

**DYNAMOMETERS AND THE
MEASUREMENT OF POWER: A
TREATISE ON THE CONSTRUCTION
AND APPLICATION OF
DYNAMOMETERS**

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Dynamometers and the Measurement of Power: A Treatise on the Construction and Application of Dynamometers by John J. Flather

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JOHN J. FLATHER

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DYNAMOMETERS

AND

THE MEASUREMENT OF POWER:

*A TREATISE ON THE CONSTRUCTION AND
APPLICATION OF DYNAMOMETERS;*

WITH A DESCRIPTION OF THE METHODS AND APPARATUS EMPLOYED
IN MEASURING WATER-POWER.

BY

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PREFACE.

THE aim in the following pages has been to present in convenient form, for the use of Technical Students and Engineers, a description of the construction and principles of action of the various types of Dynamometer employed in the measurement of power.

A chronological presentation of the subject has not been attempted, as many of the forms once used have entirely disappeared; with very few exceptions the various types discussed are those now in use.

In the measurement of the mechanical horse-power of a hydraulic motor the effective power may be ascertained by means of a friction-brake, or other dynamometer, under any given conditions; but as these may be such that the maximum power of the wheel is not developed, it remains for the Engineer to determine those conditions best suited to the wheel under consideration. In Chapter VI is given a discussion of the methods and apparatus in use for ascertaining the efficiency of a given wheel, including the determination of flow in rivers and streams.

The work here presented has been used as the basis of a course of lectures to Engineering students, and is

the outgrowth of a series of articles published in the *American Machinist*.

In its preparation free use has been made of numerous publications relating to the subject, and references for further information are given in foot-notes throughout the text.

Special mention is due Professor Andrew Jamieson, of Glasgow, for use of matter and figures from his "Steam and Steam-engines" (London: Chas. Griffin & Co.). The writer is also under obligations to Professors Jas. E. Denton, J. Burkitt Webb, Dr. Mansfield Merriman, and others.

J. J. FLATHER.

LAFAYETTE, IND., August 1, 1892.

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DYNAMOMETERS

AND

THE MEASUREMENT OF POWER.

CHAPTER I.

DETERMINATION OF DRIVING POWER.

IN designing a modern machine-shop or manufactory, and in estimating the cost of power for its working plant, an accurate knowledge of the amount of power absorbed by the different machines is not only desirable, but essential to economy and efficiency.

If the power required is not known, the engine or motor provided may prove incapable of driving the work; or, on the other hand, the motive power may be largely in excess of that required: in either case there is an unnecessary expense—in the first case, in remedying the evil, and, in the second, in the daily expenditure of fuel for excess of power.

So also in fitting up a factory: if a more accurate knowledge of the power required to drive machine-tools were known, there would be a greater economy in running them. The writer has in mind a case