The Military Engineer

THOUGH the fighting foot-soldier has ever been the backbone of armies, engineering has always played a major rôle in the conduct of war, and with the advances made in modern times in metallurgy, chemistry and the various other sciences and arts, it has become in some of its many applied forms a controlling factor in the progress of military operations.

There is a strong family likeness in all engineering work and in many respects construction behind the lines in the theatre of war does not differ greatly from that often conducted under emergency circumstances in time of peace, but the governing conditions under which the work is executed are radically different. The purposes in view are not the same and considerations enter in military work which rarely find their analogy in civil constructon. Besides his technical equipment as an engineer, his knowledge of strains and stresses, his familiarity with the characteristics and uses of structural materials, his experience in the management of labor and in the utilization of construction equipment and appliances, the military engineer must be thoroughly familiar with other subjects of which the civilian has little knowledge and for which he normally has little use.

The engineer in war must be not only a competent engineer and an efficient manager, but he must be thoroughly versed in the art of war. He must have a full appreciation of strategy and tactics; of the employment and effect of artillery and infantry fire, and must be able to devise measures which shall reduce or wholly nullify their destructive action. He must be prepared at all times to direct his construction talents in support of military operations against the enemy. A ready resourcefulness and an ability to substitute or improvise must be dominating elements in his professional equipment for his heavy duties.

The engineer who accompanies the combat troops into action is essentially a military man. In the face of the enemy, when the nation's honor or its very existence are at stake, military considerations are paramount and all operations of every nature must directly contribute to military success. This means that time is of the essence, which is the fundamental economic principle of military engineering.

His technical engineering attainments must be supplemented further by a knowledge of army regulations and governmental business methods, restrictions and requirements. He must know the duties and responsibilities of the various staff departments and the relations that they bear to one another and to the combatant forces in the field. The trained military engineer is thus at one and the same time a general practitioner and a specialist in the engineering field. He applies general engineering to the very special purposes of war under unusual and abnormal circumstances and conditions, as judged from a peacetime point of view. He does not, as is sometimes supposed, disregard economic considerations, but to achieve success he must realize that the economics of war are not those of peace.

While military engineering is a specialty, it is by no means an occult science whose mysteries only a gifted few may hope to solve. It knows no horizons—it recognizes no limits. Its field is coterminous with that of human endeavor, for there is no activity of man which does not find its application in war in some form or other. The civilian engineer, therefore, will encounter no insurmountable barrier to prevent his becoming an able military engineer, but it can not be done by the mere act of accepting a commission, or donning a uniform. There is no royal road to learning, nor is there an asphalt highway to knowledge of the military engineer's art. This can be acquired only by study and practice. The civilian, however competent he may be as an engineer, will find himself at a loss in the military machine unless he is also a trained soldier with a soldier's appreciation of military conditions. To take his place in a national citizen army the civilian engineer must train himself in time of peace to apply economically and efficiently his art in war.

If the country abides by precedent we shall always have in the permanent military establishment a force of engineers, but this body, on a peace basis, can never be more than a mere nucleus of that vastly larger number needed in a national crisis. Its object will be to keep alive the best traditions and practices of military engineering, to note developments in commercial and industrial life and to study their applications to the art of war. Not the least important of its functions will be to furnish a medium through which the great number of engineers from civil life may be instructed in the military phases of their profession and to provide a channel through which they may in an emergency be incorporated in the defensive forces, organized and assigned to those positions and duties in which they can render the maximum service.

The Engineer Officers' Reserve Corps, authorized by the National Defense Act of 1916, affords at present the most direct means of accomplishing these objects through military channels. A great many officers who served in engineering capacities in the National Army during the World War have applied for commissions. Others are known to be waiting on legislation and their future course will depend upon the action of Congress in respect to universal training and its effect on the reserve corps.

However, the Engineer Officers Reserve Corps is now reasonably able to respond to an emergency provided, of course, that it does not take on the dimensions of another World War. Due to the limited number of officers available for the multitudinous

duties of the Corps of Engineers, it has been necessary to conduct the examination of records and requests for consideration with an altogether inadequate force. An attempt has been made in each instance to tender the commission with a rank appropriate to the actual capacity and service of the officer concerned. Since the records are voluminous, though in many cases incomplete, the work involved in determining the proper grade for officers who were not formally recommended, but whose experience demonstrates suitability is enormous, and unfortunately has produced an impression of delay or indifference. Notwithstanding these adverse circumstances, steady progress is being made in this work of reorganization.

Under the law commissions in one grade higher than those held by them during the war may be offered to former officers whose records warrant it, and every effort is being made by the Board of Review to accomplish this in all appropriate cases without additional correspondence.

On the first of December there were about 3,185 reserve officers classified as to their availability for immediate duty with combat engineer troops, or for duty with certain specialist engineer organizations. This total was distributed in grades approximately as follows: 15 colonels; 70 lieutenant colonels; 300 majors; 850 captains; 850 first lieutenants; 1,100 second lieutenants.

Every reserve officer is urged to keep his correct address on file in the Office of the Chief of Engineers to the end that communications may reach him without delay. Under plans now being made, it is anticipated that information of value will be sent to these officers from time to time in order to keep them in touch with military developments.

A Society of American Military Engineers

THE war left its mark on the engineering profession as a whole, for in some capacity or other, in the government service or in the industrial world, at home or abroad, all took part in it. On April 6, 1917, when the existence of a state of war with Germany was formally declared, the engineers available for immediate military service consisted of 256 officers and 2,228 soldiers. In November, nineteen months later, there were in the Engineering Department of the United States service 10,886 engineer officers and 292,300 soldiers. There were in addition in the Ordance Department, in the Construction Division, in the Chemical Warfare Service and in various other branches of the Government, a vast number concerning whom exact data are not now available. The engineers of the country bore well their part and when the final record is written no page will be more brilliant than that which chronicles their achievements. They are justly proud of their service and their contributions toward the winning of the war are too well known to need comment here. They are vivid in the memory of all and many of their accomplishments are perpetuated in the form of structures and devices which, though created for war, will continue to serve the purposes of peace for all time.

By far the greater number of these officers and men have long since returned to their former less spectacular if more beneficent labors. Some few of these thousands of engineers came out of the war perhaps with a just grievance and a mental resolve expressed by the slogan "Never again." Improper assignments were undoubtedly made—the square peg did not invariably get to the square hole. Promotions were slow in coming and were not always made with even-handed justice. Now and again some regular officer whose rank had outstripped his judgment, "dressed in a little brief authority" took undue advantage of his position, but with the passage of time the disappointments, the resentments, the bitter memories have faded and their once sharp outlines have been softened in the happier recollections of great achievements. Distance has cleared the vision and restored the sense of proportion, and the citizen soldier now judges the army, not by the markedly inefficient nor yet by the conspicuously able, not by the most arbitrary nor yet by the thoughtfully considerate. He has begun to apply the law of averages—he realizes that the regular army man is neither god nor devil, saint nor sinner, but combines the attributes of them all and the composite result is an individual on whom the country may place its reliance.

The thinking citizen everywhere has come to realize that in deflecting an unprepared nation from the paths of peace to those of war, mistakes will occur, that war itself is a dislocation of the normal processes of thought and normal lines of endeavor, that it breeds mistakes and that unpreparedness, such as was ours before the war, serves to multiply natural errors and omissions. He now appreciates that, in consideration of things as they really were before the war, results, by and large, were not so bad after all; he experiences in his inmost soul a keen sense of gratification that it was his privilege to have taken a man's part in upholding the standards of a free people.

Under the wholesome reaction that has set in, the citizen soldier has ceased to brood upon the trials and tribulations of a day that is passed, and in the light of his experience has turned to the solution of new problems which now confront the country. His previous resolution to avoid all military service is directed instead toward the maintenance of personal preparedness to do his part should the nation again require his services, toward the formation and adoption of a sound military policy for the nation, toward preventing a recurrence of national mistakes and toward