

(3) To facilitate comparison of the performances of various foremen and gangs; to show where work is being done economically and where inefficiently, and to enable the superintendent to recognize efficiency in some gangs and to take the necessary steps to produce it in others.

(4) To form a basis for estimating the cost of future work.

(5) To supply data for the preparation of the road superintendent's annual returns to this office, and to insure such data as will satisfy the requirements both of this office and of the provincial auditor.

One of the chief requirements of such a system is simplicity. As the superintendent will have difficulty in himself furnishing all information required for the keeping of satisfactory records, he will be dependent for a considerable amount of it on his subordinates. For this reason, the system should be free from all complications, at the same time furnishing all necessary information. The information obtained should also be arranged in convenient form for future use, the ultimate object being the putting into suitable form all information collected, and making it immediately available.

The persons concerned in the proposed system are the foreman, road superintendent and treasurer, and it cannot be too strongly emphasized that success depends on each one and on all three. The foreman's work should comprise the keeping of a time book for each section of road under construction, the making out of a suitable pay-list at regular intervals, and the preparation of a brief report to be submitted periodically to the superintendent. The superintendent's work will consist of classifying the accounts and pay-lists as they are submitted to him, endorsing each account with the number of the road to which it is to be charged, and the nature of the work on which it is to be applied. He will then make a list of these accounts on a distribution sheet and forward it, with the accounts, for approval and passing, to the county road committee. These distribution lists, if properly made out, will give all the data necessary to a complete analysis of the year's expenditure. In addition to classifying accounts, the superintendent will also file the weekly reports received from his foremen and will arrange the data contained therein in such manner as to be available for convenient reference. The county treasurer's work will be the posting of the expenditures as shown on the distribution sheets which will have been forwarded to him from the road committee after approval. He will open a separate account for each road built during the season and will keep the accounts in such a way that he will be able to tell at a glance the amount spent during the season on the entire system, on any one road, or on any one part of the work of each road, as grading, culverts, cost of stone, labor, etc.

In order that the work involved may be reduced to a minimum, and that the systems of the different counties may be as nearly uniform as circumstances will permit, the use of printed forms should be made to as great an extent as possible. A little study in the preparation of these forms and in adapting them to their particular requirements will be well repaid in the ease with which they can be filled out and interpreted. The forms which it is suggested to use and which should, where possible, be standardized, are: Time book; pay-list; foreman's report; distribution sheet, and special loose-leaf ledger page.

In the introduction of new methods of time-keeping, the superintendent's first and hardest task will be the thorough instruction of all the foremen in the few principles concerned. By stimulating his interest, better

results can be obtained than by the more unpleasant method of compulsion.

The time book as ordinarily used, shows only one thing—the actual time spent on the work by each man. It makes no attempt to show in what capacity he is employed or how his time is spent. In an improved system of cost keeping this latter is essential. A book has just been designed in the Office of Public Highways specially adapted to county road work, which embodies a number of new features, chief of which are:—

(1) Special provision has been made for distributing the time; *i.e.*, showing exactly how much of each man's time is chargeable to each part of the work, such as grading, tile-draining, road construction, culverts, etc.

(2) The space for each day's entries has been considerably enlarged without increasing the size of the book. This will be appreciated by the majority of foremen whose stiff fingers and dull, soft lead pencils are not adapted to fine clerical work.

(3) Double spaces for each day are provided so that if a man changes from one part of the work to another, the fact may be recorded and the proper proportion of his time charged to each part.

(4) The dimensions of the book have been kept down in order that it may be easily carried in the foreman's hip-pocket.

(5) Explicit instructions for using the book are printed inside the cover.

The principal innovation in this new time book consists in indicating beside the daily entry of a man's time, by means of a symbolic letter, the part of the work on which the man has been engaged during the day. The main divisions of the work are enumerated in the instructions, others may be added or substituted as occasion demands. By this means, a man's time, no matter how often he changes his work, is accurately recorded, and this record forms the basis of a system of distributing the cost of labor, which may be put to a variety of purposes.

In this system there must be a separate time book for each section of road built. In cases where the pay-list is prepared by the road superintendent two time books will be employed on each section and used alternately, one being in use while the other is in possession of the superintendent for the purpose of making out the pay-list. A number of these time books have been printed to serve as models.

In order that the information contained in the time book may be permanently recorded, a new form of pay-list has been devised. In this pay-list the main feature is provision for recording the distribution of the time, as shown by the time book. If the time has been properly distributed and the totals made up in the time book, the preparation of the pay-list will be simply a matter of copying from the time book. The column showing the time worked on each day of the month has been retained in compliance with the requirements of some auditors who demand that this be shown. In any case, the distribution of each man's time must be given. The distribution on the pay-list is given under the same headings as in the time book. Provision is also made for showing the total cost of labor on each part of the work at the foot of the distribution column. This will be computed on the basis of each man's time and rate, and the total of these column footings should check with the total of the pay-list.

By means of the system thus outlined, all labor on county roads may be charged to that part of the work to which it belongs. The same should be done with all ac-