

**TEST OF THIRTY SAMSON TURBINE. A THESIS
SUBMITTED FOR THE DEGREE OF BACHELOR OF
SCIENCE GENERAL ENGINEERING
COURSE. FOR THE DEGREE OF BACHELOR OF
SCIENCE CIVIL ENGINEERING COURSE; TEST OF
AN EIGHTEEN INCH PELTON WATER WHEEL**

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Test of Thirty Samson Turbine. A Thesis Submitted for the Degree of Bachelor of Science General Engineering Course. For the Degree of Bachelor of Science Civil Engineering course; Test of an Eighteen Inch Pelton Water Wheel by Paul Hodges & Leathem Daley Smith

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PAUL HODGES & LEATHEM DALEY SMITH

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TEST OF A THIRTY INCH SAMSON TURBINE ✓

BY

PAUL HODGES ✓

A Thesis Submitted for the Degree of

BACHELOR OF SCIENCE

GENERAL ENGINEERING COURSE

AND BY

LEATHEM DALEY SMITH

For the Degree of

BACHELOR OF SCIENCE

CIVIL ENGINEERING COURSE

UNIVERSITY OF WISCONSIN

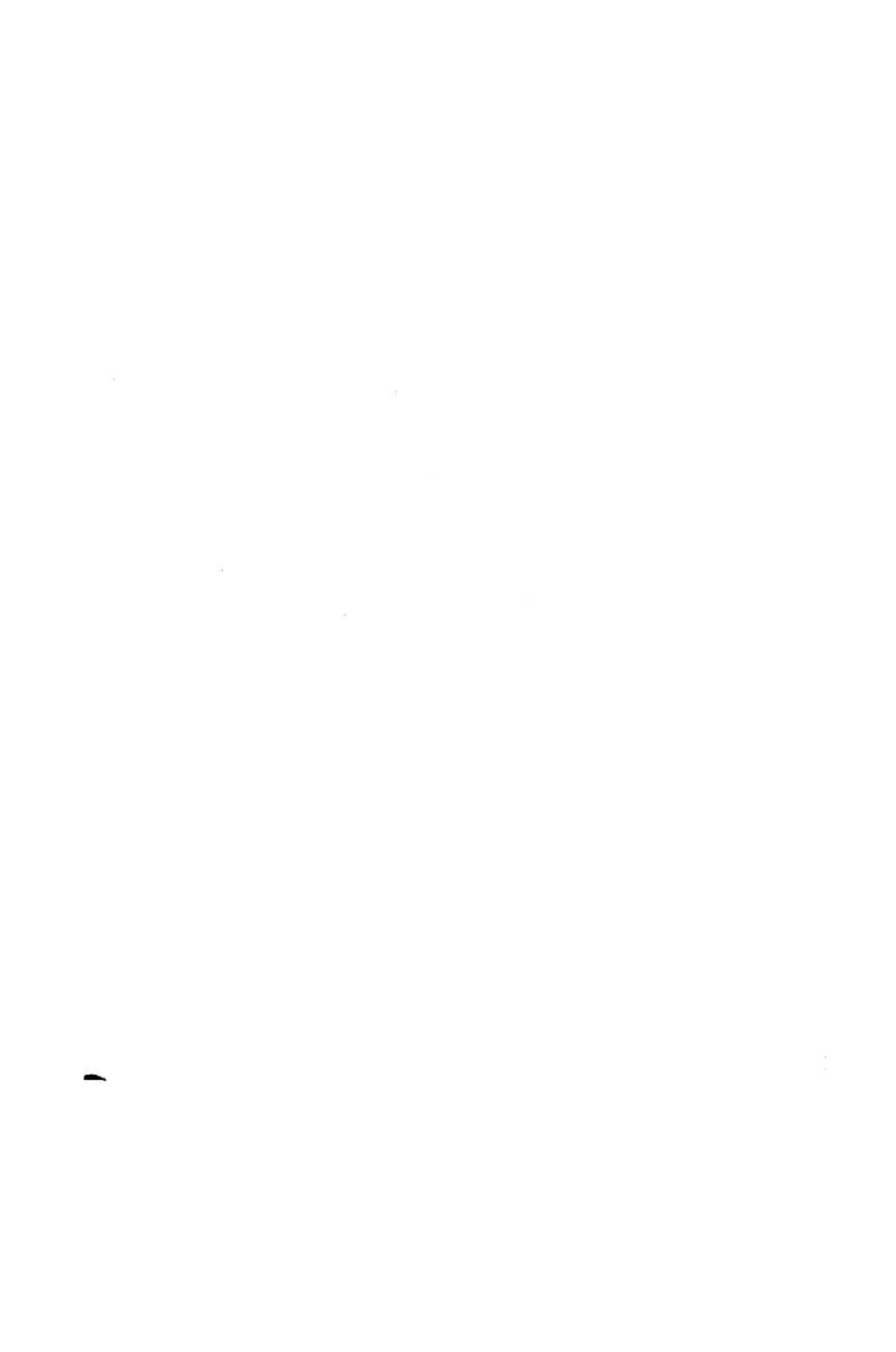
1909



INTRODUCTION.

Tests on both a 30" Samson Turbine and an 18" Pelton Wheel were run in the Hydraulics Laboratory of the University of Wisconsin during the summer of 1908. Besides the two parties submitting this thesis there were two graduate engineers working on the same test for theses for a Master's degree, Wilfred C. Parker, U. W. '06 and Chas. I. Corp, an assistant professor in Kansas University. These composed the party on the test of the 30" Samson and with the exception of L. D. Smith for the test of the wheel also.

The careful test of any waterwheel or turbine is of great interest but such tests are difficult to make on installed plants. To run a test of any commercial value a well equipped laboratory is almost necessary, for the water flow must be regulated carefully and exactly. The wheel must be kept clear of sticks, etc., which would interfere with its temporary efficiency and an accurate weir and measuring apparatus must be installed and gauged. From this it can be seen that it is practically impossible to make any valuable test



of the great majority of wheels after they are installed for service, and that therefore a test made in the laboratory to determine the most efficient speeds, gate openings and working heads or more generally the value of the most efficient ϕ ($= \frac{\text{vel. of periphery of wheel}}{\text{vel. of water}}$) is of as great importance as the test of any other machine.

The laboratory in which these tests were run has complete equipment for work of this kind with an ever increasing variety of wheels and water measuring devices, and tests run here have proved to be of great importance in the study of the laws governing turbines, pumps and other hydraulic machinery.

* * *



Description of Apparatus.

The water was supplied by a 30" Morris Centrifugal Pump located in the northeast corner of the Laboratory, taking the water from a 10' canal leading directly to the lake. The pump delivered the water into a receiving basin of considerable size from which it flowed through a large channel into the wheel pit, a chamber 10' square directly over the tail-race. The draft tube is carried down into the tail-race below the level of the water, thus maintaining a good suction through the tube.

A flat wooden platform was built over the wheel resting on the bearings but not coming in contact with the shaft, to serve as an air shield and prevent a sucking away of the water over the wheel and thereby keeping the head uniform.

Figure 1 shows the Samson wheel complete - 30" in diameter, - manufactured by James Leffel & Co., of Springfield, O., - regulated by Wicket Gate System of control.

The water that will flow through a turbine cannot