constituents have resumed their original relation, the evolution of internal heat ceases and the temperature of the piece falls steadily, due to surface radiation.

The Practical Problem.—From the foregoing sections it is evident, first, that there is a definite temperature at which to best harden any carbon steel, and second, that there results great loss, both of labor and material, unless the hardening is carried out at this temperature.

The actual shop problem thus presented is to determine readily and accurately the correct hardening temperature for any carbon steel that may be in use.

[A practical means of solution, even by one who is not an expert, will follow this article at an early date, comprising a description of apparatus and methods.—Editor.]

MUNICIPAL WORK IN SOUTH VANCOUVER.

Mr. S. B. Bennett, who has recently assumed the duties of board of works and waterworks engineer for the district of South Vancouver, sends in the following summary of street improvements carried out in that municipality up to December 31st, 1913.

South Vancouver has an area of over 9,000 acres or 14½ square miles, with a population of about 40,000.

Total mileage of streets in municipality	246.5
Mileage of streets cleared and rough graded....	204.0
Mileage of street uncleared	42.5
Mileage of streets macadamized	35.4
Mileage of paved roadways	3.84
Mileage of planked roadways	12.00
Mileage of sidewalks laid	117.83
Mileage of street car lines, double track	4.57
Mileage of street car lines, single track.....	6.02
Mileage of single track, interurban railway ...	4.70
Mileage of double track, interurban railway....	2.08
Number of wooden bridges built	7
Number of concrete catch basins	76
Number of wooden catch basins	76
Number of concrete manholes	11
Mileage of wooden box drains and culverts	13.14
Mileage of sewers laid	.15
Mileage of storm sewers laid	2.50
Mileage of concrete curb only laid	.24

Waterworks Department.

	1910.	1911.	1912.	1913.	Total.
Miles of water mains laid	76	69	39	15	199
Fire hydrants installed ..	132	169	216	66	583
Services installed 2,007		2,753	2,373	1,689	8,822

Like most other municipalities, South Vancouver has been suffering from the financial depression but is looking forward to considerable activity this season. Considerable paving work is proposed. The waterworks committee is also building a steel water tank of 750,000 gal. capacity. When completed it will be 75 ft. high and 45 ft. in diameter. The cost of the tank, painted and enamelled, will be $30,000.

To preserve steel from rust dissolve 1 part caoutchouc and 16 parts turpentine with a gentle heat, then add 8 parts boiled oil, and mix by bringing them to the heat of boiling water. Apply to the steel with a brush, the same as varnish. It can be removed again with a cloth soaked in turpentine.

REPORT ON THE MAITLAND RIVER AS A POWER PROJECT.

A REPORT on the power possibilities of the Maitland River, Ontario, is given in the sixth annual report of the Hydro-Electric Power Commission of Ontario. Since the preparation of the preceding report, continuous daily gauge readings were made at Benmiller, and these readings, with the aid of a rating curve of the stream, compiled from the regular monthly measurement of discharge, furnished the data for a further study of the hydrology of the river in its relation to the development of power.

The report contains duration curves plotted for the years 1911, 1912 and 1913, indicating that the amount of flow for economical development on this river ranges from 300 cu. ft. per second on the 212½ ordinate to 1,000 cu. ft. per second on the 152½ ordinate.

In last year's report the abnormal flow characteristics of the Maitland River were noted, and attention was drawn to the fact that any development of power must depend for continuous operation on the minimum flow of the stream in conjunction with such advantages as can be derived from local pondage.

During the summer of 1913, on a number of days the minimum flow of the stream was 75 cu. ft. per second. At the Black Hole site, with an operating head of 80 ft., this flow, without pondage, gives a minimum continuous power capacity of about 545 h.p. The local pondage above the Black Hole dam would be something over 700 acres. Assuming a maximum draw on this pond of 5 ft. (thus giving a minimum operating head of 75 ft.), a reservoir capacity of 3,500 acre-feet would be available.

An analysis of the mass curve of the Maitland River from 1911 to date, shows that 3,500 acre-feet of reservoir capacity will provide a continuous discharge of about 110 cu. ft. per sec. In extremely dry years it is probable this flow would not exceed 100 cu. ft. per sec.

From this the report ventures to state that any power development on the Maitland River at the Black Hole site could not be depended upon to deliver continuously more than 750 h.p.

The following table gives the amount of storage required for different rates of uniform draft up to 200 cu. ft. per sec., with the continuous available power for these amounts, if developed at the Black Hole:

Required Storage in Million cu. ft.	Storage in Acre feet	Uniform Flow in cu. ft. per sec.	Continuous Power Available
0	0	75	545 h.p.
80	1,835	100	725 h.p.
260	5,960	125	910 h.p.
520	11,920	150	1,090 h.p.
800	18,350	175	1,270 h.p.
1,100	25,230	200	1,450 h.p.

The table shows that for the development of 1,500 h.p. of continuous power at the Black Hole about 25,000 acre-feet of storage will be required. Owing to the fact that facilities for storage in the Maitland River watershed are lacking to an unusual degree, the purchase of land construction of the necessary works would entail an expenditure which, added to abnormal cost of development at the Black Hole, places the project, for the time being, outside of economic limits as a source of continuous power.

The rapid development in the quality of steel must be credited to a great extent to the automobile and the aëroplane. Wire for aëroplane stays or guys is made from 0.025 to 0.102 inch diameter, with a tensile strength of 350,000 pounds per square inch.