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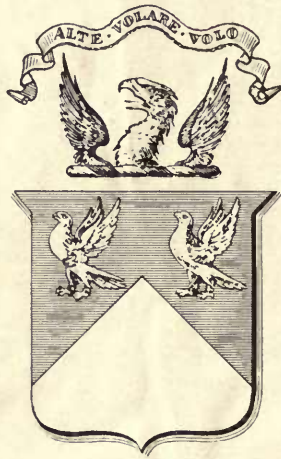
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THESIS

THE EFFECT OF
SUPERHEATED STEAM
ON
CYLINDER CONDENSATION
IN A
CORLISS STEAM ENGINE

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No. 1
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SUPERHEATED STEAM

ON

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IN A

CORLISS STEAM ENGINE

EXPERIMENTAL THESIS

PRESENTED TO THE FACULTY

OF

SIBLEY COLLEGE - CORNELL UNIVERSITY

JUNE, 1904

FOR THE DEGREE OF

"MECHANICAL ENGINEER"

BY

WALTER STEVENSON FINLAY, JR.

AND

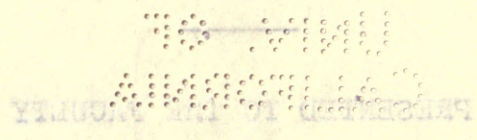
JOHN FRANCIS BORDEN.

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THE THEORY OF
SUPERHEATED STEAM
ON
CYLINDER CONDENSATION
IN A
CORLISS STEAM ENGINE

EXPERIMENTAL THESES



OF
HENRY MORSE STEPHENS
SIELEY COLLEGE UNIVERSITY

JUNE, 1904

FOR THE DEGREE OF
"MECHANICAL ENGINEER"

BY

WALTER STEVENSON WATSON, JR.

AND

JOHN FRANCIS BORDEN

INTRODUCTION.

SUPERHEATED STEAM AS A WORKING FLUID

In the following thesis and reports upon a series of tests conducted with a view to obtaining the practical results of the use of superheated steam upon a simple condensing Harris Corliss engine, data and graphical representations are carried out to the extent that they may fully demonstrate these practical results alone. The theoretical side of the problem has not been dealt with.

The unusually large cylinder condensation necessarily present in the type of engine employed, prevented any actual attainment of high thermodynamic efficiency; nevertheless the system of graphical relations holds true.

For purposes of comparison of the results of this test with the assumptions, and theory of present practice the statements of recognized authorities upon the subject will be quoted in the subsequent pages.

"Could it be employed, its characteristics would be those of saturated or wet condition."

The above statement is however qualified by this:

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INTRODUCTION.

In the following thesis and reports upon a series of tests conducted with a view to obtaining the practical working results of the use of substituted steam upon a simple condensing turbine engine, data and graphical representations are carried out to the extent that they may fully demonstrate these practical results alone. The theoretical side of the problem has not been dealt with.

The numerical data and calculations necessarily present in the type of engine employed, previous any actual attainment of high efficiency; nevertheless, the question of theoretical relations holds true.

For purposes of comparison of the results of this test with the available data and theory of present practice the analysis of mechanical efficiency upon the subject will be carried to the subject proper.

the gases, it would insure a high thermodynamic efficiency, combined with the high mechanical efficiency of the steam engine."

SUPERHEATED STEAM AS A WORKING FLUID

the condensation at entrance is reduced in amount; but, ordinarily, at least, the fluid is still wet or less wet at the point of cut-off.

Dr. Robert Henry Thurston in his work, "A Manual of the Steam Engine," has given expression to the ideas of the highest authorities of the day, with regard to the working qualities of superheated steam. His introductory statements to the subject are as follows:

"Superheated Steam can probable never be used in the ordinary steam engine, and even superheating, in its legitimate function of reducing liability to interior wastes, is employed comparatively infrequently. It is not used as a working substance for the reason that, in order that it may retain the gaseous state throughout the expansion^{period} it must be superheated initially to a higher temperature than is found ordinarily safe or practicable; or, otherwise, anyway, as yet undiscovered, must be found to so modify the engine itself as to permit its safe use, and at the same time to prevent those wastes of heat which now so promptly convert the steam, at entrance, from the superheated to the saturated or wet condition."

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The above statement is however qualified by this: "Could it be employed, its characteristics would be those of

the gases, . . . it would insure a high thermodynamic efficiency, combined with the high mechanical efficiency of the steam engine." assistance, and so as to lessen the back pressure. In "a steam engine using superheated steam . . . , the condensation at entrance is reduced in amount; but, ordinarily, at least, the fluid is still more or less wet at the point of cut-off. Superheating is thus, as commonly practiced, simply a method of economizing by reduction of interior waste." cylinder is much less than that in the boiler. Super: "It is probably never the fact, in practice," that it is possible to secure, safely and economically, so much superheating as is needed to keep the steam dry throughout the stroke." indicates more heat to the cylinder than is needed. "The superheating of the steam continually improves the working of the engine, in, (1), giving a better working substance and thus initially reducing interior wastes; - (2), at the same time, meeting more completely the demand for heat to bring up the temperature of the metal to that of the prime steam before the entrance of the latter into the cylinder." but not very much exceeding the boiling point corresponding to the pressure in the boiler. - - -

(4). Superheating in tubes or passages which the steam traverses on its way from the boiler to the cylinder. William J. M. Rankine, in his work "Steam Engine and other Prime Movers", makes the following statements in regard to the use of superheated steam: steam of any pressure.

"The objects and methods of superheating steam.

(5). Superheating by mixture, where a portion only of (1). To raise the temperature at which the fluid receives heat, and so as to increase the efficiency of the

the gas, . . . it would insure a high thermodynamic efficiency, combined with the high mechanical efficiency of the steam engine."

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William S. M. Rankine, in his work "Steam Engine and other prime movers", makes the following statements in regard to the use of superheated steam:

"The objects and methods of superheating steam. (1) To raise the temperature at which the fluid re-

fluid, and that without producing a dangerous pressure.

(2). To diminish the density of the steam employed to overcome a given resistance, and so as to lessen the back pressure.

(3). To prevent condensation of the steam during its expansion without the aid of a jacket.

The principal methods of superheating are the following:

(1) Wire-drawing, occasioning superheating when the pressure in the cylinder is much less than that in the boiler. Superheating takes place more by accident than design, and does not secure the advantages ascribed to it.

(2). By the steam-jacket, taking place when the steam-jacket communicates more heat to the cylinder steam than is necessary merely to prevent any of it from condensing. This kind of superheating cannot be subject to definite calculation, - and its extent is limited.

(3) Superheating in the steam chest or upper part of the boiler by means of flues traversing or surrounding it. By this method, the steam may be raised to a temperature somewhat, but not very much exceeding the boiling point corresponding to the pressure in the boiler.

(4). Superheating in tubes or passages which the steam traverses on its way from the boiler to the cylinder. By this method, almost any required temperature can be given to steam of any pressure.

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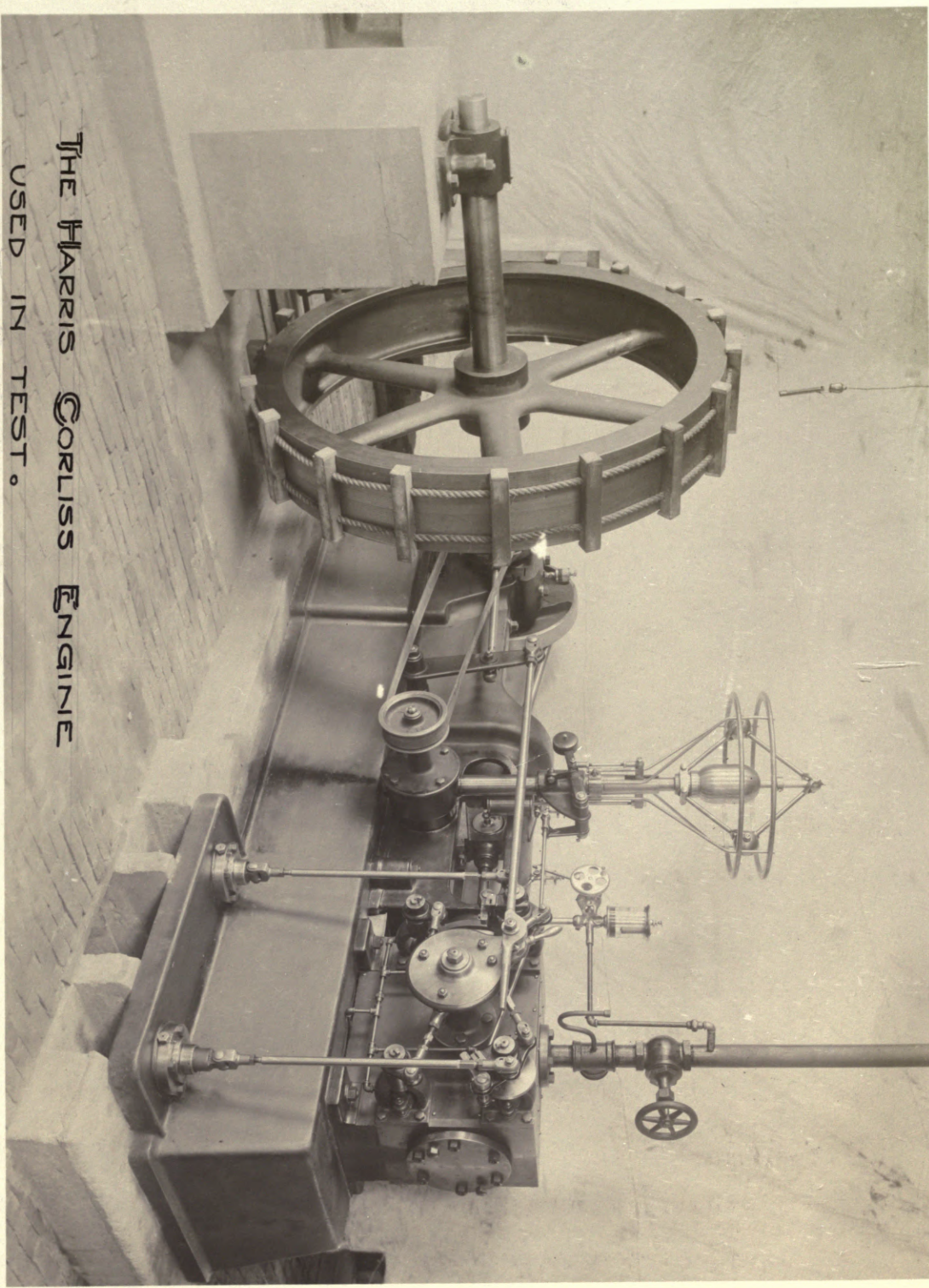
(5) Superheating by mixture, where a portion only of

the steam is passed through superheating tubes, and raised to a very high temperature, and then injected amongst the remainder of the steam at or near the cylinder ports.

(6). Superheating in the cylinder by means of a flue or furnace."

the steam is passed through an exhausting tube, and raised to a very high temperature, and then injected amongst the remainder of the steam at or near the cylinder ports.

(8). Superheating in the cylinder by means of a fine or "Passage".



THE HARRIS CORLISS ENGINE
USED IN TEST.

speed of 225 r.p.m., and THE ENGINE. y construction,

The engine is of the single eccentric type, thus placing close limits upon the range of cut-off and exhaust closure.

Description of the 5 x 15 Harris Corlies engine used in the test:- A vacuum of 25-27.5 inches was maintained, however. The engine is of a size not adapted to commercial use, being of a special build, but modeled, however, to secure good working results. As a detailed description of the machine is unnecessary, particular attention will be given only to the points which involve any effective bearing upon the case in hand.

The construction of the frame work is heavy and non-conductive to shock or vibration.

The cylinder is lagged with sheet steel, the steam and exhaust valves being somewhat exposed. As is mechanically requisite in a small engine, the clearance is proportionally large.

The Valve Gear:-

The Brown releasing gear is employed. The hook engagement is positive, and is due alone to gravity action, release being effected by a locked-edge cam, operating between the arms of the steam crank. The cam causes cut-off by a sharp shoulder, a recurve causing a slow positive steam cut-off due to governor action.

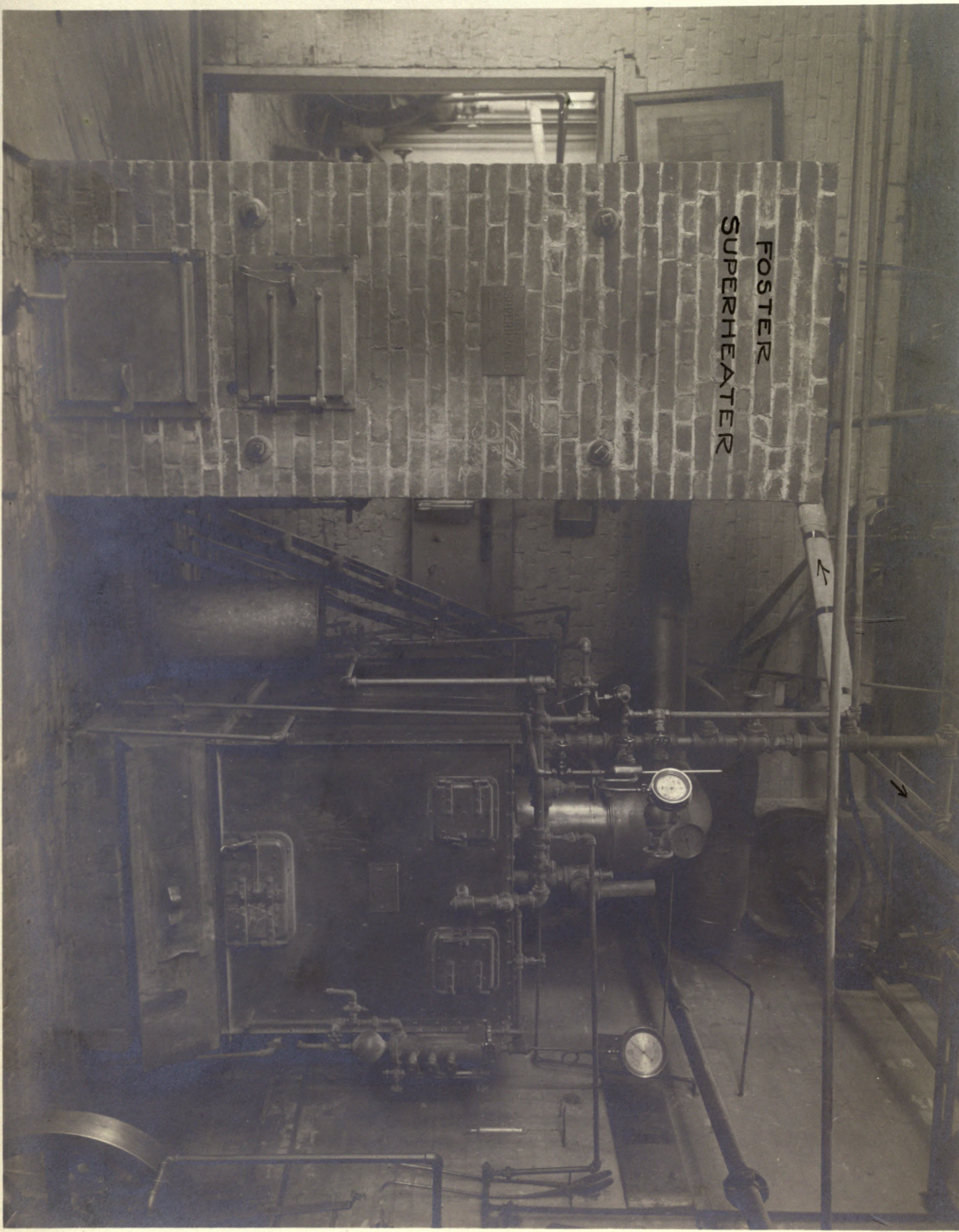
The governor is of the Porter type, running at a normal

FOSTER
SUPERHEATER

1921
SUPERHEATER

2

→



THE FOSTER SUPERHEATER.

For the tests made, the Foster Superheater was employed to reheat the steam. The original supply of steam was at times, from a Roberts Water Tube Boiler, and also from the main steam supply line of Sibley College.

In this superheater steam passes through a series of two vertical steel pipes, whose heating surface is greatly enlarged by means of large iron washers fitting about the pipes. These washers give a corrugated effect to the apparatus.

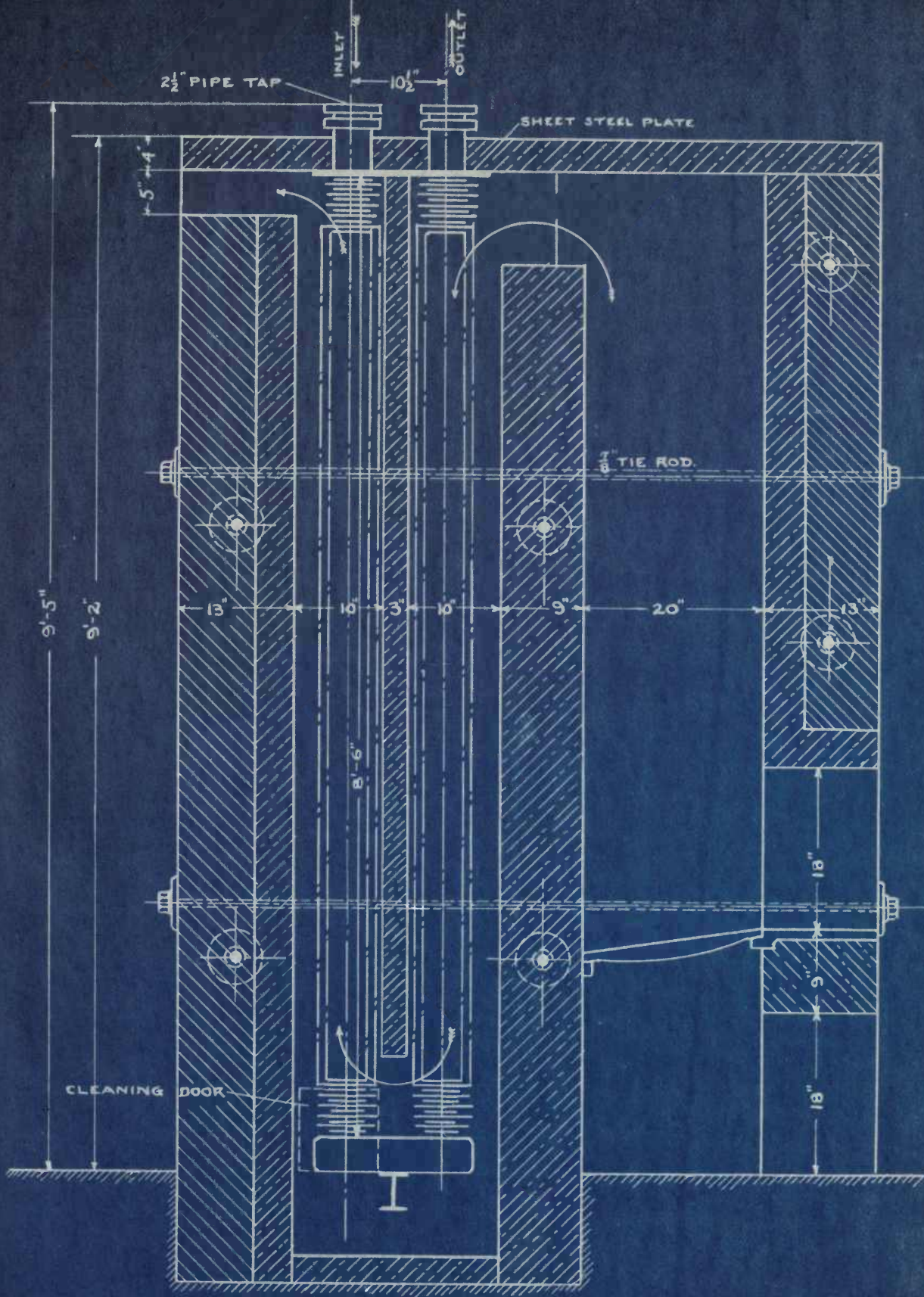
The construction and general arrangement of the superheater is shown in accompanying diagrams.

The control of degree of superheat was accomplished by means of draught and firing only. A fair continuity in point of constant results was possible, although, at times, owing to the discharge of condensed steam into the superheater great irregularities occurred.

It would seem advisable in the event of the use of the superheater at any distance from the supply, that either a separator be used or proper drip-cocks and drainage be placed at the base of the construction.

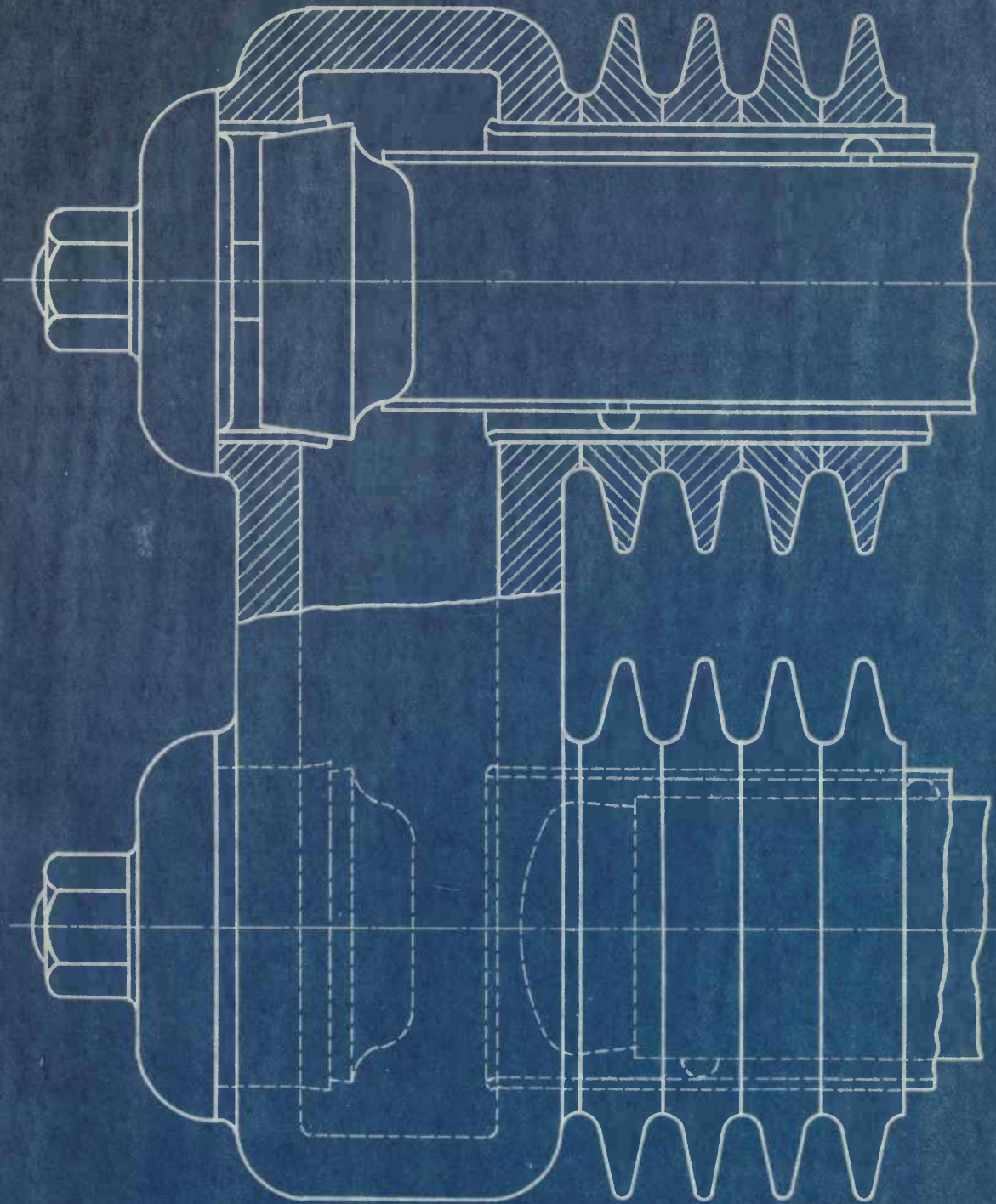
The rated capacity of the superheater is 2400 # of steam per hour, at 100° superheat. 150° superheat required at the engine necessitated a maximum degree at the superheater of 230° superheat. Under best running conditions, a drop of about 40° occurred.

Careful lagging of pipe lines between the superheater and engine gave the best possible results under running conditions.



SECTIONAL SIDE ELEVATION.

FOSTER SUPERHEATER.



DETAILS OF RETURN HEADER.

FOSTER SUPERHEATER.

THE TEST.
CONCLUSIONS.

For the sake of comparison four runs, of an hour and a half each, under conditions of saturation and atmospheric exhaust, were made.

In the main test, sixteen actual hour and one half runs, were made, ten readings at ten minute intervals. The test although these results have been graphically shown.

was subdivided into four divisions, as to degree of superheat. The first at saturation, the second at fifty, the third at one hundred, and the fourth at one-hundred fifty.

These divisions were of four runs each, the runs averaging a developed horsepower of 2.5, 5, 7 and 9.

The governor action being poor, with a tendency to "hunting", a device of controlling springs assisted to some degree, but not so as to maintain a very constant speed.

Steam pressures also varied from the desired 120 # gauge, but it was not possible for the operator to control this, so bad, that were a continuance to be considered, entire new gasketing and repacking would have been necessitated.

For constant use of superheated, decided change and improvement in these features is imperative.

CONCLUSIONS.

DATA.

As has been stated in the introductory remarks, the conclusions and results of the test are best expressed by the graphical method. The object in view of the operators has been not at all to obtain results bearing upon the economy although these results have been graphically shown.

With the increase in degree of superheat the expected results of lessened cylinder condensation occurred, and a general improvement in the operation of the engine was noticeable up to 100° degree mark. At 150°, continued running emphasized a tendency upon the part of the valves to heat up and stick.

Valves, pipe-joints, and unions were affected by the high degree, and great leakage resulted.

Towards the conclusion of the test, conditions became so bad, that were a continuance to be considered, entire new gasketing and repacking would have been necessitated.

For constant use of superheated^{steam}, a decided change and improvement in these features is imperative.

Baron. = 29.078" = 14.5 #

No.	RPM	Gauge Reading		Temperatures			Calorimeter			Weight		
		Gau.	Vac	Eng. Inj	Con Inj	Dis	Gau.	Press	Temp	Con. Inj	Water	
1	....	102	23.5	82	72.0	46	67.0	...	...	...	36.5	1810
2	94.5	111	23.5	82	72.0	46	67.0	...	...	...	36.5	1870
3	94.5	101	27.0	..	73.5	43	63.5	110	15.2	272	33.5	1870
4	94.5	113	27.3	84	74.0	46	66.0	110	15.2	270	34.2	1870
5	94.5	101	27.3	..	74.8	45	65.0	117	15.5	270	33.3	1810
6	94.4	113	27.2	..	75.0	45	65.8	...	...	...	36.2	2000
7	94.9	110	27.3	..	75.0	44	67.5	107	15.1	268	35.7	1830
8	93.0	107	27.3	84	75.0	43	65.0	...	...	...	35.0	1870
9	94.1	107	27.5	..	75.0	43	62.0	...	...	...	35.5	1830

In the following pages of data the numbers designating the different runs will have the following meaning.

- S - V - 2 = Saturated Steam-Vacuum-2 D.H.P.(approx.)
- S - V - 5 = " " " 5 " "
- 50 - V - 9 = 50° Superheat-Vacuum - 9 " "
- 100 - V - 9 = 100° " " " " "
- 150 - V - 9 = 150° " " " " "
- S - A - 7 = Saturated Steam-Atmosphere-7 D.H.P.

For every sheet of data there will be found corresponding curve sheets showing graphically all the results obtained.

While the data sheets are classed by the approximate D.H.P.'s. of each run, the actual D.H.P.'s. are used in all computations and curves.

Quality = 99 %

DATA.

The following pages of data the number designating the different runs will have the following meaning.

2 - 1 - 1	=	Estimated Steam-Vacuum - D.M.P. (approx.)
2 - 1 - 2	=	" " " " " " " " " " " "
2 - 1 - 3	=	500 Superheat-Vacuum - 9
2 - 1 - 4	=	100 " " " " " " " " " " " "
2 - 1 - 5	=	150 " " " " " " " " " " " "
2 - 1 - 6	=	Estimated Steam-Atmosphere - D.M.P.

For every sheet of data there will be found corresponding curve sheets showing graphically all the results obtained. When the data sheets are classed by the approximate D.M.P.'s of each run, the actual D.M.P.'s are used in all computations and curves.

Barom. = 29.076" = 14.3 # .

No.	RPM	Gauge Reading		Temperatures				Calorimeter			Weight	
		Gau	Vac	Eng. r'm	Con S	Inj Water	Dis water	Gau.	Pres.	Temp	Con.	Inj water
1	102	25.5	82	72.0	46	67.0	...	...	...	36.5	1810
2	94.5	115	23.5	.. 72.0	46	65.0	104	15.1	266	33.2	1870	
3	95.2	110	26.5	.. 72.0	46	66.0	...	...	...	29.3	1870
4	94.5	101	27.0	.. 73.5	46	66.5	110	15.2	272	32.5	1870	
5	94.2	113	27.3	84 74.0	46	66.0	110	15.2	270	34.2	1870	
6	93.5	101	27.3	.. 74.8	45	65.0	117	15.3	270	35.8	1810	
7	94.4	113	27.2	.. 75.0	45	63.8	...	...	...	36.2	2000
8	94.9	110	27.3	.. 75.0	44	67.5	107	15.1	266	35.7	1930	
9	93.3	107	27.3	84 75.0	43	63.0	...	...	...	35.0	1870
10	94.1	107	27.5	.. 75.0	43	62.0	...	...	...	35.5	1930

Av. 94 108 26.6 83 74.0 45 65.0 111.6 15.2 268 34.4 1883

I H P = 3.40
 Brake Load = 62 1/2 # net. Water rate per D.H.P.=73.0

D H P = 2.8 I.H.P.=60.2

Mech. eff. = 82.4 %

Quality = 99 %

Av. 0.52 84.3 1.34 15.6 104 18.1 4.1 0.8

Total I.H.P. = 3.40.

S - V - 2

HEAD END.

S - V - 5

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Out-off % St.
				End of comp	Out off	Rel	Back	
1	1.10	29.8	2.06	13.6	106	20	4	2.3
2	1.13	30.3	2.12	13.6	116	20	4	2.3
3	0.96	26.0	1.80	13.6	112	20	4	1.7
4	1.04	28.2	1.95	13.6	106	20	4	2.5
5	0.96	26.0	1.80	13.6	108	20	4	1.1
6	0.94	25.5	1.77	13.6	104	18	4	2.4
7	1.00	27.1	1.87	13.6	113	19	4	1.3
8	0.90	24.4	1.69	13.6	108	19	4	1.0
9	0.94	25.5	1.76	13.6	108	20	4	1.4
10	0.97	26.3	1.82	13.6	103	20	4	2.3
Av.	0.93	26.9	1.83	13.6	109	19	4	1.8

C R A N K S E N D.

1	0.82	22.2	1.54	13.6	100	13.4	4.0	0.0
2	0.82	22.2	1.54	13.6	108	13.4	4.8	0.0
3	0.71	19.2	1.33	13.6	100	14.3	4.0	0.0
4	0.75	20.4	1.41	12.0	100	12.0	4.0	0.6
5	0.85	23.0	1.59	13.6	104	16.8	4.0	0.3
6	0.78	21.1	1.46	13.6	100	16.0	4.0	1.4
7	0.75	20.3	1.41	13.6	108	13.4	4.0	1.0
8	1.00	27.1	1.87	13.6	109	20.0	4.0	1.4
9	0.84	22.8	1.58	13.6	104	13.4	4.0	1.4
10	0.90	24.4	1.70	13.6	104	13.4	4.0	1.7
Av.	0.82	24.3	1.54	13.6	104	16.1	4.1	0.8

Total I.H.P. = 3.40.

S - V - 5

Absolute Pressure.

No. Area K.E.F. I.H.P. Inj Off Out Bel Leak Out-off % at.

Barom. = 29.076" = 14.35 # .

No.	RPM	Gauge Reading		Temperature			Calorimeter			Weight	
		Gau	Vac	Eng. r'm	Con S	Inj water	Dis water	Gau	Pres.	Temp	Con S	Inj water
1	98.0	26.0	85	72	42.0	63.7	...	.....	...	.....	.....
2	91.9	100	26.1 ..	73	42.0	66.0	100	15.1	268	43.0	1875
3	92.0	102	26.2 ..	75	41.5	66.0	...	.....	...	44.0	1875
4	93.2	112	26.0 ..	77	41.0	66.0	113	15.2	262	45.0	1875
5	93.2	103	26.0 85	78	41.0	65.5	...	.....	...	42.7	1810
6	93.4	110	26.0 ..	77	41.0	64.0	117	15.2	250	44.0	1750
7	93.9	115	26.0 ..	77	41.0	65.0	...	.....	...	42.5	1750
8	93.7	111	26.3 ..	78	40.8	65.0	105	15.2	260	43.0	1875
9	92.0	97	26.1 86	78	40.8	66.0	...	.....	...	42.3	1750
10	92.2	97	26.4 ..	78	40.8	65.5	97	15.1	270	43.3	1810
Av.	92.8	104	26.0 85	77.3	41	65.2	106	15.2	262	43.0	1815

I.H.P. = 5.85

Water rate per D.H.P. = 51.3

Brake load = 112 # net.

I.H.P. = 43.4

D.H.P. = 4.95

Mech. eff. = 84.5 %

Quality = 98.2 %

9	1.61	41.0	2.83	15.6	101	26.4	4.3	5.40
10	1.44	39.0	2.89	15.6	104	26.4	4.0	5.40
Av.	1.51	41.0	2.85	15.6	111	26.2	4.3	5.70

Total I.H.P. = 5.85.

H E A D E N D.

S - V - 5.

No.	Area	K.E.P.	I.H.P	Absolute Pressure.				Cut-off % st.
				End of comp	Out off	Rel	Back	
1	1.65	44.7	3.08	13.6	104	28.0	4.8	10.2
2	1.67	45.2	3.13	13.6	103	28.0	4.8	12.2
3	1.60	43.5	3.00	13.6	103	28.0	4.0	8.4
4	1.54	44.5	3.07	13.6	118	28.0	4.8	7.5
5	1.56	42.5	2.92	13.6	112	28.0	4.0	7.8
6	1.61	41.0	2.83	13.6	116	24.0	4.0	6.8
7	1.60	43.5	3.00	13.6	120	26.0	4.0	6.8
8	1.63	44.2	3.05	13.6	120	26.4	4.0	7.5
9	1.69	45.8	3.16	13.6	104	23.4	4.0	10.2
10	1.67	42.5	2.94	13.6	104	26.4	4.8	9.2
Av.	1.61	43.7	3.02	13.6	110	26.9	4.5	8.7

C R A N K E N D.

1	1.57	42.5	2.95	13.6	104	24.0	4.0	6.77
2	1.50	40.6	2.80	13.6	104	25.6	4.0	8.47
3	1.53	41.5	2.86	13.6	103	26.4	4.8	7.46
4	1.56	42.5	2.92	13.6	120	26.4	5.4	6.42
5	1.61	43.5	3.00	13.6	112	26.4	4.0	6.10
6	1.42	38.5	2.66	13.6	116	26.4	4.0	5.10
7	1.51	41.0	2.83	13.6	120	26.4	4.0	5.10
8	1.46	39.6	2.73	13.6	117	28.0	4.0	5.80
9	1.51	41.0	2.83	13.6	101	26.4	4.9	6.40
10	1.44	39.0	2.69	13.6	104	26.4	4.0	6.40
Av.	1.51	41.0	2.83	13.6	111	26.2	4.5	6.70

Total I.H.P. = 5.85.

S - V - 7

HEAD END.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure			Cut-off	Cut-off 1 St.
				End	at	at		
1	3.33	50.3	4.02	28	124	30.2	4.1	15.3

Barom. = 29.152" = 14.4 #.

No.	RPM	Gauge Reading		Temperatures			Calorimeter		Weight		
		Gau	Vac	Eng. r'm	Con S	Inj water	Dis water	Gau.	Pres. Temp	Con S	Inj. water
1	120	26.4	81	89.0	40.5	73.5	...	...	...	...	...
2	89.8	112	26.3	..	87.5	40.5	75.7	...	...	...	54.5 1625
3	90.0	116	26.7	..	90.0	40.5	75.0	112	15.4	262	58.0 1625
4	89.8	110	26.8	..	88.0	40.5	74.5	...	...	...	59.5 1625
5	90.2	112	27.1	..	103.0	40.5	70.5	115	15.4	255	54.5 1750
6	90.2	114	27.0	83	90.7	40.2	64.0	...	...	...	57.5 1685
7	89.5	110	27.2	..	84.5	40.2	65.0	120	15.4	264	54.8 1685
8	90.7	118	27.5	..	83.0	40.2	65.0	...	...	...	53.5 2180
9	90.6	114	27.5	..	81.0	40.2	65.0	117	15.4	268	54.0 2320
10	90.7	115	27.4	80	81.0	40.2	65.0	...	...	...	54.5 1560
Av.	90.0	114	27.0	82	88.0	40.0	69.0	116	15.4	262	55.6 1785

Brake load = 155 # net.

Water rate per D.H.P. = 49.1

Quality = 97.7 %

" " " I.H.P = 42.7

D.H.P. = 6.64

Mech. eff. = 87.1 %

I.H.P. = 7.62

9	2.07	56.1	3.74	12	124	35	3.5	17.0
10	1.98	53.1	3.54	13	124	36	3.5	17.0
Av.	2.00	54.5	3.55	17.2	123	35	3.44	17.0

S- V - 9.

HEAD Barom. = 29.152" = 14.4 #.

No.	RPM	Gauge Reading		Temperature			Calorimeter			Weight		
		Gau	Vac.	Eng. r'm	Con S	Inj water	Gau.	Press	Temp	Con	Inj water	
1	85.8	120	25.0	80	89.0	40.2	69.0	120	15.4	264	68.5	....
2	90.5	123	26.0	..	89.0	40.0	69.0	...	....	...	67.5	2500
3	83.1	115	25.4	..	89.0	40.0	69.0	112	15.3	260	64.5	2310
4	84.3	106	25.0	..	89.0	40.0	70.0	...	....	...	63.3	2310
5	85.7	114	25.0	..	90.0	40.1	68.5	115	15.4	258	69.0	2380
6	85.8	114	25.1	80	90.0	40.2	75.0	...	....	...	60.0	2440
7	86.9	120	25.2	..	90.0	40.2	66.0	122	15.4	254	68.0	2310
8	85.3	120	25.2	..	88.0	40.0	67.0	...	....	...	71.0	2500
9	88.6	120	25.0	..	88.0	40.0	67.5	116	15.4	256	74.0	2560
10	83.9	120	25.4	80	89.0	40.0	68.0	...	....	...	74.5	2500

Av 86.0 117 25.2 80 89.0 40.0 69.0 117 15.4 258 68.5 2423

Brake load = 215 # net.

Water rate per D.H.P. = 46.7

D.H.P. = 8.8 I.H.P. = 40.3

Mech. eff. = 87%

Quality = 93 %

I.H.P. = 10.01

8 2.77 75.0 4.78 16 122 48 5.6 23.7

9 2.85 77.0 4.91 16 125 48 5.6 23.4

10 2.74 74.0 4.72 16 122 48 5.6 23.4

Av 2.82 76.2 4.82 16 123 48 5.6 23.4

HEAD END.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				
				End of comp	Cut-off	Rel.	Back	Cut-off % St.
1	2.96	80.0	5.10	16	128	54	5.6	27.1
2	3.12	84.5	5.37	16	132	50	4.5	27.1
3	3.00	81.0	5.16	16	122	52	5.6	31.2
4	2.90	78.5	5.00	16	116	52	5.6	33.9
5	3.01	81.5	5.19	16	124	52	5.6	30.5
6	3.03	82.0	5.22	16	124	52	5.6	31.2
7	3.04	82.2	5.23	16	130	52	5.6	29.5
8	2.96	80.0	5.10	16	128	50	5.6	27.2
9	2.95	80.0	5.10	16	124	52	5.6	28.8
10	2.97	80.2	5.11	16	128	49	5.6	27.1
Av.	2.99	81.0	5.16	16	126	52	5.5	29.7

Total I.H.P. = 10.01

C R A N K E N D.

1	2.75	74.4	4.74	16	132	48	5.6	21.2
2	2.84	77.0	4.91	16	132	49	4.8	22.0
3	2.88	78.0	4.97	16	124	48	4.8	25.4
4	2.80	75.6	4.82	16	116	48	4.8	30.5
5	2.83	76.5	4.86	16	124	48	4.8	25.4
6	2.85	77.0	4.91	16	125	50	4.8	26.1
7	2.85	77.0	4.91	16	130	49	5.6	25.4
8	2.77	75.0	4.78	16	128	48	5.6	23.7
9	2.85	77.0	4.91	16	128	48	5.6	25.4
10	2.74	74.0	4.72	16	129	48	5.6	22.4
Av.	2.82	76.2	4.85	16	129	48	5.1	24.8

W. H. & A. S. W. D.

1914-15

Out-let	W. H. & A. S. W. D.	W. H. & A. S. W. D.	W. H. & A. S. W. D.	W. H. & A. S. W. D.	W. H. & A. S. W. D.	W. H. & A. S. W. D.	W. H. & A. S. W. D.
1	128	18	128	18	128	18	128
2	128	18	128	18	128	18	128
3	128	18	128	18	128	18	128
4	128	18	128	18	128	18	128
5	128	18	128	18	128	18	128
6	128	18	128	18	128	18	128
7	128	18	128	18	128	18	128
8	128	18	128	18	128	18	128
9	128	18	128	18	128	18	128
10	128	18	128	18	128	18	128
11	128	18	128	18	128	18	128
12	128	18	128	18	128	18	128

Total 1. H. & A. S. W. D. = 15.00

W. H. & A. S. W. D.

1	128	18	128	18	128	18	128
2	128	18	128	18	128	18	128
3	128	18	128	18	128	18	128
4	128	18	128	18	128	18	128
5	128	18	128	18	128	18	128
6	128	18	128	18	128	18	128
7	128	18	128	18	128	18	128
8	128	18	128	18	128	18	128
9	128	18	128	18	128	18	128
10	128	18	128	18	128	18	128
11	128	18	128	18	128	18	128
12	128	18	128	18	128	18	128

50 - V - 2.

No.	RPM	St. gau	Vac.	Int	Eng	Con	Inj	Dis	Exh	Super	Con	Inj	Absolute Pressure.	
													End of comp	Out off	Rel	Back	Out-off % St.
1		.80	22.2	1.58	12.0	130	16.0	4.0	1.7	Barom. = 29.45" = 14.521#.				
2		.80	21.8	1.84	12.0	130	16.0	4.0	1.7					
3	95.7	121	26.3	393	82	88	59.5	79	111	43.0	..	....
4	95.9	118	26.3	398	..	88	59.5	79	111	50.3	31	1625		
5	95.8	125	26.3	402	..	87	59.5	79	110	51.4	29	1625		
6	95.6	125	26.3	413	84	87	59.5	77	113	64.1	30	1750		
7	95.8	115	26.3	409	..	86	59.5	77	117	56.2	29	1750		
8	95.8	115	26.3	418	..	85	59.5	77	119	70.9	29	1688		
9	95.1	114	26.4	407	84	85	59.5	76	120	60.5	31	1875		
10	96.1	118	26.3	391	..	86	59.5	86	114	42.1	28	1815		
Av.	95.5	115	26.2	387	..	86	70.0	93	115	59.9	33	1815		
10	95.8	109	26.0	406	84	92	62.5	99	114	62.5	30	1000		
Av.	95.7	117	26.3	...	..	87	61.5	82	114	54.1	30	1660	

Brake load = 62.5 # net. Water rate per I.H.P. = 48.7

Mech. eff. = 77 % " " " D.H.P. = 63.2

D.H.P. = 2.84

I.H.P. = 3.69

10	1.10	28.9	2.13	12.0	108	20.0	4.0	1.0
Av.	1.11	29.1	2.13	11.0	128	19.0	4.0	1.0

Total I.H.P. = 5.69.

Baron = 20.48" = 16.32 %

St. No.	RPM	St. No.	Vac. In. Hg	Int. In. Hg	Con. In. Hg	Dis. Water	Dis. Water	Exh. Heat	Super. Con. In. Hg
1	...	100	28.3	28.8	28	28	28	111	48.0
2	28.2	108	28.2	28.8	..	28	28	111	50.2
3	28.7	121	28.2	28.8	..	27	28	110	51.4
4	28.2	118	28.2	28.8	24	27	28	118	54.1
5	28.2	122	28.2	28.8	..	28	28	117	54.2
6	28.2	115	28.2	28.8	..	28	28	116	57.2
7	28.2	114	28.2	28.8	24	28	28	120	58.2
8	28.2	118	28.2	28.8	..	28	28	114	42.1
9	28.2	115	28.2	28.8	..	28	28	113	38.2
10	28.2	118	28.2	28.8	24	28	28	114	32.2
av.	28.2	117	28.2	28.8	..	27	28	114	54.1

Water loss = 22.5 % loss. Water rate per I.H.P. = 48.7

Exh. Heat = 48.0 D.H.P. = 32.2

D.H.P. = 2.24

I.H.P. = 7.22

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of Comp	Cut off	Rel	Back	
1	.82	22.2	1.52	12.0	122	16.8	4.8	1.3
2	.80	21.6	1.54	12.0	120	16.0	4.0	1.7
3	.80	21.6	1.54	16.0	126	16.0	4.0	1.4
4	.80	21.6	1.55	12.0	121	16.0	4.0	1.7
5	.80	21.7	1.54	12.0	130	16.0	4.0	1.0
6	.85	23.0	1.64	12.8	119	16.8	4.0	1.7
7	.84	22.8	1.62	12.0	119	16.8	4.8	1.7
8	.80	21.7	1.54	12.0	114	16.0	4.0	.7
9	.82	22.2	1.52	9.8	106	17.6	4.0	.7
10	.80	21.6	1.55	12.0	104	16.0	4.0	1.3
Av.	.81	22.0	1.56	12.2	118	16.4	4.2	1.3
C R A N K E N D.								
11	1.12	30.4	2.16	12.0	126	10.1	4.8	1.0
12	1.11	30.1	2.14	12.0	121	20.4	4.0	1.0
13	1.15	31.2	2.22	12.0	126	20.4	4.0	1.0
Av.	1.10	30.0	2.12	12.0	122	20.4	4.0	.7
14	1.07	29.0	2.06	12.0	132	21.6	4.8	..
15	1.12	30.4	2.16	8.0	119	20.0	3.2	.7
16	1.07	29.0	2.06	12.0	119	20.0	4.8	1.0
17	1.15	31.2	2.22	8.0	120	20.0	4.0	..
18	1.10	29.9	2.13	12.0	108	20.0	3.2	..
19	1.10	29.9	2.13	10.0	112	20.0	4.8	1.0
Av.	1.11	30.1	2.13	11.0	122	19.3	4.2	.6

Total I.H.P. = 3.69.

No. Area	P.E.P.	I.H.P.	of	of	of	of	of
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00
9	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
11	1.00	1.00	1.00	1.00	1.00	1.00	1.00

12	1.00	1.00	1.00	1.00	1.00	1.00	1.00
13	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00
15	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00
19	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00
21	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00
23	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Total I.H.P. = 3.00

50 - V - 5

No. Area H.E.P. I.H.P. Absolute Pressure.
Barom. = 29.6" Hg
of off comp. Out-off % St.

No	RPM	St. gau	Vac.	Temperatures.							Weights.	
				Ent S	Eng r'm	Con S	Inj wtr	Dis wtr	Exh	Super heat	Con S	Inj water
1	....	118	26.5	404	84	85.0	53.1	71.0	110	55.7	....	....
2	93.0	117	26.6	426	..	85.0	53.5	72.0	110	77.8	40.0	2250
3	93.6	113	26.5	399	..	86.0	53.0	70.0	109	53.1	43.5	2500
4	93.4	114	26.6	420	85	84.5	53.0	71.0	110	73.5	38.0	2380
5	93.6	124	26.6	410	..	84.0	52.8	71.0	110	57.8	40.0	2380
6	93.1	118	26.6	414	..	84.5	52.8	71.0	122	65.2	38.5	2440
7	92.6	120	26.7	430	86	85.0	53.0	74.0	128	80.0	39.5	2120
8	93.0	109	26.6	432	..	85.7	53.0	73.6	113	68.5	42.5	2060
9	92.3	123	26.6	418	89	85.0	53.1	73.5	111	66.3	41.7	2120
10	93.2	125	26.6	434	..	87.0	53.2	74.0	113	81.2	41.5	2120

Av. 93.0 118 26.5 420 86 85.0 53.0 72.0 115 70.0 40.7 2260

1.34 14.0 3.02 10.4 120 28 4 7.6

1.35 Drake load = 125 # net.

1.74 D.H.P. = 5.53

1.35 Mech. eff. = 85.3 %

1.37 Water rate per D.H.P. = 44.0

1.65 " " " I.H.P. = 37.3

1.76 I.H.P. = 6.48

1.67 45.3 5.14 12.0 124 29 4 6.8

1.75 47.5 3.22 12.0 125 29 4 6.8

Av. 1.70 46.0 3.20 10.5 121 28 4 7.1

50 - v - 7

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Out-off % St.
				End of comp.	Out off	Rel	Back	

comp. = 29.318" = 14.6 f.

1	1.67	45.3	3.14	12	120	28	4	8.5
2	1.73	46.9	3.24	12	116	28	4	8.1
3	1.72	46.6	3.22	11.2	112	28	4	8.6
4	1.80	48.6	3.38	8.8	116	29	4	8.5
5	1.73	48.2	3.34	12.0	128	28	4	6.8
6	1.75	47.5	3.28	16.0	125	30	4	8.5
7	1.74	47.2	3.28	12.0	128	28	4.8	7.5
8	1.75	47.5	3.28	12.0	108	30	4.0	10.3
9	1.80	48.8	3.38	12.0	126	29	4	8.1
10	1.73	47.0	3.26	12.0	126	29	4	8.1
Av.	1.74	47.3	3.28	12.0	121	28.6	4	8.3

C R A N K E N D.

1	1.70	46.1	3.20	11.2	123	28	4	7.1
2	1.64	44.5	3.08	10.4	120	28	4	7.5
3	1.65	47.7	3.50	8.0	112	28	4	8.8
4	1.74	47.2	3.28	8.0	120	28	4	6.8
5	1.65	44.7	3.10	12.0	126	28	4	6.1
6	1.67	45.2	3.13	12.0	125	28	4	6.8
7	1.65	44.7	3.09	12.0	126	29	4	6.6
8	1.78	48.2	3.34	11.2	108	28	4	8.6
9	1.67	45.3	3.14	12.0	126	29	4	6.8
10	1.75	47.5	3.28	12.0	125	28	4	6.8
Av.	1.70	46.0	3.20	10.8	121	28	4	7.1

Cont-ent H. S. D.	W. H. R. S. D.	W. H. R. S. D.	W. H. R. S. D.	W. H. R. S. D.	W. H. R. S. D.	W. H. R. S. D.	W. H. R. S. D.
1.0	4	32	100	12	1.14	1.07	10.1
1.1	4	32	112	12	1.24	1.17	10.1
1.2	4	32	112	11.8	1.24	1.27	10.1
1.3	4	32	112	11.8	1.34	1.37	10.1
1.4	4	32	112	12.0	1.34	1.47	10.1
1.5	4	32	112	12.0	1.34	1.57	10.1
1.6	4	32	112	12.0	1.34	1.67	10.1
1.7	4	32	112	12.0	1.34	1.77	10.1
1.8	4	32	112	12.0	1.34	1.87	10.1
1.9	4	32	112	12.0	1.34	1.97	10.1
2.0	4	32	112	12.0	1.34	2.07	10.1
AV.	4	32	112	12.0	1.34	2.17	10.1

W. H. R. S. D.

1.1	4	32	112	11.2	1.24	1.17	10.1
1.2	4	32	112	11.4	1.24	1.27	10.1
1.3	4	32	112	11.6	1.24	1.37	10.1
1.4	4	32	112	11.8	1.24	1.47	10.1
1.5	4	32	112	12.0	1.24	1.57	10.1
1.6	4	32	112	12.0	1.24	1.67	10.1
1.7	4	32	112	12.0	1.24	1.77	10.1
1.8	4	32	112	12.0	1.24	1.87	10.1
1.9	4	32	112	12.0	1.24	1.97	10.1
2.0	4	32	112	12.0	1.24	2.07	10.1
AV.	4	32	112	12.0	1.24	2.17	10.1

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp	Out off	Rel.	Back	
1	2.20	59.7	4.07	17	Barom. = 29.216"	= 14.4 #.		
2	2.19	63.0	4.07	12	13	76	4.0	12.0

No.	RPM	St. Gap	Vac	Temperatures.						Weights.		
				Ent St.	Eng r'm	Con St.	Inj wtr	Dis wtr	Exh	Super heat	Cond St.	Inj wtr
1	....	...	..	408	86	82	54	72	113	54.1	..	..
2	94.4	127	26	408	..	83	54	72	113	53.5	45	42
3	94.9	126	26	406	..	83	54	72	113	46.6	47	44
4	94.1	137	26	397	88	83	54	72	116	47.0	46	43
5	93.8	120	26	404	..	85	54	70	112	50.6	46	45
6	92.2	126	26	408	..	85	54	72	114	50.9	44	42
7	89.8	115	26	426	89	84	54	72	118	76.0	44	41
8	89.9	120	26	390	..	86	54	78	117	41.7	44	38
9	89.4	117	26	436	..	87	54	76	114	60.4	44	33
10	90.7	130	23	426	..	85	54	75	114	76.4	41	34

Av.	91.8	123	26	411	88	84	54	73	114.5	58.7	44.5	40.2
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3 Brake load = 155 # net. Water rate per I.H.P. = 34.9 #.
 7 I.H.P. = 7.66 8 " " " " D.H.P. = 39.9 #.
 9 D.H.P. = 6.7
 8 Mech. eff. = 87.5
 10 2.00 54.8 3.70 8 128 31.0 4.0 3.0
 Av. 1.32 54.0 3.70 9.1 131 34.3 3.9 3.3

Total I.H.P. = 7.98

London = 10.00 = 10.00

Year	Month	Day	Rate	Amount	Total
1911	Jan	1	10.00	10.00	10.00
1911	Jan	2	10.00	10.00	20.00
1911	Jan	3	10.00	10.00	30.00
1911	Jan	4	10.00	10.00	40.00
1911	Jan	5	10.00	10.00	50.00
1911	Jan	6	10.00	10.00	60.00
1911	Jan	7	10.00	10.00	70.00
1911	Jan	8	10.00	10.00	80.00
1911	Jan	9	10.00	10.00	90.00
1911	Jan	10	10.00	10.00	100.00
1911	Jan	11	10.00	10.00	110.00
1911	Jan	12	10.00	10.00	120.00
1911	Jan	13	10.00	10.00	130.00
1911	Jan	14	10.00	10.00	140.00
1911	Jan	15	10.00	10.00	150.00
1911	Jan	16	10.00	10.00	160.00
1911	Jan	17	10.00	10.00	170.00
1911	Jan	18	10.00	10.00	180.00
1911	Jan	19	10.00	10.00	190.00
1911	Jan	20	10.00	10.00	200.00
1911	Jan	21	10.00	10.00	210.00
1911	Jan	22	10.00	10.00	220.00
1911	Jan	23	10.00	10.00	230.00
1911	Jan	24	10.00	10.00	240.00
1911	Jan	25	10.00	10.00	250.00
1911	Jan	26	10.00	10.00	260.00
1911	Jan	27	10.00	10.00	270.00
1911	Jan	28	10.00	10.00	280.00
1911	Jan	29	10.00	10.00	290.00
1911	Jan	30	10.00	10.00	300.00
1911	Jan	31	10.00	10.00	310.00
1911	Jan	31	10.00	10.00	320.00

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 2100 = 10.00

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp	Cut off	Rel	Back	
1	2.20	59.7	4.07	12	133	36	4.0	11.0
2	2.18	59.0	4.02	12	132	36	4.0	12.0
3	2.25	60.5	4.12	12	140	26	4.0	10.0
4	2.14	58.0	3.95	8	125	36	2.4	11.0
5	2.30	62.5	4.25	12	132	40	4.0	12.0
6	2.20	55.4	4.12	12	125	36	3.2	10.0
7	2.00	54.2	3.70	12	128	36	4.0	10.0
8	2.05	55.5	3.78	8	124	36	3.2	10.0
9	2.05	55.5	3.78	8	136	36	4.0	8.5
10	2.10	57.0	3.83	8	124	36	3.2	10.0
Av.	2.14	57.7	3.96	10.4	130	36	3.6	10.4

C R A N K E N D.

1	1.95	53.0	3.61	8	134	32.0	4.0	8.5
2	2.03	55.0	3.75	8	136	33.6	4.0	8.5
3	2.00	54.2	3.70	8	140	34.4	4.0	7.0
4	1.93	52.2	3.56	12	124	36.0	4.0	8.0
5	2.05	55.5	3.78	12	132	36.0	3.2	8.5
6	1.98	55.4	4.00	11	128	36.0	4.0	8.0
7	1.90	51.5	3.51	8	128	32.0	4.0	7.0
8	2.00	54.2	3.70	8	124	36.0	4.0	12.0
9	2.05	55.5	3.78	8	136	36.0	4.0	7.0
10	2.00	54.2	3.70	8	128	36.0	4.0	8.8
Av.	1.98	54.0	3.70	9.1	131	34.8	3.9	8.3

Total I.H.P. = 7.66.

Comp	Oil	Oil	Oil	Oil	Oil	Oil	Oil	Oil	Oil	Oil	Oil	
1	11.0	4.0	133	38	133	38	4.0	11.0	11.0	4.0	133	38
2	12.0	4.0	133	38	133	38	4.0	12.0	12.0	4.0	133	38
3	10.0	4.0	140	38	140	38	4.0	10.0	10.0	4.0	140	38
4	11.0	3.4	133	38	133	38	3.4	11.0	11.0	3.4	133	38
5	12.0	4.0	133	40	133	40	4.0	12.0	12.0	4.0	133	40
6	10.0	3.2	133	38	133	38	3.2	10.0	10.0	3.2	133	38
7	10.0	4.0	133	38	133	38	4.0	10.0	10.0	4.0	133	38
8	10.0	3.2	134	38	134	38	3.2	10.0	10.0	3.2	134	38
9	8.8	4.0	133	38	133	38	4.0	8.8	8.8	4.0	133	38
10	10.0	3.2	134	38	134	38	3.2	10.0	10.0	3.2	134	38
Average	10.4	3.8	130	38	130	38	3.8	10.4	10.4	3.8	130	38

G R A N K E N D.

1	8.8	4.0	134	38	134	38	4.0	8.8	8.8	4.0	134	38
2	8.8	4.0	133	38	133	38	4.0	8.8	8.8	4.0	133	38
3	7.0	4.0	130	38	130	38	4.0	7.0	7.0	4.0	130	38
4	8.0	4.0	134	38	134	38	4.0	8.0	8.0	4.0	134	38
5	8.8	3.2	133	38	133	38	3.2	8.8	8.8	3.2	133	38
6	8.0	4.0	133	38	133	38	4.0	8.0	8.0	4.0	133	38
7	7.0	4.0	133	38	133	38	4.0	7.0	7.0	4.0	133	38
8	12.0	4.0	134	38	134	38	4.0	12.0	12.0	4.0	134	38
9	7.0	4.0	133	38	133	38	4.0	7.0	7.0	4.0	133	38
10	8.8	4.0	133	38	133	38	4.0	8.8	8.8	4.0	133	38
Average	8.2	3.9	131	38	131	38	3.9	8.2	8.2	3.9	131	38

Total I.H.P. = 7.82

50 - V - 9

No.	RPM	Str. Gau	Vac	Ent S	Temperatures					Weights.		
					Eng r'm	Con S	Inj wtr	Dis wtr	Exh	Super heat	Con S	Inj water
Barom. = 29.216" = 14.4 #.												
1	83.5	117	26	416	90	89	55	78	116	67.7	..	..
2	83.3	117	26	420	..	89	55	78	118	71.7	52	42
3	83.3	115	26	414	..	90	55	77	118	67.0	52	41
4	82.9	112	26	426	..	90	55	77	118	80.7	52	41
5	81.7	110	26	417	90	90	55	78	118	73.0	52	41
6	82.5	112	26	392	..	90	56	78	118	46.7	53	42
7	82.7	115	26	414	..	91	56	77	118	67.0	53	42
8	82.7	122	26	413	..	91	56	78	121	62.0	55	41
9	83.7	120	26	415	90	90	56	76	117	65.0	53	43
10	83.0	119	26	402	..	90	56	78	118	52.5	53	43
Av.	83.5	116	26	413	90	90	55.5	77.3	118	67.3	52.8	41.8
Brake load = ? Water rate per I.H.P. = 33.4 #. I.H.P. = 9.48 " " " D.H.P. = 37.0 #. D.H.P. = 8.56 Mech. eff. = 80.5 %												
Av.	83.5	116	26	413	90	90	55.5	77.3	118	67.3	52.8	41.8

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.	
				End of comp	Cut off	Rel	Back		
1	2.78	75.5	4.80	12.0	124	48	4.0	25	
2	2.88	78.0	4.82	12.0	124	52	4.0	26	
3	2.85	77.5	4.80	12.0	124	50	4.0	26	
4	2.86	77.5	4.80	12.0	120	50	3.2	29	
5	2.92	79.2	4.90	12.0	117	52	4.0	32	
6	2.85	77.2	4.80	16.0	118	52	3.2	28	
7	2.83	76.7	4.77	12.0	122	52	3.2	27	
8	2.85	77.2	4.80	12.0	128	50	2.4	24	
9	2.80	76.0	4.71	12.0	126	48	4.0	24	
10	2.85	77.2	4.80	9.6	126	52	4.0	25	
Av.	2.84	77.2	4.80	12.0	123	50.6	3.6	25.6	
				C R A N K E N N D.					
1	2.69	73.0	4.52	8.0	126	48	4.0	24	
2	2.80	76.0	4.72	8.0	124	50	2.4	25	
3	2.75	74.5	4.62	8.0	124	48	4.0	25	
4	2.82	76.5	4.75	9.6	120	50	4.0	29	
5	2.86	77.5	4.80	12.0	120	52	4.0	29	
6	2.75	74.5	4.62	12.0	120	50	4.0	27	
7	2.83	76.7	4.77	9.6	122	48	4.0	27	
8	2.80	76.0	4.71	12.0	128	48	3.6	24	
9	2.75	74.5	4.62	8.0	126	48	4.0	24	
10	2.83	76.7	4.75	9.6	126	52	4.0	25	
Av.	2.78	75.5	4.68	9.7	123	49.4	3.8	26	

Total I.H.P. = 9.48.

A. H. A. M. L. M. D.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure		Inlet	Out-let	Inlet	Out-let
				psi	psi				
1	2.75	75.5	4.30	18.0	184	48	4.0	28	
2	2.85	75.0	4.35	18.0	184	58	4.0	28	
3	2.95	74.5	4.40	18.0	184	68	4.0	28	
4	3.05	74.0	4.45	18.0	184	78	4.0	28	
5	3.15	73.5	4.50	18.0	184	88	4.0	28	
6	3.25	73.0	4.55	18.0	184	98	4.0	28	
7	3.35	72.5	4.60	18.0	184	108	4.0	28	
8	3.45	72.0	4.65	18.0	184	118	4.0	28	
9	3.55	71.5	4.70	18.0	184	128	4.0	28	
10	3.65	71.0	4.75	18.0	184	138	4.0	28	
11	3.75	70.5	4.80	18.0	184	148	4.0	28	
Av.	3.84	70.2	4.80	18.0	184	20.8	4.8	28.8	

A. H. A. M. L. M. D.

1	2.82	75.0	4.32	18.0	184	48	4.0	28
2	2.92	74.5	4.37	18.0	184	58	4.0	28
3	3.02	74.0	4.42	18.0	184	68	4.0	28
4	3.12	73.5	4.47	18.0	184	78	4.0	28
5	3.22	73.0	4.52	18.0	184	88	4.0	28
6	3.32	72.5	4.57	18.0	184	98	4.0	28
7	3.42	72.0	4.62	18.0	184	108	4.0	28
8	3.52	71.5	4.67	18.0	184	118	4.0	28
9	3.62	71.0	4.72	18.0	184	128	4.0	28
10	3.72	70.5	4.77	18.0	184	138	4.0	28
Av.	3.78	70.5	4.78	18.0	184	48.4	4.8	28

100 - V - 2

No.	Area	H.H.P.	I.H.P.	Absolute Pressure.				Out-off % St.
				End of comp.	Out off	Del	Back	
				Barom. = 29.6" = 14.6 #.				
1	.80	24.4	1.77	12	109	14.8	3.2	0.0
2	1.00	27.1	1.97	12	108	14.0	1.8	0

No.	RPM	St. gua	Vac	Temperatures						Weights.		
				Ent S	Eng r'm	Con S	Inj water	Dis water	Exh	Super heat	Con S	Inj water
1	98.0	120	26.8	421	93	83.5	53.7	63.5	130	71.0	....	....
2	98.0	115	26.8	423	..	82.0	53.6	66.0	133	76.0	25.5	2500
3	98.0	120	26.9	430	..	79.5	53.8	67.5	134	80.0	24.5	2380
4	98.1	120	27.0	438	95	78.5	54.4	65.5	133	88.0	29.0	2500
5	97.8	112	27.1	445	..	77.5	54.0	65.0	134	99.7	27.0	2620
6	97.7	108	27.0	452	..	77.0	54.0	65.0	134	109.0	26.5	2440
7	97.7	112	27.1	448	96	76.5	54.0	65.0	134	99.0	27.5	2750
8	97.9	112	27.0	441	..	78.5	54.0	65.0	134	95.7	26.0	2560
9	97.9	118	27.0	458	..	76.0	54.0	65.0	133	109	24.5	2560
10	97.9	115	27.0	461	96	76.0	54.0	64.0	134	114	24.5	2620

Av.	97.9	116	27.0	442	95	76.5	53.9		133	94.1	26.0	2549
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Brake load = 62.5 # net.

D.H.P. = 2.91

Mech. Eff. = 78.7 %

Water rate per D.H.P. = 53.6

" " " I.H.P. = 42.2

I.H.P = 3.7

Total I.H.P. = 3.70

100 - V - 5 No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp	Cut off	Rel	Back	
1	.90	24.4	1.77	12.0	109	16.8	3.2	0.0
2	1.00	27.1	1.97	12	108	24.0	1.6	0
3	.88	23.8	1.74	13.6	116	16.8	4.0	0
4	.86	23.3	1.69	12.0	112	17.6	4.0	0
5	.85	23.0	1.67	12.0	106	17.6	4.0	0
6	.82	22.2	1.62	12.0	104	17.6	4.0	0
7	.90	24.4	1.77	12.0	114	17.6	3.2	0
8	.91	24.6	1.79	12.0	112	18.4	4.0	0
9	.96	26.0	1.89	12.0	112	18.4	4.0	0
10	.97	26.3	1.92	9.6	114	19.2	3.2	0
Av.	1.90	24.5	1.76	12.0	111	18.4	3.5	0

C R A N K E N D.

1	1.00	27.1	1.97	8.6	109	20.0	2.4	0
2	.85	23.0	1.67	12.0	112	18.4	4.0	0
3	1.00	27.1	1.97	8.0	116	20.4	4.0	0
4	1.40	38.0	2.73	8.0	116	20.0	3.2	0
5	1.00	27.1	1.90	8.0	108	20.0	3.2	0
6	1.00	27.5	1.79	8.0	106	14.4	3.2	0
7	.91	24.6	1.78	8.0	114	20.0	3.2	0
8	.90	24.4	1.77	8.0	112	19.2	3.2	0
9	.92	24.9	1.81	8.6	112	19.2	3.2	0
10	.93	25.2	1.83	8.00	112	18.4	3.2	0
Av.	1.00	25.8	1.92	8.5	112	19.0	3.3	0

Total I.H.P. = 3.70.

100 - V - 5

HEAD END.

100 - V - 5

No.	Area	M.S.P.	I.H.P.	End of comp	Cut off	Rel	Back	Cut-off % St.
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Barom. = 29.6" = 14.65 #.

Temperatures

Weights

No.	RPM	St. gau	Vac	Ent PS	Eng r'm	Con \$	Inj water	Dis water	Exh	Super heat	Con S	Inj water
1	....	122	26.5	448	89	84.0	53.5	72.8	120	96.9	31.5	2000
2	93.0	128	26.6	446	..	85.0	53.5	72.5	110	91.5	37.5	2300
3	94.3	122	26.6	432	..	84.5	53.6	72.2	130	80.9	35.5	2250
4	93.4	105	26.7	432	..	84.0	54.0	73.0	137	91.0	38.5	2310
5	93.2	120	26.7	432	89	84.5	54.0	70.0	131	82.0	37.0	2380
6	93.5	119	26.7	427	..	86.2	53.5	70.0	108	77.6	....	....
7	93.3	116	26.7	443	..	85.0	54.0	72.0	110	95.4	....	....
8	93.0	112	26.6	446	94	84.5	54.0	71.0	121	100	39.5	2380
9	93.6	115	26.6	447	..	84.0	54.0	70.5	129	100	37.0	2440
10	94.3	127	26.7	454	..	84.5	53.6	70.5	132	80.0

Av.	93.5	118.6	26.5	438	90	85.0	54.0	72.0	123	90.0	26.6	2306
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Brake load = 125 # net.

D.H.P. = 5.56

Mech. eff. = 86.5 %

I.H.P. = 6.43

Water rate per D.H.P. = 39.5

Av.	1.71	48.7	"	"	3.23	"	I.H.P. = 6.43	3.7	7.0
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Total I.H.P. = 6.43

Baron = 20.5" = 14.35 #

Date	Time	Temperature		Water
		in] Dis	in] Dis	
1	100 00.0	32.0	32.0	100 00.0
2	100 01.5	32.0	32.0	100 01.5
3	100 03.0	32.0	32.0	100 03.0
4	100 04.5	32.0	32.0	100 04.5
5	100 06.0	32.0	32.0	100 06.0
6	100 07.5	32.0	32.0	100 07.5
7	100 09.0	32.0	32.0	100 09.0
8	100 10.5	32.0	32.0	100 10.5
9	100 12.0	32.0	32.0	100 12.0
10	100 13.5	32.0	32.0	100 13.5
Av.	100 00.0	32.0	32.0	100 00.0

Frane load = 155 # net.

D.M.P. = 8.64

veon. off. = 88.5 #

D.M.P. = 8.43

water rate per D.M.P. = 89.5

" " " " D.M.P. = 84.3

100 - V - 5

HEAD END.

100 - V - 7

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp	Out off	Rel	Back	
1	1.75	47.5	3.30	12.0	125	29.6	3.2	7.4
2	1.72	46.6	3.23	12.0	130	28.0	4.0	6.8
3	1.72	46.6	3.22	12.0	128	28.0	4.8	6.8
4	1.72	46.6	3.22	12.0	112	28.0	4.0	10.3
5	1.75	47.5	3.30	8.8	122	28.8	3.2	8.1
6	1.75	47.5	3.30	9.6	124	28.0	2.4	7.1
7	1.65	44.7	3.10	12.0	120	28.0	4.8	7.5
8	1.65	44.7	3.10	12.0	116	28.0	4.0	8.5
9	1.65	44.7	3.10	12.0	120	28.0	4.0	8.5
10	1.62	44.0	3.05	12.0	130	28.0	4.0	6.1
Av.	1.70	46.0	3.20	11.6	122	28.0	3.8	7.7

CRANK END.

1	1.73	47.0	3.26	9.6	124	28.0	3.2	6.8
2	1.75	47.4	3.30	11.2	132	28.0	4.0	5.8
3	1.70	46.1	3.20	10.4	128	28.0	4.8	5.4
4	1.65	44.7	3.10	8.0	116	28.0	4.8	6.8
5	1.73	47.0	3.26	9.6	122	28.8	4.0	6.1
6	1.68	45.5	3.16	12.0	124	28.0	3.2	6.8
7	1.70	46.0	3.19	8.0	120	28.0	3.2	8.5
8	1.73	47.0	3.26	8.0	114	28.0	1.6	8.5
9	1.78	48.2	3.34	8.0	120	28.8	4.0	8.5
10	1.73	47.0	3.26	7.2	128	28.0	4.8	6.8
Av.	1.71	46.7	3.23	9.6	122	28.0	3.7	7.0

Total I.H.P. = 6.43.

K R A N

Col-off	Area	Area	Area	Area	Area	Area	Area
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

K R A N

1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

100 - V - 7

HEAD END.

100 - V - 7

No.	Area	H.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.				
				End of comp	Cut off	Rel Back	Back					
1	2.05	35.0	3.82	8	134	32	3.2	8.0				
2	2.04	33.5	3.85	8	128	30	4.0	10.0				
3	2.05	34.2	3.79	8	120	30	4.0	11.0				
4	2.00	34.2	3.73	Temperatures.				Weights.				
No.	RPM	St. Gau	Vac	Ent St.	Eng r'm	Cond St.	Inj wtr	Dis wtr	Exh	Super heat	Cond St.	Inj wtr
5	93.6	127	25.8	455	84	84	54	70	113	101	..	....
2	93.6	120	25.8	432	..	82	54	70	115	82	43	2940
3	95.8	114	25.8	429	..	82	54	71	115	82.5	42	2620
4	91.6	118	25.8	453	..	82	54	72	115	104	41	2560
5	92.1	120	25.8	460	86	82	54	72	113	100	39	2440
6	94.5	117	25.8	448	..	82	55	72	115	99.7	41	2460
7	94.0	120	25.8	463	..	82	55	71	114	113	41	2560
8	93.5	120	26.0	454	..	84	53	75	115	104	..	....
9	93.5	124	26.0	464	87	84	53	72	123	111	40	2500
10	93.5	119	26.0	456	..	83	53	73	135	107	39	2400
Av.	93.6	120	26.0	450	86	82.7	55	72	118	100	40.7	2585
5	2.00	34.2	3.73	8	120	30	4.0	8.5				
6	2.02	35.0	3.82	8	134	32	3.2	10.0				
7	2.00	34.2	3.73	8	120	30	4.0	8.5				
8	1.98	33.0	3.69	8	120	30	4.0	8.5				
9	1.96	33.2	3.69	8	120	30	4.0	8.5				
10	2.05	35.7	3.67	8	124	32	3.8	10.0				
Av.	2.00	34.5	3.72	8	127	30	3.7	9.5				

Brake load = 155 # net. Water rate per I.H.P. = 32.3 #.
 I.H.P. = 7.56 " " " D.H.P. = 35.4 #.
 D.H.P. = 9.9
 Mech. eff. = 91.2 %

Total I.H.P. = 7.56.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp	Cut off	Rel	Back	
1	2.03	55.0	3.82	8	134	32	3.2	8.0
2	2.04	55.5	3.86	8	128	36	4.0	10.0
3	2.00	54.2	3.78	8	120	36	4.0	11.0
4	2.00	54.2	3.78	8	124	36	4.0	10.0
5	2.00	54.2	3.78	9	128	36	4.0	9.0
6	2.02	55.0	3.82	8	124	36	2.4	10.0
7	2.00	54.2	3.78	8	126	36	4.0	10.0
8	1.95	53.0	3.68	8	128	36	4.0	8.5
9	2.00	54.2	3.78	8	130	32	4.0	9.0
10	1.96	53.2	3.68	8	124	36	2.4	9.0
Av.	2.00	54.2	3.77	8	127	35	3.6	9.5

C R A N K E N D.

1	2.05	55.7	3.87	8	134	36	3.2	10.0
Av.	2.05	55.5	3.86	8	130	36	4.0	10.0
3	2.00	54.2	3.78	8	118	36	4.0	11.0
4	2.01	54.6	3.80	8	124	36	4.0	10.0
5	2.00	54.2	3.78	8	128	36	4.0	8.5
6	2.02	55.0	3.82	8	124	36	3.2	10.0
7	2.00	54.2	3.78	8	126	36	4.0	9.0
8	1.95	53.0	3.68	8	126	36	4.0	8.5
9	1.96	53.2	3.68	8	132	36	4.0	8.5
10	2.05	55.7	3.87	8	124	32	3.2	10.0
Av.	2.00	54.5	3.79	8	127	35	3.7	9.5

Total I.H.P. = 7.56.

Out-Off R St.	Out-Off R St.	Pressure psi	Temp deg	Flow gpm	Flow gpm	Flow gpm	Flow gpm
10.0	10.0	38 2.5	134	8	2.38	23.0	23.0
10.0	10.0	38 4.0	138	8	2.38	23.3	23.3
11.0	11.0	38 4.0	140	8	2.75	24.2	24.2
10.0	10.0	38 4.0	134	8	2.70	24.2	24.2
7.0	7.0	38 4.0	138	8	2.78	24.2	24.2
10.0	10.0	38 2.4	134	8	2.72	24.0	24.0
10.0	10.0	38 4.0	138	8	2.78	24.2	24.2
8.5	8.5	38 4.0	138	8	2.78	24.0	24.0
9.0	9.0	38 4.0	130	8	2.78	24.2	24.2
8.0	8.0	38 2.4	134	8	2.82	24.2	24.2
8.5	8.5	38 2.0	137	8	2.72	24.2	24.2

S M D S M D

10.0	10.0	38 3.2	134	8	2.72	24.2	24.2
10.0	10.0	38 4.0	130	8	2.78	24.0	24.0
11.0	11.0	38 4.0	138	8	2.72	24.2	24.2
10.0	10.0	38 4.0	134	8	2.78	24.2	24.2
8.2	8.2	38 4.0	138	8	2.78	24.2	24.2
10.0	10.0	38 2.2	134	8	2.82	24.0	24.0
9.0	9.0	38 4.0	138	8	2.78	24.2	24.2
8.8	8.8	38 4.0	138	8	2.82	24.0	24.0
8.8	8.8	38 4.0	138	8	2.82	24.2	24.2
10.0	10.0	38 2.2	134	8	2.82	24.2	24.2
9.8	9.8	38 2.7	137	8	2.78	24.2	24.2

No. Area K.E.P. I.H.P. End of Ont Rel. Back Out-off % St.
 of off
 Barom. = 29.486" = 14.55#.

No.	RPM	Gauge Readings.				Temperatures.				Weights.		
		Temp	Steam Gauge	Super heat	Vac	Eng r'm	Cons St.	Inj. Water	Dis. water	Exh.	Con. St. water	Inj. water
1	87.6	447	113	93.2	26	89	95	59	81	118	51	2330
2	87.9	455	125	102.2	26	89	95	59	81	132	50	2380
3	88.7	447	125	94.2	26	88	94	59	80	132	49	2440
4	88.0	478	130	122.4	26	89	94	59	78	138	49	2500
5	88.3	464	125	111.2	26	89	93	59	79	142	49	2500
6	87.4	454	115	106.9	26	88	93	59	83	143	47	2250
7	86.6	474	118	135.2	26	89	95	58	83	146	47	2060
8	87.5	454	117	105.7	26	89	95	58	83	142	49	2060
9	88.6	432	134	74.5	26	89	94	61	84	139	50	2310

Av. 87.9 455 123 103.0 26 89 94 59 83 136 49 2320

4 Brake load = 215 # net. Water rate per D.H.P. = 32.6#
 5 D.H.P. = 9.0 I.H.P. = 30.2#
 6 I.H.P. = 9.73.
 7 Mech. eff. = 92.5 %
 8 8.00 78.0 4.44 9.6 127 48.0 4 27
 9 8.30 77.4 5.04 10.0 130 48.0 4 27
 10 8.55 77.4 5.04 10.0 140 48.0 4 20
 Av. 8.55 77.3 5.00 10.0 139 47.0 4.0 24.2

Total I.H.P. = 9.73.

Station # 20, 1908 = M. 2008

Station	Temperature			Water level		
	Surf	1 ft	2 ft	ft	ft	ft
1908	81	80	79	1.2	1.1	1.0
1909	82	81	80	1.3	1.2	1.1
1910	83	82	81	1.4	1.3	1.2
1911	84	83	82	1.5	1.4	1.3
1912	85	84	83	1.6	1.5	1.4
1913	86	85	84	1.7	1.6	1.5
1914	87	86	85	1.8	1.7	1.6
1915	88	87	86	1.9	1.8	1.7
1916	89	88	87	2.0	1.9	1.8
1917	90	89	88	2.1	2.0	1.9
1918	91	90	89	2.2	2.1	2.0
1919	92	91	90	2.3	2.2	2.1
1920	93	92	91	2.4	2.3	2.2
1921	94	93	92	2.5	2.4	2.3
1922	95	94	93	2.6	2.5	2.4
1923	96	95	94	2.7	2.6	2.5
1924	97	96	95	2.8	2.7	2.6
1925	98	97	96	2.9	2.8	2.7
1926	99	98	97	3.0	2.9	2.8
1927	100	99	98	3.1	3.0	2.9
1928	101	100	99	3.2	3.1	3.0
1929	102	101	100	3.3	3.2	3.1
1930	103	102	101	3.4	3.3	3.2
1931	104	103	102	3.5	3.4	3.3
1932	105	104	103	3.6	3.5	3.4
1933	106	105	104	3.7	3.6	3.5
1934	107	106	105	3.8	3.7	3.6
1935	108	107	106	3.9	3.8	3.7
1936	109	108	107	4.0	3.9	3.8
1937	110	109	108	4.1	4.0	3.9
1938	111	110	109	4.2	4.1	4.0
1939	112	111	110	4.3	4.2	4.1
1940	113	112	111	4.4	4.3	4.2
1941	114	113	112	4.5	4.4	4.3
1942	115	114	113	4.6	4.5	4.4
1943	116	115	114	4.7	4.6	4.5
1944	117	116	115	4.8	4.7	4.6
1945	118	117	116	4.9	4.8	4.7
1946	119	118	117	5.0	4.9	4.8
1947	120	119	118	5.1	5.0	4.9
1948	121	120	119	5.2	5.1	5.0
1949	122	121	120	5.3	5.2	5.1
1950	123	122	121	5.4	5.3	5.2
1951	124	123	122	5.5	5.4	5.3
1952	125	124	123	5.6	5.5	5.4
1953	126	125	124	5.7	5.6	5.5
1954	127	126	125	5.8	5.7	5.6
1955	128	127	126	5.9	5.8	5.7
1956	129	128	127	6.0	5.9	5.8
1957	130	129	128	6.1	6.0	5.9
1958	131	130	129	6.2	6.1	6.0
1959	132	131	130	6.3	6.2	6.1
1960	133	132	131	6.4	6.3	6.2
1961	134	133	132	6.5	6.4	6.3
1962	135	134	133	6.6	6.5	6.4
1963	136	135	134	6.7	6.6	6.5
1964	137	136	135	6.8	6.7	6.6
1965	138	137	136	6.9	6.8	6.7
1966	139	138	137	7.0	6.9	6.8
1967	140	139	138	7.1	7.0	6.9
1968	141	140	139	7.2	7.1	7.0
1969	142	141	140	7.3	7.2	7.1
1970	143	142	141	7.4	7.3	7.2
1971	144	143	142	7.5	7.4	7.3
1972	145	144	143	7.6	7.5	7.4
1973	146	145	144	7.7	7.6	7.5
1974	147	146	145	7.8	7.7	7.6
1975	148	147	146	7.9	7.8	7.7
1976	149	148	147	8.0	7.9	7.8
1977	150	149	148	8.1	8.0	7.9
1978	151	150	149	8.2	8.1	8.0
1979	152	151	150	8.3	8.2	8.1
1980	153	152	151	8.4	8.3	8.2
1981	154	153	152	8.5	8.4	8.3
1982	155	154	153	8.6	8.5	8.4
1983	156	155	154	8.7	8.6	8.5
1984	157	156	155	8.8	8.7	8.6
1985	158	157	156	8.9	8.8	8.7
1986	159	158	157	9.0	8.9	8.8
1987	160	159	158	9.1	9.0	8.9
1988	161	160	159	9.2	9.1	9.0
1989	162	161	160	9.3	9.2	9.1
1990	163	162	161	9.4	9.3	9.2
1991	164	163	162	9.5	9.4	9.3
1992	165	164	163	9.6	9.5	9.4
1993	166	165	164	9.7	9.6	9.5
1994	167	166	165	9.8	9.7	9.6
1995	168	167	166	9.9	9.8	9.7
1996	169	168	167	10.0	9.9	9.8
1997	170	169	168	10.1	10.0	9.9
1998	171	170	169	10.2	10.1	10.0
1999	172	171	170	10.3	10.2	10.1
2000	173	172	171	10.4	10.3	10.2

Station # 20, 1908 = M. 2008
Station # 20, 1908 = M. 2008

Station # 20, 1908 = M. 2008
Station # 20, 1908 = M. 2008

Station # 20, 1908 = M. 2008
Station # 20, 1908 = M. 2008

Station # 20, 1908 = M. 2008
Station # 20, 1908 = M. 2008

Station # 20, 1908 = M. 2008
Station # 20, 1908 = M. 2008

100 - V - 9

H E A D E N D .

150 - V - 2

No.	Area	M.E.P.	I.H.P.	End of comp	Cut off	Rel	Back	Out-off % St.
1	2.70	73.2	4.78	12.0	124	45.0	4	24
2	2.76	75.0	4.89	12.0	124	46.0	4	24
3	2.66	72.2	4.72	9.6	132	45.6	4	21
4	2.80	76.0	4.95	12.0	130	48.0	4	22
5	2.70	73.2	4.77	9.6	133	44.0	4	20
6	2.65	72.0	4.19	9.6	128	44.0	4	21
7	2.70	73.2	4.78	9.6	120	45.6	4	26
8	2.70	73.2	4.78	9.6	123	44.0	4	25
9	2.73	74.0	4.82	9.6	124	48.0	4.8	25
10	2.63	71.4	4.65	9.6	136	44.0	4	18
Av.	2.70	73.3	4.73	10.0	127	45.4	4	22.6

C R A N K E N D .

1	2.83	76.8	5.00	9.6	126	46.0	3.2	25
2	2.87	78.0	5.09	9.6	126	48.0	4.0	26
3	2.85	77.4	5.04	9.6	134	48.0	4	22
4	2.95	80.0	5.21	12.0	133	48.0	4	24
5	2.80	76.0	4.95	9.6	137	45.0	4	21
6	2.85	77.4	5.04	9.6	132	48.0	4	22
7	2.85	77.4	5.04	9.6	121	48.0	4	28
8	2.80	76.0	4.46	9.6	127	48.0	4	27
9	2.85	77.4	5.04	12.0	126	51.0	4.8	27
10	2.85	77.4	5.04	12.0	140	48.0	4	20
Av.	2.85	77.3	5.00	10.0	130	47.8	4.0	24.2

Total I.H.P. = 9.73.

Out-off N. 22.	Back	Net	Out off	Comp	L.H.P.	L.H.P.	Net	Out-off
24	4	124 48.0	12.0	4.78	12.0	12.0	12.0	12.0
24	4	124 48.0	12.0	4.78	12.0	12.0	12.0	12.0
21	4	122 48.0	12.0	4.78	12.0	12.0	12.0	12.0
22	4	120 48.0	12.0	4.78	12.0	12.0	12.0	12.0
20	4	122 48.0	12.0	4.77	12.0	12.0	12.0	12.0
21	4	122 48.0	12.0	4.78	12.0	12.0	12.0	12.0
22	4	120 48.0	12.0	4.78	12.0	12.0	12.0	12.0
22	4	122 48.0	12.0	4.78	12.0	12.0	12.0	12.0
22	4	122 48.0	12.0	4.78	12.0	12.0	12.0	12.0
22	4.8	124 48.0	12.0	4.82	12.0	12.0	12.0	12.0
19	4.1	122 48.0	12.0	4.82	12.0	12.0	12.0	12.0

22.0

C H A N G E R H D .

22	2.2	122 48.0	12.0	2.00	12.0	12.0	12.0	12.0
22	4.0	122 48.0	12.0	2.00	12.0	12.0	12.0	12.0
22	4	124 48.0	12.0	2.04	12.0	12.0	12.0	12.0
24	4	122 48.0	12.0	2.00	12.0	12.0	12.0	12.0
21	4	122 48.0	12.0	2.02	12.0	12.0	12.0	12.0
22	4	122 48.0	12.0	2.04	12.0	12.0	12.0	12.0
22	4	122 48.0	12.0	2.04	12.0	12.0	12.0	12.0
27	4	122 48.0	12.0	2.04	12.0	12.0	12.0	12.0
27	4.8	122 81.0	12.0	2.04	12.0	12.0	12.0	12.0
20	4	122 48.0	12.0	2.04	12.0	12.0	12.0	12.0
24.2	4.0	120 47.8	10.0	2.00	12.0	12.0	12.0	12.0

Total L.H.P. = 2.78

150 - V - 2

No.	RPM	St. Vac gua	K.E.P. 24.4 S	I.H.P. r'm S	Absolute Pressures.				Net 18.3	Back 4.00	Cut-off % St.	
					Int	Eng	Con	Inj				
1	97.0	118	28.2	478	92.0	83.5	50.0	68.0	126	129	26.0	1930
2	96.8	110	28.2	510	..	84.1	51.0	68.0		166	23.5	1870
3	97.1	120	28.1	532	..	82.0	54.6	65.0		182	21.5	1930
4	97.7	109	28.1	540	..	79.8	49.5	60.5		198	22.5	1930
5	97.5	120	28.1	528	92	77.5	48.7	60.0		178	21.0	1930
6	97.8	120	28.6	500	..	75.5	49.0	60.0		150	21.0	2180
7	96.0	115	28.5	470	..	74.0	49.0	60.5		123	22.0	2120
8	96.0	111	28.6	458	..	73.0	49.0	61.6		114	22.5	2180
9	97.2	118	28.4	464	92	73.0	49.0	61.6		115	24.1	2060
10	97.2	102	28.5	470	..	72.5	49.0	61.0		132	25.0	2180
Av.	97.0	114	28.3	495	92.72	77.4	50.0	62.6	17.6	148.7	23	2030
1	97.0	118	28.2	478	92.0	83.5	50.0	68.0	126	129	26.0	1930
2	96.8	110	28.2	510	..	84.1	51.0	68.0		166	23.5	1870
3	97.1	120	28.1	532	..	82.0	54.6	65.0		182	21.5	1930
4	97.7	109	28.1	540	..	79.8	49.5	60.5		198	22.5	1930
5	97.5	120	28.1	528	92	77.5	48.7	60.0		178	21.0	1930
6	97.8	120	28.6	500	..	75.5	49.0	60.0		150	21.0	2180
7	96.0	115	28.5	470	..	74.0	49.0	60.5		123	22.0	2120
8	96.0	111	28.6	458	..	73.0	49.0	61.6		114	22.5	2180
9	97.2	118	28.4	464	92	73.0	49.0	61.6		115	24.1	2060
10	97.2	102	28.5	470	..	72.5	49.0	61.0		132	25.0	2180
Av.	97.0	114	28.3	495	92.72	77.4	50.0	62.6	17.6	148.7	23	2030

Brake load = 67.5 # net.

Water rate

D.H.P. = 2.79

per D.H.P. = 49.4

Mech. eff. = 78 %

per I.H.P. = 38.7

I.H.P. = 3.57

Total I.H.P. = 3.57.

Barom. = 29.82"

Time	Barom.	Temp. Air	Temp. Water	Temp. Wet Bulb	Wind Dir.	Wind Spd.	Clouds	Remarks
10	29.82	72.5	49.0	61.0	..	..	..	..
9	29.82	72.5	49.0	61.0	..	..	..	..
8	29.82	72.5	49.0	61.0	..	..	..	..
7	29.82	72.5	49.0	61.0	..	..	..	..
6	29.82	72.5	49.0	61.0	..	..	..	..
5	29.82	72.5	49.0	61.0	..	..	..	..
4	29.82	72.5	49.0	61.0	..	..	..	..
3	29.82	72.5	49.0	61.0	..	..	..	..
2	29.82	72.5	49.0	61.0	..	..	..	..
1	29.82	72.5	49.0	61.0	..	..	..	..
Avg.	29.82	72.5	49.0	61.0	..	..	..	..

Water rate
per D.H.P. = 49.4

Water rate
per I.H.P. = 28.7

Grain feed = 27.8 & net.

D.H.P. = 2.72

Each. eff. = 72.2

I.H.P. = 2.57

Absolute Pressure.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.		Rel	Back	Cut-off % St.
				End of comp	Out off			
1	1.00	21.7	1.96	8	109	17.6	4.00	0
2	.91	24.6	1.78	8	104	16.0	4.00	0
3	.90	24.4	1.76	8	108	16.8	4.00	0
4	.90	24.4	1.77	8	102	16.8	4.00	0
5	.90	24.4	1.77	8	110	16.0	4.00	0
6	.90	24.4	1.77	8	108	16.0	4.00	0
7	.91	24.6	1.78	8	104	17.6	4.00	0
8	.97	26.3	1.91	8	104	18.4	4.00	0
9	.90	24.4	1.77	12	109	18.4	4.00	0
10	.87	23.6	1.71	8	100	16.0	4.00	0
Av.	.93	24.8	1.80	8.4	105	17.0	4.00	0

C R A N K E N D.

1	.91	24.6	1.78	8	109	19.2	4.00	0
2	.87	23.6	1.72	8	104	17.6	4.00	0
3	.95	25.7	1.86	8	109	16.0	4.00	0
4	.90	24.4	1.77	8	100	15.2	4.00	0
5	.90	24.4	1.77	8	108	17.6	4.00	0
6	.90	24.4	1.77	8	104	16.0	4.00	0
7	.91	24.6	1.78	8	102	16.8	4.00	0
8	.95	25.7	1.86	8	100	17.6	4.00	0
9	.86	23.3	1.69	8	104	17.6	4.00	0
10	.85	23.00	1.67	8	96	16.0	3.20	0
Av.	.90	24.4	1.77	8	104	17.0	4.00	0

Out-Off % St.	Absolute Pressure	W.G. Cot of Comp	W.G. Cot of Comp	W.G. Cot of Comp	W.G. Cot of Comp	W.G. Cot of Comp	W.G. Cot of Comp
0	17.8 4.00	102	8	1.77	24.7	1.00	1
0	18.0 4.00	104	8	1.77	24.8	.91	2
0	18.8 4.00	108	8	1.77	24.8	.80	3
0	18.8 4.00	108	8	1.77	24.8	.80	4
0	18.0 4.00	110	8	1.77	24.8	.80	5
0	18.0 4.00	108	8	1.77	24.8	.80	6
0	17.8 4.00	104	8	1.77	24.8	.91	7
0	18.4 4.00	104	8	1.91	25.2	.79	8
0	18.4 4.00	102	12	1.77	24.8	.90	9
0	18.0 4.00	100	8	1.77	24.8	.87	10
0	17.0 4.00	102	8 4	1.80	24.8	.93	Av.

C R A M R E W D.

0	18.2 4.00	102	8	1.77	24.8	.91	1
0	17.8 4.00	104	8	1.77	24.8	.87	2
0	18.0 4.00	108	8	1.77	24.8	.80	3
0	18.8 4.00	100	8	1.77	24.4	.80	4
0	17.8 4.00	102	8	1.77	24.4	.80	5
0	18.0 4.00	104	8	1.77	24.4	.80	6
0	18.8 4.00	102	8	1.77	24.8	.81	7
0	17.8 4.00	102	8	1.80	24.7	.80	8
0	17.8 4.00	104	8	1.80	24.8	.80	9
0	18.0 4.00	88	8	1.87	24.8	.80	10
0	17.0 4.00	104	8	1.77	24.4	.90	Av.

150 - V - 5.

Absolute Pressures.

No.	Area	H.S.P.	I.H.P.	End of Comp	Cut off	Rel	Back	Out-off ft.
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1	1.34	44.8	3.00	8	128	29	4	8.1
2	1.75	47.8	3.50	12	152	29	4	6.0

Barom. = 29.62".

Temperatures.

Weights

No.	RPM	St. gau	Vac	Ent S	Eng r'm	Con S	Inj water	Dis water	Super heat	Con S	Inj water
1	...	1129	28.0	465	880	76.8	46.1	62.8	110	...	...
2	93.6	1130	28.0	484	...	76.2	46.2	65.5	129	35.1	2310
3	92.4	1122	27.9	494	...	76.5	46.2	63.1	143	35.0	2060
4	93.4	1130	28.0	491	...	75.5	46.5	64.0	135	34.5	2250
5	93.5	1120	28.0	490	893	75.5	46.5	64.0	140	34.5	2180
6	93.5	1127	28.2	493	...	75.1	46.6	65.0	139	33.5	2120
7	93.0	1118	28.4	498	...	75.5	46.7	63.0	149	35.0	2120
8	93.6	105	28.1	486	887	75.0	46.9	62.0	145	33.7	2310
9	93.6	1130	28.1	470	...	77.0	46.7	65.0	114	36.0	2310
10	93.0	1118	28.1	498	...	76.5	46.7	64.0	149	34.5	2250
Av.	93.2	1123	28.0	487	886.6	76.0	46.4	63.8	135	34.5	2212

Brake load = 125 # net. Water rate per D.H.P. = 37.4

D.H.P. = 5.54 " " " " I.H.P. = 32.1

Mech. eff. = 86 %

I.H.P. = 6.45

10	1.70	46.0	3.12	8	118	28	8	6.8
Av.	1.71	45.9	3.18	8.4	125	28	4	6.9

Total I.H.P. = 6.45.

Barometer = 29.82"

No. Run	ft. Gas	Vol. Dry Gas	Vol. Wet Gas	Temp. (in)	Barometer	Weight
		cu ft	cu ft			(lb)
1	100	22.0	48.8	78.8	29.8	110
2	100	22.0	48.8	78.8	29.8	129
3	100	22.0	48.8	78.8	29.8	143
4	100	22.0	48.8	78.8	29.8	158
5	100	22.0	48.8	78.8	29.8	170
6	100	22.0	48.8	78.8	29.8	189
7	100	22.0	48.8	78.8	29.8	199
8	100	22.0	48.8	78.8	29.8	213
9	100	22.0	48.8	78.8	29.8	214
10	100	22.0	48.8	78.8	29.8	219
Av.	100	22.0	48.8	78.8	29.8	218

Brake load = 125 # net. Water rate per D.H.P. = 27.4
 D.H.P. = 5.24
 I.H.P. = 28.1
 Mech. eff. = 88 %
 I.H.P. = 24.5

No.	Area	M.R.P.	I.H.P.	Absolute Pressure.			Cut-off % St.	
				End of comp	Cut off	Rel Back		
1	1.64	44.5	3.09	8	123	28	4	5.1
2	1.75	47.5	3.30	12	132	29	4	6.8
3	1.80	48.2	3.39	12	134	28	4	8.5
4	1.75	47.5	3.30	12	128	29	4	6.8
5	1.75	47.5	3.30	8	131	28	4	5.7
6	1.73	47.0	3.26	12	129	28	4	6.8
7	1.75	47.5	3.30	12	120	28	4	6.5
8	1.75	47.7	3.32	12	112	28	4	10.2
9	1.70	46.0	3.20	8	132	28	4	5.1
10	1.69	45.8	3.18	12	116	28	4	7.4
Av.	1.73	47.0	3.26	10	125	28	4	7.1
				C R A N K E N D.				
1	1.75	47.0	3.26	12	129	28	4	6.8
2	1.65	44.7	3.10	8	132	28	4	5.1
Av.	1.73	47.0	3.26	8	124	28	4	6.3
4	1.73	47.0	3.26	8	129	28	4	5.1
5	1.70	46.0	3.20	8	132	28	4	5.1
6	1.63	44.2	3.07	8	129	28	4	5.1
7	1.73	47.0	3.26	8	120	28	4	6.8
8	1.67	45.3	3.15	8	112	26	3	6.8
9	1.65	44.7	3.10	8	131	28	4	5.1
10	1.70	46.0	3.19	8	116	28	2	6.8
Av.	1.71	45.9	3.18	8.4	125	28	4	5.9

Total I.H.P. = 6.45.

No.	Area	M.H.P.	I.H.P.	Absolute Pressure		Cut-off
				Cut-off	Mean	
1	1.04	44.5	8.00	107	88	8.1
2	1.03	47.3	7.80	107	88	8.2
3	1.02	47.8	7.80	107	88	8.3
4	1.01	47.5	7.80	107	88	8.4
5	1.00	47.0	7.80	107	88	8.5
6	1.00	47.0	7.80	107	88	8.6
7	1.00	47.5	7.70	107	88	8.7
8	1.00	47.5	7.80	107	88	8.8
9	1.00	47.0	7.80	107	88	8.9
10	1.00	47.0	7.80	107	88	9.0
11	1.00	47.0	7.80	107	88	9.1
12	1.00	47.0	7.80	107	88	9.2
13	1.00	47.0	7.80	107	88	9.3
14	1.00	47.0	7.80	107	88	9.4
15	1.00	47.0	7.80	107	88	9.5
16	1.00	47.0	7.80	107	88	9.6
17	1.00	47.0	7.80	107	88	9.7
18	1.00	47.0	7.80	107	88	9.8
19	1.00	47.0	7.80	107	88	9.9
20	1.00	47.0	7.80	107	88	10.0

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No.	Area	H.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.				
				End of comp	Cut off	Rel. Back	Back					
Barom. = 29.486" = 14.55 #.												
1	2.30	54.2	3.34	8.9	113	32.0	3.2	15				
2	2.00	54.2	3.34	8.9	114	32.0	4.0	14				
No.	RPM	Gauge Readings.				Temperatures.				Weights.		
		Temp	Steam Gauge	Super heat	Vac	Eng r'm	Cond St.	Inj. water	Dis. water	Exh.	Con. St.	Inj. water
1	....	504	110	159.9	26.0	77	87	58	76	149	..	....
2	89.5	482	110	137.9	26.1	..	87	58	77	123	33	2060
3	90.2	476	120	126.0	26.1	..	87	58	76	130	38	2130
4	90.0	494	107	151.7	26.1	..	88	58	76	135	38	2190
5	88.9	494	122	142.9	26.1	79	86	58	76	138	36	2500
6	90.3	500	119	150.6	26.2	..	86	58	75	140	36	2190
7	90.1	502	119	152.6	26.2	..	86	58	75	140	36	2190
8	90.1	501	115	153.9	26.2	82	86	58	75	140	35	2250
9	89.0	500	114	153.5	26.3	..	86	58	77	138	35	2130
10	90.4	501	109	157.5	26.3	83	88	58	76	132	35	2190
Av.	89.8	495	115	148.6	26.2	80	87	58	76	157	36	2203

Brake load = 155 # net. Water rate per D.H.P. = 32.6 #.

D.H.P. = 6.64. " " " I.H.P. = 29.8 #.

I.H.P. = 7.25

Mech. eff. = 91.5 %

10	9.11	57.0	3.72	8.0	113	32.0	4.0	14
Av.	2.30	55.4	3.73	8.7	123	35.2	3.8	12

Baromet. = 30.4337 = 14.55 f.

No. 125	Temp. Steam Super. Vapour			Temp. Water			Wt. of Water
	Temp. Super. Vapour	Temp. Water	Wt. of Water	Temp. Super. Vapour	Temp. Water	Wt. of Water	
1	132.3	119	206	132.3	119	206	..
2	127.3	119	206	127.3	119	206	..
3	122.3	119	206	122.3	119	206	..
4	117.3	119	206	117.3	119	206	..
5	112.3	119	206	112.3	119	206	..
6	107.3	119	206	107.3	119	206	..
7	102.3	119	206	102.3	119	206	..
8	97.3	119	206	97.3	119	206	..
9	92.3	119	206	92.3	119	206	..
10	87.3	119	206	87.3	119	206	..
AV. 125	118	119	206	118	119	206	..

Baromet. = 30.4337 = 14.55 f.
 D.H.P. = 8.84
 D.H.P. = 7.32
 D.H.P. = 6.18

150 - V - 7

HEAD END.

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No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp.	Cut off	Rel	Back	
1	2.00	54.2	3.54	8.0	116	32.0	3.2	15
2	2.00	54.2	3.54	8.0	114	32.8	4.0	14
3	1.97	53.5	3.50	12.0	128	32.8	4.0	11
4	1.96	53.0	3.46	12.0	112	32.0	4.0	15
5	1.92	52.0	3.40	9.6	130	32.0	4.0	11
6	1.97	53.5	3.50	8.0	126	32.0	4.0	12
7	1.95	53.0	3.46	8.0	121	32.0	3.2	12
8	1.90	51.5	3.36	9.6	124	32.0	4.0	10
9	1.95	53.0	3.46	8.0	120	32.0	4.0	12
10	2.03	54.2	3.54	9.6	116	33.0	3.2	14
Av.	1.96	53.2	3.47	9.3	121	32.0	3.7	12.5
				C R A N K E N D .				
1	2.14	56.0	3.78	8.0	120	36.0	4.0	15
2	2.10	57.0	3.72	8.0	116	36.0	4.0	15
3	2.17	59.0	3.85	8.0	129	36.0	4.0	11
4	2.05	50.5	3.30	8.0	113	33.6	4.0	15
5	2.00	54.2	3.54	9.6	134	36.0	4.0	11
6	2.12	57.5	3.75	12.0	126	36.0	3.2	12
7	2.10	57.0	3.72	8.0	124	34.2	3.2	12
8	2.10	57.0	3.72	8.0	125	33.0	4.0	10
9	2.10	57.0	3.72	9.6	122	36.0	4.0	12
10	2.11	57.0	3.72	8.0	118	36.0	4.0	14
Av.	2.10	56.4	3.78	8.7	123	35.2	3.8	12

Total I.H.P. = 7.25.

Out-let & St.	Specific Gravity and Vol. Back	Temp.	Pressure	Flow	Time	Notes
12	1.02	30.0	110	1.0	1.00	
14	1.00	30.0	110	1.0	1.00	
11	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
11	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
10	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
M	1.00	30.0	110	1.0	1.00	
12.5	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
11	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
11	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
10	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	
M	1.00	30.0	110	1.0	1.00	
12	1.00	30.0	110	1.0	1.00	

150 - V - 9

Absolute Pressure.
 Ind Cut Back Cut-off
 of off St.
 Barom. = 29.486 " = 14.55 #.

No.	R.P.M.	Gauge Readings			Vac	Temperatures.					Weights	
		Temp	Steam Gauge	Super heat		Eng r'm	Cond St.	Inj. water	Dis water	Exh	Con St	Inj water
1	....	510	117	161.7	26.1	83	89	58	79	117	..	....
2	86.9	502	129	147.0	26.1	..	90	58	79	132	45	2250
3	86.0	504	106	162.3	26.2	..	90	58	78	141	43	2380
4	87.1	502	140	131.3	26.2	..	90	58	79	147	44	2310
5	86.6	496	115	148.9	26.0	..	90	58	78	152	47	2500
6	86.0	504	115	156.9	26.3	85	90	58	78	153	41	2390
7	85.6	504	105	163.0	26.1	..	90	58	79	155	43	2440
8	87.5	514	120	164.0	26.1	..	92	58	78	158	44	2180
9	87.4	500	102	160.8	26.0	...	90	58	77	156	43	2360
10	96.5	480	120	130.0	26.2	86	90	58	78	155	45	2500
Av.	86.6	502	117	152.3	26.1	85	90	58	78	147	44	2370

Brake load = 215 # net. Water rate per D.H.P. = 29.7 #.

D.H.P. = 8.88 " " " I.H.P. = 27.3 #.

I.H.P. = 9.67

Mech. eff. = 92 %

1	8.05	75.0	4.83	8.0	124	45.0	3.0	27
2	8.76	74.0	4.78	8.0	115	42.0	4.0	34
10	8.83	73.0	5.11	8.3	144	48.0	4.0	37
Av.	8.51	73.1	4.91	8.4	127	46.0	3.0	33

Total I.H.P. = 9.67.

Barom. = 29.488 " = 14.33 "

No. R.P.M.	Gauge Readings			Temperatures			Height ft water
	Temp	Steam	Vac	Cond.	Int.	Dist	
	gauge heat	super	Eng	water	water	water	
1	210	117	28.1	89	88	79	117
2	208	120	28.1	90	88	79	122
3	204	108	28.2	90	88	78	141
4	202	140	28.2	90	88	79	147
5	202	115	28.0	90	88	78	152
6	204	118	28.2	90	88	78	153
7	204	108	28.1	90	88	79	153
8	214	120	28.1	92	88	78	153
9	200	108	28.0	90	88	77	154
10	200	120	28.2	90	88	78	155
Av.	202	117	28.1	90	88	78	147

D.R.P. = 2.68
 D.R.P. = 2.67
 D.R.P. = 2.68
 Motor load = 215 & net. Motor rate per D.H.P. = 22.7 %
 Mech. eff. = 92 %

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.			Cut-off % St.	
				End of comp	Cut off	Rel - Back		
1	2.85	77.4	4.98	12.0	123	48	4	27
2	2.75	74.5	4.60	12.0	134	44	4	19
3	2.85	77.4	4.98	9.6	113	48	4	34
4	2.73	74.0	4.77	9.6	144	43	4	13
5	2.75	74.5	4.80	12.0	123	49	4	26
6	2.76	75.2	4.85	12.0	120	44	3.2	27
7	2.85	77.4	4.98	8.0	116	46	3.2	34
8	2.85	77.4	4.98	9.6	125	46	4.0	27
9	2.75	74.5	4.80	8.0	112	48	4.0	34
10	2.70	73.1	4.72	9.6	140	44	4.0	18
Av.	2.79	75.5	4.86	10.2	125	46	3.8	28

CIRKLE END.

1	2.86	77.5	4.99	9.6	124	45.6	3.2	27
2	2.82	76.4	4.43	12.0	137	44.8	4.0	21
3	2.83	76.5	4.43	8.0	116	48.0	3.2	32
4	2.75	74.5	4.80	8.0	146	48.0	3.2	13
5	2.76	74.7	4.82	8.0	124	45.6	3.2	25
6	2.75	74.5	4.80	9.6	124	46.4	4.0	27
7	2.80	75.8	4.68	9.6	118	48.0	4.0	30
8	2.88	78.0	5.03	9.6	127	45.5	3.2	27
9	2.74	74.2	4.78	9.6	112	48.0	4.0	34
10	2.93	79.2	5.11	9.6	144	48.0	4.0	19
Av.	2.81	76.1	4.81	9.4	127	46.8	3.6	26

Total I.H.P. = 9.67.

Site No.	Year	Month	Day	Time	Temp	Humidity	Wind	Clouds	Remarks
27	1951	12	27	0.31	82.8	87.7	10.0	1	
28	1951	12	28	0.31	82.8	87.7	10.0	1	
29	1951	12	29	0.31	82.8	87.7	10.0	1	
30	1951	12	30	0.31	82.8	87.7	10.0	1	
31	1951	12	31	0.31	82.8	87.7	10.0	1	
32	1951	12	32	0.31	82.8	87.7	10.0	1	
33	1951	12	33	0.31	82.8	87.7	10.0	1	
34	1951	12	34	0.31	82.8	87.7	10.0	1	
35	1951	12	35	0.31	82.8	87.7	10.0	1	
36	1951	12	36	0.31	82.8	87.7	10.0	1	
37	1951	12	37	0.31	82.8	87.7	10.0	1	
38	1951	12	38	0.31	82.8	87.7	10.0	1	
39	1951	12	39	0.31	82.8	87.7	10.0	1	
40	1951	12	40	0.31	82.8	87.7	10.0	1	
41	1951	12	41	0.31	82.8	87.7	10.0	1	
42	1951	12	42	0.31	82.8	87.7	10.0	1	
43	1951	12	43	0.31	82.8	87.7	10.0	1	
44	1951	12	44	0.31	82.8	87.7	10.0	1	
45	1951	12	45	0.31	82.8	87.7	10.0	1	
46	1951	12	46	0.31	82.8	87.7	10.0	1	
47	1951	12	47	0.31	82.8	87.7	10.0	1	
48	1951	12	48	0.31	82.8	87.7	10.0	1	
49	1951	12	49	0.31	82.8	87.7	10.0	1	
50	1951	12	50	0.31	82.8	87.7	10.0	1	
51	1951	12	51	0.31	82.8	87.7	10.0	1	
52	1951	12	52	0.31	82.8	87.7	10.0	1	
53	1951	12	53	0.31	82.8	87.7	10.0	1	
54	1951	12	54	0.31	82.8	87.7	10.0	1	
55	1951	12	55	0.31	82.8	87.7	10.0	1	
56	1951	12	56	0.31	82.8	87.7	10.0	1	
57	1951	12	57	0.31	82.8	87.7	10.0	1	
58	1951	12	58	0.31	82.8	87.7	10.0	1	
59	1951	12	59	0.31	82.8	87.7	10.0	1	
60	1951	12	60	0.31	82.8	87.7	10.0	1	

Total 1.2.5. = 0.87

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HEAD END.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % st.
				End of Comp	Cut off	Rel	Back	
1	0.98	26.6	1.62	36	114	28	14.4	3.4
2	1.00	27.1	1.65	36	114	26	14.4	3.4
3	0.96	26.0	1.58	36	114	26	14.4	3.4
4	0.96	26.0	1.58	36	116	28	14.4	3.4
5	1.02	27.6	1.63	36	107	28	14.4	5.1
6	0.95	25.7	1.56	40	113	26	14.4	3.7
7	0.98	26.6	1.62	32	116	28	14.4	3.7
8	0.88	23.8	1.45	40	117	24	14.4	2.4
9	0.94	25.5	1.55	36	106	24	14.4	3.4
10	0.96	26.0	1.58	36	120	24	14.4	2.4
Av.	0.96	26.1	1.59	36	114	26	14.4	3.4

CRANK END.

1	1.00	27.1	1.65	22	116	28	14.4	1.7
2	1.10	29.8	1.81	24	116	28	14.4	3.4
3	1.10	29.8	1.81	28	123	28	14.4	3.4
4	1.09	29.5	1.80	24	118	28	14.4	4.8
5	1.10	29.8	1.80	24	111	28	14.4	5.4
6	1.05	28.4	1.73	27	116	28	14.4	4.1
7	1.04	28.2	1.73	24	116	28	14.4	3.4
8	1.20	32.5	1.98	24	127	28	14.4	3.7
9	1.16	31.5	1.92	24	108	29	14.4	6.8
10	1.16	31.5	1.92	24	122	28	14.4	3.7
Av.	1.10	29.8	1.82	25	117	28	14.4	4.0

Total I.H.P. = 3.41.

W. S. A. P. 1941

No. Area A.S.P. I.H.P. I.H.P. Comp
 Absolute Pressure
 Out-off
 % of

1	0.88	23.8	1.88	38	114	28	14.4	8.4
2	1.00	27.1	1.88	38	114	28	14.4	8.4
3	0.98	26.0	1.88	38	114	28	14.4	8.4
4	0.88	26.0	1.88	38	116	28	14.4	8.4
5	1.08	27.8	1.88	38	107	28	14.4	8.1
6	0.88	26.7	1.88	40	113	28	14.4	8.7
7	0.88	26.7	1.88	40	116	28	14.4	8.7
8	0.88	26.7	1.48	40	117	24	14.4	8.4
9	0.88	26.8	1.88	38	106	24	14.4	8.4
10	0.88	26.8	1.88	38	120	24	14.4	8.4
Average	0.88	26.1	1.88	38	114	28	14.4	8.4

W. S. A. P. 1941

1	1.00	27.1	1.88	38	118	28	14.4	1.7
2	1.10	29.8	1.81	34	118	28	14.4	3.4
3	1.10	29.8	1.81	38	122	28	14.4	3.4
4	1.08	29.8	1.88	34	118	28	14.4	4.8
5	1.10	29.9	1.88	34	111	28	14.4	3.4
6	1.08	29.4	1.78	37	118	28	14.4	4.1
7	1.08	29.5	1.78	34	118	28	14.4	3.4
8	1.00	27.5	1.88	34	127	28	14.4	3.7
9	1.08	27.5	1.88	34	108	28	14.4	3.8
10	1.10	27.8	1.88	34	122	28	14.4	3.7
Average	1.10	28.8	1.88	38	119	28	14.4	4.0

Total I.H.P. = 3.41

Barom. = 29.116" = 14.35 #.

Barom. = 29.138" = 14.4 #.

No.	RPM	Steam gauge	Temperatures.			Calorimeter		Weights.			
			Eng. r/m	Con. S	Inj. water	Dis. water	Gau. Press	Temp	Con S	Inj. water	
1	82.2	111	84	72.0	39.0	53.0	111	15.3	276	27.3	1620
2	82.2	109	84	71.4	39.0	57.0	...	....	...	39.8	1560
3	82.4	116	84	70.0	39.0	57.0	116	15.4	272	31.5	1620
4	82.2	111	84	69.8	39.0	57.0	....	....	...	31.0	1560
5	82.7	102	84	69.0	38.5	57.0	105	15.2	264	30.0	1560
6	81.1	108	84	69.0	38.5	56.8	...	....	...	32.0	1560
7	82.6	112	84	68.0	38.5	56.5	115	15.3	268	33.0	1620
8	81.5	111	84	68.0	38.5	56.0	...	....	...	33.0	1560
9	81.5	101	84	69.3	38.0	56.2	105	15.2	258	27.8	1560
10	81.5	115	84	68.5	39.0	55.8	...	....	...	32.3	1620
Av.	81.0	110	84	69.4	38.6	56.0	110	15.3	267	30.8	15740 (Total)

I.H.P. = 3.41

Water rate per D.H.P. = 69.2

Brake D.H.P. = 2.63 net.

" " " I.H.P. = 53.5

D.H.P. Quality = 98.8 %

Mech. Mech. eff. = 77.1 %

Quality Brake load = 67.5 # net.

Baron. = 88.118" = 4.35 4.

No. of Gages	Mean Temp °F	Barometer at Gage Height ft	Barometer at Sea Level ft	Barometer at Sea Level ft	Barometer at Sea Level ft	Barometer at Sea Level ft
1	82.5	30.1	30.0	30.0	30.0	30.0
2	82.5	30.1	30.0	30.0	30.0	30.0
3	82.5	30.1	30.0	30.0	30.0	30.0
4	82.5	30.1	30.0	30.0	30.0	30.0
5	82.5	30.1	30.0	30.0	30.0	30.0
6	82.5	30.1	30.0	30.0	30.0	30.0
7	82.5	30.1	30.0	30.0	30.0	30.0
8	82.5	30.1	30.0	30.0	30.0	30.0
9	82.5	30.1	30.0	30.0	30.0	30.0
10	82.5	30.1	30.0	30.0	30.0	30.0
Av. of 10	82.5	30.1	30.0	30.0	30.0	30.0
(Total)	827.5	301.0	300.0	300.0	300.0	300.0

Barometer at Sea Level = 30.0

Barometer at Gage Height = 30.1

Barometer at Sea Level = 30.0

Barometer at Gage Height = 30.1

Barometer at Sea Level = 30.0

Absolute Pressure

No. Area I.H.P. L.H.P. Barom. = 29.156" = 14.4 #.

No.	RPM	Steam gauge	Temperatures			Calorimeter		Weight
			Eng. r'm	Con. S	inj. water	Dis. water	Gau. Press		Temp
1	....	114	82	76	38.5	62.0	110 15.2	246 49.0 1690
2	79.4	105	..	74	38.5	60.8	... ..	... 46.0 1750
3	79.6	114	..	73	38.0	60.0	... ..	... 43.5 1690
4	79.3	115	82	72	37.5	60.8	110 15.2	258 42.0 1620
5	80.7	111	..	72	37.0	63.0	... ..	... 44.5 1560
6	79.3	114	..	71	37.0	63.0	... ..	... 43.5 1560
7	80.6	104	81	70	37.0	63.0	104 15.2	256 41.0 1690
8	80.2	113	..	71	37.0	60.0	... ..	... 41.5 1690
9	80.8	114	..	70	37.0	62.5	... ..	... 42.0 1560
10	80.1	111	80	70	37.0	63.0	113 15.3	262 42.0 1560
Av.	80.0	111.5	81	72	37.4	62.0	110 15.2	256 43.5 1637

I.H.P. = 5.67

Water rate per D.H.P. = 53.6

Brake Load = 125 # net.

" " " I.H.P. = 45.0

D.H.P. = 4.75.

Mech. eff. = 84 %

Quality = 97.7 %

Total I.H.P. = 5.67.

Barom. = 29.158" = 14.4 F.

No. RBN Station	Gauge	T's	Temperature		Calorimeter		Weight
			W. water	in. Dis.	W. water	W. Cond. W.	
1	114	82	78	38.5	110	15.2	288 49.0 1890
2	108	..	74	35.5	..	..	.. 48.0 1780
3	116	..	73	38.0	..	..	.. 43.5 1830
4	115	82	78	37.5	110	15.2	288 48.0 1890
5	111	..	73	37.0	..	..	.. 44.5 1860
6	114	..	71	37.0	..	..	.. 43.5 1880
7	104	81	70	37.0	104	15.2	288 41.0 1890
8	113	..	71	37.0	..	..	.. 41.5 1890
9	114	..	70	37.0	..	..	.. 42.0 1890
10	111	80	70	37.0	112	15.2	288 42.0 1890
Av. 20.0	111.5	81	78	37.4	102	15.2	288 43.5 1897

1. H.P. = 5.87

Brake load = 128 # hor.

D.H.P. = 4.75

Mech. eff. = 84 %

Quality = 87.7 %

Water rate per D.H.P. = 23.0

1. H.P. = 45.0

No.	Area	M.E.P.	I.H.P.	Absolute Pressure			Cut-off % St.
				End of comp	Cut off	Rel Back	
1	1.93	52.3	3.12	36	120	40.0 14.3	13.5
2	1.60	51.5	5.07	36	112	40.0 14.3	16.9
3	1.82	49.3	2.94	36	120	36.0 14.3	13.5
4	1.80	48.8	2.91	36	120	38.8 14.3	11.8
5	1.55	42.0	2.50	36	116	36.0 14.3	10.2
6	1.76	47.6	2.83	36	120	36.0 14.3	11.8
7	1.81	49.0	2.92	36	112	40.0 14.3	15.2
8	1.80	48.8	2.91	36	120	38.4 14.3	11.8
9	1.80	48.8	2.91	36	123	38.4 14.3	11.8
10	1.93	52.3	3.12	36	118	41.3 14.3	16.9
Av.	1.81	49.1	2.95	36	118	36.3 14.3	13.5

C R A N K E N D.

1	1.72	46.6	2.77	26	120	36.0 14.3	11.2	
Av.	2	1.56	42.3	2.53	24	112	36.0 14.3	11.8
3	1.70	46.1	2.74	24	122	36.0 14.3	11.8	
4	1.68	45.5	2.71	24	124	36.0 14.3	10.2	
5	1.52	41.2	2.46	24	116	36.0 14.3	8.5	
6	1.75	47.5	2.83	24	122	40.0 14.3	10.2	
7	1.83	49.3	2.94	24	112	40.0 14.3	15.2	
8	1.84	50.1	3.02	24	120	40.0 14.3	11.8	
9	1.80	48.8	2.91	24	120	40.0 14.3	11.8	
10	1.60	43.3	2.58	24	120	40.0 14.3	8.6	
Av.	1.70	46.1	2.75	24	119	38.0 14.3	11.1	

Total I.H.P. = 5.67.

Annual's Progress

Out-Off	Out-Off	Out-Off	Out-Off	Out-Off	Out-Off	Out-Off	Out-Off
1912	1913	1914	1915	1916	1917	1918	1919
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31

W. A. S. H. D.

12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31
12.31	12.31	12.31	12.31	12.31	12.31	12.31	12.31

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Absolute Pressure.

No. Area I.H.P. I.A.P. and Gau. Press Temp. Con. Inj. S water

Barom. = 29.125" = 14.3 #.

No.	RPM	Steam gauge	Eng. r'm	Con. S	Inj. water	Dis. water	Gau. Press	Temp.	Con. S	Inj. water
1	....	105	72	80.0	39.5	67.0	....	....	....	....
2	79.5	106	..	77.5	39.5	66.5	1045	15.1	229	48.2 1690
3	79.8	108	..	76.0	39.5	67.0	....	....	....	49.7 1620
4	79.5	110	..	75.5	39.5	67.0	108	15.2	231	46.0 1870
5	79.8	112	78	75.5	39.5	68.0	....	....	....	42.7 1500
6	80.2	109	..	75.5	39.5	68.0	105	15.2	240	49.7 1620
7	79.9	107	..	76.0	39.5	68.5	....	....	....	50.5 1690
8	79.3	112	..	76.0	39.5	67.5	109	15.2	241	49.0 1690
9	77.7	109	80	76.0	39.5	63.0	....	....	....	48.0 1690
10	79.0	108	..	76.0	39.5	68.0	....	....	....	44.0 1690

Av. 79.5 108 77 76.0 39.5 67.0 103 15.2 253 47.5 1673

I.H.P. = 6.63

Water rate per D.H.P. = 46.5

Brake load = 156 # net.

" " " I.H.P. = 41.5

Quality = 96.5 %

D.H.P. = 5.91

Mech. eff. = 89.1 %

10	2.15	88.0	3.40	24	116	44	14.5	19.3
Av.	2.07	83.1	3.30	26	116	40	14.5	19.7

Total I.H.P. = 6.63.

S - A - 6.

H E A D E N D.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.			Cut-off % St.	
				End of comp	Cut off	Rel Back		
1	2.00	54.3	3.19	24	112	40	14.3	21.4
2	2.03	55.2	3.24	40	112	40	14.3	21.0
3	2.00	54.5	3.20	40	120	38	14.3	17.3
4	1.90	51.3	3.02	36	116	40	14.3	16.3
5	2.18	59.2	3.48	40	120	44	14.3	18.6
6	2.33	63.2	3.71	36	116	48	14.3	25.4
7	2.13	57.5	3.38	36	116	43	14.3	20.4
8	2.12	57.2	3.36	36	120	44	14.3	18.7
9	2.16	58.4	3.43	36	116	44	14.3	20.4
10	2.10	56.7	3.33	40	116	44	14.3	20.4
Av.	2.10	56.8	3.33	36	116	43	14.3	20.0

C R A N K E N D.

1	2.06	56.0	3.28	32	112	40	14.3	22.4
2	2.05	55.7	3.27	26	116	40	14.3	19.3
3	2.04	55.5	3.26	24	120	40	14.3	17.0
4	2.15	58.5	3.44	24	116	42	14.3	20.4
5	1.94	52.2	3.07	24	117	40	14.3	15.3
6	1.95	53.0	3.11	24	116	43	14.3	17.0
7	2.13	57.8	3.40	24	114	46	14.3	18.7
8	2.10	56.7	3.33	24	120	44	14.3	17.0
9	2.15	58.0	3.40	24	116	44	14.3	19.3
10	2.15	58.0	3.40	24	116	44	14.3	20.4
Av.	2.07	56.1	3.30	25	116	40	14.3	18.7

Total I.H.P. = 6.63.

No.	Area	M.S.P.	Absolute Pressure.		M.S.P.	Inch of Mercury	M.S.P.
			Out	In			
1	2.00	24.8	112	40	2.19	24.8	21.4
2	2.07	25.3	112	40	2.24	25.3	21.0
3	2.03	24.8	120	38	2.20	24.8	17.3
4	1.99	21.8	112	40	2.02	21.8	18.3
5	2.12	22.2	120	44	2.48	22.2	18.8
6	2.22	27.2	112	48	2.71	27.2	22.4
7	2.12	27.2	112	42	2.32	27.2	20.4
8	2.12	27.2	120	44	2.32	27.2	18.7
9	2.12	22.4	112	44	2.42	22.4	20.4
10	2.12	22.7	112	44	2.22	22.7	20.4
Av.	2.12	22.3	112	42	2.22	22.3	20.0

O R A M E N D.

1	2.02	22.0	112	40	2.22	22.0	22.4
2	2.02	22.7	112	40	2.27	22.7	18.2
3	2.04	22.2	120	40	2.22	22.2	17.0
4	2.12	22.2	112	42	2.42	22.2	20.4
5	1.94	22.2	112	40	2.07	22.2	18.2
6	1.92	22.0	112	42	2.17	22.0	17.0
7	2.12	27.2	112	42	2.40	27.2	18.7
8	2.12	22.7	120	44	2.22	22.7	17.0
9	2.12	22.0	112	44	2.40	22.0	19.2
10	2.12	22.0	112	44	2.40	22.0	20.4
Av.	2.07	22.1	112	40	2.22	22.1	19.7

Total I.H.P. = 6.22.

HEAD END.

S - A - 8

Absolute Pressure.

Barom. = 29.123" = 14.4 #.

No.	RPM	Steam gauge	Temperatures			Calorimeter			Weight		
			Eng. Con	Inj	Dis	Gau. Press	Temp	Con	Inj		
			°F	°F	°F	lb	°F	lb	lb		
1	....	105	81	80.0	40.0	68.0	....	....	62.0	2060	
2	86.1	114	..	81.0	40.0	68.0	114	15.3	257	62.0	2000
3	86.0	113	..	81.0	40.0	69.0	...	....	...	62.0	2060
4	87.2	111	..	81.0	40.0	68.0	111	15.2	258	62.0	2000
5	85.9	101	82	81.0	39.5	69.0	...	....	...	60.0	2000
6	85.9	113	..	81.0	40.0	69.0	113	15.2	261	61.0	1690
7	86.6	116	..	81.0	40.0	74.0	...	....	...	62.0	1940
8	87.4	117	..	81.0	40.0	68.0	117	15.3	265	60.0	1880
9	86.2	110	83	81.0	39.5	73.0	...	....	...	59.0	1810
10	86.8	114	..	81.0	39.5	68.0	113.5	15.3	265	65.0	1800

Av. 86.4 112 82 81.0 40.0 69.0 113.6 15.3 261 61.3 1924

Brake load = 200 # net. Water rate per D.H.P. = 43.8

D.H.P. = 8.22 " " " I.H.P. = 40.3

Mech. eff. = 92 %

Quality = 98 %

I.H.P. = 8.95

10 8.59 65.0 4.35 24 120 48.0 14.3 25.4

Av. 2.57 82.3 4.49 25 119 50.0 14.3 29.5

Total I.H.P. = 8.95.

IS - A - 8

HEAD END.

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Out off % St.
				End of comp	Out off	Rel	Back	
1	2.57	72.5	4.65	40	114	48.0	14.3	33.9
2	2.65	69.2	4.45	36	120	48.0	14.3	27.1
3	2.55	69.2	4.45	28	120	48.0	14.3	27.1
4	2.55	69.2	4.45	24	117	48.0	14.3	28.8
5	2.53	68.8	4.42	28	109	52.0	14.3	35.9
6	2.64	71.6	4.60	36	120	49.6	14.3	28.8
7	2.54	69.0	4.44	32	124	49.6	14.3	28.1
8	2.55	69.3	4.45	29	124	50.3	14.3	25.4
9	2.65	69.3	4.45	36	116	52.0	14.3	31.2
10	2.45	65.5	4.20	28	120	48.0	14.3	25.4
Av.	2.55	71.4	4.43	32	118	49.4	14.3	29.0

C R A N K E N D.

1	2.54	69.2	4.45	26	112	52.0	14.3	33.9
2	2.64	71.7	4.60	24	120	48.0	14.3	28.8
3	2.55	69.2	4.45	24	120	50.0	14.3	27.8
4	2.53	68.8	4.42	24	120	48.0	14.3	28.8
5	2.46	63.8	4.28	36	112	48.0	14.3	32.2
6	2.62	71.2	4.56	24	120	52.0	14.3	29.5
7	2.61	71.0	4.55	24	124	52.0	14.3	28.8
8	2.63	71.5	4.58	24	124	52.0	14.3	27.4
9	2.65	72.0	4.62	24	116	52.0	14.3	32.2
10	2.50	68.0	4.35	24	120	48.0	14.3	25.4
Av.	2.57	69.9	4.49	25	119	50.0	14.3	29.5

Total I.H.P. = 8.95.

W. H. & A. B.

8-1-8

Out of	Vol	Vol	Vol	Vol	Vol	Vol	Vol	Vol
10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

W. H. & A. B.

10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total L.H.F. = 8.00

AVERAGES ON CARDS.
GENERAL AVERAGES

GRANK END

No.	RPM	Steam gauge	Super heat	IHP	Water rate	DHP	Water rate	Qual at	B.T.U. Supplied
No.	Arsh			of IHP	of IHP	DHP	DHP	C.O.	per IHP per hr.
S-A-2	81.9	110.0	.....	3.41	53.5	2.63	69.2	.....	.....
-5	80.0	111.5	.....	5.67	45.0	4.75	53.6	.....	.....
-6	79.5	108.0	.....	6.63	41.5	5.91	46.5	.....	.....
-9	86.4	113.0	.....	8.95	40.3	8.22	43.8	.....	.....
S-V-2	94.0	108.0	.....	3.40	60.3	2.80	73.0	25.6	70200
-5	92.8	104.0	.....	5.85	43.4	4.95	51.3	34.8	50600
-7	90.0	114.0	.....	7.62	42.7	6.64	49.1	37.2	50000
-9	86.0	117.0	.....	10.01	40.3	8.90	46.7	47.0	47200
50-V-2	59.7	117.0	54.1	3.69	48.7	2.84	63.2	32.6	59100
-5	93.0	113.0	70.0	6.48	37.6	5.53	44.0	39.3	46000
-7	91.8	123.0	58.7	7.66	34.9	6.70	39.9	38.0	42500
-9	83.5	113.0	67.3	9.48	33.4	8.56	37.0	53.7	40800
100-V-2	97.9	116.0	94.1	3.70	42.2	3.91	53.6	28.2	52100
-5	93.5	118.6	90.0	6.43	34.2	5.56	39.5	40.9	42100
-7	95.5	120.0	100.0	7.56	32.3	6.90	35.4	40.1	40000
-9	87.9	123.0	103.0	9.73	30.2	9.00	32.6	50.8	37400
150V-2	97.0	114.0	143.7	3.57	38.7	2.79	49.4	34.3	43600
-5	93.2	123.0	135.0	6.45	32.1	5.54	37.4	41.3	40200
-7	89.8	115.0	148.6	7.25	29.8	6.64	32.6	50.0	37580
-9	86.6	117.0	152.3	9.67	27.3	8.88	29.7	62.7	34400

AVERAGES OF CARDS.

CRANK END

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp	Cut off	Rel	Back	
S-A-2	0.96	26.1	1.59	36.0	114	26.0	14.4	3.4
S-A-5	1.81	49.1	2.92	36.0	118	38.3	14.3	13.3
S-A-6	2.10	56.8	3.33	36.0	116	43.0	14.3	20.0
S-A-8	2.55	71.4	4.46	32.0	118	49.4	14.3	29.0
S-V-2	0.98	26.9	1.86	13.6	109	19.0	4.0	1.8
S-V-5	1.61	47.7	3.02	13.6	110	27.0	4.3	8.7
S-V-7	2.15	58.5	3.99	18.1	122	36.4	5.4	15.3
S-V-9	2.99	81.0	5.16	16.0	126	5.2	5.5	29.4
50-V-2	0.81	22.0	1.56	12.2	118	16.4	4.2	1.3
50-V-5	1.74	47.3	3.28	12.0	121	28.6	4.0	8.3
50-V-7	2.14	57.7	3.96	10.4	130	36.0	3.6	10.4
50-V-9	2.84	77.2	4.80	12.0	123	50.6	3.6	25.6
100-V-2	0.90	24.5	1.78	12.0	111	18.4	3.5	0.0
100-V-5	1.70	47.3	3.20	11.6	122	28.0	3.8	7.7
100-V-7	2.00	54.2	3.77	8.0	127	35.0	3.6	9.5
100-V-9	2.70	73.3	4.73	10.0	127	45.4	4.0	22.6
150-V-2	0.92	24.8	1.80	8.4	105	17.0	4.0	0.0
150-V-5	1.73	47.0	3.26	10.0	125	28.0	4.0	7.1
150-V-7	1.96	53.2	3.47	9.3	121	32.0	3.7	12.5
150-V-9	2.79	75.5	4.86	10.2	125	46.0	3.8	26.0

AVERAGES OF CARBS.

HEAD END

No.	Area	M.E.P.	I.H.P.	Absolute Pressure.				Cut-off % St.
				End of comp	Cut off	Rel	BACK	
S-A-2	0.96	26.1	1.59	36.0	114	26.0	14.4	3.4
S-A-5	1.81	49.1	2.92	36.0	118	36.3	14.3	13.3
S-A-6	2.10	56.8	3.33	36.0	116	43.0	14.3	20.0
S-A-8	2.55	71.4	4.46	32.0	118	49.4	14.3	29.0
S-V-2	0.98	26.9	1.86	13.6	109	19.0	4.0	1.8
S-V-5	1.61	43.7	3.02	13.6	110	27.0	4.3	8.7
S-V-7	2.15	58.5	3.99	13.1	122	36.4	5.4	15.3
S-V-9	2.99	81.0	5.16	16.0	126	5.2	5.5	29.4
50-V-2	0.81	22.0	1.56	12.3	118	16.4	4.2	1.3
50-V-5	1.74	47.3	3.28	12.0	121	28.6	4.0	8.3
50-V-7	2.14	57.7	3.96	10.4	150	36.0	3.6	10.4
50-V-9	2.84	77.2	4.80	12.0	123	50.6	3.6	25.6
100-V-2	0.90	24.5	1.70	12.0	111	16.4	3.5	0.0
100-V-5	1.70	46.0	3.20	11.6	122	28.0	3.8	7.7
100-V-7	2.00	54.2	3.77	8.0	127	35.0	3.6	9.5
100-V-9	2.70	73.5	4.73	10.0	127	45.4	4.0	22.6
150-V-2	0.92	24.8	1.90	8.4	105	17.0	4.0	0.0
150-V-5	1.73	47.0	3.26	10.0	125	28.0	4.0	7.1
150-V-7	1.96	53.2	3.47	9.3	121	32.0	3.7	12.5
150-V-9	2.79	75.5	4.98	10.2	125	46.0	3.8	26.0

ACTUAL INDICATOR CARDS.
SATURATED -VACUUM- 1/2 D.H.P.

C
11/3
2/2

ACTUAL INDICATOR
CARDS

ACTUAL INDICATOR

CARDS.

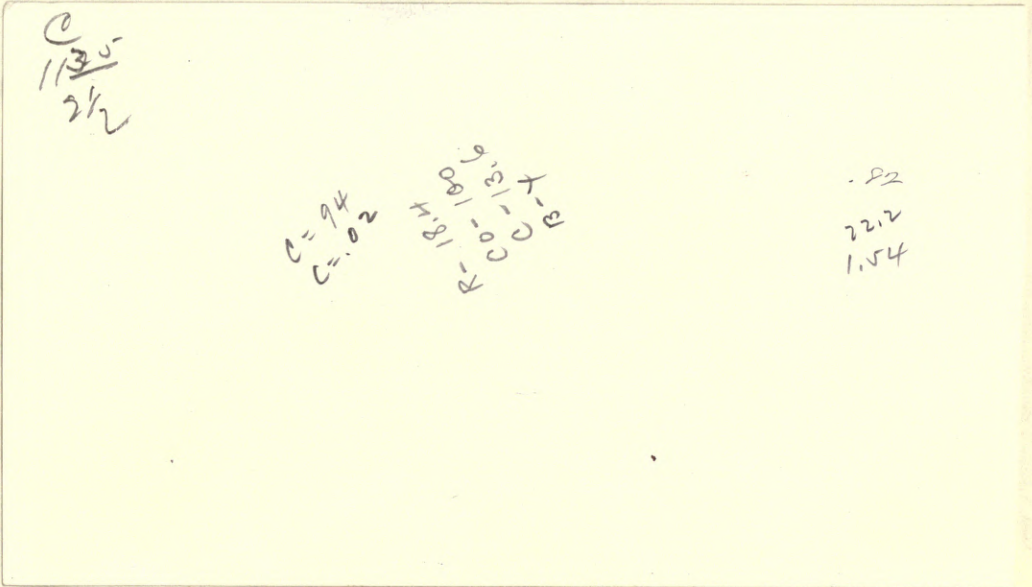
SATURATED -VACUUM- 1/2 D.H.P.

C
11/3
2/2

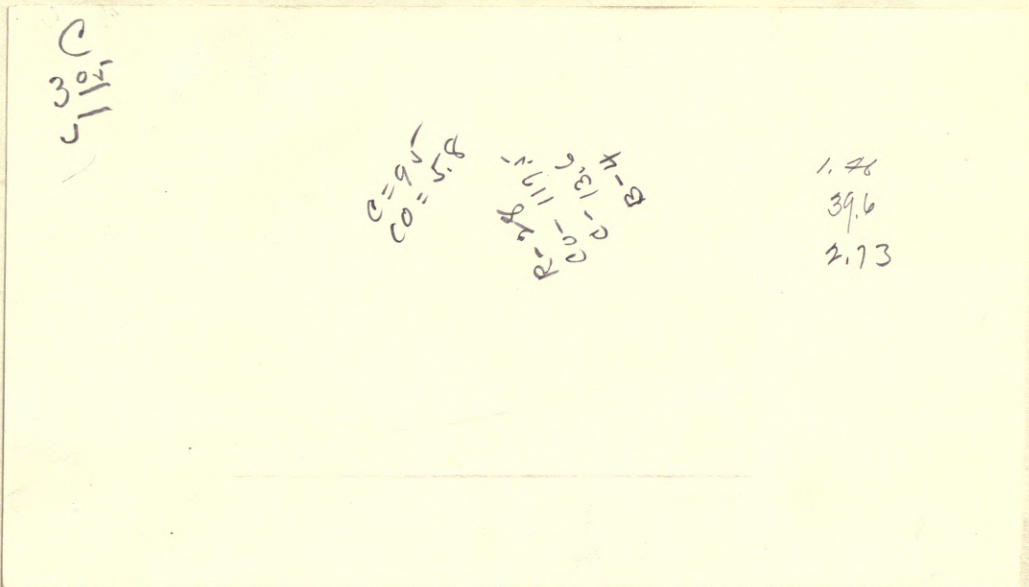
ACTUAL INDICATOR
CARDS

11/3
2/2

ACTUAL INDICATOR CARDS.
 SATURATED -VACUUM- 2 D.H.P.

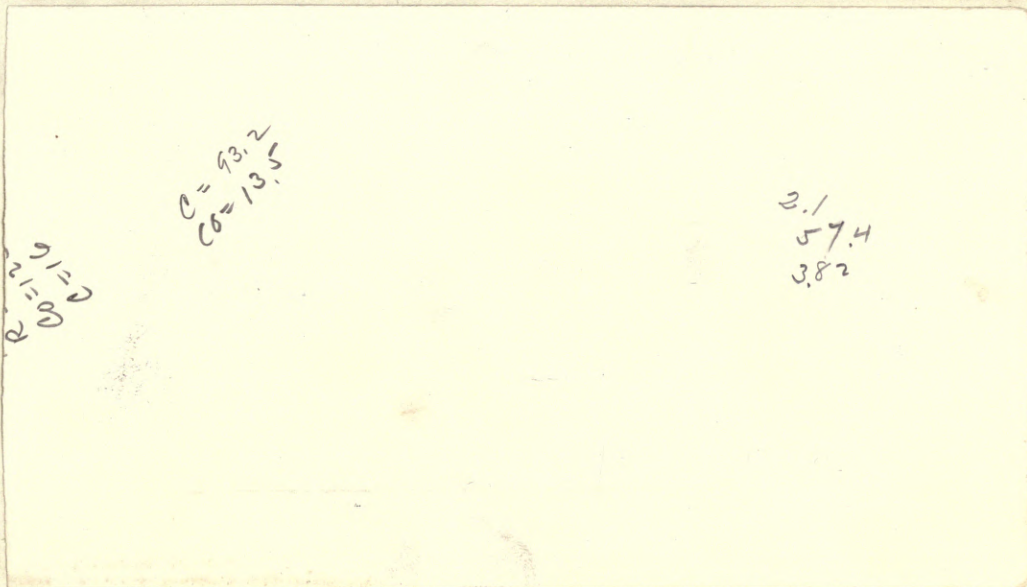


SATURATED- VACUUM- 5 D.H.P.

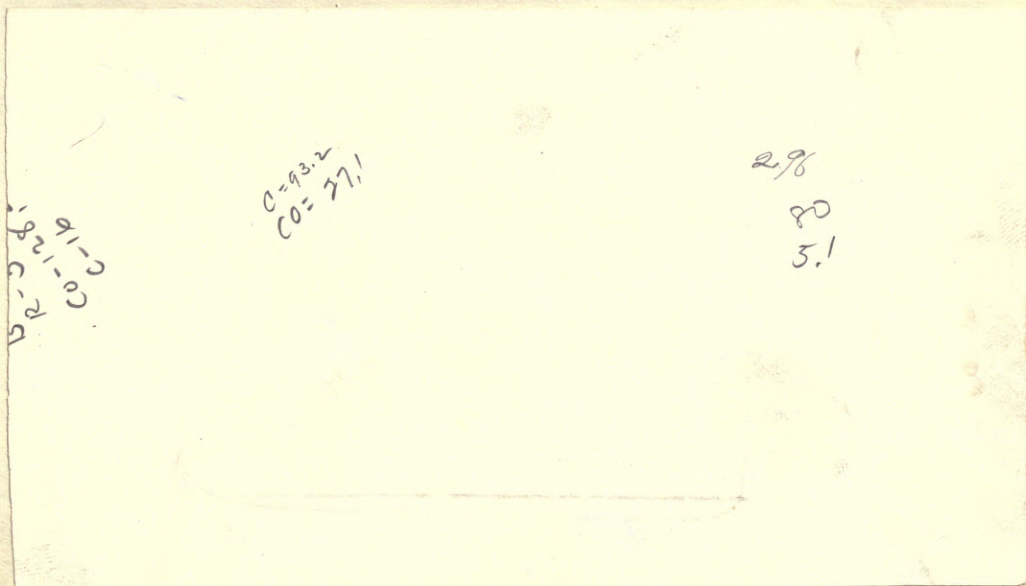


ACTUAL INDICATOR CARDS.

SATURATED- VACUUM- 7 D.H.P.



SATURATED- VACUUM- 9 D.H.P.



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STATE OF CALIFORNIA

ACTUAL INDICATOR CARDS.
50° SUPERHEAT- VACUUM- 2 D.H.P.

CO-1.7

R-16.8
B-4.8
CO-11.9
C-1.2

.84
22.8
16.2

50° SUPERHEAT- VACUUM- 5 D.H.P.

CO-8.5

4
29.6
12.5
16.

1.75
47.5
3.28

ACTUAL INDICATOR CARDS.

10° SUPERHEAT-VACUUM- 2 D.H.P.

ACTUAL INDICATOR CARDS.

50° SUPERHEAT- VACUUM- 7 D.H.P.

10

R-36
B-4
CO-140
C-12

7.23
60.5
4.12

10° SUPERHEAT-VACUUM- 8 D.H.P.
50° SUPERHEAT-VACUUM- 9 D.H.P.

24

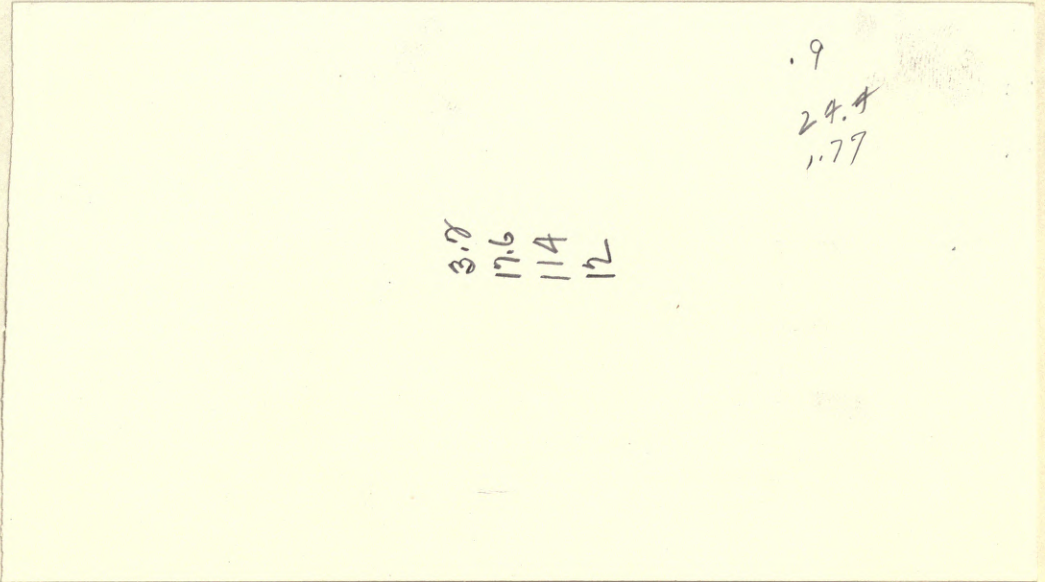
R-48
B-4
CO-126
C-12

7.8
76
4.71

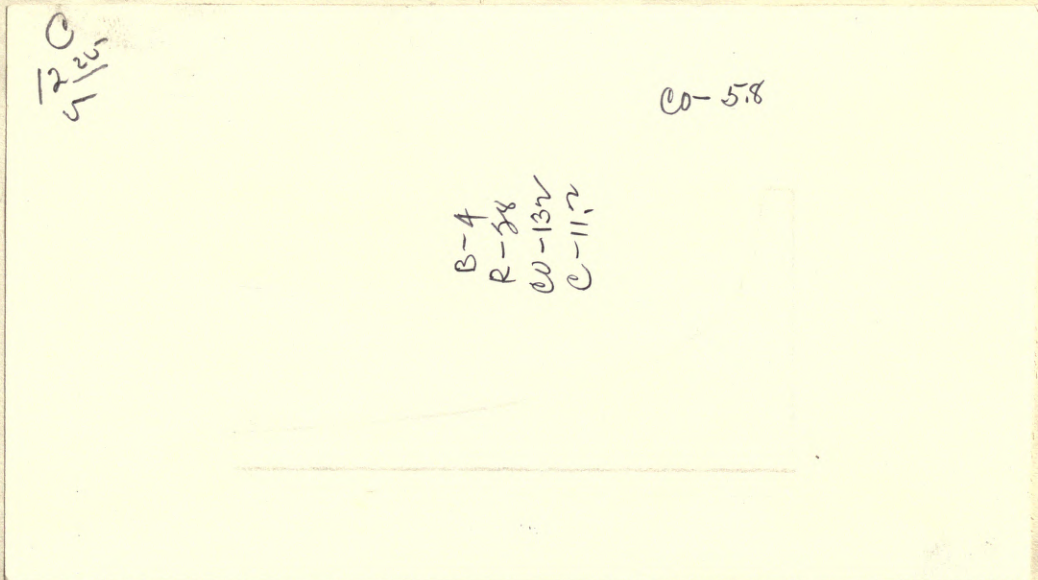
ACTUAL INDICATOR CARDS.

100° SUPERHEAT-VACUUM- 2 D.H.P.

ACTUAL INDICATOR CARDS.



100° SUPERHEAT- VACUUM- 5 D.H.P.



ACTUAL INDICATOR CARDS.

100° SUPERHEAT- VACUUM- 7 D.H.P.

①
7

R-36
B-312
CO-134
C-8

2.05
55.5
386

100° SUPERHEAT- VACUUM- 9 D.H.P.

2

CO-52

R-48
B-4
CO-132
C-96

2.85
77.4
5.04

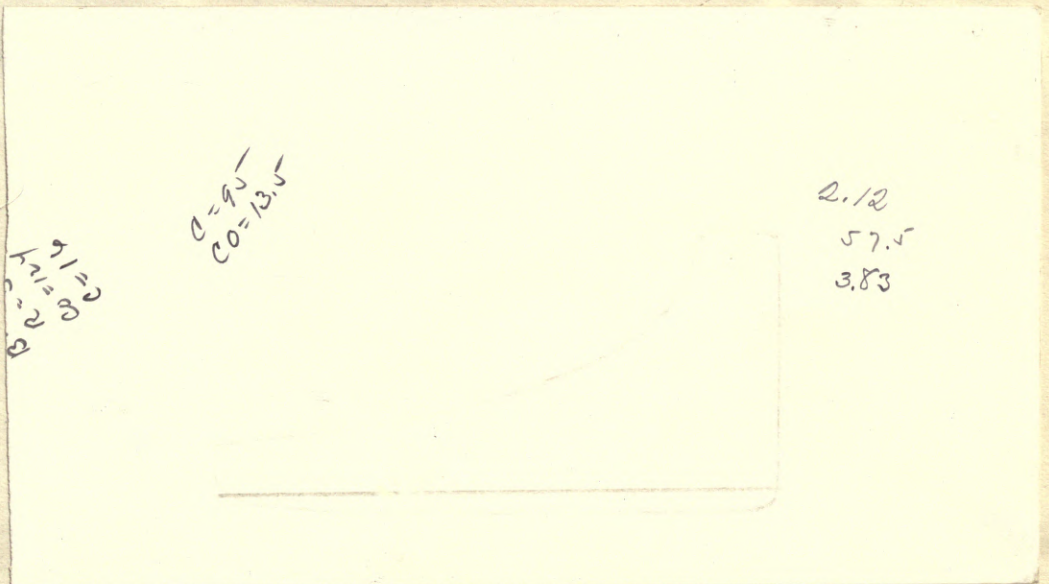
ACTUAL INDICATOR CARDS.

150° ACTUAL INDICATOR CARDS. H.P.

150° SUPERHEAT- VACUUM- 2 D.H.P.



150° SUPERHEAT - VACUUM- 5 D.H.P.



ACTUAL INDICATOR CARDS.

ACTUAL INDICATOR CARDS.

150° SUPERHEAT- VACUUM- 7 D.H.P.

CO-11

R-32.8
B-4
CO-12.8
C-12

1.97
53.5
3.49

150° SUPERHEAT- VACUUM- 9 D.H.P.

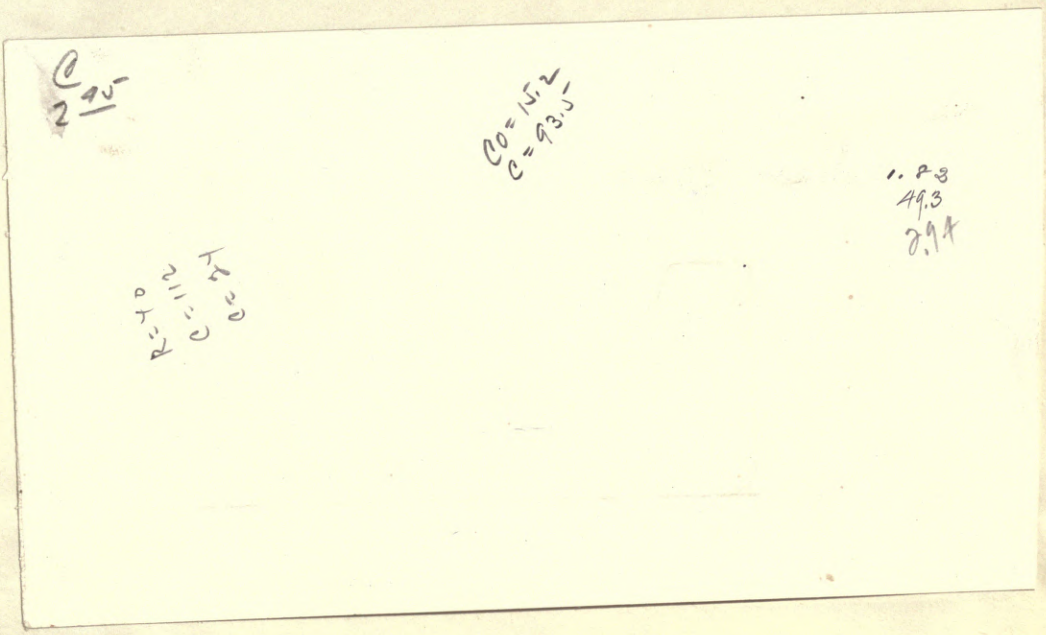
CO-27

R-48
B-4
CO-12.5
C-9.6

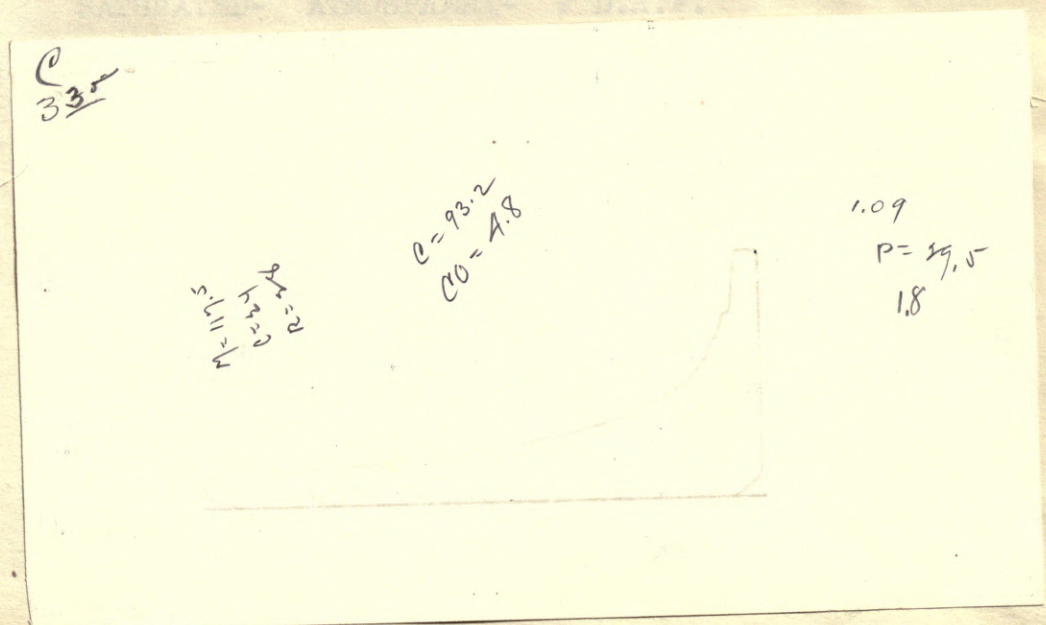
2.85
77.4
4.98

ACTUAL INDICATOR CARDS.

SATURATED-ATMOSPHERE- 5 D.H.P.

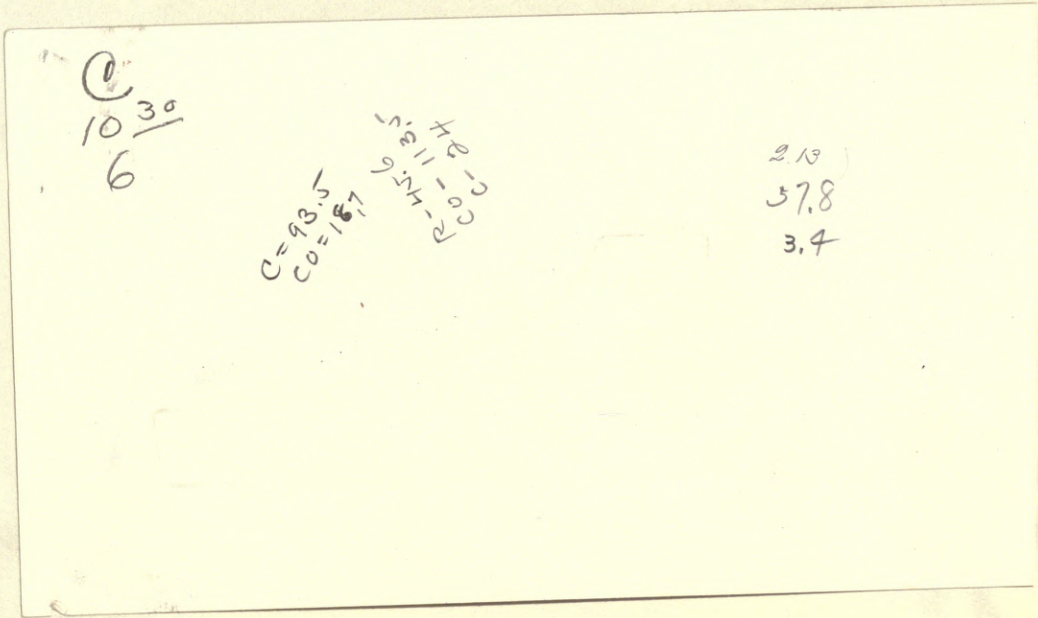


SATURATED-ATMOSPHERE- 2 D.H.P.

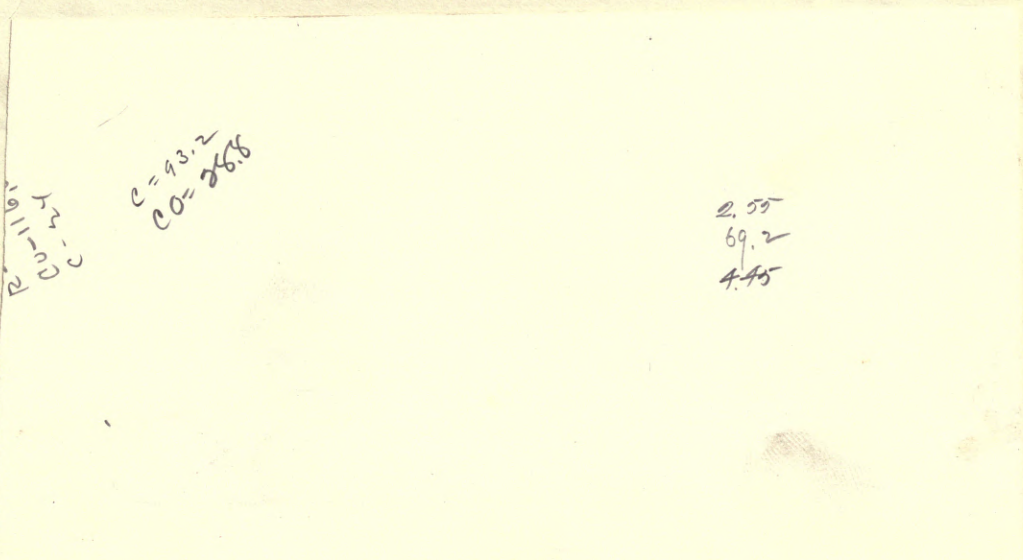


ACTUAL INDICATOR CARDS.

SATURATED- ATMOSPHERE- 7 D.H.P.



SATURATED- ATMOSPHERE- 9 D.H.P.



WATER RATE

CURVES.

Y-110

MECHANICAL LABORATORIES, BIBLEY COLLEGE.

LBS. ST' M. PR. D.H.P. PR. HR.

WATER RATE
SUPERHEAT 150°

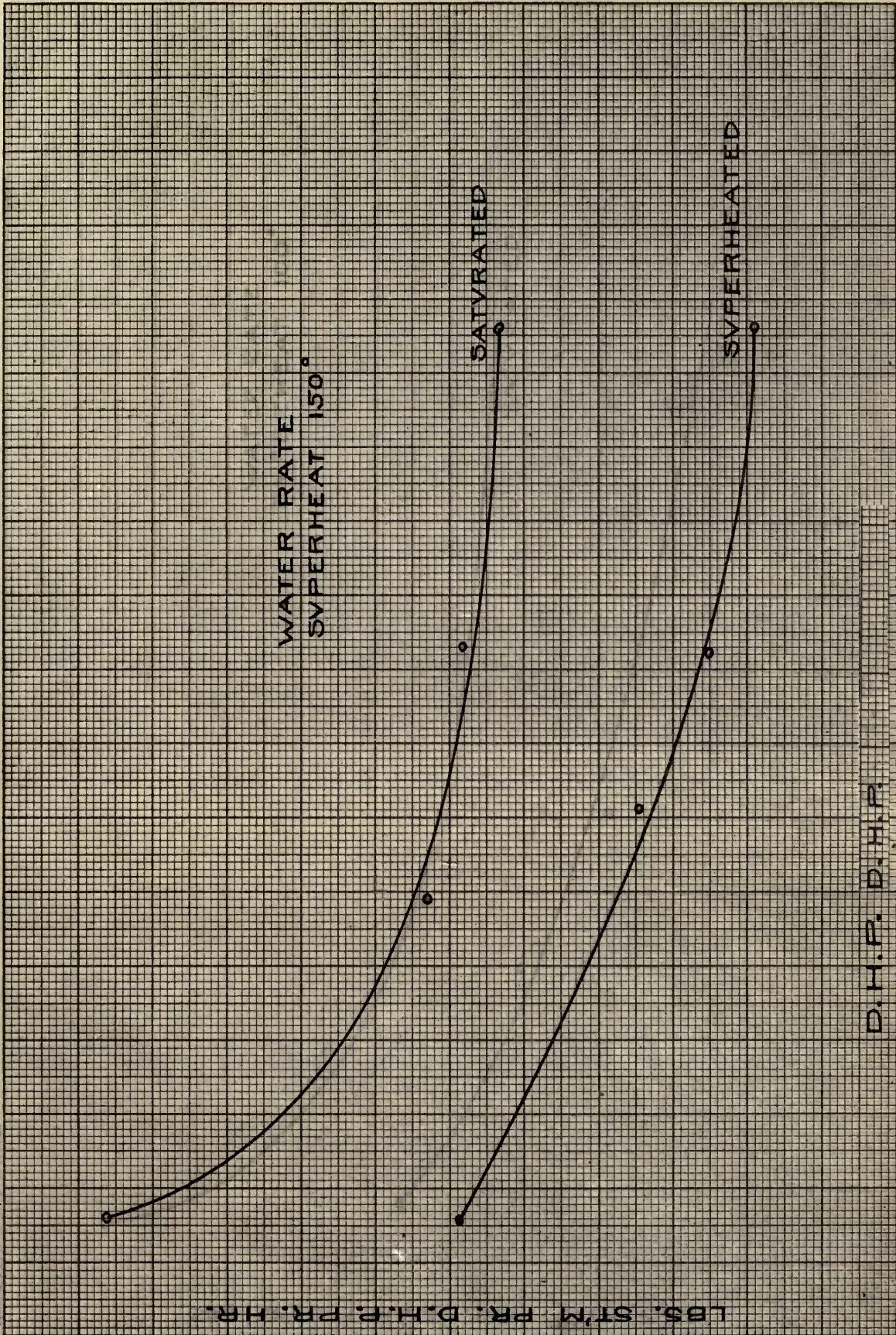
SATURATED

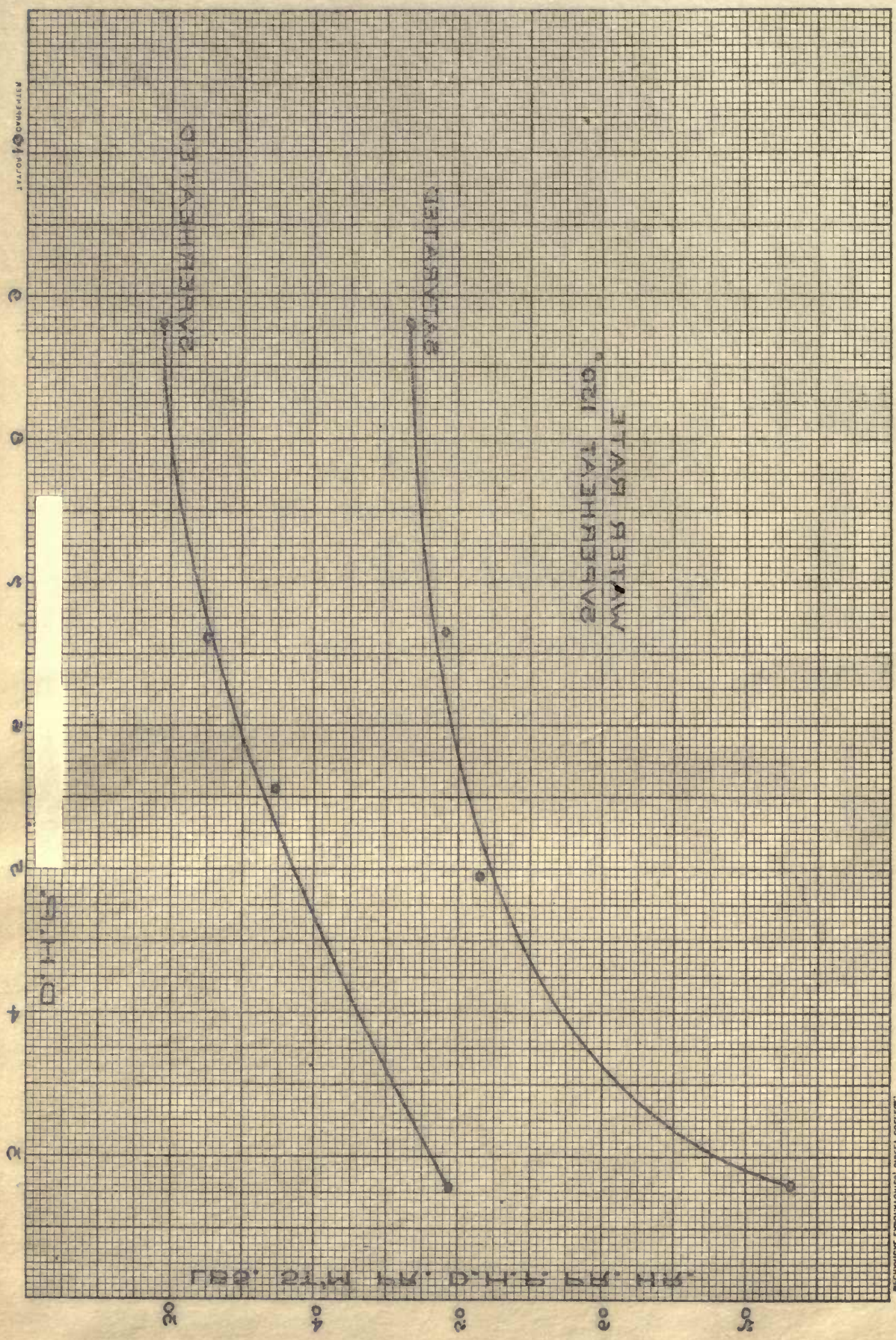
SUPERHEATED

D.H.P. D.H.P.

3 4 5 6 7 8 9

TAYLOR 10 CARPENTER





V-100

MECHANICAL LABORATORIES, BIRLEY COLLEGE

LBS. STIM PR. D.H.P. PR. HR.

WATER RATE
SUPERHEAT 100°

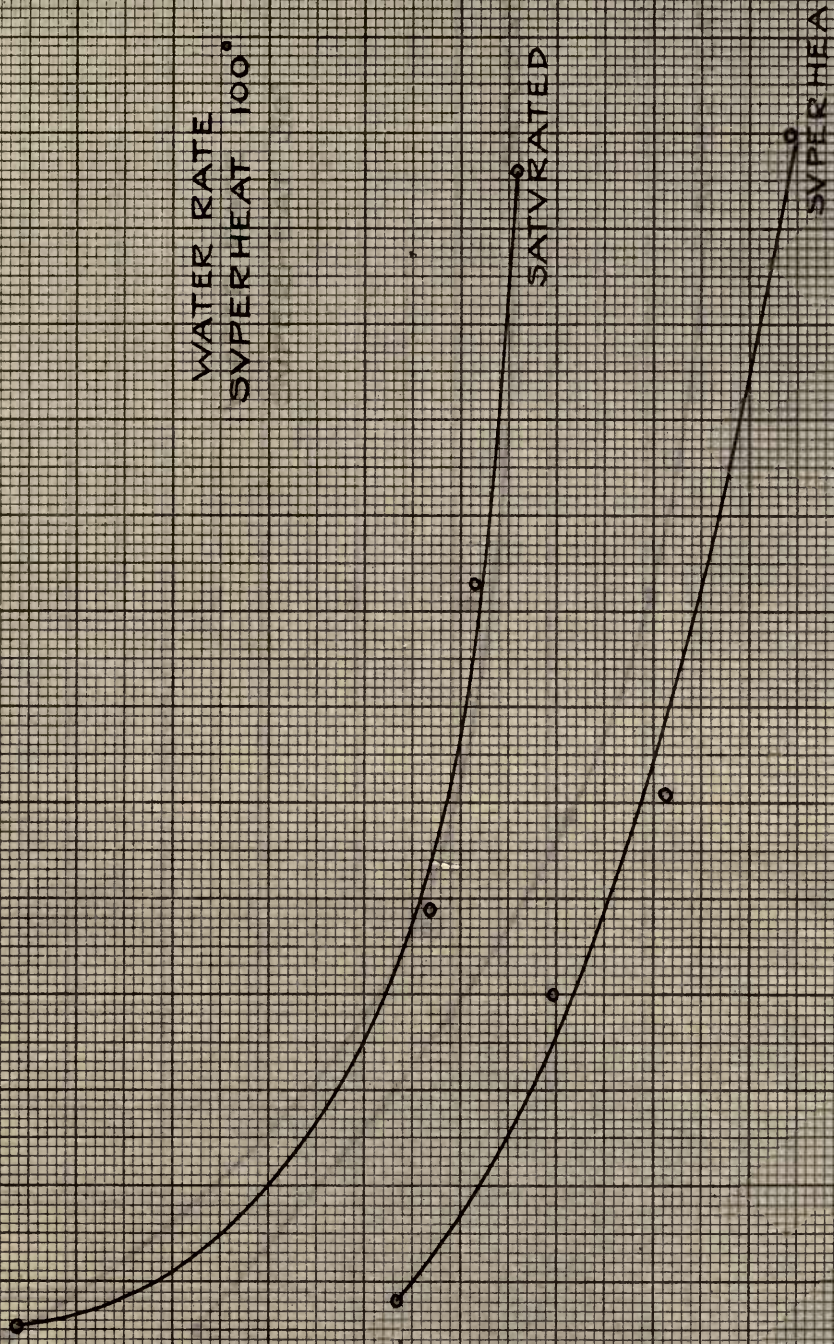
SATURATED

SUPERHEATED.

D.H.P.

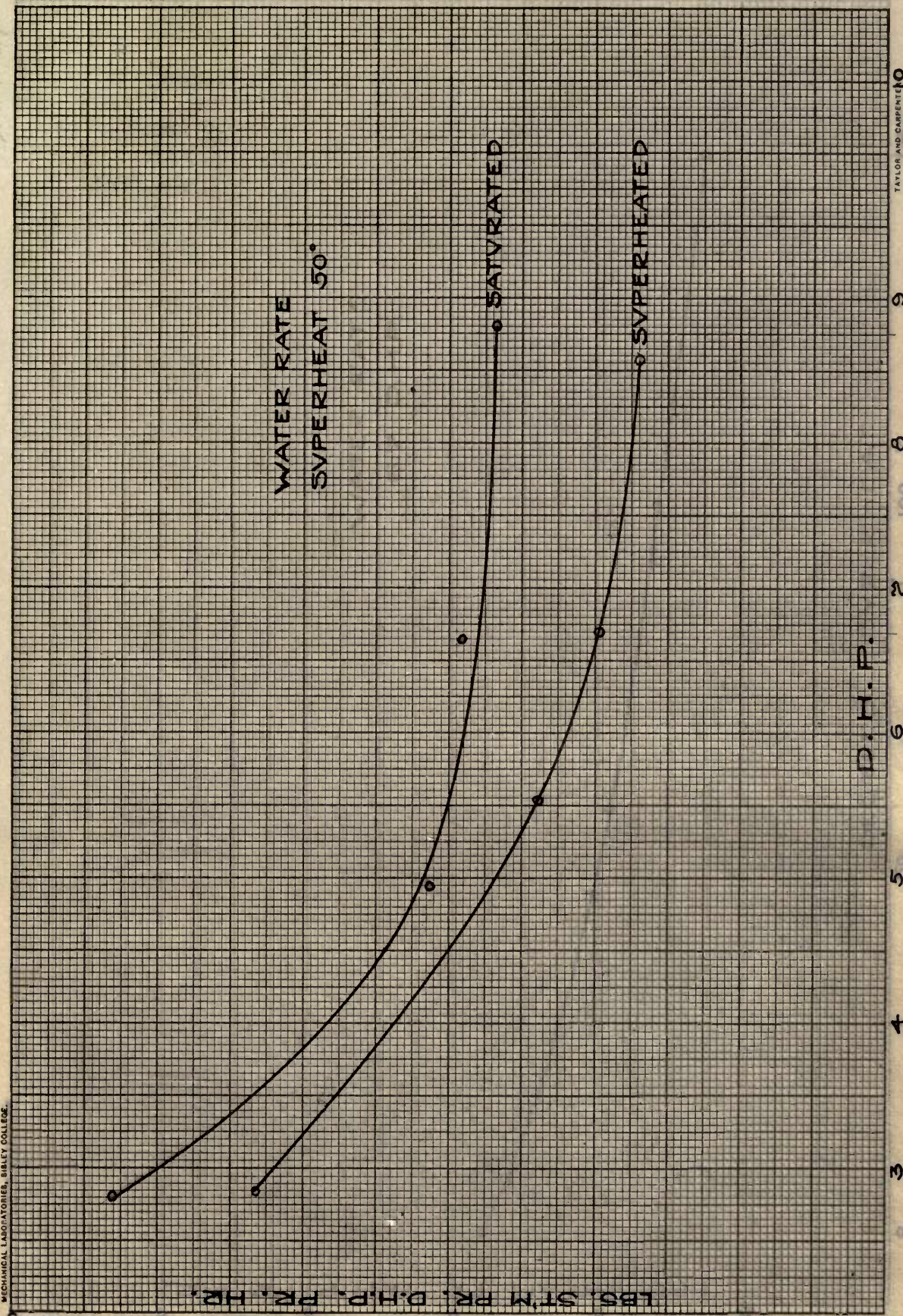
3 4 5 6 7 8 9 10

TAYLOR AND CARPENTER



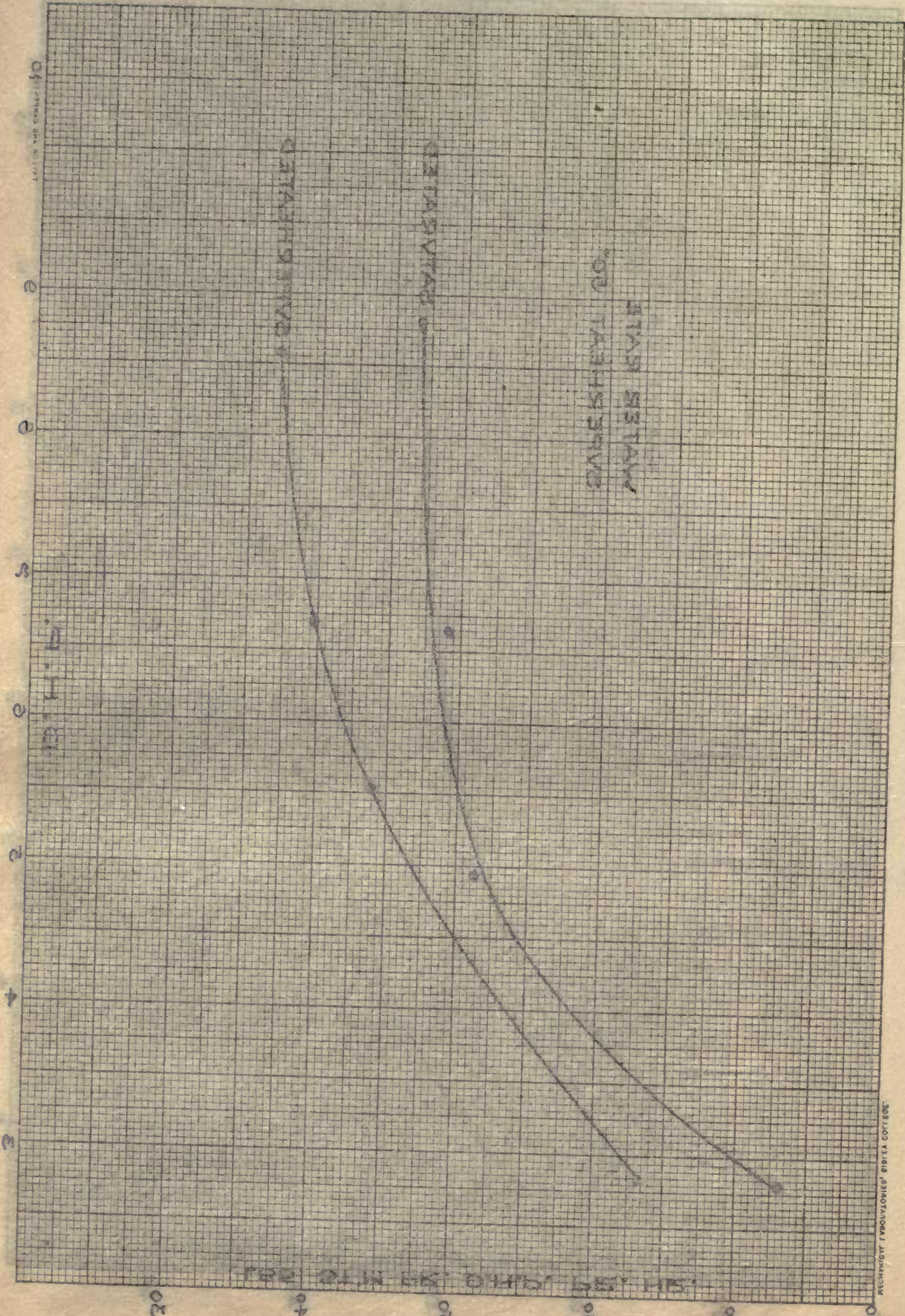
V-50°

MECHANICAL LABORATORIES, BIRLEY COLLEGE



LBS. ST. M. PR. D.H.P.

D.H.P.



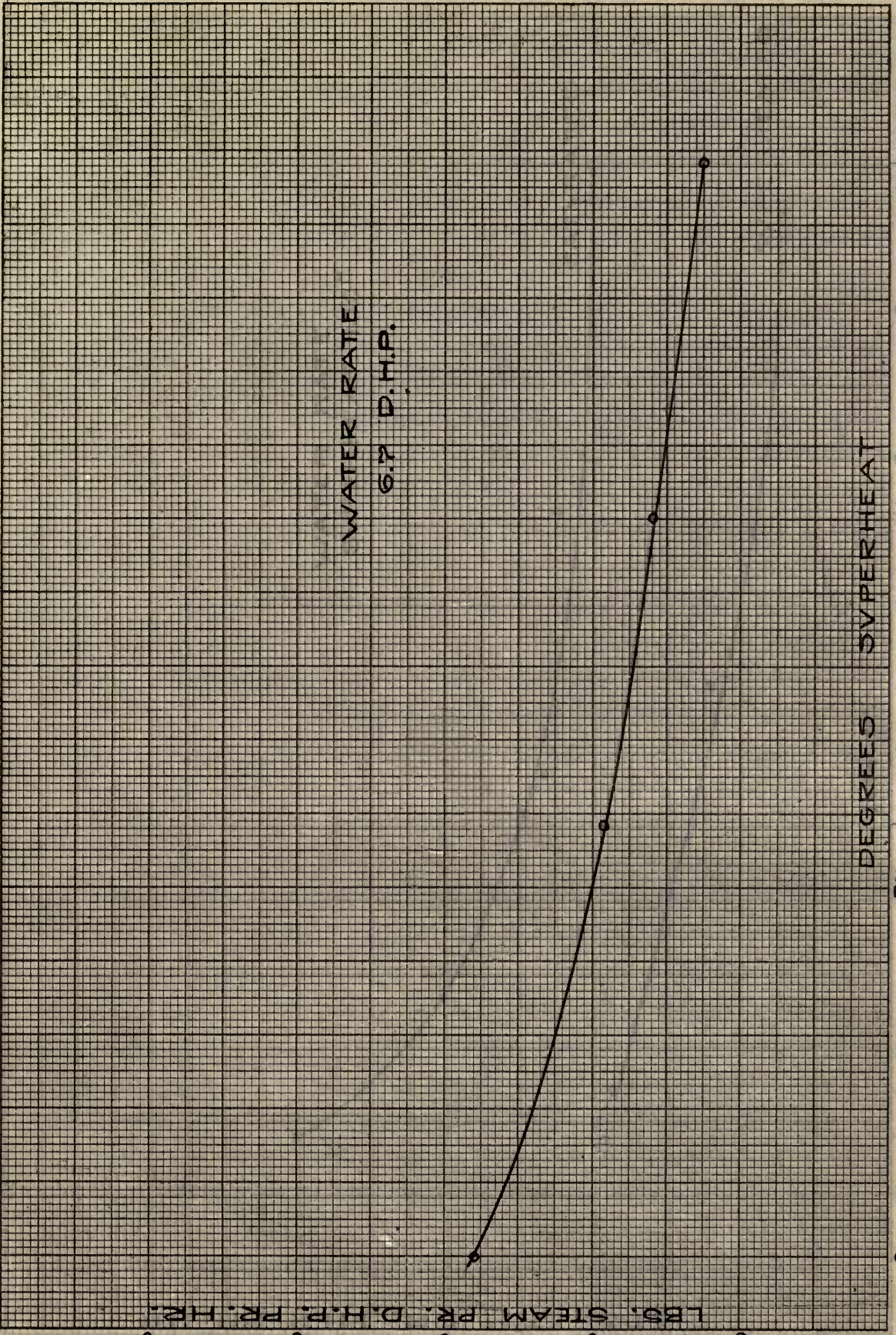
D.H.P. 6.7

MECHANICAL LABORATORIES, BRILEY COLLEGE.

WATER RATE
6.7 D.H.P.

LBS. STEAM PR. D.H.P. PR. H.P.

DEGREES SUPERHEAT



120
100
80
60
40
20
0

100

80

60

AMSHBVS
Q35D30

STAR SHAW
MULEX BATE

130' 210W 54' D.M.E. 15' H.S.

некорр. ГЕОЛ. РАБ. 1958

120
100
80
60
40
20
0

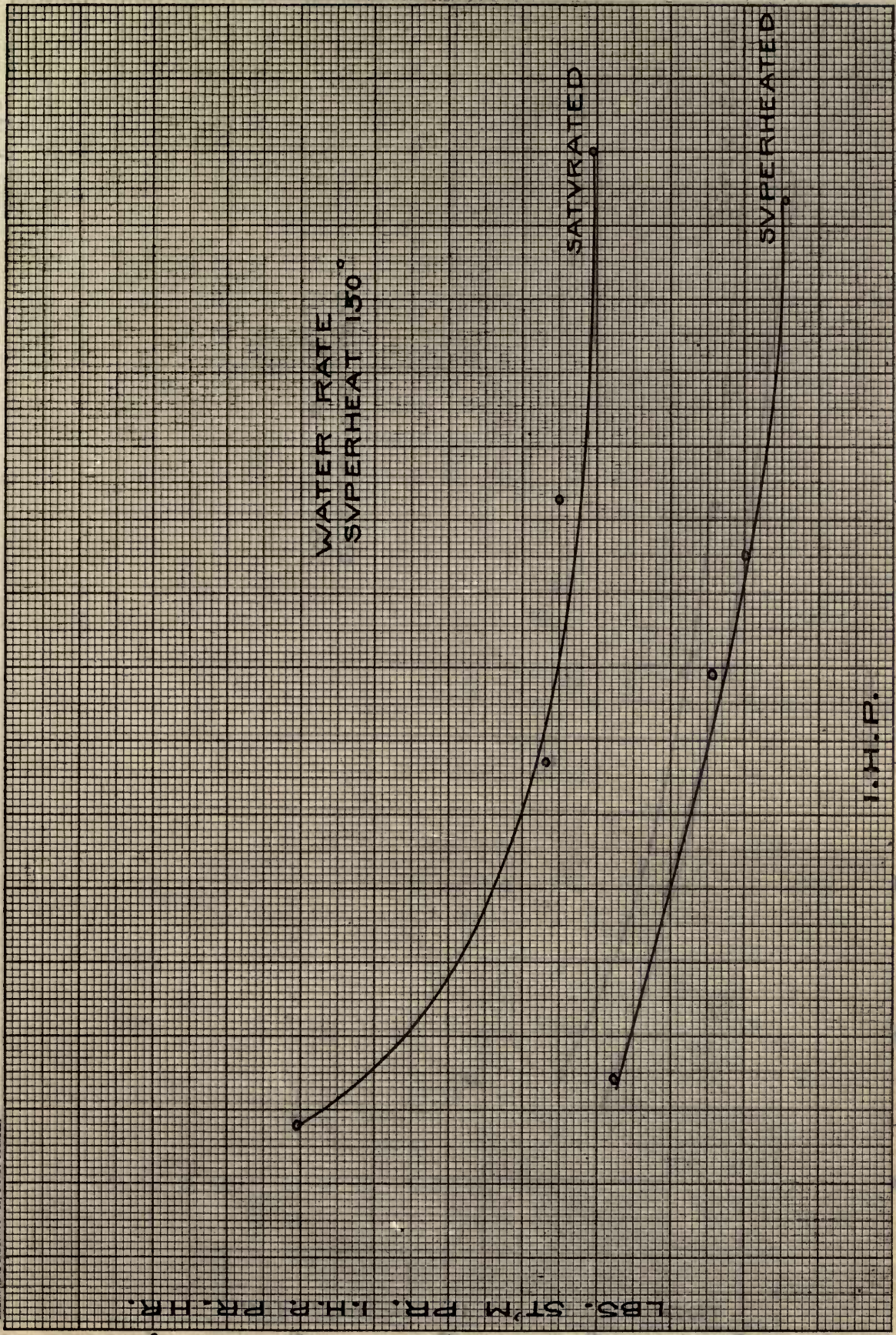
LBS. ST. M. PR. I.H.P. PR. H.R.

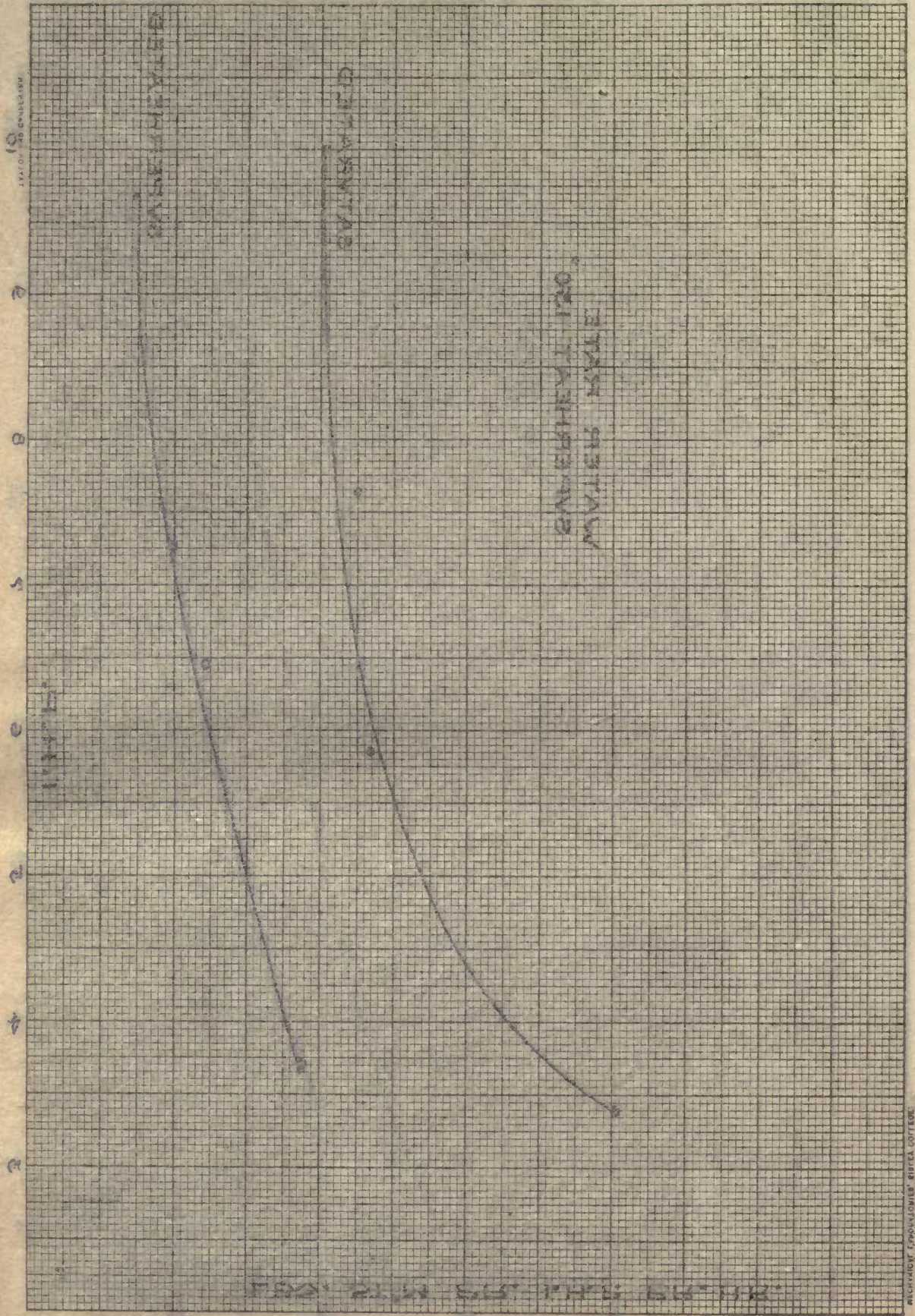
WATER RATE
SUPERHEAT 150°

SATURATED

SUPERHEATED

I.H.P.





LBS. ST. M. PR. I.H.P. PR. H.R.

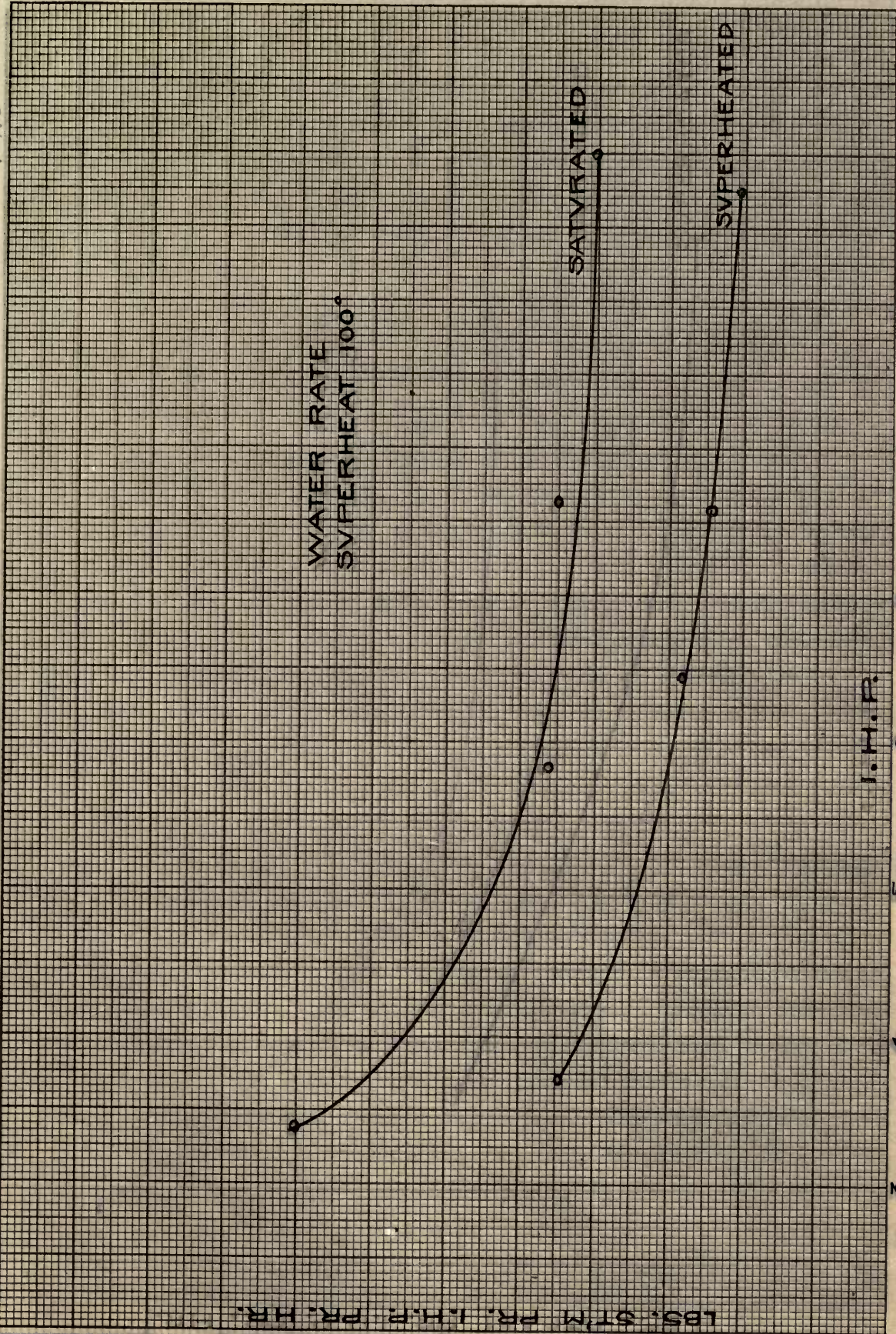
WATER RATE
SUPERHEAT 100°

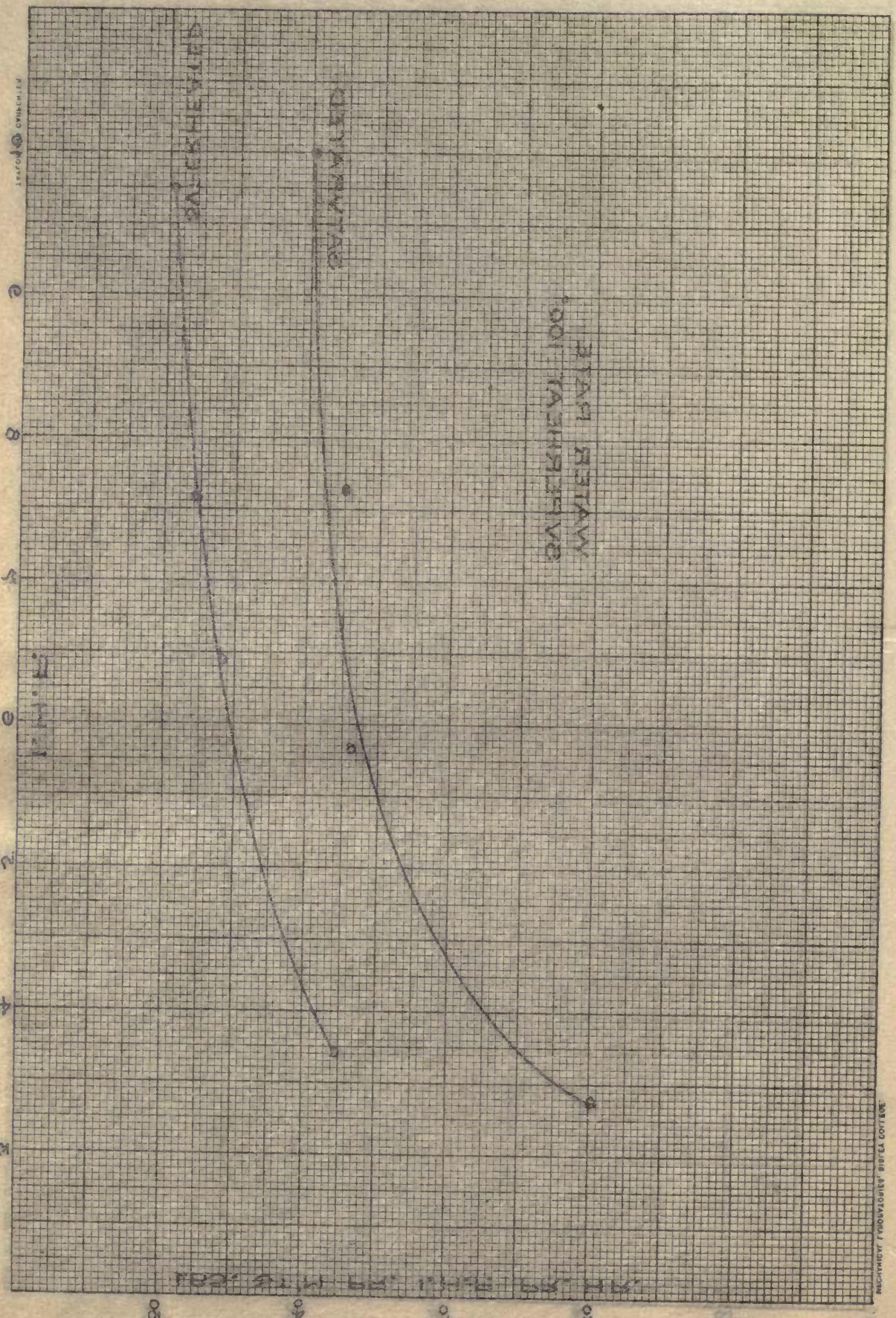
I.H.P.

SATURATED

SUPERHEATED

3 4 5 6 7 8 9





Y-27 114 P

LB'S. STEAM PR. I.H.P. PR. I.H.P.

WATER RATE
SUPERHEAT 50°

SATURATED

SUPERHEATED

I. H. P.

3

4

5

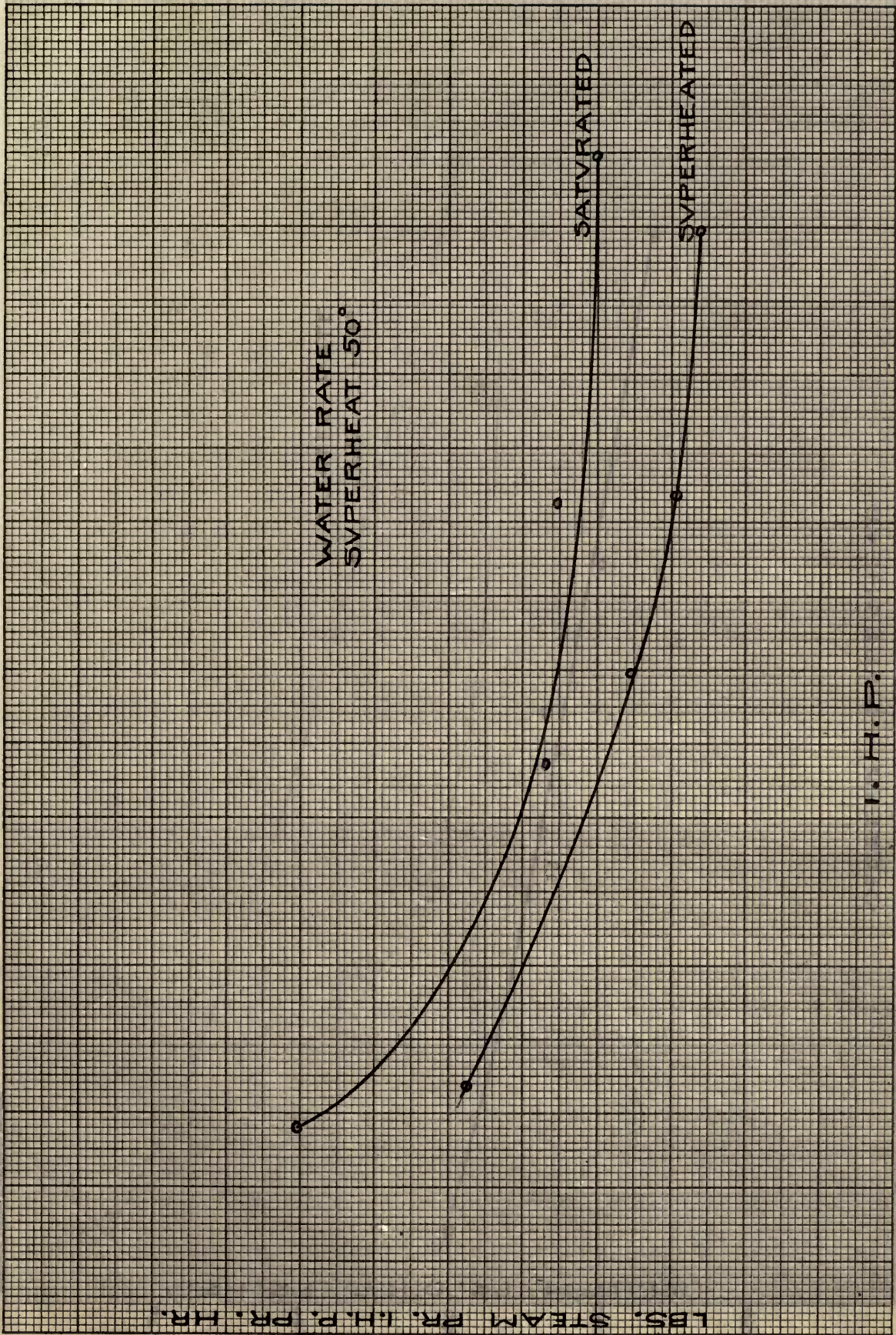
6

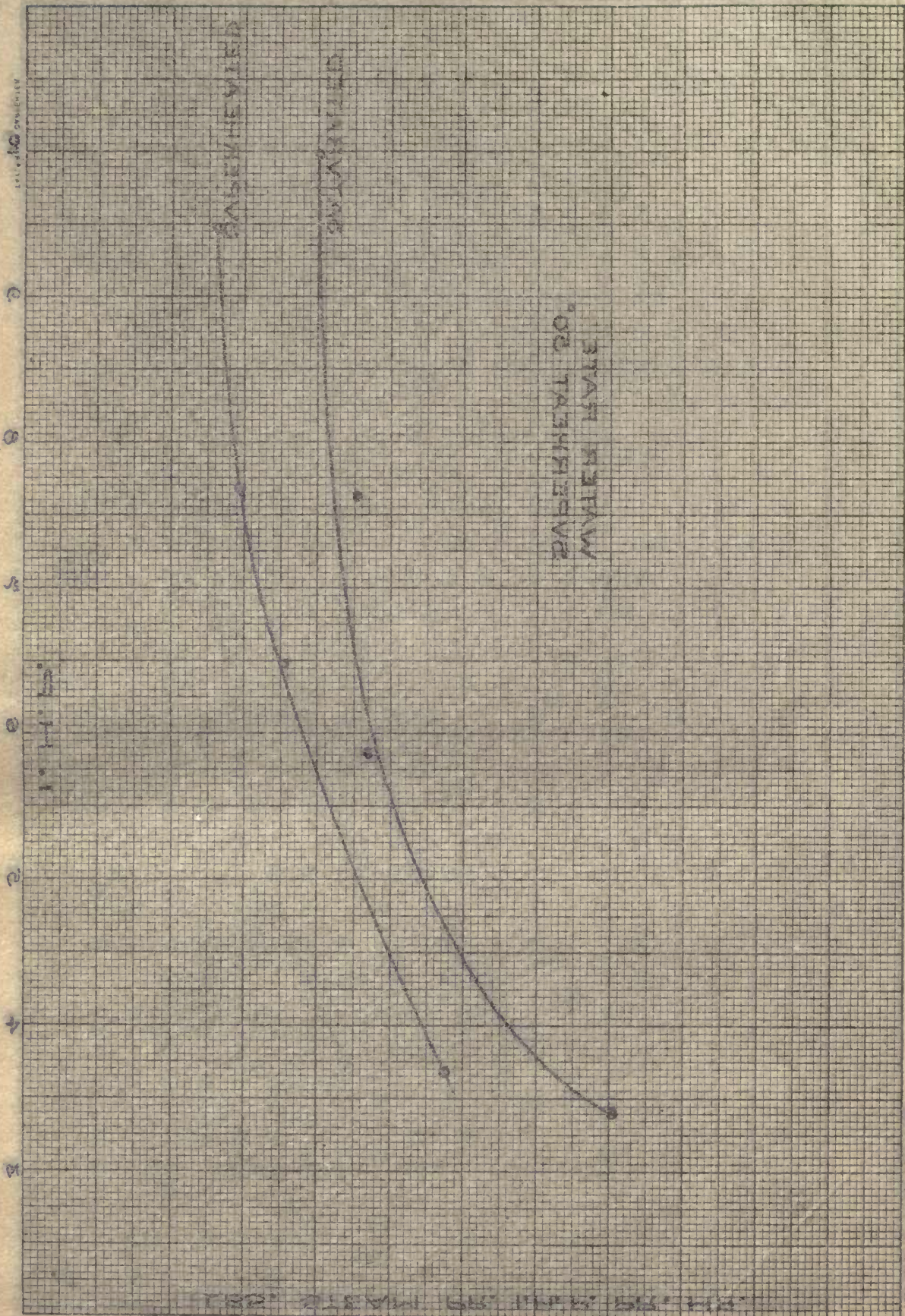
7

8

9

10





20

60

50

40

30

LB. ST. M. P. R. D. H. P. P. R. H. K.

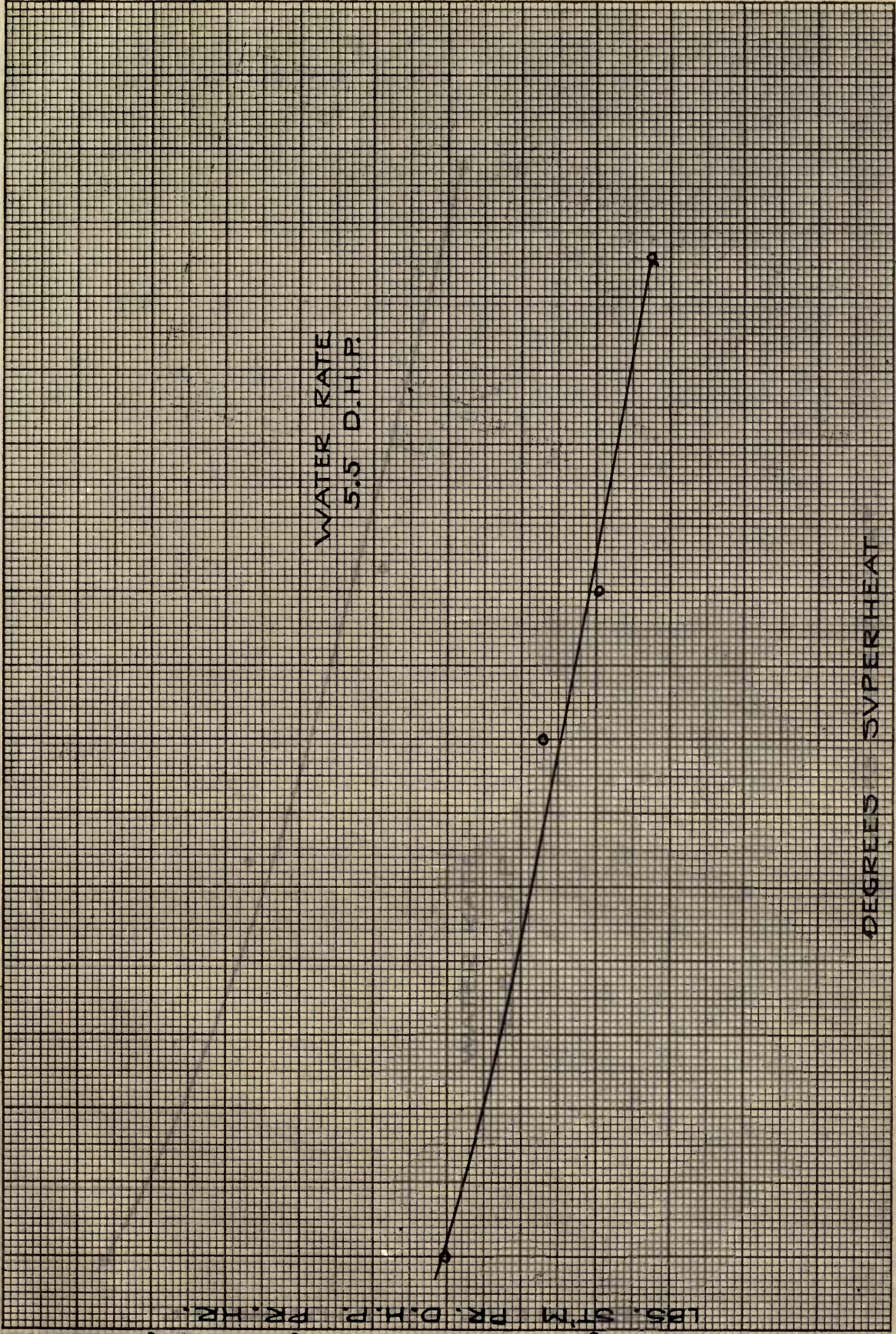
WATER RATE
5.5 D.H.P.

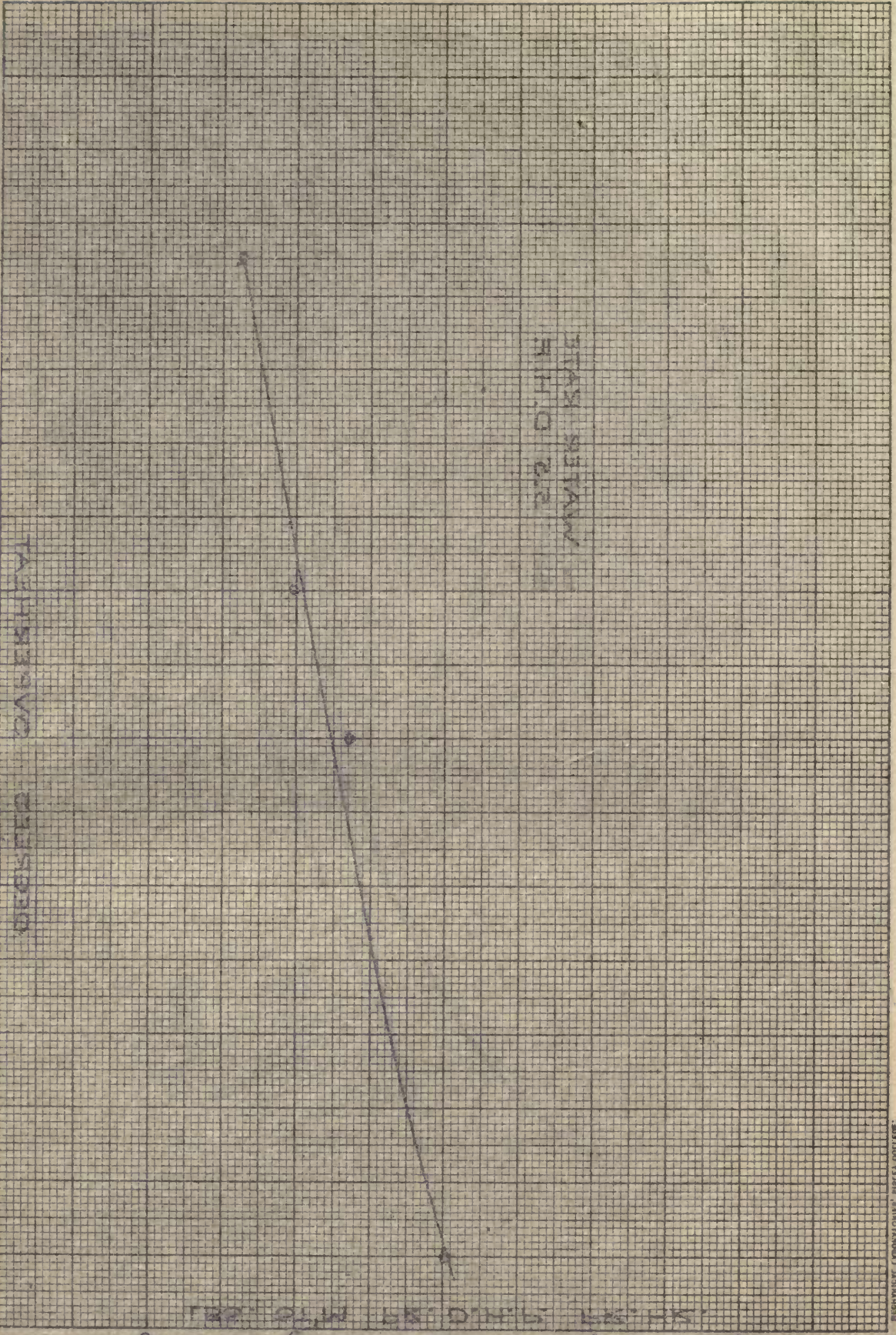
DEGREES SUPERHEAT

0

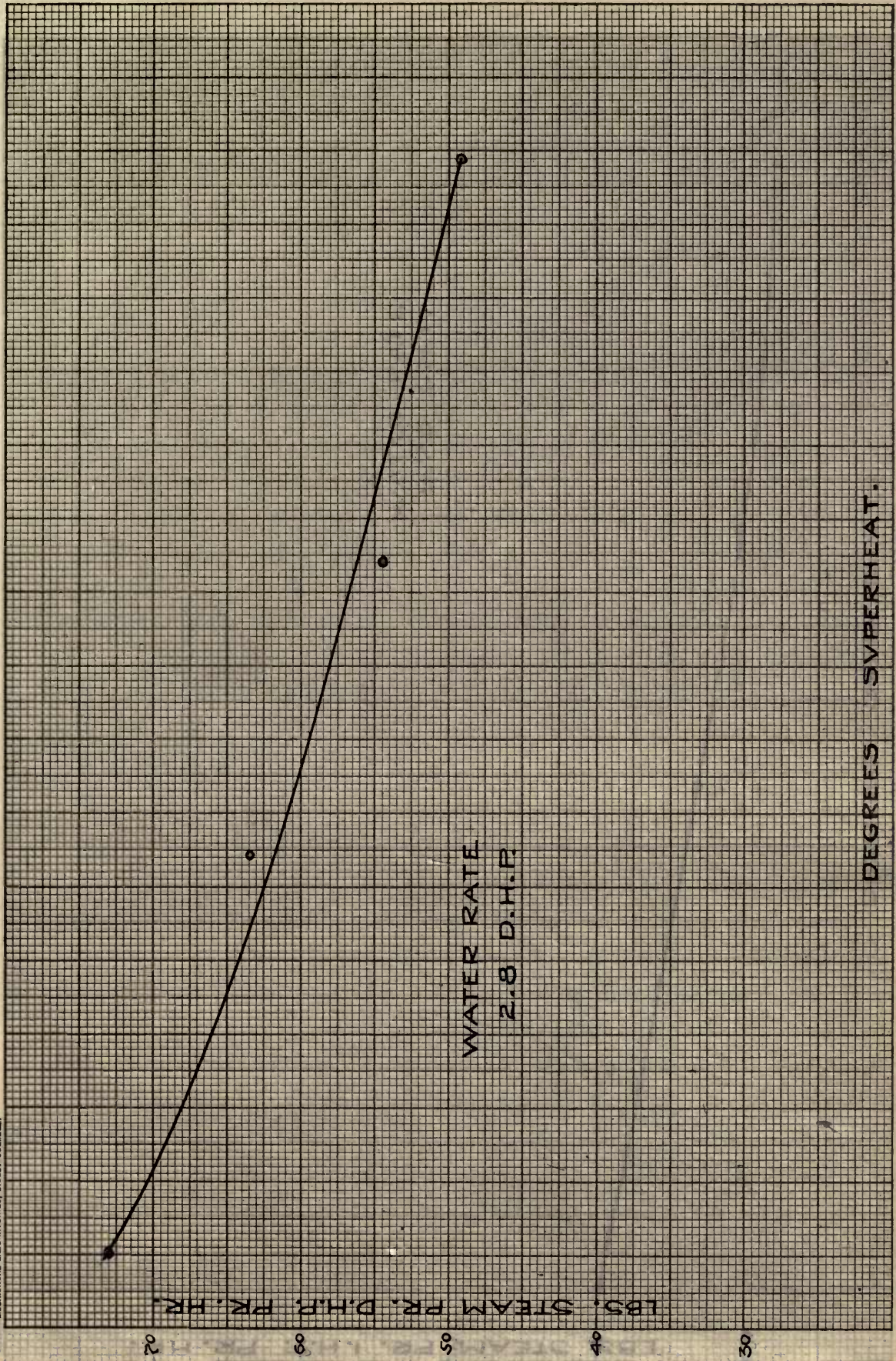
50

100





DR. D.H.H.
M.V.I.S. K.V.A.C.

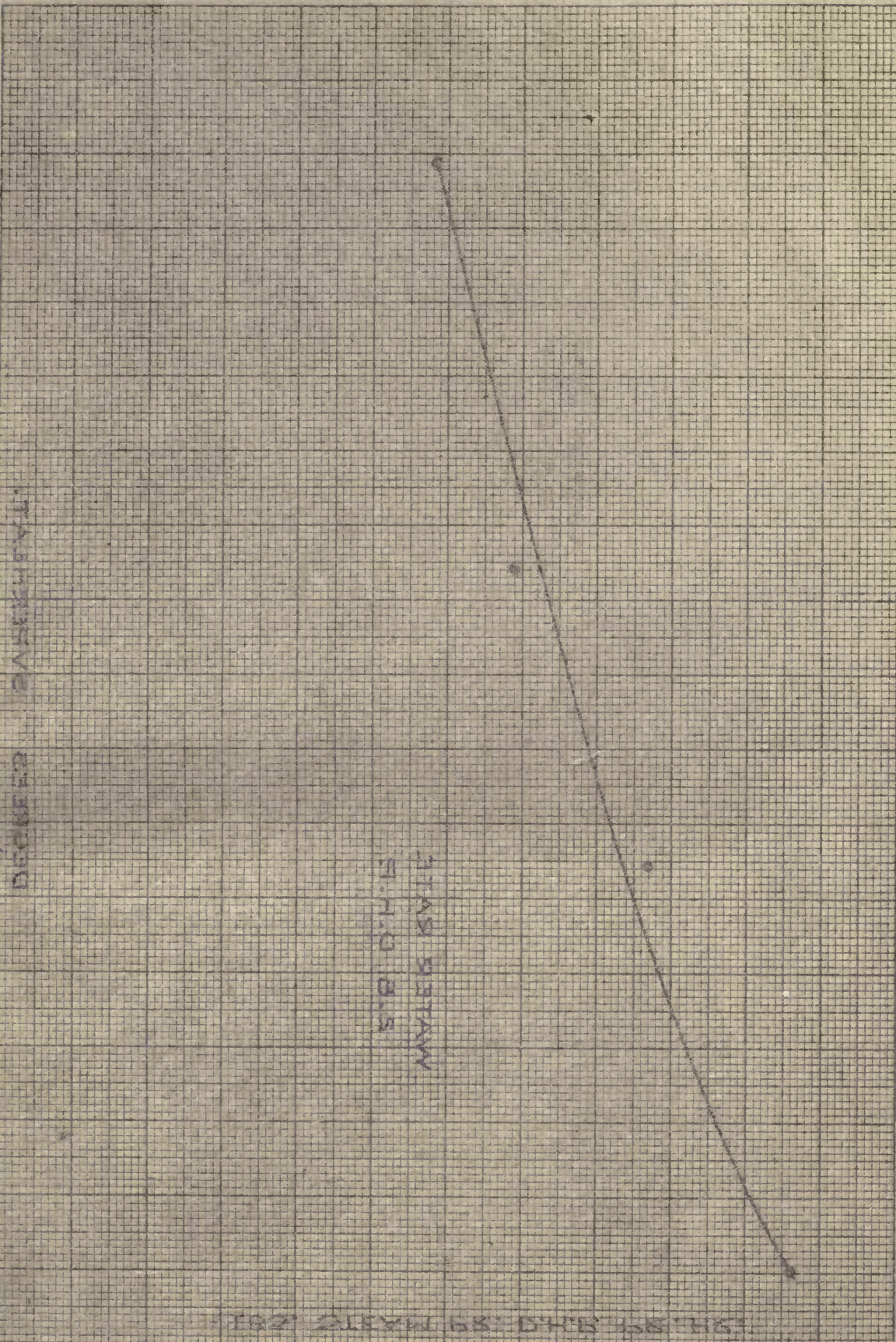


DECEMBER 1951

STAIN
GLASS
SCALE

100 200 300 400 500 600 700 800 900 1000

0 2 4 6 8 10

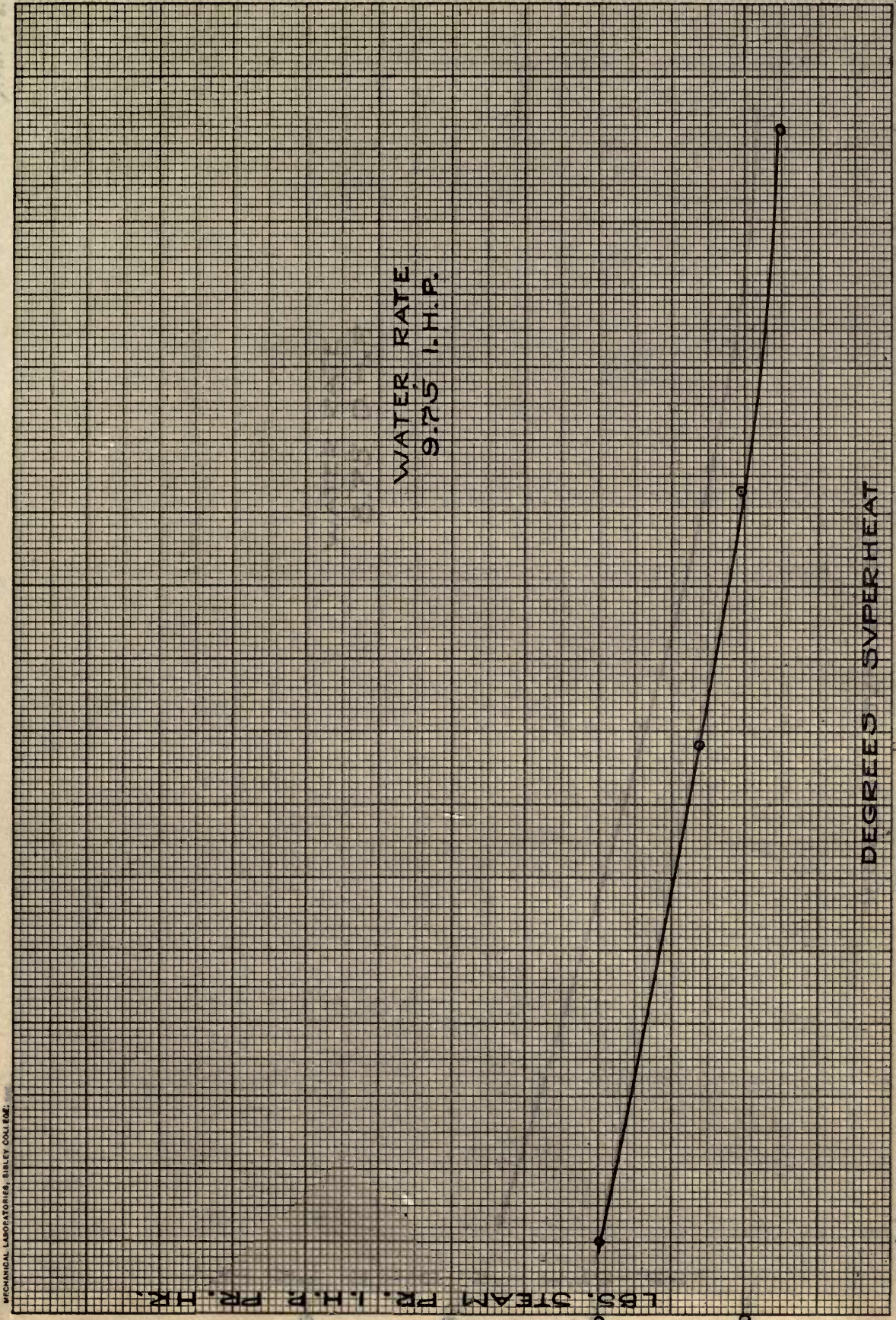


100: STEAM FR. I.H.P. PR. HR.

WATER RATE
9.25 I.H.P.

DEGREES SUPERHEAT

0 50 100



120
EXACTLY

100

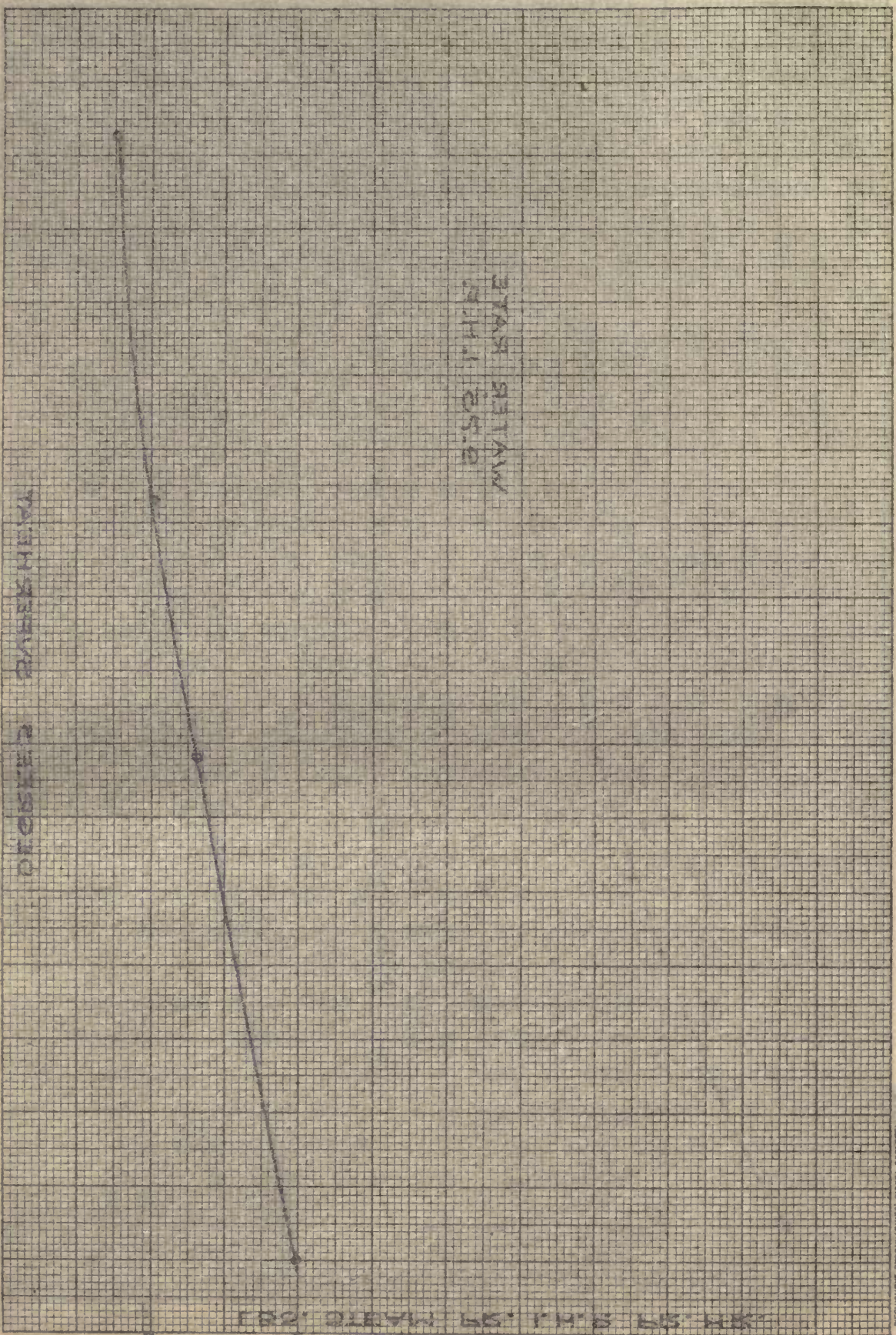
80

0

VALIENSKAYA
DROZDEVA
DUBKHEVA

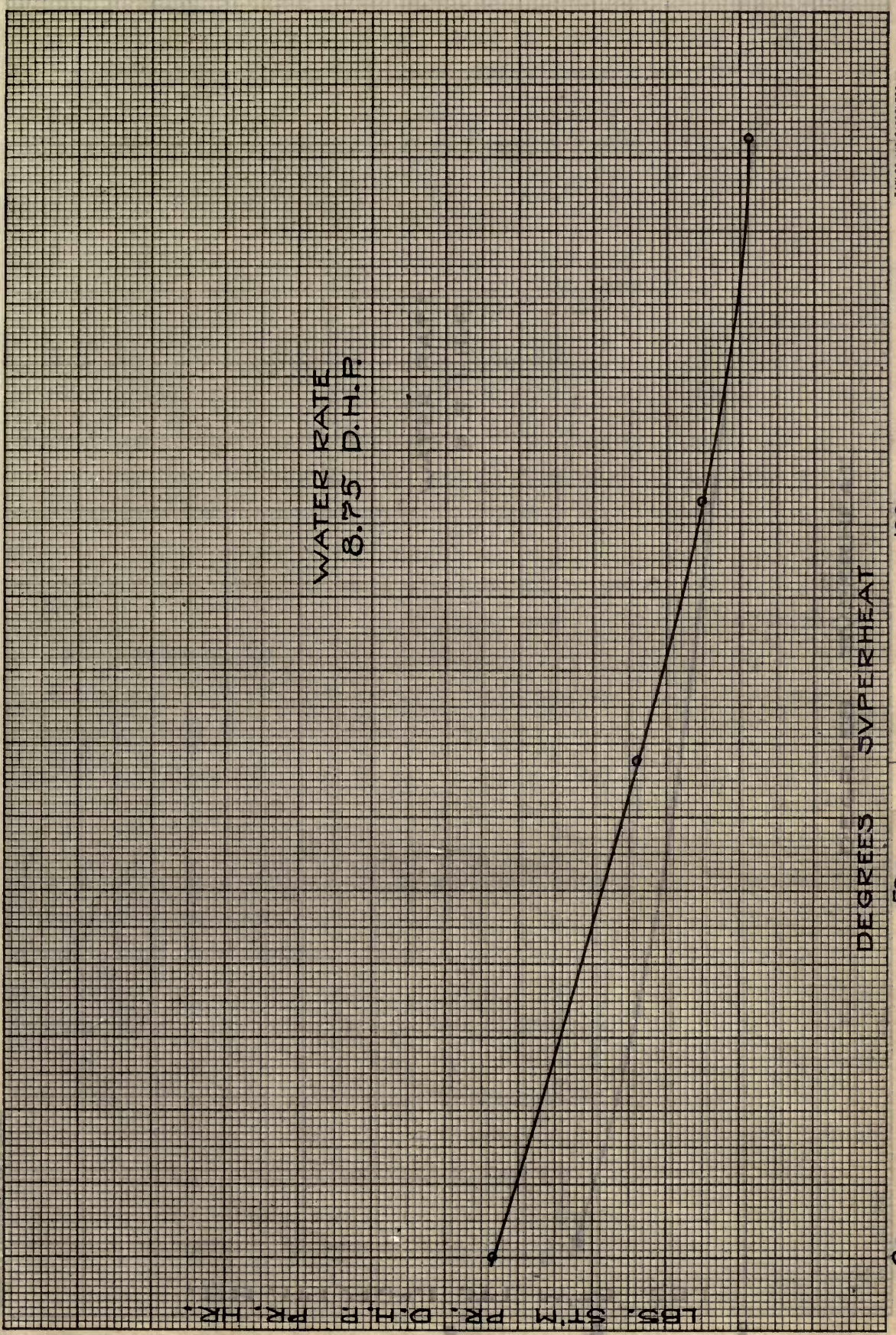
0.52 THIN
MILES BASE

120' 21.4M 55' TH'S 55' 50'



P.H.P. - 8.75 H.P.

MECHANICAL LABORATORIES, SIBLEY COLLEGE



TAYLOR & FRANCIS

1000

500

0

LB. S. 0.1 M PR. I. H. P. PR. HR.

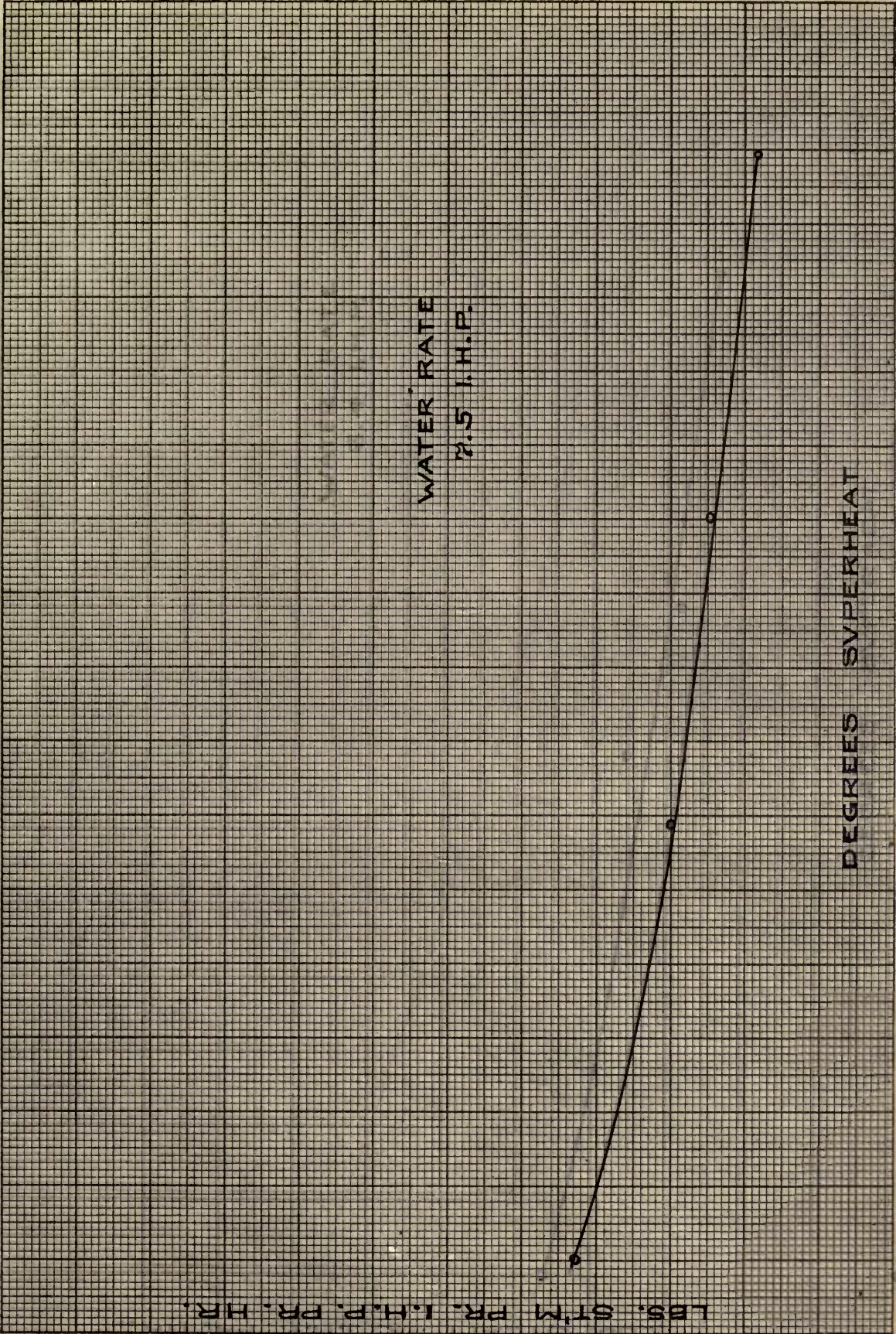
WATER RATE
7.5 I. H. P.

DEGREES SUPERHEAT

50 100

0

50 40 30



DESSER
TAMHAYE

STAN
MAYAN
M.H.I. R.S.



M. H. I. R. S.
MAYAN
STAN

LBS. STEAM PR. I.H.P. PR. HR.

WATER RATE
6.4 I.H.P.

DEGREES SUPERHEAT

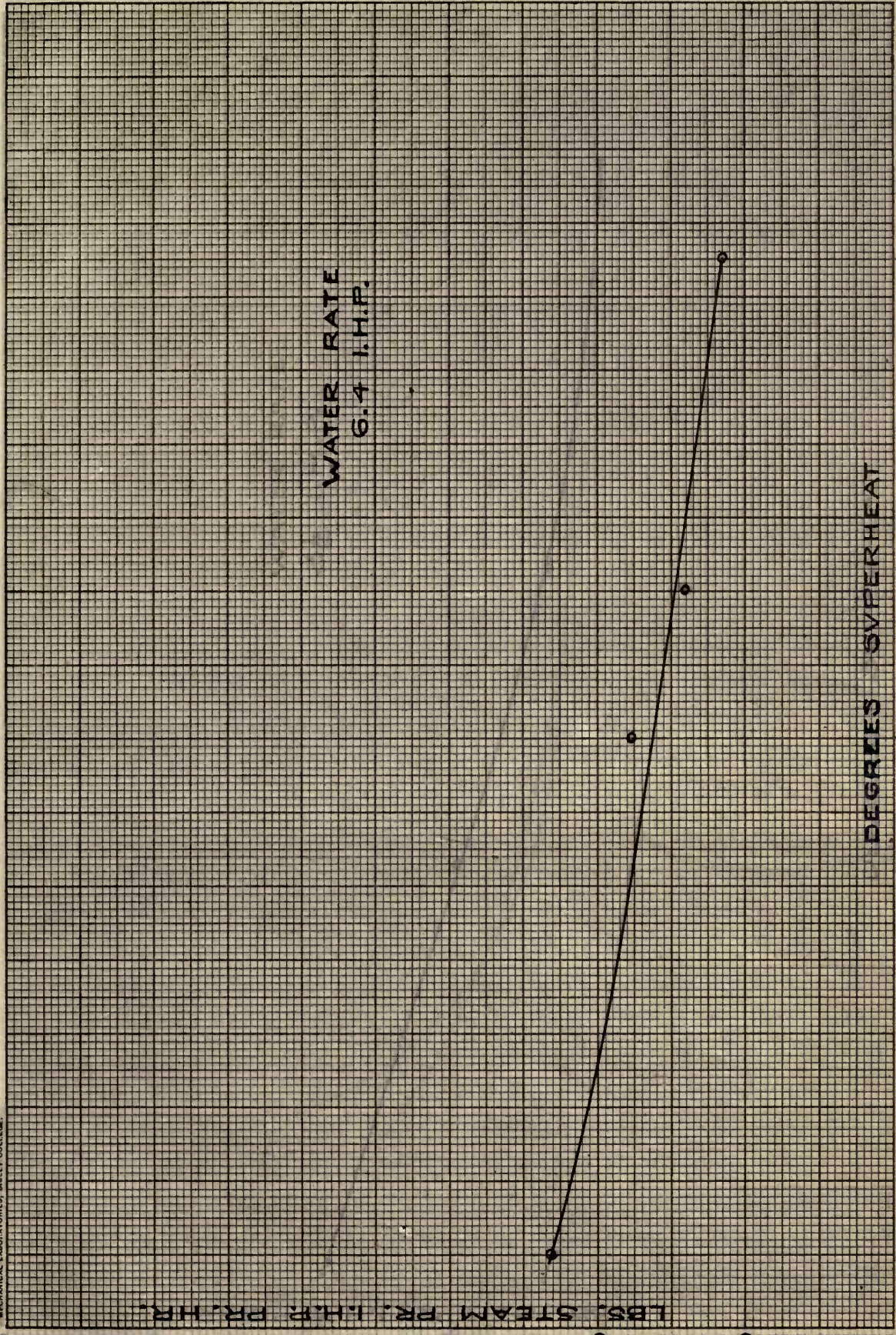
0

50

100

150

TAYLOR APPENTER

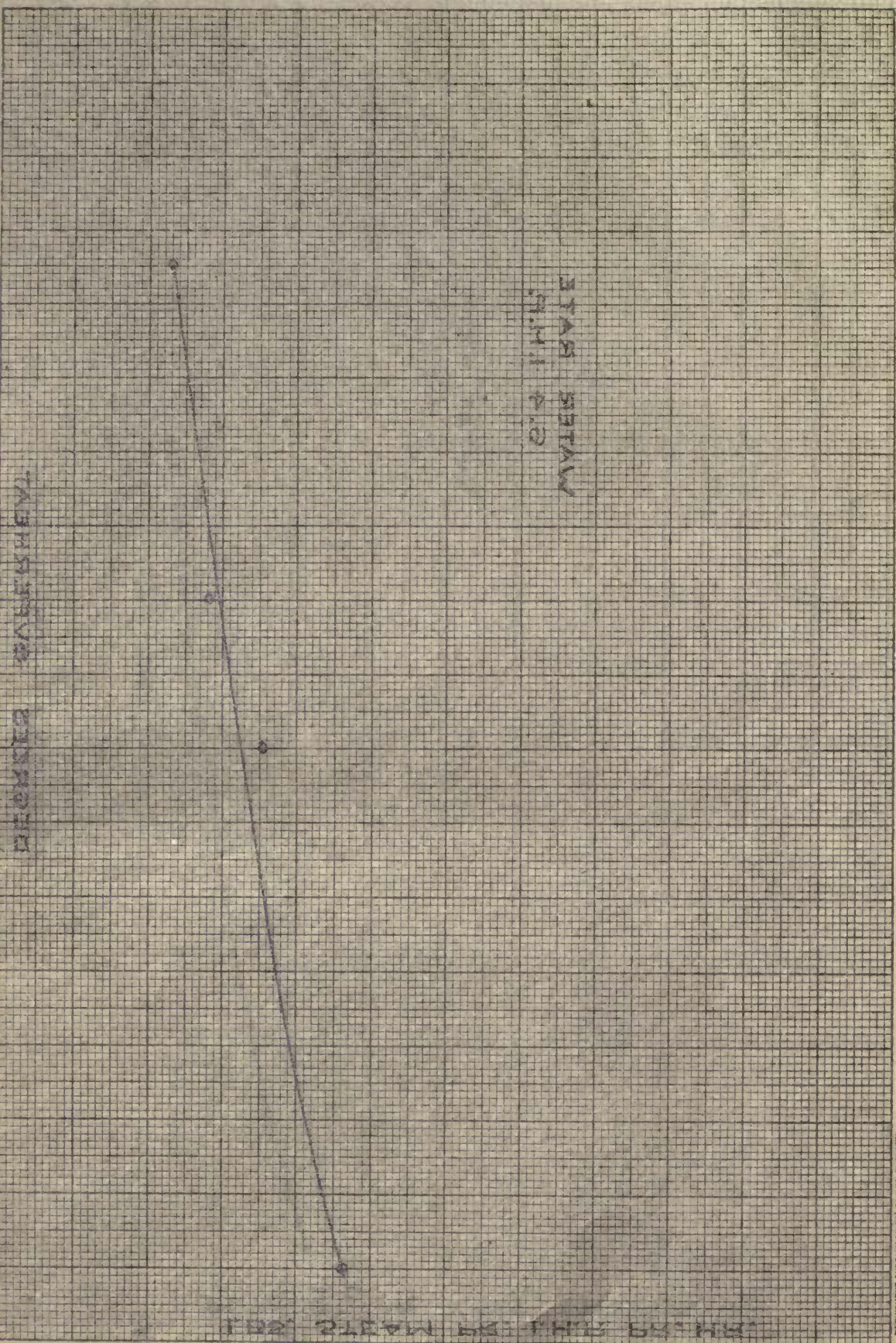


120

100

20

0



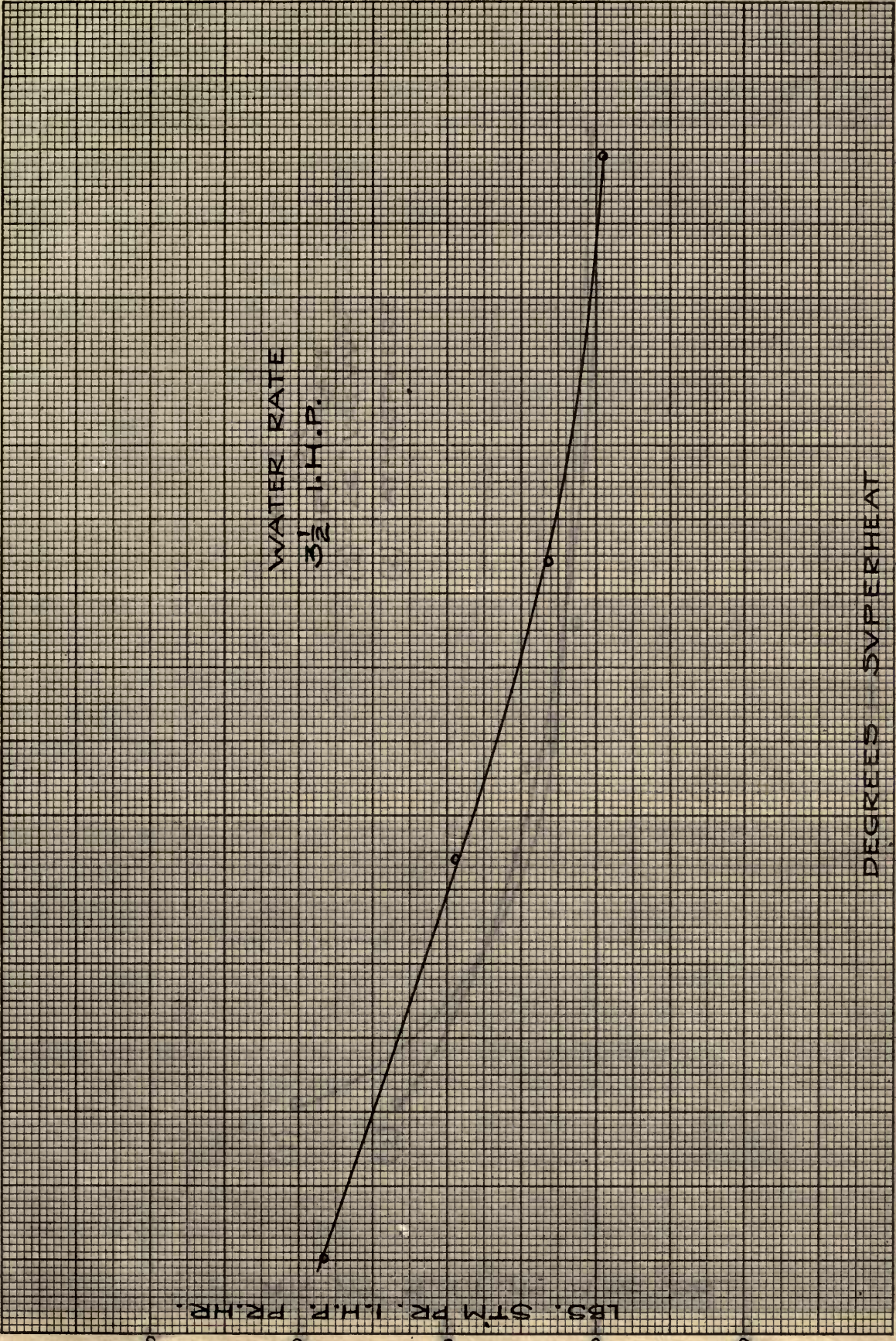
STADIUM
METER SCALE

FOR STADIUM METER SCALE

LB'S. STM. PR. L.H.R. FR. HR.

WATER RATE
3 1/2 I.H.P.

DEGREES SUPERHEAT

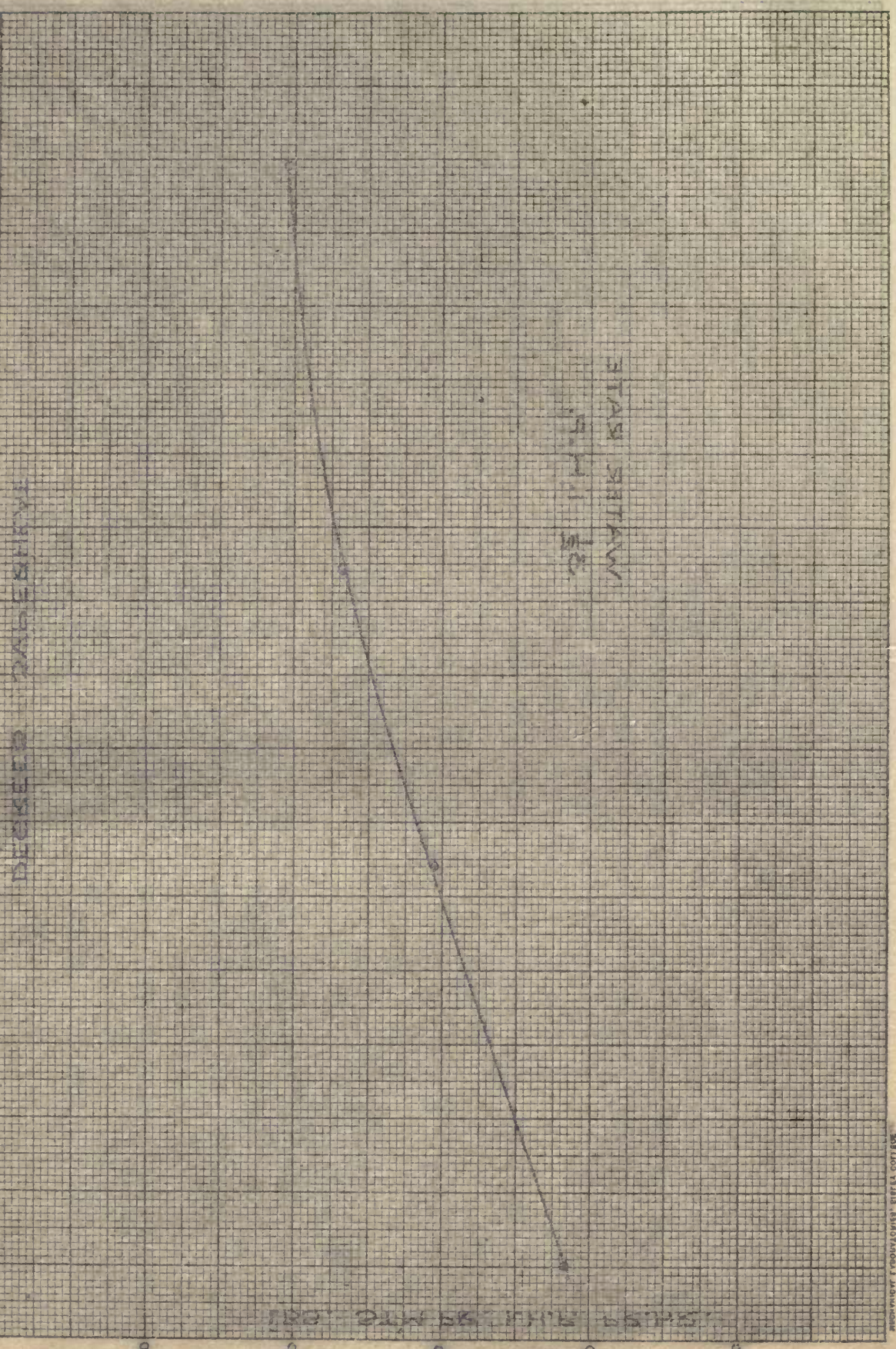


100

100

20

0



LBS. ST. M. PR. I. H. P. PR. H. P.

WATER RATE
FOR
DRY STEAM
(1) = 26" VACUUM
(2) = ATMOSPHERE

I. H. P.

3

4

5

6

7

8

9

10

20

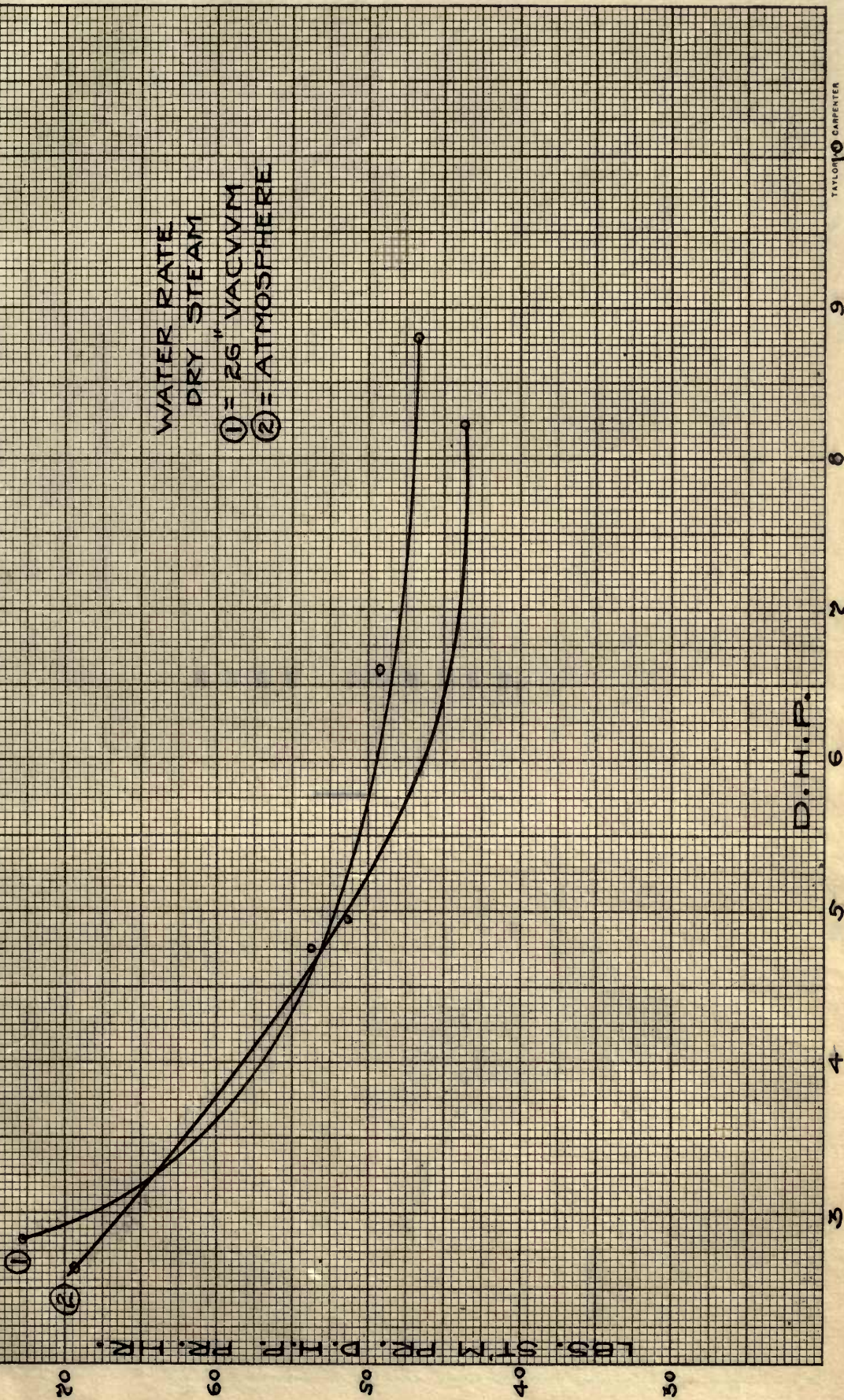
60

50

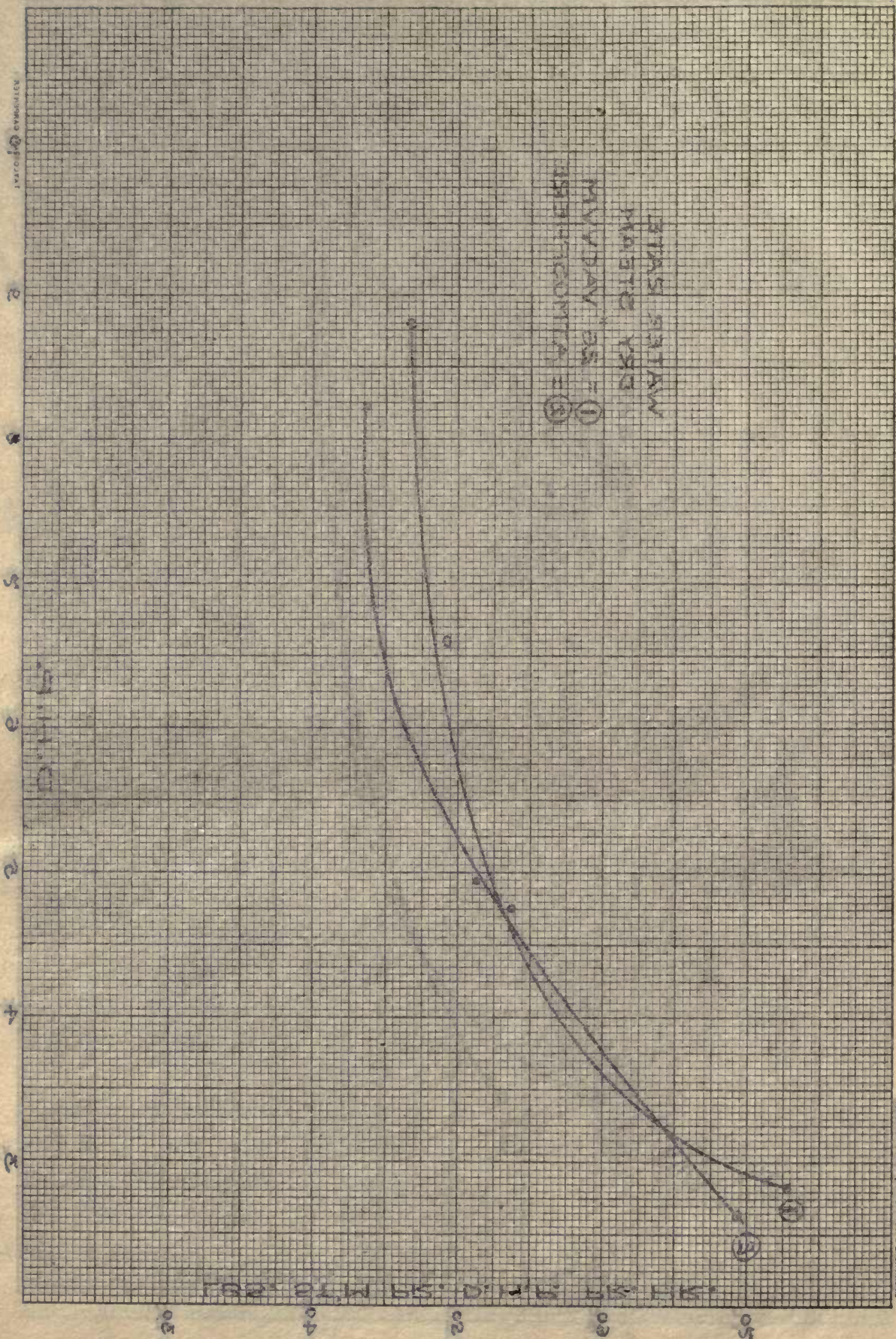
40

30

WATER RATE
DRY STEAM
① = 26" VACUUM
② = ATMOSPHERE



lbs. steam per hr. D.H.P.



HEAT CURVES.

—

CRANE'S

REGISTERED TRADE MARK
MEXICO, CALIFORNIA

MADE IN U.S.A.

1904

ALL RIGHTS RESERVED

THOUSANDS OF B.T.U. PR. I. H. P. PR. H. R.

20
30
40
50

HEAT SUPPLIED
9.5 I. H. P.

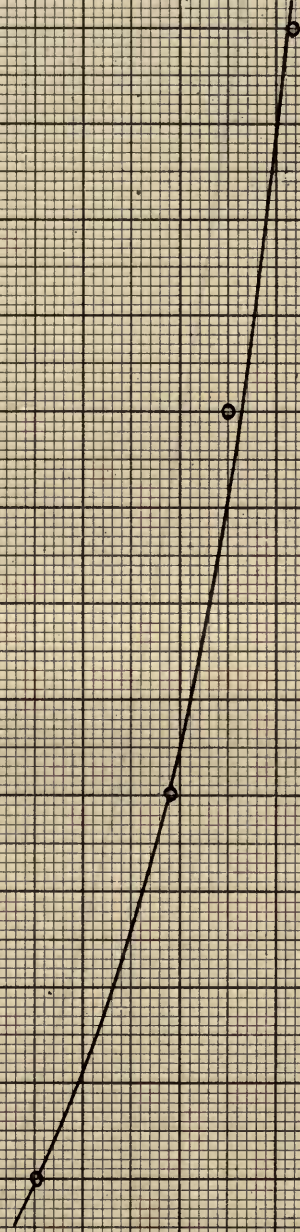
DEGREES SUPERHEAT

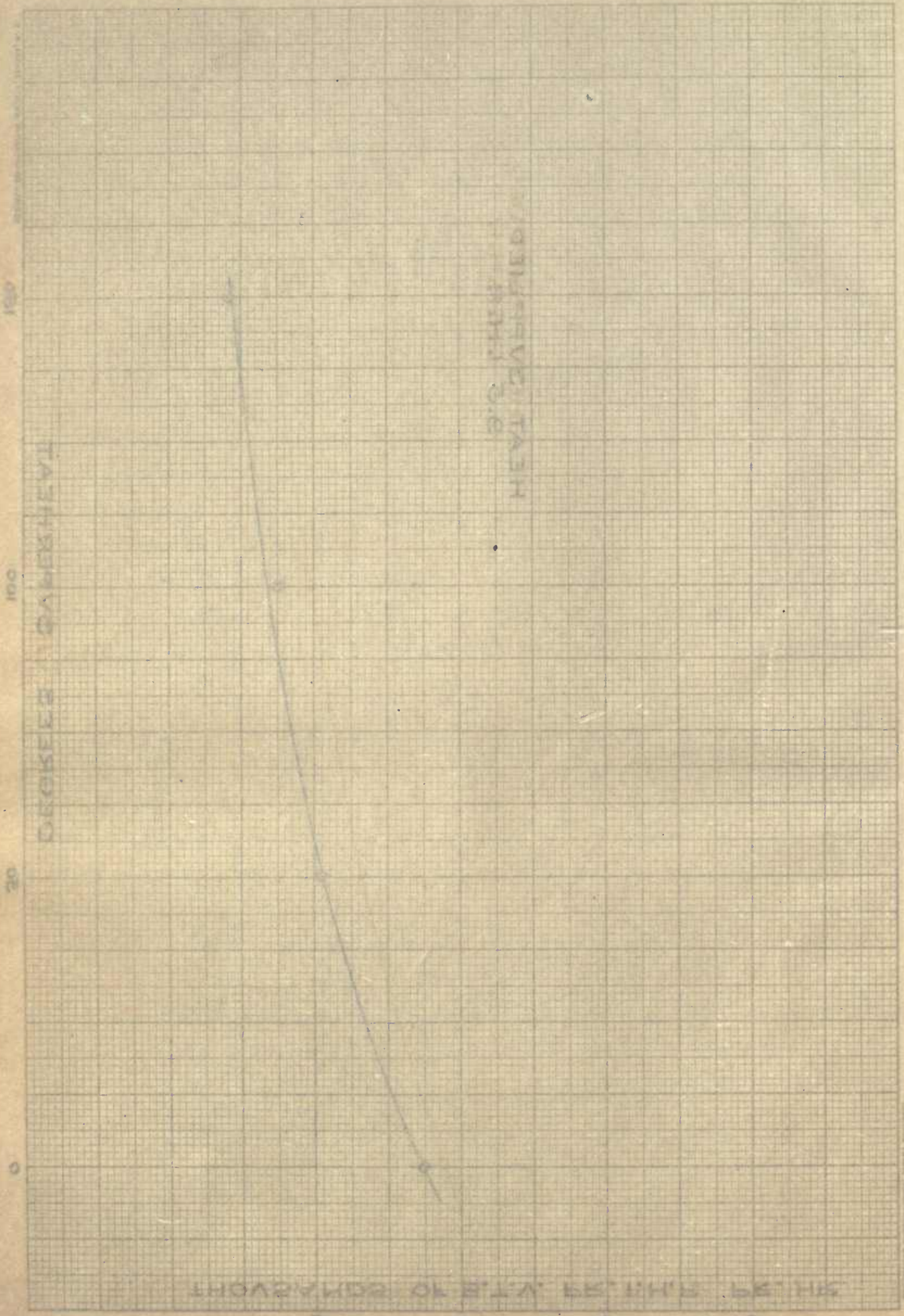
150

100

50

0





800 THER
HEAT SUPPLIED

THOUSANDS OF BTU PER HOUR

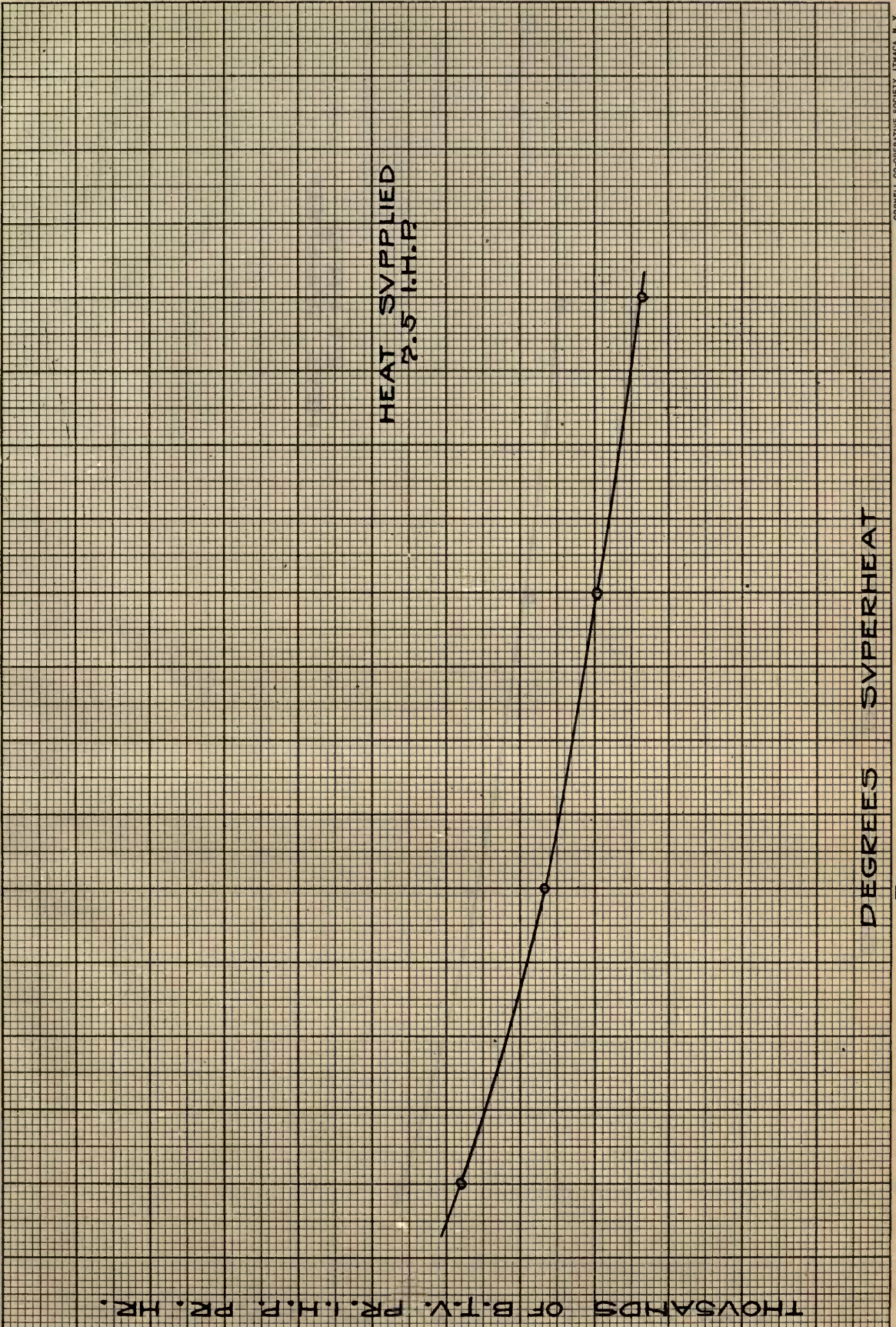
DEGREES FAHRENHEIT

THOUSANDS OF B.T.U. PR. I.H.P. PR. HR.

HEAT SUPPLIED
2.5 I.H.P.

DEGREES SUPERHEAT

0 50 100 150



THOUSANDS OF B.T.U. P.R.L.H.P. P.R. H.K.

HEAT SUPPLIED
5.5 I.H.P.

DEGREES SUPERHEAT.

60

50

40

30

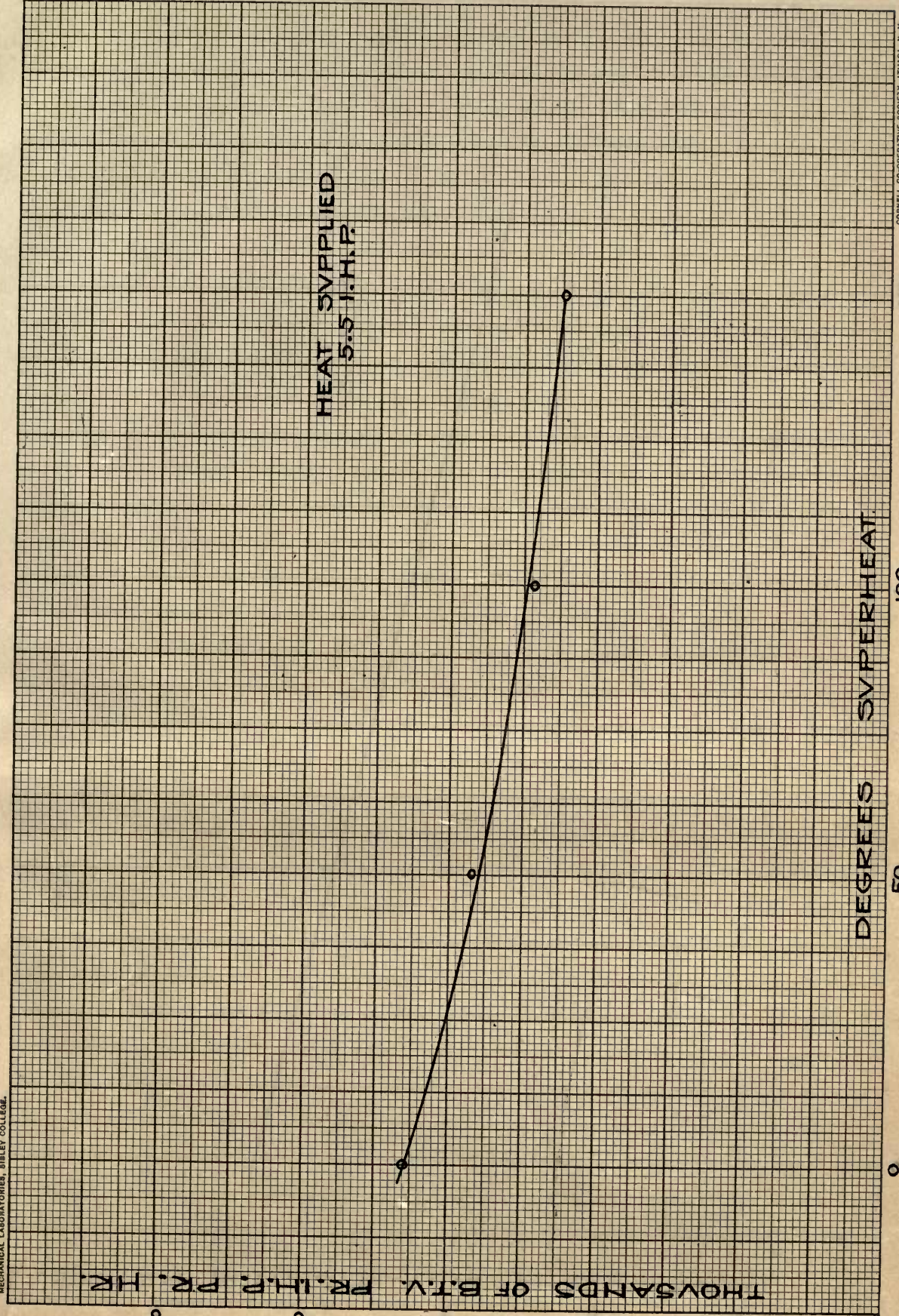
0

0

50

100

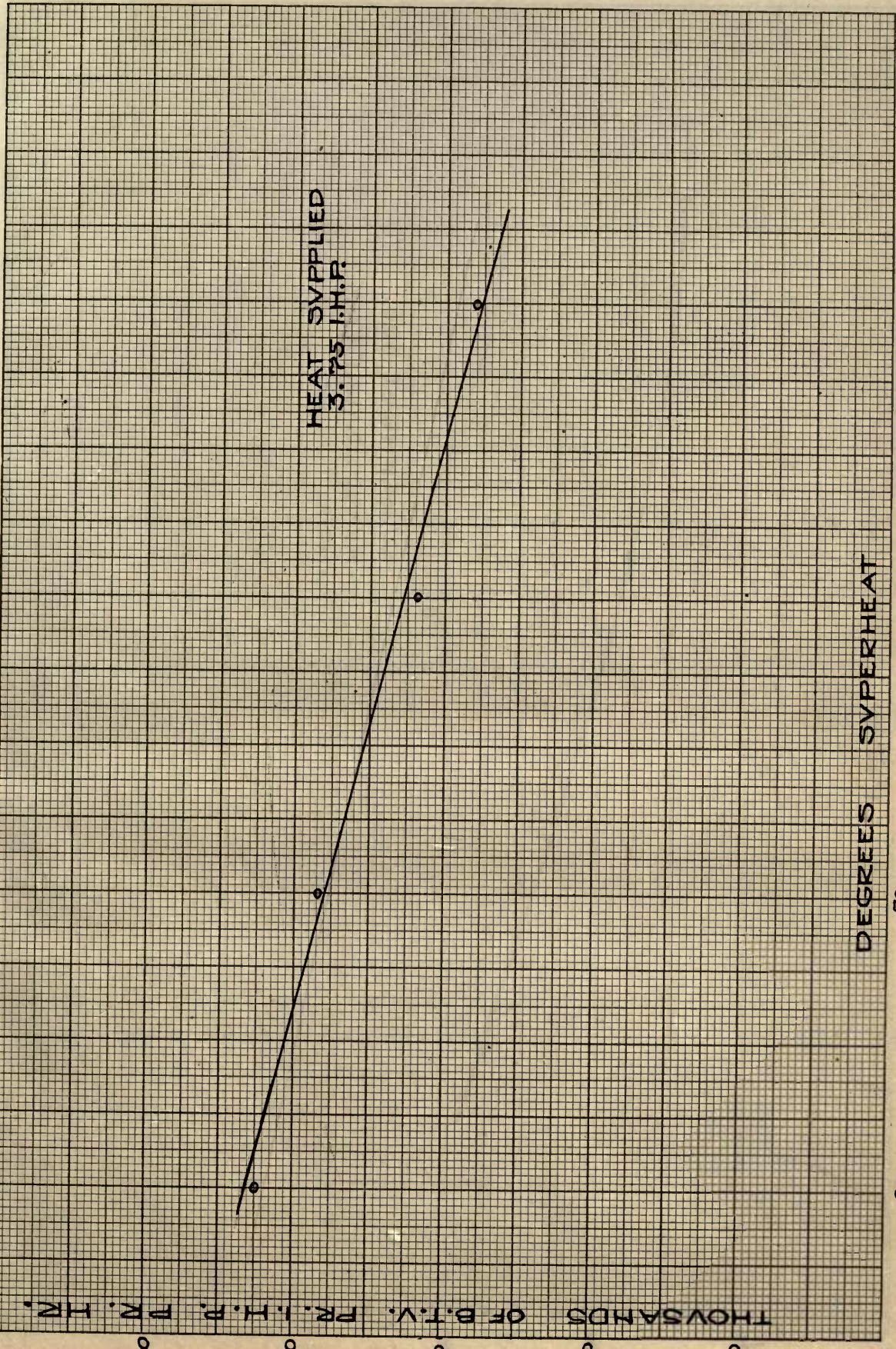
150



THOUSANDS OF B.T.U. R. I. H. P. T. N. H. N.

HEAT SUPPLIED
3.725 I.H.P.

DEGREES SUPERHEAT



20

60

50

40

30

0

50

100

150

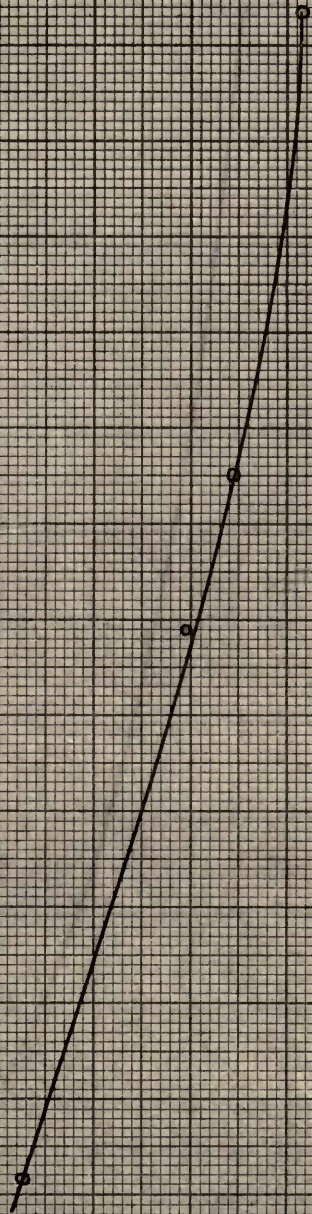
THOUSANDS OF B.T.U. PR. I.H.P. PR. I.H.P.

• HEAT
• HEAT SUPPLIED
• SUPERHEAT 150°

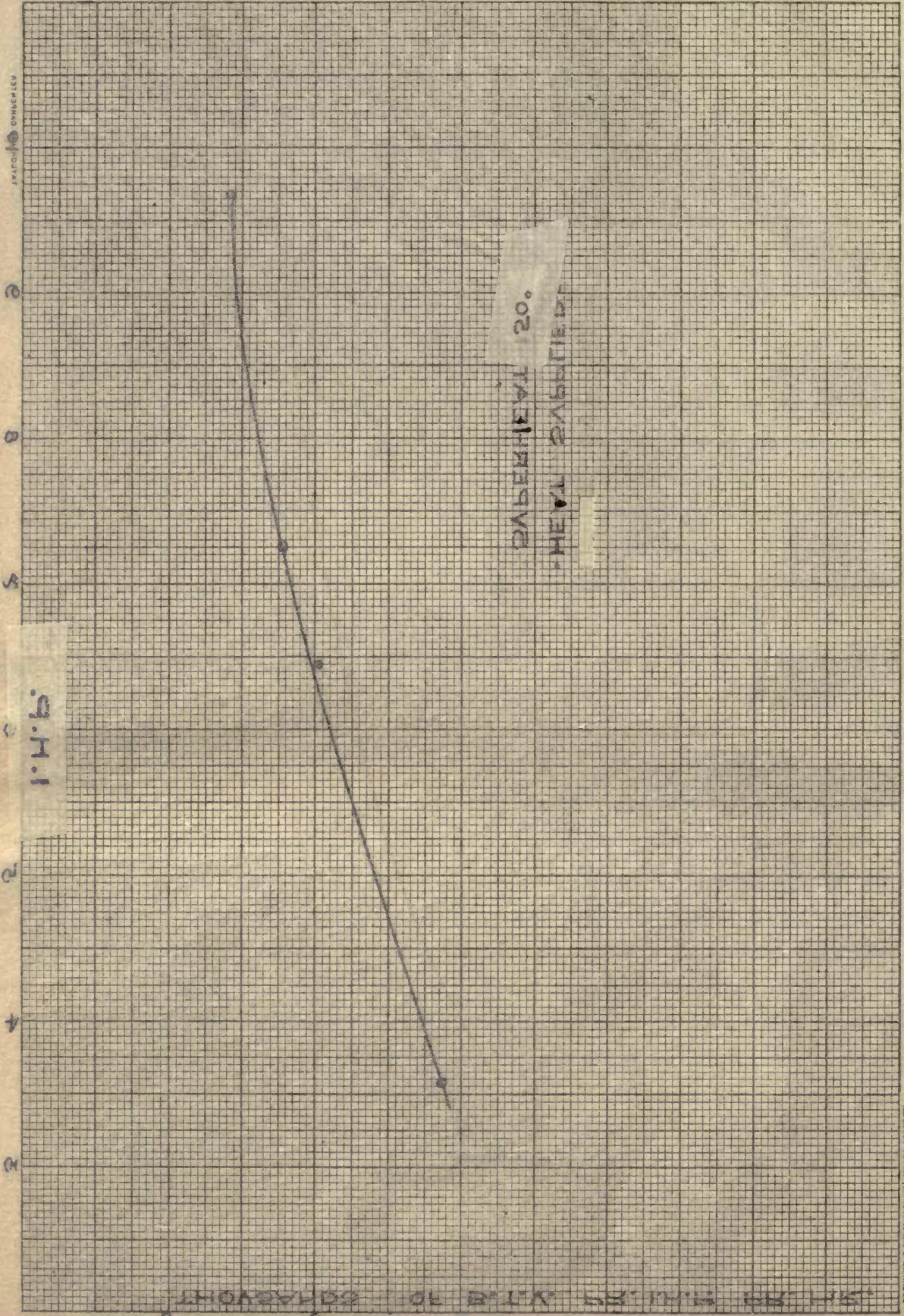
I.H.P.

50
40
30

3 4 5 6 7 8 9



УРАГОНЪ СЪМЪЩЕНІЮ



СЪБЪЕМЪТЪ 20.
-НЕВЪ СЪБЪЕМЪТЪ

9.Н.1

УРАГОНЪ СЪМЪЩЕНІЮ

100
100

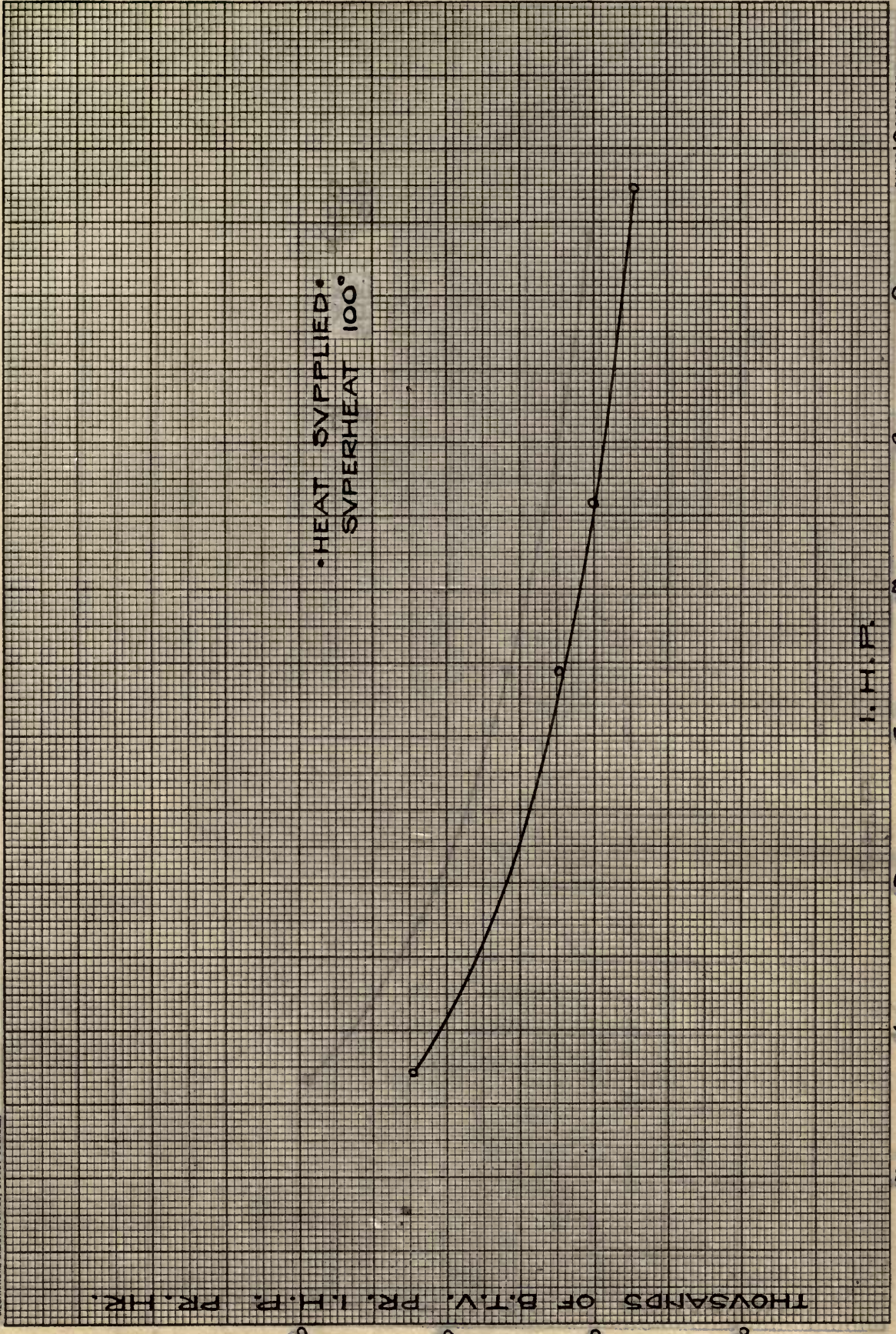
MECHANICAL LABORATORIES, BIBLEY COLLEGE.

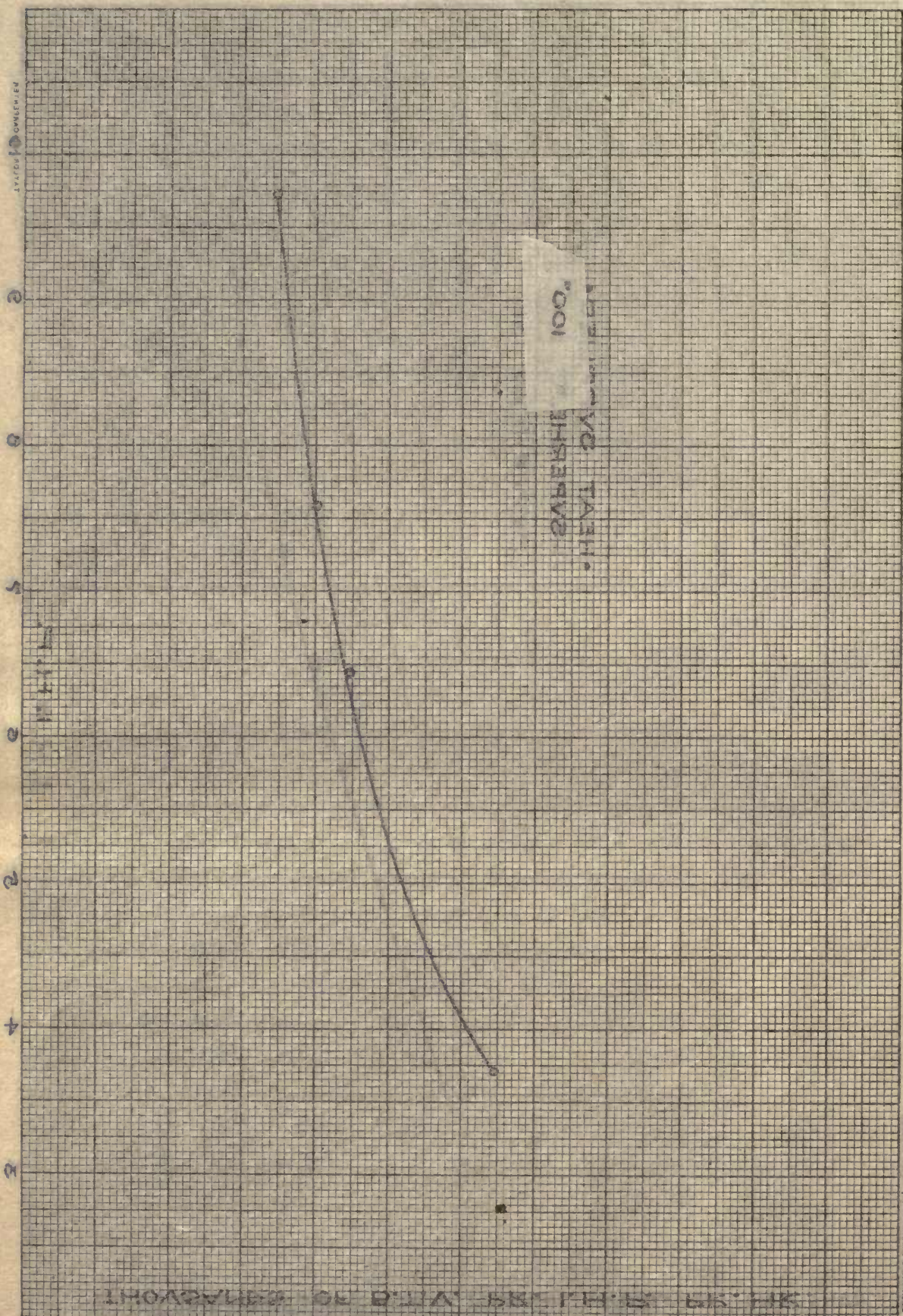
THOUSANDS OF B.T.U. PR. I.H.P. PR. H.R.

HEAT SUPPLIED
SUPERHEAT 100°

I. H. P.

TAYLOR & CARPENTER



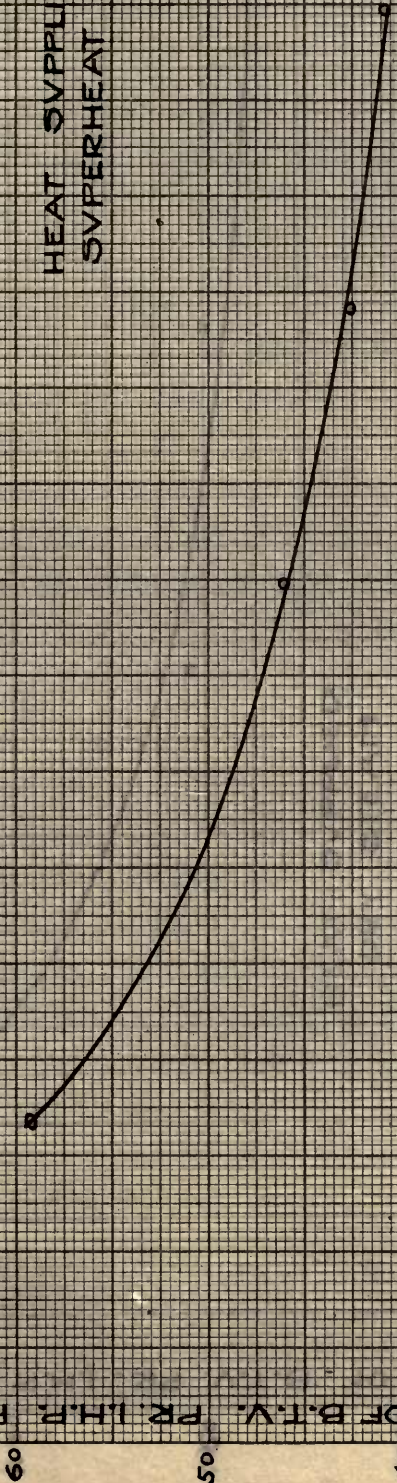


TEMPERATURE 100.00

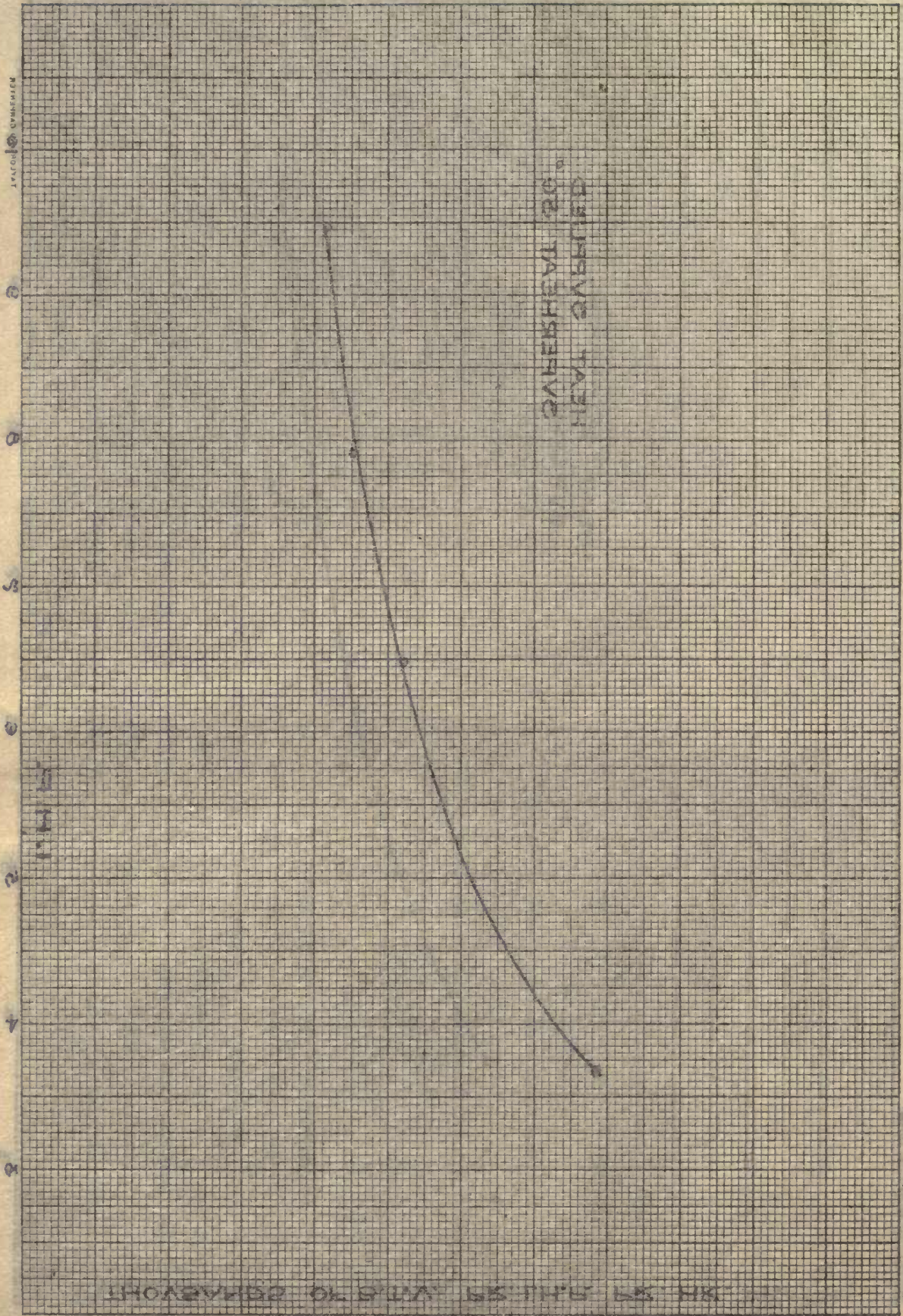
50°

THOUSANDS OF B.T.U. PR. I.H.P. PR. H.K.

HEAT SUPPLIED
SUPERHEAT 50°



I.H.P.



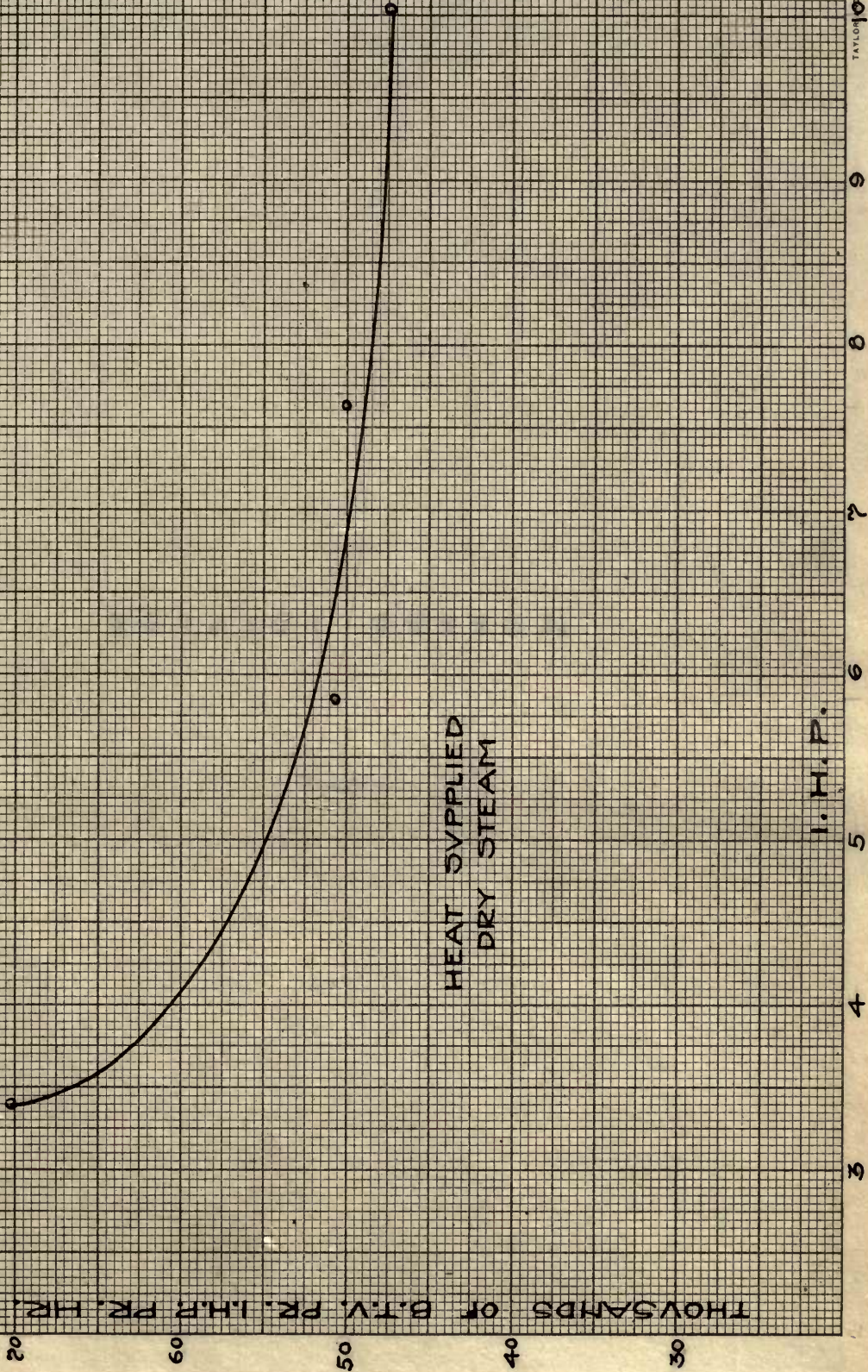
24 FEBRUARY 20 1960
 LEVEL SAMPLED

INCHES OF STAIN BY THE 1/2 IN. H.K.

THOUSANDS OF B.T.U. PR. I.H.P. PR. HR.

I. H. P.

HEAT SUPPLIED
DRY STEAM



0

0

5

0

2

4

2

1:1:1

ВЕС ОЛЕЙН
МАСТО УСА
НЕЛ. ОБЪЕМ

УМНОЖИТЕ НА 1000

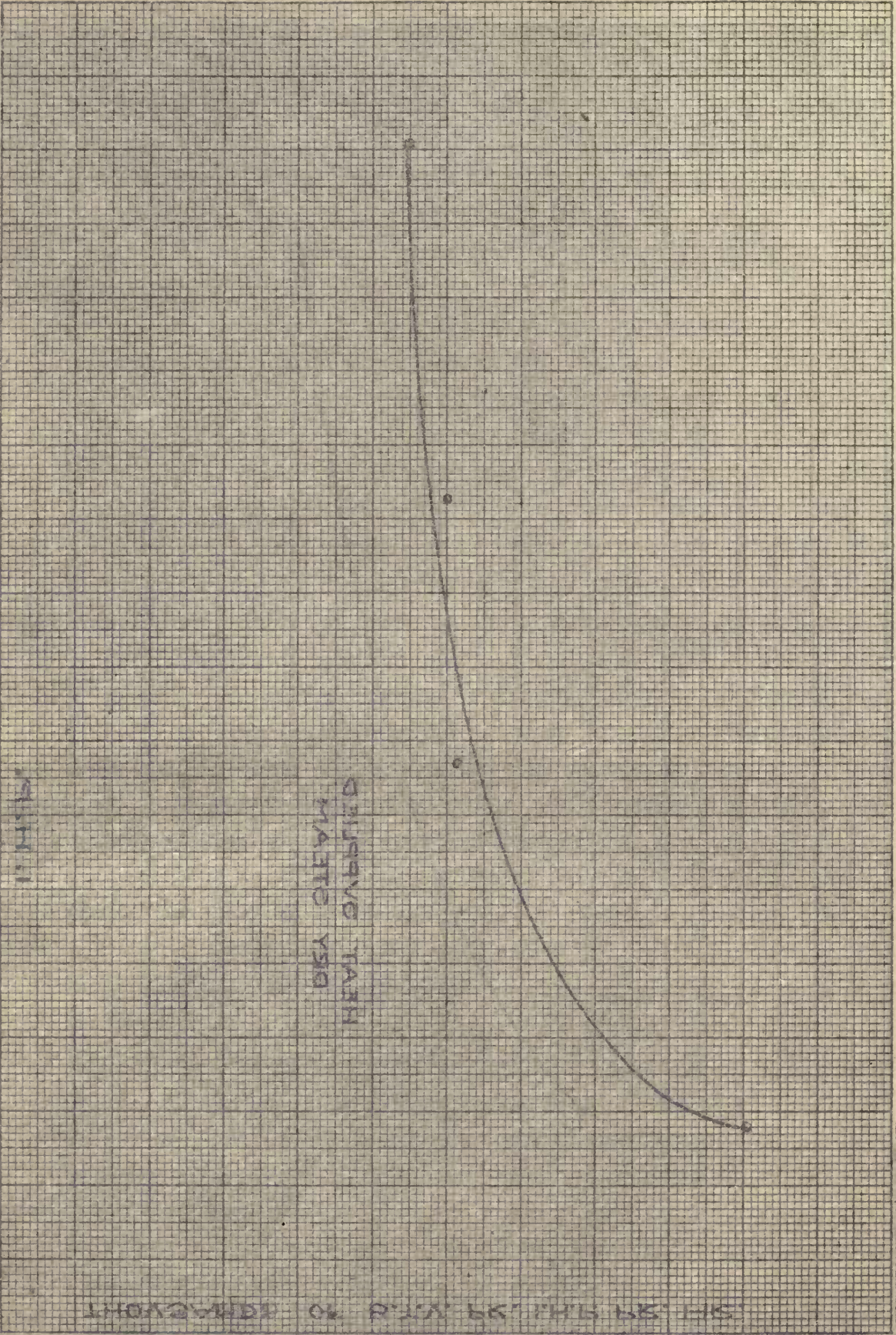
0

24

20

00

05



CRANES



QUALITY CURVES.

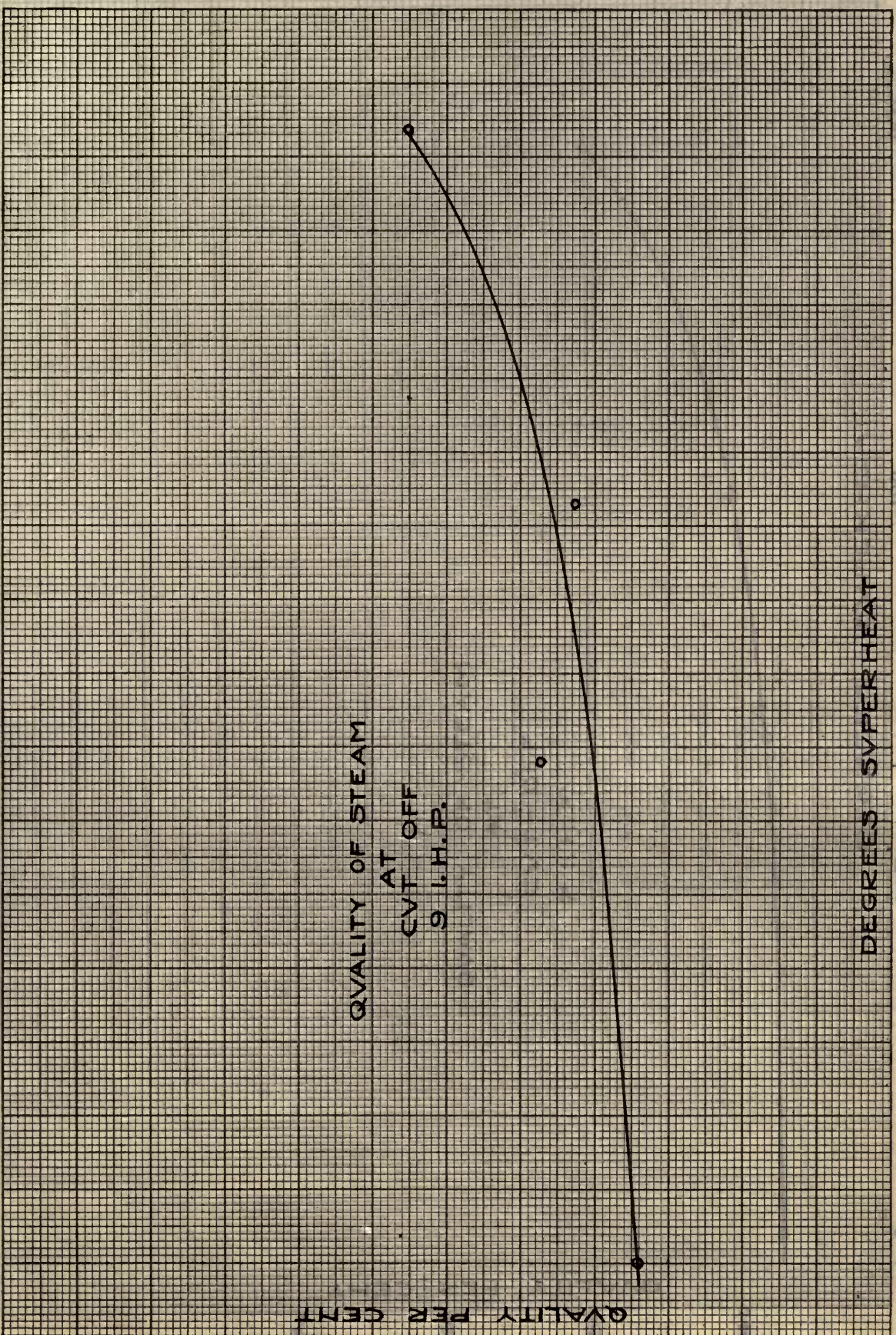
1904

WILLIAM

QUALITY PER CENT

QUALITY OF STEAM
AT
CVT OFF
9 I.H.P.

DEGREES SUPERHEAT



120

100

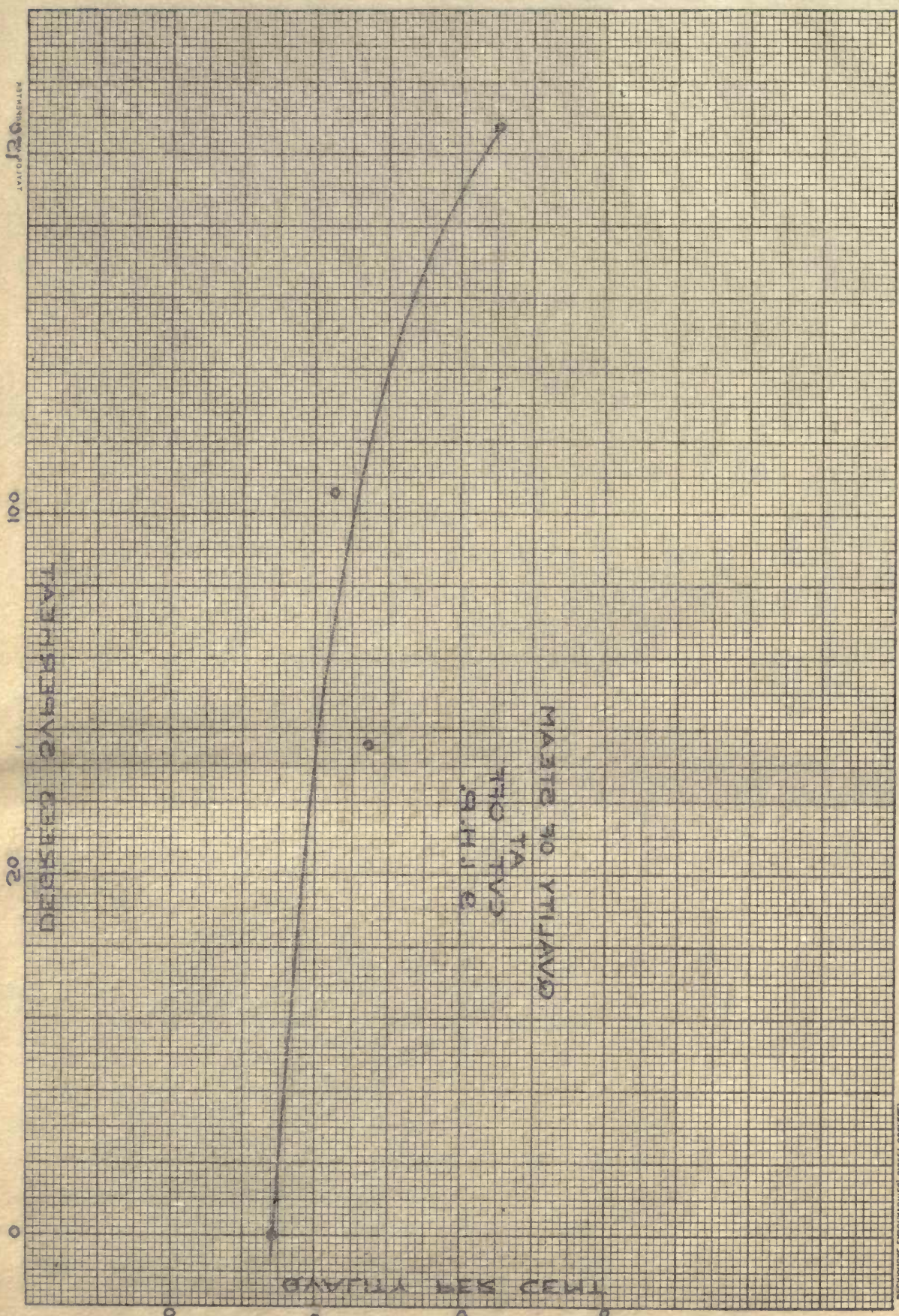
20

0

DEGREE CALIBREVAL

TRIED SET CENT

0 1 1 1 1 1
CAL OFF
TA
CALVILA OF BLEVA



7HP

MECHANICAL LABORATORIES, BIRLEY COLLEGE

QUALITY PER CENT

QUALITY OF STEAM
AT
CUT-OFF
2 I.H.P.

DEGREES SUPERHEAT

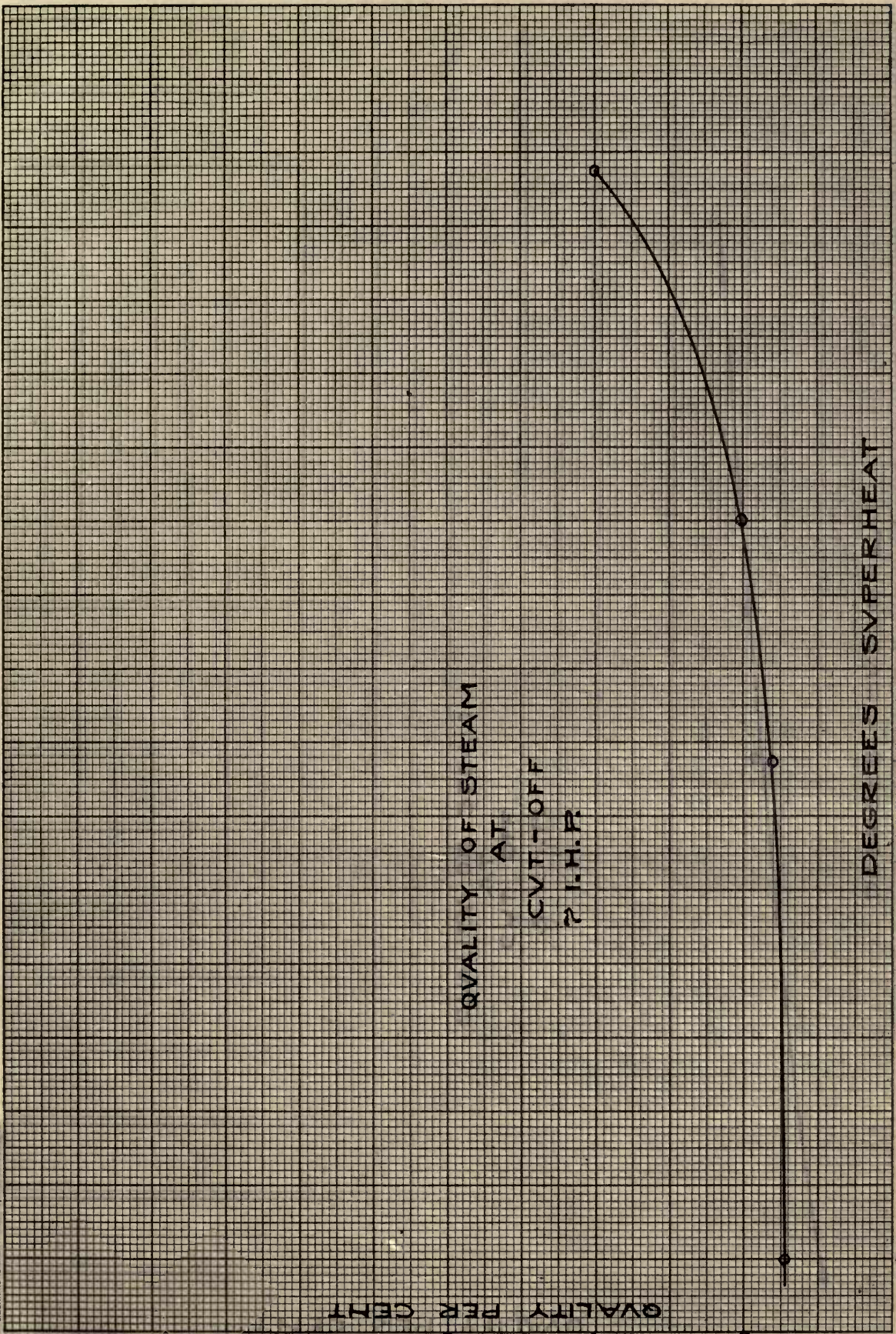
00

50

100

150

TAYLOR AND CARPENTER



DEGREEE PABERKHEVT

20

0

4

TEMPERATURE

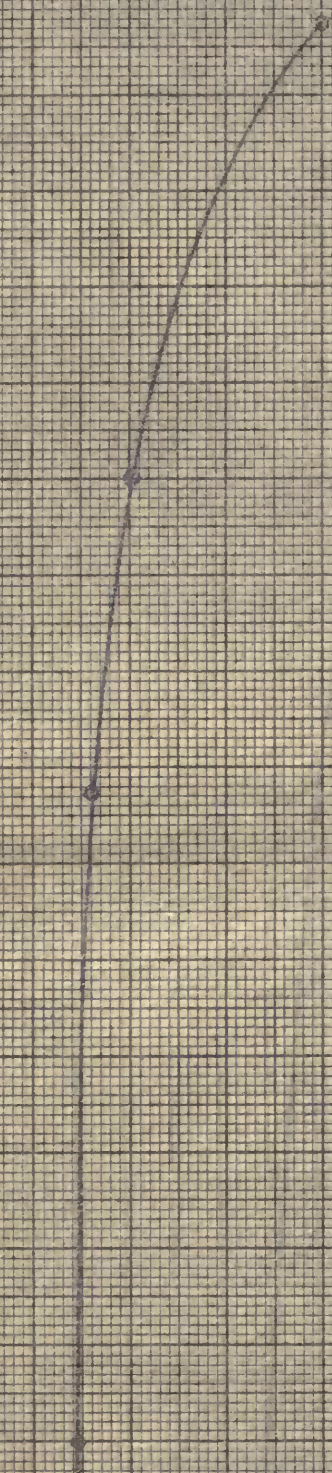
0.4

0.2

0.0

0.2

TEMPERATURE
CALCULATION
FOR
MATERIALS



QUALITY PER CENT

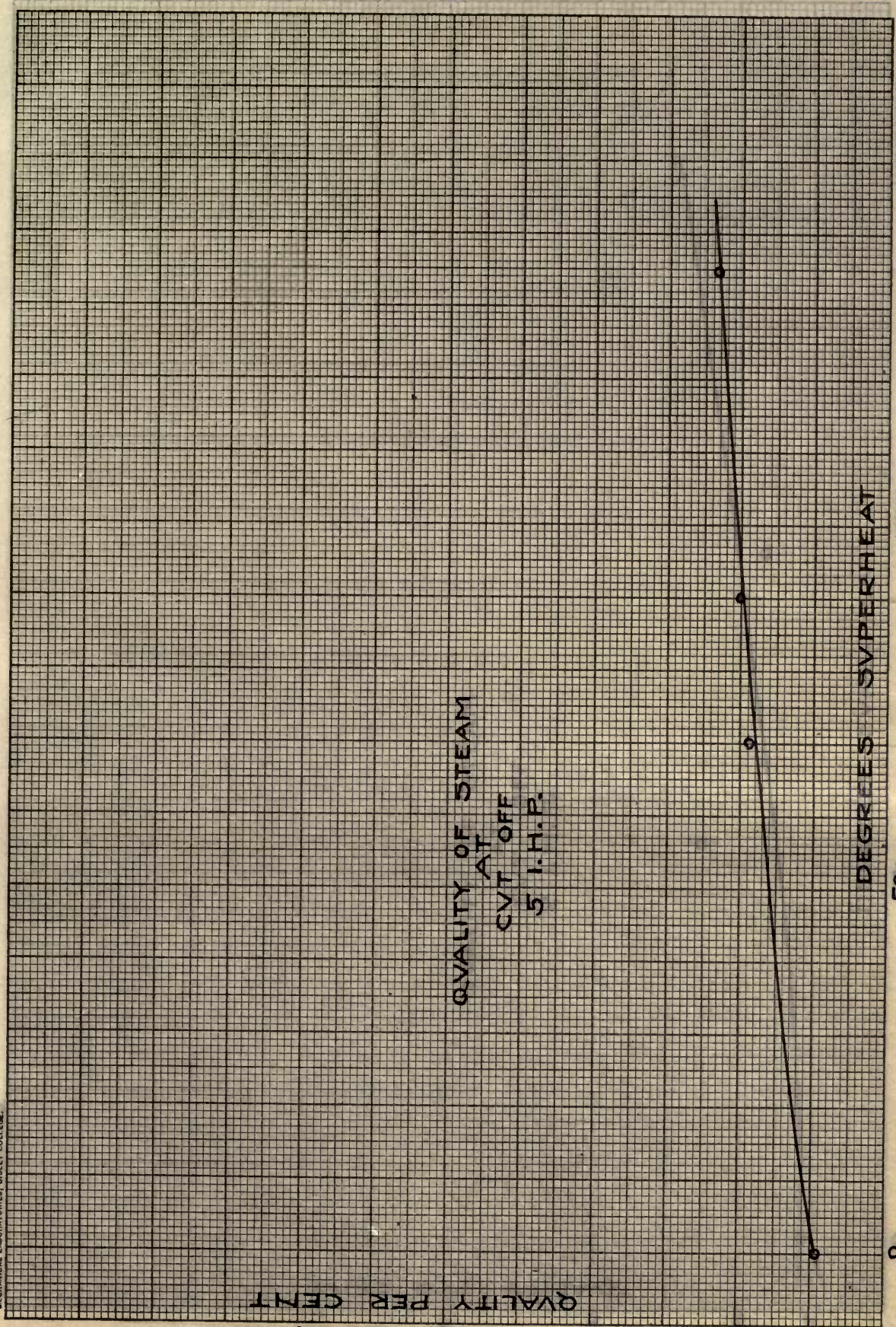
QUALITY OF STEAM
AT
CVT OFF
5 I.H.P.

DEGREES SUPERHEAT

0

50

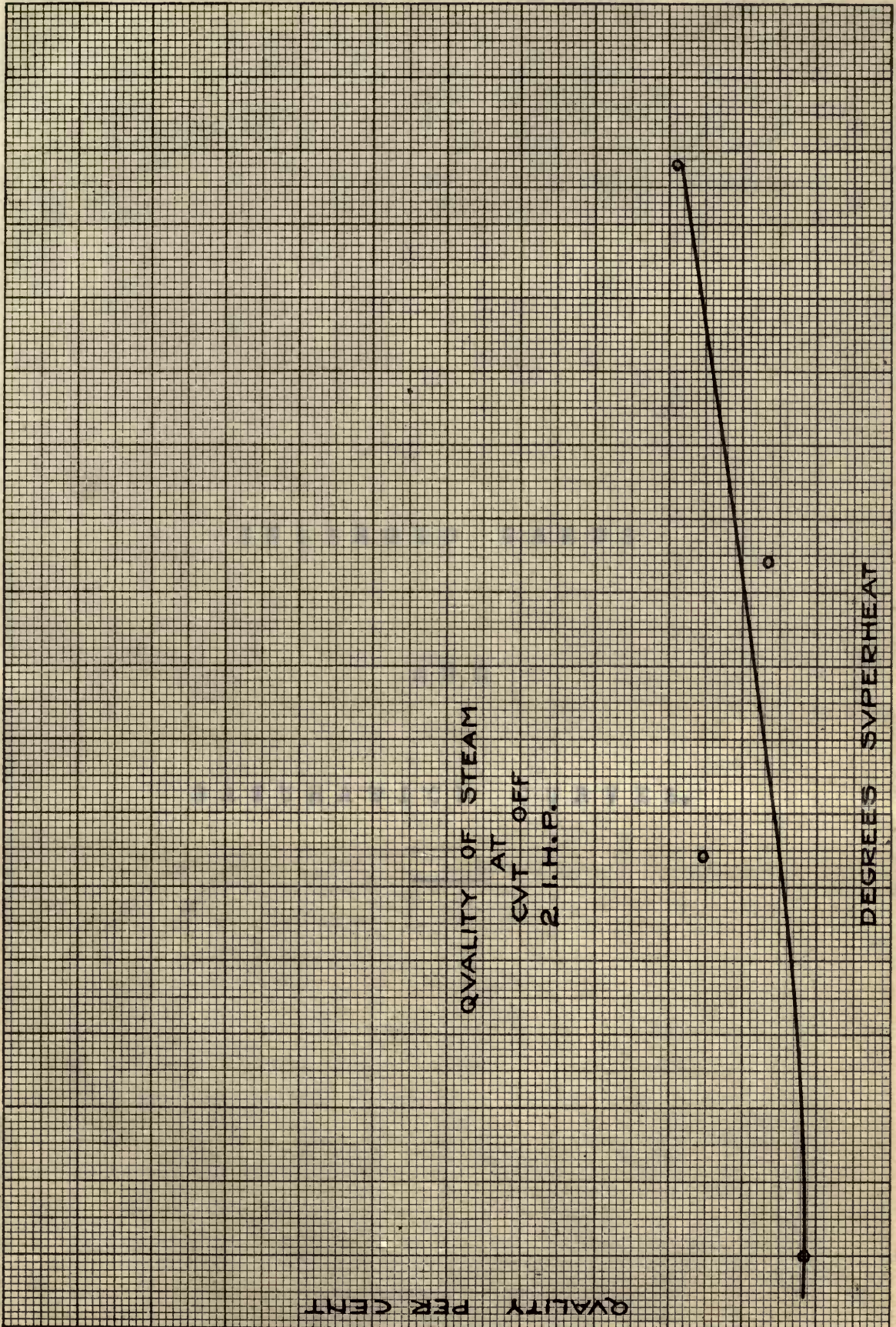
100

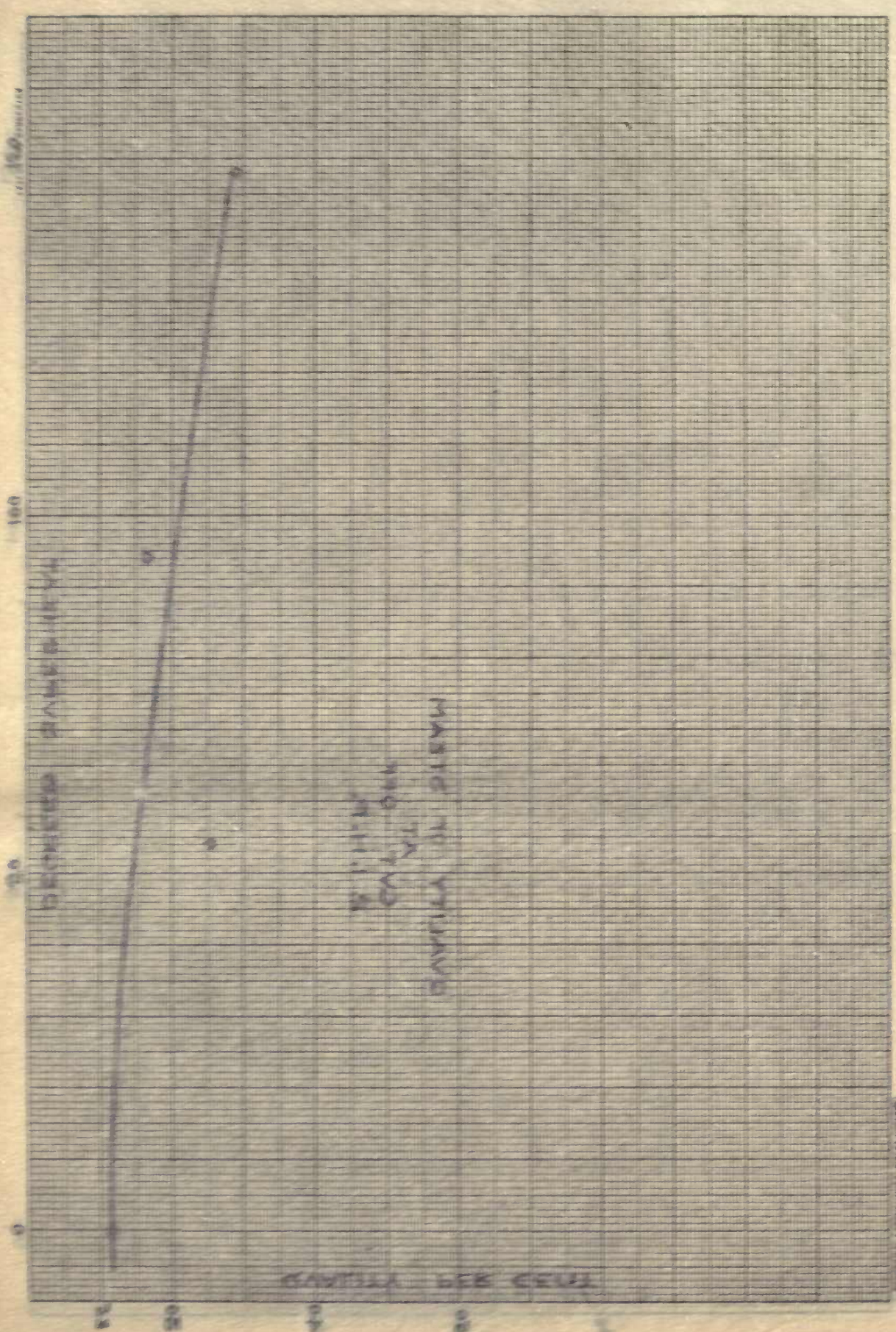


QUALITY PER CENT

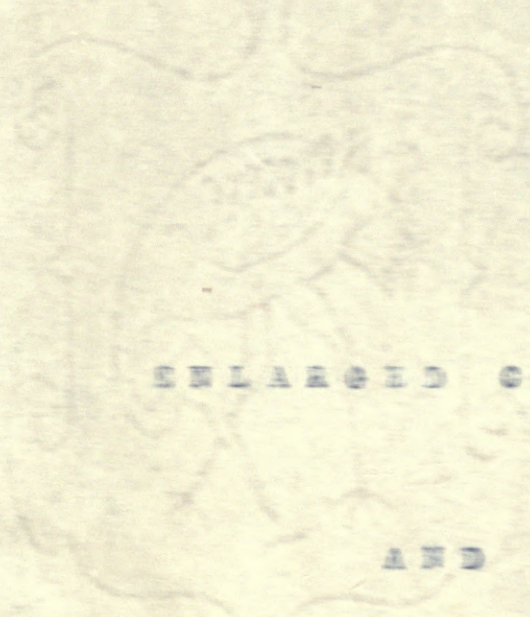
QUALITY OF STEAM
AT
CUT OFF
2 I.H.P.

DEGREES SUPERHEAT





U.S. ARMY



ENLARGED CARDS

AND

SATURATION CURVES.



ALLIED STATES

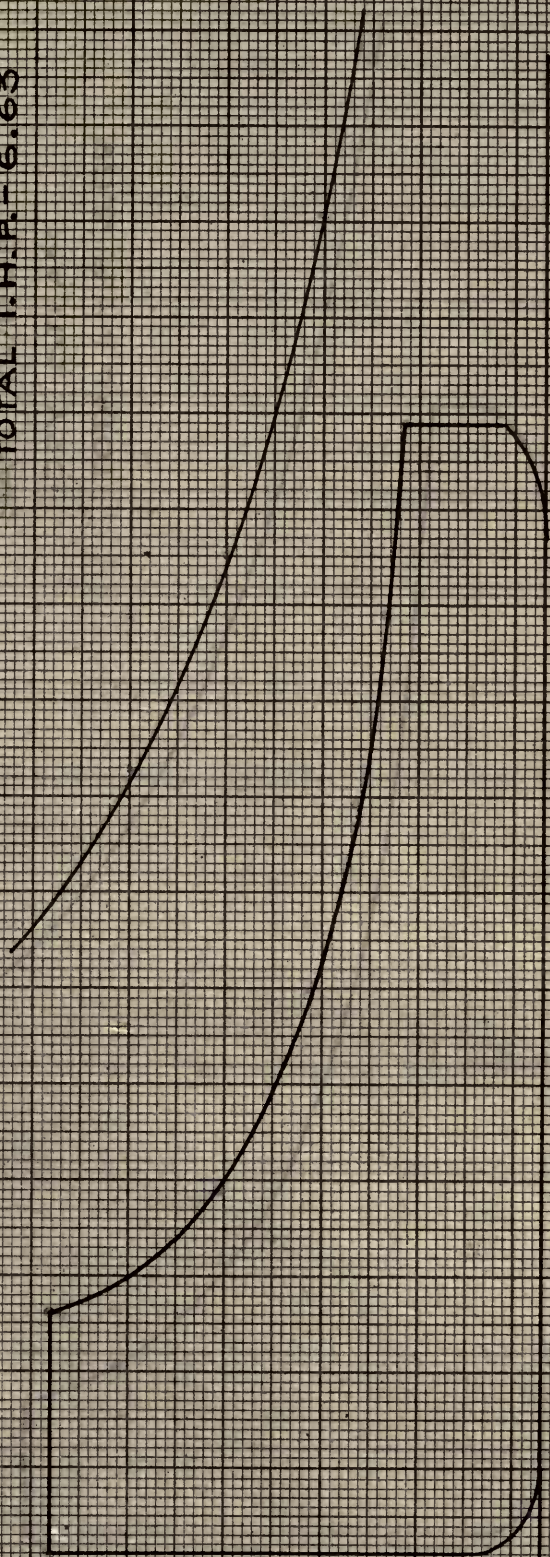
S-17-6

ENLARGED CARD
AND
SATURATION CURVE
DRY STEAM
TOTAL I.H.P. = 6.63

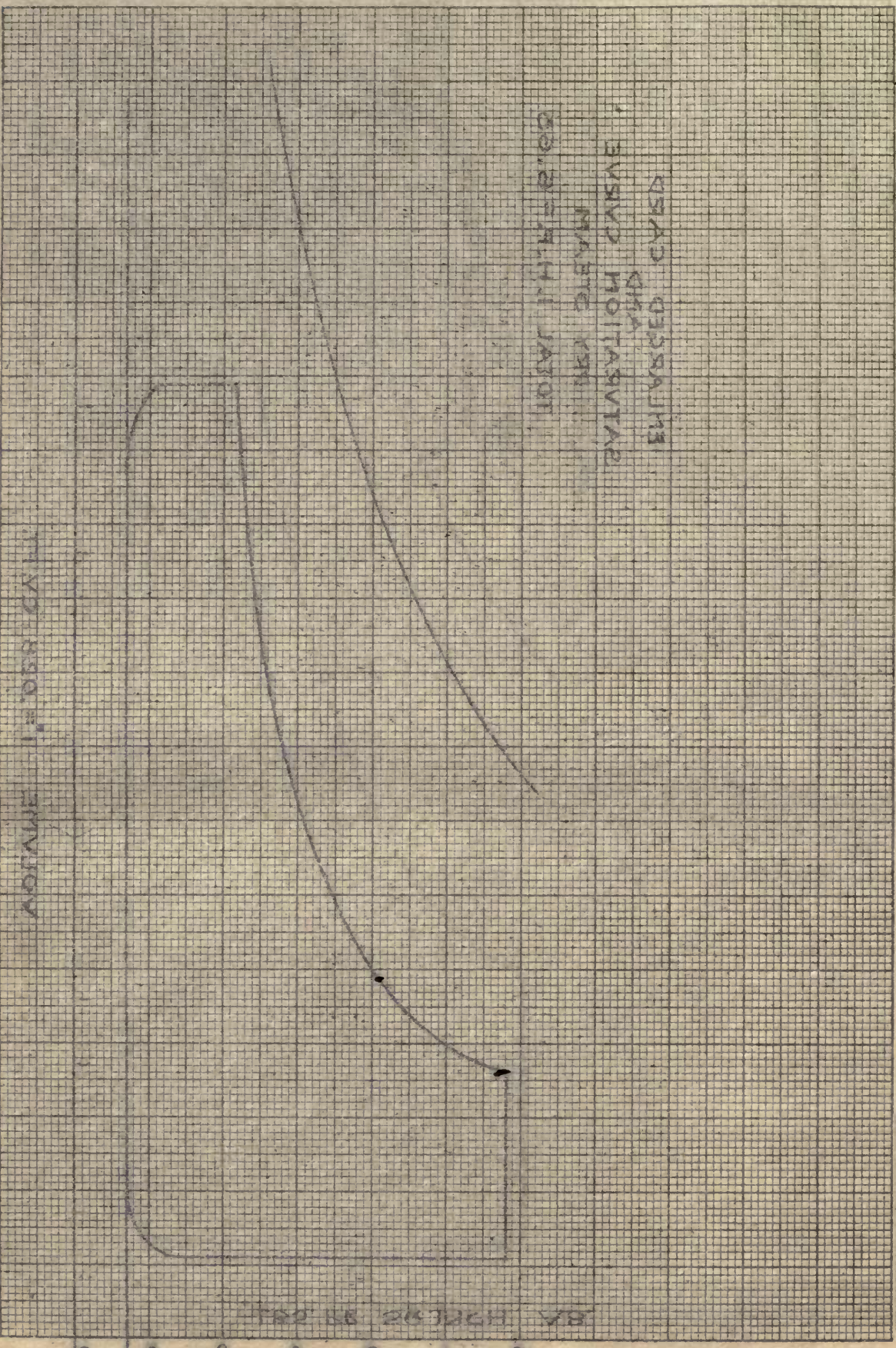
LB'S PER SQ. INCH ABS.

VOLUME 1' = .028 CV. FT.

120
100
80
60
40
20
0



APPROXIMATE 1.0000 CALIB



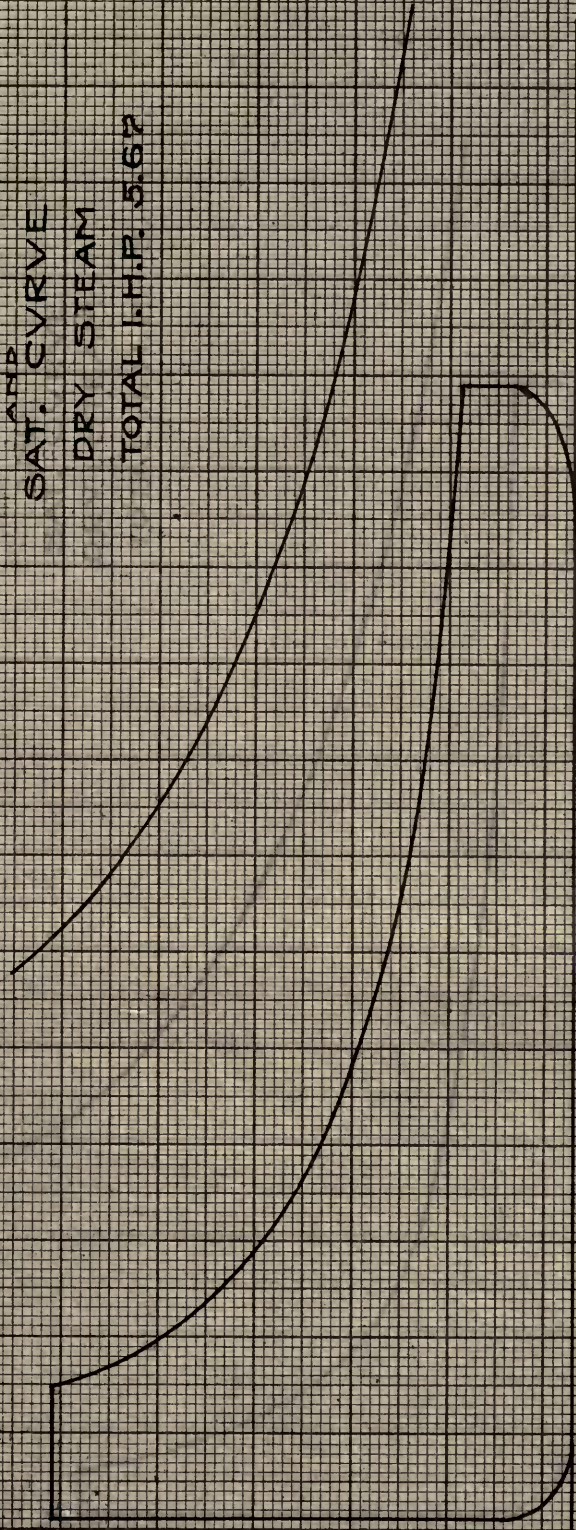
GRAD DEPRESSION
 EVIDENT MOTIVATION
 MAR 20 1941

S-M-5

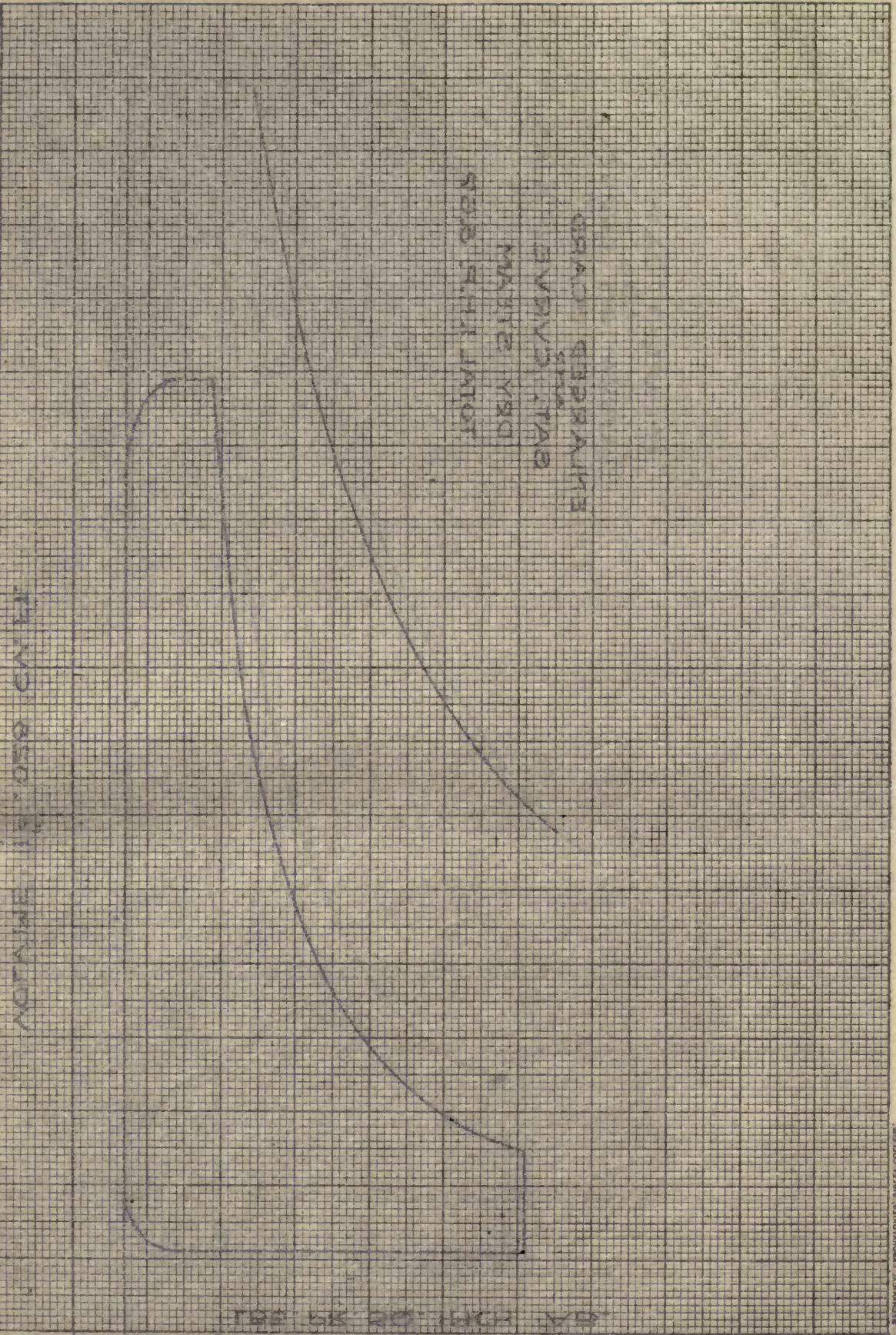
MECHANICAL LABORATORIES, SIBLEY COLLEGE.

120
100
80
60
40
20
0
LBS. PER SQ. INCH

ENLARGED CARD
AND
SAT. CURVE
DRY STEAM
TOTAL I.H.P. 5.67



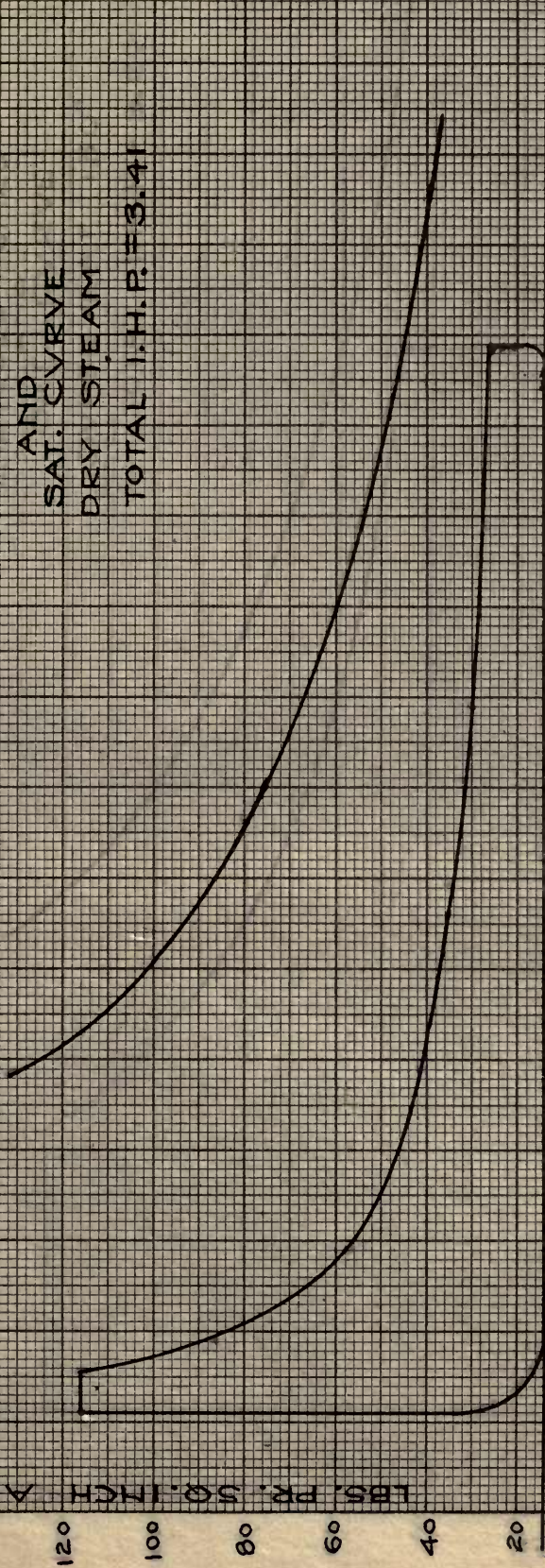
VOLUME 1" = .026 CV. FT.



PERCENTAGE
 PERCENTAGE
 PERCENTAGE

LBS. PR. SQ. INCH AB.

ENLARGED CARD
AND
SAT. CURVE
DRY STEAM
TOTAL I.H.P. = 3.41



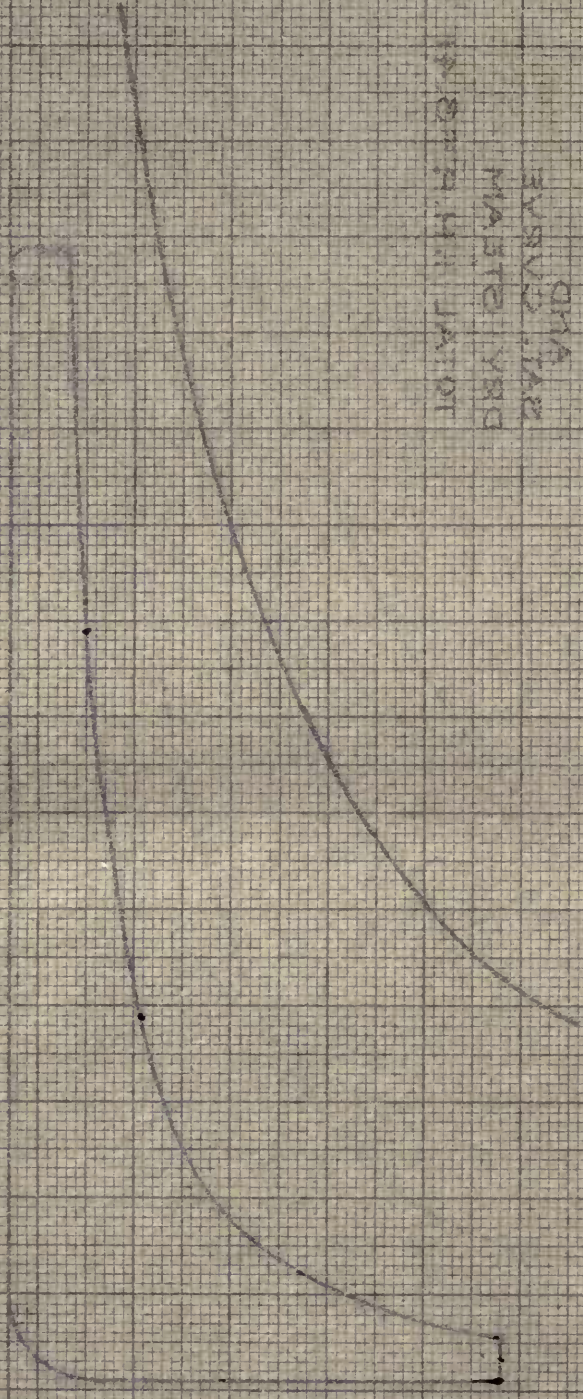
VOLUME 11.026 CV. FT.

NOTAWE 10050 SAT 41

0 50 40 60 80 100 150

(32 66 20 100 100 100)

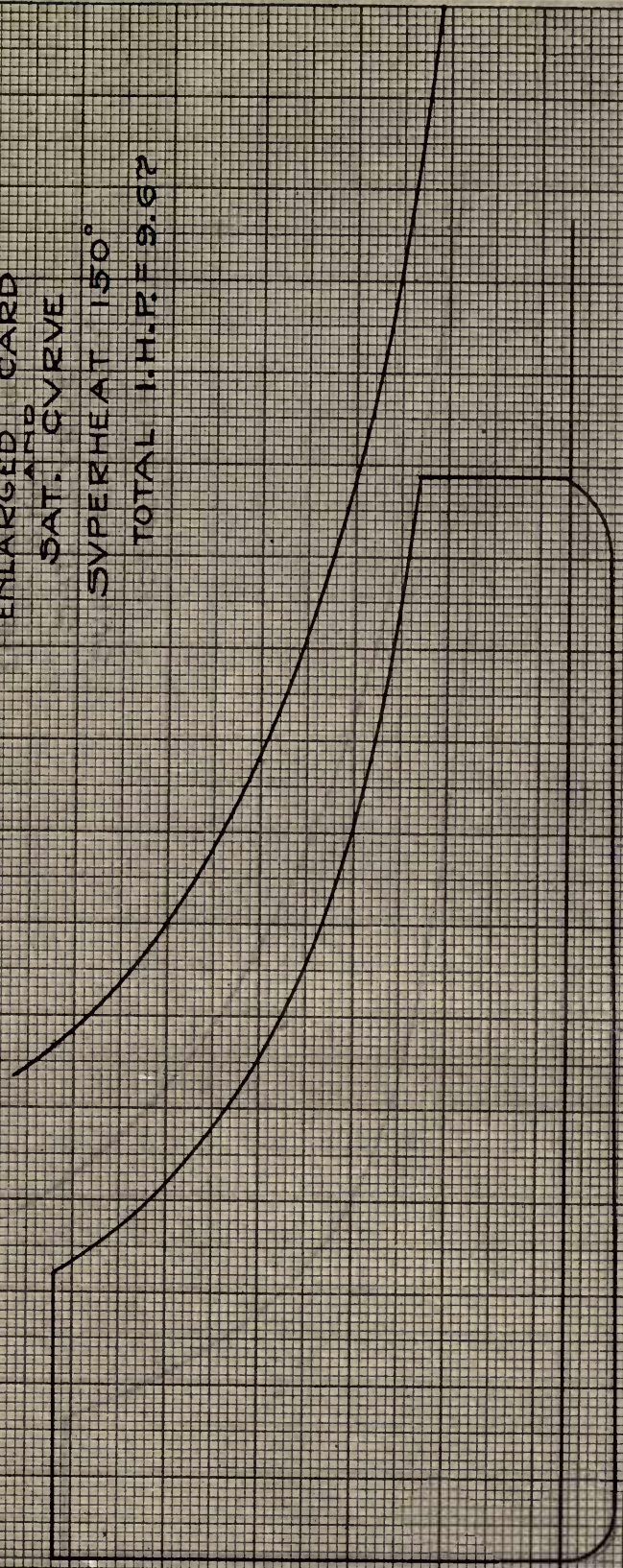
100% 100% 100%
DRY 21.5%
WASTE 100%
21.5% 100%
AND
ENHANCED CYCLE



PSI. INCH. LB.

120
100
80
60
40
20
0

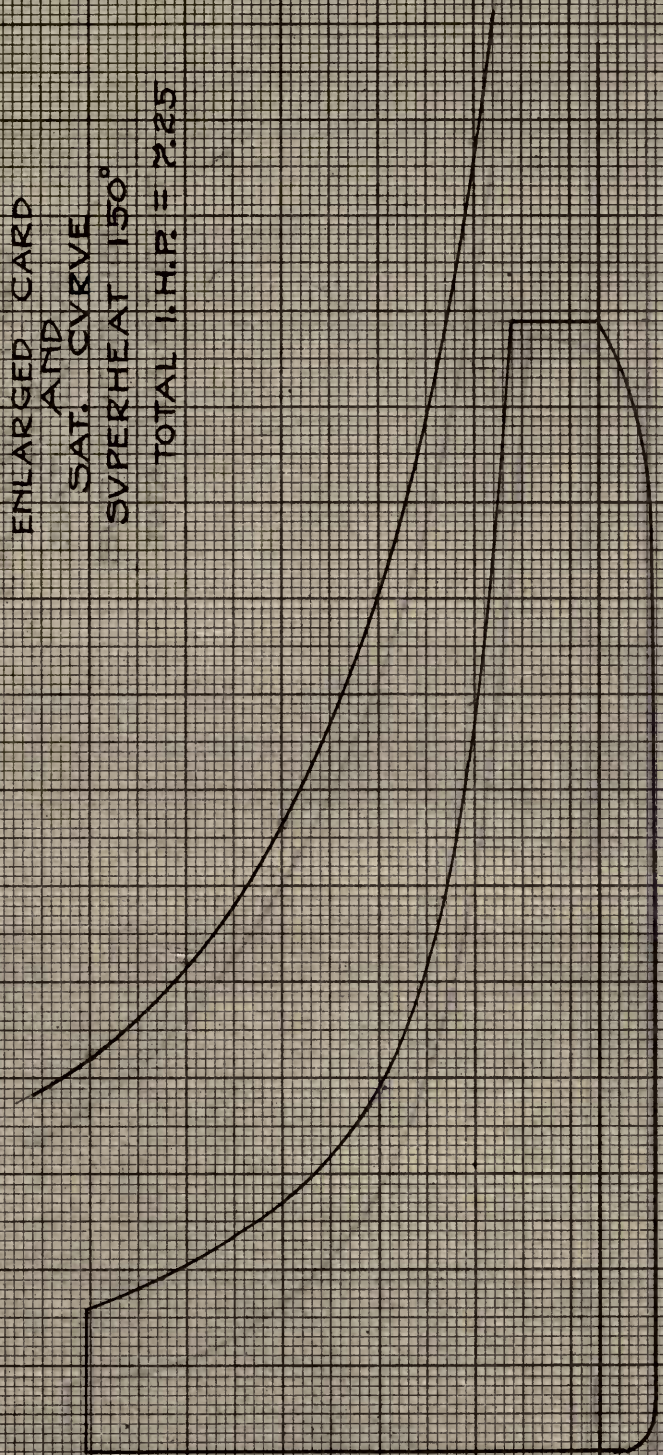
ENLARGED CARD
DATA CURVE
SUPERHEAT 150°
TOTAL I.H.P. = 9.67



VOLUME 1/1000 CV. FT.

LB. PR. SQ. IN. 120
AB. 100
80
60
40
20
00

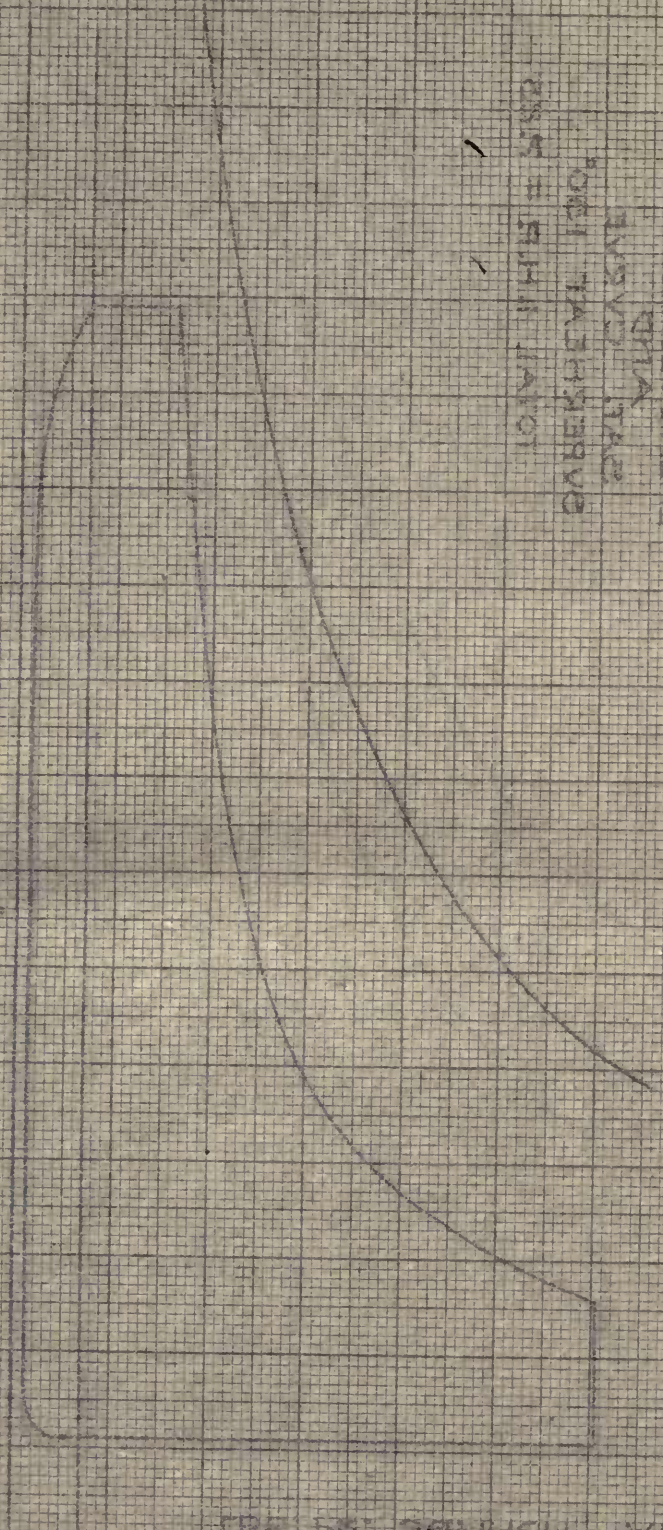
ENLARGED CARD
AND
SAT. CURVE
SUPERHEAT 150°
TOTAL I.H.P. = 2.25



VOLUME 1" = .028 CV. FT.

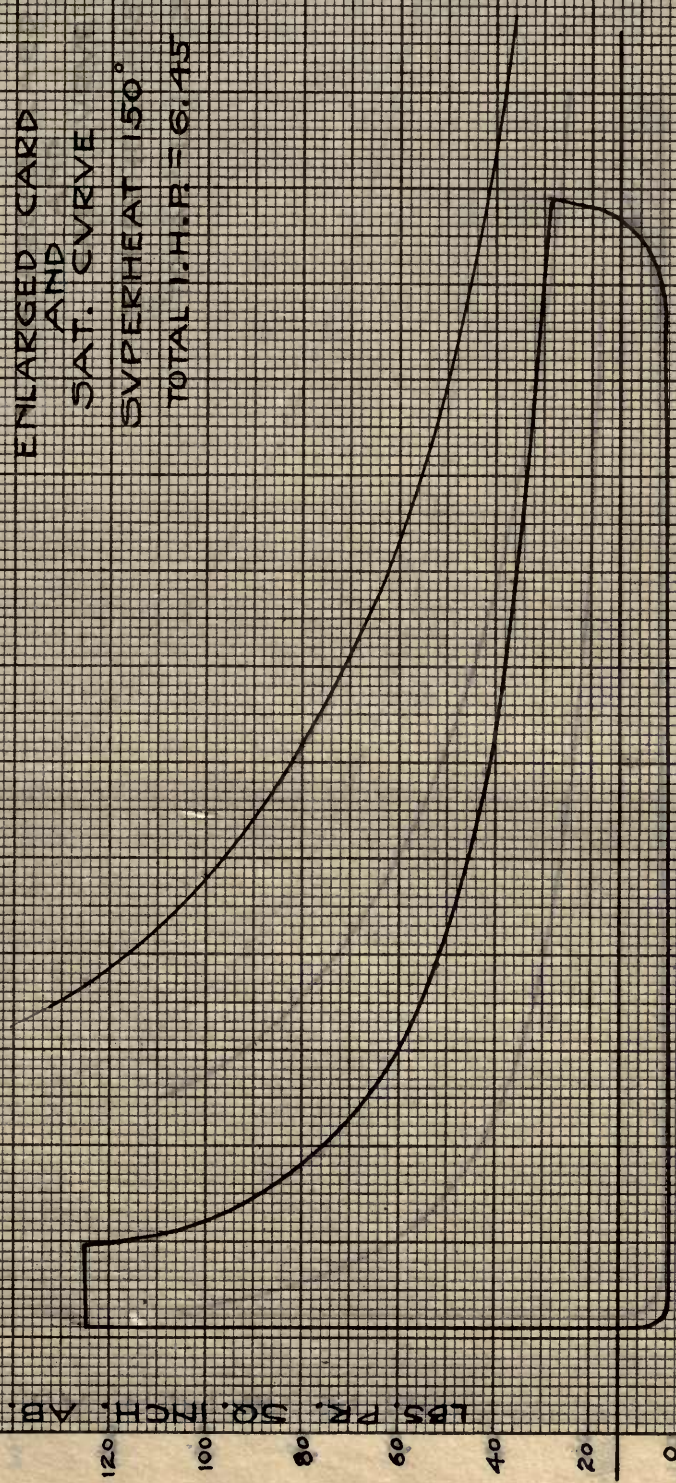
NOTAWE 1.2.082 GAVE

0 50 40 20 80 100 150



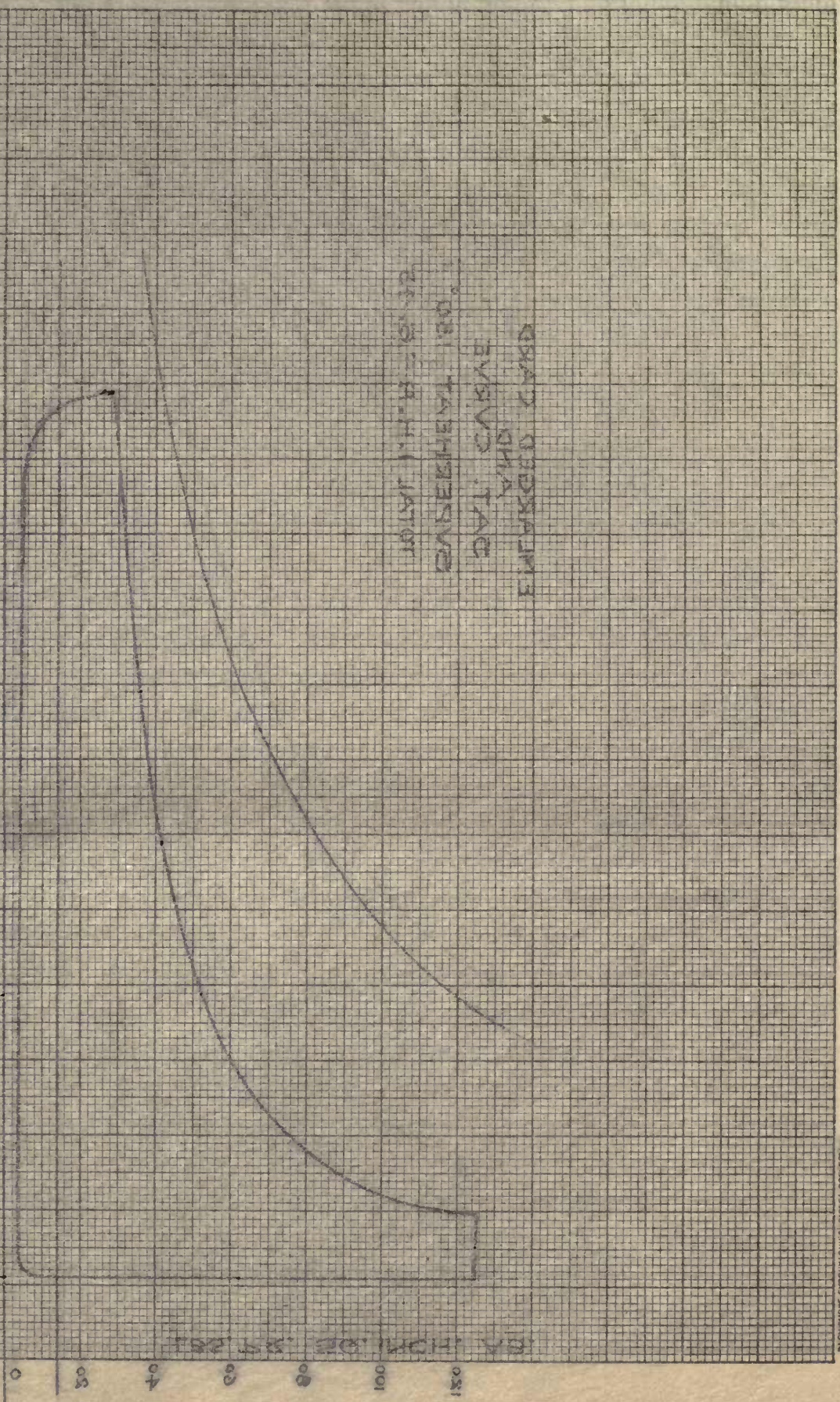
LOWT WHW = 480
 CYBERNET 130,
 EYE, COGNIE
 DATA VAD
 ENLARGED CARD

ENLARGED CARD
SAT. CURVE
SUPERHEAT 150°
TOTAL I.H.P. = 6.45



VOLUME IN CU. FT.

TRAVEL 650.00

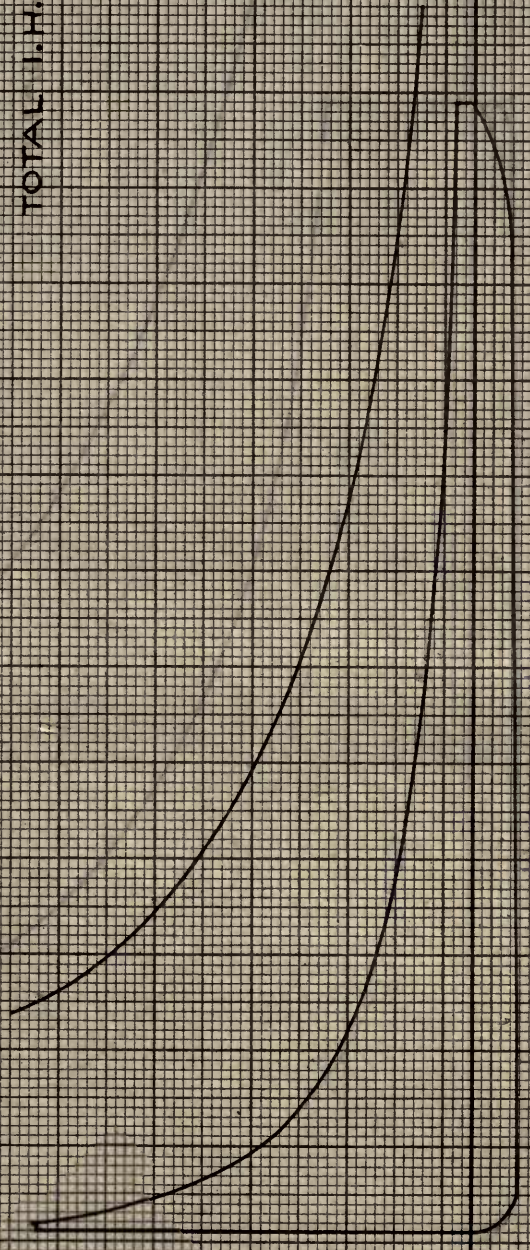


100% TAHOE
 20% TAHOE
 40% TAHOE
 60% TAHOE
 80% TAHOE
 100% TAHOE

140
120
100
80
60
40
20
10

LB5 PR. 50. INCH. AB

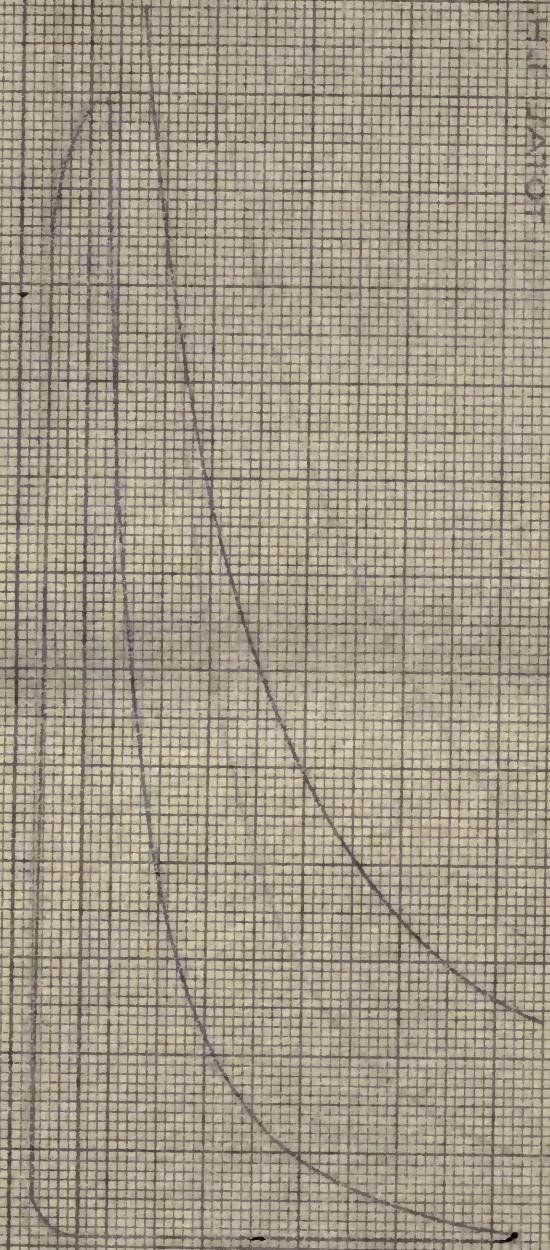
ENLARGED CARD
AND
SAT. CURVE
SUPERHEAT 150°
TOTAL I.H.P. 3.52



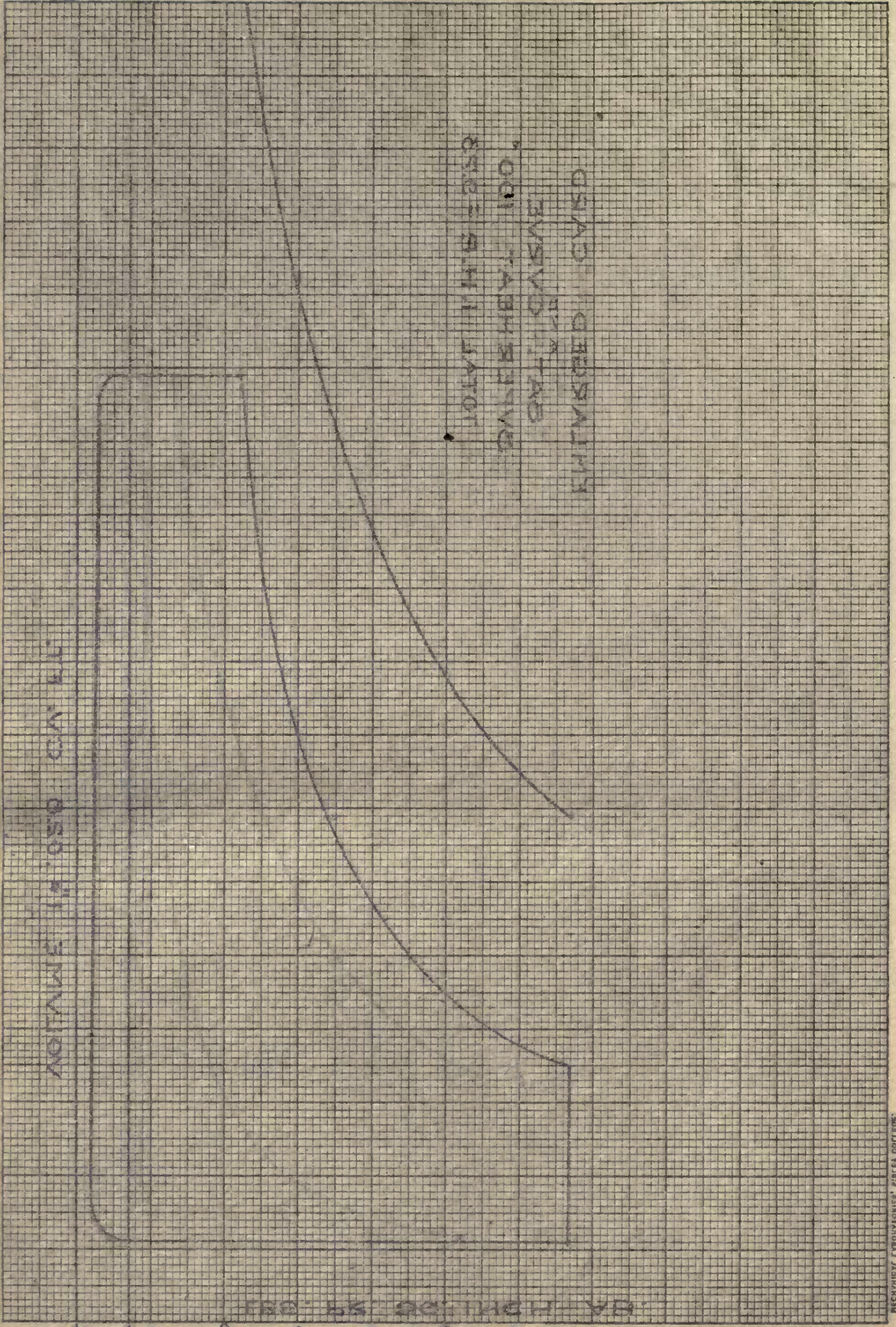
VOLUME I = 0.028 CV. FT.

VOLTAJE 15.050 CV/ELI

10 20 30 40 50 60 70 80 90 100 110 120 130



TOVAI 1111 0125
 2001 1111 1200
 2001 1111 1200
 2001 1111 1200



JULY 11th 1938
 GALEBEHEV. 100.
 GAV. 1.0
 GAV. 1.0
 KINTAKED. GAKD

4

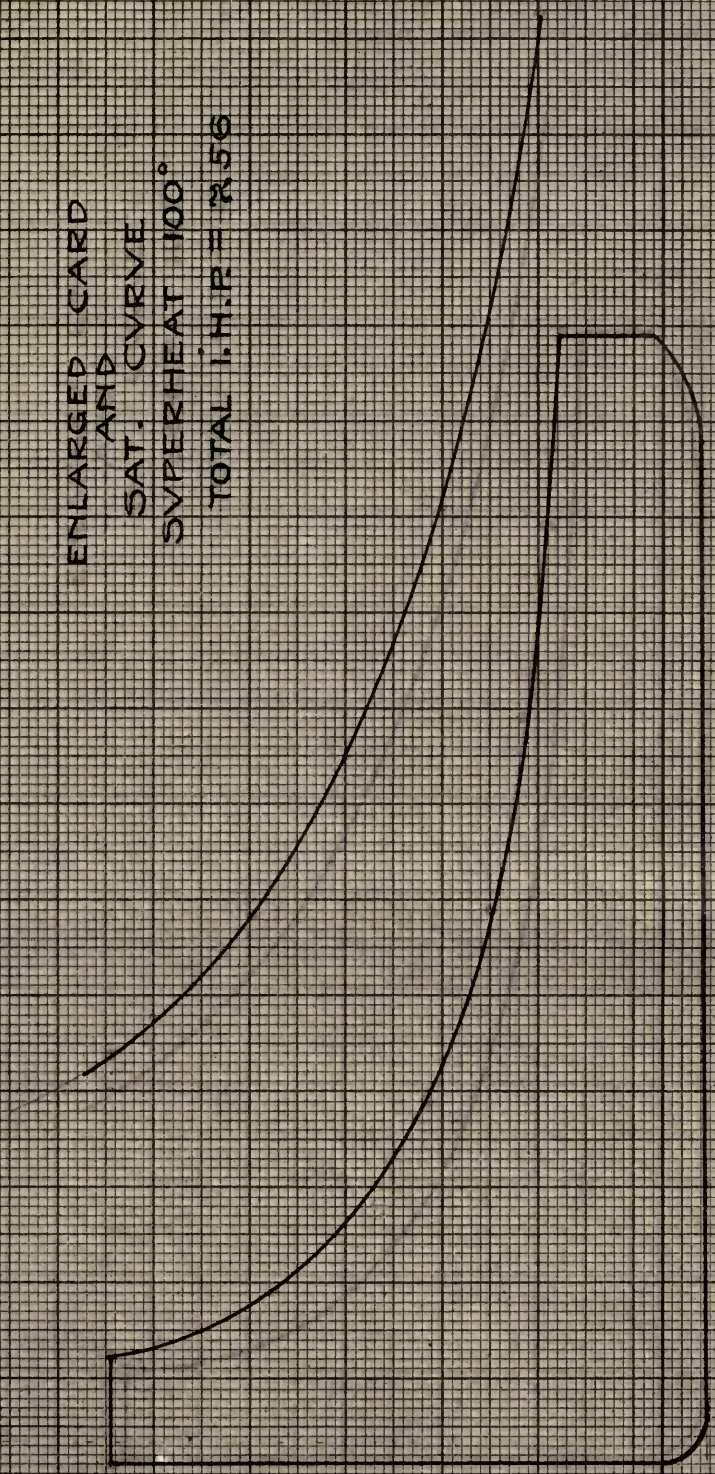
100-477

MECHANICAL LABORATORIES, BIBLEY COLLEGE.

LB'S. PR. SQ. INCH
A. P.

140
120
100
80
60
40
20
0

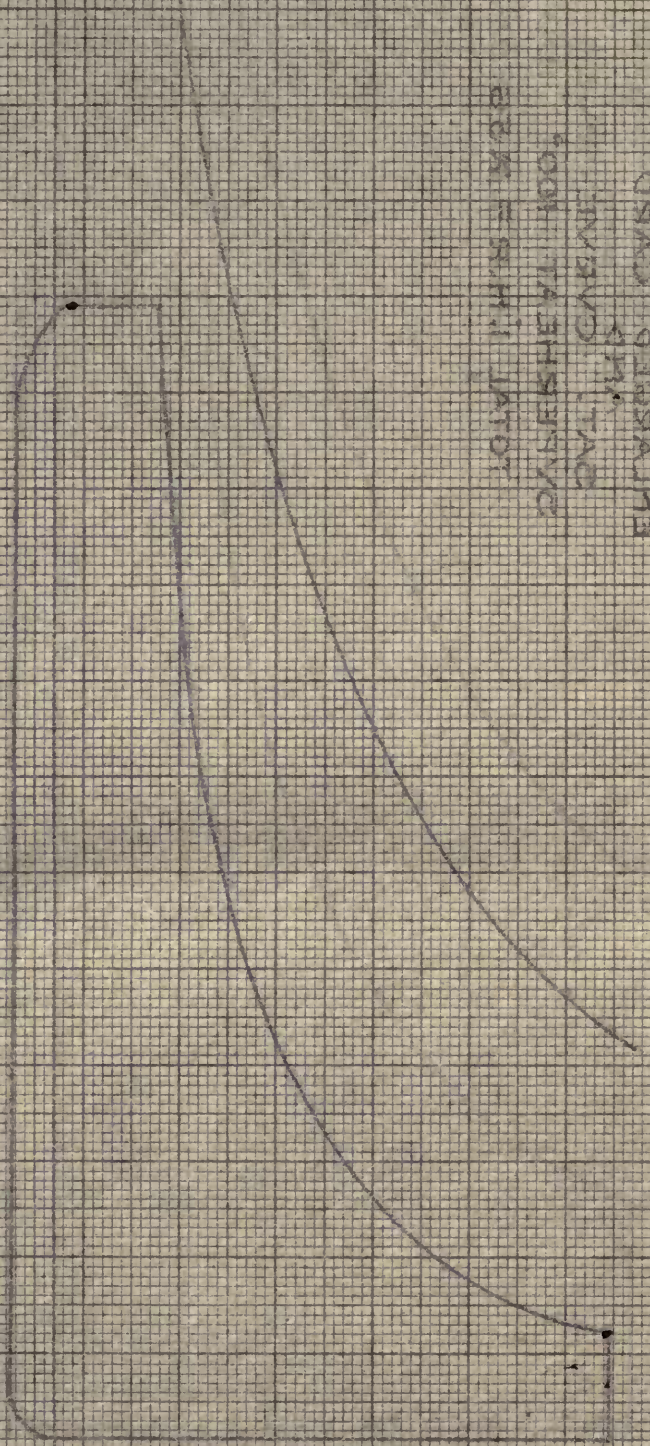
ENLARGED CARD
AND
SAT. CURVE
SUPERHEAT 100°
TOTAL I.H.P. = 2.56



VOLUME IN .028 CV. FT.

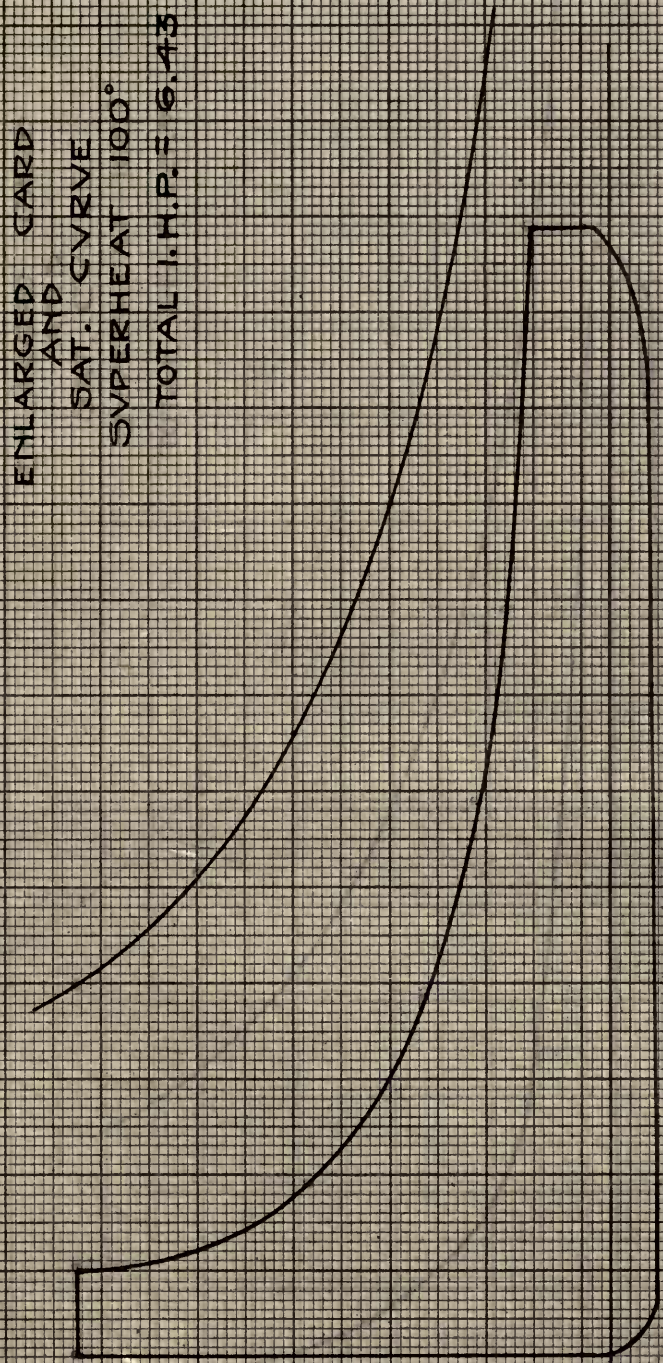
VOLUME FLOW CURVE

0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0



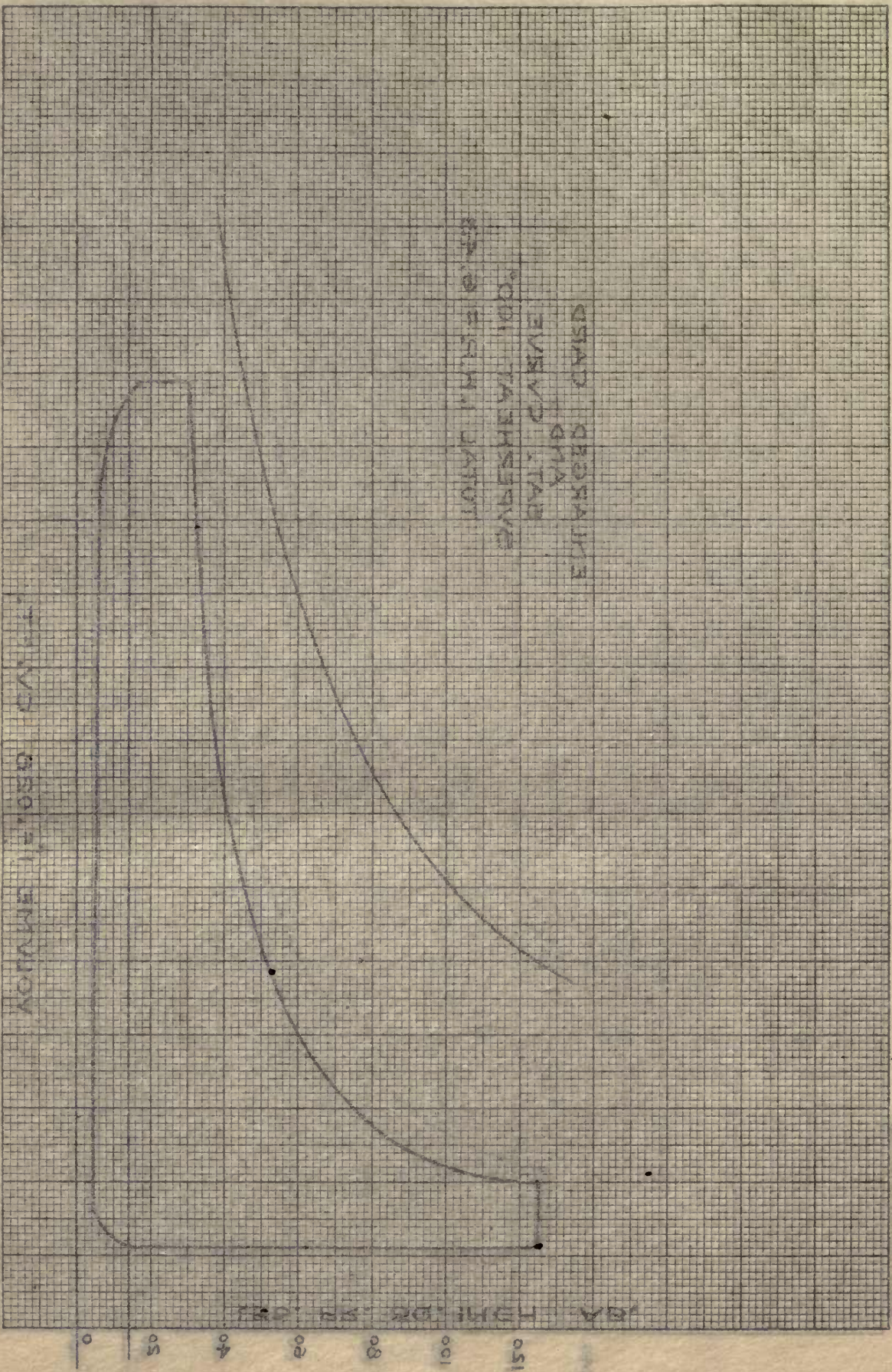
TOTAL FLOW 1.00
 DASHES 100,
 VMD
 ENGRAVED CURVE

LBS. PR. SQ. INCH
AB.



ENLARGED CARD
AND
SAT. CURVE
SUPERHEAT 100°
TOTAL I.H.P. = 6.43

VOLUME IN CU. FT.



ВАТ

ЧАС

1. ПАРОУ ВАД ДЫБЕЖНЕМ
 100% ТРАЖЕНА
 100% ТРАЖЕНА
 100% ТРАЖЕНА

LB. PR. 50 INCH AB

120
100
80
60
40
20
0

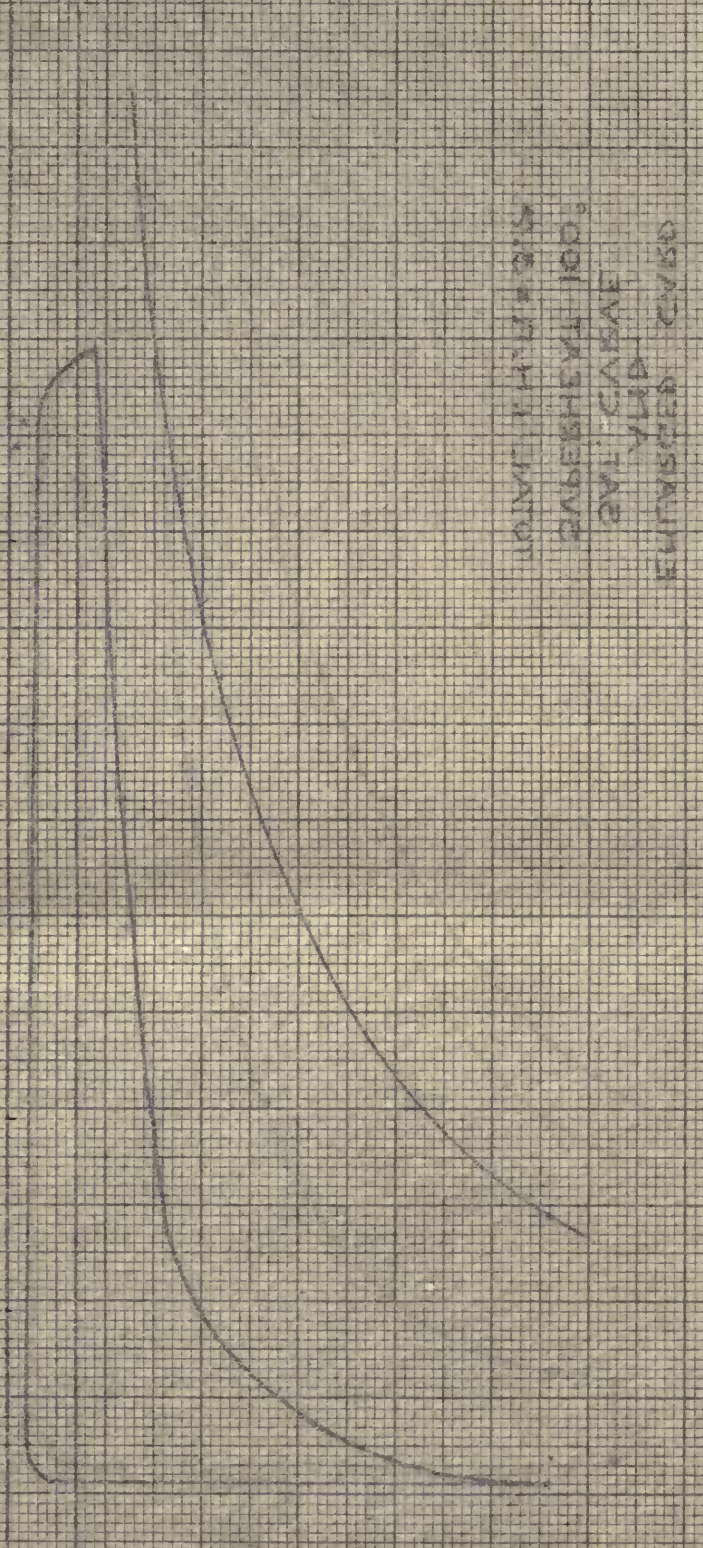
ENLARGED CARD
SAT. CURVE
SUPERHEAT 100°
TOTAL I.H.P.=3.7



VOLUME 1" = .020 CV. FT.

NOTABLE 1/2 050 GALEN

0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000

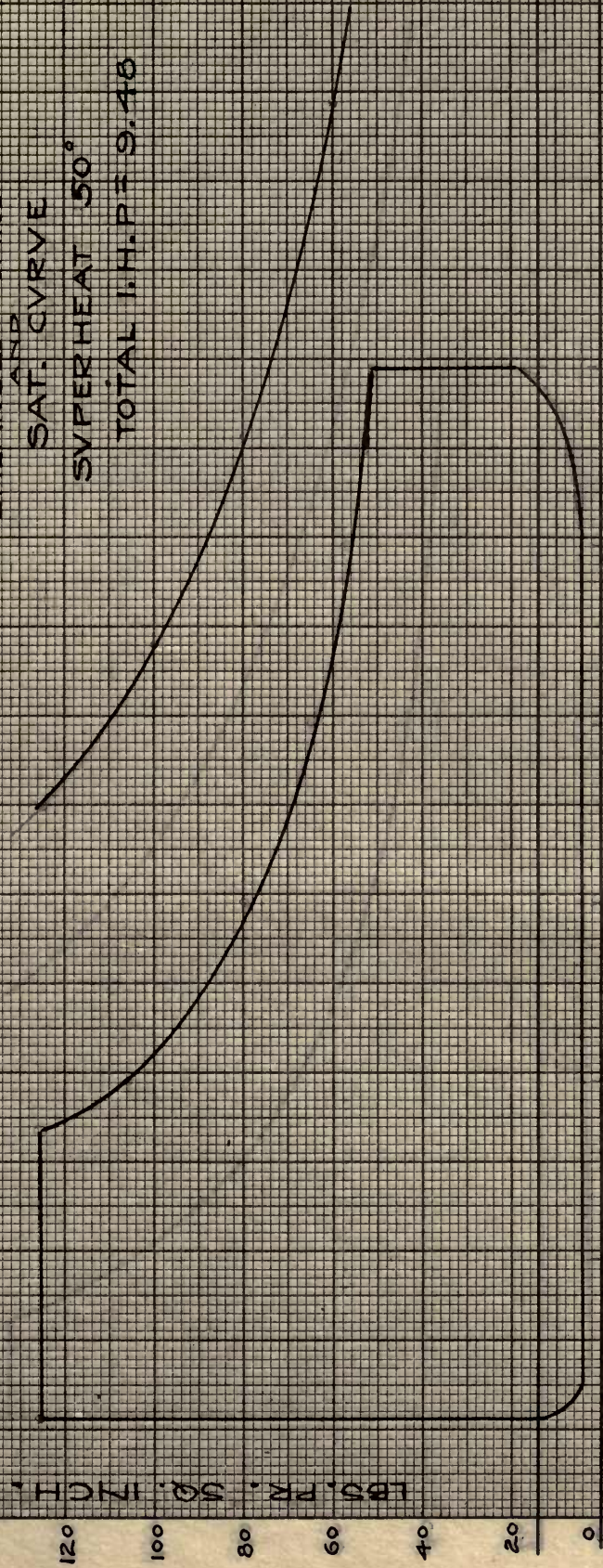


100% CHINA
PAPERHEAVY 100,
2% CARBON
YIELD
ENTRUSTED CWSO

10 1-9

LB. PR. SQ. INCH, AB.

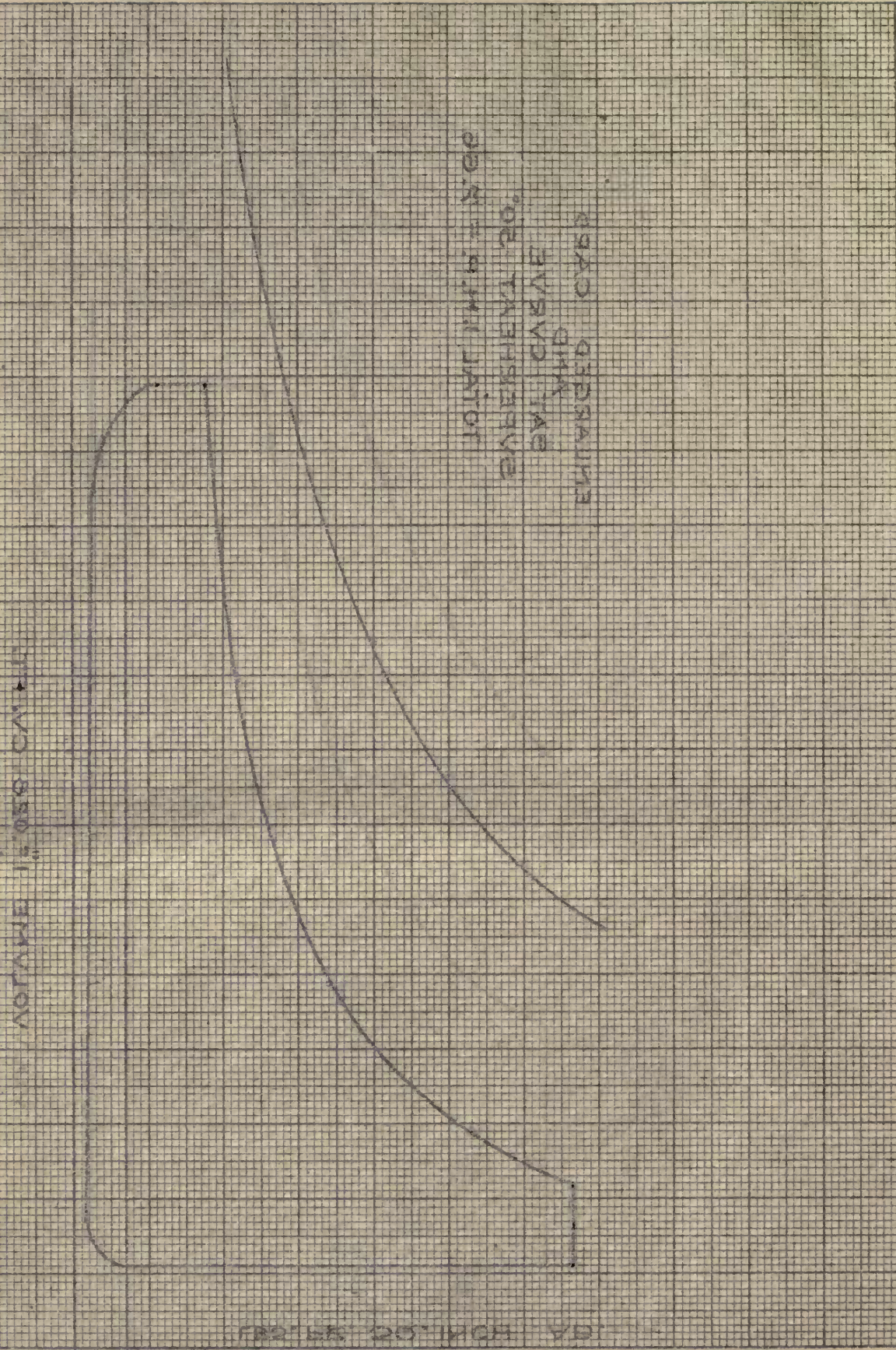
ENLARGED CARD
AND
SAT. CURVE
SUPERHEAT 50°
TOTAL I.H.P. 9.40



VOLUME 1/2 .020 CV. FT.

POTENTIAL 1.056 CM

0 50 100 150 200



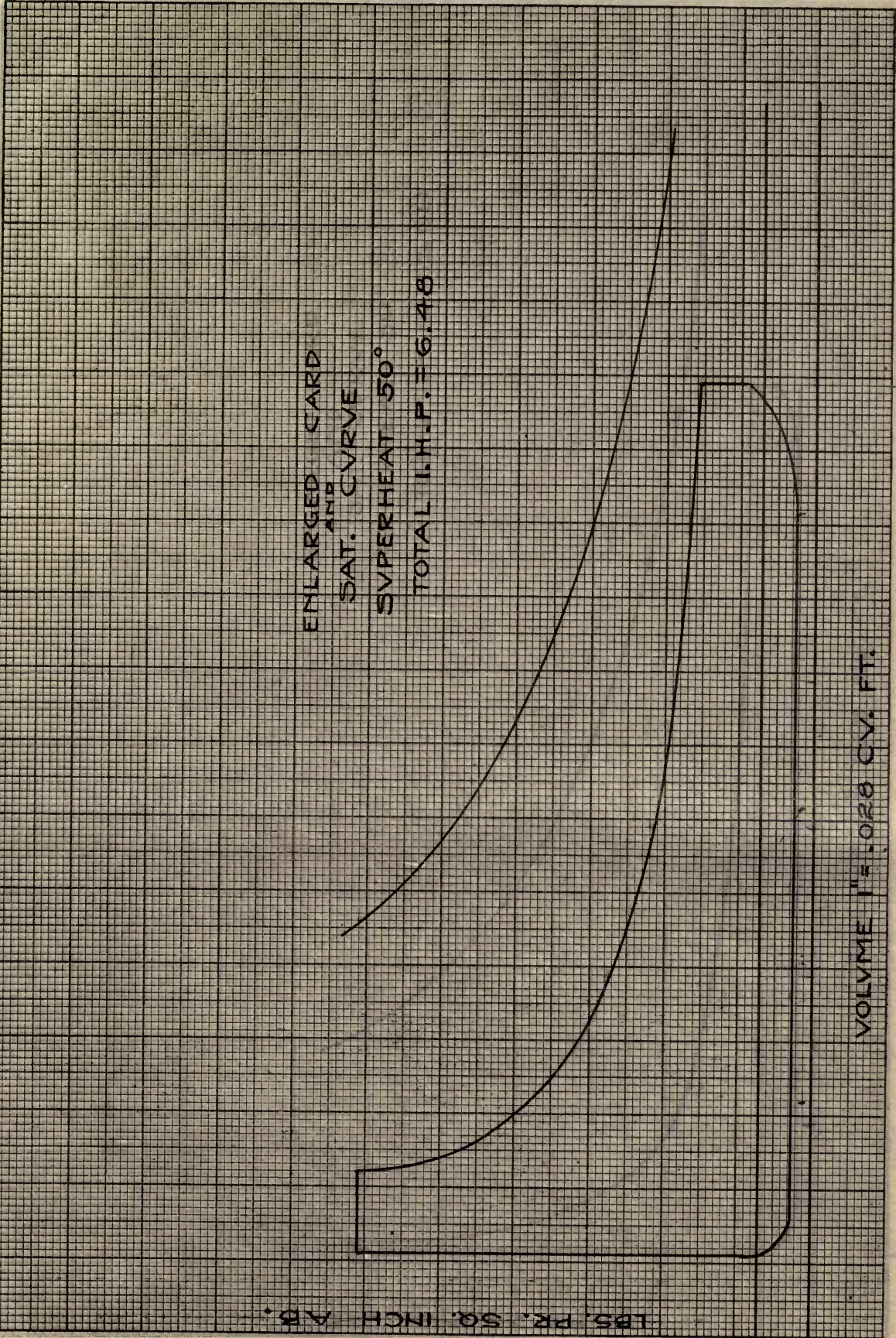
JOINT TYPE = X-60
 ENDS HEAVY 20.
 GYL. CABLE
 AND
 DEBRIS AND
 ENCASED CABLE

120
100
80
60
40
20
0

LB. PR. SQ. INCH
A.S.

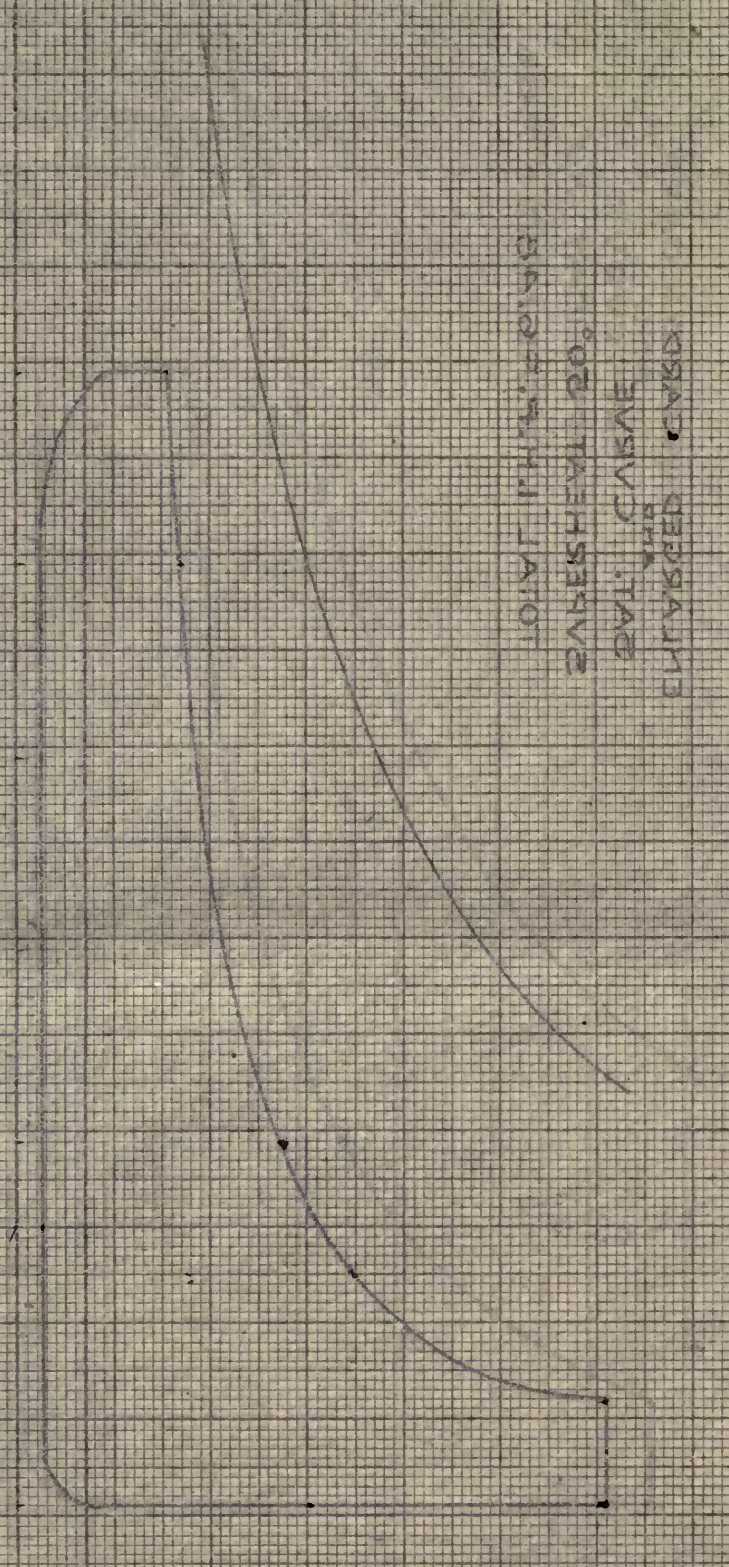
ENLARGED CARD
AND
SAT. CURVE
SUPERHEAT 50°
TOTAL I.H.P. = 6.48

VOLUME 1" = 0.0288 CV. FT.

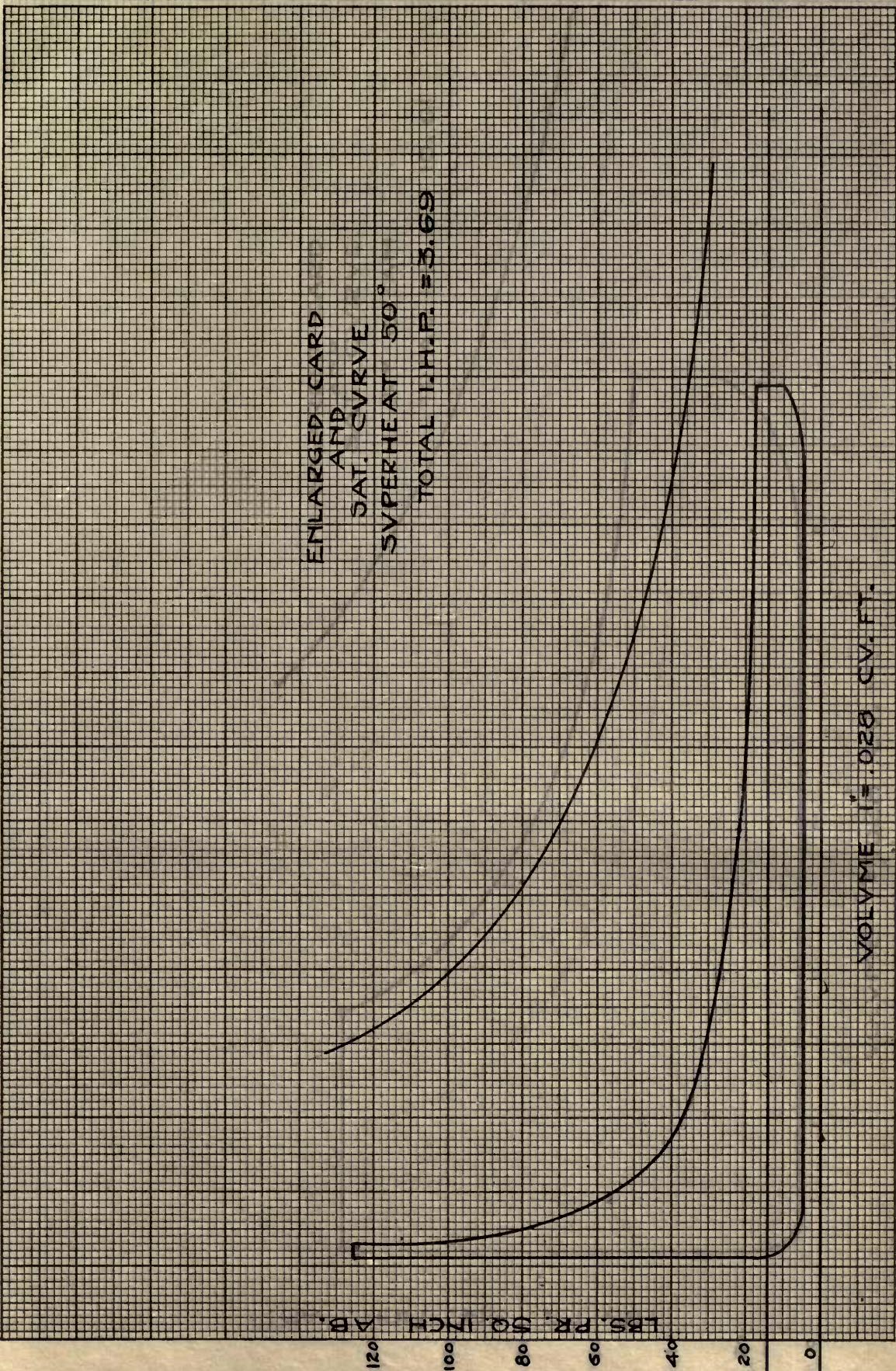


VOLUME 14-050 (M) 11

150 100 50 0 50 100 150



LOIAT PHIM'FO'NG
 SAKESHEVI 20.
 QVI' CAISE
 CHYBRED CVD

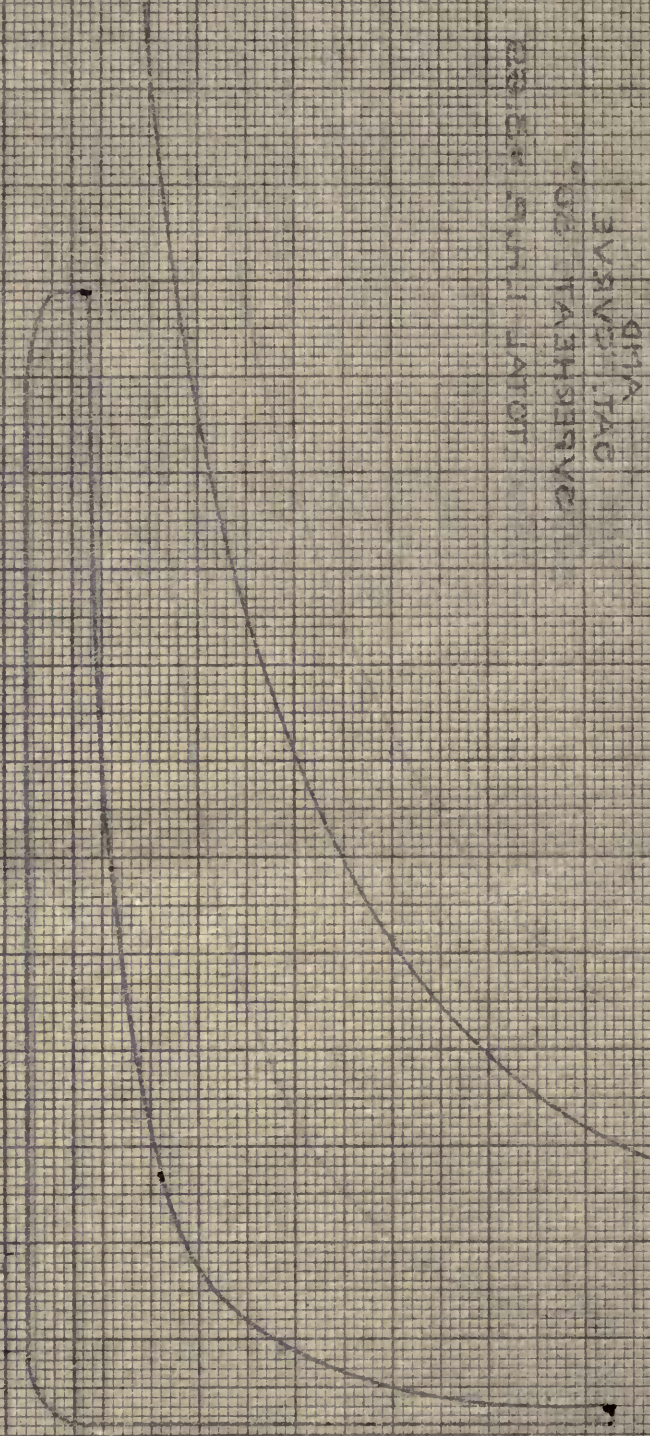


ENLARGED CARD
AND
SAT. CURVE
SUPERHEAT 50°
TOTAL I.H.P. = 3.69

VOLUME (= .028 CU. FT.)

ADPANE 1-050 CVA 62

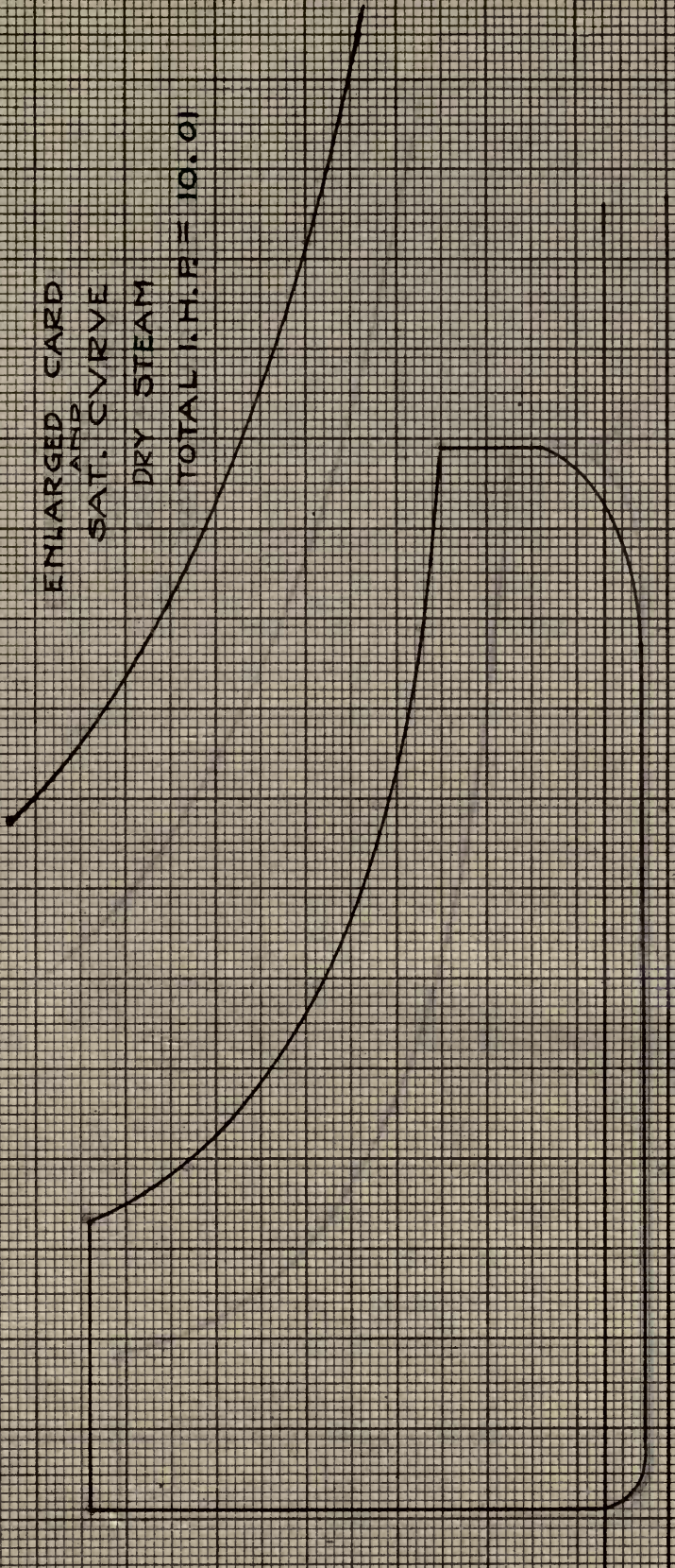
0 50 100 150



JOINT TING 100 20
DABEHEVI 20,
DYLIGARE
VIB
EMTASDED QVBD

8-1

120
100
80
60
40
20
0

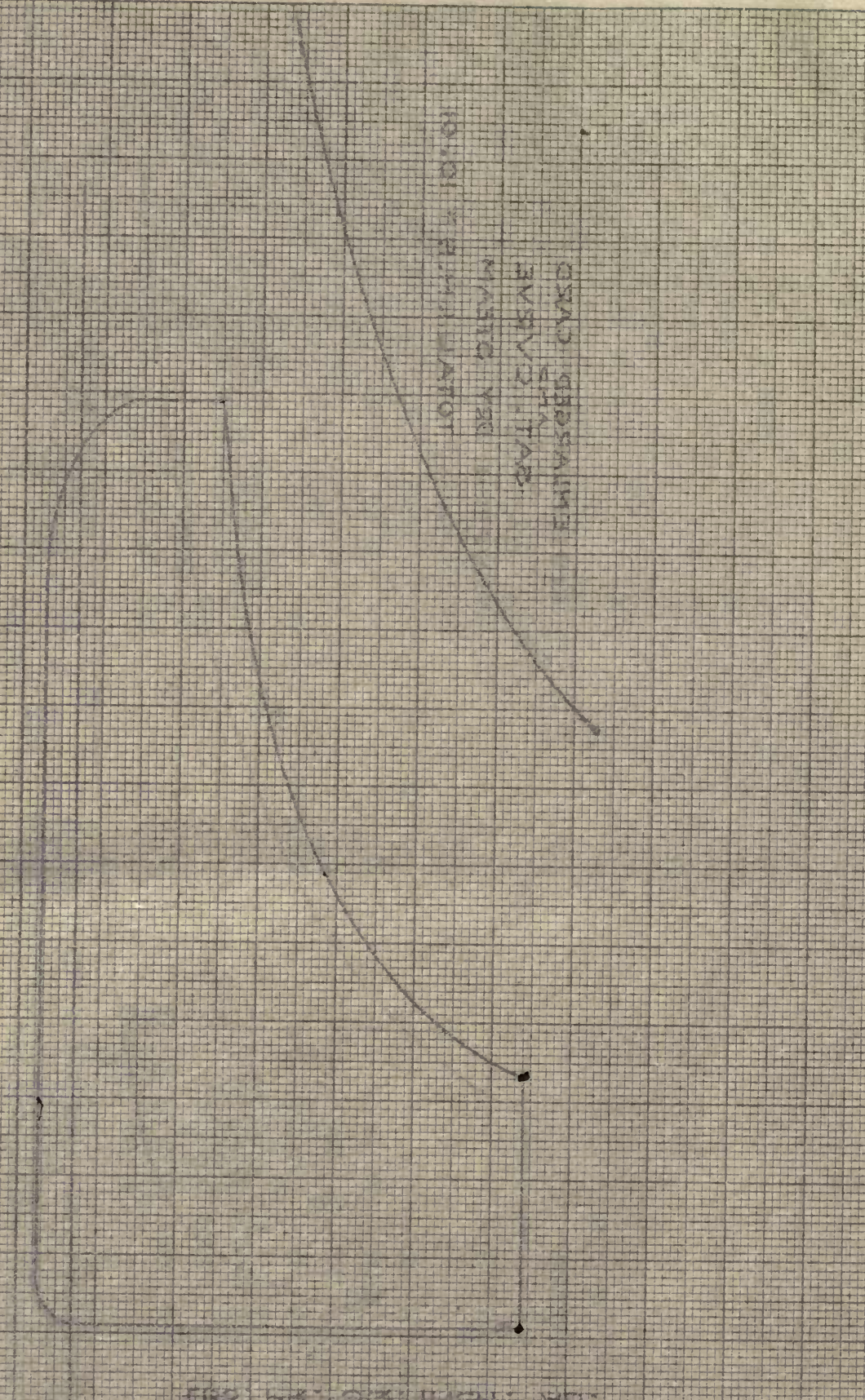


ENLARGED CARD
AND
SAT. CURVE
DRY STEAM
TOTAL I.H.P.E = 10.01

VOLUME IN 0.028 CV. FT.

AVATOR AND CYBER 18

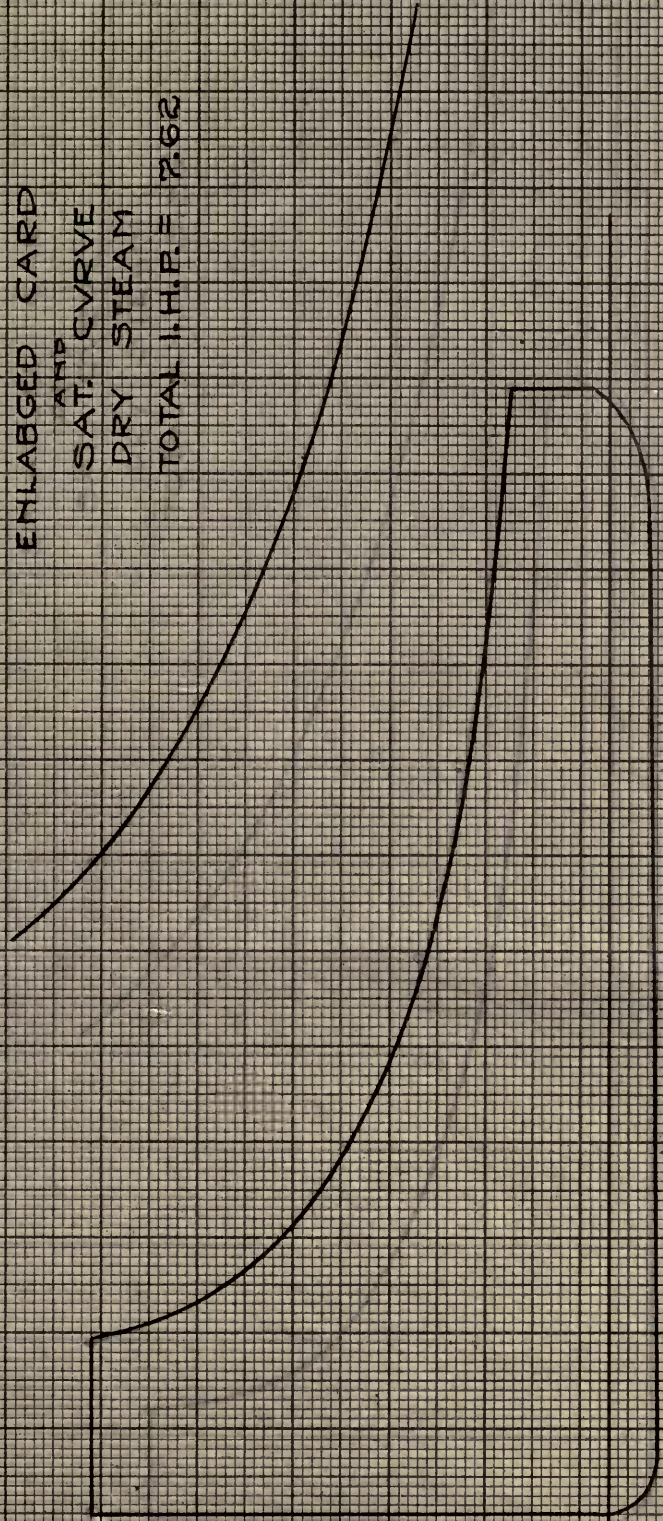
AVATOR AND CYBER 18



AVATOR AND CYBER 18
 AVATOR AND CYBER 18
 AVATOR AND CYBER 18

LBS. PR. SQ. INCH
AB.

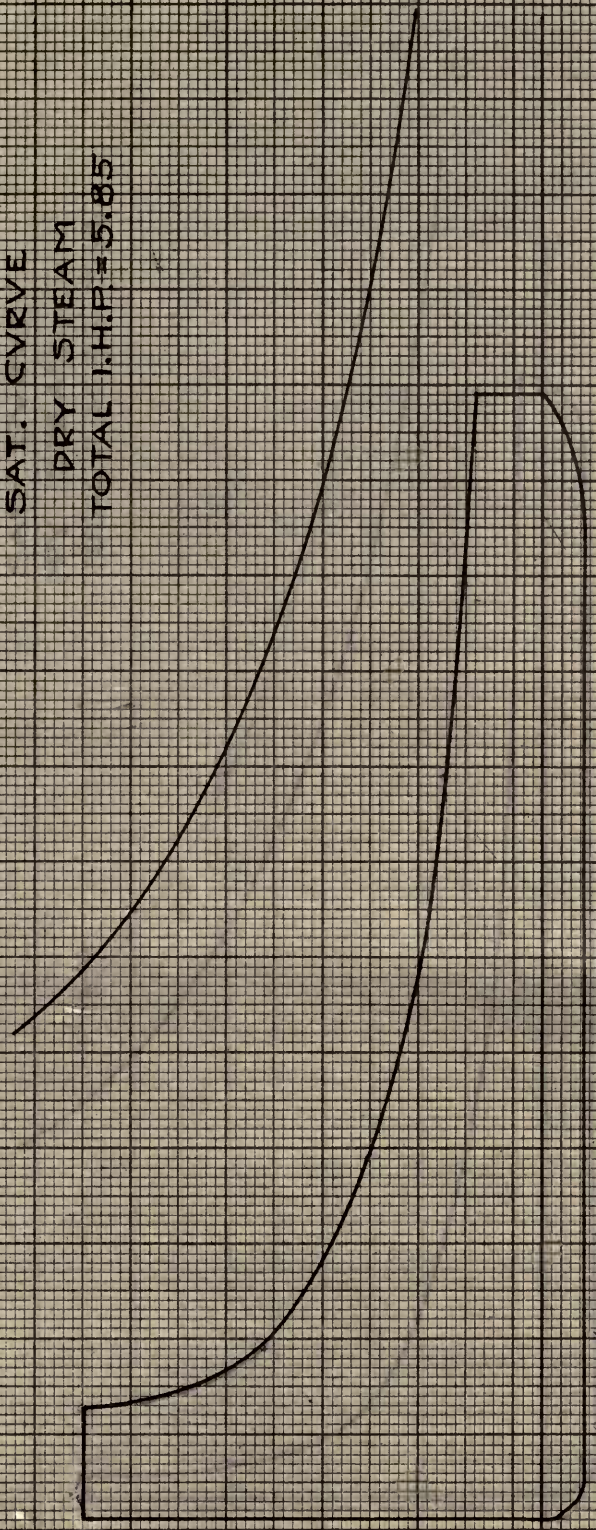
ENLARGED CARD
AND
SAT. CURVE
DRY STEAM
TOTAL I.H.P. = 7.62



VOLUME IN CU. FT.

ENLARGED CARD
AND
SAT. CURVE
DRY STEAM
TOTAL I.H.P. = 5.85

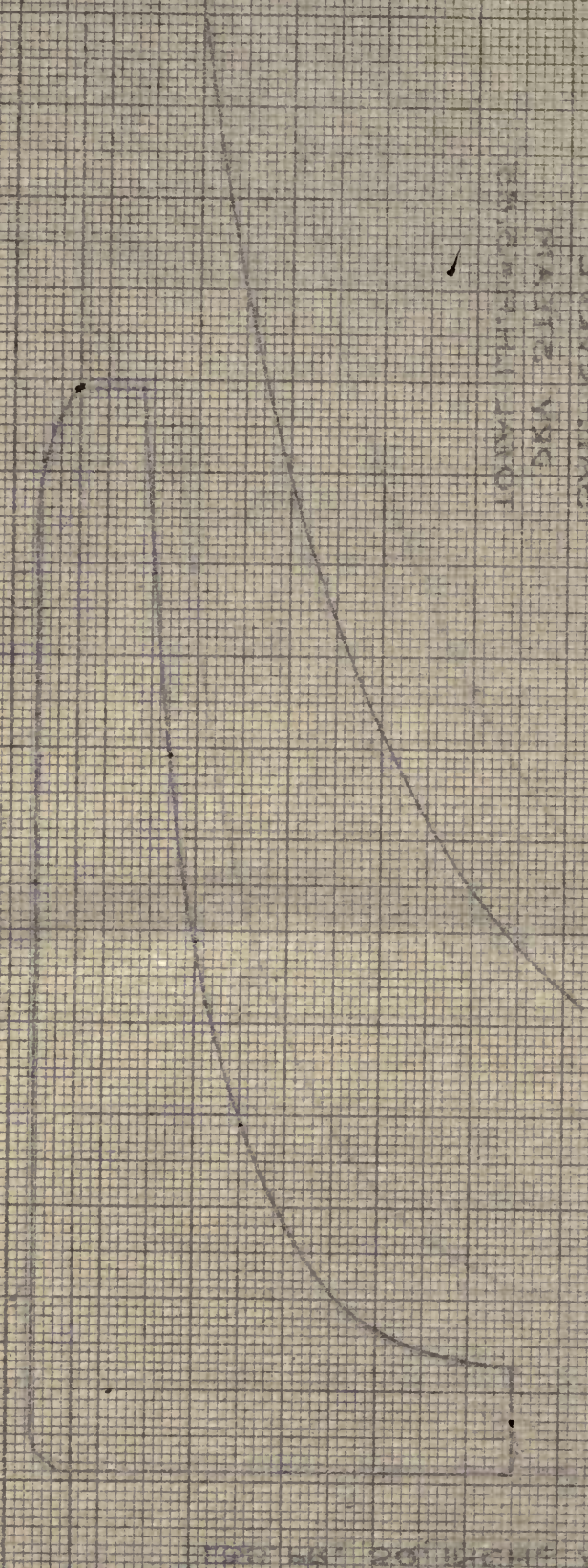
120
100
80
60
40
20
0
LBS. PR. SQ. INCH. AB.



VOLUME I" = .026 CY. FT.

NO. 1050 CASE

100 50 40 60 80 100 150

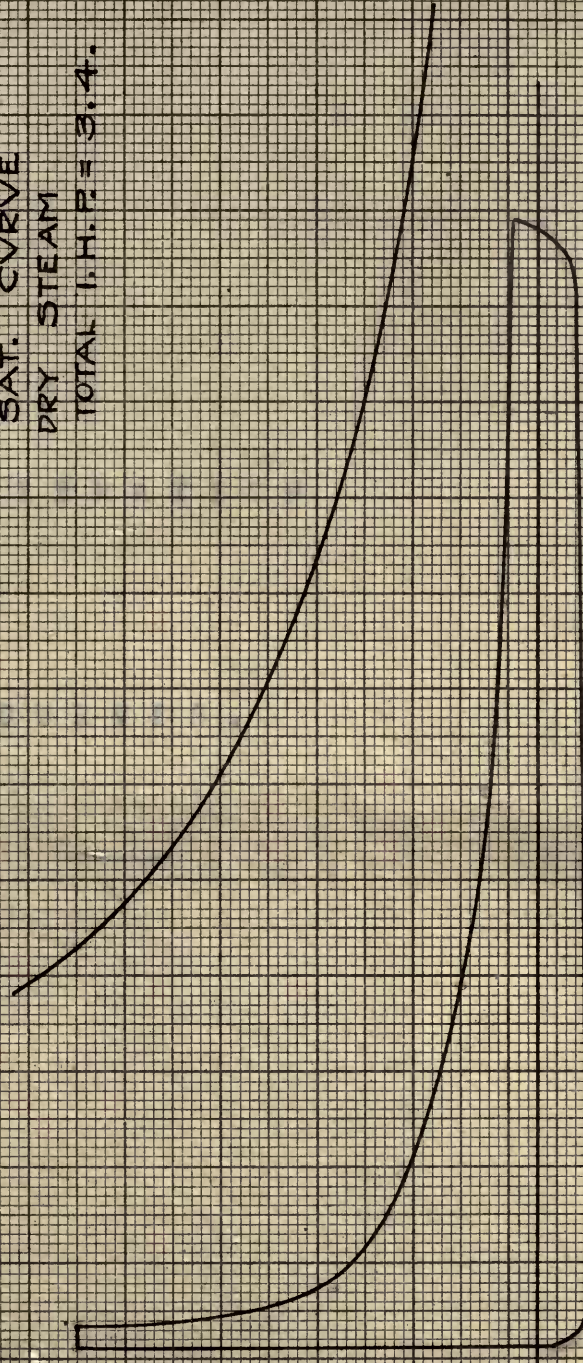


100% THROUGH
 50% 210%
 20% CASE
 10% VMO
 10% WOOD CASE

120
100
80
60
40
20
0

LB. PR. SQ. INCH AB.

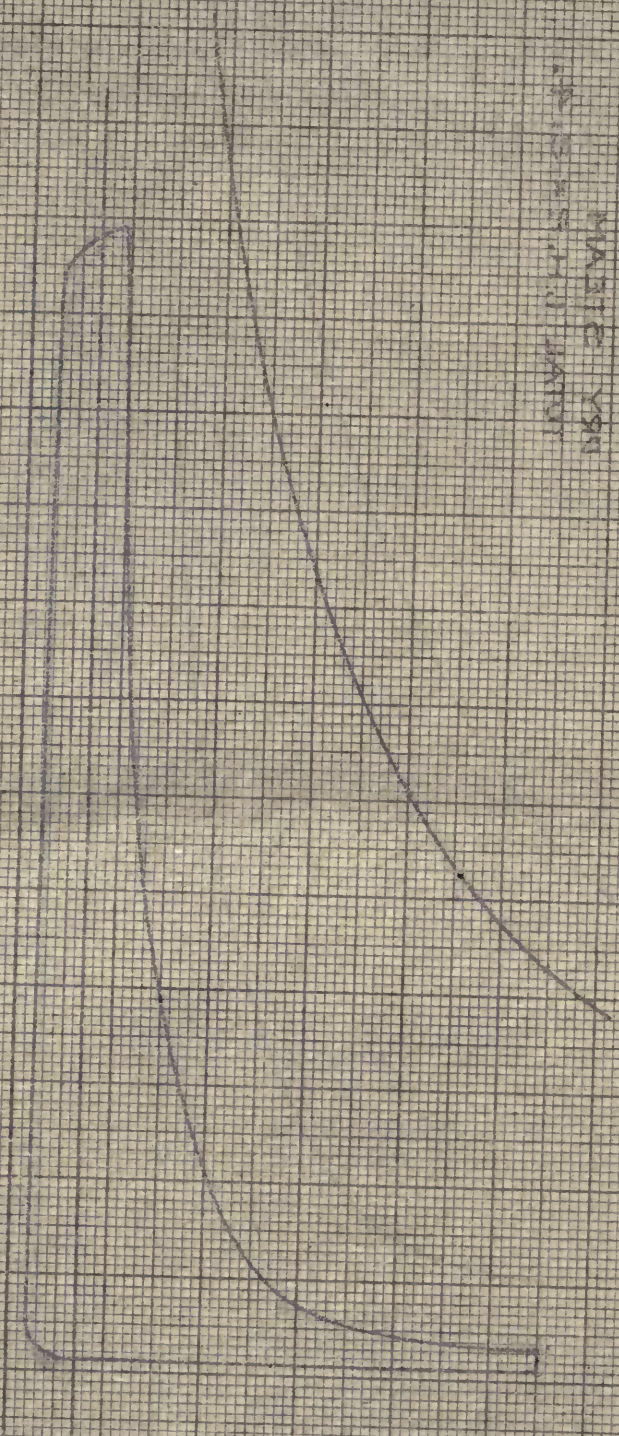
ENLARGED CARD
AND
SAT. CURVE
DRY STEAM
TOTAL I.H.P. = 3.4.



VOLUME IN CU. FT.

ADTANE 12 1520 04 11

0 50 100 150
100 05 04 03 02 01
100 05 04 03 02 01



ADTANE 12 1520 04 11
100 05 04 03 02 01
100 05 04 03 02 01
ENCLOSURE

CALIBRATION

CURVES.

NEW YORK

1854

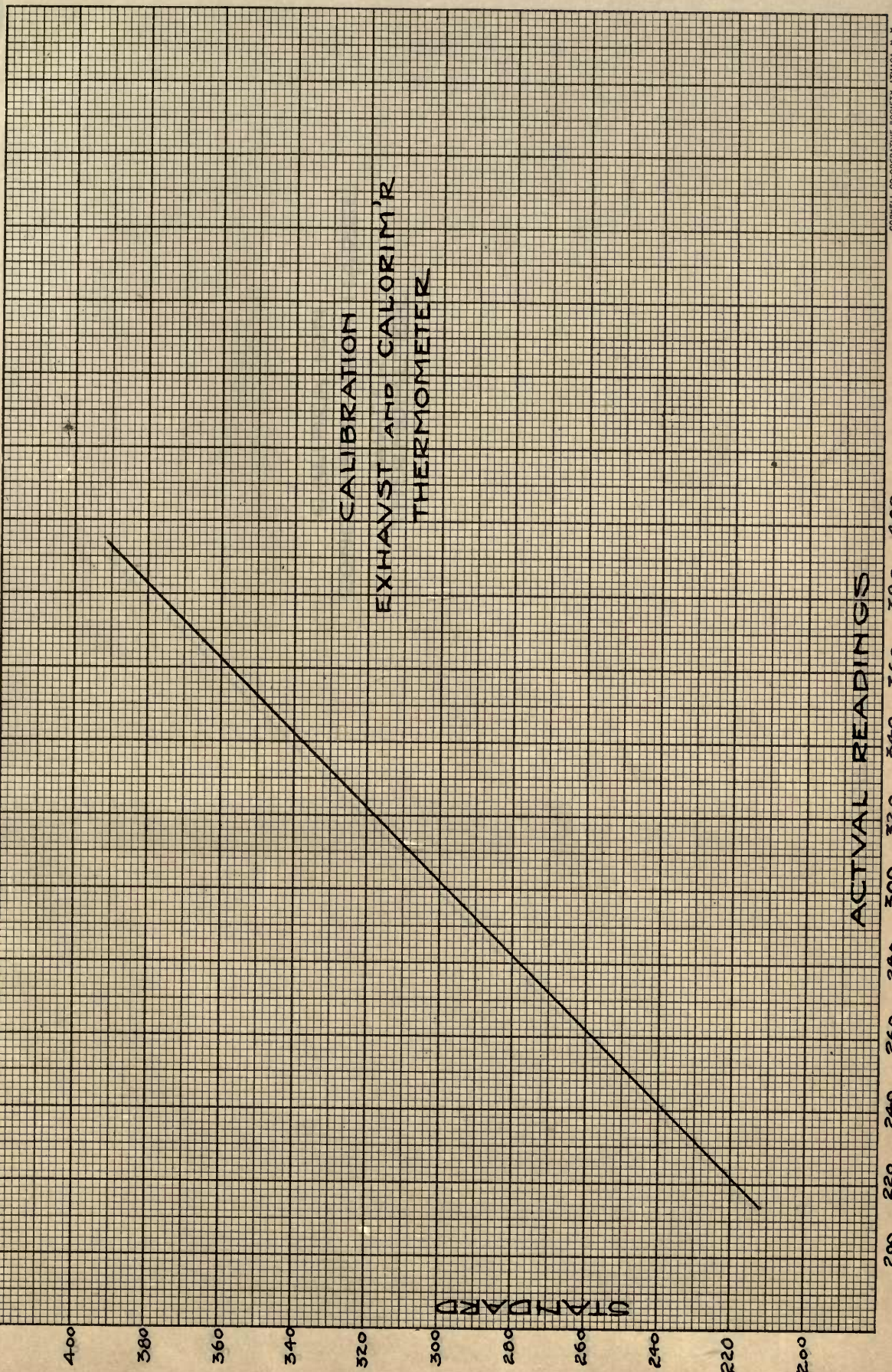
GRAY

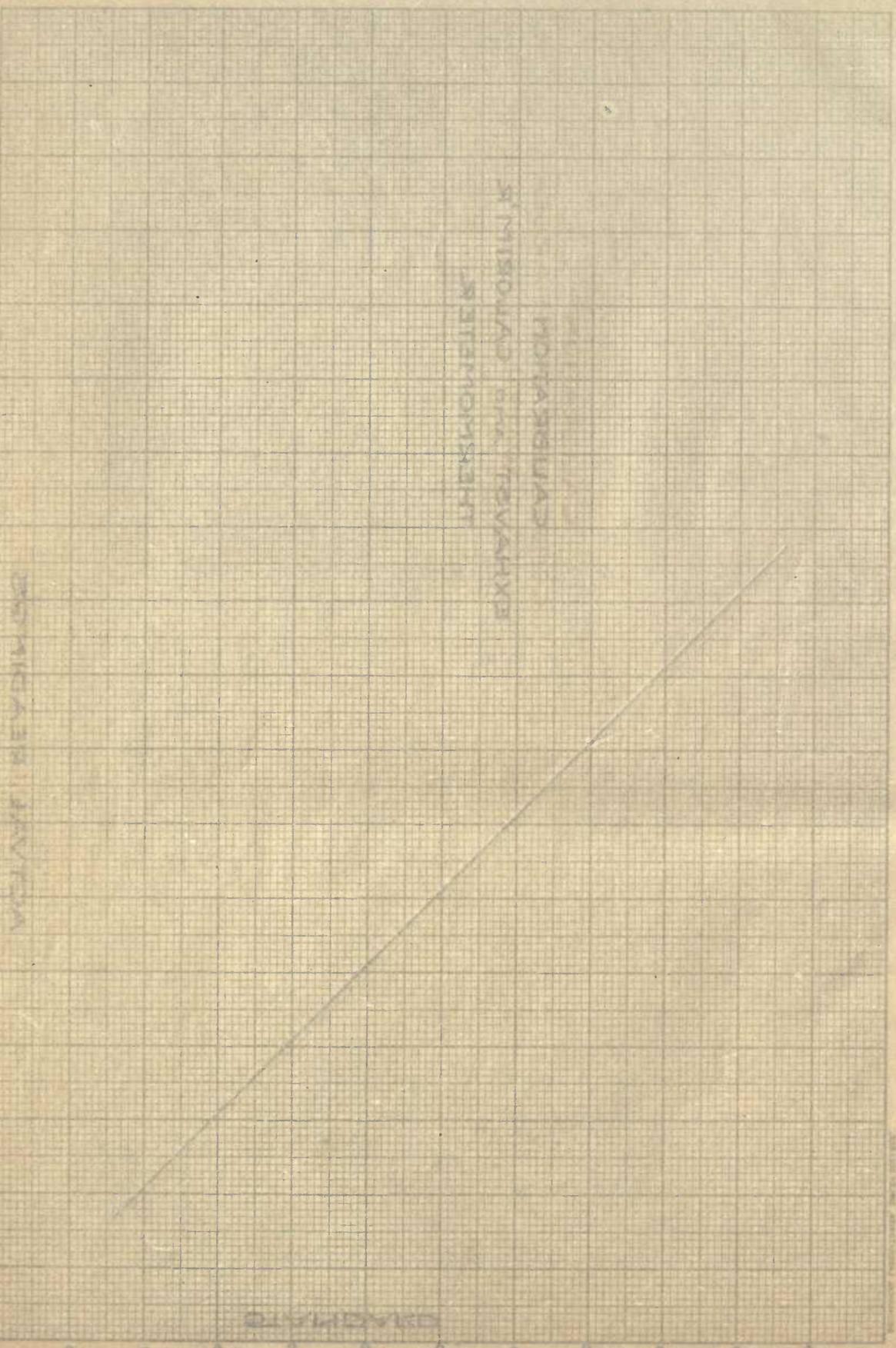


GRAY

Ch F-c

MECHANICAL LABORATORIES, SIBLEY COLLEGE.





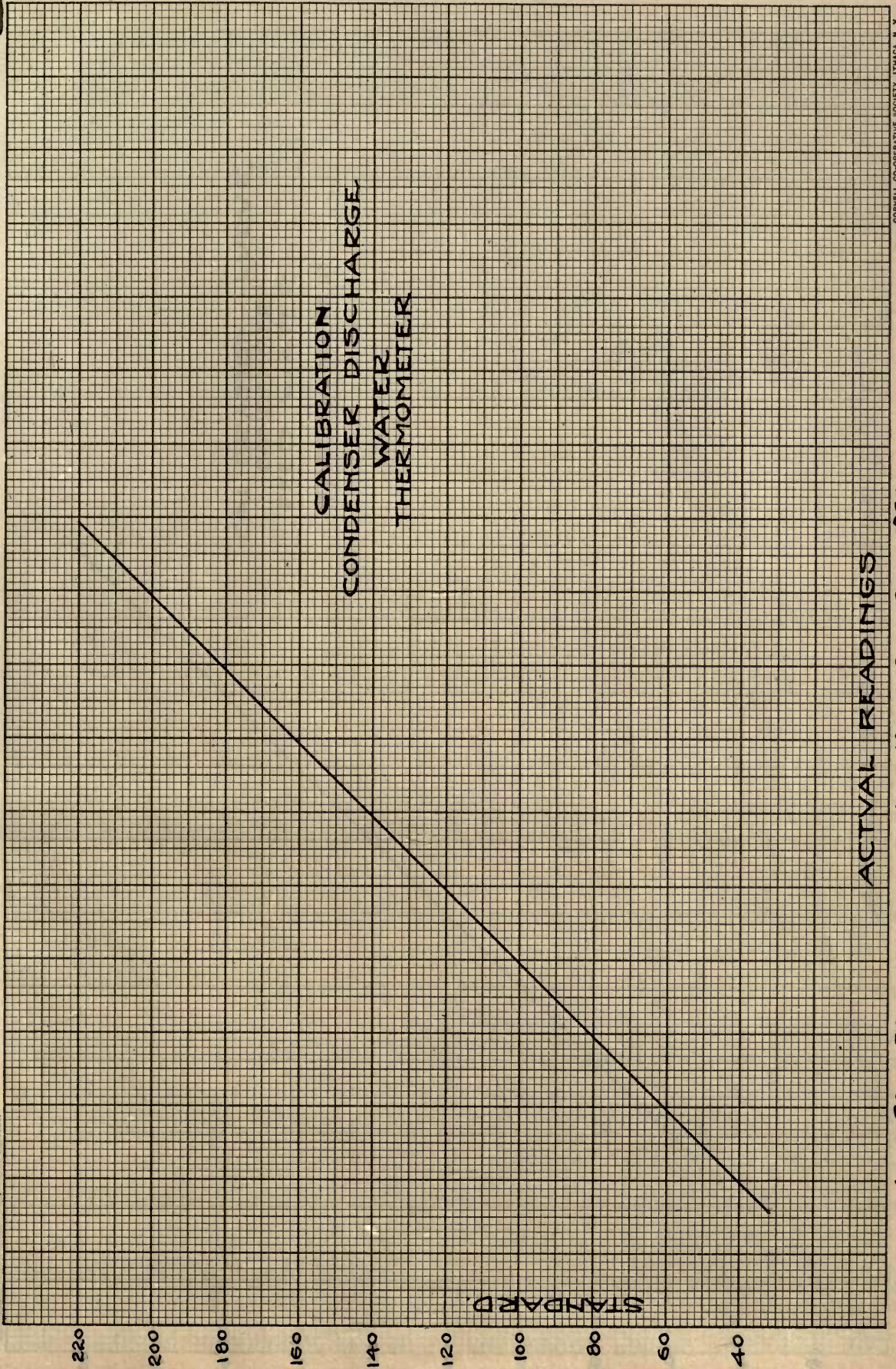
WELAVF REVDWJG

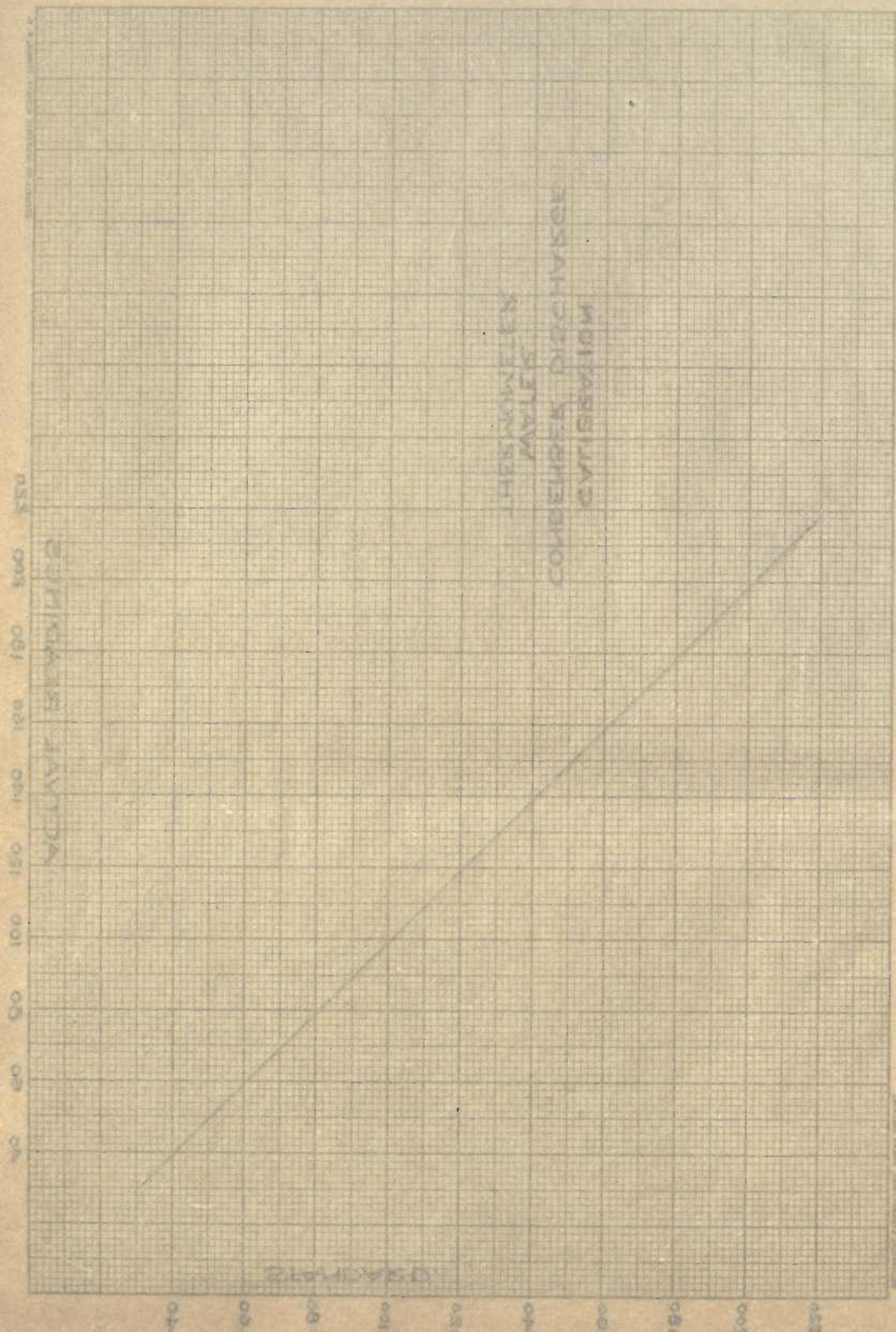
DLYMDV

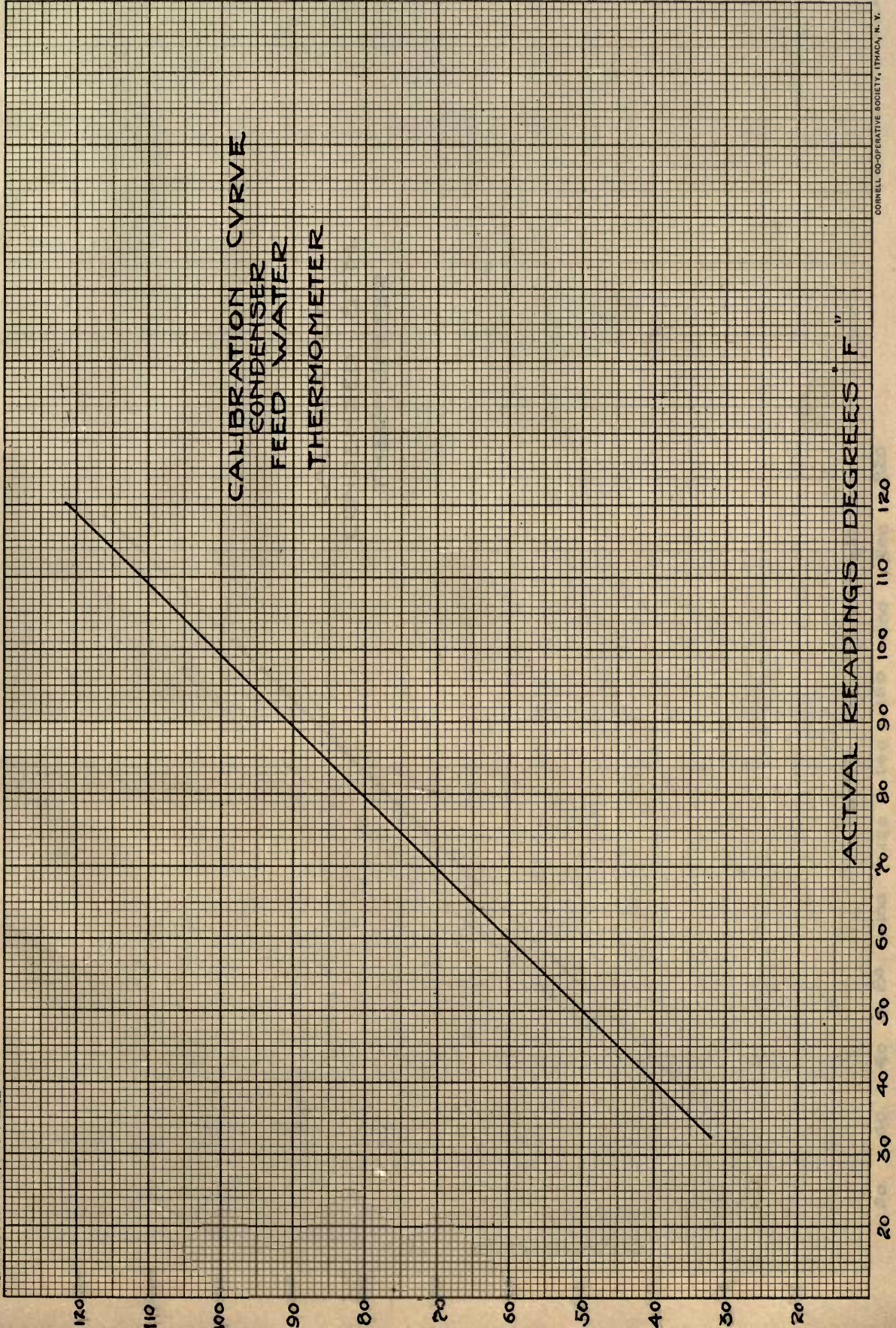
THEKOWELEK
EXHVVVJ, VVJ CVTOSVW, K

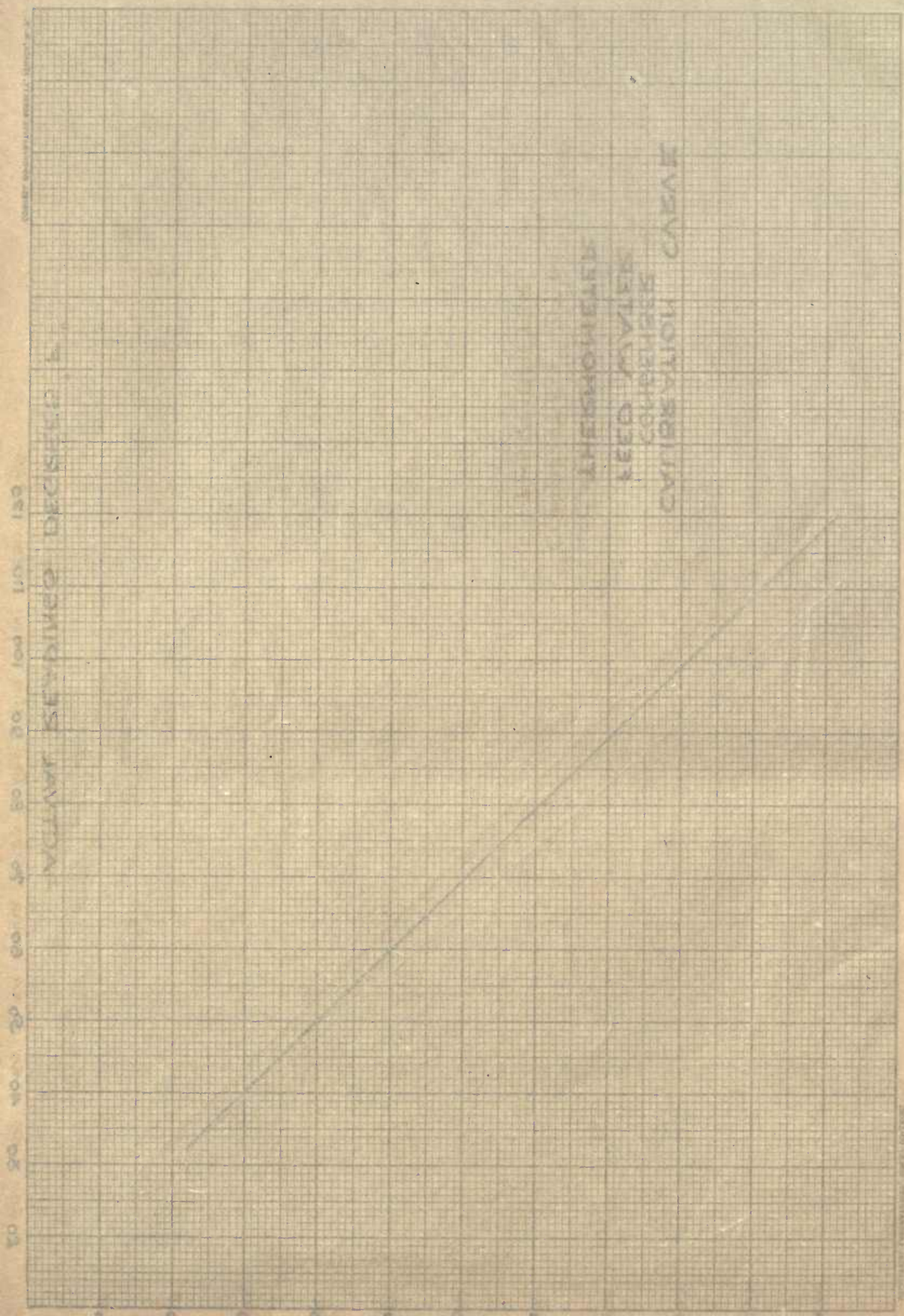
100 200 300 400 500 600 700 800 900 1000

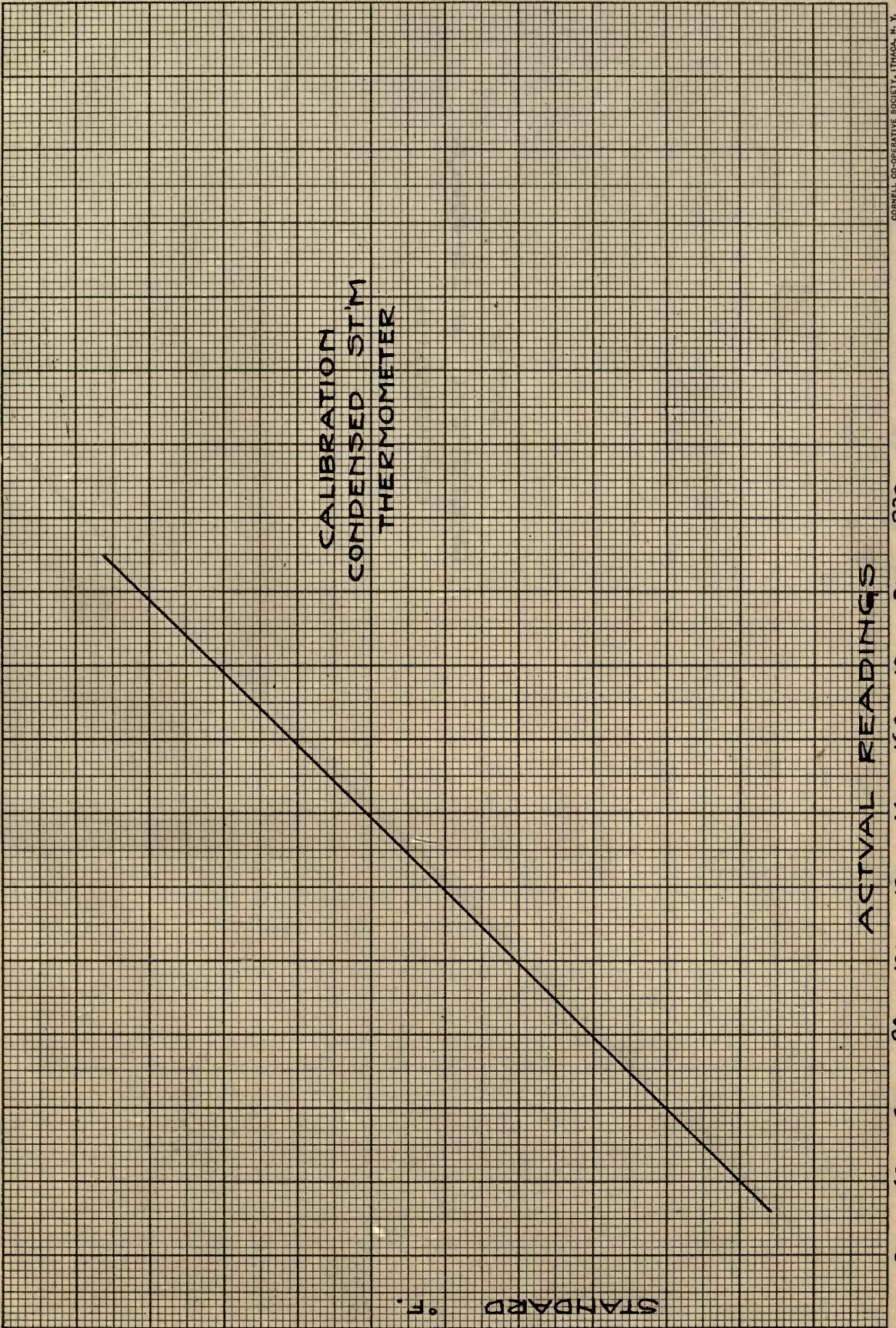
100 200 300 400 500 600 700 800 900 1000

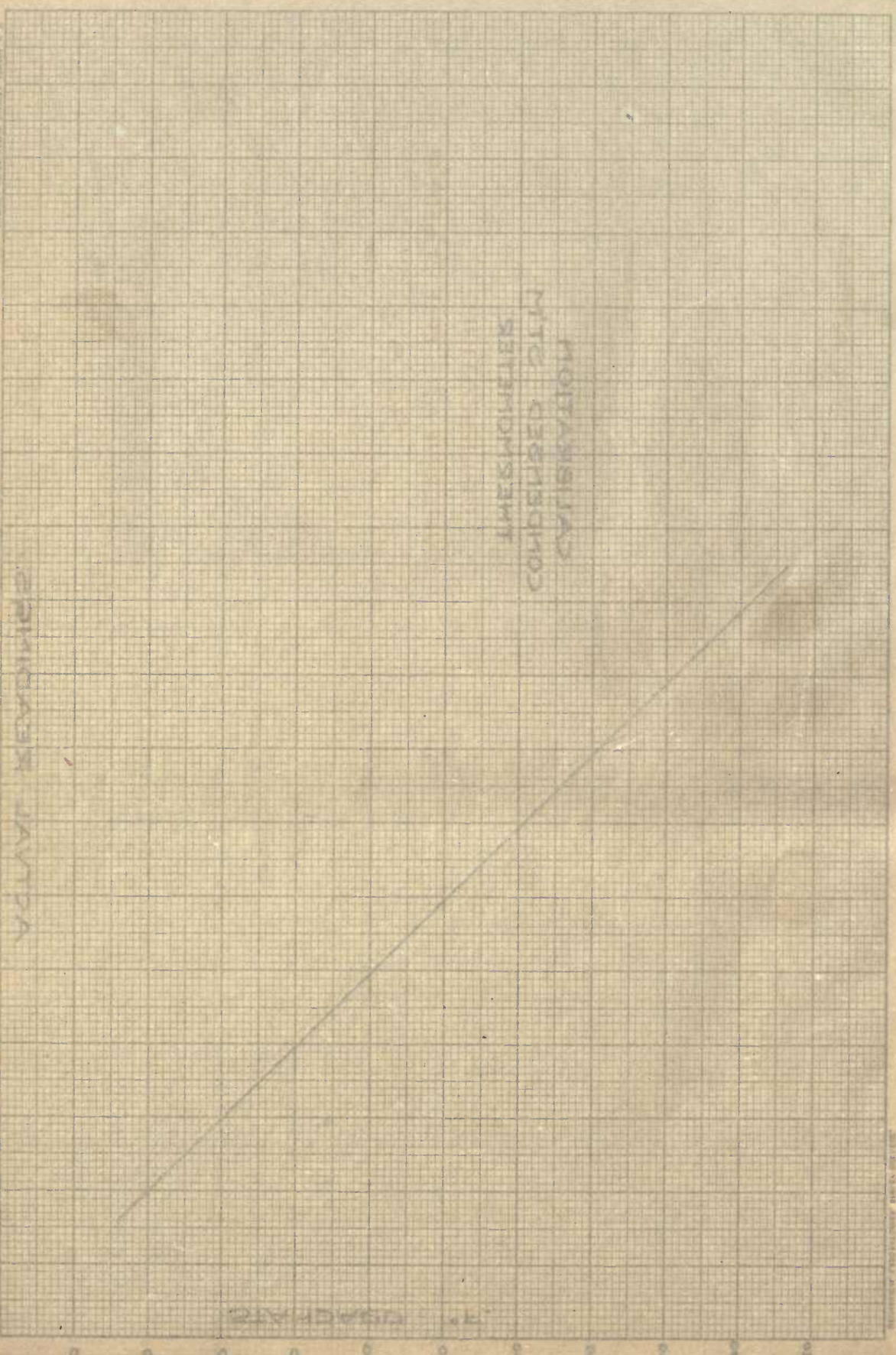




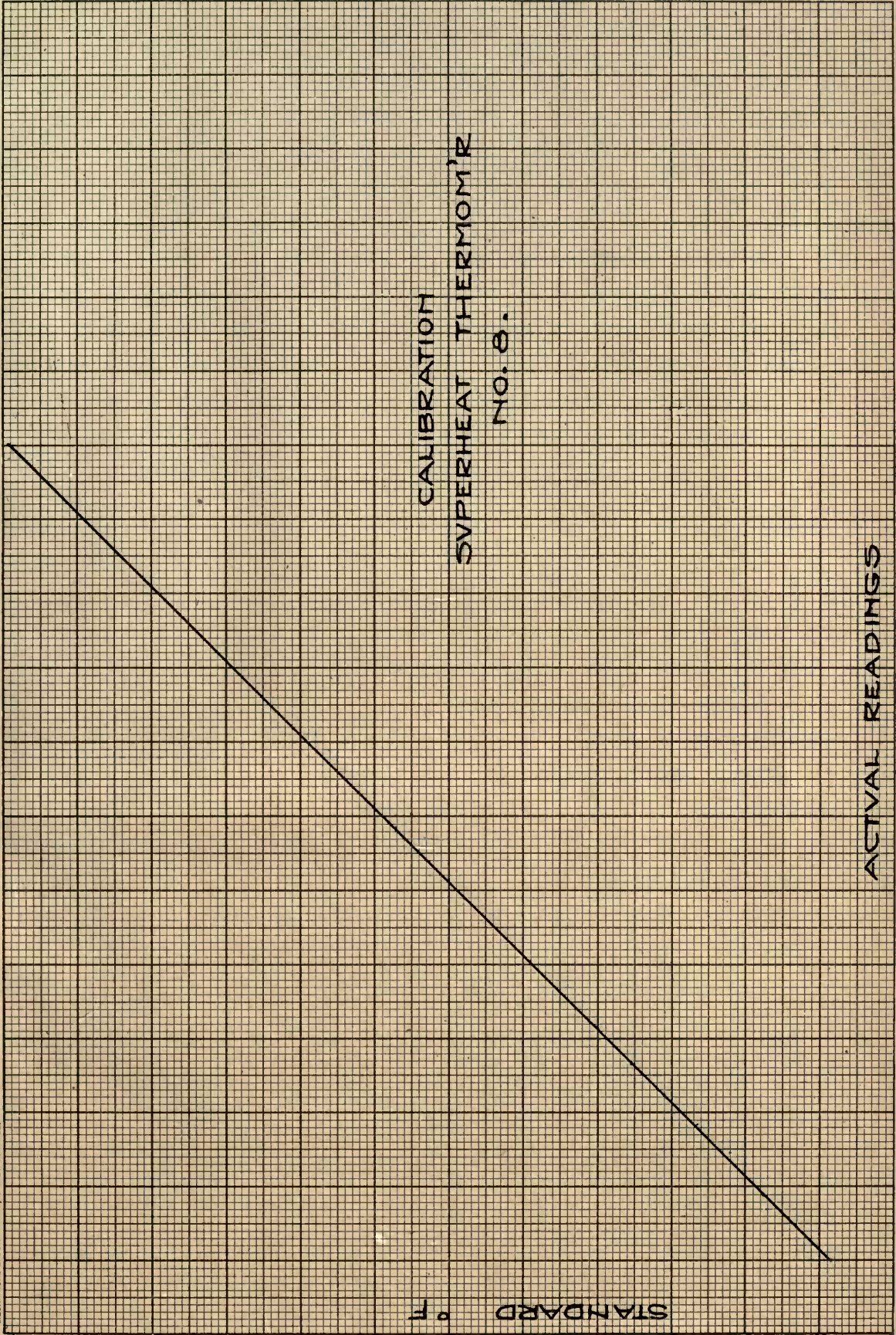








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