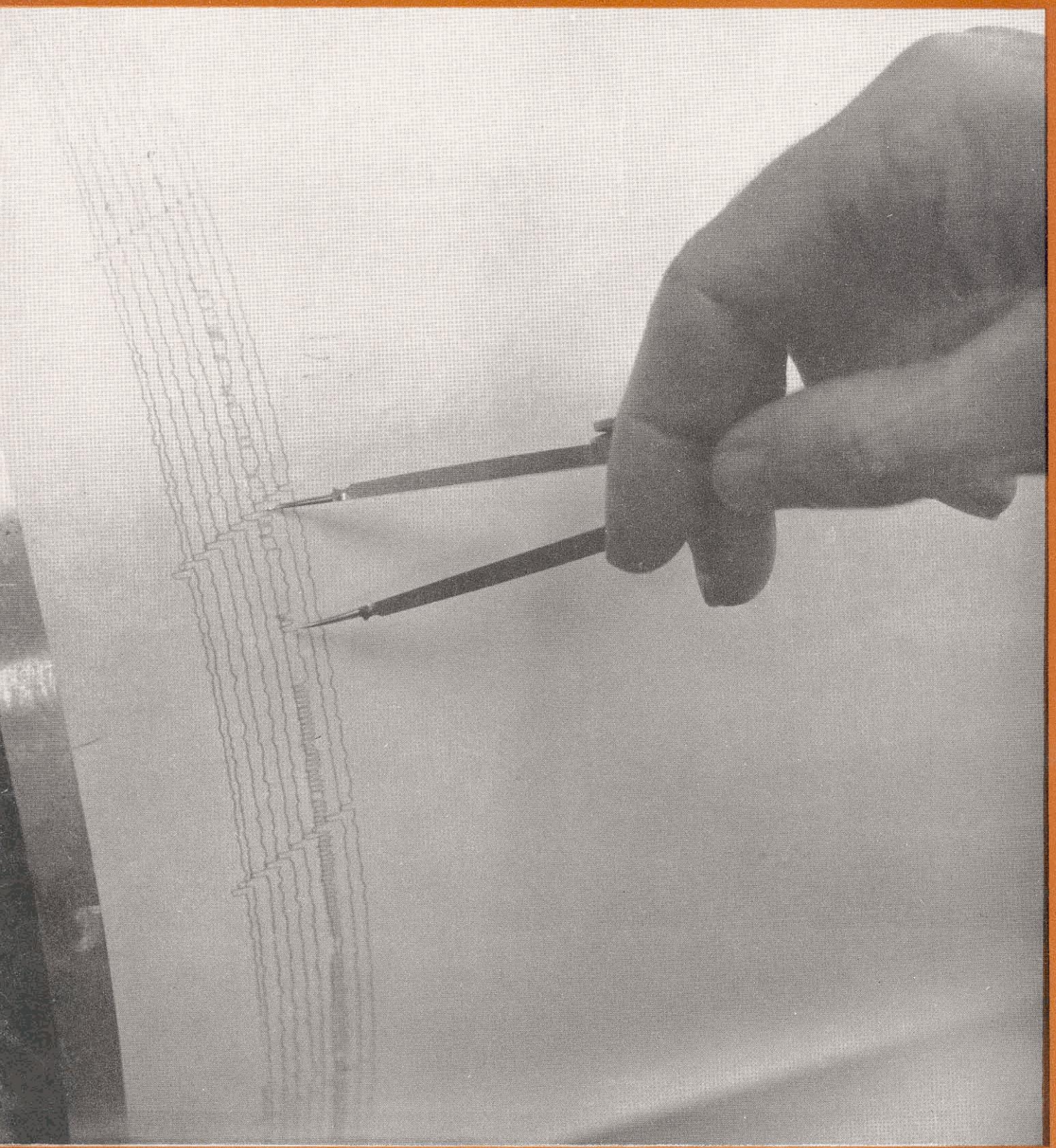
ENGINEERING | AND | SCIENCE

NOVEMBER/1951



Earthquakes . . . page 7

PUBLISHED AT THE CALIFORNIA INSTITUTE OF TECHNOLOGY

Another page for **YOUR BEARING NOTEBOOK**

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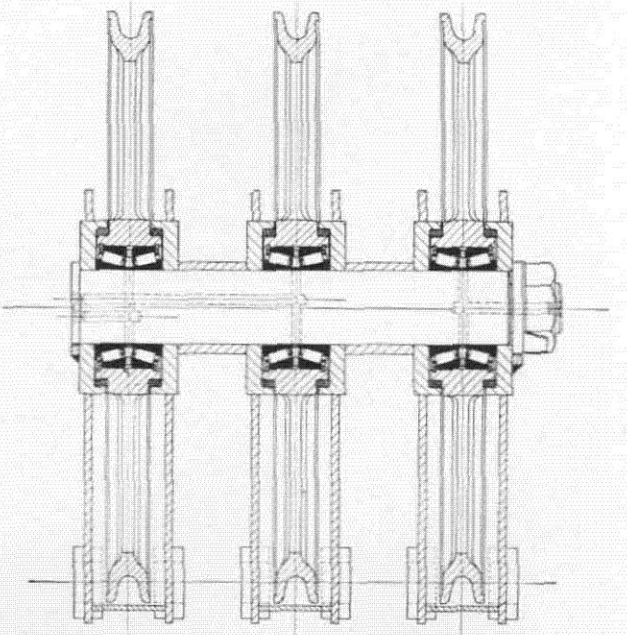

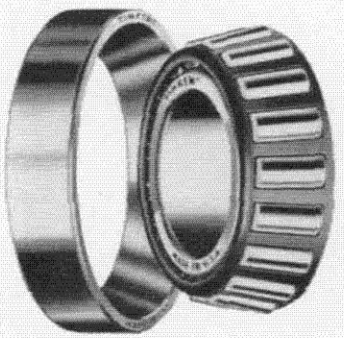

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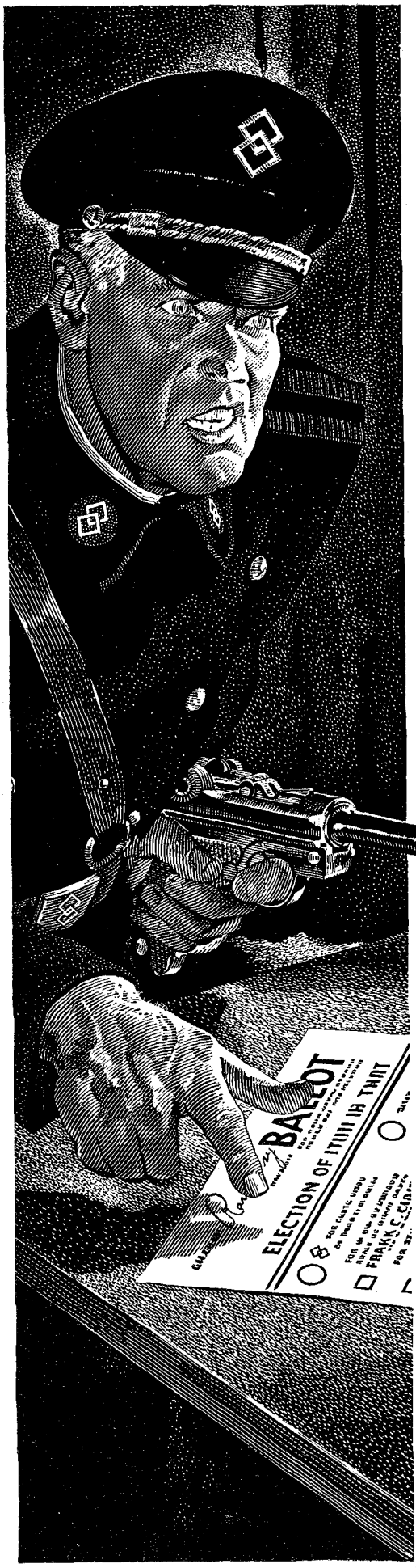

"Put your *X there!*"

"Ever have nightmares?

"I don't, often. But I sure had one last night! Wasn't my usual one, being chased by a lion and falling off a cliff. In *this* dream it was Election Day. I was at the polls, kidding with some of the boys I knew . . . but they weren't kidding back. They looked sort of worried or scared or something.

"Anyway, I got my ballot, stepped into the voting booth and pulled the curtain. I wet the end of the pencil . . . to make my X's big and black. *Then the nightmare part began.*

"A tough-looking soldier stepped into the booth. He put his finger on the ballot and said, *'Put your X THERE! And THERE . . . and THERE . . .'* None of the names I'd picked, either. He had a big black gun pointing right at me.

"That was last night. Today, all day, I've been thinking about it. I'd known that was how some elections got settled in other places. But it never occurred to me before how lucky I was to be a citizen of *this* country. *Here* I vote according to my conscience, not a gun. And I do other things the way I please . . . like going to church, or picking out my own kind of job down at the Republic plant. Try that where there's no freedom!

"That's it . . . *Freedom!* We've got all the Freedom in the world. But, honestly now, do we *really* appreciate it? Do *you?* I admit I've done *my* share of griping . . . probably never will get over that habit.

"But, with Freedom-grabbers at work here as well as abroad, I want to be sure on Election Day that we're *all alone* in that voting booth. With nobody to tell us, *'Put your X THERE!'* No sir!"

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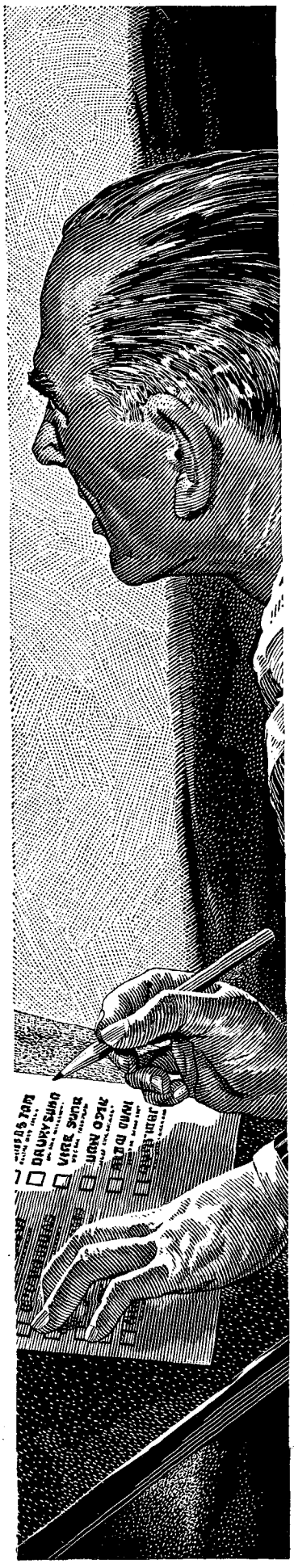


BOOKS

GOD AND MAN AT YALE: The Superstitions of "Academic Freedom"

by William F. Buckley, Jr.
Henry Regnery, Chicago $3.50

Reviewed by Hallett Smith
Chairman of the
Division of the Humanities

YALE IS A UNIVERSITY in New Haven, Connecticut. Among the diverse and distinguished living alumni of the place are Dean Acheson, Senator Taft, Clark Millikan and Henry R. Luce. The alma mater song ends "For God, for Country and for Yale," and in New Haven this series is not felt to be an anticlimax.

But a recent graduate, William F. Buckley, Jr., of the Class of 1950, has now fired a broadside at the University for not doing right by God or Country. The faculty is, he says, composed largely of atheistic socialists, and, what is even more surprising, he claims that the students are strongly influenced by the teaching.

This kind of complaint is not new; it has been heard many times in recent years from politicians, superpatriotic organizations and Westbrook Pegler. It is unusual, however, to hear the complaint, so elaborately presented as it is in this book, from an able and clever young man just out of the university. Mr. Buckley writes well and knows how to dramatize his points in the manner of a skillful debater. His book deserves, and will get, attention from alumni of privately-controlled institutions other than Yale.

His first argument, that Yale works against Christianity, is fairly well defined. By Christianity Mr. Buckley means a personal faith, something beyond ethics and philosophy. He describes the basic courses offered in the field, mentioning the professors by name and analyzing their religious positions.

Even the courses taught by clergymen are inadequate, for him, because they are not direct exhortations of the faith. It is a little difficult to see how anything short of Billy Graham would satisfy him. Mr. Buckley does not defend or explain his conception of Christianity; he merely says he is committed to it. But he apparently puts little emphasis upon the Christian virtue of humility: *God and Man at Yale* is an arrogant book.

Mr. Buckley's argument on economics amounts really, as the author frankly admits, to an attack upon academic freedom. He believes that the Yale alumni are predominantly believers in "individualism," i.e. free enterprise, "The American Way," capitalism as it operated in this country before 1932. The social science faculty at Yale does not teach this gospel, he says, and it is the clear duty of the alumni to withhold financial support until it does. He would like, apparently, to have the alumni constitute themselves a board of censorship on textbooks and a board of inquisition on faculty members and their beliefs. (This in the name of "individualism.")

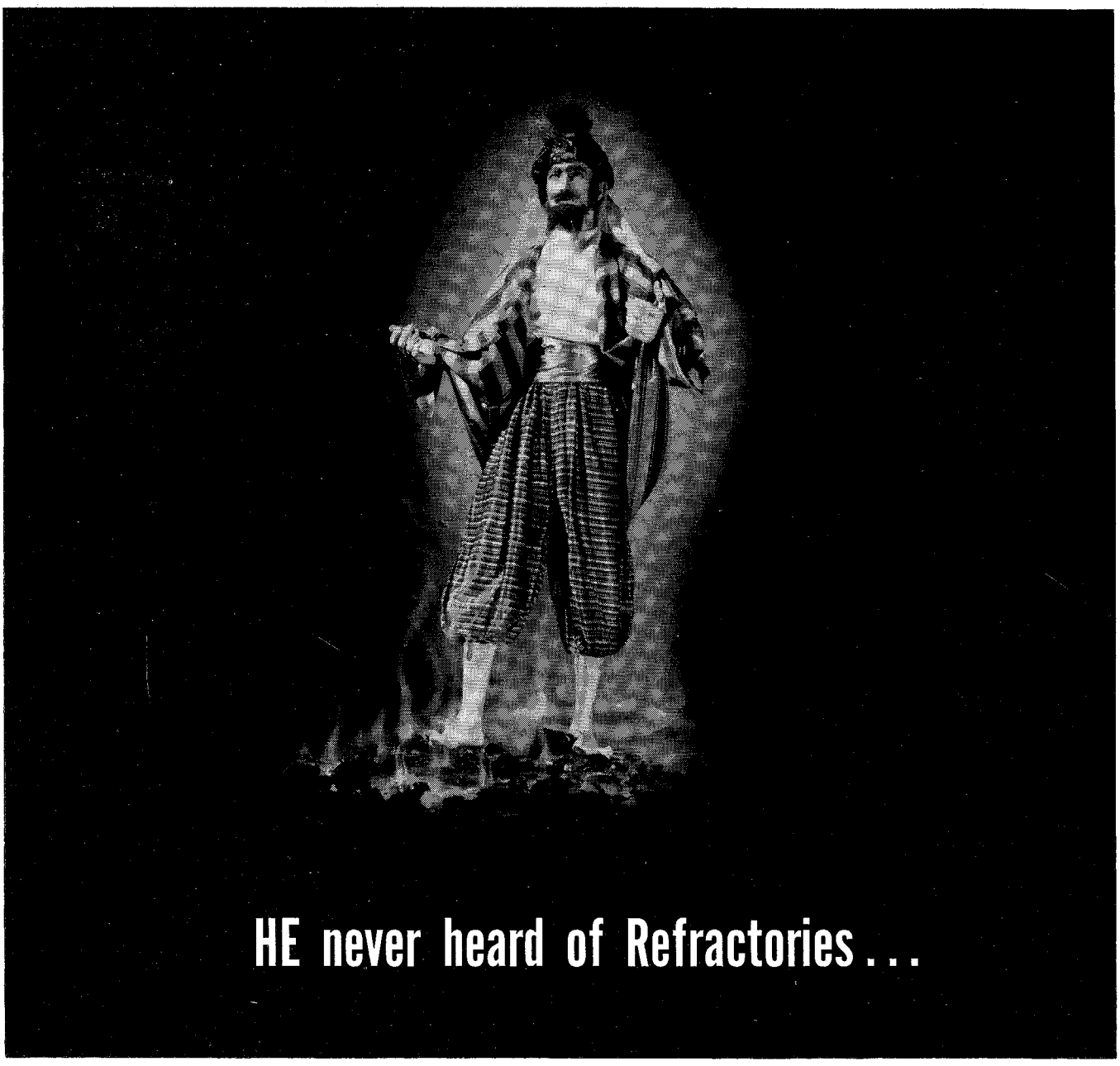
What kind of university Yale would be if Mr. Buckley had his way is somewhat hard to imagine. I do not think it would have many students, and I feel fairly sure it could never again boast of such names as Benjamin Silliman, Josiah Willard Gibbs or William Graham Sumner on its faculty. It would be evangelical and to the right of Senator Taft. But could it possibly be called a great university?

Mr. Buckley's case against Yale is elaborately documented, and his book may well cause alarm among many alumni. I think the total effect of the book can only be described as harmful to higher education and to the university the author says he loves. For this is no thoughtful, impartial examination, despite all the cases cited. It is a slick job of special pleading.

When he is confronted with an important statement of a point of view opposed to his, like the great letter of Grenville Clark to a disgruntled alumnus of the Harvard Law School, he avoids discussing the content of the letter but calls it "a lengthy, erudite statement" and makes a great to-do about the number of words used by the parties in the controversy.

He is very adroit at shifting his ground, and he is in possession of a large arsenal of loaded phrases. He will not expose his own position to attack, but keeps calling up offensive reserves from his recent personal experiences at Yale, the published opinions of people on his side, and, most of all, quotations out of context.

Mr. Buckley says he realizes that exaggeration and distortion would do Yale unwarranted damage and cause personal humiliation to himself. A reviewer can only report that the exaggeration and distortion are right there, in the book.



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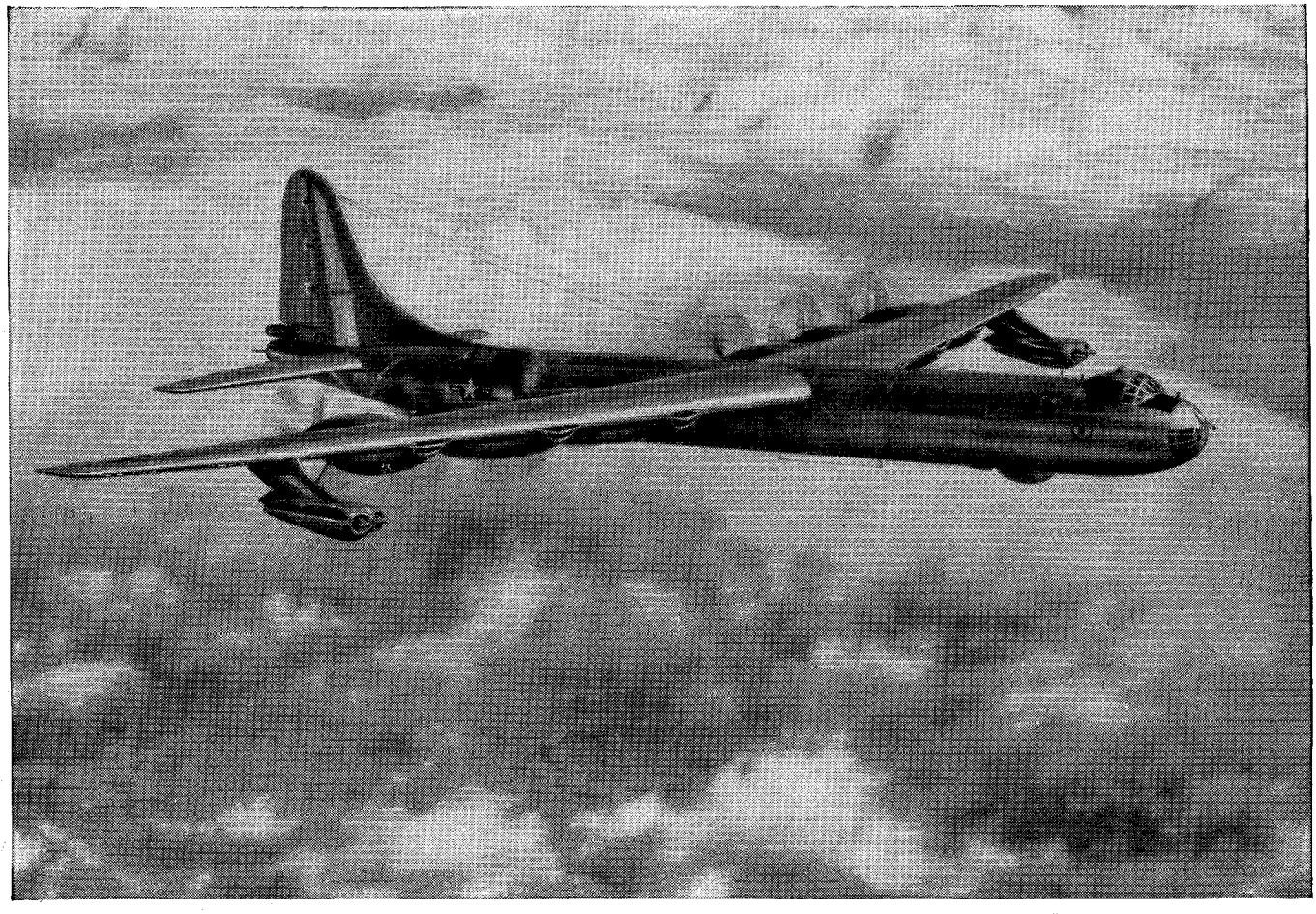

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ENGINEERING AND SCIENCE

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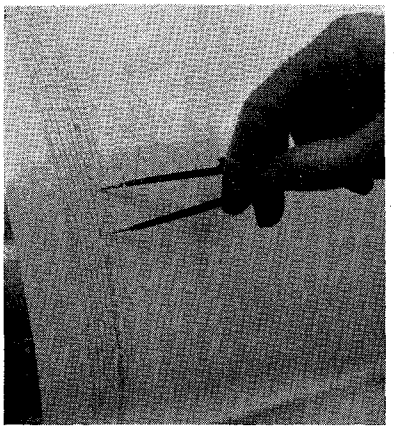

This month's cover shows a worker at Caltech's Seismological Laboratory checking the regular radio-time signal as received on the Lab's ink-writing seismometer. The signal consists of a series of offsets of the recording line, corresponding to seconds preceding the hour, with a final offset indicating the exact time of the hour. The lower point of the compass rests on this exact time, while the upper point is placed on a minute mark made by one of the Lab's clocks. Such exact time checks are necessary to keep the Lab's numerous instruments in synchronization—and to permit the Lab to maintain an accuracy of a tenth of a second in determining the time of arrival of earthquake waves. For new developments in earthquake research at the Lab, see page 7.

Maybe it's no longer a secret that E. T. Bell, who's been teaching mathematics at Caltech since 1926, is also John Taine, the science-fiction writer. But mathematics and science fiction only take up part of Bell's time. The rest of his story is on page 14.

Caltech is one of the eight colleges and universities which last month organized the new American Universities Field Staff, to send out their own corps of foreign correspondents. The story of the new organization is on page 18.

PICTURE CREDITS

Cover	William V. Wright
p. 8-12	William V. Wright
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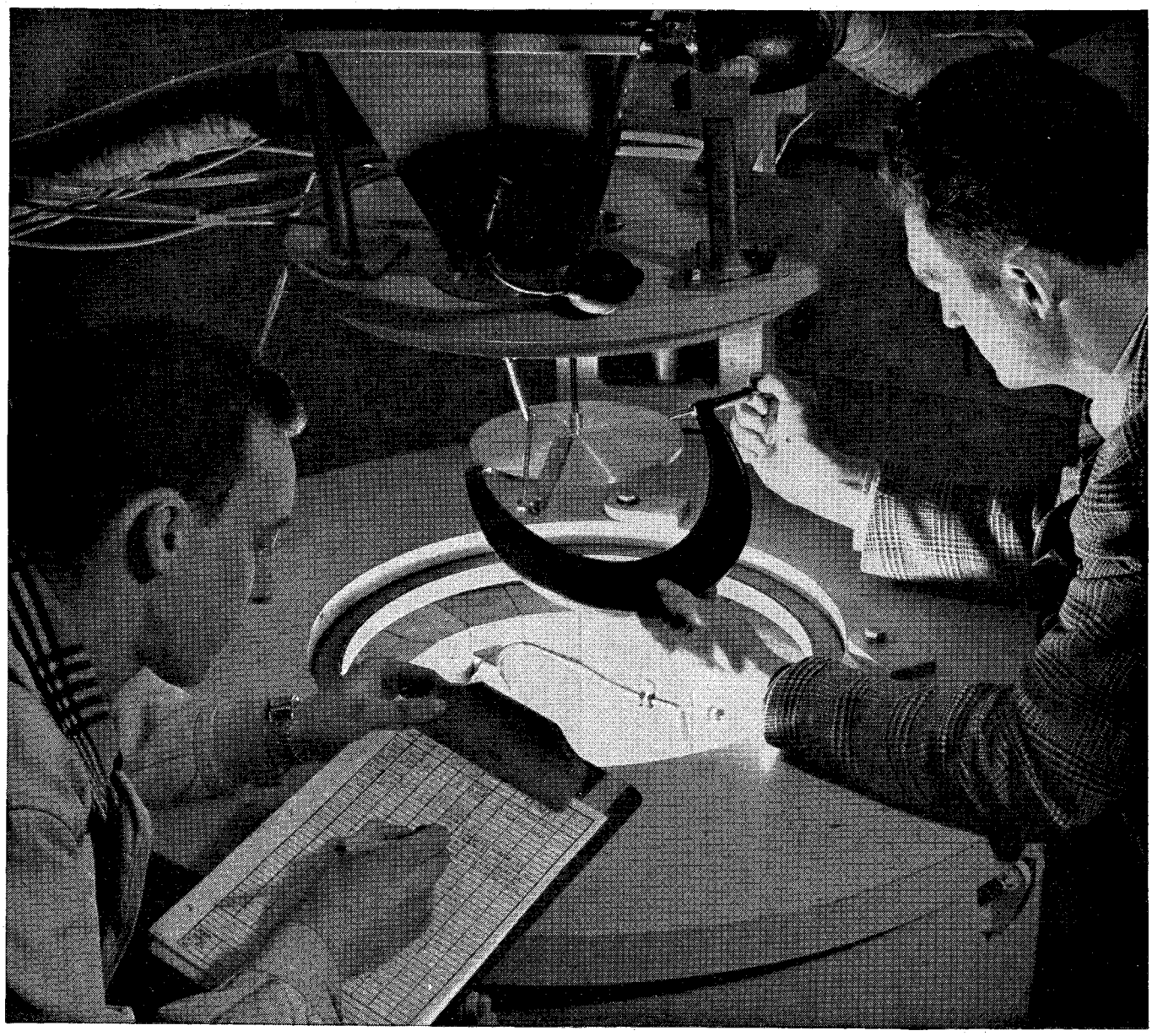

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EARTHQUAKES
— RECORDED ON TAPE

Caltech's Seismological Laboratory is making continuous sound recordings of the movements of the earth—and starting operation of the world's best earthquake recording station on Palomar Mountain.

LAST YEAR was a big earthquake year. Caltech's Seismological Laboratory recorded a total of 1400 distant quakes. Encouraged by this activity, the Lab set up a number of new seismographs and other apparatus to test this year. To date, however, 1951 has been almost spectacularly quiet. In fact the Laboratory staff is now entertaining the suspicion that it can keep down the number of quakes by setting up new equipment.

One of the most interesting of the new instruments under test at the Lab is a seismic tape recorder which enables Lab workers to actually listen in on the movements of the earth. When a local earthquake occurs, it comes through on the tape with a sharp report like a pistol shot. A distant quake sounds like a ten-strike in a mammoth bowling alley.

The machine records continuously. The vibratory movement of the earth, acting on a pendulum seismograph, generates a small amount of electric power. When this is amplified it serves to actuate the tape recorder. The recorder operates at a speed of ½ millimeter per second, in order to cover a band of seismic frequencies from approximately ten cycles per second to one cycle in several minutes.

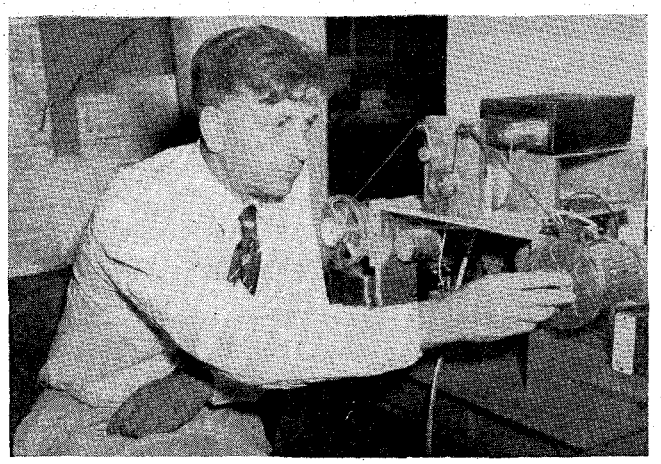
When the tape is run through a playback mechanism at 15 inches per second, the frequencies of the recorded seismic waves are multiplied by a factor of 600. Thus, although the waves—as recorded—have frequencies which are too low to be audible, they are raised into the audio range when played back.

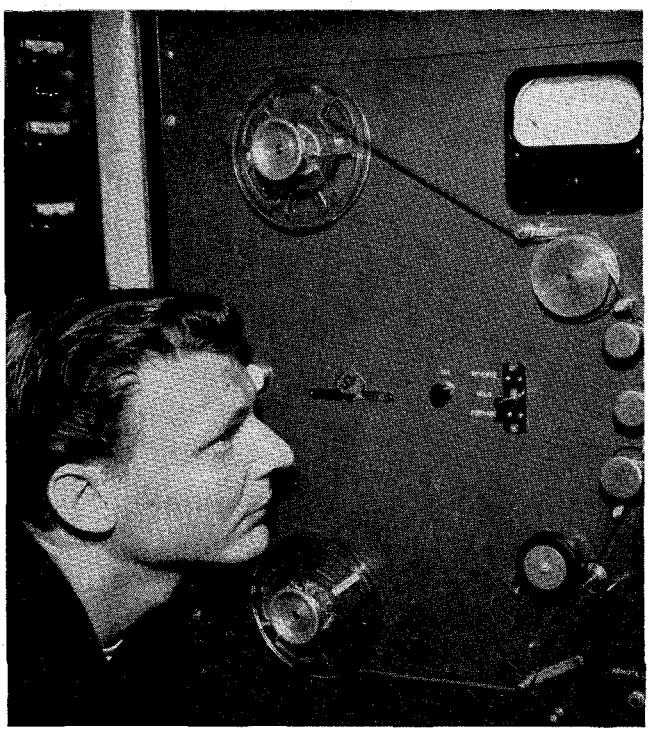
Though it is undeniably exciting to hear the sound a quake makes deep in the bowels of the earth, the primary purpose of the new tape recorder is not to listen to the earth waves, but to provide a means for measuring the energy of earthquakes as well as for measuring seismic spectra. Measurement of such spectra, a fundamental problem in seismology, indicates how the energy is distributed in the different frequencies.

The machine will also be valuable in studies of the microseismic movement of the crust of the earth. The surface of the earth moves, just as the sea does, and with approximately the same frequencies. This movement varies from day to day, like the sea. Though seismologists still don't know what causes the movement, they are certain that it is related in some way to the waves of the ocean, and that it is in fact generated at sea. The evidence to be heard on the seismic tape recorder does nothing to refute this theory; the sounds of the earth at rest are exactly like the steady, regular rise and fall of the ocean waves.

In their search for the causes of these microseisms, workers at the Laboratory have already learned to differentiate between the actual sounds made by the earth and assorted man-made disturbances which make their way onto the tape. A recent playback of the tape, for instance, revealed two very pronounced sounds which had nevertheless been too minor to show up on any of the Laboratory's regular photographic records.

One of the sounds was traced to the heavy contracting machinery which was being used on the new Colorado Street Bridge construction job, less than a mile from the Lab. The other noise, a continuous single-pitch disturbance, which disappeared on Saturdays and Sundays, sounded suspiciously like a large reciprocating engine somewhere in the vicinity. It turned out to be the compressors in an ice plant on the other side of town.





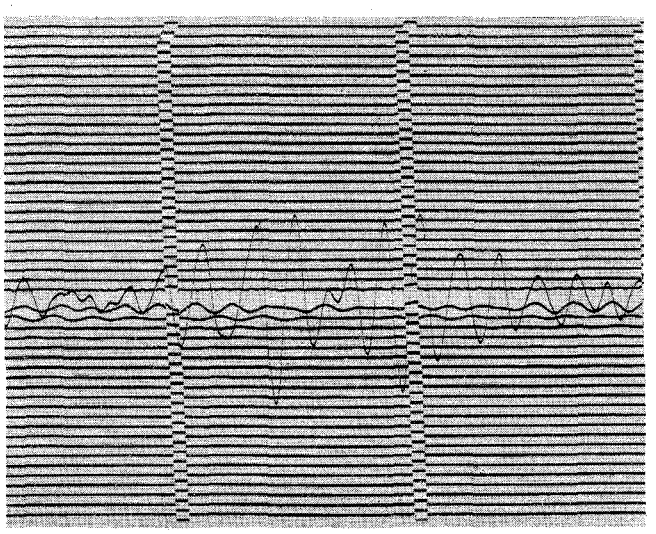
The Seismological Laboratory's new seismic tape recorder enables Lab workers to actually listen in on the movements of the earth. Above, the recorder is being operated by Dr. Hugo Benioff. It records at a speed of one-half millimeter per second. When the tape is run through the playback mechanism (at the right) it's speeded up 600 times, bringing low frequency seismic waves into the audio range. The recorder is useful for measuring the energy of earthquakes.

This indication of the sensitivity of the tape recorder explains why the Lab is already planning to build equipment which will translate its tape recordings into ordinary ink and photographic records. The resulting records will include details that can now be obtained only from a combination of several of the standard instruments.

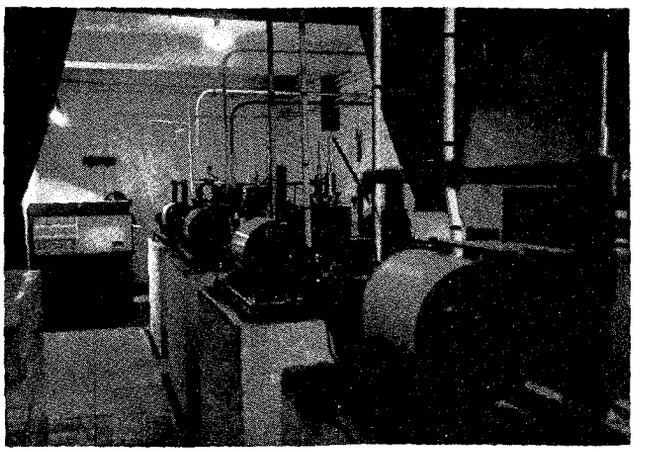
Permanent tape recorder

This translating equipment will probably not be built for a year or more. The tape recorder now in use at the Lab is only a pilot model. A permanent recording machine is just about completed, and as soon as this job is done, construction will get under way on analyzing equipment, which will take about a year to build.

The most spectacular equipment that the Lab is putting into operation this year is not at its headquarters in Pasadena, however, but at its auxiliary station on Palomar Mountain. The Lab has 13 auxiliary stations scattered throughout the southern California area. This earthquake-recording network makes possible the location of quakes not only in southern California but throughout the world. Stations are located in Riverside, Santa Barbara, La Jolla, Mount Wilson, Tinemaha, Haiwee, Palomar Observatory, China Lake, Perris, Big Dalton, Desert Hot Springs, El Cajon and Big Bear. Each of these is operated with the aid of some outside



This is the record of an earthquake—specifically, of one at Baffin Bay in 1930. Recorded on a linear-strain seismograph like the one across the page, it shows the strains produced in the rock underneath the Seismo Lab by the passage of long-period surface waves. Since the horizontal lines on the record are 15 minutes apart, it is evident that the activity shown here continued for about two hours. The short, faint jiggles in the horizontal lines, which can be seen in the upper portion of this record, have nothing to do with the earthquake; but they do give some indication of the sensitivity of the strain seismograph, because they are caused by people walking in the building in which the instrument is located.

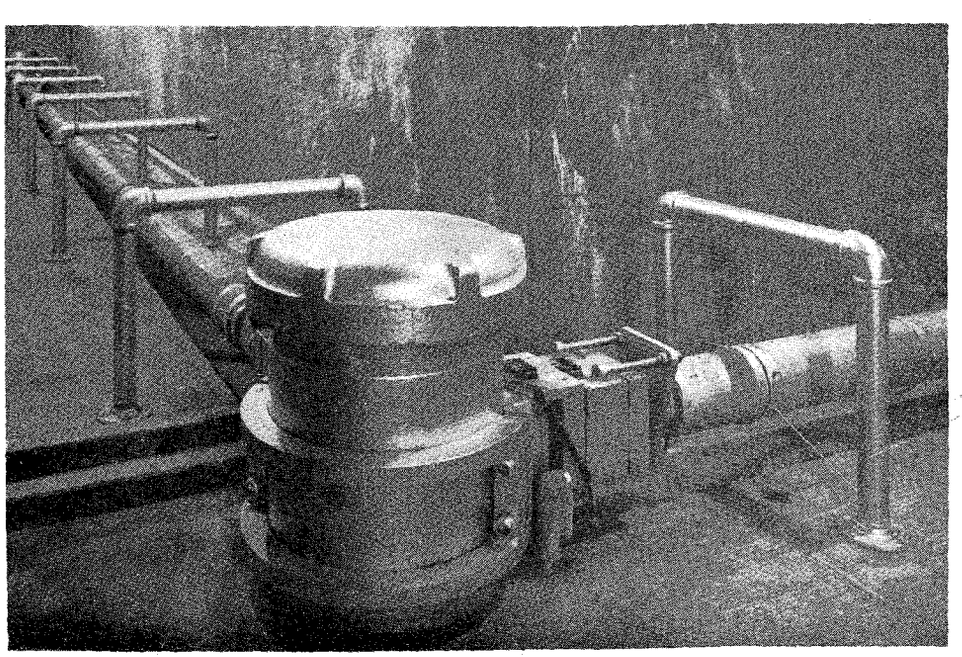


Principal recording room in the Seismo Lab has 18 photographic recorders in continuous operation. Most of these recorders are actuated by seismometers located in the tunnels bored into the hillside under the lab. They operate in complete darkness. The photo above was taken in red light. At left, girl is working on some of the 40 records which are processed at the lab every day, washing paper records. Some recorders use photographic paper, others use 35-mm. film.

agency. In Riverside, for example, this agency is the City Light Department; at Santa Barbara it is the Museum of Natural History; at La Jolla, the Scripps Institution of Oceanography; at China Lake, the Naval Ordnance Test Station. Earthquake data, automatically recorded on photographic sheets at each of the auxiliary stations, are sent to the Lab in Pasadena once a week.

The new equipment, which is exepected to go into preliminary operation at Palomar this month, will make this station the best earthquake recording unit in the world. The Palomar station will be equipped to record more characteristics of earthquakes than any existing station can, and to record waves which are not received by any other station.

One of the most valuable recording instruments in the Seismological Laboratory in Pasadena is the electromagnetic linear-strain seismograph. The response of this instrument is derived from strains produced in the ground by seismic waves rather than displacements of the ground, as is the case with all the pendulum-types of seismographs. The linear-strain seismograph records as little as six millionths of an inch of ground-squeezing produced by a distant quake, and if the Atlantic Coast should be squeezed a foot closer to the Pacific Coast it



The linear-strain seismograph responds to strains produced in the earth by seismic waves rather than displacements of the ground. It will record as little as six-millionths of an inch of ground-squeezing produced by a distant quake. Two of these instruments —each 150 feet long—are now being installed at the Seismo Lab's auxiliary station on Palomar Mountain.

Marine-type chronometers and synchronous motors are used to make seismographs operate with extreme uniformity. In the Lab's time room, shown here, marine chronometers (left) serve as clocks. They have electrical contacts operating once a minute, which serve to put minute marks on all seismographic records. At the right, in this picture, is a radio receiver with an automatic time switch which turns the receiver on seven times a day in order to record the time signals broadcast from Mare Island, California—which, in turn, are rebroadcast from Washington. Chronometers at the Lab are therefore corrected seven times daily. In determining the time of arrival of earthquake waves, the Lab tries to maintain an accuracy approaching a tenth of a second.

would record that. Observations made with this instrument, taken by themselves or in combination with those of the pendulum instruments, provide information concerning seismic waves which cannot possibly be had from the records of the pendulum instruments alone.

The Palomar station will have two of these linear-strain seismographs in operation. The main Lab at Pasadena has two now—one of which is 20 feet long, the other 60 feet long. The Palomar instruments are 150 feet long. Each seismograph consists of two piers set 150 feet apart, with a two-inch quartz tube rigidly fastened to one pier and mounted by a series of flexible supports so that the free end comes close to the second pier. The passage of a seismic wave in the rock in which the piers are set produces changes in the separation between the two piers, and this is recorded by means of an electromagnetic device attached between the free end of the quartz tube and the fixed pier.

Linear-strain seismographs are so sensitive that, even though they are installed deep in the tunnels under the Seismological Laboratory in Pasadena, the presence of people in the building is enough to hamper their effectiveness. The footsteps of a man walking down a hall in the Lab will be clearly recorded on the instruments. As a result, the Pasadena instruments are completely effective only at night, when the building is unoccupied.

At Palomar, the strain seismographs, at the southern end of the mountain top, well removed from the Observatory, will get no human interference at all—except for the man who comes to change the records once a week. And if the instruments behave as expected, they will record earth waves of a longer period than have hitherto been recorded anywhere in the world.

This isn't the only new instrument being installed in the Palomar station, though. In addition there's to be one which photographs an enlarged pattern of the actual movement of the earth in two dimensions—a picture of what you'd see if you could look down into the earth—with the ground motion magnified approximately 5,000 times. With these records seismologists can determine, by inspection, the kind of movement occurring in a seismic wave. With older instruments this had to be computed from point to point by comparing records; and it was such a laborious process that it was rarely done at all. But the photographs at Palomar will furnish this information at a glance.

Finally, there is to be a new installation which will provide accurate information as to the direction of arrival of earthquakes and microseismic waves.

Estimating the distance of a quake is difficult enough. But the determination of its direction is even harder. A seismograph writes a very complicated record, showing two kinds of shock waves coming through the earth at different speeds, plus various echoes from the surface of the earth and from the central core. Except for very deep shocks, all this is followed by a long train of waves traveling over the surface of the earth. The whole process may take hours to record—not because the original earthquake lasted that long, but because it sets up a commotion that takes a long time to die down. From such a record, a seismologist can usually estimate the distance of a quake.

Every earthquake sends out two kinds of shock waves, called P and S waves. P waves vibrate longitudinally, while the vibratory motion of S waves is at right angles to the direction of propagation. P waves travel faster than S waves, and the time interval between them varies from a few seconds at short distances, up to more than 11 minutes at 7,000 miles. By multiplying this time interval by 5, a seismologist can get a rough idea of the distance from the earthquake in miles. At best, he gets a distance within 50 miles or so.

Direction is not so easy to determine. When times are reported from other stations, and the seismologist

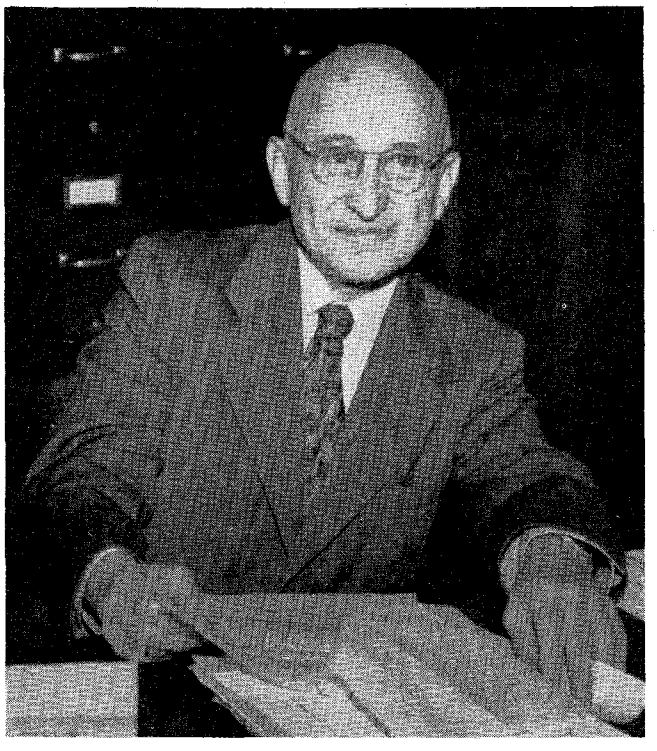
has two distances and a rough indication of direction—or three distances—he can locate the earthquake epicenter on the globe.

The new instrument at the Palomar station will provide information on three distances simultaneously—thus making it possible to determine direction accurately. This will be a tripartite installation, consisting of three vertical seismometers—so arranged at the vertices of a triangle of about 3,500 feet on a side, that they will record three traces side by side.

Aside from these new instruments, the Palomar station will, of course, have the normal complement of all auxiliary station equipment, including marine chronometers, automatic radio time-signal records and a recording microbarograph (used to study the possible relation between microseisms and atmospheric pressure variations).

Most of this equipment is housed in an insignificant-looking, box-like cement structure within hailing distance of the Palomar Observatory. Despite the disparity in the structures, the research programs being conducted in these two locations are remarkably complementary. Just as the big 200-inch telescope is pushing further out into the dark and unknown regions of the sky, so will the new earthquake recording station probe deeper into the core of the earth than man has ever been before.

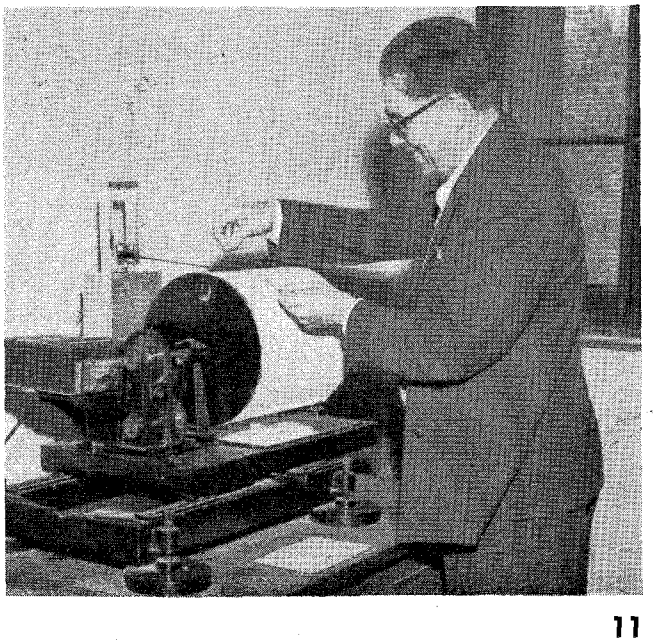
THE MEN WHO RUN THE SEISMO LAB

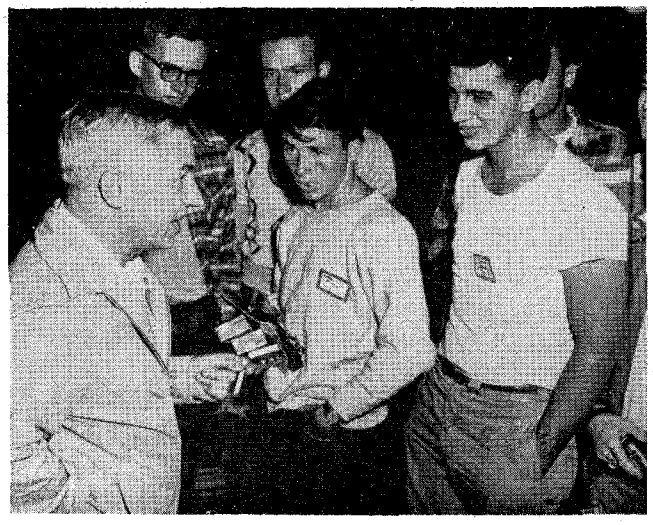


Dr. Beno Gutenberg, Director of the Lab, came to Caltech in 1930 from the University of Frankfurt. He is probably the world's greatest living earthquake expert. Now president of the International Association of Seismology and Physics of the Earth's Interior, he recently returned from a UNESCO mission to Turkey and Israel to advise the two nations on establishing and improving seismological studies.

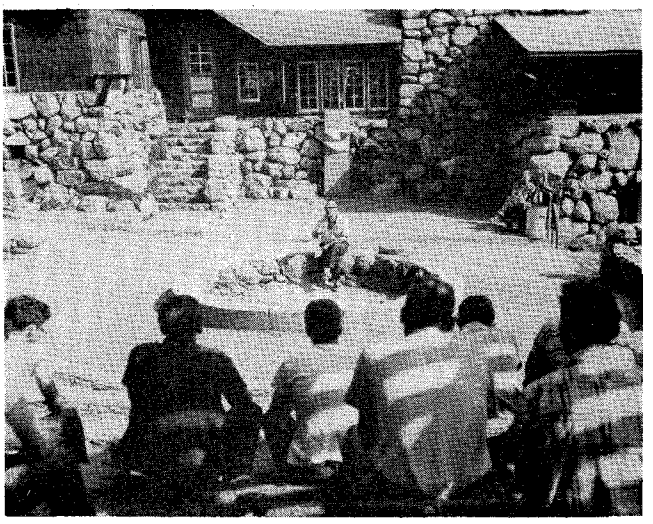
Dr. Hugo Benioff, in charge of all instrumentation for the Lab, is shown at the lower left with his newest variable reluctance seismograph for measuring horizontal motions of the ground. The instrument will drive two recorders simultaneously—one for slow vibrations of the ground and one for rapid vibrations. Benioff has developed almost all of the Lab's instruments, and his seismometers are now used throughout the world.

Dr. Charles Richter, shown below reading the Lab's ink-writing recorder, which reports quakes as soon as they occur, is in charge of the measurement of all records at the Lab and of the preparation of all reports and bulletins. During the '30s Dr. Richter developed for the first time an accurate yardstick for the measurement of the size of an earthquake. This magnitude scale has led to a completely new interpretation of earthquake statistics.



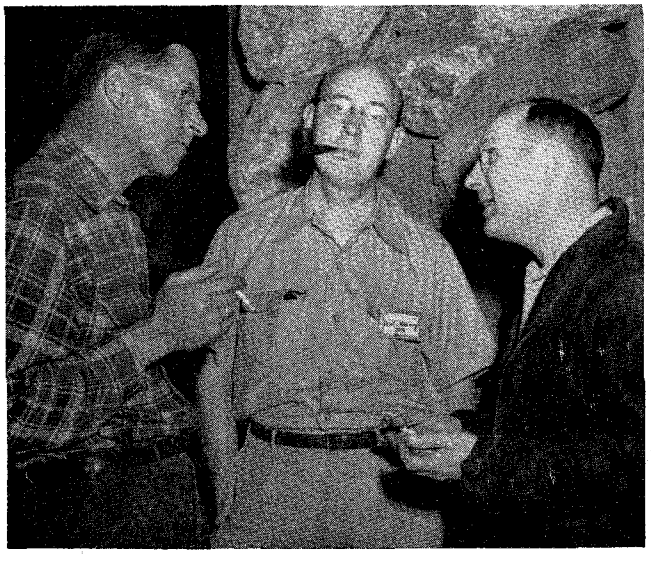


Dr. DuBridge gets acquainted with the class of '55

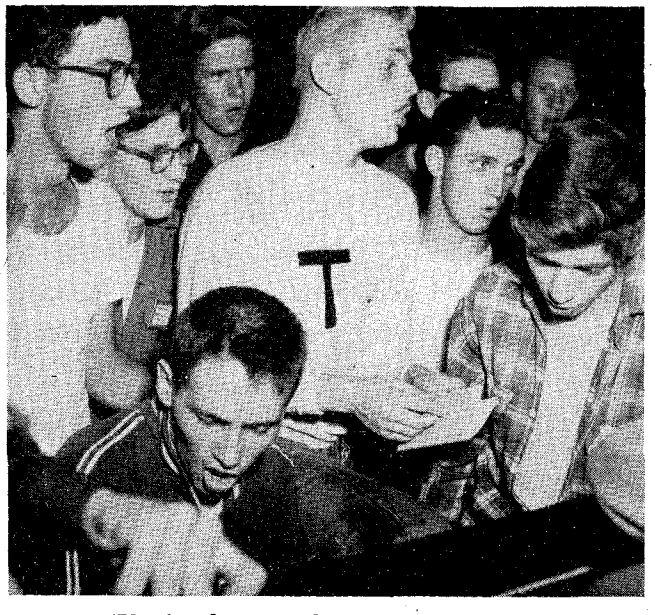


Freshmen get the word from Prof. Harvey Eagleson

CANDID LOOK AT FRESHMAN CAMP



Faculty conference—Haagen-Smit, Varney and Clark



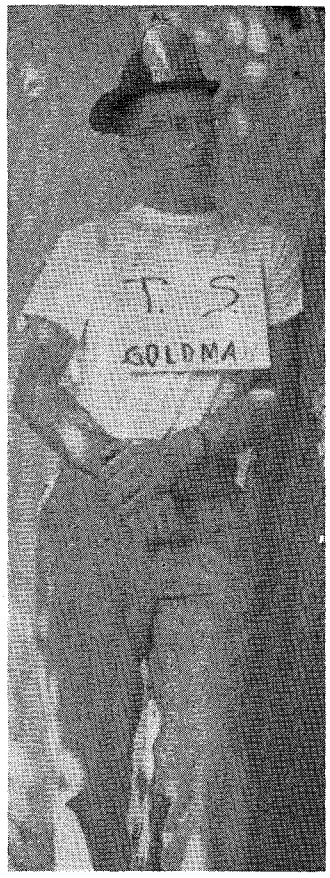
They've been working on the railroad

Prof. Smith makes a killing at moonlight croquet

FALL FASHIONS FOR FRESHMAN INITIATION

Ricketts

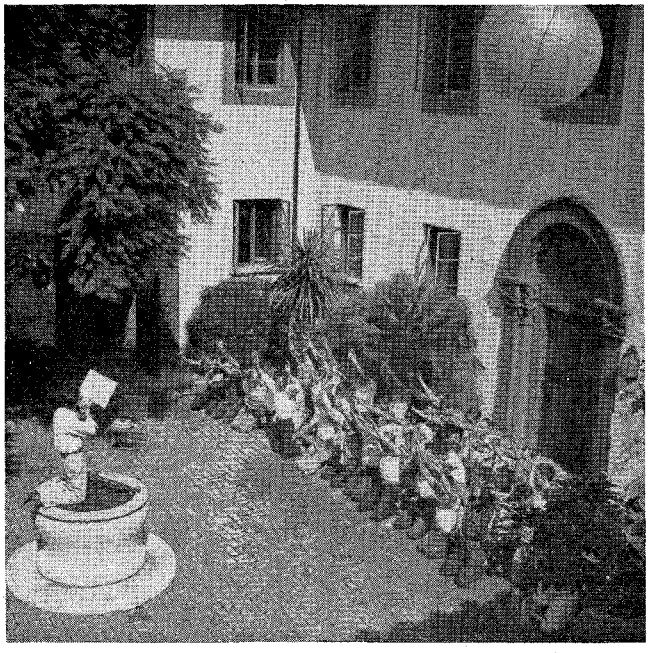
Dabney



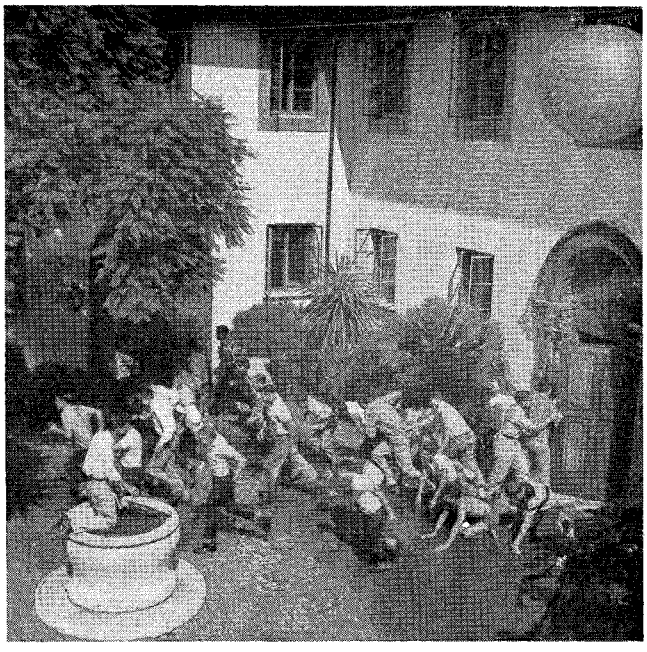
Fleming

Blacker

BALL PALL: An Old Initiation Custom

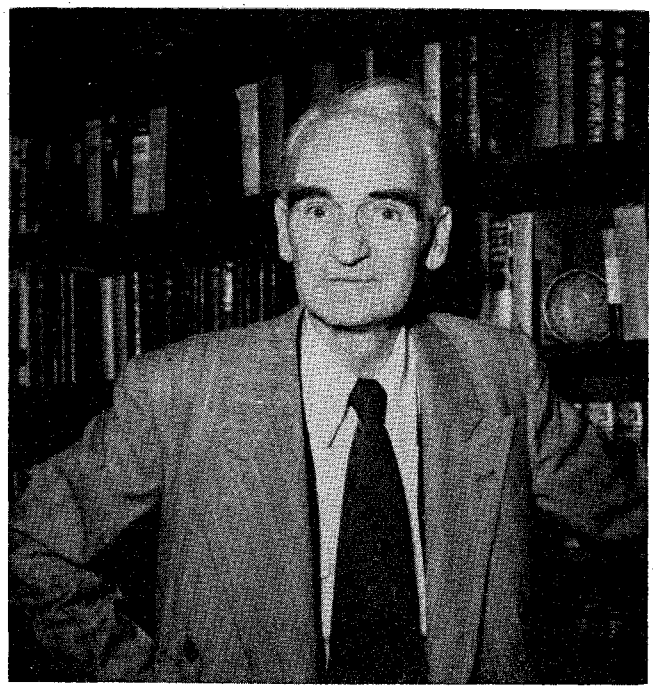


Annual Ball Pall ceremony in Ricketts begins as freshmen invoke the aid of a weather balloon—



and ends, predictably, as their sins are washed away in a torrent of water from the upstairs windows.

THE DOUBLE LIFE OF DR. BELL



EVER SINCE E. T. (for Eric Temple) Bell came to Caltech in 1926, his double life has been an open secret. He is, of course, not only an eminent teacher of mathematics, but is also a prominent science-fiction writer. For his Dr. Jeykll activities he uses his own name; his Mr. Hyde work appears under the pseudonym of John Taine.

This division of labor led the editor of the local Pasadena *Star-News* to indulge in a sly intramural joke when Bell's serious work, *The Magic of Numbers*, appeared in 1946. He had the book reviewed by Taine.

John Taine gave it a rave review, in which he even quoted from the book jacket which said that "with matchless wit and insight, Eric Temple Bell has made *The Magic of Numbers* . . . a human history . . . a living biography of the men who played and play so great a part in one scientific and philosophical development."

"I agree," wrote Mr. Taine.

There was at least one subscriber to the Pasadena *Star-News* who was not in on the joke though. In an angry letter to the editor she complained that it was an insult to the august Dr. Bell to have his book reviewed by a science-fiction writer.

Mathematics and science fiction are not Dr. Bell's only concerns. Most of his life, in fact, they have had to share his time and interest with such other varied activities as painting, writing poetry, gardening and raising cats. True, any of these latter activities might be considered hobbies by an ordinary individual. But not even his worst enemies have ever accused Bell of being ordinary. He's never had any hobbies—just a series of full-time occupations.

He has published four learned books on mathematics; and just under 300 mathematical papers; 10 popular books of mathematics, history, and social criticism; 13 science-fiction novels, and at least that many more magazine stories.

He has been writing poetry for more than forty years, though not much of it has been published. His paintings, with those of his late wife, cover the walls of his home in Pasadena. The Bell garden, in its heyday, was ablaze with flowers even at that time of year when the neighbors were trying to force up a couple of crocuses. And even the Bell cats seemed somehow bigger and more prolific than most cats.

Double life, indeed; it's been, at the very least, squared.

E. T. Bell was born in Aberdeen, Scotland, in 1883. He came alone to the United States in 1902, with the American equivalent of two years of college behind him, and entered Stanford University. After graduation in 1904 he "bummed around" San Francisco for the next three years. He was there during the 1906 earthquake—and many of his treasured books still bear witness to that fact. After the quake Bell hurriedly buried them in the backyard of the house in which he was living—but not deep enough to keep them from being scorched by the fire which destroyed the house shortly thereafter.

In 1907 Bell went to the University of Washington in Seattle as a Denny Fellow. After receiving his M.A. in the spring of 1908, he went to live in Siskayou County in northern California. He taught school part of the time, and worked for a while in a lumber mill, where he left the thumb of his right hand. During most of

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this period he lived in the town of Yreka—whose sole claim to fame, the Yreka Bakery, was spelled backwards long before the invention of Serutan.

In 1910 Bell was married to Jessie Brown of San Francisco and in 1911 went to New York to attend Columbia University. As soon as he got his *Ph.D.* in the spring of 1912 he put as much distance as possible between New York and himself, and went back to the University of Washington as an Instructor in Mathematics.

Acquiring a reputation

He taught mathematics at the University of Washington for 14 years, from 1912 to 1926. During this time his research in the theory of numbers began to win him a reputation as one of the most brilliant, as well as one of the most productive mathematicians in the country. In 1920 he received the coveted Bocher Prize of the American Mathematical Society for his solution of an extremely difficult classical mathematical problem. From 1924 to 1927 he served on the council of the American Mathematical Society, and in 1926 was vice-president of the Society. In 1930 he was vice-president of Section A (the Physical Sciences) of the American Association for the Advancement of Science. From 1931 to 1933 he was president of the Mathematical Association of America. In 1938 he received the Gold Medal of the California Commonwealth Club for his mathematical writings. He is a member of the Circolo Mathematico di Palermo, the Calcutta Mathematics Society, the National Academy of Sciences, the American Philosophical Society, Sigma Xi, and an honorary member of Phi Beta Kappa.

When Bell began his career as a science-fiction writer in about 1918, he took the name of John Taine—not because he was concerned about sullying the scholarly reputation of E. T. Bell, but because his employer had violent objections to staff members engaging in any outside activity. So, while E. T. Bell continued to turn out enough learned papers for any three ordinary mathematicians, John Taine began to produce anywhere from one to three science-fiction thrillers a year.

These were generally written in the Christmas and Easter vacation periods, though one book, Bell recalls, took all of five weeks to finish. The manuscripts were neatly typed and carefully edited by Mrs. Bell, who worked along with her husband far into the night. Mrs. Bell couldn't always match her husband's energy, though.

In the early hours of one morning she rose groggily from her typewriter, leaving half a novel to be typed, and announced that *she* was going to bed.

"Hmph!" said Bell. "If you can leave it without finishing it it can't be any good. I guess I'd better write it again."

Bell's science fiction is distinguished by its violence. It abounds in overwhelming catastrophes of nature, prehistoric reptilian monsters, men turned into brute beasts and men turned into masses of fungoid growth. All these juicy horrors are described in such hair-raising detail and with such devilish pleasure that Bell's books almost all land in the can't-put-it-down class—even for some of Bell's squeamish academic colleagues who never meant to take them up at all.

Most of the science fiction was written in the years between 1920 and 1940. Bell hasn't turned out many new ones in recent years, though he's still got enough of a backlog to keep his publisher supplied with one or two a year.

Seeds of Life, published this year, was written in 1928. It reveals its age only when the hero pays out the princely sum of $10 for a month's rent in New York City. *The Forbidden Garden*, published in 1947, caused one reviewer to remark that it had obviously been inspired by the atomic bomb. It was written in 1918.

G. O. C. 666 was written in 1940. (G. O. G., by the way, stands for General Order of Genetics, and 666 is the number of the beast). The story takes place in an un-named mythical country under a dictatorship. Nevertheless it was turned down for publication in 1940 on the grounds that it was unfriendly to one of our allies. It's still the same manuscript, and the same mythical country but now it's being rushed into publication for this year.

Bell started writing science fiction because he thought he might get some of his serious books published if he could provide a publisher with this sideline of salable staples. The scheme worked nicely for everybody, even though it turned out to have been an unnecessary precaution on Bell's part.

His technical books, notably *Algebraic Arithmetic* (1927) and *The Development of Mathematics* (1940), were valuable contributions to mathematical literature, and immediately became standard works in the field. Of the popular books on mathematics, *Men of Mathematics* (1937) was a legitimate best-seller when it was first published, has sold steadily in this country and abroad ever since, and remains a classic of popular science writing.

The notoriety of Taine Bell

Bell still lives in the comfortable house across from the Caltech campus where he and his wife settled when they first came to Pasadena. His son, Taine—who enjoyed a certain notoriety as a child after he observed a cross on a church steeple and asked what they'd put the plus-sign up there for—is now an M.D. in Watsonville, California. He's married to a girl who's an M.D. herself.

In recent years Bell has cut down on a good many of his varied occupations in order to concentrate on the revision of a long work written almost 40 years ago.

All of which is in partial explanation of Bell's comment, on the biographical-information sheet filled out by all Caltech faculty members, under the heading of Extra-Curricular Activities.

"Unfortunately none," he wrote. "Life is so short."

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Both of Western Electric's jobs—telephone and military—are vital to this country's present and future strength. Both are filled with challenges for the best engineers of today and tomorrow.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

THE AMERICAN UNIVERSITIES FIELD SERVICE

A group of representative colleges and universities, including Caltech, organizes its own corps of correspondents to furnish accurate, firsthand information on foreign areas.

LATE THIS month Edwin S. Munger and John B. George will visit the Institute to report to the faculty, students and friends of the Institute on current conditions in East and West Africa. Early in January, Albert Ravenholt will be here with firsthand information on the Far East. He will be followed in February by Phillips Talbot, who will report to the Institute on Pakistan and India.

These four men are all representatives of the new American Universities Field Staff plan, organized by a group of American colleges and universities to send qualified young men out as their correspondents in foreign areas. In addition to sending back regular reports to the sponsoring colleges and universities, each of these men returns home every two years to visit the campus of each of the sponsoring institutions to report in person on current conditions, problems, and personalities in the area he is studying.

Though the American Universities Field Staff plan is brand new, it is actually an extension of a plan which has been in existence since 1925. In that year the Institute of Current World Affairs was incorporated in New York and provided with an endowment which now has a book value of about $1,500,000 by the late Charles R. Crane (Crane plumbing) to give young men of promise an opportunity to study, firsthand, foreign areas about which there is a general lack of knowledge in this country.

Charles Crane, a widely traveled man, was always interested in the development of international information services. He was one of the men who put up money when Adolph S. Ochs took over the New York *Times*. He helped finance the Japan *Advertiser*, among other publications. He brought a number of distinguished foreign professors to this country, and financed a chair of Russian history at the University of Chicago.

In 1925 he endowed the Institute of Current World Affairs, with the understanding that Walter S. Rogers, his longtime associate—both in business and in his outside interests—would organize it, develop a program for it, and direct its activities.

Walter S. Rogers made his first important study of international communications shortly before the first World War, when he went to the Far East for Crane, to investigate the possibilities of building up a chain of American-owned newspapers there, to gather news for the American market and distribute American news in that part of the world. The project had to be abandoned because of the approaching war, but the experience showed Rogers what small success we were having in getting news of our government's policies and actions to the rest of the world.

At President Wilson's request, Rogers, soon after he returned to this country, arranged for world-wide dis-

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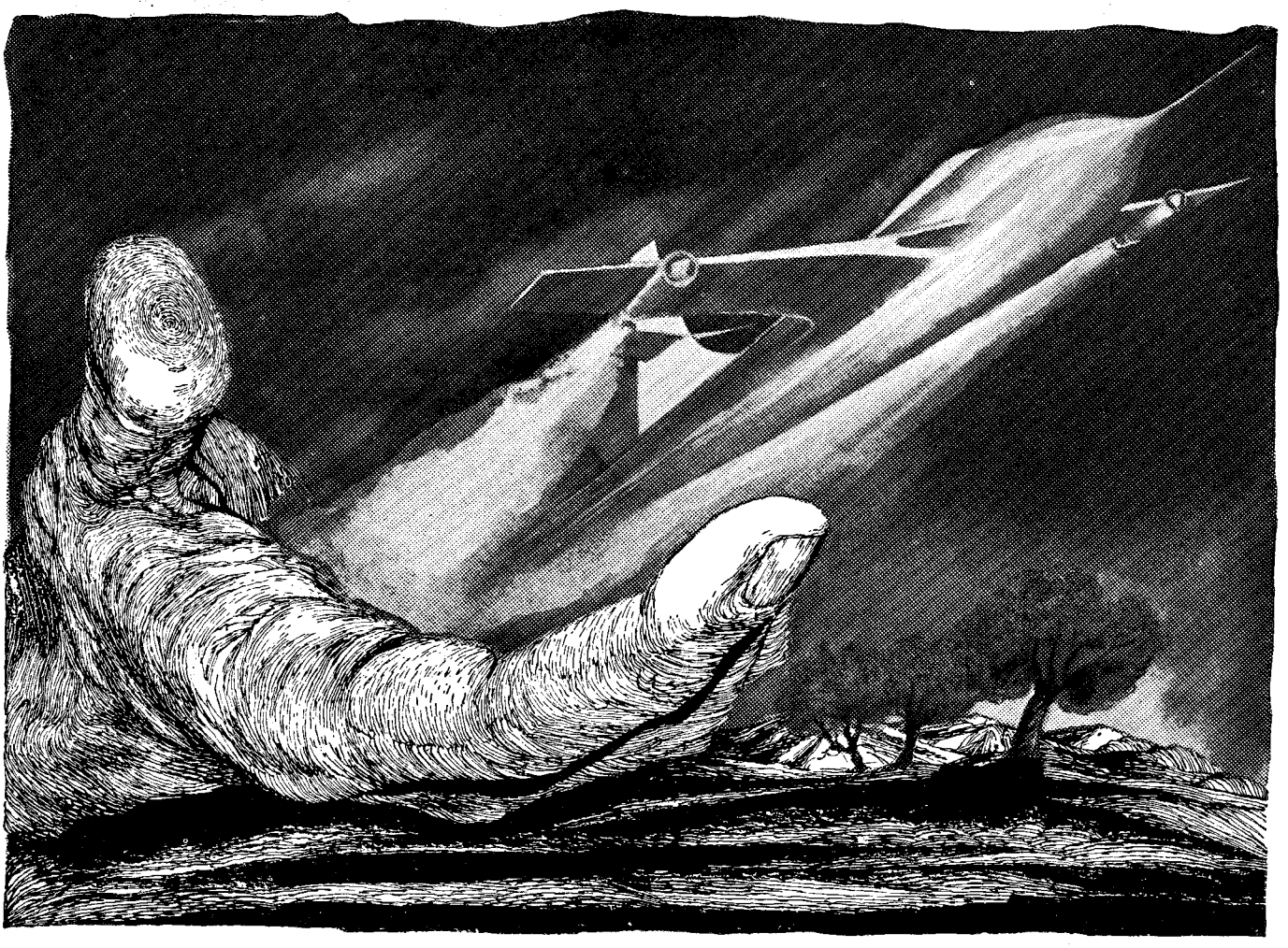

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tribution of the President's next message to Congress. The success of this effort led to Rogers' being asked to set up and direct a government news service, which continued in operation throughout the war and the Paris Peace Conference. Rogers acted as advisor to the American Delegation to the Peace Conference, and later on was appointed one of the American delegates to an international communications conference. During the next few years he was involved in a number of other activities concerning the collection and distribution of news.

Institute of Current World Affairs

Since 1925 Rogers has centered his attention on the Institute of Current World Affairs, and, in the past 26 years, has sent out more than 20 young men to study contemporary forces in Japan, Manchuria, China, Russia, Mexico, Brazil, Argentina, Turkey, India, Africa, the Arab countries, and France. The Institute's associates include such men as Professor John N. Hazard of Columbia University, the only American yet to be graduated in Soviet law from the Moscow Juridical Institute; Thomas L. Blakemore Jr., the only American yet to be admitted to full practice before the Japanese bar; and several of those who will now take part in the AUFS program.

Most of these young men have been sought out and selected personally by the Institute in colleges and universities, from the field of journalism, and from other activities related to foreign areas. Each man goes through a rigorous training program. This is planned by consultation between him and the Institute, and often starts with a year or two at a suitable university in this country or abroad, where he studies the language, law and customs of the particular country he has selected.

The man then goes out to the country. For the first six months or so he is likely to live in one of the native villages. Later he moves on to a wider field and surveys the more general problems of the country. He sends back periodic reports to the Institute, which circulates them among a small number of persons who are interested in the area.

In general the Institute considers that it takes about five years to train a man to be an expert in his field. At the end of this time most of the men in the Institute Corps join university faculties, work for various governmental agencies, or go into journalism, the professions or private business. Only a few have remained with the Institute.

In recent years the Institute has been looking for a way to make this expert knowledge of foreign conditions both more useful and more available. The American Universities Field Staff plan is the result. Its original sponsors include Brown University, Caltech, Carleton College, the Harvard Graduate School of Business Administration, the University of Kansas, Stanford, Tulane and the University of Washington—a group of educational institutions of widely varied interests, located in various sections of the country. Other colleges and universities will be admitted to the new organization by vote of the Board of Trustees. This board, elected at the organizational meeting of the AUFS on October 24, includes President Wriston of Brown University, Chairman; President Sterling of Stanford University, Vice-Chairman; President Gould of Carleton College, Secretary; and Phillips Talbot of the Institute of Current World Affairs, Executive Director.

To finance the AUFS program, each of the sponsoring institutions will contribute the equivalent of the average salary paid to an associate professor on its faculty. In addition, the organization will make its staff reports and services available to other institutions that can use such firsthand information—newspapers, magazines, business firms and the like. With the income from these sources, and the possibilities of endowment from other sources the program should be adequately financed.

In time, the field staff is expected to be built up to a strength of some 20 men. These men will prepare regular reports for the staffs of the cooperating institutions, and will be available for consultation by visiting professors and graduate students. Each man will return home every two years, and will visit the campus of each participating institution to take part in seminars, faculty discussions and conferences, give lectures and meet with local bankers, businessmen, and journalists.

As the plan evolves this will mean that four or five field men will be visiting each university each year, to expand and enrich the university's existing courses of instruction with their direct reports on conditions in various sections of the world.

The AUFS, an independent organization

As the AUFS begins to function under the control of its trustees, it will choose for its staff men who are highly skilled and fully trained in interpreting significant developments in important foreign areas. The Institute of Current World Affairs, which has assisted in the formation and organization of the AUFS, will continue to cooperate with it—and continue to train men in the contemporaneous affairs of significant foreign areas. These men will be eligible to be taken on to the AUFS staff, if they qualify. The AUFS will, however, be ready to draw highly qualified men from any source at all.

Obviously the development of the AUFS into a full-blown service is likely to take four or five years, since there is no short cut to the type of regional understanding its men are expected to have. It expects, at first, to concentrate on those areas which are relatively little known in American life, while gradually developing a service which will cover the major accessible areas of the world.

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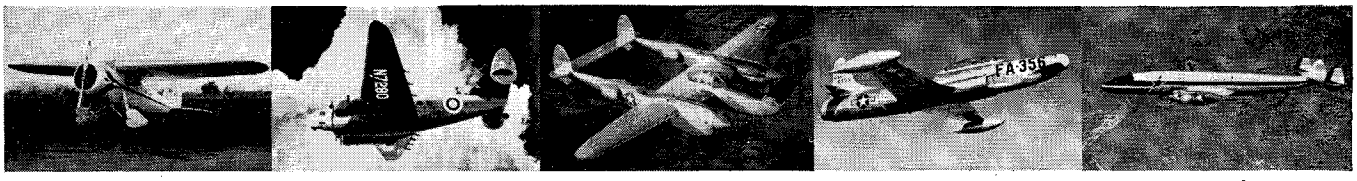

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THE MONTH AT CALTECH

Registration

FINAL REGISTRATION figures for this year put the Caltech student body at 1023—611 undergraduates and 412 grad students—which is 47 under last year's total.

Undergraduate enrollment includes 138 seniors, 139 juniors, 135 sophomores and 199 freshmen. This isn't the biggest freshman class ever, but it's just one man away from it. The freshman class in 1942 had 200 men in it.

Final tally on the number of freshmen signed up for the Institute's new Air Force R. O. T. C. program is 154—sophomores, 20.

Betasyamine

THE CALIFORNIA INSTITUTE Research Foundation in Pasadena, and the International Minerals and Chemical Corporation of Chicago made a joint announcement last month of a new therapeutic combination which is currently undergoing extensive investigation to determine the extent of its potential benefits in heart and degenerative diseases.

The new combination consists of betaine and glycocyamine, two materials related to the amino acids. These materials have long been known to biochemists, but their use in combination is new to medicine. The first preliminary reports on betaine and glycocyamine were published in the October issue of the *Annals of Western Medicine and Surgery*.

Dr. Henry Borsook, Professor of Biochemistry, reports on the use of betaine-glycocyamine therapy in heart cases.

The published papers cover the use of betaine-glycocyamine therapy in 46 heart cases. Clinical observations by the authors indicate that two-thirds of the patients benefited in varying degrees. In some of the cases all other forms of heart therapy were withdrawn, and in others betaine and glycocyamine were used in combination with digitalis and other traditional medication. In most cases the reported results were clinical or subjective—i.e., the patients told the clinicians that they felt better and could lead more active lives. One of the major goals of further investigation is to measure the results of betaine-glycocyamine therapy by objective methods.

Except for occasional gastro-intestinal disturbances, the clinicians reported that use of the betaine-glycocyamine combination disclosed no evidence of toxicity or other disturbing side effects.

The first of the four published reports outlines the basic biochemical background which encouraged the preliminary clinical investigations. This paper was prepared by Henry Borsook, M.D., Professor of Biochemistry at Caltech, and his brother, Dr. M. E. Borsook, a Los Angeles physician and surgeon, who is also a member of the Research Division of the Leo N. Levi Hospital at Hot Springs, Arkansas.

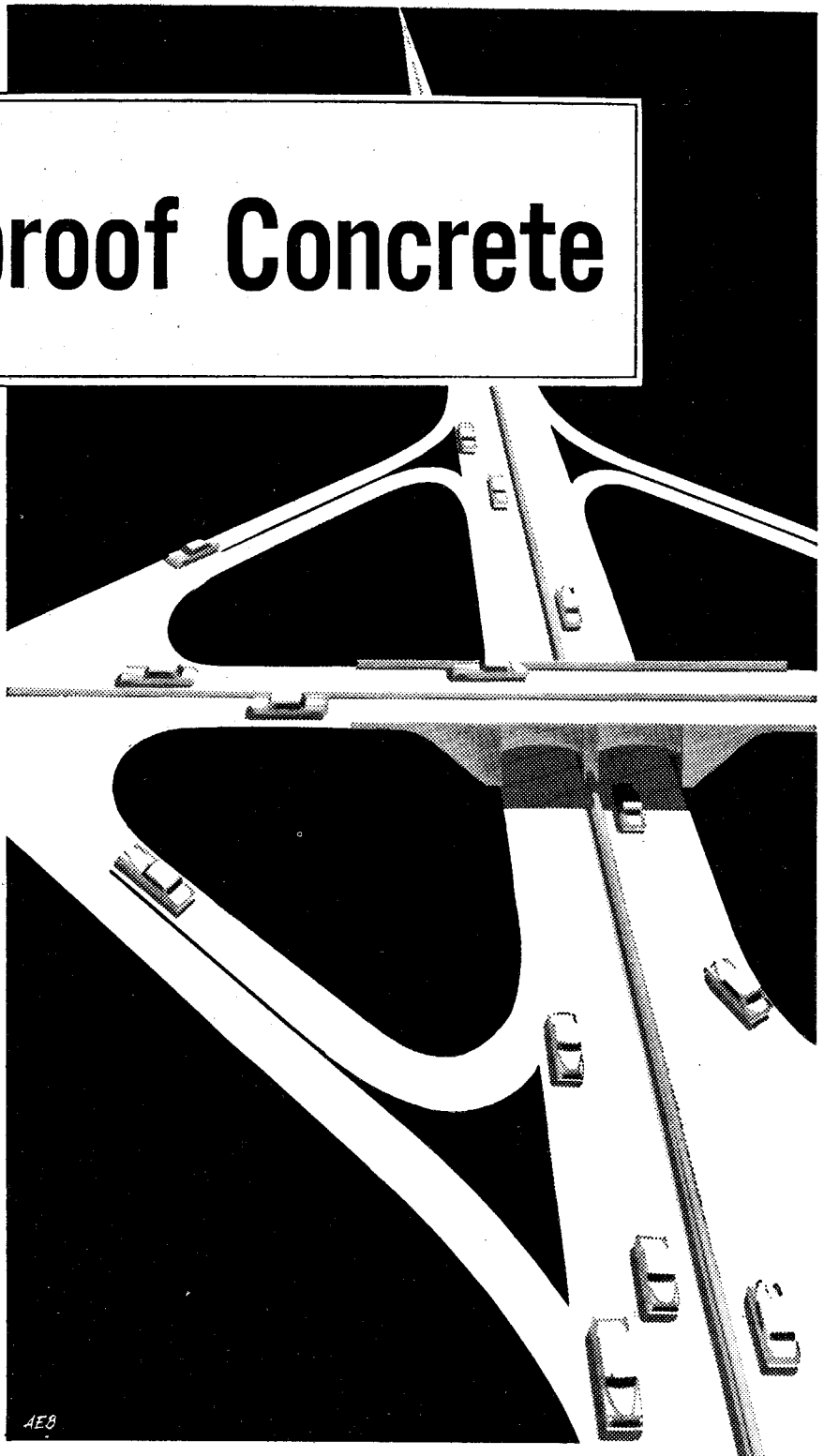
The biochemical basis of clinical interest in betaine-glycocyamine therapy rests on the hypothesis that the combination, when taken orally, leads to the formation of phospho-creatine, which is recognized as the main reservoir of immediately available energy in muscular, nerve and glandular tissues of the body.

The three other papers report on the clinical results obtained when betaine and glycocyamine were used in the 46 heart cases. Authors of these papers are: Drs. M. E. Borsook and Henry Borsook; Drs. Vernon van Zandt, a Los Angeles heart specialist, and Henry Borsook; and Captain Ashton C. Graybiel (MC-USN), Director of Research of the U. S. Naval School of Aviation Medicine, and his associate, Lt. Charles A. Patterson (MC-USN), at Pensacola, Florida.

The Office of Naval Research assisted in the support of the biochemical investigation at the California Institute of Technology and also at Pensacola. The Amino Products Division of the International Minerals and Chemical Corporation contributed to the clinical investigations and also supplied some of the material used.

CONTINUED ON PAGE 24

Climate-proof Concrete



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THE MONTH . . . CONTINUED

To permit further investigation on the broad scope indicated by the preliminary reports, International Minerals and Chemical Corporation is currently preparing adequate research quantities of betaine and glycocyamine in various combined dosage forms. For possible future use, the company has selected the trade name "Betasyamine" for the combined dosage forms.

In devoting virtually his entire October issue to the four papers on betaine and glycocyamine, Dr. Edmund T. Remmen, editor of the *Annals of Western Medicine and Surgery*, said:

"Use of the combination is new to medicine. The papers no doubt will stimulate investigational interest on a wide scale . . . Additional studies by these and other investigators are currently in progress in the cardiac field, in poliomyelitis, arthritis, and other conditions. . . . For the present, the combination of betaine and glycocyamine is available for investigational use only."

Dr. Paul D. V. Manning, Vice President in charge of research for International Minerals and Chemical Corporation, said that his company will limit the distribution of the available research quantities of betaine and glycocyamine to qualified investigators in the field of heart and other degenerative diseases. He cautioned:

"The most we can say for the results to date is that betaine and glycocyamine present very interesting biochemical substances for further medical research.

"In view of these results and the serious nature of the illnesses involved, for the present the use of betaine and glycocyamine must be limited to investigators who are willing to use the medication under controlled conditions. Because heart patients obtain an improved sense of well being and feel like they can do more work, controls must be exercised to see that they do not overdo.

"International Minerals and Chemical Corporation is supporting various research projects by supplying materials and, in some instances, funds for further research in connection with selected institutions.

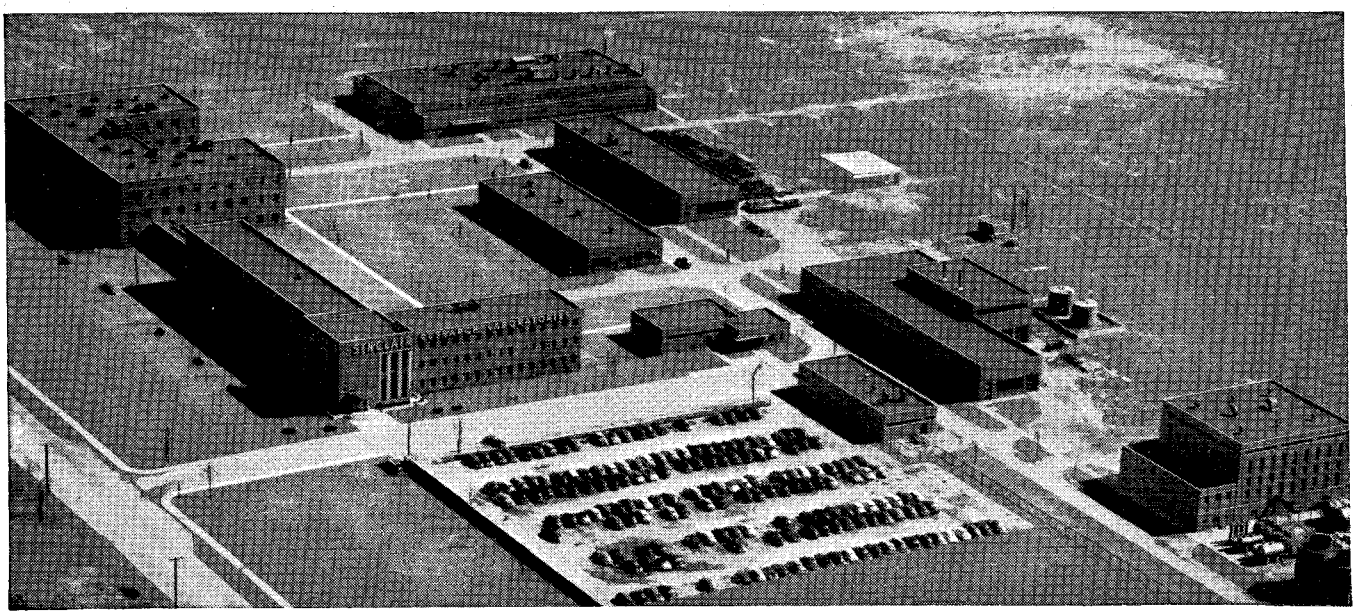
"However, because we feel that the therapeutic potential of this material should be investigated as quickly as possible, International Minerals and Chemical Corporation will also make research quantities available to other qualified investigators at nominal cost.

"Above all, it should be stressed that this material will not be made available at this time for general clinical use through traditional drug distribution channels."

New Moon?

LATE IN SEPTEMBER Dr. Seth Nicholson, staff member of the Mount Wilson and Palomar Observatories, photographed a celestial object with the 100-inch telescope on Mount Wilson which is believed to be the twelfth moon of Jupiter. The discovery was announced last

CONTINUED ON PAGE 26



SINCLAIR RESEARCH LABORATORIES—nine buildings containing the most modern testing equipment known—have contributed many of today's most important developments in petroleum products, production and refining. Under the Sinclair Plan, the available capacity of these great laboratories is being turned over to work on the promising ideas of independent inventors everywhere.

An Offer of Research Facilities to Inventive Americans Who Need Them

The Sinclair Plan is opening up the Company's great laboratories to every American who has an idea for a better petroleum product

INVENTIVE Americans are often at a loss today. Not because of any lack of ideas, but because of a need for expensive facilities to find out if and how their ideas work.

This was no obstacle in our earlier days. The Wright Brothers designed their first airplane with the help of a foot-square homemade "wind box"—and the plane flew.

In contrast, the man with a new idea in airplane design today often needs a supersonic wind tunnel costing millions.

In short, science and invention have become so complex that a man with an idea for a better product often needs the assistance of an army of specialists and millions worth of equipment to prove his idea has value.

Within the petroleum field, the Sinclair Plan now offers to provide that assistance.

Under this Plan, Sinclair is opening up its great research laboratories at Harvey, Illinois, to independent inventors who have sufficiently good ideas for better petroleum products or for new applications of petroleum products.

If you have an idea of this kind, you are invited to submit it to the Sinclair Research Laboratories, with the provision that each idea must first be protected, in your own interest, by a patent application, or a patent.

The inventor's idea remains his own property

If the directors of the laboratories select your idea for development, they will make, in most cases, a very simple arrangement with you: In return for the laboratories' investment of time, facilities, money and personnel, Sinclair will receive the privilege of using the idea for its own companies, free from royalties. This in no way hinders the inventor from selling his idea to any of the hundreds of other oil companies for whatever he can get. Under the Plan, Sinclair has *no control* over the inventor's sale of his idea to others, and has *no participation* in any of the inventor's profits through such dealings. Moreover, it is a competitive characteristic of the oil business that the new products adopted by one company are almost invariably adopted by the whole industry. This means that the very fact of his agreement with Sinclair should open up to the inventor commercial opportunities which might otherwise be hard to find.

How to proceed: Instructions on how to submit ideas under the Sinclair Plan are contained in an Inventor's Booklet available on request. Write to: W. M. Flowers, Executive Vice-President, Sinclair Research Laboratories, Inc., 630 Fifth Avenue, New York 20, N. Y. for your copy.

IMPORTANT: *Please do not send in any ideas until you have sent for and received the instructions.*

SINCLAIR—A Great Name in Oil

month only after a number of additional photographs revealed that the object was definitely moving with Jupiter. However, until it has been observed in the vicinity of Jupiter for a full month, or until its orbit can be computed, it can't definitely be called a satellite.

If it turns out to be the twelfth moon of Jupiter, Dr. Nicholson will rate right along with Galileo as the only astronomer to have discovered four of Jupiter's satellites. Galileo found the first four in 1610 with his two-inch telescope. Dr. Nicholson found one in 1914, and two more in 1938.

Jupiter, the largest of the nine planets, has a volume about 1300 times greater than that of the earth. Its mass, however, is only about 318 times as great, because its density is far less than the earth's. It has a mean diameter of 87,000 miles—11 times that of the earth. Right now it is close to its nearest approach to the earth for the year, rising as the sun sets and remaining visible throughout the night—a mere 366 million miles from the earth.

The object discovered at this distance by Dr. Nicholson is only about 15 miles in diameter, and very faint—as were the three satellites Dr. Nicholson discovered previously. Its photographic magnitude is 19, indicating that it is about one one-hundredth as bright as the faintest object visible to the unaided eye.

THE BEAVER

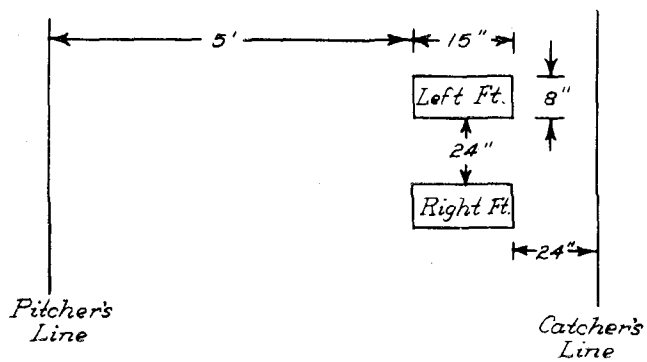
TECH'S VERY EXISTENCE presupposes that nothing so stimulates a man as competition. In addition to the ever-present competition between individuals for grades, girls, and seconds on food in the student houses, there are trophies which are awarded to deserving houses for achievements in athletics, forensics, bridge, scholarship, bowling, beer drinking, and skiing.

Each house has its own distinctive trophies, which are often enshrouded in a sanctimonious aura of tradition, from having come down through generation after generation of Techmen. Each house has an intrahouse athletic trophy, which is based either upon interalley or interclass competition. But the really distinctive prizes are those which are not based upon any civilized skills.

Ricketts House, for example, has an old Brake Drum which is a perpetual source of competition between its freshmen and sophomores. The object of the contest is refreshingly simple: to gain possession of the Brake Drum. The rules are correspondingly simple: anything goes. The winners of the last contest peremptorily announce the time of the event, whatever hour it may be, with a siren in the courtyard. After an hour or two, someone manages to get away with the Brake Drum and hide it, thus ending the contest. Some weeks later, the winners sound the siren, and the melee in the courtyard begins once more.

Fleming House, one of the more trophy-minded of the houses, has a trophy for the best lover in the house, and one for the worst. It also has a trophy given to the member with the saddest story of the month. A new trophy for academic persistence is to be awarded to members who left school for academic or related reasons and came back. But the greatest trophy is the revered Brass Spittoon, which has been a challenge trophy between the alleys of the house since 1935. Not satisfied with the more conventional contests, such as toilet-paper eating and raw-egg guzzling, one of the alleys recently challenged the alley in possession of the Spittoon to a newly contrived contest christened Asinine Baseball. The formal challenge, which began with a short but haughty introduction disparaging the athletic and mental prowess of the challenged alley, completely covered four typewritten pages. Some of its thirty rules are given below in an abbreviated form.

1. The playing field will be layed out as follows:



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THE BEAVER . . . CONTINUED

2. The official balls will consist of fresh ranch eggs, and only game balls will be furnished by the challenging team. All balls used for batting practice or infield and bullpen warmup will be supplied by the individual clubs.

3. The number of men on each team, as in regular baseball, will consist of nine men.

4. Each team shall field one pitcher and one catcher per inning.

5. The length of the game will be two innings.

6. The batter's position is as follows:
   a. Both feet will be in their respective boxes.
   b. The posterior will face the pitcher.
   c. The hands will grip the legs below the knees.
   d. The knees will be straight.
   e. The batter will be blindfolded.

7. Summer uniforms will be worn.

8. The bat is hereinafter used synonymously with the posterior.

9. The catcher may not use gloves, sacks, or any aid other than the two bare hands.

10. The pitcher must at all times remain behind the pitcher's line and deliver the ball underhand.

11. The batter will attempt to keep his bat from hitting the ball, and in so doing will register a hit if the ball is not caught by the catcher.

12. A ball missing the bat and hitting the batter elsewhere will be scored as a double; and a ball missing the bat and batter both and not caught by the catcher will be scored as a home run.

13. A ball hitting the bat will put the batter out.

14. A pop-fly to the catcher will be defined as any ball which the catcher believes desirable to catch with his head.

15. Should the catcher upon catching the ball in any manner not described in Section 14, render it unplayable, a home run will be scored for the batter.

16. Each team will be allowed one bat boy, who must be a frosh, and whose duty is to keep the bats clean.

17. Should an out be properly executed and it is observed that the ball contained a double yolk, a double play will result if any one of the bases is occupied.

18. The losing team will clean up the playing field at the conclusion of the contest.

19. Use of lead in the bat will be strictly forbidden.

20. Broken bats may be taped at the infirmary.

The game itself consumed four dozen eggs, not counting practice balls. The challengers won with a rally in the last half of the second inning by a score of 12-11, after being egged on by an eggstraordinarily spirited audience. Heroes of the game were the catchers who put the batters out by employing the rule of Section 14.

—Al Haber '53

PERSONALS

1915

Robert S. Ferguson, formerly an instructor in electrical engineering at the Institute, is now Chief Engineer of the Goodyear Rubber Company in Akron, Ohio.

1921

Manton M. Barnes reports the arrival of his first grandchild, Allen Manton Barnes—Caltech '73. Proud father is Stan Barnes, '49.

1922

Howard G. Vesper has recently assumed the Chairmanship of the Lubricants Panel, Fuels and Lubricants Committee, of the Research and Development Board (Dept. of Defense). This group, which consists of three civilian and three military members, is responsible for correlating and advising on lubricants research in all fields of the Armed Services. The three civilian members serve on this Panel in addition to their regular civilian jobs, as a government service. Panel headquarters is in the Pentagon, Washington, D. C.

1924

Edward A. Wilson says that three days after graduating from CIT in June of 1924 he started work for the Union Oil Company, and is still with them. His son, Stephen, finished U.C. last June (Mechanical Engineering) and is now training with G. E. at Fort Wayne, Indiana. His daughter, Doris, started U.C. last month.

1925

Neal D. Smith is still City Manager of Santa Cruz, California. His son *Robert* graduated from Caltech in June and is now a Sanitary Engineer with the Panama Canal Company at Cristobal, Canal Zone, as assistant to the Superintendent of the Mount Hope Water Treatment Plant.

1927

F. Earl Turner, M.S. '28, is still working for the Union Oil Company in Hollister, exploring the petroleum possibilities in those parts.

1928

Guy L. Chilberg, M.S. '29, has been transferred to Seattle, Washington, by Pacific Tel. and Tel. He's General Plant Supervisor of their Washington-Idaho area. Another piece of important news is the arrival on August 8th of the Chilbergs' son, Joseph Murphy, who weighed in at 8 pounds, 12 ounces.

1929

Colonel George F. Taylor, M.S. '31, Ph.D. '33, recently returned from an assignment with Joint Task Force III in the Pacific, and has been assigned to Headquarters, Air Weather Service, Andrews Air Force Base, Maryland. The Air Weather Service is a component of the Military Air Transport Service, and provides meteorological information to the U. S. Air Force and Army Ground Forces around the world. George returned to active duty in December, 1948.

1931

George E. Liedholm and his wife have just returned from a business (and pleasure) trip to England, France, Germany, and the Netherlands—a two months' assignment to Shell Refining and Marketing. They found general economic conditions vastly improved over four years ago. Their daughter, Joan, is a freshman at Stanford, and their son, Carl, is in junior high school.

Francis W. Hutchinson is on his way around the world on a cruise ship studying air conditioning and refrigeration on shipboard under various ambient conditions.

1932

Lowell J. Wright is now executive officer of the Seattle District of the United States Army Corps of Engineers. They are building the Chief Joseph and Albeni Falls Dams up there, besides doing military construction.

PERSONALS . . . CONTINUED

1934

E. B. Doll, M.S. '35, Ph.D. '38, is living in Palo Alto, and working at the Stanford Research Institute as Chairman of the Applied Physics Division. He's married, has a son and a daughter.

1935

H. D. Estes has been named Manager of the Economics and Scheduling Department at the Houston Refinery of Shell Oil. He joined the company in 1927 as a clerk in the Wilmington Refinery, and has served as Senior Engineer in the Head Office-Manufacturing Operation since 1949.

Lewis B. Browder is now on active duty with the Navy—a Lieutenant Senior Grade—as a specialist with AFSWP.

1936

Reverend Tyler Thompson is now Assistant Professor of Philosophy of Religion at the Garrett Biblical Institute in Evanston, Illinois—which is the largest of the ten graduate schools of theology affiliated with the Methodist Church. Reverend Thompson has done previous work at Allegheny College, the Methodist Mission in Singapore, and at Methodist pastorates throughout New England.

Clarence F. Goodheart writes from Schenectady, New York, that he's been promoted to full Professor of Electrical Engineering at Union College. He served as acting head of that department last spring.

1937

Walton A. Wickett has left Varian Associates in San Carlos—where he did computational work in connection with the manufacture of Klystron tubes—and is now a Research Engineer with the Friden Calculating Machine Company in San Leandro.

"My status is still that of cantankerous bachelor, due perhaps to driving an MG sports car with an 8.2 compression ratio and to skiing most of the winter weekends."

1938

Richard Rosencranz was recently transferred from Martinez, California, to Houston by the Shell Chemical Corporation, for which he has been working as a senior technologist for the past five years. Dick writes that *Bruno Pilorz* '44, who was working with him in Martinez, was recently called back into the Navy as a Lieutenant.

1939

Robert W. Winchell, M.S. '40, has recently moved from Palo Alto to accept a position with the Airsupply Company in Los Angeles.

Ed Sullivan was transferred last January from the Sacramento Regional Office of the U. S. Bureau of Reclamation to the Fresno office—which is responsible for all the Bureau activities from Merced to Bakersfield—as assistant to the District Manager. The Sullivans had a daughter last October—their fourth child.

1940

Claude E. Davies is vice-president of the Wood and Cies Distributing Company and of the Imperial Television Manufacturing Company of Los Angeles, and is in charge of the distribution of Imperial and Tele-Tone television for northern California. Recently he has been travelling considerably in connection with company government work, and has met a good many Tech men throughout the country, including Hank Evans '38, in Washington, D. C. Claude and his wife Charlotte, and their two sons — Tommy (6) and Dickie (3) — live in Orinda, near Berkeley.

Sheldon C. Crane, now a Research Fellow at Caltech, and Carol Walker were married this summer in Cohasset, Massachusetts.

1941

Gil Jones is now a Lieutenant Commander in the Navy, stationed in Yokosuka, Japan, and connected with ship repair work. He says that he has been in Japan one month now, long enough to get "orient-ed," and would like to see any Tech men who happen to be in that part of the world.

Wayne G. Abraham received his Ph.D. in Electrical Engineering from Stanford in June, 1950, and is now working at Varian Associates in San Carlos. This summer he visited Holland, Switzerland and France to meet his in-laws. His wife is Cornelia van Mourik of Holland.

Hugh Bradner, Ph.D., writes that he is settling down in Berkeley again (where he's on the staff of the Radiation Lab at the University of California), after spending the year chasing around the U. S. and Pacific Ocean on defense work.

Kenyon B. Howard, who now has two boys and a girl, is operating both the K. B. Howard Co., lab and consulting office, and Tri-Dex Co., manufacturing electronic gear on subcontracts. What time is left he devotes to Kiwanis, the Chamber of Commerce of Lindsay, California, and civic affairs, as well as the West Coast Electronic Manufacturers Association, AIChE, ACS, and other organizations.

1942

Carter Hunt reports that he and his wife now have three children—one boy and two girls. Carter's still Assistant Superintendent of the San Francisco plant of Hiram Walker and Sons, Inc.

Forest M. Clingan was transferred to to Honolulu in January and has since been promoted to Lieutenant Commander. His wife writes that they are in love with Hawaii, and live on a hill in Honolulu overlooking the ocean and a part of the city.

George Holzman, Ph.D. '48, spent a year at MIT in 1948, and has been with Shell Development in Emeryville, California, ever since. The Holzmans have a son, Thomas Frederic, born on December 31, 1950.

Wayne MacRostie is now with the State Division of Water Resources in Sacramento as a Senior Hydraulic Engineer. Most of the work of this division is in water resources investigations for the State Water Resources Board. Wayne's work recently has been on the Santa Clara Valley, Elsinore Basin, and state-wide investigations.

The MacRostie boys, by the way, are now aged 3 and 5.

1943

Allen Dean Weeks received his M.S. in Electrical Engineering from the University of Southern California last June.

William E. Deeds, M.S., received his Ph.D. from Ohio State at the summer quarter convocation on August 31.

John R. Spencer, who is now Reservoir Engineer with the Continental Oil Company in Ponca City, Oklahoma, wants the Marriage Insurance Policy Group of '43 to know that in the shuffle of moving he lost several birth announcements, and would appreciate an up-to-date tally on everybody's family status. (Ed. Note—So would we. E. & S. hasn't had any news since October, 1950).

1944

Joseph Solomon received his M.S. in Mechanical Engineering from the University of Southern California last June.

Douglas G. Dethlefsen, M.S. '48, reports that last December he served a tour of active duty at the Office of Naval Research in San Francisco, during which time he compiled a summary report on the subject of Magnetic Amplifiers. In June he began working at the Stanford Research Institute with their Magnetic Circuits Group, and is now spending spare time working on a thesis for an Engineer's Degree in electrical engineering at Stanford University.

Frank Chesley Smith, Jr. and Sally Ann McQueen of Houston, Texas, announced their engagement in September.

George G. Shor, Jr., M.S. '48, reports the arrival of his first son, Alexander Noble Shor, on September 9.

Tom Norsworthy was married in Dallas to Frances Ann Flaig last June. He is still in the advertising business—vice president of J. B. Taylor, Inc.

1945

William A. Myers received his M.S. in Education from the University of Southern California in June.

Albert N. Baxter got his M.S. in Mechanical Engineering at the same time.

William J. Elliott received his LL.B. from the University of San Francisco Law School last June, and is now Transportation Application Engineer with Westinghouse in San Francisco.

Edward Lowe, M.E. '45, reports that he is a consulting engineer in Fresno, doing electrical design and layouts for architects —mainly for schools, churches, hospitals, commercial buildings and street lighting work.

1946

Robert A. Golding got his M.S. in Chemical Engineering from the University of Southern California in June.

John O. Nigra, M.S., recently received his Ph.D. from the University of Mexico and is now with the Arabian American Oil Company in New York. He likes his job, which affords him an opportunity to continue along the lines in which he is interested. He recently wrote a paper on Eolian Sand which is due to be published this fall.

W. A. Ross is now in the Navy—Lieut. (J.G.) Civil Engineer Corps—in the Pacific Alaskan Division at Treasure Island. The Rosses have two sons, Roger Dana, 2½, and Timothy Scott, 8 months old.

1947

Thomas N. Wilson received a Master of Science degree in Physics from the University of Southern California last June.

PERSONALS . . . CONTINUED

Charles Auerbach, M.S., Engr. '48, who has been in the General Engineering Department of Standard Oil of California for the last three years, has accepted a position in the Engineering Department of the California-Texas Oil Company—whose offices are in New York—effective December 1. There's a Mrs. Auerbach now too, as of April 1950.

David L. Judd, M.S., Ph.D., '50, is now a staff member of the Radiation Laboratory of the University of California at Berkeley. He's in the theoretical physics group. Previously he'd been a member of the nuclear energy division of the Rand Corporation in Santa Monica.

John Pettley, M.S., who is teaching at Webb School, played a leading role in a production of W. Somerset Maugham's "Our Betters," presented by the Claremont Actors Company last September 10 to 15.

Adrian Pauw, M.S., who spent last summer in Pasadena completing his Ph.D. thesis on a soil mechanics problem, is now Assistant Professor in Civil Engineering at Rice Institute in Houston, Texas.

Charles B. Shaw, Jr., spent the summer at the Corona (Calif.) Laboratories of the National Bureau of Standards doing research on guided missiles with the use of the "largest analog computer in the West," recently installed at the new laboratories. This fall he returned to U.S.C., to continue work for his Ph.D. in theoretical physics.

1948

Charles Susskind and his wife took a trip to Europe after he got his Ph.D. from Yale last June. He is now a Research Associate at the Microwave Laboratory of Stanford University. Also at Stanford is *Warren A. Christopherson* '48, working for his Ph.D. and holding down a job as a Research Assistant at the same time.

Niels J. Beck, M.S., is studying for his Ph.D. degree at the University of Wisconsin.

J. Frank Valle-Riesta, M.S. '49, is working as Research and Development Engineer for the Western Division of Dow Chemical in Pittsburg, Calif. At present he is investigating various applications of calculating machines, particularly in the field of multicomponent distillation of chlorohydrocarbon mixtures. Other Tech men in the Pittsburg plant: *Bob Heitz* '36, Assistant Research Director; *Bill Brown* '40, *Bob Funk* '49; *Dick McKay* '49; and *Bill Bailey* '49, now on leave to the Army.

Donald P. Spalding writes that after graduating from Caltech he joined General Electric's advanced training program for a year. *Bob Winchester* '48, was in the same first year class at Fort Wayne, Indiana. Don spent the summer of '49 at the company's plant at Lynn, Massachusetts, and since that time has been a design engineer in the D-C Armored Motor Engineering Division in Erie, Pennsylvania. His work deals with D-C motors that are mostly used in steel mills to drive auxiliary equipment. Last September he married Margaret Bishop, of Fort Wayne, Indiana.

Rupert Morris Bayley got his M.S. in Electrical Engineering from the University of Southern California in June.

Larry Noon, M.S. '49, is now employed at the Cutter Laboratories in Berkeley. His son, Eric Robert, was born March 5, 1951.

1949

Charles Bergman Shaw, Jr., received a Master of Science degree in Physics from U. S. C. last June.

Jack L. White is working on an AEC Predoctoral Fellowship at the University of California—in the field of extractive metallurgy. Jack says he's still boring everybody up there by telling them that Caltech has played more Rose Bowl games than Cal.

William C. A. Woods and Beverly Ruth Swager of Arcadia were married in San Marino on August 27th. They will live in Richland, Washington, where Bill is employed at the Hanford atomic energy plant.

Joseph M. Green, now at CIT working for his Ph.D. in theoretical physics, was married on September 16th to Davice Anne Greenblatt of Chicago. They met at the University of Chicago where Joe received his M.S. degree, and Davice was a student in the College of the University.

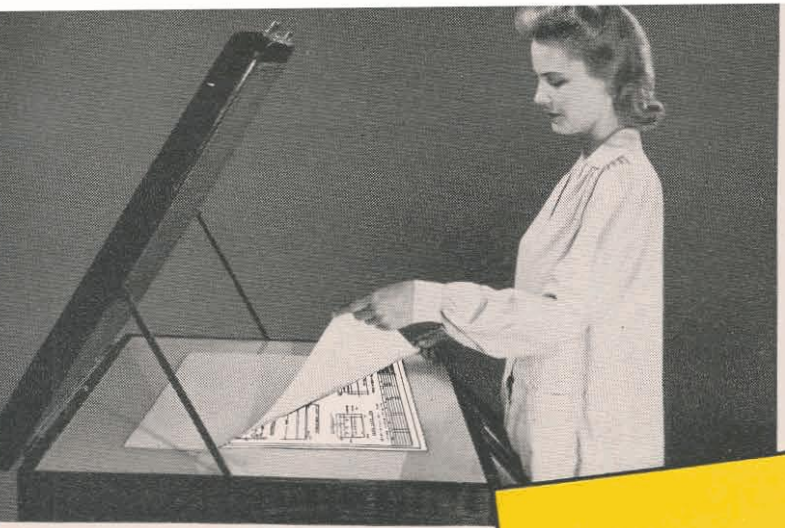
1950

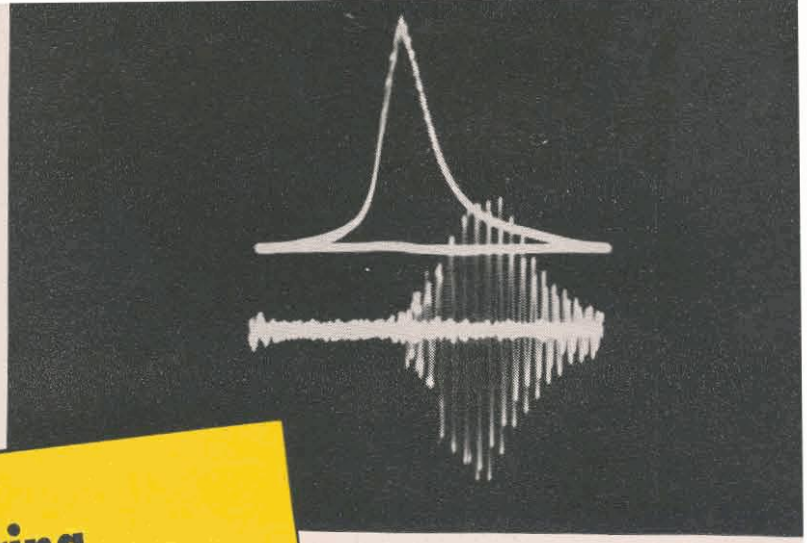
Cdr. Frank Welch, Jr., USN, is now Commanding Officer of VF-111—a Navy Fighter Squadron flying Panther jets.

Richard S. Fairall completed the requirements for a Master's Degree at Stanford, after working for three months last summer at the Naval Base at Inyokern. He has also been doing some consulting engineering in Palo Alto. He's expecting to work in Southern California now.

1951

Marshall Klonfeld joined the Up-Right Scaffolds organization in Berkeley in July and has now been appointed Factory Sales Representative for New Jersey, with his office at the company's Teterboro, N. J., factory.





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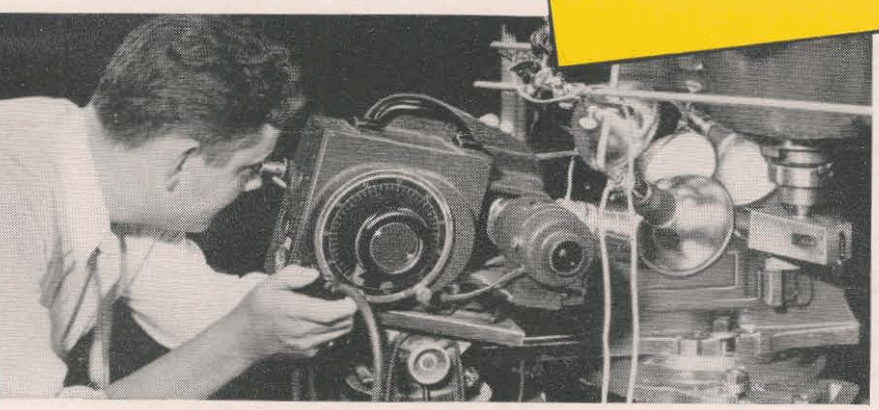

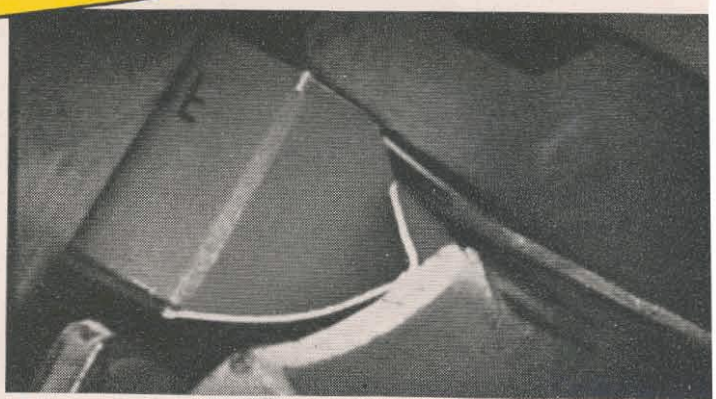

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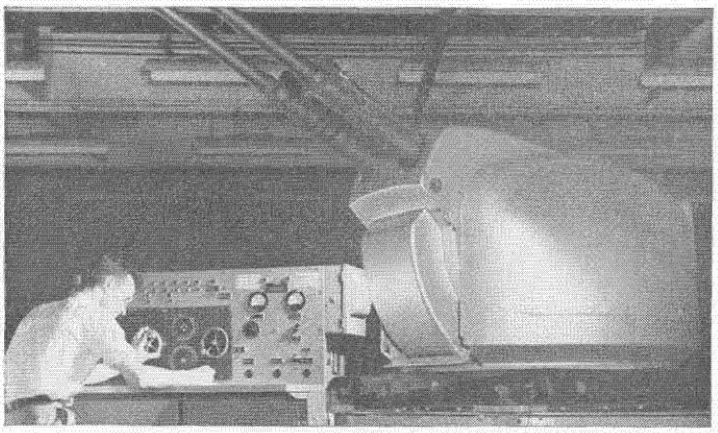
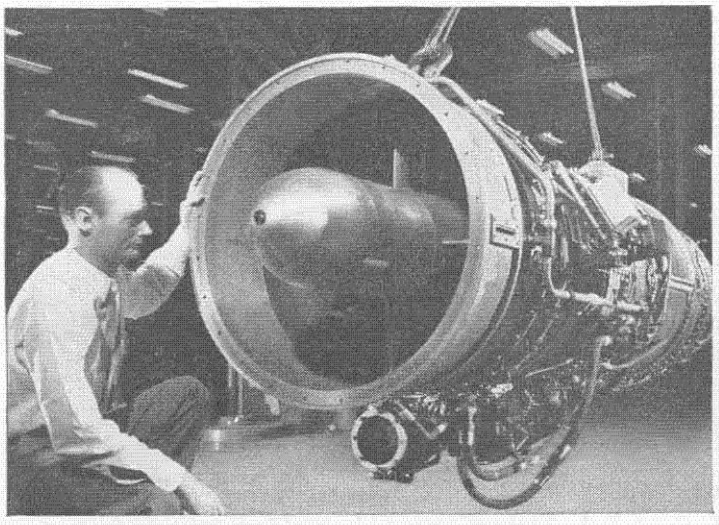


A gun turret for the B-36 bomber undergoes test as it comes off the assembly line at a General Electric plant.



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