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TRANSACTIONS.

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PNEUMATIC POWER APPLIED TO WORKSHOPS.

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To be read Wednesday, 17th June, 1896.

In the early days of ironworking the tools were usually brought to the work, and they were manual. Later, as tools increased in size and stiffness, the work was brought to the machine and moved with it under or against the tool. To-day, in many operations, the bulk of metal to be handled is getting so unwieldy that it is again proving common practice to carry the machine tool to the work. Electrical and air motors are certainly factors in this evolution, even if not largely responsible for it.

This paper proposes putting on record the present position of air power, as part of a craft, illustrated more especially by railway shop-work.

A natural hope, then, would be that the author should give figures, comparative between air-driven, water-driven, electrically driven and shaft driven machines.* Such figures the author cannot give from his own experiment, and after wide search is of the opinion that at the present day they have not been obtained; therefore, this paper must be qualitative rather than quantitative.

EFFICIENCY.

The author does not intend to say that air, for continuous work in plate flanging, or for high pressures in stamping and forging, is a more economical transmitter of power than water, or that pipes, air engines and motors are better or cheaper than wires and electric motors, or independent air driven tools than steam applied through shafting and belts to a compact group of machine tools, but he is of the opinion that if many widely scattered, different and intermittent operations are to be performed; if a cold climate has to be fought; if the technical skill and knowledge of the workman employed is limited; and if the special and portable tools are more or less of home design and manufacture to suit the particular and limiting conditions of their use, then air has efficiency, economy, and a wide field of usefulness. For the many and varied services it now is used in and about a railway, see the appendix.

The common opinion that the compressing of air was costly and power transmission by it wasteful, has been the main obstacle to its more extended use. Prof. J. T. Nicolson, M.C.S.C.E., has (in Transactions, v. 7, p. 79) clearly proved that there is no difficulty or great first cost in securing a mechanical efficiency of 86 per cent., a thermodynamic of 92, and a main (pipe) efficiency of 96.2, and re-warming the air near to the motor; that he recommends, the author finds in practice to be easy, cheap, and so effective as to tempt him to emphasize Prof. Unwin, who says (Proceedings I.C.E., v. 105, p. 202) heat applied in re-warming compressed air is used nearly five times as efficiently as an equal amount of heat employed in generating steam.

*For such an economical comparison between small motors see Proceedings I.C.E., vol. 105, p. 308.