

THE INSTITUTE FOR ADVANCED STUDY

*Founded by Mr. Louis Bamberger and Mrs. Felix Fuld*

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Princeton, New Jersey  
March, 1945

*Extract from the letter addressed by  
the Founders to their Trustees, dated  
Newark, New Jersey, June 6, 1930*

"It is fundamental in our purpose, and our express desire, that in the appointments to the staff and faculty, as well as in the admission of workers and students, no account shall be taken, directly or indirectly, of race, religion, or sex. We feel strongly that the spirit characteristic of America at its noblest, above all, the pursuit of higher learning, cannot admit of any conditions as to personnel other than those designed to promote the objects for which this institution is established, and particularly with no regard whatever to accidents of race, creed, or sex."

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1945

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1946

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1947

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HENRY ALLEN MOE, New York, New York

1948

EDGAR S. BAMBERGER, East Orange, New Jersey  
HERBERT H. MAASS, New York, New York  
LEO WOLMAN, New York, New York

1949

FRANK AYDELOTTE, Princeton, New Jersey  
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## STAFF OF THE INSTITUTE

FRANK AYDELOTTE, *Director*  
ABRAHAM FLEXNER, *Director Emeritus*  
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### SCHOOL OF MATHEMATICS

#### *Professors*

JAMES WADDELL ALEXANDER  
ALBERT EINSTEIN (*Emeritus*)  
MARSTON MORSE  
OSWALD VEBLEN  
JOHN VON NEUMANN  
HERMANN WEYL

#### *Associate*

WALTHER MAYER

#### *Assistants*

VALENTINE BARGMANN  
ERNST G. STRAUS

### SCHOOL OF ECONOMICS AND POLITICS

#### *Professors*

EDWARD MEAD EARLE  
\*DAVID MITRANY  
WINFIELD W. RIEFLER  
WALTER W. STEWART  
ROBERT B. WARREN

\* Absent on leave, 1944-1945.

## SCHOOL OF HUMANISTIC STUDIES

#### *Professors*

HETTY GOLDMAN  
ERNST HERZFELD (*Emeritus*)  
E. A. LOWE  
BENJAMIN D. MERITT  
ERWIN PANOFSKY

#### *Field Mediaevalist*

KURT WEITZMANN

#### *Research Assistant*

\*HANNS SWARZENSKI

#### *Assistants*

FRANCES FOLLIN JONES  
JUDITH E. SACHS

### GEST ORIENTAL LIBRARY

#### *Curator*

NANCY LEE SWANN

STANDING COMMITTEE: Professors von Neumann, Riefler,  
Lowe

LIBRARY COMMITTEE: Professors Weyl, Warren, Goldman

SECRETARY OF FACULTY: Benjamin D. Meritt

\* Absent on leave, 1944-1945.

## CALENDAR

1944-1945

First term: September 18-December 16

Second term: January 29-May 5

1945-1946

First term: September 17-December 15

Second term: February 4-May 4

### ADMISSION OF MEMBERS

Applications for admission should be addressed to the Institute for Advanced Study, Princeton, New Jersey. The Trustees have set aside a sum which may be used for stipends for persons of distinct ability and promise who require a limited amount of financial aid.

## MEMBERS, 1942-1945

HANS BARON, (1944-1945), Ph.D., University of Berlin, 1922

RICHARD P. BLACKMUR, (1944-1945), Lecturer in Humanities, Princeton University

OSCAR BRONEER, (1942-1944), Ph.D., University of California, 1931

SHING-SHEN CHERN, (1943-1945), D.Sc., University of Hamburg, 1936; Professor, National Tsing Hua University

KEI-WON CHUNG, (1942-1945), Ph.D., Princeton University, 1938

PAUL A. CLEMENT, (1942-1945), Ph.D., The Johns Hopkins University, 1930

IRVIN S. COHEN, (1942-1943), Ph.D., The Johns Hopkins University, 1942

REV. JOHN S. CREAGHAN, S.J., (1944-1945), M.A., Fordham University, 1939

RUTH J. DEAN, (1943-1944), D.Phil., University of Oxford, 1938; Assistant Professor, Mount Holyoke College; A.A. U.W. Fellow

CHARLES DE TOLNAY, (1942-1945), Ph.D., University of Vienna, 1925

ADOLFO DORFMAN, (1943-1944), Ing. Indust., University of Buenos Aires, 1932; Director, School of Economics, Colegio Libre de Estudios Superiores, Buenos Aires; Guggenheim Fellow

CHARLES WARREN EVERETT, (1945), Ph.D., Columbia University, 1931; Guggenheim Fellow

GEORGE H. FORSYTH, JR., (1944-1945), M.F.A., Princeton Graduate College, 1927

PAUL FRANKL, (1942-1945), Ph.D., University of Munich, 1910

GUIDO FUBINI, (1942-1943), Dr. Math., University of Pisa, 1900, died June 6, 1943  
 FELIX GILBERT, (1942-1943), Ph.D., University of Berlin, 1931  
 KURT GÖDEL, (1942-1945), Ph.D., University of Vienna, 1930  
 JEAN GOTTMANN, (1942-1944), Licencié ès lettres, Sorbonne, 1936; Diplômé d'Études Supérieures d'Histoire et Géographie, 1934; Lecturer in Geography, Johns Hopkins University  
 ALBERT A. GRAU, (1944-1945), Ph.D., University of Michigan, 1944; H. H. Rackham Fellow  
 JACOB HAMMER, (1944-1945), Ph.D., Columbia University, 1926; Associate Professor, Hunter College  
 OLAF HELMER, (1944-1945), Ph.D., University of Berlin, 1934; University of London, 1936; Lecturer, The New School for Social Research  
 NING HU, (1943-1945), Ph.D., California Institute of Technology, 1944; Fellow of National Tsing Hua University  
 ROBERT A. KANN, (1942-1945), Dr. jur., University of Vienna, 1930  
 ADRIENNE KOCH, (1944-1945), Ph.D., Columbia University, 1942; Guggenheim Fellow  
 SHUICHI KUSAKA, (1942-1943), Ph.D., University of California, 1942; Instructor, Smith College since 1943  
 RENSSELAER W. LEE, (1942-1945), Ph.D., Princeton University, 1926; Professor, Smith College  
 DORO LEVI, (1942-1945), Ph.D., University of Florence, 1920; Guggenheim Fellow  
 CLARENCE D. LONG, JR., (1942-1943), Ph.D., Princeton University, 1938; Associate Professor, Wesleyan University; Guggenheim Fellow  
 FRIEDRICH LUTZ, (1943-1945), Dr. rer. pol., University of Tübingen, 1925; Associate Professor, Princeton University  
 ÉTIENNE MANTOUX, (1942-1943), Docteur en droit, University of Lyon, 1941; Rockefeller Fellow

JONATHAN MITCHELL, (1942-1945), A.B., Amherst College, 1921  
 WOLFGANG PAULI, (1942-1945), Ph.D., University of Munich, 1921; Professor, Eidgenössische Technische Hochschule, Zürich  
 STEFAN T. POSSONY, (1942-1943), Ph.D., University of Vienna, 1935  
 TIBOR RADÓ, (1944-1945), Ph.D., University of Szeged, 1921; Professor, Ohio State University  
 A. E. RAUBITSCHEK, (1944-1945), Ph.D., University of Vienna, 1935; Fellow of the American School of Classical Studies at Athens, 1944-1946  
 DONALD E. RICHMOND, (1944-1945), Ph.D., Cornell University, 1926; Professor, Williams College  
 ROBERT SCHATTEN, (1944-1945), Ph.D., Columbia University, 1942; Assistant Professor, University of Vermont  
 WALTER SCHIFFER, (1943-1944), Dr. jur., University of Breslau, 1929; Docteur ès sciences politiques, University of Geneva, 1937; Guggenheim Fellow  
 CARL L. SIEGEL, (1942-1945), Dr. Phil., University of Göttingen, 1920  
 EDMUND SILBERNER, (1942-1944), Ph.D., University of Geneva, 1935  
 OLIVER STRUNK, (1943-1945), Litt.D., University of Rochester, 1936; Assistant Professor, Princeton University  
 ALFRED TARSKI, Ph.D., University of Warsaw, 1923; Adjoint Professor, University of Warsaw; Guggenheim Fellow  
 PAUL TEDESCO, (1942-1945), Ph.D., University of Vienna, 1920  
 TRACY Y. THOMAS, (1943-1944), Ph.D., Princeton University, 1923; Professor, Indiana University  
 EUGENE VANDERPOOL, (1944-1945), A.B., Princeton University, 1929; Agora Fellow of the American School of Classical Studies at Athens, 1932-1945  
 LUTHER I. WADE, JR., (1942-1943), Ph.D., Duke University, 1941; National Research Council Fellow

JEAN WEILLER, (1942-1943), Agrégé, Faculté de droit, University of Paris, 1936; Professor, University of Toulouse; Rockefeller Fellow

MARIAN WELKER, (1942-1943), Ph.D., University of Pennsylvania, 1938; A.A.U.W. Fellow

J. ERNEST WILKINS, JR., (1942-1943), Ph.D., University of Chicago, 1942; Julius Rosenwald Fellow

LUCIUS WILMERDING, JR., (1945), M.A., Oxford, 1929

FUMIO YAGI, (1942-1943), M.S., University of Washington, 1941; Ph.D. Massachusetts Institute of Technology, 1943

TUNG YIU, (1942-1945), M.A., Oxford, 1942; Professor, National Northwestern Union University, China; Fellow in Oriental Languages and Literatures, Princeton University

#### RESEARCH ASSISTANTS, 1941-1944

##### *School of Mathematics*

JOHN W. CALKIN, (1942)

AUDREY WISHARD McMILLAN, (1942-1943)

WILLIAM R. TRANSUE, (1942-1943)

GEORGE W. WHAPLES, (1941-1942)

##### *School of Economics and Politics*

VALENTINE T. BILL, (1942-1944)

HARRY CHESTER, (1942-1943)

ALFRED LANDAU, (1942-1943)

##### *School of Humanistic Studies*

DAVID J. ANDERSON, (1943-1944)

Members of the Economic, Financial and Transit Department of the League of Nations on mission at the Institute for Advanced Study.

DR. ALEXANDER LOVEDAY, *Director* Great Britain

MR. JOHN H. CHAPMAN New Zealand

MR. PAUL DEPERON Belgium

MR. FOLKE HILGERDT Sweden

MR. W. MARTIN HILL Eire

MR. MIROSLAV A. KRIZ Czechoslovakia

MR. JOHN LINDBERG Sweden

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MR. J. ANSGAR E. ROSENBORG Sweden

MRS. PHYLLIS W. VAN ITTERSUM Netherlands

MR. PERCY GILL WATTERSON Great Britain

MR. JACQUES J. POLAK (left the service in April 1943)

# I

## THE FOUNDERS

THE Institute mourns the death in 1944 of its two Founders, Louis Bamberger and Caroline Bamberger Frank Fuld. Since 1930 the Institute has been the greatest interest in their lives. Both Mr. Bamberger and Mrs. Fuld followed every detail of the development of the young institution. While Mrs. Fuld's health made it impossible for her to attend meetings of the Board of Trustees during the last few years of her life, Mr. Bamberger was constant in his attendance and tireless in his attention to every detail of Institute business.

Louis Bamberger was a great merchant, a loyal Jew, a public-spirited citizen of Newark and a patriotic American. While he had only a limited amount of schooling, he possessed an instinct for excellence. In partnership with his brothers-in-law, Louis Frank and Felix Fuld, he built up one of the great department stores of the United States. In the field that he chose for his lifework, he had his part in a creative achievement of the first order. He and his partners accomplished this by their skill in coordinating the efforts of many individual men and women.

Mr. Bamberger's modesty and his generosity created a spirit of loyal cooperation in his fellow workers. When upon his retirement in 1929 he distributed one million dollars in gifts to the men and women who had contributed most to the success of the Bamberger



store, that act was in keeping with his character. It was likewise in keeping with his character that he and his sister should decide to follow the advice of Dr. Abraham Flexner to devote the fortune they had earned to the establishment of an Institute for men and women devoted to higher scholarship in which not size, not popular acclaim, but rather excellence in creative scholarship should be the sole basis of preferment.

Mr. Bamberger and Mrs. Fuld sought no recognition for themselves. They left to the Trustees and the Faculty the task of determining the fields of work and the educational policies of the institution which they founded. They wished only to make it as useful as possible to higher learning in America. Their selflessness, their public spirit, their complete absence of vanity and prejudice are a lesson to every Trustee and to every individual who may benefit by their generosity. They made no speeches to Trustees, Faculty or Members, but by their acts they have laid upon everyone connected with the Institute the injunction "Establish thou the work of our hands."

The Founders made an initial gift of \$5,000,000 in 1930 which made possible the opening of a School of Mathematics in 1933. At various times during the next few years, the endowment funds of the Institute were increased by the Donors to approximately \$8,000,000, and the two Schools of Humanistic Studies and of Economics and Politics were started in 1935. In accordance with the wish of the Donors that the Institute should be located in the state of

New Jersey, Princeton was decided upon. The Trustees and Faculty of Princeton University gave the Institute a most cordial welcome and have generously made available to the staff and members the resources of the Princeton University Library and other facilities for advanced work. For several years the work of the Institute in mathematics was conducted in Fine Hall, and the Institute work in the history of art is still carried on in McCormick Hall. In 1939 Fuld Hall, the gift of the Founders, was opened and now houses most of the Institute activities. An additional gift by the Founders in 1940 made possible the organization of a working library. Fuld Hall is located on the Olden Farm, the site of the Battle of Princeton, west of the borough, beyond the Graduate College. Both Mr. Bamberger and Mrs. Fuld have made the Institute residuary legatee under their wills. While the two estates have not yet been settled, it is expected that these bequests will result in a substantial addition to the endowment funds.

One purpose of the Founders, that the Institute should confer the Ph.D. degree, was during the 1930's, with their full approval, abandoned. It is licensed to do so under its charter but experience has shown that the need of facilities for post-doctoral research are so much more urgent and so much less fully met in other places that the Institute has concentrated upon this field.

As it has developed, the Institute has become not a college or a university or a research foundation. It is an institution in which a small permanent group of

professors serves as the nucleus of a larger, temporary group of mature, though generally younger scholars. It has been found that the scholars thus brought together are so much interested in their respective tasks, in their own development and in the advancement of knowledge, that the usual academic arrangements such as regular courses, required attendance, degrees, examinations and administrative supervision can be dispensed with as superfluous.

In these respects, which are all consequences of the fact that it limits its membership to scholars of a high level of maturity, the Institute differs from all American universities. It is like a university in that its success depends on the influence that it has on its temporary members as well as on the individual discoveries of its professors. While it is like a research institute in that the members of its staff are contributors to knowledge, it differs in two major respects, (1) the emphasis on the stream of temporary members which flows through it and (2) the absence of a specified program of research and of all regimentation.

Bulletin No. 10 of the Institute was published in October 1941, two months before Pearl Harbor. For some time before the date of that catastrophe, various members of the Faculty had already been called upon for national service—defense work as it was then called. With the coming of the war the members of our staff began to be greatly in demand for such service and the Trustees adopted a generous policy of releasing members of the Faculty for important

war work for which they possessed special qualifications. The requirements of military secrecy make it impossible as yet to tell in detail the story of the war work of the members of our Faculty, but when that story can be told, it will be an extremely interesting and creditable one.

The war has made heavy demands likewise upon our temporary members. Mathematicians and physicists have been needed for teaching and for war research. Economists have been called upon for various types of government service and the members of the School of Humanistic Studies have been able to make interesting and important contributions to the war effort in connection with the invasion of North Africa, Sicily, Italy and Greece, and in the preservation of cultural monuments.

Nevertheless in the intervals of war work, scholarly research has progressed steadily. The publications of the Faculty and Members of the Institute during the year 1943-1944 exceeded in volume and importance those for any previous year since its foundation.

In the chapters which follow are given in condensed form the most important facts about the work of the several Schools from 1941 when our last Bulletin was published, down to the end of the academic year 1943-1944, together with certain notes about researches in progress during the year 1944-1945.

## II

## SCHOOL OF MATHEMATICS

IN the School of Mathematics work is carried on by individual research, individual contact with students, by seminars, by courses of lectures and by other means, as each professor sees fit. In the past the work of the permanent staff was greatly amplified by the activities of the temporary members, and it is expected that the same will be true in the future. The lectures and seminars, held either in our own building or in Fine Hall on the campus of Princeton University, are open to advanced students in the University, while, *vice versa*, University courses are open to members of the Institute. There is the closest cooperation by both groups in seminars as well as in the Mathematics Club.

Since America's entrance into the war, the members of the permanent staff have given part, in some cases almost all, of their time to important work connected with the war effort. Nor could the younger mathematicians and physicists be spared. Nevertheless the amount of pure research carried on in mathematics and theoretical physics during these years has been impressive.

The following brief survey of the research activities of the staff members and of some of the present temporary members might at the same time serve as a necessarily somewhat indefinite outline of a pro-

gram for 1945-1946. Because of its confidential character all war research work has been excluded.

Professor Alexander is at present completing an exposition of topology from a combinatorio-algebraic point of view. He expects to lecture in 1945-1946 on applications of topology to analysis.

Professor Chern worked on differential geometry, with particular emphasis on problems related to topology.

Professor Einstein worked on the theory of bivector fields and other fields the structural elements of which depend on two space-time points, as a possible means for the construction of a unified field theory of relativity. This research will be continued.

Dr. Gödel has been continuing his work on the independence of the axiom of choice and Cantor's continuum hypothesis. He is at present engaged in investigating some aspects of the work and life of Leibnitz.

Professor Morse studied the variational theory in the large without assuming the traditional regularity condition. Further research will be directed toward new topological methods in the theory of harmonic and analytic functions and relations between integral equation theory and variational theory in the large.

Professor Pauli, with a number of collaborators from the Institute and Princeton University, carried on research on the quantum theory of wave fields in general and of the meson field in particular, with applications to the problem of nuclear forces.

Professor Radó is working on a book on Length and Area.

The main topics of Professor Siegel's research in the period covered by this report have been: symplectic geometry, and automorphic functions of several variables, 1941-1942; zeta functions, discontinuous groups (in particular the group of units in a simple algebra), Waring's problem in arbitrary algebraic number fields, 1942-1943; indefinite quadratic forms, 1943-1944.

Professor Veblen is at present trying to reorganize and complete his work on spinors which was interrupted in 1942.

Professor von Neumann's work in 1941-1942 was mostly concerned with various questions related to operator theory and the ergodic theorem. In 1944 he completed a book on the theory of games and economic behavior, in collaboration with Professor Oskar Morgenstern of Princeton University. In the immediate future his interests will probably be centered on hydrodynamics and non-linear differential equations.

Professor Weyl's investigations concern application of integral equations to the theory of harmonic integrals, non-linear problems of hydrodynamics, theory of analytic curves. In 1945-1946 he plans to lecture on Hilbert's mathematical work and its influence on present-day mathematics.

A quarterly journal called *Annals of Mathematics*, a collection of advanced mathematical texts known as the *Princeton Mathematical Series*, and the less

formal photoprinted *Annals of Mathematics Studies*, are published by the Princeton University Press under the joint sponsorship of the Department of Mathematics of Princeton University and the School of Mathematics of the Institute for Advanced Study. The *Annals of Mathematics Studies* continue in improved form the *Princeton Mathematical Notes*, multigraphed notes of lecture courses given in Princeton for which there had been an ever increasing demand in this country and abroad. The editors of the *Princeton Mathematical Series* are Professors Marston Morse, H. P. Robertson, and A. W. Tucker. The editorial board of the *Annals of Mathematics* consists of Professors S. Lefschetz, H. F. Bohnenblust, J. von Neumann, and associate editors from various institutions.

The following is a list of (1) *courses and seminars* held by members from 1941-1944, (2) *lectures and series of lectures* given by members and visitors during the same period. The courses and seminars given or planned for the present academic year 1944-45 are included.

#### 1941-1942

##### *Courses and Seminars*

Seminar on Harmonic Integrals (main speakers: H. Fred-eric Bohnenblust, Claude Chevalley, Gerhard P. Hochschild, Hans Samelson, Albert W. Tucker, André Weil, Hermann Weyl)

JAMES W. ALEXANDER: Selected Topics in Topology

MARSTON MORSE: Seminar on the Foundations of the Variational Theory of Multiple Integrals



- JOHN VON NEUMANN: Selected Topics in Operator Theory; Quantum Mechanics  
 HERMANN WEYL: Functions of Complex Variables; Fluid Dynamics; Algebra Seminar (with George W. Whaples, Ellis R. Kolchin and Richard D. Brauer)  
 VALENTINE BARGMANN: Methods of Mathematical Physics; Statistical Mechanics (courses at Princeton University)  
 SUBRAHMANYAN CHANDRASEKHAR: Stellar Dynamics  
 JOSEPH L. DOOB: Continuous Stochastic Processes  
 WOLFGANG PAULI: Theory of Cosmic Rays; Theory of the Meson Field; Advanced Quantum Mechanics (course at Princeton University)  
 CARL L. SIEGEL: Modular Functions  
 GEORGE W. WHAPLES: Class Field Theory

*Lectures and Series of Lectures*

- A. A. ALBERT: Composition of quadratic forms  
 ALFRED T. BRAUER: On the solvability of the linear Diophantine equation in positive integers  
 JOHN W. CALKIN: Ideal theory in operator rings; Operational theory of boundary value problems  
 SUBRAHMANYAN CHANDRASEKHAR: The abundance of the elements  
 KENNETH S. COLE: Mathematical biophysics; Nerve problems  
 RICHARD COURANT: On the reduction of variational problems to problems with a finite number of coordinates  
 JOSEPH L. DOOB: Markoff chains  
 JESSE DOUGLAS: The inverse of the calculus of variations  
 PAUL ERDÖS: On certain sequences of integers  
 AARON FIALKOW: Foundations of conformal differential geometry  
 JACQUES HADAMARD: Some byproducts of the theory of linear partial equations; On Huygens's principle  
 MARSHALL HALL: Abstract projective spaces

- PAUL R. HALMOS: Relative dimension; Numerical dimension  
 GUSTAV A. HEDLUND: Non-conjugacy and transitivity  
 GERHARD P. HOCHSCHILD: Derivations of semi-simple algebras  
 SHIZUO KAKUTANI: On rings of analytic functions (with Claude Chevalley)  
 GEORGE W. MACKEY: Some generalizations of a theorem of Eidelheit  
 SAUNDERS MACLANE: Group extensions in infinite complexes  
 HENRY B. MANN: Proof of the alpha plus beta hypothesis  
 WALTHER MAYER: General homology theory  
 DEANE MONTGOMERY: Topological transformation groups  
 WOLFGANG PAULI: The present state of the meson theory  
 HANS SAMELSON: On spheres that are group manifolds; Topology of group manifolds; On monothetic groups  
 LEONARD J. SAVAGE: Metric differential geometry; Report on Rashevsky's book on mathematical biophysics  
 ARTHUR H. STONE: Connectedness and coherence; Complement on coherence  
 MARSHALL H. STONE: Spectral theory  
 ALFRED TARSKI: Algebra of topology  
 ROBERT M. THRALL: Representations of groups  
 JOHN VON NEUMANN: Examples of operator rings of finite continuous class  
 HERMANN WEYL: On some non-linear differential equations of hydrodynamics  
 GEORGE W. WHAPLES: Remarks on class field theory  
 HASSLER WHITNEY: Geometrical aspects of combinatorial topology  
 OSCAR ZARISKI: Reductions of singularities of surfaces

1942-1943

*Courses and Seminars*

- HERMANN WEYL: Course on Meromorphic Functions and Curves; Seminar—Reports on members' own research

(Irvin S. Cohen, Local rings; Luther I. Wade, Transcendency problems)

VALENTINE BARGMANN: Electricity and Magnetism (course at Princeton University; repeated 1944)

WOLFGANG PAULI: Quantum Electrodynamics and Meson Theory; Analytical Mechanics (course at Princeton University)

#### *Lectures*

WALTHER MAYER: Series of lectures on Intersection theory  
CARL L. SIEGEL: Discontinuous subgroups of the symplectic group; Discontinuous groups

1943-1944

#### *Courses and Seminars*

JAMES W. ALEXANDER: Algebraic Topology

WOLFGANG PAULI with JOSEF M. JAUCH and VALENTINE BARGMANN: Seminar on Current Topics of Theoretical Physics

CARL L. SIEGEL: Analytical Theory of Numbers

#### *Lectures*

A. A. ALBERT: Quasigroups

SHIING-SHEN CHERN: Theory of geometrical objects and the method of equivalence; Sphere bundles; Pontrjagin's theory of characteristic cycles; Homotopy theory; Compact Lie groups and their representations

GODOFREDO GARCÍA: On the regularization of the problem of three bodies

NING HU: Cosmic ray production; Recent developments concerning the strong coupling theory in Switzerland

HERMANN WEYL: A recent progress in the geometry of numbers

1944-1945

#### *Courses and Seminars*

Mathematical Seminar (Carl L. Siegel, Automorphic functions; Shiing-shen Chern, Fibre bundles and differential geometry; Hermann Weyl, Quadratic forms in division algebras and their reduction)

WOLFGANG PAULI: Theory of Relativity

## III

## SCHOOL OF ECONOMICS AND POLITICS

THE members of the Faculty of the School of Economics and Politics have been engaged in various forms of important war work. Professor Riefler returned from London in the autumn of 1944 where he had served for two years as Minister to England in charge of Economic Warfare. Professor Mitrany, on leave since September 1939, was first on the staff of the Royal Institute for International Affairs, and more recently has acted as political adviser to a Dutch committee studying post-war problems. Professor Warren and Professor Stewart have been part-time advisers to the Treasury Department in Washington, with special reference to the relation between fiscal operations and the banking system. Professor Earle is serving part-time as special consultant to the Army Air Forces.

During the years 1942-44, the work of the School of Economics, though greatly affected by the war, was continued along the lines of earlier years. The scope of the work is indicated by the various studies pursued by the members of the School. Dr. David Durand, Dr. W. Braddock Hickman and Dr. Clarence Long gave up their memberships in the Institute to enlist in the armed services. Before leaving Dr. Durand completed his investigation of the Basic Yields of Corporate Bonds, 1900-1942, which was

published by the National Bureau of Economic Research in June 1942. At the time of Dr. Hickman's departure, he had finished an analysis of the term structure of interest rates, a study of why short-term rates vary as they do in relation to long-term rates; also he had drafted a report on interest structure and war financing, making comparisons between the two world wars and considering the problems and techniques of control. Dr. Long, during the two years of his membership, was engaged in a major study of the magnitude and composition of unemployment and the changes in the labor force in this country over the past three decades. Some part of his findings, *The Labor Force in Wartime America*, was published in March 1944 by the National Bureau of Economic Research.

Professor Friedrich A. Lutz, for two years a member of the Institute, on leave from Princeton University, is engaged in a study of the theory and practice of investment, in which the theoretical analysis is checked empirically both by available statistical data and wherever possible by the rules and practices of those who make the actual decisions concerning capital expenditures. These studies, like the studies already referred to, are a cooperative undertaking with the National Bureau of Economic Research. Dr. Lutz's study on "Corporate Cash Balances in Manufacturing and Trade, 1914-1943" will be published by the Bureau early in 1945.

Mr. Jonathan Mitchell is bringing to completion his report on the struggle in the Senate over the

Treaty of Versailles. Mrs. V. T. Bill, who was engaged on a study of the social and cultural history of Russia, gave several lectures on the subject to a group at the Institute. Dr. Walter Schiffer, a member of the School of Economics on a Guggenheim Fellowship, is preparing a study on the conflicting theoretical ideas underlying the origin and activity of the League of Nations. This study was interrupted by his appointment to a research position in the field of international administration at Syracuse University. Dr. Adrienne Koch, also a Guggenheim Fellow, is studying the social philosophy of Jefferson, Madison and Monroe as expressed both in their writing and in their behavior as statesmen. Mr. R. P. Blackmur, on leave from Princeton University, is completing his study of Henry Adams. Mr. Lucius Wilmerding, Jr., whose appointment as a member of the Institute began March 1945, will complete his history of the government accounting offices, a sequel to his book on the history of the efforts of Congress to control expenditures.

During the past two years several conferences have been held at the Institute. The American Economic History Association held its fall meetings both for 1943 and 1944 in Princeton. In the summer of 1943 Sir William Beveridge was invited to the Institute to meet with a group of economists, both English and American, to discuss the problems of social security. The League of Nations Delegation on Economic Depressions, of which Professor Riefler is Chairman,

held a series of meetings in the autumn of 1944 and early in 1945, and will shortly complete and publish its Report on Economic Stability in the Post-War World.

After the war, the School of Economics plans to initiate studies in international political and economic problems that will include studies in public finance during the period of the war, wartime banking and investment, and international monetary experience. These projects, which would make full use of the varied war experiences of the members of the School, must, however, remain tentative until suitably prepared scholars are again free to undertake them.

Professor Earle has continued his studies of American foreign relations, with a view to publishing a volume on the changing conditions of American security. His seminar on military affairs had to be interrupted in the spring of 1942 because of the entry of all of its members into the Armed Forces or other branches of Government service. Professor Earle himself has devoted part of his time to studies for the Office of Strategic Services, the War Department General Staff, and the Headquarters of the Army Air Forces. As a member of a small committee which conducted certain studies for General H. H. Arnold, he made a brief trip overseas during the spring and summer of 1944. He hopes at an early date to publish a short book on the impact of air power upon world politics.



Professor Earle, the members of his seminar, and a number of scholars from other institutions collaborated in the publication in October 1943 of a volume *Makers of Modern Strategy*, which was a study of military thought from Machiavelli to Hitler. Professor Earle edited the volume with the collaboration of Dr. Felix Gilbert of the Institute and Professor Gordon A. Craig of Princeton University, and also wrote four chapters. Members of the seminar who contributed to the volume were Messrs. Gilbert, Mantoux, Possony, DeWeerd and Gottmann. *Makers of Modern Strategy* was intended primarily to be a study in history and political theory rather than a technical commentary on the conduct of military operations.

In September 1942 the members of Professor Earle's seminar, in collaboration with the Office of Population Research and the School of Public and International Affairs of Princeton University, conducted a conference on Military Man Power and American Policy for the War Department General Staff. It is hoped that in the autumn of 1945 Professor Earle may be able to resume his seminar and to continue his own studies in American foreign relations and the impact of changing military technology, especially air power, upon the policies of the United States.

Professors Earle and Riefler hope to collaborate in sponsoring at the Institute a series of studies in economic warfare, in which they will draw on their own experiences in the present conflict as well as on those

of other scholars who have been in government service here and in Great Britain.

Members of Professor Earle's seminar have continued the publication of books and articles on subjects connected with military policy and the foreign policy of the United States as follows:

Dr. Felix Gilbert, *The Roots of American Foreign Policy*;

Dr. Jean Gottmann, *Les relations commerciales de la France*;

Dr. Stefan Possony, *The Axis Grand Strategy: Blueprints for the Total War*, and translation (in collaboration with Lieutenant Daniel Vilfroy) of Field Marshal Ritter von Loeb's *Defense* and Lieutenant General Erfurth's *Surprise in War*;

Dr. Edmund Silberner, *The Idea of War in the Economic Literature of the Nineteenth and Twentieth Centuries*;

Professor Harvey DeWeerd, *Great Soldiers of World War II*;

Dr. Bernard Brodie, *Sea Power in the Machine Age*, and *A Guide to Naval Strategy*;

Dr. Richard P. Stebbins (in collaboration with Professor Grayson Kirk), *War and National Policy*.

Dr. Robert A. Kann is engaged in a study of Federalism in the Austro-Hungarian Empire.

Professor Earle has been appointed a Fellow in Military Science of the Library of Congress and a lecturer in the Army and Navy Staff College.

## IV

## LEAGUE OF NATIONS

THE members of the Economic, Financial and Transit Department of the League of Nations,\* who came on mission from Geneva to Princeton in the fall of 1940, have been working since that time at Fuld Hall under the direction of Dr. Alexander Loveday. Originally consisting of thirteen officials, the group has now increased to thirty-seven, of whom twenty-five are local personnel. In addition, the following have undertaken studies for the Department, either outside Princeton or at the Institute:

Mr. KENNETH BOULDING

Professor W. ADAMS BROWN, Jr.

Professor GOTTFRIED HABERLER

Miss MARGARET W. JOSEPH, seconded by the British Government

Dr. FRANK W. NOTESTEIN and other members of the Office of Population Research of Princeton University

Mr. AGUSTIN L. OLMEDO, seconded by the Mexican Government

Mr. LOUIS RASMINSKY, seconded by the Canadian Government

Mr. ARMANDO SERVÍN, seconded by the Mexican Government

Professor EUGENE STALEY

Professor JACOB VINER

Professor JEAN S. WEILLER

Dr. JULIUS WYLER

\* List of officials given on page xiii.

During the last four years the Economic and Financial Department has continued in Princeton the preparation and publication of certain of its regular pre-war volumes, i.e.:

*The World Economic Survey*, 1939/41 and 1941/42  
(two editions)

*Money and Banking*, 1940/42

*The Statistical Year-Book*, 1940/41 and 1941/42  
(two editions), the latter including an Addendum  
1942/43

A separate edition of the League's *Monthly Bulletin of Statistics* has been published regularly in this country since January 1942. This is entirely prepared for photo-printing each month in the Institute. A new edition of the volume on *Money and Banking* is in the press and new editions of the *World Economic Survey* and the *Statistical Year-Book* are now in preparation.

A program of studies on post-war problems was laid down for the Department by the Economic and Financial Committees of the League, which have held three joint meetings—one in London in April-May 1942, and two in Princeton in August 1942 and December 1943. The following studies have already been published, while others are in course of preparation:

Relief Deliveries and Relief Loans, 1919-1923

Europe's Overseas Needs, 1919-1920, and How They Were Met

Agricultural Production in Continental Europe during the 1914-18 War and the Reconstruction Period

International Currency Experience

The Network of World Trade  
 Europe's Trade  
 Commercial Policy in the Inter-War Period: International Proposals and National Policies  
 Trade Relations between Free-Market and Controlled Economies, by Professor J. Viner  
 Quantitative Trade Controls: Their Causes and Nature, by Professor G. Haberler and Martin Hill  
 Economic Fluctuations in the United States and the United Kingdom, 1918-1922  
 Prosperity and Depression, by Professor G. Haberler (new and enlarged edition)  
 The Future Population of Europe and the Soviet Union: Population Projections 1940-70, by Dr. Frank W. Notestein and other members of the Office of Population Research of Princeton University

Among other publications prepared in Princeton are:

Wartime Rationing and Consumption  
 Food Rationing and Consumption, 1943/44  
 An Annotated Catalogue of Selected Publications on Economic and Financial Subjects

Studies now nearing completion and likely to be published shortly include:

A Study on Industrialization and Trade  
 A Collection of Memoranda on Customs Unions  
 A Study on Aspects of the International Raw Materials Problem  
 Certain Studies on Demographic Questions

A preliminary draft of a general report on commercial policy has been prepared for submission to the Economic Committee at its next meeting, which, it is hoped, may be held at an early date.

The League's Delegation on Economic Depressions has held six meetings in Princeton and published the first part of its report in 1943, under the title *The Transition from War to Peace Economy*. The second part of its report, dealing with the longer-term problem of ensuring economic stability and the fullest possible use of productive resources, is now in press. The Delegation has met under the chairmanship of Professor Winfield W. Riefler, since the death of the former Chairman, Sir Frederick Phillips of the British Treasury.

The text has just been sent to the press of three model conventions covering the main aspects of international tax relations adopted by a conference of fiscal officials of the Americas organized by the Economic and Financial Department in Mexico City in 1943. Further studies of post-war tax problems are being made by the Department.

Mr. Paul Deperon, a member of the League group, has been on mission in Latin America in connection with a study of the conditions conducive at once to the acceptance of foreign capital and to capital export. He visited government officials and experts in Bolivia, Brazil, Colombia, Cuba, Mexico, Panama, Peru and Venezuela.

The Director, Dr. Loveday, has been actively concerned in recent months with problems of the future organization of international economic and financial work. He and other members of the Department have been participating in the work of the Interim Commission on Food and Agriculture and have at-

tended the sessions of the UNRRA Council, as well as the International Monetary Conference held at Bretton Woods last July. The Department has also been represented at the International Labor Conference in Philadelphia in April 1944; the Conference of Commissions of Inter-American Development organized by the Inter-American Development Organization in May 1944; the Middle East Financial Conference in Cairo in April 1944; the Inter-American Demographic Congress in Mexico in October 1943; and the Middle East Statistical Conference at Cairo in November 1943. Close working contacts have been maintained with other Inter-American organizations such as the Inter-American Statistical Institute.

During its four years at Fuld Hall the Library of the League of Nations group has built up a substantial collection of official documents and other publications required in connection with the work of the Department. This documentation is mainly concerned with extra-European countries. The Department's Library receives regularly about 800 periodicals and has an annual accession to its collection of about 3,000 volumes and pamphlets coming from some 50 countries and colonial territories.

## V

## SCHOOL OF HUMANISTIC STUDIES

THE work of the epigraphical seminary has been carried forward in spite of some readjustments made necessary by the war. Mr. W. Kendrick Pritchett entered the armed forces early in 1942, so that the preparation of a proposed new edition of the *Prosopographia Attica* which he was to supervise had to be postponed. A considerable amount of work, however, has been done in the assembling of materials, and the undertaking can be resumed at once as soon as the war is over and various collaborators return to civilian life. Mr. Pritchett is now a captain in the Army Air Corps. At the earliest opportunity after his return he will spend a year in Athens carrying out original investigations on the source material for this book.

In the summer of 1942 Mr. Anthony Raubitschek accepted a teaching position at Yale University. After two years there he has now returned to the Institute where he is engaged in publishing the inscriptions found in the excavations of the American School of Classical Studies at Athens. Mr. Raubitschek is a member of the staff of the School but he will be in residence at Princeton for two years in order to bring to completion as much as possible of the very considerable task of publishing the new epigraphical discoveries.



This publication continues with regular installments in the journal *Hesperia*. Mr. Paul Clement continues to serve as Managing Editor of this journal as well as of the other publications of the American School. Professor Meritt is editor of *Hesperia* and represents the interests of the Institute in the work that has been done in Athens; he is now supervising the general program of publication. His own contributions of original material have been made in *Hesperia*. Professor Meritt is also editor of the *American Journal of Philology* and serves as a member of the Boards of Management of two British journals, the *Classical Quarterly* and the *Classical Review*.

During the summer of 1944 the Christian texts in the epigraphical collection were studied by Mr. Raubitschek and Father John Creaghan, who spent two months as a member of the Institute working upon these later documents. This material is now ready for publication. During the spring and early summer of 1944 Mr. Eugene Vanderpool was also a member of the epigraphical seminary. He was in charge of the work in the Agora excavations when Greece was occupied by the Germans and after spending some time in concentration camps in Germany returned on the "Gripsholm" in March. He was able to finish at the Institute two studies which he had begun in Greece, one dealing with inscriptions and one with ceramics. Mr. Raubitschek's definitive publication of the Dedications from the Athenian Acropolis is being sponsored by the Archaeological Insti-

tute of America, with assistance from the Institute, and will probably appear in 1945.

The Institute has some twenty thousand paper impressions or "squeezes" of the documents of Athens of which about six thousand are of the new inscriptions found in the Agora. The program of the epigraphical seminary is to continue the study and publication of these texts.

Dr. Meritt has been granted leave of absence for the academic year 1945-46 to enable him to serve as Eastman Professor at the University of Oxford provided war conditions make it feasible for him to do so.

During the war years Professor Goldman, with the collaboration of Miss Frances Follin Jones, has completed the work on Halae, and it has been published in *Hesperia*. In the same journal, Dr. Leicester B. Holland, formerly of the Library of Congress, who spent a semester at the Institute in 1941-1942, published a long article on Colophon.

Professor Goldman's first volume on the Tarsus excavation, which covers the Roman and Hellenistic periods, has now been, with the assistance of Miss Jones, completed for publication. It contains an important chapter by Miss D. H. Cox on the coinage of Tarsus, prepared on a grant made to Professor Goldman by The American Philosophical Society.

The work of Dr. Marion Welker, who was at the Institute for a year on a scholarship of the American Association of University Women, has been accepted

by the American Oriental Society for publication in its Series under the title of "The Painted Pottery of the Second Millennium B.C. and its Chronological Background."

The studies of Dr. Saul Weinberg were cut short by his entry into the army, but his Guggenheim fellowship has been renewed and he expects to return to the Institute to complete the manuscript of his book on the pre-history of Greece and the Aegean.

In the spring of 1944, Professor John Garstang of Liverpool spent six weeks at the Institute conferring with Professor Goldman on the pre-history of ancient Cilicia. Professor Garstang has recently excavated a prehistoric site at Mersin, a harbor town in Cilicia, near Tarsus.

It has been customary for Professor Lowe to give a general course in palaeography at the Institute every year, but during the last two years, with the country at war, there have been no graduate students in Latin palaeography in Princeton. Contact with younger scholars, however, was maintained continuously by short courses given in New York University, the University of North Carolina, Bryn Mawr College, and the Pierpont Morgan Library. There exists in America considerable interest in the subject; and it is worth mentioning that the progress of palaeographical studies will in the coming years more and more depend on American support and the labors of American investigators. This tendency was already noticeable before the present war: it is generally admitted

that the most important contributions to Latin palaeography during the last quarter-century, both qualitatively and quantitatively, were made by American scholars.

Miss Ruth J. Dean, Associate Professor at Mount Holyoke College, spent a year at the Institute (1943-44) preparing for publication her study of the 13th century Dominican scholar, Nicholas Trevet, begun several years ago at Oxford and continued on various journeys abroad. Dr. Jacob Hammer, Associate Professor at Hunter College, is devoting the current year (1944-45) to textual studies of Geoffrey of Monmouth, of which a number have already appeared. In his brief sojourn at the Institute, he has already made great progress in collating the mass of manuscript material which is to serve as the basis for a definitive edition of this medieval British historian. The first volume, entitled "Variant Version of the *Historia Regum Britanniae*," is nearly completed.

Dr. Lowe's fourth volume of *Codices Latini Antiquiores*, the second half of the section dealing with the oldest manuscripts in Italian libraries (Perugia—Verona), has been seen through the press—all but the preface which has been held back in order to take advantage of a recently published work in Italy which promised to be important. The book has at last arrived, and as a result certain aspects of early Italian writing will have to receive more extensive treatment in the preface. Work has been proceeding at the same time on the bibliography of Volumes V and VI which will deal with the manuscripts

of France. Field work abroad will be resumed as soon as travel becomes practicable.

In Persian archaeology, Professor Herzfeld, who retired in 1944, is continuing active work on a special research grant. His *Matériaux Pour un Corpus Inscriptionum Arabicarum: Aleppo* is now being printed by the Princeton University Press and a volume on Zoroaster and His World is being prepared for publication. Professor Herzfeld plans another trip to Persia when war conditions make this possible.

The *Monuments et Inscriptions D'Aleppo* were prepared, during the years 1908 and 1930, as part of the surveys undertaken, under the auspices of the Institut de France and under the direction of M. Max van Berchem, of Geneva, for the *Matériaux pour un Corpus Inscriptionum Arabicarum*. Many volumes of this work, e.g. Egypt, Jerusalem, Tripolis, Asia Minor have been published between 1894 and 1922, but the death of Max van Berchem caused them to stop. The present volumes are intended as a continuation and resumption of the interrupted work. Therefore they follow in methods and shape the style developed in the former volumes.

*Aleppo* consists of two volumes of text and one volume of plates. Apart from a few pre-Arab inscriptions, it contains 275 inscriptions surveyed, translated and interpreted as to their diplomatic and historic contents. These inscriptions were found on the great fortification of the town, city walls and gates and citadel, and on its mosques, colleges, hospitals, caravanserais, fountains and baths, beside a few pri-

vate buildings, altogether 90 buildings not counting walls and citadel. The publication, as "*Matériaux pour un Corpus*," does not only give the inscriptions, but the survey of the buildings as well, in their essential parts. With a few exceptions, buildings and inscriptions were unknown when this survey started. They date between A.D. 100 and A.D. 1500. Fortification and 40 buildings are older than the conquest by the Mongols in A.D. 1260, hence date from the period immediately preceding the crusades and during the crusades. No other town possesses so many monuments of the first successors of Saladin as Aleppo.

Thus, the very complete picture of the civilization of that period is important for the study of the contact between the Christian and the Muhammedan world at that decisive phase of the Middle Ages.

In the history of art a varied list of books and articles have been published or prepared for publication by the faculty and members of the Institute. Dr. Frankl has published several articles, with others in press, and worked on his study of the Gothic Style as interpreted in literary sources from the inception of the style up to our own day. Miss Lawrence wrote a monograph on the Early Christian Sarcophagi of Ravenna which will be published as soon as circumstances permit. Dr. Swarzenski completed, apart from several articles, his book on *The Berthold Missal*, which was published by the Pierpont Morgan Library in 1943.

Dr. de Tolnay published, apart from several articles, the first volume of his monumental work on Michelangelo (*Michelangelo*, vol. I: *The Youth of Michelangelo*, Princeton, 1943) as well as *History and Technique of Old Master Drawings*, New York, 1943. The second volume of his *Michelangelo* (*The Sistine Chapel*) is in print and scheduled for publication in the spring of 1945. Dr. Weitzmann published several articles. In addition his two books, one entitled *Roll and Codex*, the other *The Byzantine Octateuchs*, will appear at the earliest possible moment. The illustrations are already in print.

Professor Panofsky published, apart from several articles, a book *Albrecht Dürer*, Princeton, 1943 (second edition, 1945). His edition, translation and commentary upon the writings of Abbot Suger of St. Denis is in print and scheduled for publication in the early summer of 1945.

Owing to the disappearance of graduate students and other war conditions, educational activities were considerably reduced. Dr. Lee fulfilled, on a part-time basis, his obligations as Professor at Smith College and delivered, in 1942, a series of lectures on Nicolas Poussin at Johns Hopkins University. Dr. Swarzenski gave, in 1942, a graduate seminar on Romanesque book illumination in Princeton. Dr. de Tolnay delivered, in 1942, a series of lectures on old master drawings in Princeton. Dr. Weitzmann gave, in 1941 and 1942, graduate seminars on Byzantine book illumination in Princeton, and delivered a series of lectures on the same subject at Dumbarton Oaks

(Research Library of Harvard University) in 1942. Professor Panofsky gave a graduate seminar on Baroque art in Princeton in 1941 and a graduate lecture course on medieval architecture and sculpture at New York University in 1941. He also delivered the Lorado Taft lectures at the University of Illinois in 1943, the Page-Barbour Lectures at the University of Virginia in 1942, and a series of lectures on the Gothic Style in the Pierpont Morgan Library in 1943.

Of the two members who joined the group this year, Dr. Strunk is working, in close collaboration with Dr. Weitzmann, on such unpublished manuscripts, photographed by Dr. Weitzmann in Greece, as throw light upon the history of Byzantine music. Mr. Forsyth, recently released from the Navy, is completing his monograph on the Church of St. Martin in Angers, the plates of which had already been printed before he went into service. In addition, he assists Professor Panofsky in the preparation of his book on Gothic based on the Page-Barbour Lectures delivered in 1942.

In October, 1943, Dr. Swarzenski left the Institute, with a leave of absence for the duration of the war, in order to join the staff of the National Gallery of Art in Washington where he functions as Curator of Sculpture and Assistant to the Chief Curator.

Dr. Lee devoted much of his time to his task as Editor-in-Chief of the *Art Bulletin*, which has emerged as the leading art historical magazine of the world. In October, 1944, Dr. Lee resigned from



this editorship and accepted the post of Executive Secretary of the "Committee of the American Council of Learned Societies on Protection of Cultural Treasures in War Areas." Throughout the year 1943-44, Dr. Lee himself, as well as Dr. Frankl, Dr. Weitzmann and Professor Panofsky also participated in the preparation of the maps, lists and handbooks issued by this Committee for distribution to the Armed Forces.

## VI

## GEST ORIENTAL LIBRARY

IN the Gest Oriental Library at 20 Nassau Street there are now more than 100,000 volumes on the shelves according to the Chinese standard library fourfold classification system. Far Eastern acquisitions of Princeton University other than those in the field of Oriental Art continue to be shelved in the Gest Library, and now number more than 4,000 volumes. Since February, 1943, Dr. Chung Kei-won, who has pursued his study in Far Eastern languages in the Library for several years, has been on leave of absence for government war work, first in New York City and later in Washington, D.C. Mr. Yiu Tung (M.A. Oxon) still gives frequent volunteer services along with his use of the facilities of the Library as Fellow in the Graduate School of Princeton University. Since October, 1943, however, Mr. Yiu has served as instructor in Princeton University, teaching Chinese language classes in the Navy School of Military Government, Princeton, but at the end of six months he will resume his full-time study in the Department of Oriental Languages and Literatures of the University.

With the able assistance of Mr. Yiu a study by Dr. Nancy Lee Swann, Curator of the Library, of an A.D. first century Chinese text has been put in form for publication. This text entitled "Treatise on Food

and Money" (*Shih-huo Chih*, *Han Shu* 24 A.B.) is, except for one document of more limited scope, the earliest extant economic history of China. It covers the period from the earliest times down to A.D. 25. Among special features of the study are a chronological table of contents of the treatise in parallel columns, a translation and study of two related texts, *Han Shu* 91 and *Shih-chi* 129, a series of running comments and chronologically arranged references under wealth, poverty and rates of interest, and a statement on Han money. The topics of the text itself are in many instances startlingly modern.