

The Artillery "Barrage"—How It Works

By H. WINFIELD SECOR

THE "barrage" fire as now practised by Allied and Teutonic artillerists represents one of the greatest advances of military science conceivable, for in order to achieve success in using the barrage, and in order not to kill many of your own men, hundreds of guns have to be fired simultaneously to the fraction of a second. Furthermore, all of these guns—in some cases as many as five hundred to one thousand cannon—are required to increase their range periodically so as to keep it just a certain distance ahead of the advancing troops. Telephony, radio, meteorology, ballistics and range finding, besides many other highly perfected ramifications of modern science figure in the barrage.

No one outstanding feature of the great war now raging across the sea has so impressed men of science as well as the lay student, of military and naval affairs, as the wonderful advance in military fire, known technically as the "barrage" (pronounced bar-räg, with "g" pronounced as "zh" or having the sound of "raj" in rajah). Many accounts have been given from time to time by our war correspondents and other writers in the daily and periodical press, mentioning the wonders achieved by the Allied artillery officers with their modern and highly perfected barrage fire, by means of which it has become possible to carry out an offensive movement with infantry, even when an enemy trench, or series of trenches, is particularly well constructed and heavily manned. The importance of the barrage or "curtain of fire" will be the more strongly appreciated in relation to infantry maneuvers, when we consider that the trench lines have often lain dormant for months, during which time the enemy has usually succeeded in constructing an almost inconceivably strong breastworks with concrete-lined trench walls and machine gun emplacements, all of these connecting with elaborate underground galleries and dug-outs, some of which have been found to be capable of holding two regiments of soldiers and sustaining ordinary gun fire for days.

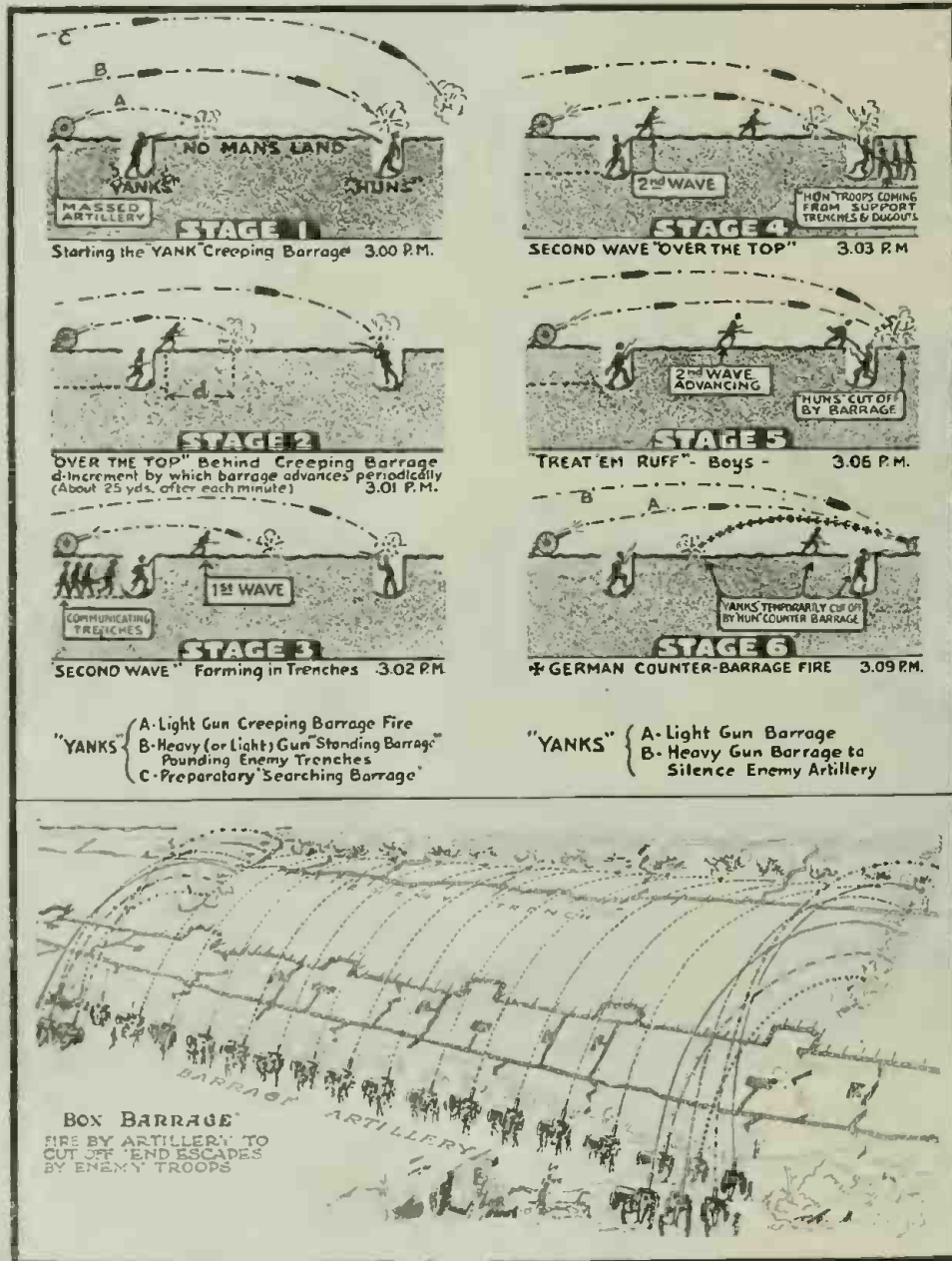
By means of the artillery barrage as it is usually employed, three major operations are carried out in a short space of time, once the hundreds of guns have been lined up almost hub to hub for the purpose, and these are as follows:—*First*, either a portion or all of the guns start firing on the second in a "searching barrage" extending over a considerable stretch of the enemy's ground behind his trenches, for the purpose of cutting off his communications, prevent-

ing ploding shell* shall advance at a certain prearranged distance ahead of the wave or waves of infantry.

The "searching barrage" is set up several hours before the time that the infantry is ordered to advance, and it thoroly combs the enemy trenches, filling the landscape for several miles with shell holes and craters, and smashing his wagon and auto supply trains, not to mention the pulverizing of his once inhabitable front-line and support trenches. This veritable holocaust of exploding shrapnel and gas shell raises extreme havoc with the enemy morale, not to mention his casualties and the destruction of enemy gun positions and ammunition dumps.

Thus far we have the preliminary "searching barrage" and the "standing barrage", which latter is kept playing on the enemy front-line trenches. We then come to the critical moment when the troops are to go "over the top", and this exact time is, of course, well known beforehand by all of the artillery and infantry officers concerned. Part of the artillery barrage batteries, just prior to the moment when the infantry is scheduled to go "over the top", is ordered to start the *third* operation or the "creeping barrage", behind which the "dough-boys" are to advance and storm the enemy trenches. The accompanying diagram of a creeping barrage time-table shows how wonderful this operation actually is, especially when one stops to consider the several dozen different and highly diversified factors which enter into the firing of even a three-inch field gun. For who would believe that one could tell to a hair as to just what pressure a certain charge of explosive in a cannon barrel will create, and how far it will throw the projectile! Then again we have such scientific problems as the wind velocity, the humidity of the air, gun erosion or pitting due to wear, etc.

Reverting once more to the action of the "creeping barrage", and the troops' advance on the enemy trenches, we learn that the creeping curtain of shell-fire starts about twenty-five yards in front of the Allied trenches. In one minute the bar-



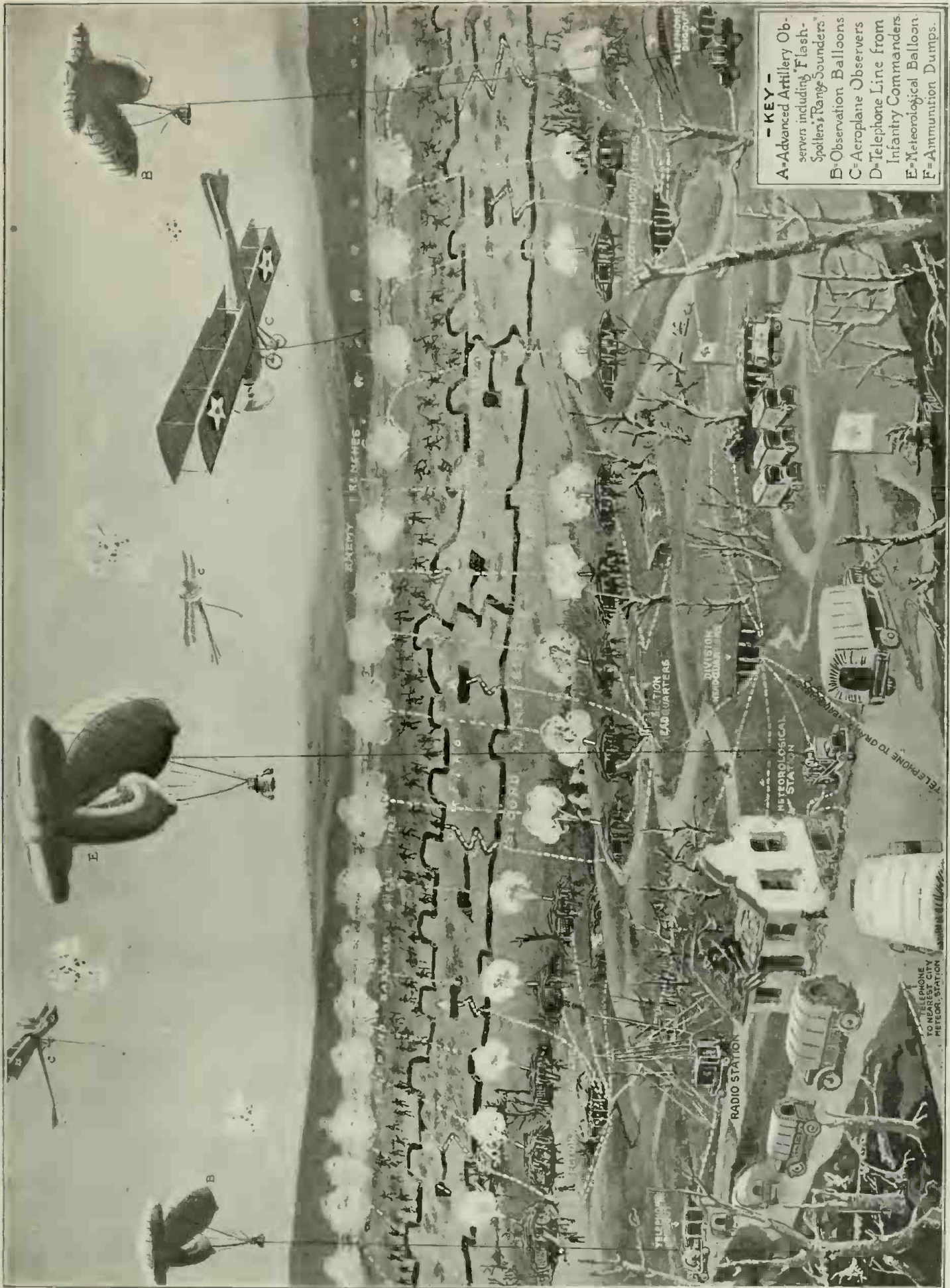
ing the bringing up of supplies, and reinforcements of troops. *Secondly*, and meanwhile some of the guns keep up a "standing barrage" on the enemy first and second line trenches. It is interesting to note that the watches used by the infantry officers in the Allied trenches, as well as those used by the artillery officers, are of the split-second type, because when the troops are to advance behind a barrage, perfect coordination must exist between the artillery and the infantry—in order that when the troops advance, the curtain of ex-

ploding shell* shall advance at a certain prearranged distance ahead of the wave or waves of infantry.

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(Continued on page 431)

*The plural is shell, not shells.



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 A Comprehensive Panorama of a Section of the Western Battle-front When the "Doughboys" Make an Advance Behind a "Creeping Barrage" or Curtain of Shell-fire. For Hours Previous the "Searching Barrage" Has Combed the Enemy Trenches and Supports to a Depth of Several Miles. It Has Taken Days and Weeks to Prepare the "Barrage"—But It is Worth It.



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Darkening of certain portions of the desert tracts hourly were also noted at this opposition and attributed to the warming and thawing of the ground with the increasing warmth of the sun's rays, the darkening being most noticeable in the Martian's afternoon. It was concluded from this that the ground frequently freezes at night and thaws out during the day. Tropical frosts appear to be quite the usual thing on Mars and two were directly observed at this opposition. Three temporary increases in the size of the melting north polar cap were also recorded this year, due to heavy snow storms at the north pole. The polar cap in the winter season frequently extends 35° from the pole, but at the height of the summer season it has a diameter of only four hundred miles or so and on rare occasions almost, if not quite, disappears.

Whatever may be one's opinion as to the reality or unreality of the canal system the evidence that Mars possesses air and water seems to be beyond dispute and therefore we are justified in assuming that both animal and vegetable life may exist upon this interesting planet.

The comparative ages of Mars and the earth are unknown. It is generally believed that Mars is more advanced in age and development than our planet, due to its smaller size, which would cause it to cool off and form a surface crust earlier.

Mars has one-seventh of the volume and about one-tenth of the mass of the earth. Its surface gravity is thirty-eight per cent of that of our own planet and a body weighing one hundred pounds on the earth would weigh only thirty-eight pounds on Mars. As a result of these facts the Martians are sometimes pictured as creatures of great size and agility, far more advanced in evolution than the human race. We must remember, however, that nothing whatever could be known concerning the inhabitants of the planet Mars. If life exists on Mars it must be adapted to its environment, which is probably affected by many factors that make it very dissimilar to our environment.

To speculate concerning the nature and characteristics of the Martians is very fascinating, but will not lead to any definite or satisfactory result and serves no purpose except to exercise our powers of imagination.

(Next installment will appear in November issue.)

THE ARTILLERY BARRAGE—HOW IT WORKS.

(Continued from page 368)

rage is lifted another twenty-five yards out, and so it advances as the illustrated timetable herewith shows—twenty-five yards at the end of each minute. At 3.01 P. M. when the barrage has lifted to a distance of fifty yards in front of the trenches, the first wave of doughboys go "over the top", with bayonets fixed and belts loaded with hand grenades. The advancing barrage is lifted, the specified increment exactly at the end of each pre-arranged interval (say one minute), and not gradually or during the one minute interval. This is done so that the infantry officers know just how far their men shall advance by the watch. In other words, they know that at the end of a minute, the barrage will have lifted another twenty-five yards, and their men can then crawl forward that distance; at the end of another minute the barrage will have lifted another twenty-five yards and the men can then proceed forward again for this distance; they then hold the new position until another minute has elapsed, when the barrage will have again lifted the specified increment, et cetera.

Looking at the barrage time-table once more, we see that C in stage I, represents

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