

Late in 1831 two oblong plates, drawn by I. Shaw and aquatinted by S. G. Hughes, were published by Ackermann, each measuring 26 inches by 8 inches. Both are entitled "Travelling on the Liverpool and Manchester Railway" and depict two trains, one above the other (see plate). The "Train of the First Class of Carriages, with the Mail" is hauled by the "Jupiter," a locomotive of the "Planet" class, incorrectly shown with four equal wheels, and has a comparatively modern-looking four-wheeled tender. The "Train of the Second Class, for outside Passengers" is drawn by the "North Star," an improved "Rocket" with the primitive water barrel tender. The engine of the "Train of Wagons with Goods, etc., etc.," named "Liverpool," is of the "Bury" type with coupled wheels. This engine ran on the line for some little time in the early days, but never became the property of the company. The locomotive of the "Train of Carriages with Cattle" is an excellent representation of the "Fury," which had a splashers on the driving wheels and a respectable tender with a cast-iron frame.

The original plates from which these prints were struck, were later reworked, and at least three states of the impressions exist, each with minor variants.

## MODIFICATIONS IN THROOP HALL

During the past few years there have been several modifications to Throop Hall. Most alumni will remember that the entrance lobby to Throop Hall was graced by Apollo. The space which he had dominated for so long became desirable for an expansion of the accounting office, so he was moved to the fresh air on the covered area between Throop Hall and the Kellogg Laboratory.

During the war it became necessary to expand the business office. This expansion made use of the north and south hallways on the first floor as a temporary accommodation for office workers. With the construction of the Mechanical Engineering Laboratory in the winter of 1944-45, the space at the north end of the second floor of Throop Hall, occupied by the mechanical engineering offices, was transformed into business offices.

The offices on the west side of the south hallway on the first floor have been modified to accommodate the assistant comptroller, the chairman of the Board of Trustees, and a conference room.

The Engineering Division office is now located on the large stair landing area between the first and second floors. This office was also used prior to July, 1945, as headquarters for E. S. M. W. T. courses.

One very significant change is the removal of the book store from its former location to the northeast corner of the basement floor of Throop Hall. The new quarters are indeed elegant. In fact, it appears to have been transplanted from a modern department store. Beautiful oak panelled display cases and cabinets, illuminated by fluorescent lighting, present a definite sales appeal. Adequate space is also provided for the maintenance of stocks of books and supplies. This book store is provided with an entrance from the walk on the east side of Throop Hall. To provide space for the book store, the Soil Mechanics Laboratory was moved into the space formerly occupied by the athletic office and the athletic office was moved to the area formerly occupied by the Department of Construction and Maintenance engineering group.

The area formerly occupied by the book store on the first floor has now been taken over by the Registrars Office.

## INSTITUTE LOSES HARRY BATEMAN

**P**ROFESSOR Harry Bateman, world-famed Caltech mathematician who collaborated on the theory of relativity with Dr. Albert Einstein, died suddenly January 21, 1946, en route to New York.

Professor Bateman, according to California Institute of Technology colleagues, "was probably the most widely quoted faculty member, his researches in pure mathematics being internationally acclaimed."

He was stricken on the train as he and his wife were en route to New York to be guests of honor at a dinner, following which the scientist was to be made a Fellow of the Institute of Aeronautical Sciences, and receive a medal for his contributions to aeronautics. Renowned as a chess player, he had participated in many international matches.

A member of the Caltech staff since 1911, Dr. Bateman was unique in holding full professorship in three fields—mathematics, physics, and aeronautics. In 1904-1905, he was so close to the discovery of the special theory of relativity that he, instead of Dr. Einstein, might have been given credit for the then revolutionary concept.

The author of many standard higher mathematics texts, his "*Partial Differential Equations of Mathematical Physics*" is the best known. His contribution to aeronautics, according to Professor A. D. Michal, an intimate colleague, was vital, in that his work in fluid mechanics was a basic factor in airplane design.

Born in England sixty-three years ago, Professor Bateman was graduated from Cambridge, studied in France and Germany, and served at one time on the staffs of Bryn Mawr and Johns Hopkins. He was honored by being elected a Fellow of the Royal Society, England, and a member of the National Academy of Sciences in this country. His name is among the select group whose names are starred as pre-eminent in "*American Men of Science*," the American scientific "who's who."

Besides his widow, Mrs. Ethel Bateman, he leaves a daughter, Joan Bateman, a sister, Miss Annie Bateman, and relatives in the east.

## DU PONT COMPANY FELLOWSHIPS ANNOUNCED FOR 1946

The Du Pont Company has announced plans to award the following university fellowships in 1946: forty-two post-graduate fellowships in chemistry; five in physics; fifteen in chemical engineering; and seven in mechanical engineering. Six post-doctoral fellowships in chemistry are also included. As in the past, the selection of the fellows, as well as the problems on which they shall work, is left to the universities.

Each post-graduate fellowship provides \$1,200 for a single person, or \$1,800 for a married person, together with an award of \$1,000 to the university. Among the universities listed to receive the post-graduate fellowship awards in chemistry are: Brown University, California Institute of Technology, Columbia University, etc.

## Minkler Tells Alumni of Oil at War

**A**T the January meeting of the Alumni Association held at the University Club in Los Angeles, Mr. R. L. Minkler, vice-president and director of the General Petroleum Corporation of California, spoke on the subject "Oil at War."

Immediately following "Pearl Harbor," Mr. Minkler spent approximately fifteen months in Washington, D. C., as director of Petroleum Supply of the Petroleum Administration for War, on leave of absence from the corporation. From this point of vantage he participated in the mammoth job of supplying the armed forces with the "sea of oil" upon which the United Nations "floated to victory."

The astronomical size of the job done by the petroleum industry is illustrated by the facts that two-thirds of all tonnage shipped overseas consisted of petroleum products, meaning that petroleum shipments were over two times as great as the total tonnage of all arms, munitions and supplies, and sixteen times as great as the tonnage of all foods shipped abroad. For a single Pacific amphibious campaign, the Navy's Service Squadron 10 supplied enough oil to fill a train of tank cars 238 miles long with enough oil left over to heat 10,000 homes. To keep our planes in the air—a staggering job considering that a single B-29 uses enough gas in one hour to supply the needs of an average civilian for five and one-half years—the industry stepped up aviation gas from a prewar capacity of 30,000 barrels per day, to 616,000 at the peak of operations. So successful was the job of supply that at no time did the armed services lack for oil.

In addition to supplying the armed forces, the industry was faced with the task of delivering 1,500,000 barrels per day to the East Coast from the Gulf Coast, the same physical feat as transporting the total daily steel production of the United States which is approximately 250,000 tons over the same distance. Although the East Coast reached a point where supplies were reduced to a two-day level, the oil was delivered. According to government authorities, if the supply to war industry had failed we would have lost the war.

Most astonishing fact about the successful accomplishment of the battle of oil was that the work was done without new equipment, through pooling, organization and the joint use of industry facilities. An example of one expedient used to solve the transport problem involved a government ruling that loaded tank cars might move north or east, but that no loaded cars might move south or west. This device prevented duplication of oil flow. In effect, the petroleum industry, by encouraging the abundant—even extravagant—peacetime use of oil in the United States, built a plant structure capable of taking in slack to care for expanded war needs. Thus, what is sometimes called the "competitive inefficiency of the private enterprise system" actually proved the saving factor which allowed us to pull in our belts and out-produce the planned economies of the Fascist states.

This same competitive system within the petroleum industry carried on development and exploration at a rate providing the United States with her greatest oil reserve of all time at war's end. However, the existence of these reserves does not mean that our supply is inexhaustible, for consumption has grown faster than production. During the years from 1942 to 1945 we used 20 per cent of all oil produced in our history. In spite of this ever-expanding consumption, Mr. Minkler predicts that the oil industry, operating as it has in the past,

and expanding at a rate which produced 975,000 barrels per day in 1918 in all of the United States as compared to 1,002,000 barrels per day in 1945 in California alone, will discover new fields, invent new processes, or extract oil from natural gas, and that oil will serve us as well in peace as it has in war.

## Caltech Conference Standing Good

By H. Z. MUSSELMAN

Director of Physical Education

**P**ASSING the halfway mark in the basketball schedule, Caltech has won two out of five Conference games, to place the Engineers third in the league's standing, just behind Redlands and Occidental. The Conference teams are well bunched this year, and no league game has been won by more than a six-point margin. While the Tech team may not top the Conference in the final standings, they have an excellent chance to improve their position in the three remaining league contests.

In the opening games, the Engineers annexed two close victories in winning from Whittier 30-29, and from Occidental 37-25. Redlands grabbed two torrid contests, both by four-point margins, 51-47 and 43-29, while Whittier in the return encounter annexed a 43-38 victory.

The Beavers have not fared as well in non-Conference engagements, having dropped all their games with U.S.C., U.C.L.A., Pepperdine, March Field and Camp Ross.

The team has been playing a good floor game, but the lack of consistent scorers has been a distinct handicap. The men have been getting the shots, but have not been able to connect.

A full card of contests with southern California Conference schools has been scheduled in spring sports. With only forty Navy trainees on the campus, the Intercollegiate teams at the Institute now will be composed mainly of civilians. All squads will be inexperienced, as there are practically no lettermen in school who were members of our 1945 teams. However, several track and baseball men who made their letter before the war, are planning to return, and should form the backbone for good squads.

## John J. Lund is New Institute Librarian

**D**R. JOHN J. LUND, formerly university librarian at Duke University, has joined the staff of California Institute of Technology as Institute Librarian.

Born in Denmark in 1906, Dr. Lund, now a U. S. citizen, came to the United States in 1910, and to California in 1912. He received his A.B. from the University of California in 1928, and his Ph.D. in Comparative Philology from the University of Chicago in 1932.

From 1936 to 1938 Dr. Lund was library assistant and instructor in Scandinavian languages at U. C. L. A., and from 1938 to 1943 he was associated with Duke University as Head of Order Department and University Librarian. During the late war years, Dr. Lund proved his versatility, and participated directly in the war effort by his work as a machine designer in Oakland, California. Victims of the housing shortage, Dr. Lund's wife and two children are still in Oakland.

Among Dr. Lund's publications are: "The University

Library: *Some Thoughts About Its Past and Some Questions About Its Future*," done in collaboration with Gustave O. Arlt; "*The Cataloging Process in the University Library: A Proposal for Reorganization*"; and "*The Undergraduate in the University Library*."

### Former C. I. T. Meteorologists Forecast Japanese Weather

A RECENT letter to Paul E. Ruch, Associate Professor of Meteorology at the Institute, from Captain C. E. Erickson, former instructor in Meteorology at California Institute of Technology, describes the part played by the weather forecasters in helping to defeat Japan. The reference in the following excerpt from the letter is to the contribution of Captain Loren W. Crow, formerly of C. I. T.:

"I would like to say a word about Crow's work at Guam. I took over for Crow for about three weeks before the war ended while he went back to Hickam for a rest leave, and I know fully well what he contributed to the efforts of the 20th Air Force in defeating Japan. The staff officer relayed Crow's outlooks for coming operations verbatim to the general staff, and the general staff relied almost wholly upon the weather forecast to do their planning. I don't mind going on record to say that no individual forecaster contributed more to the success of the operations of the 20th than did Doc. I can get plenty of men to back that statement, too. Colonel Seaver, the staff officer, relied very heavily on Crow for the dope and had great confidence in him.

"When you next see Crow, don't let him off with his modesty. If Crow had come back a week earlier he would have made the forecast for the Atomic Bomb. As it was, I made the forecast for it five days in advance, and at the time Colonel Seaver said it was the longest operational forecast that had been carried through without a hitch. However, by that time the semi-permanent high was sitting over the empire, and it was little trouble to forecast, in comparison with the obstacles that Crow bucked through the winter and spring."

### C.I.T. Student in Siamese Army

The Royal Thai Legation in Washington, D. C., reports that Charoen Vadhanapanich, for two years a member of the class of 1944, now holds the rank of captain in the Royal Siamese Army.

Leaving C.I.T. in the fall of 1943, Vadhanapanich received training from the United States Army, where he became a qualified paratrooper. He was then commissioned as an officer of the Free Thai Military Unit which was formed in this country during the war. Overseas, he entered Siam, which was still under Japanese occupation, and there Vadhanapanich helped in organizing underground resistance and in securing information about the enemy which was transmitted to the Allies.

### Letters to the Editor:

*Caltech Alumni Association:*

I would like to suggest that Tech graduates do a little more "horn blowing" as a matter of common pride. One simple idea would be to make "Caltech" car windshield stickers easily available to alumni. Perhaps these could be given out annually with dues renewals by some means.

I would like to obtain such a sticker, but have not made the special effort to get one. Perhaps others have found the same. Why not?

(Signed) R. J. Hallanger '35

For any interested alumni, Caltech windshield stickers may be obtained from the Institute book store. Order by mail, enclosing 10c to cover handling costs.—Editor.

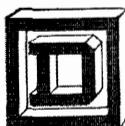
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## Dr. Harlow Shapley Visits Campus

**D**R. HARLOW SHAPLEY, president of the American Academy of Arts and Science, director of the Harvard Observatory, and from 1914 until 1921 a member of the staff of Mt. Wilson Observatory, recently made an informal report before the weekly faculty seminar at the California Institute of Technology. The report covered Dr. Shapley's trip to London and the background leading to the formation of "Unesco," the United Nations Educational, Scientific and Cultural Organization.

An outgrowth of sentiment for an International Office of Education, "Unesco" has received support from such diverse groups in this country as the Chamber of Commerce, the C. I. O., the Brotherhood of Pullman Porters and a total of over 50 organizations. Of these organizations, Sigma Xi Fraternity was the first to endorse the idea of an International Office of Education. At Dumbarton Oaks, the Chinese went on record that such an organization was necessary, and at San Francisco a resolution incorporating the basic points of the Taft-Fullbright Bill, providing for an International Office of Education, became a part of the record.

At the London Conference in November of 1945, attended by representatives of 44 nations, a constitution was drafted which provides for "promoting collaboration among the nations through education, science and culture in order to further universal respect for justice, for the human rights and fundamental freedoms—by instituting collaboration among the nations to advance the ideal of equality of educational opportunity without regard to race, sex or any distinctions, economic or social; by suggesting educational methods best suited to prepare the children of the world for the responsibilities of freedom—by assuring the conservation and protection

of the world's inheritance of books, works of art and monuments of history and science—by encouraging cooperation among the nations in all branches of intellectual activity, including the international exchange of persons active in the fields of education, science and culture—by initiating methods of international cooperation calculated to give the people of all countries access to the printed and published materials produced by any of them." The "Unesco" constitution provides for the necessary machinery of financing and administering activities and shall come into force when it has been accepted by the governments of 20 of the United Nations.

It is Dr. Shapley's hope that because of the long record of international cooperation in science—there have been over 1,000 scientific international meetings or congresses held to date—"Unesco" may be successful in establishing a workable pattern for other types of international cooperation. He believes that the present "Unesco" constitution is an excellent start toward the fulfillment of this objective.

## Harry Cunningham '26

Harry Cunningham, who has been connected with the U. S. Bureau of Public Roads for 15 years, and successively held ratings as senior engineer and senior economist, has now added another title to his collection. Following completion of a law course at George Washington University, Washington, D. C., and admission to practice before the District Court of the United States and the United States Court of Appeals, he has been given a rating as senior attorney and appointed assistant chief, division of contracts and claims of the Public Roads Administration where his engineering experience should prove very valuable.

As a student, Mr. Cunningham was wrestling manager and boxing coach.

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