

CALIFORNIA TECH

California Institute of Technology

Thursday, March 10, 1949

No. 20

Volume L.

Snakes Sally From Seclusion To Stirring Sorb Spectacle

Gloria Murphy Stars, Other Thespians Include Carl Fox, Carl Price, Jim Hendrickson, Sis Stabler

Proving again that all Pasadena stage talent does not reside at the Playhouse, our Caltech thespians outdid themselves again this year in their annual production, "Maid in the Iceplant," presented Thursday and Friday evenings at Culbertson Hall, involved Sorbian intrigue, brass corsets, bananas, and the coed system on the roommate plan.

Accepts Post

It all started when Gen. Erdgang von Graustark accompanied by his daughter Annelida, accepted the post of Regent of the Undergraduate Teapot at the California Institute. Gen. von Graustark had traced the infamous international criminal Gregori Meuhlenberg, who he quested around the world to settle a matter of Sorbian honor, to Pasadena.

Upheaval

At the Institute, however, things were in upheaval due to the proposal of Dr. Max Crock for the coed system on the roommate plan. Dr. Drawbridge was violently against the proposal as he saw millions of dollars in endowments being thrown to Oxy as the result. The whole matter was to be decided by the Student-Faculty Illicit Relations Committee. To complicate matters Gregori Meuhlenberg was a member of the committee, having fled to Pasadena and now posing as an R. A. named Charles Ottersprach. He had a corner on the international corset cartel, and saw coeds as the wedge to move in on the American corset business.

Seduction

The resulting plot between Gregori and Annelida to seduce one of the Frosh on the committee to approving coeds and thus swinging the split vote, was the high point of the play.

Coeds Approved

In the end the committee approved coeds, and reunited Gen. von Graustark and Annelida with Ernst, his son, and Veda, his wife. They had been missing for many years because of a Sorbian revolution over the accepted manure theory. In addition a \$500,000,000 endowment was given to the Institute for the improvement of Schnapps, and Gregori was found out and shot.

Cast

Carl Fox played Gen. von Graustark; Gloria Murphy, his daughter, Annelida; Jim Hendrickson as Ernest; Carl Price as Gregori Beuhlenberg; Et Parker as Mrs. von Graustark; Sis Stabler as Incipit Nova-Vita, Ernst's girl.

Refreshments were served in the Astrophysics Court, and open house was held in the houses following the play.

Glee Club Officers Chosen At Meeting

On Wednesday night, March 1, the Caltech Glee Club held its annual election meeting in Dabney Lounge. After a few introductory remarks by Mr. Lauris Jones, Director of the organization, Ulrich Merten was unanimously elected president for the coming year, while Tony Dolan was elected to serve as Club Librarian for the remainder of this year.

At the same time representatives for the student houses and Throop Club were chosen: Jim Denton for Throop Club, Charles Bates in Blacker, Dick King in Dabney, Charlie Steese in Rickets, and Dean Daily in Fleming. Those elected took office immediately.

Campus Calendar

THURSDAY, MARCH 10—
12:00 Y Upperclass Luncheon
12:15 Throop Club Meeting
7:15 A.S.C.I.T. Board of Directors Meeting
FRIDAY, MARCH 11—
1:30 Staff Meet at Compton
SATURDAY, MARCH 12—
1:00 Conference Track Relays at Occidental College
11:30 Tennis Meet at U.C.L.A.
2:15 Baseball vs. Cal. Poly. at San Dimas
MONDAY-FRIDAY, MARCH 14-18—
Finals

Caltech Plans Arts And Crafts Display

The Women's Club of the California Institute of Technology has announced its plans for an all-Tech Arts and Crafts Show to be held on the campus April 6 through April 9.

Last Year

Last year the Club sponsored a fine arts show at which more than sixty professors, students, office workers and their families exhibited paintings, sculpture, photographs and drawings. This year the scope of the show has been increased to include pottery, weaving, cabinetmaking, metalwork and other handcrafts.

Many Eligible

Entries will be accepted from any students or employees connected with Caltech, Mt. Wilson and Palomar Observatories, Jet Propulsion Laboratory, Co-Operative Wind Tunnel, and Huntington Library. Like last year, some professional work will be shown, but the large majority of exhibits will be the creations of amateurs and hobbyists. There will be no jury or awards. It's all just for fun.

Advisors

Assisting the show committee in an advisory capacity are Miss Abbie von Schlegell, President of the Board of Trustees of the Pasadena Art Institute; Roger Hayward, Pasadena architect and artist, and Jarvis Barlow, Assistant Director of the Modern Museum of Art in Beverly Hills.

McKinney Prize

- Open to Seniors and Juniors
- Papers due April 18
- See Prof. MacMinn, 212 Dabney, for details

The Caltech Method

It is very seldom that the California Tech prints articles with no immediate news value, articles which treat with subjects beyond the ordinary range of news reporting.

A week or so ago, Bernard Shore brought us an essay which he had written and which he felt deserved wider publication. After we read it, we agreed with him. It should be of vital interest to every student and faculty member of the Institute.

In the hope that this article will provoke some comment, we give here the entire essay which Bernard Shore has written.

AN EVALUATION OF THE CALTECH METHOD**By Bernard Shore**

There is an impressive unanimity about the primary purpose of the undergraduate school at Caltech. The primary purpose of the undergraduate school, as stated by the Trustees of the Institute, is "to provide a collegiate education which will best train the creative type of scientist or engineer so urgently needed in our educational, governmental, and industrial development." As Dr. DuBridge has repeatedly pointed out, the Institute has included in its curriculum four educational policies that in combination will best train the creative type of scientist or engineer: first, limitation of enrollment, careful selection of student body, and concentration on a small group of students second, restriction of the fields in which the student can receive instruction third, emphasis on the fundamentals of science and engineering, and on creative work fourth, "inclusion in the curriculum of a large proportion of cultural studies . . . so as to develop a broad human outlook in the students." In other words, every student at the Institute is to be given full opportunity to exploit himself and his environment so that his scientific or engineering capacities actually develop and expand, and so that he becomes a productive citizen in our democracy and one who is loyal to its ideals.

Any curriculum may be evaluated in two ways—by its aims and by its success in achieving its aims. This writer subscribes wholeheartedly both to the Institute's primary educational aim, the training of a creative scientist or engineer, and to the four major educational policies that have been indicated. This essay will explore the question of whether the Institute has in fact been achieving successfully its aims.

Though the Institute is accomplishing its first three educational policies for the most part, suggestions for more completely realizing them are voiced in this essay. Criticism is of course important, for where nothing needs to be criticized nothing need be done. The proposed reforms do not require complete transformation of the curriculum, but use what is good in an inadequate situation to improve the whole.

The major thesis off this essay is a dispassionate evaluation of the Institute's success in producing a broad human outlook and a consciousness of democratic ideals in its students. In short, the essay analyzes the Institute's version of a liberal education and suggests needed reforms and methods of revision of the Humanities curriculum.

It will be recalled that the first cardinal principle of the Caltech method is the limitation of enrollment, careful selection of student body, and concentration on a small group of students. That enrollment should be limited and that concentration should be placed on a small group of students are intents whose actual realization makes unjustifiable any criticism. However, let us examine the criteria for selection of the student body.

Fortunately, the Institute realizes that not all applicants to Caltech are equally fitted to profit from the education available. To assume that the Institute has not thoroughly investigated the selection of adequate criteria for admittance to the undergraduate school would indeed be gratuitous. As a result of the entrance examinations and careful perusal of the secondary school records of applicants, the Deans certainly possess records of educational

(Continued on Page 2)

"Earth's Period Decreasing," Astronomer Royal Asserts

Eagleson Prints To Be Exhibited

The extensive collection of Japanese prints owned by Dr. Eagleson will be on exhibit at the Pasadena Art Institute through March 28. In addition to Dr. Eagleson's prints, the Art Institute will also display its own collection, recently augmented by a gift from the estate of Mrs. Emaline Johnson. Also being exhibited are some excellent examples of Japanese swords and scabbards.

Hiroshige Examples

Dr. Eagleson's collection contains many examples of the Hiroshige school (b 1797, d. 1858). Among them are some of the well-known Chushingura series—that series illustrating episodes in the famous Japanese marionette play later played upon the regular stage by Japan's foremost dramatists, Chikamatsu Morza-Yeman and Tokedo Izumo. The play was first given at Yedo in 1748.

Other Prints

Other prints from Dr. Eagleson are some of the Great Tokaido and others from the various stations of the Kiso Kaido series, the Seasons, together with several scenes from the Hundred Views of Yedo, the Provinces, and two of the unusual size known as Harimaze used for figures and floral sprays as a rule.

Third Term Registration

Registration for the third term will be on Monday, March 28. The first day of classes will be Tuesday, March 29.

Twenty-Four Hour Service Scheduled For Health Center

Services of the Caltech Health Center are available to Tech students on a twenty-four hour a day basis. A physician is on duty at the Dispensary from 9:30 to 12:00 and 1:30 to 5:00 daily, and emergency cases will be handled at any time of the day or night. The Institute physicians are William S. Gevurtz, M.D., F.C.C.P., and E. F. Ziegler, M.D. Dr. Ziegler's night telephone is SY 6-7114; Dr. Gevurtz's night telephone is SY 6-0101, or if calling from Los Angeles RY 1-7681.

Hospitalization

One of the Institute physicians will be available at all times to handle emergencies. In case of an emergency of serious proportions the patient should be taken directly to the Huntington Memorial Hospital, or to the Pasadena Emergency Hospital, where arrangements will be made to call one of the Institute's physicians.

Faculty Cases

The services of the Dispensary and the Institute physicians are available to the employees and faculty of the Institute on a reduced fee basis, but because of the heavy load it is difficult to assume the treatment of chronic cases. The Institute physicians are particularly well qualified in diseases of the heart, chest, and gastro-intestinal system. They will undertake for all members of the Caltech family diagnostic services in all cases, but in certain cases requiring prolonged treatment or observation it may be necessary to refer the patients to their private physicians after the diagnosis is established.

Nights Of Perpetual Full Moon Will Be Result Of Tidal Friction

British and American Educational Systems Contrasted; Opportunities for Graduates in Astronomy Mentioned**By Bob Kurland**

"Atomic" clocks may soon replace the earth as a standard timekeeper, according to Sir Harold Spencer Jones, British Astronomer Royal.

Interview

Sir Harold, in an interview after his Friday assembly talk, "The Earth as a Clock," also gave his views on American and British educational systems, post-graduate opportunities for Caltech astronomy majors, and the British government's financial policy regarding education and science.

The main body of his talk, however, concerned the slowing down of the earth's rotation period and its effect on astronomical observations and the moon's orbit.

Retardation

No need to reset your watches though; the slowing down doesn't amount to more than two-milli-seconds per day over a period of a century.

This gradual retardation will, in a few million years, lengthen the day to 47 of our present days. The length of a day will then be equal to a lunar month.

Moon Spirals

The earth will then always present the same face to the moon, just as the moon shows only one face to the earth now. The moon also is spiralling five feet further away from the earth each century, due to the same force causing the lengthening of the day.

Tidal Brake

The most likely cause for this lengthening of the day, explained Sir Harold, is the tidal friction between the oceans and sea bottoms. The sea, in such shallow bodies of water as ocean shores, the Bering and Irish seas, acts as a brake on the spinning of the earth.

Trepidation

Trepidation, the astronomical effect of other small irregular changes of four or five milliseconds per day over periods of several years, might be explained by sudden changes of five or six inches in the earth's radius. Any other changes in the earth's moment of inertia great enough to account for these fluctuations in the length of the day, would have to involve shifting of land masses greater than leveling the Himalaya Mountains to sea level.

Education

Turning to educational subjects, the British astronomer said that Caltech and the American educational systems offer a broader background than English schools.

The British Astronomer gave several reasons for this rarely held view:

1. English secondary (high schools) schools carry pupils to (Continued on Page 6)

Department Asserts Numerous Openings For Graduate Civils

From time to time students make inquiry regarding the demand for graduates in the Civil Engineering field. Quite often the student is concerned, as early as his junior year, whether or not the field is becoming overcrowded. In order to clarify this question the Civil Engineering Department desires to cite the present situation.

Constantly Asked

The department is constantly being asked to furnish, not only recent graduates, but graduates with experience, for positions both in private and public employ. At present there are interesting positions open for recent graduates with contracting and construction companies. These positions pay an initial salary from \$325 to \$430 a month for men with a bachelor's degree.

Satisfied

It is interesting to note that the department has been unable to find any men to take these positions due to the fact that no graduates are interested in changing their present employment to accept these particular positions. Many public agencies are urging undergraduates to take the civil service examinations for civil engineering positions with initial salaries ranging from \$310 to \$355 a month. The employment situation in civil engineering is excellent.

EE—for training to do product development, product design, drafting, power plant work, plant and maintenance engineering.

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BS degree men in Mechanical, Electrical, and Chemical Engineering.

CE—for training to do product development, product design, drafting, power plant work, plant and maintenance engineering.

BS degree men in Civil, Structural, and Architectural Engineering.

BS degree men in Chemical Engineering.

ME—for training to do product development, product design, drafting, power plant work, plant and maintenance engineering.

BS degree men in Chemical Engineering.

CE—for training to do product development, product design, drafting, power plant work, plant and maintenance engineering.

BS degree men in Civil, Structural, and Architectural Engineering.

EE—for training to do product development, product design, drafting, power plant work, plant and maintenance engineering.

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The Trojans—Trojan March and Royal Hunt and Storm—Berlioz

Sir Thomas Beecham and London Philharmonic Orchestra.

*Symphony No. 7 in A Major—Beethoven, Eugene Ormandy and The Philadelphia Orchestra

William Tell—Passo a Sei—Rossini

Arturo Toscanini and NBC Symphony Orchestra

FRIDAY, MARCH 11

*The Comedians—Kabalevsky

Efrem Kurtz and Philharmonic Symphony Orchestra of New York

Concerto in D Minor—MacDowell

J. M. Schreiber, pianist

Arthur Fiedler and the Boston Pops

Nursery Suite—Elgar

Sir Edward Elgar and London Symphony Orchestra

SATURDAY, MARCH 12

*A Fair Overture—Wagner

Arturo Toscanini and NBC Symphony Orchestra

La Bohème—Mi Chiamino Mimi—Puccini

Linda di Chamounix—O luce di quest'anima—Donizetti

Don Pasquale—I also know fine arts—Donizetti

Erna Sack, soprano with Orchestra

*The Garden of Fand—Bax

Sir Thomas Beecham and Royal Philharmonic Orchestra

SUNDAY, MARCH 13

Nina Overture—Paisiello

Sir Thomas Beecham and Royal Philharmonic Orchestra

Concerto in A Minor—Grieg

Dinu Lipatti, pianist. Alceo Galliera

and The Philharmonia Orchestra

*Variations on a Rococo Theme—Tschauderovsky

Paul Tortelier, cellist. Norman Del Mar and Orchestra

MONDAY, MARCH 14

Pastorale Suite—Larsson

Erik Larsson and Symphony Orchestra

Petite Suite—Gounod

Fernand Hubrabois and Paris Wind Instrument Society

*La Mer (The Sea)—Debussy

Ernest Ansermet and Orchestra de la Suisse Romande

TUESDAY, MARCH 15

Colas Breugnon Overture—Kabalevsky

Arturo Toscanini and NBC Symphony Orchestra

*Symphony No. 4 in E Minor—Brahms

Paul Kletzki and Lucerne Festival Orchestra

*Greenland Ballet—Risager

Johan Knudsen and Royal Chapel Orchestra

WEDNESDAY, MARCH 16

La Dame Blanche Overture—Boieldieu

Arthur Fiedler and Boston "Pops" Orchestra

*Concerto No. 3 in G Minor—Saint-Saëns

Henry Mordkoff, violinist. Piero Coppola and Pasdeloup Orchestra

*Death and Transfiguration—Richard Strauss

Leopold Stokowski and New York City Symphony Orchestra

*By Request

The Evening Concert

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THURSDAY, MARCH 10

LEONORE OVERTURE NO. 2, by Beethoven. Concertgebouw Orchestra of Amsterdam conducted by Eduard van Beinum (14).

SYMPHONY NO. 4 IN C MINOR (TRAGIC), by Schubert. Philharmonic-Symphony Orchestra of New York conducted by John Barbirolli (29).

PABLO CASALS, VIOLINCELLIST. CONCERTO IN B MINOR FOR VIOLIN-CELLA AND ORCHESTRA, by Dvorak. Czech Philharmonic Orchestra conducted by George Szell (36).

MUSIC FROM CARMEN, by Bizet. New York Symphony Orchestra conducted by Leopold Stokowski (33).

FRIDAY, MARCH 11

ELIJAH—ORATORIO, by Mendelssohn. Isobel Baillie, Soprano. Gladys Ripley, Contralto. James Johnston, Tenor. Harold Williams, Bass-Baritone. The Huddersfield Choral Society and Liverpool Philharmonic Orchestra conducted by Sir Malcolm Sargent (153).

SATURDAY, MARCH 12

DON GIOVANNI, by Mozart. The Glyndebourne Festival Opera Company conducted by Fritz Busch.

MONDAY, MARCH 14

DIE FLEDERMAUS—OVERTURE, by Johann Strauss. The Halle Orchestra conducted by Leslie Heward (8).

SYMPHONY NO. 3 IN E FLAT MAJOR (RHENISH), by Schumann. Minneapolis Symphony Orchestra conducted by Dimitri Mitropoulos (30).

VLADIMIR HOROWITZ, PIANIST. PICTURES AT AN EXHIBITION FOR PIANO, by Moussorgsky (32).

SUITE NO. 3 IN D MAJOR FOR ORCHESTRA, by Bach. Boston Symphony Orchestra conducted by Serge Koussevitzky (20).

DER ROSENKAVALIER—SUITE, by Richard Strauss. The Hall Orchestra conducted by John Barbirolli (20).

TUESDAY, MARCH 15

PRECIOSA—OVERTURE, by Weber. Berlin Philharmonic Orchestra conducted by Eric Kleiber (7).

SYMPHONY NO. 6 IN C MAJOR, by Schubert. London Philharmonic Orchestra conducted by Sir Thomas Beecham (29).

MISCHA ELMAN, VIOLINIST (39).

CONCERTO IN G MINOR FOR VIOLIN AND ORCHESTRA, by Vivaldi. London Symphony Orchestra conducted by Lawrence Collingwood.

SONATA NO. 3 IN D MINOR FOR VIOLIN AND PIANO, by Brahms. Wolfgang Rose, Pianist.

ENIGMA VARIATIONS, by Elgar. National Symphony Orchestra of England conducted by Sir Malcolm Sargent (26).

TWELVE CONTRA DANCES, by Beethoven. Columbia Broadcasting Symphony conducted by Howard Barlow (12).

WEDNESDAY, MARCH 16

OVERTURE IN D MAJOR IN THE ITALIAN STYLE, by Schubert. National Symphony Orchestra of England conducted by Dr. Heinz Unger (18).

SYMPHONY NO. 41 IN C MAJOR (JUPITER), by Mozart. Philharmonic-Symphony of New York conducted by Bruno Walter (26).

LINA PAGLIUGHI, SOPRANO (32).

BEL RAGGIO LUSINGHIER FROM SEMIRAMIDE, by Rossini.

MICHAELA'S ARIA FROM CARMEN, by Bizet.

CARO NOME FROM RIGOLETTO, by Verdi.

AH CHI AMANDO ERA FELICE AND H CHE GIÀ CHE PIACER FROM THE ABDICATION FROM THE SERAGLIO, by Mozart.

O COME E BELLO IL CIEL FROM IL GUARANY, by Gomez.

O COLOMBELLO, SPOSARTI FROM IL RE, by Giordano.

SUL FIL D'UN SOFFIO ETESIO FROM FALSTAFF, by Verdi.

HAROLD IN ITALY, by Berlioz. William Primrose, Violin. Boston Symphony Orchestra conducted by Serge Koussevitzky (40).

MEDITATION FROM THAIS, by Bizet. Boston "Pops" Orchestra conducted by Arthur Fiedler (4).

CAMPUS BREWINS

Double, double, toil and trouble is a rose is a rose is a rose is a rose by any other name would smell just as sweet. The cauldron of Caltech boiled furiously under Carl Price's ASCIT machinations, and Schmipps is still Schmipps is still as sweet and wholesome as ever. Now that the subject has been mentioned, we will continue, as every several weeks the raving reporter feels the urge to unburden himself of his collected tidbits of **Schmippis**, culled from the bitter mutterings of his frustrated compatriots. Ed Matzner reverently recounts that the **Schmippis** find that he almost brought to dinner in Fleming last week was deeply shocked to find that in Fleming we don't eat by candlelight! ("I simply CAN'T eat dinner without candlelight!") — and she didn't—Matzner got her here too late.

Of course Tech's nose isn't entirely clean, due partly to the efforts of Dave Elliot, part owner of the junk-propelled, burping Buick. He aced out his partners by demanding the car to take his date back to Schmipps; our spy system reports that he started fast, but it just isn't right to complete one's business with a Tolite, then precipitately take off, leaving her standing there to pick up a few pointers before Mr. Parsons breaks up those sweet front porch trysts.

Willis also does his part. The lovely Miss Lacey is getting the idea that he couldn't make it on time if he wanted to. That's right—he couldn't. Title of **Schmippis** for this weekend goes to a certain Toll Hall lass, lately passionately attached to Lothario Shepard (known to his close friends for taking off to Colorado College for a week last term for clandestine purposes.) The beak has it that, having accepted Con's date for the ASCIT formal, the wench went out to lunch with a Pomona hero whom she presently enticed into taking her to Mexico (hmmm) on the spot. Later chickening out slightly, she made him bring her back in time for the formal, but with the reservation that she would see him at 2300. Hence she greeted Don with the sweet news, as they started for the dance, "Don, dear, I have to be back at Claremont at 2300. I have a late-date." O tempora, O mores!

Don Asquith inadvisably let his gal aid and assist in the navigation back to schmipps. She evidently pushed or pulled the lever, and succeeded in removing eight or ten pounds of transmission. Jack Dyer, Jim Enslow, (Continued on Page 6)

THE CALTECH METHOD

(Continued from Page 1)

quotients and of educational marks. But are interviews of prospective freshmen an adequate and valid measure of personality? They somewhat successfully measure the fundamental personality traits of industry, ambition, self-confidence, and resourcefulness. However, because of the importance of proper evaluation of the applicant's personality, the interviews ought to be supplemented by any tests that scientifically measure the fundamental personality factors. For example, a test that scientifically measures the ability to work hard and steadily should be included in the personality analysis.

Health, the selection of the proper field of study, the interest in school work, the academic load carried, and emotional adjustment are important factors in determining academic success. Each of these may be thought of as a complex set of factors, some of more importance than others, and as dynamic rather than static in any given student. If these factors are analyzed and measured in students, the Deans can improve the already excellent means of selecting students and of assuring their success in college.

The second major educational policy, restriction of the fields in which the student can receive instruction, demands that the instruction presented be of the highest quality. Now, while it is true that instruction is usually excellent, it is also certain that an improvement in the quality of instruction is possible. I speak primarily, but not exclusively, of the physics and mathematics instruction in the freshman and sophomore years. Of course, good teachers are not borne to Caltech from a Platonic heaven. I realize that the Institute is more interested in men who are capable of research than in men who are primarily teachers. But it cannot be denied that improvement is possible and necessary in the quality of instruction. The teacher can make or break the curriculum. The education of the younger generation is a respectable and great undertaking. Yet the men who have the personality, as well as the scholarship, to stir up youth intellectually and to win its respect for the pursuits of the mind are not encouraged to devote their major energies to this end. I speak for the undergraduate who needs to be awakened, stirred, and aroused. I speak for each person in whom there is some unique quality of charm, intelligence or character, some promise and mystery that invites attention and nurture. I speak for the student who requires intellectual stimulation to strengthen him in the search for truth. Let it not be forgotten that only one teacher is required to ruin a student's career.

How wonderful it would be if research capabilities and teaching (Continued on Page 3)

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THE CALTECH METHOD

(Continued from Page 2)

aptitudes were included in all graduate assistants. However, not all graduate assistants are both research men and teachers. Accordingly, Caltech should learn to recognize teaching, rather than the production of learned monographs, as the essential quality in a teacher. There have been and are teachers of the sciences who are not research men. It is sufficient that they know their science. "To know is not necessarily to do research. To do research is to discover a truth, or to demonstrate an error. To know is to possess a fact after it has been attained and to assimilate a truth into one's mind."

Let us see what the Institute has done to improve the quality of teaching. The student is compelled to devote ninety-six (twelve units of mathematics and twelve units of physics) hours a month to the study of basic sciences whose understanding proceeds further study at the Institute. The instructor is invited to attend, an hour each month, what is euphemistically termed "a seminar in educational problems and methods." To judge from the comment of undergraduates, these seminars are characterized by one distinguishing feature. That feature is their ineffectiveness in improving instruction. Apparently, too little time is spent actually in analyzing educational problems and methods.

These seminars have not improved the quality of instruction because they have not devoted enough time to solving the instructor's own teaching problems. Consequently, I recommend that graduate assistants be required to attend, at least until the students and the heads of the departments have noted a definite improvement in instruction, seminars that thoroughly investigate the problems and methods of teaching. These seminars should at least study the common psychological and philosophical educational principles of instruction. Each graduate should be given a basic understanding of the techniques of teaching and learning. Individual teaching problems should be solved. Each teacher ought to understand how to plan a lesson, without mechanically imposing it on the class. Each graduate should be shown how to get his students to reach a familiar conclusion, such as the derivation of a familiar theorem, with a sense of having made their own discovery. Certainly, sympathetic understanding, sensitivity to student needs and problems, and that quality of patience towards students which accepts as natural the first groping steps towards understanding of a difficult subject, should be developed in all instructors.

In short, each graduate should be required continually to attend seminars in educational psychology and educational philosophy, and in the specific problems and methods of teaching. Individual teaching difficulties must be analyzed. Excessive emphasis cannot be placed on developing intellectually competent and intellectually stimulating instructors. Even one hour a week may not be enough time. If possible, the experienced members of the department should continually supervise the instruction of the graduates.

The third major educational policy is emphasis on the fundamentals of science and engineering, and on creative work. No one can argue that the Institute does not give its students a broad

background of training, and that it does not equip its students for life rather than merely for the first few months after graduation. Instruction is certainly given in the basic principles that govern a whole class of intellectual and practical skills for which the individual has a bent and interest.

To praise highly the teaching at the Institute of basic principles is not to argue against any desirable lightening of the academic load. A lightening of the academic load would provide students with an opportunity to satisfy the intense intellectual curiosity that is so characteristic of them. In some students, this curiosity is manifest solely along scientific lines, perhaps in the form of a hobby. In others, the curiosity takes the form of a deep interest in art, music, or literature. Only the exceptionally brilliant freshmen are able to adjust to college life, cram the contents of textbooks into their heads, and still find time for the satisfaction of this curiosity. Perhaps, reduction of the academic load is a means of providing the student with a chance to satisfy his curiosity. Whether the student will exploit his opportunity is another question. But we cannot solve it until he is given the opportunity.

What lightening of the academic load do I urge? Too often, the curriculum is a Procrustean bed wherein the student is cut or stretched to a preconceived pattern that ignores individual differences, needs, abilities, and interests. For example, mathematics, geology, physics, chemistry, and biology majors are compelled to take sophomore biology and geology irrespective of their options. It would be more desirable for a mathematics or geology major to take a month's survey course exploring the mysteries of the natural world than to spend three months in the intensive study of biology. Similarly, for many students a month's survey course in the development of the earth would be more beneficial than an intensive course in physical geology. The student could use the time afforded by reduction of academic load to improve the quality of the rest of his work or to satisfy his intellectual curiosity. Curriculum revisions of the sort just indicated appear to be desirable, and certainly should be examined.

A liberal education should "engage the productive energies of the student to distinguish what is of survival value in the cultural heritage of his age; it should engage his productive energies to carry forward these values, and to expand and enrich his own contribution to the meaning and worth of life."

As has been said, "We always live at the time we live and not at some other time, and only by extracting at each present time the full meaning of each present experience are we prepared for doing the same thing in the future." Thus, the student should recall from memory associated meanings and values to serve as bases of judgment in the problematical situations confronting him. The survival values of the race, as recorded in history, literature, philosophy, and all the liberal arts, serve this purpose.

Too often, Caltech prepares scholars primarily for life in the smaller, rather than the larger, community—for life in the school itself. For example, a physicist may be so trained and may so train himself along the narrow groove of physics that he will not know anything else when he gets through college. He may get a doctor's degree in that subject, and if he follows it up in his later days he

may make notable discoveries in that field. But still this physicist may not know anything other than physics. Carefully analytical in his own field, he may be content with unexamined prejudices outside it. This physicist, who may create the tools to advance technological progress, should be made cognizant of the wide gap between man's ethical intelligence and his technical competence. The problems raised by Hiroshima should become as much a part of his consciousness as Maxwell's equations.

Whatever a liberal education is, it should at least be concerned with the problems of the present age. Too often at Caltech, it seems to me, life is regarded as an impudent intruder to be kept outside the ivy-covered grounds. Too often, Caltech seems to be a place to spend four years immaculately preserved from contamination with the outside world, a refuge and a vacation from the world's problems. Too often, the glories of the ancient world and of ages past are studied while the social and philosophical problems raised by such novels as *The Grapes of Wrath* and *The Magic Mountain* are neglected. I do not agree with those who believe that literature is not literature and history is not history until time has extracted all social and philosophical significance from the writings, and they can be studied solely for esthetic pleasure. Emphasis in a liberal education should be placed on the development of techniques which are applicable to modern problems. As Whitehead writes, "the only use of a knowledge of the past is to equip us for the present."

Caltech has not introduced its students to the fundamental problems of the age—to the social, political, intellectual, and the philosophical questions posed by our time and culture. It is not the Humanities division fault that it has had to devote the major portion of its time in interesting its naively Philistine students in the Humanities. Unfortunately, the Humanities division has had to spend too much of its time in inducing the students to enjoy liberal arts, and not enough in teaching the students what is important, and what is worthy of study. The revisions I propose in the curriculum will probably not affect those who do not care what they study provided they obtain a C; consequently, they will have no objection to the proposed changes. However, the thinking student will welcome the proposed revisions since they will engage his productive energies in distinguishing what is of survival in the cultural heritage of his age, and in expanding and enriching his own contributions to the meaning and worth of life. The revisions will aid in meeting science's obligation to society by furnishing leadership for society, and by giving adequate orientation towards an understanding of the society of which the students are a part. Furthermore, aroused student interest in the Humanities will result in increased teaching enthusiasm among the professors.

I suggest the following revisions. In an honest examination of contemporary life, numerous social and philosophical problems are indicated clearly. Such problems are religious and racial intolerance, the conflict between labor and capital, the conflict between religion and science, and the reconciliation of social security and political democracy. These are fundamental problems of our society, not ephemeral ones. Study of these contemporary problems uncovers their connections with the past and their bearings on the future.

The instructor and the students are to trace scientifically the factors which have given rise to contemporary problems. The term "scientifically" implies the use of the temper of mind that characterizes the methods of science—the hypothetical attitude, the powerful weapons of tentativeness, probability, critical caution and the holding of no dogma above the test of experience. These problems should first be described and explored as problems which our country is facing, without indoctrinating students to belief in the particular solutions put forward by various pressure groups. After the student has become familiar with the historical, philosophical, and social background of these problems, he might be afforded an opportunity to express his own convictions. In this manner, the students will be habituated in the use of a scientific methodology in thinking about social problems. And, in so doing, he will discover the social values for which succeeding generations of mankind have struggled.

The quest for a personal philosophy forged from experience, esthetic sensitivity, individual self-maturity, and social democracy represent the basic cultural forces of our society. The curriculum should acquaint the student with history, philosophy, literature, comparative economics, psychology, anthropology, and sociology. The study of anthropology is essential for a knowledge of modern society. As Ruth Benedict has pointed out, "anthropology is the study of human beings as creatures of society. It fastens its attention upon those physical characteristics and industrial techniques, those conventions and values, which distinguish one community from all others that belong to a different tradition." Sociology, the science of the origin and evolution of society, is no less important.

The Humanities curriculum should help its students understand the nature of social conflicts, recognize the rights of others in the struggle for security, tolerate reasonable social experimentation aimed at ameliorating suffering and insecurity, and accept a share in the burden of caring for the unfortunate and the underprivileged. These are the essential elements of an educational policy that will socially integrate students by acquainting them with the essential problems of modern life.

Dr. Millikan has often stated, "The cardinal doctrine in the creed of every man of science is stated in the motto of the Institute, 'The truth shall make you free.' Let the shining clarity of truth illuminate the Humanities as well as the sciences!"

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THE SQUARES' CIRCLE

Fellow students,

This letter is both an explanation and an apology for the tone of the campaign—if I may say that—that I put on for Publicity Manager. I had hoped by my somewhat supercilious tone to impress upon you the fact that no one was running against me, that the Student Body had not shown enough interest to nominate sufficient of its members to supply competition in each race (four offices were uncontested). I'm sure you must admit this is a deplorable condition of apathy, of the sort that has led to the common popular opinion of Tech as a grind-monastery where only atrophied snakes go to school. I felt that lack of competition for my office was a reflection on everyone and attempted to emphasize my sentiment with my sarcasm.

If my apparently irresponsible manner offended you personally, I hope it will serve to goad your interest in student government in next year's elections. Meanwhile, for this year, let me reassure you by sincerely promising to give my utmost enthusiasm and experience to the job of Publicity Manager and to support President Lovberg actively and willingly in his ASCIT projects.

Jim Hendrickson.

Dear Editor,

On January 22, three professors at the University of Washington were fired, two because they were members of a small political party highly critical of the government—the Communist Party—and the third because of his activity in liberal and progressive organizations.

Ignoring the findings of a faculty committee that found the three "without academic fault, competent as scholars . . . and objective as teachers," the University president based his action on his personal viewpoint that "A Communist is incompetent to teach the truth."

When it is considered that the U.S. government holds 200 to 300 of its left wing critics in jail, that (with a few WW II conscientious objectors still in prison) 200 conscientious objectors to the draft are in jail, that Secretary of Defense Forrestal has a plan to organize concentration camps and put two volunteer governments agents on every city block, the imperative necessity to fight for civil liberties becomes apparent.

The Washington firings fall within the scope of students as they affect academic freedom.

David Pollard

Heath Speaker For ASCE Convention

Preparations of plans for the forthcoming convention of the western states' representatives of the American Society of Civil Engineers was the main item of business at last Monday's meeting of the Student Chapter.

Two Speakers

Featured on the program were two speeches by Dave Baron and John Heath, who competed for the honor of representing the Caltech Student Chapter at the convention. Heath spoke on "The Water Supply Problem in Santa Barbara," while Baron chose as his subject "Flood Control in Los Angeles County." The three judges decided at length that Heath should be the representative at the convention.

Guests

The distinguished guests at the meeting included the three judges, Mr. N. D. Whitman, Senior Contact Member of the Student Chapter; Mr. Homer Jorgensen, Secretary of the LA Section of the ASCE; and Professor William J. Bobisch, and, in addition, Professors Martel, Michael, and Vannoni.

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Who Dealt This Mess

By Carl Fox

There have been several questions raised recently concerning the probabilities of various distributions and splits. It is hoped that the following tables and notes will clear up any misconceptions that may exist. The first column lists the number of cards that you and partner hold between you in the suit in question. The second column is the manner in which the outstanding cards may be split while the last column is the probability of this particular split.

You Hold	Split	Percentage
6 cards	4 - 3	62%
	5 - 2	31%
	6 - 1	7%
7 cards	7 - 0	Less than 1/2%
	4 - 2	48%
	3 - 3	36%
	5 - 1	15%
8 cards	6 - 0	11%
	3 - 2	68%
	4 - 1	28%
	5 - 0	4%
9 cards	3 - 1	50%
	2 - 2	40%
	4 - 0	10%
10 cards	2 - 1	78%
	3 - 0	22%
11 cards	1 - 1	52%
	2 - 0	48%

It is often handy to know, with a certain number of cards outstanding in a suit, just what the chances are of finding any particular missing card either singleton, doubleton, or tripleton. These percentages are listed below, first the number of cards up, then the others in order.

Cards	Single	Double	Triple
2	52%	48%	
3	26	52	22%
4	12	40	38%
5	6	28	40%
6	Low	18	54%

It should be understood that the percentages listed above apply only to the original holdings of thirteen cards and cannot be applied after any cards of the suit have been played.

Since there are few, indeed, who have time or inclination to remember these tables, the following are listed for more general guidance.

An even number of cards will probably not be divided evenly.

An uneven number of cards will probably split as evenly as possible.

If the opponents hold two honors in a suit they will be divided between the two hands 52 per cent of the time and will be in the same hand 48 per cent of the time. Thus 24 per cent of the time they will both be in one particular hand.

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Oxy Favorites As Cinder Men Prepare For Relays

This Saturday afternoon Coaches Anderson and Carroll's track squads will journey to Oxy to compete in the Conference Relays. As the title suggests this meet is primarily a series of relays, but a full schedule of field events will also be included.

With the help of a little California "sunshine" the track in Tournament Park has been looking a lot like a swimming pool, to that some of the boys have had serious doubts as to whether they were reporting to the right place for track workouts. As a result very few of the men are yet in any good form, so that the times are still pretty slow in most of the races.

HE MARRIED HELEN
Hell ensued.
He left Helen.
Helen sued.

Schussing with the Shoose

After almost two weeks of good spring snow fresh powder has and is coming to the Southlands. Is there no end to the snow this year? There is a fine six foot or so pack that Johnny Elvrum says will last up into July (on Slide Peak), and it seems that there is a fresh snow surface almost every week. This last weekend we had fresh snow, and another storm is coming in at this writing.

Lift

It is good news on the chair lifts. As soon as the thaw is here the big lift up to Race Peak is going to be completed. The word is that another chair lift is going in approximately where the present sling tow is operating. There is increasing pressure to get rid of the sling because of the danger of accidents (a skier was almost pulled in two on it three weeks ago) and because of the need of shutting down when

thick fog sets in.

Also, a fine chair lift is supposedly going in at Big Bear this summer. Some of our members who went up to the race there this last Sunday said that the slope that the lift is going in on is a fine, steep one that compares with the top of the Bowl at Snow Valley.

Hut

The hut is looking much better. Small crowds the last couple of weeks have enabled some of us to get the interior looking much cleaner. There is a lot of construction to go into the hut this coming Spring, Summer, and Fall, so you can begin thinking of spending a few weekends up there after the snow and skiing are through for the season.

Patrol

The Snow Valley Ski Patrol is rounding into shape now, and the Tech Ski Club is getting several members onto the patrol. Olly Gardner and Pete Price were among the first to serve on the patrol. The general duties of the patrol include first aid and safe-

Rowdies Finally Grip Tennis Title

The end of the Interhouse tennis season finally came, bringing Ricketts out on top with an unmarred record. The long, long awaited final match was played between Ricketts and Throop, with Win Soule topping Wayne Beebe for the Rowdies' final victory.

Fleming settled for runner-up spot by virtue of the Rowdie triumph over Throop. Dabney was in the middle of things, batting 500. Blacker took fourth, and Throop failed to score.

Final standings:

House	Won	Lost	Points
Ricketts	4	0	15
Fleming	3	1	9
Dabney	2	2	9
Blacker	1	3	6
Throop	0	4	3

try on the slopes and a general lookout on the various tows to see that the maximum number of people get the maximum number of rides with a minimum of holdups and delays.

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Talkin' It Over
 With The Goon

Dropped out to Tournament Mudflats the other day to see how Easy Ed Preisler's batsmen look. After last Saturday's mercy-go-round with the Muir Mustangs prospects for this season look mighty good. The infield is air tight. With Tom Petrusas, the Great Greek of the Week, shifting from behind the plate to first, Hambones and Dick King fighting for the number two bag, the incomparable Chucker at short, and Lou Stallkamp up from the Frosh on third, Ed can rest a little easier.

Walt Pfeiffer is moving his small but mighty frame around behind the plate and is due to be one of the top catchers in the League. "Moe" Morrison has dragged his cannonball arm out in the field again where he and Paterson daily look for four-leaf clovers. All in all the Beavers boast one of the strongest clubs in many years. Bruce Hedrick is improving with every game and should within this season be hurling better than his brother.

"Andy"

Mason Anderson's sit and sun club has been showing a little more action this week after watching the Tigers tussle the Trojans. Bill Parker, Oxy's triple threat king, turned in a blazing 49.2 in his first race of the season.

If Barnes isn't careful he'll be losing a malt a week to Monty

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Baseball Opener
15-4 Over Muir

Coach Ed Preisler's varsity baseball team started off the season with a victory over the Muir JC team at Tournament Park last Saturday. Due mainly to the lack of control on the part of the Muir pitchers Tech was able to push across fifteen runs while limiting Muir to four. The Beavers were not too impressive, but showed up well for the first game of the season.

Preisler started a lineup of Pfeiffer catching, Hedrick pitching, Petrusas on first, King on second, Stallkamp on third, Norman at short, and an outfield of Morrison, Patterson, and White.

Patterson and Stallkamp were the power at the plate for Tech. Patterson got three hits, one being a home run with the bases loaded. For the most part, though, the Tech hitters didn't have enough power to punch their way out of paper bag, but they got their share of walks and tickets to first base through the courtesy of the Muir infielders. Hedrick pitched good ball and may turn out to be the answer to Preisler's worries about a starting pitcher.

The team is much improved over last year, possessing a well balanced infield and reserves to fill in at every position in both the infield and outfield.

on a little pre-season wager. Andy and Bud are currently in the market for a Hopi Indian that can call off the Rain-god that has been plaguing them.

Swimming

The Frosh swimmers came through in grand style in the last interhouse meet. Cagle, Barmoore, Yeazel, and Weil are a potent foursome. Cagle smashed the previous interhouse breaststroke mark, while Barmoore proved to be an iron man in swimming both the hundred and fifty in good times.

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IH Bowling Stakes
Won By Sid Stone

Sid Stone of Ricketts walked off with the 1949 bowling sweepstakes trophy last Monday after rolling high game of 219 and high series of 561. A second trophy was awarded to Fred Drury of Blacker, who hit the pins for second high series of 555. Win Soule came through with a 536 series, which was third high for the afternoon. Second and third high individual games were bowled by Carl Fox, with 217, and Jerry Matthews, with 214.

Glenn Reichenback, manager of the Pasadena Bowling Courts, awarded the Goldsworthy Trophy for interhouse bowling supremacy to the Ricketts House team captains, Andy Check and Carl Fox.

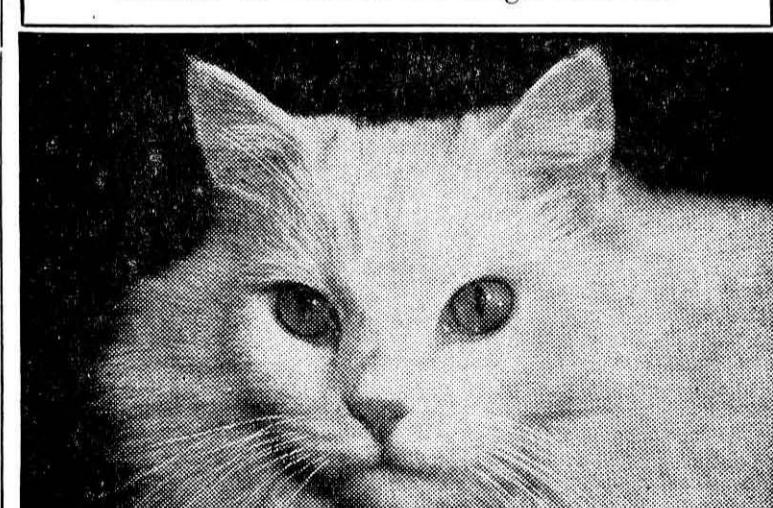
High Averages
 1948-49 Interhouse Bowling League, Individual Summary:

High Averages (15 or more games)		
Woody Bratnaber	R	189
Ray Heggland	T	173
Bob Benton	T	163
Andy Check	R	159
Sid Stone	R	154
Lowell Cockett	T	154
Bill Culbertson	D	151
Fred Drury	B	150
Dick King	D	149
Win Soule	R	158
Carl Fox	R	148
Milt Carus	R	147
Gene Mooring	T	147
Roland Berner	B	147
Howard Cohan	B	145
Wayne Herzig	D	145

High Series	High Game
Bratnaber	599
Heggland	588
Check	584
Stone	582
Benton	535
Fox	535
Drury	532
Carus	520
Schlinger	519
Cockett	514
Soule	512
Neverman	510
King	507
Holmes	507
Baron	500
	200

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*of 327 Burroughs Dr., Snyder, N.Y.

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WILDRONT CREAM-OIL HAIR TONIC

LANOLIN

Hair Tonic

WILDRONT CREAM-OIL HAIR TONIC

CAMPUS BREWINS

(Continued from Page 2)

Uh huh, mother.

We received a bit of interesting historical data at Friday morning's Assembly. There Sir Harold Spencer Jones, Astronomer Royal, let us in on what is probably the greatest Skinning job in history. Oh, well may we novices profit by the works of the master—a slight study of these methods will enable us to Skinner such that not the cleverest physics Prof can detect it. Seems that something was wrong with the moon—about ten seconds worth of acceleration—so LaPlace does out an excuse (I think it was tidal friction, or something just as unlikely) and proceeds to make beaucoup computations such that—well whaddaya know?—it comes out just ten seconds worth of correction. It wasn't for years and years that some nosy individual named Davis pointed out that there was a wee bit too much elasticity in La Place's (or was it La Grange's) slide rule.

Fresh full of the astronomical information, everybody and his date appeared to investigate the truth about iceplant on Friday night. Somehow, the memory of a considerable number of stalwarts regarding this play seems surprisingly limited—only one sight seems to have registered throughout the performance (or was it two?). Ernst von Graustark reports from shocked lap-side observation that everything she has she owes to mother, not to Bullock's. Upon interrogation, Gloria would only volunteer that she was wearing a melon hued dress that night, and that her formula for success was: Don't smoke, don't drink, get in early and get lots of sleep, and you, too, . . . ah, but what's the use??

The cast of the play (Does this include Sis?) (Ed. Note: No)

Classified Ads

DE SOTO '41, 7-pass., looks rough but good engine, tires, radio, gas mileage. See Hedrick, Dabney 11. SY. 39814. \$450.

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eagerly contributed a small sum apiece to a betting pool on the vital measurements—Brad Houser carried off the pool with suspiciously accurate guesses.

Following this epic production there was frantic activity. We might even get away with printing a small part of it. The party for the cast got off to a good start, and was proceeding according to plan, when some sober strolled in, got a bottle of beverage, and rushed outside, shaking it, to then gleefully squirt it all over Norm Bullman's door and alley. Nothing worse than a sober at a party.

Dabney tried the saturation method to solve the problem of stags, etc., eating up the refreshments, and was able, with Fleming's help and Beaucoup cheese, crackers, and cider, to stand off the horde 'til 1230. Dancing there were a number of people and GLORIA MURPHY. MacKenzie was there with the library blonde—she was seen the next night with Bill Bradley, who was seen the night before—oh well—let's be Bohemian.

The brand new, rustless, dustless, fur-lined, 24 karat gold filled chamber-pot of the week goes to Don Royce, who succeeded in reducing his bed to a pile of ashes. It wasn't his date—she was from Schmipps. It seemed that sleeping on the porch was a little chilly, so Royce got some surplus electrically heated flying suits, spread them amongst his bed clothes, and each night before going to bed he would give his bed about 15 minutes of pre-heat. This was as long as was advisable, for airplanes don't run

on 110, you know. Well, Royce contrived to put the plug in about three o'clock Friday afternoon, and then departed into the gay social whirl of life at Caltech. About 9:00 that night, while Royce was happily watching the play, his room mate decided that the smell was getting unbearable. A glass-of-water-brigade was formed of Wood, Snider, and Beek, and the student houses saved, but the bed was not exactly sleepable.

Of course, everybody didn't go to the play Friday. For instance, there was Dave Warren, who managed to creep in on the Hydro formal at the Athenaeum (Eve, y'know), and Dabney's ex-DMSH, Tom Turner (busted because he made Tau Beta) undertook to show the town to those sheltered lads, Herzog and Fasola, Perry's, Shap's, The Terrace, Constance, Brandon's—why, man, there's no limit to the excitement available in Pasadena!

With the possible exception of the over-enthusiastic candlepower of the bar, the LA Breakfast Club is in for a tremendous ovation. Many there are, indeed,

who wriggled out of the pits for the first time to bask in the warmth of Hal Lomen's syrupy symphonies. Opinion was mixed as to the desirability of Hal Lomen—those looking on dancing as an end, agreeing that he was keen, and those looking on dancing as a means, decrying his variety. It was noted with surprise that Bill Woods was seen without his Schmippsian Cynthia. We fretted grievously until he showed up with her at chow Sunday.

The evil plot to discompose the mighty Eschner was partially carried out. As Al was sadly able only to escort one of his four women to the formal, it was deemed only just by the clique of Whist, Freed, and Walquist that the other three should also be invited and that they would volunteer to do the honors—and only Whist failed to carry through his part in the noble coup. Ivy to Humman! The effect on Eschner has not reached us.

Stan Boicourt and GLORIA MURPHY were given a rough time. After four or five buddy Cruddites greeted the enterprising Stan with, "Hello Lover," the poor guy found a lovely but inconveniencing Irish elbow between him and our gal. Things must have perked up, though, for he got back to Tech even after Victor "Morning-Star" Van-

Carl E. "Dumpter" Fox was seen squiring a cute chick to the formal. He's been leaving Gage's woman alone lately. Smarter, Carl, no fight left?

Phil Randolph had a blind date

for the ASCIT dance. It hardly seems fair for one frosh to corner the market on something there's so much demand for.

We don't want to say that Ted Bowen is snapping under the strain, but he doesn't seem to be quite his normal self. Paper airplanes are kid-stuff. Bowen's been having a fine time with metallic jobs, salvaging cigarette pack tin-foil to carry on the noble research. Economizing, apparently to look frugal, Ted and Norm Schroeder have set up a cigarette rolling machine that operates far into the night. Watch out American Tobacco, these boys are ambitious! From the smell of the burning product, we must be closer to Santa Anita than we thought.

Bob Haufe and Jim Hummel have created a Frankenstein, and we aren't kidding. The tit-tat-toe machine works! But it is too near human, and as if the incessant banging of its jillion relays wasn't enough of a curse, the verdammt thing, when cheated, will cheat you right back. Bah!

EARTH'S PERIOD

(Continued from Page 1)
a later age, usually 19 years, and start specializing earlier;

2. Once in college, specialization starts much earlier for the British student than for the American.

Post-graduate work in the two countries is not any more different than post graduate work in two American colleges, he said.

Astro Opportunities

Speaking on post-graduate opportunities for Caltech astronomy majors, Sir Harold said, "Although the field is necessarily limited, there is always opportunity for the well-qualified man."

Grants

Education and science in Great Britain are benefiting greatly from increased government grants, was his opinion. However, this policy of government grants would probably be undertaken by both a Labor or a Conservative government, under present conditions.

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