is manufactured and shown, the soil-pipe must be placed at the rear of the closet and the flush-pipe at the same place. This arrangement would in nearly all cases be very inconvenient, and make it hard to join other connections to the vertical soil-pipes. By Fig. 4 I show how any wash basin, bath, sink or set of wash-tubs should be connected, taking care to fix the short branches level, so that no pocket of air can accumulate between the fixture trap and the vertical soil-pipe. If by reason of the great distance between the fitting and the vertical waste-pipe, a perfectly level pipe is too long and would not work well, then another line of vertical pipe must be made that can be set nearer the fitting to accept the short branch. No line need be erected perfectly plumb from the foot to head, but may be bent to suit circumstances, on condition that a good upward grade is always obtained in every part, and all branches are inserted in the vertical portion and not into the graded portion. The reason for this will be obvious to mechanics.

A few years ago the improvement in drainage and plumbing took a wrong turn and large sums of money were being wasted by municipalities, causing the people at the present time to be slow to spend more money to undo the evils thus created. But there are other towns which would not reorganize their sanitary laws to comply with the new ideas because of the large expense it entailed, and the nuisance of the long delays and inspection, etc., required. Then some experienced sanitarians could not see the advantages stated by the promoters of the new system, only the one that would increase the cost and circulate money. These towns are fortunate, for the experiments lately made have not only proved the extreme folly of the obstructive system (which can easily be proved by watching the gases coming out of the street grates on a hard frosty day), but have found out how easy it is to arrange both sewers and plumbing so that no sewer gas can be manufactured in them, therefore the public could not be poisoned with it, and our private drains and main sewers may by using reasonable intelligence during construction be made as odorless as any other part of our inhabitable premises.

THE ETHICS OF CIVIL ENGINEERING.*

I do not intend to inflict upon you a long historical sketch of the engineering works which have been commenced or completed during the past year, for the daily papers with their well written articles and photographic accompaniments bring these matters attractively to our notice, and the technical journals record them with such close detail and elaborate drawings that they are in everyone's mind or on our book shelves as works of reference, far more valuable and with infinitely greater facility for reference than any words of mine would possess. A few words to the students and young members of our society may, however, be of some service, and, if devoid of any other merit, will, I promise you, possess the merit of brevity. With such institutions as McGill College, which the young man of to-day, especially those within easy reach of Montreal, possesses, he will be well equipped for, and should move forward erect and with a firm and steady step, indicative of his honesty and firmness of purpose. In due course he will no doubt secure an engagement on some public work (thanks to his McGill diploma), and his success will be in his own hands. He will probably be located in some small town or village, a stranger to everyone, and, if he has not already done so, he should formulate for his guidance rules of conduct based on common sense, which will win for him the confidence and respect of the community, which are as necessary for his advancement as technical knowledge. He should be cheerful and affable. He should move slowly in forming acquaintances, that he may not make mistakes which it would embarrass him to correct. He should not pose as a puritan, but should avoid saloons and gambling as he would the plague. He should be early in the field and late in the office when the necessities of work require. He should make it a point to have his work well laid out in advance and detailed plans prepared early, that the contractor may have no grounds to complain of delay on his part, for it is of the first importance that the contractor should have facilities for changing his men from place to place or putting on a large force when conditions are favorable. It may also affect the contractor's profits if plans of structures are not furnished at an early day, that he may arrange for materials when prices and conditions are in his favor. In preparing detailed plans, utility and durability should be studied. Standard sizes and shapes should be used as far as conditions will permit, as a departure from standards means not only increased cost, but difficulty and often serious delay in obtaining materials. He should cultivate the habit of observing closely what is being done upon the work, how and with what appliances it is being done, and who is doing it. He should make himself familiar with the roads and sho' ats in the neighborhood of the work, and their varying conditions as affected by the weather and seasons. In short, he should be perfectly at home in everything connected with the work and its surroundings, that he may be eligible for advancement when opportunity offers. When measuring the work for the monthly estimates, he should, as far as time will permit of his doing so, return the actual quantities of work done and materials delivered, as it would be unfair to the contractor to underestimate the work, and an unkindness to him to over-estimate it, as to do so would be misleading and disappointing when actual quantities were returned, as they would eventually have to be. By assisting the contractor in the various ways above mentioned, it will be less difficult for the young engineer to say no when his duty requires him to do so, and that unpleasant duty will, no doubt, have to be occasionally performed, particularly about estimate time, when large estimates are often asked for by the contractor "to tide over pressing needs, and to be adjusted in the next month's estimate." Such a course should never be followed. The actual quantities should be returned to the senior engineer with the statement of facts. Young engineers beginning practice to-day have advantages which their seniors educated in this country have never had, and no more genuine and sincere assurance of the appreciation of the munificent donations which have made McGill College what it is can be given the donors than to see the lecture and experimental rooms and museums thronged with bright and earnest students making every possible effort to possess themselves of the wealth of knowledge so generously placed within their reach, and so easily acquired with the assistance of McGill's able professors. A thorough grounding in the fundamental principles of any profession or calling is as necessary for the individual independence and stability which every man should strive to possess, as a solid foundation is for the stability of a structure. This thorough grounding McGill College affords, with facilities which cannot be surpassed, and I would urge upon our students and young members to avail themselves of these advantages to the fullest extent possible. Theory and a large portion of practice, especially in the results obtainable from the testing machines, here go hand in hand, and the earnest and painstaking

*Being the opening address of President W. G. McN. Thompson at the annual Convention of the Canadian Society of Civil Engineers.