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PUBLIC HEALTH DRAINAGE WATER SUPPLY VENTILATION HEATING LIGHTING

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## THE PLUMBER AND SANITARY ENGINEER.

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### A WORD TO INSURANCE OFFICERS.

Instead of merely hammering at a man's chest to find if he has a tendency to any disease, would it not be well for the medical examiners of life insurance companies to inquire if he has not got a cesspool leaking into his well, or untrapped pipes beneath his basins and closets?

More persons die of zymotic diseases in New York than from almost any other malady, yet a man living in the midst of contagious influences, and hence daily liable to take diphtheria or typhoid fever, would yet find little trouble in getting a heavy policy on his life.

If insurance officers would give this subject their attention they might save many losses to their companies, and also benefit the public generally; for if men found that their homes were rated as "hazardous," they would soon begin to think of finding a remedy for the difficulty.

### PLUMBING INSPECTION.

This subject is intelligently discussed in two communications from valued correspondents on another page. It is a topic to which we have several times referred, and is attracting more attention than formerly; and, indeed, it is quite time that something was done to put a stop to the criminally bad plumbing work which is so universal now-a-days. The occasional spasmodic exposures by the daily press of such cases as the "Buddensick" houses do little permanent good. The culprit is vigorously denounced, and perhaps arrested, but he soon gets bail and after a while resumes his nefarious trade. Buddensick has never been brought to trial, and his case only serves as an example of the way to escape punishment. The only practical and permanent remedy for this difficulty is to prevent bad work by having it inspected by a competent person. The authorities should allow no house to be occupied unless thus inspected; where defective work is afterwards found, they should cancel the license of the plumber who did it; if he persists in such evil practices, then send him to the penitentiary to learn the error of his ways.

The fears expressed by "J. S." that the position of inspector would probably be filled by a mere politician do not seem justifiable to us. We have many men occupying public offices who are honest and capable, and with proper care we see no reason why this office should not be equally well filled.

Certainly the evil is of sufficient magnitude to need reform, and prevention is both easier and better than cure.

Let us then at last try the experiment, and see if something is not possible in this direction, for we certainly cannot permit matters to go on as they have been without having an epidemic or some other penalty to pay for our apathy.

To show that tenement house reform is both practical and profitable, we take pleasure in stating that a well-known gentleman in this city, who has expended considerable money in improving his tenement property, states that as a result he has a better class of tenants who pay promptly, and that the change is in every respect for the better.

The Brooklyn Mechanics and Builders' Exchange oppose the bill introduced by Senator Pierce at Albany to give the Health Board power to determine and supervise the plumbing work to be done hereafter in Brooklyn. They think it will "impose a great burden of expense and trouble upon the building interest." Nevertheless the bill will benefit householders generally, and ought to pass.

### PRACTICE vs. THEORY.

There is an unfortunate prejudice shown by many—we might say by most practical men—toward scientific investigators. The correspondence between Mr. Waring and "Journeymen," in some of our early numbers, was partly due to an antagonism of this kind, and almost daily we hear expressions of contempt, from practical men for the labors and researches of "theorists."

We can well understand that the practical plumber must feel disgust at much of the windy talk on sewer gas and like topics, which fills the daily papers. He knows how much stuff and nonsense there is in these arguments, and just how little value they will prove to anyone.

But in condemning the charlatan, he must not be unjust to the real man of science, whose type is found in Humbolt, Agassiz, Farraday, Tyndall, or the late Prof. Henry. These men are the benefactors of mankind. They are disinterested seekers after truth. Agassiz said "he had no time to spare for money-making," and they all sacrifice the selfish gratification which other men seek, for the greater enjoyment of research and discovery. The practical benefits which result from their labors are incalculable. Take Prof. Henry's institution of the Weather Bureau Reports, for example. Is there a single one of our thirty millions of people who is not daily and hourly benefitted by Old Probabilities? Yet its inventor never derived a penny of gain from this discovery and its application.

Plumbers are quite as apt as most practical men to scoff at scientific theory, and yet some of them appreciate its value. We quote from a published letter from one of them, this candid expression of opinion:—

"I never had any instruction on plumbing, although I have been practically engaged in the business both as a journeyman and master plumber, for the last 25 years, consequently all the knowledge I have of it has been acquired by perseverance in learning the mechanical part of it; observation and experiments aided by a more than common school education, supplied the theoretical portion, and I believe the theoretical part of plumbing the most essential to make a good plumber."

Not long since, the remark was made in the presence of a New York plumber, that one of his neighbors had refused to subscribe to this journal, because he knew all he cared to learn about plumbing. With an indescribable expression of disgust, the other observed, "that man is evidently a d— fool! I've been working all my life, and when I can't learn any thing more I want to die."

This was in the true spirit. Sir Isaac Newton in his old age, when he was master of all the knowledge of his time, said "he felt as if he had been gathering shells along the shore, while the great ocean of truth stretched before him unexplored." We commend this sage observation to those men who think they know everything.

## THE HOLLY SYSTEM OF STEAM HEATING.

BY ROBERT BRIGGS, C.E.

A seven-day wonder in mechanical engineering has been disclosed to the public view, and has been discussed with the usual profundity of the newspaper writers in nearly every paper in the land, until a large portion of the community have come to have an implicit faith in the ready and inexpensive attainment of that comfort which proceeds from heat, abundant in quantity, controllable to suit all desires or necessities. The inclemency of winter will have been overcome, the current expenditure of the community will be lessened, public health will be ensured, and, not least, private enterprise will meet its reward in abundant profits. The great source of all these advantages lies in the "Holly system," and it may be well to institute a brief inquiry into the same and discover, if possible, what it is that in the eyes of the practical mechanic can be found to constitute its merits.

The first step will obviously be to ascertain what the "system" is, or what it claims to be. Here the inquirer finds himself somewhat at loss. A careful reading of a pamphlet issued by the projectors, commencing "Warmth is the essential condition of life," etc., etc., leads one to the conclusion that the "system" consists in extending the distribution of heat derived from circulation or emission of steam to more than one dwelling, or at several points on the line of one common steam pipe.

It may be alleged to be unfair to find words for a claim when they are not used, but the title of the pamphlet in question is "the Holly System of Steam Heating," and the implication is that novelty and utility on the one hand and profitable applicability on the other should be exhibited by the authorized publication. The distribution of steam through pipes, its use for conveyance of heat, can scarcely be thought a meritorious novelty, however meritorious in practical engineering it may be. The length of the distribution in these days where lines of many thousands of feet have existed for years, and it was well known that the limit of length was solely that of requirement and economy from loss by radiation, cannot be admitted as patentable. The heating of separate buildings or dwellings or rooms by means of heat of steam or hot water, whether by direct radiation from the steam or hot water heated surfaces or by currents of air which have derived their heat from such surfaces, is the common practice of all civilized countries out of the torrid zone. Steam for heating and steam for power are materials of sale and lease in all our cities, as completely as the houses themselves. Steam pipes have been and are carried underground or carried overhead wherever and whenever they are wanted. Any and all of these applications and uses of steam are the common property of the mechanics of the country to adopt and utilize.

The merits of the "system," then, must be narrowed down to the details of construction.

In the generation of steam no particular novelty is set forth. "An arrangement of boilers by this system," said "to be deserving of special attention," exhibits the common horizontal tubular boilers, which are certainly pre-eminent for safety and economy, but as this type of boilers forms perhaps one-third of all now used in the U.S., and one-half of those in use in large heating apparatus, the embracing them in the system may be considered a concession to the good judgment of the builders of unpatented heating apparatus in general. But the connection of mains depicted on the approved plan in the pamphlet may, out of special meritoriousness of the system, possess sufficient freedom for expansion. An irreverent observer would doubt the safety of these main pipe connections.

It is said, "The popular belief is that steam cannot be carried a long distance on account of its condensation." This manufacture of a "popular belief" to knock down is quite comfortable, but every good steam engineer knows just what

can be done from practical experience, and avails himself of his knowledge when needful. Numerous patents exist for means of protecting pipes from loss of heat, but nothing of the least value is covered by any of them beyond what was known and practiced by Count Rumford in the last century, and what Faray, Pole, Tredgold and others have re-stated in this century over forty years since. The "Holly system" does not present a trace of novelty and very little of excellence in the method proposed to avoid loss of heat from pipes.

There are other details exhibited—a connection T and expansive piece; a steam trap or water separator; a differential pressure valve; a new radiator. These adjuncts to "the system" one and all have only to be examined by the steam fitter for him to decline them. They would have been steps in the history of steam heating if they had been developed and brought forward before 1812, when Robertson Buchanan wrote on "the practice of steam heating."

The crown of "the system" is the meter. Words cannot express the extreme delicacy and accuracy of this instrument. It must be left entirely to the imagination and belief of the consumers, in which recommendation some people will class it with a well devised gas meter.

But the test of the "Holly system" must come in its superior economy in money cost—either prime cost or cost of operating.

The demands of heat by each and every room in any dwelling are quite well known to thousands of skilled constructors. The most economical method of supplying these demands is found in the close stove in the rooms of a house, and this method also supplies the heat demanded at the least possible cost of apparatus. The next method, in capacity to heat, is that of heated surfaces placed in the room where steam or hot water become the alternate vehicle. Here the cost of the surface becomes much more than equally effective stove surface, but a more equable temperature of room is secured; and here also the boiler and distributing pipes become a great part, perhaps one-half, of the prime cost, and a considerable loss of heat, more than enough to compensate for the reduced temperature of the gases of combustion from the boiler below those passing from the stove, is incurred.

Any steam heating apparatus whatever will cost quite as much for fuel and ten to twelve times as much as stoves in any house for prime cost. Neither of these methods provide for ventilation, and by either of them fresh air is optional by admission and removal with or without systematic (not Holly system) provision.

With the regular admission of abundance of air for ventilation at all times it becomes possible to warm rooms in general by imparting an excess of heat to the fresh air currents, and when the proper quantity of fresh air is provided it can be said that the demands for heat can be supplied by equivalent quantities of heat imparted to the air by stoves or by steam coils set in a room below that which is heated. When the stove system, now having become a hot air furnace system, will be found to cost in prime cost four or five times what the stove in rooms would, and, as there is much heat allowed to escape from the chimneys of furnaces, there will have been burned quite one-half more in the furnace than would have been needed for the stove with equal quantities of fresh air. The steam heating system being thus more economical in fuel than the furnace. These remarks as to relative costs must be accepted generally.

The comfort and reliability of steam or hot water heating over any other is undenied. The advantage and saving in attendance, and especially in the ability to collect all the fireplaces of a house or number of houses into one general or common boiler, is highly appreciated. Other advantages in point of uniform temperature, healthful air, etc., etc., will not be enumerated but it will be assumed to have general acceptance that the most perfect heating apparatus is that which has the largest quantity of surface at the lowest temperature imparting heat to the

largest possible supply of air; complete control and manageability being assumed to be concomitant.

When the building or group of buildings are extensive, a steam heating apparatus becomes a system. Boilers of sufficient size to need the constant attention of a regular fireman can be employed and a certainty of action ensured with great economy of labor and often some economy in fuel, but the absolute demands for heat are so large that no considerable gain in fuel can be made over what would be consumed by several small boilers doing the same work.

These large apparatus for systematic heating generally combined with systematic ventilation are the rule in good modern constructions. There are many public buildings and institutions in the U. S. with lines of steam mains in halls, in corridors, in vaults, in ducts, above-ground and under-ground, stretching for miles from a central boiler house. The protection of pipes from loss of heat, the relief from the effects of expansion, the removal of waste water, the form and design of radiators, all the things set down as parts of the "Holly system," are done far better than the crude devices which are disclosed in this scheme for obtaining capital.

As a legitimate business it has been and will continue to be, especially here in America where usage has brought content with the deficiencies of steam heating, a good investment to become a partner in the steam-fitter's trade. It is open for any one. A man can become a lawyer, or a doctor, or a steam-fitter, if he chooses. Heaven born geniuses (genii is perhaps the right word) can be insurance agents, railroad directors, gas company officials, and can perhaps safely invest their friends' money in improved novel systems of heating.

Some plumbers may think that it is just as well for those who rightly understand the business that so many incompetent men are employed to do plumbing as this causes bad work to multiply and they find plenty of occupation in tearing out and replacing such work. But this is a narrow view of the matter and should not be entertained for a moment. The effect of such a state of things is seen in the present disposition of so many persons not to have any plumbing at all in their houses, or to do with as little of it as possible. It is also the reason why public condemnation of the trade is so general. If all plumbing was well done in the beginning there would be a great deal more demand for it. The ordinary wear and tear would always give plenty of occupation for competent men. Therefore it is the interest of the latter to discourage poor work in every possible way.

The complaints made from time to time against the Board of Health inspectors are very much like wolves around a sheepfold, crying out "Hydrophobia" when the watch-dog appears.

In a late letter to the New Haven Common Council, Prof. Brewer, President of the Health Board, ably discusses the character and scope of health boards, whose duties he thus summed up:

- 1st. To do that which the free individual cannot do in his private capacity to protect himself from unwholesome conditions which arise from his neighbors.
- 2d. To see that the conditions which produce or spread zymotic diseases are suppressed or controlled.
- 3d. To educate the public in sanitary matters, advise it of real dangers, and quiet fear as to imaginary ones.
- 4th. To protect the poor from those dangers to health which they are particularly subjected to.

An interesting discussion of sanitary topics took place at a late meeting of the St. Louis Social Science Association. Many ladies were present, and Mrs. Helen E. Starrett read a paper on "House Ventilation," which was discussed by Sewer Commissioner Moore, Supt. Harris, Prof. Woodward, of the public schools, Dr. Leete, Rev. Dr. Eliot, the Unitarian divine, Rev. Dr. Post, Dr. Green and Mr. Silas Bent, of the Police Board. It is a hopeful sign to see vital subjects discussed by men of this class.