



**This PDF is part of the  
Philadelphia Water Department Historical Collection  
Accession 2004.071.0001  
Frederic Graff Jr. Scrapbook, 1854-1857**

**It was downloaded from  
[www.phillyh2o.org](http://www.phillyh2o.org)**



## PURE WATER.

The new mode of rendering water pure and wholesome, noticed in the American Courier a week or two since, is really a matter of more importance than may appear at first sight. Though as a general thing water is drunk without, perhaps, a thought of its quality, except as it may be agreeable to the taste, there can be no doubt, notwithstanding the different degrees of purity of water, that all brought into our cities, from rivers, will be improved by filtration, some of course to a greater extent than others, but all will be more or less benefited. We do not lay much stress on such accounts as from time to time appear in the newspapers, as that of the child which, having been long in ill health, was relieved by an emetic, and the ejection of a snake, several inches in length, supposed to have been swallowed when quite small. Such accounts are too vague and improbable, perhaps, for credence, though we have read others of a similar character. Nor need we attach particular importance to the announcement that "on Sunday last, June 18th, as Dr. Janvier, of the Nineteenth Ward, was drawing water from his hydrant, he discovered a mass of putrid intestines of fish, so offensive as to sicken the stomach." The Public Ledger, from which we get this information, asks, "what more prolific source of disease can be imagined than the daily use of this solution of filth?" But we have little faith in such extreme statements; still, we think it reasonable to conceive the possibility of impure particles and objectionable matter occasionally finding their way into the water we daily drink. The report recently made to our City Councils by Mr. Graeff, the able Superintendent of our City Water Works, furnishes evidence of the excellent quality of our water and its decided superiority over that used in the city of New York. Still, excellent as our water unquestionably is, few will hesitate in welcoming any convenient and simple mode for rendering it more pure, and freeing it from any foreign or objectionable substances. Such being the case, we are justified in placing a high estimate on the remarkably simple and ingenious mode of filtering, recently noticed, by which the filter is at once cleansed of its sediment and impurities by its own action, an operation never before attempted, and which gives it the well merited title of "The Self-Purifying Filter." An examination of the process makes it at once evident that, at every operation of the Filter, the self-cleansing process cannot be otherwise than repeated, it being self-regulated by the flow of the water itself. In this opinion of its unerring and invariable self-action we are confirmed by some of the most practical and intelligent scientific men in the city of Philadelphia, who are unanimous and decided in anticipating the universal introduction of this water purifier, not only universally into this city, but into every other, where pure, wholesome water is rightly appreciated. Such an invention is certainly a public blessing, especially at this time, when the attempt to prohibit intoxicating liquors makes it all important that Nature's bright, sparkling beverage should be made as pure and acceptable as possible.

Mr. Wainwright, from the Watering Committee, submitted an ordinance, providing, according to the recommendations of the Chief Engineer of the Water Works, for the better security of fire plugs from freezing.

The bill provides that the Permit Clerk of the Watering Department, be directed to grant no permit for the construction of a vault upon the footway where a fire-plug is already situated, unless it be so built that the plug shall have on all sides of it, at least four feet of earth retained by the wall of the vault, and the flag-stone pavement be so arranged that the plug may be removed and repaired without necessity of taking up or breaking the stone for the purpose, the work to be done in accordance with the directions of the Chief Engineer of the Water Department, or his agent; and that where plugs are now situated, the committee shall be authorized to have the same protected by building walls or otherwise, whenever it shall be considered necessary.

The ordinance was passed without debate. Council refused to concur in an amendment made

## Why the Cornish Engine is Superior to the Common Condensing One.

H. Haines, your Virginia correspondent, asks on page 47, this Vol. SCIENTIFIC AMERICAN, to ascertain the cause of the superiority, if any existed, in the Cornish engine over the other, provided they operated under similar circumstances. I think that will depend very much upon their construction, and the skillful care devoted to their attendance.

A badly constructed and attended Cornish engine would but poorly compare with a good ordinary condensing one, and, on the other hand, a badly constructed and attended ordinary condensing engine would compare still worse with a good Cornish. A Cornish engine is nothing more than a condensing engine with all the improvements added to it, to adapt it to desired purposes. These purposes vary, and it may not be out of place here to state them:—For draining mines the Cornish engine, proper, is used, in which the piston is attached to the pump rods through the medium of an over-head beam; there is no rotative motion, the piston is attached to one end of the beam by piston rod and parallel motion links, and the pump rods to the other end direct.

The Direct Action, or "Bull Engine," in which the piston rod passes directly downward through the cylinder bottom, and is attached directly to the pump rods.

The Plunger Lift or "Water Works" engine, which is the same as the Cornish engine, proper, except that a plunger pump takes the place of pump rods and drawing lift fixtures; and the hoisting or rotative engine, which condenses its steam or not, and is generally provided with a beam.

The name "Cornish engine" may apply to any one of these, but no one knows which one is meant until it is specified; they all possess Cornish peculiarities, and generally not only Cornish but world-wide superiority.

The ordinary double-acting condensing engine has not, and never will equal, much less excel any of the single-acting non-rotative engines just mentioned, when applied to the same purposes—that of pumping water—for reasons which can be readily set forth in detail, but which, in the main, may be stated thus:—It is not in the nature of things for a complication of heavy machinery laboring under indirect application of the prime motor, to compete with the direct-action principle.

But H. H. wants to know the cause of difference in action and economy in the ordinary condensing engine and the Cornish engine, having the same sized cylinders, and operating under the same circumstances. We suppose that the first is one of our best maker's, and the other a good Cornish engine from the "land of its birth," or by a regular Cornish engineer. In this view of the case the Cornish engine will excel in the smoothness and gracefulness of its operation, as well as in its superior economy. The reasons are these:—The beauty and excellence of any machine will much depend upon the perfection of its details, and the intelligent care with which it is maintained in good working order.

You will quickly infer, then, that the Cornish engine is more perfect in its details; just so; and this virtue was brought into the mechanical world by the "mother of invention," and nurtured into important growth by a system of registration and encouragement held out by premiums, which have afforded the greatest scope for ingenuity in the improvement of the steam engine, as applied to manufacturing purposes as well as to the draining of mines. But what are these details, and how do they differ from those of our engines?

The shortness of and enlargement of the induction steam pipe to a point—all the way from the boiler—near the steam chest, always with a supply of steam; the engine losing little power by that horse-leech wire-drawing of steam in the supply pipe.

The employment of a very simple but very effective means of preventing the piston rod from carrying air into the cylinder during its in-motion.

Superior methods of clothing the several the several parts of the engine containing steam to prevent loss of power by radiation of heat. I mention this because a Cornish engineer takes more pains with this perfecting of detail than any other kind of engineer thinks it worth while.

The extent to which the principle of expansion is carried, and adapting the variation of expansion to different speeds, effective powers, &c., under which the engine may be worked, also the conveniences of the adjustable valve gear.

The position and peculiarities of the condensing apparatus in the designing and arranging of which a Cornish engineer displays not a little engineering skill, and in the managing of which a tact only to be acquired by long-continued contact with, and strict attention to its sensitive and subtle performances, a knowledge of which, applied to practice, can alone secure the economical results from this portion of steam action, or, I should rather say, the getting quit of its re-action, and that of those parasite gases (so to speak) which sap the virtue of atmospheric pressure.

These are some of the causes why a Cornish engine is better than the other more common variety, and they are real causes, embodying the secret of success of the engine's performances. Touching upon the question of fuel, there are peculiarities of furnace and boiler construction, and attendance of fires in the Cornish practice alike contributive of economy. J. West, of the Norris Works, Norristown, Pa., is an excellent and thorough bred Cornish Engineer.

JOHN H. COOPER.  
486 North 6th st., Philadelphia, Pa., January 1856.

[In the communication of H. Haines, page 147, on the third line above the last, for the words "effect radiation," read "prevent radiation." The foregoing letter corroborates the inferences of Mr. Haines.

The valves are better, and work with more ease, and are less liable to derangement and leak. They are the Cornish double-beat balanced valve, a kind just beginning to be appreciated by our makers of rotative engines. The gear for working the valves is lighter, and in consequence keeps in good order longer, and works quite differently from the common eccentric hook, rock shaft, and lifter motions, getting rid of a great deal of friction. The adjusting and performance of valves, in reference to quantity of steam to be admitted, and time of action, both in opening and shutting, to the necessities of the piston's motion, are more under the control of the engine driver, and the engine's own motion.