

cularly where there are structures which are subjected to traffic conditions for which they were not designed, and they can also co-operate with the district officials in the choice of more suitable sites for bridges which require renewing and which are poorly located. Where the government has a large amount of costly plant, it is advisable to place it under the charge of a mechanical superintendent. It would be his duty to see that the plant is kept in good working order and not abused, that competent mechanics are employed to operate the different pieces of machinery, and that plant be transferred from one district, when not in use, to another

Trail district, ferry number 4, and so on. These numbers not only fix definitely the road or bridge, but they are also the file numbers under which correspondence on the individual roads or bridges is filed in the different offices. When a district engineer is writing about a certain road, the number of that road is also his file number as well as that of the office to which he is writing. The results are that it facilitates filing; it gives the head office a check on how the system is being kept up in the outside offices; it gives uniformity throughout the province, and when an assistant is promoted to another district, he is at once familiar with



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where required, and to dispose of old equipment that is no longer serviceable or economical to operate.

A satisfactory system of entering and filing correspondence should be inaugurated so that government business will be carried on with the same promptness and dispatch that obtain in a private corporation, and with some governments this is the exception rather than the rule. In British Columbia our method of accounting is based upon electoral districts and we have taken advantage of this to introduce a system of filing that is proving satisfactory.

A Workable Designation and Filing System

A brief explanation of this may prove of interest. In the Constitution Act the electoral districts are placed alphabetically and numbered according, so that Alberni is No. 1, Comox is No. 6, Trail is No. 36, and so on. We have then taken arbitrary numbers to represent the different classes of work; 20, for example, represents roads; 40 represents bridges, and 50 represents ferries. I may add that in British Columbia the highway department is a branch of the public works department and the other numbers represent other classes such as public buildings, wharves, river bank protection, etc. Every individual road, bridge and ferry in each electoral district is numbered, which fixes it definitely although it may have a number of local names. The result is that 1-20-32 is Alberni district, road number 32; 6-40-75 is Comox district, bridge number 75, and 36-50-4 is

the filing system in use in that office. By introducing this system and making other changes at the head office, we were able to reduce the staff and still handle a 30% increase in the correspondence, and what is more important, answer it promptly.

Plans, Specifications Forms and Cost Data

Standard plans and specifications for all classes of work are most essential, as well as bulletins on the basic principles of road construction and maintenance for the use of the foreman and others. Further it is necessary to have standard forms for submitting reports so that they will be uniform and comparable. Cost data where they can be procured accurately and at reasonable expense are most valuable. On provincial and municipal work, foreman are usually paid the same wage for similar classes of work and there is no monetary inducement to rise above the average. Again, they are too frequently subject to criticism by the public and seldom commended, so that about the only method of arousing their interest in their work is to keep cost data as the work progresses. This will show them what it is costing and will be an incentive for them to try to steadily reduce the cost by improved methods. Also, the moral effect of having cost records on file in the office for future reference is beneficial.

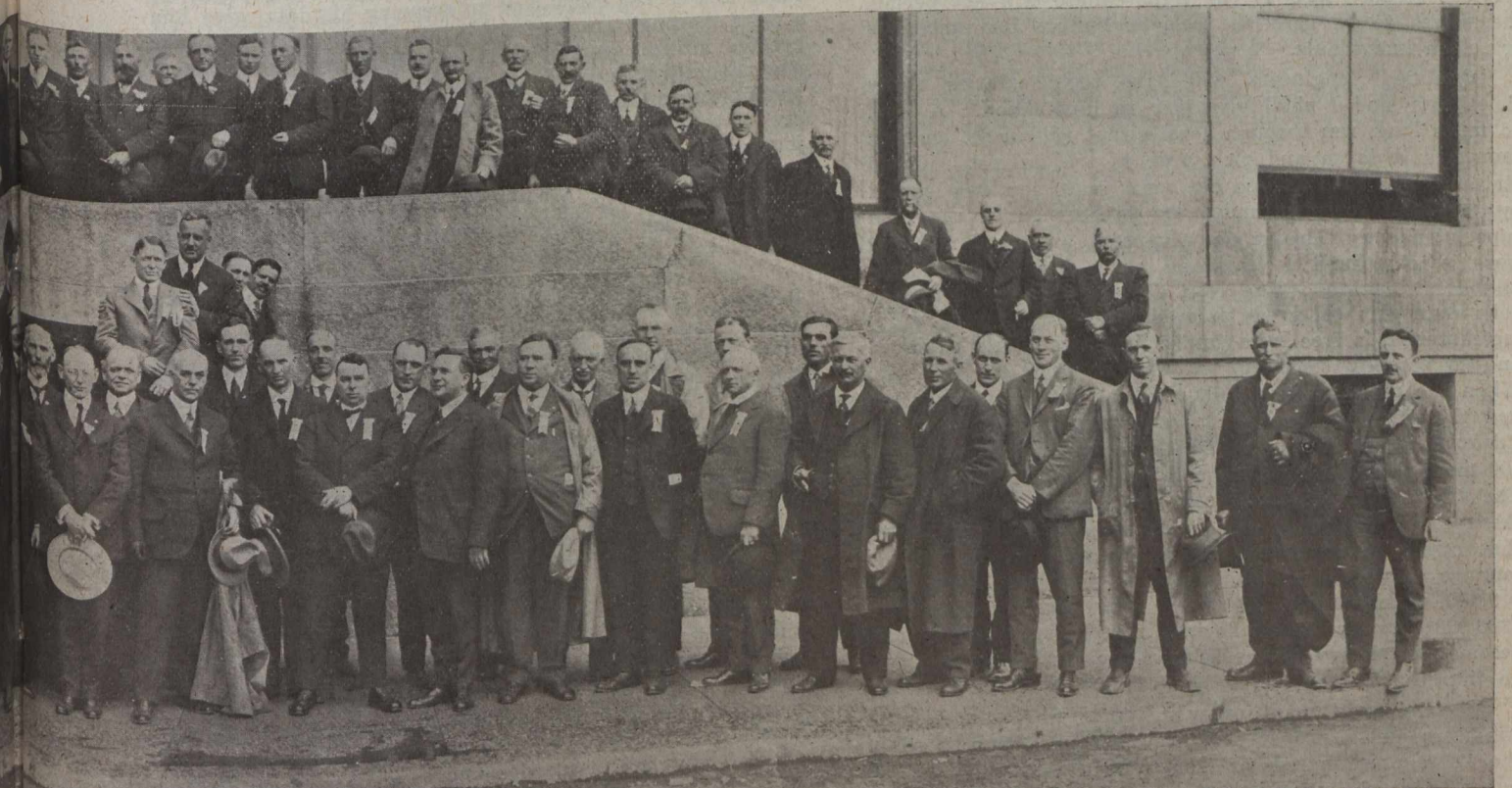
An illustration of the value of such records was afforded in connection with the building of a wooden bridge 425 ft.

long consisting of three Howe trusses and trestle approach by day labor over the Nechaco River at Fort Fraser in 1918. A timekeeper was placed on the work and the bridge foreman was supplied with unit costs as the work progressed. Notwithstanding the greatly increased cost of labor and materials, this bridge was erected for nearly nine thousand dollars less than a similar bridge over the same river at Vanderhoof in 1916 and the latter is only 70 ft. longer. Thus, it pays to keep a check on the cost of the work as it proceeds. Again there should be forms for keeping the cost of loading gravel and rock by hand, by trap and slip scrap-

There are many other important forms which the limited time at my disposal will not permit me to enumerate or explain, but which are essential parts of the machinery of organization.

Energizer of the Organization—The Staff

The success of the department depends very largely upon the personnel of the staff. A government should endeavor to secure the services of the most competent and experienced engineers available, and I may say that in addition to technical knowledge and experience, tact and



ers and by mechanical loaders; for hauling road metal with teams, tractors and trucks; and for keeping the cost of operating automobiles.

In British Columbia over 99½% of the area is unorganized district in which the provincial government collects all the taxes and carries out all of the improvements. We, therefore, have many requests for roads. The applicant is given a form to fill in involving answers to a number of questions respecting the physical and financial conditions affecting the proposed road. The assistant engineer then examines conditions on the ground, checks the statements made by the applicants and prepares an estimate with a sketch plan on the back of the form and submits it with his recommendations, to the department. All the facts are thus intelligently upon its merits and not necessarily upon the size of a petition, or the influence of some of the petitioners.

Another branch of the highway service is that of ferries. There are over 50 of them in British Columbia and it is of the utmost importance to keep detailed traffic records respecting them. Since systematic returns have been kept in British Columbia it has been possible (a) to eliminate some small ferries which did not appear to justify their operation; (b) to calculate approximately the estimated revenue from some of the larger power ferries on which tariffs are now imposed; (c) to reduce operating expenses of others by amending running schedules, etc.

sound judgment or good horse sense are important and essential in the government service. A clerk in a store may know his business thoroughly and he may be a hard and conscientious worker, but if his manner estranges and drives away customers then he is not a satisfactory man for the position and the same argument applies to an engineer on government work who may have the other necessary qualifications but lacks tact. In fact, I believe that a successful engineer on government work, and I emphasize the word *successful*, requires more attributes than are necessary to fill a position of similar responsibility with a private corporation. To procure men of this calibre a government must be prepared to do two things:—

- 1.—Make appointments purely on the basis of qualifications and fitness, and
- 2.—Pay equitable remuneration for services rendered.

Appointments on Merit Only

All vacancies in the higher positions should, where possible, be filled by promotion from within the service and such promotions should be based on merit and not on seniority. Failure in this respect will seriously affect the spirit and efficiency of an organization. It will not only discourage good men in the service, but it will deter the desirable type of man from entering the service. Engineers should be employed who can inspire the confid-