THE EFFECTS OF THE ATOMIC BOMB ON NATIONAL SECURITY

(An Expression of War Department Thinking)

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ABSTRACT

It is considered that the atom bomb is not the ultimate atomic weapon, because its cost is excessive and its use is restricted.

Greater destructive power than that of the bomb is anticipated in the use of radioactive particles, dispersed without explosion, to contaminate water supplies and large industrial areas.

Because radioactive particles would be created as a byproduct of peace-time atomic power plants, it would be difficult to establish any international control of the use of radioactive particles as atomic weapons.

Atomic warfare probably would result in the ruin of both or all contesting nations.

Russia is considered not to be likely to have atomic weapons in quantity for eight to fifteen years. Therefore, war initiated by Russia is not expected for the duration of this period. No foreign attack is expected while atomic weapons are held by the United States alone.

If an atomic war does come, total mobilization will be required. Every citizen must be trained to deal with emergency, in one capacity or another. Local governments must be ready for operation independent of central government. A highly developed intelligence system will be a necessity.

If the United States is to hope for survival in such a war, basic industrial facilities must be dispersed, and possibly duplicated underground. There must be provisions for establishing the White House and other key headquarters underground. Action must be taken to disperse and put underground all important military stockpiles.

In atomic warfare, the tactics of other wars will still be used. The Government will still need armies, navies, and air forces.

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PART I

CAPABILITIES AND LIMITATIONS OF THE ATOMIC BOMB

In order properly to consider the effects of the atomic bomb on our National Security, it is necessary to discuss briefly the capabilities and limitations of the weapon. The nature of the atomic bomb, involving as it does a great scientific discovery, and the security measures adopted to safeguard its development and employment, have given rise to false claims and false impressions which have hampered its correct evaluation.

The atomic bomb releases energy in three forms: radiant heat (as in other explosions, but much more intense, due to the extremely high temperature and to the size of the characteristic fire-ball), radiation (similar to X-ray or radium effects), and blast or pressure (similar to ordinary explosions but much more severe). The temperature at the center of the explosion is estimated at millions of degrees Centigrade and even at the edges of the characteristic fire-ball it is placed at between 3,000 and 9,000 degrees C. Burns of unprotected skin occur as far as 13,000 feet from an explosion in the air; however, the heat is of only a fraction of a second's duration and even light clothing or the shadow of a building affords considerable protection at some distance from the explosion. The radiation effects are highly penetrating and are lethal for an average distance of 3,000 feet from a point directly under an air-burst such as that occurring at Hiroshima and Nagasaki. They are caused primarily by gamma rays, which are very intense and penetrating X-rays, by released neutrons, and by the radio-active particles which result from the explosion. The lingering effects of radiation are not accurately known as yet. In the case of a high air-burst over ground or water, it appears that the area can be entered within a matter of hours without harmful effects. On the other hand, radioactivity such as resulted from the underwater explosion at Bikini may deny access to an area or an object such as a ship for many months. The blast effects are essentially those of conventional large high explosive weapons, though on a much larger scale. The energy equivalent of an atomic bomb is estimated at 20,000 tons of TNT if the 20,000 tons of TNT were detonated in one charge. If compared to the total equivalent blast damage of a number of smaller charges set off in efficiently dispersed locations, the effectiveness is something of the order of 800 to 900 tons of TNT. The destruction effected at Hiroshima and Nagasaki covered between 3 1/2 and 7 square miles, including the areas of absolute and serious damage.

The atomic bomb is not an all purpose weapon; in fact, it is rather narrowly limited in its employment due to its great destructive power (which is not significantly reducible at present), and its relative high cost as a single weapon. In a restricted sense, it is just another bomb, particularly suited for purposes of destruction of major targets, such as cities, industrial concentrations and major military targets. In a broader and more accurate sense, it is "a decision in a package," providing a means of wiping out large segments of civilization. The casualties at Hiroshima were 70,000-80,000 killed and a like number injured; those at Nagasaki 35,000 - 40,000 killed and another 35,000 - 40,000 injured. The bomb itself is of little value without the means to deliver it on a selected target.

Any consideration of the atomic bomb, therefore, must take into account the vehicles by which the atomic explosive is delivered. At the present time means of delivery under tactical conditions are limited to long-range heavy bomber type aircraft, or to surreptitious transportation to, placement on, and detonation at a target.

Future developments will likely make possible the employment of atomic explosives by such other means as pilotless aircraft, and as warheads in guided missiles and torpedoes. It may also make possible the employment of atomic weapons other than explosives. Such weapons might make use of the radioactive effects of particles dispersed by means other than an explosion, thus providing the radiation effects without the accompanying blast and heat effects.

PART II

THE OBJECTIVE AND REQUIREMENTS OF SATISFACTORY INTERNATION CONTROL

We recognize that satisfactory international control of atomic energy provides the only alternative to a future atomic armament race with attendant world-wide day-to-day fear of atomic attack; therefore, we support fully the present efforts to establish such international control. We are aware that to be effective a system of international control must include:

a. An international agency with power to control atomic activities.

b. Right of access to, and freedom of movement within, the borders of all nations, to insure adequate inspection for violations.

c. Proper safeguards to protect complying states against the actions of any state violating the agreements. In the final analysis such safeguards must include the readiness to impose sanctions, including war, upon the violator. Therefore, before sharing our atomic knowledge with the nations of the world, we shall insist that these three basic elements be accepted in the control system.

We appreciate that the most we can expect from a system of international atomic control is a period of approximately one year in which to prepare for a full-scale atomic attack with significant quantities of bombs after warning has been given of a major violation of international control regulations on the part of one nation or a group of nations; therefore, we must retain indefinitely, in accord with international agreements, our knowledge and industrial capacity to produce atomic weapons. The employment of such other atomic weapons as radioactive particles or materials is not only possible but also might be effected with little or no warning, since such material would be a readily available by-product of atomic power plants, once developed. This possibility demands our continual vigilance and investigation.

PART III

THE IMPORTANCE OF TIME

At present, to the best of our knowledge, only the U.S. has developed and manufactured atomic bombs. Other nations are making strong efforts to develop this weapon, but our best estimates indicate that it will take any other nation several years successfully to complete one bomb. It is further estimated that unless a new, "short-cut" technique is developed, and this is not foreseen at present, an additional period of several years will be required before the successful nation could produce a significant number of bombs (significant in the sense that they would provide an important military capability). These calculations lead us to two conclusions:

a. For a number of years, perhaps as many as eight to fifteen, only the U. S. will possess atomic bombs in significant quantities.

b. After the period mentioned in a above, other nations will possess atomic bombs in significant quantities.

These conclusions are reached without considering the possibility of successfully completing satisfactory international control of atomic energy. If international control is achieved, the U. S. will presumably dispose of its bombs upon satisfactory implementation of the other provisions of the agreement which call for proper safeguards and rights of inspection. It is apparent that a period of time will elapse before final disposition of the U. S. stockpile. Five years from the date of agreement on international control is judged a reasonable figure for such a period. At the end of this period all nations would have access to the know-how of making bombs, but no nation would have authority to do so. Another figure of significance is the estimated time required to produce atomic bombs in significant numbers after illegal seizure of facilities by a violator of the international control agreements. This figure is estimated at one year.

Assuming, then, that international control were made operative in the near future we can draw these three conclusions:

a. For a period of about five years only the U. S. will possess atomic bombs in significant quantities.

b. After a period of about five years no nation will possess atomic bombs in significant quantities.

c. After a period of about five years the U. S. and other nations, by openly violating agreements, can produce in approximately one year significant quantities of atomic bombs.

Considering the two sets of conclusions tabulated above, and noting that the security of the U. S. requires that the most disadvantageous possibilities must dictate our minimum measures for security, it is apparent that we must be prepared to meet the threat of: atomic warfare, with one year's notice, at any time after about five years; atomic warfare, without prior notice, after an interim period of several years (estimated variously from eight to fifteen); and "conventional" warfare at any time.

In the discussion to follow, emphasis will be placed on the future period when other nations, as well as the U. S., possess significant quantities of atomic bombs. It must be borne in mind, however, that this

military atomic age is still an estimated minimum of several years in the future. In the meantime our strategy, tactics, weapons, and political and military requirements must undergo gradual evolution, in such a manner that we will attain the advantages of accelerated development and acceptance of the new, while simultaneously retaining the full security afforded by the old. Time is an all-important factor in our military posture.

PART IV

THE EFFECT OF THE ATOMIC BOMB ON OUR POLITICAL REQUIREMENTS

The total destruction of a nation's resources which has evolved from the development of strategic bombing has been brought to culmination by the atomic bomb. The end of an atomic war may find both victor and vanquished in a state of almost complete ruin. It follows that winning the war may well not be preserving national security. With minor exceptions, the U. S. due principally to its geographic position, has never been threatened with a destructive war fought on its own territory. Even the appearance of strategic bombers and missiles such as the V-2 posed no immediately serious threat for the population and industry of this country during World War II. The development of long range aircraft and guided missiles, however, coupled with the introduction of atomic explosives now makes the U. S. vulnerable to the destructive effects of total war and leaves us in the position of no longer being able to count so heavily on our geographical location for the protection of our homeland.

The "cushion of time," which we have historically enjoyed for the mobilization of our resources, both manpower and industry, is lost. The loss of our "cushion of time" results not from the atomic bomb alone, but also from the means of delivery, the long range bombers. As time goes on and long range missiles and other means of delivery are developed, the effectiveness of surprise attack will be reinforced. The present technical capability, however, of making one-way bombing trips from distant portions of the globe to targets in the U. S. proves that the problem is a current one. We are prevented by our form of government and our constitutional processes from launching surprise attacks against potential enemies, but unfortunately the reverse is not true; whereas our Congress has the sole right to declare war and whereas our moral position in the world and the force of our public opinion prevents our leaders from initiating an undeclared war, the same is not true of possible aggressors who, with their totalitarian forms of government and their uninformed or misinformed populaces are able to launch surprise blows against the U. S. This military disadvantage is a sacrifice we inherently make in the interest of our democratic way of life. Our military strategy must take it into account and devise ways and means of decreasing the scale of its disadvantageous effects.

From a political point of view, then, of vital importance to counteract our loss of a cushion of time is a need for allies. We cannot stand alone in the world today, if for no other reason than lack of sufficient strength to do so. Balance of power is still a factor in preventing war, and will remain so until the United Nations concepts have developed sufficiently to outmode it. The shock of a powerful aggressor, with modern weapons, including the atomic bomb, can be better absorbed by a number of nations than by a single nation. The ability to retaliate promptly, and eventually to overcome the aggressor, likewise is dependent, if success is to be reasonably certain, on bases, resources, and forces dispersed in more than one nation.

As a means of securing warning of impending attacks, we must have an effective, national intelligence service. We have never had an adequate intelligence service. A worldwide organization such as that employed by some other great powers has never been accepted by the open, democratic character of the American people, nor has it been, heretofore, a requirement for their security. Since we are a nation whose strength is a potential strength, requiring a certain amount of time to put it into action, it now becomes of supreme importance that we are apprised early of the possibility that a foreign power or powers may be plotting our destruction. We are the choice prize of any aggressor, the envy as far as the material things of life go, of every nation on earth. Adequate intelligence cannot wholly make up for the advantage we accord an opponent in giving him the initiative to attack by virtue of governmental structure, but by gaining prior knowledge of his intentions upon which to base increased alertness on our part, we can offset to some degree his favorable position. We must depart from our traditional position of isolation and inattention to the flow of events in other parts of the world. We must realistically indulge in all forms of intelligence procurement necessary to provide us with the best and most up-to-date information on all the activities of foreign nations which bear on their capabilities or desires to wage war against us. Emphasis is particularly required on the collection and processing of information dealing with scientific activities in foreign countries, information which is of value in furthering our own development programs as well as indicating potential enemy capabilities. This new interest in world affairs goes hand-in-hand with our comparatively recent realization of our overall, world-wide responsibilities and interests. Failure of our intelligence agencies in the future, resulting in an "atomic Pearl Harbor," might well cost us our life as a nation.

At home we must strengthen our means of reducing the threat of espionage, sabotage, and subversion. The danger of crippling blows delivered by foreign agents or disaffected elements of the U. S. populace has mounted as atomic explosions have made possible sabotage incidents of far greater magnitude. A single atomic bomb, surreptitiously planted and remotely detonated can effectively destroy a large industrial concentration. The need for instant counter-offensive action underlines the importance that the machinery for effecting prompt retaliation must not be endangered by subversive activity. Subverted personnel in high governmental positions might readily destroy in the early hours after a surprise attack on the U. S., our capacity to avoid defeat by introducing delay in our countermeasures and our mobilization.

War today is total war. Since a future attack on the U. S. will be an attack on our industry and the communities serving our industry, we must be prepared to reduce to a minimum the damage, casualties, and dislocation resulting from such an attack. The responsibility for carrying out measures of civil defense must be primarily a civilian responsibility, and the measures effected through civilian organization. In time of emergency the military must devote the bulk of its efforts and resources to its primary mission of destroying the enemy's will and capacity to conduct total war against us. The civil defense task if of such magnitude that the effort to meet it must be carried out on all levels, starting with individual citizens and extending up through municipal, state and federal government agencies. Federal assistance will surely be required in order that local provisions, methods, and equipment are standard so that aid and reinforcement may be furnished from one locality to another as the nature of the attack requires. In the federal government, a close tie between the military and the civil defense organization will have to be established. Total war inherently demands total mobilization which

can only be given direction by a federal agency. The National Guard will bear heavy responsibilities, both for maintenance of law and order when attacks have broken down the normal processes and also for the local defense against enemy attacks such as airborne operations which are likely to be experienced in connection with atomic bombing attacks. Damage control, repair of public utilities, reestablishment of control and communications and resumption of productive activity are primarily the functions of the community itself. Such measures will be the daily tasks of the "every man" in total war. He is in a battle position as truly as the soldier in uniform, and his dependence on discipline, training, and ability to act in concert with his fellowmen is as vital to the nation as is the soldier's. Provision must be made to accord him this training, to develop this discipline.

PART V

THE EFFECTS OF THE ATOMIC BOMB ON OUR MILITARY REQUIREMENTS

The atomic bomb is the successful result of history's greatest example of the cooperative effort of science, industry, and government to produce a weapon of war. The lesson it teaches is the extreme importance of continuing research and development efforts in the interest of National Security. These efforts must have as their objective the development of better offensive weapons, including improved atomic weapons of all types; defensive weapons and defensive measures for protection against present-day weapons and methods of warfare; and the knowledge with which to understand and estimate properly potential enemy capabilities with respect to new weapons and methods. Although present scientific opinion concludes that there is no effective means of defense against atomic weapons, as distinct from the carriers of such weapons, basic research may result in knowledge leading to measures which afford at least partial protection against or reduction of the effects of these weapons. Our future security may depend to a considerable degree on the successful pursuit of scientific endeavor in this direction. It is conceivable, of course, that defensive means may be developed against the aircraft and other carriers of atomic weapons which would greatly reduce the effectiveness of such carriers and hence of the atomic weapons themselves.

Our own research and development leading to the production of the bomb has taught us that it is possible for a nation to adapt scientific and industrial progress to warfare in such a manner as to affect decisively the outcome. Our military requirements now include as an item of prime importance a coordinated effort, civilian and military, designed to insure that the U. S. retains its world leadership in scientific and technological development as applied to weapons and methods of warfare.

The development of the atomic bomb and long range carrying vehicles has had an important effect on our requirement for Armed Forces "in being." Whereas, previously the main mission of the peacetime forces was to provide a framework for wartime expansion behind light covering forces, now it is necessary to have forces in being capable of providing instantaneous defense against air attacks or surface forays against us, of minimizing the effects of such attacks, and of concurrently launching counterattacks against vital enemy targets, including the bases, launching sites, and industrial facilities which support an enemy atomic attack and are invulnerable to our aerial counterattack. We require, in the first instance, defensive forces capable of intercepting and destroying aircraft and/or

guided missiles. Such forces include both intercepting aircraft and ground weapons, utilizing special air-to-air and ground-to-air missiles. The success of their operations will depend to a great degree on the efficiency of our radar detection net which will be necessary to provide early warning of attack--"early" in the sense of seconds, or at the most, minutes. The well-planned, well-coordinated attacks of a determined enemy, once launched in strength, can be expected to achieve their objectives even though the defender can impose extremely heavy attrition on present-day long range bombing aircraft. Consequently, an atomic attack on the United States can be exceedingly destructive in spite of the success that a stubborn and determined defensive action may have in decimating the attacking force. The objective of the defense can only be reduction of the effects of the attack and infliction of such heavy damage on the attacking forces as to destroy the enemy's resources available for continuation of such attacks.

Since such attacks may be accompanied or immediately followed by airborne and seaborne invasion forces, seeking to capitalize on the disruption effected by the attack, our military establishment must include forces capable of defeating any such action. Again these forces must be forces in being and highly mobile, in order to keep their numbers to a reasonably low figure. They must be well balanced, including shore defense naval units, armored, airborne, and mobile infantry forces with their supporting ground-support air units and other arms.

The most important aspect of the absence of a preparatory period is that our counter-attacking forces must be ready for instant retaliation. Our requirement is for strategic bombers, and for long-range guided missiles when they are developed, to carry atomic explosives immediately to those installations, probably deep in enemy territory, which are vital to the continuation of his early attacks on us or which are necessary to his general war effort. We will need bases so located that our bombers and missiles can reach those vital installations. It is only by such offensive air action that we can quickly deliver substantial blows by which we may save ourselves from defeat in the initial stages of the surprise war and seize the initiative necessary to gain final victory. Forces in being will have the additional mission of quickly reinforcing or seizing essential bases, and of undertaking such timely military operations as will blunt the hostile offensive and gain for us an advantageous military position.

Our present strategy recognizes the overriding importance of strategic bombing. This concept has been developing with the technical perfecting of long-range aircraft, but it has been confirmed and emphasized by the development of the atomic bomb, since the scale of destruction of this weapon has given the offensive such a marked advantage, at least for the time being, over the defensive. It was possible, as long as strategic bombers were limited to the use of conventional explosives to exact such a price from the attacking force by improved methods of defense as to make the success of such offensive measures doubtful. With the pay load atomic explosives, however, great destruction is achieved cheaply (in terms of resources and manpower), and foreseeable defensive means are unable to keep pace with offensive methods. It is our belief now that strategic bombardment either by piloted aircraft or by guided missiles of one form or another provides the single most important element of our military capabilities.

The atomic bomb, primarily an offensive weapon, serves to emphasize the principle that only by offensive action can victory be attained.

However, the development of the atomic bomb by other nations requires that the U. S. adopt a principle of strategy in seeming conflict with the fundamental importance of offensive effort. We must devote a higher percentage of our national resources than ever before to the measures we take for defense. We must do this in order to insure that we retain the capability of delivering effective offensive effort. Unless we provide adequate means to reduce our vulnerability we may find in the moment of emergency that we are unable to launch our own atomic offensive. A careful balance must be attained. Land and sea radar outposts are required to give early warning; aircraft and ground weapons are required to intercept and destroy a maximum number of airborne bomb-carrying vehicles; and aircraft and naval craft are required to intercept and destroy a maximum number of water-borne (surface or subsurface) bomb-carrying vehicles. In addition balanced forces are required to repel any airborne or water-borne invasion forces which might attempt, in connection with an atomic attack, to seize objectives in the U. S. or to carry out raiding missions against installations in the U. S.

The initial strategy of the Armed Forces, in the light of the loss of our cushion of time, is that of absorbing or diverting initial attacks, delivering immediate counterattacks, with long-range bombers or missiles, accomplishing initial, essential deployment, and effecting without delay the necessary mobilization of national resources.

The time afforded us for mobilization may be so relatively short and the interference so great that we may have extreme difficulty in mobilizing large field forces such as we mobilized in World War II. Victory or defeat may have been realized before large forces could be brought to bear. It must be borne in mind, of course, that we have no assurance that our atomic warfare capabilities are, or will be, fully sufficient to accomplish our strategic aims. It might develop that such factors as availability of raw materials would force us to supplement the employment of atomic weapons with substantial employment of non-atomic weapons and methods of warfare. Since it is politically and economically unfeasible to retain "in being" forces sufficient to discharge all requirements of an atomic war, there remains a vital need for rapid mobilization of manpower as well as Industry. We must have an call a reservoir of partially trained men who can quickly be assimilated and employed in reinforcing our initial efforts, including deployment to distant areas, and carrying the attack through to final decision. A careful balance must be effected as between the manpower requirements of Industry and those of the Armed Forces. It appears that numerically the demands of Industry are continually increasing with scientific and technological development. These demands are likely to impose a heavy drain upon manpower, which in final analysis may be reflected in decreased manpower in the Armed Forces proper.

In addition to providing forces in being, how can we increase our capability successfully to accomplish our rapid mobilization?

We have need for a system of far-flung bases whose installations can provide early warning of attack and contribute to the interception and destruction of the vehicles of attack. Securing such a system may be at the expense, in some instances, of our political position, which is our first line of defense. Under such circumstances, a purely military aspect will often be overruled by the fact that more National Security can be achieved through political position than military position. Keeping in mind this factor, which may militate against our realization of as complete or efficient a system of bases as would be militarily

desirable, the primary function of the bases would be to provide early warning of attack aimed at the U. S. proper and interception of a number of the vehicles of the attack, whether they be airborne or surface-borne. The bases would also provide the launching sites for counterblows against enemy territory. Obviously, these blows can be more effective if launched from a point close to their target than from a distant base in the U. S. In the long run the North American continent is not to be defended as an island. Adequate defense requires decisive offensive action, a substantial part of which may be necessary shortly after the initiation of hostilities. In order to insure that such bases are prepared to carry out their functions in time of war, they must be maintained adequately during peacetime, garrisoned with sufficient troops to protect them against small scale attack, and equipped with such installations as airfields or launching devices for their offensive role. Communications to them must be maintained and the control of air and sea approaches to them retained by the U. S. It is recognized that the maintenance of such installations is expensive and that in event of limited budget many of the bases would have to be abandoned in favor of the more vital military establishments such as the strategic air striking forces and defensive forces in being. It must also be borne in mind that no one base can be fortified or garrisoned to such an extent that it would withstand a concerted enemy attack, and hence, it must be accepted that a certain number of our bases might well fall to the enemy at the initiation of hostilities. Further, it may be pointed out that an alternative is to wait until the advent of hostilities to seize certain of the bases we need, assuming that we maintain our advantageous position with respect to Naval and Air power in order to retain the capability of doing so.

While it is recognized that widespread dispersion and establishment of underground facilities is impractical, we must achieve that minimum degree of such protection essential to the preservation of our retaliatory counter-offensive power. The pattern of U. S. life, social and industrial, will never permit the degree of dispersion which military strategy makes desirable. We can disperse the bulk of our critical military stockpiles. We can disperse some of our vital Industry, particularly new plants. We can probably never achieve substantial dispension of our general industrial concentration, in spite of our reliance on it for continuation of a war effort. Nor are we likely to be able to disperse government and other control and communication agencies which bind together the efforts of the whole nation toward National Security. What we must do, then, is to select those facilities absolutely essential to our fight for survival and effect a minimum dispersion, protection, or duplication of them to an extent which is both practicable of attainment and sufficient to give promise of success. That success in this respect is not hopeless may be indicated by the historic examples of Industry's ability to survive, demonstrated by German industry in World War II, which not only survived but increased its output up till 1944; and the Russian industrial effort, which survived the great German territorial advances which overran or destroyed industrial capacity representing equivalent results of an enormous amount of strategic bombing. Complete dispersion of our cities of over 50,000 population, which number some 200 and total 50 million inhabitants, appears beyond our capabilities--not because of requirements of money or engineering effort, staggering as they are, but because of the political resistance of our people against being regimented, uprooted, and forcibly moved. Our strategy must be based on realism, and the all-out dispersion of Industry can only be classed as a militarily desirable but unattainable measure. In additon to limited dispersion we must effect substantial stockpiling. The equipment and supplies of our

forces in being, particularly our atomic weapons with their carrying vehicles, must be stockpiled in numbers sufficient to sustain our initial efforts and to carry over until such time as production of essential items can be resumed. We must also stockpile those items which are vital to our rapid mobilization and whose replacement takes long periods of time.

Dispersion and protection are two mutually supporting defense measures. By going deeply enough underground or by providing a protective shield of sufficient concrete, lead, or other protective materials, it is possible to achieve comparative safety from the bomb effects. The scale of such an effort limits its use to a comparatively few extremely vital installations or facilities which must be retained in operation at all cost. Nerve centers such as key government or military headquarters and certain command and communications facilities necessary to the carrying out of retaliatory atomic attacks will require this type of protection. Such installations are inherently immobile and must be self-sufficient in sustaining life of the personnel engaged and in maintaining the equipment necessary to their operation.

Above all, the advent of the atomic bomb demands that we retain flexibility in our military and national organization, and flexibility in our strategy and our planning, if we are to maintain a reasonable and acceptable state of National Security.

There are certain duties and responsibilities of the Armed Forces which are affected little, if at all, by the atomic bomb. These responsibilities include our commitment for the occupation and demilitarization of Germany and Japan, our commitment to provide Armed Forces to the Security Council of the United Nations for the maintenance of international peace and security, and our political requirement to maintain those forces designed to enhance our position in the international balance of power which is continually the object of security considerations even within the framework of the United Nations. There appears to be no possibility that the atomic bomb would be employed in effecting the occupation of Germany and Japan and in carrying out our major policies in those ex-enemy states, any more than we would be likely to use it on the cities of our allies occupied by an enemy. The requirements in these respects are basically those which can be best performed by conventional ground forces, since the duties are police and surveillance duties.

The requirement for these forces may extend as long as 25 to 40 years, depending upon the agreements reached by the major powers in the German and Japanese Peace Treaties or other instruments of international policy.

Under Article 43 of the United Nations Charter, the U. S. is committed to provide certain Armed Forces to the Security Council of the United Nations for its use in maintaining international peace. The regulations governing the composition of these forces remain a matter of current United Nations discussion. It appears that a considerable time will elapse before such forces are actually established in being. The requirement will probably be that these forces, held as national contingents by each furnishing nation, shall be available upon notice to the Security Council. It is not contemplated that the atomic bomb will be included in the U. S. contribution to these international forces. Conventional Air units must be included in accordance with Article 45 of the United Nations Charter.

While the inherent offensive value of the atomic bomb to the U. S. during the period of its sole possession of the weapon is unquestioned, it would be shortsighted to believe that even during this interim period it was sufficient in itself. A large measure of security comes to the U. S. from the very existence of its military strength which is evidenced in its conventional force in being, as well as such unorthodox weapons as the atomic bomb. To retain our strength in terms understandable to all nations, we must continue in existence certain of the forces which clearly spell power to the potential aggressors. These forces include Fighter and Bomber units, Infantry Divisions and Aircraft Carriers; in short, the conventional forces that the man on the street can recognize anywhere in the world.

Military tactics are relatively unaffected by the advent of the atomic bomb. Until it has been demonstrated that the atomic bomb can achieve a decision by itself (and the certainty that it can has yet to be demonstrated), conventional military operations will continue to be employed, using, for some time to come, substantially the tactics of the end of World War II, characterized by constantly increasing speed of movement and more concentrated power. The principle of dispersion to limit the effects of Air action will be of greater consequence. Massing of forces can be effected only with full realization of the risks involved in offering a profitable target for the employment of the atomic bomb. Of necessity, since offensive action requires some concentration of forces, tactics will have to evolve methods of quickly massing for offensive action, then quickly dispersing. This necessity for dispersion applies to all components of the Military Establishment, Land, Sea, and Air Forces.

A new weapon, even one of such revolutionary character as the atomic bomb, serves not to make war "cheaper," but only to add to the burden borne by all peoples and all nations in the interest of National Security. The development of the atomic bomb, even temporary monopoly of its employment, has not given the U. S. an inexpensive substitute for a balanced Military Establishment. The bomb, and the potential range of aircraft and missiles, has made the defense of the nation more difficult, more expensive and less certain of attainment. The need of eliminating war itself has never been so vitally necessary to the National Security of the U. S. and to the survival of civilization throughout the world.

NAVY'S ATOMIC VIEWS

Following are salient excerpts from the summary of the Navy's thinking on the effect of the atomic bomb on National Security:

In presenting a synthesis based exclusively on interviews of "official" Navy thinking on naval problems posed by the atomic bomb, two cautionary notes are in order. Both pertain to the limitations of the interview process itself. In the first place, any document issued by the Navy Department on the subject, if there were one, would represent the distillate of thoroughly considered and presumably agreed opinion of the chief policy-making officials of that department. Interviews alone, on the other hand, present one with a medley of reflections and observations--some based on long thought and possibly intradepartmental discussion, others merely random thoughts stimulated by the conversation of the moment. The second point derives from the first, and concerns the distinction between the Navy as a corporate being and the individuals who may in turn speak for it. There

again, in the absence of papers bearing the official approval of the department as such, one is burdened with the problem of differentiating between views held by individuals and perhaps distinctive to them and those likely to become effective departmental policy.

The cooperation afforded the compiler by the Navy Department did, however, go a long way towards overcoming these defects in method. The fact that the individuals interviewed comprised the Chief of Naval Operations, Fleet Admiral Chester W. Nimitz, and senior officers designated by him lent to the discussions an authenticity which would otherwise have been lacking. Moreover, Admiral Nimitz agreed to review this section of the paper in order to check the accuracy of its interpretation and the degree to which it reflected institutional rather than merely individual opinion. Thus, while the comments presented below represent the compiler's own synthesis of the views of the senior officers with whom he spoke, that synthesis enjoys if not the approval at least the concurrence of the Office of the Chief of Naval Operations.

Fundamentally, according to naval spokesmen, the Navy's planning in respect to changes wrought by the atomic bomb must envisage the respective needs of three wholly different situations, which may be listed as follows:

1. Peacetime, when the Navy's functions, apart from augmenting preparedness for war, are taken up with policing obligations. In general, police functions require weapons of precision rather than of mass destruction.

2. A war in which the atomic bomb is either not used at all or introduced only substantially after the onset of hostilities, or perhaps used only by us and not by our enemies. Such a situation might follow from the successful operation of such a plan as that envisaged in the Baruch proposals, or from mutual fear of retaliation, or from the possibility that our enemies will not yet have succeeded in manufacturing atomic bombs and thus destroying our present monopoly.

3. A war in which atomic bombs are available in substantial numbers to both sides and in which reciprocal resort to their use may occur at any time. One could refine one's presumptions indefinitely and conceive of special cases which would overlap Nos. 2 and 3, but in terms of planning the above distinctions are sufficient--and suggest difficulties enough. It should be noted that a force adequate for Situation No. 2 is adequate also for No. 1, so that the problem may be boiled down to that of discriminating between the respective needs of Situations 2 and 3.

Moreover, in weighing the respective needs of Situations 2 and 3, one must take into account the time factor. The needs of the immediate present may be very different from those to be expected five to fifteen years hence--which might be regarded as the intermediate period--and the needs of that period will again differ, perhaps radically, from those which will follow. And while it is true that the forces required to fight a war say fifteen years from now may be very different from those existing today, the reverse is also true. Thus, the forces which would be needed to fight a war today on in the near future are those which on the naval side represent pretty much the kind of fleet which we have and are trying to keep rather than the kind which may be indicated fifteen years hence. And the American forces needed to fight a war today are those which, so long as they exist, operate as a deterrent to aggression anywhere in the world.

In the matter of deterrent value, there is a psychological element hinging upon the visibility and location of the force involved which must not be overlooked. Thus, an American task force operating in the Mediterranean may have a stabilizing influence in that area which a strategic bombing force situated in Utah could not possibly have--regardless of the ultimate relative effectiveness of the two types of forces in actual war. The task force operating in the troubled area is like the mounted policeman on Fifth Avenue, who by his mere presence and confidence emphasizes the invisible but omnipotent power which the state places behind him. A naval force is uniquely suited to perform in trouble spots the function of "conspicuous representative of the law." For the sea, unlike the land or even the air, is an international common, and the fleets which have the legal prerogative to roam over it at will have also the necessary mobility to avail themselves of that prerogative. By suitable rotation they can keep the sea in a troubled area for as long as their presence there is deemed to exert a beneficial influence.

To proceed from peacetime uses to possible war needs, under present conditions, it might be objected by those who consider our present naval establishment excessive that there is visible today no major navy which could reasonably be considered available to a possible enemy. Certainly the British Navy need not be so regarded. Such a view, however, misrepresents (a) the character of the naval threat which we may at any time have to meet, and (b) the various functions which our fleet would have to perform in any war against a major power, regardless of whether or not that power disposed of large naval forces.

In respect to (a) above, it should be noticed that while the Soviet Union, for example, does not possess a substantial surface fleet, it does enjoy a very considerable submarine fleet. Moreover, they have acquired as a result of the war both samples of newer German submarines and a fair number of the technicians who designed them. We now know that the Germans had under development types of submarines which, had the war lasted six months longer, would have made the defeat of the U-boat campaign immensely more difficult than it proved to be in 1943-44. A submarine war today would entail far more hazards to our shipping and require much greater efforts to counter than was true even in the worst periods of World War II.

In respect to (b) above, which concerns the functions which our fleet would have to perform in war, it must be remembered that the utility of fleets is not confined to the business of countering enemy naval strength. During the latter stages of the Pacific War, heavy burdens were placed upon our fleet in amphibious operations even after the Japanese had ceased to possess a substantial naval arm. Under conditions of war in which our enemy possesses atomic bombs, it will be more than imperative--for reasons which will be explained below--to keep him from taking over bases near us. Also, we may want bases near him. For the huge quantities of men and materials required in modern amphibious operations, especially where the area to be conquered is a large and important one, ships must continue for a long time to come to provide for the greater portion of the transport facilities. And so long as the sea is used as an avenue of transport in wartime, the ships doing the transporting must be protected. When it comes to assisting the actual landings, the huge fire power contained in a modern fleet is, if not always indispensable, certainly a great saver of lives. The demonstrations both of that fire power and of its utility provided in the numerous landings of World War II are much too impressive to be ignored.

Thus, for the "intermediate" era of the relatively near future as well as for the present, the following general types of naval forces will be required:

1. Mobile tactical air forces, embodied in aircraft carrier groups. By means of aircraft carriers, navies have incorporated within themselves the only truly mobile tactical air forces--in which the air bases as well as the aircraft themselves are highly mobile and enjoy all the advantages of mobility such as ability to concentrate and to achieve surprise. With land-based air forces, on the other hand, fields have to be built and developed on the required sites (which may first have to be acquired by capture) before the aircraft can be utilized in the desired area.

2. Amphibious forces. These include specialized transports, escort craft, landing craft, supporting ships capable of copious rocket and gun fire, and supporting tactical air forces.

3. General escort forces, including antisubmarine craft. Such forces now include escort ships of the destroyer and destroyer-escort types, smaller aircraft carriers and their escorts, and land-based aircraft of proper design with crews of suitable training.

The present United States active and reserve fleets, which already comprise the types of forces described above, appear suitable for the kind of hostilities likely to prevail over at least the next ten years, should war occur within that time. Provided funds are made available to maintain those fleets in a high state of efficiency with sufficient and well-trained crews and to make suitable architectural and ordnance changes in major units where indicated, the Navy will remain over a substantial period to come a powerful instrument for deterring aggression and otherwise implementing American foreign policy.

The Role of Advanced Bases in Atomic Warfare. It was stated above that under conditions of war in which atomic bombs are available to a possible enemy, the importance of depriving the enemy of bases near one's own shores and preferably of acquiring and maintaining bases close to his territory remains at least as great as before. The logic supporting this proposition derives from the characteristics of atomic-bomb carriers presently known or conceivable.

Apart from possible techniques of surreptitious planting, there are two methods known or conceivable for delivering atomic bombs to a target. One is the large bombing aircraft, such as the B-29, which has thus far served as the sole agent for delivering atomic bombs to an enemy target. The other would be a rocket comparable to the German V-2 but representing a considerable development beyond it in weight-carrying capacity and preferable also in range. Let us consider the latter instrument first.

Despite the prevalence of romantic predictions concerning "push-button" warfare, presumably carried on with rockets capable both of great accuracy and of some four or five thousand miles range, experts in the field of supersonic guided missiles--including civilian scientists so engaged--are practically at one in the conviction that such missiles cannot be considered to be in the offing. As one scientist put it, it would require "quantum" jumps in our knowledge concerning both propulsion and control to achieve such weapons. It would require, that is, revolutionary discoveries in both fields, comparable in scope and in magnitude of effects to the discovering and utilization of atomic fission itself, in order to

accomplish the required results. No mere evolution of what is known now will do it.

According to some scientists who are not specialists in this field, it is already theoretically possible with existing fuels to construct a rocket of some 3,000 miles range. Such calculations about supersonic missiles usually imply the concept of pick-a-back rockets, where the initial rocket fires at the summit of its trajectory another rocket, which in turn fires still another rocket, and so on. But when one considers that some seven of the twelve tons of fully-loaded weight of the V-2 were taken up with fuel alone, that a comparable proportion of fuel to inert mass would have to obtain in each of the telescoped rockets--thus calling for a geometric progression in relative sizes--and that the final rocket would have to be capable of delivering an atomic bomb, one is considering an initial launching rocket of perfectly gigantic size. It would be so huge as to be practically incapable of mobility prior to firing. This takes no account of the numerous metallurgical and other practical problems involved in the intense heats engendered, and of course does not touch that vast realm of problems dealing with control of such a missile.

Nor can it be assumed that propulsion by atomic energy itself will provide the answers to very-long-range requirements. The nice balance in rate-of-combustion necessary to rocket propulsion is only one of the tremendously difficult technological problems to be solved before atomic energy can be so used. And if they were solved, the question would remain whether was not an inordinately wasteful way of consuming fissionable materials--whether it would not be much better to use those materials for more bombs to be delivered by other means. For these and many other reasons not here touched upon, it seems a wholly reasonable and safe assumption that rockets with atomic warheads capable of thousands of miles of range are not to be expected for at least another twenty-five years.

The large bombing aircraft, on the other hand, cannot be considered a sufficiently reliable means of delivering scarce and expensive atomic bombs against a strong and well-alerted enemy. The present technological trend is decidedly in favor of the defense as against the offense in ordinary strategic bombing. Means of detection and interception of subsonic bombing aircraft are making great strides. Guided or homing missiles of the rocket type, fitted with proximity fuses, promise to give new potentialities to anti-aircraft fire. Jet propulsion, permitting speeds far above those available to propeller-driven craft, is much more suited to short-range fighter planes than to large, long-range bombers, due to the tremendous and rapid fuel consumption involved in the jet principle. It must be acknowledged that such trends may reverse themselves in the future as they have in the past, and that during peacetime the development of bomber types usually proceeds much faster, due to the possibilities of commercial application, than the development of fighter types. But the latter disparity can be overcome by government subvention of research having primarily or exclusive military application. At any rate the present trend is the only one we can see in operation, and that trend decidedly favors--as against the recent past--the defense of large centers of population and industry.

The solution from the offensive side is the resort to short-range but very high speed jet-propelled bombers or preferably to supersonic missiles representing an evolutionary development of V-2. For what was said above concerning three-thousand-mile rockets does not in the main apply to the problem of increasing the range of the V-2 by a factor of

perhaps two and arming it with an atomic warhead. But in either case what is necessary to reach the target is a launching base relatively near the target- to put it most liberally, within five hundred miles. Such a base might in fact that the form of a ship*, including submersible types--which would provide for retaliatory attacks that flexibility and surprise available only to mobile instruments--or of a distant territory the acquisition and maintenance of which would depend inevitably upon the instrumentality of sea power.

The outlying base, if properly placed, is also a tremendous advantage to the defense as a further measure of protection against long-range bombing aircraft. For such bases provide means of advance detection and interception which greatly augment the obstacles to penetration of vital territories by attacking bombers. Those bases may themselves be vulnerable to atomic bomb attack, but so long as they are not likely to be bypassed. In this respect the advanced base may be likened to the pawns in front of the king on the chessboard; meager though their power may be individually, so long as they exist and the king stays securely behind them he is safe.

* The unfinished (Iowa class) battleship Kentucky and one of the Alaska class cruisers are now being altered on an experimental basis to fire rockets rather than large shells, the usual primary armament of 16-inch and 12-inch guns respectively being omitted. However, the rockets which they will fire will not approximate either in size or range the German V-2 rocket.

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Capabilities and limitations of the atom bomb show that it is not considered the ultimate atomic weapon. The objective and requirements of satisfactory international control are discussed along with the importance of time in the event of war and the effect of the bomb on our political and military requirements. For the U.S. to survive in war, all important military stockpiles, basic industrial facilities, the White House, and other key headquarters must be dispersed and put underground.

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The atomic bomb is not considered the ultimate atomic weapon because its cost is excessive and its use restricted. Greater destructive power than that of the bomb is anticipated in the use of radioactive particles, dispersed without explosion, to contaminate water supplies and large industrial areas. Because radioactive particles would be created as a byproduct of peace-time atomic power plants, it would be difficult to establish any international control of the use of radioactive particles as atomic weapons. It is considered unlikely that Russia will have atomic weapons in quantity for from 8 to 15 years. Therefore, war initiated by Russia is not expected for the duration of this period. No foreign attack is expected while atomic weapons are held by the United States alone. In the event of an atomic war, the tactics of other wars will still be used. The Government will still need armies, navies, and air forces.

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