

California Institute of Technology



COMMENCEMENT
EXERCISES

Friday afternoon
June thirteenth, nineteen forty-seven
at four o'clock

PROGRAM

Presiding:

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

ORGAN PRELUDE:

TOCCATA IN D MINOR J. S. Bach
ADAGIO CANTABILE (Op. 13) Beethoven
FANTASIA M. Festing
TRUMPET TUNE R. S. Lang

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

PROCESSIONAL MARCH . . . TRIUMPHAL MARCH . . . Gounod
(*The audience is requested to remain seated during the
Processional March*)

INVOCATION . . . The Reverend George West Barrett, A.B., S.T.B.
Rector, St. Luke's Episcopal Church, Monrovia.

COMMENCEMENT ADDRESS:

"THE RESPONSIBILITY OF THE SCIENTIST"

Lee Alvin DuBridge, Ph.D., Sc.D.,
President, 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 presented
by William R. Smythe, Ph.D., Chairman of the Committee on
the Course in Science.*

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

*Candidates for professional degrees presented by William N. Lacey,
Ph.D., Dean of Graduate Studies.*

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

BENEDICTION

RECESSIONAL MARCH . . . MARCIA Weber
(*The audience is requested to remain seated until the end of the
Recessional March*)

Candidates for Degrees

BACHELOR OF SCIENCE IN SCIENCE

REED MACOMBER ANDERSON
 ROLLAND SANFORD ASHER
 GEORGE ALLEN AUSTIN
 HAL WAYNE BANBROOK
 JOHN S. BILLHEIMER
 ARTHUR FREDERICK BLIGHT, JR.
 JONAS BRACHFELD
 HARRY PAUL BRUEGGEMANN
 DAVID ORVILLE CALDWELL†
 RODERICK KEENER CLAYTON
 ARTHUR J. CRITCHLOW
 JOHN JOSEPH DENISTON
 DAVID LEWIS DOUGLAS*
 GEORGE GORDON GAMMANS
 DONALD IRVING GRANICHER
 WILLIAM GORDON HAMMERLE

GEORGE F. HARDY
 ROBERT HUTCHISON HARRIS*
 JOHN WM. HARRISON
 RICHARD JAMES HERNDON*
 GEORGE GULDIN KELLEY
 ROBERT WARNER KENNEY
 WILLIAM ROBERT KING, JR.
 HAROLD WILLIAM KUHN*
 HARVEY JOHN LAWRENCE
 PAUL AUDREY LINAM
 BARTHOLOMEW LOCANTHI
 RAYMOND RALPH LOCHHEAD
 JOHN LATIMER MASON
 JOHN M. MAYS*
 CHARLES HENRY
 McDougall, Jr.
 DALE JOSEPH MEIER

DONALD DOLTON MON
 ELMO MOOREHEAD
 DAVID EUGENE MULLER
 ROLLIE JOHN MYERS, JR.
 ARNOLD HASTINGS NEVIS†
 WALTER THOMAS OGIER
 DAVID RUSSELL OPPERMAN
 LEON SHENFIL
 EUGENE MERLE SHOEMAKER*†
 PETER SWERLING*
 WARREN STANLEY TORGERSOHN*
 CHAROEN VADHANAPANICH
 JEPHTHA ALAN WADE, JR.
 JERRY DALTON WARD
 THOMAS NEAL WILSON
 ERIC JOHN WOODBURY*

BACHELOR OF SCIENCE IN ENGINEERING

RICHARD STEPHEN BARNA
 ROBERT BEARSON
 WILLIAM ROCHELLE BELLEW
 ROBERT C. BELYEA
 DUDLEY EARL BENNETT
 ELLIS HARLEY BEYMER
 ROBERT LOUIS BLINK
 ARTHUR S. BOLLES
 FRANCIS ROBERT BOWERMAN
 ROBERT KING BREECE
 LATHAM LOOMIS BRUNDRED, JR.
 JAMES FERGUSON CHALMERS
 HAROLD COMLOSSY, JR.
 EDWIN J. COWAN
 CECIL A. CRAFTS
 CHARLES BURTON CRUMLY*
 RODNEY O. DARLING
 CHADWICK SCHUYLER
 DAUWALTER
 ORIN JACK DEMUTH
 WESLEY MOORE DYNES
 MANFRED EIMER
 BYRNE EGGENBERGER
 RICHARD LEROY FELBERG
 BERNARD FLAM
 DARWIN LEGRANDE
 FREEBAIRN, JR.
 JACK EDWARD FROEHLICH
 WILLIAM FRANCIS
 GIACOMAZZI, JR.
 WENDALL MAX BOAS HAAS

WALTER JOHN HAMMING
 DAVID SHERIDAN HATCHER
 HARRY HOYT HAUGER, JR.
 ROBERT GRAY HAWTHORNE
 LANGDON CLYDE HEDRICK†
 HAROLD M. HIPSH*
 MERWYN EDGAR HODGES
 JOHN DWIGHT HOLMGREN
 KENNETH FRASER HOLTBY
 GRAHAM ALLISON HORINE
 ROBERT M. KENDALL
 CHRESTEN MILLS KNUDSEN
 HENRY GEORGE KOHLER
 JOEL M. KOWAN
 JAMES FLETCHER LANE
 NORMAN RAY LEE†
 RODIN VOLTAIRE LESOVSKY
 HOWARD KIRK LEWIS, JR.
 JAMES ADAMS LEWIS
 LEVAL LUND, JR.
 WILLIAM PEARSON LUNDY
 GEORGE WILSON LYON†
 ORDWAY TALBOT MANNING
 LLOYD FULLER MAULDIN
 ROBERT STUART
 MACALISTER, JR.
 GORDON MCCLURE
 ROB ROY McDONALD†
 STANLEY HAROLD MENDES
 CHARLES NORMAN MILLER
 EDWARD WILSON MILLER
 RETURN FRANCIS MOORE

STEPHEN FAULKNER MORAN, III
 ALBERT HERBERT JOSEPH
 MUELLER
 FRANKLIN OLIVER MYERS
 BLAINE R. PARKIN
 LUCIEN ARTHUR PASCOE
 ARTHUR E. PLATT
 JOHN PATRICK PRENDERGAST
 CARL F. RASMUSSEN
 KAMALESH RAY
 WILL RICHESON, JR.
 JOHN CUMMING RIEDEL
 EUGENE S. ROSE, JR.
 JOSEPH ROSENER, JR.
 HERBERT NATHAN ROYDEN
 WILLEM SCHAAFSMA
 HENRY WILLIAM SCHROEDER
 JOHN RAYMOND SCULL
 GEORGE DONALD SHIPWAY
 CARTER SINCLAIR*
 LYLE DEAN SIX
 JAMES STEWART SMITH
 DONALD STEWART, JR.
 STANFORD GRANT STILES
 ROGER DEAN STUCK
 CLAYTON ROBERT STURDEVANT
 FRANCIS DUANE SULLIVAN
 RICHARD GORDON SWEET
 RAYMOND BERNARD TASKER*
 JOHN PHARES TERRY
 ROBERT HAROLD UTSCHIG

*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.

Physics

ALFRED BRUCE BROWN, JR., B.S., Lehigh University, 1942.
RICHARD HARDING DAVIS
WILLIAM RICHARD DAVIS, B.S., California Institute of Technology, 1944.
ROBERT BRIGGS DAY, A.B., Haverford College, 1943.
ALBERT TROMLY ELLIS, B.S., California Institute of Technology, 1943.
HUSSEIN MOHAMMED AMIN EL-SUM, B.S., Fouad' University, 1941.
FRANK BEHE ESTABROOK, A.B., Miami University, 1943.
~~EDWARD ADOLPH GAUGLER, B.S.E., University of Michigan.~~
LOUIS ADAMS GIAMBONI, B.S., University of California at Los Angeles, 1941.
ROBERT MAX ILFELD, B.S., Massachusetts Institute of Technology, 1944.
DAVID LOCKHART JUDD, A.B., Whitman College, 1943.
HERMAN KAHN, B.A., University of California at Los Angeles, 1946.
FIORELLO RANZO LEO, B.S., National Chio-Tung University, 1937.
ALFRED LEWIS MENDENHALL, B.A., Miami University, 1937.
MAURICE RATTRAY, JR., B.S., California Institute of Technology, 1944.
LELAND PERLEY ROBINSON, JR., B.S., University of New Hampshire, 1939; M.S., University of New Hampshire, 1940.
MALVIN AVRAM RUDERMAN, A.B., Columbia College, 1945.
ROBERT G. THOMAS, B.S., California Institute of Technology, 1944.
RICHARD DAVIDSON YOUNG, B.A., Princeton University, 1945.

MASTER OF SCIENCE IN ENGINEERING

Aeronautics

JERRY FREDERICK LOUIS ALDRICH, A.B., University of California at Los Angeles, 1944.
MORTON ALPERIN, B.S., New York University, 1939.
WARREN AMSTER, B.S., California Institute of Technology, 1944.
NORMAN CARL APPOLD, B.S., University of Michigan, 1940; M.S., University of Michigan, 1941.
ADOLFO JOSE ATENCIO, B.S., Buenos Aires University, 1944.
PAUL GREGORY ATKINSON, JR., B.S., United States Military Academy, 1943.
JOHN WRAY BENNETT, B.S., University of Florida, 1942.
ZEGMUND OSCAR BLEVISS, B.S., University of California, 1944.
WILLIAM CROCKETT COOLEY, B.S., Massachusetts Institute of Technology, 1944.
SUBODH CHANDRA DAS, B.S., Presidency College, 1937.
HAROLD M. DEGROFF, JR., B.S., Rensselaer Polytechnic Institute, 1946.
JAMES ALEXANDER GWILYM DIACK, B.S., University of Toronto, 1943.
WILLIAM HENRY EISELE, B.S., Rensselaer Polytechnic Institute, 1946.
MORRIS FEIGEN, B.S., University of California, 1940.
LUIS EDUARDO FREIRE, B.S., California Institute of Technology, 1946.
ROBERT DAVID FUSFELD, B.S., Columbia University, 1942.
JACK ALBAN GIBBS, B.S., Oregon State College, 1936.
GEORGE EDWARD GOMPF, B.S., Virginia Polytechnic Institute, 1942.
JEAN GLEN GOPPERT, B.S., Texas Agricultural and Mechanical College, 1943.
WILLIAM D. GRAZIANO, B.S., New York University, 1943.
ALBERT HENRY HALL, B.S., University of Alberta, 1942.
WENDELL WILLIAM HARTER, B.S., California Institute of Technology, 1942.
EA-QUA HUANG, Technische Hochschule, Berlin.
HARRY FREDERICK IMSTER, B.S., University of Michigan, 1946.
ARNOLD AXTELL JENSEN, B.S., University of Minnesota, 1939.
FELIX ANDREW KALINSKI, B.S., United States Military Academy, 1943.
JOHN ANDREW KELLY, B.S., University of Colorado, 1946.
WARREN GOTTLIEB KOERNER, B.S., Purdue University, 1942.
SEYMOUR LAMPERT, B.S., Georgia School of Technology, 1943.
JAMES STEVEN LESKO, B.S., Rensselaer Polytechnic Institute, 1943.
BERNARD WALTER MARSCHNER, B.S., University of Minnesota, 1942.
GEORGE BERT MELROSE, JR., B.S., Brown University, 1945.
IRVING MICHELSON, B.S., California Institute of Technology, 1943.
CURTIS EDWARD MILLER, B.S., University of Minnesota, 1943.
THOMAS GUY MONROE, JR., B.S., North Carolina State College, 1943.
ANTONY JOHN ANDREW MORGAN, B.S., California Institute of Technology, 1944.
WILLIAM EDWARD MORLEY, B.A. Sc., University of Toronto, 1945.

DAVID BASIL VAN DEERLIN
ARTHUR FRANCIS VIEWEG
ROBERT LAWRENCE WALKER

ALLEN DEAN WEEKS
JERARD BEN WERNER

JAMES STEWART WIGGS
EDWARD BYRON WINTERS, JR.

MASTER OF SCIENCE IN SCIENCE

Chemistry

RAYMOND ALLEN BROWN, B.S., Wagner College, 1941.
EDWARD WOODROW HAMMOCK, A.B., Lynchburg College, 1937.
CHARLES NORMAN SCULLY, B.S., California Institute of Technology, 1941.
DUDLEY WATSON THOMAS, A.B., University of California, 1942.
WARREN SCRIVER WOOSTER, Sc.B., Brown University, 1943.

Chemical Engineering

CHARLES EDWARD AUERBACH, B.S., University of California, 1942.
HAROLD HERBERT BRADLEY, JR., B.S., California Institute of Technology, 1943.
PAUL STEPHEN FARRINGTON, B.S., California Institute of Technology, 1941.
ARTHUR HENRY GARDNER, B.S., California Institute of Technology, 1943.
WALTER D. HARRINGTON, JR., B.S., University of California, 1939.
LOUIS EDWARD KLEIN, B.S., Lehigh University, 1942.
DAVID MALCOLM MASON, JR., B.S., California Institute of Technology, 1943.
STANLEY FOX NEWMAN, B.S., California Institute of Technology, 1944.
JOHN BURTON OPFELL, B.S., University of Wisconsin, 1945.
JARVIS LARSON SCHWENNESEN, B.S., Michigan College of Mining and Technology, 1943.

Geological Sciences

PRABHAT KUMAR BHATTACHARYA, M.S., Calcutta University, 1942.
EDWIN CONGER BUFFINGTON, B.A., Carleton College, 1941.
LEENDERT DEWITTE, B.S., Goringen University.
JAMES WILLIAM EDMUNDSON, A.B., Stanford University, 1941.
LUIS FLORES COVARRUBIAS, C.E., National University of Mexico, 1937.
JOSEPH STEWART MARTIN, B.S., California Institute of Technology, 1944.
HENRY WILLIAM MENARD, JR., B.S., California Institute of Technology, 1942.
ROBERT CARLETON WHITE, A.B., Dartmouth College, 1942.

Meteorology

DAVID MURRAY ALEXANDER, B.S., St. Andrews University, 1938.
ARTHUR FREDERICK BLIGHT, JR., B.S., California Institute of Technology, 1947.
TA-SAN CHUNG, B.S., Tsing-Hwa University, 1938.
BRIAN DAVID DAGNALL, B.S., University of London, 1942.
FERNAND PETREGILLE DE PERCIN, B.S., Rutgers University, 1943.
BERNARD EMILE DETHIER, B.S., California Institute of Technology, 1946.
BYRNE EGGENBERGER, Certificate in Meteorology, University of California.
ERIC GILLAM, B.S., University of London, 1945.
DONNELL HUNTING GOULD, B.S., Berea College, 1943.
WALTER JOHN HAMMING, B.S., California Institute of Technology, 1947.
CHI-HSUN HSUEH, B.S., National Central University, 1937.
NORMAN JOSEPH MACDONALD, B.S., California Institute of Technology, 1946.
JOHN MANOUKIAN, B.S., Imperial College of Science, 1942.
ARNOLD ALLEN MCCARLEY, B.S., Austin State Teachers College.
CLIFFORD A. OLSEN, B.A., Montana State University.
JOHN PETTLEY, B.A., University of London, 1935.
EUGENE PORTER RICHEY, B.S., University of Alaska, 1941.
PAO-KANG WAN, B.S., National South West Associated University, 1938.
NORRIS WOERNER, B.S., Tri-State College, 1943.
LAI-CHAO YING

WILLARD A. DODGE, JR., B.S., California Institute of Technology, 1944.
 JAMES HUGHES DRAKE, B.S., California Institute of Technology, 1946.
 NORMAN HARRY ENENSTEIN, B.S., University of California at Los Angeles, 1946.
 JEROME SMYTH HARRINGTON, B.S., California Institute of Technology, 1945.
 LAURENCE OLIVER HAUPT, JR., B.S., California Institute of Technology, 1946.
 WILLIAM LEROY HAYHURST, B.S., Queens University, 1946.
 CHARLES ROBERT HILL, B.S., University of Utah, 1941.
 PAUL TRICE HUTCHISON, B.S., Mississippi State College, 1944.
 WILLIAM GLEN LALL, B.S., Punjab College of Engineering and Technology, 1944.
 VINCENTE HIDALGO LIM, B.S., United States Military Academy.
 DAVID COLVILL LINCOLN, B.S., California Institute of Technology, 1946.
 RICHARD HENRI MACNEAL, B.S., Harvard University, 1943.
 ANDREW WAHLERT MCCOURT, B.S., Washington University, 1943.
 RUBEN FRED METTLER, B.S., California Institute of Technology, 1944.
 LLOYD EDWARD OTT, B.S., California Institute of Technology, 1945.
 LOWELL CARR PARODE, B.S., California Institute of Technology, 1945.
 RICHARD WELLS POWELL, B.S., California Institute of Technology, 1940.
 ROBERT GEORGE ROGERS, B.S., University of Texas, 1945.
 ROBERT KENNETH RONEY, B.S., University of Missouri, 1944.
 DAVID FREDERICK RUTLAND, B.S., California Institute of Technology, 1944.
 ALFRED DALE SCARBROUGH, B.S., California Institute of Technology, 1945.
 JACK HAMILTON SLATON, B.S., Illinois Institute of Technology, 1945.
 RICHARD ALLEN SMITH, B.S., California Institute of Technology, 1946.
 CARL PHILIP SPAULDING, B.S., University of Colorado, 1943.
 JOHN ALBERT STALLKAMP, B.S., Columbia University, 1946.
 FREDERICK STEVENS, JR., A.B., Whitman College, 1944.
 LOREN FRANK STRINGER, B.S., University of Texas, 1946.
 STANLEY GROVER STROUD, B.S., California Institute of Technology, 1941.
 ERNEST WADE, B.S., California Institute of Technology, 1943.
 ORISON WADE, B.S., California Institute of Technology, 1946.
 DEAN ALLEN WATKINS, B.S., Iowa State College, 1944.
 BARTON COOK WOOD, B.S., Purdue University, 1944.
 GREGORY ODD YOUNG, B.S., California Institute of Technology, 1944.

Mechanical Engineering

SPENCER ROE BAEN, B.S., Texas Agricultural and Mechanical College, 1943.
 OLIVER ALBRECHT BAER, A.B., Stanford University, 1943.
 RICHARD HARDING BALL, B.S., Purdue University, 1942.
 ROBERT OWEN BARKDOLL, B.S., Northwestern Technological Institute, 1945.
 EDWARD RICE BARTLETT, JR., B.S., California Institute of Technology, 1942.
 EARNEST HUBERT CLARK, JR., B.S., California Institute of Technology, 1946.
 DAVID ARTHUR ELMER, B.S., California Institute of Technology, 1943.
 EDWARD WILLIAM GARRISON, B.S., Harvard University, 1943.
 LEON GREEN, JR., B.S., California Institute of Technology, 1944.
 JOHN ARNOLD HEINZ, B.S., California Institute of Technology, 1945.
 CHI-NAN HSU, B.S., Chiao-Tung University, 1941.
 HERBERT ARTHUR LASSEN, B.S., California Institute of Technology, 1943.
 THEODORE GIBSON LAWRENCE, B.S., California Institute of Technology, 1943.
 H. DAVID LIFTON, B.S., Carnegie Institute of Technology, 1940.
 MICHAEL KEVIN MOLLOY, B.S., University of Toronto, 1945.
 WALTER MACTAVISH OGSTON, B.A., New College, Oxford, 1939; M.A., New College, Oxford, 1946.
 DOUGLAS CHAPPELL REID, B.S., California Institute of Technology, 1943.
 WILLIAM TRELOAR RUSSELL, B.S., University of Washington, 1942.
 GLENN AUGUST SCHURMAN, B.S., Washington State College, 1944.
 RICHARD BRIGHAM SMALL, B.S., Massachusetts Institute of Technology, 1942.
 RICHARD ALVORD SUTTON, B.S., California Institute of Technology, 1943.
 JACK DAHLSTROM VERSCHOOR, B.S.E., University of Michigan, 1945.

CLYDE RICHARD MURTAUGH, B.E.E., Ohio State University, 1943.
 CONRAD NATHANIEL NELSON, B.S., Massachusetts Institute of Technology, 1941.
 JOHN LEWIS ORR, B.A.Sc., University of Toronto, 1939.
 TELFORD WILBERT OSWALD, A.B., Stanford University; S.M., Harvard University.
 NORMAN CHARLES PETERSON, B.S., University of Michigan, 1943.
 ERNEST I. PRITCHARD, B.S., Antioch College, 1943.
 ANATOL ROSHKO, B.S., University of Alberta, 1945.
 DONALD BARSTOW SEAGER, B.S., University of California, 1942.
 THOR EYOLFUR STEPHENSON, B.A. Sc., University of Toronto, 1942.
 JAMES LEONARD SUMMERS, B.S., University of Washington, 1942.
 CALHOUN WINFRED SUMRALL, B.S., Louisiana State University, 1945.
 GEORGE RENZO VANDEN HEUVEL, B.S., Georgia School of Technology, 1939.
 MILTON DENMAN VAN DYKE, B.S., Harvard University, 1943.
 WILBERT GAYTON WHELDON, B.S., United States Naval Academy, 1941.
 MAX L. WILLIAMS, JR., B.S., Carnegie Institute of Technology, 1942.
 EUGENE FRANK WYSZPOLSKI, B.A.E., Rensselaer Polytechnic Institute, 1945.

Civil Engineering

HAROLD SEVERIN ANTHON, B.S., Illinois Institute, 1939.
 JAMES HENDERSON BEDDOW, B.S., West Virginia University, 1938.
 RICHARD ARNS BOETTCHER, B.S., University of Wisconsin, 1938.
 RAYMOND MAURICE CLOCK, B.S., United States Military Academy, 1940.
 WILLIAM TATEM COLLINGS, B.S., California Institute of Technology, 1944.
 JOHN PINNA CRAVEN, B.S., Cornell University, 1946.
 THOMAS V. DAVIS, B.S., California Institute of Technology, 1937.
 CHARLES MARSDEN DUKE, B.S., United States Military Academy, 1939.
 EDWARD AIKEN FLANDERS, B.S., United States Military Academy, 1940.
 JOHN EDWARD FRITZ, C.E., University of Cincinnati, 1937.
 RICHARD CARL GERKE, B.S., University of Colorado, 1946.
 RICHARD HALL GILMAN, III, B.S., California Institute of Technology, 1944.
 JOHN A. GRAF, B.S., United States Military Academy, 1940.
 ELMER ERNEST HALL, JR., B.S., University of California, 1944.
 ROBERT BLYNN HARRIS, B.S., University of Colorado, 1940.
 WILLIAM EDWIN HELLER, B.S., California Institute of Technology, 1945.
 WILLIAM MILES LINTON, B.S., United States Naval Academy, 1941.
 SIDNEY TAYLOR MARTIN, B.S., United States Military Academy, 1939.
 MYRON ELLSWORTH PAGE, JR., B.S., University of California, 1938.
 ADRIAN PAUW, B.S., University of Washington, 1937.
 JOSEPH MANSFIELD PHELPS, B.S., California Institute of Technology, 1944.
 PATRICK MICHAEL QUINLAN, B.E., University College, 1941; B.Sc., University College, 1942;
 M.Sc., University College, 1943.
 GURUVAYUR SUBRAMANYAM RAMASWAMY, B.S., College of Engineering, Madras, 1944.
 FRED EDGAR ROSELL, JR., B.S., United States Military Academy, 1942.
 CLAYTON ALLEN RUST, B.S., United States Military Academy, 1940.
 FRANK ALBERT SWATTA, B.S., State University of Iowa, 1938.
 DONALD CALVIN TILLMAN, B.S., California Institute of Technology, 1945.
 JOSEPH ERNEST VEALE, B.S., A.E., Georgia School of Technology, 1933; B.S., C.E., Georgia School of
 Technology, 1936.
 CLIFFORD MCBRIDE WIMBERLY, B.S., New Mexico State College, 1942.
 CLYDE CALHOUN ZEIGLER, B.S., United States Military Academy, 1935.

Electrical Engineering

CHARLES WESLEY BAUGH, JR., B.S., Purdue University, 1944.
 FLOYD KENNETH BECKER, B.S., University of Colorado, 1945.
 ROBERT ROYCE BENNETT, B.A., Reed College, 1943.
 ARTHUR TREW BIEHL, B.S., Illinois Institute of Technology, 1945.
 JAY ROLDEN BORDEN, B.S., California Institute of Technology, 1944.
 EARLE ROBERT BUNKER, JR., B.S., California Institute of Technology, 1943.
 PAUL KRISHNAMA CHARLU, B.E., College of Engineering, India, 1944.
 DAVID ARTHUR COOKE, B.S., University of Colorado, 1944.

JOSEPH OSCAR WEISENBERG, Lt., U.S.N., B.S., Rockhurst College, 1940; M.S., California Institute of Technology, 1946.
 THOMAS FRANKLIN WELDON, Major, A.A.F., B.S., Holy Cross College, 1941; M.S., California Institute of Technology, 1946.
 ALONZO HOLBROOK WELLMAN, JR., Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
 JOHN PAUL WHEATLEY, Lt. Comdr., U.S.N., B.S., University of Washington, 1938; M.S., Harvard University, 1939.
 QUENTIN ROBERT WHITMORE, Lt., U.S.N., A.B., Nebraska State Teachers College, 1941.
 WILLIAM CLARENCE WILBURN, Lt. Comdr., U.S.N., A.B., Birmingham-Southern College, 1941; M.S., California Institute of Technology, 1946.

Industrial Designer

LEE MARTIN GRISWOLD, B.S., Principia College, 1943.
 HERMAN HEIDT, B.S., University of Colorado, 1944.
 MUNDKUR VASUDEV KAMATH, B.S., Madras University, 1938.
 HENRY CHAPMAN KECK, B.A., Dartmouth College, 1943.
 EMMETT THOMAS KING, B.S., University of California, 1933; M.S., *ibid*, 1936.
 ORVILLE SAMUEL POWELL, B.S., Purdue University, 1942.
 PAUL C. YANKAUSKAS, JR., B.S., Rhode Island State College, 1943.

Chemical Engineer

RUSSELL ALBERT THOMPSON, JR., B.S., Massachusetts Institute of Technology, 1942; M.S., *ibid*, 1943.

Mechanical Engineer

WALTER HARDENBROECKE GOODWIN, B.A., University of British Columbia, 1942; B.S. *ibid*, 1943; M.S., California Institute of Technology, 1946.

Meteorologist

CHARLES HADLEY LEWIS, A.B., Whittier College, 1944.
 JOHN OSMER MONTGOMERY, B.A., University of Southern California, 1942; M.S., California Institute of Technology, 1946.

DOCTOR OF PHILOSOPHY

WILLIAM FRANCIS BALLHAUS (Aeronautics and Mathematics), A.B., Stanford University, 1940; M.E.A., 1942. Thesis: Aerodynamic and Geometric Parameters Affecting Aircraft Weight.
 STANLEY CORRISIN (Aeronautics and Physics), B.S., University of Pennsylvania, 1940; M.S., California Institute of Technology, 1942; Ae.E., 1942. Thesis: I. Extended Applications of the Hot-wire Anemometer. II. Investigations of the Flow in Round, Turbulent Jets.
 DONALD ALLAN DARLING (Mathematics and Physics), A.B., University of California at Los Angeles, 1941. Thesis: Continuous Stochastic Processes.
 JERRY DONOHUE (Chemistry and Mathematics), B.A., Dartmouth College, 1941; M.A., 1943. Thesis: Studies of the Representation of Interatomic Distances in Molecules and Crystals as Sums of Atomic Radii.
 JAMES WIGHTMAN FOLLIN, JR. (Physics and Mathematics), B.S., Massachusetts Institute of Technology, 1940. Thesis: Propagation of Cosmic Rays through Interstellar Space.
 DAVID HAGELBARGER (Physics and Mathematics), A.B., Hiram College, 1942. Thesis: Cancellation of Reflections Due to Obstacles in an Ultra High Frequency Transmission Line.
 WALLACE DEAN HAYES (Physics, Mathematics and Aeronautics), B.S., California Institute of Technology, 1941; Ae.E., 1943. Thesis: Linearized Supersonic Flow.
 PAUL BENNETT JOHNSON (Mathematics and Physics), A.B., University of Washington, 1938; M.S., 1944. Thesis: Some Applications of Functional Analysis to Parallel Displacement in Riemannian Geometry.
 ROBERT BENJAMIN LEIGHTON (Physics and Mathematics), B.S., California Institute of Technology, 1941; M.S., 1944. Thesis: The Vibrational Spectrum of a Monatomic, Face-Centered Cubic Crystal Lattice.
 KURT MARTIN MISLOW (Chemistry and Physics), B.S., Tulane University, 1944. Thesis: I. The Synthesis of Potential Antimalarials. Some 2-substituted 8-(3-diethylaminopropylamino)-quinolines. II. Isomorphism in Relation to Serological Specificity. III. A Study on the Hammett Reaction.

- SAMUEL POPE MORGAN, JR. (Physics and Mathematics), B.S., California Institute of Technology, 1943; M.S., 1944. Thesis: Properties and Applications of Bessel Functions of Imaginary Order.
- SAM NAIDITCH (Chemistry and Physics), B.A., University of California at Los Angeles, 1939. Thesis: I. Rate and Mechanism of Hydrolysis of the Hydroxylamine Disulfonate Ion. II. The Low Voltage Electrically Exploded Wire.
- ROBERT HORNER OLDS (Physics and Mathematics), B.S., California Institute of Technology, 1938; M.S., 1939. Thesis: The Partial Volumetric Behavior of the Methane-n-butane-decane System.
- GUY CLIFTON OMER, JR. (Physics and Mathematics), B.S., University of Kansas, 1936; M.S., 1937. Thesis: Studies of Non-homogeneous Cosmological Models.
- ARTHUR BECK PARDEE (Chemistry and Physics), B.S., University of California, 1942; M.S., California Institute of Technology, 1943. Thesis: I. The Degree of Association of Some Simple Antigens. II. The Reactions of Synthetic Antigens with Specifically Purified Antibodies. III. The Size and Shape of Molecules of "A" Substance from Hog Gastric Mucin.
- DONALD HARRY POTTS (Mathematics and Physics), B.S., California Institute of Technology, 1943. Thesis: Mean Value Derivatives.
- DAVID COOK REGNERY (Genetics and Embryology), B.A., Stanford University, 1941. Thesis: A Study of the Leucineless Mutants of *Neurospora Crassa*.
- SYLVAN RUBIN (Physics and Mathematics), B.S., California Institute of Technology, 1939. Thesis: A Photographic Method for Measuring the Angular Distribution in the Yield of Nuclear Reactions.
- RICHARD SCHAMBERG (Aeronautics and Physics), B.S., California Institute of Technology, 1943; M.S., 1944. Thesis: The Fundamental Differential Equations and the Boundary Conditions for High Speed Slip-flow, and their Application to Several Specific Problems.
- DAVID POWELL SHOEMAKER (Chemistry and Physics), B.A., Reed College, 1942. Thesis: I. An Attempt to Prepare Antibodies to Histamine *in Vitro*. II. An Investigation of a Possible Method for Preparing Large Single Crystals of Aluminum Orthophosphate. III. Investigations of the Crystal Structures of Amino Acids by X-ray Diffraction; (a) An Investigation of the Space-Group and Lattice Constants of Dl-Serine; (b) An Investigation of the Crystal Structure of l-Threonine.
- ALEXANDER SMITH (Petrology and Geochemistry), B.A., University of British Columbia, 1932; M.A., 1933. Thesis: Control of Ore by Primary Igneous Structures: (1) Porcher Island, British Columbia; (2) Crestmore, California. The Geochemistry and Paragenesis of the Ores of the Cactus Mine, Kern County, California.
- JONATHAN DEAN SWIFT (Mathematics and Physics), A.B., University of California, 1939. Thesis: Periodic Functions over Fields of Characteristic p.
- HOWARD JONES TEAS, JR. (Genetics and Biochemistry), A.B., Louisiana State University, 1942; M.A., Stanford University, 1946. Thesis: The Biochemistry and Genetics of Threonine-requiring Mutants of *Neurospora Crassa*.
- E. ARTHUR TRABANT (Mathematics and Physics), B.A., Occidental College, 1940. Thesis: Applications of the Tensor Calculus to Problems Arising in Dynamics.
- KENNETH NYITRAY TRUEBLOOD (Chemistry and Physics), A.B., Harvard College, 1941. Thesis: I. The Coordination of Silver Ion with Ethylene and Propylene. II. The Development of a Chromatographic-spectrophotometric Method for the Isolation and Estimation of Minor Impurities in RDX. III. An Experimental Study of Chromatography on Silicic Acid-Celite Columns. IV. A Method for the Study of the Absorption Spectra of Adsorbed Compounds.
- DONALD BINGHAM WHEELER, JR. (Physics and Mathematics), B.S., Lehigh University, 1938. Thesis: Dispersion and Absorption of Ultra-high Frequency Electromagnetic Waves in Some Fatty Acids.
- ALBERT GEORGE WILSON (Mathematics and Physics), B.S., Rice Institute, 1941; M.S., California Institute of Technology, 1942. Thesis: Axially Symmetric Thermal Stresses in a Semi-Infinite Solid.

PROFESSIONAL DEGREES

Aeronautical Engineer

- ROY GENE ANDERSON, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
 CLYDE CECIL ANDREWS, Lt. Comdr., U.S.N., M.S., California Institute of Technology, 1946.
 KENNETH PERRIN BARDEN, Lt., U.S.N., M.S., California Institute of Technology, 1946.
 JAMES MONFORT BOWIE, Lt., U.S.N., M.S., California Institute of Technology, 1946.
 EDWARD GEORGE BULL, Lt. Comdr., U.S.N., B.S., University of Michigan, 1941.
 GLENN WILLIAM BURGER, Lt. Comdr., U.S.N., M.S., California Institute of Technology, 1946.
 FREDRIC "B" CLARKE, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1939.
 ROBERT EMMETT CLEMENTS, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
 CHARLES WILLARD COLE, B.Ae., University of Minnesota, 1940; M.S., California Institute of Technology, 1946.
 HUGH "L" H. COLLINS, Lt., U.S.N., B.S., Spring Hill College, 1940.
 JERRY FOREST DANIELS, JR., Lt. Comdr., U.S.N., M.S., California Institute of Technology, 1946.
 JOSEPH BENJAMIN DEODATI, Lt. Comdr., U.S.N., B.S., Agricultural and Mechanical College of Texas, 1939; M.S., California Institute of Technology, 1946.
 WILLIAM EARL DITCH, Lt., U.S.N., M.S., California Institute of Technology, 1946.
 FRANK JOHN DORE, B.S., California Institute of Technology, 1945; M.S., *ibid*, 1946.
 PAUL CHRISTIAN DURUP, Lt., U.S.N., M.S., California Institute of Technology, 1946.
 MIKE WALTER FOSSIER, B.S., Agricultural and Mechanical College of Louisiana, 1945; M.S., California Institute of Technology, 1946.
 CHARLES W. GRIFFING, Lt. Comdr., U.S.N., B.S., University of Florida, 1940; M.S., California Institute of Technology, 1946.
 R. RICHARD HEPPE, A.B., Stanford University, 1944; A.M., *ibid*, 1945.
 GERALD STEPHEN HUESTIS, Lt., U.S.N., M.S., California Institute of Technology, 1946.
 THOMAS FREDERICK KIRKWOOD, A.B., Stanford University, 1943; A.M., *ibid*, 1944.
 BERNARD BARCLAY LEVITT, B.S., University of Colorado, 1941; M.S., California Institute of Technology, 1946.
 TING YI LI, B.S., National Central University, 1940.
 FRANK EARL MARBLE, B.S., Case School of Applied Science, 1940; M.S., *ibid*, 1942.
 ROBERT L. MASTIN, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1939.
 THOMAS RUFUS MCCLELLAN, Lt., U.S.N., B.S., United States Naval Academy, 1942.
 EARL WILSON McLAUGHLIN, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
 EDWARD BERLENDIS MONTEATH, Lt. Comdr., U.S.N., B.S., Washington University, 1940; M.S., California Institute of Technology, 1946.
 RALPH EARL MOYER, JR., Lt., U.S.N., B.S., Maryville State Teachers College, 1941.
 LEO WAYNE MULLANE, Lt. Comdr., U.S.N., B.Ch.E., University of Minnesota, 1940; M.S., California Institute of Technology, 1946.
 DONALD JOHN O'MEARA, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1939.
 GEORGE MARSHALL PALMER, JR., B.S., Purdue University, 1945; M.S., California Institute of Technology, 1946.
 ALBERT DAVID POLLOCK, JR., Lt. Comdr., U.S.N., B.S., Santa Barbara State College, 1938.
 HENRY THOMAS PONSFORD, A.B., Stanford University, 1944; M.S., California Institute of Technology, 1946.
 DAVID PURDON, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
 FLOYD FRANCIS RECK, B.S., Hamline University, 1941.
 RUSSELL LAWRENCE REISERER, Lt. Comdr., U.S.N., M.S., California Institute of Technology, 1946.
 HAROLD EGBERT RICE, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1941.
 CHARLES WESLEY RUSH, JR., Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1941.
 LEWIS B. SANDERS, Lt. Comdr., U.S.N., Nebraska State Teachers College, 1936-37, 1939-41.
 MERRILL HOMER SAPPINGTON, Lt. U.S.N., B.S., United States Naval Academy, 1942.
 LOYS MALCOLM SATTERFIELD, Lt. Comdr., U.S.N., B.S., Trinity College, 1940.
 ROBERT WALTON SHACKFORD, Lt., U.S.N., B.S., Northeastern University, 1942.
 JOHN SMALL, B.S., California Institute of Technology, 1941; M.S., *ibid*, 1946.
 ORLAN ALTON SOLI, Lt. Comdr., U.S.N., B.S., River Falls State Teachers College, 1940; M.S., California Institute of Technology, 1946.
 JEAN BARRIEU STEVENS, Lt. Comdr., U.S.N., B.S., California Institute of Technology, 1940.
 ROBERT FULTON TANGREN, B.S., California Institute of Technology, 1939; B.S. in Ae., *ibid*, 1940.
 LEON TRILLING, B.S., California Institute of Technology, 1944; M.S., *ibid*, 1946.
 JOSEPH A. TVEDT, Lt. Comdr., U.S.N., B.A., University of North Dakota, 1939.

UNDERGRADUATE PRIZE AWARDS

CONGER PEACE PRIZE ORATION

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

First Prize: IRVING SULMEYER

Second Prize: JOHN HOLMGREN

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: CHARLES SUSSKIND

Second Prize: ALFRED E. WATERS