

things done, responsibility must be definite and concentrated. It would be folly to expect the 200,000 manufacturers to shoulder the responsibility for dealing with technological unemployment. If we really wish action, we must give someone the definite task of doing what can be done. The problem is largely one of reducing the displacement among the older and the less desirable employes and of concentrating the effect of industrial changes upon younger workers who can be more easily placed in other employment at existing wage rates. It is obvious, therefore, that progress in dealing with technological unemployment requires a well-organized labor market—in fact, no kind of unemployment would be reduced so much by better organization of the labor market. Unfortunately most organizations of manufacturers in the United States have shown no disposition to help improve the organization of the labor market, and—I cannot make this too emphatic—have actually fought, in the states and in Congress, such efforts as have been made to create modern machinery for marketing labor. This opposition of manufacturers to modern machinery for marketing labor is just as uneconomic as the opposition of some wage earners to modern machinery in the work shop.

To provide leadership in dealing with technological unemployment, I suggest a Federal Labor Board composed of six or seven industrialists and labor leaders with the Secretary of Commerce and the Secretary of Labor ex-officio members. The Board would be provided with a technical staff and connected with industry by a national advisory committee and by regional and industrial advisory committees. The federal employment exchanges would be transferred to the Board's control and the Board would be provided with funds for expanding the services.

What could the Board do about technological unemployment? As soon as it became apparent that a new machine would displace labor on a substantial scale, that machine should be the subject of immediate study by the technical staff of the Board. How many men is the machine likely to displace and how rapidly? How can the influx of young workers into the shrinking occupation be promptly stopped? How can employers who need men in the occupation obtain them from other enterprises which are installing machines and laying off men? Into what other pursuits can the displaced men be most advantageously transferred?

The technical staff should prepare a definite plan for meeting the problem created by the machine. This plan should be submitted by the staff to the Board and by the Board, in turn, to the industry. After receiving criticisms and suggestions from the industry, the Board should work out a revised plan which it should ask the industry to accept. Obviously the Board would have no power to compel acceptance of its plans. Its effectiveness would depend upon its success in commanding voluntary co-operation. This, of course, would depend upon the reasonableness of the Board's suggestions and the respect which the members of the Board, by virtue of their ability and fairness, would be able to command.

In conclusion, permit me to suggest that such a Board would represent scientific management applied to the marketing of labor. There is just as much need for careful planning to adjust the movement of labor to the ever-changing needs of industry as there is need for scheduling and planning to assure a smooth and unbroken flow of material through a shop. I hope that at some future meeting the Taylor Society may devote a session to the specific topic: "Scientific Management of the Marketing of Labor."

Leonard Kuvin.<sup>9</sup> Technological unemployment is that fraction of total unemployment which may be ascribed to the displacement of men by machines. Because such displacement has been brought about generally without the accompaniment of other economic changes which would transform into cultivated leisure what is now devastating and demoralizing enforced idleness, the entire phenomenon of displacement is viewed as, on the whole, unwelcome. The engineer has done very much to bring this state of mechanization about; the economist and the public at large would like to see its immediate and its long-term effects dealt with properly.

We all know that this condition is not a new one. Mechanization of industry has been part of the natural order of events since the industrial revolution. The difference between conditions today and what they were years ago is that whereas labor at one time resisted the introduction of the machine, now the machine is resisting in a different manner the utilization of labor.

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The days of business recession are the days when constructive measures may be thought out at least, if not immediately adopted. The very phenomenon of expansion and mechanization of industry is more steadily being accepted as an underlying condition which if improperly dealt with leads to periodic business recessions. The need immediately before us is to diagnose the condition and to suggest, if possible, the means of cure.

Professor Douglas has in his study isolated the phenomenon of changes in price in their relation to changes in demand. His mathematical attack, if properly extended beyond the necessary closed system involved in a two dimensional projection of a three dimensional continuum of price, quantity and time, may point the way.

A comprehensive analysis would have to embody interaction of commodities in domestic and foreign markets as well as elements of changed economic institutions and affected human behavior. When such an analysis is completed we shall be well on the road toward the solution of all economic problems in an economy of profit and competition.

The essence of the solution, it seems, would be the discovery of the truth in factual form, and the dissemination of knowledge for purposes of better individual and collective planning and control.

To this end considerable cold light could be thrown on matters if to the knowledge of static reactions of supply, demand and price were added the available factual material on the growth of industries in time. We know that in this country the railroads had their era of rapid expansion; at another time copper mining took the lead; at another steel production; at another radio and at still another aviation. In each of these cases and in any number of others, the industry goes through a period of rapid growth and expansion and then assumes a diminished pace and tempo.

Invention is followed by engineering application, manufacture and distribution. When technological developments reach a point where the product receives general utilization under economic conditions prevailing at the time, the industry takes on a retarded rate of growth more closely in line with the growth in population than before. The demand for a particular item under consideration is either elastic or inelastic depending upon both the stage of technological development possible in the industry and the consuming power of the particular portion of the population capable of being served by it. A commodity which can

be produced so cheaply as to be within the reach and a part of ordinary prevalent living standards of the bulk of the population tends to become inelastic in its demand qualities; the opposite also holds true.

No elaborate statistical verification need be summoned to substantiate these facts of retarded growth of industries, though there is an abundance of data easily at hand. The points to be emphasized are that retardation depends on both technical processes and on possible distribution of the product to the consuming population. But it must be recognized that the growth of complimentary industries, the capital available for them and the fact of lack of synchronism in the growth of all industries have also major retarding influences. They all work together to bring about at one or another time a period of readjustment. They induce directly and indirectly the displacement of labor known as technological unemployment.

We are prone, however, to focus our attention on the short-term run of forces. This is chiefly because the effects of technical change, especially in mechanization, are relatively quickly observed in the displacement of labor. Data on changes in the past decade show clearly, moreover, both the lack of uniformity of industrial development in production and the disproportion between the growth in production, the growth or decline in payrolls and the growth or decline in employment.

The five-year period between 1925 and 1929, inclusive, when compared with the five year period 1920 to 1924 discloses interesting relationships. Federal Reserve Board indexes for all industries showed a gain of 26 per cent in production against a 9 per cent gain in payrolls and a 4 per cent gain in employment.

In the non-ferrous metal industries there was a 50 per cent gain in production as compared with a 10 per cent gain in payrolls and a 1 per cent gain in employment. In the iron and steel industry there was a 36 per cent gain in production as compared with a 13 per cent gain in payrolls and a 7 per cent gain in employment. Textiles gained 17 per cent in production, 2 per cent in payrolls and showed practically no change in the employment of labor. In automobiles there was a 13 per cent growth in production, a 38 per cent gain in payrolls and a 28 per cent growth in employment. This industry reacted best from the standpoint of balanced growth, payrolls and employment. The food, leather and tobacco industries showed decreased employment with increased production.

Changes in production and employment check fairly