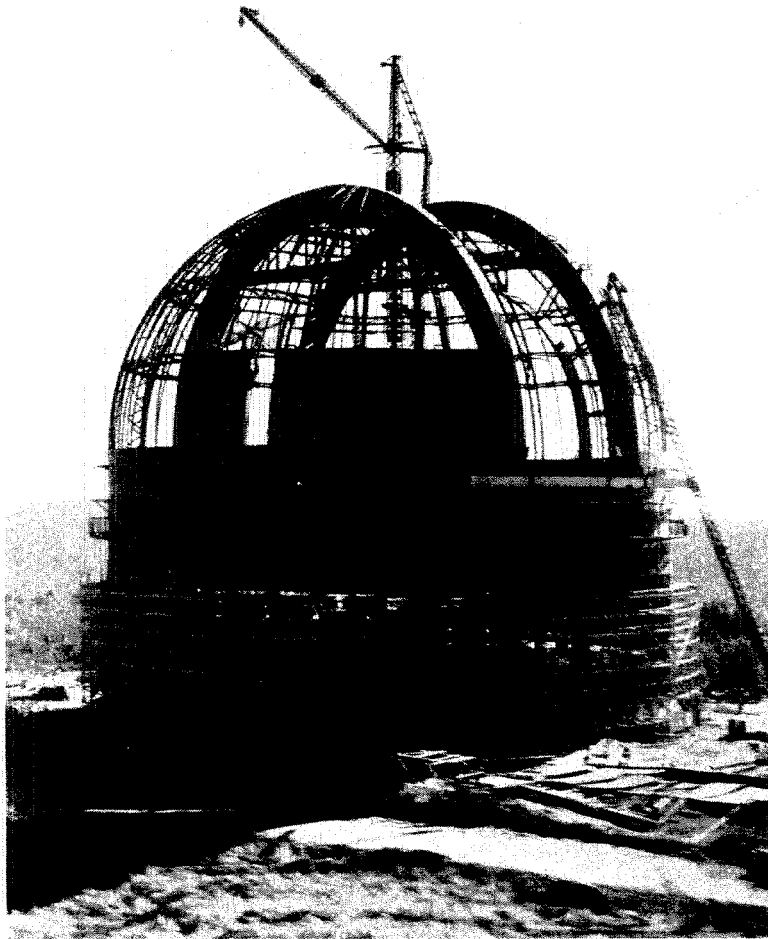


ALUMNI REVIEW

CALIFORNIA INSTITUTE OF TECHNOLOGY



OFFICIAL U. S. NAVY PHOTOGRAPH

PALOMAR

No. 3

DECEMBER 1937

ALUMNI REVIEW

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PLACEMENT

In the September issue of the Alumni Review appeared a report of placement activities for the year 1936-1937. This report included statistics on the placement of men receiving degrees on June 11, 1937. At the time the records were compiled, 85% of the men were known to be employed. Of the remaining 15% only 8 men, or 3.7% were known to be unemployed.

On November 30, 1937, the records show that of the men who received degrees in June, 1937, 6 were unemployed: 4 with B.S. degree; 1 with M.S. degree and 1 Ph.D. Most of these men have held positions since receiving their degree, but due to business conditions they are now unemployed.

At the present time there are twenty graduates on the unemployed list as follows:

Chemistry 2, one of the class of '35, being an assayer and the other, Class '16, experienced in compressor and stabilizing plants.

Chemical Engineering 1 B.S., '26, experienced research chemist and teacher.

Electrical Engineering 9 B.S. including the years '24, '27, '33, '34, '35, '36 and '37; of these one is experienced in utilities, one in sound stage equipment, 3 are interested

in radio and have, therefore, given much of their time to the study of sound; one is an editorial writer.

Mechanical Engineering 3 B.S. including the years '26, '36 and '37. The elder of the three is an experienced draftsman and designer.

Meteorology, 1 M.S. '36. This man prefers a position as tutor or companion where traveling is involved.

Physics, 2 B.S., Classes '33 and '37; one M.S. '36; 1 Ph.D. '37. The man of the Class of '33 has taken a course in Education and holds general secondary teaching credentials for the State of California; the B.S. '37 has had some experience in geophysics and the M.S. is an experienced surveyor despite the science major. The candidate who holds the Ph.D. degree has recently returned from a year of research in Europe.

The number of ex-students remains more or less fixed, 7 being listed.

Any reader of this article knowing of an opening where men experienced in lines as given above may be employed, will render great help to the Placement Service by conveying such information promptly.

—Donald S. Clark,
Director of Placements.

PALOMAR

ASTROPHYSIC'S 200-INCH TELESCOPE

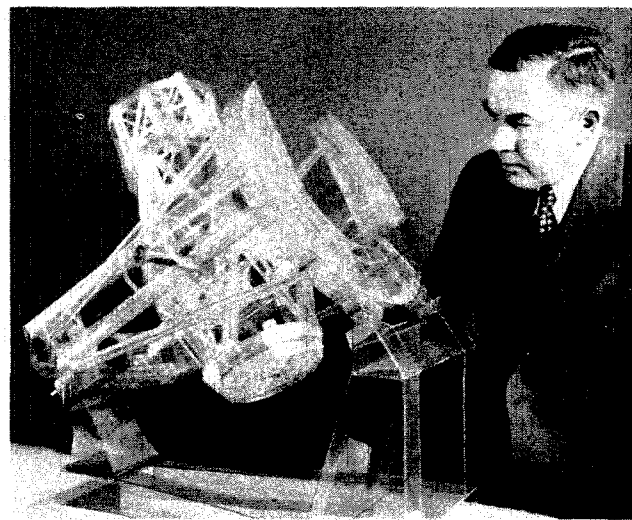
Every Caltech alumnus is undoubtedly familiar with the general phases of the 200-inch telescope project but probably few know many of the interesting details that are too "technical" for the general public. In this issue of the ALUMNI REVIEW there is presented a series of articles dealing with some of these details in a manner which it is hoped will show the vastness of the work and the multiplicity of the problems which are being encountered.

Many will remember the time, about five years ago, when the building activity for the Astrophysics department was almost as great as the present construction that has disturbed the west end of the campus. Three buildings were completed within a short period. These were the Astrophysics building, the Optical Shop and the Instrument Shop. By now, of course, all three look as much a part of the campus as Bridge or Gates.

The Astrophysics building is at present housing a number of chemists and probably some geologists in the depths of its numerous basements. The astronomers occupy the top floor. The Instrument Shop is equipped to handle all but the heaviest work on the telescope. It contains some beautiful equipment and some expert mechanics, so whenever one of the other departments wants some really nice work done they send over their best salesman to try to convince the star-gazers that their job is more important than the telescope. The Optical Shop is busy with its big job, but in addition a number of smaller mirrors are being ground.

The Astrophysics Department is headed by an Observatory Council whose members are: G. E. Hale, Max Mason, W. S. Adams, R. A. Millikan and the late Henry M. Robinson. Dr. J. A. Anderson acts as its Executive Officer, in direct charge of design and construction. The engineering end of the job is under the supervision of Captain C. S. McDowell, U. S. N. In addition there is an advisory committee consisting of scientists from the Mount Wilson Observatory as well as from Caltech. This combination of Mount Wilson talent with that of the California Institute is an interesting feature of the 200-inch telescope development. There always has been close co-operation between the two groups and the new project extends this in a more formal way. The Palomar Observatory is not going to be a competitor of Mount Wilson but is going to supplement the work of the older observatory with its larger instrument and newer equipment.

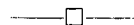
The two men chiefly concerned with the building of the Palomar observatory, with whom Alumni should be better acquainted, are Dr. Anderson and Captain McDowell. Dr. John A. Anderson has been an astronomer since the early years of the twentieth century. He was associated with Johns Hopkins University from 1908 to 1916. At that time he joined the Mount Wilson staff. He has been connected with the Institute since 1928. His astronomical interests have been mainly in the field of spectroscopy and



Captain C. S. McDowell and Celluloid Model of 200-inch Telescope

the construction of gratings. He has been an editor of the Journal of the Optical Society. In addition to his astronomical work he has been interested in seismology, and, with Harry O. Wood of the seismo lab, designed a seismometer which has been widely used. At present he is still connected with the seismological laboratory in the San Rafael Hills.

Captain McDowell, U. S. N., has worked with the Navy's engineering problems for many years. During the War he was in command at the Naval Experiment Station at New London, Connecticut, and was executive secretary of the U. S. Anti-submarine Board. Recently he has held positions such as: New Construction Superintendent, N. Y. Navy Yard; Manager, Pearl Harbor Navy Yard; Inspector of Machinery, N. Y. Ship-building Corp. Tech is fortunate indeed to have a man of his experience in charge of its biggest construction job.



THE MIRROR

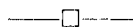
William H. Pickering, '32

In 1934 the first large slab of glass was received in the Optical Shop. This was a Pyrex disc 120 inches in diameter to be made optically flat and to be used for testing the large mirror. The grinding machine was ready and at the present time this disc is practically in its finished condition. The 200-inch disc was received with a great fanfare in 1936 and in a short time grinding commenced. The first job was to smooth off the back of the glass to prepare it for its permanent mounting on a large iron disc. At present this part has been finished and work has commenced on the front face, and indeed there is already a noticeable cavity

of about two inches in the central section of the slab. It is expected that the mirror will be spherical and ready for its first tests by next spring. Then will come the delicate job of parabolizing its surfaces to the final exact shape. This is expected, with luck, to be finished sometime in 1939. Finally for testing purposes when the mirror is installed, a small central section will again be made spherical, co-axial with the parabola. This will be just another unique feature of the 200-inch, but one which is expected to be of great value.

When the surface has been ground accurately to its final shape, there remains the formation of the reflecting surface. This will be aluminum deposited on the glass by evaporation while the whole mirror is in a very good vacuum. Such a process results in a better mirror than the more conventional silver. This technique was developed at the Institute by Dr. J. D. Strong only a few years ago, but has already been applied successfully to many telescopes from the 100-inch down.

The complete optical system of the 200-inch contains some half dozen auxiliary mirrors ranging in size from about 40" on down. Work is now in progress on these mirrors at the Optical Shop, grinding being done at a number of small machines that look like toys when compared with the 200-inch grinding machine.



THE DOME

By Mark Serrurier, '26

At the present time, a force of about 25 men is busy erecting the dome for the 200-inch telescope building. In a general way, this dome is similar in appearance, and performs the same functions as the dome for the 100-inch telescope.

Since the 100-inch telescope was built many new materials and processes have been developed which had to be considered in designing the new 200-inch dome. Stainless steel and dural were considered, but no justification was found for using either of these for the structure of the dome. Aluminum foil, however, was adopted as the material for insulating the dome.

The development of the coated rod has made welded joints reliable. The use of welding is increasing so rapidly that it was given very careful consideration in order that the finished structure would still be considered modern some years in the future.

Furthermore, welding lent itself to the so-called monocoque type of construction which has been developed to such a high degree by the airplane industry. Here again was something which would stamp the dome as a modern structure for many years to come.

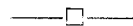
The design group was very fortunate in having on the campus Dr. von Karman and Professor Martel, who directed the theoretical and experimental research necessary to make a proper design. Ernie Sechler, '27, and Bill Bollay, assisted them in this work. In order to check the theoretical results and the applicability of previous tests by others, tests were made on a small model of the dome. The model consisted of a copper hemisphere 36 inches in diameter

with a copper cylinder soldered to it. The model was tested in a great variety of ways, before and after cutting the slot.

The model was loaded by floating in mercury; that is the model was inverted and fastened to a concrete basin just a little larger than itself, and then the mercury was poured in. Concentrated loads were applied through a system of levers.

Various steel fabricating companies were consulted about the size of the plates, cost of dishing plates, minimum thickness of plates and method of erection.

A thumbnail description of the dome would read about as follows: The dome consists of a hemisphere 137 feet in diameter on top of a cylinder 27 feet high. The hemisphere is made from $\frac{3}{8}$ -inch plates which were dished to the proper radius in the shop. The maximum size which could be economically handled was 7 by 22 feet. The framework was designed so that the plates were laid with their long dimension vertical and the joints between them came over a member of the frame work. The joint between the plates was a butt weld. The cylinder is made from $\frac{3}{8}$ -inch plates, 100 inches wide and about 27 feet long. On each side of the shutter opening is an arch which is 3 feet wide and 8 feet deep. Near the bottom of the cylinder is a balcony which is also a horizontal plate girder whose function is to keep the bottom of the dome circular. The dome, which will weigh approximately 1,000 tons, will be entirely welded, no rivets or bolts being used.



CONSTRUCTION ON PALOMAR

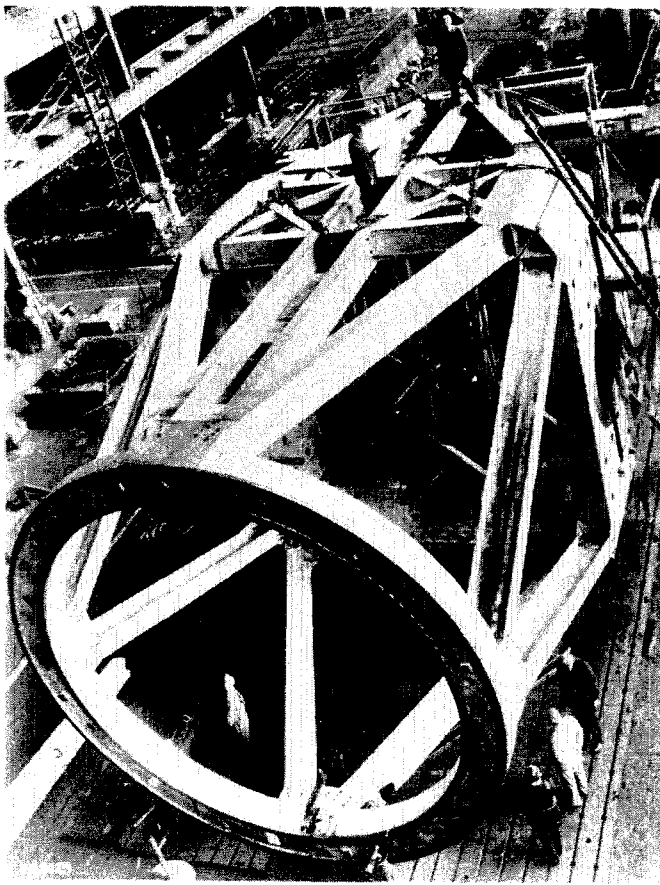
By Bruce Rule, '32

In addition to the extensive grinding program for the 200-inch mirror, and aside from the numerous engineering problems in the design and construction of the tube, its mounting and its housing structure or dome, there are other interesting features in the Palomar Mountain Telescope project: such as providing of complete utilities at the mountain site, entirely independent of the outside world except for supply trucks.

First work was begun at the site in the fall of 1935. A water supply below the site was developed, a pumping plant installed, a million gallon storage reservoir and elevated tanks built, and the necessary pipe lines laid. Then a Diesel powered generating plant followed to supply light and power for the workcamp, cottages, shops and telescope. Butane storage tanks were installed for heating and cooking. Local roads were constructed, brush cleared, fire lines installed, sanitation system completed, and a local automatic dialing telephone system put into operation.

With headquarters on the Institute campus, the problem of supervision and communication to and from the site was solved by an automatic two-way short wave radio telephone which is giving reliable service and has been on more than one occasion the only contact with the outside world.

In outward appearance the 200-inch Dome building will be similar to the Mt. Wilson 100-inch, but larger. In the cylindrical housing below the dome proper, the ground



Telescope Frame During Construction at Westinghouse Plant

floor will be given over to various offices, a library, and laboratory. The mezzanine floor will contain machinery rooms for the telescope and elevator, the main switchboard, the battery room, telescope control cables and racks. The observing floor, covered by the round insulated dome with its shutters, will contain, of course, the telescope proper will all the necessary control desks, panels and equipment to operate the instrument. In addition, there will be an insulated visitors' gallery (to prevent temperature rise in the room rather than from exclusiveness), dark rooms, coude observing room, small instrument shop, and mirror handling equipment. Stairway and elevator lead to the rotating balcony platform above, on which will be located switchboards, machinery for the shutter, wind screen in shutter opening, and the prime focus elevator which will carry observers up to the cage located at the top of the telescope tube. A stairway leading from the balcony level to the dome attic gives access to the main crane and the electrical machinery and working lights that serve in conjunction with lower wall units to illuminate the interior and floor 92 feet below. These units are heat insulated from the interior room.

The crane is a 60 ton main hoist and 5 ton auxiliary hoist that rotates as part of the dome. Electrical connection for this, along with other dome power and light, must be fed through collectors and slip rings that total about two miles long, for connections must finally be made to the switchboard room, control points, or balanced telescope cables leading to the polar axis of the telescope.

THE TELESCOPE

By M. B. Karelitz, '25

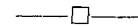
A large reflecting telescope is a complicated instrument which collects light from celestial objects and concentrates it either at its focal point, called the prime focus, or, by a series of additional reflections from auxiliary mirrors, at other focal points on the telescope convenient for direct photographic or spectrographic work.

The major advantages of the 200-inch telescope over other large instruments in existence are (1) its considerably larger light collecting capacity, permitting reduction in the time of exposures and the photographing of more distant objects in space, and (2) its design permitting astronomical work directly on the telescope tube at the prime focus of the 200-inch mirror, thus avoiding the loss of light through additional reflections that were required in the 100-inch and other smaller telescopes used to date.

In the design of the 200-inch telescope special attention is being paid to reducing the time necessary for changing the auxiliary mirror combinations for work at different focal points. Instead of changing cages at the top of the tube in order to use the different auxiliary mirrors, as has been done up to the present, all mirrors will be permanently located on the telescope and will be swung in and out of position by means of motorized mechanisms. Not only can the auxiliary mirrors be placed by pushing buttons, but even the telescope itself can be set into the desired field of vision automatically.

In its optical and mechanical parts such as bearings, drives, etc., the 200-inch telescope differs materially from the older ones, since recent advances in different engineering fields can be incorporated in their design.

The large size and necessary accuracy of the component parts of the telescope require machines and equipment of unusual size. Special machines for cutting the large driving gears had to be built on the campus. The tube proper, the mounting and bearing assemblies of the telescope are being manufactured by the Westinghouse Electric and Manufacturing Company at its S. Philadelphia and E. Pittsburgh plants. Even there large machine tools had to be modified and a huge annealing oven had to be installed. Smaller parts, especially those requiring great accuracy, are being manufactured in the Astrophysics Instrument Shop on the campus.



THE SCHMIDT TELESCOPE

William H. Pickering, '32

The first astronomical instrument actually installed and put into operation on Palomar is an 18" Schmidt telescope which took its first photograph on September 5, 1936. This telescope is a new type of instrument designed for photographing large areas of the sky. It is essentially a camera with an 18" lens working at an aperture of F2. By astronomical standards it is also a very wide angle lens. Actually the field of view is about 10° in diameter. This field is free of distortion to the very edge. By taking forty minute exposures, objects down to about magnitude 17.5 can be photographed.

Since its installation the Schmidt has been in continuous use carrying out a program of investigation of the extragalactic nebulae. The persevering camera fiends are J. J. Johnson and F. Zwicky, who, for over a year, have been taking turns commuting to Palomar for a little night life.

The Schmidt type of telescope is well suited for an investigation of the distribution of the distant nebulae in clusters and groups. With an ordinary telescope having a small field of view a photograph will usually reveal only one or two nebulae and accordingly it is difficult to determine whether or not these nebulae are in groups. With the Schmidt, however, the large field of view reveals at once the presence of nebular groups. Hence one object of the program has been a survey over as much of the sky as possible, in order to investigate the distribution of the nebulae down to about the sixteenth magnitude, which corresponds to a distance of about one hundred million light years. As a result of this survey Dr. Zwicky announced the discovery of at least two new clusters, and furthermore he believes that eventually all the nebulae will be found to be in clusters. Dr. Zwicky says that these studies lead him to the conclusion that the time scale of the universe, established by the astronomers from the theory of the expanding universe must be greatly lengthened and hence that the whole expanding universe idea must be modified.

The other main objective of the program has been the discovery and investigation of super-novae. About once in a thousand years more or less, in each galaxy a star seems to suffer some sort of convulsion and flare up until it is actually brighter than the whole galaxy of millions of stars, of which it is a part. In our local galaxy, which comprises all the stars visible to the naked eye, such a super-nova probably occurred in 1570, when a star suddenly became bright enough to be visible in the daytime. These super-novae are of great interest to physicists and the Schmidt photographs constitute the best possible source material for them. Selected fields are chosen which contain a lot of nebulae and by photographing these at intervals changes can be noted. Such changes, in the more distant objects, can only be due to super-novae. Already several have been found, one of which, last August, was comparatively close, and a fine specimen.

Editor's Note: There are quite a number of Alumni employed on the construction of the 200-inch telescope. Among the mechanical engineers are to be found M. Karelitz, '25, and E. Grant, '30; while among the civil engineers are B. Hill, '25, Mark Serrurier, '26, and R. A. Philleo, '27. The electrical engineers are represented by the following group of alumni: E. M. Irwin, '24, R. H. Duval, '28, George Lewis, '31, and Bruce Rule, '32. One physicist Dr. Sinclair Smith, '21, is also a member of the staff.

Study of safety factors to guard against the destruction of buildings by major earthquakes is being investigated by the Institute under the direction of Professor R. R. Martel. This work was made possible through funds allotted by the Los Angeles County Supervisors.

THEORY OF GENES CHALLENGED

In the November 29 issue of Newsweek appears an article which tells that Dr. Richard B. Goldschmidt, professor of Zoology at the University of California, recently announced in Nature and by subsequent interview stated that he had obtained experimental proof that genes, hereditary factors in germ cells, do not exist.

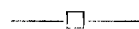
The gene theory is the accepted theory of heredity and is principally the development of famed 71 year old Dr. Thomas Hunt Morgan. Dr. Morgan, head of the Biology Department at the Institute was awarded the Nobel Prize for his development and lifelong research on the theory of genes.

Were a lesser person than Dr. Goldschmidt, former director of the Kaiser Wilhelm Institute, and long a leader in experimental biology, to attack such an accepted theory scant notice would be taken. Dr. Goldschmidt backs his challenge with the conception that the chromosome is an infinitely complex protein molecule built on a chain pattern; and he thinks that any disorder within the molecule will produce what has previously been known as mutation.

Whatever the outcome there is certain to be an interesting controversy in the world of genetics.



First issued as a textbook on practical fluid mechanics twenty-one years ago, when its author was a teacher at Cornell University, Professor Robert L. Daugherty's "Hydraulics" is just out in a fourth edition with the McGraw-Hill Book Company. This new edition has been rewritten and greatly enlarged to include the latest developments in hydrodynamics.



GRADUATE ENROLLMENT GROWS

California Institute of Technology's present student body, graduate and undergraduate, comes from 40 states, 3 dependencies and 13 foreign countries, according to figures released by Philip S. Fogg, registrar.

This is a much wider geographical distribution of the student body than ever before in the Institute's history. Along with this, the total of students shows a larger proportion than ever coming here from beyond the bounds of California, the statistics show.

Some of the foreign countries now represented at Caltech are Canada, China, Japan, Mexico, Panama, South Africa, Newfoundland, Denmark, England, Germany and Switzerland.

Final registration figures tabulated in Professor Fogg's office show a total enrollment of 850 students subdivided into 609 undergraduates, and 241 graduates, who are working for master's and doctor's degrees. There are in addition about 60 research fellows, who come here under the terms of various foundations, like the Commonwealth Research Fund, the International Research Association, American Petroleum Institute, Kellogg and other funds.

TRUSTEE HENRY M. ROBINSON DIES

On November third, death came to Henry M. Robinson, 69, famed banker, philanthropist, and adviser to Presidents.

The story of his life is a fascinating one, ranging from the economic development of Southern California to the peace conference at Geneva. Born in 1868 in Ravenna, Ohio, he attended Cornell and then practiced law in Youngstown. During the formation of United States Steel Corporation by the Morgan interests, Mr. Robinson was so successful in conducting merger negotiations that at the age of 39 he was able to retire a wealthy man.

It may be said that his retirement was but the beginning of his real service to humanity. For many years he was chairman of the board of directors of the Huntington Library and Art Gallery. He was also chairman of the board of the Huntington Memorial Hospital now being established in Pasadena.

Mr. Robinson, always interested in education, was for many years a trustee of the California Institute of Technology, Vice-President of its Board and a member of its Executive Council. It is to him that our scientific school owes much of its present eminent position, for his keen judgment and financial guidance have been of inestimable value in the development of the California Institute.

Mr. Robinson exerted a very vital influence in the decision to go ahead with the new 200-inch telescope project at the California Institute of Technology when the Rockefeller group had agreed to be responsible for the construction of that enterprise if the Institute would become responsible for its operation when erected. At the time of his death, Mr. Robinson was the only layman serving on the Observatory Council of the Institute, which has charge of the 200-inch telescope project. He had been a very interested and active member of this Council from its inception.

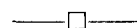
In business, Mr. Robinson was exceedingly active and his interests were widespread. He played an important part in the building of the Southern California Edison Company, the Union Oil Company and the California Redwood industry, and was also engaged in the merger that created the present Southern California Telephone Company. In the 1920's he became President of the First National Bank of Los Angeles, which later merged to become part of the present Security-First National Bank, of which he was Chairman of the Board of Directors at the time of his death.

Mr. Robinson was an officer of the French Legion of Honor, a Commander of the Crown of Belgium, an officer of the Crown of Italy, and a persona grata with the nations of Europe because of his outstanding work at the Peace Conference, at the Spa, and at Geneva. He was named by President Coolidge as the only joint member of the two American committees that set up the so-called "Dawes Plan."

He served on many other international and national committees such as the International Chamber of Commerce, the National Drought Relief Commission, and President Hoover's Organization on Unemployment Relief.

At the time of his death, he was Chairman of the Board of the Newport News Shipbuilding and Drydock Company and of the Security-First National Bank, and was a director of the General Electric Company, the Union Oil Company of California, the Southern California Edison Company and the Pacific Lumber Company.

Mr. and Mrs. Henry M. Robinson have presented the California Institute with the Charles Arms Laboratory of Geological Sciences now being erected on the campus. In his will Mr. Robinson left an additional \$50,000 as an endowment for Physics. Also, after certain other bequests, the balance of the residue of the estate at Mrs. Robinson's death has been given to the California Institute for the maintenance and operation of the 200-inch telescope at Palomar.



A TRIBUTE BY DR. MILLIKAN

No more staggering blow could come to this whole community than the loss of Henry M. Robinson. He has been an altogether outstanding factor in its development in a great number of directions. I have never known a man who combined so conspicuously soundness of judgment with disinterestedness of purpose and complete devotion to public service. His scholarly, painstaking approach to all his problems; his understanding of human motives, his grasp of the fundamental elements of our social problems, his statesmanship in handling exceedingly difficult situations, his poise, integrity, and his greatness of soul, were all so extraordinary that there are very few men in the United States who could be called his peers. I saw him throughout the war rise by the sheer weight of his intelligence and character from a position of insignificance in public affairs to one of commanding importance in the councils of the nation; but despite the weightiness of his responsibilities and the difficulties with which he was all the time struggling, I never found him unwilling to lend an ear to and give sound judgment upon my smaller problems and perplexities. Without his guiding hand, the development of the California Institute of Technology to its present position would have been completely impossible. But this is only one of a group of public institutions which bore a similar relationship to him. The world suffers from his loss more seriously and more fundamentally than from the loss of any man that I have ever known.

—Robert A. Millikan.

ALUMNI CHAPTERS

The Directors of the Alumni Association have this year taken a far-reaching step towards the organization of out-of-town chapters. Article 14 of the By-Laws contains all the details and is printed herewith in its entirety.

Essentially, there are two outstanding features in this program. First, that the Alumni Association will remit a considerable share of the dues to each local chapter of all paid members within the bounds (100 miles) of that particular chapter. This, it is felt, will be of great assistance to the local chapters in meeting the expenses of their meetings and social programs. Second, is the item of closer relationship of the locals with the Alumni Association through the appointment of a corresponding secretary whose duty is to exchange lists of members, addresses, announcements and reports of meetings and programs with the local secretary-treasurer of each group.

It may be said here that the pages of the Alumni Review are open to all chapters for announcements of meetings, programs and reports of meetings held. In fact the editor urges all groups to report on their doings for who knows but you or I may be in New York, San Francisco or Denver before long and would like to see some of the old gang.

ARTICLE XIV.

CHAPTERS

SECTION 1. FORMATION.

A chapter of the Alumni Association, California Institute of Technology, may be formed by resolution of the Board of Directors upon receipt of a written application signed by ten or more members of the Association whose dues are paid for the current year, and shall exist at the pleasure and discretion of said Board so long as compliance with the provisions in this Article of the By-Laws is evidenced and until revocation of the charter by resolution of the Board of Directors.

SECTION 2. MINIMUM MEMBERSHIP.

The minimum membership of a chapter shall be ten Alumni who are members of the Association and whose dues are paid for the current year.

SECTION 3. MEETINGS.

A minimum of four meetings per year of each chapter will be required, one of which shall be held on the date of the Alumni Association Annual Banquet.

SECTION 4. LOCATIONS.

A chapter may be formed in any community which does not lie within an area circumscribed by a radius of 100 miles about Los Angeles or any previously established chapter, and may solicit active membership therein except where such an area would overlap a similarly described area about Los Angeles or that of any previously established chapter.

SECTION 5. OFFICERS.

The officers of any chapter shall consist at least of a

Secretary-Treasurer who shall establish and maintain communication with the Board of Directors or a member designated by said Board.

SECTION 6. REMITTANCE OF DUES.

The Secretary-Treasurer of each chapter shall submit the names of each member of the Alumni Association residing in his area immediately after August 1st of each year and the Treasurer of the Association shall remit to each chapter an amount to be determined by the Board of Directors for each year for each such member whose dues are shown by Association records to be paid as of that date, to compensate such members for their inability to attend Association activities in the Los Angeles area. A second list shall be submitted immediately after March 1st of the following year containing the names of the additional members paying dues prior to that date and the Treasurer of the Association shall remit to each chapter an amount to be determined by the Board of Directors for each year for each such additional member whose dues are shown by the Association records as being paid as of such a date.

All Alumni interested in this program please communicate with H. Fred Peterson, 1008 W. 6th Street, Los Angeles.

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Among other leading engineering schools, the Institute has been accredited by the Engineers Council for Professional Development on the basis of a survey which was recently completed in 109 engineering schools.

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NORTHERN ALUMNI HOLD PARTY AFTER SAN JOSE GAME

Not to be outdone by their Southern brethren, who attend home-coming rallies, the northern contingency of the alumni are still conscious of the old college spirit and were on hand at San Jose to give the Fox's team the benefit of lusty cheers on Friday, October 22. To partially compensate for the unfortunate outcome of a game in which our team was outweighed 25 pounds to the man the alumni and their ladies were royally entertained by George K. Whitworth, 1920, at his spacious new home in Palo Alto. In the large, modern living room refreshments were served and there was dancing and reminiscing. "Doc" Haines distinguished himself as a ping-pong player in a game of mixed doubles. Some great times have been had by the Northern California Alumni, but none have been more thoroughly enjoyed than this evening at Mr. and Mrs. Whitworth's home.

Those present were: Mr. and Mrs. Robert Bowan, '26; Mr. and Mrs. Dave Harries, '23; Alex Hazzard, '30; R. H. Bungay, '30; Elmer Muff, '30; Stuart Seymour, '26; Francis Wyatt, '34; Jack Sturgess, '30; Eugene Smith, '24, and George K. Whitworth, '20.

HYDRAULICS LABORATORY REOPENS

Activity is again to be observed in the west end of the Aeronautics building where a crew is busy rearranging and checking the equipment preparatory to testing. A series of tests are to be conducted for the Metropolitan Water District which will furnish more data on transient hydraulic phenomena occurring during rapid shutdown and valve closure on a pumping system. It is thought that these tests will require several months to complete.

The laboratory is under the direction of Professors von Karman, Daugherty, and Knapp and during the present program Mr. James W. Daily is in charge of operations. The operating staff will be composed of graduate and undergraduate students and a full time mechanic. Several engineers from the District are to be on hand during the testing program, among whom is Al Atwood, '32.

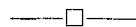


DON'T FORGET

This is just the time to jot down a few dates on those new calendars that are about to make their appearance on desks and walls. Save Friday evening, January 21, 1938, as the date of the next Alumni Meeting. Full details of what promises to be a great meeting will be mailed you early in the new year.

Saturday evening, February 26, is the date set for that gala affair, the annual Alumni Dance, which was such a huge success last year.

For those who are still shy of the opposite sex or who wish a little respite from them, don't forget the Stag and Field Day to be held April 30, and of course there will be the annual Commencement Banquet which this year is set for June 10.



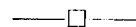
VISITING ALUMNUS

A recent visitor to our campus from far off Venezuela was R. W. Parkinson of the class of 1913. He is spending a short vacation in this country preparatory to going to Europe on business for his company. His daughter will remain in this country to continue her education. She recently entered Scripps College.

Mr. Parkinson, who has been in Venezuela for many years, is construction engineer for the Caribbean Oil Company, which is a subsidiary of a large American concern.

The distinction of being the first travel prize winner ever to go to Europe is possessed by Mr. Parkinson. He was

one of five electrical engineers graduated in 1913, the third class to be turned out by Professor R. W. Sorensen. After graduation he joined the General Electric Company in Schenectady, N. Y.; from there he received an appointment with the Maracaibo Electric Co., later going over to the oil concern in Venezuela.



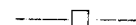
ALUMNI HOMECOMING GREAT SUCCESS

More than 300 Alumni and friends turned out for the Oxy game and homecoming this fall. It was one of the most successful and largest turnouts the Alumni have ever had.

It all started with an inspection of the campus Saturday afternoon, after which the student houses were thrown open and a buffet supper was served to approximately 240, while in the Athaneum some 60 Gnomes and friends gathered for supper.

At the Rose Bowl a much belittled Tech team outplayed Oxy but just missed pushing the ball over, and the game resulted in a scoreless tie. It is the second year in a row that Tech and Oxy have tied.

After the game several hundred Alumni returned to the student houses where dancing and visiting were enjoyed until the wee small hours.



GRAND CANYON PARTY RETURNS

A group of geologists have just returned from a thrilling two months trip through the Grand Canyon. The trip, sponsored by the Carnegie Institution with the co-operation of the California Institute and the National Park Service, was made for the purpose of studying rocks of the Archean era.

The Archean formation, which is found in the depths of the Grand Canyon, comprises the world's oldest known rocks.

The personnel of the expedition consisted of two Caltech geologists, Dr. Ian Campbell and Dr. John H. Maxson, Dr. John T. Stark of Northwestern University, noted authority on pre-Cambrian rocks of the Lake Superior region, Mr. E. D. McKee, naturalist of the Grand Canyon National Park, and Robert P. Sharp, '34, graduate student in Geology and Harvard fellow. There were also three experienced river men to guide the party.

The journey was made without a single boat being overturned or smashed—a unique record for a Grand Canyon expedition.

TECH SEMINAR WEEK-END PLANNED

What do you know about *genes*, *hormones*, *enzymes*, *endocrine glands*, or, in fact, *biology* or *bio-chemistry* in general?

What do new terms like *positron*, *deuteron*, *neutrino*, *deutrinon*, etc., mean to you? Do you know that the *positron* was a world-renowned discovery of one of our own alumni, productive of the Nobel prize in physics? Would you like to hear of his newest discovery, shortly to be acclaimed throughout the world—a new particle as yet unnamed but revolutionary of present theories of atomic physics?

What do you know about an expanding universe, the how, when, and where of it?

What would you expect in the next ten years of *aeronautics*, *chemistry* and other sciences? Have you kept abreast of recent researches in these fields?

What's happening in the field of world affairs? Not newspaper stuff but long-range trends. Where are we heading for? Are you, as a scientifically trained member of society, orienting yourself in this world picture? Are you keeping your feet on the ground, or are you blindly following, without interest or attempt to analyze what is happening?

What's new in *geology*, *earthquakes*, *weather forecasting*, *vacuum tubes*, *automatic control equipment*, *industrial machines*?

Discoveries and research in these fields at Tech are outstanding. On the campus, we have men who have a world of information in these and related fields, information which might be invaluable to you. We have world-renowned authorities at hand to answer our questions, yet most of us go on wondering.

Some of you have asked why we can't get the Institute to loosen up with some of this world of information; why we can't have some direct contact between faculty and alumni; why we can't have some sort of adult education program whereby an alumnus can keep abreast of what's happening in his field of endeavor or related arts. *We can*. The Institute is whole heartedly willing. The Ph.D.s, Nobel prize winners, and international authorities on the campus are willing. All they need is an invitation and a receptive audience.

Here's where the Alumni Association comes in. We are going to try something different, something many of you have asked for, something extra for your money. Here's the dope:

EVENT: A Tech seminar week-end, distinctly stag.

TIME: In February or March, 1938.

PLACE: The Campus.

INVITEES: All alumni, the press, and, facilities permitting, a limited number of friends of the alumni.

PLAN: We propose arranging about six sessions, seminars, lectures, or whatever you would like to term

them; two on Saturday morning, two on Saturday afternoon, and two on Sunday morning. Also, an outstanding meeting on Saturday night.

SPEAKERS: Every one will be an authority in his field and will speak by invitation of your Alumni Association, on subjects which we choose. Their presentations will be outstandingly informative and interesting. A Ph.D. degree will not be necessary to understand them.

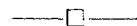
SUBJECTS: We have a multitude of possibilities as to subjects, some being mentioned above. Help us by giving your suggestions so that we can better choose what you want most.

Here's something you won't want to miss, an opportunity that thousands of rank outsiders would jump at. We hope to give you more information packed in a short space of time than you could obtain in weeks of study otherwise and, at the same time, make it so interesting that you won't want to miss a single session.

Also, here's the best opportunity ever offered you of fulfilling that ambition, which you may sometimes have had, of returning to the campus and again enjoying that old time feeling. The campus will be yours. For a large number of alumni, we hope to have the student houses available for your occupancy on Saturday night. You can eat together, organize your own discussion groups on any subject you desire, attend bull sessions (do you remember the ones during your undergraduate days?) and, in general, revive that old affection for campus life which you may have missed for years.

The list of subjects is as yet not definitely determined. The program is quite flexible and the Institute is most co-operative. Why don't you write the Chairman of the committee in charge, telling him what you think of the idea and mentioning the subjects and speakers which would appeal to you most? It is *your* program, for *your* benefit and fun, so you might as well give us *your* ideas. Address your comments to Clarence F. Kiech, 471 Chamber of Commerce Building, Los Angeles, California.

But whatever you do, don't forget to make preliminary plans to attend the first Tech seminar week-end. More detailed announcements will be made later.



The name of Dr. Carl D. Anderson is often to be seen in print these days. The November 29 issue of *Time* has a picture of him and a story of the part he has played in the discovery of the new X particle. Recently Dr. Street of Harvard obtained a photograph of the path of this particle hence was able for the first time to make an estimate of its mass, which he says is roughly 130 times that of an electron.

Not long ago Dr. Anderson was honored by the Junior Chamber of Commerce of Los Angeles. He was presented an orchid by Louis Spaeth a symbol presented by the Junior C. of C. to "the outstanding young men of the month."

ALUMNI YOU SHOULD KNOW

TRANSPORTATION ENGINEER

After spending eleven years at sea, including six before the mast on windjammers, and five years in navigation and as an officer on steamships and in the German navy, Fritz Karge tired of the romance of the sea and settled down to engineering work in California. In 1915 he found employment in Union Oil's engineering department and during a leave of absence completed his formal engineering education at the Institute in 1918. Returning to Union he was put in charge of Civil Engineering Design and during the period of greatest expansion in the oil industry he was in charge of design of many types of structures and installations, such as, tanks, reservoirs, foundations, water and sewer systems, wharves, and the like. He was also in charge of survey and mapping activities. Since 1929 Mr. Karge has served as Engineer of Transportation for the Union Oil Company thus supervising the design and installation of oil pipe lines, pump stations, water systems, as well as surveying and mapping projects.

Mr. Karge was President of our Alumni Association in 1921 and served for nine years as chairman of the Advisory Board of the Institute's Y.M.C.A. activities. He is a member of the A.S.C.E., is secretary of the Los Angeles Alumni Club of Tau Beta Pi, and is also a California State Licensed Surveyor, Civil and Structural Engineer. Mr. Karge is also a member of several important committees of the American Petroleum Institute.

The sound judgment and wide engineering experience of this alumnus have served as an inspiration to many of our more recent graduates who have had the opportunity to work under him on some of the ramified problems which are under his jurisdiction.



FRITZ KARGE

LAWYER



EDWARD E. TUTTLE

Edward E. Tuttle received a Bachelor of Science degree in Electrical Engineering from the California Institute in 1928. At that time the profession of law held more appeal than the engineering profession for young Tuttle, hence he shortly enrolled in a law school.

He was an excellent student both in Caltech, where he won his Tau Beta key, and at U.S.C. Law School, from which he graduated in 1931 with the award as the most capable scholar of his class for the three year period.

Upon graduation he entered the firm of Ferrand & Slososon where he is now engaged in the general practice of law. He is, of course, a member of the California State Bar as well as of many others. He has also been admitted to practice before the Supreme Court of the United States.

Mr. Tuttle finds law an interesting and absorbing occupation and his principal tasks include general civil litigation, corporation and probate work. Recently, he combined a vacation with work when he went East to present some tax cases.

Ed Tuttle is a keen supporter of the Alumni Association and at present is doing a splendid job as its Secretary.

THE FOOTBALL SEASON

Perfect score for Tech this year in Football! No wins. The Oxy game and the second Pomona game ended in a 0-0 proposition. The boys really deserved to win the Oxy game but lacked the punch to put the ball over the goal line when they had several opportunities.

Much criticism would be justified over the schedule. Such teams as Flagstaff Teachers, San Diego Marines, and San Jose State are anything but a match for Caltech teams. Since Caltech is outside the Southern California Conference the schedule must be made with teams who will give us games. The two game idea with Pomona is evidently a filler due to the lack of other possibilities. Caltech teams have always showed plenty of fight and plenty of football in those games that really interest the boys who are playing the game. Let us hope the 1938 Schedule finds a situation where Tech is not the setup for some other team to try out their offense and take a breather before the big game with Podunk College.

BASKETBALL?

Question? Is there going to be any basketball this year? The schedule says "yes" but the opportunities for practice say "no". As this Magazine goes to press all the possibilities in Pasadena, Glendale, and Alhambra for a floor to practice on have been eliminated. Only one possibility remains and that is a very thin one. It looks as though the boys will practice on the nice modern dirt courts built for the advancement of physical education on the Caltech campus.

At this point the writer would like to pause to put in an old plug. We need a gym! And from the looks of the Athletic Schedules we need to belong to a Conference! Why not make a concerted Alumni movement to bring each one into reality.

BASKETBALL SCHEDULE

Sat. Jan. 8—Santa Barbara State at Santa Barbara
Sat. Jan. 15—Redlands at Redlands
Wed. Jan. 19—Occidental
Sat. Jan. 22—Pomona
Sat. Feb. 5—Pomona at Claremont
Wed. Feb. 9—Occidental
Sat. Feb. 12—Chapman at Chapman College, L. A.
Sat. Feb. 26—Chapman at Chapman College, L. A.
Captain for Basketball: Stanley Wolfberg

TRACK SCHEDULE

Sat. Feb. 26—Pomona and Caltech Relays at Pomona
Sat. Mar. 5—A. A. U. Relays at Long Beach
Sat. Mar. 12—C. I. T. vs. U. C. L. A. at Westwood
Sat. Mar. 19—Pomona at Caltech
Sat. Apr. 2—Occidental at Caltech
Fri. Apr. 8—Redlands at Caltech
Sat. Apr. 16—Compton J. C. at Compton
No Captain elected for the Track Team

Normal rainfall and mild temperatures are in store for California this winter, Dr. Irving Krick, air mass meteorologist of the Institute, announced recently. This forecast agrees with that of Dr. George F. McEwen, oceanographer at Scripps Institute. It is understood that the meteorology department of the Institute is supplying the Los Angeles County flood control engineers with special weather reports in advance of heavy rainfalls.

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Here is an item found in a New York newspaper recently:

When Dominic Pompeo attempted to mail a letter 20 firemen and their equipment appeared. In Flushing court Magistrate Anthony P. Savarese fined Pompeo \$50 when he learned that Pompeo had lived in the same neighborhood for two years. "You ought to know the difference between a fire alarm and a mail box by this time," the magistrate said. Eds. Note: Wonder if this is our alumnus?

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The Mount Wilson observatory now publishes the information that they observed many sun spots last summer. Why didn't they say so last summer, so that we could have stayed away from the beach and thus avoided all that sunburn.

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OLD GRADS GATHER

On November 27th Ray Gearhart, '13, entertained some of the old timers in his home for dinner. Ray is in the building construction business for himself, with headquarters in Pasadena. Dr. Shearer, "Prexy," was the guest of honor.

Among those present were: "Parkey" Parkinson, '13, who is visiting for a few weeks in Southern California before returning to his job with Royal Dutch Shell in Venezuela; Chester Hovey, '13, who is also in the building construction business; our old friend Prof. Clapp; Louis Koch, '13, who is with the Engineering Department at the County Hospital; Herbert Wood, '13, Principal of the Garfield High School in Belvedere; Ray Catlin, '15, who is still in the oil tool business; Bob Bultman, '15, who is at Santa Fe Springs with the Union Oil Company installing gas recovery plants; and E. A. Burt, '15, who since graduation has been with the Los Angeles County Road Department, where he is now a Construction Engineer.

A NEW TECHNICAL PROFESSION

By Brian Sparks, '32

One hears so much ballyhoo about the "get-rich-quick romance" of aviation that one is liable to scoff at the industry as a whole, particularly the field of piloting. I myself was no exception to this fairly common failing. Aviation has been going through a great struggle to divorce itself from its swashbuckling, romantic past. Since flying has such a natural romantic angle to it, this has been no easy matter, and it has not been helped by the polished boots and breeches, self-designed uniform type of publicity hero that we have been afflicted with during the past few years. These anachronisms have lost greatly in public favor during the last two or three years; their complete disappearance is an earnest hope for the future.

The very recent developments in long range transoceanic flying boats, as well as the high altitude land transports, have required even greater developments in the standards of the pilots who must operate them. Merely flying one of these large aircraft has become a highly complicated and involved procedure which requires at least two men to actually manipulate the flight and engine controls, and this is but one phase of the duties. The engine room telegraph of the steamship has already made its appearance in a modified form on the latest flying boats, serving for communication of orders between the pilot's cockpit and the flight engineer's desk. A crew of seven is considered the minimum number satisfactory for the operation of four-motored seaplanes on flights of six hours or less, with eight or more required for the longer flights.

With the introduction of wing flaps, cowl flaps, automatic pilots, automatic mixture control carburetors, constant speed propellers, tabs and whatnot, landing, takeoff, and cruising procedures have become considerably more than simple manipulation of throttle and elevators. For example, consider the commands given during takeoff of one of Pan American Airways' Sikorsky Clippers: "Standard carburetor, full rich, gas on, (carburetor) heat, off, ten degrees flap, twenty-two fifty (rpm), stabilizer set;" immediately after leaving the water, "thirty inches (manifold pressure)," then shortly later, "zero flap, high power cruising, 1950."

Actual flying is but one part of the duties expected of an airline pilot. On long range flights he may be assigned as straight pilot, first or second officer or pilot navigator. In the capacity of first officer besides doing considerable of the flying, he must calculate the center of gravity location before each takeoff, the horsepower whenever a change of engine settings is made, hourly check gasoline consumption and determine by means of cruising charts the most efficient manifold pressure and rpm for the next period. As second officer his time is divided between flying, relief radio operator, flight engineer. The latter duty consists of a periodic check of the operating condition of the engines and auxiliary devices. When assigned as pilot-navigator, most of his time is taken up with celestial navigation, making out position reports, checking latest radioed meteorological reports.

Realization of the advancing requirements of pilots has prompted Pan American Airways to lead the way in preparing a program for the future. Only pilots with a college education (preferably technical) are considered when new

men are employed. In addition they must be a graduate of either the Navy or Army Flight School. This means at least two years experience in military flying, admittedly the most exacting flying experience available. When he begins airline work, it is taken for granted that such a man is an expert aviator. What is not taken for granted is that he has the very specialized knowledge believed necessary for modern airline flying.

He spends his first three months as a mechanic in the overhaul and service shops, is then required to get Airplane and Engine Mechanic's licenses. Following this he must get a regular seagoing radio operator's license, Radiotelegraph Second Class. On flight duty he often functions in dual or triple capacities of copilot, flight mechanic, radio operator. At the end of the second year he is expected to pass a series of examinations for Junior Pilot. These cover a variety of subjects in twelve separate examinations, including international air legislation, navigation, radio, meteorology, general science and mathematics, historical aspects of the Latin American countries, working knowledge of the Spanish or Portuguese language.

Upon transfer to a transoceanic division he must prepare for another series of examinations in advanced meteorology, celestial navigation, long range cruising control. But he is not through yet: after a minimum of three years as second pilot, he becomes eligible for "checkout" as first pilot. This involves another series of examinations, similar in scope to the Junior Pilot examinations, but considerably more advanced. After being checked out as Senior Pilot, he has one more step ahead of him. This is advancement to Master of Ocean Flying Boats, again entailing examinations, the most comprehensive of all. Interspersed throughout are various correspondence courses to be taken.

At present a considerable part of all this work is not absolutely necessary for successful transoceanic airline operations. The preparation is for the future, for it takes a long time to build up a force of technically trained pilots. As aircraft increase in size over present types, an executive-pilot will become necessary to direct the work of the crew, similar to a seagoing captain. Such an executive must be thoroughly conversant with engineering principles and practical theory of aircraft, engines, and accessories, as well as being an experienced pilot and navigator.

The tendency in the establishment of seniority for advancement is very definitely towards qualification and knowledge and away from the system based solely on length of service. This is proper, considering the increased amount of studying and individual work required, the greater responsibility involved. Modern engineering has at last entered even the "romantic aviator's" realm and made of it a new technical profession.

Editor's Note: Brian Sparks is well qualified to discuss this new profession as he has been serving as co-pilot on the Pan American Clipper ships flying to South America for over a year. Sparky, as he is known to his friends, is now flying Clipper ships on the Pacific run, and makes his home in Honolulu when on land.

NEWS OF CLASSES

ORANGES AND LEMONS

The California Fruit Grower's Exchange, the people who see that you get your "Sunkist" oranges and lemons, find a good sized technical staff to be a necessity. Several Caltech alumni are to be found serving the Exchange in various capacities.

At Ontario, California, WILLARD E. BAIER, Class of '23, directs the activities of the research organization. Much interesting work has recently been completed on the X-raying of frozen citrus fruit. There is continual search for new and better by-products, improved storage conditions and control. Bill's family consists of a very charming wife and two children.

W. CAMPBELL NELSON, Class of '30, is assistant plant superintendent in the by-products plant where oranges are converted into various products including orange oil, juice, pectin and dried orange meal. Since leaving Caltech, Nelson has received a Master of Science degree from the Massachusetts Institute of Technology, and has dabbled in the salt and sulphur industries. He is the proud father of a baby girl.

WYATT H. LEWIS, Class of '33, is supervising the manufacturing of pectin at Ontario. This is the stuff that makes jelly jell. Lewis is the most recent Tech man to join the "Exchange," having left Trona, California, where he was employed by the American Potash and Chemical Corporation, some six months ago. He is a married man now with a little over one year to his credit.

DONALD R. THOMPSON, Class of '27, is in the products sales division of the organization, being the assistant sales manager. He tackles many of the technical problems in the bottling and canning trades, jam, jelly and confectionery trades. Don is married and has a young daughter.

At Corona, California, is located a plant and research organization which is concerned with the by-products of lemons.

RAYMOND E. COX, Class of '27, has been working in the research department of the California Fruit Grower's Exchange on the chemistry, uses and production of pectin. Ray has been with the "Exchange" for a little over ten years, is married and has two children.

GEORGE BOWEN, Class of '32, is working for the Exchange Lemon Products Company on the production of citric acid, sodium citrate and pectin. Bowen is married and has one child to keep him busy.

CLASS OF 1916

W. M. DU MOND, Ph.D., 1929, now on the Institute campus and HARRY A. KIRKPATRICK, Ph.D. '31, who is now on the Occidental campus recently succeeded for the first time in making a photographic spectrum of X-rays scattered by gas.

CLASS OF 1922

ROBERT W. GILLIES, who is employed in the laboratory of the State Division of Highways, has recently developed a successful filler for pavement expansion joints.

CLASS OF 1926

MARK SERRURIER, the perennial bachelor of the Civils of '26, has at last announced his engagement. Mark is one of the civil engineers working on the construction of the 200-inch telescope.

A. S. BULL has been appointed Technical Assistant, Vice President's office, of the Insulite Company, Minneapolis, Minnesota.

C. HAWLEY CARTWRIGHT, formerly with R.C.A. in Hollywood, is now an Assistant Professor at Massachusetts Institute of Technology.

CLASS OF 1927

VERNON JAEGER is now a Chaplain in the United States Army and is stationed at Fort Riley, Kansas. Captain Jaeger, for the past three years, was stationed at Wheeler Field, Hawaii.

BILL AULTMAN, an engineer with the Metropolitan Water District, is in charge of testing water treating equipment at Boulder City.

CLASS OF 1928

NICOLAI K. SENATOROFF is now Chief Chemist for the Southern Counties Gas Company. He was formerly an assistant chemist with the Southern California Gas Company.

FRANCIS N. NOEL is with District 9, State Division of Highways.

GUNNER GRAMATKY on October 12 became the proud father of a seven pound ten ounce daughter. It is his second daughter and another coach for Oxy.

TOMIZO SUZUKI is now an Assistant Civil Engineer in the Department of Home Affairs of Japan.

ROBERT I. COULTER recently became a member of the firm of Carpenter, Abbot & Coulter, Attorneys and Counsellors at Law, with offices in Chicago. The firm specializes in patent, trademark and unfair competition cases.

L. J. (JUDD) EASTMAN is employed by the State Board of Equalization and his duties consist largely of utility valuation.

MOE W. GEWERTZ is a construction engineer with the State Bridge Department.

CLASS OF 1929

NORRIS JOHNSTON, who obtained a Ph.D. in 1929, is now with The General Petroleum Corporation in Los Angeles. He was formerly with the Firestone Tire & Rubber Company in Akron, Ohio.

HOWARD HOLROYD, Ph.D. '29 is teaching mathematics and strength of materials in the Curtis-Wright Technical Institute, Glendale.

CHARLES BOSSERMAN, also '29 is employed as an instructor at the same school.

CLASS OF 1930

BOB BUNGAY, ELMER MUFF and JACK STURGESS, three confirmed bachelors, are living together in San Francisco.

ROBERT I. STIRTON Ph.D. '34, of the Union Oil Company is handling export activities in the Orient.

HENRY FRACKER, after some time with the Bell System and with affiliates of Electrical Research Products, Inc. in Hollywood, is now doing operating and testing work with Paramount.

CLASS OF 1931

OSCAR NEWBY has strayed far from the ranks of the rough and ready engineers for we recently learned that he is now an ordained Methodist minister at Seal Beach, California.

NEWS OF CLASSES

WINTON HOCH, ace cameraman with Technicolor, is an experienced world traveler. Last February and March he was in South America flying from Santiago to the Canal Zone and taking many photographs of the Andes and scenic spots in Chile and Peru. Incidentally, the plane on which he made this trip crashed a short time later at Panama with all lost. This summer, Winton, who is the cameraman in charge of Fitzpatrick Travel Talks, visited Sweden, Denmark, Poland, Czechoslovakia, Austria, Hungary and France in quest of new travelogue material.

PERRY BOOTHE is now working for the Spreckles Street Railway in San Diego. He was married last year to Marcia Hammond and is now the proud papa of a bouncing baby boy.

LOWELL F. GREEN and his wife left Pasadena November 1 for Pittsburgh where Mr. Green has accepted an appointment to the staff of the University of Pittsburgh.

EVERETT G. TROSTEL, drilling engineer with the Union Oil Company, is the proud papa of a son and heir.

JOHN SINNETTE, who is an engineer with the Metropolitan Water District is located at Boulder City testing water treating equipment.

C. EDWIN KUYKENDALL resides in Sacramento where he is employed in the laboratory of the State Division of Highways.

ARNOLD WILKING was married on November 3 to Miss Martha Brumby of Franklin, Louisiana. Wilking is working with the Shell Petroleum Corporation in Wood River, Illinois where at the present time he is doing design and cost work.

CLASS OF 1932

ERIC J. MILES who received an M.S. in electrical engineering in 1932 is now a student in the Department of Business Administration at the University of Pittsburgh.

BILL CLAUSSEN and his wife were guests of Dr. Yost during a visit to the Southland this fall. Bill is a research chemist with the Standard Oil Company at the Richmond refinery.

E. CHET KEACHIE is on the staff of the department of economics at Pacific University, Forest Grove, Oregon.

BILL SHULER on a week's leave from Fort Lewis, Washington, to visit his parents, showed up for football

practice the other evening. Bill attended West Point after graduating from Tech and captained the Army football team becoming an All-American player. This fall Bill has been coaching the Fort Lewis eleven. It is interesting to note that in 1918 Fox Stanton was coaching a Fort Lewis eleven and brought them to the Rose Bowl that year to play the Marines to whom they lost 19 to 7. Shuler who is now a lieutenant in the engineering corps plans to attend California next year and obtain a masters degree in civil engineering.

CLASS OF 1933

LOUIS A. PIPES, M.S. '34, Ph.D. '35, recently accepted a research fellowship in electrical engineering at the University of Wisconsin after having spent the previous year at Rice Institute as assistant professor of electrical engineering.

CLASS OF 1934

CARROLL C. CRAIG is employed with the U. S. Bureau of Reclamation, and at present is located in Sacramento.

CLASS OF 1935

ALAN BEERBOWER who is a chemical engineer with the Standard Oil Company of New Jersey, was married on August 21, 1937, to Miss Clarissa Howe, of Washington, D. C. The couple first met while pursuing advanced studies in chemistry at Columbia University. They now make their home in Elizabeth, New Jersey.

RICHARD H. JAHNS, who for the past two years has been studying at Northwestern University, has returned to Tech to complete his work for his Ph.D. Last summer Jahns worked with the U. S. Geological Survey in the New England territory.

WILLIAM KEYES, JR., is now a graduate student at the University of Illinois.

MILO S. KETCHUM, JR., has been appointed assistant professor of structural engineering at the Case School of Applied Science in Cleveland. Since leaving school he has been employed in the technical bureau of the Portland Cement Association at Chicago.

HOWARD P. GLUCKMAN was married on October 31 to Miss Carmel Rothstein, a graduate of U.C.L.A.

CHARLIE GIBBS, who is located at the Richmond Refinery of the Standard Oil Company, was recently married.

JAMES H. JENNISON is working in the State Bridge Department in Sacramento.

CLASS OF 1936

DAVID WHIPP became the proud father of a baby girl this summer. Dave is with District 9, State Division of Highways in Bishop.

JACK PALLER is an Inspector with the U. S. Engineers in Alhambra.

WALFRED SWANSON has taken a position as Inspector with the U. S. Engineers in Alhambra.

PAUL JONES is also an Inspector with the U. S. Engineers in Alhambra.

ROBERT JERAULD, who is with the Oil Well Supply Company, was recently transferred from Oil City, Pennsylvania to Los Angeles.

PAUL HAMMOND was a recent visitor to the campus. Paul is employed with the Southern California Gas Company in Visalia.

STUART FERGUSON, who is now with the Coconino Copper and Chemical Company in Northern Arizona, Flagstaff area, has been renamed "The Medicine Man" by the Indians of that region since they have seen him apply first aid to his co-workers.

ROBERT A. MCINTYRE recently received the newly established Shell Oil Company scholarship for the year 1937-1938.

HENRY J. GOODWIN, who was recently married, is now employed by Duel and Schoeller.

WILSON BUCKNELL is a more ardent "ham" than ever, now that he is an engineer with the Peerless Transformer Co. in Los Angeles, and designs radio transformers himself.

BYRON INMAN, who received an M.S. in '36, is now a chemist at the Dupont plant in El Monte. He is married and has a small daughter.

CLASS OF 1937

DUDLEY AUGER is working in District 9 of the State Division of Highways.

STANFORD BRIGGS is now pursuing graduate studies at the University of Illinois.

BRUCE DUNBAR was married on October 19 to Marguerite Louise Erlandson of Glendale.

JOHN SULLWOLD was married on October 19 to Ruth Culley, an Occidental graduate and president of her sorority. John is with the Columbia Steel Co. in San Francisco.

CLARK BOWERS was married in October to a girl from San Luis Obispo. Clark is with the Pomona Pump Company.

ATTENTION ALL ALUMNI

Dear Alumnus:

How would you proceed in order to enlist members in our Association? Spending one man's dues to obtain four others would be profitable if we had an infinite number of eligibles. Even then each member would be deprived of 20 per cent of the advantages that are rightfully due him.

Your Alumni Association is a non-profit organization, and you can benefit both yourself and your friends by inducing them to become members. Won't you telephone a few of your classmates tomorrow morning and urge them to forward their 1937-38 subscription of \$2.50 to the Alumni Office at the Institute?

If each of you 650 members (to date) will expend that much time in support of your Association, you will be astounded by the effective results of your efforts. Sounds simple doesn't it, and truly it is simple yet it requires the loyal support of all of us.

Don't leave it to the other fellow or it won't be done. Make out your list right now and call them soon.

Sincerely yours,

ED KINSEY,
Vice President and
Membership Chairman

Report comes in that an interesting and gay meeting was held early in October by the Northern California chapter at the Riviera Club in San Francisco.

HERE IS A DANDY

Five men are engaged in a poker game: Brown, Perkins, Turner, Jones, Reilly. Each smokes a different brand of cigarettes, the brands being: Luckies, Camels, Raleighs, Old Golds and Chesterfields, (not respectively). At the beginning of the game, each player has a different number of cigarettes, namely: 20, 15, 8, 6, 3 (not respectively).

During a single round of drawing, the following events occurred. From them deduce the brand of cigarettes each smoked and the number each had at the beginning of the game:

1. Perkins drew three cards.
 2. Reilly smoked one half of his original supply of cigarettes, or one less than Turner had smoked.
 3. The Chesterfield man originally had as many more, plus one half as many more, plus two and one half more cigarettes than he has now.
 4. The man who draws to an inside straight absent mindedly lights the tipped end of his fifth cigarette.
 5. The man who has smoked Luckies has smoked at least two more cigarettes than anyone else, including Reilly.
 6. Brown drew as many aces as he had cigarettes, originally.
 7. No one has smoked all of his cigarettes.
 8. The Camel man asks Jones to pass Brown's matches.
- There is only one correct answer—drop a postcard to the editor and he will be glad to supply it.

THE CALIFORNIA TECH

Some alumni have been wondering why they have not received the weekly campus newspaper this year, so here is the answer. Last June the Directors made this quarterly magazine, the ALUMNI REVIEW, their official publication and discontinued sending the student newspaper to the alumni.

Because of the many requests regarding the CALIFORNIA TECH arrangements have been made so that alumni desiring to subscribe may do so for the nominal sum of fifty cents for the school year. Please send subscriptions and remittances care of the Alumni Association, California Institute of Technology, Pasadena, California.

THE BIG T

Members of the Alumni Association

Many of you men who have at one time or another graduated from Tech, seem to get a particular satisfaction by "keeping in touch" with your old haunts. This is evidenced by the large enrollment of the Tech Alumni Association, and by the fine turnout at the recent Tech-Oxy game reunion. By the same token, you get a particular satisfaction in the ownership of a permanent memoir of Cal Tech which you could admire and constantly refer to.

You owe it to yourselves to order a Big T this year. The clear pictures of familiar scenes, the write-ups of activities in which you once took part will afford you a great deal of pleasure.

It is easy for you to avail yourself of a copy of your 1938 annual. Sit down this evening and mail us, together with your forwarding address, a check for three dollars payable to the Big T. Then, sometime during our third term, we will send you free of handling charge and postage, a copy of the 1938 Big T. We do not think it possible that you would regret it.

John van Fleet
Business Manager Big T

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