

crease reflects changes in the levels of education and skill in the working population, the growth of capital, the increased use of machinery, the alertness and ingenuity of management, and scientific progress. The measures of productivity are better for mining and transportation than for manufacturing and agriculture, while no satisfactory measures for construction are available. The measures found are too heavily weighted for raw materials and hence underestimate the rise in total output. They also cover old industries better than new. The apparent increase in total productivity and in the productivity in manufacturing reflects in part the increasing importance of industries with high productivity. The combination of partial measures on the basis of dollar values introduces a danger of errors.

The causes of increased productivity are likely in large part to continue to function. These are: (1) the greater growth of newer industries (but some of these, e.g., automobiles, may decline in productivity if demand declines seriously); (2) growth of "payment by results"; (3) more systematic promotion for merit<sup>2</sup>; (4) improving relations between management and employees; (5) improvement in the industrial arts; (6) greater mechanization of industry.

We are justified in believing, then, that improvement in economic conditions in this country is verified by the facts as to increase in productivity and that continuance of this improvement is probable because of continued functioning of the causes of that improvement. One of the main threats against continued progress, however, must be considered—instalment selling. The report shows that while *instalment selling* has become an important element in certain retail selling, especially of automobiles, no large growth seems to have occurred after 1923 and the total annual volume of instalment sales has been running only about 15 per cent of all retail sales. The primary cause for the changes in the volume of business in these lines must be sought elsewhere rather than in instalment selling. As instalment transactions are on the average about half completed at any particular time, the dangerous effects in case of crisis of this

<sup>2</sup>These last two items are emphasized more by foreign observers than by our own experts who know how difficult it is to measure "results" and "merit," and are not so sure we have done it correctly.

method of marketing do not seem as serious as sometimes thought.

1b. The dangers of unsound use of credit in the stock market were viewed more seriously in this report than those likely to result from instalment selling. Increased resort to stock issues has provided funds for larger concerns, with less need to call on the banks for ordinary commercial loans. It is possible that in one or more of the following directions—long period of business above normal, extraordinary large volume of building, of new financing, of automobile production, and of consumption and a huge volume of speculation—an unsound economic structure has been built up, the dangers of which are not now obvious. Only the test of a longer period of time can yield convincing results, in the opinion of the writers of the chapter on Money and Credit. Other material in the report makes it clear that the dangers referred to are primarily short-term rather than long-term.

On the whole, then, examination of fundamental economic conditions justifies active expansion plans, insofar as they depend on conditions outside the particular enterprise. Such is the implication of the report, and I can see no flaw in their argument important enough to change their conclusions and know of no omitted factor which should modify that conclusion.

2. The second main topic in my list, on which this report furnishes valuable material, is "Under what conditions are large units more effective than small in agriculture, manufacturing, railroad transportation and merchandising?" This topic, under slightly different labels, appears on the program for full consideration later in Mr. Williams' paper, Thursday morning, on "Is there an optimum size of organization?" and in Col. Rorty's paper, Friday evening, on "Preserving individual initiative in a large concern," if I may take the liberty of somewhat abbreviating a long title. Under the circumstances, it is appropriate at this time merely to call attention to certain major points suggested by the report without attempting to cover all phases of the subject.

In the section on Agriculture by E. G. Nourse, attention is called to the necessity of larger farm units both in the subhumid regions and in the corn belt. Wheat farms of four sections in the subhumid regions can be handled by two men equipped with modern machinery and the addition of a little

seasonal labor. Farms of 5,000, 10,000 and even 50,000 acres are being operated, some of them with striking results, in the way of efficiency and low unit costs. One reason for these larger farms is the nature of the combine, which can operate efficiently on wheat that has not been beaten down by rain and therefore makes regions of low rainfall superior from that point of view to what have usually been considered the more favored regions. Even in the corn belt, close observers are looking with more and more favor on the 640-acre tract rather than the old-time 160 acres as a family farm and are even coming to the conclusion that the better type of business farmers can, and should for maximum efficiency, operate units of 1,000 to perhaps 2,500 acres. Such a farm permits reasonable specialization of the labor force, a full line of modern equipment, and the services of a practical manager who devotes his time fully to the supervision of the technical and business operations of the farm without himself engaging in much, if any, manual labor. There seems seldom to be much advantage, however, in units larger than what can be supervised in considerable detail by one man; that is to say, there seems to be no building up of the long chain of supervisors which is characteristic of large manufacturing organizations.

In manufacturing, the plant employing twenty to one hundred workers is shown by census figures to have held its own much better than is usually thought. In 1923, the latest date for which this type of summary is available, there were 37,558 such establishments, actually more than in any previous year, while there were fewer than 1,000 establishments employing over 1,000 workers apiece. Plants employing over 250 workers apiece, to be sure, employed slightly more than one-half of all wage-earners, but the small establishment shows no tendency to disappear. Mr. W. L. Thorp, the author of this section, points out that there are certain types of industry in which small-scale production is required. They are: (1) industries in which products cannot be standardized and establishments which make products to suit the differing tastes of consumers, such as those producing tailored suits, high-grade furniture, art goods and finely bound books; (2) industries producing for a small market, such as those manufacturing artists' materials and nets and seines; (3) industries in which the local market is small and whose product

has a high transportation cost (in the manufacture of artificial-stone products, or bricks, the activity can seldom be on a large scale because of the limited local market and the high cost of transportation); (4) industries in which the material used is widely scattered and cannot be concentrated because of high transportation cost or perishability, such as, cheese factories and cider mills; (5) industries in which skilled labor is the chief element, such as, engraving and job-printing, whose products are really services rather than commodities.

In spite of these special cases, the potential economies of large-scale production and large-scale operation favor the larger unit where the demand to be supplied is large, uniformity of product essential and transportation cost of raw materials and product relatively unimportant.

In regard to the question of relative costs, Mr. Thorp concludes that at any given time and with any given stage of the industrial arts, there appears to be a size of plant which is most efficient. While the evidence shows a tremendous increase in size of plant during the past few years, and our technical advance has pushed the point of diminishing returns further up the scale, Mr. Thorp feels sure that such a point exists. I leave further discussion of the validity of this point of view to Mr. Williams tomorrow morning.

A suggestion is made in the chapter on Agriculture that some manufacturers tend to distribute their plants to towns and villages adjacent to agricultural land where living is cheaper and the rural population can be drawn on for a working force. No attempt is made to show under what circumstances such advantages would offset the disadvantages of less-than-carload shipment of raw materials and products, of arranging production schedules with a scattered group of such factories, and of recruiting the necessary specialists. I am not sure how much of Mr. Williams' attention this suggestion deserves as it does not seem to reflect much of the production executive's point of view.

In the field of railroad transportation, it is part of the law of the land that larger size of transportation units will be for the best interests of the country. In this case, the larger size is to be secured by the unification of what are already relatively large units. The true objective of rail consolidation is stated to be simplification of rate control, but other advantages hoped for are uni-