

General Homer Lea, "The Aeroplane In War: Some Observations on a Military Delusion," *Harper's Weekly*, August 20, 1910: 8-9.

Part I. Aeroplanes as Destructive Agents

In the beginnings of a new science it is with difficulty that men differentiate between those limitations which are imposed by natural laws and those illimitable powers that they are so wont to attribute to their own creations. The product of man's creative genius causes him to vie with the gods. He judges that the process of external affairs is determined by his own wants, by his own will, and only when experience shows him the folly of his pretensions does he attempt to disentangle himself from those notions he wants believed to be imperishable.

In the mutability of human progression we find that man's vanity and the ignorance of it alone remain constant. Because of this the infancy of every science, ancient and modern, is swaddled in fetishism, and so swaddled is this new science of Flight. What God denied man he has now made for himself; and this creation of his he has endowed with potentialities it does not possess.

The ideas now so widespread concerning the use and value of aeroplanes in future conflicts, is due primarily to prevailing ignorance concerning laws and forces that govern the conduct of war; and a failure to comprehend that all engines and instruments of combat occupy but a limited and subordinate sphere. In England, China, and the United States, where militancy has become an immaterial factor, such ignorance is almost universal, and neither political nor social eminence is a preservative against military delusions.

The superstition of the inanimate is still upon man. It is true that the moonlight no longer has its fairies, nor the solitudes their genii, nor the darkness its phantoms; but these old familiars of man have not departed. Under a new nomenclature man still houses them in his own creations, his theories swarm with chimeras, his doctrines with simulaera and phantoms, while his engines of war are endowed not with human, but superhuman power. Whenever militancy goes from the spirit of a race, there enters into it, in a proportionate degree, a racial aversion to pain and subordination; in other words, moral and physical cowardice has come upon it, and it is then, in that period of evasion and subterfuge, that he seeks succor in the inanimate; in gods, inventors, or what not.

Paradoxical as it may seem, military delusions increase in nonsense with the increase of what is known as civilization. And in this epoch-making age we find certain nations thrilling with the pitiful hope that wars in the future will be carried on by aeroplanes guided perhaps and controlled and fought in the upper heavens by Hertzian waves. No man shall be upon them. Unseen, unheard by the dainty multitudes, they will manoeuvre and bang and ram away at one another until the battle is ended; not a single life lost, not a pound of potatoes consumed. The inanimate has been welded and soldered and hammered and sewed together so that it alone bears the burden of combat.

To such nations, scheming to keep without the labor of war, what in their military vigor they gained by war, we owe the delusions of Hague conferences, submarines, and now—aeroplanes! Were it possible, they would do wholly without war, could they retain in their moral and military decrepitude the fruits of their virility; but if wars must be

fought, and let them be carried on by man's creation; those machines to which are attributed such powers as alone belonged to the supernatural of yesterday.

Unfortunately, wars are between men and not between the instruments they make use of in their combats. The causes, purposes, the progress of war are not immutable to the very changes that occur from age to age in human society, but bear the same relation to the transient machines of combat as does the progression of civil life bear to the utensils of husbandry and commerce. In modern times no material difference will exist between the armament of nations, since, as has been said before, the armament of the greatest military power must determine relatively the armament of all other nations, which is made possible on account of the intimacy of international associations in the general diffusion of mechanical knowledge.

Should, however, the armament of one nation be superior to that of the other, it will not prove decisive if other conditions more important in military efficiency are lacking. The chassepot of the French was superior to the Prussian needle-gun in 1870, and the Russian artillery superior to that of the Japanese in 1904; but it was not the chassepot and the needle-gun that went out to fight, it was the Frenchman and the German; nor was it the artillery of Russia that thundered down alone to conquer Japan, but the Russian himself. Yet the chassepot but pointed out the way to Sedan, and the Russian artillery did no more than mark those broken roads that led to the trenches of Mukden. And so shall there be for all time Sedans and Mukdens for those nations who seek to substitute for the efficiency of the soldier the efficiency of the weapon. Out of the inanimate they but create for themselves Frankensteins, and in due time they are, by their own creations, destroyed.

This tentative and futile evasion by man of those works that national development and expansion lay upon him, and his transference to the utensils of combat the accomplishments of those labors that he alone can perform, is not new. But in the future this condition will be supplemented by those elusive theories that continue to emanate from militantly declining races those melancholy portions of society that call their moral cowardice altruism and their physical cowardice the brotherhood of man. Only a little over ten years ago a classical instance of this evasiveness of mankind was given to us. It was through the altruism of H. Bloch in his book the impossibility of future wars. In this he deals with the ferocity and destructiveness of modern weapons. Man, except to be killed with these weapons, was made of little account. So frightful did the engines of combat appear that to conceive of the impact to hostile armies without the complete destruction of one or both of them was impossible. It seemed at that time that man had conquered himself by giving to the inanimate power that he himself could not withstand. That power once turned loose, he must perish.

Paradoxical as it is, subsequent to the writings of H. Bloch, nearly every great nation has been engaged in military enterprises and the destruction of life has been proportionately less than any of the great wars of the past. What, might we ask, is the salient difference between the battle of Waterloo and the battle of Liaou Yang?

The difference of the yardstick.

The range of musketry and artillery has only increased the zone of fire between hostile fronts; communication by telephone, telegraph, and heliograph has only extended their flanks, while the rapidity of fire has done no more than widen the interval between the ranks and the individuals composing them. By these natural and simple expedients

man has restored that invariable equilibrium which must always exist between the weapons of offense and the means of defence.

What, then, is the difference in the fundamental principles of ancient and modern wars?

There is none.

Do not new machines of war or military inventions alter perceptively these principles?

They do not.

Mankind as a whole almost always transfers to the inanimate world those strange conceptions that are the product of his wants and fears. He gives to mere form his own volition and circumstances the unknown with limitations of his own perceptions. Whatever possesses the potentiality of destructive power or is strange or vast fills his mind with dread. And now that man has come to the age of flying, he again turns his eyes heavenward and with the same credulity that peopled the heavens with gods and monsters, he marks out for himself new hopes and fears. About the strange craft soaring overhead he has created a phantasmagoria of realities.

Yet, concerning the aeroplane as a destructive agent in warfare, we lay down this apparently paradoxical axiom; that the greater the destructive potentialities of the aeroplane are, the less destructive will it prove to man in his wars. And if it should ever possess the capacity to annihilate cities and lay whole kingdoms in ruin, then, indeed, both cities and kingdoms would become immune, and the aeroplane would cease to be a combative agent.

The law of defence is elemental. Defence is the corollary of offense. It does not alone appertain to man, but to all forms of animal life. The progression of human defence is determined by the development of offensive weapons. Due to the use of swords and spears and arrows came shields and armor; as men banded together in larger units for the purpose of offense, fortified positions were made use of; with the increased range of efficiency of modern weapons, defence was found by increasing distance and by concealment.

When, however, destructive agents come into possession of mankind, that are beyond his control, he resorts to the final and most complete means of defence against them--that of mutual prohibition. The history of war shows that the more destructive the instruments of combat become, the less destruction results; and whenever that destructiveness becomes uncontrollable and annihilative, it becomes harmless.

Due to the above factor, we establish this law of combative equilibrium: The equilibrium between the years of offense and defence remains relatively constant. This is due to three reasons:

1. The development of offensive weapons is made necessary by the initial superiority of the defensive capacity.
2. The development of the defensive always precedes that of the offensive, or there would be no continuous development of offensive weapons, which, in turn, would necessitate no change in the defensive. This would result in an absolute equilibrium or equality between the means of offense and defence.
3. Whenever the development of offensive weapons equals the capacity of human defence, then at that point offensive development ceases.

Whether the combative equilibrium is relative or absolute, the militancy of the combatants alone determines the issue. Man cannot get around this law, for he is the law, and to protect himself far beyond the possibility of self extinction is the elemental principle that governs his activities. He will, therefore, always reduce to uselessness by mutual prohibition those destructive agencies within or without war that are not capable of his control and restriction.

At present he prohibits by international convention the employment of poison or poisoned weapons: killing or wounding treacherously; to kill or wound an enemy who, having laid down his arms, has no longer means of defence; to declare that no quarter shall be given; to employ arms or projectiles or material calculated to cause unnecessary suffering. He has forbidden the laying of unanchored automatic contact mines except under certain conditions; or to lay anchored automatic contact mines except under restrictions; the use of torpedoes that do not become harmless when they have missed their mark. He has forbidden the laying of automatic contact mines off the ports and coast of the enemy with the object of intercepting commercial shipping. He has forbidden the bombardment of undefended ports, towns, villages, dwellings or buildings; neither can these be bombarded on account of failure to pay money contributions; nor can a town or place, taken by storm, be pillaged.

It was this same instinct of preserving the supremacy of defence over that of offensive weapons--common not to a portion of mankind, but to the whole object--that prohibited the use of balloons and other aerial craft as combative agents immediately subsequent to the American Civil War, where they were, for the first time, tentatively used in reconnaissance. While the science of aeronautics was still embryonic, no more than a nebulous possibility, the fear of the air fell upon man.

The first convention to assemble subsequent to the American Civil War was that of St. Petersburg, November 29, 1868, and in that convention the use of aerial craft for the dropping of explosives was prohibited. The next prohibition was the Hague Declaration of July 29, 1899, and at the second Hague Conference in 1907 this prohibition was continued to the end of the third conference, which will not be convened for several years.

The elimination by international agreement of the harmless old gasbag of the Civil War as an engine of combat shows how deeply rooted is man's fear of those destructive engines that may drift without his control. Now, however, with the more or less true principle of flight discovered, these possibilities that inspired the declaration of St. Petersburg more than forty years ago have become to a degree actualities, and, being actualities, they have produced conditions not, probably at that time, fully understood. Nor do we mean to say that they are now apparent, but are considered relative to the future development of the aeroplane, rather than the primitive thing that now, as a fledgling learning to fly, hardly more than flicks about over limited distances.

At the present time all forms of aerial craft are useless as effective engines of war, not only on account of their undeveloped state, but also because no projectile has been invented which, dropped from aerial craft, would produce the degree of destruction that is believed in by the public. With these factors, however, we have nothing to do. We are only to show that when whenever the aeroplane shall possess the destructive characteristics now attributed to it by popular belief, it will then become as useless in

warfare as the use of poison--thanks to the mutual agreement of those great nations that control the international affairs of the world.

The regulation of the means and manner of the conduct of war is now determined, not by individual commanders nor single states, but by international conferences and agreements. Such conferences are dominated by the great military powers, and whatever agreement the delegates of these nations determine upon, the minor states of the world must, perforce, accept. In the future, as in all past international conferences, no agreements will ever be reached that, lessening the combative ability of the controlling powers, will, at the same time, increase that of minor nations. Yet the admission by international agreement of aerial craft as a combat of agency in warfare would diminish the military power of the great nations in inverse ratio as it increased the military capacity of minor states. This apparently anomalous condition is determined by two principles:

1. There are but three objects to be attained in war: the destruction of the enemy's forces; the destruction or control of his resources; and the destruction or seizure of his government. Battles are fought only to this end.

2. The use of aeroplanes as destructive agents withdraws from the great powers the advantages they now possess in war over minor states due to greater wealth, armament, and population.

In a war, at present, armies are able to protect a position of their territory for a longer or shorter period of time by contesting the frontiers. Armies must move by roads that are defined and known to both combatants; while the Navy of the nation, moving about on a single plane, is able also to a greater or less degree to prevent the ruin of war from falling upon those portions of the nation whence it draws its resources, and the greater the wealth of a nation and the more complex its industries and civilization, the more does the destruction or threatened destruction of these affect its capacity to wage war.

But to the aeroplane there are no frontiers, no roads that they must travel over, nor passes nor bridges: nor, like ships of war upon the sea, are they limited to one plane. The ways of the air are, relatively, as numerous to them as the width of the aircraft, and their vertical planes to the height of their flight. In this manner, the entire population of a nation, together with their means of subsistence and their habitations, are brought into the theater of combat, and that which now constitutes the power of the great nations goes for naught.

Should aeroplanes ever be used as engines of war, we would be obliged to reverse military conditions and except three new principles of war:

First, a state composed principally of rural communities would possess irrespective of its wealth or population, proportionately greater military potentiality than a nation whose wealth and population were concentrated in towns and cities. As we have said before, the three objects of war are to destroy or possess the enemy's army, resources, and government: the destruction of his army being only necessary in order that the resources and government might be gained, for the seizure of these latter two elements, and not the first, is the purpose of war.

To illustrate this principle, the late war between Spain and the Moroccan tribesmen affords an example. While fleets of Spanish aeroplanes were being directed against the tribesmen, careening about over the desert or congregated in small widely separated habitations--the annihilation of half of whom would have no effect on the other

half--the Moroccan aeroplanes have fixed objectives, viz., those immovable political strategic, and economic centers, Madrid, Barcelona, Seville, etc., which, destroyed, would so disrupt the Spanish Government that it could not prosecute the war, nor could it with its airships retaliate upon the people whose political and economic conditions of natural life were not concentrated in the component parts of which were self dependent, politically as well as economically.

The second principle is that a nation whose economic and political needs are relatively primitive is more capable of making use of the aeroplane and better adapted to such a war than a nation whose form of government and civilization is complex. As an illustration of this, a war between Mexico and the United States affords an example. So complex is the economic condition of the United States that there is not to be found an important community in this republic that is self-sustaining. Once the centres of control and distribution are destroyed, with further destruction of lesser centres, the republic falls into chaos, and all military coherence would be rendered impossible, and any successful prosecution of the conflict would come to an end in the turmoil of internal disorders.

On the other hand, if the principal cities of Mexico were destroyed it would have relatively far less effect upon the nation, owing to the simplicity of the economic wants of the people as a whole and the self-dependence of separate communities.

The third principle is that the probabilities of victory in a conflict between an established power and an unorganized government or revolution are reversed. The burden of conflict would then rest, not with the revolutionists, as is now the case, but with the government. Once this apparently anomalous condition is made possible, there can exist no security for established government wherever discontent is possible among its people.

The consideration of a Polish revolution against Germany illustrates graphically this principle. From concealed bases the political, economic, and military centres of the empire would be subject to attack and capable only of aeroplane defence, which, as we have said before, is an impossible defence, since the aeroplane is restricted to no defined avenues and possesses vertical as well as horizontal freedom of movement. The German government would be forced solely upon the defensive. No offense could be made, regardless of the number of her aeroplanes. She could not lay waste Polish cities, for the Polish cities are her cities; their wealth her wealth, and a large proportion of the population loyal. The empire would have but one resource: the destruction of the revolutionary airplanes, an almost impossible task, for when mankind uses in his wars the highways of heaven, he leaves no wheel-tracks behind him. The air-ships come and go and leave no spoor other than the dreadful death they drop down upon the city tops, alike upon the palace roofs of kings and the garret roofs of paupers. Their bases may be in the Carpathian Mountains, and the marshes of Pinsk, or in the gloom of some Polish wood, or in all these and numerous other places. To discover and destroy these must cover a period of time, and when accomplished, entail upon the revolutionists an insignificant loss, postponing to another year the re-commencement of the unequal conflict.

We can, therefore, accept as established truths:

1. That the use of perfected aerial craft as destructive agents in warfare is incompatible with international control by those great nations that now determine the mode and means of international warfare.

2. That the use of perfected aerial craft and warfare is incompatible with the rule of the majority, in wealth, population, and physical power.

3. That the use of perfected aerial craft in warfare is incompatible with organized and stable governments.

4. That the governments of the world, in tentatively forbidding the use of aerial craft as a destructive agent in warfare, acted through the force of a natural law, and this prohibition will pass from the tentative to the absolute as aerial craft pass from the experimental to the perfected machine.

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Part II. Aeroplanes as a Means of Reconnaissance

A condition very noticeable in the practical workings of the science of war--and no doubt true in many phases of other sciences--is the failure to realize the limitations that circumscribe the utility of mechanical contrivances. To new inventions, because of the natural credulity of men, are almost always ascribed the repute of maximum utility, which is reduced by slow gradations only as empirical knowledge manifests their limitations. This conditional viewpoint is not only the natural one, but any other would, in a general sense, be impossible.

An invention, in overcoming some natural impediment or substituting artificial for natural means, or increasing natural capacity, has a point of hypothetical completeness--that is, complete accomplishment of the purpose of its invention. In the beginning, men almost invariably fixed their minds on this hypothetical perfection, and only when time and experience show them how far short of this the invention falls do they gradually alter their opinions. Thus, the automatic gun, the long-ranged rifle and artillery, the submarine, the torpedo, and other numerous inventions have gradually lost the terrible potentiality they were supposed to have in the first untried days of their invention.

We are not, therefore, wrong when we say that those military men who have such high hopes in the utility of aeroplanes and other aerial craft for the purpose of reconnaissance have their thoughts fixed on that hypothetical degree of completeness that gives to aerial craft powers they can never possess. In most instances this form of delusion is due to the fact that military men allow themselves to be influenced and carried away by the unreasoning mob-mind of multitudes, so that their judgment is no longer free from prejudice and those cheating hopes that preclude reason.

In this case, fixing their thoughts on aerial craft high in the heavens, they apparently forget the earth, the purpose and limitations of true reconnaissance. That aerial craft can and will be used in the future for reconnaissance is quite certain, but their use will be so limited that they will be relegated to an entirely secondary consideration. The reconnaissance of a battlefield or a projected theater of combat is not and cannot be confined to aerial inspection. To look upon the terrene is not to know it any more than one is able to guess the character and purpose of an individual by looking at him. Reconnaissance is not merely to view, but to become acquainted with, the theater of

action, and there can be no acquaintance by aerial inspection but what will sooner or later prove to be an optical illusion.

A battle is not analogous to a game of chess or checkers, as the self-delusive and whimsical mind of the public is so wont to believe. And while it is better, in such a game, to look down upon the pieces than to peer over the edge of the table, this analogy cannot be carried to the checkered field of battle. In considering military reconnaissance, it must be remembered that its activity is specific and limited. The conduct of a battle is not determined by man alone, but by him and the earth that alternately opposes his intentions or abets them.

Alas! what little consideration does man, in his combats, give to his great opponent or ally--the earth. The number of battles the earth has won for man and lost to him is immeasurably greater than those due solely to his prowess. Yet his vaingloriousness scorns to acknowledge to this universal combatant the credit of his victories or the responsibility for his defeats. Rather, like the ancients, he would have the gods come down and war for or against him. These gods he calls Luck and Chance: the Indefinable; for to define them would only manifest his ignorance of that old, old combatant fighting in every skirmish and battle of man. She has her ramparts, her abittis, her moats. She has her gloom and inspiration that turns to good or evil the morale of armies. She has her ambuscades and whole armies go into these to return not again. She leads man and bewilders him; she constrains his activities and abets them; she throws barriers across his advance; she alternately defends and devours him. That is why the ancients offered up sacrifices on the day before battle. They had a dim consciousness of this goddess, the combatant earth. In modern times the sacrifices are postponed to the day of battle and are yielded up in great hecatombs upon its fields. In war the alliance or hostility of the earth is not an unknown quantity; her support belongs to the armies who know her and are conscious of the part she plays in every battle. But to those forces and commanders who, ignorant of the part she has to take, scorn and deride her, there is no escape from a pre-determined and melancholy end.

One cannot deny the earth and learn those hidden secrets that give to armies victory or defeat. Yet reliance upon aerial reconnaissance presupposes to a greater or less degree this denial. Knowledge and not a fleeting view of the terrene constitutes the essential factor in an army's reconnaissance, and such knowledge can be gained only by actual contact. All that aerial scouts could accomplish would be to observe the movement of troops. But we will hereafter show that the introduction of aeroplanes for observation will so increase the secrecy by which troops are moved from one position to another that the utility of this form of reconnaissance will not be as great as is most generally supposed.

Those who regard the aeroplane as invaluable in warfare, far beyond its possibilities, are led to their conclusions by two errors: first, they do not differentiate between the wonder of the invention, *per se*, and the limitation of its application. Second, that this conquest of the heavens has nothing to do with the subjugation of man. It has not invented into him new faculties; and yet it is man and not machines that we have to deal with. While it has given new means of military observation, it does not follow that these observations will be more intelligible nor his deductions more reliable, nor his judgment and genius, his valor and endurance, superior to what it had been before.

The unreliable and diverse opinions of scouts on things that they have been in actual contact with is a well-known military phenomenon, and one that is perfectly natural, since there are no two men whose perceptive faculties are identical. A good scout is one of the rarest elements in an army, for he is good only because he has lived in an environment and followed a vocation that develops the faculties of observation and renders them accurate. An aerial scout, on the other hand, suddenly shoots forward out of a vocation that has nothing to do with those elements that would give reliability to his reports even though he were inspecting, on the ground itself, the familiar objects. But he is in an entirely new environment: he must judge all things from an entirely different point of view, and there is but one single thing that he could make a report on that would be worthy of consideration, and that is the actual movement of a body of troops on an open terrene. But his reports as to the strength, its destination or rate of movement, could be accepted by no commander, and practically all the rest of his information would be erroneous.

Peering down from a great height, it would be impossible for him to determine the depth of streams, their bottom or their currents or the thickness of ice. He could not ascertain the angle or height of declivities. Looking down from the perpendicular upon these, he could have no means of determining whether or not they belonged to a deep gorge or a shallow ravine. He could not ascertain the location of fords and whether in adjoining thickets they were defended by bodies of troops or by wired entanglements in the ford itself. It would be impossible for him, looking down upon the woods, villages, and forests, to ascertain whether or not they contained troops, and if troops what kind of troops or the number. What would appear to him to be a gap in the enemy's lines might in all probability be their strongest position.

Conditions governing observation from aeroplanes are, moreover, restricted in still another sense; they must move at a great height to be beyond the range of gunfire, and this necessitates the use of binoculars for observation. To maintain themselves in the air they must have such a speed that the area of observation, limited by the area of the glasses, gives no continuity to the survey, and on account of the rapidity of the movement of the carriage no observation of minute character could be made of the area visible through the binoculars but what would prove illusive. Any one can determine the inutility of such a scheme by trying to observe a mountainside a mile away through binoculars while in a railroad train or motor-car moving at thirty miles an hour. Such observations would be far more accurate than those taken from an aeroplane, from the fact that one would be viewing what one is accustomed to view, the vertical elevation of objects.

Were it possible, however, to use aerial craft for reconnoitring in the manner attributed to them by the people at large, of what value would be such observations?

They would be dangerous in both a negative and a positive sense. The information given concerning topographical features would be useless until verified by actual contact with regular scouts. Those features of the topography that are essential for commanders to know must always remain enigmas to aeronauts. They could give no information acceptable to a commander as to any natural obstacle being or not being passable to the different arms of the military force--whether a forest, river, ravine or mountainside. They could not tell whether ice would support foot, cavalry, or artillery, or none of them. They could not distinguish between a fallow field and a marsh; yet upon

this exact knowledge the decision of the battle might rest. They could not tell the dry mud of Austerlitz from that which did not dry on the field of Waterloo. With what eyes could they have peered down through the pine woods of the Chickahominy and found the fatal base of that broken triangle Lee had thrown about the bewildered army of McClellan; or through the thickets of the Wilderness or Antietam; or at Chancellorsville fathom out the mind of a man who moved in plain view of an entire army and rolled it back to utter defeat?

Such is the character of the negative dangers entailed by the use of aerial craft, while the positive dangers are that in having air-ships with armies they will be made use of, not under special and possibly just circumstances, but under all conditions, and the information thus gained will influence commanders to a great degree on account of the supposed increased accuracy of the means of securing it. As the balloon of the American Civil War prevented the movement of the Army of the Potomac and lost to that army its greatest opportunities for decisive victories, so shall there occur in the future, by the same general means, the same procrastinations, the same dreadful culmination.

To judge, however, the value of aeroplanes or other aerial craft, from the viewpoint of battles fought in the past, is not only useless, but absurd. Yet from these very means are deduced the erroneous conclusions of those who now believe in their unlimited capabilities for observation in future wars. What is more common than to hear exclaimed: well think what would have happened if such and such a general had had air-ships?

It should be remembered that prior to the Napoleonic wars and in lesser degree up to the time of the American Civil War, tactical secrecy was not and could not be attempted on account of the short range of the ordnance and compact movement of troops, and therefore all that, in a general sense, which was worth being viewed by air-ships was visible to the commanding general on the field.

Beginning with the American Civil War and culminating with the Russo-Japanese conflict there has been a continuous extension of the line of battle and expansion of the movements of columns on, to, and from the flanks, until we find in the last war a line of battle approximately twenty times longer than the fronts of Napoleon at Waterloo. Under modern conditions it might be argued, therefore, with apparent plausibility, that the time for the use of aeroplanes has now come.

But what brought about this extension and wide dispersion of armies in the field? The necessity of mutual defence, the law of self protection made operative by the destructiveness of modern ordnance and the rapidity of communication and transportation. When aeroplanes are used, whether for reconnoitring or other purposes, this same law will again alter the tactics and logistics of armies so as to procure the necessary protection. And as has been stated before, offensive utilities can never overtake in their development the defensive capacity of man. To conditions alone manifest the truth of this relative to the use of aerial craft for gaining knowledge of the enemy's position or movements.

Reconnoitring, other than a reconnaissance in force, is supposed to be carried out as secretly as possible and to the degree that secrecy is maintained in securing information is to be found its value, since the enemy, not being aware that his movements have been discovered, will make no attempt to change them or reinforce his columns or alter their direction. But in reconnoitring by aerial craft the element of

secrecy is dispensed with absolutely and all observations are made in full sight and knowledge of the enemy, and consequently can possess no determinate value.

The use of aerial craft for reconnaissance instead of inducing radical alterations in the logistics and tactics of armies only adds, by a single gradation, another phase in the evolution that has been going on in the employment of military forces during the last fifty years, and that slight change, coming under the law demands defensive capacity, nullifies any practical use of aeroplanes for military observation.

Beginning with the American Civil War, and progressing proportionately as were introduced new military ordnance and utilities, has been the increased concealment of troops individually and in force; in marches and in conflict. This science of concealment reached its highest point of development in the Russo-Japanese War. There were whole armies marched and fought practically concealed from one another; men in covered trenches; guns in covered pits. Before crossing the Yalu, Kuroki's force was obliged to follow a spacious road on the left bank entirely visible to the enemy entrenched across the river. During the night pine trees were transplanted so thickly along this bank that the movement of his force was completely concealed as they moved over this position of the road. Whenever, therefore, aeroplanes or other air-ships become agents of military observation they will be rendered practically useless by the simple expedient of adopting vertical concealment to the same degree that horizontal concealment is now practised.

Moreover, it will be found in future wars that all such appliances will be most largely used by non-militant nations. For whenever a nation denies the possibility of war it scorns its knowledge, endeavoring, on the one hand, to escape by evasion what it is not prepared to meet, and attempting by subterfuge to meet what it cannot escape. Because of this it will be found that in whatever proportion volunteers constitute the nation's military forces in war, in just such proportion will there be made use of such impracticable means to gain information and carry on war. The vast proportion of commanders, being without military instinct or training, will be unable to distinguish between true and false military information; hence until after several years, or, in other words, until after the militia and volunteers cease to be volunteers or militia, and superior commanders supplant political favorites, there will be almost endless procrastination and disasters resulting from this single cause.

True preparation for war concerns itself alone with the preparation of the soldiers for combat, and has nothing to do with the illusions of hope nor those vain speculations by which men pad their valor and fudge upon the unoffending machines they trundle to and from the field of battle. Only when the men of a nation are militant by upbringing and military by training are they able to understand the wide chasm that separates the soldier from his weapon, and to realize that the degree of perfection in a soldier determines in its final phase the military utility of every instrument of combat.

Ante-bellum war utensils are not determinate factors in war; the innumerable and variant conditions, coexist with the war itself, evolve the means by which campaigns are conducted and the manner its battles are won or lost. While there never has been and never will be two wars identical in the application of their means, yet there remains through all the endless changes warfare one constant factor--the soldier.