

ECONOMICS AND TECHNOLOGY

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ECONOMICS AND TECHNOLOGY

BY

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PREFACE

We live in an epoch that reminds us in many respects of the times of some one hundred years ago, that is the beginning of the nineteenth century. For what we experience to-day is not only a revolution in the sphere of morality and politics, but also a revolution on a large scale in industrial technique. What was a hundred years ago the steam-engine is to-day electricity and the internal combustion engine ; what was then the railway and the steamship is to-day the motor-car and the aeroplane ; what were then the rising textile and metal industries are to-day the growing ramifications of the giant chemical and electro-technical industries.

The literature of that period brings back to our minds the numerous complaints that were made against technical development and the introduction of machinery as becoming more and more the cause of poverty and unemployment. Such objections appeared to us in pre-War days, when technological development was slowing down, as unjustifiable and reactionary. We were at a loss to understand them ; we regarded them as a sign of ignorance and narrow-mindedness. "Who," we asked, "could blame the progress in industrial technique for the unemployment and poverty of the people ?" We maintained that technological progress reduces our physical efforts, lowers the cost of production, contributes to the general welfare and enhances economic development. Unemployment due to technological development is only a passing phase, and hands that have temporarily become idle will soon be absorbed by the turning wheel of the economic machine.

All this is, of course, true, but how much time will it take ? We know to-day that between the appearance of unemployment and its subsequent absorption, not only

years but decades may elapse, as indeed happened at the beginning of the nineteenth century; and time is an essential element that cannot be overlooked by the economist.

We are, therefore, much more able to understand to-day the objections of the nineteenth-century economists than we were before the War. For to-day the same kind of problem has emerged. We hear to-day that social progress does not keep pace with technological progress, that we have not succeeded in utilizing all the potentialities of technical science, that we cannot consume all that we can produce, while vast masses of people live on the verge of starvation and millions are unable to find employment and earn their livelihood.

The problems of poverty and unemployment become especially acute at a time when capitalism is passing through a process of important change caused by technological progress, which in our days has been accelerated by the late War and its consequences. Liberal capitalism is giving way more and more to monopolistic capitalism. It is within this monopolistic and autarchic capitalist system that rapid technological development takes place. Under such a system the possibility of absorption of unemployment is very limited, and adjustment between technological and social progress under these circumstances much more difficult.

With increasing frequency we hear the question: Does not technical progress under such circumstances miss its object, does it not lose sight of the very purpose which it is supposed to serve? The very aim and purpose of technical progress is being questioned, as it was a century ago. John Stuart Mill took a very critical view of the benefits that *man, as an individual*, derives from mechanical inventions: "It is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being. They have enabled a greater population to live the same life of drudgery and imprisonment, and an increased number of manufacturers and others to make fortunes. They have increased the comforts of the

middle class. But they have not yet begun to effect the great changes in human destiny which it is in their nature and in their futurity to accomplish."¹

This scepticism of John Stuart Mill does not appear to us to be justified to-day to the same extent as it might have been a century ago, when the birth-rate was fairly high. To-day the revolution in industrial technique goes hand in hand with a revolution in moral standards and, as a result of the latter, the birth-rate is continually falling. The fear of Mill, therefore, that the only benefit derived from mechanical inventions will consist in the fact that a greater population will be able to live "the same life of drudgery" seems to-day less justifiable.

To-day, we are faced with a number of other factors that make us doubt whether technological progress bestows any actual advantage not only on man as an individual, but *on man as a species*. It is to be feared that all the advantages derived from the development of technology will be utilized for the purpose of financing military, social and economic warfare, and that industrial development will make such warfare only the more cruel, ruthless and devastating. To perfect the machinery of destruction seems to have become the aim of technological progress. Its avowed purpose appears to be to help men in their conquest of men, whether such conquest be military, economic or otherwise. Such dangers are by no means illusory. The sociologist, the economist and the politician, each in his own sphere, have to take notice of them. But the question to be dealt with is: To what extent are these dangers real?

Readers will not find in my work any rough and ready answers to these vital questions. Notwithstanding, the material of thought and fact collected in my book ought to prepare the ground for a better understanding and a wider treatment of the subject, while the interrelation between technology and economics may enable us to arrive at certain conclusions.

¹ *Principles of Political Economy*, Book 4, ch. vi., § 2.

The book consists of an analytical part (Analysis of Technological Progress), a theoretical part (Problems of Compensation for Technological Unemployment), a sociological part (Sources and Limits of Technological Progress), and finally of a practical part (Remedies for Technological Unemployment).

I wish to lay stress on the analytical part of my work. In it I endeavour to show that what we call "technological progress" is really a complicated set of phenomena, that differ not only in form and scope, but also in their cause and effect, and the importance to be attributed to them. What I call "progress in novelty" (development in the production of novelties) is a matter which is different, both in nature and extent, from "progress in productivity" (an advance in industrial output). "Qualitative progress" must be distinguished from "quantitative progress." Mechanization creates a different set of problems from rationalization, industrial organization or industrial psychology. Progress resulting in saving of capital has a different economic significance from progress resulting in a saving of labour. Development that aims at the production of goods that are positively productive must be measured and valued from a different angle from the production of goods that are of a destructive character. All these distinctions have to be kept well in mind, for if we do not take into account the vast and essential differences between such factors, the conclusions that we arrive at will be lacking in perspective and miss the essential point.

Previous attempts at a complete analysis of the subject have not succeeded in getting at the root of the problem and discovering the causes and effects of technological progress. They contained too many generalizations and had too narrow a scope. I am afraid that I shall be unable to make my analysis as thorough and detailed as the problem requires. But it is better to sacrifice certain details and save the work from an excessive casuistry, for nothing could be more dangerous in such a work than to lose sight of the wood for the trees.

Preface

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I feel obliged to thank the Economic Society in Cracow and its President, Professor Adam Krzyżanowski of the University of Cracow, for their assistance in publishing this work—and also Mr. I. Hake for his translation of my book from Polish into English.

FERDYNAND ZWEIG.

CRACOW, *February* 1936.

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