their rapid descent on Paris by the aid of motors for cannons, ambulances, searchlights, food supplies, repairs, etc., etc. An immense number of quickfiring guns are mounted on automobile trucks, converting them into travelling forts. Some idea of the great demand for motor vehicles may be gleaned from the fact that $13,000,000 worth were ordered by Russia alone, whilst the Allies in nine months received motor vehicles to the tune of $57,000,000 from the United States.

Water Supply.—It will be acknowledged by all that the question of water supply is of paramount importance to the troops. In the South African war more men fell from enteric than from wounds. This has been the record of most wars. The engineers' expedition to Abyssinia in 1864 was fitted with filters but the writer has no data at hand showing the results obtained. The quantity of water actually required does not amount to much when reckoned individually, but for the huge European armies the total will be very great and this, of course, increases the task of furnishing pure water. The United States troops who marched from Texas City to Houston consumed only two gallons of water per head per day for cooking and drinking, and the horses drank 6½ gallons per animal per day.

The progress in the art of water purification during the last fifty years has been considerable, although not so great as might be expected. Sedimentation and filtration were practised long ago, but the technique has been developed during the last generation. We know better to-day how to treat water scientifically and can ascertain the results more accurately and reliably. Bacteriology has furnished the key by which our knowledge of water purification has been expanded. Now water for the soldiers can be sedimented, filtered, and sterilized in a manner which was never before possible. The study by engineers and bacteriologists of the use of rapid filters and various types of sterilizers has made it possible to make water which is seriously polluted, reasonably safe for dietetic purposes.

Sewage treatment and disposal and refuse disposal in camps or on battlefields are now carefully organized. Reports from France clearly show that every precaution is taken by the Allies against insanitation. Mr. G. B. Hartfree, the engineer to the Alton Town Council, England, has written a series of most instructive articles in the "Surveyor" on "The Surveyor in Military Service." (The term surveyor in this connection is synonymous to town engineer.) The articles are now available in book form at a price of about 25 cents. They deal with the selection of camping grounds, billeting, sanitation, cooking arrangements, heating, refuse disposal, water supply, bridges, hospitals, hot water, miniature rifle range, etc. Whilst the supervision of the sanitary work of the army is attended to by the medical branch, much of the executive work must perforce be carried out by engineers, as—the lighting, heating and ventilating of hospitals, the drainage, water supply, sewage and refuse disposal of permanent camps and barracks, and so on. In active service the problem is somewhat difficult, for then the supply of requisite equipment is not always available but the work must nevertheless go on. So the engineer is there called upon to utilize the things that are at hand, build with uncompromising materials and adapt everything to the service of the moment.

Woodshops.—No army can subsist long without supplies from the base. The present war shows that to maintain a soldier at the front probably two civilians must remain at home to keep him supplied. The list of articles required to carry on war is enormous, and when it is examined its magnitude increases rapidly, for directly or indirectly the list involves almost every line of industry and labor. To supply even leather boots, the farmer, butcher, fellmonger, tanner, and shoemaker must each do his bit, whilst the machinist must build contrivances to expedite the mechanical processes. Take high explosives: much of the toluol, picric acid, trinitrotoluene are by-products of gas manufacture, hence the anxiety of the Prussians in particular to maintain an ample coal supply for their gas works in Germany and Prussia to produce these and other valuable things. The miner, gas stoker, etc., distiller, chemist, and the mechanic must carry out their duties to obtain these raw materials. Cotton must be obtained and treated with nitric acid to form nitrocellulose or gun cotton. Glycerine can be made from lard or other animal fats. Whatever munition of war is considered, it means the employment of many hands and the concentration of many minds and the devotion of years of erudite research to produce it and to make it superior to the enemy's products. The workshops of Europe and America are working at high pressure to enable the great armies to fight. Ordinary business has been virtually suspended so that munitions of war may be supplied. Shipping has been diverted from ordinary commercial operations to transport men and munitions. Engineers of all ranks and classes are striving to make the Allies supreme, and consider the subject from any angle, it will be found that the engineer is one of the most necessary of men, both behind the firing line and also at the front.

Two points further and this article will close. First, one lesson of this war is that the design and construction of machines should be modified so as to ensure more rapid production with existing machine tools. In a sudden call for munitions and the consequent enormous demand for special machinery so that the specifications are conformed to, much valuable time is lost before such special machinery is made and installed; whereas, if the designs and specifications were modified it would no doubt be possible to start work immediately and turn out the parts more rapidly and more cheaply. These are the summarized views of men competent to judge. The other point is that whilst engineers are willing to serve the nation to the full capacity, the Admiralty Board of Invention and Research has only one member who is actively engaged as an engineer, namely, Sir Charles Parsons. Whilst it is desirable to have the most highly accomplished scientists, it is also desirable to have men who know and know how from the practical point of view.

ONTARIO'S MINERAL OUTPUT

The output of the metalliferous mines and works of Ontario for the six months ending June 30th, 1915, as reported to the Ontario bureau of mines, is shown by the following table, which gives also the production for the corresponding period of last year:—

	Six months, 1915.	Six months, 1914.
Gold	$3,570,072	$2,011,069
Silver	5,188,763	7,053,418
Copper	1,229,894	1,197,059
Nickel	3,393,528	2,872,843
Iron ore	288,296	118,119
Pig iron	2,856,040	4,429,664
Cobalt	34,443	22,581
Cobalt oxide (including nickel oxide)	56,812	379,152