In the following table are given a few representative samples of the efficiency of slow and rapid sand filters in cutting down the typhoid fever rate in communities where they are used. This is one of the best indices to the bacterial efficiency of filters. In addition to the reduction of typhoid fever effected by filters, it appears to be a fact that the death rate of a community is materially reduced by the substitution of a pure for a polluted water supply. At the International Engineering Congress, held at St. Louis in 1904, Allen Hazen made the following statement:[1]

* * * Where one death from typhoid fever has been avoided by the use of better water, a certain number of deaths, probably two or three, from other causes have been avoided. This seems the clear and logical conclusion from the statistics. It is not easy to explain how the water is connected with the deaths other than those from typhoid fever. It may be that a good water supply, used freely and with confidence, results in a better general tone in the system of the population, and so indirectly to a lower death rate, and that a part of the reduction is represented by diseases having no recognized connection with the quality of the water supply.

Death Rate From Typhoid Fever per 100,000 Population in Cities Using Filters.

City	Kind of filter	Plant completed	Years, in average— Typhoid fever death-rate— Before filtration.	After filtration.	Before filtration.	After filtration.
Albany, N.Y.	Slow	1899	10	10	90	21
Binghamton, N.Y.	Rapid	1902	5	5	47	15
Cincinnati, Ohio .	Rapid	1908	4	2	50	13
Columbus, Ohio ..	Rapid	1908	11	2	78	15
Lawrence, Mass. .	Slow	1893	7	15	114	25
Paterson, N.J. ...	Rapid	1902	5	8	32	10
Pittsburgh, Pa. ..	Slow	1907	8	3	133	*26
Watertown, N.Y...	Rapid	1904	5	5	100	38
York, Pa.	Rapid	1899	2	8	76	22

*Filtered-water section. Allegheny not included.

[1]Trans. Am. Soc. Civil Eng., vol. 54 D, p. 153.

A SILICIOUS WOOD PRESERVATIVE.

In a new process for the impregnation of timbers with melted paraffin and naphthalene, diatomaceous earth, a silicious material, is ground so fine that ninety-two per cent. passes a two-hundred-mesh screen. This is mixed with the melted paraffin and the naphthalene and timbers immersed in the mixture for four hours. As compared with the twelve to twenty-four hours required in creosoting, this is noteworthy. Furthermore, it is an open vat process. The wood is permeated to the centre and resists the attack of marine borers and decay, besides gaining the resilience. Nails hold better and do not rust, nor does the wood become waterlogged. Hardwoods, like white oak, which resist other treatment, yield to this preservative. The expense is small, for the mixture costs only three cents per pound, and less than two pounds of solution are required for each cubic foot of timber.

When completed, New York's skyscraper, the mammoth fifty-five-story Woolworth Building, will have cost approximately $13,500,000, of which amount $4,500,000 represents the cost of the land, $1,000,000 of foundation excavation, and $8,000,000 for construction.

JACKET WATER TEMPERATURES AND FUEL CONSUMPTION IN INTERNAL COMBUSTION ENGINES.

By Reginald Trautschold, M.E.

The thermal efficiency of internal combustion engines, the proportion of the heat units supplied that are converted into available or useful kinetic energy at the fly wheel—is, and has been, high as compared with that of even the most efficient types of reciprocating steam engines. And one of the main reasons of the recent wide adoption of the former type of engine to service of all kinds lies in the fact that its average efficiency, as the engine is to-day manufactured, shows considerable improvement over that of similar engines built but ten or fifteen years ago. This increased efficiency has been obtained through the use of more suitable mixtures in the combustion chamber, better regulation, improved design, and proportions, etc., etc., until at the present time

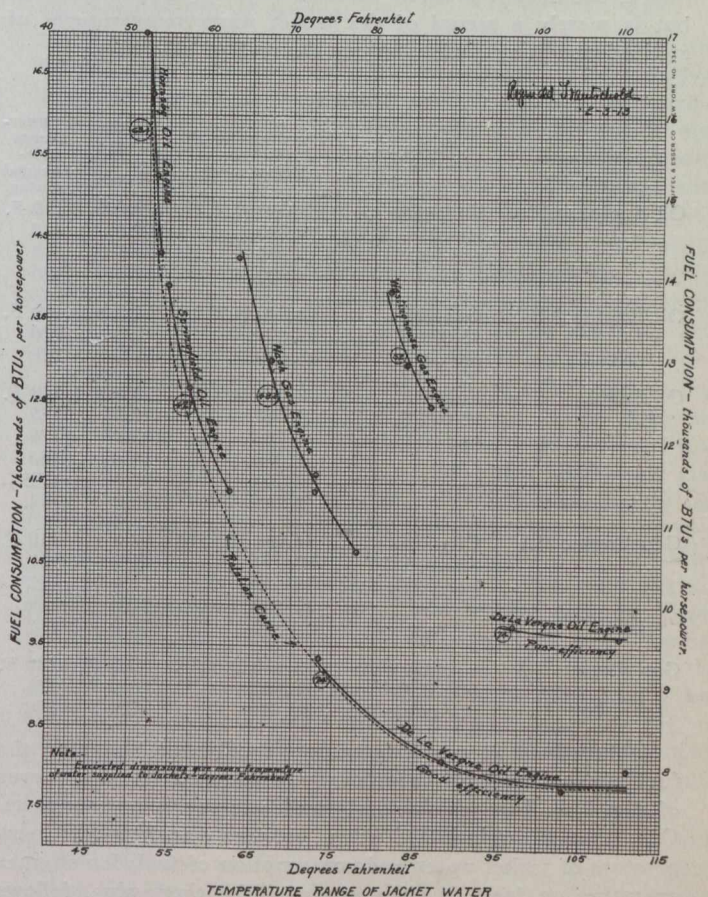

CHART I.

internal combustion engines operating on crude and the heavier oils have occasionally developed a thermal efficiency of about 35 per cent. Such progress is very gratifying and has helped in the wide introduction of internal combustion engines, but even now many such engines are being operated below their best efficiency from lack of general and proper knowledge of the requirements and conditions governing efficiency. Particularly is this so in the question of jacket water temperatures—water jacketing being generally resorted to in stationary engine practice—and a study of this question is, therefore, of particular interest.

In considering the effect of jacket water temperatures upon fuel consumption, two main points naturally present themselves, 1st, the amount of heat that the jacket water should absorb—i.e., its temperature range, for most satis-