

drainage" is the best plan to adopt, while others maintain that the public sewers should be constructed in the public streets. The latter plan is the safer and more economical, allows the whole system of sewerage to be brought under perfect control, and does not entrench upon private property. It necessitates, however, the construction and laying of sewers underneath and through houses; but there can be no possible objection to this if the sewer-work be carefully and properly done.

Public sewers may, *very exceptionally*, be carried through private property.

The common sewers should be carried within one hundred feet of every house to be included in the sewerage scheme.

The natural streams should not be covered over and transformed into sewers.

To obtain a good outfall, it may sometimes prove advantageous to deviate from the lines of natural drainage and convey away the sewage by tunnels through hills, and by aqueducts and syphons across valleys.

#### SECTIONAL FORM OF SEWERS.

The forms of sewers must be such as to fulfil the conditions of strength and efficiency. Their construction must ensure their stability without an unnecessary expenditure of material, and they must convey away with a *maximum* velocity both the *maximum* and *minimum* flows.

The *external* forces on a sewer are the vertical and horizontal pressures due to the surrounding earth. (*The horizontal pressure will, of course, depend upon the angle of repose of the earth.*)

For purposes of construction, the *circular* form is doubtless the strongest.

Theoretically, as the greater pressure is vertical, the *elliptical* form would most effectually resist the crushing forces.

A certain minimum velocity must, however, be maintained in all sewers that are to be self-cleansing, and the velocity increases with the mean hydraulic depth.

$$(The\ mean\ hydraulic\ depth = \frac{sectional\ area}{wetted\ perimeter})$$

Hence, a sewer with an intermittent flow, should be of such a form as to ensure the maximum velocity for the smallest volume flowing through it, and should therefore be *egg-shaped*.

Sewers with a pretty uniform flow, which convey a large volume of sewage, should be *circular*. They will be both cheaper and stronger.

In practice, for all ordinary purposes, sewers up to 18 inches internal diameter are best in earthenware or stoneware, and should be circular in section.

For greater diameters than 18 inches, and when the sewer is never less than *half* full (this being  $\frac{1}{2}$  the maximum flow) the sewers may be made circular in section.

In all other cases, or when the fluctuation of flow is between greater limits, the sewer should be *egg-shaped* in section.

#### Questions.

- (1.) How would you dispose of the sewage of towns situated on estuaries and tidal rivers?
- (2.) Enumerate some of the principal points to be attended to, in the laying down of ordinary sewers?
- (3.) State the principles upon which the construction of sewers must depend?
- (4.) Compare the respective qualities of egg-shaped and circular sewers, and define the conditions which should determine the sectional form of a sewer?
- (5.) Describe the new form of oval sewer, state its advantages, and estimate its sectional area?

H. TAYLOR BOVEY.

24th October, 1878.

[In the last sentence of the paragraph relating to inland towns, in the Syllabus of Lecture III., it is written—"Hitherto it has proved ineffectual," &c. This is a printer's error, and should be—"Hitherto it has proved most effectual, &c.]"

#### WITTICISMS.

"A jest's prosperity lies in the ear  
Of him that hears it; never in the tongue  
Of him that makes it."—*Shakespeare*.

Hypocrisy is the homage paid to virtue by vice.

Seasonable: "What a fall is here, my countrymen!"—*Ex*.

The best cure for drunkenness is, while sober, to observe a drunken man.  
—*Chinese Maxim*.

A sure cure for sleeplessness is to imagine you have got to get up.—*Danbury News*.

A Frenchman's politeness begins by his raising his hat, and frequently ends by his putting it on again.

One-half of the world don't know how the other half live—and its none of their business.—*Yonkers Gazette*.

There is *Melody* among the Fenians once more since the last prisoner's offence was *Condon-ed*.—*The Jester*.

"Doctor, you must really prescribe something for me." "My dear lady, you need no medicine—only a little rest, and then you'll be as well as ever."  
"But, really, doctor, surely I ought to be given some medicine of some sort or

other. You've only felt my pulse; examine my tongue. (He does so.) "Precisely, madam; your tongue needs rest too."

A handsome youth, being questioned by a rather stylish lady as to his occupation, replied that he was an "adjuster of moveable alphabets." He was a printer.

THE SCHOOL BOARD.—Mistress: "Now, Mary, you will see that the work is all properly done in time." Mary: "Yes, ma'am, if nothing intervenes to impede."—*Fun*.

An eminent artist, celebrated for his love of discussion, paused in the middle of one of his speeches, then said—"I was thinking." "Thinking! impossible! I don't believe it," said Douglas Jerrold.

Theological student: "I think in every church there should be a pitcher of water near the minister so that he could drink if thirsty." Senior: "Yes, I have heard a good many dry preachers."—*Argosy*.

To be in the fashion you must wear a Hanlan scarf, Marquis of Lorne plaid pants, Beaconsfield coat, John A. shirt, Lava jewellery, and you need not have a cent in your pocket, nor brains in your head.

At Chinese military posts, the sentinels call out: "Twelve o'clock, and I am not worthy to kiss the ground my captain walks on." The captain sleeps much better after hearing the call.—*Detroit Free Press*.

Andrew Murphy's mother desires us to state to the public that her son Andrew was not the Joseph Murphy who was up for drunkenness at the Police Court the other day. Mrs. Murphy's request is thus complied with.

"Speaking of bathing," said Mrs. Partington, "some people can bathe with perfect impurity in water as cold as Greenland's icy mountains and Africa's coral strand; but for my part I prefer to have the water a little torpid."

Douglas Jerrold said, speaking of a man who was said to be a "pattern of benevolence," "He is so benevolent, so merciful a man, that in his mistaken compassion, he would hold an umbrella over a duck in a shower of rain."

Student: "I think, Professor, the labials were only introduced into our alphabet for the purpose of giving the lips a chance to apply themselves." Prof. (smiling): "Yes, the lips should have a chance to apply themselves."—*Argosy*.

"It seems to me," said a customer to his barber, "that in these hard times you ought to lower your prices for shaving." "Can't do it," replied the barber. "Nowadays everybody wears such a long face that we have a great deal more surface to shave over."

A widower, when showing a friend the cinerary urn in which reposed the mortal remains of his dear departed, let it fall. It broke and scattered the ashes over the carpet. He rang for a servant, and when she appeared, said to her: "Jane, sweep up your mistress."

A husband who lately went to execute a few little commissions for his wife, gives it as his experience that there are two dozen different brands of lilac sewing silk so exactly alike that no male eye can tell the difference, and a wrong choice means ruin to a silk dress, and no pie in the house for a week.

A humorous old minister, near Peebles, who had strong feelings on the subject of matrimonial happiness, thus prefaced the marriage ceremony by an address to the parties who came to him:—"My friends, marriage is a blessing to a few, a curse to many, and a great uncertainty to all. Do ye venture?" After a pause, he repeated, with great emphasis, "Do ye venture?" No objection being made to the venture, he then said, "Let's proceed."—*Dean Ramsay*.

Be careful, Sir John, you'll find it no fun

To manage the team you have chosen:

And if you contrive to continue your drive,

We'll say you're a man of a dozen.

Fermes la Porte—Shut up Turkey.

#### WHY DO PEOPLE NOT GO TO CHURCH?—I.

A Discourse by the Rev. A. J. Bray at Zion Church, Montreal, October 30, 1878.

Having spoken last Sunday evening on the subject "Why do people go to Church?" it naturally suggested the topic of to-night's discourse "Why do people *not* go to Church?" For, as every one knows, a large proportion of the community take the Sabbath as a day of rest from labour for bread, a day for recreation and nothing more. They give the Church no thought—or if a thought, a scornful one. If they speak of it and the idea it embodies, the words are pitiful, or contemptuous. Among the Roman Catholics this prevails to a far less degree than among those who come under the general, and to me, bewildering denomination of Protestants. Of course there are large numbers in countries where the Roman Catholic form of faith and worship is recognized who do not hold the priesthood in reverence—nor believe that the Pope is infallible—nor tremble when the Church thunders out her condemnation—but who, like Gambetta and many more in France, and Garibaldi and many more in Italy, and Bismarck and many more in Germany, hold that the Church is the principal enemy to the public good—an institution that works against free thought, and free speech, and free life, and the wise working of politics—that its main idea is not to do good unto the State, but to strengthen and enrich itself—that its measures are not promotive of education, but of a blind, and ignorant, and enslaving belief. But as all those ideas and many more like them, are held by those who live on the ground covered by the Protestant form of faith and worship, and do not go to church—and, as I am preaching for Protestants, I shall speak only of those who, if they were anything, would be Protestants.

We speak truth when we say that the institution of Religion extends more widely than human statutes—claims the largest place in human affairs; takes a deeper hold on men than the glory of war, or the machinery of science, or the administration of comfort; is coeval and co-extensive with the human race—that is to say, Religion is not to be referred to a passing passion—or a fancy of the earlier times coming down to, and which this, or the next age, may outgrow

For Cuts, wrap up the wound in the blood, and wet the bandage thoroughly with BROWN'S HOUSEHOLD PANACEA and Family Liniment. For chills and fever it has proved very efficacious. It quickens the blood and invigorates the whole system. No mistake about it. For internal and external use. Sold by all druggists.—*Advt.*

A single trial of Mrs. Winslow's Soothing Syrup for children teething never yet failed to relieve the baby and overcome the prejudices of the mother. It will relieve the poor little sufferer immediately. It not only frees the child from pain, but regulates the stomach and bowels, cures wind colic, corrects acidity and cures dysentery and diarrhoea, gives rest and health to the child, and comforts the mother.—*Advt.*