

HAVE A
GOOD
VACATION

CALIFORNIA TECH

AFTER
FINALS,
THAT IS

Volume LII

New Tech Staff Takes Over Jobs

Streamlining Being Planned for the Tech Next Term Opportunities Open for Any Ambitious Journalists

With this issue of the California Tech a new staff takes over in the editorial capacities on the paper. The new editor-in-chief, elected in last month's student body elections, is Chuck Benjamin.

Other editorial staff members are: Budd LeTourneau, managing editor; Mike Mecherikoff, news editor; Duane Marshall, feature editor; Nick Nicholson, sports editor; and Paul Helfrey, copy editor.

The business manager, also elected in last month's elections, will not take over until September, and Charlie Steese will continue as California Tech business manager, while Dick White, business manager-elect, will continue in his present position of circulation manager.

The New TECH

Next term the Tech is going to be streamlined in its journalistic aspects in accordance with the policies of the new editorial staff. If you, as readers, have any comments about the appearance of future issues, they will be appreciated by the editor. Also, with the "shake-ups" in the staff, there are now vacancies open which anyone who is interested in journalistic work is urgently invited to fill.

Pyatt Enters Regional Meet

Ed Pyatt, winner of Caltech ASCE speech competition, will represent CIT at the Western Regional Conference at Yosemite on May 5th, in competition against students from Berkeley, USC, Stanford, Nevada, and Santa Clara. Regional winners will win 10, 15, and 25 dollar prizes.

Interesting Topics

ASCE members competing to represent Tech at the regional conference were Bob Smith, speaking on artificially induced precipitation; Dick Libbey, speaking on underground oil storage tanks; Hodge Gaines, on pre-cast concrete slab construction; John Fee, on the new San Diego water treatment plant; and Ed Pyatt, discussing the use of radioactive tracers in hydraulic studies.

Sharp's Talk Ends Initiation

The culmination of the week of initiation duties for the 17 newly elected members of Tau Beta Pi came Friday, March 2, with the formal initiation followed by the banquet at Pierre's in San Marino. Speaker at the banquet was the Institute's professor of geomorphology, Dr. Robert P. Sharp, who spoke on the "Economics of Glaciers," showing the perfect balance maintained between income (of snow) and expenditure (loss due to melting). He illustrated his lecture with beautiful colored slides taken during summer work in Alaska of the Malaspina Glacier.

The pledge essay contest was won by Boyd C. Israelson, the theme of the essays being "How Can the U.S. Best Utilize Its College Level Engineers and Scientists in a National Emergency." The winning essay will be entered in the national Tau Beta Pi pledge essay contest.

Campus Calendar

THURSDAY, MARCH 8
7:15 Board of Directors Meeting

FRIDAY, MARCH 9
4:15 Varsity Swimming, Caltech vs. John Muir College at Muir

SATURDAY, MARCH 10
9:00-12:00 Art Class, 04 Mudd

1:30 Varsity Tennis, Caltech vs. Whittier

1:30 Frosh Tennis, Caltech vs. Whittier

2:00 Varsity and Frosh Track, Caltech vs. Redlands

2:15 Varsity Baseball, Caltech vs. Cal Poly at Cal Poly

SUNDAY, MARCH 11
8:00 Chamber Music Concert, Dabney Lounge

TUESDAY, MARCH 13
12:00 Frosh Lunch Club

WEDNESDAY, MARCH 14
7:30 Geology Club, 155 Arms

California Institute of Technology
Pasadena, California, Thursday, March 8, 1951

No. 20

Y Elections Today

YMCA elections will be held today in 106 Dabney at 7:30 p.m. "Y" officials urge every member to vote.

Honor System vs. Average College

It would probably do us all a lot of good if they would start a new course at Caltech. It would be called "Observations and Remarks on Average College." The observations would be made entirely by the students and then the remarks would follow. If we really took this course seriously, we would realize that Average College is missing something that even Coeds can't replace. Average College doesn't have our Honor System.

Unfortunately, the inauguration of such a course would be a little impractical, but we can get a good idea of what it is like in those tight exams with proctors all around by just talking to your friends who go to UCLA, USC, or any of the other schools without an Honor System. Most of us just don't do our best work when there is someone looking over our shoulder waiting for us to cheat, and sometimes, I think, a little disappointed if he doesn't see anyone cheating. He could lose his job, you know.

Guardian Angel

One school I have heard of provides its full grown college students with a guardian angel proctor who follows you if you leave an exam. Then when you come back from the little men's room he stops at the exam room door and waits for the next person. That, I would say, is somewhat of an extreme, yet it serves to show what means are taken to try to keep students from cheating.

You'll agree that here at Caltech we have a better system. By comparing our system with the above method, we can readily see how fortunate we are.

Maintain Spirit

But an Honor System isn't something that can just go on and on by itself: It needs the continual aid and assistance of the entire student body and the co-operation of the faculty. Our big job as members of the student body is to keep it working by maintaining the spirit of the Honor System, and by helping the Board of Control.

First, each of us preserves the spirit of the Honor System by respecting its basis and by realizing our obligation to live up to its expectations. In other words we mustn't cheat. The second way that the spirit of the Honor System is maintained is by helping the Board of Control.

Mature Minds

At the beginning of next term in class meetings there will be elected two men from each class who will be running for positions on the Board. It is a good idea to devote considerable time and thought to your choice of these men, because upon them falls the responsibility of judging the cases that are brought to the Board by the students or faculty. It is a serious job that calls for a mature mind not swayed by prejudice.

But to get back to how you help the Board of Control. It would be appreciated if you would point out to any of the Board members anything you think is endangering the spirit of the Honor System, either on the part of the students or faculty.

Lax habits can easily slip to a point where they become violations, and the Board would rather work to correct lax habits than to try violations.

In the event that you observe something you think is an infringement of the spirit of the Honor System, whether a violation or a bad habit, be sure to mention it to one of the Board members.

Present Members

The Board members at this time are: Bob Salkeld, Bruce Watkins, Jerry Ross, Mike Lourie, John McCourt, Henry Richter, Neal Pings, Dallas Peck, and Dave Hanna. Any of these men will be glad to speak with you, or, better yet, you may come around and see me. I'm sure that with our common desire to see the Honor System maintained we can get any difficulties settled.

These remarks are particularly timely right now with exam week coming up, but remember them all the time. It is not just during exam weeks that our Honor System works.

Finally, then, keep in mind the advantages of our Honor System and remember your duties toward keeping it intact.

Mike Callahan—Chairman, Board of Control

House Men To Make Sacks No Assembly Fri. Due to Ill Star

In order to avoid a raise in the room and board fee, the daily cleaning of the rooms and making of the beds has been discontinued. This has allowed the number of maids to be reduced one-half. The money which will be saved, approximately five percent of the total room and board fee, is felt adequate to make up for any loss in the operating budget.

According to the present plan, the rooms will be cleaned and fresh bed linen and towels will be exchanged for the soiled ones, once each week. This will be done on Monday in Blacker; Tuesday, Ricketts; Wednesday, Dabney, and Thursday, Fleming. Concert Last Week

Last week the 70 Techmen who attended the annual orchestra concert were impressed by the fine assembly put on by the Caltech orchestra. Applause acknowledged Dick Taylor's brilliant violin solo, besides the competent playing of the string section in general.

Voluntary Basis

It seems natural that each man will have enough pride in the appearance of his room to keep it neat and clean. We have commenced this program on a voluntary basis and certainly hope it may continue. Mr. Tanham hopes that all rooms will be tidy and the beds made by 1:00 p.m.

In some of the houses enterprising students are offering, for a nominal fee, to make the beds each day.

(Continued on Page 6)

Forthcoming Movie Depicts Student Life at Caltech

Pictures of Technical and Social Features Prepared to Interest Prospective Freshmen

High school students across the nation will soon be seeing Caltech in a new light; that is, the light of a movie projection lamp. This new and different motion picture will be filmed in full color on the campus of our alma mater, and the stars will be the students and faculty of Caltech. The purpose of the film is to sell CIT to prospective freshmen, and to aid the admissions committee in obtaining applications.

Contents of the film will include academic and extra-curricular activities being done on campus. Sections are planned to show what is offered in the main options, and stress will be placed on the Tech method of teaching fundamentals. Scenes of some of the special work on campus, such as the wind tunnel, high voltage lab, and the Synchrotron, will add special interest.

Extra-Curricular

Action scenes of our sports teams will show, for those who haven't heard, that Tech participates in many of the major sports. Social activities will be illustrated by scenes taken at typical Tech dances and parties. A few scenes will point out our system of student houses. The final result will be approximately thirty minutes of enlightening, and yet interesting, information.

Shooting Starts

Actual shooting will be started by April. To be of any use during the coming fall term, the movie must be completed during the Spring term this year. This makes it impossible to film many of the interesting events of the school year. An urgent call has been sent out for any films that anyone has taken about student affairs. They would help fill in the gaps in the first two terms. So if anyone has taken movies of the Mudeo, frosh initiation, skiing, dances, beach parties, field trips, sports, or any similar subjects he is urged to make them known.

Oral Presentation

Professor MacMinn has urged that all candidates see him before writing their essays. The finalists will make an oral presentation of their essays; therefore, the papers should be written with this in mind.

Candidates for the contest must read the following books:

Robert A. Millikan—Autobiography

Sidney Overstreet—The Mature Mind

Arthur Miller—Death of a Salesman

T. S. Elliot—The Cocktail Party

The essays should be of about 1200 words and the ideas must be drawn from the assigned reading. The essays will be judged by a committee of the English department. The four men who are found to have submitted the best essays will engage in the final contest and will present their papers orally before a group of judges at an assembly to be held in May. Last year, the finalist judges scored 70 per cent on thought and expression and 30 per cent on effectiveness of delivery. The same scoring will probably be used this year. The length of presentation should be about 10 minutes.

Established in 1946

Established at the Institute in 1946, the Mary A. McKinley Prize Contest in English was created for the purpose of cultivating proficiency in English. Samuel P. McKinley M.D., a graduate of Rensselaer Polytechnic Institute, founded the contest in memory of his mother. All essays must be submitted to Professor MacMinn, 212 Dabney Hall, by Monday, April 16, 1951.

Balloons Burst At Term Dance

The ASCIT dance ended with the bang of popping balloons last Saturday night. "Jump for Joy" featured decorations of 700 helium and air balloons which burst off the ceiling and walls throughout the four dancing hours.

Although it was rather cool outside, the lawns were occupied by Techmen and their dates for a great portion of the evening. Keith Williams and his 10-piece orchestra played for the dance.

(Continued on Page 6)

Interview Schedule

MARCH, 1951
THURSDAY & FRIDAY, 8 & 9—BS, MS, Ph, ME, Collins Radio Co., Burbank, Calif. M. L. Doelz and Francis Moseley.

THURSDAY & FRIDAY, 8 & 9—Bell Aircraft, Buffalo, New York. Bruce Foster, BS, MS, Ph.D./Ac. M. E., Ma. (Theoretical & applied). List of positions to be filled available in Placement Office, Survey, Los Angeles and Norton Airforce Base, San Bernardino, Calif. and CE's interested in Geological Survey, L. A. contact Placement Office, Sacramento Signal Depot.

PLACEMENT OPPORTUNITIES
1951

Resumes of positions available to June 1951 graduates. If you are interested in any of the following, please contact the Placement Office at once for further details and referrals.

Pre-Interview Survey
Weyerhaeuser Timber Co., Longview, Wash.

Interested in employing graduates with degrees in Engineering Physics, A. Ch.; design production, development, process engng.

California Texas Oil Co., Ltd., New York—ME, Ch, CE; for design, construction, maintenance, and operation of petroleum refining equipment.

Army Ordnance, Pasadena—Ph, ME ChE, EE for employment at Frank Arsenal, Phila., Pa.

Note: If sufficient interest is evidenced in any of the above interviews will be scheduled at a later date.

Positions Available—No interviews sched.

Brazilian Traction, Light & Power Co., Ltd., Canada—EE, CE, ME; for expansion of hydro-electrical developments in Brazil and Toronto. Usual premium salary for overseas service plus pension plan. 4 mos. leave /3 years.

Jefferson Chemical Co., Inc., N. Y.—ChE for Port Neches, Texas plant, preferably with MS; MS/ChE for N.Y. engineering design process design group; MS/ME for N.Y. engineering division mechanical group.

Electro Engineering Co. of Calif., L.A.—EE with electronics for design engineering and modification of various types of government electronic equipment.

McClellan Air Force Base (near Sacramento), Calif.—ME, AE, EE, IE for permanent status, must take junior engineering examination.

Kimberly-Clark Corp., Neenah, Wis.—Jr. Design Engineers, CE, ChE, EE.

California State Personnel Board—announces examinations for Jr. Engineering Aid, \$220-231; 243-255-268; and Sr. Engineering Aid, \$268-281-295-310-325; on April 7, 1951. Final date for

(Continued on Page 6)

THE SQUARES' CIRCLE

To the Editor:

I'd like to thank all the men who made the success of this last ASCIT dance possible—"Pinky" Pinkerton, Ed Salsbury, Paul Langdon, Mike Lourie, Bob Smith, and "Dud" Wagner, who helped all day Saturday with the decorations . . . Teddy Einwoh-

ner, who secured the Institut's help, and Pete Mason who took care of the helium supply problems. Without these men, the dance would not have been anywhere near as bright and cheerful as it was. Sincere thanks to all of you again.

Art Cuse.

THE SPACE BEAVER

by Al Lewis

Rumors are beginning to fly concerning an impending shake-up in the editorship of **Astounding Science Fiction**. They say that John Campbell, who has held the job since 1937 and is probably more responsible for the present high quality of science fiction than any other individual, is about to be replaced. It seems that Campbell is spending more time on dianetics than on **Astounding**, and Street & Smith is looking for a replacement. According to the rumor, Theodore Sturgeon has the inside track.

Two New Magazines

The latest addition to the science fiction field is the revived **Science Fiction Quarterly**, which is being published by Columbia as a companion to **Future**. This magazine, while not up to the **Galaxy** standard in format, contains a group of very enjoyable stories. If Wallace West's lead story is somewhat trite, this is more than offset by the rest of the issue, which features authors William Grey Beyer, Robert Abernathy, Lester del Rey, George

ON THE RECORD

By George Abell

Of the numerous musical events which will take place in the Los Angeles Area during vacation, by far the most spectacular will be the Los Angeles Philharmonic Orchestra's presentation of Mahler's Symphony No. 2, on Thursday evening and Friday afternoon, March 22 and 23.

Repeat Performance

Music Director Alfred Wallenstein will conduct the orchestra, which will be assisted by Phyllis Moffet, soprano; Janice Moudry, contralto, and the Roger Wagner Chorale. This is a repeat performance of the work, which closed the Orchestra's season last year.

Gustav Mahler

In 1907, after ten years in Vienna, the master resigned this post as a result of considerable pressure from his ever present opposition. The ranks of Mahler's enemies had increased to considerable proportions, partly, perhaps, because he was Jewish, but probably because of the enormous demands he made of his co-workers, and his frequent inadvertent lack of tact in dealing with important artists.

It was at this time that Mahler came to the United States to conduct at the Metropolitan Opera and for the New York Philharmonic Symphony Society. At the expense of his health, the conductor drove himself to the limit of his endurance. When he collapsed in the midst of a nationwide concert tour which proved too strenuous for his weakened heart, he hastened to Europe for medical care. A few months later, in the middle of 1911, he died at his home in Vienna.

The Composer

As a conductor Mahler worked extremely hard. His hours were long and taxing; he often required as many as eight rehearsals before a single performance. It is not difficult, therefore, to see that he had precious little time for composition. It was, indeed, his dream that one day he would retire, and devote the remainder of his life to his own

creations.

That retirement, of course, was never realized. Yet, somehow, before and after working hours, and during brief vacations, this man turned out ten gigantic symphonies, several great song cycles, and forty-two individual songs. (Only nine of his finished symphonies are numbered; the composer was reluctant to assign "Das Lied von der Erde," in essence a symphony in six movements, the title "Ninth Symphony" owing to the deaths of Beethoven and Bruckner after they had each completed nine symphonies. Of course Mahler did, eventually, write a "Ninth," and even began his "Tenth.")

The Man

An appreciation of Mahler's art is probably somewhat facilitated by some knowledge of his character and personality. He was a man of great complexities, of keen and varied interests, of perpetual curiosity, and of intense nervous energy. Most significant, perhaps, are the conflicts which were ever present within Mahler's own philosophy. Although his conversion to Catholicism when he went to Vienna was probably largely for practical rather than esthetic reasons, he was certainly a religious man.

His was not a religion of dogma, however. According to Bruno Walter, Mahler, the god seeker, found it impossible to reconcile the existence of a supreme being who could create a world abounding with so much beauty, and yet, with so much suffering.

The Music

Today, half a century after his death, the position of Gustav Mahler in the world of music is a disputed one. Many consider his works inordinately long, heavy, confused, lush, or excessive. Certainly, most listeners will not find that what he has to say is obvious at first hearing.

Mahler was an experimenter, and a great master of orchestration. His symphonies are as complex and intricate as any up to his time. He frequently obtained quaint and original orchestral effects with solo instruments. He sometimes aimed for massive effects; three of his sym-

Who Dealt This Mess

by John Rogers

Losing Cards

In bridge, declarer has two methods for getting rid of losing cards in his hand. One of these is by trumping them in dummy, and the other one is by sluffing them on dummy's high cards. This week's hand illustrates both possibilities:

S K,Q,8,2
H 8,6,3,2
D 9,5
C A,6,3

S 6,3 N S J,10,9,7,4

H A,K,Q,10,9,4 H 7

D J,10,7 W E D Q,6,3,2

C 9,8 S C J,10,4

S A,5

H J,5

D A,K,8,4

C K,Q,7,5,2

BIDDING

N E S W

1S P 2D 2H

3C P 5C P

P P

Bidding

What is This Stuff?**Tech Scientists Aid L.A.
In Battle Against Smog**

Professor A. J. Haagen-Smit, a member of the Institute's Biology Division, working for the Los Angeles County Air Pollution Control District, has uncovered evidence that many of the most annoying—and damaging—components of "smog" are formed in the atmosphere instead of being released directly by chimneys, exhaustpipes, and the like. The discovery of this chemical aspect of smog production may have a widespread effect on the whole approach to the problem of air pollution.

Big Sewer

Mankind treats the earth's atmosphere as a vast sewer, a sewer incapable of being affected for long by the smoke and fumes that pour into it. Luckily, at most times and in most places the atmosphere can accept everything that mankind has to offer.

In some areas, however, geographical and meteorological conditions can limit the capacity of the sewer. There are several such areas in the world, and of them, the Los Angeles area—because of the growth in its population and its industrial development—is currently the most troublesome.

Mountain ranges bar the normal horizontal flow of air in the Los Angeles region. A chronic

temperature inversion (a hot layer of air above a cooler one) stops the normal upward flow of heated air. When this layer gets down to a height of 1,000 feet or less, the air available for the dissipation and "dilution" of the smoke and fumes can be considered as limited to a volume about 25 miles square and 1,000 feet high.

Such a volume, about 120 cubic miles, contains roughly 650,000 tons of air. Forty-odd pounds of ethyl mercaptan, a compound related to skunk's odor, released into the air above Los Angeles

could perfume this whole volume.

As little as one-half a pound of a still more odiferous compound could do the job. Hence Los Angeles' particular atmospheric sewer is obviously limited in the amount of waste that it can handle.

The human sense of smell is quite sensitive, however, and it requires amounts of pollutants much larger than those mentioned above to produce the eye irritation and plant damage that bad smog causes. It would take, for instance, 400 tons of the war gas Lewisite to produce tears in the area, and about 30,000 tons of sulfur dioxide, a compound released by certain industrial processes. (A reassuring figure is the quantity of pollutant that would be required to make the air of the Los Angeles area leave the area, and about 30,000 tons of Lewisite, 3,000,000,000 tons of sulfur dioxide.)

So it is clear that in an area such as that around Los Angeles, even though the size of the atmospheric sewer may be limited, it can still take several hundred tons of pollutant be-

fore the pollution becomes objectionable.

Eyes and Plants

On the other hand, it is immediately obvious that somehow the necessary quantities of pollutants are being produced in the Los Angeles area; for not only does the smog make eyes sting and water on bad days, it also damages severely many of the crops on which the agricultural life of the area depends.

The best clue to the damaging component of smog has been found in the fact that smoggy air has an unusually high oxidizing ability. Susceptible objects exposed to smog, whether tires or paint or laboratory chemicals, soon reveal the effects of oxidation. It has been customary in the past to blame such oxidation on inorganic compounds such as ozone, the active molecule made up of three oxygen atoms. But it has been found that there is not enough ozone—or for that matter of any other inorganic oxidizer—to account for the total oxidizing ability of smog.

Organics

It was at this point in the re-

search that the important role of organic compounds in the smog-forming process was suggested.

oxides and other compounds that may be formed in the air from hydrocarbons.

Lab Atmosphere

It is easy to simulate in the laboratory this atmospheric production of peroxides by mixing gasoline vapor with ozone. The resulting mixture has the oxidizing ability of smog. It also looks like smog, smells like smog, and irritates the eyes as smog does.

On this evidence, it would be easy to assume that the real villains of smog are organic peroxides and related compounds formed in the air from the hydrocarbons released by various domestic and industrial processes. The fact that the experimentally produced mixture looks, smells, and acts like smog does not necessarily mean that it is smog, however; it might simply be producing the same effect as some other mysterious compound in smog.

Fortunately for the organic peroxide hypothesis, strong supporting evidence for the importance of peroxides in smog has been forthcoming from a study

(Continued on Page 4)

What's bad about profits now?

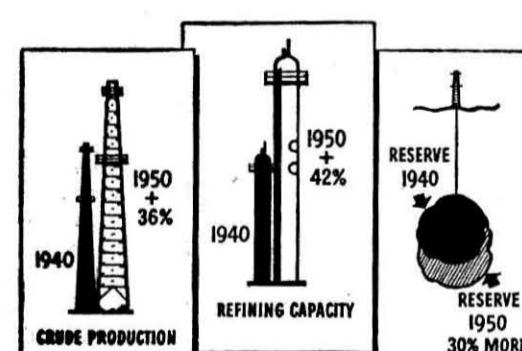
1. During the past 20 years, a great many uncomplimentary things have been said about profits. In fact, profits have been so thoroughly lambasted by left-wing propaganda that a great many honest Americans were beginning to wonder if maybe there wasn't something evil about them after all.



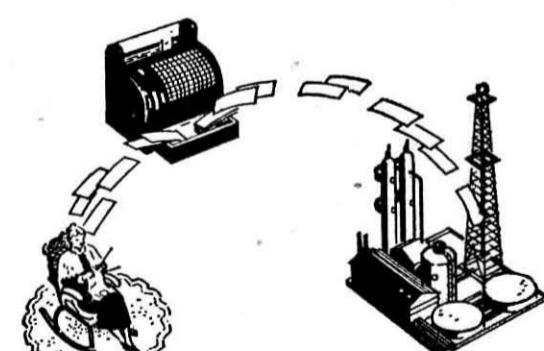
2. Today the answer is plain. The oil industry, as one example, has had some profitable years since 1945. Now, in 1951, America is faced once again with the prospect of all-out war. In war, as in peace, petroleum is the lifeblood of a nation. (During World War II, 60% of the tonnage required to supply our armed forces consisted of petroleum products.)



3. Today the U.S. oil industry has from 1/3 to 1/2 more capacity than it had in 1940. Profits, and profits alone, have made this possible. First, 88% of that increased capacity has been paid for out of profits. Second, what new capital has come in to make up the other 12% was attracted by the earning record of the industry.



4. As a result, the industry today is producing 36% more crude each day than it was in 1940. (Union Oil produces 71% more.) The industry has 42% more refining capacity. (Union Oil has 54% more.) And finally, in spite of all the oil we used up during World War II, the industry has 30% more underground crude oil reserves today. (Union Oil's reserves are 49% greater.)



5. So, next time anyone starts ranting to you about profits remind him of this: Only 40% of the average oil company's net profits go out to the stockholders in dividends. The bigger share goes into replacing and expanding facilities. Without this expansion in the oil industry—and other industries as well—America's productive capacity could never have grown big enough for the tasks that lie ahead.

UNION OIL COMPANY

OF CALIFORNIA

INCORPORATED IN CALIFORNIA, OCTOBER 17, 1890

This series, sponsored by the people of Union Oil Company, is dedicated to a discussion of how and why American business functions. We hope you'll feel free to send in any suggestions or criticisms you have to offer. Write: The President, Union Oil Company, Union Oil Building, Los Angeles 17, California.

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School.....
Address.....
City..... State.....

TECH SCIENTISTS AID IN SMOG BATTLE

(Continued from Page 3)

of the effects of smog on plants.

Indicator Plants

The combined efforts of the Los Angeles County Air Pollution Control District, the University of California Agricultural Experiment Station at Riverside, and the California Institute of Technology have produced five "indicator plants," plants that are each damaged by smog in a specific, individual way.

Spinach, endive, and sugar beets suffer a splotchy silverying of the undersides of their leaves. Alfalfa and oat leaves are bleached. This pattern of damage makes such a good "fingerprint" of smog that the research group has been able to rule out more than 50 possible air pollutants, none of which could duplicate the damage on all five plants.

Ozone Villain?

The mixture of gasoline vapor with ozone, however—the laboratory version of the peroxides formed in the air—even in very small concentrations produces effects on each plant indistinguishable from the effects of smog itself on the same plant.

While ozone is readily available for laboratory purposes, the ozone content of the city air is usually quite small (if ozone is present at all), because this active compound is rapidly used up in the oxidation of the organic material in the air.

Smog Factory

An additional agent capable of producing peroxides in the air, however, helps to make up for any lack of ozone in the atmospheric smog factory. This agent, nitrogen oxide, is an air pollutant formed for the most part in combustion processes.

Plant damage produced with the aid of nitrogen oxides, just like that produced with the aid of ozone, shows the typical smog pattern; and in addition it can be demonstrated that the nitrogen oxides combine with the hydrocarbons to form obnoxious compounds which contribute to the other effects of smog.

Supporting evidence for the part that the nitrogen oxides play comes from still another and totally different aspect of the smog problem. The rapid cracking that takes place when rubber is stretched or bent during exposure to smog has been shown to be a cumulative effect of the action of ozone and that of the nitrogen oxides under the influence of sunlight, and explains why tires crack more readily in smog areas than elsewhere.

Rise of Smog

The concept of Los Angeles smog that arises from the foregoing reasoning and experimental work is this: Industrial and domestic processes release hydrocarbons into the air, by evaporation as well as by incomplete combustion. In the air these hydrocarbons are acted upon by the ozone that occurs naturally in the air and, under the influence of sunlight (which assists the chemical reactions involved), by the oxygen and nitrogen oxides to form the substances which make eyes water and which disfigure plants. These active materials, the peroxides, gather together into large molecules to form aerosols, droplets too small to fall to the ground of their own weight but too big to permit good visibility, and thus help to produce the dense haze so familiar to those living in the smog area.

Remaining Task

What remains is to discover and eliminate the sources of the organic material, mostly hydrocarbons, which are later transformed into the damaging substances. Many of these sources have already been mentioned. It will, however, be quite a task to assess the relative importance of each source, since this form of air pollution is widespread.

It will take extensive study to decide which sources of organic pollution should be stifled, and to develop control methods for each. Fortunately, in the case of the hydrocarbons re-

leased from petroleum products, each move toward smog abatement will mean increased efficiency; refineries and service stations that lose hydrocarbons to the air are losing a valuable part of their product, and automobiles that release unburned hydrocarbons are obviously not working at peak efficiency.

Effects of Research

In one way, this research may have effects that extend far beyond the immediate Los Angeles smog problem. As each metropolitan area of the world becomes larger and more industrialized, its release of hydrocarbons to the air becomes greater. While Los Angeles and its environs have apparently reached the saturation-point first, other areas may also reach the point at which their atmospheric sewers begin to back up. When that happens, the danger signals—to be noted on the indicator plants—and the remedial measures—already developed to the point at which the sources of trouble, at least, are clear—will be known.

THE SPACE BEAVER

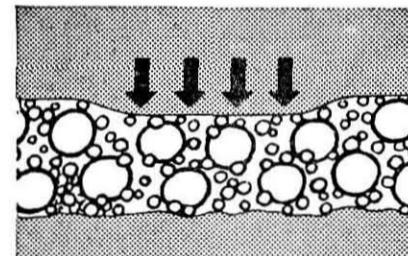
(Continued from Page 2)

Avon is planning to bring out an **Avon Science Fiction Reader** as a companion to their current **Avon Fantasy Reader, Dynamic Science Stories**, which lasted for exactly two issues back in 1939, is being revived as a companion to **Marvel, Marvel**, incidentally, is adopting a pocket format with their next issue. Damon Knight's science-fiction magazine **Worlds Beyond** has been discontinued.

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Cross-section of wax film shows how pressure of foot pushes the hard "Ludox" particles into the wax, causing a snubbing action.

the one frequently used in studying metals—requires solvents. These would dissolve and ruin a wax surface.

So it became necessary for the chemists and electron microscopists to develop an entirely new way to make a replica of a surface. This they did, as part of a research program that lasted several years.

With it some remarkable pictures were made. They showed that many "Ludox" particles stay at the surface of a wax film, even though they are denser than wax. As you walk on a floor, your shoe presses the tiny silica particles down into the wax spheres that make up the film. This sets up a snubbing action which keeps you from slipping.

Much more could be told about Du Pont research on colloidal silica. For example, chemical and mechanical engineers had to develop manufacturing equipment, including a specially designed ion exchange column. Organic and physical chemists used research findings to formulate better waxes, as well as silica-containing adhesives and anti-slip treatments for rayon fabrics. Like practically all Du Pont achievements, "Ludox" is the result of close, continuous teamwork of men and women trained in many fields of science.

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Houses Elect New Officers

With the ASCIT elections duly disposed of, the time of the year has come when the house officers must be chosen to serve for the last term of this year and the first two terms of the next school year.

Candidates for the various offices were nominated on Wednesday and Thursday last week, and the elections took place yesterday, however the results were too late to publish in this edition.

Major Offices

The major offices filled in each of the five houses are president, vice-president, social chairman, treasurer, secretary, and athletic manager. In each case a simple majority of votes was necessary for election.

Not to be forgotten were the various minor house officers that were elected at the same time.

A fourth issue may or may not be published. Another rumor has it that **Galaxy** will raise its price to 35¢ in the near future.

Slan

A. E. van Vogt is rewriting his superb novel **Slan** prior to its second book publication late this year. The revised and watered-down version will be published by Simon & Schuster.

Sophs Challenge Frosh in Softball

On registration day for the third term there will be a softball battle to the death between the members of the freshman and sophomore classes. Everyone is urged to register early in the morning so that the afternoon may be open for the game.

Remember the time: afternoon, third term registration day; the place: tournament park; the event: a red-hot softball game between the frosh and sophs; the details: register early, bring yourself, and your glove or a powerful set of lungs for cheering.

INTER-HOUSE TROPHY STANDINGS

Throop	97	
Blacker	82½	
Dabney	69½	
Fleming	68½	
Ricketts	54½	
Dabney	0	.000

Ricketts Spikers Win Discobolus

Losing two volleyball games by scores of 15-11 and 15-6 Throop Club lost its hold on the Discobolus Trophy to Ricketts House. The Ricketts team showed great strength beating Throop and will probably be a strong contender for the Inter-House volleyball crown next term.

Blacker house finished the Inter-House tennis season with a perfect record by beating the Ricketts team 3-0. In singles matches Salsbury (B) def. Dessler (R) 6-1, 1-6, 7-5; and Schmid (B) def. Stannard (R) 1-6, 6-3, and 4-6. In the only doubles match McCourt, Schmid (B) def. Patraw, Stannard (R) 6-8, 6-4, and 6-3. Throop defeated Fleming 3-0 to gain undisputed third place.

Blacker	4	0	1.000
Ricketts	3	1	.750
Throop	2	2	.500
Fleming	1	3	.250
Ricketts	0	4	.000

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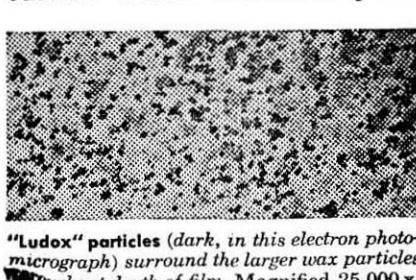
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"Ludox" particles (dark, in this electron photomicrograph) surround the larger wax particles throughout depth of film. Magnified 25,000 x.

Study in duplication

Often, problems like this have been solved by preparing a thin replica or copy of the surface for examination in its stead. However, the conventional method for making a replica—

Engineers Cop Third in Conference Relay Meet

What? All Conference Relays. Where and when? Saturday at Oxy's Patterson field. Who won? Oxy, of course. How did we do? Well, third as a matter of fact. Did Oxy set a new medley record? Nope, missed it by seven seconds. And that's the story of the start of another year's track for the thinclads.

Poor Third

While we didn't come close to Oxy or even close to Redlands, (final score—Oxy 67, Redlands 29, Caltech 14, Whittier 7, Pomona out with flu) we were in there trying. I don't think anyone had the feeling of being smeared which followed the All Conference meet last spring.

The highly touted relay team of McKibben, Cotrel, Barnes, and McMillan didn't hit the world record of 9:59.4 but they did shave a healthy margin off the old mark of 10:38.9. They did 48.0, 2:02.2, 3:03.5, and 4:15.4 to run a solid 10:07.1. The team has two more tries this year and may well hit it later, when they are in better shape.

Not Lapped

Caltech's distance medley team has the proud distinction of being the only one not lapped, finishing second with 10:57.4. Individual times were Johnson 52.1, Aagard 2:06.6, Pilkington 3:25.3, and Mason 4:33.4. With the exception of the 880, these are the equal or better of personal records for the runners involved at these distances, so there's still some improvement left in the old men.

Others scoring for the Engineers were Heacock, who heaved the discus 114 ft. 8¾ in. for a clean third, Middebrook with a surprise fourth in the javelin at 153 ft. 7½ in., and Waid, who broad jumped 20 ft. 11¾ in. for a fourth place.

(Continued on Page 6)

BUTTIN' IN

—by Butler

Last Friday night brought an end to one of Tech's most unsuccessful basketball seasons. The team played good ball at times but had a bad habit of loafing at the wrong times, at which point the opponents went wild. I could make all kinds of excuses for the team, but I think that all our troubles hinged around not having enough practice time.

That Gym Again

Carl Shy has a real coaching problem every fall. Rarely does he get a group of men who are fairly polished ball players; commonly he receives of a group who have never played or have played just a little. It takes time and lots of time to teach these men fundamentals. And this time comes only by starting practice sessions as soon as school opens with two or more hours of drill. Every other school in the league has a basketball program along that line and their teams show the polish that comes from long hours of practice. How do they do it? By having a gym. Everyone is familiar with the gym problem so I need say no more.

The Past

After the final horn in the Pomona game, I took a moment to look back over past basketball experiences. The most thrilling moments occurred once in college (and once in high school). A lot of us still remember that double overtime game with Oxy in the '49 season when "Goon" Saltman literally iced the game single handed. And I can still see Jim Gabler firing that mid-court shot against the Harvard J.V. five in the clos-

(Continued on Page 6)

Beaver Sports

Horsehiders Netters Take Open Season Two Matches

The Varsity baseball team had their first game last Wednesday with Muir. They lost 7-5, but the score did not mean too much. The weather has not been warm enough to have a good practice and the field was a little muddy.

Errors Hurt

Muir only got one hit while we made four errors. The hit scored only two runs. The rest of their runs were unearned. Caltech scored their runs on three hits and five errors.

Winslow and Hedrick did the pitching for Caltech. Winslow started, had a little difficulty with control. In the first inning and finished the next two innings three up and three down. Hedrick was also having trouble with control.

Wednesday we played East LAJC at 4:15 p.m. here. If the weather clears up so that we can practice, the game Saturday with Cal Poly of San Luis Obispo will be good. This will probably be the strongest team we will play. However, by that time our pitching staff should be a little more polished. The batting should be improved also so this might be a very good game.

First League Game

The team will take a vacation during finals week and then the Wednesday of vacation they will open league play with a game with Pomona there.

Cagers Drop Two to End With 1-9 Record

Sagehens Take 65-72 Decision From Beavers; Chapman Dumps Tech 88-55

Last Friday night marked the end of a rather tough basketball season for Caltech. In their final game the Beavers fell before the Pomona Sagehens, 65-52. This loss gave Tech a season record of 1-9, Redlands being the only team they defeated.

Familiar Pattern

The Pomona game followed the familiar pattern of most of Tech's games. The Beavers managed to play it pretty close in the

Frosh Sports Roundup

by Nick Nicholson

Basketball season wound up with two games last week, one an easy victory and the other a hard fought loss. Wednesday night the frosh pounded out a 71-42 win over hapless Chapman, while Friday they went down to defeat before a sharp-looking Pomona frosh quintet. This leaves the team with a conference record of three wins and seven losses.

Easy Win

Chapman started out on an even keel with the Techsters but couldn't keep up the pace, the score shooting from 11-11 to 34-14 under a hot spell the Beavers had in the first half. Halftime count was 35-20, Tech's favor.

Tom Emery

Tom Emery (C) def. Paul Herold (Chap) 6-4, 6-1.

Doubles:

Martin-Smith (C) def. Grahm-D. Turner (Chap) 6-1, 6-0.

Baier-Welch (C) def. Hansen-Lee (Chap) 6-2, 6-2.

LaFleur-Hyman (C) def. F. Turner-Von Bieghard (Chap) 6-2, 6-2.

The squad enjoyed a victorious week by also winning a practice match with P.C.C. 8-1. Such a record should raise the pride of the team to a height stimulating a fighting drive for next term's battles.

Name	Field Goals	Free Tosses	Total Points	Avg.
Johnson	48	52	321	26.75
Smith	35	16	86	12.40
Plambeck	25	18	68	7.15
Watkins	5	4	14	3.50
Vodopia	4	1	9	6.00
Henderson	6	2	2	1.00
Lynam	2	2	2	1.00
Taylor	2	2	2	1.00
Peyton	1	1	1	1.00
Kaiser				
Crosby				
Dondaville				
Pinkerton	3	6		
Team Totals	254	133	641	53.4
Opponents	332	109	773	64.4

(Continued on Page 6)

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ENGINEERS COP

(Continued from Page 5)

Other Relays

Among other relay events in which Tech scored was a third in the four-man 880, run by Teague, LaTourette, Waid, and Walker. Al Teague replaced Pat Fazio, who was unable to attend. Unfortunately no times were recorded for our team in this event.

Times were recorded, however, in the four-man mile, in which we took third, Waid running 53.7, Irwin 54.3, LaTourette 53.9, and Johnson 54.1 for a team total of 3:36.0. This is not a bad time for so early in the season.

The only other event in which we placed was the shuttle hurdle, where we took second. The team consisted of Veazy, Kleigle, Irwin, and Waid, and again no times were taken.

First Dual Meet

This Saturday sees Caltech's first dual meet at Redlands. The Bulldogs have a good team, but nowhere near as much better as last week's score would indicate. In fact, Coach LaBrucherie figures that the score will be just about even. Caltech will add Fazio in the sprints and Don Tautz in the pole vault to strengthen the team considerably.

Relay results:

VARSITY

Distance Medley Relay: 1—Occidental (McKibben, Correll, Barnes, McMillen); 2—Caltech; 3—Redlands; 4—Whittier. Time, 10m. 7.1s. (New record, old mark of 10m. 38.9s set by Occidental in 1950).

480-Yard Shuttle Hurdle Relay: 1—Occidental (Bennett, Schiegle, Asman, Dennis); 2—Caltech. Time, 59.4s.

Mile Relay: 1—Occidental (Straw, Butler, Jones, Munroe); 2—Redlands; 3—Caltech; 4—Whittier. Time, 3m. 31.5s.

880-Yard Relay: 1—Occidental (Maruyama, Harvey, Jackson, Ruprecht); 2—Redlands; 3—Caltech. Time, 30.5s.

100-Yard Dash: 1—Ruprecht (O); 2—Mason (R); 3—Ludwig (R); 4—Maruyama (O). Time, 10.1s.

Pole Vault: 1—Tie between Shivers (O) and Conly (R), 11ft. 6in.; 3—Marrin (O), 11ft.; 4—Harshman (O), 10ft. 6in.

Broad Jump: 1—Schlegel (O), 22ft. 3in.; 2—Bennett (O), 21ft. 4 1/4in.; 3—Mason (R), 21ft. 3 1/4in.; 4—Waid (C), 20ft. 11 3/4in.

Javelin: 1—Ward (R), 188ft. 1in. (New meet record, old mark 181ft. 9in. set by Custer of Occidental in 1948.) 2—Bradley (O), 177ft. 1 1/2in.; 3—Dennis (O), 172ft.; 4—Middlebrook (C), 153ft. 7 1/2in.

High Jump: 1—Tie between Thorsen (R), and Reid (W), 5ft. 11in.; 3—Tie among Rheinschild (O), Dennis (O) and Copeland (W), 5ft. 9in.

Shot-Put: 1—Oleson (O), 45ft. 1/2in.; 2—Hoffman (O), 42ft. 10 3/8in.; 3—Martin (O), 41ft. 3 1/4in.; 4—Fletcher (R), 40ft. 4in.

Discus: 1—Hoffman (O), 128ft. 2 7/8in.; 3—Heacock (C), 111ft. 8 1/4in.; 4—Oleson (O), 112ft. 4 3/8in.

Final Scores: 1—Occidental, 67; 2—Redlands, 29; 3—Caltech, 14; 4—Whittier, 7.

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CAGERS DROP

(Continued from Page 5) giving him 18 points for the high for both teams.

Earlier in the week the Beavers ran into trouble at Chapman. It was unfortunate and hardly fair that they had to play both games against Chapman in the Panther lair. The small floor makes it the toughest place in the conference for a visiting team.

For the first five minutes the game was close. Then Chapman moved out to a five point lead. Their fast break began to click, and they picked up several baskets on it. Gradually Tech cut the lead, largely through Butler's ten-point first half effort. Chapman led 35-30 at the break.

Panthers Hot

When play resumed, both teams were fired-up. Chapman, however, suddenly became so hot that they just couldn't miss. Led by Dave Weatherill, they started a weave with three men out and repeatedly shook off the Tech defense, but only for a couple seconds. Apparently this was long enough for the dead-eyes. At one point they made nine out of ten shots from the free-throw line or beyond.

Although they tried hard, Tech couldn't match this terrific pointmaking barrage. Chapman increased its lead to about twenty points before they cooled off a little, not much. By then Coach Shy saw the game was lost and sent in his reserves. Chapman won going away, 88-55.

Slow Start

Looking back over the season, one sees that Tech got off to a very slow start. Part of this was due to injuries and to the late starting of practice. By the end of the first round the Beavers began to get into shape and started playing much better. They had some tough breaks, especially in losing a couple of close games (Oxy, Pomona.) But the climax came in the 57-55 defeat of Redlands.

Miss Butler, Sereno
Consistently leading his team

in scoring was Thorne Butler. His 158 points in ten games placed him high among the league's individual scorers. His fine floor play and his genuine sportsmanship and leadership along with his genuine sportsmanship and leadership with his high average should again win him a spot on the All-Conference team. Thorne will be missed next year, not only by his fellow players and coach, but in a different way by the other teams as a most dangerous player.

Scrappy Al Sereno fought dearly for a Tech victory. This year, particularly in the latter part of the season, Al began to prove himself. His energy and drive, his aggressiveness, his determination to win, all combined to make him the cagey fighter he was. Although he did not score too often, he set up his teammates time after time. Probably Al passed up shots he should have taken in order to give someone a better chance. Al, too, will be missed this year.

Gray, Mike to Lead

Forwards Norm Gray and Leon Michaelson were behind Butler in scoring with 85 and 81 points respectively. These two men found their shooting eyes late in the season and helped greatly to make the games close. Both will return next year and should lead the team.

Line-ups:

Caltech 55	Chapman 88
7 Patapoff	F Bigbee 20
8 Michaelson	F Snell 2
20 Butler	C Barney 10
10 Gray	G Weatherill 20
4 Sereno	G Reeves 12

Halftime—Chapman 35; Caltech 30.

Scoring subs—Caltech: Stevens 4, Gee 2.

Chapman: Lee 4, Arbenz 10, Holloway 3,

White 7.

Caltech (52)

Pomona (65)

Pasadena (2)

B. Ronstad

Michaelson (6)

F. Adickes (8)

Butler (18)

C. Woods (9)

Gray (16)

G. Allen (9)

Sereno (9)

G. Kroeger (16)

Halftime—Pomona, 29; Caltech, 26.

Scoring subs: Pomona—Cooper, 16; Peter, 4; J. Ronstad, 3.

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BUTTIN' IN

(Continued from Page 5) in scoring second of an overtime period to maintain an unblemished record. Last year Jim had still maintained his eye by being picked on that All-Ivy League team while playing for Harvard.

The most discouraging game was when Norm Glick poured 42 points through the hoop for the Loyola Frosh while I stood helplessly by.

And to the little basketball success that I have experienced, I owe a great deal to two men. First, to Gordon Benn of the Phillips Exeter Academy who painstakingly taught me a right and left handed hook shot. And secondly to Carl Shy who spent two years curbing a rather un-sportsmanlike temper.

It is going to be hard to say goodbye to what I think is a great game. When next fall comes around, I will feel very strange not taking shots at the hoop while waiting for the season to start rolling. But no matter what the future, I know that basketball has been a lot of fun and a great teacher of how to take both wins and losses with a smile.

WHO DEALT THIS MESS?

(Continued from Page 2) to prevent one of the defenders from trumping the spade.

It should be noticed that clubs must not be drawn before trumping the diamonds (since then dummy would have no clubs left with which to trump), but they must be drawn before sluffing on the spades.

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FROSH SPORTS ROUNDUP

(Continued from Page 5)

Tracksters Get Workout

As was expected, Oxy ran away with the conference relays. Frosh scores came out like this: Oxy, 66; Tech, 30; Redlands, 4, and Whittier, 5.

With nine men contributing to the point total, Tech's frosh did all right for themselves. The only firsts grabbed out of nine events were Eyleth's winning toss of the shot and the combination of Lloyd, Campbell, Ogden, and Munn in the 880 relay. In place and show positions the team grabbed the rest of their points.

Campbell got 2nd in the broad jump and 4th in the high jump and helped Lloyd, Kirkpatrick and Corbin take a third in the sprint medley to give him the most points for the day. Kirkpatrick ran with Munn, Ogden and Corbin for 2nd in the mile relay and took a 2nd in the discus. Lloyd ran a photo finish 2nd in the 100 yarder, Kaiser took 2nd in the shot and Gauss got 3rd in the javelin toss to complete the scoring.

Events coming up this weekend are a tennis match against Whittier here Saturday at 1:30 and a dual track meet against Redlands, there.

INTERVIEW SCHEDULE

(Continued from Page 1)

filling applications, March 17, 1951.

Summer Opportunities

Corps of Engineers, U.S. Army, Anchorage, Alaska—Student Aid Employment Program for the 1951 construction season.

Positions will be open to engineering students who have completed two or

three years study. Work will include

drafting, surveying, computing, preparing engineering reports, laboratory test-

CAMPUS BREWINS

(Continued from Page 2) attended, and except for an unlucky few, pretty near everybody had a fairly decent tart.

Stop-the-press reports are just received from the muscular Northwest, where the monitors for the coming year have finally been picked: the Beak extends a clammy claw to Schlenger, Haber, Gray and Cassidy.

Well, this is the news to date, and this has been your Beak reporting for Kurland, Hefner & Co. The Beak will be back next term, but first a word of advice: All is not what it seems to be. Remember, a stitch in time saves nine. Thus we leave you, brutish but content. Start snacking.

FILM CLASSICS

(Continued from Page 1)

of fishermen off the coast of Scotland and a British documentary film classic will be shown.

May 27 and 28 "Monsieur Beaucaire" with Rudolph Valentino, Bebe Daniels and Doris Kenyon. This picture, based on Booth Tarkington's short story of court life in the time of Louis XV, and of the barber who becomes a famous personality, is considered to be Valentino's best film.

Tickets

Tickets are now available from Miss Pond in the Dean's Office, 111 Throop. All those connected with C.I.T., the Huntington Library and Mt. Wilson Observatory are eligible to purchase tickets for the series for \$1.80 per person; undergraduate tickets, 90 cents.

ing, and inspection of construction. Note: Apply at once at Placement Office, as applications should be air mailed.

Childcraft, Field Enterprises, Inc., Chicago, (Marion) "I Love a Wire".

"ROC Summer Program"—6 weeks duration. Curriculum to consist of courses in Naval Science. Open to freshmen, sophomores, and juniors.

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