

*California Institute of Technology*



COMMENCEMENT  
EXERCISES

*Friday afternoon*

*June tenth, nineteen forty-nine*

*at four o'clock*

# PROGRAM

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*Presiding:*

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

## ORGAN PRELUDE:

TRUMPET TUNE . . . . .	<i>Henry Purcell</i>
HIGHLAND ROMANCE . . . . .	<i>J. H. Shearer</i>
DEDICATION . . . . .	<i>Felitz</i>
TRAUWEREI . . . . .	<i>Schumann</i>

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

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

## INVOCATION AND CHAPLAIN'S ADDRESS

The Most Reverend Joseph T. McGucken, D. D.,  
*Auxiliary Bishop, Archdiocese of Los Angeles*

## COMMENCEMENT ADDRESS:

“PHYSICS AND POLITICS”

Peter H. Odegard, Ph. D.,  
*Professor of Political Science, University of California, Berkeley*

## CONFERRING OF DEGREES:

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

*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 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*

## CHARGE TO THE GRADUATING CLASS AND ANNOUNCEMENTS

Lee A. DuBridge, Ph. D., Sc. D.,  
*President, California Institute of Technology*

## BENEDICTION

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

RECESSIONAL MARCH . . . FINALE . . . . Widor

# Candidates for Degrees

## BACHELOR OF SCIENCE IN SCIENCE

CLAUDE HARRIS ADAMS, JR.	RADOY WITT HEGGLAND	ROBERT REA PILLING
FORREST STURDEVANT	JARVIN R. HEIMAN	CARL ARTHUR PRICE*†
ALLINDER, JR.*	ROBERT GEORGE HEYNEMAN	WILLIAM JAMES RAMSEY
JOHN MILTON ANDRES*	DONALD ERNEST HIBBARD	MARION COLBURN RINEHART
WILLIAM HOWARD BAILEY	DAVID SWENSON HOGNESS*	BERNARD DAVID RUDIN
JOHN GEORGE BARR	ALBERT SCHILLER HOOK	PAUL DAVID SALTMAN†
WILLIAM L. BASHAM	WILLIAM J. HOUGHTON	RICHARD ISAAC SCHOEN
MANUEL NATHAN BASS	JAMES ALEXANDER HUMMEL*†	RICHARD P. SCHUSTER, JR.
GEORGE HAMILTON BOWEN, JR.*	NEAL LILBURN HURLEY	FREDERIC THOMPSON SELLECK
LEO BREIMAN	ROGER CHRISTIE JOHNSON	FRANK HARVEY SHELTON
DOUGLAS RAY BROWN	HUGH F. JOHNSTON	LEIGH SHERIFFS
WHARTON WHITWORTH BRYAN	BYRON CONSTANTINE KARZAS	BERNARD SHORE
HOWARD JAY COHAN	WILLIAM JAMES KARZAS*†	ROLF MALCOLM SINCLAIR
RICHARD CALVIN CORNELIUS	ROBERT EUGENE KOFAHL*	DON ELDON SIX
JOSEPH ROSS CURRAY	WILLIAM T. LANZ	ARTHUR OGILVY SPAULDING
WARREN EVALD DANIELSON*	DAVID ARTHUR LIBERMAN*	ROBERT MALCOLM STEWART, JR.
PATRICK DAVID DOHERTY	MYRON LIPOW	ROBERT THEODORE TERRIERE
EDWARD CHARLES DUFORT	FREDERICK ALLEN MACHETANZ	KENT MELVILLE TERWILLIGER*
CLAYTON ENGLAR	JAMES D. MALONE	JOHN HUNTER THOMAS
KENDALL FERRIS FAMULARO*	RICHARD ALAN MCKAY	ARUNDALE VRABEC†
ROBERT LLOYD FISHER	EUGENE CAMERON MOORING	CHARLES GEORGE WALANCE
EDWARD PENN FISK	DONALD ROBERT MORRISON	WARREN PALMER WATERS
AARON NATHANIEL FLETCHER	RALPH MORRISON	STEVEN WEISBROD
ROBERT DONALD FORESTER*	WILLIAM MARSHALL MYERS	ESTAL DALE WEST
ROBERT B. FUNK	WILLIAM RUDOLF	DONALD RAMSEY WESTERVELT
KENNETH WAYNE GARDINER	MUEHLBERGER†	JACK LEE WHITE*†
SIDNEY GORE GIBBINS	FRED H. NICOLAI	HENRY HUGH WOODBURY*
JOSEPH MATTHEW GREEN*	LAURENCE HEWIT NOBLES	WILLIAM CHARLES ALVA WOODS
RONALD CRUNDON GREENE	DONALD WILLIAM PETERSON†	GEORGE WALTER WOODWARD
PAUL BERNARD HARRIS	THOMAS GEORGE PETRULAS	JAMES DEAN YOUNG
ROBERT CARROLL HAUFET†	DON H. PICKRELL, JR.	

## BACHELOR OF SCIENCE IN ENGINEERING

EDWARD LAWRENCE ALEXANDER	DAVENPORT BROWNE, JR.	HENRY FASOLA, JR.
OSCAR J. ANDERSON, JR.	ARTHUR ELWIN BRUINGTON	FREDERICK FLAM
WILLIAM EARL ARCHER	EDWARD OLCOTT BULKLEY	SAMUEL FONG
STANLEY M. BARNES†	JOSEPH ROBERT CANTWELL*	CHARLES FRANCIS FORESTER†
WALLACE ALEXANDER BARNES, JR.	HUGH CLENDENIN CARTER†	MYRVEN FRANK GIFT, JR.
DAVID BARON	MILTON BLOUKE CARUS†	NATHANIEL GOULD
LAWRENCE IRVING BAUMANN	ALVIN LEONARD COHEN*	ROY WALTER GOULD, JR.*
FRANK HOWARD BEARDSLEY	JOSEPH M. CONOVER	JOHN PHILIP HANN
CARLOS LUIS BEECK NAVARRO	JOHN HENRY DANNAN III	ANDREW VAN VLEET HARRIS
ARTHUR ROBERT BENTON, JR.	FRED JOHN DARMS, JR.	WILLIAM NELSON HARRIS
GEORGE WILLARD BERGSTROM	ROBERT ALLEN DARROW	DAVID KIRKLAND HAYWARD
ERNEST WILLIAM BLAIR, JR.	RAYMOND EUGENE DAVIS*	JOHN HEATH, JR.
FRANKLYN HAROLD BRADY*	JOSEPH A. DOBROWOLSKI	WAYNE M. HERZIG†
ERLE J. BROWN, JR.†	EDWIN JOHN DOLAN	WALTER JOSEPH HIRSCHBERG*
GEORGE JAMES BROWN, JR.	WILLIAM ANTHONY DOOLIN	GEORGE MARTIN HREBEC
	ALEX GEORGE DRAPES	PAUL WILLIAM HUBAY

\*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.

FRANK G. HYLTON  
 JAMES EDGAR JOHNSON  
 RAYMOND A. JOHRDE  
 JOHN C. KARIOTIS†  
 NAOMI KASHIWABARA  
 ELI KATZ  
 FRANK WALTER KEINONEN  
 JAMES T. KENNEY, JR.  
 ROBERT WENDELL KERMEEN  
 PAUL HOWARD KIDDER  
 DANIEL W. KING  
 RICHARD GALPIN KING†  
 CHARLES HENRY KNIGHT, JR.  
 KEITH DOUGLAS KOHNEN  
 JOHN FRANCIS KOSTELAC  
 FRED ELVIN KRASIN  
 IRVING L. KRUMHOLZ  
 CLAUDE ALLEN LANE  
 EDWARD LEVONIAN  
 HAROLD JAY LINDERMAN  
 DENNIS VERNON LONG†  
 HENRY ALLAN LONG  
 JOHN RICHARD LOVE  
 DAVE W. MADDEN  
 JOHN COTTON MARSHALL†

HARDY CROSS MARTEL\*  
 WILLIAM DELMERE MATHIS  
 JOHN ARCHIE MCPHATE  
 ORSON LORENZO MITCHELL  
 JACK A. MONES  
 GEORGE RICHARD MORGAN  
 MERLE LOREN MORGAN\*  
 RIDLEY MYERS  
 CHESTER BRUCE ORR  
 WILLIAM EATON PALMER†  
 RICHARD LA BARRE PATTERSON  
 BYRNE PERRY\*  
 GEORGE MICHAEL PETZAR  
 RICHARD JACK POLLAK  
 DAVID OWEN POWELL  
 WALTER GLEN PREVOST  
 WILLIAM DALLIBA PYLE  
 CHARLES FREDERICK  
 QUIRMBACH, JR.  
 JOHN DALTON RICHARTZ  
 THEODORE W. ROSE  
 MARVIN B. RUDIN  
 WILLIAM ISAAC RUMER  
 BURTON BENJAMIN RUTKIN  
 DALE D. RYDER

LELAND HARLEY SATRE  
 ALLAN MACPHERSON SAUNDERS  
 CLEMENT JOSEPH SAVANT, JR.\*  
 FRED CARL SCHNEIDER  
 CLYDE RICHARDSON SEITZ  
 CHARLES H. SHALLER†  
 WILLIAM HERBERT SIMONS\*  
 ROBERT ALLEN SINKER\*  
 GENE DAVID SIX  
 ROBERT F. STAPPLER\*  
 ROBERT LACEY STUBBINS  
 ALBERT SUNDSMO  
 WILLIAM AINSWORTH SYLVIES  
 WILLIAM CHARLES TAYLOR  
 DONALD EUGENE TRYK  
 THOMAS A. TURNER  
 THOMAS EDWARD VAIL  
 WILLIAM T. VICKREY  
 MILTON C. VOGEL  
 THAD VREELAND, JR.  
 THOMAS H. WAKEMAN, JR.  
 ROBERT LOUIS WALQUIST\*  
 ROBERT REID WATERS\*  
 WILTON WELLS WEBSTER, JR.  
 JEAN FOLKE WIREN

\*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.

## MASTER OF SCIENCE IN SCIENCE

### *Chemistry*

PIERRE JEAN LEROUX, University of Liege, Belgium, 1947. 5  
 RAFAT MIRZA, B.S., University of Madras, India, 1946.  
 EMMETT PAUL MONROE, B.A., Ohio State University, 1947.  
 FRED GEORGE ROSICKY, B.S., Creighton University, 1941.  
 JOHN SHELDON SHOWELL, B.S., California Institute of Technology, 1946.

### *Chemical Engineering*

DAVID COLLINS BANKS, B.S. (E.E.), 1945, B.S. (ACh), California Institute of Technology, 1948.  
 VIRGIL JENNINGS BERRY, JR., B.E., Vanderbilt University, 1948.  
 ROBERT HENIGSON, B.S., California Institute of Technology, 1948.  
 ARTURO MAIMONI, Chemist, Universidad Nacional de Colombia, 1947. 8  
 WILLIAM MARKHAM MCCARDELL, B.S. in Ch.E., The Rice Institute, 1948.  
 WILLIAM LAWRENCE NOON, B.S., California Institute of Technology, 1948.  
 JOSEPH WILFRED SCHMIT, B.S. in Ch.E., Montana State College, 1944.  
 JOSEPH FRANK VALLE-RIESTRA, B.A.S., University of California, 1945; B.S., California Institute of Technology, 1948.

### *Geological Sciences*

CHARLES W. ALLEN, A.B., Fresno State College, 1947.  
 DAVID HARRISON CUTSFORTH, B.S., Oregon State College, 1943.  
 SAMUEL NORMAN DOMENICO, Geol.E., Colorado School of Mines, 1948. 7

(MASTER OF SCIENCE IN SCIENCE—*Geological Sciences*, cont.)

- SAMUEL R. HOFFMAN, B.S., College of the City of New York, 1943.  
FREEMAN BEACH LEIGHTON, B.S., University of Virginia, 1946.  
WILLIAM RUDOLF MUEHLBERGER, B.S., California Institute of Technology, 1949.  
LAURENCE HEWIT NOBLES, B.S., California Institute of Technology, 1949.

*Meteorology*

- JOHN L. BAUMAN, JR., B.A., The George Washington University, 1948.  
HAROLD D. COOPER, B.S., Eau Claire State Teacher's College, 1940. 6  
EMERY MANES CRAIGHEAD, B.S., Southeastern State Teacher's College, 1936.  
FRANK T. EDWARDS, JR., B.S., Oklahoma Agricultural and Mechanical College, 1949.  
PHILIP HERBERT LEIDERMAN, JR., University of Chicago.  
DALE JESS STEPHENS, B.S., University of Kansas, 1948.

*Physics*

- WILLIAM LUMPKIN ALFORD, B.A., Vanderbilt University, 1948.  
THOMAS JOSEPH ANDREWS, Major, U.S.A.F., B.S. (E), Air Institute of Technology, Wright Field, 1948.  
EDWIN FRANKLIN BARKER, JR., Lt. U.S.N., A.B., San Diego State College, 1942.  
GEORGE EDWARD COMSTOCK, III, B.S. (M.E.), 1945, B.S. (E.E.), 1948, Worcester Polytechnic Institute.  
WALTER PASOLD EATHERLY, B.S., California Institute of Technology, 1948.  
GAELN LEE FELT, A.B., Harvard College, 1943.  
RICHARD ALLAN FERRELL, B.S., California Institute of Technology, 1948.  
THOMAS LEWIS GILBERT, B.S., California Institute of Technology, 1944. 15  
CARL WILHELM HELSTROM, B.S., Lehigh University, 1947.  
ARMIN JOHN HILL, B.S. in E.E., 1932, M.S. in E.E., 1938, Montana State College.  
STANLEY L. KAMENY, B.S., Queens College, 1948.  
MALCOLM CAVEN MCQUARRIE, B.S., Lafayette College, 1948.  
CHARLES CALVIN PETTY, B.A., Wabash College, 1948.  
JOHN WELLS WACHTER, B.S., in E.P., Lafayette College, 1944.  
JAMES REED WILTS, B.S., Iowa State College, 1944.

MASTER OF SCIENCE IN ENGINEERING

*Aeronautics*

- MARVIN ABRAMOVITZ, B.S., Wayne University, 1947.  
JOHN JOSHUA ATTIAS, B.S., California Institute of Technology, 1948. 47  
DAVID THEODORE BARISH, Lt., U.S.A.F., B.S., Air Force Institute, Wright Field, 1948.  
HOWARD MARTIN BERGER, B.S. (A.E.), B.S. (Math.), University of Michigan, 1948.  
THOMAS DAVID BLAZINA, Lt., U.S.A.F., B.S., United States Military Academy, 1946.  
ALVARO RICHARD BOERA, B.S., Stevens Institute of Technology, 1947.  
GERALD PAUL BREAUX, B.S., Louisiana State University and Agricultural and Mechanical College, 1948.  
ARTHUR EARL BRYSON, JR., B.S. Aero. Eng., Iowa State College, 1946.  
BEN CAGLE, B.S. in M.E., University of Oklahoma, 1943.

FREDERICK AUGUSTUS CURTIS, JR., B.S. in M.E., Worcester Polytechnic Institute, 1948.  
 RALPH EMERSON DARLING, B.S. in Aero. Eng., Tri-State College, 1943; (B.S. Math and Aero. Eng.), University of Illinois, 1948.  
 HAROLD WILLIAM DAVIDSON, B.A.E., New York University, 1948.  
 DAVID HAROLD DENNIS, B.S., University of California, 1948.  
 JOHN ALFRED DODGE, Major, U.S.A.F., B.S. in A.E., Massachusetts Institute of Technology, 1939.  
 JAMES HERBERT DWINNELL, B.S. in A.E., University of Washington, 1939.  
 ROBERT CHARLES EVANS, B.S., Carnegie Institute of Technology, 1948.  
 ALAN HARTE GREEN, B.A.E., New York University, 1943.  
 FRED CARL GUNTHER, B.S., California Institute of Technology, 1948.  
 RICHARD JAMES HARER, Lt., U.S.A.F., B.E., University of Toledo, 1948.  
 RICHARD FRANK HUGHES, Lt., U.S.A.F., B.S. in M.E., Carnegie Institute of Technology, 1942.  
 ABNER KAPLAN, B.S., California Institute of Technology, 1948.  
 SAUL KAPLUN, B.S., California Institute of Technology, 1948.  
 CHARLES EDWARD KUCHAR, M.E., Stevens Institute of Technology, 1948.  
 JEROME GUY LABERGE, B.S. in M.E., McGill University, 1947.  
 LIONEL L. LEVY, JR., B.S. in A.E., Alabama Polytechnic Institute, 1948.  
 RICHARD OWEN LOWREY, B.S. in A.E., Georgia School of Technology, 1943.  
 THOMAS RUSSELL MARKS, Lt., U.S.A.F., B.S., United States Military Academy, 1945.  
 ROBERT CLIFFORD MATTESON, B.S., Louisiana State University and Agricultural and Mechanical College, 1948.  
 ROGER EDWARD MATZDORFF, B.S., California Institute of Technology, 1948.  
 GLENN DARRYL MAXWELL, B.S., University of California, 1943.  
 ROBERT MCCLELLAN, B.S., California Institute of Technology, 1948.  
 RICHARD LIND MERRELL, B.S., 1947, Louisiana State University and Agricultural and Mechanical College; M.S., 1948.  
 MAX OLIVER MITCHELL, Capt., U.S.A.F., Eng., Air Institute of Technology, Wright Field, 1948.  
 JACK NORMAN NIELSEN, B.S., University of California, 1941.  
 ROBERT NORRIS OLIVER, B.S., Massachusetts Institute of Technology, 1948.  
 STANLEY CARTER PACE, Major, U.S.A.F., B.S., United States Military Academy, 1943.  
 DAN MOREY PARKER, Capt., U.S.A.F., B.S., United States Military Academy, 1943.  
 DAVID EDWARD REESE, JR., B.S., California Institute of Technology, 1948.  
 HAROLD NORMAN RUISE, B.S. in M.E., Purdue University, 1939.  
 JAMES MAURICE ROUNDS, Capt., U.S.A.F., B.S., Air Force Institute of Technology, 1948.  
 HARRY HIROYUKI SHIBATA, B.A.E., University of Minnesota, 1947.  
 COLIN GOULD SIMPSON, B.S., University of California, 1948.  
 GEORGE TOLMIE SKINNER, B.S. in M.E., University of St. Andrews, Scotland, 1948.  
 CECIL ERNEST SPRUILL, B.S. in A.E., Virginia Polytechnic Institute, 1947.  
 THOMAS VREBALOVICH, B.S., California Institute of Technology, 1948.  
 JOSEPH WOLFF WECHSLER, B.S., California Institute of Technology, 1948.  
 WILLIAM JEFFRIS WILLIAMSON, B.S., California Institute of Technology, 1948.

### *Civil Engineering*

22

JOSEPH LOGSDON ALBERT, B.S., Michigan College of Mining and Technology, 1936.  
 DOUGLAS CLARK ATKINS, Lt., U.S.A., B.S., United States Military Academy, 1945.  
 RICHARD TRABER BATSON, Major, U.S.A., B.S., United States Military Academy, 1943.  
 JOHN MARVIN BLAIR, B.S., California Institute of Technology, 1948.  
 MURRAY SIMON BORNSTEIN, B.C.E., The Cooper Union School of Engineering, 1948.  
 WILLIAM JEROME CARROLL, B.S., California Institute of Technology, 1948.  
 HERBERT CAMPBELL CLENDENING, Major, U.S.A., B.S., United States Military Academy, 1941.

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

- ROBERT DOCK DALTON, JR., B.S., California Institute of Technology, 1948.  
JAMES ROBERT DAVIS, B.S., California Institute of Technology, 1948.  
WILSON BURDETTE JONES, B.S., California Institute of Technology, 1938.  
RALPH EDWARD LIND, JR., B.S., Louisiana State University and Agricultural and Mechanical College, 1939.  
EVERETT EUGENE LOVE, Lt., U.S.A., B.S., United States Military Academy, 1945.  
ALEXANDER MORTON MAISH, Capt., U.S.A., B.S., United States Military Academy, 1944.  
JOHN CLEMENT MATTINA, Major, U.S.A., B.S., United States Military Academy, 1942.  
ERIC CASTLEREIGH ORME, Major, U.S.A., B.S., United States Military Academy, 1942.  
BYRNE PERRY, B.S., California Institute of Technology, 1949.  
MARSHALL CLARKE POND, B.S., California Institute of Technology, 1948.  
ARNOLD STANLEY ROSNER, B.S.C.E., Illinois Institute of Technology, 1947.  
ALBERT EMMANUEL SAARI, Major, U.S.A., B.S., United States Military Academy, 1943.  
WILLIAM WARD SMITH, JR., Lt. Col., U.S.A., B.S., United States Military Academy, 1938.  
ALFRED EARNEST WATERS, B.S., California Institute of Technology, 1948.  
JOE KEITH WILLIAMS, B.S., California Institute of Technology, 1948.

*Electrical Engineering* 36

- PHIL ALLEN ADAMSON, B.A., University of Redlands, 1946.  
DONALD WALTER CHAPIN, B.E.E., Clarkson College of Technology, 1948.  
MARION ASHER CONDIE, B.S. (E.E.), University of Colorado, 1948.  
ROBERT PAUL CRAGO, B.S., Carnegie Institute of Technology, 1948.  
THEODORE VINCENT CRATER, B.S. in E.E., Montana State College, 1947.  
CHARLES BURTON CRUMLY, B.S., California Institute of Technology, 1947.  
WALTER ALFRED DANTINE, Diploma Ingenieur, Technical University of Vinena, 1946.  
HERMAN STANLEY DICHTER, B.M.E., College of the City of New York, 1948.  
WILLIAM JOSEPH DIXON, B.S., California Institute of Technology, 1948.  
JOHN HARRISON GOLDIE, B.S. in E.E., University of Washington, 1947.  
JOHN NATHANIEL HARRIS, B.S., California Institute of Technology, 1948.  
WAYNE KASSELL HODDER, B.S., California Institute of Technology, 1943.  
OMAR JOSLIN JACOMINI, B.S., United States Naval Academy, 1946.  
JEROME SAYRE LINN, B.E., University of Southern California, 1948.  
ROBERT SMITH MACMILLAN, B.S., California Institute of Technology, 1948.  
ARTHUR RICHARD NATHANIEL MARKS, B.Ss. Tech., University of Manchester, Faculty of Technology, England, 1948.  
ALBERT HARRY MCEUEN, B.S., California Institute of Technology, 1948.  
ORVILLE RAYMOND MEYER, B.S. in E.E., University of Washington, 1946.  
EDWARD EUGENE MITCHELL, B.S., California Institute of Technology, 1948.  
DIPENDRA NATH MITRA, B.S., University of Calcutta, Vidyasagar College, India, 1943; M.S., University of Calcutta, 1945.  
BOUDE CLISBY MOORE, B.S., California Institute of Technology, 1948.  
MAX HENRY MOORE, B.S., California Institute of Technology, 1945.  
ALBERT HERBERT JOSEPH MUELLER, B.S., California Institute of Technology, 1947.  
RANGASWAMY NARASIMHAN, B.S., University of Madras, India, 1945.  
IRWIN PFEFFER, B.E.E., The Cooper Union School of Engineering, 1948.  
RICHARD CARL PLATZEK, B.S., California Institute of Technology, 1948.  
JACOB FRED RENTZ, JR., B.S., Carnegie Institute of Technology, 1948.  
JAMES ROBERT SHULL, B.S. in E.E., University of Arizona, 1948.

SALIM SION SOLOMON, B.S., Fouad I University, Egypt, 1948.  
 DONALD CLINE STINSON, B.S.E.E., Iowa State College, 1947.  
 JOSEPH WARREN TRINDLE, B.S., California Institute of Technology, 1941; M.A., Occidental College, 1948.  
 WILLIAM RUSSELL TURNER, B.S., California Institute of Technology, 1942.  
 WILLIAM W. WARD, B.S.E.E., Agricultural and Mechanical College of Texas, 1948.  
 MITCHELL WEISS, B.Elec., The Cooper Union School of Engineering, 1948.  
 WILLIAM LOGAN WOODSON, B.S., California Institute of Technology, 1948.  
 WILLIAM GARRISON WOODWARD, B.S.E.E., Illinois Institute of Technology, 1947.

*Mechanical Engineering*

29

ALLAN JAMES ACOSTA, B.S., California Institute of Technology, 1945.  
 CHARLES CALHOUN ALSWORTH, B.S. in M.E., The Rice Institute, 1947.  
 EARL BEDER, B.S., California Institute of Technology, 1948.  
 JOHN HERBERT BEVERIDGE, B.S. in M.E., University of Texas, 1946.  
 ROBERT EUGENE BROWN, B.S. in M.E., University of Arizona, 1948.  
 CHE-MIN CHENG, B. of Eng., National Tsing Hua University, China, 1947.  
 JESSE CAMERON DENTON, B.S., Swarthmore College, 1948.  
 SEBA ELDRIDGE, JR., B.S., California Institute of Technology, 1948.  
 ROBERT HUGH GALSTAN, B.S. in M.E., Northwestern University, 1948.  
 JAMES ELLYSON HOLDITCH, B.S., California Institute of Technology, 1948.  
 TORU IURA, B.S., University of Wisconsin, 1948.  
 WALTER BLAKE KING, JR., B.M.E., University of Florida, 1948.  
 VICTOR N. LAWFORD, B.M.E., Ohio State University, 1948.  
 GEORGE A. MARTINEK, B.S., California Institute of Technology, 1948.  
 CARLTON LEWIS MCWILLIAMS, B.S.C.E., Rose Polytechnic Institute, 1941; M.E., 1947.  
 HERBERT L. PODELL, B.S., California Institute of Technology, 1948.  
 ROBERT LEONARD PONS, B.E. in M.E., Tulane University, 1948.  
 ALLEN THRASHER PUDEK, B.S., California Institute of Technology, 1948.  
 JOHN RUMSEY REEVE, JR., B.S., Oklahoma Agricultural and Mechanical College, 1948.  
 HARVEY LEE ROBERSON, B.S., California Institute of Technology, 1948.  
 RALPH MCGEE ROTT, B.S., State University of Iowa, 1947.  
 JOHN GALLUS SCHAUB, JR., B.S., New Mexico College of Agriculture and Mechanic Arts, 1948.  
 EMERSON WARFIELD SMITH, B.M.E., University of Virginia, 1943.  
 CHARLES WILLIAM SUMAN, B.S. in M.E., University of Texas, 1945.  
 ALBERT MERRICK TAYLOR, B.S., University of California, 1943.  
 MEHMET AYHAN TÜRKKAN, B.S., Istanbul American Colleges, Robert College, Turkey, 1948.  
 ROBERT N. WILLARD, B.S., Stanford University, 1947.  
 DONALD ELI WITKIN, B.M.E., New York University, 1948.  
 ROBERT ZACHARIAS, B.S., California Institute of Technology, 1948.

ENGINEER'S DEGREES

*Aeronautical Engineer*

JOHN WILLIAM BACON, JR., B.S., California Institute of Technology, 1943; M.S., 1948.  
 JOSEPH NISSIM BENEZRA, B.S., University of Washington, 1944; M.S., California Institute of Technology, 1948  
 RICHARD ALEXANDER BEVERNICK, Comdr., U.S.N., B.S., United States Naval Academy, 1937.

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

- PHILIP GEORGE BLENKUSH, B.A.E., Detroit University, 1941; M.S., California Institute of Technology, 1948
- WILLIAM ROBERT BOTTENBERG, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
- JOHN R. BROWN, Comdr., U.S.N., B.S., United States Naval Academy, 1938.
- JAMES DONAHUE BURKE, B.S., California Institute of Technology, 1945; M.S., 1948.
- RALPH STEWART CHANDLER, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1941.
- JAMES SIGGINS COOLEY, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1938.
- JAMES EDWARD DENSMORE, B.S., California Institute of Technology, 1946; M.S., 1948.
- SATISH DHAWAN, B.A., Punjab University, 1938; M.A., 1941; B.Sc. M.E., 1944; M.S., A.E., 1947.
- WARREN WOODROW FORD, Comdr., U.S.N., B.S., United States Naval Academy, 1937.
- DONALD LOWELL FRANCIS, B.S., California Institute of Technology, 1945; M.S., 1948.
- JOSEPH GARRETT, Lt. Comdr., U.S.N., B.S., South Dakota School of Mines, 1939.
- FILLMORE BOLLING GILKESON, Comdr., U.S.N., B.S., United States Naval Academy, 1937.
- THOMAS PARKER GOEBEL, B.S. in A.E., Iowa State College, 1944; M.S., California Institute of Technology, 1945.
- GEORGE EDWARD GOMPFF, B.S., Virginia Polytechnic Institute, 1942; M.S., California Institute of Technology, 1947.
- DONALD JAMES HARDY, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1939.
- LEONARD EDWARD HARMON, Comdr., U.S.N., B.S., United States Naval Academy, 1938.
- WILLIAM EARL HENRY, Lt. Comdr., U.S.N.
- WILLIAM EMERSON LAMB, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1948.
- NEIL ALLAN MACKINNON, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1941.
- MICHAEL FERDINAND MARX, B.S., Rensselaer Polytechnic Institute, 1944; M.S., 1948.
- BENOIT B. MANDELBROT, B.S., Université de Clermont-Ferrand, 1942; Ingénieur de L'Ecole Polytechnique, 1947; Licencié ès Sciences Mathématiques et Physiques, Université de Paris, 1947; M.S., California Institute of Technology, 1948.
- JOHN DILL MCKENNEY, B.S., California Institute of Technology, 1945; M.S., 1948.
- GERALD MORGAN MONROE, Lt., U.S.N., A.A., North Texas Agricultural College, 1939.
- VINCENT URIEL MUIRHEAD, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1941.
- DOUGLAS CLARK OLGIVIE, B.S., University of California, 1947; M.S., California Institute of Technology, 1948.
- WILLIAM MERRITT RINGNESS, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1939.
- HARRIS MCINTOSH SCHURMEIER, B.S., California Institute of Technology, 1945; M.S., 1948.
- VERNON ELLWOOD TEIG, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
- JOHN WILLIAM THOMAS, B.S., United States Naval Academy, 1935; M.S., California Institute of Technology, 1948.

*Aeronautical Engineer (Jet Propulsion)*

- LOUIS EUGENIO BENITEZ, Lt., U.S.N., B.S., United States Naval Academy, 1943.
- ALBERT HARRISON CLANCY, JR., Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
- OLIVER SCOTT DWIRE, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1941.
- JOHN KENNETH HOLCOMB, Lt., U.S.N., B.S. in CE, Marquette University, 1941; B.S. in ME, 1942.
- RICHARD HARDY MCELLIGOTT, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.
- ROBERT TOLMIE MOORE, JR., Capt., U.S.N., B.M.E., Vanderbilt University, 1942.
- \*CHARLES C. PINKERTON, JR., Capt., U.S.A.F., B.S., United States Military Academy, 1943; M.S., California Institute of Technology, 1946.
- DAVID EDWIN SHONERD, B.S., California Institute of Technology, 1943; M.S., 1948.
- ROBERT ALEXANDER WEATHERUP, Lt. Comdr., U.S.N., B.S., United States Naval Academy, 1940.

\*Degree conferred posthumously.

### *Chemical Engineer*

JOHN S. BILLHEIMER, B.S., California Institute of Technology, 1947; M.S., 1948.  
GORDON HENRY GOFF, B.S., University of California, 1943; M.S., California Institute of Technology, 1948.

### *Geophysical Engineer*

LLOYD PHILIP GELDART, B.A., Mount Allison University, 1937; M.A., Toronto University, 1941; Ph.D., McGill University, 1941.

### *Industrial Designer*

THOMAS E. ALLEN, B.A., Millsaps College, 1947.  
JOE DEE BAKER, B.A., University of Texas, 1939.  
JAMES HARVEY CRATE, B.S., Stevens Institute of Technology, 1946.  
FRANCIS CECIL FOSTER, B.S., United States Military Academy, 1927.  
JAMES ALEXANDER MCINTOSH, B.S., Yale University, 1944; B.E., 1947.  
ROBERT SCHWARZ, JR., B.A., Stanford University, 1946.  
ROBERT EDWARDS WALDRON, B.S., University of Michigan, 1942.  
RICHARD ALFRED WALLACE, B.S., Purdue University, 1944.  
LEO WOLF, B.S., Agricultural and Mechanical College of Texas, 1943.

### *Mechanical Engineer*

TAO-HUNG CHU, Diploma in ME, Henry Lester Institute, Shanghai, China, 1943; M.S., California Institute of Technology, 1948.

## DOCTOR OF PHILOSOPHY

THOMAS LOFTON ALLEN. (Chemistry and Physics), B.S., University of California, 1944. Thesis: The Free Energies and Heats of Formation of Molybdenum and Thorium Iodides.  
ALAN ANDREW (Physics and Mathematics), B.S., University of Nebraska, 1942; M.S., California Institute of Technology, 1944. Thesis: The Concentration of the Isotope Helium 3.  
CHARLES HAMMOND ARRINGTON, JR. (Chemistry and Physics), B.S., Duke University, 1941. Thesis: Studies on the Structural Properties of Actin, Myosin, Actomyosin, and the Interaction with Adenosine Triphosphate.  
EDWARD LEIGH BENNETT. (Chemistry and Plant Physiology), B.A., Reed College, 1943. Thesis: I. Studies on the Synthesis, Resolution, and Properties of Some Fluorinated Amino Acids. II. Studies on Blood Group A-Specific Substance. III. Systematic Qualitative Tests for Certain Acidic Elements in Organic Compounds. IV. Isolation of Compounds Toxic to Tomato Plants from *Thamnosma Montana*.  
ROBERT ROYCE BENNETT. (Electrical Engineering and Physics), B.S., California Institute of Technology, 1945; M.S., 1947. Thesis: Electric Analog Computer Techniques Applied to Certain Mechanical Vibration Problems.  
ARTHUR TREW BIEHL. (Electrical Engineering and Physics), B.S., Illinois Institute of Technology, 1945; M.S., California Institute of Technology, 1947. Thesis: Statistical Studies of Cosmic Rays at High Altitudes.  
JOHN THOMAS BOWEN. (Mechanical Engineering and Physics), B.S., California Institute of Technology, 1942; M.S., 1946. Thesis: Some Viscosity Effects in Axial Flow Compressors.  
RAYMOND ALLEN BROWN. (Chemistry and Physics), B.S., Wagner College, 1941; M.S., California Institute of Technology, 1947. Thesis: The Fractionation of Serum Proteins by Electrophoresis-Convection.

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Ag 0	Ma 2	CE 2	(My 1 - the last)
Bi 2	Ph 12	EE 6	
Ch 18	Re 7	ME 4	
Gr 4	CH 2		

(DOCTOR OF PHILOSOPHY, cont.)

- FRANK PAUL BUFF. (Chemistry and Physics), A.B., University of California, 1944. Thesis: A Statistical Mechanical Theory of the Coefficients of Shear and Bulk Viscosity of Monatomic Liquids.
- WILLIAM WALTON CARTER. (Physics and Mathematics), B.S., Carnegie Institute of Technology, 1943; M.S., California Institute of Technology, 1948. Thesis: Measurement of  $f$ -values in the Iron Spectrum and Applications to Solar and Stellar Atmospheres.
- E. RICHARD COHEN. (Physics and Mathematics), A.B., University of Pennsylvania, 1943; M.S., California Institute of Technology, 1946. Thesis: Angular Distributions in the Elastic Scattering of Protons by Light Nuclei; Analysis of the Reactions  $\text{Li}^+(\text{pp})\text{Li}^+$  and  $\text{Be}^+(\text{pp})\text{Be}^+$ .
- JULIAN DAVID COLE. (Aeronautics and Mathematics), B.M.E., Cornell University, 1944; M.S. & Ae.E., California Institute of Technology, 1946. Thesis: Problems in Transonic Flow.
- JACOB FREDERICK DEWALD. (Chemistry and Physics), B.S., Haverford College, 1943. Thesis: I. Studies of the System, Sodium-Ammonia; II. Empirical Criteria for Miscibility in Liquid Metal Systems.
- FRANK HOST DICKEY. (Chemistry and Genetics), B.S., California Institute of Technology, 1941. Thesis: Walden Inversions Involving the Isomeric 2, 3-Butanediamines and Related Compounds.
- NORMAN HARRY ENENSTEIN. (Electrical Engineering and Physics), B.A., University of California at Los Angeles, 1946; M.S., California Institute of Technology, 1947. Thesis: Angle of Arrival Measurements of 3.2-Centimeter Radio Waves.
- DANIEL TALBOT FINKBEINER, II. (Mathematics and Physics), A.B., Washington and Jefferson College, 1941; M.A., 1943. Thesis: A General Dependence Relation and Its Application to Lattice Imbeddings.
- HAROLD KARL GARNER. (Chemistry and Plant Physiology), B.S., California Institute of Technology, 1943. Thesis: The Mechanisms of Some Reactions of Optically Active 2, 3-Butanediol and its Derivatives.
- HARRY GRUENBERG. (Electrical Engineering and Physics), B.A., University of British Columbia, 1944. Thesis: A Resonant Cavity Method of Measuring the Velocity of Light.
- GEORGE BOARDMAN GUTHRIE, JR. (Chemistry and Physics), B.A., Reed College, 1940. Thesis: I. The Standard Entropies of Several Compounds. II. Theory of the Thermal Diffusion of Electrolytes in a Clusius Column. III. A Study of the Structure of Sulfur Monochloride by Electron Diffraction. IV. A Study of Factors in the Design and Use of an Electron Diffraction Camera.
- KENT MIDGLEY HARMON. (Chemistry and Physics), A.B., University of Redlands, 1942; M.S., University of California, 1944. Thesis: Studies on: The Specific Activity and Inhibition of Urease; Trypsin and Chymotrypsin—Catalyzed Hydrolysis of Simple Peptides; Isomeric Transitions of Radioactive Tellurium.
- PHILIP HAYWARD. (Chemistry and Mathematics), B.S., University of Arizona, 1941. Thesis: Kinetics of the Reaction of Iodate Ion with Hypophosphorous Acid.
- RICHARD MOORE HEAD. (Aeronautics and Meteorology), B.S. & M.S.My., California Institute of Technology, 1942; Ae.E., 1943. Thesis: Investigations of Spontaneous Condensation Phenomena.
- LAWRENCE D'ARLE HINDALL. (Physics and Electrical Engineering), B.S., Carnegie Institute of Technology, 1942; M.S., California Institute of Technology, 1946. Thesis: An Investigation of the Permeability of Iron at Ultra-High Frequencies.
- WILLIAM FRANK HORNAK. (Physics and Electrical Engineering), B.E.E., College of the City of New York, 1944; M.S., California Institute of Technology, 1945. Thesis: Applications of Beta Ray Spectroscopy.
- BENJAMIN FRANKLIN HOWELL, JR. (Geophysics and Geology), A.B., Princeton University, 1939; M.S., California Institute of Technology, 1942. Thesis: 1. Ground Vibrations Near Explosions; 2. Structural Geology of the Region between Pacoima and Little Tujunga Canyons, San Gabriel Mountains, California.
- HASSAN MOHAMED ISMAIL. (Civil Engineering and Aeronautics), B.S., Fouad I University, 1938; M.S., 1944. Thesis: Study of Suspended Sediment in Closed Channels.
- LEON KNOPOFF. (Physics and Mathematics), B.S., California Institute of Technology, 1944; M.S., 1946. Thesis: Many Signal Interference of Frequency Modulated Waves.

- MAX KRAUSS. (Embryology and Genetics), A.B., University of California, 1938; M.A., 1940. Thesis: Lytic Agents of the Sperm of Some Marine Animals.
- JOHN FRANKLIN LANCE. (Paleontology and Geology), B.A., College of Mines and Metallurgy, 1940; M.S., California Institute of Technology, 1946. Thesis: Phylogeny of the Later Tertiary Equidae in the Light of New Pliocene Horses from Chihuahua, Mexico. Origin of the Pioneer Pyrophyllite Deposit, San Diego County, California.
- RICHARD LATTEK. (Physics and Mathematics), B.S., California Institute of Technology, 1942. Thesis: A Study of the Two-Meson Hypothesis.
- RICHARD HENRI MACNEAL. (Electrical Engineering and Physics), B.A., Harvard College, 1943; M.S., California Institute of Technology, 1947. Thesis: The Solution of Partial Differential Equations by Means of Electrical Networks.
- SAMUEL THEODORE MARTNER. (Geophysics and Geology), A.B., University of California, 1940; M.S., California Institute of Technology, 1946. Thesis: Observations of Seismic Waves Reflected at the Earth's Core Boundary.
- DAVID MALCOLM MASON, JR. (Chemical Engineering and Mechanical Engineering), B.S., California Institute of Technology, 1943; M.S., 1947. Thesis: Temperature and Velocity Distribution in the Wake of a Heated Cylinder.
- EUGENE KINGERY MAUN. (Chemistry and Physics), B.S., University of Illinois, 1945. Thesis: I. The Iodometric Determination of Zinc. II. Investigations in the Chemistry of Rhenium.
- RUBEN FRED METTLER. (Electrical Engineering and Aeronautics), B.S., California Institute of Technology, 1944; M.S., 1947. Thesis: The Anemometric Application of an Electrical Glow Discharge in Transverse Air Streams.
- GEORGE KIYOSHI MORIKAWA. (Aeronautics and Mathematics), B.S., California Institute of Technology, 1939; M.S., 1941. Thesis: The Wing-Body Problem for Linearized Supersonic Flow.
- HENRY TAKESHI NAGAMATSU. (Aeronautics and Mathematics), B.S., California Institute of Technology, 1938; M.S., 1940. Thesis: Theoretical Investigation of Detached Shock Waves.
- JUDD CUTHBERT NEVENZEL. (Chemistry and Plant Physiology), B.S., University of Arizona, 1941; M.S., 1942. Thesis: 1. The Apparent Acid Dissociation Constants of Phenylalanine and Some of its Nuclearly Substituted Derivatives. 2. The Isolation of Sphingosine from Bovine Spinal Cord. 3. The Ultraviolet Absorption of Some O-Benzoyl Compounds.
- FRED DELANCY ORDWAY, JR. (Chemistry and Physics), B.S., Rensselaer Polytechnic Institute, 1942; M.S., 1943. Thesis: Studies in X-Ray Crystallography. I. Calcium Chloride Hexahydrate; II. Hexamethylene Tetramine Complexes with Metal Halides.
- NORMAN CHARLES PETERSON. (Aeronautics and Mathematics), B.S.E. Ma., and B.S.E. Ae.E., University of Michigan, 1943; M.S., California Institute of Technology, 1947. Thesis: Noncircular Fuselages in Supersonic Flow.
- HEINZ GERHARD PFEIFFER. (Chemistry and Physics), A.B., Drew University, 1941; M.A., Syracuse University, 1943. Thesis: An X-Ray Diffraction Investigation of Boric Oxide and Silver Azide, and an Electron Diffraction Investigation of Some Three-Membered Rings and Some Halogenated Methanes.
- ALLEN EMERSON PUCKETT. (Aeronautics and Mathematics), S.B., Harvard College, 1939; M.S., Harvard University, 1941. Thesis: Supersonic Wave Drag of Thin Airfoils.
- PATRICK MICHAEL QUINLAN. (Civil Engineering and Mathematics), B.E., University College, 1941; B.Sc., 1942; M.Sc., National University of Ireland, 1943. Thesis: A Fourier Integral Approach to an Aeolotropic Medium.
- IRVING STOY REED. (Mathematics and Physics), B.S., California Institute of Technology, 1944. Thesis: Quadratic Differential Equations in Banach Spaces and Analytic Functionals.
- CHARLES FRANKLIN ROBINSON. (Physics and Mathematics), A.B., State Teachers College of Missouri, 1935; B.S., Drury College, 1936; M.S., California Institute of Technology, 1938. Thesis: The Production of Positive Ions in Resonant Cavities.
- WILLIAM CARL ROESCH. (Physics and Mathematics), B.A., Miami University, 1945. Thesis: Studies of the Cosmic Ray Latitude Effects.
- ROLF HEINRICH SABERSKY. (Mechanical Engineering and Physics), B.S., California Institute of Technology, 1942; M.S., 1943. Thesis: Experimental and Theoretical Investigations on the General Flow Patterns in Axial Flow Compressors.
- GEORGE MICHAEL SAFONOV. (Physics and Mathematics), B.S., California Institute of Technology, 1943; M.S., 1948. Thesis: A Momentum Spectrum for High Energy Mesotrons.

(DOCTOR OF PHILOSOPHY, cont.)

- WARREN GLEASON SCHLINGER. (Chemical Engineering and Mechanical Engineering), B.S., California Institute of Technology, 1944; M.S., 1946. Thesis: I. An Apparatus to Determine the Volumetric Behavior of Nitrogen Oxides. II. Isobaric Heat Capacity of 1-Butane and 1-Pentene at Bubble Point. III. Mass Transfer in a Turbulent Air Stream.
- ARTHUR JOHN RUDOLPH SCHNEIDER. (Mechanical Engineering and Physics), B.S. & M.S., California Institute of Technology, 1943. Thesis: Some Compressibility Effects in Cavitation Bubble Dynamics.
- THEODORE BEATON SMITH. (Meteorology and Aeronautics), A.B., Ohio State University, 1938; M.S., California Institute of Technology, 1940. Thesis: Interruptions in the Normal Westerly Flow of the General Circulation of the Atmosphere.
- BLAKEMORE EWING THOMAS. (Geology and Meteorology), A.B., University of California, 1940; M.S., California Institute of Technology, 1943. Thesis: Geology and Ore Deposits of the Wallapai District, Arizona.
- MILTON DENMAN VAN DYKE. (Aeronautics and Mathematics), S.B., Harvard College, 1943; M.S., California Institute of Technology, 1947. Thesis: A Study of Second-Order Supersonic Flow.
- PHILIP ALFRED VAUGHAN. (Chemistry and Physics), B.A., Pomona College, 1943. Thesis: I. Preparation and Description of Some Derivatives of Molybdenum Dichloride. II. Structure Determination of Complex Molecules or Ions by X-Ray Diffraction by Solutions.
- LOWELL GRANT WAYNE. (Chemistry and Mathematics), B.S., University of California, 1937. Thesis: Kinetics of the Gas Phase Reaction between Nitric Oxide, Nitrogen Dioxide and Water Vapor.
- WILLIAM JUNIUS WEST. (Physics and Mathematics), B.S., Massachusetts Institute of Technology, 1944. Thesis: A Precision Study of the Molybdenum and Tungsten K alpha 1 X-Ray Lines, and a Measurement of the Reflecting Properties of the (310) Planes of Quartz; by the Method of the Two Crystal X-Ray Spectrometer.
- M. KENT WILSON. (Chemistry and Physics), B.S., University of Utah, 1943. Thesis: I. A Reinvestigation of the Vibration Spectra of Several Triatomic Molecules. II. The Infrared Spectrum and Configuration of Hydrogen Persulfide. III. Some Observations on the Spectrum of "Sulfur Monoxide."
- DAVID SHOTWELL WOOD. (Mechanical Engineering and Physics), B.S., California Institute of Technology, 1941; M.S., 1946. Thesis: The Influence of Stress and Temperature upon the Time to Initiate Plastic Deformation in an Annealed Low Carbon Steel.
- SIEN-CHIUE YU. (Genetics and Embryology), B.S., National Wu-Han University, 1935. Thesis: A Genetic and Cytological Study of Some X-Ray Induced Mutations and Reverse Mutations in *Drosophila Melanogaster*.
- CLAYTON MELVIN ZIEMAN. (Physics, Electrical Engineering and Mathematics), B.A., University of Wisconsin, 1927; M.S., University of Hawaii, 1939. Thesis: The Arrival Angle of Microwaves.

## Undergraduate Prize Awards



### CONGER PEACE PRIZE ORATION

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

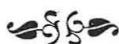
FIRST PRIZE:

BERNARD RUDIN

ULRICH MERTEN

SECOND PRIZE:

RALPH STONE



### 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:

BERNARD SHORE

SECOND PRIZE:

IRVING L. KRUMHOLZ



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, 1921-1944. 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.