

pany. He usually attaches one field company to each infantry brigade to aid them in carrying out the work in their area. The work in their area consists of the maintenance of the front line; communications to the support line; the support line; communications to the subsidiary line; and all strong points between the subsidiary line and the support line. In some instances they are given the maintenance of the subsidiary line to look after. The working parties for this work are supplied by the brigade in the line and are directed by the field company attached to the brigade, and in addition, this field company looks after the construction of all new lines in front of the subsidiary line, which may or may not be built by working parties supplied by the brigade; the construction of the subsidiary line, which is usually constructed by the troops supplied by the division; the construction of strong points immediately behind the subsidiary line by working parties supplied by the division; the digging of wells in the brigade's billeting area; the construction of roads in the brigade area which are not main roads looked after by corps, and the construction of huts for billeting reserve battalions of brigade; construction of routes for the use of working parties in dry weather; and all the innumerable drainage schemes required in the rear brigade area, also the construction of light railways in the brigade area. At the same time, a considerable portion of the personnel of this company may be working under the C. R. E. for construction of such things as divisional bath houses, Y. M. C. A. recreation huts, etc.

The C. R. E. usually splits up his pioneer battalion by keeping one company to work directly under his own orders, and attaching each of the other three companies to a brigade, to work under the orders of the respective field companies. The tunnelling company works directly under the C. R. E.'s orders, and is supplied with material and working parties by the field company in whose brigade area the tunnelling company may be operating. The C. R. E., for the construction and maintenance of the works looked after by him, also gets working parties from corps troops, such as battalions in corps reserve, dismounted cavalry, and any other units that may be at the disposal of corps and lent to division.

Some of the best engineers in Canada prior to the war are now in France with the Canadian Engineers. It is claimed that at least 40% of the men in the ranks of the Canadian Engineer companies attached to the first Canadian contingent were graduates of engineering colleges; and practically all were high class men. The result was that the Canadian Engineers made a name for themselves in France; and they obtained a status in the army worthy of the corps.

As was the Royal Engineers, the working party idea was developed in the Canadian army, because of the immense amount of engineering work necessary; and the sapper in the Canadian Engineer field companies became in reality a foreman of working parties, carrying on the various forms of engineering work at the front, of which trench construction and trench consolidation constituted a very important part. Some of the Canadian Engineer officers have developed the "task" idea, in connection with working parties, to the decided advantage of the work to be done, and the men in the working party. Returned sappers have told of the effectiveness of having a specified amount of work to be done by each member of a working party, with instruc-

tions that the working party goes "home" when work is completed. Usually a working party with a "task," will finish an equal or greater amount of work, and be in billets and asleep, while a working party without set tasks for each would still be on the job.

As has been before stated, the obtaining of engineering equipment and materials has always been one of the big problems of the engineers. When an army is on the march, the engineer field companies are dependent upon the districts through which they pass for materials, with the exception of course of certain materials, equipment and tools carried by each field company. In trench warfare there is nothing left but mud, and all materials for trench construction, splinter proof construction, bomb proofs, etc., is brought up from the rear, first by motor or horse transport, and then by carrying parties to the point where the work is being done. This has led to the establishment of engineer parks in the rear, where all forms of standard engineering material are made up, including frames for splinter proofs, bomb proofs, trench revetting, etc., and forms of wire entanglement, etc. All kinds of tradesmen and mechanics are needed in these parks for the manufacture of these standard forms and materials, and the work is carried on by working parties of sappers' mates, the work being supervised by sappers from engineer companies. There are also hutting parties, consisting of carpenters, drawn from other units, attached to engineer companies, who construct, under sappers' direction, the huts which form the infantry's reserve billets. Brigade wiring parties, consisting of volunteers from the infantry, attached to engineer companies, are taken back and live at the engineer billets, and are trained to do wire entanglement work; and when proficient put out the wire under their own officers, but directed by the engineers.

An idea of the status of the Canadian Engineers in France can be had from the fact that no one in the Canadian army can get one stick of material unless it is sanctioned by the engineers, that is the Canadian Engineers are called upon to pass judgment upon any and all construction work, and this absolute control of material by the engineers gives them a status with all troops in France. The general staff does not make a move without efficient engineer advice. This is true all the way down. The captain of an engineer company is continually consulting with the brigadier-general of the brigade as to the work that it is possible to carry out with the men and material available. The engineer subaltern is present at the conferences, composed of the brigadier-general, the engineer major or captain, and the four colonels of the brigade, at which decisions are made as to the programme of work for the next relief. The engineer subaltern, with his section of sappers, usually looks after all construction work in one battalion front; so that he, after having been present at the brigade conference, settles all minor details about the work in that sector, with the colonel of the battalion in charge of the sector. He then has the working parties turned over to his sappers. An engineer n.c.o. will have charge of four or five working parties, and each party will be in charge of a sapper.

When the Canadians moved into the Ypres salient in April, 1915, they took over trenches from the French Iron Division, which were anything but what they had been taught to expect trenches would be. There were little sections of disconnected trench forming this front,

which were made by throwing up a little dirt against the backs of hedges and were not even bullet proof. There was no daylight communication between these sections and no daylight communication to the rear. The problem that confronted the Canadians was whether it would be better to make a proper front line first, or to develop communications to the rear, and strong subsidiary line defences. They decided, on the advice of the engineers, that the first thing required was to make the front line fightable. To do this the engineers jumped in and kept large working parties working night and day on the construction of a properly traversed front line.

In one section of this front, held alternately by the 7th and 8th battalions, there was a particularly bad piece of trench, enfiladed by German artillery fire, which connected the line to a very important little knoll. One engineer subaltern impressed on the colonels of these relieving battalions that that piece of line should be immediately put in good shape. He urged on them almost day and night to get the maximum number of men available working on this piece of line. It was a disagreeable piece to work in, because the French had believed in the theory of making no move during the daylight hours, and they had buried their dead side by side in the bottom of this trench, and covered them about a foot deep with earth. To improve the trench it was necessary to dig through these bodies and construct a heavy parapet and put in large traverses. The work was extremely disagreeable for the infantry working parties, who would only be there for a six hour stretch, but it was still more disagreeable for the engineers, who were there all the time. In a few nights this section of trench was completed, and none too soon, as the big German gas attack was then launched. This piece of trench held, and one of the colonels, now a major-general, after the second battle of Ypres, told this engineer officer that his obstinacy in insisting on getting the large working parties, and keeping the infantry at it day and night, in getting that section of trench completed, had saved practically a company of the battalion from annihilation. That engineer officer, in dealing with these large working parties, could not have been successful in the accomplishment of this work, if he had not been backed up by a very high class of sappers on whom he could depend individually to handle from 50 to 100 men efficiently and well, under most trying conditions. This is an example of where the high class of personnel among sappers may mean the difference between holding a line and failing to hold it.

**Electrification of the Lehigh Valley Rd.** is said to be under consideration, and engineers are reported to be making surveys and investigations preparatory to rendering a report upon the project. The L.V.R. carries a very heavy coal traffic from the anthracite region to tidewater, and all trains have to climb over a high summit in passing west from Wilkes-Barre. It is stated that the plans for electrification comprehend the entire main line from Jersey City to Wilkes-Barre.

**American Association of Dining Car Superintendents.**—E. W. Smith, Superintendent, Dining and Parlor Car Service, G.T.R., Toronto, and S. Wertheim, Superintendent, Sleeping, Dining and Parlor Cars, District 2, C.P.R., Toronto, have been elected chairman and secretary, respectively, of the association's Canadian territorial committee.