

ence of the general public, men of firmness who will report adversely upon a request for work which is not warranted, no matter by whom the request is made, and do so with such fairness, tact and judgment that they will retain the confidence of their chief and of the general public, and when possible the goodwill of the applicant.

#### Adequate Remuneration

Such men are none too plentiful, but where a government is spending large sums of public money it should be prepared to pay sufficient salary to obtain their services, and then treat them so that it can retain their services because men of the right calibre will not permit themselves to be used as tools or buffers for ambitious or selfish individuals.

Qualified engineers will save their salaries many times over and I shall give you an illustration. A road 15 miles long, ran through a somewhat barren section, but connected a large and rich area to the nearest railroad station. The road as laid out some years ago was located by the local foreman under the supervision of the road superintendent. The grade, alignment and road material were so poor that two years ago it was decided to re-locate all but two miles of the 15. The new road is better in both alignment and grade, is over more suitable road building material, is free from gumbo, has a southerly exposure and is actually some 700 ft. shorter than the old one. When the old road was built the cost was not segregated and the original cost cannot be obtained, but to-day the old road would cost over \$60,000 to build, or about \$10,000 more than the new one and now has to be abandoned. The traffic over the road can be closely estimated from the records kept on a nearby ferry, and it is estimated that owing to improved grades, etc., the saving on the tonnage hauled over the road last year would be over \$19,000, which capitalized at 6% would roughly amount to \$300,000; besides the traffic will increase very rapidly and become very heavy as the settlers are just commencing to go into that district.

I could quote many other instances where experienced engineers and a proper organization would have saved in the aggregate hundreds of thousands of dollars. Thus the importance of engaging competent men cannot be too strongly impressed. This not only applies to the district and the assistant engineers but the local foremen and other employees of the department as well.

#### Keeping the Organization Running Smoothly

There are two factors that have to be considered in keeping the organization working smoothly and effectively:

1.—It is necessary to keep the engineers in touch with the latest engineering practice on highway work by means of literature, etc.;

2.—It is necessary to arouse in them an interest in, and enthusiasm for their work, by creating a camaraderie among the members of the staff and by making each one feel that he is an important unit of an active, progressive and up-to-date organization.

#### Instruction and Example

Engineers should, undoubtedly, be provided with the best and latest literature on road work. Arrangements should be made with provincial libraries whereby standard technical books might be loaned to any of the district and assistant engineers when required in connection with any special work they were doing. They should also be placed on the mailing list for such publications as those issued by the Office of Public Roads of the United States Department of Agriculture and similar bulletins; and special articles in mechanical journals should be called to their attention, or copies supplied to them. Whenever possible they should be given every opportunity of seeing actual

construction work carried on, for example, the laying of concrete roads in which the methods are continually being improved.

#### Annual Conferences

The second factor may be brought into play by holding annual conferences of the engineering staff. Every member should take an active part in the conference by preparing either a paper, or a discussion on some work which he has been doing. The program should be drawn up well in advance, so that every engineer may come fully prepared and the very fact of his having to prepare information to place before other experienced engineers will cause him to use every care in securing his data, give him a more thorough grasp of the details and cause him to take greater interest in his work. I might say that some of the papers which were submitted by the district and assistant engineers at our annual conference last January are now appearing in one of the Canadian technical journals. The results obtained by bringing the men together and giving them the opportunity of exchanging ideas and the inspiration derived from such a meeting will be most beneficial and will add greatly to the efficiency of the men and of the department.

Last spring one of our general foremen in eastern British Columbia was so interested in the program for the engineering conference that he wrote for permission to attend the conference, stating that he would be willing to take his holidays at that time and pay his own expenses. One of the assistant engineers in the interior where they have no hard surfaced highways arranged to take his holidays at the coast during paving operations so as to gain experience on this class of work and when this spirit is in evidence, the best of results should follow.

Those who are in attendance at this convention, will, I am sure, appreciate the benefits and inspiration to be derived from such gatherings.

In order that the fullest benefit may be derived from such annual conferences, and that the good work initiated may be sustained, special committees should be appointed to deal respectively with road, bridge and ferry matters. Each committee should be under a responsible chairman whose duty it would be to keep in touch with the members thereof, circulate suggestions for improvements in methods of design and carrying out of work, and finally to submit concrete data to the chief engineer for his approval. If properly followed out much splendid work can be accomplished, particularly in providing specifications, plans and forms which are likely to meet general requirements.

#### Value of Co-operation

Co-operation should be the keynote of the department. There should not only be co-operation between the different members of the staff, but co-operation with other departments of the government and with the general public. You can well afford to dispense with the services of even a capable man if he refuses to co-operate. He is a misfit and out of gear and has the same effect upon the organization as sand upon the bearings of a machine.

Monthly meetings of the heads of the different branches at head quarters for suggestions for improvements and for constructive criticism are valuable in creating the best departmental organization and upon the efficiency of these largely depends the successful working of the service inside and outside. Every member of the staff and every employee of the department should be encouraged to make any suggestion that he or she considers would improve the service.

There should be close co-operation between the department and municipalities, and the district and assistant engineers should be encouraged to co-operate with responsible public bodies, such as boards of trade, farmers' institutes, and good roads associations, but they should not deal with partisan or political associations as such. The latter should communicate with their members or the Minister direct. When you attempt to mix the two in-