

CAMPUS NEWS

TECH GRADUATES 238

Two hundred and thirty-eight students were awarded degrees at the annual commencement exercises held on June ninth on the campus lawn beside the Athenaeum. Thirty-two degrees of doctor of philosophy were given, fourteen of the candidates having been recipients of earlier degrees from the Institute, seventy-eight received degrees as masters of science, thirteen became bachelors of science in the five year courses of aeronautics and meteorology, and one hundred and fifteen received bachelor's degrees.

Of the graduating seniors, eleven were awarded Honor Keys for participation in student activities, and nine were graduated with honor by vote of the Faculty. Roderick M. McClung was the only graduate honored by both Faculty and the Student Body.

William C. Mullendore, Executive Vice-President of the Southern California Edison Company delivered the commencement address entitled, "Opportunity in the Forties," in which he touched on the American system of freedom and current trends. The Most Reverend John J. Cantwell, Archbishop of Los Angeles, delivered the Invocation and Benediction.

The degrees were conferred by Dr. Robert A. Millikan, who also delivered a report on the progress of the Institute and elaborated on the purposes of the new labor relations department.

Grand Coulee Pumps

One of the most important engineering research projects now under way on the campus are the pump testing investigations being made for the pumping installations at the Grand Coulee Dam in Washington. The project is sponsored by the U. S. Bureau of Reclamation and is directed by Robert T. Knapp, Ph.D., '29, professor of hydraulic engineering, with Donald P. Barnes, M.S., '30, as resident engineer for the Bureau.

The tests were undertaken as a consequence of the successful results of the investigations made for the Metropolitan Water District of Southern California. Whereas the Water District has eight pumping plants of 200 c.f.s. capacity for a total of 1600 c.f.s., each of the Grand Coulee pumps will have a capacity of 1600 c.f.s., and 12 units are to be constructed ultimately.

Sorensen Honored

Dr. R. W. Sorensen, professor of electrical engineering, received the award for the outstanding contribution in the field of public relations and education of the American Institute of Electrical Engineers at its annual meeting in June held in San Francisco. The award, which has not been made since 1935, was for his paper, "The Economic Status of the Engineer," published in *Electrical Engineering*.

Cosmic Ray Hunt

Dr. Robert A. Millikan, accompanied by H. Victor Neher, Ph.D., '31, and William Pickering, '32, Ph.D. '36, sailed for Australia and New Zealand last month to make an extended series of researches on the total cosmic energy brought to the earth at different latitudes, especially near the equator. In addition to work in Australia, tests will be carried on in Tasmania, Dutch East Indies, and India.

In these experiments a new type of instrument, developed by Neher and Pickering, will be used which transmits by radio signals to a ground station data gathered during the balloon flight, making unnecessary the return of the instrument. The principle involved is not new, but the method is expected to improve the accuracy of the results attained.

While in Australia, Doctor Millikan will deliver a series of twelve broadcasts for the New Zealand and Australian Broadcasting Commissions. In addition he will act in an advisory capacity on the development of industrial research.

PLACEMENT REPORT

The Alumni Placement Service during the year ending July 1, 1939, placed 166 men in positions, as compared to 146 the previous year, according to the annual report of Dr. Donald S. Clark, '29, Director of Placements. However, while the total number of placements is greater, the number of requests for applicants is less. A greater number of individuals registered as unemployed in the past year as compared to 1937-1938.

The Placement Service received 277 requests for applicants for full time positions. Men were sent to 242 of these requests, and 89, or 32%, of the total number of requests were filled by men supplied from the Placement Service. During the past year 205 men were registered as unemployed, as compared with 138 for the previous year, while 41 were listed as unemployed as of July 1, 1939, against 31 on July 1, 1938, exclusive of the classes of 1938 and 1939.

CAMPBELL ELECTED

Dr. Ian Campbell, who is associate professor of petrology, has been elected to serve a five year term on the Executive Council of the Pacific Division of the American Association for the Advancement of Science, succeeding Dr. W. V. Houston.

Sturtevant Co-Author

Dr. A. H. Sturtevant, professor of genetics, is the co-author with Prof. G. W. Beadle of Stanford of a new textbook, "Introduction to Genetics," published by the W. B. Saunders Co., Philadelphia. Extensive use is made of recent studies on *Drosophila* at the Institute.

ENGINEERING OBJECTIVES

The Engineering Committee appointed by the Board of Trustees last January, as reported in the March issue of the *Alumni Review*, is making a study of engineering research and education at the Institute, and has received for its consideration a report from the members of the engineering staff.

The maintenance of a position of unquestioned eminence in both undergraduate and graduate instruction and the attainment of a position of unquestioned eminence in a few selected fields of basic engineering research are the aims of the Institute as reiterated by the engineering staff in its report to the Engineering Committee of the Institute Associates.

The present excellent standing which the engineering course has attained, notwithstanding its relative youth, rather meagre equipment, and small engineering faculty, is due to a consistent adherence to high scholastic standards and to the fortunate association with distinguished departments in the fundamental sciences, according to the report.

In order that the engineering courses, undertaken by 65% of the undergraduates, 75% of the candidates for the master's degree and 25% of the candidates for the doctorate, may compare favorably with the science courses and with other leading engineering colleges, the instruction staff should be strengthened, especially by the engagement of visiting lecturers pre-eminent in their fields.

Physical Needs

The need for additional physical facilities is most pronounced, as there is a serious shortage of suitable classrooms and much of the limited engineering equipment is obsolete. The limited number of items of modern equipment have been used to the utmost by staff, students, and industry and have resulted in some outstanding accomplishments.

The engineering staff pointed out that acute need exists for modern and more ample equipment for materials testing and the study of strength of materials, internal combustion and steam engineering, air conditioning and refrigeration, heat transfer, hydraulics and fluid mechanics, sanitation, physical metallurgy, electronics, and aerodynamics. The building for mechanical engineering would logically tie on to the present boiler plant and should be symmetrical with and parallel to the Guggenheim laboratory, while the buildings for materials, civil engineering and hydraulics could flank the driveway entering from San Pasqual Street. Space vacated in Throop Hall would provide much needed room for expansion of the electrical engineering department. Use of new equipment by industry would partly compensate for its cost.

VITAMIN B-1

John B. Hatcher, '37, is doing research at the Institute on the tracing of the course of Vitamin B-1 in the human system. In order to follow the vitamin it was made 'visible' by producing Vitamin B-1 from sulfur made radio-active by the cyclotron at the University of California, which was done by Dr. Edwin McMillan, '28. Hatcher uses himself as a 'guinea pig,' taking approximately two or three milligrams of the radioactive Vitamin B-1, and following the course through his body by means of Geiger counters.

TECH GEOLOGIST REACHES SUMATRA

Tech geologists continue to spread to the four corners of the Earth, and **Richard Hopper, Ph.D., '39**, in a recent letter cleverly details a typical experience.

Hopper, who sailed for Medan, Sumatra, N.E.I., after Commencement, has perhaps been more fortunate than some, in that he had an opportunity to inspect the conditions in both Japan and China brought about by the 'China incident.' He found the buildings in Tokio, Kobe, Osaka, and other Japanese cities plastered with anti-British slogans, and the British Crown Colony of Honkkong teeming with Chinese refugees.

According to Hopper, over 300,000 undernourished and filthy refugees are in Hongkong. At night these wretched people sleep on sidewalks and in gutters, and each night takes heavy toll in victims of starvation and cholera.

In Medan, located on the northeastern coast of Sumatra, conditions are in startling contrast. Under the benevolent rule of the Dutch, the natives are clean, happy, and prosperous. Buildings are modern, parks are numerous, and the climate delightful. In fact, says Hopper, Medan is about the size of Pasadena, and perhaps just as modern. Bicycles and bullock carts are the favorite modes of transportation, with a few three-wheeled Dutch and German cars. Dick believes that the American suspender manufacturers should prosper in Medan, since the native sarongs seem to stay in place with no visible means of support.

Professionally, Dick's first job is in the jungle two hundred miles South of Medan, and he feels that his first geological map will be characterized by a large black line, running from left to right, labeled **Equator**. The approved method for the geologist to traverse the bush, is to follow the numerous elephant trails and streams, after a preliminary aerial reconnaissance.

The Dutch frown upon guns, and since Sumatran ivory is the most valuable in the world, Dick feels that he may be able to strangle one of the small native elephants, and recover the ivory by way of a slight bonus.

Jungle Immunity

In regard to jungle denizens, it appears that tigers are not hesitant about seizing natives, but the smell of the white man renders him relatively immune. Hopper feels that because of this, it may pay to wear the same shirt for the entire duration of any field trip . . . as anti-tiger bait.

With the exception of the king-cobra, the most poisonous reptile known, the other animals are quite tolerant of white geologists. Dick writes, ". . . the orang utans are of the type that will give you a pat on the back, and an encouraging smile, while you examine an outcrop. Elephants probe into your pockets for peanuts while you are taking dip-and-strike. Leopards rub against your legs and purr. Rhinoceroses maintain a hands-off policy, and pythons scarcely look up from their work as you pass."

Communications with base camps or main office is maintained by short wave radio, but Dick feels that by the time this story is in press, his feeble crys may not carry over his field radio, except as a low "belch from deep within some tiger who has managed to eat his first white meat by holding his nose . . ."

LETTERS

Carlton Hotel
Amsterdam
June 29, 1939

Dear Editor:

My Cal Tech class ring is noticed quite frequently here in Europe, and I am always glad to tell people where I received it. Most aviation people know Cal Tech well by name, if they haven't been there personally.

The weather here cannot compare with that in California . . . However, there are occasionally days without clouds and rain, and I am able to get sunburned while sailing on one of the many lakes or canals in Holland.

Preparations for war are in evidence everywhere, but the people in general are going about business and pleasure much the same as before. Around most airports you will find gun emplacements, if not the actual guns, while in London, the parks are being dug up for the installation of bombproof shelters. Many of the downtown buildings in all cities here are converting their basements into bombproof shelters. With it all, the flowers are as lovely, and the canals and buildings are as picturesque as ever, and I am having an enjoyable time. My duties as Technical Advisor to the Factory Representative of the Lockheed Aircraft Corp. keep me very busy.

With best personal regards,

Charles F. Thomas, '35.

% The Caribbean Petroleum Co.
Maracaibo, Venezuela
July 10, 1939.

Hello Everybody!

I was glad to receive your letter about commencement activities, even if I could not take advantage of them, and containing a bill for dues as it did. If you can give me credit on the latter for a short time, I shall be glad to join. My desire for credit comes not from lack of money, but from lack of facilities for exchange in the particular part of the jungle in which I am stationed.

In the meantime, I would appreciate very much your sending me whatever publications you may have with news of my old friends and school. I am somewhat out of touch with the association as this was the first letter forwarded to me in my two years of isolation.

Sincerely,
R. A. McRae, '35.

Union Oil Co. of Calif.
Singapore, S. S.
August 4th, 1939.

Dear Association:

Thank you for your letter which, I regret to say, arrived too late to enable me to make the necessary arrangements to attend the Commencement Day Banquet this year. I would have received it during July instead of August, had I not been travelling in the wilds of Siam at the time. However, I am pulling things together here and hope to be able to make the banquet next year,

which I note is a "Re-Union Year" for the class of 1930.

Work out here is interesting, since it takes me to India, Burma, Ceylon, Sumatra, Java, Bali, the Celebes, Siam (just renamed "Thailand"), French Indo-China, North Borneo, the Philippines, and Hongkong as well as British Malaya (where I have my headquarters). It's no place for a person who cannot live reasonably happily in a continual bath of perspiration, however, and if you are prejudiced against insects and bugs in general, this is a good place to stay away from. The tigers, pythons, cobras, etc., are overrated as menaces, but the ubiquitous mosquito and cockroach make life a trifle burdensome at times.

If you have any other Tech men on your mailing lists anywhere in the oriental tropics, I would like to have their addresses and might look them up if the occasion presented.

Sincerely,
Robert I. Stirton, '30.

Northwood,
Middlesex,
England.
July 10, 1939.

Dear Editor:

From time to time I have received letters regarding the Cal Tech Alumni Association, and have felt rather guilty that I have not responded. I am afraid 8,000 miles separation has reinforced my natural laziness so that I have never made sufficient effort.

However, as I recently acquired three one dollar notes which cannot so easily be spent in this country I have managed to restrain my inclination to spend them and send them along herewith as a subscription to the Alumni Association. Very best wishes for its future prosperity and should any members visit England I shall be happy to meet them.

Sincerely,
John Read, Ph.D., '34.

1939—Contd.

Perry Brown is working in the engineering department of the Pomona Pump Company at Pomona, Calif.

Fred Hoff and **Harry O. Davis** are employed by the Sterling Motors Company.

V. K. Crawford is now an applied chemist for the General Petroleum Corporation.

James McKinlay is working for the Douglas Aircraft Corporation.

Howard Craft and **Ray V. Gerhart** are employed by the Gilmore Oil Company.

Kenneth Collins was married to Miss Billie Crain of Altadena on September 16th in Pasadena, and the couple will make their home in Pittsburgh, Pennsylvania.

STUDENTS TO BE FLIERS

The Civil Aeronautics Authority announced on Sept. 10th that students at the California Institute of Technology would be eligible to participate in the government's civilian pilot training program, the Institute being one of the 166 educational institutions certified to help with the campaign to instruct 11,000 young men in flying during the coming school year.

1939 CLASS ROSTER

DOCTOR OF PHILOSOPHY

Addicott, F. T.
Arnold, H. A.
Beeson, C. B.
Budenholzer, R. A.
Christensen, N. A.
Chu, D. Y.
Davenport, H. W.
Dilworth, R. P.
Dreyer, R. M.
Fine, P. C.
Foster, M. G.

Hicks, B. L.
Hopper, R. H.
Horowitz, N. H.
Howland, W. L.
Krohnacker, F. D.
Krohnacker, F. D.
Lauritsen, T.
Lambert, J. A. E.
Lombard, Jr., R. H.
Macknight, R. H.
McCann, Jr., G. D.
McLean, W. B.

MASTER OF SCIENCE IN SCIENCE

Physics

Armi, E. L.
Gregory, C.

Olds, R. H.
Vargas, Jr., J. A.

Chemistry

Albrecht, G. A.

Hepner, F. R.

Chemical Engineering

Cardwell, Jr., W. T.
Gullekson, E. E.

Taylor, Jr., H. S.
Wald, Jr., G.

Geological Sciences

Cabeen, W. R.
DeLong, Jr., J. H.
Dougherty, J. F.

Hoy, R. B.
Urick, R. J.
Wilson, H. D. B.

Mathematics

Levit, R. J.

Yood, B.

Biology

Lilleland, O.

MASTER OF SCIENCE IN ENGINEERING

Electrical Engineering

Havens, B. L.
Jones, W. G.
Lentz, J. J.

Stevens, J. F.
Unholtz, K.
Weinstein, J.

Mechanical Engineering

Beafield, B. F.
Duncan, S. F.
Gongwer, C. A.
Hudson, D. E.

Serrell, P. V. H.
Shapiro, H. B.
Sharp, H. W.
Wetmore, W. O.

Civil Engineering

Bonell, W. H.
Carrick, H. H.
Dorwart, G. M.

Sheppard, H. R.
Sidler, A. W.
Wilson, W. E.

Aeronautics

Ashkenas, I. L.
Beardsley, G. F.
Coates, Jr., L. D.
Fan, H. T.

Piper, C. N.
Tsubota, G. Y.
Wang, T. K.

Meteorology

Burns, M. C.
Dahl, L. F.
Easton, R. L.
Farman, I. L.

Stephens, F. B.
Tatom, J. F.
Yates, D. N.

EARTH LIKE GLASS

At the meeting of the Geological Society of America early in August, Doctors Beno Gutenberg and Charles F. Richter, Ph.D., '28, announced that the earth is like glass fifty miles down. From their seismological studies they have determined that the layered structure is continued to the depths of the earth, and that seismograph records show that vibrations reaching a depth of about fifty miles had a decrease in speed, rather than the expected increase in speed with depth. This disturbance would result if the vibration had encountered a zone of sudden change from crystalline to a glassy structure.

GEOLOGISTS ON MINING COMMITTEE

J. Clark Sutherland, '29, geologist for the Pacific Clay Products Company, and G. Austin Schroter, '28, manager of Mines and Exploration, Filtrrol Corporation, have both been appointed to the Mining Committee of the Los Angeles Chamber of Commerce.

Sutherland is serving on the Non-Metal-

lic Sub-Committee, and Schroter is on the Legislative Sub-Committee for the Study of Labor and General Regulatory Legislation.

The Committee is made up of leading mining and oil executives of Southern California, in order to study and recommend on State and National legislation which may affect the mining industry, matters of taxation and regulation of engineers, non-metallic and strategic minerals, public lands, gold and silver, reciprocal trade and excises, and other matters pertaining to the mining and oil industries of the Western states.

COMBS ON TOUR

Theodore C. Combs, Jr., '27, who is a member of the Board of Directors of the Alumni Association, left Los Angeles this month on a business tour of the Atlantic Seaboard in the interest of the West Coast Lumbermen's Association for which he is field engineer at Los Angeles. Combs will promote the use of pre-cut framing for wood dwellings, a recent major development in housing for which he is largely responsible.

While he is on tour, Combs will attend meetings of Alumni groups in the interests of the Association discussing the problems and desires of the groups and their relationship with the main body of the membership in Southern California.

WIND TUNNEL GRADES SOILS

The use of a wind tunnel to classify soils and sand according to particle size has been accomplished by the United States Soil Conservation Service working at the Institute. The procedure is to suck a stream of air through a 12 foot tunnel, with the soil and sand mixture flowing into the air stream at the intake end and carried by the air current. Heavy particles fall first, the fine particles being carried furthest before deposition in trays.

Twenty different trays are used to catch the particles, the smallest of which corresponds to those passing a 250 mesh screen, equivalent to an average diameter of 27 ten-thousandths of an inch. The study of particle size and distribution is important in soil erosion and conservation work, and also in the silting of dams and lakes.

(Cut out on this line and paste in your 1939 Alumni Directory.)

RESERVE ENGINEER OFFICERS' CAMP

At the annual Reserve Engineer Officers Camp held at Camp Ord, Presidio of Monterey, from August 14th to 26th, Cal-Tech alumni were prominently represented. **Captain Theodore C. Combs, Jr., '27**, delivered one of the most interesting lectures at the camp on "Aerial Photography and Mapping."

The following alumni in the Engineer Reserves attended Camp Ord this year:

49th Engineers

Capt. J. W. Dunham, '29
Capt. J. E. Shield, '22
1st Lieut. W. H. Krelle, '27

349th Engineers

Capt. T. C. Combs, '27
Capt. J. C. Krouser, '25
1st Lieut. R. A. Philco, '27
1st Lieut. O. F. Reinen, x29
1st Lieut. E. H. Ross, '28

444th Engineers

1st Lieut. A. W. Dunn, '29
2nd Lieut. J. C. Monning, '33

589th Engineers

2nd Lieut. R. Creveling, '27

FOG ASSISTS RAY RESEARCH

Production of fog in scientific instruments enables scientists to study cosmic rays, according to **Robert M. Langer, Ph.D., '27**, in a paper presented at the Stanford University meeting of the American Physical Society last July.

"There may be excess moisture in the atmosphere and rain may threaten for a long time before droplets begin to fall," said Doctor Langer. "The condensation of water vapor from the air on to the drops happens rapidly enough at first; but so much heat is given out in the process that the droplet warms up until the evaporation from it just about equals the condensation upon it. Unless this heat of condensation is dissipated the droplet will stop growing before it can be seen. The best way to dispose of the heat is to pass it into the surrounding air."

Cosmic rays are studied by making the rays visible through the creation of paths of artificial rain drops by the rays in the Wilson cloud chamber. The idea, said Doctor Langer, is to produce a fog along the path of the cosmic ray, and it takes a full second for fog drops in a cloud chamber to attain full growth.

ICE FORECASTS

Development of a new forecasting technique that warns of approaching ice, thunder, and lightning storms was described by **Irving Krick, Ph.D., '34**, associate professor of meteorology at the Institute, before the recent convention of the Pacific Coast Electrical Association meeting in Pasadena.

Predictions can be furnished two days in advance, with a definite warning 12 hours before the arrival of an ice storm, with the exact area of the storm determined. Ice storms are particularly prevalent in the East during the spring, according to Doctor Krick. Thunder and lightning storms, which often disrupt communication systems, can now be predicted by the "air-mass" analysis data secured from instruments at the Institute correlated with that of other stations, he said.

Average forecasting at the California Institute of Technology is better than 95% correct, said Krick, which is the highest attained, and government forecasts do not include ice, thunder, and lightning service.

— T —

**ARE YOU A MEMBER
OF THE ASSOCIATION?**

(Cut out on this line and paste in your 1939 Alumni Directory.)

BACHELOR OF SCIENCE (FIVE YEAR COURSE)

Aeronautics
Bellevy, S. E.
Egler, A.
Eischer, H.

Frederick, J. L.
Kypal, D.
Nagumatsu, B. S.

Powell, W. B.
Valenzuela, J. L.
Widmer, R. H.

Alme, E. A.

Meteorology
Norquest, K. S.
Sanders, R. A.

Streckevand, P. H.

BACHELOR OF SCIENCE (FOUR YEAR COURSE)

Science
Asakawa, G.
Battie, J. A.
Betz, W. E.
Hishop, R. H.
Carter, R.
Cratt, C. H.
Crawford, V. K.
Dibble, Jr., B.
Englander, H. S.
Evyang, J. C.
Finn, D. E.
Frankton, Jr., W. H.
Gerhart, R. V.
Gombotz, J. J.

Science
Griffiths, J. R.
Ingnalls, F. C.
Kegon, R. C.
Kolb, L. L.
Kyle, R. M.
Laventell, L. S.
Levet, M. N.
MacLish, K. G.
Parker, E. H.
Leat, Jr., J. M.
Pinney, E. J.
Pollen, Jr., K. A.
Radovich, F.

Rainwater, L. J.
Rasmussen, Jr., V. K.
Regan, Jr., L. J.
Robertson, F. A.
Rondebush, B. V.
Ruhlin, S.
Ruzertero, R. J.
Scott, D. H.
Stef, T.
Smith, I. E.
Stones, J. W.
White, R. W.
Younger, V. E.
Younes, H. S.

Anderson, Jr., N. H.
Antonenko, B. P.
Bauer, Jr., C. H.
Beard, L. R.
Beck, D. W.
Black, J. W.
Borgeson, L. G.
Brushaw, R. R.
Brace, K. R.
Brathwaite, J. W.
Brown, Jr., C. H.
Brown, P. H.
Brown, W. L.
Broyle, J. J.
Carlisle, F. L.
Carstaphen, C. F.
Collins, H. K.
Connell, R. B.
Crozier, G. O.
Davis, Jr., H. O.
Devirian, Jr., P. S.
Diehm, W. A.
Engelder, P. O.

Engineering
Eischer, R. A.
Fraser, S. M.
Gassaway, J. S.
Goodell, J. H.
Goodin, Jr., H. A.
Green, A. P.
Green, W. M.
Griswold, E. A.
Hall, M. A.
Hance, H. V.
Hannon, A. L.
Hansler, R. L.
Hieble, E. K.
Hoff, F. C.
Holtz, G. M.
Hoyt, D. E.
Kimball, R. B.
Konecni, J.
Lawrie, D. G.
Lawson, W. G.
Lee, C. M.
Longfelder, H. J.
Mathew, T.
McClung, R. M.
McCreery, F. E.

McKinlay, J. H.
Merrick, W. D.
Morkawa, G. K.
Norton, Jr., W. M.
Oakley, S. W.
Osborn, J. E.
Paul, C. H.
Pettigall, C. E.
Pond, R. K.
Ritchey, J. C.
Hoot, W. A.
Hopp, W. F.
Schneider, C. J.
Shuster, G. M.
Sinclair, G. W.
Smith, J. E.
Smith, R. L.
Smith, R. L.
Snyder, W. M.
Strong, Jr., H. D.
Sullivan, E. F.
Thompson, R. F.
Winchell, R. W.
Zakerman, I. G.

* Deceased