

APPENDIX I.

COAL-CUTTING BY MACHINERY.

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THE winning of the world's coal-seams by the direct application of mechanical devices to the actual "coal-faces" has been and is, generally speaking, of slow development when comparatively considered with the high standard of machinery efficiency applied to the multifarious requirements dealing with the mineral from the time it leaves the said coal-face until it finally reaches the consumer.

Parallel with all great industries, the coal trade of the world is governed and swayed by political, industrial, and commercial conditions. The two former have such diverse influences upon the latter in the various coal-producing centres of the world that mutability of trade whereby uniform and reasonable benefit to all concerned would be assured becomes purely mythical. It is therefore a grave question at all times and in all countries as to the direct bearing of these conditions on the trade, beneficially or otherwise, of any particular nation. When the conditions are so diverse it is but fair to consider that the obtaining or the maintaining of industrial supremacy is the result of regulative economics judiciously applied to overcome exigencies.

Referring solely to the coal-mining industry, the pride of place so long held by the United Kingdom in the matter of output has now to be ceded to America, and this prestige is considered as principally due to the application of machinery to the actual holing and cutting of the coal-faces. By this means production rapidly increased. In the year 1899, as a result of the extended application of mechanical appliances in direct operation at the coal-face, America outstripped the United Kingdom in output. The following excerpt from the report of C. Le Neve Foster, D.Sc., F.R.S., one of H.M.'s Inspectors of Mines, England, sets forth that the United Kingdom "in the year 1899 gained eighteen millions of metric tons, but the United States' gain was far larger—viz., thirty millions of metric tons. One may well ask how the United States were able in the course of that short period of twelve months to make such an enormous addition to their output. The answer is: Increased use of coal-cutting machinery. The difference between the two great coal-producing countries of the world is very marked indeed, as the United States owe 23 per cent. of their total output to the use of coal-cutting machinery, against 1½ per cent. so won in the United Kingdom." It is just, however, to concede that America has the advantage in very many instances as to thickness of seams and density of same, also relative absence generally of the adverse conditions with which the British mining engineer has to cope. Having this in view, the types of coal-cutting machines which prove successful in America would probably fail in the United Kingdom proportionate to the range of adversely altered conditions.

British mining engineers have during recent years apprehended the necessity of applying machinery to the undercutting and shearing of the coal-faces; consequently exhaustive investigations and trials are continually being carried out with the view of proving and adopting the class of machine best suited to the requirements resulting from existing local conditions. In coal-mining there is practically no similarity in local conditions—that is, judging one colliery with another; hence the prevention of general application of any one type of machine, and therefore, subsequently, the varied nature of the skill required of the mining engineer who has to determine systems and methods most suitable to particular demands. Depths of seams from the surface, thickness thereof, nature of such seams, &c., are all factors from which emanate local conditions so multiform, comparatively, in character that the universal applicability of one set design of machinery to a successful issue is thereby precluded. There are many seams where coal-cutting machines in their present form cannot be profitably substituted for hand-labour. This does not result from the principle of machine-application being wrong, but from the simple fact that the right type of machine is not yet designed or constructed to successfully surmount the particular conditions attached to the working of such seams.

Difficulties in an acute form have presented themselves from time to time in the way of mechanical application to coal-winning, apart from the work at the face, but such have been surmounted with maximum benefit, and this knowledge leads to the assumption that the mechanical skill now being concentrated on this highly important object under review will evolve suitable coal-cutting machinery for all and varied conditions.

This has been very aptly designated as the "mechanical age," from the fact that machinery of suitable design has been invented and applied to practically every ramification of the world's industrial life. The effect upon general production as a result of such mechanical development has been of a phenomenal character.

There are many opponents to mechanical operation when applied in detail, on the assumption that labour is dispensed with to an unwarrantable degree; but the term "labour-saving" as ascribed to machinery should not be taken to literally imply that the number of human operators under any particular system in connection with an industry cease for ever as "workers" because of mechanical installation; rather should it be understood that their energy and skill is requisitioned in other channels wherein greater exercise of brain-power is needed, but concurrent therewith a satisfactory conservation of physical power results.