

writing, and when on the stand will be permitted to refresh his memory if he is prepared to swear that the notes are the result of actual observation noted when he was making his examination.

One of the difficulties expert engineers have to face is text-books or writings, where the opinions of the authors, living or dead, appear to strengthen his opponent's case. By watching carefully while the case proceeds he may be able to discover the names of the works with which he is likely to be confronted, and, upon examination, he may find that it is antiquated, or even an old edition, and in a more recent issue the same author may have expressed an entirely different opinion.

Expert witnesses should keep their books of reference from public gaze.

An expert witness should not be too thin-skinned. A violent attack from the opponent's counsel should be considered as a compliment. It is quite apparent that the examiner considers his evidence has made an impression, else he would not attack it.

In the matter of fees he should arrange the amount beforehand, and be careful to stipulate that so much be paid down and so much per day as the trial progresses. There are, unfortunately, some members of the legal profession who, when they have lost a case, are, to say the least, careless in the matter of fees. When the case has been won, generous fees are allowed the successful client, and the expert witness should see to it that he receives his share.

But above all, he must adopt a high standard in reference to whatsoever things are true.

### TOWN AND COUNTRY.

This is not a discussion of the relative advantages of country life compared with city life, but its purpose is to consider some of the figures obtainable from the census returns of Canada and the bearing the matter of congested population is sure to have upon problems which the engineer must face.

In Canada, as in other countries, the tendency of the population is to leave the country and heap up in the cities. This is one of the great worries of those who are over-anxious for the future. When the census of 1871 was taken there were some 457,000 people in the towns and 3,252,000 in the country sections of Canada, or the country dwellers were eight times as many as those living in the towns and cities, but when the census of 1891 was taken there were 1,589,000 people living in the towns and 4,052,000 in the country, or three times as many people in the country as in the cities. Looking at this in another way, it means that while the rural population was increasing twenty-five per cent. the urban population increased three hundred per cent.

In the decade preceding 1901 Toronto increased 27,000; it grows that much every year now, and what is true of Toronto is true of such growing cities of Canada as Montreal, Winnipeg, Edmonton, Vancouver and a dozen others.

The census of 1911 will undoubtedly show immense increases in our urban population compared with the increase in the rural districts, and all this in spite of the fact that we are spending annually \$1,000,000 to encourage emigrants to settle upon our agricultural lands.

All this goes to show that, while in the past we have been developing rural highways and pioneer transportation routes, the engineering of the future will have to do

with the problems that arise from the congestion of population and the crowding together of our population in cities.

### SHEET PILING AND SHORING.

In most classes of work it is not difficult to decide upon a unit basis for payment, but in sheet piling work and shoring, which is of a temporary nature, it is sometimes difficult to prepare specifications that are fair alike to the owner and the contractor. In all classes of excavation works in towns and cities shoring has to be more or less resorted to. Structures are so close together that one cannot take the risk of the bank caving in. If the shoring or the piling have to be left in place, the basis of payment is not difficult to arrange, but where the material may be taken out and used again and again the situation is different. If the contractor is to give a lump sum covering all this work he will doubtless allow for all the work to be shored, and on those sections where he could avoid shoring he makes an extra profit. This is not fair to the owner, as he is paying for work which is not done.

Altogether, the fairest way to pay for this class of work is to arrange two prices, one price covering the material furnished, and the other the material in place. According to this plan the owner will then pay for all the material used and some that can be reused two or three times. It will be a saving. The contractor receives payment for work done, and he is not tempted to use lighter material than the work requires.

### WATER POWER CONTROL IN QUEBEC.

Before the Caledonian Society at Montreal last week Mr. F. D. Monk, M.P. for Jacques Cartier, spoke on the enormous water power possibilities in Canada. After dealing in an interesting manner with the amount of power available in Ontario and Quebec, and the St. Lawrence valley more particularly, Mr. Monk emphasized the need of conserving the natural resources of Canada, and intimated that next January there would be submitted to Parliament seven recommendations from the committee on water powers. These recommendations are as follows:—

1. Water powers to be alienated for stated period only.
2. Reference before alienation is to be made of the application for water powers to the Conservation Commission.
3. Determination of the development to be made, and the right of entry and of the annual rental calculated on the horse-power used.
4. Time within which proposed development is to be made, and forfeiture in case of non-observance, and revision of rentals at expiry of each period.
5. Indemnification of lessee in case of failure to agree after each period,
6. Control of rates at which the public at large is to be supplied with electric power by the lessee.
7. Jurisdiction to determine differences between the government and lessees in case of failure to agree in some independent tribunal.

It is expected that legislation based on these recommendations would be introduced, and that laws aiming at the removal of existing abuses in the use of water power will shortly be enacted.