

Other parts of the general plan call for the training of South American meteorologists by scientists of the U. S. Weather Bureau, the establishment of a tropical forest experiment station in Puerto Rico, cooperation with radio

companies for the transmission and dissemination of information, and the publication of scientific results after translation into Portuguese, Spanish and French.

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tion of chloride of lime about the premises.

The biggest danger from gas attacks is the panic that might be induced. Confusion, due to fear, and not due particularly to the action of the gas itself, would be expected to bring the greatest menace to the most people.

This has spurred efforts to combat fear by training the populations of large European cities in the use of the gas mask and the steps to be undertaken, in event of an aerial gas attack.

After the proper protective methods were worked out for defense against gas attacks, during the World War, the effectiveness of this wartime weapon declined rapidly among disciplined and trained troops. The basic idea behind civilian training is to obtain, to the greatest degree possible, civilian discipline.

3. The final menace from aerial attack is aimed—not so much at personal injury as poison gas but—toward property damage. The giant explosive bombs, of course, cause such damage, but these losses are costly to produce and would not be widely used for general destruction, but only against the most important military objectives.

However, fire is still about the best destroyer of property that exists and so a serious factor in an aerial bombardment would be the fire-creating bomb.

The thermit bomb, producing a temperature of 2,300 to 2,700 degrees Centigrade, is a fire producer par excellence.

These thermit bombs, containing aluminum and iron oxide, are tiny objects. A single plane could carry hundreds. Scores upon scores of fires could be created in a great city at practically the same instant and by this means give the fire-fighting units such an enormous task that the risk of a general conflagration would be great.

In cities where many of the homes are of masonry and the roofs are essentially fire-proof the risk from thermit bombs would be reduced. The danger in areas where the buildings are of wood would be great.

The weather would, perhaps, determine the type of attack which would be made on a given city at a given time. In windy weather thermit bombs, spreading fires, would be a good rule. This wind, however, would be just the thing not desired for gas bombing and so, on a quiet day, thermit bombs would probably give place to gas bombs. The great explosive bombs, of course, would be equally effective upon all occasions.

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CHEMISTRY

Death From Skies In War Would Strike Down Civilians

Three Menaces At Which Protection Is Aimed Are Threats of Explosion, Gas, and Incendiary Bombs

THE capitals of Europe have feverishly groomed their civilian populations for attacks from the sky. Very few doubt that the non-combatants, hundreds of miles behind the lines of active fighting, will immediately be plunged into warfare.

Any city which produces anything which can be construed as remotely affecting the final outcome of the conflict—and that, of course, includes all but tiny hamlets—may be a military objective under modern warfare.

Danger from the skies, in present day warfare, means aerial bombing and the civilians in the cities will be likely to have three distinct types of menaces dropped on them from high overhead.

1. Explosive bombs containing up to a ton of shattering explosive that will virtually destroy any objects they hit. Tests have shown that it takes 80 feet of earth or 12 feet of concrete to protect against some of these giant bombs. One explosion from such a bomb can shatter a whole city block of ordinary dwellings. Against such giant bombs civilians can expect little effective protection other than those bomb-proof shelters already built or the more massive buildings and subways which exist in cities.

It takes huge planes to carry effective payloads of such bombs. While older-style bombing planes would probably be used there is a relative scarcity of very modern large bombing planes comparable in performance with Uncle Sam's "flying fortress" type. The effective radius of these missiles is less than that of gas or fire-creating bombs.

2. More personal, in its attack on civilian populations, is the gas bomb. The rush to supply gas masks to all the people of Europe's capitals is evi-

dence of the menace which military leaders believe poison gas bombs will bring.

The imminence of poison gas bombings raises the question of whether new and yet undisclosed gases exist in the laboratories that would be more deadly than anything now known. There is such a possibility, but reasoning suggests that while there may be secret gases they would probably not be more efficient than known gases. Chlorine and mustard gas (dichlorethyl sulphide) were potent weapons during the World War, and can do major damage by themselves.

One reason for their continued use, in a new conflict, would be that the methods for their efficient manufacture and handling have been worked out. There would not be the delay in their application which occurred during the World War. It took the Allies, at that time, a year to get into production of mustard gas after the first German attacks.

The enemy of all poison gases is wind, which can dispel the gases until the concentrations fall below those which will cripple or kill. A principal military advantage of mustard gas, during the World War, was its weight. It would seep down into trenches, shell pockets and dugouts and contaminate them for days.

This means, for civilian city populations, that the first menace of mustard gas could be overcome by going to the second stories of homes. Gas proof shelters, effective for some period of time, are cheap to construct in most homes and it is to be expected that city dwellers will retire to such shelters during the actual attack and await, if necessary, the arrival of trained rescue squads to clear up the gas menace by the applica-