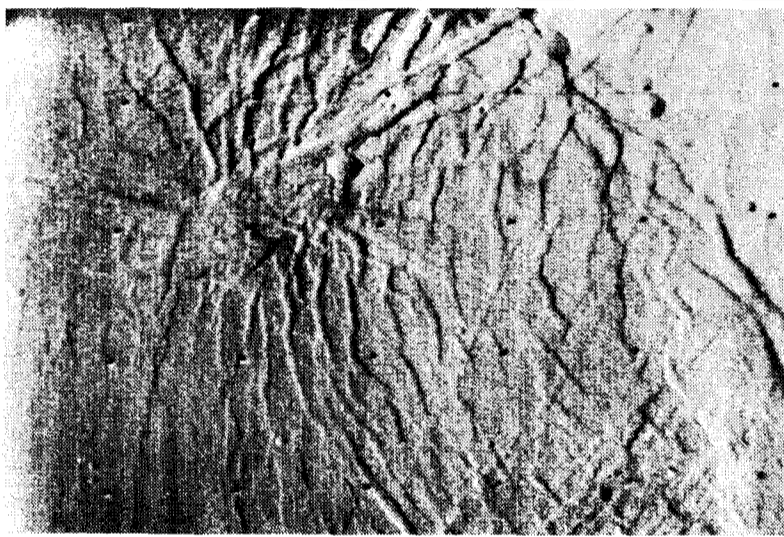
by Jeff Mallory

Dr. Bruce Murray, head of Tech's Space Photography Lab, will deliver the next presentation in the *Caltech Lecture Series* this Monday, January 10, at 8:30 in the Beckman Auditorium. Dr. Murray, already well known for his work with the Mariner project and recent public talks, will again breach that subject with his lecture "Mars—From Science Fiction to Science."

Dr. Charles Archambeau, professor of geophysics and presently working out at the Seismo Labs, was scheduled to give "Sea Floor Spreading and Continental Drift: Manifestations of Planetary Evolution" on this date but was called to Washington, D.C. on a special government assignment.

As usual, no tickets or money required and everyone is welcome and encouraged to come.

The *Dabney Lounge Chamber Music Concert Series* springs to the fore again with its second concert of the season Sunday, January 9, at 8:15 p.m. in Dabney Lounge. The performance will feature the *Concertante Ensemble* with Virginia Baker on the violin, Thomas Osborn on the clarinet and recorder,



An aerial view of a typical suburb in the Imperial city of Helium on the planet Barsoom as taken by perennial tourist Bruce Murray. Note the large lots.

Delores Ackrich on the cello, and Marilyn Scranton at the piano.

The program will consist of four pieces: *Sonata in A Minor for Recorder, Violin and Continuo* by Georg Telemann, *Concerto a tre* by Ingolf Dahl, *Trio No. 5 in G Major, K. 564 for Violin, Cello, and Piano* by Mozart, and ending with Messiaen's *Quatuor pour la fin du temps for Violin, Clarinet, Cello, and Piano*. No admission charge or tickets are required for the concert and the event is open to the public.

Special thanks should be given to Philip Kahgan, Thomas Morton, and the Caltech Committee for Musical Activities for arranging and directing these events.

Humphrey Visit Will Highlight Second Term

by Claude Anderson

A visit to campus by Senator Humphrey will highlight the Caltech Y's program for second term. He and the other candidates in the California presidential primary have been invited for Olive Walk talks. Senators Muskie, Jackson, McGovern, and former Senator McCarthy are considering Caltech as one of their campaign stops.

On February 15, David Harris (Joan Baez's husband) will be on campus. There will be several opportunities to hear the draft resistance leader. Details on this will

be given later.

AUFS in Latin America

Representing the American Universities Field Staff, Tom Saunders and Charles Gallagher will be here this term. The AUFS is sponsored by Caltech and several other colleges. The staff members live overseas for a period of time and return to the sponsoring universities to lecture and tell of their experiences. Tom Saunders, who will be here during the second and third weeks of January, is an expert on drugs, catholicism and politics in Latin America.

Two projects still in the planning stages need the help of students. One involves bringing a State Department diplomat to Caltech to discuss foreign policy. The other is concerned with the ethical problems of the scientist, especially in genetics. If you will help, please contact the Y.

Enough of Politics!

On the lighter side, the Y has many plans and facilities to make student life more enjoyable. Tickets have been purchased for the January 21 game between the Lakers and the Jets. These will be sold at subsidized prices. The Y now has a Xerox machine which makes excellent copies for five cents each. Sleeping bags, packs, and other camping equipment have been ordered and will be available for a minimal rental fee.

Many people are still unaware that the Y lounge contains a very good stereo system and the rock record library. In addition, there is now a display of photographs by Floyd Clark.

Student Tickets Available For Weekend Music Center Concerts

Special \$2 tickets will be available for the Israeli violinist Pinchas Zukerman's three Music Center appearances with Daniel Barenboim conducting the Los Angeles Philharmonic on January 6, 7, and 9.

Zukerman will play Mozart's A Major Violin Concerto, K.219, and Barenboim will direct the orchestra in Bruckner's Ninth Symphony and

Webern's Five Pieces for Orchestra, Op. 10.

As with all the programs on their 1971-72 Winter Season, the Los Angeles Philharmonic will set aside at least 100 student tickets, specially priced at \$2, for each of the three Zukerman/Barenboim concerts. These student tickets become available to those with approved identification 90 minutes prior to performance time. This policy remains in effect whether or not full-priced tickets are available.

Performance times for the three Zukerman/Barenboim concerts are Thursday and Friday, January 6 and 7 at 8:30 p.m., and Sunday, January 9 at 3:00 p.m. For further information on these concerts, call 626-7211.

Newsbriefs

Big T Needs More Staff

En 15 (Journalism) is going to have a second section starting this term. This section of the course is aimed at discussing the methods and techniques of putting together yearbooks, with special emphasis on the 1972 *Big T*. There are no quizzes, midterms nor finals. The only requirement is that you join the yearbook staff and produce publishable material on a regular basis. This is a great opportunity for dedicated yearbook workers to boost their GPA's by getting 3 units of A (maybe). Those who are interested in working on the 1972 *Big T* and signing up for the course please contact Ed Hutchings at the Publications Office in Throop or attend the organizational meeting on Wednesday, January 13 at 3 pm in 128 Baxter.

Undergraduate Directory To Be Ground Out Again

The Undergraduate Directory may be published again this term, probably next week. With your help this will become a reality sooner. If your name or address was wrong in last term's list, please send the correction to Dave Peisner in Page by tomorrow.

Vent Spleens on Graduation Speakers

Notice to all seniors: If you have any reasonable suggestions for a graduation speaker, now is the time to vent your feelings. Send the names of any person(s) you would like to see to the student rep on the convocations committee, care of the "R" box in Blacker House, preferably before next Wednesday.

Matchpoint Bridge in Clubroom One

Try some matchpoint bridge. The Caltech Bridge Club (which meets every Wednesday night at 7:30 for an IMP scored game) will have its first and only matchpoint event of the year for the trials for the Intercollegiate Bridge Tournament. If we can get enough people playing, we will be able to send three pairs to the regionals as we did last year.

Hams, Take Notice! It's Your Money

There will be a meeting of the Caltech Amateur Radio Club in clubroom 2 at 7:30 on Wednesday, December 12. How to spend money will be discussed.

Issues For Lunch

Athenaeum Forums Resume

Members of the Caltech community are invited to a special series of Athenaeum luncheon forums. The cost of the luncheon is \$1.75 and reservations should be made with the Y at least 24 hours before each program. People wishing to come for the talk only may do so at 12:30.

The schedule is as follows:

Jan. 12. "Tragedy and victory on the Indian subcontinent." Dr. K. B.

Rao

Jan. 19. "Catholicism and Castroism—two revolutions in South America." Dr. Thomas G. Saunders

Feb. 9. "Religion as the seed of political conflict in international affairs." Charles Gallagher

Feb. 23. "White Rhodesia independence and its meaning for black Africa." Dr. James Hooker

Mar. 1. "Religion and social
Continued on Page Two

Throop Beat

Applications Down Sharply

by millikan troll

How are applications going this year? "Lousy," according to Dr. Peter Miller, Dean of Admissions. Caltech is down about 150 applicants from this time last year, or about 30 to 33 percent. Miller blamed growing disaffection towards science and engineering and the generally poor economic situation for the drop.

To try to remedy the situation, all freshmen and sophomores were sent letters over vacation asking them to recommend likely prospects and encourage them to apply. A similar letter went out to the faculty. Why freshmen and sophomores? Dr. Miller said they would supposedly be closer to their high school math and physics teachers, and to the people at their schools.

Widespread

Apparently private schools throughout California face similar drops in applications. Both Pomona and Stanford have reported substantial decreases in applications while, interestingly, MIT reports no change. Most of the other schools indicate that the high (and rapidly increasing) costs of private colleges dissuades many qualified applicants.

Public colleges and universities report an inverse situation. The University of California reports an unprecedented number of applicants. Applications have already been closed at almost all of the campuses. UC San Diego and UC Santa Cruz closed themselves to further applications early in December.

Quality, not Quantity

Applications at Caltech took a slight dip last year, which Miller fears may have been the start of a

widespread disaffection of high school students for science and technology. Caltech had 1100 applicants last year, as opposed to about 1400 the year before (which was a higher than normal year).

If the quality of the applicants remains high, Miller foresees no particular difficulties for the Institute. If not, he sees "considerable difficulty." Encouragingly, the quality of early decision applicants this year appeared higher than last year, although their numbers were down sharply. Nineteen out of twenty early decision admits are coming in September; the odd man is out for financial reasons.

Top of the Week

John Benton will be going to France for a year on a Fulbright Fellowship to study medieval social conditions . . . Dr. Vogel's group will have one of the first experiments on the new 56 megabuck linear accelerator at the Los Alamos Meson Physics Facility.

Caltech's growing humanities and social sciences division ground out six books, edited three, and had 32 articles published last year according to Dr. Huttenback . . . a faculty discussion meeting is slated for tomorrow at four in the Athenaeum, topic not mentioned.

Trustee

John G. McLean, a Caltech alumnus and president of Continental Oil, has been elected to the Board of Trustees. McLean holds a Masters and a Doctorate from the Harvard Business School, and was on the faculty there for 14 years. He joined Continental Oil in 1954, subsequently holding several key posts culminating with president.

McLean has long been actively

involved in Caltech, and is a member of Institute Associates. He holds the Distinguished Service Award, the highest honor bestowed by the Alumni Association.

And So On

The 1971 California Legislature might have been one of the most productive sessions in the history of that not-so-august body, were it not for the influence of one man. Consequently, the first Etaoin Shrdlu Award of 1972 goes to Governor Ronnie "Veto" Reagan. However, in recognition of backbiting, in-fighting, petty feuding, and partisanship above and beyond all expectations, the Legislature will share this one. Wear it in good health, your honorables.

Luncheon Forum

Continued from Page One reform in America." Rev. George F. Regas

Mar. 8. "An old China hand looks at President Nixon's Peking visit." Albert Ravenholt.

Clean Cars . . .

Continued from Page One

and propane vehicles would also be involved in some of the work, however. Anyone who is interested in such a course (no prerequisites, no automotive know-how necessary) should contact James Henry at X2694, X1831, or 793-6686 as soon as possible.

Another big need is cars. A representative sample of cars that can survive the testing must be found. Anyone who would like to have his car tested as part of this program should send a note to C.A.C.P. c/o EQL - Dabney Hall. Included should be your name, address, phone, type and year of car, type of engine (as best you know), and any information about its condition that might be pertinent (supercharged, overheats in subzero weather, etc.).

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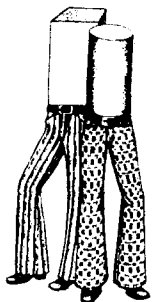
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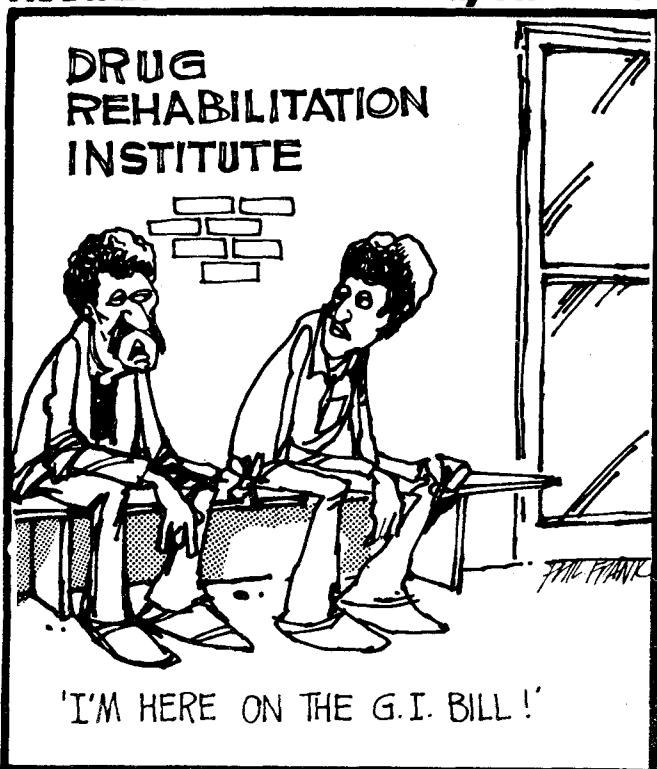


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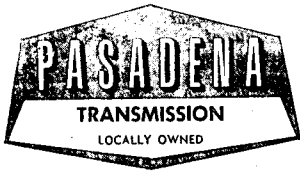
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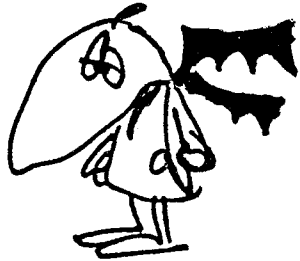
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4:00 p.m. Wrestling Biola Home
6:30 p.m. JV Basketball Redlands Home
8:30 p.m. Vars. Basketball Redlands Home

Saturday, January 8
12 noon Fencing U.C. San Diego, Cal State L.A. Caltech at UC Riverside
6:30 p.m. JV Basketball Claremont/Harvey Mudd Away
8:30 p.m. Vars. Basketball Claremont/Harvey Mudd Away

Tuesday, January 11
3:00 pm Wrestling Caltech, Pasadena College at UC Riverside

Wednesday, January 12
8:00 p.m. Vars. Basketball Cal, State Dominguez Hills Home

Friday, January 14
4:00 p.m. Swimming Cal State Los Angeles Away
6:30 p.m. JV Basketball Pomona Away
8:30 p.m. Vars. Basketball Pomona Away

Saturday, January 15
8:00 a.m. Caltech Invitational Wrestling Tournament Home
1:00 p.m. Fencing San Fernando Valley State Away
2:00 p.m. Swimming S.C.I.A.C. Relays Oxy
6:30 p.m. JV Basketball La Verne Away
8:30 p.m. Vars. Basketball La Verne Away

PAGE WINS!

by Bob Kieckhefer

Page House swam to an easy victory in the Interhouse Swimming Meet, held December 7, 8, and 9, as its men set two interhouse records. The meet started with Beall, Mariani, Keenan, and Horn swimming the 200-yard medley relay in 2:02.4, shaving 0.8 seconds off the old record. Later in the meet Don Keenan knocked another second off his 50-yard butterfly record, with a time of 0:26.7 En route to scoring 90 points in the meet, Page men won both relays as well as four of the seven individual events. Bob Miller won the 50- and 100-yard freestyles, Doug Trotter finished first in the 50-yard breast-stroke, and the team of Miller, Horn, Novikoff, and Keenan won the 200-yard freestyle relay.

Fleming finished a strong second, as Ray Waldo led the team with a record-breaking win in the 100-yard individual medley, in 1:06.0. Rick Martin was Fleming's leading point scorer, with a victory in the 50-yard

Continued on Page Four

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Owens Sinks Tech

by Andy Renie

Southern California's small college player of the week Jerry Owens scored a career-high 44 points in leading Los Angeles Baptist College to an 118 to 53 victory over Caltech Tuesday night. The game was the first in well over two weeks for Caltech (because of Christmas vacation) and left the Beavers' log at 1-3.

Caltech led in the early stages of the game 7-6 on a field goal by forward Gary Prohaska, but eight straight points by the Mustangs—six of these by forward Gil Bussanich—gave L.A.B.C. the lead which they never relinquished.

The first half saw many turnovers committed by both sides. Unfortunately for the Beavers, L.A.B.C. reaped the greater harvest from the frequent miscues. The half ended with the Mustangs solidly in the lead, 59-24. **Points**

Points Divided

At the end of the first half, scoring was pretty well divided among the Beavers. Six foot one guard Jerry Feely led the scoring with five points while Durwin Wright, Mark Bleck, and Gary Prohaska all had four points. At this point, Owens had already scored 28 of his phenomenal 44 points.

The second half of the game saw the partisan crowd cheer the Mustangs to an easy victory as Caltech failed to close the gap. Instead, it widened. In the early minutes the Mustangs outscored the

Beavers 20-2 to take a commanding 79-26 lead. The remainder of the game saw both teams substituting freely.

Final statistics showed that five players in the game scored in double figures. Jerry Feely of Caltech had 19 points. For the Mustangs, Jerry Owens had 44, Dennis Lord 21, Gil Bussanich 15, and Claude Heavens 13.

SPORTS

Interhouse Swimming—

Continued from Page Three

backstroke, second in the 50-yard freestyle, and third in the 100-yard freestyle. Fleming's second-place finish in the freestyle relay gave them a total of 49 points in the meet.

Lloyd finished third, as Bruce Johnson led his house with second places in the 100-yard individual medley and the 50-yard butterfly.

Lloyd's 31 points put them just ahead of Ricketts and Ruddock, who tied for fourth with 28 points apiece. Jim Loddengaard led the Scurves with a first place in the diving, but the individual swimming events were disastrous, even though Ricketts placed second and third in the relays. Ruddock's team was led by Frank Shuri, who placed second in the 50-yard backstroke.

Wrestlers Seek Perfect Season

By H. R. Schnurrd

Friday, Tech's magnificent matmen meet Biola in a crucial test of skill, speed, determination, and virility. The undefeated Beavers have won their first seven dual meets:

Caltech 39, LACC 12
Caltech 54, Azusa Pacific 3
Caltech 51, Laverne 0
Caltech 46, Trade Tech 9
Caltech 24, SFVSC 21
Caltech 32, CSCLA 15
Caltech 33, Cal Lutheran 21

Individual performances have been excellent; the six returning

lettermen, as well as new team members, have come through in grand style:

(Results not including Trade Tech meet.)

116 Moss	4-2
126 Morris	3-3
134 Lewis	4-1
142 Fratello	5-0
142 Stone	4-1
150 Zieve	5-1
158 Walker	5-1
167 Catanzarite	3-3
190 Smoody	5-1
Hwt Johnson	5-1

Vince Fratello, after dropping 20 lb to 142, shocked the world by pinning each of his first five opponents; Willie Moss, a Frosh out for the first time, has turned in a number of impressive performances, wrestling and winning, it seemed, on pureness of heart, and guts. Val Catanzarite, the martyr, weighing 150 and wrestling 167 and 177, looked good in three close losses.

Chances for taking league look good if we can beat Biola; but, in the words of a great man, "It shore would be nice if someathemothers would comean watch!"

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