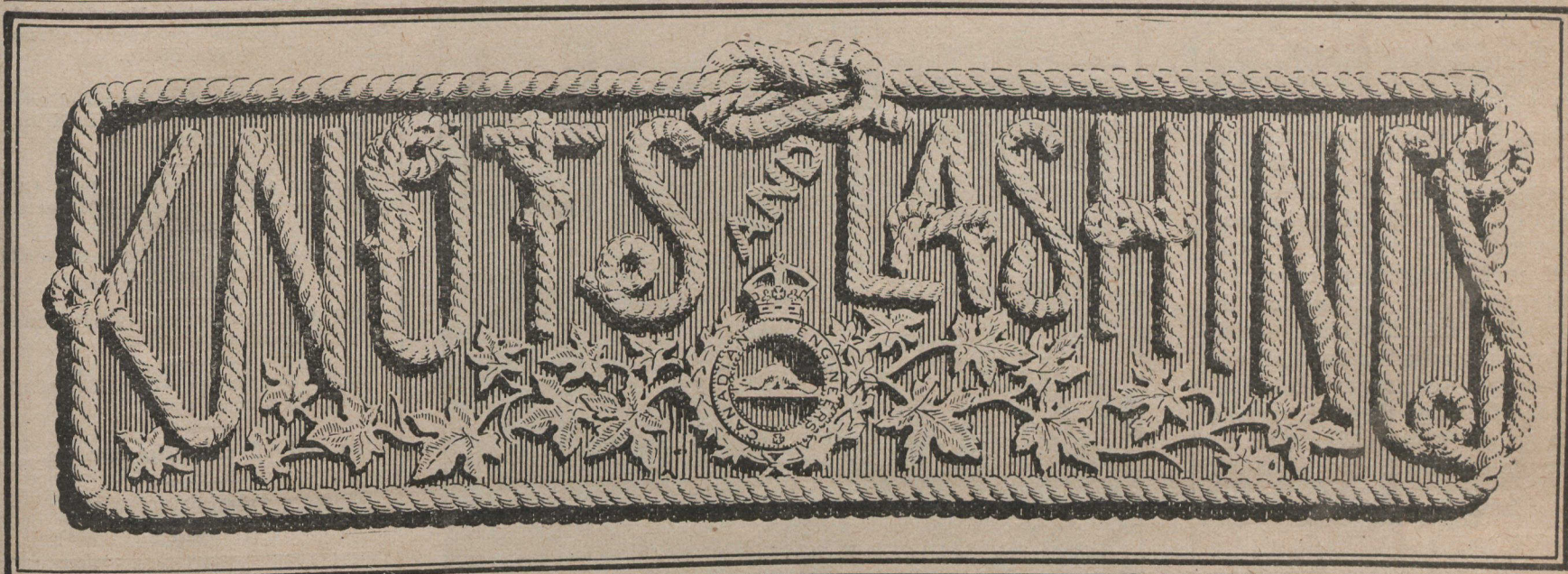


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## Practical Pointers on Dug-Outs, ==You'll soon have to dig them

### DUG-OUTS

By Lt. E. T. Adney, C.E.

(The following article on "Dug-outs", constitutes the ninth of a series of able contributions by Lieut. Adney, on the subject of modern field defences.)

Whenever it is possible to deliberately fortify a position for defense, the first points to be selected are locations for flanking machine guns and dug-outs. These govern the lay-out of the trenches and obstacles. Dug-outs are to protect the garrison from artillery fire, and the degree of protection that can be given, depends upon their position in the zone of defense, their concealment, and the nature of the ground.

In the front or firing line, protection is now scarcely considered at all. It can only be held lightly, as an outpost. Formerly, machine gun emplacements with "splinter-proof" cover, were sited in and in front of the parapet, and the Germans constructed deep mined dug-outs, to which entrance was afforded by means of stairways under the parapet. But the covered emplacements were soon battered to pieces, and the precision of the British artillery creeping barrage

was such, that after the barrage lifted, the assaulting troops were in the trench and bombing the inmates of the dug-outs before they could climb out and use their rifles, machine guns or grenades. These front line deep dug-outs of the Germans, then, proved to be only "man traps", so Gen. Von Armin, commanding the 4th Army, ordered them all closed, in July 1917. The little rest-shelters,—sometimes barely large enough for one man,—that soldiers excavate under the front line parapet, are hardly to be considered. They weaken the parapet, and the protection is more imaginary than real. In the supervision or travel trench, when there is one, and along the communication trench, dug-outs for the garrison, the Company Commander, Company Sergeant-Major, Signallers, etc., may be placed. But what is true of machine gun emplacements, is also true of dug-outs, according to present practice,—as one goes rearward, their strength and the amount of protection they give, increases.

#### Degrees of Protection.

Considering materials, labor, and the conditions of trench warfare generally, the maximum of security

is afforded by what are known as "mined" dug-outs. Twenty feet of earth overhead, is considered as proof against the heaviest bombardment. Dug-outs of this class are "bomb-proof",—a term which implies resisting power against continuous shelling by 8-inch guns, the heavy trench mortars, and single hits by heavier calibres. Often there is thirty feet and more overhead. Where the ground will not permit the construction of the deep dug-out, on account of water, or when for any other reason it is impracticable, then effort is made to provide what is known as "shell-proof" cover. This should afford protection from guns up to 5.9-in., howitzers or smaller flat trajectory guns.

#### Shell-Proof.

Dug-outs that are considered shell-proof only, will either be covered with a thinner layer of earth, or with walls and roof of concrete, either plain or reinforced with iron rods. But where earth must mainly be depended upon, the requisite protection has been found in various arrangements of materials. The bursting effect of a high explosive shell is upward. If a shell,—say 18-lb. H.E.,—strikes earth and penetrates three or four feet before detonating, it blows out

a funnel shaped crater. If it can be detonated by a "bursting course" of concrete blocks three or four inches thick, or steel rails, it then only strikes a downward blow.



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