

Option Requirements Revised

The faculty has approved a proposal of the Faculty Educational Policies Committee which recommends revising the undergraduate curriculum so that a student can change his option before the start of the junior year without carrying an overload. The Division of Civil, Electrical, and Mechanical Engineering and Aeronautics, and the Division of Chemistry and Chemical Engineering have proposed changes in their curriculum which would implement the EPC's proposal.

EPC PROPOSALS

The recommendations of the

EPC are:

1. Each student must express a preference for an option and be assigned an advisor by the time of pre-registration in the third term of his freshman year. The requirements for a given option must be such that any student in good standing can change to this option before the start of the junior year and still meet minimum requirements for the bachelor's degree within the usual four-year period without penalty in overloads.

2. An option may specify up to 30 units of required courses in

the sophomore year in addition to Ma 2abc, Ph 2abc, H 2abc, and PE 2abc (these 30 units need not be in the particular option).

3. Each option shall include 27 units of electives in science and engineering during the sophomore year, but each option may limit the number of the 27 elective units which can be taken in the major field.

APPLIED SCIENCE

The Division of Civil, Electrical and Mechanical Engineering and Aeronautics has proposed that effective with pre-registration in May, an entirely new un-

dergraduate program in engineering replace the present options.

The plan, as announced by Dr. Frederic Lindvall, is as follows: Rather than following tightly prescribed curricula, students will be offered great latitude in elective choices. A new system of advising or counseling will be established so that the student may develop, with the assistance of his advisor, a program of study in which he is most interested.

The general character of this undergraduate study will be Ap-

plied or Engineering Science. The four year program will lead to an undesignated Bachelor of Science degree in Engineering. The Master's degree will then be the first degree in engineering in a specified curriculum, just as it is now in Aeronautics.

The tentative plans for undergraduate Engineering study are based on the general Institute requirements and electives. The engineering electives will comprise about one-third of the sophomore year, one-half of the junior year, and two-thirds of the senior year.

For students now in their second or more advanced years of engineering, more electives will be available than now, but with some necessary restrictions based on preparation to date.

OTHER OPTIONS

The main proposal of the Division of Chemistry and Chemical Engineering is to let the sophomores have more choice of the 27 units of electives in science and engineering.

The other Divisions—Biology, Geology, Humanities, and Physics, Mathematics and Astronomy—are expected to have any proposed changes ready for approval in time for pre-registration in May. All these proposals must be approved by the faculty before they go into effect, and it is hoped that full details on all proposed changes and information about faculty approval will be available by pre-registration time. The California Tech will publish all new information as it becomes available.

A series of general meetings to aid freshmen in choosing an option and an advisor for the sophomore year and to explain the available electives will be held by each option.

Engineering: April 7, 1:00 a.m., 201 Bridge

Chemistry and Chemical Engineering: April 14, 11:00 a.m., 22 Gates

Physics: April 21, 11:00 a.m., 201 Bridge

Following the general meetings, students who wish to do so may arrange individual conferences with the following option consultants:

Engineering: Professors Norman Brooks, Charles Crede, R. V. Langmuir, G. D. McCann, Rolf Sabersky.

Chemistry and Chemical Engineering: Professors Fred Anson, William Corcoran, and J. Wasser.

Physics: Professors T. Lauritsen and R. Leighton.

The Registrar's office must have at least a tentative indication from each freshman of his choice of option by April 27.

ROTC Instructor Suffers Injury In Air Accident

Captain Andrew Henry, Air Force ROTC sophomore instructor, suffered a broken collar bone, and a slight skull fracture when he was forced to bail out of a crippled T-33 jet trainer March 17, near San Diego.

He parachuted to the top of 5,000-foot Mt. Woodspn, where he was found and taken to the San Diego Naval Hospital. He returned home last Tuesday. Since he is encased in a heavy cast, he probably will not be able to resume his teaching duties this term.

Keck Donates Half Million For Grad. House

A \$500,000 gift to Caltech to finance one of the planned four new graduate houses was announced last week by Dr. DuBridge. The donors are Mr. and Mrs. W. M. Keck, Jr., of Beverly Hills, and the William H. Keck, Jr. Foundation.

Plans call for the Keck house to be a three-story, 53-room building, containing 16,000 square feet of floor space.

CONVERT TO SUITES

Thirteen pairs of the 53 single rooms may be converted into suites suitable for living quarters for couples attending scientific meetings in the summer or on holidays.

The building will have a central lobby and lounge, the latter opening onto a patio. A second-floor kitchen will be available to foreign students restricted to diets of their native countries. The house also will be equipped with washers, dryers, and ironing boards.

BUILD NEXT FALL

The four-house graduate center, costing \$1,500,000, will provide living and social facilities for about 175 unmarried students. Construction will start next September and will be completed for the fall term the following year. The buildings will be located on the east side of Holliston avenue north of San Pasqual street.

Two of the new undergraduate houses, already under construction, are all that remain to be financed in Caltech's two-year \$20 million development program.

Budget Requests Due On Monday

All student organizations desiring money from next year's ASCIT budget should speak to Sid Leibovich, ASCIT treasurer, before next Monday's meeting. The Board of Directors will begin considering budget proposals at that time.

Announcements

ASCIT APPLICATIONS DUE

Applications are due for ASCIT appointive offices as follows: April 4, membership on the Executive Committee; April 11, head of ASCIT Photo, Chairman of the Election Committee, membership on the Educational Policies Committee; April 18, Business Manager of the Big T; April 25, Head Yell Leader, Chairman of Students' Day. Those interested should submit their names and the position sought, in writing, to John Golden, Dabney.

YMCA PRESENTING ACTIVITIES

The Caltech Y has several activities of note this week. The Man and the Arts Commission is meeting tonight at 6:30, and welcomes anyone interested in culture to drop by the Training Tables. At 7:30 the usual Folk Song Session will take place in the Y Lounge. Folk Dancing is scheduled for Sunday at 7 p.m. in Culbertson; no previous experience is necessary. Also on Sunday the Y Film Series is presenting "Harvey." At 7:30 206 Dabney will become the movie theater.

California Tech

Associated Students of the California Institute of Technology

Volume LXI

Pasadena, California, Thursday, March 31, 1960

Number 22

Work Harder, John



New Tech Editors, John Todoroff and Tom Tisch.

Music History, Analysis Subject Of New Course

A course in music history and analysis will be offered beginning next fall, according to an announcement by Dr. Hunter Mead. This will be the first credited music course ever presented at Caltech. It will last a full year, five units per term, and will not be allowed as a senior humanities elective.

The new course comes as a result of several years of work by Dr. Mead and other faculty members, and by the ASCIT Educational Policies Committee. A major problem has been disagreement as to the subject matter, with some groups asking for music appreciation and others favoring music theory or even orchestration and advanced harmonic analysis.

The course finally agreed upon will be a history of music studied through the development

of musical form. The text for the first half year will probably be Masterpieces of Music Before 1750, accompanied by recordings prepared for the purpose by the Hadyn Society. From there, most of the work will be from pocket scores.

The Humanities Department has asked Dr. Orpha Ochse, a musicologist from Eastman School of Music, University of Rochester, to teach the course. Dr. Ochse is minister of music at the First Congregational Church, Pasadena, and a teacher of organ at Whittier. She is also beginning private classes in harmony on Saturday mornings.

Registration for the course will be limited to 30 students aside from auditors. There are not prerequisites, although ability to read music would be helpful. In place of exams, there will most likely be several short-term papers. Classes will probably be two hours each Wednesday evening.

2-S Deferments

Qualification examinations for Selective Service 2-S deferments will be held on April 28, according to Professor McCormick's office. More information is coming in the Tech.

Stacks Offer Longer Hours

Bridge lab has been opened for evening study and new hours have been assigned to Dabney library and the General library, the Institute announced at the last Student-Faculty Relations Committee meeting.

Bridge will be open until 11 p.m. Monday through Thursday for the convenience of students. Dabney Hall will continue to remain available.

The General library in Bridge will have new hours as follows: Monday through Friday, 8 a.m. to 6 p.m.; 7:30 p.m. to 11 p.m. Saturday, 9-12 noon and 1-5 p.m.

New hours have also been arranged for the Humanities library, in accordance with the institute policy of providing more study space for students. These hours are as follows:

Monday through Friday, 8 a.m. to 6 p.m.; 7:30 to 11 p.m. Saturdays, 9 a.m. to 12 noon. Sundays, 2-6:30 p.m. and 7:30 to 10 p.m.

The students' desire for more down-campus study room is apparent. If enough students make use of Bridge to warrant keeping it open, there is a good chance that Engineering or Mudd or Kerchoff may be opened to provide additional room.

Tech Abacus Lab Expands

The Burroughs Corporation has presented a new \$420,000 Burroughs 220 electronic computer system to the remodeled Tech computer center. The computer began work the last week of second term.

Acknowledging the gift, president L. A. DuBridge said: "Electronic computers are increasingly important in many branches of science and engineering—from astronomy to aeronautics. This fine new machine will greatly enhance the capacity and versatility of Caltech's computer center, and the Burroughs Corporation will have made a great contribution to our research program."

The 220's high-speed performance and versatility will accelerate many research projects, according to G. D. McCann, professor of electrical engineering and director of the computer center. "There has never been a lack of mathematical theories

(Continued on page 6)

Editorial

Chance To Help

The sweeping curriculum revisions now being formulated reflect a faculty desire to encourage each individual to pursue a variety of personal interests within, of course, the necessary bounds of grad school and professional requirements. For this new outlook all undergraduates owe a vote of thanks to the faculty Educational Policies committee and to the division chairmen.

We need not stop at this point, however. The ASCIT Board of Directors will soon appoint a new nine-man student Educational Policies committee which can have an influence in the designing of specific elective courses which each department will offer to implement the new policy. We would like to encourage applications (now open—see "Announcements" on page 1) for membership on the committee especially since only five people have applied to date.

Also we would like to suggest some specific areas that the new EPC, judging by student complaints, should investigate during its year in office for possible inclusion in the reorganization.

1. Humanities department. Thanks to Dr. Hunter Mead and some work of the EPC there is a new credited music elective. Fine, but now how about other fine arts and why aren't non-seniors able and encouraged to take the humanities electives?

2. The physics option. Objections were raised on the EPC last term to Ph 111 on the basis that it covers topics in only a sketchy manner such that everything learned will only have to be relearned more rigorously later. The physics department asserted that the juniors need a qualitative understanding and feeling for certain phenomena so that they will know intuitively whether a wavelength or a force or an energy that they might compute is of the right order of magnitude. This, it is claimed, is the aim of the course.

We would like to know, however, why it is possible to take both freshmen and sophomore physics courses and learn no physical intuition. Why do the students taking Ph 111 have to have the EPC investigate before they know why they are taking the course? And why does the physics department discourage interested students and suggest first and foremost that they leave the option or never enroll in it because they are having grade troubles? Why are there no sophomore physics electives? How successful is the Ph 2c modern physics course, now in its second year?

3. The advisor system. With the removal of most rigid requirements it is going to be more important that each advisor get to know his advisees well and so be able to see that they take the program that is the best for them. Fortunately the faculty has indicated that it is quite conscious of this necessity.

4. Engineering. The new policy is bringing the biggest changes in the engineering option because it was here that some of the most rigid requirements existed. There is a great opportunity to make the elective philosophy mean most to engineers and the EPC can help by working on the department to offer the engineering electives that the students most need and want. Good points of several unpopular courses such as ME 1 and EE 2 lab might be reworked and combined into a new elective. The material of AM 4 and AM 5 might be better grouped so that EE's can study what is interesting to them without having to sit through what is designed for ME's, and at the same time give the ME's a better course.

5. The grading system. How can there be less emphasis on one's GPA and a more accurate recorded picture of one's abilities and performance?

We suggest that the committee work more closely with the faculty EPC and that it keep the student body better informed of its discussions and recommendations than the outgoing committee has done this year.

The faculty is in a mood to let the student chart a large share of his own curriculum. We would like to see the EPC take advantage of this opening and ask the faculty essentially to widen and deepen the student's choice in ways similar to those we suggested.

—JT

Letters

Moler's Memory Maimed

Editor, California Tech:

Several weeks ago the California Tech ran an editorial about the IHC and how Ricketts almost lost its Interhouse Trophy points for track. The editorial was well-phrased but little different from stuff previously written for similar occasions on behalf of the house that's "getting a raw deal." In fact, this editorial was written chiefly as a result of the IHC Secretary having been in the Tech office the night the paper was being put to bed and convincing most of the staff that there really was a good chance that the IHC would vote unfavorably.

Yes, we all agree that Ricketts won the track meet. We also agreed in theory that Ricketts should not lose all 25 points as a penalty. Especially clear was the fact that the rules could be applied to reach either conclusion; loss or no loss. It should also be clear that the pros and cons were rather abstract. This is pointed up by the way that the final vote was decided: the houses having the most to gain could treat the abstract views more suitably from a penalty enforcement approach, the house that could lose reflecting the opposite point of view, and the houses not affected being left free to side with the underdog as custom dictated.

Rules can't be made to cover every case — the more you fill the loopholes, the more subject to interpretation the rules become. But both rules and interpretations of same can be defined. And once defined, stick to the system, damn it. Okay, so the penalty is too stiff. So the officers responsible did a sloppy job. So a couple of people almost cost a large group of guys 25 points toward a trophy that the house is working hard to win. A sense of fair play and willingness to forgive

may make them happy. But promises that it won't happen again are a poor substitute for that for which the penalty system is designed. Even the most prejudiced Ricketts man will agree that, if his house had lost its points, the lack of responsibility that caused the loss would be remedied, and fast. But since irresponsibility can now be covered up by a forgiving IHC, we must rely on conscientious voters and officers to make sure that things run smoothly.

I scarcely advocate that, where a group has been running smoothly, it is a result of their having recently having had their hands slapped. But hand-slapping will put anybody on their toes for the next round. And for Caltech I heartedly recommend both hand-slapping (to the point of cruelty) and election of conscientious officers. Then, maybe, things will get done around here. They may even be done right.

Not even Brad Efron can convince me that no one in Ricketts

knew (or at least thought) that the house list is supposed to be as accurate as possible; that the Athletic Department uses the house list to determine house membership in Interhouse sports; that the Athletic Department not only told the Athletic Managers and house secretaries of this use of house lists, but sent repeated notes to this effect.

The plain fact is that Ricketts' secretary was irresponsible, their athletic managers were sloppy, and their executive committee ignorant. Oh, no one ever told the secretary, the athletic manager, etc. Blame whoever you want. And don't laugh at Ricketts. Every student group on campus this last year suffered from the apathy disease to some extent. Witness the Beavers, campus service group.

The suggested solution? Work within the rules and/or traditions, and if they don't work, change them, don't ignore them; enforce penalties for a job poorly done; aim in trying to do the best job you can—at least do something.

Doug Shakel

Arms Race Value Discussed

Editor, The California Tech:

It seems to me that we've all had ample time now to attempt an evaluation of Norman Cousins' visit, yet even at this time of intensive international negotiations concerning atomic testing, one has to search deeply around Caltech to find people who are genuinely concerned with the far-reaching implications of the arms race. We at Tech cannot ignore the gruesome consequences of the fanatical race to destruction in which this world is involved. We, especially, have no special dispensation which allows us to ignore the ever-increasing danger of the situation.

What sound reason is there to continue atomic testing and stockpiling? Are we making our safety more certain? We can already annihilate any enemy and ourselves as well. How many people feel safer now than they did three or four years ago? Has our policy of matching and racing the Russians made anyone feel that we are safer now?

Let's forget for a moment that we are all engineers or scientists who will seemingly benefit from the current hysteria to match Russia's technological progress. To what avail will our knowledge be when some damn fools start dropping bombs?

I don't propose to tell people what to think about this. I only ask that anyone who feels that the arms race has significance for the future to try to find out more. There are more and more publications available and more opportunities to see and hear what informed people have to say. Let's talk to each other and try to learn more. Let's use our intelligence on a problem that really requires intelligent thought. Let's do something.

Bruce Abell

Ouch!

Editor, The California Tech

For a change it was possible to make some sense from Carnoy's Griffen column, amid the hackneyed figures of speech.

Ouch!

Arthur Rubin

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The California Tech

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ASCIT Play To Show Soon

By MIKE TALCOTT

This year's ASCIT play, *Dark of the Moon*, will be a challenge both to the actor and audience.

This marks the first time a serious dramatic offering will be presented as the annual play. Up to this point, in general, we have witnessed light, frothy, situation comedies. But *Dark of the Moon* is anything but that; it is taut, exciting drama and the type of play which would not receive the Good Housekeeping Seal of Approval. This break with tradition is a healthy change and will allow the drama club to carry on a fuller and freer program. There is room for all sorts of drama on this campus: tragic, comic, farcical, experimental—all types should be allowed to exist as a mode of expression for the Tech student. Drama, as an extracurricular activity, is at once fun and creative, and the program should have a broader scope.

The actor in serious drama must act, he cannot fake as in light comedy. In order that the audience be moved and involved, the actor must be so likewise. This promises some interesting results. For an area so deluged, as Pasadena, with airy nothingness in the realm of drama, *Dark of the Moon* should be a refreshing change.

There is still room for those who wish to assist with lighting, sets, and props. Contact Bob Poe, Lower Throop mailbox, if you are interested. Oh, yes. Tickets will be out soon.

Cepheid Meter Sticks Are Blinkin' Accurate

Using observations of cepheid variable stars, astronomers at Palomar and Mt. Wilson Observatories have completed calibrating a method of measuring the vast distances in space beyond the Milky Way.

For more than 40 years astronomers have been using cepheids to measure distances in space, but with imprecise calibration. These stars have two unique habits that make it possible to use them as distance indicators. They dim and brighten periodically, and the length of their blink period and their brightness are related—the longer the period the brighter the star. If two cepheids of the same period are compared and one of them appears to be brighter than the other, the difference in brightness will be due entirely to the fact that one is farther away than the other.

There are some complications involved in using cepheids for a yardstick. Some have an irregular period and others do not conform exactly to the period-luminosity relationship. Also, some have been discovered with the same period but small differences in luminosity.

These are the problems which the group of Palomar and Mt. Wilson astronomers set out to solve. The group is composed of Halton C. Arp, Robert P. Kraft and Allan R. Sandage. They studied cepheids ranging from the dim ones with one-day periods to the very bright ones with periods of 100 days.

Arp went to Africa and, using

the 74-inch telescope at Pretoria, observed 69 cepheids in the Small Magellanic Cloud, a small satellite galaxy of the Milky Way visible only from the southern hemisphere. Arp determined that cepheids with the largest amount of variation of luminosity during a period are the most reliable as distance indicators because their period-luminosity relationship is the most precise.

Sandage pointed out the physical reason that cepheids with nearly the same period may very slightly from their average luminosity: they increase their average radius as they evolve.

There are some 610 known cepheids in the Milky Way Galaxy, and Arp, Kraft and Sandage studied some of them in the Milky Way's star clusters. This was done because the distances to those clusters have been established by a modified version of triangulation. Knowing the distances to the clusters that contain cepheids, astronomers then know the true candlepower, or brightness, of the cepheids in those clusters. Thus the starting point of the distance scale is established and can be used to compute distances in light years.

Two problems remain unsolved in the investigation, but they are not expected to affect the calibration to any large degree. One is the indication that some cepheids have a different metal composition than others. Special patterns of cepheids change during their period because their temperature changes throughout the cycle. There is evidence, too, that at some phases of the

period, two layers of gas may pass through each other.

The other remaining problem in the current cepheid investigation is the determination of the evolution of these stars. It is believed that early in their life cycle, many stars become the kind of cepheids that will be used as distance indicators. The mechanism of the pulsation or the cause of it is not known, but several promising leads are emerging with which to develop a theory of pulsation.

It has been suggested, primarily by the Russian astronomer S. A. Zhevakin, that the pulsations may be due to the formation of a helium-ionized zone near the surface, which acts as

(Continued on page 4)

May 2 Deadline for McKinney Contest

Another opportunity is available for those Techmen who feel that their literary genius is being stifled by the repressing conventions of the classroom. They will be rewarded with money rather than grade points in the McKinney Prize Contest in English for 1960.

Prizes of \$100, \$75 and \$50 will be awarded to the three top essays, which will be entitled "The Beat Generation." The papers, to be 1200 words in length and to be based on Kerouac's "On the Road," and Ferlinghetti's "A Coney Island of the Mind," must be submitted to Professor Kent Clark by Monday, May 2, 1960.

Fortune Honors Tech Physicists

Dr. Richard Feynman and Dr. Murray Gell-Mann, professors of theoretical physics, are honored in the March issue of *Fortune* magazine in a story which describes the work of 11 of the country's outstanding physicists.

This is the first in a *Fortune* series planned to review the principal scientific advances since 1920 and introduce the most eminent American scientists. Subsequent issues will deal with chemistry, astronomy, biology, and psychology.

Student Discount On Biltmore Play

Tech students can get a \$1.00 discount on tickets to see the Piccolo Teatro di Milano performing in "The Servant of Two Masters," opening Tuesday, April 5, at the Biltmore Theater. The discount cards are available at the News Bureau in Lower Throop.

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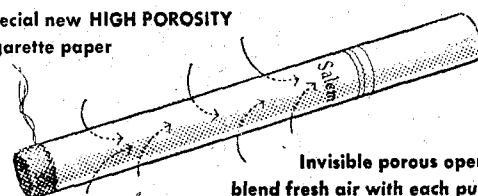
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Preparation Ends, Mun Delegates Off To Cal

Twelve Techmen will be leaving next week for Berkeley where they will participate in the Tenth Commemorative Session of the Model United Nations. The conference, which will be attended by delegates from almost 80 western colleges and universities, will take place next Wednesday through Saturday on the University of California campus.

The Tech delegation will be representing Israel. The delegates will participate in discussions and vote on resolutions as if they were actually Israeli delegates to the United Nations.

Cleve Moler is chairman of the delegation. Ken Scholtz, Clyde Zaidins, Roger Noll, Bob Koh, Marty Carnoy, Lou Toth, Pedro Bolsaitis, Francis Wilson, Sid Leibovich, Bob Walsh and Harold Thomas complete the group.

Over two dozen international problems will be considered by various committees and councils during the three-day session. Of particular interest to the Israeli delegation will be the Arab refugee problem, development of undeveloped countries, race conflict in South Africa and French nuclear testing in the Sahara.

Israel will also be arguing a case before the mock International Court of Justice. They will request the Court to instruct the United Arab Republic (Oxy) to allow Israeli ships and cargos through the Suez Canal.

All resolutions passed by the committees will be submitted to a General Assembly session on Saturday for a final discussion and vote.

Stars

(Continued from page 3)

a valve, alternately blocking and releasing radiation that normally streams through the outer layers of stars. Sometimes the pulsations increase a cepheid's girth by 30 per cent.

Anyway, the cepheid scale should be accurate out to about 5,000,000 light years, the observable limit of cepheids. The Milky Way is about 80,000 light years across, which means the cepheid indicator reaches beyond this galaxy into several neighboring ones.

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Steve Allen To Visit Tech On April 5

Steven Allen, noted television comedian and motion picture actor, will be on campus Tuesday, April 5. Allen will be here under the auspices of the Caltech YMCA, and will speak at three campus meetings. Many think of him as a comic and nothing more, but Allen is a concerned leader and thinker in the fields of social action and the history of philosophy.

Along with Robert Ryan, Allen was the founder of the Hollywood chapter of the Committee for a Sane Nuclear Policy. He has written a number of articles and editorials on the segregation question. And he is working on plans for a television program, which would make the great thoughts of Western man palatable to a mass TV audience.

Allen will speak to students and discuss his concerns with them at a public meeting in Dabney Lounge from 2-4 in the afternoon.

Aero Keeps Manned Nose Cones Cool

A promising solution to the re-entry problem of manned space vehicles has been found by the Guggenheim Aeronautical Laboratory. It has been discovered that the ejection of helium gas from the front of the nose cone cools the rocket significantly during its flight through the atmosphere. The onrushing air spreads the helium in a thin, continually flowing blanket over the cone's surface.

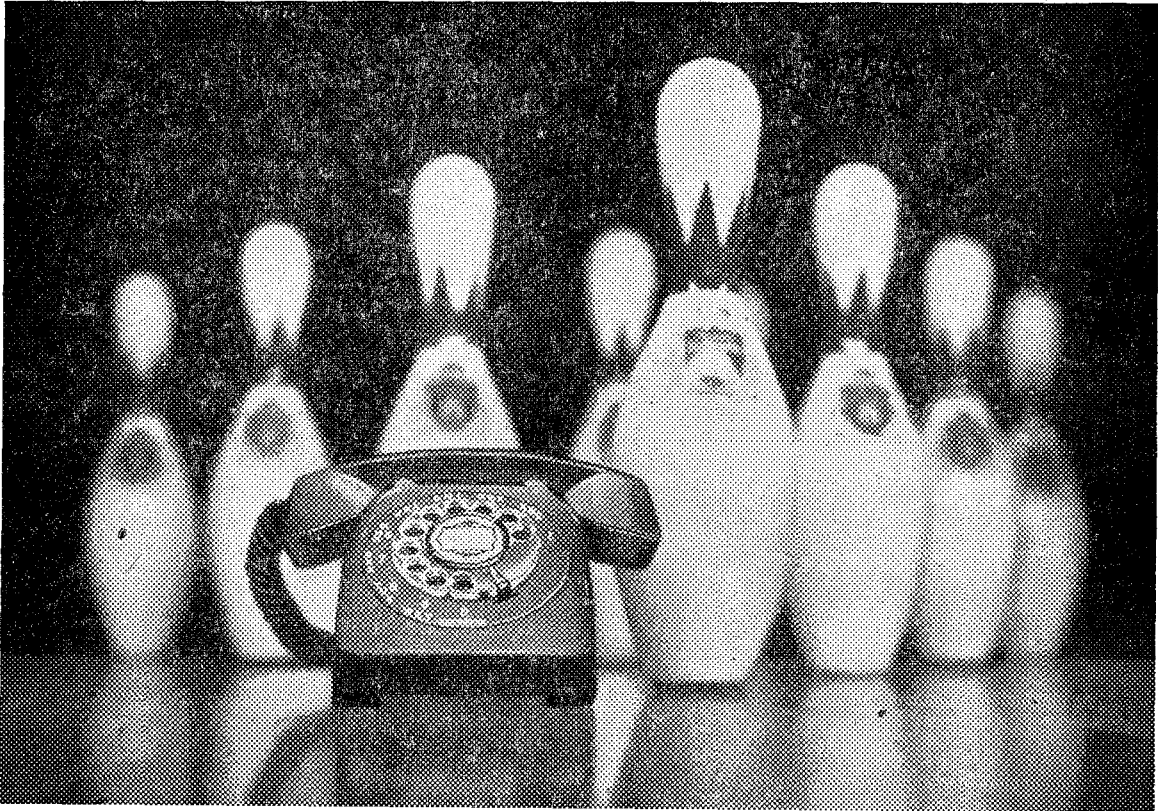
Helium, chosen because of its large capacity to absorb heat, not only prevents the hot shock-wave layer of air over the nose from transferring much of its heat to the cone, but also absorbs and carries away most of the heat.

Of course, the re-entry problem has been solved for guided missiles already, but these remain in the dense atmosphere only for the relatively short period of 30 seconds, rather than the more extended period of about an hour required for manned vehicles. Ballistic missiles must take higher temperatures than manned vehicles, but for much shorter durations.

Lester Lees, professor of aeronautics, is directing the research, which is being carried out by Captain Monte Coffin of the Air Force and Dr. Toshi Kubota, assistant professor of aeronautics, in a program supported by U.S. Army Ordnance.

The experiments, being carried out in a Caltech wind tunnel, are designed to simulate speeds of about 19,000 miles per hour at altitudes of up to 150,000 feet, where the atmosphere is very thin. Information obtained from the wind tunnel experiments is being extrapolated to predict the performance of the helium blanket under flight conditions where much higher temperatures and speeds are attained.

Other heat absorbing blankets are going to be tested in the research program. These include water, ice and frozen camphor. All these materials show promise.



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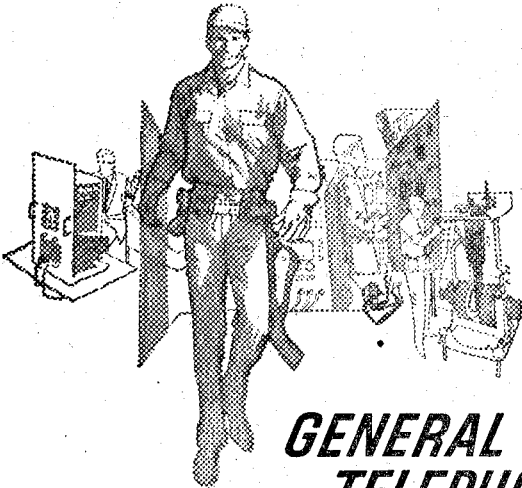
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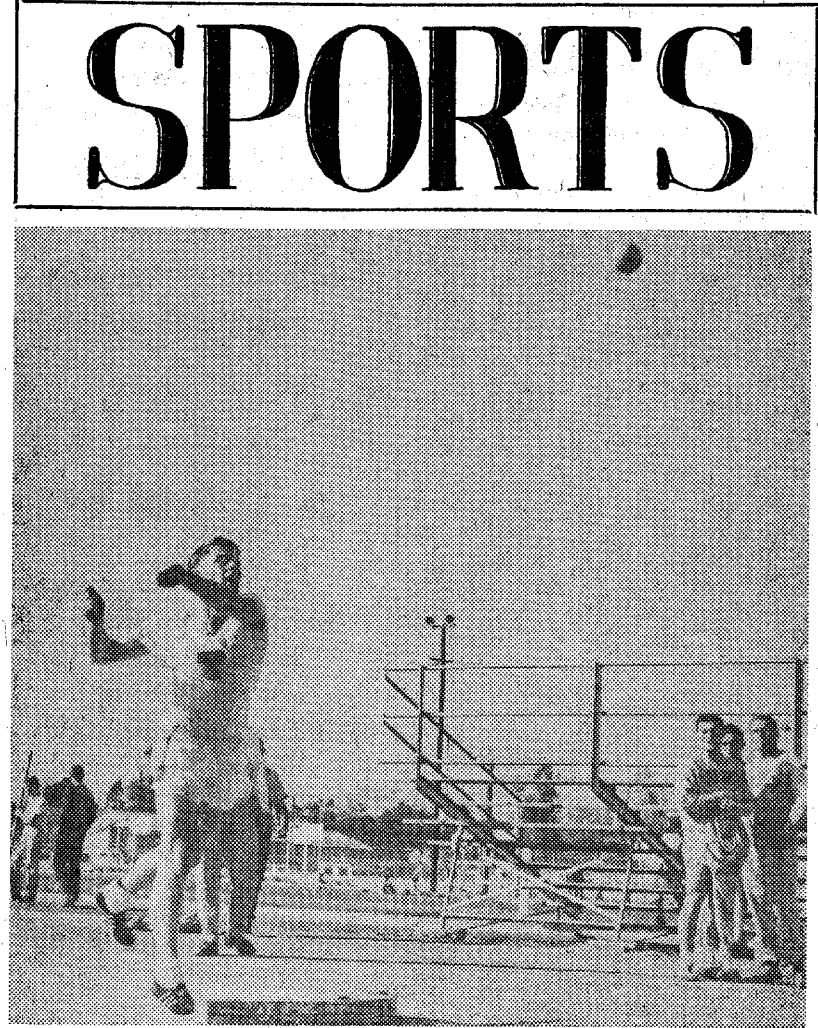
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Question Period



Trackmen Face CHM, Pomona On Saturday

Saturday afternoon, the Caltech track team faces its first SCIAC competition in a triangular meet against Pomona and Claremont-Harvey Mudd. The hosts may offer Tech its closest competition of the season.

Sparked by a strong team effort in its last meet before finals the Tech Varsity will be improved. That meet resulted in a near victory with the final score San Fernando State College 67½, Caltech 61½, Cal at Riverside 20, and Pasadena College 15.

Spearhead of Tech's spirit is hard-working Dick Tuft, who led the way in the last meet with twin victories—4:32.7 in the mile and 2:02 in the half. Jim Klett contributed valuable points with his double win the 100 and 220. Tom Kyle rounded out Tech's dominance of the flat races with a 51.2 victory in the 440.

DEPTH GROWS
Key to Tech's improvement is its growing depth, particularly in the field events. Lannes Purnell is nearing top form in the javelin with marks over 190 feet. Ed Cline, with eyes on 12-foot six-inch should push returning John Weaver on to new heights. Versatile Geary Younce has filled the weakness left in the broadjumping of the low hurdles.

Weightmen Leibovich and Stewart continue to improve. Typifying the team effort runners Bob Juola, Mike Ruecker, Rich Harris and Ben Burke have contributed valuable points each meet in several races.

Pomona looks strong in Saturday's meet with Claremont-Harvey Mudd close behind, led by miler Laughton, who boasts a 4:23. A victory by Tech will be a well-deserved one.

FROSH STARS
In their few chances to shine, Tech's frosh spikers have shown great potential. Inactive for three weeks and forced to run with the varsity before that, they are anxious to enter SCIAC competition.

Leading the way is distance man Pat Early who is sure to break the school two-mile frosh record. His present mark is

10:23.6. In the middle distances Jan Dash and John Lindsey are coming on strong. Will Saam leads the improving sprinters.

Characterizing the frosh team
(Continued on page 6)

Swim Team Tackles Claremont Long Beach St. In Dual Meet

In their first league meet last term, the varsity and frosh swimming teams defeated Redlands. The varsity won by a surprisingly close margin of 55 to 40, while the frosh trounced their opponents, 65 to 7.

The leading swimmer of the day was Winn of Redlands, who won the individual medley, beat Caltech's Gary Tibbits by 0.2 of a second in the 440-yard freestyle, and then led his freestyle relay team to a victory in the respectable time of 3:49.7. The best performance turned in for Caltech was that of Marshall Buck, who won the 200-yard breaststroke in the time of 2:33.6, coming within two seconds of the school record, set last year by Don Owings.

The Caltech varsity squad will attempt to extend its dual meet win streak to six straight this week end, when, it encounters

Claremont-Harvey Mudd here at 4:15 on Friday and Long Beach State there at 10:00 on Saturday.

C-HM will make a determined effort to repeat last year's victory over CIT. Paced by Rick Morse, one of the finest competitors in the conference, and Mike Harvey, they are hoping to catch the Caltech varsity team cold as a result of their two-week layoff.

Long Beach State, led by Ken Handorf, Doug Martin and Bill Renison, will be strong in every event. They also defeated CIT in a dual meet last year.

Frosh Win

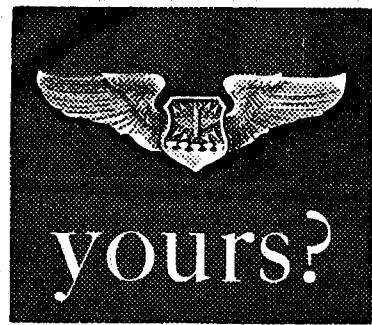
Redland's greatly undermanned frosh team offered no serious threat to Caltech's frosh, who proceeded to win every event. Among the outstanding times turned in by the freshmen were 2:37.6 and 2:41.0 by Pat Manning in the 200-yard

backstroke and 200-yard individual medley, respectively, and 5:31.4 by Larrk Daubek in the 440-yard freestyle. Bruce Chesebro marked himself as a strong contender for individual all-conference honors on the basis of his times of 25.7 and 59, in the 50-yard and 100-yard freestyle events.

Due to a lack of entrants, there was no fresheeman diving competition. Coach Webb Emery would be interested in talking to any freshmen willing to fill this important spot.

The frosh team is scheduled to compete against the C-HM frosh team this Friday. In case the latter does not show up, they will have an intersquad competition with several of the swimmers, who add necessary depth to the Caltech varsity.

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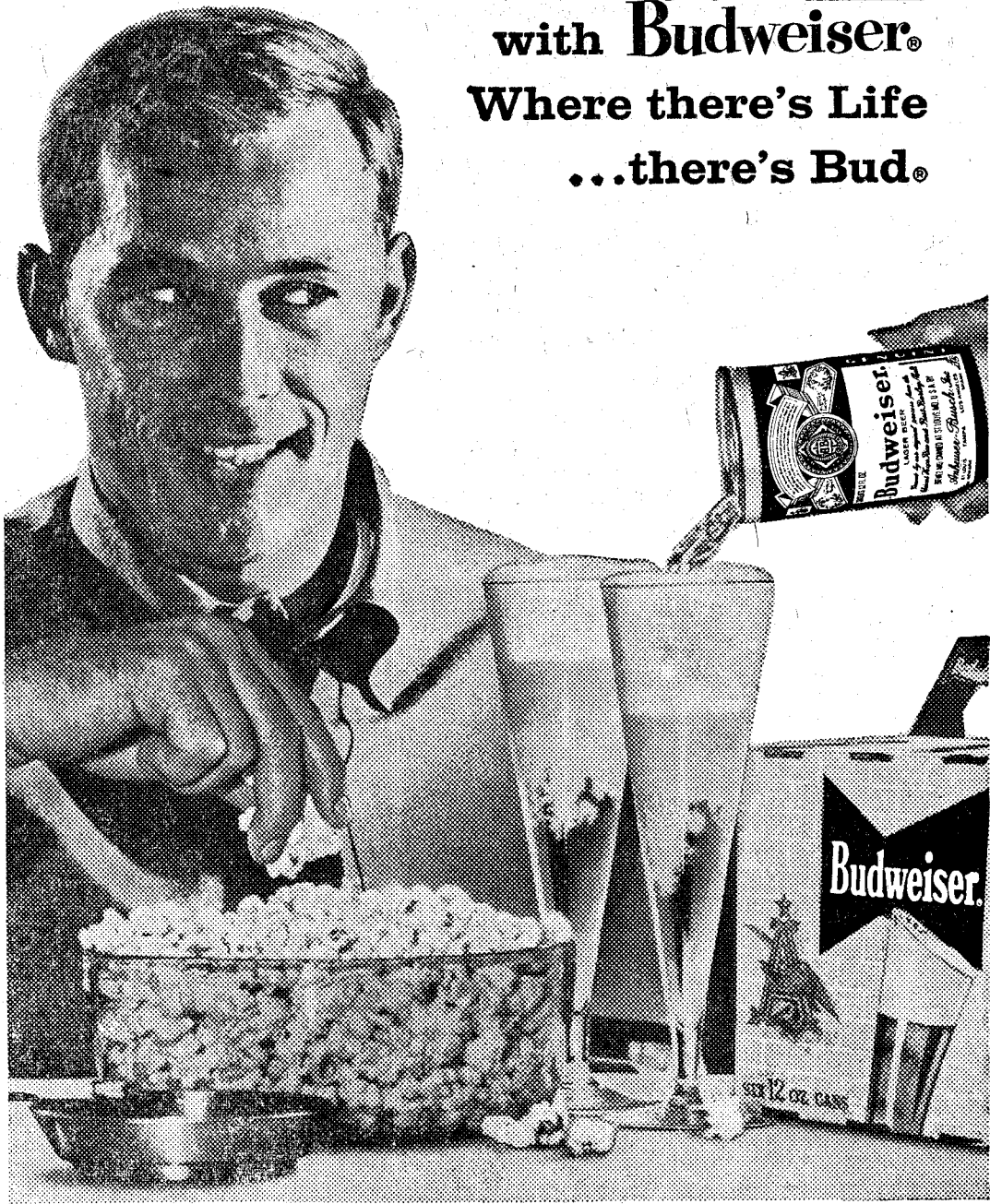
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Baseballers Win 5 Of 6 As Pitching Improves

After a highly successful tour during vacation, the red-hot Beaver baseball team came back on Tuesday to stomp Claremont-Harvey Mudd 7-3 for a win in their first conference game. The victory places the Caltech nine in second place in the SCIAC and a half-game behind leader Oxy who has a perfect 2-0 slate.

Versatile Dave Blakemore, a regular at his third position in three years, hurled the route for the winners in limiting the visitors to nine scattered hits. Biggest hit for the Beavers was a center field triple by John Walsh which drove in Fred Newman with the fourth and winning run. Scoring three runs in the first inning, the Beavers coasted to the win easily, and gave up the Claremont tallies in the last two frames.

With a somewhat patched-up lineup, using Skip Stenbit, first baseman last season, at catcher and switching veteran Herm Hartung to third, the Beavers also looked good defensively. Blakemore stifled the CHM running threat with two pickoff plays in the first two innings and the Beaver infield contributed two double-plays.

The baseballers, winners of five of their last six contests, will meet Redlands Saturday in a double-header for their next league test.

In their southern swing last week, the Techmen met Miramar Naval Base, the University of San Diego and Cal Western in five games and dropped only the USD contest.

Cal Western, holding a good overall season record, fell 7-3 as soph Steve Heineman, pitching mainstay of last year's frosh squad, went the distance in picking up the win. Heineman yielded only four singles and used a big sixth inning rally by his mates to grab the victory.

The winners, who collected seven hits, were helped by nine walks and two errors. In the four-run outburst in the sixth inning, Herm Hartung and John Arndt belted hits to drive in one run apiece.

With Blakemore hurling the next day, the Beavers buried the hapless Cal Western squad under a 19-run barrage to step to a 19-3 decision. Blakemore again was impressive as he hung up a complete game without getting into trouble. Newman boomed three hits with Stenbit, Blakemore and sophomore outfielder Frank Ridolphi each clipping a pair of safeties.

Coach Ed Preisler, shuffling his youthful mound staff, was given another fine performance as sophomore Bill Palke also went the distance in racking up a 8-3 triumph over Miramar. Palke, after giving up two hits to the first two batters, flipped hitless ball for the remainder of the abbreviated six-inning game.

The Beavers also only registered a pair of singles but took full advantage of an amazing 13 errors by the accident-prone Miramar infield.

San Diego U., abruptly derailed the on-rushing Beavers with a stunning 21-1 setback, allowing the losers the stingy total of two singles. Using three pitchers, the Techmen gave up 13 hits to the powerful home squad which scored in every inning.

Closing out their vacation exhibit schedule last Saturday, the Beavers returned to easier pickings and grabbed a 7-3 verdict over the out-manned Miramar nine. Soph Don Nisewanger, another of the three second-year men in the starting lineup, had

a perfect three-for-three day at the plate in leading the potent 13-hit attack of the victors. Hartung, Arndt and Merrill each contributed two hits.

Pitching, supposedly the weak spot in the Beaver baseball picture, has shown startling improvement with five complete games in the last six tilts. With the addition of a pair of sophomore mound starters and some improved hitting, the Beavers are looking better with every game.

Track

(Continued from page 5)

are the field-event men — inexperienced but talented: John Letcher, high jump; Denis Couzins and Aram Mekjian in the javelin, and Bill Francis and

Golfers Tee Off; Beaten By Cal Poly

The Cal Poly (Pomona) golf team defeated Caltech, 9-15, in an exhibition match played Monday afternoon on an unusually wet Los Serranos Golf Club course. Gil Carter of Cal Poly won medalist honors by firing an 82.

Individual results were:

Cal Poly	points	Caltech
Carter	6 0	Cointment
Miyashire	1 5	Larson
Brooks	3 3	Funada
Paro z	6 0	Shanks
Tisdell	3	Ihler
Parker	5 1	Sorensen

Tom Anderson in the shot. Their victories in the Pomona Relays early in the season showed their potential to the rest of the league.

Computers

(Continued from page 1)

—only a lack of time to test them,” McCann said. The 220, capable of 300,000 additions or subtractions per minute, promises to help solve this problem.

Satellite orbit calculations, simulation of brain functions, and calculating the rate of expansion of the universe are a few of the chores awaiting the 220.

The Burroughs 220 system includes a data processor unit, 55,000-digit magnetic core memory, paper tape input-output units and two magnetic tape auxiliary storage units. It is capable of being expanded to include an additional 55,000 digits of main memory, plus eight magnetic tape auxiliary-storage units.

In addition to the central 220 system, the newly remodeled computer facility will house two analog computers developed by the Analysis Laboratory. Basic data derived from these computers will be processed and evaluated by the 220.

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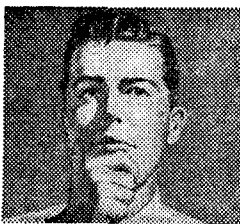
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