Objections Relating to Scavenging.

1. In order to handle refuse collections properly teams must be interchangeable.* This will be interfered with by the functional plan.

Comment: No trouble should arise over this point. All that is necessary will be to rule that in case of insufficiency of teams, scavenging has the preference. This will prevent friction between the foremen and allow teams to be interchanged.

With the introduction of a motor pick-up service for street sweepings any troubles due to interchanging teams will largely disappear. Eventually, the collection of street sweepings by horse-drawn wagons should be confined to light traffic streets.

2. Quantities to be collected vary so much that it is impossible to plan the work ahead of time, as the proper use of the functional method demands.

Comment: There will always exist a variation in quantities of refuse to be collected. The difficulty is met usually by hiring private carts when there is an excess and releasing them when no longer needed, and there is no reason why this could not be done under the functional plan.

The only difference will lie in the fact that, under the ordinary plan, all general foremen must make these adjustments for themselves, whereas under the suggested plan there would be but one responsible head. Under proper management this should represent a gain in administrative control.

Objections Relating to Plant and Equipment.

1. The customary practice of having one man in absolute charge of a stable allows greater flexibility than where authority for the use of teams has to come from a central office.

Comment: This will not be true if it is understood in advance that in case of an insufficient number of teams, the scavenging work has first choice. A street cleaning foreman, finding that some of his wagons will be needed for scavenging, will be able to notify his chief and arrange for hired teams before nuisance is caused.

This is not the only point. As stated above, motor trucks will probably take over the collection of all street sweepings within the next few years in all progressive cities. This will free the street cleaning branch from any dependence whatever upon teams, except in emergencies.

Conclusion.

Review of the foregoing shows that the objections raised against the functional plan are, for the most part, not serious enough to damage the main arguments in its favor, which are: (*a*) Centralized, responsible administration on a city-wide basis; (*b*) opportunity for detailed study and continuous planning along definite lines; (*c*) provision of natural channels for cost accounting data, with consequent increase in cost knowledge and a greater chance to reduce expenses.

Those familiar with municipal work will doubtless ask whether the demands of the functional plan are not too severe for the average type of employee secured for street cleaning and scavenging service—and whether the adjustments it requires can be effected without friction among a personnel already used to present methods.

As to the demands made by the change from a sectional to a functional basis of work, commonsense would suggest that any change so fundamental as this should be made by easy stages—first functionalizing each district, or a group of districts, and thence proceeding to the merging upon a city-wide basis. As to friction in making the necessary adjustments, there does not seem to be anything inherent in the functional plan which can not be handled by a competent administrator with the use of ordinary tact and patience. Making the change by degrees, instead of all at once, should overcome this trouble as well as the first.

*It is assumed (see introductory note) that the stables are used jointly by street cleaning teams, refuse collectors, etc.

EFFECTS OF EXPOSURE ON TAR PRODUCTS.*

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IT has been shown on several occasions that changes occur in bituminous materials on exposure to the action of air and sun. Such changes are not due merely to the volatilization of lighter oils, but also to chemical changes in certain constituents of the bitumen, such as molecular rearrangements, inter-reactions, and oxidation. Changes of such a nature were demonstrated in the case of native asphalt and petroleum products by abnormal increases in the percentage of bitumen insoluble in paraffin naphtha, and in the case of tars by abnormal increases in the percentage of free carbon.

The present study was instituted for the purpose of extending the work through a greater range of tar products and to determine what relation, if any, existed between the changes brought about by exposure and those produced by laboratory distillations.

Seven samples were chosen, including two refined coal-tars, one refined water-gas tar, one refined mixed tar, two tar-asphalt mixtures, and one crude coke-oven tar. The results of the usual examination made according to methods published in Bulletin 38[2] of the Office of Public Roads, United States Department of Agriculture, are given in Table I. In addition, a dimethyl-sulphate test as described in United States Department of Agriculture Bulletin No. 314 was performed on distillates from the two tar-asphalt preparations.

Briefly stated, the method of procedure was as follows: Samples of each material were exposed to the action of sun and air for three months, which the previous investigation seemed to indicate was sufficient to bring about the maximum changes desired. Examinations were made at the end of each succeeding month to determine the change in weight and extent of hardening. In order to compare the effect of exposure with straight distillation, distillations in an Engler flask were made on each sample to produce a residue corresponding, in percentage by weight of the amount taken, to the residue produced on exposure, and the consistency of the residues thus produced was determined. Changes in the samples due to volatilization or other causes were noted by estimation of the percentage of material insoluble in carbon disulphide in the various residuums.

The box used for exposure tests was made of ¾-inch wood and had interior dimensions of 25 by 14½ by 2 inches. This was covered with a plate of ¼-inch plate glass resting on a strip of thick felt fastened to the sides of the box so as to make a tight joint and exclude all dust. Slots ¼ inch wide were cut through each side of the box, and to prevent the entrance of rain these were

*Abstracts from a communication by Logan W. Page, Director, Office of Public Roads and Rural Engineering, Washington, D.C.