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## A Cover of Concrete to protect against Shell Fire!

### THE USE OF CONCRETE IN WAR.

By Lieut. E. T. Adney, C.E.

The extent of the use of concrete in this war is incredible, as is true of other materials which enter into construction of the field positions of the contending armies. While in the early stages of the war field defenses remained merely temporary defenses of a mobile army, concrete hardly entered into construction at all; but when the armies settled down into so called "position warfare", with flanks terminated only by natural or other impassible barriers, the contending lines became comparatively rigid and permanent. Then concrete, both plain and reinforced, came into use.

Naturally the Germans were the first to employ it on a great scale, when, after the Marne, they withdrew to positions selected beforehand, embracing the whole industrial part of France, which they meant to hold and which they believed they had made impregnable. The British did not so soon nor so extensively employ concrete, for while the German braced his legs apart and said "Here is where I mean to stay", the British and the French too, did not plan to stay where they were. They planned to beat through the German defenses, and they showed that they could hold, too. Unconsciously perhaps, this will explain why our trenches were not so elaborately finished for comfort and protection as were those of the Germans. The German general staff selected their de-

fensive line so that the British in particular and the French in many places had to occupy low lying, water logged ground which alone made elaborate trench provision almost impossible. However, for more than a year, the Allies have gained and occupied ground where they can construct deep dugouts, and have put the Germans (in many sectors) where they must occupy the mud and water which we had to exist in during the first years of the war.

A glance at the German "Manual of Position Warfare for all Arms. Part I. The Construction of Field translated and issued by the

Positions (Stellungsbau.)" 1916, British General Staff, May, 1917 (alas! in vain was it "verboten"—"Not be taken into the front line—SECRET") will give an idea of some of the uses of concrete. The "document" shows also numerous working plans of trench furnishings, such as, Shelters under parapets, Entrance galleries into deep dugouts, Machine gun emplacements, Infantry Observation posts, Searchlight emplacements, Shelters for signallers, Dressing stations, Trench mortar, ammunition shelters, Elaborately planned battle headquarters for Battalion and Brigade commanders, Command

posts for same, Shelters for reserve and for supports, Covered battery emplacements with command posts, telephone and ammunition stores.

Attention is called to the facts that, the weak parts of deep dugouts having, say, 20 ft. head cover, are the entrances, especially those leading down from trenches. These will be covered by broad thick belts of concrete; and both sides and top of the descending gallery will be thickly sheathed, growing thinner toward the bottom. A typical shelter for two or three men under a parapet will have cover and walls 2 ft. 8 in. thick, using 32 cu. yards of concrete; (this appears to be

## THE CAPTURE OF PALESTINE



General Allenby receives the city notables in the barrack square.

—Photo by courtesy of C.P.R.