STUDIES IN

Income and Wealth

VOLUME THREE
Officers

GEORGE SOULE, Chairman
DAVID FRIDAY, President
W. L. CREM, Vice-President
SHEPARD MORGAN, Treasurer
W. J. CARSON, Executive Director
MARThA ANDERSON, Editor

Directors at Large

CHESTER I. BARNARD, President,
New Jersey Bell Telephone Company
HARRY O. KENMOR, President, Associated Dry Goods Corporation
HARRY W. LANDER, Executive Director,
The League for Industrial Democracy
L. C. MARSHALL, The American University
GEORGE O. MAY, Price, Waterhouse and Company
SHEPARD MORGAN, Vice-President, Chase National Bank
GEORGE E. ROBERTS, Economic Adviser, National City Bank
BEARDSLEY RUMIL, Treasurer, E. H. Mcr and Company
GEORGE SOULE, Director, The Labor Bureau, Inc.

Directors by University Appointment

WILLIAM L. CRUCE, Harvard
H. M. GROVES, Wisconsin
E. E. DAY, Cornell
WALTON H. HAMILTON, Yale
GUY STANTON FORD, Minnesota
HARRY ALVIN MILLIS, Chicago
F. P. GRESHAM, North Carolina
WALTER C. MITCHELL, Columbia
A. H. WILLIAMS, Pennsylvania

Directors Appointed by Other Organizations

FREDERICK M. FEINF, American Engineering Council
DAVID FRIDAY, American Economic Association
LUE GALLOWAY, American Management Association
MALCOLM MUIR, National Publishers Association
WESLEY C. REIFLER, American Economic Association
MATTHEW WOOL, American Federation of Labor

Research Staff

WALTER C. MITCHELL, Director

ARTHUR F. BURNS
SOLOMON FABRENT
MILTON FREEDMAN
SIMON KIEHN

EUGEN ALTSCHUL, Associate
RELATION OF THE DIRECTORS

TO THE WORK OF THE NATIONAL BUREAU

OF ECONOMIC RESEARCH

1. The object of the National Bureau of Economic Research is to ascertain and to present to the public important economic facts and their interpretation in a scientific and impartial manner. The Board of Directors is charged with the responsibility of ensuring that the work of the Bureau is carried on in strict conformity with this object.

2. To this end the Board of Directors shall appoint one or more Directors of Research.

3. The Director or Directors of Research shall submit to the members of the Board, or to its Executive Committee, for their formal adoption, all specific proposals concerning researches to be instituted.

4. No study shall be published until the Director or Directors of Research shall have submitted to the Board a summary report drawing attention to the character of the data and their utilization in the study, the nature and treatment of the problems involved, the main conclusions and such other information as in their opinion will serve to determine the suitability of the study for publication in accordance with the principles of the Bureau.

5. A copy of any manuscript proposed for publication shall also be submitted to each member of the Board. If publication is approved each member is entitled to have published also a memorandum of any dissent or reservation he may express, together with a brief statement of his reasons. The publication of a volume does not, however, imply that each member of the Board of Directors has read the manuscript and passed upon its validity in every detail.

6. The results of an inquiry shall not be published except with the approval of at least a majority of the entire Board and a two-thirds majority of all those members of the Board who shall have voted on the proposal within the time fixed for the receipt of votes on the publication proposed. The limit shall be forty-five days from the date of the submission of the synopsis and manuscript of the proposed publication unless the Board extends the limit; upon the request of any member the limit may be extended for not more than thirty days.

7. A copy of this resolution shall, unless otherwise determined by the Board, be printed in each copy of every Bureau publication.

(Resolution of October 25, 1926, revised February 6, 1933)
STUDIES IN

Income and Wealth

VOLUME THREE

BY THE CONFERENCE ON RESEARCH IN NATIONAL INCOME AND WEALTH

NATIONAL BUREAU OF ECONOMIC RESEARCH

NEW YORK · 1939
This third is in sign. This volume division of meaning the Merwin. J. deal with rents or wealth owing to estimate used to put paper is a kinds of goods and a pleaser the the nation the useful relative capacities grants.

The paper was devoted to picking and matching took as its among its or the need for the possible for the use of papers and of the total.
This third volume of the series, *Studies in Income and Wealth*, is in significant contrast to the preceding two. Every paper in this volume is concerned with problems centering about the division of a national total—of either wealth or income—into meaningful constituents. The first three papers—by C. I. Merwin, Jr., Charles Stewart, and Enid Baird and Selma Fine—deal with the division of the total among groups of income recipients or wealth holders classified by size of income or amount of wealth owned. The fourth, by R. W. Goldsmith, is an attempt to estimate the portion of total income that is saved rather than used to purchase goods currently consumed. Clark Warburton's paper is a review of the available allocations of income by the kinds of goods and services that make up the total income stream, and a plea for better measures in this field. R. R. Nathan considers the problems involved in allocating the total income of the nation among political units, the states, and P. H. Wueller, the usefulness of such an allocation for the purpose of measuring relative capacities of the states as a guide in distributing federal grants.

The papers in *Volumes One and Two*, on the other hand, were devoted primarily to problems centering about the meaning and measurement of total national wealth and income. None took as its specific and main problem the allocation of a total among its constituent elements, although all the papers reiterate the need for breakdowns of the totals and clearly recognize that the possibility of evaluating the components is largely responsible for the usefulness of the estimates of the totals. But even those papers and comments that deal almost exclusively with segments of the totals—for example, the series of papers on income de-
rived from government or the discussion of measuring inventory gains or losses—were concerned with these segments not primarily because they were important in their own right but rather because they presented baffling problems of estimation that needed to be solved to improve the adequacy of the totals.

This shift in emphasis is both understandable and desirable. The preceding volumes have by no means reconciled the divergent opinions concerning the constitution of national income, or of that as yet little quantified total, national wealth, and the probability that further discussion of these points in later volumes will be needed is fully recognized. But they have served the function of laying bare the nature of and reasons for the divergencies, of setting forth the border areas where disagreement is sharp, and of making explicit the assumptions concerning them.

We can now formulate, as we could not so clearly before, three major questions about the constitution and measurement of national income on which there is a fundamental division of opinion: first, whether capital gains and losses should be included in the income total; second, whether the net value product of illegal enterprises should be included in the income total; third, how the services rendered by government should be valued.

Capital gains and losses reflect changes in the value of assets on hand at the beginning of the year that arise from unanticipated changes in their quantity or quality. Such alterations in the valuation of assets may result from price changes alone, or from actual physical changes in durable goods (for example, through fire losses) or from changes in our knowledge of them (for example, through discovery of mineral resources). Quantitatively, capital gains and losses due purely to price changes are much the most important aspect of the problem; consequently, this summary is restricted to gains and losses of this type. Divergent views as to whether they should be included in national income have probably been responsible for wider discrepancies between estimates of year-to-year variation in national income than have divergent views on any other class of items. Three positions as to the proper treatment of such capital gains and losses have been held. One position is that they should be excluded from income in both 'current' and 'constant' prices; a
second, that they should be included in income in current prices but should be eliminated when income is adjusted for price changes; and the third, that income in both current and constant prices should include capital gains and losses, in whole or in part.

The disagreement with respect to income in current prices hinges on a difference of opinion as to which concept is most useful. Those who favor the exclusion of capital gains and losses think that national income in current prices will be most useful if it is a measure of the value of a flow of commodities and services rather than a measure of the flow of monetary values. They would define national income in current prices as the current value of the goods and services consumed plus the current value of the changes in the community's stock of capital and thus would exclude both realized and unrealized capital gains and losses arising from price changes. Some of those who hold the opposing view argue, on the other hand, that national income in current prices has primarily a monetary significance—that logically it should be defined as equal to the 'values' consumed by or accrued to the credit of the individuals constituting the community. This would mean that national income would be defined as equal to the value of the goods and services consumed plus the change in the value of the community's stock of capital and thus would include both realized and unrealized capital gains and losses. Others support the same position for somewhat different reasons. Although granting that capital gains and losses do not add to the total value of the flow of commodities and services during a period, they maintain that such gains and losses do affect the share of the total to which component groups in the community can lay claim, and hence should be included at least when problems dealing with the distribution of national income are considered.

The practical aspect of the question, namely, whether capital gains and losses can be objectively measured, though outstandingly important, does not contribute unambiguously to a solution. Some types of capital gains and losses, such as those arising in connection with real estate and investments, are to a considerable extent separable in the accounting data used for income estimates; their inclusion in national income means adding
items, the measurements of which may be inaccurate. However, other types of capital gains and losses, such as those arising in connection with inventories, are included in the raw data on which income estimates rest and can be eliminated only by subtracting estimates of them from a presumably more nearly accurate total.

The disagreement with respect to income in constant prices arises from divergent views as to the price changes for which correction should be made. One view is that 'income in constant prices' should be defined as equivalent to an index of the physical volume of commodities and services produced. This would require correction for changes in specific prices that would of necessity eliminate all capital gains and losses, at least in a closed economy. Deflation by a general price index is then merely an indirect method of approximating an index of physical volume, and any failure thereby to eliminate capital gains and losses is to be counted an error. The other view is that it is desirable to correct solely for changes in the 'general level of prices' or in 'purchasing power', but not for changes in specific prices. According to this view, deflation by a general price index yields, conceptually, the desired figure and not an approximation; failure thereby to eliminate all capital gains and losses is considered a correct and proper result. All parties to the controversy agree on the importance of measuring capital gains and losses; the division of opinion is on the advisability of including the resultant estimate in the national income total.

A second major issue in connection with the definition of total national income is whether to include the net value product of illegal enterprises. Those who would include activities such as bootlegging during the prohibition era urge as a principal reason for so doing that inclusion only of legal items would invalidate comparisons of income estimates for periods during which the legal status of any important type of activity has changed. They note also that illegal enterprises employ tangible national wealth and human labor as legal enterprises do and that the net value-product formula is equally applicable to their accounts. Those who advocate the exclusion of the products of illegal enterprises have urged that the line between legal and illegal enterprises represents the judgment of the community as to which enter-
prises are economically productive and that if national income is to be defined in terms of an objective distinction between economically 'productive' enterprises and others, the legality basis is the most satisfactory one for making such a distinction. A second point made against the inclusion of illicit activity is the unreliability of the accounting data that pertain to it.

The valuation of the share of national income derived from government is a third issue on which there is fundamental disagreement. This issue can be conveniently considered in terms of the two main constituent items of the gross-value-product of government: (1) the value of services to ultimate consumers and to other enterprises and (2) the value of additions to the tangible assets of government. The treatment of the latter item is not in dispute; it is agreed that it should be valued in the same way as additions to the assets of non-government enterprises, namely, on the basis of cost, or outlays. Disagreement on the valuation of current services arises because these services are, in the main, not 'sold' on the market for a 'price' but are made available without specific payment. Yet they clearly contribute to national income.

It has been urged, on the one hand, that total tax receipts are the closest analogue to the revenue from sales of a business enterprise and that tax receipts should, therefore, be taken as representing the value of such services. On the other hand, those who object to this view would substitute an imputed value for government services. Whether tax receipts or an imputed valuation of government services is used to determine the gross-value-product of government, there is general agreement that to obtain the corresponding net value product it is necessary to subtract payments to non-government enterprises for products used in producing the current services.

Proponents of the 'tax receipts' basis argue that net income originating in the private sector of the economy is typically measured by receipts minus payments to other industries for goods currently consumed and that consistency requires that current government services be measured in similar fashion. They grant that even in dealing with the private sector of the economy there are items, other than additions to the assets of enterprises, that cannot be valued on the basis of actual receipts,
notably farm products consumed on farms and net rental value of houses occupied by their owners. These, however, may be valued at prices at which comparable items are actually sold, but this method is not considered practicable for most government services because closely comparable services are rarely sold on the market.

Proponents of an imputed valuation for government services frequently rely upon an estimate of the cost of or outlays upon such services to obtain an imputed value. They urge in favor of such a procedure as a substitute for tax receipts that tax receipts are a mere money flow, the year-to-year changes which have no necessary relation to year-to-year changes in the value of government services. They further urge that if year-to-year (or month-to-month) comparisons of government net-value-product are to be made, an imputed valuation is necessary if misleading results are to be avoided.

Whichever view is accepted, there remain five important questions regarding income derived from government that have caused a good deal of discussion. The first three have to do with the distributive shares into which the net-value-product of government can be divided. (1) Are such payments as those to relief-workers properly distributive shares or are they really to be classed with direct-relief payments as redistributions of income? (2) What part, if any, of government-interest payments belongs to the primary distribution of income, and what part represents a redistribution of income? (3) What distributive share for government, if any, corresponds to additions to or withdrawals from surplus for corporations? (4) Is it feasible and necessary definitely to apportion the value of government services as between services to other enterprises and services to ultimate consumers? One view is that such a segregation of government services is not feasible without making violent assumptions that render the resulting estimates worthless; that in most government activities, services to individuals and to business are inextricably interwoven. Against this view stands an actual statistical attempt at such a segregation and the contention that any estimate of national income necessarily implies segregation. (5) Can the net-value-product of government be determined without knowledge of the incidence of taxes? Some have contended...
that it is necessary to distinguish between those taxes which fall upon ultimate consumers and those taxes which come out of business profits or some other distributive share in order to estimate the net value product of government.

This summary of divergent opinions is obviously not intended to be exhaustive with respect to the considerations advanced on the three items discussed, the items on which there is disagreement, or the contents of the preceding volumes. Problems of measuring income in kind from owned consumer goods and property income derived from financial enterprises, two items of considerable quantitative importance, and the usefulness of the end products of statistical estimation have been discussed at some length by the contributors to the volumes. Similarly, the treatment and definition of such items as gifts, occupational expense, income from abroad, entrepreneurial withdrawals and 'business savings'—especially with respect to unincorporated enterprises; and the meaning and techniques of deflation have been the subject of discussion, controversy, and disagreement. Finally, there has been a divergence of opinion on the value of giving wealth inquiries a prominence more nearly equal to that given income inquiries. The most extended discussion of wealth measurement was incidentally an argument that income measurement is more worth while than wealth measurement. While on many of these points the degree of clarification achieved has been greater, on others it has been far less than on the three items just considered. The purpose here is not to present this discussion in detail but rather to delineate in broad strokes the major boundary disputes with which the preceding volumes have been largely, though by no means entirely, preoccupied.

These boundary disputes clarified, at least to the extent that the alternative boundaries are fairly clearly marked, the natural next step is a more detailed survey and study of the character of the area staked out. This study is clearly important in its own right; in addition, it is an essential step before further agreement on the exact boundaries can be expected. Differences of opinion largely center on the usefulness and feasibility of the several concepts, and such differences can be removed only by putting the concepts to a pragmatic test. Conversely, the clarification of the
nature of the boundary disputes is an exceedingly helpful preliminary for a careful exploration of the territory.

The seven papers in this volume proceed to a more detailed examination of the area staked out. They deal with three types of allocation of the national total: among groups classified by size of income or wealth, among the various components of saving and expenditures, and among states. Each type of allocation is considered separately. But their ultimate usefulness will depend very largely on the extent to which they can be interrelated. Thus it is clear from Dr. Wueker’s paper and the discussion to which it gave rise that income estimates by states need to be supplemented by distributions of income by size. In the National Resources Committee estimates, one aspect of which is discussed by Miss Baird and Miss Fine, a first step has been made in this direction by the preparation of income distributions for broad geographic regions. The savings estimates presented by Dr. Goldsmith are admittedly exceedingly rough, but it is evident that as more refined estimates become possible it will be desirable to break down those components that admit of it not only by geographic units but also by income class. The allocation of income among various types of consumer’s goods and capital formation, discussed by Dr. Warburton, relates partly to consumers’ expenditures, and to that extent can and should be cross-classified with distribution of income by size among families in different areas, and partly to investment, and to that extent should be combined with a territorial breakdown.

The discussions in this volume of the three major types of allocation of income and wealth totals carry forward the work on what has been called the second phase in the investigation of national income. However, a wide field for this type of inquiry still remains. We need additional types of breakdowns, some of which we can now list, others of a kind that problems not yet in the forefront of discussion will doubtless require. Thus for many problems, state breakdowns of national income are insufficient; as suggested in the discussion of Dr. Wueker’s paper, estimates by size of community within states seem clearly called for. Dr. Warburton’s paper and Dr. Copeland’s comment on it emphasize the need for estimates by types of commodities and services.
more detailed and more adequate than any now available. Many other types of breakdowns could be noted, but those enumerated will perhaps suggest the range of the problem.

The exploration of the problems indicated raises many conceptual questions only briefly if at all touched on in the preceding volumes. The papers by Messrs. Merwin, Goldsmith, Nathan, and Wueller discuss some of these. Still others are suggested by the attempts to obtain distributions of income by size. It is not clear, for example, that definitions appropriate for estimates of national income are equally appropriate for individual income. The desirability of excluding transfers, such as gifts, from national income does not necessarily imply the desirability of excluding them from individual income in constructing distributions of income by size. The situation is similar with such items as capital gains and receipts from illegal activities.

It is thus to be expected that future papers will return to conceptual problems of the sort to which the earlier volumes were so largely devoted, but with the important difference that the treatment of the constituent parts will receive far greater consideration. To many, those especially who hold an unequivocal and dogmatic view of the essential economic concepts and relations, the conceptual phases of our discussion, with the manifest divergence of opinions, may appear superfluous and confusing. To others, the empirical phases of our studies may seem additions of uncertain importance to the conceptual discussion that can formulate the issues so much more sharply and clearly than they can be measured in quantitative terms. To us, both phases seem indispensable in the development of the study of national income and wealth to a level where it will yield efficient tools for economic analysis and social planning.

With one exception, the papers in this volume were submitted to and discussed at the fourth meeting of the Conference on Research in National Income and Wealth held in April 1939 at New York City. The report by Miss Baird and Miss Fine was submitted later but was circulated for comment among the participants in the Conference prior to publication. The editing of
the volume, by Milton Friedman, was reviewed by the other two members of the editorial committee, W. W. Hewett and O. C. Stine.

Executive Committee

M. A. COPELAND       HAROLD GROVES
W. L. CRUM           R. R. NATHAN
HILDEGARDE KNEELAND  O. C. STINE
SIMON KUZNETS. Chairman
MILTON FRIEDMAN. Secretary
CONTENTS

Part One

AMERICAN STUDIES OF
THE DISTRIBUTION OF WEALTH AND INCOME
BY SIZE

C. L. MERWIN, JR.

I American Studies of the Distribution of Wealth 4
1 Historical and methodological review 4
2 Purpose of the studies 21
3 Statistical adequacy of the studies 24
4 Recapitulation of wealth distribution studies 29

II American Studies of the Distribution of Income 30
1 History and methods 30
2 Purposes of studies 54
3 Statistical evaluation 60
4 Recapitulation of income distribution studies 72

III Conclusion 73
Bibliography 77
Discussion 85

Part Two

INCOME CAPITALIZATION
AS A METHOD OF ESTIMATING THE
DISTRIBUTION OF WEALTH
BY SIZE GROUPS

CHARLES STEWART

I The Alternative Methods 99
1 The estate-multiplier method 99
2 Distribution of probated estates 101
3 Direct census of wealth 101
II Refinement of the Income-Capitalization Method

1 Contributions of Ingalls and King
2 Typical problems of the capitalization approach
3 Distribution of income-yielding property
4 Lehmann's correlation of dividend income and net estates

III Annual Estimates of the Distribution of Wealth in the United States, for the Higher Brackets, 1922-1936

1 Description of the method
2 Some difficulties of the method
3 Estimates of wealth, 1922-1936
4 Comparison of the estimates

IV A Concluding Statement

Discussion
1 Milton Friedman
2 Difficulties inherent in the method
3 Inclusion of "capital gains" in income reported on income tax returns
4 Conclusions

II W. L. Grum

III Fritz Lehmann

IV Charles Stewart

Part Three

THE USE OF INCOME TAX DATA
IN THE NATIONAL RESOURCES COMMITTEE
ESTIMATE OF THE DISTRIBUTION OF INCOME BY SIZE

END BARD AND SELMA FINE

I Statement of the Problem
II Purpose of this Paper
III Essential Differences between Consumer Purchases Data and Income Tax Data
1 The year covered
2 The definition of net income
3 The reporting units for which data were compiled
IV Available Tabulations of the Income Tax Data
CONTENTS

V Steps Involved in Combining and Adjusting the Income Tax Data
1 Sequence of various adjustments 168
2 Combining returns for family units 169
3 Dividing community property returns 169
4 Pairing incomes of husbands and wives making separate returns 167
5 Adjusting for capital gains, various types of deduction, and tax-exempt interest 173
6 Adjusting to 1935-36 basis 180
7 Adjusting for nonreporting and understatement of incomes 183
8 Adding income of supplementary earners 187
9 Adding imputed value of non-money income 189
VI Correction of Preliminary Income Distribution based on Consumer Purchases Data 190
VII Summary of Results of Various Adjustments 192
1 Changes in aggregate income 192
2 Changes in frequency distribution 197
3 Suggestions for improved results 197
Discussion
1 A. J. Goldenthal 204
2 Combining returns of husbands and wives 204
3 Adjustments for differences in income concepts 209
4 Nonreporting and understatement of incomes 212

Part Four

THE VOLUME AND COMPONENTS OF SAVING IN THE UNITED STATES 1933-1937

R. W. GOLDSMITH
WITH THE ASSISTANCE OF
WALTER SALANT

1 Definitions 220
II Four Methods of Measuring Saving 220
1 Balance sheet and income account methods 221
2 Sample and overall methods 222
3 Comparability of methods 223
Appendix: Statistical Sources and Methods
1 Change in Currency and Deposits in Banks and Postal Savings System held by Individuals
2 Individuals' Equity in Building and Loan Associations
3 Individuals' Equity in Insurance and Pension Reserves
1 Legal reserve life insurance companies
2 Fraternal orders
3 U.S. Government life insurance fund
4 Social Security funds and accounts
5 Other treasury funds
6 Adjusted service certificate fund
7 State and municipal trust funds
IV Change in Individuals' Equity in Security Holdings
1 Computation of net change in securities outstanding
2 Cash sales of new domestic corporate and foreign securities
3 Cash retirements of domestic corporate and of foreign securities
4 Computation of change in holdings of domestic non-individuals
CONTENTS

5 Computation of change in domestic individuals' borrowings on securities 271
4 V Change in Individuals' Equity in Nonfarm Dwellings 273
5 Computation of net construction of one to four family nonfarm dwellings 274
4 VI Change in Individuals' Equity in Automobiles 277
4 VII Change in Individuals' Equity in Durable Consumers' Goods other than Houses and Automobiles 278
4 VIII Business Saving of Farmers 279
4 IX Corporate Saving 281
4 X Saving of State and Local Governments 285
4 XI Saving of the Federal Government 290

Discussion
1 Gerhard Colm 294
2 M. A. Copeland 295
3 E. L. Dulles 300
4 IV A. G. Hart 301
5 Walter Salant 305
1 The distinction between investment and consumption expenditure 305
2 The data relevant to the analysis of income 309
4 VI R. W. Goldsmith and Walter Salant 311

Part Five

THREE ESTIMATES OF
THE VALUE OF THE NATION'S OUTPUT
OF COMMODITIES AND SERVICES
A COMPARISON
CLARK WARBURTON

1 Scope, Objectives, Categories, and Time Coverage 320
2 Scope and objectives of the three investigations 320
3 Categories 321
4 Time coverage 323
5 Category adjustments necessary for comparison 323
6 Scope and focus of comparisons made in this paper 323

II Comparisons of the Three Sets of Estimates 324
1 Totals for consumers' outlay and for gross and net capital formation 325
CONTENTS

2 Consumers' outlay for perishable commodities, semi-durable and durable commodities, and services 327
3 Consumers' outlay for various types of commodities and services 329
4 Gross and net capital formation 331
III Conclusion 337

Discussion
I A. G. Hart 381
II Simon Kuznets 381
   1 Comparison of national income estimates 382
   2 Comparison of estimates of services not embodied in new commodities 386
   3 Comparison of other components 388
   4 General observations 389
III M. A. Copeland 390
IV Clark Warburton 391

Part Six

SOME PROBLEMS INVOLVED IN ALLOCATING INCOMES BY STATES

R. R. NATHAN

I Purposes of State Income Estimates 402
   1 Market analysis 402
   2 Economic welfare 405
   3 Taxation 406
   4 Productivity 407
II Concepts of Income 407
III Allocation of Net Value of Product 408
IV Methods of Measurement 409
   1 Wages and salaries 414
   2 Entrepreneurial income 414
   3 Dividends and interest 416
   4 Other items 418
V Inclusions and Exclusions 422
VI Interpretation of State Income Estimates 427

Discussion
I Simon Kuznets 439
CONTENTS

Part Seven

INCOME AND THE MEASUREMENT OF
THE RELATIVE CAPACITIES OF THE STATES

P. H. WULFIER

Text 437

Discussion
I Gerhard Cohn 450
II E. L. Dullas 453
III H. M. Groves 454
IV Gordon Keith 455
V J. L. Martin 456
VI Hans Neisser 461
VII Milton Friedman 463
VIII P. H. Wullfer 467

Indexes 471