lamp bulbs themselves are exposed to varying degrees, depending on the size of bulb and type of reflector. This presents a series of bright spots down the thoroughfare which counteracts some of the benefits gained through better illumination by offering such intense contrast with the surroundings that actual visibility is decreased. Emphasis in the design of the radial wave reflector seems to have been placed on obtaining an apparently efficient illumination curve with little consideration of visibility or of uniformly distributing the light up and down the street.

This analysis has led to several obvious improvements which should be incorporated into a new design. The light ordinarily directed downward by the bowl of the reflector and that ordinarily passing into house windows directly behind the lamp should be redirected up and down the road. The cut-off angles on the reflector should cut off direct rays from the filament at a greater angle with the horizontal and a backdrop should be provided to redirect those rays which would ordinarily shine into adjacent house windows. The preliminary designing was begun at this stage with the general objective of redirecting upward rays from the lamp filament and rays which would ordinarily shine into windows of adjacent houses out to areas where the illumination is weakest.

THE DESIGN

Rough sketches were made through various sections of the reflector to help develop the general form. A clay model was then made as an aid in visualizing the transitions between sections and the form as a whole. As a rough approximation of the reflector the model was now considered in relation to the manufacturing process. A slip casting in a one piece mold with a small amount of hand finishing was the obvious method for producing the reflector. As the reflector consisted of two halves which were mirror images of each other and whose axial plane was perpendicular to the thoroughfare, an accurate model had to be made and production molds taken off this.

With the general form of the reflector determined, a full scale drawing was next made, showing several sections through the center. First a full-scale section drawing was made of the standard base adapter into which the neck of the reflector must fit. Then the removable lamp socket and lamp were drawn in position and the position of the filament carefully located. The neck of the reflector was designed to fit the standard clamp adapters in the base and to distribute the stress over as large an area as possible. The neck of the reflector was tapered out from the base to the bowl of the reflector so as to provide sufficient clearance around the bulb for the tongs used by repair men in replacing bulbs. The shape of the reflecting surfaces was determined graphically, using the center of the filament as the light source. The bowl of the reflector was designed as illustrated in *Fig. No. 1*, to redirect the upward rays to areas between adjacent lamps on the street where the light intensity is weakest, instead of directing these rays straight down. The backdrop and aprons were developed in a similar manner with the same objective of redirecting as much light as possible to distant points, again illustrated in *Fig. No. 1*. Additional means of more efficiently distributing the light, such as by louvres in the neck of the reflector and a reflecting surface directly under the bulb, were considered, but eliminated because of production costs and difficulties in servicing.

PRODUCTION AND TRIAL

The working drawings were submitted to a manufacturer of ceramic products and discussed in regard to production and costs. Materials and glazes were suggested and slight revisions were made on the neck of the reflector to eliminate as much hand trimming as possible. A drawing was next made to shrink scale for the mold shop. From this drawing a plaster model was made and then a one piece mold was cast around the model. In the finished mold the first piece was slip cast. A pottery body was used, because of its low cost and relatively high shock resistance. After trimming and drying, the piece was fired and glazed. Clear glaze was used on the reflecting surfaces and green glaze to match the adapter was used on the outside. The reflection characteristics of the less expensive clear glaze over the light cream pottery body compared so favorably with a white glaze that it was finally selected for the inside surface.

The finished reflector was mounted in a standard base adapter, provided with a standard bulb, and given a check test in the photometric laboratory. Distribution curves showed too great a concentration of rays directly below the reflector, dictating a slight modification of the reflecting surfaces. The suggested revisions were sent to the mold shop, where the original model was altered to the new specifications. A new mold was cast around the revised model and several reflectors were cast. These were fired, glazed, and tested again. A sample unit was installed by the Pasadena Light and Power Department (see *Fig. No. 2*). Initial tests have indicated a great improvement in the general light distribution and visibility in the vicinity of the reflector as compared with that of comparable standard reflectors now in use.

C. I. T. NEWS

A CAMPUS TALE

By R. W. SORENSEN

THREE inducements caused me to answer, way back in 1910, a request from Cal Tech, then Throop Polytechnic Institute, that I consider joining its staff as the Electrical Engineering faculty. These were Dr. George E. Hale, as a member of the Board of Trustees, Dr. James A. B. Scherer, as President of the Institute, and the declared college policy of making the humanities, as they are taught at C.I.T., a large part of the entire four-year undergraduate curricula. Reminiscences concerning these arguments were brought to the fore a short time ago, when during some of my east coast rovings, I had dinner with a group of Cal Tech alumni in Washington, D.C. The group was small and the meeting took on the nature of an old-acquaintance get-together for a few of the many C.I.T. graduates who are now in Washington. Each one who partook of the excellent steak dinner was stimulated to the point of contributing some tale relating to the good old days when he was a student on the campus at 1201 East California Street. When my turn came, I told the tale of how Cal Tech got James A. B. Scherer for its president. Those present seemed keenly interested so I venture to tell the same tale to all alumni who read these pages, hoping that at least those who were students and knew Dr. Scherer during his presidency will find the tale as interesting as did those who heard it at our Washington meeting.

My first knowledge of Throop and Dr. Scherer was obtained when I considered joining the faculty being formed at the time Throop Hall, the first building on the present campus, was opened. Naturally, not knowing Dr. Scherer, I endeavored to learn something of his biography and discovered immediately that before going to Pasadena he had been president of Newbury College in

South Carolina. A contact with some of my friends in Pittsfield, Massachusetts, where I then lived, who had come there from South Carolina, brought forth from them very high praise for Dr. Scherer and comments of surprise when they learned that he had gone to Southern California.

Soon after I went to Pasadena and became acquainted with Dr. Scherer. I asked him how he became interested in Throop Polytechnic Institute and received from him information as follows:

He had conceived, as president of Newbury College, the idea that its curricula should include engineering subjects properly arranged with the liberal arts courses in such a way as to produce men of culture capable of doing engineering work. Knowing of the interest that Andrew Carnegie had in colleges of the type he had in mind, he decided to pay Mr. Carnegie, who at that time was in Scotland, a visit for the purpose of trying to interest him in helping finance his Newbury College Program.

Dr. Hale, who was well known to Mr. Carnegie because of the contracts he had as Director of the Carnegie Solar Observatory in Pasadena, also paid a visit at the same time to Andrew Carnegie in Scotland to discuss observatory matters and no doubt to also talk to him about his new interest of developing on the Pacific Coast the technical college which is now California Institute of Technology. In making these visits, and I think while crossing the ocean on the same boat, Scherer and Hale became acquainted. That acquaintance seemingly resulted in a discussion of their common educational interests which developed into the formation of a firm friendship and a request by Hale to Scherer that he accept the presidency of Throop Polytechnic Institute, the offer of course, as shown by future developments, being accepted.

As we closed the conversation which gave me the above information, Dr. Scherer showed me a leather-bound note book on the cover of which, in gold letters, were the words, "The First Half Million." I never saw inside the book but the seed planted therein by Dr. Scherer, Mr. Flemming, Dr. Norman Bridge, and other members of the Board of Trustees must have all been good seed that fell on good ground as evidenced by present-day activities.

One of the casualties of World War I was Cal Tech's president. When Dr. Scherer was called as a "Dollar a Year Man" to be one of the nation's Paul Reveres, he responded to a degree which threw him into ill health and forced his retirement as president but he never lost interest in the college and his faculty. Always, whenever we met he made inquiry about the progress of the college and the welfare of those who served with him during the first decade of college life on the present campus.

SPRING SPORTS

By HAROLD Z. MUSSELMAN
Director of Physical Education

AS this article is written, we are about halfway through our Spring Sports schedule in track, baseball, tennis and golf.

Coach Dr. Floyd Hanes' track athletes have been more than holding their own against the stiffest competition. To date they have won two and lost two dual meets, won the southern California relays, and placed third behind U.S.C. and U.C.L.A. in the A.A.U. meet.

Gathering eight first places and the relay, Tech emerged with an 82½-48½ victory over the combined southern California junior colleges in the opening dual meet. Clean sweeps were made in the discus, javelin and 2-mile.

In the southern California college relays, the engineers dominated the college division, scoring 56 points, followed by Oxy with 25¼ and Redlands 18. In the relay events, the Beavers captured the distance medley, 4-man 880, and open mile, while placing second in the novice 4-man mile and the shuttle hurdles. Tech men also won the open 100, shot, discus and high jump, while four second places were gained in the open events.

In the major dual meets, Cal Tech bowed to U.C.L.A. 72-59 and to U.S.C. 74-57. In each of these meets, the Beavers won only five events, but placed two men in nine events and copped the relay.

The Tech team placed a close third in the Southern Pacific A.A.U. meet which featured the cream of civilian and service athletes in southern California. Tom Carter placed second in both the 100 and 220. Gill Kuhns grabbed a second spot in the 440, while Bernie Wagner and Stan Barnes took second and fourth in the half. In the relays, the Beavers finished in second spot just behind U.S.C. in the mile, and placed third in the 4-man 880.

Capturing the relay by inches in a photo finish, Tech nosed out Oxy 67⅓ to 63⅔ to annex the mythical Southern California Conference track championship. Of the nine first places won by Tech, two established new school records. Don Tillman with a heave of 47 feet three inches broke the shot put record of 47 feet, three-eighths inches established by Bill Shuler in 1932, while Folk Skoog's 1932 record of 1:58.7 in the half dropped when Bernie Wagner toured the two laps in 1:58.4.

The baseball team is having difficulty in getting started. Opening the league season with an 8-5 win over Pepperdine, successive games were dropped to U.C.L.A. 20-1, Oxy 3-2 and U.S.C. 9-4. After the U.C.L.A. rout, a revised lineup played the best game to date against Oxy. However, inexperience and a multitude of errors are a severe handicap to the team. The teams in the league appear rather evenly matched, and most of the games have been close. At present U.S.C., U.C.L.A. and Redlands are tied for first place in the league standings.

As U.S.C., U.C.L.A. and Cal Tech are the only schools with teams in tennis and golf, our contests in these sports are rather limited. In tennis, the Beavers dropped matches to U.S.C. 8-1, 6-3 and to U.C.L.A. 7-2. Stan Clark, playing first singles, has proved the class of the collegiate players in southern California by winning all his matches. The golf team appears to be headed for an undefeated season, having defeated U.C.L.A. 16½-10½ and U.S.C. 19-6.

NEW YORK CHAPTER MEETINGS

WITH many of the members of the New York Chapter working long hours, traveling out of town, etc., it has not been easy to get together, but in spite of the difficulties, they have had three successful meetings.

On Saturday night, April 22, a group of about 35, including several ladies, held a dinner meeting at the Hotel Holley. Dr. Sorensen and Dr. Houston spoke briefly regarding their current activities, and of Institute affairs.

The main feature of the evening was an address by Dr. Ray Untereiner who is on leave of absence from the California Institute and now associated with the National Association of Manufacturers as economic adviser. He presented an inspiring picture of what could be accomplished by combining a huge potential postwar market with our tremendous manufacturing capacity to bring about a degree of prosperity and a standard of living beyond anything this country has ever known. All of this can be realized, he said, but only if definite advance preparations are made and favorable conditions are provided to insure confidence and incentive on the part of both labor and industry, and all other components of the consuming and investing public as well.

Dr. Untereiner pointed out that in contrast with the situation in the last war, manufacturing industries in general are now fully awake to the absolute necessity for postwar planning, and have already made substantial progress including actual appropriations for specific reconversion or peacetime projects. Furthermore, industry, recognizing the benefits of a free competition, is determined that monopoly shall have no place in the postwar setup. Likewise industry is now thoroughly converted to a liberal view toward labor and social security problems.

The address was followed by an instructive and enjoyable period of questions, answers, and discussion.

The first meeting of the year was held on November 19 where the chapter was entertained, following dinner at the Hotel Holley, by sound color movies showing the story of the production of petroleum products and the construction, operation, and maintenance of pipe lines, featuring particularly the "Big Inch" line of the War Emergency Pipe Lines, Inc.

The second meeting was held on January 26, at which time Dr. Sorensen described the latest setup and activities at the Institute.

The last meeting will probably be held in June. The president for the year has been Harry P. St. Clair, '20.

ANNUAL ALUMNI SEMINAR

THE Seventh Annual Seminar of the Alumni Association was held on the campus Sunday, April 16, with an attendance of 130. The success of the event was due largely to the efforts of Leonard L. Snyder, '27, and the members of his Seminar Board.

The morning session was opened by chapel conducted by Paul Ackerman, Y.M.C.A. secretary on the campus. The Reverend George A. Warmer, pastor of the Methodist Church, gave an inspiring address.

Professor Clark B. Millikan spoke on the topic, "The Activities of the Aeronautics Department in Cooperation with the Airplane Industry." This was followed by a discussion, "Unions and the Engineer," by Professor Robert D. Gray who presented the legal aspects, and by Professor Franklin Thomas who described the bargaining units that have been created by the American Society of Civil Engineers.

At 12:00 the group gathered at the Athenaeum for luncheon. Ernst Maag, president of the Alumni Association, introduced several guests, including Rear Admiral Ralston S. Holmes and Lieutenant Commander E. W. Mantel. James R. Page, president of the Board of Trustees, gave a broad view of Institute affairs, and Harry J. Bauer, a member of the Board of Trustees, spoke on "The Southern California Power Problem." John E. Michelmore, '26, sang several selections, accompanied on the piano by Paul E. Noll, '25. The luncheon period was closed by the group singing the alma mater song.

Professor Brighouse, who has been secured to give a course in psychology at the Institute, spoke on the subject, "New Frontiers of the Mind." The Seventh Annual Seminar was then closed at 3:00 with a few remarks by Dr. William B. Munro.

PERSONALS

1913

R. W. PARKINSON, who for some time has been chief engineer of the Caribbean Petroleum Company located at Maracaibo, Venezuela, has been located in New York for several months as American representative of that company. He recently returned from a three months tour of several South American countries.

1918

CORLISS A. BERCAW has been appointed to the position of assistant general manager of the Elliott Company's Springfield, Ohio, division. He was a naval ensign and aviator in World War I, and joined Westinghouse as an engineer after his discharge from service, becoming a special representative of the Diesel engine division. He was associated with the Baldwin Locomotive Works as sales manager of Diesel locomotives and later as production manager of the Diesel engine division before joining the Elliott Company. He is married and has two children.

1919

PAUL A. SCHERER is chief of the engineering and transition office, national Defense Research Council of the Office of Scientific Research and Development in Washington.

1921

CHARLES F. QUIRMBACH was appointed assistant electrical engineer of the Pacific Railway Company, Los Angeles, in March.

1922

F. L. HOPPER is with the Western Electric Company, Electrical Research Products Division, and has returned recently to Hollywood after six weeks in New York in connection with a project for the National Defense Research Council.

GERALD G. SPENCER is still assistant superintendent of the Fred C. Nelles School for Boys at Whittier. He is in charge of business management and engineering, a training program for delinquent boys.

1924

LIEUTENANT COLONEL EDWARD LOWNES is in charge of all Army construction in British Columbia, with headquarters in Prince Rupert.

1925

OSCAR S. LARABEE is now stationed at the Office of the Chief Engineer, General Headquarters, Australia. He is in charge of camouflage for that theater of operations and finds it extremely interesting work.

1926

MAJOR ARTHUR B. ALLYNE has been assigned at the Edgewood Arsenal, Md., as an executive officer of the Inspection Division, Office of Chief, Chemical Warfare Service. He travels around the country a great deal of the time on materiel surveys and inspections.

STANLEY C. VAN DYKE is the new president of the Pasadena Chamber of Commerce. He is a distributor for the Tidewater Associated Oil Company.

LIEUTENANT COLONEL STUART L. SEYMOUR was promoted recently from the rank of major in the Coast Artillery. He held a reserve commission as captain in that service and went on active duty at Camp Callan in April, 1941, being transferred to Camp Haan in the summer of 1942. He was line coach of the Caltech football team from 1930 to 1940.

1927

C. KENYON WELLS is division engineer in the Long Beach Water Department. He is married and has two sons, 7 and 11 years old.

DR. HALLAM E. MENDENHALL, of Summit, N. J., has been appointed manufacturing engineer by the Kearny Works of Western Electric Company. He will have charge of engineers assigned to the manufacture of vacuum tubes. For the past 10 years he has been engaged in electronics research and vacuum tube development at the Bell Telephone Laboratories in New York.

1928

NICHOLAS D'ARCY left the E. M. Smith Company recently and is now employed by the Carter Company.

MAJOR ED JOUJON-ROCHE is temporarily stationed at Camp Santa Anita.

1929

LIEUTENANT COLONEL ALLEN W. DUNN is now director of training on the staff of Brigadier General L. W. Miller at Camp Sutton, N. C.

WILLIAM LITTEL BERRY has been promoted from major to lieutenant colonel.

1930

LIEUTENANT J. H. MacDONALD, U.S.N.R., is attached to degaussing, San Pedro, Calif. He is married and has two children.

H. H. DEARDORFF has returned to his duties as resident engineer for the State Division of Highways at San Francisco after a few months work on a Navy project at the Institute.

1931

LIEUTENANT (j.g.) LARRY FERGUSON contracted a tropical disease while on convoy duty in the Caribbean area, and convalesced at the Boston Naval Hospital. He is now again on active duty.

1932

WILLIAM H SAYLOR is employed at the California Institute of Technology. He is the father of a son, Richard Clarke Saylor, born May 30, 1943.

1933

JOHN D. MENDENHALL has been administrative engineer of the Birmingham Modification Center for several months.

1935

JACKSON EDWARDS and Patricia Burr were married in November, 1942. He is chief engineer for Air Associates, Inc.

ROBERT M. STANLEY, chief test pilot of the Bell Aircraft Corporation in Buffalo, New York, was the first in America to fly the new jet-propelled airplane. The May 6 issue of Saturday Evening Post carried an interview with Mr. Stanley describing the flight.