N. I. STONE:[1] In July, 1921, the magazine *Factory* inaugurated a discussion of the business cycle in its relation to individual plant management by publishing an article entitled "Can We Smooth Out The Business Curve"? Unlike our speaker of today, who speaks from the viewpoint of an economist, the author of that article, a practical plant manager, looked at the problem entirely from the angle of the man in charge of an individual business. While he analyzed the phenomena of the business cycle with its spurts of feverish activity succeeded by periods of paralyzing stagnation with admirable clearness, his conclusions bore the marks of obvious limitations which come from too narrow an outlook. Perhaps if Dr. King had read that article he would not feel it necessary to apologize as he has today for the temerity of a theoretical economist in discussing this subject before a body of practical engineers.

The conclusions of the practical engineer who wrote the article I am referring to are well epitomized in the following two sentences which I quote verbatim:

"Good times and bad times are not wholly due to financial or psychological or any other phenomena, but to the aggregate of good or bad management in individual businesses. If enough businesses were well managed all the time, we should never have a depression."

Having been asked by the editor of *Factory* along with a number of others to discuss the article in question, I took issue with that conclusion. I felt then, as I do now, that the phenomena of the business cycle have their roots in the deeper foundations underlying the economic structure of our present order of society, and are practically beyond the reach of the engineer dealing with the technical problems of the individual plant. Not that I fail to appreciate the need of and the advantage which comes from efficient management. There is no question that no manufacturing enterprise can be too efficient. We need all the efficiency and all the aid which the technical engineer can bring to the individual plant. Nor can there be any question as to which of the industrial enterprises have the better chance of surviving an industrial depression; those managed efficiently or those poorly managed. But while giving the engineer full credit for all he can do for an industrial enterprise in strengthening its position as against its competitors in the same field, I maintain, contrary to the assertion of the author of the *Factory* article, that if all industrial plants were run with the highest efficiency of which skilled engineering is capable, there would still be industrial depressions succeeded by booms so long as the general economic conditions which cause these distinctly modern phenomena continue to prevail.

What are these economic forces which distinguish our present industrial order from those of other historical epochs? Obviously, I have not the time to go into this fully. Dr. King has already touched upon the subject. Perhaps I can supplement what he said by calling attention to one outstanding feature which distinguishes the present industrial order from all its predecessors and which is perhaps more responsible for the modern phenomenon of recurring business cycles than any other single economic factor. It is this:

Modern industry is built on *credit* and is constantly at work creating a supply in anticipation of *future demand;* under the precapitalistic industrial systems, the producer always worked for the customer whom he knew personally; supply *followed* demand, and transactions were based on *cash* payment or on exchange of goods, but not on credit. The craftsman of old was satisfied with the trade which came to him from his customers, with whom he was in personal contact; when his apprentices grew to be journeyman mechanics they left him one by one to set up in business for themselves; in other words production continued on a small scale and there was no impelling force to drive the producing craftsman to build up a larger and larger business. The advent of the steam engine and mechanically propelled machinery produced a revolution in the industrial order. It made for growth of the industrial unit. It brought about standardization of products, which in turn made possible working ahead of the demand. This brought two forces in its train unknown before; the element of speculation in business and the necessity of doing business on credit.

Freed with the aid of credit from the shackles imposed by the limitations of its own capital resources, forced by competition to seek constantly for new and expanding fields and lured by the law of increasing returns and diminishing costs as production is carried on an increasing scale, modern industry leaped forth in a manner that was not dreamed of before these modern forces had come into play. It was inevitable that under these circumstances productive capacity should soon outstrip the demand and that we should get periodic gluts in industry after industry as they expand in obedience to the newly released economic forces. There is no escape from the operation of economic law for any concern that wants to play the modern industrial game. Engineering efficiency will sharpen the weapon of the individual concern for the competitive struggle and will enable it to survive at the expense of its less efficient rivals when the next industrial cyclone with its inevitable depression of prices wipes out those whose costs of production make it impossible for them to survive. But if every manufacturing concern were on an equal plane of industrial efficiency, it would not prevent the recurrence of the business cycle so long as there is no central authority to gauge demand and to keep the production of an entire industry down to that demand; so long as each individual concern is free to enlarge its output without regard to the output of the rivals and is under constant pressure to do so under the workings of competition and of the economic law of increasing returns. In fact, if all were equally efficient, it would only serve to hasten the rate of growth at which production (supply) outstrips consumption (demand) under the capitalist order. In the hypothetical case of equally efficient industrial units, victory would be with those best equipped financially to weather the storm.

Technical Management and the Cycle

With these facts as a background, I shall try to answer the two questions assigned to me for discussion. 1. Would it promote more precise and economical technical management in our plants if cyclic fluctuations could be materially reduced? 2. Are there probable ways in which the managements of enterprises acting either individually or collectively can reduce cyclic fluctuations?

Answering the first question. The recurrence of business cycles is one of the worst, if not the worst, disturbers of managerial plans for the orderly and economic operation of industrial plants. Efficient plant operation above all requires regularity in the repetitive processes of industry. This regularity is widely upset by the intrusion of outside economic forces having nothing to do with internal plant management and over which the plant engineer has no control. Plant organizations, including specialists of high degree, skilled mechanics trained and disciplined through years of hard work in the special processes developed in the particular plant, plant morale built up through the laborious effort of the employment manager, an esprit de corps developed among the staff of executives and foremen, all are swept away almost over night through the necessity of shutting down the plant dictated by the sudden cessation of orders and the drying up of bank credit.

When plant operations are resumed after the storm is over, most of the work of the plant managers must be done over again with a newly rebuilt organization. Even the work of unskilled labor suffers under the circumstances, for there is hardly any labor, no matter how low the degree of skill, that does not gain in efficiency through acquaintance with and adaptation to the conditions of each plant, and it therefore takes time to "tune up" a plant to a performance somewhere near 100 per cent of its capacity.

Can Management Help Reduce Cyclic Fluctuations?

Granted that business cycles are caused by general economic causes, it follows that they can be dealt with effectively only through counteracting forces of a similar nature. If the big force in modern business is credit, it is obvious that control of credit with the business cycle in mind is pregnant with great possibilities. As long as credit was dispensed by individual banks to individual customers solely from the point of view of day-to-day requirements of those customers on the one hand and their financial reliability on the other, the credit instrumentality was as much a blind force in the operation of the business cycle as the manufacturing unit itself. But with the creation of the Federal Reserve Board and the pooling of all the cash and credit resources into one national pool, the possibilities of a unified control of credit on a national scale from the broad viewpoint of the best national interests and from the long range view of the business cycle, rather than the short range view of immediate prospects and orders on hand, are well-nigh limitless.

Those who were privileged to hear Prof. Friday's address at the New York meeting of this Society some two or three years ago, may recall his brilliant scheme for insuring continuity of production through the instrumentality of some such national agency as the Federal Reserve Board. Without entering into consideration of his ambitious and far-reaching scheme, it is obvious that this is the one agency in the country which today is in the possession of more complete information as to the business activities of the country than any other institution. With that information at hand, it is in a position to tell when the industrial activities of the country have reached a point of saturation beyond which farther extension means only competition for existing supplies of material and labor, which can only lead to artificial price inflation with the inevitable collapse in the end. A word of warning from the Federal Reserve Board at this point, coupled with the refusal to discount commercial paper given for financing additional business, can put more powerful brakes upon the overspeeding engine of industry than any other single force. By doing so, the Board would arrest the

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