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these cases. The owner was then notified to make the change and the reason for it was explained. As the purpose of the water department was to secure the maximum improvement as quickly as possible, cases of serious opposition to making the relocation were given little attention until the first campaign was well along toward what it was foreseen would be a satisfactory conclusion. The strong objectors then received attention, and the changes were brought about by using such measures as seemed best fitted to the conditions of each case. The practical outcome of the work has been an increase of about fifty per cent in the efficiency of the meter reading staff, a result of decided importance in a city of nearly half a million inhabitants. The result also shows conclusively the importance of locating meters originally in the most accessible place available, something which it is thought will be of interest to water departments generally. John W. Judson, chief accountant for the Newark Water Department, has been very energetic in pushing the work of relocating meters and in seeing that new meters are satisfactorily placed.

There is one feature of the work about which there exists a difference of opinion, and the views of the members on it will be received gladly in Newark. This is the proper location of a meter for a factory service. Some hold that the best place is outdoors in a well-built, easily reached pit. Others hold that the meter should be in the factory building. This is now a subject of such importance in Newark, and may become so elsewhere, that members who have had experience showing any special advantage or disadvantage in either location are asked to send reports of their experience to the editor of the *JOURNAL*, in order that they may be published in the *JOURNAL* in addition to being communicated promptly to the writer of these notes.

MORRIS R. SHERRERD.

THE SUPERVISING ENGINEERS' TROUBLES IN CANTONMENT
CONSTRUCTION

The paper on the water works of Camp McClellan which Mr. Scharff contributes to this number of the *JOURNAL* affords an opportunity to make some long overdue comments on the troubles experienced by the supervising engineers who had local charge of the engineering features of the construction of the military camps and

cantonments in the summer of 1917. Their work has not been given the public recognition it has deserved; the very conditions of it have prevented such recognition. In May, June and July, 1917, there was assembled at Washington the most competent group of specialists which ever met to consider municipal problems. Working under tremendous difficulties and without facilities not supplied by themselves as a rule, these engineers planned a typical military city and laid down the general principles to be followed in providing it with the needful utilities. These general plans and sets of governing regulations were then sent out to the supervising engineer of each camp or cantonment, and it was the trying task of that engineer to design his city to conform as closely to the typical plan as the topography of the site and the various governing principles would permit. Headquarters acted essentially as a consulting engineer, as a staff advisor, while the supervising engineer was the actual planner and superintendent, performing a line function.

It has been said that the specialists advising the Construction Division or acting as officers in it worked under tremendous pressure. Just so far as they could foresee a question likely to arise in the field they endeavored to answer it, so as to reduce to a minimum the need for reference to headquarters from the field. Yet despite all this care, although the regulations governing field work were scrutinized by a number of the ablest, most experienced specialists in the country, they were not wholly clear. In the basic matter of the per capita water supply to be provided, Mr. Scharff encountered lack of clearness in the rules, as he points out at the beginning of his paper. This is not mentioned here, nor does Mr. Scharff mention it in his paper, in the spirit of captious criticism, but rather as a guide for us in future work. This recent tremendous drain on our lives and resources will not yield its greatest returns unless we take to heart the little details as well as the big things which the war teaches. One of these little things is the importance of perfect clearness and preciseness in instructions to field officers, and out of the experience of the supervising engineers in camp and cantonment construction with the regulations of the Construction Division it should be possible to develop a code of field instructions of substantial value to the engineering profession and invaluable to the War Department.

When the supervising engineer reached the camp site he was charged with the duty of constructing a city for 20,000 to 45,000 population in about three months. The clearing of the site of one of

these great areas would usually occupy about that period under ordinary construction conditions. Time was the paramount consideration; a day was worth more than a month during peace times, and the supervising engineer was the man responsible for saving that day, so far as engineering work was concerned. The time factor introduced peculiar difficulties that only the supervising engineer himself could realize fully, for frequently this insistent call for the highest speed possible changed the usual order of precedence of the elements governing the choice of plans and methods, and it needed a versatile as well as clear-thinking mind to adopt suddenly new points of view, as in selecting a source of water supply for Camp McClellan and in choosing pipe sizes and the location of the supply main. Attention is called particularly to Mr. Scharff's statement of the pipe sizes which he was forced to use to meet his time schedules.

It was not alone in designing and constructing the camps that the ingenuity and nerve of the supervising engineer were tested to the full. Every superintendent should consider what it meant to operate a booster pumping station as was done at Camp McClellan during August and September, while carrying the enormous detail work of finishing the construction of the city. Such operation is a story of real interest in itself, yet it was just an incident, a mosquito bite, in the life of the supervising engineers at these camps during those strenuous times. How these men and their assistants accomplished what they did will probably never be told, but it is worth telling as the "inside story," the real story, of how our troops found shelter in these great military cities when they arrived at them.

The writer of these comments became familiar with the water works of the camps and cantonments after the supervising engineers had finished their work. He has been in general charge of their operation and has been deeply impressed by the intricacy of the problems which these field engineers had to solve on the spur of the moment, and by the success of their work. The combined water supply and sewage problems at Camp McClellan were even more than ordinarily difficult, and it is a pleasure as well as a duty to bear witness to the efficient manner in which the problems were solved at this camp.

GEORGE A. JOHNSON.