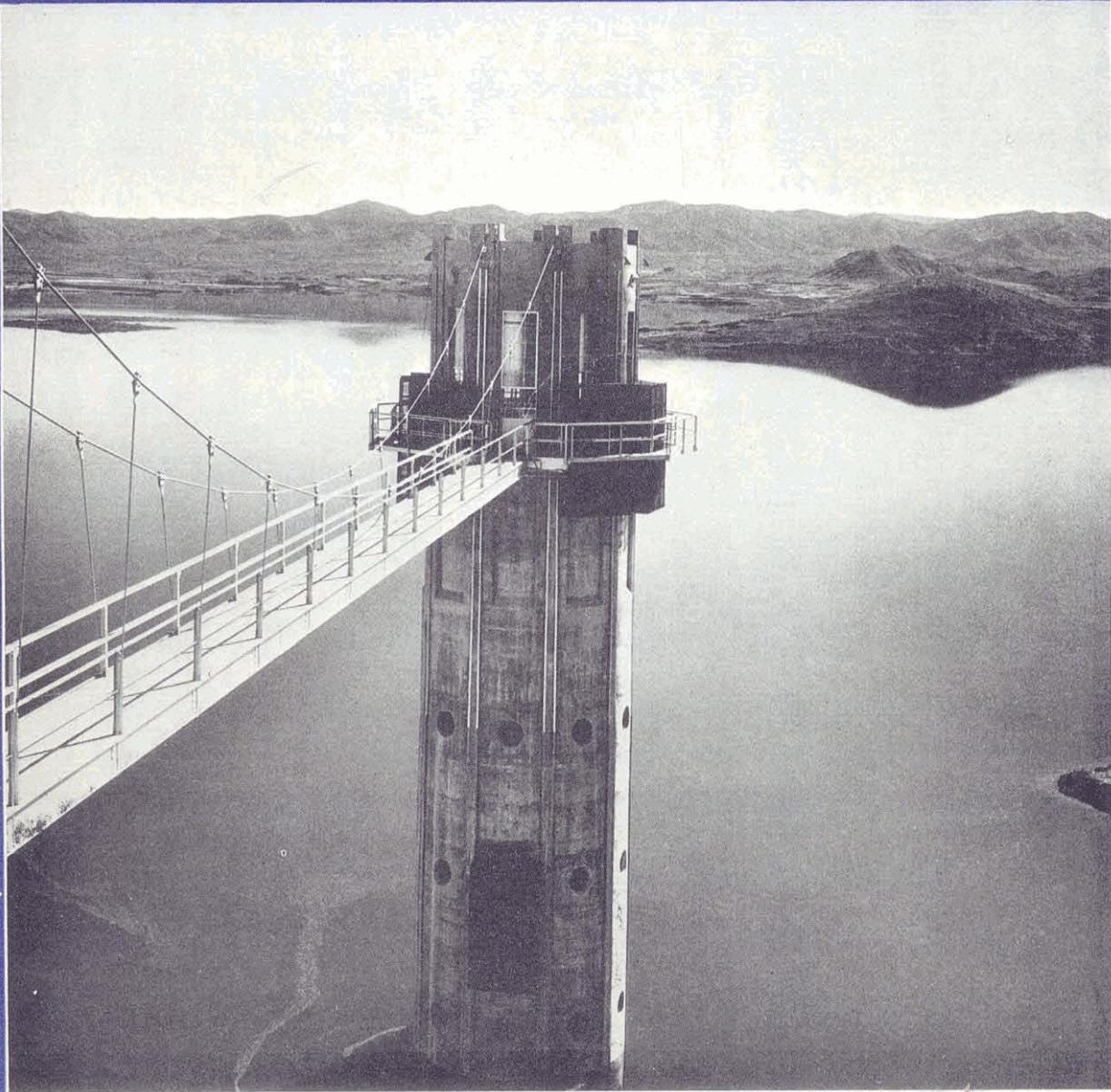


Prof. Roger Stanton

ALUMNI REVIEW

CALIFORNIA INSTITUTE OF TECHNOLOGY



Metropolitan Water District of So. Cal.

Lake Cajalco as it appears from the outlet tower.

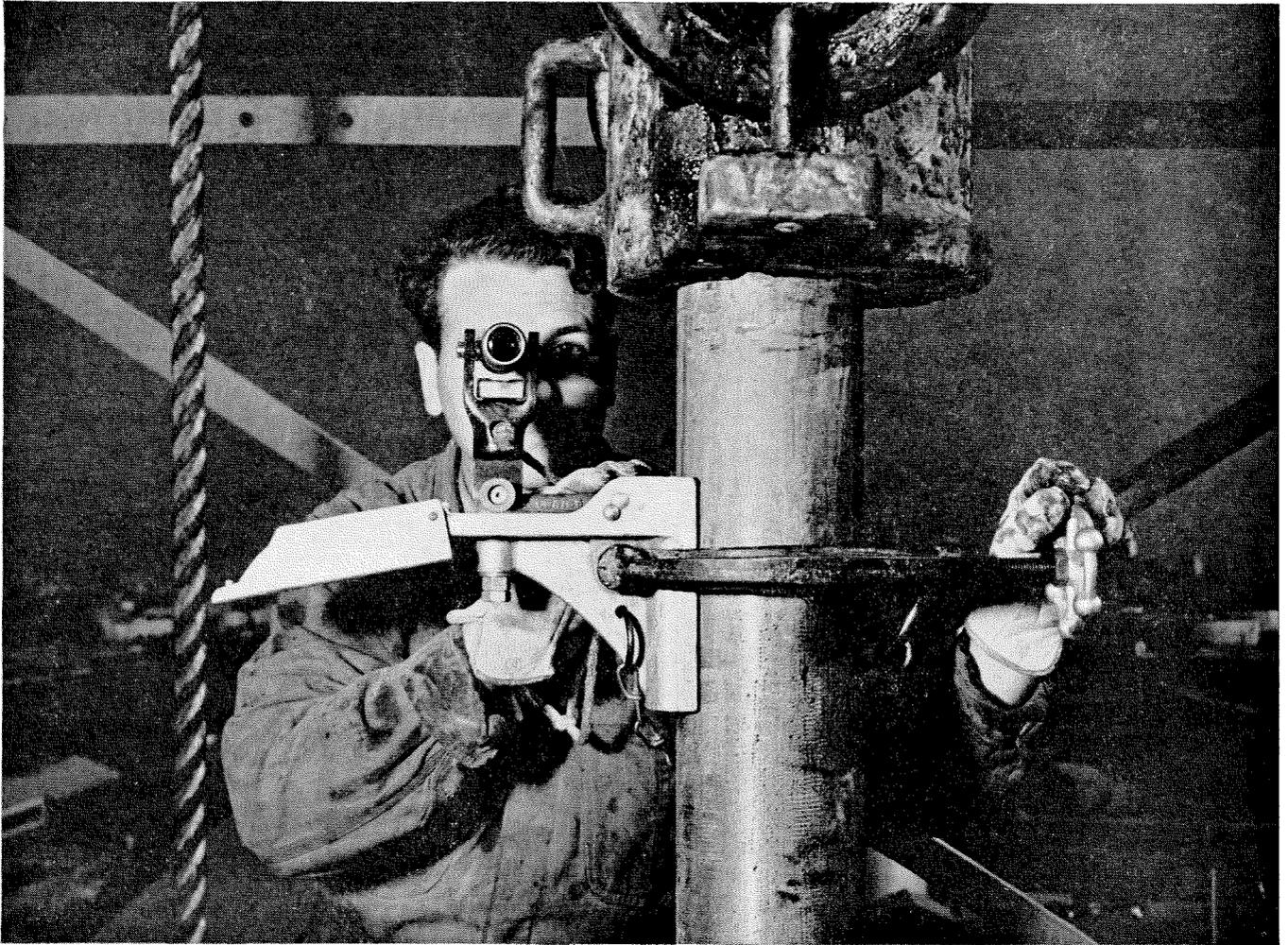
ADVANCES IN CIVIL ENGINEERING

SEE PAGE 4

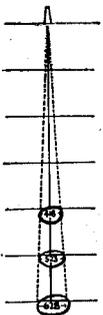
Vol 3 No 3

March, 1940

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ALUMNI REVIEW

ALUMNI ASSOCIATION, INC.
CALIFORNIA INSTITUTE OF TECHNOLOGY

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MARCH, 1940

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ALUMNI SEMINAR WEEK END APRIL 13th and 14th

PLANS for the Third Annual Seminar Week End, to be held at the Institute on April 13th and 14th, are rapidly nearing completion. The Program subcommittee announces the following program, the topics as given are general:

GENERAL ASSEMBLY

- Prof. Theodore G. Soares — Problems Involved in a Federation of Democracies.
- Prof. Royal W. Sorensen — Unionization of Engineers.
- Dr. Rudolph M. Langer — Uranium Fission.
- Dr. Arthur L. Klein — Airplane Production Problems.
- Dr. Louis B. Wright — Wm. Byrd of Westover, Virginia — An American Pepys.
- Prof. Horace N. Gilbert — Foreign Affairs.
- Dr. James F. Bonner — Growth of Plants in Nutrient Solutions.
- Prof. Ray E. Untereiner — Domestic Affairs. (Tentative)
- Geology Department — Subject and speaker to be announced.

Departmental seminars are to be held in Civil Engineering, Mechanical Engineering, Electrical Engineering, Petroleum Engineering and Geology, Aeronautical Engineering, Industrial Relations, Chemistry, Physics (Tentative), and the Humanities.

Final programs and reservation cards will be mailed so as to reach the membership of the Association about April 1st. As in the past, members of the Association will be permitted to bring one guest.

A unique feature of this year's program will be the recording of some of the lectures for circulation among the Chapters. This will enable some of the more distant members of the Association to benefit from the Seminar.

The members of the Seminar Week End Committee are Sidney F. Bamberger, '33, Chairman; John E. Shield, '22, Ex-Officio, Social Chairman; H. Fred Peterson, '27, Program; Dr. Carl D. Anderson, '27, Campus Relations; Sam Eastman, '31, Publicity; George Rice III, '31, Printing; and H. Phillips Henderson, '26, Registration.

FORTHCOMING EVENTS: Exhibit Days April 6-7: Annual Seminar Week-end, April 13-14: Annual Field Day and Stag, Altadena Country Club, May 11: Annual Meeting and Banquet, The Athenaeum, June 7.

ENGINEERING NEEDS AT THE CALIFORNIA INSTITUTE OF TECHNOLOGY

By HERBERT B. HOLT, '15
Member, California Institute Associates

In 1921 the trustees of the Institute adopted a statement of educational policies for the Institute which among other things said the following:

1. The Institute shall offer two four-year undergraduate courses, one in engineering and one in science.

2. The four year undergraduate course in engineering shall be of a general fundamental character with a minimum of specialization in the separate branches of engineering. It shall include an unusually thorough training on the basic sciences of physics, chemistry and mathematics and a large proportion of cultural studies as well as the professional subjects common to all branches of engineering.

3. The four year undergraduate course in science shall afford even more fully than is possible in the engineering course an intensive training in physics, chemistry and mathematics. In its third and fourth years groups of optional studies shall be included which will permit some measure of specialization, which will most effectively fit able students for positions in the research and development departments of manufacturing and transportation enterprises.

Thus early in its history, the Institute made a partial segregation of its undergraduate students between the fields of engineering and science. I say partial because the two courses of studies must necessarily overlap to a considerable degree.

The consistent adherence to high scholastic standards in both these departments of education is too well known to Caltech alumni to need any comment. Facilities and personnel necessary to properly present the courses have kept pace with the ideals outlined in the educational policies as enumerated above and as outlined more fully in the catalogue of the Institute.

It has been recognized that the development of facilities in connection with the engineering course at the present time is somewhat behind that of the science course, and with a view to studying this situation, Doctor Millikan appointed some months ago a committee to investigate the conditions. It has been found that an acute need exists for modern and more ample equipment for materials testing and an up to date study of strength of materials, internal combustion and steam engineer-

ing, airconditioning and refrigeration, heat transfer, hydraulics and fluid mechanics, sanitation, physical metallurgy, electronics and aerodynamics, nor are there buildings now available for these essential installations. The hydraulic and mechanical engineering laboratories are still housed in their original quarters, considered temporary when constructed nearly thirty years ago. A minimum of equipment was then provided for a small number of undergraduate students only. Much of it is now obsolete and of little use for advanced work or research.

Approximately sixty-five percent of the students receiving Bachelor's Degrees of the Institute are in the engineering course, and among the graduate students the proportion of engineers is increasing. Adequate accommodations and equipment for the proper training of these students must be given attention at as early a date as possible.

Since the start of the Institute, changes in the engineering field have been considerable. The Institute has kept abreast, if not ahead of the times in following such transition and its plan of prescribing thorough ground work in mathematics, physics and chemistry has avoided narrow specialization, and superficial instruction. However, the technical advances in recent years have been so great that additional obligations are imposed upon an engineering college which endeavors to keep to the forefront of development.

Great opportunities exist in the west for research based upon current community problems. Examples of work done on some of these at the Institute are represented by improvements in high voltage electrical circuits and apparatus, the control of flood flows, increased stability of structures, development of large capacity pumps, the development and utilization of alloys, improvements in railway car construction, and improvement of aircraft. Results of gratifying excellence have been attained in these fields.

The objectives of the engineering department of the Institute can be summarized as follows:

1. To maintain a position of unquestioned eminence in both undergraduate and graduate engineering instruction.
2. To attain a position of unquestioned eminence in a few selected fields of basic engineering research.

The Alumni as a whole, particularly those from the engineering course, may well hope that the growth and improvement of the facilities necessary to maintain these objectives will keep pace with the needs. In fact, they might well do more than just hope, and lend every assistance possible in interesting themselves and others in directing funds towards the Institute and enlisting aid for furthering the ends outlined.



Herbert B. Holt, '15



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ADVANCES IN CIVIL ENGINEERING-A SYMPOSIUM

INTRODUCTION

By DONALD R. WARREN, '38

Structural and Civil Engineer, Los Angeles, Calif.

The advance in civil engineering can best be appraised by considering the visual results of the profession, through a comparison of the engineering structures of the past with those of the present. Let us reflect upon the water supply and sanitation systems today with those of twenty years ago. Think of the increased use in electrical energy, with its spider-like lines delivering power from the impounded water of the distant mountains to even the humble homes. Observe the broad boulevards and freeways, with stately grade separations and impressive bridges, and recall the winding roads of 1920. Then we can realize the progress that has been made in civil engineering.

The social standards of man have been greatly improved by the applications of engineering knowledge in the solution of society's problems. As a direct result of the utilization of scientific knowledge by the engineer, the world has become more efficient, it offers more conveniences, greater safety, and better health conditions to the masses. The inherent financial requirements to satisfy the ever increasing demand of civilization for greater convenience and comfort, often coupled with the intangible economic returns on these investments, has centered the civil engineering activities in governmental subdivisions.

The harnessing of the relief problem upon the construction industry, by the federal administration, has increased both the number and size of civil engineering projects. Federal expend-

itures and loans on public work has made the Boulder Canyon project, the Colorado River Aqueduct, the San Francisco-Oakland Bay Bridge, the Columbia River project with its Grand Coulee and Bonneville dams, the flood control works, and numerous other projects possible. Civil engineering is a service to society, and by its nature will always be closely allied to governmental activities. However, there are indications that the rate of demand for civil engineers in federal service is declining.

The Public Works Administration (PWA) activities are to terminate this summer. The widespread dissatisfaction with the Works Project Administration (WPA) and work relief policies, combined with demand for economies in governmental expenditures, has caused Congress to greatly reduce appropriations for this work. With the public debt fast approaching the statutory limit of 45 billions, government expenditures for public works must be further reduced. On the other hand, the European situation has made Congress defense-minded, and vast appropriations for the Army, Navy, and Air Corps have been made.

At the same time there is a lessening of governmental expenditures, there is a general improvement in economic conditions. This general improvement is stimulating private business, and the civil engineer holds a favorable spot in the program of the future. Legislation is also improving his status by enforcing more rigid control of the engineering practices. With the adoption of the engineering license law by Idaho, there remain but six states in the union where the public is not protected by law from the untrained and inexperienced engineer.

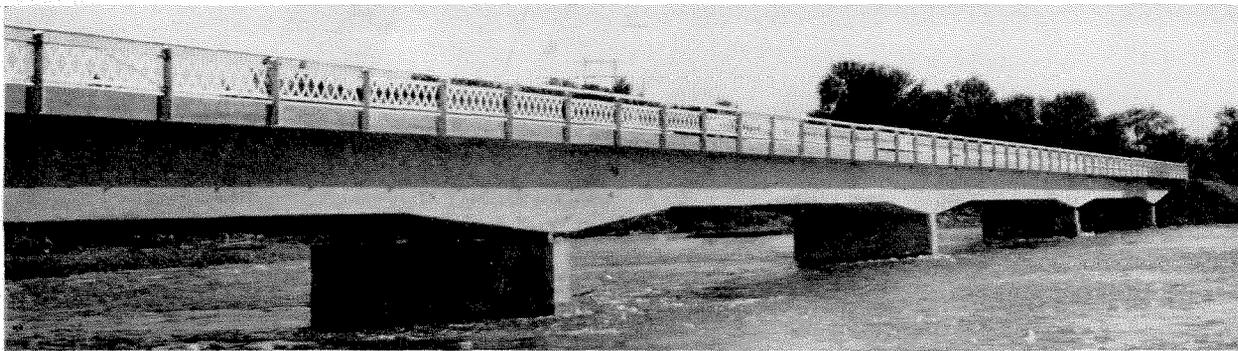
Civil engineering activities have been most pronounced in the eleven western states. Although these states have but ten per cent of the Nation's population, they did twenty per cent of our Nation's highway construction in 1939. In heavy construction, which includes dams, tunnels, canals, excavation work of all kinds, river improvements, etc., one-third of the Nation's total for 1939 was in these western states. It is interesting to note that in the United States, the per capita expenditure for civil engineering construction is \$22.00, while in the eleven western states the per capita expenditure is \$42.00 — nearly double the amount.

Ingenious application of engineering has been particularly noticeable in the construction of bridges with great spans, of bridges with foundations extending to unprecedented depths, and of floating or pontoon bridges. The earth fill dam on the Mud Mountain Flood Control Project in Washington, with a height of 420 feet, establishes a record for this type of dam. The advance in construction methods is emphasized by the all-time monthly record of placing 530,000 cubic yards of concrete in Grand Coulee Dam. The use of conveyor belts for long distance transportation is being extended with the construction of a nine mile conveyor to transport 10,000,000 cubic yards



Randalls Island, N. Y., Traffic Circle
Triborough Bridge in Background

Civil Engineering



Civil Engineering

Box Girder Bridge at Yekima, Washington

of aggregates for the Shasta Dam. There has been a marked increase in the capacity and power of earth moving machinery.

The ever increasing size and importance of engineering projects depicts the advance in civil engineering. The civil engineers have given a creditable account of themselves in recent years. Their scope of activity is increasing and the Nation's future will be to a large extent measured by the tempo of engineering achievements.

— T —

ADVANCES IN STRUCTURAL ENGINEERING

By DONALD F. SHUGART, '22

Structural Engineer, Los Angeles, Calif.

The professional growth of structural engineering during the past two decades has been marked in California by three significant events. First, official recognition came in 1929 with the passage of the Civil Engineers Act. This was followed two years later by an amendment acknowledging structural engineers as a distinct group within the broader field of civil engineering. In 1933 the Long Beach earthquake awakened the general public to the existence of and the necessity for this profession. Shortly thereafter the Field Act was passed to assure the safety of construction of California school buildings; this Act further served to establish Structural Engineers as a responsible professional group. The Structural Engineers Associations of Northern and Southern California have aided materially in the healthy growth of the profession, by their consistent efforts to raise its standing and standards.

However, many problems remain to be solved, not the least of which is the establishment of some reliable standard which will give the public a greater measure of assurance that a Consulting Structural Engineer possesses not only the required technical knowledge, but also sound and mature judgment, as well as professional stability and permanence.

One of the greatest contributions to the technical knowledge of the structural designer during this period was the publication of the method taught and used by Professor Cross for the analysis of continuous and rigid frames. This method has had very widespread acceptance and is now quite generally used,

with a resultant lessening of the work and shortening of the time required for a proper design. It should be noted here that rigid frame action has come to be quite generally recognized in the design to resist both vertical and lateral loads, and the additional work involved in this type of analysis has resulted in many attempts being made to find design shortcuts or shorter design methods. Thus it is that we may thank the earthquake for providing the incentive to improve our structural design, this incentive finding its expression in the new requirements in official building codes.

Improvements in the production and use of old materials, as well as the introduction of many new materials and construction methods, have all had their part in advancing this branch of civil engineering. Wide-flange structural steel shapes and larger rolled sections, made possible by new types of rolling equipment, have effected economies and improvements in steel design. The quality of structural steel has been raised and made more uniformly dependable. For unusual conditions of sufficient importance special alloys have been used to produce steels many times as strong as any formerly obtainable, thus making possible such structures as the Golden Gate bridge. Concrete structures have been improved mainly by careful control of materials, mixing and placing, resulting in sounder construction and higher strengths. The general acceptance of wood grade-marking has been a step forward, and the use of timber connectors and plywood in the jointing of heavy wood structures has opened a new field for wood design. The increased use of reinforcing steel in brickwork has enlarged its field, and there have been many examples of new forms of construction and construction materials. One of these is the Knap System of Wall Construction, which has recently completed an exhaustive testing program both here in Southern California and in the United States Bureau of Standards at Washington. The equipment of their new factory has just been completed and manufacture of the Knap units has been commenced.

Our modern world moves so fast that it is only in retrospect that we are able to fully realize the great strides we are taking, and the many advances which we can see in the past few years serve to stir our imaginations in an attempt to visualize the ones to come.



The Modern Well Planned Highway

ADVANCES IN PLANNING

By WALLACE C. PENFIELD, '26

Engineer-Secretary, Santa Barbara County Planning Commission

The term *Planning* is a general term to describe the evolution of the so-called "City Planning" movement. City planning has been recognized for centuries, but its economic value has only recently become fully understood, particularly in the United States. The spectacular, but haphazard, growth of American cities has resulted in huge economic losses which the American people are forced to pay for lack of foresight in laying out their cities in providing them with the modern means of transportation, recreation, and utilities.

In the early years of the Twentieth Century the city planning movement became popular on a rather superficial basis. It was devoted largely to city beautification, but neglected the more fundamental problems connected with the rapidly growing American city. As time went on it became evident that the close relationship between public expenditures and haphazard growth reflected heavily on the taxpayer's pocketbook, and the city planning movement became a matter of economics rather than art.

City planning came to include provision for proper transportation; the segregation of residential, business and industrial areas; the provision for proper recreational spaces and other necessities of modern community life.

Suddenly came the "mechanized era," outmoding centuries of city building in a single generation. The problem of adapting new requirements to old cities too firmly established to be abandoned has become acute. Likewise the necessity to adapt new towns to new conditions has become evident. City boundaries no longer exist on the physical landscape. The countryside which once was the exclusive domain of the farmers has now been invaded by city dwellers with all the crowding, waste and friction which the modern community develops. This has increased many fold both the opportunity and the responsibility of planning. For example, hundreds and thousands of dollars per mile are spent on major traffic arteries only to have them cluttered up and rendered inefficient and unsafe by abutting property owners. This is possible because of the old custom of using streets primarily for providing access to property. As

a result, the traffic congestion in metropolitan areas has become so acute that entirely new systems of parkways and freeways must be built to prevent a stalemate.

Towns and cities are "spreading out," leaving behind them a waste of obsolescence and depreciation that is difficult to estimate. Rural areas are subdivided into 50-foot lots which throw an unbearable load on the traffic arteries, the rural school systems, and other public services, while the taxable values in the downtown areas suffer.

Planning is, therefore, no longer a local problem. It must include whole regions, which are tied together by common bonds. County and regional planning have come into being in an attempt to guide the ever-increasing development made possible by the new method of living. The State and Federal governments have recognized the necessity for more than local guidance in the management of natural resources, national and state facilities, and accordingly have instituted State and Federal planning agencies.

Planning, however, must still be done in the face of uncertainty. No one can say where invention will stop or envision the bearing which future scientific advance may have upon the manner of living and the form of our communities. We have advanced in a few centuries from the old fortified town to the modern super-highway, but not always in the easiest or most efficient way. With the ever-increasing complexities of modern life, the job of the planner becomes doubly difficult and doubly important, if our community structure as a whole is to function well enough to give us a decent place in which to live.

— T —

PROGRESS IN WATER SUPPLY AND PURIFICATION

By WILLIAM W. AULTMAN, '27

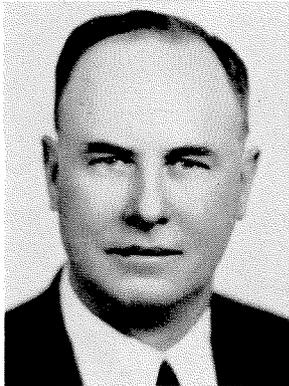
Engineer, Metropolitan Water District of Southern Calif.

The impetus given to construction of municipal waterworks by financial aid from the Federal Government has raised the industry into the realm of "big business." A census made by the Engineering News-Record reveals that now some two-thirds of the population of the United States is served potable water through some 12,750 waterworks. And while in the past there was a trend toward private ownership of waterworks, now only 27 percent of America's waterworks are operated by private utility companies.

The past few years has seen the start or completion of three large water treatment plants. The Milwaukee filter plant of 200 million gallons per day capacity was put into operation during 1930; the Minneapolis filter plant of 120 m.g.d. capacity is in the process of construction; and Southern California's Metropolitan Water District water softening and filtration plant of 100 m.g.d. initial capacity and 400 m.g.d. ultimate capacity was started in November, 1939, and is due to be completed in January, 1941. Each of these plants is unique in itself. The Milwaukee plant being built along more or less standard designs, the Minneapolis plant being built around the newly developed Spaulding Precipitators, and the District plant

(Continued on page 10)

ALUMNI YOU SHOULD KNOW



BUILDING CONTRACTOR

The career of Ray Gerhart, one of the five members of the class of 1913, though unspectacular, illustrates the satisfactions secured from a job well done. He remembers well his part on the 1909 football squad which beat Pomona, only to be beaten by Occidental two weeks later, so badly that only two members

of the team could finish the game, so that the balance of the team was made up of Oxy subs.

Upon graduation he secured employment with the Worthington Pump and Machinery Company, having been smitten with the diesel bug, and worked on diesels, pumps, and mining and milling machinery for nine years, but homesickness finally won out so that he returned to Pasadena.

He arrived on the tail end of a building boom, and presto, he was contracting and has been at it ever since. He has been the builder of numerous residences, store buildings and schools throughout the metropolitan area of Los Angeles, giving all credit to the architects, the engineers, and the plumbers. He hopes that by this time he is as good a builder as can be found and hopes that in another fifteen years he may be better than the best.

His real hobby is his family of three boys, one of whom, Ray Van Dusen Gerhart, graduated from the Institute in the class of 1939. He is extremely proud of the fact that he is one of the Tech graduates who is also the father of a Tech alumnus.

CALTECH Y.M.C.A.

By DONALD P. MACFARLANE, '26

Progress at the Institute is being made, not only in the strictly scientific field, but also to a marked degree by the Caltech Young Men's Christian Association. The program of this student religious and service organization has been more than doubled during the past two years. This growth is due to the excellent student leadership and the work of John W. Price, who became its full-time secretary in September, 1937. Through its fellowship it offers each student an opportunity to participate in its activities regardless of his race or creed.

One of the most active of student organizations is the Y.M.C.A. The program of this organization is planned to meet the interests and the needs of the Tech men. With the individual as the center of the organization, the program is planned to help him understand himself, the essence of the Christian religion and those forces at work in the world of today affecting his ideals. Included in the more tangible items of the extensive program are the following:

1. A two day Frosh camp held prior to the opening of college with 135 Frosh attending.
2. Frosh Tea Dance in Dabney lounge with 120 new men.
3. Public affairs discussion with 100 men attending.
4. Frosh "Y" luncheons meeting once a week for discussions.
5. Soph "Y" luncheons meeting once a week for a series on "Comparative Religions" — just organized this fall.
6. World News Map with special bulletins from the Pasadena Star-News hot off the wire each day.
7. Special assembly programs.
8. Sex lecture series.
9. Vocational interest tests and talk.

10. Christmas and Easter Vesper services.
11. Six intercollegiate meetings with near-by colleges, and ten men to the Asilomar Conference.
12. Non-profit used book exchange—335 books sold for \$600.
13. Loan Fund for short term personal loans was used by 50 students 100 times.
14. Provides typewriters, adding machine, library of current magazines, etc.
15. Fifty students earned \$1,350 in part time jobs secured through the "Y."
16. Student faculty fireside group on "Philosophy of Life," just organized this year.



John Price, "Y" Secretary

Mr. Price is a graduate of Kansas State Teachers College and Yale Divinity School. He has had excellent training in physical education and religious and personnel work so that he is well trained to give able leadership to the Y.M.C.A. He visits all students who are hospitalized and offers appropriate assistance. He is leading two religious discussion groups and helps students who are away from home to become affiliated with the local churches' young people's groups. His confidential and friendly counseling which is always available to students is one of the most important services. In addition to aiding with many other Y items not enumerated above, Mr. Price serves as Frosh Basketball coach and assists with Frosh debating.

The organization has an advisory board of student officers, faculty members, alumni and friends meeting periodically to review the progress of the work.

CAMPUS NEWS

THOMAS AWARD

Prof. Franklin Thomas received the gold medal of the Arthur Noble Award of the City of Pasadena at a dinner in his honor on January 24th. Professor Thomas is the fifteenth recipient of the award for notable service in promoting the welfare of the city.

Professor Thomas served two terms on the Board of City Directors of Pasadena and has been vice-president of the Metropolitan Water District of Southern California since its organization. He has also served as president of the Pasadena Chamber of Commerce, and is prominent in many other civic functions.

— T —

SORENSEN HONORED

Prof. Royal W. Sorensen was nominated as president of the American Institute of Electrical Engineers at its annual convention in New York last January. The nomination is tantamount to election.

Professor Sorensen has been a member of the Board of Directors of the A.I.E.E. for several years and is very active in the work of the organization, being chairman of the committee on student branches. Last summer he was elected vice-president of the Society for the Promotion of Engineering Education.

— T —

COLOR

The March 5th meeting of the Southern California alumni was devoted to the subject of "Color Photography," being the most popular meeting of the year as attested by the attendance of over 180 members and guests.

The speaker of the evening was Doctor Curtis of the Curtis Laboratories, who has developed a camera and a process for taking color negatives from which color positives can be made. He explained the process and showed samples of the work that can be secured. At the conclusion of his talk, numerous questions, showing the interest of the audience, were answered.

Color transparencies taken by alumni

were then shown which showed the uses of color photography in engineering construction, geologic studies, and industrial applications. Several alumni vacation trips of interest were also displayed. The meeting was arranged by G. Austin Schroter, '28.

— T —

BASEBALL TROPHY

Largely through the efforts of *John Monning*, '33, who was chairman, a group of about 25 former members of the Institute's baseball teams presented a new baseball trophy to the student body on March 4th. The new cup which is to be called the "Alumni Baseball Trophy" is to be awarded to some member of the squad each year on the basis of sportsmanship, moral influence, ability, and individual improvement.

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IN MEMORIAM

RICKETTS

Dr. Louis D. Ricketts, First Vice-President of the Board of Trustees and a member of the Executive Council, died on March 4th in Los Angeles after an

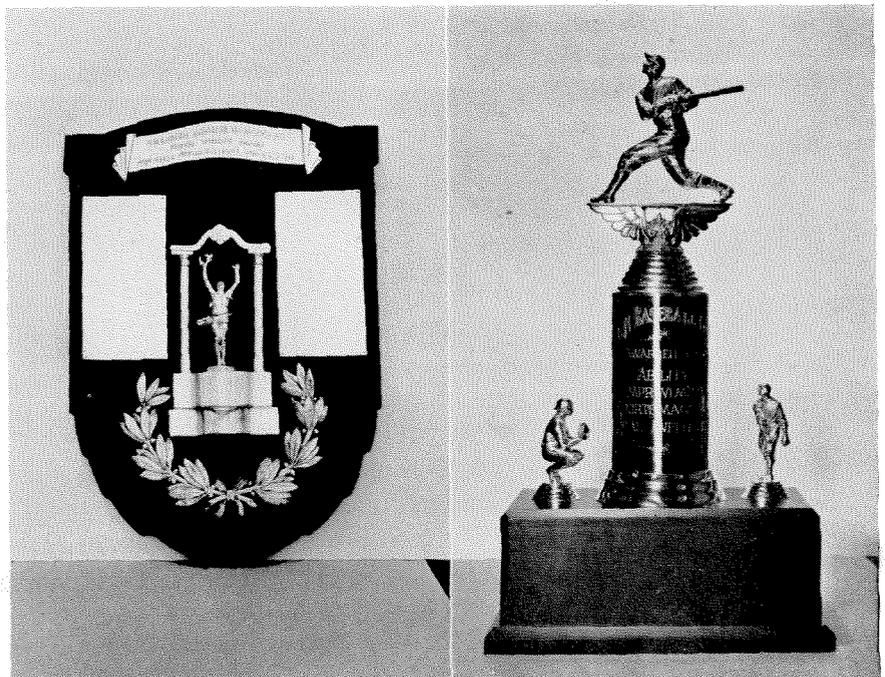
illness of a month. Ricketts House was donated to the Institute by Doctor Ricketts, as the welfare of undergraduate students was always his particular interest.

Doctor Ricketts was a mining engineer of international reputation, having been manager of numerous mines and was a director of the Phelps Dodge Corporation, Anaconda Copper Company and many other corporations. He served as State Geologist of Wyoming for three years, and in 1916 he served as president of the American Institute of Mining and Metallurgical Engineers, which last fall awarded him the James S. Douglas Medal for "inspirational leadership and distinguished achievements in the metallurgy of copper."

Doctor Ricketts was elected a member of the Board of Trustees of the Institute in 1926, of the finance committee in 1928, and first vice-president and member of the Executive Council in 1937.

CAMPBELL

John Stuart Campbell, '26, passed away in Rochester, N. Y., in September, 1939. He was a member of the physics department at the University of Rochester, doing research in optics and light, and teaching, since 1935. Prior to that time he had done advanced work in physics at Rice Institute, in Berlin, the University of Chicago, and Rollins College.



LEFT: Alumni Award for House Intercollegiate Competition, donated by the Alumni Assn.
RIGHT: Alumni Baseball Trophy, donated by Alumni Baseball Men.

ALUMNI ACTIVITIES

SAN FRANCISCO

The San Francisco Chapter held a Football Banquet meeting at Hellwig's Restaurant in San Francisco on January 12, 1940. President *Howard Vesper*, '22, presided. *Bob Bowman*, '26, gave a report of the nominating committee and the following officers were elected for the year 1940: *Manley Edwards*, '26, President; *Louis Erb*, '22, Vice-President, and *Robert Freeman*, '32, Secretary-Treasurer.

Howard Vesper read a clipping from the Pasadena Star News written by Dr. James A. B. Scherer in which he had commented favorably upon his impression of the San Francisco group after his meeting with them on October 13, 1939.

Art Allyne, '26, upheld the tradition of all Football Banquets by giving an interesting and amusing dissertation upon his study of human nature in men's wash rooms. Colored motion pictures of Treasure Island, a sports short and a picture of the manufacture of R.P.M. motor oil were shown through the courtesy of Howard Vesper and the Standard Oil Co.



At Palomar

SAN DIEGO

The San Diego chapter has been having an active year under the presidency of *Perry Boothe*, '31, and *Martin J. Poggi*, '37, as Secretary-Treasurer. At the organization meeting in September the speaker was a gem expert, Mr. J. B. Ware of San Diego.

On Sunday, November 5, 1939, a picnic was held at Palomar Mountain. Fifteen members brought a total party of forty to enjoy the picnic facilities and the hospitality of *Byron C. Hill*, '25, and *T. V. Watterson* at the Observatory.

March, 1940

NEW YORK

The California Tech Club of New York has developed interest among men in the New York area with two interesting meetings recently. On January 26th a luncheon meeting was held at the Alice McCollister Restaurant in Greenwich Village attended by a substantial number of New York members as well as several out of town guests including *Professor Sorensen* from Tech, *Prof. Wm. Lewis*, '26, of Cornell, and "Chuck" Schweiso formerly of the Tech Y.M.C.A. The luncheon was held during A.I.E.E. Convention Week and Professor Lewis announced the nomination of Professor Sorensen as President of the American Institute of Electrical Engineers.

One of the most interesting meetings ever held by the New York group was that on the evening of February 20th at the Francis Lynn Restaurant at Central Park South. Capt. *Harold R. Harris*, '22, Executive Vice-President of Pan-American Grace Airways, was the main speaker of the evening. He described many of the interesting details in connection with the development of the "Panagra" Airway System along the west coast of South America for which he was largely responsible. Mr. Harris also brought along several reels of color movies taken at different parts of the Pan American Airway System. Incidentally the pictures were filmed by *Palmer Miller*, '24. Forty-three members and guests were present at the meeting.

SINGAPORE

Last fall on their way to India in quest of more information on the nature and behavior of cosmic rays Doctor Millikan and his two assistants *Victor Neher*, Ph.D., '31, and *William Pickering*, '32, Ph.D., '36, arrived in Singapore. What befell them there and in Rangoon is best told by quoting directly from Bill Pickering's letter.

"The day after we arrived in Singapore we had a surprise when the telephone rang and the local chapter of the C.I.T. Alumni

(Continued on page 13)

ALUMNI DANCE

The Fourth Annual Alumni Dance was held in the Biltmore Blue Room on the evening of January 27th and was attended by nearly 300 alumni, and 94 members of the Class of 1940 as guests of the Association. Members attended the dance from as far as Boulder Dam, Imperial Valley, and San Diego.

The music of Hal Lomen and His Orchestra was enjoyed by all especially the programming of the music to include pieces popular in the last two decades. In addition, numerous tunes were selected by those attending for the extra dances. The success of the dance was largely due to the efforts of the Dance Committee of which Fred S. Scott, '30, was chairman.

SACRAMENTO

During January *Glen Chamberlain*, '31, who is employed in the State Bridge Department in Sacramento, staged a little party for all the Tech men he could round up in that section of the world. *Walter Grimes*, '29, came up from Rio Vista where he is working for the USED supervising the dredging of various channels in the delta, to chin with *Moe Gewertz*, '28, and *Harris Mauzy*, '30, both of the State Bridge Department. *Bill Wheeler*, '33, who is working in the Division of Architecture checking plans for school buildings came, as did *Willard Snyder*, '39, and *Ed Sullivan*, '39, from the Bureau of Reclamation office. Three other Tech men were home with the flu and had to send their regrets. It turned out to be a lively bull session and many thanks are due to Chamberlain for getting the gang together.

CIVILS

The Navy Department has announced an examination of candidates for appointment as Lieutenant (junior grade) in the Civil Engineer Corps of the U. S. Navy. Civil engineering graduates who are interested should contact Prof. Franklin Thomas at the Institute immediately as the closing date for applications is April 15th.

Advances in Civil Engineering - A Symposium

(Continued from page 6)

being built to soften Colorado River water by the lime-zeolite process in the largest zeolite softeners ever constructed.

One of the major problems which has always confronted a water works man is the stabilizing of waters so that they will be neither corrosive or incrustant. A few years ago Professor W. F. Langelier of the University of California developed a formula whereby the hydrogen ion concentration — or pH — could be determined which, for the particular water under investigation, would cause neither corrosion or deposition in pipelines. This method of corrosion control necessitates certain analytical results of the water quality which are not always readily obtainable in a small waterworks plant. As a result, a small, continuous stability indicator has been suggested by Linn Enslow by which a plant operator can determine whether or not his water is in equilibrium so that it will neither corrode or incrust the pipes. Perhaps the greatest contribution in this field of corrosion and incrustation control has been the introduction of the chemical sodium hexametaphosphate — trade name Calgon — by which introduction of as little as one-half part per million the formation of calcium carbonate incrustation is prevented. Calgon merely inhibits incrustation and its action is probably due to certain surface-active properties of the molecules of this salt which, by the same property, appear to protect bare metal surfaces against corrosion. One of the additional advantages of Calgon is that of eliminating the necessity for recarbonation when water is softened by lime, although such elimination is sometimes more costly than recarbonation.

A decided divergence from past practice of recarbonation is the development and use at Oklahoma City of a submerged burner for natural gas. By this means the expensive gas com-

pressors, scrubbers and driers are eliminated. The results which have been obtained so far indicate that the efficiency of such under-water combustion appears to be quite high.

During the past year there has been considerable research work done on the use of chlorine in excess — or superchlorination — as a means of controlling tastes and odors in a water supply. While this is not a new idea, the recent investigations have produced much data indicating the fundamental action taking place, which will help the waterworks operator to consistently produce a satisfactory water.

In the waterworks field, as in every other branch of engineering, it is necessary to follow the current literature of the profession in order to keep abreast of the times and to progress as the world progresses.

ADVANCES IN SANITARY ENGINEERING

By RICHARD POMEROY, '26, PH.D., '31

Chemist and Bacteriologist,

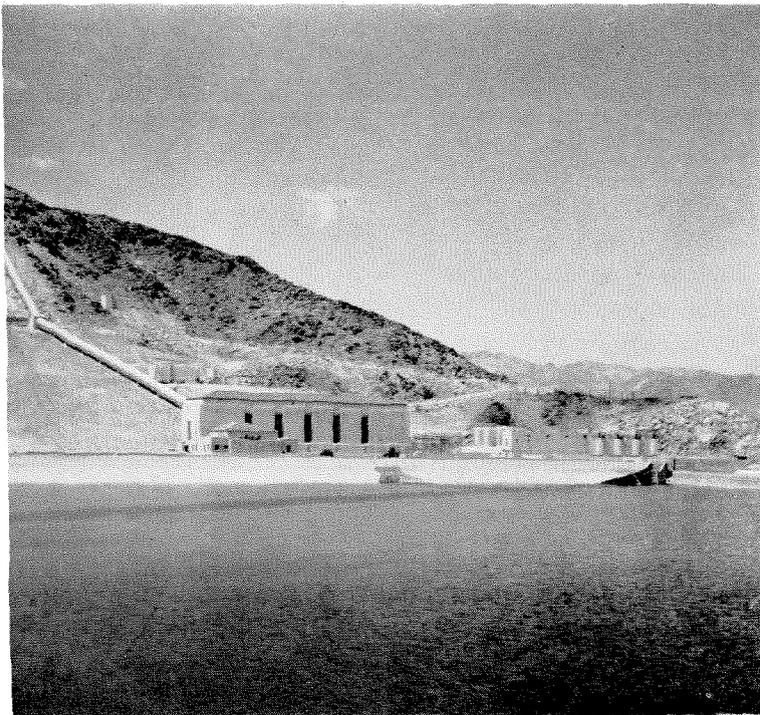
Los Angeles County Sanitation Districts.

The last decade has seen a remarkable increase in construction of sewerage and sewage treatment works. Numerous cities which 10 years ago discharged their sewage into bays and water courses with little or no treatment now are operating modern treatment plants. This is nowhere better exemplified than in Southern California, where the number of sewage treatment plants in operation has nearly doubled in 10 years.

Of perhaps more interest than the increase in the number of plants is the progress in methods of sewage treatment. The septic tank as a device for large-scale sewage treatment passed out of the picture before 1920. Its place was taken by the Imhoff tank, in which the settling solids dropped through a slot into a separate compartment where the process of fermentation or "digestion" could take place with less re-polution of the sewage stream. But now the Imhoff tank is giving way, at least in the larger installations, to plain sedimentation with separate sludge digestion. That is, the clarification of the sewage takes place in a tank having sludge removal equipment, whereby the sludge is transferred to a separate tank for digestion. A plant of this type removes 60%-70% of the suspended matter of the sewage, which is somewhat better than septic and Imhoff tanks can do. Even more important, this arrangement facilitates heating of the sludge to accelerate digestion. In 1930 there was one separate sludge digestion installation in Southern California; now there are 22.

Sanitary engineers are saying goodbye to another form of treatment which was in vogue earlier in this century — the method of fine screening. Fine screening removes only 5% - 10% of the suspended matter, and very little of the grease which is so undesirable if the sewage is discharged into the ocean or streams. Old screening plants are gradually being replaced by more efficient processes.

Biological methods of treatment continue to prove their worth in producing high-quality effluents. The biological filter, or trickling filter, vies with activated sludge. The former has a lower operating cost, but the latter produces the better effluent. The plant at Washington, D. C., and the huge Ward's Island



Metropolitan Water Dist. of So. Calif.

Mountain Pumping Plant with its forebay partially filled with Colorado River Water

plant of New York City are important additions to the activated sludge list.

Many new ideas in equipment and methods of treatment have been tried out in recent years. Mention may be made of the revival of interest in chemical precipitation, which was a popular method before 1900, and of the magnetite sand filters, in which the cleaning is aided by an electromagnet. Decisions as to the usefulness of these methods waits on the future.

Vacuum filtration of sludge is increasing in popularity in locations where density of population prevents drying on the land. The trend is strongly toward digestion prior to filtration. Elutriation before filtration, in order to reduce the chemical requirement for conditioning, is being practised in several places, as at San Francisco. Where there is not sufficient fertilizer market for the low-grade sludge cake, modern practice calls for incineration.

The utilization of gas from the sludge digesters is becoming common. The largest installation of this sort in the west is at the plant of the Los Angeles County Sanitation Districts, where engines totalling 400 H.P. are connected to generators to produce all electrical power requirements.

Engineers and scientists in the field of sanitation look on this record of progress with pride, and look to the future with anticipation of further interesting developments.

— T —

ADVANCES IN FLOOD CONTROL POLICY AND ENGINEERING

M. E. SALSURY, '25

Junior Assistant Chief Engineer,

Los Angeles County Flood Control District

Flood control as a national policy, and the resultant change in scope and standards, has been the outstanding advance in the flood control field in recent years.

This recognition has come because of the ascending national aspect of flood control, the realization of the devastating effects of the interruption of transportation and communication even upon communities far from the disaster and a growing consciousness of the need for adequate national defense.

Floods of great magnitude no longer affect only those whose families or properties are touched by it, but reach out with profound effect upon large contiguous areas. The whole nation reacts socially and economically. Witness the Mississippi Valley floods of recent years, the New England flood in 1937, and the Southern California disaster of two years ago.

To provide needed control works the question always has been "Who shall pay?" With this as in other matters of community consequence, a gradual and logical transition has taken place through

- (a) The individual living on the river felling trees along the bank to protect his land;
- (b) A neighborhood banding together to pool its efforts against a common hazard, perhaps taxing or "assessing" themselves;
- (c) A watershed or metropolitan area "district" being formed to protect cities and states;

(d) A national program authorized by Congress to combat the great flood menaces.

Each progressive method has been the result of a need, and evolved for the purpose of dealing with floods on a larger scale. Each has resulted in the ability to attack the problem more effectively with corresponding advances in engineering applications and standards.

With the advent of national participation Congress has required that each project show an economic justification, that the Federal Government should participate in the improvement of streams for flood control purposes "if the benefits to whomsoever they may accrue are in excess of the estimated costs, and if the lives and social security of people are otherwise adversely affected."

Such a policy has brought about the formulation of a rather generally accepted method of determining the economic justification of a project. When the annual flood damages exceed the annual carrying charges of providing flood protection, the improvements which accomplish flood control are justified. The cost of the improvement is readily determined. Against this is set the benefits.

In addition to direct benefits there are the indirect benefits such as prevention of loss due to interruption to transportation, loss of business, and such benefits as will accrue from a change in land use, increased property values and tax revenue. The intangible benefits are not readily determined and are reserved by the engineer as a margin of safety in his decision on justification. What value may be placed on a human life? Preventing an epidemic or sparing a community unfavorable publicity are worth some measure of flood insurance.

Advances have been made in recognizing different types of flood hazards and developing methods of combating them. An important example in Southern California is the hazard from debris floods. The tremendous damage and loss of life in the Montrose flood of 1934 was due almost entirely to debris flows. The "debris basin," or trap at the mouth of the canyon, has emerged as an effective means of removing large and floating debris from flood discharges. Control of the flood water then becomes a matter subject to hydraulic principles.

Upstream flood control, a broad term embracing preventive measures on the watershed such as fire protection, forestation, check dams, and erosion control, is rapidly gaining recognition. It is part of the national soil erosion program and is a valuable supplement to positive downstream flood control structures since it acts to prolong the life of basins and reservoirs.

Design has improved and construction methods have advanced in the flood control field as in others. With each year's increase in basic hydrologic data more accurate estimates of adequate sizes for reservoirs and flood channels can be made. Observation and continued experimentation combine to develop structures which will function more satisfactorily.

Large sums available from Federal sources have made possible the construction of entire systems of flood control, from source to outlet, of sturdy permanent structures and to standards of design and alignment wished for but only dreamed of by the engineer even a decade ago.

HIGHWAY ENGINEERING

By HARRY E. CUNNINGHAM, '26

*Highway Engineer Economist, Public Roads Administration,
Washington, D.C.*

During the past 20 years, road building has undergone many important and vital changes both in practice and in technique. The experience and skill of laymen have been gradually reinforced by the work of highly trained technical men and scientific practices are rapidly replacing rule-of-thumb methods. The engineer, the economist, the chemist, and the architect have become indispensable to modern road building.

Twenty years ago about 350,000 miles of surfaced roads served 9 million motor vehicles. But only a fraction of this mileage was of dustless or high type surfacing. Compare this figure with today's more than 1,100,000 miles of surfaced roads in the United States serving nearly 30 million motor vehicles. Of this mileage roughly ten percent is high type dustless surfacing.

Yesterday a motorist could not travel far even on the main highway system without encountering rough and dusty roads. There were many speed restrictions in the thirties and often a motorist was fortunate if his car could go that fast. But motor car manufacturers were making rapid progress in providing the public with low cost, fast and comfortably riding automobiles and today we find few States with low maximum speed restrictions. Some States have gone so far as to substitute personal liability for reckless driving at any speed without limiting the maximum allowable speed.

The earliest significant changes in highway construction occurred in design standards and in strength of materials. To the layman a batch of concrete was simply a combination of materials thrown together according to some formula and sufficient water added to make the mass flow easily. Then came scientific control developed from engineering research in the laboratories. Unheard of strengths of concrete were found possible permitting better design standards and economy of construction. It was then that one began to hear of the water-cement ratio and better testing of aggregates and cement as well as the water itself. Likewise the temperature of the aggregates, time and method of mixing, vibration compaction, and rigid control of curing with other operations all becoming essential elements of modern concrete road building.

In the field of soil stabilization and low cost bituminous

surfacing the chemist and the research analyst proved their worth. Many miles of smooth riding and non-skid bituminous roads have given the motorist a dustless enjoyable motor car trip that would not have been possible with the knowledge of the 1920 road builder. Besides providing these social benefits this use of oil has greatly benefited the oil industry of the country. The scientist has, in this way, made substantial advances in road building possible, an enterprise involving in recent years an annual expenditure exceeding a billion dollars.

But modern highway construction has gone far beyond the smooth surface and strength of material stage. Trained experts are engaged in detailed studies of highway planning. The accident experience of highways is analyzed to determine corrective measures both as to road design and as to motor vehicle equipment and operators. Present day speeds require high standards and highways built to earlier requirements are in need of modernization. Added to the rebuilding program is the problem of new arterial routes and the need to separate opposing traffic streams. The experience of one State showed for a 4-lane undivided highway 0.31 accidents per million vehicle-miles and when the highway was reconstructed to a 4-lane divided roadway the accident rate was reduced to 0.13 per million vehicle-miles. To eliminate the crossing of traffic streams at intersections, clover-leaf separation structures have proven successful as well as overhead or underpass arrangements where it is unnecessary to move from one highway to the other. Motorists want this class of highway and are willing to pay for it as evidenced by the tax burden borne uncomplainingly by vehicle owners and operators.

Unfortunately the motorist does not always receive what he pays for as constant raids are made upon the highway fund. Diversions to non-highway purposes of money collected by motor vehicle taxation reached the alarming rate of 16 per cent of the total income in 1936. These conditions greatly impede highway construction, improvement, and maintenance, and the demand for modern new highways is but a small part of the road building problem facing highway officials.

The cost of constructing a mile of 2-lane paved highway in the Twenties averaged between \$25,000 and \$35,000. In 1940 with modern standards and if the highway is to be of the dual-lane divided type its cost may run from \$100,000 to \$150,000 a mile plus the cost of bridges and grade separation structures.

A Preview of
Pennsylvania's 160
Mile Turnpike —
Which Will Have
No Speed Limit
or Intersection at
Grade



Partially Completed
Pavement and
Reinforced Concrete
Rigid Frame
Overpass.

Civil Engineering

Recently there was presented before the United States Congress a master plan of express highways providing unusual features for safety and convenience of travel on rural roads and more efficient conduct of traffic streams into and across cities with belt-line distribution roads around larger cities and by pass roads around many of the small communities. In non-mountainous areas the highway would have a maximum of 3 degree (1910 ft. radius) curves and 3 per cent grades and in mountainous sections maximum of 4 degree (1432 ft. radius) curves and 4 per cent grades. Highways of this class would cost in the neighborhood of \$200,000 a mile and would require considerable reconstruction of city street arterials where coinciding with the express highway system.

Contrary to common opinion most traffic approaching a large city wants to enter the city. All too frequently is found the case where wide and well designed rural highways stop abruptly at the corporate limits of cities forcing large volumes of traffic to enter narrow congested streets. While a solution of the problem of rural traffic is well started, the city street problem with respect to arterial routes has hardly been touched.

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The *Alumni Review* wishes to thank the American Society of Civil Engineers, publishers of "Civil Engineering," and the Metropolitan Water District of Southern California for the use of the cuts accredited to them.

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J O B S —

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LETTERS

The following letter was addressed to Stuart Seymour, '26.

Lungchiho Water Power Project
National Resources Commission
Changshow, Szechuen, China.
November 29, 1939.

Dear Stuart,

Your letter of July 18, 1939, and the "Class Letters" all reached me sometime ago. I certainly appreciated them and enjoyed reading them very much. I put my letter in and sent them to Hsiao, '26, who is now in Chungking, only 50 miles upstream on the Yangtze River. We meet each other very often.

Hsiao was recently promoted to Assistant Commissioner of the Bureau of Highways under Ministry of Communication. He is very busy reading reports and signing documents.

As for me, I am the director of the Lungchiho Water Power Project. This pro-

SINGAPORE

(Continued from page 9)

Association announced itself. This turned out to be *Bob Stirton*, '30, who is holding down the fort for the Union Oil Company in that part of the world. He said that he thought he was the only alumnus in Singapore. He and his wife then proceeded to show us the town and see that we were properly entertained. Bob had to leave for Bangkok by plane the next day so we didn't see very much of him, but Mrs. Stirton was very nice to us. Among other things she arranged a dinner at which we met the United States Consul, who had just returned from China where he had been with the Embassy in its flight up the river from Nanking to Chungking. Needless to say he had some interesting stories.

"We spent five days in Singapore and then left in the midst of a blackout the day after the sinking of the "Sirdhana" by mines in the harbor. We sailed for Calcutta via Penang and Rangoon. At Rangoon we met more people with Tech connections. This time it was *Dwight O. Smith*, '25, who is the physics professor at a Baptist College associated with the University of Rangoon. He was in Pasadena at the beginning of the year doing cosmic ray work with us, so once again we were driven around to see the sights. This time it was pagodas and Buddhas and the Burma road to China — 1200 miles from Rangoon."

ject consist of three power plants on the Lungchiho which is a small tributary of the Upper Yangtze river. The largest plant has a capacity of 38,000 h.p., with four units of 9,500 h.p. water turbine generators. The dam will be some 600 meters long and 30 meters high, which will create a reservoir of more than 25 square kilometers, with a storage capacity of 314,000,000 cubic meters. The waterway will be a 3 kilometer pressure tunnel. When this is finished, it will be the first large water power plant in China.

JAPANESE WAR

The war between China and Japan is the chief event in the Far East. By the penetration of the Jap's force into our territory she seems to be getting the upper hand. In reality we are on the winning side. Now she is stuck in the mud so to speak, and her fate is in our hands. The war may not end before the European war, but the outcome is certain that we are the victor. You Americans can help us to end this wrestling sooner, if your Senate will pass a law to prohibit the export of war materials to Japan. Our national policy is two fold, i.e., to resist Japanese invasion on one hand and to reconstruct a new China on the other. There are millions fighting at the front, but Hsiao and I are the soldiers for the latter work. If you came to China you would be surprised at the fast progress made in the past two years.

One big handicap is transportation. The traffic on the Haiphong-Kunming Railway is congested. With the non-wholehearted co-operation of the French, our goods move in very slowly. The highway through the mountainous district is a bottle neck, too. With these poor means of communication, some of our machinery ordered two years ago has not reached the site yet. We are doing our work with hand labor, and locally built things. The progress is surely slow, but the works are being carried on.

Our office is at the site. We have an engineering staff of about twenty, and about equal number of clerical staff. About one-third of the staff have their families here, forming a village of our own. We formed a glee club and athletic club to occupy us in the leisure hours.

AIR RAIDS

The location is about 50 miles from Chungking by air and is just on the air route from Hankow to Chungking. When the Japs make a raid on the latter, they always fly over us. Our system of air raid alarm is quite efficient. As soon as the Japs take the air at Hankow we know their intentions right away and make all precautions. When they are about 50 miles from us, we sound the alarm, telling the men to take cover. When we see they are gone, we come out to work again. In the night raids we don't give a damn. We just keep ourselves comfortably in bed, only the light in the vicinity is strictly under control. Though many bombs have been dropped on places some miles away from us, they never discover and bother us. Since they suffered many terrible defeats in air battles, now they dare not fly over us in the day time, but on those nights when there is a bright moon.

I think I have written enough for this time. I beg to stop.

Yours very sincerely,
Y. H. Huang, '26.

NEWS OF CLASSES

1913

Ralph W. Parkinson, who is with the Caribbean Petroleum Co. at Maracaibo, Venezuela, reports that the press accounts of the fire of the native village of Lagunillas were greatly exaggerated. The village destroyed was an agglomeration of wooden houses and shacks built on piles in the lake and had been a recognized fire trap for years which the oil companies had attempted to eliminate by offering a site on shore with the necessary utilities installed for the village, but no action had been taken by the authorities on the new facilities offered.

1918

M. J. Dowd, who is General Superintendent of the Imperial Irrigation District, has been granted an indefinite leave of absence because of ill health.

Carlyle H. Ridenour has been promoted to lieutenant-colonel in the U. S. Army Air Corps, and is now on duty at Wright Field where he is known as one of the best engineering officers in the Air Corps.

1919

Don Norwood has retired as a captain in the U. S. Army Air Corps and is living in Pasadena where he is working on some inventions.

1920

Harry P. St. Clair, who is with the American Gas and Electric Company, discussed papers on lightning protection and circuit breakers at the recent convention of the American Institute of Electrical Engineers.

1923

J. R. North, who is with the Commonwealth and Southern Corporation, discussed several papers at the recent A.I.E.E. convention in New York.

1924

Horace Gridley has formed a partnership with M. R. Dinsmore for the sale of construction equipment and furnishing engineering services for plant layout and construction yard problems, and their office is located at 535 South Clarence Street in Los Angeles.

Holly Moyses is continuing his athletic fame being golf champion of the Bel Air Country Club.

Howard W. Goodhue was married to Miss Irene Fisher on February 24th at Bryson City, North Carolina, and they are at home at 3339 Whittle Springs Road in Knoxville, Tennessee.

1925

W. G. Thompson is now a sales engineer for the Southern California Gas Company.

Linus Pauling, Ph.D., has been made a member of the committee of the John Simon Guggenheim Memorial Foundation. The committee decides on applications for fellowships in research and creative work in the fine arts. Doctor Pauling was a Guggenheim Fellow in 1926-27.

Al Newton has been elected President of the Venice branch of the Los Angeles Chamber of Commerce.

Mike Brunner has been transferred to the Los Angeles office of the Shell Oil Company.

Harold C. Sheffield has been elected historian of the Pasadena Chapter of the Reserve Officers Association.

1926

J. A. Van Den Akker, Ph.D., '31, recently visited New York to attend a paper makers' convention, and also renewed old acquaintances at the February 20th meeting of the New York alumni.

C. Hawley Cartwright, Ph.D., '30, announced the discovery of a coating for camera lenses at the December meeting of the American Association for the Advancement of Science which eliminates "ghosts" caused by the reflections from the glass surface of

+ ALUMNI SEMINAR +
APRIL 13 and 14

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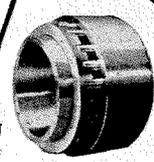
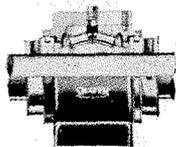
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a lens and increases the transmission of light by eliminating the reflections. His discovery was the subject of a two page spread in the February 19th issue of "Life."

Alex A. Kroneberg, of the Southern California Edison Company, delivered a paper on the Boulder dam transmission line at the recent New York convention of the A.I.E.E.

Ivan Farman, M.S. '39, has been promoted to captain in the U. S. Army Air Corps and is stationed at March Field where he is Weather Officer.

1927

C. Hewitt Dix, who is a geophysicist for the Socony Vacuum Oil Company, has been transferred from South America to the New York office of the Company.

Ted Combs, Field Engineer for the West Coast Lumbermen's Association, is a member of the Technical sub-committee of the Building Construction Division of the Los Angeles Chamber of Commerce.

John H. Maxson, Ph.D. '31, was recently elected president of the Pasadena Chapter of the Reserve Officers Association.

1928

G. Austin Schroter, who is manager of mines and exploration for the Filtrrol Corporation, addressed the Mining Committee of the Los Angeles Chamber of Commerce on February 27th on the subject of adsorbent clays.

Albert E. Lombard, Ph.D., '39, who is assistant professor of aeronautics at the Institute, addressed the Engineers' Club of Los Angeles on February 22nd on "Future Trends in Aeronautics."

1929

Kam Hu Lau is the father of a baby daughter now ten months old. He is a chemical engineer with the United States Department of Agriculture at Honolulu.

Harold Huston is now with the Southwest Welding Co. of Alhambra, Calif.

Homer Reed is now working for the Union Oil Co. of California in the Research and Development Department.

Nicholas M. Oboukhoff, Ph.D., who is on the staff of the Engineering Experiment Station of the Oklahoma Agricultural and Mechanical College, is the author of a paper, "Engineering as Action and Science," which has been published by the College.

Tom Evans, who is teaching at the University of Virginia, spent the Christmas holidays at Palm Beach, Florida.

Nicholas A. D'Arcy was recently promoted to Assistant California Sales Manager of the Machinery Division of the Emsco Derrick and Equipment Company. He has been lecturing on heavy machinery at the vocational classes sponsored by the American Petroleum Institute in Los Angeles.

James W. Dunham was recently elected judge advocate of the Pasadena chapter of the Reserve Officers Association.

1930

Ira Bechtold is now working for the Moisture Register Company in Hollywood.

John C. Shields, who is with the Constructing Quartermaster's Office at the Army Air Depot near Sacramento, was a recent visitor to the campus.

Josef J. Johnson, Ph.D., '35, who is re-

search fellow in astronomy at the Institute, discovered his first supernova with the Schmidt Telescope at Palomar last month.

H. M. O'Haver is the proud father of a son, Michael Wells, born on March 5th.

Ralph B. Atkinson, Ph.D., jointly with Emery Huse, who is with the Eastman Kodak Company, received honorable mention for scientific achievement from the Academy of Motion Picture Arts and Sciences for the development of specifications for chemical analysis of photographic developers and fixing baths which have been universally adopted by the motion picture industry.

Jack Sturgess after two years in Honolulu spent the Christmas holidays in Los Angeles and, after seeing the New Year's Day football game, spent a week in San Francisco before returning.

Edwin Green is the proud father of a baby boy born on Christmas morning.

De Wolfe Murdock has sailed for Wake Island where he is to be chief of survey party for the Navy Department during the construction of the air base.

Bill Hacker, Jr., has recently returned from a business trip to South America in the interests of the American Pencil Company of which he is export sales manager.

George Rice III wishes to announce the removal of the plant of George Rice and Sons, Printers, to 320 Crocker St., Los Angeles.

Winton Hoch of the Technicolor Motion Picture Company received honorable mention from the Motion Picture Academy of Arts and Sciences for the development of an auxiliary optical system.



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Aubrey Horn has opened offices at 2404 West Seventh Street in Los Angeles for the practice of architecture. He was formerly in the offices of Gordon B. Kauffman, and was recently appointed a member of the Technical Sub-Committee of the Building Construction Division of the Los Angeles Chamber of Commerce.

1932

Cecil L. Kilgore, who is with the United States Bureau of Reclamation, has been transferred to the Denver office where he is in charge of a group of engineers engaged in the design of the electrical control system for the power plant at Shasta Dam.

John L. Cox is now working in the Department of the Office Engineer at Balboa, Canal Zone. He is doing structural design, for a time working under **Ed Browder**, '27.

1933

Twelve members of the civil engineering class and their families were present at a picnic in Tournament Park on Sunday, November 12th. Also present with their families were Professors Thomas, Martel, Michael, and Converse. The fine display of cakes and cookies was testimony to the fact that the '33 civils picked good cooks as well as lookers.

M. E. Czamanske, M.S., is now with the Consolidated Aircraft Corporation at San Diego.

Ed Hayes has been transferred to the Los Angeles office of the General Electric Company.

Sam Johnson is with the Freeport Sulphur Company at Port Sulphur, Louisiana.

Louis A. Pipes, Ph.D., '36, who is now at Harvard University, delivered a paper at the recent convention of the American Institute of Electrical Engineers in New York. The paper was entitled "Transient Analysis of Symmetrical Networks by the Method of Symmetrical Components."

Alfonso C. Bulnes was married to Miss Mary Frances Kiley in Houston, Texas, on February 6th.

Edgar Crawford is now engineer for J. E. Haddock, Ltd., contractors on the Calhuenza freeway near Hollywood.

1934

Warren L. Patton is now a Registered Patent Agent, having recently passed the examination given by the Patent Office. He is continuing legal studies at the University of Southern California Law School, and is employed in the office of **Robert W. Fulwider**, '25, Patent Attorney in Los Angeles.

Irving P. Krick, Ph.D., was the subject of a feature article in the Saturday Evening Post for February 10th entitled "Weather for Sale."

John L. Magden, M.S., is a flight captain for Transcontinental and Western Air on the Kansas City-New York run.

Norton B. Moore, Ph.D., is lecturing on aerodynamics and airplane structures at the University of California at Berkeley.

James C. Radford is now a sales engineer for the Union Oil Company and has been transferred to Los Angeles.

1935

Robert L. Kramer and **Victor W. Willits, Jr.**, have been transferred from Long Beach to the Ivorydale, Ohio, plant of the Proctor and Gamble Company.

Henry W. Stoll is the exceedingly proud father of twin sons, Henry William and Howard Walter, born on November 28th.

Robert A. McRae, who is with the Caribbean Petroleum Co. in Venezuela, is returning to the United States this month to spend several months leave. He can be contacted at his home at 2139 South Cloverdale Ave., Los Angeles.

Lawrence Stuppy after a year of inter-ship at the Peter Bent Brigham Hospital in Boston, is now a doctor on the staff of the Worcester State Mental Hospital at Worcester, Mass.

John R. Rossum was married to Miss Elisabeth Fiscus on February 2nd at San Diego.

Horace Baker was married to Miss Victoria Solaini on December 30th.

Jesse Hobson, Ph.D., received honorable mention as one of the Country's outstanding electrical engineers at the recent New York convention of the A.I.E.E.

Charles F. Thomas has returned safely from Amsterdam where he was Technical Advisor to the Factory Representative of the Lockheed Aircraft Company.

Daniel Miller, who is with the Square D Company at Portland, Oregon, visited the campus during the Christmas holidays accompanied by his wife.

Wallace Johnson who is sales engineer for the Moore Machinery Company has been transferred to San Francisco.

1936

Maurice Nichols is now working for the Board of Fire Underwriters of the Pacific.

Malcolm Douglass has been transferred to the West Lynn works of the General Electric Company where he is working on time switches and thermostats.

Ross L. Hand is now working for the Lombard Governor Corporation at Ashland, Massachusetts.

P. Ervin Knight, M.S., has recently been transferred to New York City's new municipal airfield, La Guardia Field, where he is meteorologist for American Air Lines.

Neil Snow is a sales engineer for the Pacific Coast Aggregate Company at Niles, California.

Robert Kent is now with the Dicalite Company at East Orange, N. J.

1937

Frank A. Rechif is convalescing at his home, 2742 East 4th St., Tucson, Arizona, after a long siege of sickness contracted in South America. He would like to hear from his classmates.

Fremont F. Radcliffe is now a chemical engineer with the Great Western division of the Dow Chemical Co. at Pittsburg, Calif.

Joseph J. Peterson has returned from his wedding trip to the Philippines and is now with the Lockheed Aircraft Corp.

Dean Nichols was married to Miss Elisabeth Anne Treacy in Washington, D. C., on December 20, 1939.

Robert C. Jones expects to receive the doctor's degree from Harvard University this year where he is doing work in organic chemistry.

Jack Kinley and **Dan Schuman** are now at the Harvard Business School.

John Blue is now a second lieutenant in the U. S. Marine Corps and is stationed at San Diego.

1938

Phillip E. Saurenman who is with the Tidewater Associated Oil Co. has been transferred to Oildale.

Charles Clarke is attending the Harvard Graduate School of Business and was recently honored by being elected president of the Century Club.

Lowell Hulbirt expects to finish at the Harvard Business School and may return to work for Douglas Aircraft.

Harrison Lavender is at the Massachusetts Institute of Technology and is working for his doctor's degree in chemical engineering.

James Balsley is working for his doctorate in geophysics at Harvard University where he is a teaching fellow.

Fred Llewellyn is a Baker Scholar at the Harvard Business School. He spent last summer working as Assistant to the General Manager of the Forest Lawn Cemetery at Glendale and expects to work there on completion of his studies.

John G. McLean is a Baker Scholar at the Harvard Business School, being in the top 23 of his class. Last year he was president of the Fireside Speaking Club and this year is vice-president of the Century Club.

Bruce Elliott is a member of the Tech contingent at the Harvard Business School.

Frank B. Jewett, Jr., is a Baker Scholar at the Harvard Business School. Last year he made a trip to Bermuda as a member of the Harvard rugby team.

Calvin Muller graduated in business administration at the University of Southern California last June and is now at the Harvard Business School.

Harold Sharp was married to Miss Aleda Hill on March 6th.

Robert Davidson has recently completed a trip to Houston, Texas, in the interests of the Filtrrol Corporation.

Oran Graybeal has been visiting the mid-continent oilfields to study the continuous well logging device of the Barnsdall Oil Company by whom he is employed.

1939

James Rainwater is a teaching assistant in physics at Columbia University and expects to secure his master's degree in the fall. He intends to continue his studies having been reappointed to his assistantship for next year.

John Battle is now employed by the Board of Fire Underwriters of the Pacific.

John Black is now with the Pacific Railway Equipment Company.

Kenneth Bragg and **Stuart Fraser** are at the Harvard Business School.

Jake Brown was married to Miss Dorothy Leslie of Eagle Rock on February 17th.

C. H. Townes, Ph.D., is now with the Bell Telephone Laboratories in New York City.

1940

Collis Steele has completed his studies and is now employed by the Schlumberger Corporation at Long Beach.



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These are only a few of the things we accept today as commonplace. We expect wide, smooth, well-lighted streets. We want automatic heat in our homes; we clean our rugs with vacuum cleaners. When we go to the dentist we expect him to use an electric drill; we accept without comment an X-ray examination as part of a medical check-up. Luxuries? Not at all; they're part of the American standard of living.

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