PART I

The Study of Economic Growth

How to increase production, or to increase production faster, is a question to which radically different solutions are offered.

The differences on what to do arise partly because so little is known of the determinants of economic growth. In part, also, they arise because there are other objectives besides higher output; the objectives are valued differently by different people; and attainment of one objective may be impeded or furthered by the way the others are sought.

Improved knowledge of economic growth would help lessen the first source of difference. It should help lessen also the second. For greater knowledge of economic growth — and of other types of economic change — could serve to clarify and perhaps reshape economic goals, lead to closer agreement on priorities, and open ways to reconcile competing objectives.

Seeking economic knowledge is an uncertain venture, and it is especially risky when the subject is nothing less than the economic growth of nations. But whatever can be done to remove or narrow some of the differences of opinion that separate people in their thinking on this important subject would be useful. The study of economic growth is worth focusing on, in our annual review of the work and plans of the National Bureau.

Because economic life is "all of a piece," study of almost every economic factor, process, or institution contributes — in large or small degree — to understanding of every major problem of economics. When we ask what the National Bureau is doing on the subject of economic growth, the inventory could list a good deal of the Bureau's work. But an exhaustive answer is neither necessary nor desirable. You have in your hands the full set of reports by the staff. I shall point only to highlights.

I

When Malthus first discussed the relation between population and output, a census of

This report was presented at the annual meeting of the Board of Directors of the National Bureau, held in New York City, March 2, 1959. I am indebted to my colleagues for helpful suggestions on Part One, and to Geoffrey H. Moore for taking charge of the preparation of Parts Two and Three.

Britain's population had not yet been taken, and the few contemporary estimates of production were primitive efforts at best. The trends during the preceding century in British national product, national income per capita, or real wages could only be guessed. Economists concerned with the determinants of production could not direct their thinking by reference to known quantitative facts on production.

Progress has been made since Malthus' time. Estimates of national income became more frequent and somewhat more soundly based during the nineteenth century, and the twentieth century has seen accelerated advance in the theory and practical business of measuring production both for the economy at large and for its several parts. The initiation in a few countries during the interwar years of periodic official estimates of industrial production and national income, and their appearance in other parts of the world since, has been one of the major statistical advances of our time.

But the trends of output during Malthus' lifetime — which included the vastly significant Industrial Revolution in Britain — are still subjects of controversy. So are the trends during the first half of the nineteenth century in this country, and the trends in the first half of the twentieth century in many other countries. Even the current course of production cannot be traced so clearly as a world bent on promoting it needs.

The task of clarifying concepts, developing data, and measuring changes in production and related items, continues to be a useful enterprise. That it is being pursued vigorously by many could be heard in the spirited discussions at several of the conferences to which we recently gave a portion of our energies: one devoted to a critique of the income and product accounts of the United States, the proceedings of which were published by the National Bureau last year; another, now in press, on income and investment in the United States and Canada during the nineteenth century; and a third, held only a few months ago, on the measurement of output, input and productivity The scholars, government officials, business economists and others who joined in these discussions are earnest men grappling with the problems of providing quantitative measures that will be helpful in the analysis of significant features of economic life and in the guidance of economic policy.

The construction of useful economic indexes is also a normal part of the research responsibilities we shoulder at the National Bureau, as will be seen in a number of studies soon to be submitted for the approval of the Board of Directors. Readers of these reports will profit from the statistical volume that supplements Simon Kuznets' study of capital, which contains revised estimates of gross and net national product — and their major components — back to 1869; the appendixes to John Kendrick's study of productivity, which present an annotated collection of indexes of output for every division of industry for which an index could be calculated; and the compilation and review of the figures on Soviet industrial output in Warren Nutter's study of that subject.

A specific illustration of the Bureau's work on the measurement of production may be taken from Nutter's report, now in the hands of experts for critical review before final revision.

To many, Russia's success in her efforts to industrialize appears to point straight at the answer to the question, how to get the greatest increase of national production. Although doubts may be raised about the logic of this inference, Russia's growth is an important, if not the overriding, fact of our time. It is highly desirable to know the rate of increase of her output, and how it compares with that of other countries.

Nutter's report gives in detail the growth rates of many Soviet industries. The number of industries varies between successive pairs of years, an indication of change in coverage and thus of gaps in every year. It is clear, also, that certain large industries are omitted — those manufacturing military goods, of course, and some producing basic materials of military interest; and we suspect that some stagnant or declining industries are also omitted. We are aware, as well, that some of the series — especially those for machinery — are highly doubtful aggregates of the output of hetero-

geneous goods. These are very real difficulties, not easily overcome. But Nutter does all that can be done by including virtually all industries for which statistics are available, and using his collection with the care required to reach the best possible balance of coverage.

Another problem is posed by the very wide dispersion that Nutter finds in the rates of growth of different Russian industries. This sort of variation, typical of changing economies everywhere, is a major obstacle standing in the way of a single satisfactory index for Soviet industry as a whole. Nutter has met this difficulty in the only way possible, namely, by calculating a variety of indexes. For the period 1928-1955, for example, some of Nutter's indexes are based on 1928 weights, some on 1955, some on a combination of years; some include a constant list of products, some a fuller but changing list; some include doubtful items like "miscellaneous" machinery, some do not; and so on. The results differ considerably. But even the highest index calculated by Nutter shows a rise in Soviet industrial output that is far short of the rise indicated by the official Soviet index. Nutter's own choice of a single index falls between the extremes he has calculated. It shows a rate of growth since 1928 that is not much more than a fourth of that shown by the official Soviet index.

On the other hand, even the lowest of Nutter's indexes shows a higher rate of growth in industrial output than that in the United States for the 1928-1955 period. The difference points to a fact that must be reckoned with. But it is a fact that must be interpreted with care.

To begin with, comparisons of change over other periods give different results, as Nutter is careful to note. Were the period to start with 1913, for example, the net change to 1955 in the United States would look far less different from the net change in Russia; if the period were 1945-1958, on the other hand, the difference would be much greater. In addition, for the United States, too, various alternative indexes are possible, and the difference between industrial growth in the United States and in Soviet Russia depends on the choice among these alternatives. Further, because change in industrial output is a many-sided event — or series of events — no comparison of indexes alone can be wholly satisfactory. Nutter therefore goes to some trouble to make the comparison of Russian and American output in a variety of ways, each of which throws light on one facet or another of the difference. Finally, because industrial output is but one segment of national output, its share and significance in the total in Russia can hardly be the same as in the United States. This is a point that Nutter properly emphasizes, and one to which he will be able to devote further attention when Ernest Williams' full report on Soviet transportation, and George Kuznets' on Soviet agriculture have been completed. As we shall see later, Nutter's report has already made a significant start in this direction by analyzing some of the causes of the rapid increase in Russian industrial output.

Nutter has been able to compare, in a detailed way, growth in Russia's industrial output with growth in the industrial output of the United States alone. More fully to understand or simply to assess Russian growth, or Russian industrial growth, as detailed a comparison with other countries is needed. This would be a very considerable undertaking, since the scale and difficulties of the task would be so much greater. But its results would add a good deal to what we now know about Russian growth — and also about growth in other countries; and it could mark another significant forward step in the study of production generally.

II

Once estimates of production are at hand, it is possible to compare them with population. Economists have lost no time in doing so, for national output per capita is generally a better measure of the economic growth that people want than is output alone. As always, however, no single measure will really do for judging progress, and output per capita is therefore often supplemented — when this is possible — with output per worker or per man hour of work done. But if error is to be avoided, even this combination must be watched with at least a corner of one's eye kept on population, and on such other criteria of economic welfare as

the distribution and stability of income and the conditions of work.

Calculations of output per capita began, as I have implied, in the nineteenth century if not earlier and have reached a flourishing — in some directions perhaps an overblown — stage in the twentieth.

We are all familiar with the main results. One, for example, is that national product per capita in the United States is higher than in any other country of the world, and far higher than in most. Because manhours of work per capita are lower in this country than in other countries, national product per manhour is higher still.

We also know, from Simon Kuznets' study, that national product per capita has been rising in the United States at something like 20 per cent per decade, on the average, over the past eight or nine decades, and — a fact of special interest to those prone to "extrapolate" — that there has been no significant sign of diminution in the rate of growth in output per capita. We are aware, further, that this rather persistent rise of 20 per cent per decade has taken place with population rising, not falling; with manhours of labor per person of working age down, according to Long's newly published volume; with the distribution of income among families becoming less, not more, concentrated — at any rate, over the period since World War I, for which Kuznets' calculations and the more recent estimates of the Department of Commerce are available; with the distribution of wealth also somewhat less, or at least not more, concentrated since 1922, to judge from Lampman's new estimates; and with conditions of work generally improved.

National product per manhour of work done, I should make clear, rose more rapidly than product per capita — about 25 per cent per decade, on the average, according to Kendrick's estimate for the private domestic economy. Also — a fact of great importance — the long-term pace of advance in output per manhour has been speeded up. It was 22 per cent per decade during the quarter-century preceding World War I. It has averaged 29 per cent since. During the most recent period — after World War II — national product per manhour has been rising at an even greater rate, 35 to 40 per cent per decade. This means, in absolute terms, that a ten-year period sees added to the output of each manhour of American labor an amount well in excess of the *total* output obtained from an hour of work in most parts of the earth.

Comparable long-term indexes and related facts for other countries leave much to be desired. We cannot be sure how the rates of growth in output per capita or per manhour in this country compare with those elsewhere, and we know even less about some of the other criteria of economic welfare. It seems safe to say, however, that the long-term rate of growth in both output per capita and output per manhour has not been low in relation to the experience of other countries over comparable periods.

Comparisons of output with labor input in individual industries, such as have been made by Mills and those at the Bureau who followed him, also illuminate the economic growth of the United States. If there were like information for other countries — which is as yet scarcely the case — international comparisons could be made of levels and of trends in output per man or per manhour in similar industries, these could be correlated with the comparative studies of output change suggested earlier, and economists might be farther along in their understanding of the general problem of growth. Hultgren's comparison of British and U. S. transport and the other few efforts of this sort seem promising.

We owe to Nutter a new example of what might be learned from such comparisons — in this case, of changes in labor productivity, employment and output in the United States with corresponding changes in the Soviet Union. There are, to be sure, difficulties in making the comparison between the two countries, but if the results are anywhere near the truth, they reveal a remarkable contrast. Between 1928 and 1955, as I have mentioned, industrial output in Russia rose much more rapidly than in the United States. This difference did not reflect a more rapid rate of increase in Russian labor productivity. In fact, labor productivity in the United States rose

about as rapidly as in Russia, measured by output per worker, and probably more rapidly, measured by output per manhour. The big difference between Russia and the United States was in the rate of increase of industrial employment. In the United States, employment in the industrial sector rose about as rapidly as labor productivity. In Russia, industrial employment rose far more rapidly than labor productivity. In short, the great rise in Russia's industrial output between 1928 and 1955 came primarily from the diversion of manpower to industry. This has important implications for the corresponding trends of output in the other, nonindustrial, sectors of Russia's economy, into which Nutter's associates are looking, and thus for Russia's total output. The implications are even more important for the future rate of Russia's industrial growth.

III

Speculation about the causes of change in production relative to population or labor input go back, as I have indicated, to days before the amount — or even direction — of the changes were known with any accuracy.

Not until recent decades could economists begin to discipline their speculations about the immediate determinants of production or production per worker, and weigh the relative importance of each by appeal to comprehensive quantitative facts, including the vital facts on tangible capital.

The initial efforts of the 1920's made little progress, however. The first results seemed to indicate that the rise in output could be fully accounted for by the rise in labor and capital — output per unit of labor and capital combined had remained constant; or put differently, that the dominant factor in the rise of output per worker had been increase in the volume of fixed capital. Neither the technological advances the world of industry had experienced, nor the other factors that might be expected to influence output, appeared significant.

But these large implications could be no better than the facts from which they were drawn, and these were deficient in several respects and therefore unrepresentative of the history of industrial development. The facts as now reported by Kendrick for the period back to 1889 indicate that output per unit of labor and tangible capital combined has risen greatly — indeed, at an average rate close to 20 per cent per decade.

One may no longer conclude that increase in output per worker or manhour has been dominated by increase in the volume of fixed (or total) tangible capital. Increase in volume of tangible capital goods has undoubtedly played a significant role in raising labor productivity, but it has not been the dominant one.

Of course, capital contributes to output not only directly through the additional hands it provides. It contributes also indirectly through its embodiment of technological advance, for the hands become more skilled. However, this is true also of men and of the hands of men. Technology is a factor not measured by volume of capital or by number of workers. It needs to be accounted for separately.

Because the information, especially on tangible capital, is skimpy and disparate, it is not certain that the conclusions that hold for the United States hold also for trends in other countries generally and for international comparisons of levels. What information there is for other countries does suggest that increase in volume of tangible capital has not been the dominant factor in pushing up output per worker. But more than this cannot be said without a clearer notion of the magnitudes involved. A major task in following developments in other countries, and thus in grasping the law of increase of production in general, is to acquire better information on the volume of capital they use.

IV

To say that production in the United States has risen twice as fast as labor and tangible capital input combined, over the past two-thirds of a century, is to say in the same breath that a large part of the explanation of the rise in production remains to be determined. Is the key to this puzzle to be sought in the growth of inputs other than manhours and tangible capital, or in the greater efficiency with which

resources are utilized? One or two of our studies and some of our conference activities are being aimed at this difficult question.

That inputs other than labor time and the services of tangible capital contribute to production has been understood for a long time. Only recently however, have serious efforts been made to learn something of their dimensions.

No elaborate calculation is needed to show that education is a major investment activity. Students enrolled in regular schools and colleges, full or part time, number over 40 million, and students, teachers and others joined in this vast enterprise make up 25 per cent of the entire population. A majority of these are children of 13 and less, but only in a country like the United States of today, would economists hesitate to count the time of these youngsters as economically valuable. Since there is also the great amount of informal education obtained on the job, any reasonable estimate of the annual gross investment in educational capital would be large. In the case of college education, for example, Becker's preliminary results suggest that the total annual cost per student at the freshman level in 1950, including "foregone" earnings and a value assigned to the services of educational capital goods, was $1,750, about double the current money expenditure. But men must die, and a large annual investment is therefore needed merely to maintain educational capital. Becker's study here at the National Bureau, and the work going on elsewhere, should help sharpen our notions of gross investment and maintenance and of the significant difference between them — the net investment in education.

Another objective of these studies is to determine the "returns" to education. As measured by income differentials associated with differences in level of education, other factors held constant, these returns seem to have diminished relative to labor income generally. However, as Becker points out, this does not necessarily mean that the return on educational investment has declined absolutely. But whether it has or not, it seems to be high, measured in relation to private investment. Thus Becker's preliminary results indicate that the rate of return on private investment in college education is greater than the rate of return on total investment in manufacturing companies, even with such allowance as can be made for the "differential" ability of men innately intelligent enough to go through college. If the rate of return on investment in college education including also public and private subsidies is calculated, however, it is less than the return on manufacturing investment. It remains to be seen how comparisons with still other types of investment come out, whether these comparisons will stand up upon review, and to what extent they are affected by factors peculiar to the few years for which the estimates are available. They have significant implications for the objectives of public subsidies to education.

Becker's study, like the other efforts in this general area, may be expected to open the way to later inquiries. This task of exploration can be expedited also through discussion by those interested in the economics of education. The executive committee of the Universities-National Bureau Committee for Economic Research is therefore exploring the possibility of a conference on research in the area of "capital investment in human beings."

Great as are the difficulties in dealing with investment in education, the difficulties standing in the way of accurate knowledge of investment in research and development and of the return on this investment appear to be greater. Expenditures on basic and applied research (excluding market research, sales promotion and the like, and excluding also research in the social sciences and psychology) totalled some $8 billion in 1957. But this figure can be considered as nothing more than a hint as to what resources are engaged in this important activity. The main task at this time is to develop ways to grasp the elusive quantities and qualities involved in research and development and analyze the relevant causes and effects. The subject is important and worth while. A conference on the economic and social factors that determine the rate and direction of inventive activity, being planned jointly by the Universities-National Bureau Committee and the Committee on Economic Growth of the Social

Science Research Council, may light the way to study of this particular source of growth.

V

In the absence of an adequate approximation to measures of inputs other than tangible capital and labor time, it will continue to be impossible to determine just how much input contributes to output. It is difficult to believe, however, that if full account could be taken of all inputs, little would be left to be ascribed to the factors that get lumped together under the heading of "efficiency." In the study of economic growth, it is better to presume that efficiency is worth looking into.

One direction in which to look was suggested long ago by Adam Smith. He stated that the degree of specialization depends on the size of the market, and the productiveness of labor in turn rests heavily (though not exclusively) on specialization. Increase in the economic size of a nation (assuming, as appears to be the case, that the resulting pressure on its resources are offset by technological advance) will increase its efficiency by permitting specialization within and between industries to a degree not possible in smaller nations even when they are able to take advantage of the opportunities offered by foreign trade. This has been persuasively argued in a paper by Stigler, and at the last meeting of the Income Conference, devoted to output, input and productivity measurement, he attempted to measure these "economies of scale" — or more accurately, consider how one might measure them.

It is possible, and some feel it is probable, that the effects of increased scale of operations on efficiency are large enough to account for a sizable part of the 20 per cent per decade rise in total productivity noted above. But nobody really knows. Efforts to measure economies of scale involve, among other things, distinguishing them from the effects of other highly correlated factors making for change in efficiency. The problem, as Solow said in his comment on Stigler's effort, is "an econometric puzzle worthy of anybody's talents."

Once we have a clearer notion of the economies of scale, it will be desirable also to assess more closely than has been done heretofore the factors that limit the scale of markets. These include not only "natural" obstacles to trade and the movement of resources, but also artificial obstacles, such as the tariff and other walls that stand at national boundaries.

VI

Comparing output with total input to get at a closer measure of efficiency, and then distinguishing between those changes in efficiency that are associated with "scale" and those that are not — if it should prove practicable — would be a major step forward in the analysis of economic growth.

But it would not answer all questions. Economic growth depends only proximately on change in resources and efficiency. It is necessary also to go back of these changes to their causes.

The National Bureau's work on population, the labor force, and the hours people work, is one effort in this direction. It resulted in the publication last year of Long's elaborate study of the labor force, which I have already mentioned. The stability in the percentage of the working-age population participating in the labor force that Long found in the record for the United States is matched by similarly horizontal trends in the labor force participation rates of Great Britain, Canada, New Zealand, and Germany. The stability is especially remarkable because of the greatly diverging trends in the labor-force participation rates of different groups within the population of each of these countries, when these groups are distinguished by age, sex, race and origin. Long's analysis of these and other significant facts concerning the labor force and hours of work and their relation to income and employment should interest all concerned with economic growth, and with other economic and social problems as well. A popular digest of his book, now being prepared by the Joint Council on Economic Education, will make his results widely available.

Also relevant is last year's Universities-National Bureau conference on the interrelations of demographic and economic change, which brought demographers and economists together to discuss their ideas on this border-line

subject. The topics treated included the economic factors affecting birth, marriage and labor force participation rates, and the demographic factors affecting household behavior with respect to consumption and saving — all subjects bearing on the problem of economic growth. The proceedings of the conference are being prepared for publication.

An important section of Kuznets' forthcoming report on capital deals with the relations between capital and population. Currently under way, also, is Easterlin's study of trends and fluctuations in population and population movements, which takes Kuznets' analysis as a starting point. Easterlin is considering the economic factors that influence these significant changes, and their effects on the size of the labor force and the demand for consumer and investment goods. A study of Canadian population growth parallel in some respects to Easterlin's was begun by Buckley during the year he spent with us as a Research Associate. Becker, too, is doing some work on the factors affecting fertility, and on the relation between these and the factors affecting investment in education. The knowledge wrung from these and other studies should help deepen understanding of the role of population, which has been at times a powerful stimulant to economic growth and at others a depressant.

VII

A great deal of attention has been given by the National Bureau to tangible capital. The studies range widely. They include investigations of the stock of capital and its relation to output, gross capital formation, capital consumption and net capital formation, savings, financial institutions and instruments of finance, capital markets, and rates of return. Even the list of last year's National Bureau publications in this area, and of reports soon to reach the stage of publication — by Kuznets, Hickman, Saulnier, Halcrow, Jacoby, Goldsmith, Ulmer, Creamer, Robinson, Klaman, Copeland, and their collaborators — is too long to give here. It appears in Part II.

The information on capital in the United States, we must acknowledge, is still rather crude despite the hard work already done to fill in gaps, smooth out inconsistencies, and adjust for price and other changes in valuation. Yet I know of few other countries for which comparable information over so long a period of time is nearly as good, or of any other country for which so broad and intensive an analysis of capital has been made. The results of the National Bureau's studies of trends in capital formation and financing, under Kuznets' leadership, and of the studies of the postwar capital markets, directed by Goldsmith, should be of major interest to persons in this country, but I expect that economists elsewhere will find them a useful base from which to start seeking information and understanding of capital and its place in the economic growth of their own countries.

One of the significant facts brought out is the rapid rate of growth of tangible capital (expressed in constant prices) at the disposal of the private domestic economy — an average of 28 per cent per decade for the total, and 10 per cent per decade in relation to population or employment, with both percentages greater when consumers' durables and government assets are included. Another is the gradual decline in the rate of growth of this tangible capital. A third is the lack of stability — even in the long run and in the aggregate — in the ratio of tangible capital to output, a fact contrary to many assumptions made in calculating "capital requirements." Also important is the composition of the tangible capital stock. Factory plant and equipment — which many consider to be the heart of the capital equipment of an industrialized country — is exceeded in size by the fixed investment of railroads and public utilities, and also by the fixed capital of the rest of business; business inventories bulk larger than any one of the three industrial categories of fixed assets mentioned; housing is far larger in value than all nonresidential structures; and consumer durable goods are as large or larger than all business equipment. Enormous changes have taken place in the composition of this capital, whether classified by ownership group, type of asset, or industry — a reflection of the vast shifts characteristic of a progressive economy, one

significant aspect of which Stigler is investigating in his study of the factors that cause (or impede) capital movements among industries. While inter-industry shifts in capital have matched corresponding shifts in output, they did not do so exactly, and the trends of the capital-output ratios have therefore varied greatly among industries.

Of special interest also is the trend in the percentage of national income saved. Recent events confirm Kuznets' famous finding concerning the horizontal, or perhaps even declining, trend in this significant ratio. Similar results are obtained even when allowance is made, as in Goldsmith's calculations, for the increasing proportion of savings that go into consumers' durable goods. Whether inclusion also of investment in education and the like would tilt the trend enough to make it rise remains to be seen.

Much more might be said about the work done on the financing of capital formation, but two points made by Kuznets deserve emphasis. Kuznets finds that, with the relative growth of capital consumption charges and the expanded role of government in the economy, corporations and governments together now account for more than two-thirds of the nation's gross saving; and that a much larger fraction of the rest of the nation's savings than in earlier days goes through the hands of financial intermediaries. As he remarks, these developments have considerable implications for the operation of the financial system and the channeling of savings to alternative investment outlets, and thus also for economic growth as well as stabilization policy. Some of these implications are being explored in the postwar capital markets project by Goldsmith, Robinson, Shapiro, Mendelson and others, in the work Murray, Holland and Cagan are doing on the impact of pension systems on saving and investment, and in Gort's study of diversification by manufacturing corporations.

VIII

Mitchell's analysis of business cycles and the analyses of others subsidiary to it, also are studies in economic growth. For if we keep in mind the significant fact that a peak in general business — that is, in production, employment, investment, and productivity, as well as other variables — has in the great majority of cases stood higher than the preceding peak, we can see that Mitchell was concerned with the question why progress in a private enterprise economy is cyclical in nature.

So, also, we may view the study of long swings in the economic growth of the United States currently being pursued by Abramovitz. It asks whether the rate of growth in business activity, after allowance for the changes associated with business cycles, has fluctuated in a systematic manner, and if so, why.

Abramovitz' study is important among our studies of economic growth because it is comprehensive. If things go well, it will connect a wide range of phenomena. These include changes in various significant variables — population and labor force, migration and land settlement, capital formation and financing, national product and degree of divergence of trends in individual products, money stock and commodity prices, speculative activities, productivity and patents issued; and also various types of change — business cycles, long cycles in construction, in immigration, and in foreign investment, secular changes in technology and population, and wars. Thus it deals with more of the interrelations of the developments that constitute growth than do the monographic studies to which I have referred. Of course, it could not have been undertaken with as good a prospect of success in the absence of the more specialized studies. It constitutes, in effect, an effort to integrate some of their major findings and open promising lines of further monographic work.

The heart of the problem of business cycles, Mitchell felt, lay in the question, "how an economic system of interrelated parts develops internal stresses during expansions, stresses that bring on recessions, and how the uneven contractions of its varied parts pave the way for revivals." The development of internal stresses during the "surges" in economic growth that constitute the upward phase of the long swings — a thesis already explored by Burns in his work on production trends — may

turn out to be the clue also to the causes of these long swings, and Abramovitz is proceeding with such an hypothesis in mind. If the long swings constitute a repetitive process, reflecting some "stable structure of economic relations which tends to generate recurrent periods of acceleration and retardation in growth," they should yield a number of "observations" that may be compared with one another and their similarities and differences noted. For this reason, the study holds forth more than the ordinary promise of illuminating the process of economic growth. It is attractive also because it may provide a background against which to view and assess the political decisions of lasting import that seem to be induced by the stresses or imbalances that play a part in the recurring swings.

Whether surges and relapses in the pace of economic growth in fact reflect a repetitive process or are largely accidental in origin, their existence raises questions of great importance for all concerned with economic prospects, and not only with those of the United States, but of other countries as well. The more we know about these changes in rates of growth, the better we will be prepared to appraise and deal with developments as they take place.

The study by Abramovitz, and the complementary study by Easterlin, do not stand by themselves in the work we are currently doing. The history and analysis of changes in the stock of money in the United States since 1875 that Friedman and Schwartz are bringing to completion, North's study of American economic growth before 1860 — which he, like Buckley, began while a Research Associate — and the study of quality of credit in booms and depressions, which has been put in Earley's charge, also deal with one or another feature of long swings. And it is certain that Burns and Moore, in their study of the postwar business cycle, will have to concern themselves not only with "permanent" differences between recent cycles and those of earlier days but also with differences — and resemblances — of the kind that may be associated with long swings. The investigators of the several studies will support one another, we may expect, in the difficult tasks they face.

IX

One place at which to attack the problem of economic growth is at the point where particular economic, political, or social institutions impinge on the incentives that influence the quantity and quality of resources and the efficiency with which they are put to use in production. This approach draws attention to the alternatives of more or less or different action by government to stimulate economic growth. It raises the question, for example, whether feasible changes in laws, regulations, or tax rates might increase tangible and intangible capital more easily than could government investment, subsidy, or direction — a question of which the Russians were thoroughly aware when they abandoned their policy of equalitarianism almost thirty years ago.

It is worthwhile, therefore, to devote some of our energies to the analysis of particular features of social organization, and seek to discover, first, how they influence economic growth and the attainment of other national objectives, and, second, what might reasonably be said about proposals to improve them.

One important institution surely must be the federal tax system, and we have therefore been formulating tentative plans for a study that would consider the effectiveness of the country's tax system from the standpoint primarily, though not entirely, of achieving economic growth. It should embrace all major parts of the federal tax system, including not only personal and corporate income taxes, but also the excises and estate and gift taxes. Among the questions that might be tackled in such a study are the effects of high, graduated personal income taxes on savings and on investment; the effects of high corporate taxes and relatively rigid depreciation provisions on the growth of corporate enterprise; the possibilities of effective devices for tax averaging for use by those whose income is subject to wide fluctuations; and the influence of these and other tax provisions on the ability of small businesses to prosper and grow. These are complex problems, yet their importance is such that a serious effort to bring together and analyze the relevant facts bearing on them —

including a comparison of our tax system with that of other countries — seems warranted. The study of the personal income tax now going forward under Seltzer's direction — in which originate Kahn's forthcoming study of personal deductions and Holland's of dividends — should make the task less difficult than it would otherwise be.

Another significant institution is consumer credit, which is closely related to the efforts men make to raise their standards of living. The broad study we have planned of consumer credit and its place in the economy will have to deal with the business of consumer financing and its regulation by government, and with the implications for stability. But a significant part of our attention will be occupied also by the relation between consumer credit and the dynamic aspects of consumption. For the study may not ignore the factors that determine consumption and the volume of consumer assets — especially the vast quantity of goods that are part of the nation's transport equipment, laundry facilities, freezer capacity, and amusement channels, to mention items that may be labeled "producers' durable goods" as logically as they are labeled "consumers' durable goods" — nor may it pass over the relation of these to the availability and use of consumer credit and their bearing on economic growth. But the study of consumer credit can mark only a beginning in the larger study of consumption that we have long felt was needed.

X

A significant function of a center of economic research, like the National Bureau, is to cooperate with others engaged in like tasks. We discharge this responsibility in a variety of ways. One, on which I have already reported, is by sponsoring conferences on research. Another is by exploring a broad area of research, when the opportunity offers itself and the need is genuine, and issuing a report containing a review of the work in progress, a conspectus of the questions and issues that seem most important and susceptible to scientific analysis, and suggestions on how to deal with these questions.

My final example of our work during the past year in the area of economic growth is an exploration that also involved two conferences. The subject was the comparative study of economic growth and structure. The report, to be sent to the Directors after revision, includes the memoranda submitted by a number of participants, and in this way resembles a volume of regular conference proceedings. It also includes a staff report by Goldsmith that is based on, but goes beyond, the discussion at the meetings.

The problem area was defined broadly to include differences as well as similarities among countries in patterns of growth and structure, and to include also the factors related to these similarities and differences. As one might expect, the list of factors that attracted the attention of the participants extended over a wide range to embrace natural resources, human resources and attitudes, capital, saving and finance, economic organization, and international relations. It was felt also that the exploration should concern itself with the methodologies, data and organization needed to cope with the scientific problems involved; and the discussion dealt with these matters as well.

As is indicated by the table of contents (given in Part III), the report presents various suggestions on both research objectives and organization. Because the suggestions were prompted by problems encountered and questions unearthed in the actual business of research and policy administration in which most of the participants in the discussion are engaged, they are by no means in the same direction or even always consistent with one another. But consistency is no virtue in an exploratory survey, and the diverse suggestions are the better for having emerged out of efforts to grapple with the process and direction of economic growth.

The list of suggestions for research problems and projects will be scanned, and the potentialities of each weighed, by readers in the light of their experience, capacities, tastes and current commitments. So also will the discussion of method and organization, for there is no one "best" method or organization for everyone. But the volume should help stimulate

thinking and rethinking on what needs to be done and how it might be done in the important area explored.

For us at the National Bureau, too, the most promising directions of further work radiate from what we have learned in the studies we are now doing and have done in the past. I have already mentioned some of these, but a further word on two main lines of work may be desirable.

One is concerned with productivity, technology, and related developments in the workshops of the world. Among the important and interrelated questions to which systematic inquiries lend themselves in this general area are (1) national differences in productivity levels and trends in comparable major industries, taking account of capital as well as labor input; (2) the magnitude, character and sources of financing of research and development activities, in this and other countries; (3) the process of diffusion of new and improved techniques within and among countries; and (4) obstacles to improvements of technology that stem from governmental regulation, business monopoly, labor practices, financial organization, or other factors.

The second main area is concerned with the study of consumption to which reference was made earlier, and to which the way is being cleared by work here and elsewhere. What is needed is a systematic investigation of trends in consumption and their relation to the general development of our economy. Vast changes have occurred in recent decades in technology, the distribution of population between urban and rural centers, the industrial status of women, the education of children and adults, the length of human life, the range of available commodities and services, the facilities for financing their acquisition, the speed of communication, the income per capita, the distribution of incomes among the people, and the activities of government. How have these and related developments affected consumer spending patterns? How, in turn, has the modern emphasis on possession of ever-larger amounts of consumer goods reacted on the pecuniary ambitions of people, their willingness and ability to work, and their attitude toward assuming the risks of innovation and enterprise? If we keep questions of this sort in mind, in a broad survey of consumption trends — and of international differences in consumption, should resources permit — the contribution to be made to an understanding of the growth of the American economy and of growth generally seems great indeed.

It would be well, also, to keep in the mind the desirability of a parallel or subsequent study of secular changes in the volume and character of governmental services. The continued pressure for more and more of these services marks the importance of this area of investigation. The National Bureau's studies of government activity in the United States and Britain — to which we can soon add the report by Peacock and Wiseman — have opened the way to such an enterprise. The study of the changing place of philanthropy in the economy, on which we expect to embark shortly, should also provide information useful in the study of these and other important aspects of consumption — and also of education, research, and related subjects significant in the study of economic growth generally. For we view this new investigation broadly as a study of "philanthropic-type" activities and all the sources from which they are financed.

XI

A reading of the exploratory report on the comparative study of growth and structure and of the interesting memoranda attached to it will, I think, confirm the impression I have not avoided giving in my discussion of the work of the National Bureau — the impression that only a beginning has been made in tackling the problem of economic growth.

It is a good beginning, however. The current and past work of this and other centers of research and of individual scholars, by yielding information on important quantitative facts, economic institutions, and aspects of economic behavior, is gradually filling in the knowledge we need of the intricate process of economic growth. Much more is known than before of the rate of growth of output in the United States, of the changing components of production and consumption, of the trend and fluctu-

ations in labor and labor productivity, of the character and causes of change in the volume and composition of the nation's tangible capital, of the relations between growth in tangible capital and in labor productivity and output, of the organization of industry and finance, of the activities and fiscal operations of government, of the volume and effects of investment in technology and education, of the division of the gains of productivity and the distribution of income and wealth generally. Knowledge of the growth of other countries and of the role played in growth by the changing economic relations of countries with one another also is being improved.

Research, it is true, is an uncertain venture. But our experience, and the experience of others, demonstrates that if research is pursued energetically and in an objective and scholarly manner, progress can be reasonably counted on. Serious effort to advance useful knowledge of the process of economic growth — its character and direction, its causes, its consequences, and the policies needed to cope with the recurring and the special problems it poses — is worthwhile.

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