

California Institute of Technology



COMMENCEMENT
EXERCISES

*Friday afternoon
June ninth, nineteen fifty
at four-thirty o'clock*

PROGRAM

Presiding:

James R. Page, LL.D., *Chairman of the Board of Trustees*

ORGAN PRELUDE:

ADAGIO CANTABILE *Beethoven*

TRUMPET VOLUNTARY *Purcell*

HEBRIDEAN PASTORALE *Nesbitt*

DEDICATION *Felitz*

James H. Shearer, A. R. C. M., A. R. C. O., *Organist*

PROCESSIONAL MARCH . . . TRIUMPHAL MARCH . . . *Clark*

INVOCATION AND CHAPLAIN'S ADDRESS

The Reverend Curtis Beach, A. B., B. D.

Pastor of the Neighborhood Church, Pasadena

COMMENCEMENT ADDRESS: "THE FIGHT FOR FREEDOM"

Lee A. DuBridge, Ph.D., Sc.D.

President of the California Institute of Technology

CONFERRING OF DEGREES:

*Candidates for the degree of Bachelor of Science presented by
Franklin Thomas, C. E., Dean of Students*

*Candidates for the degree of Master of Science in Science pre-
sented by William R. Smythe, Ph. D., Chairman of the Com-
mittee on the Course in Science*

*Candidates for the degree of Master of Science in Engineering
presented by William W. Michael, B. S., Chairman of the
Committee on the Course in Engineering*

*Candidates for the engineer's degree presented by William N.
Lacey, Ph. D., Dean of Graduate Studies*

*Candidates for the degree of Doctor of Philosophy presented by
Dean Lacey*

ANNOUNCEMENTS

President DuBridge

BENEDICTION

The Reverend Mr. Beach

*(The audience is requested to remain seated after the Benediction
until the end of the Recessional March)*

RECESSIONAL MARCH NUN DANKET Karg Elert

Candidates for Degrees

BACHELOR OF SCIENCE IN SCIENCE

Jared Abell	Wilbur Lawrence Knight
James Russell Alder	Richard Hubert Knipe
Harvey Jerome Amster	Peter T. Knoepfler
George Myron Arcand*	James Lorenz Kohl*
Donald Owen Asquith	Ralph Harvey Lovberg*†
Donald Roy Baker	Ralph Lutwack
J. Allan Beek, Jr.	Scott Lynn*
Christian James Blom†	David Brindley MacKenzie*†
Louis Bogart	James Matterson Mansfield
Stanley Clyde Boicourt†	Monte Lee Marks
Julian Brody	Jerry Orchard Matthews
Raymond Edward Brow	Richard Moore McIntyre
Richard Pierson Buck	Donald Paul Merrifield*
William Louis Burriss	Marco Antonio Montemezzi
William Denman Calhoun	Donald William Moore
Odell Edward Carson	Thomas Warner Moore
Paul Torkelson Clark	Wheeler J. North
Thomas Paul Coons	David Charles Oakley
Duane Herbert Cooper*	Breck Parker
Fernando José Corbató*	Roger A. Picciotto*
William Parker Cox*†	Richard Scott Pierce* ✕
William Craven Culbertson	John William Reeds
William D. Dean	Edward A. Revay
Herbert Amasa Forrester*	Werner Boris Riesenfeld*
Carroll Leslie Friswold	Bruce Robinson, Jr.†
James Basil Gerhart*	Lee Wallace Ross
Lester Kepner Goodwin*	Willis Andrew Rosser, Jr.
John Morgan Greene*	James E. Schofield
Kenneth James Hammond	Leonard Gene Schultz
James Briggs Hendrickson*†	Arent Henry Schuyler, Jr.
Shigeru Irwin Honda	John Michael Sellen, Jr.†
Peter Adam Howell	Donald Lee Shepard
John David Hughes	Donald Lee Smathers
Floyd Bernard Humphrey	Jack Wendell Smith
John Keith Inman	Roland Nesbit Smoot
Norman Ford Jacobson	Melvin A. Baren Sprecher
Robert Ross Jennings*	Hugh Franklin Stoddart
Eric Bertil Johansson	Ralph Jay Stone
Walter John, Jr.*	Bruce Bernot Stowe*†

*Graduated with honor in accordance with a vote of the Faculty.

†Awarded the Honor Key by the Associated Students, CIT, for participation in student activities.

Harold Alwin Streaker	LeRoy William Weeks
Victor Anton Jacobus van Lint*	Robert Stephen Welte*
David Richard Viglierchio*	Wilbur Andrew Wikholm
John J. Vrolyk	Stanley Alan Zwick*
Martin Walt, IV*	

BACHELOR OF SCIENCE IN ENGINEERING

Donald Shaw Barrie	Jerome E. Jacobs*
Leon Joseph Bass	Donald B. Jennings
Charles Richard Bennett	Merle Thayne Kealii kapu Kam
Arthur Robert Benton, Jr.	Louis Katz
Weldon Oscar Bergreen	Donald V. Kendall
Galt Buhler Booth*	Max Stewart Kreston
Theodore Munson Bowen	Warren Eugene Krum
Wilson Bradley†	Thomas Glenn Lang
Andrew John Check	William D. Lansdown
Harry Fay Clark, Jr.	Almon Elsdon Larsh, Jr.
Howard Ellsworth Clark	Donald D. MacDougall*
Lowell C. Cockel, Jr.	Daniel Markoff
Harold Keith Coulter	Craig Marks*
Robert Nelson Curtis	Max Vernon Mathews*
Bain Dayman, Jr.*	James Oeland McCaldin*
Cecil William Drinkward	Richard Alexander McKinnon
Frederick Weed Drury, Jr.	Albert Edward McLellan
Gardner Wade Earle, Jr.	William Howard McLellan
Vern A. Edwards	H. Reha Mesara
Ralf Austin Erickson	John Paul Moffat, Jr.
Albert Eschner, Jr.*†	Jay Allen Montgomery
Richard Snowden Fairall	John Thomas Mosich
Norman Stanley Fink	Walter LeRoy Mudgett
Carl Edward Fox†	Gibson Oakes
John Prescott Francis	Irving Lee Odgers*
William August Freed†	Donald Jay Oswald*
Boyd MacIntosh Gage*	Robert Eames Parker
Abram N. George	Richard Holden Perry
Robert Larimer Gottier	John Kimball Poindexter
Geoffrey Hamline Grey	Roswell Harry Potts
William White Haefliger	William Howard Proud
Clinton Darle Hale	Ronald Lewis Quandt*
Michael Alexander Hall	Dean Arthur Rains
Dirck T. Hartmann	Howard Edwin Reinecke
Malcolm Van Cleve Hickey	Marco Antonio Romero
William Bernard Higgins	Martin Neal Ross
Charles Stetson Howard, Jr.	Donald Frazer Royce†

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†Awarded the Honor Key by the Associated Students, CIT, for participation in student activities.

(BACHELOR OF SCIENCE IN ENGINEERING, cont.)

Charles Anthony Savant*	Donald Wayne Stillman
John Robert Scantlin	William Ainsworth Sylvies
Dwight Clare Schroeder	Howell Newbold Tyson, Jr.
Henry Shapiro	Harry Van Akin
Virgil Jones Sims, Jr.*	Norris Dudley Whitehill
Winsor Soule, Jr.	Warren G. Whiting
Eugene Godfrey Spencer	James Rutledge Wilcox
William Thomas Staats, Jr.	Jack Kester Willis
Tom Hamilton Stauffer	Kam Leung Wong
Robert Leavens Stert	Edsel Augustus Worrell*
Robert Tarrant Stevens	Richard Bruce Wright*
Dale Frederick Stewart	

MASTER OF SCIENCE IN SCIENCE

Astronomy

- Frederick Harold Leinbach, Jr., B.S., *South Dakota State College of Agriculture and Mechanical Arts*, 1949.
Morton S. Roberts, B.A., *Pomona College*, 1948.
John Whittlesey, B.S., *California Institute of Technology*, 1948.

Biology

- Chung Hsien Li, B.S., *National University of Peking*, 1935.

Chemical Engineering

- Forrest Sturdevant Allinder, Jr., B.S., *California Institute of Technology*, 1949.
Donald Harding Baer, B.S., *University of New Mexico*, 1949.
Robert Bayard Funk, B.S., *California Institute of Technology*, 1949.
Richard Alan McKay, B.S., *California Institute of Technology*, 1949.
Glenn David Robertson, Jr., B.S., *Rice Institute*, 1949.
Robert Mitchell Sherwin, B.S., *California Institute of Technology*, 1943.
Robert Malcolm Stewart, Jr., B.S., *California Institute of Technology*, 1949.

Chemistry

- Roy Phillip Craig, B.A., *University of Colorado*, 1948.
Robert Frederick Petzold, B.S., *Massachusetts Institute of Technology*, 1945.

Geological Sciences

- Joseph Brightwell Alexander, B.S., *Royal School of Mines*, 1933.
Joseph Harold Birman, B.A., *Brown University*, 1948.
Phillip Granville Cook, B.S., *Ohio University*, 1948.

*Graduated with honor in accordance with a vote of the Faculty.

Paul Bernard Harris, B.S., *California Institute of Technology*, 1949.
 William Porter Irwin, B.S., *New Mexico School of Mines*, 1944.
 Edward Malcolm MacKevett, Jr., B.A., *University of California at Los Angeles*, 1947.
 Carel Otte, Jr., B.S., *University of Amsterdam*, 1943.
 George Pierce Rigsby, B.S., *California Institute of Technology*, 1948.
 James Archibald Roddick, B.S., *University of British Columbia*, 1948.

Geophysics

C. Walter Faessler, B.S., *Université Laval*, 1948.
 Robert Donald Forester, B.S., *California Institute of Technology*, 1949.
 James Paul Heppner, B.S., *University of Minnesota*, 1948.
 Joseph Robert Moran, B.A., *Pomona College*, 1948.
 Robert Leslie Nelson, B.A., *Williams College*, 1948.
 John Renowden Reese, B.S., *Purdue University*, 1947.

Meteorology

James Baxter Garrison, Jr., B.S., *University of Arkansas*, 1947.
 Edward Foy McDaniel, B.S., *Southern Methodist University*, 1949.
 David Alloway Strange, A.B., *University of California*, 1948.

Physics

John Milton Andres, B.S., *California Institute of Technology*, 1949.
 Philip Joseph Clossmann, B.E., (Ch.E.), *Tulane University*, 1944; S.M., (Ch.E.), *Massachusetts Institute of Technology*, 1948.
 Warren Evald Danielson, B.S., *California Institute of Technology*, 1949.
 Milford Hall Davis, B.S., *Yale University*, 1949.
 John Nathaniel Harris, B.S., *California Institute of Technology*, 1948.
 Robert Edward McMillan, B.S., *Louisiana State University*, 1942.
 Edmund Alexander Milne, B.A., *Oregon State College*, 1949.
 Rolland Albert Missman, Jr., B.S., *Oregon State College*, 1949.
 Don H. Pickrell, Jr., B.S., *California Institute of Technology*, 1949.
 Frank Harvey Shelton, B.S., *California Institute of Technology*, 1949.
 Alexander Stolovy, B.S., *Brooklyn College*, 1948.
 William Dennis Warters, B.A., *Harvard College*, 1949.
 Calvin Wong, B.S., *Massachusetts Institute of Technology*, 1948.

MASTER OF SCIENCE IN ENGINEERING

Aeronautics

Thomas Charles Adamson, Jr., B.S., *Purdue University*, 1949.
 John William Baxter, B.S., *Louisiana State University*, 1948.
 Nick S. Diaconis, B.S., *University of Pittsburgh*, 1949.
 Donald Allen Dooley, B.S., *University of Notre Dame*, 1949.
 Andrew George Fabula, B.S., *Princeton University*, 1949.
 James Edwin Francis, B.S., *Agricultural and Mechanical College of Texas*, 1948.
 Raimo Jaakko Häkkinen, Dipl.-ins., *Finland Institute of Technology*, 1948.

(MASTER OF SCIENCE IN ENGINEERING—*Aeronautics*, cont.)

- Paul H. Jackson, Jr., *B.S., University of Kansas, 1949.*
Robert Hani Korkegi, *B.S., Lehigh University, 1949.*
Robert Richard Larson, *B.S., University of Washington, 1949.*
Robert McMillan, *B.S., University of Saskatchewan, 1938.*
Robert Vartan Meghreblian, *B.S., Rensselaer Polytechnic Institute, 1943.*
Robert Chase Miller, *B.S., Massachusetts Institute of Technology, 1945.*
Calvin Etheridge Porcher, *B.S., University of Texas, 1948.*
Valluri Sita Rama Rao, *B.Sc., Benares Hindu Institute, 1948; D.I.I.Sc., Indian Institute of Science, 1949.*
Scott Carson Rethorst, *B.S., Massachusetts Institute of Technology, 1936.*
Howard Richard Schmidt, Capt., *U.S.A.F., B.S., (M.E.), University of Illinois, 1942; M.S., (M.E.), Rensselaer Polytechnic Institute, 1946.*
Jack Lawrence Shoenhair, Comdr. *U.S.N., B.S., Rensselaer Polytechnic Institute, 1950.*
George Edward Solomon, *B.S., University of Washington, 1949.*
William Walter Willmarth, *B.S., Purdue University, 1949.*

Civil Engineering

- Frederick Clark Badger, Lt., *U.S.A., B.S., United States Military Academy, 1946.*
Arthur Elwin Bruington, *B.S., California Institute of Technology, 1949.*
Robert Edward Crawford, *B.S., University of Texas, 1949.*
Thomas Edward Dowd, Jr., Lt., *U.S.A., B.S., United States Military Academy, 1949.*
Leonard Edelstein, Lt., *U.S.A., B.S., United States Military Academy, 1946.*
Rudolph Christof Frey, *B.S., Marquette University, 1949.*
Peter Grosz, Jr., Lt., *U.S.A., B.S., United States Military Academy, 1946.*
James Hart Hottenroth, Major, *U.S.A., B.S., United States Military Academy, 1942.*
William Farbridge Jones, *B.S., King's College, University of Durham, 1949.*
Robert Bruce Linderman, *B.S., Utah State Agricultural College, 1949.*
Robert Clough Nelson, Lt., *U.S.A., B.S., United States Military Academy, 1945.*
John Brisbin Rutherford, *B.S., Lehigh University, 1949.*
William Powers Schneider, Lt., *U.S.A., B.S., United States Military Academy, 1946.*
James Alfred Vivian, Major, *U.S.A., B.S., United States Military Academy, 1942.*
Amos Luther Wright, Lt., *U.S.A., B.S., United States Military Academy, 1945.*

Electrical Engineering

- Henry Archibald Corriher, Jr., *B.S., North Carolina State College, 1949.*
Jerome King Delson, *B.S., Illinois Institute of Technology, 1949.*
Donald Jerome Gimpel, *B.S., Illinois Institute of Technology, 1949.*
James Cecil Goodwyn, *B.S., College of William and Mary, 1948.*
Michel Joseph-Jean Gossot, *B.A., Université de Paris, 1942; B.E., Ecole Polytechnique, 1949.*
Frederick A. Gross, *B.A., University of Southern California, 1943.*
Palmer Eino Hakala, *B.S., Montana State College, 1949.*
Walter Joseph Hirschberg, *B.S., California Institute of Technology, 1949.*
Geoffrey Bishop Holmes, *B.S., Agricultural and Mechanical College of Texas, 1948.*
James Robert Holmes, *B.S., Stevens Institute of Technology, 1945.*
Robert Charles Howard, *B.A., Whitman College, 1944.*
Robert Vernon Knox, *B.S., California Institute of Technology, 1945.*

William Kroll, B.S. (M.E.), *University of Illinois*, 1947; B.S., (E.E.), *University of Michigan*, 1949.
 Rubin William Ludwig, B.S., *University of Texas*, 1947.
 Gerald Steven Mayner, B.E., *University of Southern California*, 1949.
 Lewis Michnik, B.E., *Johns Hopkins University*, 1948.
 Alfred James Monroe, B.S., *Michigan State College*, 1949.
 Merle Loren Morgan, B.S., *California Institute of Technology*, 1949.
 William Thomas Morgan, B.S., *University of Akron*, 1948.
 Donald John Nelson, B.S., *Oregon State College*, 1948.
 Harvey Lewis Pastan, B.S., *Worcester Polytechnic Institute*, 1949.
 Robert William Paulson, Lt. Col., U.S.A.F., B.S., *University of Washington*, 1946.
 William Isaac Rumer, B.S., *California Institute of Technology*, 1949.
 Burton Benjamin Rutkin, B.S., *California Institute of Technology*, 1949.
 Dale Delbert Ryder, B.S., *California Institute of Technology*, 1949.
 Clement Joseph Savant, Jr., B.S., *California Institute of Technology*, 1949.
 Garland Berte Seaborn, Jr., B.S., *Clemson Agricultural College*, 1949.
 Henry Susumu Takemura, B.S., *University of California at Los Angeles*, 1949.
 Robert Reid Waters, B.S., *California Institute of Technology*, 1949.
 James Howard Watkins, Capt., U.S.A.F., B.S., *United States Military Academy*, 1943.

Mechanical Engineering

Roger Alan Anderson, B.S., *California Institute of Technology*, 1949.
 Donald Robert Bartz, B.S., *University of California*, 1949.
 Erle J. Brown, Jr., B.S., *California Institute of Technology*, 1949.
 Robert Duff Clark, B.S., *Stanford University*, 1949.
 William Nelson Harris, B.S., *California Institute of Technology*, 1949.
 Harold Harty, B.S., *University of Washington*, 1948.
 Victor Guy Jackson, B.S., *University of Illinois*, 1949.
 James Edgar Johnson, B.S., *California Institute of Technology*, 1949.
 James Theodore Kenney, Jr., B.S., *California Institute of Technology*, 1949.
 Taras Kiceniuk, B.S., *Neward College of Engineering*, 1949.
 Henry Allan Long, B.S., *California Institute of Technology*, 1949.
 Robert Bruce McClure, B.S., *Purdue University*, 1949.
 John Hawes McNamara, B.A., *Dartmouth College*, 1948; B.S., *Thayer School of Engineering*, 1949.
 Ralph Lucas Merrill, B.S., *Purdue University*, 1947.
 William Eaton Palmer, B.S., *California Institute of Technology*, 1949.
 Charles Herrick Rose, B.S., *California Institute of Technology*, 1940.
 Philip Rosenblum, B.S.E., *University of Michigan*, 1940.
 Harold Lewis Sletten, B.S., *North Dakota Agricultural College*, 1948.
 Ezra Spevak, B.S., *University of Toledo*, 1949.
 Thad Vreeland, Jr., B.S., *California Institute of Technology*, 1949.
 Hugh Ross Wahlin, B.S., *University of Wisconsin*, 1949.

ENGINEER'S DEGREES

Aeronautical Engineer

Harry Israel Ashkenas, B.S., *University of California*, 1944; M.S., *California Institute of Technology*, 1946.
 David T. Barish, Lt., U.S.A.F., B.S., *Air Force Institute, Wright Field*, 1948; M.S., *California Institute of Technology*, 1949.

(ENGINEER'S DEGREES—*Aeronautical Engineer*, cont.)

- William Cyrus Barker, B.S., *University of California*, 1942; M.S., *California Institute of Technology*, 1948.
- William Cleveland Bryan, Lt. Comdr., U.S.N., B.S., *United States Naval Academy*, 1940.
- Patrick Stanley Chase, B.S., *California Institute of Technology*, 1943; M.S., 1946.
- Richard Daniel DeLauer, Lt., U.S.N., A.B., *Stanford University*, 1940.
- Leo Francis Frick, Lt. Comdr., U.S.N.
- Ralph Lewis Geisberg, B.M.E., *Clemson Agricultural College*, 1937; M.S., *California Institute of Technology*, 1944.
- John Clarence Kane, Lt., U.S.N., B.S., *United States Naval Academy*, 1943.
- Roger Edward Matzdorff, B.S., *California Institute of Technology*, 1948; M.S., 1949.
- Robert Norris Oliver, B.S., *Massachusetts Institute of Technology*, 1948; M.S., *California Institute of Technology*, 1949.
- James Victor Rowney, Lt. Comdr., U.S.N., B.S., *United States Naval Academy*, 1942.
- Lee Richard Scherer, Lt., U.S.N., B.S., *United States Naval Academy*, 1942.
- Louis Vincent Schmidt, Capt., U.S.A.F., B.S., *California Institute of Technology*, 1946; M.S., 1948.
- John Tyler Shepherd, Lt., U.S.N., B.S., *United States Naval Academy*, 1942.
- Basil Staros, B.S., *Massachusetts Institute of Technology*, 1941; M.S., *California Institute of Technology*, 1948.
- Joseph Wolff Wechsler, B.S., *California Institute of Technology*, 1948; M.S., 1949.
- Frank Welch, Jr., Lt. Comdr., U.S.N., B.S., *United States Naval Academy*, 1941.

Chemical Engineer

- Harry Ward Brough, B.S., *California Institute of Technology*, 1945.

Electrical Engineer

- George Epprecht, B.S., *Swiss Federal Institute of Technology*, 1946.

Geophysical Engineer

- Milner Darwin Quigley, B.S., *Michigan State College*, 1941; M.S., *Northwestern University*, 1947.

Industrial Designer

- Harry Lacelles Masser, Jr., B.S., *University of California*, 1947.

Mechanical Engineer

- Harry Eastwood Crossley, B.S., *University of Vermont*, 1943; M.S., *Massachusetts Institute of Technology*, 1947.
- Richard Lee Robinson, B.S., *Massachusetts Institute of Technology*, 1947; M.S., *California Institute of Technology*, 1948.

DOCTOR OF PHILOSOPHY

- Robert Train Adams. (Chemistry and Animal Physiology), B.S., *University of California*, 1942. Thesis: I. *The Synthesis of D- and L-Threo- and D- and L-Erythro-alpha-Amino-beta-hydroxy-n-caproic Acids*. II. *Experiments on the Preparation of alpha-Aminoalkanesulfonamides*. III. *The Influence of Nerve Impulse Sequence on the Contractions of Different Crustacean Muscles*.

- Fred Peter Adler. (Electrical Engineering and Physics), B.S., *University of California*, 1945; M.S., *California Institute of Technology*, 1948. Thesis: *Measurement of the Complex Conductivity of an Ionized Gas at Microwave Frequencies*.
- Jack Leland Alford. (Mechanical Engineering and Electrical Engineering), B.S., *California Institute of Technology*, 1942; M.S., 1946. Thesis: *Internal Friction in Metals*.
- Morton Alperin. (Aeronautics and Mathematics), B.Ae.E., *New York University*, 1939; M.S., *California Institute of Technology*, 1947. Thesis: *A Study of Detached Shock Waves in Two Dimensions*.
- Spencer Roe Baen, Capt., U.S.A. (Mechanical Engineering and Electrical Engineering), B.S., *Agricultural and Mechanical College of Texas*, 1943; M.S., *California Institute of Technology*, 1947. Thesis: *The Ternary System Iron-Chromium-Molybdenum at 1200° Fahrenheit*.
- William Alvin Baum. (Physics and Electrical Engineering), B.A., *University of Rochester*, 1943; M.S., *California Institute of Technology*, 1945. Thesis: *Attenuation of Ultraviolet Light by the Lower Atmosphere*.
- Stanley Urner Benscoter. (Aeronautics and Civil Engineering), B.S., *University of Illinois*, 1932; M.S., *Agricultural and Mechanical College of Texas*, 1935; C.E., *University of Illinois*, 1941. Thesis: *Secondary Stresses in Thin-Walled Beams with Closed Cross-Sections*.
- Prabhat Kumar Bhattacharya. (Geophysics and Physics), M.S., *Calcutta University*, 1942; M.S., *California Institute of Technology*, 1947. Thesis: *An Investigation of Changes in the Magnetic Field of the Earth (Magnetic Anisotropy of Sedimentary Rocks)*.
- Robert Hockman Blaker. (Chemistry and Physics), A.B., *Berea College*, 1942. Thesis: *Characterization of Nitrocellulose and Certain other High Molecular Weight Substances including Studies of the General Applicability of the Light Scattering Method*.
- Marvin Charles Brooks. (Chemistry and Mathematics), B.S., *Yale University*, 1942; M.S., *New York University*, 1944. Thesis: *The Development of New Methods for the Characterization of High Polymers*.
- Alfred Bruce Brown, Jr. (Physics and Mathematics), B.S., *Lehigh University*, 1942; M.S., *California Institute of Technology*, 1947. Thesis: *Excited States of the Mirror Nuclei Be^7 and Li^7* .
- Werner Bucholz. (Electrical Engineering and Physics), B.S., *University of Toronto*, 1945; M.S., 1946. Thesis: *An Arbitrary-Function Generator and Its Application to the Study of Some Non-linear Systems on the Electric Analog Computer*.
- Stanley Campbell Burket. (Chemistry and Physics), B.A., *Linsfield College*, 1939; M.A., *University of Kansas*, 1943. Thesis: *The Relation between the Infrared Spectra and Structure of Carbohydrates and Related Compounds*.
- Richard Raymond Carhart. (Physics and Mathematics), B.A., *University of California at Los Angeles*, 1940. Thesis: *Theory of Viscous and Thermal Attenuation of Sound by Small Spheres*.
- Chieh-Chien Chang. (Aeronautics and Mathematics), B.A., *National Northeastern University*, 1932; M.S., *California Institute of Technology*, 1941. Thesis: *The Linearized Wing Theory of the Supersonic Flow*.
- Feng-Kan Chuang. (Aeronautics and Mathematics), B.S., *Chiao Tung University*, 1946; M.S., *California Institute of Technology*, 1948. Thesis: *On the Statistical Theory of Turbulence*.
- James Carroll Conly. (Chemistry and Genetics), B.A., *University of Rochester*, 1942. Thesis: *Spiro (3, 3) heptane; The Hunsdiecker Degradation of Carboxylic Acids*.
- Thomas Joseph Connolly. (Chemical Engineering and Chemistry, B.Ch.E., *Syracuse University*, 1943; M.S., *Carnegie Institute of Technology*, 1947. Thesis: I. *Application of Digital Computer Techniques to the Calculation of Thermodynamic Properties of Hydrocarbon Systems*. II. *Isobaric Heat Capacities at Bubble Point n-Hexane, Methylcyclopentane and n-Octane*.
- Harold Miller DeGroat, Jr. (Aeronautics and Mathematics), B.Ae., *Rensselaer Polytechnic Institute*, 1946; M.S., *California Institute of Technology*, 1947; Ae.E., 1948. Thesis: *Aerodynamic Forces on a Propeller in Non-Stationary Motion*.
- Peter Dehlinger. (Geophysics and Geology), B.S., *University of Michigan*, 1940; M.S., *California Institute of Technology*, 1943. Thesis: *Shear Wave Vibration Directions and Related Fault Movements in Southern California Earthquakes*.
- John Edward Denby-Wilkes. (Mathematics and Aeronautics), B.A., *University of Paris* 1939; B.S., 1940; B.A., *Columbia University*, 1942. Thesis: *Structure of Commutative Normed Rings*.

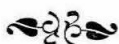
- Mayette Elner Denson, Jr. (Geophysics and Geology), B.S., Montana State College, 1941; M.S., California Institute of Technology, 1948. Thesis: I. Longitudinal Waves through the Earth's Core. II. The Madison (Mississippian) Limestone of the Bighorn Basin, Wyoming.
- Leendert de Witte: (Geophysics and Petroleum Geology), States University of Grönigen, Holland; M.S., California Institute of Technology, 1947. Thesis: I. Infiltration of Porous Formations by Drilling Fluids in Relation to the Quantitative Analysis of Electrologs. II. Experimental Studies on the Characteristics of the Electrochemical Potentials Encountered in Drill Holes. III. Factors Governing Accumulation of Oil and Gas in Stratigraphic Traps.
- W. Smith Dorsey, Jr. (Chemistry and Chemical Engineering), B.S., Iowa State College, 1940. Thesis: I. Determination of an Acetylenic Hydrocarbon (3-Hexyne) in Carbon Tetrachloride and in Aqueous Solution. II. Complex Formation by the Carbon-carbon Triple Bond.
- Worthie Flefer Doyle. (Mathematics and Physics), B.A., University of Washington, 1943. Thesis: An Arithmetical Theorem for Partially Ordered Sets.
- Kazim Ergin. (Geophysics and Mathematics), B.S., Massachusetts Institute of Technology, 1942; M.S., California Institute of Technology, 1943. Thesis: I. Energy Ratio of the Seismic Waves Reflected and Refracted at a Rockwater Boundary. II. Amplitudes of PcP, P_cS, ScS and ScP in Deep Focus Earthquakes.
- Frank Behle Estabrook. (Physics and Mathematics), A.B., Miami University, 1943; M.S., California Institute of Technology, 1947. Thesis: An Experimental Determination of the Absolute Oscillator Strengths of Some Resonance Transitions of Chromium and Nickel.
- Paul Stephen Farrington. (Chemistry and Chemical Engineering), B.S., California Institute of Technology, 1941; M.S., 1947; Ch.E., 1948. Thesis: I. Coulometric and Amperometric Methods of Analysis. II. Spectrophotometric Investigation of the Copper (II) Monobromo-Complex. III. Determination of Carbon by Wet Combustion.
- Jack Edward Froehlich. (Aeronautics and Mathematics), B.S., California Institute of Technology, 1947; M.S., 1948. Thesis: Nonstationary Motion of Purely Supersonic Wings.
- Louis Adams Giamboni. (Physics and Mathematics), B.S., University of California at Los Angeles, 1941; M.S., California Institute of Technology, 1947. Thesis: A New Gyromagnetic Effect.
- Donald Arthur Glaser. (Physics and Mathematics), B.S., Case School of Applied Science, 1946. Thesis: The Momentum Distribution of Charged Cosmic Ray Particles near Sea Level.
- Leon Green, Jr. (Mechanical Engineering and Aeronautics), B.S., California Institute of Technology, 1944; M.S., 1947. Thesis: I. The Permeability of a Bed of Smooth Spherical Particles. II. Non-steady Flow of Gas Through a Porous Wall.
- Robert Russell Grinstead. (Chemistry and Electrical Engineering), B.S., University of California, 1946. Thesis: I. The Ferromagnetic Alloy System Copper-Manganese-Indium. II. A Volumetric Method for the Determination of Indium.
- Richard Manning Hermes. (Mechanical Engineering and Mathematics), B.E.E., University of Santa Clara, 1934; M.A., 1938. Thesis: Modeling for Dynamic Stress Similitude.
- Armin John Hill. (Physics and Astronomy), B.S., Montana State College, 1932; M.S., 1938; M.S., California Institute of Technology, 1949. Thesis: Relative *f*-values of Selected Lines in the Absorption Spectrum of Chromium I.
- Harvey Akio Itano. (Chemistry and Physics), B.S., University of California, 1942; M.D., St. Louis University, 1945. Thesis: I. Contributions to the Study of Sick Cell Hemoglobin. II. A Rapid Diagnostic Test for Sick Cell Anemia.
- Rodman Jenkins. (Chemical Engineering and Chemistry), S.B., Massachusetts Institute of Technology, 1946. Thesis: Studies on Thermal and Material Transfer in Turbulent Flow.
- Robert Clarke Jopson. (Physics and Mathematics), B.S., California Institute of Technology, 1944. Thesis: I. Flux of Low Energy Protons at Sea Level. II. Other Phenomena Involving Particles of Greater than Minimum Ionization.
- David Lockhart Judd. (Physics and Mathematics), A.B., Whitman College, 1943; M.S., California Institute of Technology, 1947. Thesis: A Study of the Injection Process in Betatrons and Synchrotrons.

- Bertram Keilin. (Chemistry and Physics), B.A., New York University, 1942; M.S., California Institute of Technology, 1945. Thesis: *The Adsorption of Capillary-active Substances at the Drooping Mercury Electrode; An Electron Diffraction Investigation of the Structure of Some Organic Molecules.*
- Nathan Hart Koenig. (Chemistry and Physics), B.S., University of Chicago, 1937. Thesis: I. *The Distribution of Cyclohexene between Carbon Tetrachloride and Aqueous Solutions of Acids and Salts.* II. *The Solubility of Some Nonpolar Organic Liquids in Water and in Aqueous Solutions of Strong Acids, Alkali Salts, and Silver Nitrate. The Co-ordination of Silver Ion with Benzene.* III. *A Proposed Enium Nomenclature for Ionic Complexes Involving Carbon-Carbon Multiple Bonds.*
- Henry Lemaire. (Chemistry and Physics), B.S., Massachusetts Institute of Technology, 1942. Thesis: *Addition to the Carbon-Carbon Triple Bond. The Reaction of Acetic Acid with 3-Hexyne.*
- Leonard Solomon Lerman. (Chemistry and Physics), B.S., Carnegie Institute of Technology, 1945. Thesis: *The Reaction of Antibody with Simple Substances; The Slow Contraction of Frog Muscle; the Hemodynamics of Aortic Occlusion.*
- Ting-Yi Li. (Aeronautics and Mathematics), B.S., National Central University, 1940; Ae.E., California Institute of Technology, 1947. Thesis: *Periodic Supersonic Motions of a Thin Wing of Finite Span.*
- Harold Lurie. (Aeronautics and Mathematics), M.S., University of South Africa, 1946. Thesis: *Lateral Vibrations as Related to Structural Stability.*
- Robert V. MacAllister. (Chemistry and Chemical Engineering), A.B., Wartburg College, 1934. Thesis: *Studies on Carbohydrate and Amino Acid Chemistry.*
- Harold Clifford Martin. (Aeronautics and Mathematics), B.S., New York University, 1934; M.S., 1937. Thesis: *Elastic Instability of Cantilever Struts Under Combined Axial and Transverse Forces at the Free End.*
- John Latimer Mason. (Chemical Engineering and Chemistry), B.S., University of Chicago, 1944; B.S., California Institute of Technology, 1947; M.S., 1948. Thesis: *Transfer of Heat and Momentum in Non-uniform Turbulent Flow.*
- Frank Ambrose McClintock. (Mechanical Engineering and Mathematics), B.S., Massachusetts Institute of Technology, 1943; M.S., 1943. Thesis: *A Study of Single and Polycrystalline Ingot Iron under Repeated Stress.*
- Jack Enloe McLaughlin. (Mathematics and Physics), B.S., University of Idaho, 1944. Thesis: *Projectivities in Relatively Complemented Lattices.*
- Melvin Leroy Merritt. (Physics and Mathematics), B.S., California Institute of Technology, 1943. Thesis: *Experimental Fluctuations in the Ionization of Cosmic Ray Particles in a Thin Foil.*
- Harold Morton Mooney. (Geophysics and Physics), B.S., Harvard College, 1943; M.S., California Institute of Technology, 1948. Thesis: *A Study of the Energy Contained in the Seismic Waves P and pP.*
- James Donald O'Reilly, Reverend. (Physics and Mathematics), B.S., St. Patrick's College (Maynooth), 1938; S.T.B., 1940; M.S., California Institute of Technology, 1946. Thesis: *The Physical and Chemical Composition of the Sun.*
- Franklin Page, Jr. (Chemical Engineering and Mechanical Engineering), B.A., San Diego State College, 1947. Thesis: *Further Studies of the Analogy Between Fluid Friction and Heat Transfer in a Steady-State, Two-Dimensional Turbulently Flowing Air Stream.*
- Wen-Kwe Pao. (Genetics and Biochemistry), B.A., National Central University, 1939. Thesis: *Investigations of the Thermophobic Character in Neurospora crassa, Especially of the Relationships Between Temperature and Carbohydrate Utilization.*
- James Howard Pinckard. (Chemistry and Biology), B.A., Arizona State College, 1938; M.A., 1939. Thesis: *A Study of Some Naturally Occurring and Synthetic Cis-trans Polyenes.*
- Volney Kinne Rasmussen, Jr. (Physics and Mathematics), B.S., California Institute of Technology, 1939. Thesis: *Energy and Intensity of the Gamma Radiation from F^{19} and H^1 and Be^8 and D^2 .*
- Bernard Rasof. (Aeronautics and Mathematics), B.S., Illinois Institute of Technology, 1941; M.S., California Institute of Technology, 1944. Thesis: *Supersonic Source Flow Past Thin Air Foils.*
- Eberhardt Reichtin. (Electrical Engineering and Physics), B.S., California Institute of Technology, 1946. Thesis: *Application of a New Technique for Radio Wave Propagation Study to Experimental Confirmation of the Phase Characteristic of Norton's Ground Wave Propagation Theory.*

(DOCTOR OF PHILOSOPHY, cont.)

- Robert Kenneth Roney. (Electrical Engineering and Physics), B.S., University of Missouri, 1944; M.S., California Institute of Technology, 1947. Thesis: *The Influence of Metal Grain Structure on the Attenuation of an Ultrasonic Acoustic Wave*.
- William Treloar Russell, Major, U.S.A. (Mechanical Engineering and Electrical Engineering), B.S., University of Washington, 1942; M.S., California Institute of Technology, 1947. Thesis: *Lumped Parameter Analogies for Continuous Mechanical Systems*.
- Adam Frank Schuch. (Chemistry and Physics), B.S., Michigan State College, 1930; M.S., 1931. Thesis: *Studies in X-ray Crystallography: I. The Allotropic Forms of Cerium; II. The Structure of Urea Oxalate*.
- Glenn August Schurman. (Mechanical Engineering and Physics), B.S., Washington State College, 1944; M.S., California Institute of Technology, 1947. Thesis: *The Autoignition of a Combustible Mixture Due to the Presence of a Heated Surface*.
- Albert Mills Soldate. (Chemistry and Mathematics), A.B., Stanford University, 1941; A.M., 1942. Thesis: *I. The Crystal Structures of Certain Intermetallic Compounds. II. Metallic Valence and X-Ray Emission Fine Structure: A Discussion. III. Crystal Structures of Certain Inorganic Compounds*.
- Bernard Samuel Strauss. (Biochemistry and Immunology), B.S., College of the City of New York, 1947. Thesis: *Studies on Vitamin B6 Requiring Mutants of Neurospora crassa*.
- John Henry Sullivan. (Chemistry and Physics), B.A., University of California at Los Angeles, 1943. Thesis: *I. Kinetics of the Vapor Phase Exchange of Radioactive Bromine Between Trichlorobromomethane and Bromine. II. Kinetics of the Forward and Reverse Reactions of the Vapor Phase Thermal Bromination of Chloroform. III. A Method of Estimating and Minimizing the Error of Measurement of the Rate of a Radioactive Exchange Reaction*.
- You-Chi Tang. (Chemistry and Physics), B.S., National Ting-Chi University, 1942. Thesis: *I. The Investigation of the Alloy System Lead-Thallium. II. The Investigation of the Crystal Structure of the Complex of Hexamethylenetetramine with Manganous Chloride*.
- Alvin Virgil Tollestrup. (Physics and Mathematics), B.S., University of Utah, 1944. Thesis: *Precision Determination of the Energy Released in Nuclear Reactions in the Light Elements*.
- Max Lea Williams, Jr. (Aeronautics and Mathematics), B.S., Carnegie Institute of Technology, 1942; M.S., California Institute of Technology, 1947; Ae.E., 1948. Thesis: *The Plate Problem for a Cantilever Sector of Uniform Thickness*.
- Martynas Freelandas Ycas. (Embryology and Invertebrate Zoology), B.A., University of Wisconsin, 1947. Thesis: *Studies on the Respiratory Enzymes of Sea Urchin Eggs*.

Undergraduate Prize Awards



CONGER PEACE PRIZE ORATION

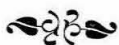
Established in 1912 by the late Everett D. Conger, D. D.

FIRST PRIZE:

RALPH STONE

SECOND PRIZE:

SWAROOP CHANDRA BHANJDEO



MARY A. EARL MCKINNEY PRIZE IN ENGLISH

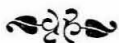
*Established in 1946 by Samuel P. McKinney, M. D., of Los Angeles,
as a memorial to his mother*

FIRST PRIZE:

DAVID ELLIOTT

SECOND PRIZE:

JAMES A. IBERS



FREDERIC W. HINRICHS, JR., MEMORIAL AWARD

Established in 1948 by the Trustees of the Institute in memory of Frederic W. Hinrichs, Jr., member of the Institute Faculty and Dean, 1921 to 1944. The award is made annually to "the senior who, in the opinion of the undergraduate Deans, has throughout his years at the Institute made the greatest contribution to the welfare of the student body and whose qualities of leadership, character and responsibility have been outstanding."

The recipient of the award is announced each year at Commencement.

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