

ployment of one airship—dirigible balloon or aeroplane—against another will shortly develop very expert "airmanship" and a variety of aerial ordnance and protective apparatus which will be a feature of the next war.

Already types of aerial armament and terrestrial ordnance for use against air craft have been developed, especially by Germany. In aerial armament we learn of patents being taken out for guns and rifles operated by compressed air or other gases devoid of flame, of bombs and bomb throwing devices, of explosive bombs thrown by hand, of aerial torpedos and mines, of drifting kites, parachutes etc. carrying percussive explosives and other devices. On land the Germans have developed various types of automobile mounted aerial guns as large as three-inch calibre and there are various types of naval guns arranged for high angle and vertical fire already mounted on naval warships. The efficacy of guns on fast automobiles is, however, yet to be demonstrated because, although the automobile may be quite as speedy or speedier than the aeroplane or dirigible, say 40 to 60 miles per hour, it is hampered by the topographical features of land, course and conditions of roads, by other traffic and by the obvious fact that it must halt to aim and fire. The same remarks apply to some extent to naval torpedo boats and destroyers, though doubtless, they have much advantage over land ordnance.

If, however, a dirigible balloon is traveling near the surface, even if fast, it becomes a good target for small arms and rapidly handled stationary artillery if favorably posted. An instance of this occurred in experiments carried out in the June 1910 manoeuvres by United States officers where kites and captive balloons were used at elevations from 200 to 400 yards at ranges of from 500 to 2,000 yards. The opinion of the officers engaged is given thus: "If the aeroplane or balloon is to be rendered immune from crippling by small arms or by artillery fire it will have to be traveling pretty high up. Anything under 500 yards would be dangerous to the machine and its occupants." (U. S. Army and Navy Journal.)

Reconnaissance by Airships.

Much has been said the past few years of the wonderful opportunities opened by aerial navigation for reconnaissance and intelligence work. This is undoubtedly true, and it will be along these lines of usefulness that for some years to come both dirigibles and aeroplanes will be employed. It is needless to point out the ways in which the reconnaissance can be done from airships as the various methods from rapid observation at 50 miles per hour to slow, almost hovering movement sufficient to observe terrestrial details by field glasses, sketch outlines and photograph by telephono lenses can be well appreciated.

It must be remembered, however, that it is very difficult to distinguish objects on the earth at a height above it. Even at 300 feet above the ground, men appear as very small objects; at 3,000 feet, not even the strongest camera lens would bring out details of