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The National Bureau's First Quarter-Century

N. I. Stone, one of our original directors, now Chairman of the Board, tells the story of the National Bureau's founding in 1920 "to encourage, in the broadest and most liberal manner, investigation, research, and discovery, and the application of knowledge to the well-being of mankind; and in particular to conduct, or assist in the making of, exact and impartial investigations in the field of economic, social, and industrial science." Our silver anniversary is an occasion for thanking others, examining ourselves, and planning for the years to come.

I OUR DEBT TO OTHERS

This venture by a few men of affairs and economists at the end of the first World War would have accomplished little had not their aims met a growing need of the times, and been warmly supported by many farsighted Americans who, though busy with their own interests, devoted time and thought to public welfare. The list of these benefactors and active collaborators is long and varied. It includes philanthropic foundations, universities, libraries, business enterprises, labor unions, governmental agencies, and hundreds of individuals from different walks in life.

Those who assisted the launching of our experiment were prompted by public spirit. They could expect no personal advantage, for the National Bureau began its researches with a study of national income, in which all citizens have a common interest. It published its findings for the benefit of contributors and non-contributors alike. It expressed no moral judgments such as might give comfort to special groups, and it offered no practical advice on how to deal with current issues. Its function was solely to ascertain the ever changing state of affairs as precisely as possible, and put its findings at the disposal of anyone and everyone who cared to use them. Only those who believed that "the truth shall make you free" had reason to lend a hand.

Each of our original sponsors assumed a considerable risk.

Whatever his personal views on social affairs, everyone who shared in the venture was supporting an organization directed by men some of whom had opinions sharply opposed to his own. From the start the National Bureau tried to include in its Board leading representatives of diverse interests and ideologies. Socialists and conservatives, employers and trade unionists, practical men and economic theorists contributed to shaping our policy. Every Director was chosen in the belief that he possessed a judicial temperament, but no one knew whether such a group could work harmoniously, however good their intentions. Nor was there assurance that the newly formed staff would prove efficient, or that anyone could make estimates of national income and its distribution by methods that would command confidence.

The continuation and increase of the support accorded the National Bureau in later years from many sources and in many forms must mean that these early doubts have been resolved. Further, it means that the need for knowledge of the kind we try to win has grown more pressing and become more widely appreciated. Twenty-five years has been long enough to let our friends discover the limitations of what we can accomplish and its heavy cost. Our findings are merely approximations, and often we have to warn readers that the margins of uncertainty surrounding them are wide. Many of our books are bulky; most of them are crammed with statistics and charts. They are technical, and their style is more remarkable for striving after accuracy than for grace. To value such 'literature', readers must have keen interest in a problem and uncommon power to assimilate facts. These formidable tomes cost much more to produce than the popular books skilled writers can turn out single-handed in a quarter or a tenth of the time. Only a strong and high minded motive can keep so many people contributing money and effort to a program so undramatic, so severe in its methods, and so general in the distribution of whatever benefits it bestows. To all contributors, past and present, our gratitude goes out—the more so because they have made us feel ourselves co-workers in a cause that is theirs as much as ours. Many besides the National Bureau's directors and staff have come to believe in the need for and the possibility of ascertaining how our economic organization works.

II OUR RESEARCHES IN RETROSPECT

CURRENT ISSUES AND BASIC PROBLEMS

Living up to the opportunities generously afforded us has been difficult, and like most mortals who look backward from time to time seeking guidance for the future, we find instructive blunders in our past. Economic research, like scientific experimentation, proceeds by trial and error. Much as the invention of new instruments aids the advance of the experimental sciences, the compiling of more and better statistical records helps us; improvements in concepts and tools of analysis play a similar role in both lines of endeavor. Because of this technical progress in the means of research, scientific results are continually being revised. That process is even more striking in the social than in the natural sciences, because social phenomena change more rapidly than do those with which physics, chemistry, and biology deal. A considerable part of our energy has gone into re-doing things we had done before, and doing them better.

Revisions have not embarrassed us when the earlier results had been published, because our audience is composed mainly of men acquainted with research, aware that conclusions are tentative, and eager to see them revised. However, when we have become dissatisfied with results before they were made public, and decided we must start afresh, we have been embarrassed by the inordinately long time before we had anything to show for our pains. Often we have wondered why we did not see in advance what we found out after long labor. Such experiences are mortifying, and we have learned to take more time than we did at first in planning researches before we start active work. But no precautions are a guarantee against committing costly mistakes. We do not count it among our blunders that we have expended most of our effort upon relatively few subjects, persistently re-working old and gathering new data, until we reached the best results of which we were capable at the time.

That practice is not feasible in dealing with 'questions of the day' which lose their urgent interest on the morrow. But persistent effort in the same direction is highly desirable when dealing with basic problems of economic behavior that change only with the gradual evolution of culture. The National Bureau has concentrated its attention chiefly upon problems of the latter

type. Yet on occasion, especially in our early years, we have complied with requests to investigate current topics that bore immediately upon social welfare. When so doing, we submitted perforce to the conditions such work imposes, raking together the readily available material, analyzing it as best we could in the time allowed, and producing a report on the 'dead line'.

Our first job of this sort was done for a committee of President Harding's Conference on Unemployment held in the midst of the severe depression of 1921. Four members of our staff, with the collaboration of sixteen individuals or agencies, put together in short order a useful book, *Business Cycles and Unemployment*, published in the spring of 1923. That spring also, Willford I. King reported the outcome of a sample field survey—*Employment, Hours, and Earnings in Prosperity and Depression, United States, 1920-22*. Later, the same committee under the chairmanship of Herbert Hoover, then Secretary of Commerce, requested us to take charge of a more elaborate survey. Five members of our staff and twelve collaborators, with the aid of many public and private agencies, produced between January 1928 and February 1929 the two volumes on *Recent Economic Changes in the United States*. Leo Wolman's *Planning and Control of Public Works* (1930) grew out of this survey for Mr. Hoover's Committee, while Arthur D. Gayer's *Public Works in Prosperity and Depression* (1935) was prepared for the National Planning Board headed by Frederick A. Delano. King's slender volume on *Trends in Philanthropy* (1928) was written at the request of the Carnegie Corporation; Williams and Croxton's *Corporation Contributions to Organized Community Welfare Services* (1930), at the request of the Association of Community Chests and Councils; Pierce Williams' *The Purchase of Medical Care through Fixed Periodic Payment* (1932), at the request of the Committee on the Costs of Medical Care, presided over by Ray Lyman Wilbur, then a member of the Cabinet.

Of course it is most desirable that current social problems should be examined thoughtfully. Action based on such knowledge of the facts as competent investigators can gather quickly is likely to be wiser than action based upon 'hunches'. The desire of public officials and private philanthropists to get at the facts and their increasingly frequent requests for the aid of indepen-

dent research agencies augur well for the future. The National Bureau feels honored by the calls that have been made for its services, and likes to believe that what it did proved useful. But our experience with *ad hoc* investigations confirms the opinion that they contribute less in the long run to the knowledge men need, and less to the practical treatment of social ills, than systematic studies of broader and more fundamental character. Dealing with questions that are uppermost in men's minds at the moment is always exciting; it attracts public attention; the conclusions can be acted on promptly; the men so engaged feel they have a share in determining policy. No wonder numerous agencies prefer to concern themselves with such issues. We rejoice that they have grown in number and technical competence during our lifetime. In short, the reasons that prompted the National Bureau to undertake tasks of this character have become weaker, and we have devoted our resources more exclusively to systematic research.

The gravest limitation of piecemeal investigations is that their results do not cumulate so surely or so effectively as the results of a program in which the problems suggested by one investigation become the subjects of later studies. Dealing energetically with one practical question for a year does not necessarily make an investigator better qualified to deal next year with a different question. Economic problems of the day arise from difficulties experienced in the functioning of an economic organization in which all the innumerable parts are interdependent. That these parts are genuinely interdependent is a proposition everyone accepts; but two corollaries are often overlooked: first, no economic problem can be adequately treated by itself; second, anything learned about the basic features of economic organization applies to a host of practical problems. The first corollary most emphatically does not mean that *ad hoc* studies are futile; for inadequate analysis is often better than no analysis. The second corollary does mean that growth in ability to deal with economic problems at large depends upon learning more about the economic system as a whole. In the long run, systematic research into fundamentals has greater practical value than piecemeal research.

OUR FIRST PROJECT

In 1920, our Board of Directors had the wisdom to select as the National Bureau's initial project one that envisages an aspect of the whole economy. National income embraces the output of all commodities and services that can be thought of without overstraining conventions as passing through the market, with due allowance for the fact that a portion of this output merely offsets the wearing out of certain durable possessions.

Of course, the summary has the confusions characteristic of the practices it covers. For example, the services of housewives to their own families are not included in national income, because they are not thought of as performed for gain and are not bought on the market. Commodities consumed by their producers are included if they are of sorts on which a commercial price is set, not otherwise. Of consumers' possessions depreciation is allowed only on dwellings, though clothing, furniture, and automobiles depreciate faster. Depletion of mineral deposits is admitted, but not depletion of soils, for mining companies generally do and farmers generally do not recognize this item in their accounts. Socially condemned products are excluded, however highly organized and commercialized the traffic in them.

A logician can criticize these procedures as inconsistent, a humorist can derive amusing paradoxes from them; a moralist can wax indignant over the acceptance of conventions that embody a commercial scheme of values. Even the estimators of national income are sufficiently perturbed by the superficiality of commercial values to present two sets of figures, one in current and one in constant prices, though the latter estimates do no more than accept as standard the market's valuations in some selected period. At bottom, the critics are dealing with inconsistencies, foibles, and superficialities in our scheme of institutions, which are rather cruelly exposed when one sums up in definite figures society's own records of its economic valuations.

The philosophically minded should approve of national income estimates precisely because they reveal limitations in our customary calculus.¹ From the practical viewpoint, acceptance of the social scheme of values makes it possible to use existing data with a minimum of revision, and also makes the results immediately applicable to many issues, as they are commonly conceived. Estimators who set up their own notions about what con-

stitutes genuine national income would have to solve ethical problems that had been the subject of age-long dispute before they began work; as they proceeded, they would have to pull many figures out of their inner consciousness, because society does not keep its books in their terms; they would end with results damned by many and useful to few.

What is more germane at the moment, a summary of current practices provides the best basis for organizing a systematic program of research into what actually happens in our world as it is. In striving to improve the lot of mankind and mankind itself, reformers often begin by picturing an ideal state as the goal of effort. Needless to say, ideals differ. But whatever ideals men cherish, their efforts at improvement must start from the present imperfect state, and must use such means as it affords. Knowledge of this present state, with its mixture of interests and ideals, is a prerequisite for formulating any effective plan for change. It is such knowledge, derived from careful observation and thoughtful analysis of experience, that the National Bureau has tried to extend. The realistic summary of what goes on in the American economy afforded by estimates of national income in terms of prevailing practices was a fortunate beginning, because it provided a framework within which economic factors could be seen in their organic relations to one another.

DEVELOPMENT AND PRESENT STATUS OF OUR WORK ON NATIONAL INCOME

How closely the National Bureau would hew to the line suggested by its first venture we foresaw but dimly in 1920. The first follow-up task was to determine the geographical distribution of income—information desired especially by men interested in marketing and in taxation. It was performed by Oswald W. Knauth in 1922, and somewhat more elaborately by Maurice Leven in 1925.² We were eager also to improve upon our original

¹ Simon Kuznets dealt faithfully with this aspect of our estimates in the first chapter of his *National Income and Its Composition, 1919-1938* (National Bureau, 1941). Since that book was published, the great shift in the scale of values brought by the war, and efforts to compare per capita income in different nations have emphasized the dependence of national income totals upon institutional factors.

² *Distribution of Income by States in 1919, and Income in the Various States: Its Sources and Distribution, 1919, 1920, and 1921.*

set of national totals and to extend them over later years. In 1920 data on income from merchandising and rendering services not embodied in commodities were especially deficient; moreover, we had to include a deplorably large miscellaneous group about which we could learn little. By 1930 new materials enabled Willford King to improve markedly upon the estimates he had made in 1921 and 1922. His *National Income and Its Purchasing Power* (1930) broadened the analysis and brought the figures down to 1928. Later still, Simon Kuznets incorporated materials not available to King, covered another decade, and further enriched the analysis in his *National Income and Its Composition, 1919-1938*. Comparison of that treatise with our first two volumes will show how much we had learned by twenty years of persistent effort. Estimates of national income in simplified form have been carried back to 1869, largely on the basis of William A. Shaw's detailed work on the flow of finished commodities and construction materials, while Harold Barger has put some of the annual figures on a quarterly basis in his *Outlay and Income in the United States, 1921-1938*, published in 1942.

Much to our satisfaction, the usefulness of national income estimates was recognized by the Congress. In 1932 the Senate adopted a resolution instructing the Department of Commerce to prepare a report on the subject. The Department borrowed the services of Mr. Kuznets to supervise the work and early in 1934 submitted its report, *National Income, 1929-32*, published as a Senate document with warm acknowledgments to the National Bureau. What pleased us even more, the Department made the preparation of future estimates a part of its routine, so that we were relieved of a laborious task. When the country entered this war, estimates of national income covering twenty years and classified in several ways were available. Only those who had a personal share in the economic mobilization for the first World War can realize in how many ways and how much these basic figures facilitated mobilization for waging war across two oceans.

To make work in this field more effective, we sponsored, at the suggestion of the Universities-National Bureau Committee, a Conference on Research in Income and Wealth, which met in January 1936, organized as a permanent body, and chose Mr. Kuznets as its first chairman. By bringing together in an operating unit the leading students of income in the United States

and Canada, the Income Conference has been largely responsible for the rapid progress achieved in the field. The five volumes of its *Studies*³ constitute a technical series of the highest interest to specialists, contributing notably toward clarifying concepts, improving methods of using data, and making important new materials available.

The Conference has given especial attention to one aspect of the subject with which we dealt as best we could in 1920-22, but that still remains in most unsatisfactory shape—the ‘distribution of income by size’. We need to know how many individuals or families have incomes of different sizes from the lowest to the highest ‘brackets’ in a given year and in successive years. In our second volume, Frederick R. Macaulay used the scattered data then available to make size distributions for the six years 1914-19. His ingenious methods and their results were suggestive, but no one realized the uncertainties surrounding his tables and charts better than their author. A few attempts have been made to improve upon Macaulay’s work, but even the latest, derived mainly from a survey of family incomes in 1935-36, is for a single year and rests upon an inadequate sample. The Income Conference has sought to procure more representative data, especially by stimulating states that tax very low incomes, or all incomes however small, to tabulate and analyze their returns. The lowering of exemption limits upon the federal tax promises similar materials that should be exploited in due time. Last autumn, President Roosevelt issued a ‘directive’ calling for a fresh study of the distribution of income by size. It is obvious that the National Bureau and its offspring, the Income Conference, have a keen interest in this undertaking, toward which the Bureau of the Budget and the Departments of Agriculture, Commerce, Labor, and the Treasury will contribute. By request, we have appointed a technical consultant, Milton Friedman, to share in planning the field work and subsequent analysis. By constructive criticism, an independent agency of recognized competence may aid in developing annual estimates of distribution by size that should become one of the annual statistical compilations of the federal government.

Another matter of keen interest to us, and happily to the statis-

³ Not counting Harold Barger’s book mentioned above, which was published in this series, another monograph in press, and three more in preparation.

tical services of other countries, is the effort to achieve closer comparability among the income estimates of leading nations. Since each estimate must be based upon the records kept in the country concerned, and therefore bears the impress of its institutions, strict uniformity of methods is hardly attainable. But by close cooperation among the estimators, the figures can be made more comparable, and whatever non-comparable elements remain can be pointed out, so that careful users will not be misled.

The National Bureau's hope is that the routine work of preparing current estimates of national income classified by industrial source, by type and size of income, by type of final product, and by geographical area, will be performed by governmental agencies here and abroad, on the basis of unexceptionable data and clearly formulated concepts. The last phrase is not used lightly. The war has brought into the open the high debates over concepts that used to go on within the Income Conference. Outsiders then smiled at the importance the experts attached to subtle distinctions, and the vigor with which they strove to demonstrate one another's errors. It seemed much ado over little. Nowadays, outsiders scowl at the subtle and involved discussions they must wade through to find out why authorities produce estimates that differ by tens of billions of dollars. Granted that concepts control estimates, and that different purposes demand different concepts, experts have still not done their full duty until they have explained what their figures mean in terms a plain man can understand if he tries. Now that so many plans for the future are predicated upon a national income of unprecedented peacetime magnitude, income estimators should more than ever seek to make their results intelligible. The National Bureau is one of the agencies on which this moral responsibility rests—a responsibility we have not adequately discharged.

NATIONAL INCOME AS AN INCITEMENT TO AND A FRAMEWORK FOR OTHER STUDIES

We might have developed a systematic program by following any of several classifications used in estimating national income. Classification by industrial source would have led us to study farming, mining, professional services, etc. including government, which is treated here as an industry. Classification by type of income would have led us to study wages, interest, rent, and

profits, or rather, the mixed forms these theoretical categories take on in practice. Classification by type of final product would have led us to study different kinds of consumer and producer goods, whether commodities or services, and the uses to which they are put, notably the upkeep and increase of 'capital goods'. We might have turned back to the 'factors of production', inquiring into the roles played by labor, natural resources, 'capital', and business organization in producing national income, concentrating upon the 'productivity' that can be imputed to each. Or we might have examined the changes national income and its components undergo from year to year, using the categories of time-series analysis—secular trends, long waves, structural changes, seasonal variations, business cycles, and random movements. Or we might have dealt successively with different types of activity—producing, pricing, marketing, financing, and the services of government.

In some degree, we have followed all these leads; yet in no instance have we confined our researches within the limits suggested by a single approach. The interrelations among economic activities are so vital that strict monographic treatment is relatively sterile. How can one treat production realistically apart from prices, or either without reference to natural resources and the productivity of labor, or the latter without attending to industrial equipment and business organization, or enterprise without reference to taxation and governmental policies, or changes in economic activity without reference to interrelations among the factors that change? In economic theorizing it is possible to impound awkward complications in a *ceteris paribus* clause, then proceed serenely with a qualitative argument about what happens under the simplified conditions created in imagination. But investigators who observe the course of affairs in the actual world and try to account for what happens can never assume that other things remain the same. No factor of moment behaves in that obliging way, and realists must face facts. Hence we have not been able to build neat logical walls around our several investigations, cutting each off from others.

This inescapable feature of an effort to understand the complex world in which we live presents complications; but we think it can be made, and in our practice has been made, a source of strength. For it means that every investigation focused

primarily upon some specific theme can avail itself of the fruits of preceding research, and in its turn contributes toward subsequent research. A program that follows faithfully problems as they unfold from one another becomes self-reinforcing; it gains momentum and richness as it proceeds. That has been the story of achievement in the natural sciences, where theorizing is tested and stimulated by experiment. Our experience confirms the belief that it can be the story in a social science, if theorizing is tested and stimulated by analysis of observations. How the process works with us can be shown by reviewing the gradual development of our program from its original focus.

CAPITAL FORMATION AND CONSUMPTION

In 1932-33 a committee of the Social Science Research Council under the chairmanship of David Friday planned a study of the growth of capital—a matter about which little definite was known. The committee thought first of capital funds, considering the processes by which individuals and business enterprises convert part of their dollar receipts into forms that promise future income. Several members of the committee were familiar with financial operations. They doubted that work along this line could reach satisfactory results, and recommended trying the more tangible approach through capital goods. The chairman, with characteristic insight, grasped the relation between this approach to the study of capital formation and our work on national income. So the committee requested Mr. Kuznets to investigate the production and disposition of durable commodities, especially of those used to make other goods.

Such was the origin of the National Bureau's studies of the formation and consumption of capital, out of which came in 1937 Kuznets' *National Income and Capital Formation, 1919-1935*, and in 1938 his *Commodity Flow and Capital Formation*, as well as Solomon Fabricant's companion piece, *Capital Consumption and Adjustment*. These pioneering ventures covered a wide range, for to find out what place the production of capital goods occupies in the American economy Kuznets had to examine the output of all types of goods, including those not embodied in commodities, and to learn what uses they were put to by final purchasers. As this inquiry grew out of our earlier work on national income, so it grew back into that work in its later

forms, supplying the highly significant classification of national income by type of final product.

TYPES OF INCOME

The classification by type of income in Kuznets' latest revision indicates that in the two decades 1919-38 'employee compensation' constituted 64 per cent of the national total. In private corporations it averaged 84 per cent, but in farming only 16 per cent—a difference that illustrates the influence of institutional arrangements on the distribution of income. 'Entrepreneurial withdrawals'—funds taken by men in business on their own account from current receipts to defray living expenses—is the second largest income stream, averaging 17 per cent of the total. Like wages, it must be regarded as payment mainly for labor. Dividends, interest, rent, and net savings of business enterprises together make up the remaining 20 per cent of the total, and must be regarded as mainly income from property. In other words, the most prosperous of nations still lives chiefly by the sweat of its brow, and only in minor degree on income from accumulated wealth. But the largest item in accumulated wealth does not appear in our summary as a source of private income separable from its users—knowledge inherited from ancestors and learned anew by each generation at far less than its original cost of acquisition.

These findings increased our desire to examine in detail the leading types of income and the factors influencing them. One type—business profits—is conspicuous by its absence from Kuznets' classification, which is concerned solely with income distributed to individuals or retained by business enterprises as net savings.⁴ A well authenticated sample showing the profits of nearly 4,600 identical corporations for 10 consecutive years enabled Ralph C. Epstein to write *Industrial Profits in the United States* (1934). It was followed the next year by W. A. Paton's *Corporate Profits as Shown by Audit Reports*, which was based upon materials supplied by the American Institute of Accountants.

Frederick R. Macaulay's highly original *Some Theoretical Problems suggested by the Movements of Interest Rates, Bond*

⁴ But estimates of business profits can be derived from *National Income and Its Composition* by adding undistributed net profits or losses and dividends.

Yields, and Stock Prices in the United States since 1856, the outcome of long labor and acute analysis, finally appeared in 1938. It is a book destined to be rediscovered time and again as economists come to appreciate Macaulay's piercing insight, and the significance the problems he formulates have for future research. About rents something is said by David L. Wickens in *Residential Real Estate* (1941); but that is merely one of the items covered by this extraordinary survey of a continental area, of which most people know only the corner they live in. One of the least known parts of the income field has been *Income from Professional Practice*. The book of that title, by Milton Friedman and Simon Kuznets, presents the most systematic information so far available on the earnings of physicians, dentists, lawyers, certified accountants, and consulting engineers. The Department of Commerce supplied most of the basic data and is now publishing current figures covering more professions.

To the largest of the income streams, wages, we have given most attention, but our studies have been bound up with other interests of wage earners, employers, and consumers. In the days when immigration was much in men's minds as a factor in the supply of labor, Harry Jerome wrote *Migration and Business Cycles* (1926). Three years later we published the valuable statistics on *International Migrations* compiled by Imre Ferenczi, then of the International Labor Office, and in 1931 a companion volume of *Interpretations*, edited and largely written by Walter F. Willcox. When public interest turned to 'technological unemployment', Jerome undertook case studies of the direct and indirect effects produced by a series of notable inventions. His *Mechanization of Industry* (1934) is a model of method and a warning against resting content with the startling conclusions so often drawn when the Industrial Revolution makes one of its seemingly sudden lunges. Leo Wolman traced the changing scope of organization among wage earners in *The Growth of American Trade Unions, 1880-1923* (1924), *Ebb and Flow in Trade Unionism* (1936), and a *Bulletin* on Union Membership in Great Britain and the United States, to which he is adding an *Occasional Paper* on Union Membership in Wartime. Most of his effort, however, has gone into collecting and analyzing the vast body of data to be used in his forthcoming history of wage rates since the Civil War and their relations to changes in business conditions,

which we expect to be one of the National Bureau's major contributions.

PRODUCTIVITY

One aspect of these income studies has broadened into a quasi-independent project. In a system of free enterprise the earnings of any factor in production, whether classified as labor, natural resources, capital, or business organization, is limited by its 'productivity', which in our usage means the contribution it is credited with making toward the final product as valued by the market. Grants by the Maurice and Laura Falk Foundation enabled us to investigate this significant phase of the nation's economy. Starting in 1940 with Solomon Fabricant's *The Output of Manufacturing Industries, 1899-1937*, we have so far published in this series his *Employment in Manufacturing, 1899-1939: An Analysis of its Relation to the Volume of Production* (1942), Barger and Landsberg's *American Agriculture, 1899-1939: A Study of Output, Employment and Productivity* (1942), and Barger and Schurr's similar analysis of *The Mining Industries, 1899-1939* (1944). Studies of transportation, gas, electricity, and of the little known service industries are in preparation. We hope finally to prepare a summary in which the relations between what a man produces for others and what he gets for himself will be traced through all the industries we are covering in monographs.

The dependence of the relatively high standard of living attained by American families upon the relatively high level of productivity of American workers is self-evident and widely recognized. But we often have difficulty in seeing the connection between what we get personally from others and what we do for them. This is one of the points at which the veil of money obstructs, and self-interest warps, our view of facts that become clear when presented in the broad and impersonal perspective of the economy as a whole. National income could not have risen as it has, on a per capita basis and apart from changes in prices, unless the goods turned out annually had increased despite the general reduction in working hours; for larger income in constant prices means greater output. Just as obviously, the one way toward higher standards of living is to raise productivity. Only by comparison with our own past or with the present level

of other nations can our current standard of living be called high. Judged by what this very standard makes us think desirable and attainable, we still have far to go, and the plainer the path of progress can be made, the better. The detailed demonstration of the connection between the productivity of the resources employed in many business enterprises and the incomes received by their workers, managers, and owners should contribute toward wiser policies on the part of all groups of producers.

PRICES

In estimating national income, prices are both an indispensable means and an obstacle. They are means in that money prices provide the only common denominator in which one can express and combine the widely different commodities and services that constitute national income. They are an obstacle in that estimators are painfully conscious of the degree to which price changes affect their totals for different years, at times giving misleading impressions of improvement or deterioration in the nation's fortunes. It is to minimize this danger that we have made a practice of presenting two statements of national income each year, one in current prices and one in prices that prevailed during some base period. Thus our first venture compelled us to study intensively the price system and the changes it is continually undergoing, but only with reference to their bearing upon estimates of national income after it has been produced.

That could be no more than the beginning of our concern with prices, for, like other students of economic affairs, we realized that prices are intimately bound up with the processes whose output we had measured. The relations among the prices of different goods determine what commodities and services will be profitable and what unprofitable to produce at a given time; changes in these relations have a potent influence upon aggregate production in successive years. To understand the results of our first investigation, we had to treat prices not merely as measures of values produced but also as determinants of production.

Toward that end, we induced Frederick C. Mills to join our staff in 1925. The first fruit of his labors was *The Behavior of Prices* (1927)—a book later selected by a committee of the Social Science Research Council as a model of economic research meriting close critical study by men intent upon raising the social dis-

ciplines to a higher scientific level. Mills then went on to consider the role that prices, in conjunction with other factors, play in the economy as a whole. From this effort came in 1932 his *Economic Tendencies in the United States*, and in 1936 his *Prices in Recession and Recovery*.

As in the case of national income, our work on prices interested many investigators who presently formed the Conference on Price Research, a continuing organization of specialists, of which Mills was the first chairman. For it, we have published three volumes dealing with the structure and functioning of prices in the bituminous coal mining, petroleum, steel, and textile industries. The second chairman of the Conference, Edward S. Mason, his successor, Clair Wilcox, and several other members were drawn into the war effort in capacities affording admirable opportunities to observe how the current measures of price control operate. When peace returns, we expect that these men and their colleagues will be keener than ever to push further their explorations into the structure of the price system in its relations to production costs, consumers' incomes, and their purchases. Prices were among the earliest economic entities to be studied empirically, but so far the gulf between theories of prices and facts concerning them has not been bridged. The Price Conference promises to be one of the groups that will contribute largely to this construction job.

FINANCIAL OPERATIONS

Financial operations are as omnipresent a feature of all business as prices, even if we restrict the term to such matters as providing venture capital, lending or borrowing in some form, insuring against risks of various sorts, trading securities or real estate, and making payments. In modern economies elaborate organizations of numerous types have grown up around the older banks to render multiform financial services for business enterprises and individuals. These activities are represented in our estimates of national income. But there they cut a minor figure. The banks, which according to Federal Reserve Board estimates, effected payments for their customers averaging \$723 billion annually in 1919-38, are credited by Kuznets with only 1.4 per cent of the national income. Obviously, this small fraction no more reflects the role banking plays in the American econ-

omy than agriculture's share, 9.6 per cent, reflects the importance of an industry without which we would starve. After using prices to estimate national income we wanted to see how they aid in determining that which they help to measure. Similarly, after ascertaining how much of the national income originates in financial operations, we wanted to see how they aid other industries to function.

An invitation that came to us in 1937 helped toward realizing this desire. The Association of Reserve City Bankers requested us to draw up for their consideration a program for research in finance, and provided funds for a survey of studies then being made in various quarters and of further work needed. We appointed a committee under the chairmanship of Winfield W. Riefler which explored the field carefully and submitted a report the insight of which has been attested by subsequent developments. The committee recommended a series of studies; the Association made an experimental grant, soon supplemented by funds from the Rockefeller Foundation, and our Financial Research Program began.

Its first project was a series of *Studies in Consumer Instalment Financing*. An able staff, directed by Ralph A. Young, has produced ten reports on various types or aspects of this rapidly expanding branch of business, and hopes to summarize the findings in an eleventh. These consumer finance studies proved useful to the federal authorities who had the responsibility of mobilizing the country's financial resources for war. Next the Program turned to *Studies in Business Financing* of which eight have appeared. In part they rest upon a unique collection of balance sheets and income statements that help to fill a serious gap in our business cycle data. While the staff was still laboring over the finishing stages of these two series, it prepared a timely set of *Occasional Papers* on financial aspects of the war, then began planning two new ventures—studies of Agricultural and of Urban Real Estate Financing. Only the exploratory phases of these undertakings belong to the history of our first quarter-century; their execution belongs to future years.

In addition, the Financial Research Program took charge of a large cooperative project we believe to be of great value, though circumstances beyond our control have postponed its completion. In 1938 Leo Crowley, then Chairman of the Federal Deposit In-

insurance Corporation, suggested that a thorough study of experience with bonds issued by business corporations would yield information needed by investors, enterprises, and regulatory agencies. The Works Projects Administration provided funds to pay a large staff for compiling pertinent data about every domestic corporate bond issue of appreciable size since 1900, and for tracing its subsequent history in detail. The Office of the Comptroller of the Currency, the Board of Governors of the Federal Reserve System, the Securities and Exchange Commission, Fitch Investors Service, Moody's Investment Service, Poor's Publishing Company, and Standard Statistics Company lent their aid. Under the general direction of William J. Carson, Winfield W. Riefler, and Ralph A. Young, a staff of supervisors was carefully chosen to see that the job was carried on efficiently. The cooperating agencies came into possession of the best collection of data yet assembled concerning the terms on which bonds have been issued by business enterprises, their nominal rates of interest, their actual yields to investors, defaults, refundings, and fluctuations in market prices. These rich materials have been recorded on punch cards, but scarcity of personnel and tabulating machines stopped operations at that point. Those intimately acquainted with the records are sure that, when properly tabulated and analyzed, they will reveal much about the conditions under which this type of financing proves satisfactory to those who provide funds, those who use them, and to that ultimate beneficiary of or sufferer from business arrangements, the public at large.

FISCAL PROBLEMS

Some critics have objected to our inclusion of government among the industrial sources of national income. We take the ground that the services performed by governmental agencies in democratic countries must be recognized as goods wanted by a majority of the people, and wanted enough to keep the majority willing to pay the cost, just as they are willing to pay the costs of medical care and theatres. But government is a very peculiar industry in that it is not run for profit, gives away many of its services, forces others on unwilling recipients, and usually assesses the cost according to ability to pay, not according to benefits received. Moreover, this peculiar industry fixes the rules under which all other industries must play their roles in the na-

tional economy, so that its policies exercise a more pervasive and potent influence upon the nation's fortunes than the policies of any private industry.

Hence we were impelled to delve into the operations of governments, at least with respect to financial matters. In the summer of 1937 the Universities-National Bureau Committee appointed an Exploratory Committee on Research in Fiscal Policy. After surveying the field, this committee recommended that another continuing Conference be set up. Our Directors approved the step, and the new Conference chose W. Leonard Crum as its Chairman.

It initiated an analysis of the differences between the income of enterprises as calculated for business purposes and as defined for taxation. Then it began an examination of the management and financing of the federal debt. Among other items on its docket were the effects of federal taxation upon business management, and what are called the 'income creating' effects of federal financing. But these peacetime plans went agley even before the United States entered the war. No other set of economic specialists was more in demand for public service than those trained in public finance. Several months before the attack on Pearl Harbor, the few Conference members with time at their own disposal threw themselves energetically into canvassing ways and means of providing for the rapidly mounting public expenditures. In September 1942 we published *Fiscal Planning for Total War* by W. Leonard Crum, John H. Fennelly, and Lawrence H. Seltzer, which we have reason to believe was read and used by several of the groups responsible for framing policy on taxes and loans. A notable example of how one sector of our program contributes to others is that *Fiscal Planning for Total War* was organized around an analysis of national income estimates.

While this book was going through the press, the Conference turned its attention to the tax treatment of capital gains and losses, about which controversy was raging in both professional and lay circles. Seltzer, M. Slade Kendrick, and Selma F. Goldsmith assembled and analyzed the factual evidence on which an impartial judgment might be based. Despite the pressure of other duties, they expect to submit their report to the Conference this summer.

Though work on earlier projects has not come quite to a standstill, the Chairman of the Conference hesitates to forecast dates of completion. Meanwhile he has been able to devote nine months to studying the fiscal problems that will confront the country on the return of peace. His interim reports have been circulated among those most familiar with such matters, and seem to have had considerable influence upon the fiscal planning now going forward in many quarters. Out of this work, in which Kendrick has shared of late, may come a manuscript for publication, or plans for further research, or both.

TYPES OF CHANGE IN ECONOMIC ACTIVITIES

All the investigations reviewed above deal with activities in continual flux. Realistic research can make little use of the 'static state'—a concept that has done much to facilitate economic theorizing. But it can make changes themselves the subject of research, and in so doing look at most of its problems from a fresh angle. Time-series analysis has taught us to distinguish among secular trends, long waves, structural changes, cyclical fluctuations, seasonal variations, and random perturbations. If estimates of national income covered long periods and were to be had by months, we might find all these movements in them. As matters stand, readers of *National Income and its Composition* must have been impressed by the close attention paid to secular and cyclical changes. Had we lacked other incentives, the effort to understand our first set of findings would have led us to inquire how and why economic activities fluctuate from month to month, year to year, and decade to decade.

Several volumes mentioned above belong in this field: *Business Cycles and Unemployment*, King's *Employment, Hours, and Earnings*, Jerome's *Migration and Business Cycles*, and sections of *Recent Economic Changes*. For that matter, Mills' studies of prices, Wolman's studies of trade union membership, hours of work, and wages, our statistics of migration and their interpretation, Jerome's *Mechanization in Industry*, Macaulay's studies of interest rates and stock prices, Wolman's and Gayer's reports on public works, Epstein's and Paton's studies of profits, Wickens' volume on real estate, Kuznets' and Fabricant's work on capital formation, all our books on productivity, Haberler's *Consumer Investment Credit and Economic Fluctuations*, the other publi-

cations of the Financial Research Program, also those of the Conferences on Income, Prices, and Fiscal Policy deal in greater or less degree with changes in economic conditions—as indeed must all realistic researches that cover an appreciable period.

While this ever present aspect of economic life is a theme that runs through virtually our entire program, it becomes the focus of interest in several reports already published and of more in preparation. Seasonal variations have been dealt with by many statistical analysts, but usually as a confusing set of movements to be measured, then set aside. In *Seasonal Variations in Industry and Trade* (1933) Kuznets tries to see what can be learned about the temporal relations among the seasonal patterns of production, prices, and sales in selected branches of business. His comparisons reveal the way in which 'coming events cast their shadows before' more definitely than any other study we have published. Secular movements are examined with equal thoroughness by Arthur F. Burns in *Production Trends in the United States since 1870* (1934).

With cyclical movements we are dealing more fully. To construct a working concept of the phenomena we wished to study, collect explanatory hypotheses, canvass the observations available for analysis, and outline a plan for using them, I prepared a preliminary volume, *Business Cycles: The Problem and Its Setting*, which appeared in 1927. Meanwhile, Willard L. Thorp had compiled for our use the *Business Annals* of seventeen countries running back to dates ranging from 1890 to 1790. Having thus mapped our campaign, we set about collecting time series from the United States, Great Britain, France, and Germany, and developing my rather vague plan of analysis into a technique for measuring the cyclical behavior of economic activities. Both tasks grew on our hands and consumed far more time than we had expected. No other undertaking has absorbed so much of our energy and funds, and no other has been so slow in bearing fruit. C. T. Schmidt's *German Business Cycles, 1924-1933* and J. Maurice Clark's *Strategic Factors in Business Cycles*, both published in 1934, made some use of our data and methods. Burns and I contributed a few articles to the National Bureau's *Bulletins* and *Occasional Papers*. But not until late in 1944 was *Measuring Business Cycles*, written mainly by Burns, ready for the press. It makes some substantive contributions to knowledge,

but is concerned primarily with explaining and testing our technical methods.

We have applied these methods to well over a thousand time series, though not all of the analyses have been brought up to date in the form we have come to consider best. We have planned a series of monographs on the cyclical behavior of certain factors and, despite the withdrawal of numerous collaborators into war work, have made considerable progress toward the completion of a few: notably Moses Abramovitz's manuscript on inventories held by manufacturers, Thor Hultgren's on railway transportation, Mills' comparison of prices and production, and Ruth P. Mack's study of the shoe trade—one of the consumer goods industries for which fair data can be had. Also I have made a start toward fitting the diverse measures provided by our analysis into a systematic account of business cycles. But much remains to be done.

THE PROGRAM AS A WHOLE

The preceding review of the National Bureau's researches since 1920 is far from complete. Our *Bulletin*, *Occasional Papers*, *Technical Papers*, and the series called *Our Economy in War* have been mentioned only casually or not at all. Our substantive findings have been barely touched upon, and they are what really count. But to summarize all we have learned about economic organization and its workings would take so much time and skill that the committee on our anniversary has divided the task among several members of the staff. Arthur Burns, Simon Kuznets, Fred Mills, George Stigler, Leo Wolman, Ralph Young (in collaboration with Winfield Riefler) and I, will review the investigations with which each has been most actively concerned.

However, the present sketch brings out the salient features of our program. The National Bureau's aim has been to examine what goes on in the world as it is, focusing attention primarily upon basic and abiding features of economic activity. We have tried to define the objects of research clearly, to observe them accurately, and to draw quantitative as well as qualitative conclusions about them and their relations to other factors.

This aim has imposed heavy reliance upon statistical methods, but we have tried to make our symbols illuminate human activities, and to avoid substituting mathematical for economic prob-

lems. No one who has shared our experience suffers the delusion that use of numerical data borrowed from administrative records lessens 'the intolerable toil of thought'. On the contrary, a user of realistic data finds it even harder to discriminate clearly than does his colleague who sets up artificially simplified situations in his imagination. As in all analytic inquiries explanatory hypotheses have to be framed in the course of such work; and these hypotheses must be susceptible of testing for conformity to fact—an onerous condition. Frequently we too imagine thoroughly artificial problems and work them out deductively; but we do so merely as an incidental step toward understanding actual processes.

Understanding these processes requires more than defining concepts, reasoning about them, and manipulating statistics. The investigator should know a great deal about the activities his figures represent—how they are organized and directed, how they depend upon activities of other sorts, how changes in them react upon the economy. The fuller this background knowledge the better. That is one reason why we have sought the cooperation of so many agencies and individuals, and why we owe so much to their generous help. No lonely thinker who stays in his closet becomes well enough acquainted with the techniques of production, with the purposes for which different goods are used, with the problems of marketing, with the way prices are determined, with financial arrangements and interconnections, and with the incidence of governmental policies upon business operations to make the best use of the data we collect. Since our staff members, though not lonely thinkers, never know enough about such matters, they take counsel with carefully chosen advisors when planning an investigation, at frequent intervals as the work proceeds, and again when they have a draft ready to show others. When the author and his advisors have done their best, the manuscript is examined by three members of the staff who had no hand in it. Aided by their suggestions, the author prepares a revised draft, which is edited and submitted to a reading committee of three Directors, who may recommend further changes, decide against publication by the National Bureau, or authorize publication. This procedure sounds and is elaborate. It takes time, it costs considerable money, it taxes patience severely. New collaborators often become restive under the numerous sug-

gestions and criticisms offered them. But men whose scientific bent is stronger than their conceit soon realize that their insight is clarified by being compelled to look at their problems from many angles, uncomfortable as the experience is.

Our self-imposed rule against expressing opinions on public policy may be thought of as a corollary of our basic rule that the Board of Directors shall include men of differing views on social policy. Some feared that from an organization confining its efforts to the strictly scientific task of investigating what happens would come reports of slight interest and no practical value. Many a book on economics owes its effectiveness largely to trenchant criticism of abuses and moral fervor for reform. That these qualities are not necessarily incompatible with vigorous analysis is demonstrated by the *Wealth of Nations*, Mill's *Principles*, Marx's *Capital*, and Keynes' *General Theory*, not to mention the cloud of lesser witnesses. But the eager souls who think emotional drive and practical recommendations are essential to effectiveness in an economic book forget how the better established sciences have made their great contributions to human life. What these sciences have done is to explain in detail the operation of many processes. When men have learned what consequences must be expected from certain operations, they can choose those leading to consequences they prefer. Scientists who lament that the knowledge they have won is often applied to evil ends are no more effective preachers of righteousness than other men, and, like others, they frequently differ among themselves as to what consequences are good, what bad. Those who are trying to do scientific work in the peculiarly complex field of economics have no more and no less claim to set themselves up as ethical judges than chemists or physiologists. Their special competence is confined to the job of finding out as definitely as possible what happens under specified conditions. So far as they succeed, they enable all citizens, including themselves, to foresee consequences more clearly, and so to act more intelligently.

That the National Bureau's findings have been used by many, we have definite evidence. Presumably every member of the Board and staff, every collaborator, and every contributor would call some of the practical applications misuses; but they would not expect their lists to agree perfectly. Two or three of the out-

standing instances of use by public agencies have been mentioned in passing. Letters assure us that private agencies also have utilized our reports in one way or another—often the reports that seem least interesting to the general reader. A different and not less important type of use is the incorporation of findings we have made and methods we have devised in the rapidly growing literature of economics and statistics. A survey of books and technical journals published in the last two decades leaves no doubt on that score. A few of our reports have come into limited use as textbooks in colleges and graduate schools, while more are found on the reading lists drawn up by teachers and librarians. It may well be that the rule against giving practical advice has done more to enhance than to restrict the practical, scientific, and pedagogical uses of the National Bureau's output.

Early in the National Bureau's career, we found that our investigations were contributing to one another, revealing relations that bound superficially diverse undertakings into an organic whole. More than one of our annual reports have dealt with this aspect of our experience, and certain instances have been mentioned in the preceding pages, but it is so characteristic of the kind of work we do, and promises so much for the future, that an anniversary review should emphasize it, at whatever cost of repetition.

That our program becomes more organic as it develops is not a triumph of artful planning. The unity inheres in the processes we are trying to understand, and forces itself upon the attention of everyone who examines them thoughtfully. Leon Walras invented a device for representing the interdependence among economic phenomena by simultaneous equations, which have been extended to include symbolically most factors in the economic calculus. Alfred Marshall's motto, "the one in the many, the many in the one", is a literary expression of the concept. When realistic inquirers find their investigations contributing to one another they are merely experiencing empirically bits of what Walras, Marshall, and others envisioned.

That we can do more than our predecessors toward turning abstract into concrete symbols, and supplementing qualitative by quantitative determinations, is due to favoring circumstances. Economic records have been vastly extended in range, especially

since the first World War, and substantially improved in quality. In no other country are these basic materials so abundant as in the United States. An equally rapid advance has been made in the technical methods of statistical inference, and in mechanizing computations. The latter achievements are international and Americans can profit by what is done in any country. Administrative needs in both government and business have led to wider and more skillful use of quantitative methods, and diffused an increasingly discriminating appreciation of their value and limitations. It no longer seems chimerical to think that duly qualified workers can gradually extend the process of testing speculative hypotheses to the social sciences, among which economics offers some of the most favorable opportunities. When governments and ably managed corporations find it worth while to employ staffs of economists and statisticians to advise concerning practical problems, philanthropists feel justified in aiding similar efforts in the public interest. The National Bureau is merely one among many beneficiaries of and participants in a broad cultural advance.

III HOPES FOR THE FUTURE

If the National Bureau is to celebrate a fiftieth anniversary in 1970, it must render services in the coming twenty-five years that the community will value. To plan how best to serve, the Board of Directors chose last July a Committee on Future Policy. At more than a dozen long sessions, this Committee discussed with staff members the investigations now in process, desirable extensions, and possible additions to the program. The report prepared in this thoughtful fashion was submitted to the Board of Directors at their annual meeting in February.

This report promises to be a milestone in the history of the National Bureau, but not a turning point. For, after reviewing what has been done in the past, the Committee on Future Policy recommends that we continue to concentrate attention upon basic problems rather than upon questions of the day, to seek understanding of what happens in the actual world, to measure economic factors so far as possible, to test explanatory hypotheses for conformity to fact, to cooperate closely with like-minded individuals and agencies, to publish the evidence on which con-

clusions rest and point out the margins of uncertainty surrounding them, not to give advice on policies or to pass moral judgments—in short, to keep our work and our reports as scientific in method and spirit as we can.

But following these old lines will lead us into new fields. The interdependence among economic activities that has imparted some of its organic unity to our past program implies that our earlier findings will not be fully explained until we have explored the whole economic system. That we cannot hope to do, but we can by degrees fill in some glaring gaps, and count on others being filled by agencies whose aims and methods are similar.

Certainly one need is fuller knowledge of international and 'transnational' (to borrow a word from Riefler) factors that influence the American economy. Already several investigations have taken us outside the country. The Conference on Research in Income and Wealth sharpened its wits by examining the estimates made for foreign countries at different stages of cultural evolution. The business cycle unit has recognized that no one can understand changing conditions in the United States who does not know the course of business elsewhere; its collection of time series covers Great Britain, France, and Germany. Wolman's work on wages, the series of papers on *Our Economy in War*, the Financial Research Program, and the plans of the Conference on Fiscal Research reach into foreign fields. More developments of the sort may be expected, but the Committee on Future Policy doubts that casual and sporadic excursions meet our own scientific needs or fulfill our social obligations. Whether we like it or not, applications of physical science are exposing every nation to new hazards as well as opening fresh opportunities. It is surely the part of wisdom to face these facts frankly and to study their probable consequences. Fortunately for the country, appreciation of the growing reach and strength of the ties that bind nations to one another has spread rapidly. In the realm of research, international projects have become the fashion of the day. No agency should enter the field without surveying what is in progress and in prospect, or without sober questioning of its own facilities. Hence the Committee on Future Policy contented itself with calling attention to the waxing importance of international influences, and recommend-

ing that a special committee consider what the National Bureau can usefully undertake in this direction.

Meanwhile, the Committee for Economic Development has suggested and is helping us to fill, at least partly, a conspicuous domestic gap. While much has been learned in recent years about the flow of goods from producers through distributors to ultimate consumers, very little is known about the counter flow of money beyond the bare fact that payments average some ten times gross national product. A preliminary survey has given grounds for thinking it may be possible to do for the flow of money what Simon Kuznets did six years ago for goods in his *Commodity Flow and Capital Formation*. The lively interest of various governmental and private agencies is assured; Morris A. Copeland, one of the leading students of this puzzling subject, has taken charge, and a recent conference of experts has concluded that his tentative plan of attack is well considered. It may be that this pioneering job will in time yield results comparable with those attained in national income, eventually to get incorporated into the statistical routine of a governmental bureau, and the thinking of all economists.

That a committee composed as the CED is—of business men—should set up a division of research like that directed by Theodore O. Yntema, and call upon the National Bureau to hunt for facts about the mechanism of exchange illustrates the widening demand for our type of inquiry. Here is at least one trend that can be extrapolated over the next decade without grave misgiving. There will be calls for more information on old subjects, information on new subjects, and more trustworthy information all along the line. As figures of the kind we help to provide are put to practical uses, they are subjected to increasingly vigorous criticism. Last year's attacks upon and defenses of national income estimates, the Federal Reserve Board index of industrial production, and the Bureau of Labor Statistics 'cost of living' index are forerunners of coming debates upon the representative value of many series. On us, as on other agencies, this prospect should have a salutary influence. The still small voice of conscience bidding us do our utmost to scrutinize data narrowly, to define concepts meticulously, to test conclusions rigorously, and to state findings intelligibly will be strengthened by searching criticisms, some ill conceived, some

justified. So much the worse for our comfort perhaps, but so much the better for our work!

We like to think of ourselves as helping to lay the foundations of an economics that will consist of statements warranted by evidence a competent reader may judge for himself. But it would be wishful thinking to expect that progress toward that goal will be rapid. Speculative systems can be quickly excogitated precisely because they do not require the economist to collect and analyze masses of data, to test hypotheses for conformity to fact, to discard those which do not fit, to invent new ones and test them until, at long last, he has established a factually valid theory. It is more reasonable to expect that, in the days we look forward to, realistic economics will evolve mainly by the gradual accumulation of detailed findings—a process that has played so prominent a role in the natural sciences. Indeed, the growth may be slower in our field than it was in the earlier days of observational astronomy and experimental physics and chemistry, because economic phenomena change more from century to century. Of course, the growth in detailed knowledge is expedited by speculation, especially by speculation directed toward and tested by records of what actually happens. The forming and testing of hypotheses should not be put off till a mountain range of alleged facts has been piled up. On the contrary, careful analysis should guide fact gathering, and fact gathering should suggest hypotheses to be tried. It has been through ceaseless interactions between these two processes that man has progressed in knowledge of his environment. It is through their interaction that the National Bureau stands the best chance of contributing in coming years to knowledge of economic behavior.

WESLEY C. MITCHELL
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