AD/A-001 439

EXPLORATION OF THE NATURE OF FUTURE WARFARE

Russell E. Bigney, et al

Army War College
Carlisle Barracks, Pennsylvania

3 June 1974

GROUP RESEARCH PROJECT

3 JUNE 1974

EXPLORATION OF THE NATURE OF FUTURE WARFARE

BY

COMMANDER RUSSELL E. BLONEY, USN
LIEUTENANT COLONEL JOHN W. CRANCER, INFANTRY
LIEUTENANT COLONEL THOMAS M. HAMLIN, USMC
LIEUTENANT COLONEL BRADLEY W. HETRICK, USA
LIEUTENANT COLONEL MURL D. MINGER, INFANTRY

COLONEL ROBERT N. REUTER, ARMOR
RESEARCH LEADER

US ARMY WAR COLLEGE, CARLISLE BARRACKS, PA 17013

AD/A-00 1439

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)

EXPLORATION OF THE NATURE OF FUTURE WARFARE

5. TYPE OF REPORT & PERIOD COVERED

Group Research Project

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)

CDR R. E. Bigney, USN; LTC J. W. Crancer, INF; LTC T. M. Hamlin, USMC; LTC B. W. Herrick, USAF; LTC M. D. Munger, INF

8. CONTRACT OR GRANT NUMBER(s)

9. PERFORMING ORGANIZATION NAME AND ADDRESS

US Army War College
Carlisle Barracks, PA 17013

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

CONTROLLING OFFICE NAME AND ADDRESS

Same as Item 9.

12. REPORT DATE

3 June 1974

13. NUMBER OF PAGES

106

MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)

15. SECURITY CLASS. (of this report)

Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

SUPPLEMENTARY NOTES

KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The objective is to determine plausible forms of military action, violence, or coercion that will be used by nation-states to attain political or economic goals in the early years of the 21st Century. To accomplish this objective, a thorough exploration and examination of current macro-trends (and in some cases significant micro-trends) in the fields of Economics, Politics, and Technology was conducted. Also considered were the

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

USAWC MILITARY RESEARCH PROGRAM PAPER

EXPLORATION OF THE NATURE OF FUTURE WARFARE

A GROUP RESEARCH PROJECT

by

Commander Russell E. Bigney, USN
Lieutenant Colonel John W. Crancer, Infantry
Lieutenant Colonel Thomas M. Hamlin, USMC
Lieutenant Colonel Bradley W. Hetrick, USAF
Lieutenant Colonel Murl D. Munger, Infantry

Colonel Robert M. Reuter, Armor
Research Leader

US Army War College
Carlisle Barracks, Pennsylvania
3 June 1974

AUTHOR(S): Russell E. Bigney, CDR, USN; John W. Crancer, LTC, IN, USA; Thomas M. Hamlin, LTC, USMC; Bradley W. Hetrick, LTC, USAF; Murl D. Munger, LTC, IN, USA; Robert M. Reuter, COL, AR, USA.

TITLE: Exploration of the Nature of Future Warfare

FORMAT: Group Research Project
DATE: 3 June 1974 **PAGES:** 103 **CLASSIFICATION:** Unclassified

The objective is to determine plausible forms of military action, violence, or coercion that will be used by nation-states to attain political or economic goals in the early years of the 21st Century. To accomplish this objective, a thorough exploration and examination of current macro-trends (and in some cases significant micro-trends) in the fields of Economics, Politics, and Technology was conducted. Also considered were the effects of anticipated psychosociological drives in various population segments. The focus within these broad research areas was narrowed to those specific trends which unmistakably would influence military strategy, planning, and employment in the years ahead. The trends were then projected and five plausible levels of conflict determined. These are: Terrorism, Insurgency, Minor War, Major War, and Total War. Parameters pertaining to each conflict level were established. The paper concludes with projections regarding the declining utility of formal warfare but stresses that warfare will continue to be a viable option for attaining national interests.

PREFACE

This Group Research Project was produced under t aegis of the Strategic Studies Institute, US Army War College. The scope and general methodology were outlined by the Institute. The five authors of the study elected to participate based on their background and interest in future military requirements. A major effort was made through visitations to obtain and incorporate in the study the opinions of a variety of internationally renowned scholars about the future nature of the world and warfare. An attempt was made to conduct the analysis without being constrained by the existing doctrine of any DOD agency or service.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

GENERAL

The standard refrain that the military prepares for the next war based on how it fought the last one implies a general assumption that there is a lack of forward looking and planning in the defense establishment. Blitzkrieg warfare, the Manhattan Project, and a multitude of other historical events refute any such truism. However, the above cited examples to emphasize the fact that an innovative approach is all too often a one-sided affair to the ultimate detriment of one of the belligerents.

Because today's world has become so complex in every field of human endeavor, it is exceedingly difficult, if not impossible, to foresee the direction of events and to imagine the impacts of alternative choices. For these reasons and the great expansion of knowledge, foundations in the new sciences of futurology and cybernetics have been established and efforts in these disciplines are attempting to provide devices to better control our destinies. The complexity of life requires decisions long before the weight of these decisions are generally felt. The lead times for increasingly complex equipment grows. Industry of recent times has been forced into long range planning. The family's education requires the early allocation of funds for the advanced knowledge required to operate in today's world. The fact is that, today, intelligent forecasts are required tools.

Warfare is man's most traumatic experience. The forces unleashed, the civilizations destroyed, and the human suffering endured alter the human condition. Because of the threat of disastrous consequences to the vanquished, man has always prepared for war. Due to the increasing complexity of war, which parallels the developments in society in general, it has become necessary to attempt prediction much further into the future as to the nature of warfare than hitherto required.

PURPOSE

The purpose of this study is to go beyond the normal planning horizons and to postulate on the plausible nature of future warfare and define it in general terms meaningful to today's reader. Though this effort is primarily educative for the participants, a product useful to interested activities of the US Army is also desired.

SCOPE

Because warfare is the outgrowth of the interrelationships of social behavior, the original scope of this study had to be extremely broad. Any initial assumptions made about the various facets of this behavior could possibly infringe on the elements defining the predicted nature of a future war. Thus, initial efforts were made to establish the present status and trends of world politics, economies, military strength, etc., before projections into the future could be made and subsequently focused on conflictual situations. This first step involved massive research to include interviews with reknowned thinkers

and institutions devoted to the world environment. As the data collected became synthesized it formed a framework of information applicable to conflict in the future. Using this as a basis, the study then was narrowed to examine the kinds of war considered plausible in the early years of the 21st century and to note broad implications to the United States. The specific rationale and definitions that serve to further delineate the study scope are presented in the paragraph on Terminology, below.

OBJECTIVE

The narrowed objective of this paper is now stated as follows: Determine the nature of warfare around the year 2000 and the implications to the United States.

ASSUMPTION

The only basic assumption made is that warfare will occur. Obviously, this assumption is used in order to answer the objective statement. Additionally, it serves to narrow the focus and discard those trends that tend away from war and are therefore not germane to the study. It is worth noting that because of the futuristic nature of this paper, that wholesale conjecture is its essence when attempting to sketch the nature of future warfare.

TERMINOLOGY

It is quite evident that the terms of the objective statement require definition or explanation. Since military planning attempts

to encompass a twenty-year cycle, it would be redundant to consider through 1995 as an element of a future time block. However, the extreme difficulty and questionable utility in forecasting innovations that are not based on existing theory and ideas must be recognized. Therefore, the "future" of this research will be restricted to those horizons that can be perceived from today's knowns. Most of the existing investigatory futures and technological data work focuses on the year 2000. Because of the availability of this background information, but probably equally important, because of the psychological impact of the dawning of the 21st century, the "future" for this research effort is centered on the early years of the 21st century.

A more difficult term of the problem statement to define is "nature." This is because of the multiple definitions given to the nature of warfare by authors through the ages. They range from detailed descriptions of the tactical battlefield to philosophical extensions of man's nature. Since one of the goals of this research effort is to provide some useful product for interested activities of the US Army, the nature of warfare must emphasize its military aspects. Those elements that tend to define the nature of war in this perspective are the political goals of war, the duration, the levels of violence employed, the strategic and tactical concepts, the technology and weapons employed, and the manner of conflict or war resolution. These parameters highlight the military descriptive nature of war being sought.

Warfare is defined as an organized violent act for a political goal that threatens the vital interests of a nation-state. That

part of the definition, "an organized violent act for a political goal," is pure Clausewitz[1] and has been recognized by every authoritative source since its original definition. The further refinement, "that threatens the vital interests of a nation-state," is included to offer some delineation between organized terrorism and insurgency. If terrorism becomes so widespread as to affect national survival, national well-being, or some prized ideological tenet, then it must be redefined as an insurgent war. Terrorism as an instrument of political change, however, is considered within the framework of this paper since it can have military implications by itself or in conjunction with other forms of warfare.

METHODOLOGY

The particular methodology for the development of this paper is to outline the major determinants of the future, to define their specific influence on a broad spectrum of conflict, and from the resulting analyses to draw universal conclusions and, lastly to measure the general implications of these conclusions on the United States.

Major determinants are those macro-trends that could be discerned to have significant impact on the world of tomorrow. No effort is made to conjure up new trends without basis today. Some of the micro-trends derived from the macro are identified in the detailed analysis as they shape the components of conflict.

The spectrum of conflict is a methodological effort to logically divide conflict into manageable parts for detailed analysis. Its logic stems from the primary political trend of the world power structure. Discusssion of this logic is contained in Chapter II.

The conclusions as to the nature of future warfare are gained from the analysis of and detailed conclusions derived from the individual parts of the spectrum of conflict.

The implications of the conclusions to the United States are necessarily kept extremely broad, and general, and constitute aggressive supposition on the authors' part since each implication deserves intensive study in itself to determine its degree of validity. However, if an implication contains significant apparent impact on the United States, it is worthy of identification.

CHAPTER II

MAJOR DETERMINANTS

BACKGROUND

There is something inherently presumptuous about any writings concerning future events. However, there is nothing wrong with presumption, providing the thought process behind it is completely rational and anchored in fact. Likewise, when erecting a house of futurist thought that can withstand the winds of educated criticism, the foundation must be constructed upon the solid rock of historical prologue, the walls supported by strong members derived from analysis of contemporary trends, and the roof shingled with logical projections. Otherwise, the final product is not a house of substantial plausibility, but rather a dream castle of gosamer fragility.

It is perhaps trite to say the world of 2000 A.D. will be shaped by innumerable variables, many of which are at work now and others yet to be created. Moreover, it would not be possible to determine or understand all these variables and how they will influence the future. It is possible, however, to look at history for a clue to the future and to discern contemporary trends of such magnitude that their ability to influence future world environment is unmistakable. By using these tools we can at least conjure up a plausible glimpse of the world of tomorrow.

Since the purpose of this paper is to determine the nature of future warfare, we must specifically look at those determinants that

have the greatest impact on the shaping of the essence of future armed conflict.

The capability and manner in which any nation wages war is directly related to its economic base, political health, and its state of technological development. Therefore, nature of warfare in the year 2000 will be directly and inextricably linked to economic, political, and technological conditions existing at that time. To determine the identity and strength of these conditions, it is necessary to extrapolate from the present and attach the most significance to trends that possess perceived performance.

What follows in this chapter, therefore, are analyses of three major variables relative to the nature of future war. Each variable is dissected to expose the strong and relevant trends that, in our judgment, will determine war's future.

ECONOMIC

The broad, somewhat oversimplified, outlook for the world economy in the early 21st century is that the poor will get a little richer and the rich will get even richer. There will be an across-the-board improvement for everybody, but the gap between the less-developed countries (LDCs) and industrial states will widen.

The political and military power of nations is derived in a rough sense from their economic power. Conversely, the entire international economic system reflects the international power system of nation-states.[1] There will be a tendency toward the perpetuation of the advantages and disadvantages of the system. "Them that has, gets."

Additionally, the weak infrastructure of the LDCs, continuing world inflation,[2] and uneven technological transfer will depress the growth of the LDCs and contribute to their continuing instability.

The neomalthusian predictions of gloom and doom will not take place in the early 21st century, if at all. Technology will solve subsistance levels. Rising education and well-being will depress population growth. The application of these trends will not be universal. There will still be areas affected by overpopulation and malnutrition.[3] Raw materials and energy are two elements that can possibly throw the picture askew. The technology to resolve a large portion of the energy problem is known today. Some of this technology needs extensive engineering development, other is immediately usable. The one area of weakness in the energy picture is the foreseeable shortage of a mobile energy source. Depletion of oil reserves will accelerate. New reserves will be found, but probably not in sufficient quanities or timeliness to satisfy demand.[4] Alternate sources are known (e.g., hydrogen) but there will not be sufficient time or interest to create the infrastructure of such an industry to influence the period under study. To a lesser extent, this lack of timeliness will influence the wider energy situation. Lead times are particularly long in this sector and the slow reaction and lack of anticipation by nation-states to cope with marginal shortages will tend to depress the overall picture.[5]

The raw materials picture is somewhat spotty for the turn of the century. Known reserves of iron ore are still plentifull. Some of the more exotic materials may be short. New discoveries, the substi-

tutability of elements in alloys, new materials usage and recycling of expended products will assuage these shortages, but not completely. Serious shortages will occur and because of the crudity of international economic mechanisms, the effects of economic dislocations will be felt unevenly by all the nations of the world.

Two points can be deduced from the energy and raw materials situation in the year 2000. First is the political leverage that can be expected by possessors of a relative monopoly of supply of a critical material. Second is the significant increase in the expense of finished products arising from higher prices of raw materials and from the more complex production and reclamation situation. This further indicates the necessity for a sophisticated industrial base and technologically astute population to maintain an industrial economy.

The influence of economic factors on the world environment will not cause any radical changes in the power structure as it is known today. The Soviet Union together with its East European hegemony will continue to enjoy and foster virtual autarky. On a barter basis, Western nations will be allowed to contribute to its industrial base and develop raw materials. Geographic and climatic conditions will continue to restrict any long-term increases in USSR agricultural productivity. The Soviet economic central planning techniques will continue and be enhanced by use of better information processing technology. These techniques, together with Communist political philosophy and the large portion of the GNP devoted to national defense, will continue to encumber an acceleration in the building of an extensive and highly sophisticated economic infrastructure. These economic

facts point to an avoidance by the Soviet Union of a prolonged war of attrition. The economy can not sustain such a war and conversely their in-being military capability points to the quick war. Thus, Soviet policy, doctrine, and actions will continue to maintain large forces-in-being and mass destruction weapons for quick, incisive warfare.

The international economic instruments of today are extremely crude mechanisms. On a global scale, this system will continue because it will suit the self-interests of the United States and a second group of nations. These nations (Japan and West European powers but not India and China) plus possibly some new economically expanding states will be linked politically and economically. Because of the beneficial effects of the interlinkage, it will continue despite short-term abrasions caused by these countries' economic competitiveness. These nations with substantial economic power will seek modification of international monetary, trade, and tariff agreements only to the degree it is helpful to the individual state. This continuing economic nationalism will be abated to some degree by developments in economic regionalism--the most developed of which is and will be the European community. Other areas, in the Pacific Basin and Latin America, will develop but will be dominated by a few states with the remainder in a client-dependent status. The far distant future may see some integration of various regional unions.

The political and military scence may see some influence by these regional blocs. Japan and Brazil with the attainment of a credible military power could become the spokesman for vast areas of the

world. This situation is not expected to fully materialize because of problems inhibiting both nations. However, some degree of patronal power can be expected to be achieved by each.

As previously indicated, the recipient of the whip saw effect of world economics will be the late developing countries (LDCs). An oversimplified, but useful general, picture of these countries is the following: Subsistance economies with some exporting extractive and agricultural industries which in turn support some import substitution efforts. An extremely thin layer of entrepreneurship, technological and management knowledge in the face of increasingly complex world environment make it almost impossible for these nations to achieve more than marginal net growth rates without substantial capital and technology transfer from more developed areas.

As a result of the apparently successful efforts of the Organization of Petroleum Exporting Countries in attaining better terms for their product, other nations enjoying a relative monopoly of supply will combine and attempt similar cartel-type actions. Unfortunately, the largest demand market is and will be the United States and the Common Market. This together with the East-West ideological competition will cause the transfer of some technology and capital to the LDCs by the United States and Europe. In world power relations, this will have marginal impact but will provide the LDCs some political leverage not hitherto available.

The economic scene of discontent in the 21st Century will be the less-developed world. When magnified by the political discontent latent in many of these areas, potential trouble is a continuing reality.

POLITICAL

In looking at political influences that may shape the nature of warfare (or lack thereof) between now and the early years of the 21st Century, it is essential to examine briefly political history. Politics is considered by many to be a science concerned with organization and administration of political units. If it is a science, then politics should exhibit some constant characteristics regardless of size or type of political system examined.

Our review of political history revealed two distinct characteristics, common to all political units through the ages, which particularly influence international relationships and thereby the prospects for war or peace. These characteristics[6] are:

1. Political units, like living organisms, seek to survive. Both the leaders and the led are eager to maintain their collectivity which has resulted from history, race, religion, or fortune.

2. Political units seek to impose their wills upon each other. Political entities proud of their independence, jealous of their capacity to make major decisions on their own, are rivals by the very fact they are autonomous. Each can count only on itself.

Since these characteristics have been present in organized society for hundreds of years and since the nature of man has changed little, it is reasonable to assume they will continue to be pertinent in governments of the early 21st Century. If these characteristics are constant and true, one realizes then that the primary objectives of any political unit are to:

1. Retain what it now has,

2. Improve what it now has,

3. Enlarge what it now has,

or some combination thereof.

In a competitive world, to do these things requires political power. The amount of political power a nation possesses can be said to be a function of economic power, technological capability, social cohesiveness and their respective contributions to usable military power. However, total political power is not just the sum of those ingredients, but is an illusive intangible also comprised of reputation, diplomatic skill, and contributing or detracting power of friends and enemies. Total political power is not constant, but rather is a dynamic force that rises and wanes with changing times and changing conditions.

Security, for example, is based upon either stength of self or relative weakness of others. Paradoxically, when one political unit acquires too much strength in search of security, it may actually lose security because other political units, due to fear or jealousy may ally against it. There is another danger in seeking too much "security." Nations seek to be strong first for security and to enjoy peace, but also they seek to be strong so as to be feared, respected, or admired. Security can be a final goal but power too can be a final goal. While survival is paramount, often danger is not appreciated after the intoxification of power.

The reason for this background development is to emphasize that the basic nature of man and of national government has not changed

for centuries and will not change in the next 30 years. That conclusion in itself helps the futurist project current trends and anticipated developments into plausible political scenarios for the year 2000.

An analysis of research revealed several significant political conditions existing today that will be only slightly altered by the end of this century. Conversely, numerous trends were discerned which, if projected logically, will have a significant impact upon the political climate in 2000 A.D.

The following description of plausible conditions existing in the early years of the 21st century are derived from a projection of both the trends for change and the stable remnents of today's political realities. . . . As the 21st century begins, the expected drive for regional political groupings or world government failed to materialize. The nation-state system continues and nationalism is the dominant political force. Ideology is often subordinated to national interest. Western Europe remains politically fragmented and the United Nations is politically limited.

There has been no thermonuclear war between the United States and the USSR, and none is foreseen except by accident or miscalculation. This absence of actual US-USSR war has in no means signaled an end to their adversary relationship. Consequently, no world peace is in sight. Continued Soviet expansionism is evident through political and economic initiatives plus selective use of low-level violence.

The military world has remained essentially bipolar; howeve., nuclear proliferation has made "second tier nations" relatively more powerful in their relationships with the superpowers and the lesser developed nations. The deterrence capabilities of the two superpowers remains equal. A "balance of prudence" is maintained. The rift between the PRC and the USSR has not been healed. Mutual fear and suspicion of each others intentions remain. War between the PRC and the USSR is more likely than a Soviet-American or Sino-American war.

While the military world remains bipolar, the economic world has become multipolar. The intense competition for raw materials, tools of productions, and agricultural products have created frictions among nations and regional collectives. Additionally, the desire for higher standards of living (particularly among the peoples of the less developed nations) in an age of shortages will place internal stress on national governments. Many nations, including the Soviet Union and the PRC, will be in need of Western technology to fully realize the potential of their human and natural resources. Accordingly, the United States is enjoying relative economic prosperity but paradoxically is experiencing domestic unrest and international uncertainty.

This international uncertainty results in part from vascillating policies upon the part of its traditional allies. NATO has been revised and is less militarily oriented. US presence in Western Europe has declined considerably. The Soviets are attempting the "Finlandization" of Western Europe and have achieved some success. Norway, Denmark, Italy, and Greece can be considered responsive to Soviet suggestion.

Social/psychological pressures resulting from political decisions, technological developments, and economic conditions are influencing large population segments which are in turn influencing political decisions. Improved education and mass communication systems have produced desires and ambitions in the populations which the deprived state of the national economies cannot hope to fulfill. This contributes to dissatisfaction and unrest.

As a result of the above conditions interacting, the world political scene is that of uncertainty, unrealized dreams, frequent chaos, and disorder. Consequently the possibility of terrorism or civil war occurring in the lesser developed nations is strong. Unstable conditions in the third world and in the second tier countries will probably lead to serious conflicts and minor wars. Major war or total war between major powers is considered an unsatisfactory method of achieving a political end. Therefore, other alternatives are explored. . .

The above scenario provides a plausible glimpse at the political world of 2000 A.D. Since wars are normally waged to achieve net political gain, the projected political climate is necessary to efficiently evaluate the utility of future war and plan for its various ramifications.

TECHNOLOGICAL

In searching for a "catchy" opening to the technological part of this paper, it was difficult to improve on the often used, somewhat trite, but nonetheless appropos standard introductory remark that "we are in the midst of a technological explosion which is revolu-

tionizing the nature of warfare." This is a timeless statement. It loses none of its salience whether used in Isaac Newton's time, today or in all likelihood in the year 2000, thanks to the exponential growth nature of technology.

Such is this growth nature that for the last 300 years, the sum total of scientific knowledge has exhibited a compounded annual growth rate of 5-6%, consequently doubling every 12-15 years.[7] Most of the accumulated store of scientific knowledge (which includes technology) has constantly had an age of less than 50 years, and over 90% of all the scientists who ever lived have been alive at any given time during that 300 year period.[8]

This obviously cannot continue. True exponential curves exist only in pure mathematics. Indeed there are several indications that a leveling off is not only inevitable but already in progress. Andrew Stratton contends that technology has already advanced to the stage at which many more possibilities exist for weapons development than are economically feasible.[9] Supportive examples of this trend are numerous--the Soviet concentration of technology on military applications to the detriment of consumer oriented production and progress; the U.S. Congress' cancellation of the supersonic transport for primarily fiscal reasons and after Apollo, a deliberately slowed U.S. pace in planetary space exploration. By the same token, given a desire for advancement in a certain area the financial wherewithal coupled with specifically oriented scientific emphasis can achieve modern-day miracles (or yesterday's possibilities). The Apollo manned lunar landing program is a good case in point of combined national desire,

scientific dedication and enough money to get the job done. A more down-to-earth (no pun intended) example might be the B-52 program. First flown in 1952, the B-52 would have been technologically infeasible had not Congress voted to increase the 1950 budget.[10]

Perhaps, however, the financially forced attenuation of technological progress is a blessing. Were the full potential of technology--including weapons of warfare--to be realized at the even more rapid rate possible, the ideas expressed in Alvin Toffler's book, Future Shock might become a classic of understatement. It is debatable if man is politically ready for even the existing and possible weapons of today, much less the even more awesome destructiveness and efficiency of the technologically potential weapons of tomorrow.

What will these weapons of tomorrow be? Some are easy to predict. Mankind either already has them or has the capability to develop them now. These obviously include the fission and fusion nuclear weapons, chemical and biological agents, lasers, and the more conventional delivery systems and explosive munitions and weapons systems which have seen almost constant use throughout the first three quarters of this century. It is a financial fact of life that once developed, weapons and associated systems are so expensive, they must remain in the inventory for lengthy periods to amortize their cost. The ancient Douglas DC-3 (C-47, Gooney Bird or Dakota) is still around thirty-nine years after her maiden flight. The B-52 will likely remain a primary element of US strategic forces well into the 1980's. Such systems are replaced when they are worn out--not just when a better

replacement can be built. Even when they are retired from active inventory they are maintained in a ready status, relegated o reserve units or sold to less developed countries. Thus one still sees many nations operating first generation jet aircraft or World War II vintage ships, tanks, and personnel carriers. We can therefore make one prediction for the year 2000 almost with impunity--many weapon systems in use then will be those prominent in today's military inventories.

Another factor which tends to support the lengthy retention of in-being systems and somewhat modify the speed with which they are replaced is the long lead times needed to design and develop replacements. The Aeronautical Systems Division Deputy for Development Plans (Schemes and Dreams) estimates ten years lead time for an aircraft system.[11] Even more time is required if technological breakthroughs or significantly advanced capabilities are required of the new systems.

But what of the weapons of tomorrow which do not exist already? They will come about in four different ways according to Morganstern, Knorr, and Heiss.[12] The first of these is through marginal improvements to known technologies. While serving as Secretary of Defense, Robert McNamara listed several such advances during the period 1960-1966. These were: anti-satellite and anti-missile systems; the SR72, A7, and F-111 airplanes; the Army's Main Battle Tank (MBT); Over-the-Horizon radar; and the EX-10 heavy torpedo for use against fast, deep-diving nuclear submarines.[13] Current systems in the design/development process--ships like the patrol frigate and trident submarine, planes like the B-1 and lightweight fighter, and the Army's Big Five--are primarily in the category of marginally improved known technologies.[14]

This kind of system evolution is generally known as state-of-the-art, and contributions from this form of technological progress alone can be astonishing. State-of-the-art improvements for example have accounted for a 3000 fold increase in nuclear weapon yield since Hiroshima and a 400 fold reduction in ballistic missile circular errors in the 25 years from the V-2 rocket to the Atlas ICBM. The automobile, the airplane, electronics, virtually everything has been subjected to the marginal improvement phenomenon with resultant orders of magnitude advancement.

A second way in which technology advances is by the combined application of two or more known improvable technologies to do something new. Andrew Stratton states that the application of known technology in a novel way to the solution of new problems plays a major part in many developments.[15] The problem may not necessarily be a new one, however. Witness the impact of the micro-electronics developments on the computer problem of size. The first vacuum tube computer Eniac, built in 1947 by Eckert and Mauchly of the University of Pennsylvania weighed 30 tons, took up 1500 square feet of floor space and had 18,000 vacuum tubes and 1500 relays. It could perform 5000 additions per second.[16] Now we have pocket sized minicomputers with integrated circuits to perform the functions of as many as 4200 gates or calculating elements such as transistors. Holographic computer memory and solid state storage devices will undoubtedly replace bulky disk and tape memories now used.[17] Other new technologies of the future can in turn be anticipated which will further combine micro-electronics, cybernetics and electro-optics to create new marvels and advancements.

In the weapons and warfare area, a vivd example of blending technologies is the applicatior of electronics and electro-optical systems into weapons delivery modes in attacking .he problem of accuracy. This one new area for exploration and development categorized as precision guided munitions portends to have possibly the greatest impact on future warfare and tactics of any currently visualized. It is still a fairly new concept and the "smart bombs" of today are but the equivalent of the Wright Brothers' early airplane. The door is opened, however, and the blend of technologies has been demonstrated. Now the marginal advancement concept will take over. In turn, other new technologies will enter the blend to further expand the possibilities of application. It takes little imagination to foresee laser equipped missile defense satellites; it takes little imagination to foresee the blending of electro-optical (EO) guidance, communications and intelligence devices with the embryonic Romotely Manned Vehicle (RMV) concept; indeed it takes very little imagination to see the incorporation of adaptive "reasoning" computers and defensive lasers into EO RMV's so that man's place in the loop becomes ever smaller.[18] Surface effect ships, navigation satellites, laser communications and data recording, and space warfare are but a few of the hundreds of areas evidencing advancement through applied combinations of technologies.

Another broad technological area which promises to provide unlimited adaptation to others is that of improved materials, fabrics, and composites. This becomes an extremely attractive development area because of the desirable characteristics of these exotic materials--high melting point, light weight, strength, invisibility to portions

of the electro-magnetic spectrum, etc.--and also because of potential cost savings and the possibility of substituting them for critically short raw materials. This is of course related to technological expansion of our production base--the adaptability afforded by computers and the diversity and broadening range of possible products.

The "soft" side of R&D--management--is yet another related discipline which benefits from technological advances and blends in computers, communications, command and control, etc. More efficient decision-making, cost control and the like meet both necessity and sufficiency conditions for technology to progress. In an era when blind paths and false starts can be extremely dangerous from a technological parity point of view, as well as extremely costly from a more practical point of view, effective management is a prime determinant of both the nature and probability of future warfare.

The third way in which technology progresses is the successful discovery of sought after new technologies. These are the ones that man deliberately pursues such as the cure for cancer and medical transplants. A more militarily oriented example would be thermo-nuclear power envisioned after the fission nuclear energy breakthrough. Others for the future in this category might be the neutron bomb and nuclear powered rockets. Thes latter area of research, according to H. Guyford Stever as Director of the National Science Foundation, offers the best promise as a propulsion system for deep space operations.[19] Deep space operations would take in the solar system planetary explorations--including a manned Mars landing by the year 2000--which are forecast by Wernher Von Braun.[20] A more recent example of

a target area for dedicated research surfaced in the energy crisis--the need for alternative energy sources.

Symbolic of the prevailing attitude toward technology is the general belief that new energy sources can and will be found. The equation: desire and will plus money plus lead time equals success demonstrates America's faith in the acknowledged power of technology. This same equation applies to weapons systems development and should the perceived need arise for an accelerated defense R&D program--the two major limiting factors would only be money and time. Much beyond our current meager efforts is within reach if sought after and given necessary temporal and fiscal consideration.

The last way in which technology advances is the one which always destroys efforts to predict the future; the surprise technological breakthrough. These are the unforeseen quantum jumps that drastically alter concepts, methods, and capabilities. By their very nature, however, they cannot be treated in any work attempting to look into the future. For this reason such noted futurists as Herman Kahn in The Year 2000 are forced to caveat their endeavors with "surprise-free" limitation while pointing out that the only real surprise would be a total absence of political or technological surprises during the time period being studied.[21]

Without knowing what breakthrough might occur in the next quarter century a review of some of the unexpected developments of the recent past is convincing argument in support of Wernher Von Braun's thesis that most prophesies err because they are not bold enough.[22] Table I includes some of the more significant of such developments plus

some expected or likely developments as postulated by Arthur C. Clarke.[23] Table II indicates some selected likely future breakthroughs as listed by Herman Kahn in his book The Year 2000.[24] With some possible area exceptions such as agricultural or animal husbandry, few new developments can be visualized as not having possible military impact. Even these two exception examples can, without too much imagination, be seen as possibly relating to chemical and biological (CB) warfare research.

Table I. Some unexpected achievements or discoveries on the left and on the right are some expected concepts which have materialized. Source: Arthur C. Clarke, "Hazards of Prophecy", The Futurists, p. 149. Other unexpected developments might include antibiotics, jet propulsion and radar.

Unexpected	Expected
X-rays	Automobiles
Nuclear energy	Flying machines
Radio, TV	Steam engines
Electronics	Submarines
Relativity	Spaceships
Transistors	Telephones
Masers, lasers	Robots
Superconductors	
Atomic clocks	
Dating the past	

Table II. Some selected technical innovations very likely to be realized by the year 2000. Source: Herman Kahn, The Year 2000, pp. 51-55.

Multiple application of lasers

New or improved structural materials, fabrics

Super helicopters, giant jets

New sources of power

Some control of weather and climate

Cheap and widely available central war weapons and weapon systems

New and effective counterinsurgency techniques

Space defense systems

Inexpensive and reasonably effective Ground Based Ballistic Missile Defense

New Chemical and Biological (CB) methods to incapacitate

New and possibly very simple methods for lethal CB warfare

The interrelation of research areas vividly portrays the synergistic nature of an open society pursuing knowledge in ever broadening horizons. While some might deplore an apparent lack of centralized direction of US R&D as opposed to the single-mindedness exhibited by the Soviet Union, it would appear that the very free-wheeling nature of American technological growth is the more promising from the standpoint of new doors.[25] It is the "new doors" aspect of technology which is the ultimate key to the future. When one considers the degree of destructiveness at hand today, maybe it is just as well we cannot foresee the almost certain quantum jumps in man's insane compulsion for self-destruction.

In addition to the obvious direct impacts of technology on weapons and hardware developments, there is an indirect impact on deterrence, the arms race and other components of the state of the political world referred to by the term "stability." Available literature contains a veritable plethora of views and opinions on this subject.

US Senator Edmond Muskie fears that more accurate ICBM's capable of being targeted against military targets rather than against cities is likely to increase their possibility of being used.[26] Defense Secretary James R. Schlesinger, on the other hand, argues that the President needs flexible nuclear response options. How can a conscionable President respond to a limited Soviet attack on some US ICBM's when his only response option will trigger decimation of US cities?[27] General Andre Beaufre contends that "a conventional arms race produces instability whereas a nuclear arms race produces stability."[28] Others view nuclear proliferation with a dread based on their certainty that once weapons have become commonplace, they have always been used. Some experts state that development of defensive systems invites increases in offensive inventories and makes war more possible as leaders assess their assured survival potential and may act less rationally. Many other experts believe that as defensive potentials increase, the possibility of war decreases.[29] And on and on and on.

All proponents of all views present equally lengthy and reasonable arguments to support their theses. Who is right? Obviously with such divergent positions they cannot all be right, yet perhaps to some degree they are. Herbert F. York points out the modern absurdity that as nations' military power increases, their national security decreases.[30] The fact remains that despite the continued presence of all the standard historical causes of war, the 20th Century trend toward larger wars occurring more often has been apparently reversed since the advent of nuclear weapons. As nations become more interdependent and more affluent, perhaps their propensity for war will diminish.

That technology has definitely impacted on stability is undeniable. Without enumerating any more of the "hows" and"whys", there are a few generalities worth mentioning. First--technological advances of the future cannot appreciably increase the significant danger and destructiveness of existing weapons. To quote US Senator George McGovern, we are already talking about the difference between making gravel or refined dust of an enemy's worthwhile targets.[31] Additional relative improvements in that direction therefore become somewhat immaterial. It would appear instead that while technological pursuit of efficiency, reliability, sophistication, etc., continues in actual fact weapons (nuclear as well as potential chemical-biological) are trending toward permitting a military capability of sparing cities and civilizations or parts thereof either through more precision/less blast in nuclear attacks or through the use of less lethal incapacitants in a chemical-biological attack.

Second, the five properties listed by Klaus Knorr by which nuclear weapons have impinged on the utility of the military greatly revise the historical relation between peacetime standing armies and a nation's mobilization base.[32] Outcomes of future wars will be greatly influenced if not totally decided by a nation's military readiness (to include training, equipment, and supply levels) at the outbreak of hostilities. Within budget constraints, powers of the future will have to form, train, and maintain extremely diverse military forces capable of conducting all conceivable levels of warfare ranging from terrorist/insurgency operations to full scale conventional and/or

nuclear/CB engagements. The cost associated with such capability portends smaller, more sophisticated, highly professional forces.

Third, much future stability will depend on who makes what technological breakthrough first. A significant advantage--even short term--such as that which might come from an antisubmarine warfare breakthrough would accrue to whichever side first exploits it. Should that side be the Soviets, for example, and should they evaluate their advantage to be sufficiently decisive, Possony and Pournelle remind us that even in the year 2000 A.D., it will be treason to pure Communist Doctrine to fail to take advantage of such a situation.[33] A study at UCLA conducted by George R. Pitman, Jr. concluded that it is this kind of technological innovation which is the most destabilizing of the several factors which perpetuate the arms race.[34]

The flow of technology is inexorable. As it continues to advance at an accelerated pace, some of the important results will unfortunately continue to be focused on militarily destructive devices. However, many of the fruits of technology will be beneficial. They will improve the quality of life of even the world's most destitute. By the year 2000 A.D., Herman Kahn's world of plenty will still be far away, but perhaps enough people will be able to envision it to ensure that no one is foolish enough to destroy the chances of reaching it.

CHAPTER II

FOOTNOTES

1. James R. Schlesinger, The Political Economy of National Security, p. 62.

2. Irving S. Friedman, Inflation, A Worldwide Disaster.

(The author points out that the present international economic system has a built-in bias for inflation. He further points out the rising expectations and subsequent political and social frustrations suffered in the poorer countries who are least equipped to handle inflation.)

3. Hudson Institute, 1973 Synoptic Context on the Corporate Environment: 1975-1985, Vol. II, "Prospects for Mankind." (Draft)

(This draft study, along with Kahn's The Year 2000, presents strong arguments predicting near universal affluence. The basis of the argument is new and improved technology, slowing population growth, more efficient and wider use of the earth's wealth and better management. The neomalthusian alternative set forth in The Limits to Growth by Donella Meadows limits the projection with present day political, social, and institutional constraints, thus failing to demonstrate a balanced progression. If one assumes the Kahn position or a more moderate version, worldwide shortages just cannot happen in the early 21st Century. It must be emphasized that this assumption does not rule out moderate to severe local shortages, be they either politically contrived or real. Third World countries have neither the economic base internally nor the political clout externally to be able to satisfactorily deal with every possible economic hazard.)

4. Sanford Rose, "Our Vast, Hidden Oil Reserves," Fortune, April 1974, p. 104. This author makes a strong case that the United States has nearly 50 years of high cost reserves but that governmental energy policy inhibits exploitation.

5. Ernest Cotton, "Energy and the Environment, Implications for National Security," address by representative of the American Petroleum Institute given at US Army War College, Carlisle Barracks, PA, 29 Aug 73.

6. Raymond Aron, Power, Glory and Idea or On the Goals of Foreign Policy: National Security and American Society, edited by Frank N. Trager and Philip S. Kronenberg, 1973.

7. Derek J. de Solla Price, Science Since Babylon, p. 97.

8. Raymond C. Schreckengost, USMC Res., "Science, Technology and Change: Implications for the Navy," Naval College Review, November 1971, pp. 2, 14.

9. Andrew Stratton, "Contests in the Sky," Unless Peace Comes: A Scientific Forecast of New Weapons, ed. Nigel Calder, p. 87.

10. Herman Kahn, "The Military," The Future of the U.S. Government: Toward the Year 2000, ed. Harvey S. Perloff, p. 204.

11. Interview with key staff personnel in the Deputy for Development and Plans, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio 30 April 1974.

12. Oskar Morganstern; Klaus Knorr; and Klaus P. Heiss, Long Term Projections of Power: Political, Economic, and Military Forecasting, pp. 2-3.

13. John Erickson, "Introduction. Nuclear Strategy: World Dilemma," The Military-Technical Revolution: Its Impact on Strategy and Foreign Policy, eds. John Erickson, Edward L. Crowley, and Nikolai Golay, p. 6.

14. The Army's Big Five Research and Development Programs are:

SAM-D	Surface to Air Missile--Defense
AAH	Advanced Attack Helicopter
MBT	Main Battle Tank
MICV	Mechanized Infantry Combat Vehicle
UTTAS	Utility Tactical Transport Aircraft System.

15. Stratton, p. 64.

16. William H. Desmonde, Computers and Their Uses, p. 16.

17. Alan R. Caplan, "Computers," The Americana Annual, 1974, Encyclopedia Americana, p. 185.

18. Interviews with key staff personnel, Air Force Avionics Laboratory and Deputy for Reconnaissance, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio, 30 Apr 74.

19. "Nuclear Propulsion May Enable Man to Escape Solar System," The Futurist, Vol. 2, Apr 71, p. 60.

20. Wernher von Braun, quoted by Jonathan Spivak, "Space: Men on Mars," Here Comes Tomorrow, Wall Street Journal Staff, 1966, p. 87.

21. Herman Kahn and Anthony J. Weiner, The Year 2000, p. 8.

22. William B. Graham, "RMVs in Aerial Warfare," Astronautics and Aeronautics, May 1972, p. 28.

23. Arthur C. Clarke, "Hazards of Prophecy," The Futurists, ed. Alvin Toffler, p. 149.

24. Kahn and Weiner, pp. 51-55.

25. Stefan T. Possony and J.E. Pournelle, The Strategy of Technology: Winning the Decisive War, pp. 21-42.

26. "Visions of the Next War," Newsweek, 22 Apr 74, p. 53.

27. Ibid., p. 52.

28. Possony and Pournelle, p. 152.

29. Ibid., p. 115.

30. Herbert F. York, Race to Oblivion, p. 228.

31. Thomas Gordon Plate, Understanding Doomsday, p. 10.

32. Klaus Knorr, On the Uses of Military Power in the Nuclear Age. pp. 82-87. The five properties by which nuclear systems have impinged on the utility of the military are:

1. Enormous increase in scale of destruction.
2. Enormous technological superiority of offense over defense.
3. Uncertainties about military forces' capabilities and the international relationship of military power. Secrecy of capabilities.
4. Global reach of weapons.
5. Speed of weapons delivery.

33. Possony and Pournelle, p. 2.

34. George R. Pitman, Arms Races and Stable Deterrence, Security Studies Project, Paper No. 18, 1969, UCLA, pp. 46-50.

CHAPTER III

LEVELS OF CONFLICT

BACKGROUND

The present relationships of nations can be categorized as follows: The US and the USSR clearly dominate the international scene politically and militarily. A second group of nations (European states, China, India, and Japan) have sufficient power to exert sizable but limited influence on world affairs. The last group is the rest of the world's countries who are restricted in their options in the international sphere.

Much of the power generated by the second grouping derives from their economic power and indirectly the military potential that economic power implies. A short-cut to greater international muscle is, of course, the acquisition of nuclear arms. In countries like India and China the combination of massive populations and nuclear capability allow them to bypass the sterile measure of Gross National Product, and to exert influence only indirectly related to economic power.

The bipolarity of the US and the USSR is expected to continue into the 21st century. The makeup of the second group of nations will be more dynamic. Egypt, Iran, Brazil, Indonesia, and South Africa have economic and/or nuclear potential that could move them to this second group.

In examining the possible type conflicts in the above described world, it is necessary first to examine the military potential of

these nations. A determination of this potential may indicate a level of warfare in which they could logically engage. The measure of a nation's power is its national will to pursue its political goals and interests and convert economic power to military power, its military capability (forces-in-being), its mobilization capability (the convertability of economic resources to military capability), and its power projection capability (transportation and logistic infrastructure required to place forces in a theater of operations). Additionally, a nation's power is subjected to the positive or negative influences of other nations as well as the losses expected from an adversary's military actions.

In the third group of nations (less developed countries, LDC's) their military power is nearly totally circumscribed in the forces-in-being. These nations have a growing military capability and increasingly expend more of their domestic product on maintaining this capability.[1] Except for the subsequent use of unemployed and underemployed manpower they have little mobilization capability and they have no power projection capability beyond states contiguous to their border. Not considering national will and third country influence, a war between LDC's would pit capability against capability. With limited quanity and quality of weapons, limited mobilization capability, the duration of the conflict would be limited and on the world scene the political impact would be limited. Even with a fanatical will, an LDC would be reduced over time to unsophisticated indecisive warfare. Only third country influence could change this circumstance. This level of warfare is classified for this study as minor war.

In the second group of nations, those that have some modicum of economic or military power, there exists some significant mobilization capability, an international power projection capability and nuclear arms potential or capability. The undeniable fact that cannot be assumed away about any conflict between these countries is that they are inextricably intertwined politically, economically, and militarily with the US-USSR bipolar power structure. Therefore, major political interests become involved in such a confrontation. Additionally, the forces involved are of major proportions and their projection capability on at least a regional basis is formidable. For all these reasons it becomes extremely difficult to isolate or negated the influence such a conflict would have on the entire world. Any such warfare would have to be classified as major.

Conceivably the US and the USSR could become involved in a war of major proportions using the magnum capabilities available to each. Such a war would perforce be major and because of the enmeshing network of bipolarity would probably involve some nations of the second group. The greater this involvement and the more prone to initiation of mass destruction weapons the more total such warfare becomes for mankind. The thresholds for this level of war must be strategic involving multiple nations.

The above paragraphs define levels of warfare between nation-states. Not surveyed were sub-national levels of warfare. Terrorism attempts to exert influence on the political goals of power elites. It does so by using minimum force to extract maximum political change or, taken conversely, to reduce the will to maintain the status quo

Insurgency is one more step up the ladder. The insurgent has more military power to use to reduce the will of an established government to pursue its political goals and at the same time erode the government's power base. The final phases of insurgency are seen as the transition to a direct confrontation of insurgent and government military power. This is a civil war. It then takes on the overtones of a classical contest of military forces. This phase is not discussed separately in this study since at that point the adversaries have established political roles not unlike nation-states engaged in some level of warfare.

Not introduced into this exposition were the various combinations that can take place in conflicts between nations with quantum differentials in power (e.g.,US vs LDC, 2d Group vs 2d Group, etc.). As each of the defined levels of conflict are viewed in the light of possible 21st century settings, the impact of great power entry and other states entry into such conflicts will be surmised.

There have been, in resume, five levels of conflict isolated which can beneficially serve for the investigation of the nature of warfare in the year 2000 A.D. They are terrorism, insurgency, minor war, major war, and total war.

TERRORISM

> . . . Military strategy can no longer be thought of as the science of military victory. It is now equally, if not more, the art of coercion, of intimidation, and deterrence. The instruments of war are more punative than acquisitive. Military strategy, whether we like it or not, has become the diplomacy of violence. . . .
>
> Thomas C. Schelling[2]

The practical application of terror to achieve political ends can be traced through history in all wars, regardless of size or arena. The intensity or degree of terroristic acts, however, varied with the "rules of engagement" in vogue during that particular era. Since terror is a human ingredient and since terror has been employed by individuals, groups, and nations throughout human history, it is only reasonable to expect it to continue to be used as an instrument to effect change. The purpose of this chapter is not to set forth a listing of terrorist principles or specific tactics but rather to examine the rationality of terrorism, evaluate its practicality and utility, and project what part, if any, it may play in warfare of the future. Criminal terrorism or terrorism for immediate personal reward is not considered in this discussion.

Terrorism is herein defined as "an organized campaign of civil violence for political objectives carried out by an establishment or opposition group." Terrorism may be international or confined within the borders of a single nation. Its genesis results from perceived injustices (real or imagined) which require, in the opinion of the terrorist, a definite political act or actions to correct. It normally is a consequence of the inability of a group to achieve desired change through normal governmental process or nonviolent expressions. The resort to terrorism implies a real or perceived weakness on the part of the terrorist group. They are striving to build a political base while simultaneously eroding the power base of the establishment group. Acts of terror, when carefully orchestrated, are not as counter productive to favorable public opinion as one might suppose for reasons shown later.

International acts of terror are immediately portrayed throughout the world by mass communications means. Spectator countries often become concerned or active participants as the program of terror unfolds. External political and economic measures are frequently exerted by other concerned countries to resolve the issues. World-wide attention is focused upon the terrorist and his political goals. His publicity objective is achieved and in many cases a hero-martyr role is established. The oppositions group's goal of recognized legitimacy as a political unit is furthered.

It is surprising that the acts of a terrorist are usually branded as irrational by government spokesmen and the press. This reflects a lack of understanding of the terrorist's premises. His violent acts are designed to achieve some political end. His lack of achieving his goal through non-violent means have created a desperation that violent action may be successful (or partially successful) and better than continued failure or no action at all. The terrorist does not need to be loved but he needs to be heard and recognized. He needs no justification other than to believe his actions will benefit his cause. He is not irrational but on the contrary quite logical about achieving his goals with meager assets. Another emotional factor to be considered is his frame of reference: e.g., as one Arab delegate to the United Nations has stated, ". . . one man's terrorism is another man's patriotism." Rationality therefore is in the eye of the beholder.

A classification[3] of terrorist activities is convenient to promote understanding of specific methods employed, Two general categories emerge:

(1) Demonstration Terrorism. This category is designed to demonstrate to all concerned (and outside observers) that the opposition terrorists have the capacity and the determination to act. It is used to unnerve the opponent, impress the populace, and erode confidence in the establishment to restore order. Publicity is desired and political legitimacy is the goal. Assassinations, bombings, and armed attacks on government activities are some examples.

(2) Bargaining Terrorism. A natural follow-on from Demonstration Terrorism is Bargaining Terrorism. After establishing their ability to act violently and the inability of the government to control these acts, a new dimension is added. Bargaining Terrorism is seeking some specific goal of concession from the establishment in exchange for not carrying out some credible threat. Examples include kidnapping for some sort of ransom, threat of assassination, threat of destruction of some vital installation, etc.

It can be shown then that the coercive diplomacy of violence is practiced not only by major world powers in nuclear or sub nuclear brinkmanship but also by extremist groups possessing the will and the means to mount a credible threat against an establishment group. The establishment group, if consistently unsuccessful in preventing terrorist acts, may become either more repressive or more susceptible to political accomodation with opposition demands. Usually greater repression is first tried and, if unsuccessful, accomodation follows. As this occurs, the population concerned (and the outside observers) tend to increasingly identify with the winning group. (Studies by

social psychologists have found that groups tend to identify with aggressive behavior and turn against organizations displaying passive or submissive tendencies.)[4]

The above statements should not be construed to mean that terrorism is bound to be successful in achieving its goals or that establishment groups cannot successfully combat terrorism. Governments have and are waging successful counter-terror and counter-terror terror campaigns. The point intended is that terrorism has a rational basis, is within the capabilities of an organized and dedicated group, and has been successful on many occasions in accomplishing political change. These successful examples offer the needed encouragement to other dissident elements whose frustrations have not been solved by non-violent means. Herein lies the fertile soil where the seed of terrorism can grow. When this seed is further nourished by assistance from some external group of nation, the growth, stamina, and survivability of the terrorist plant is multiplied.

With the above thoughts in mind, what role will terrorism play in shaping the world political scene between now and the year 2000? How will military organizations and future warfare be affected? What utility value does terrorism have for political units of all sized from dissident groups to superpowers? Before developing a scenario for terrorism in the year 2000, its important to highlight several trends that will influence the use of terrorism.

Trend #1. International laws for curbing terrorism have not been enacted and it is unlikely that they will be.[5]

A review of incidents of terrorism during the past decade show it to be an increasing problem for the international community and will likely continue to be unless effective international sanctions are adopted and applied. To date neither the United Nations nor any other organization has been effective in curbing international terrorism. International law does not provide for any legal measures against the international terrorist. In fact, no mutually accepted definition of terrorism has been accepted by the UN and none is likely to be accepted in the foreseeable future.

The proposals submitted by the United States to the United Nations concerning the control of international terrorism reflect the opinion of the non-Marxist and non-Third World countries. The Western nations believe in suppressing international terrorism because it is contrary to our historical concept of law and order. This is not the same for a majority of other nations of the world and is contrary to their history, ideology, and national interest in many cases. Therefore, international terrorism receives implied approval by many governments.

Trend #2. Exorbitant cost of modern weaponry is making formal war too expensive.

The costs and destructiveness of modern warfare, including insurgent wars, are becoming prohibitive and may exceed net gains. As a result many nations are looking for alternative means to achieve political and economic dominance over adversary nations. The relative low cost of sponsored terrorism and the disproportionate influence that a small well-trained terrorist group can exert becomes an attractive alternative to war.

Trend #3. Advancing weapons technology will permit small terrorist groups to possess extreme destructive power.

The advance of technology and the increasing availability of nuclear weapons will enhance the destructive capabilities of all terrorist groups. Groups sponsored by technologically advanced nations will possess weapons of extreme destructiveness, lethality, and coercion. Even those idealistic and highly nationalistic groups not sponsored by external forces will nevertheless accrue increasing bargaining power from the increasing lethality of their arsenals.

Trend #4. Socio/psychologicl climate in world populace is conducive to development of terrorism.

Social and economic pressures are creating conditions favorable to the development of more terrorist movements. In the underdeveloped nations, the racial differences, growing populations, diminishing resources, improving education and communications systems, are being combined with ineffective, corrupt, and often repressive governments. This is an ideal spawning ground for terrorist developments. In Western nations, growing egalitarianism, economic instability, the effect of mass communications, and a questioning of traditional values, are combining to make it increasingly difficult for governments to govern. While terrorism is less likely to develop in democratic nations where varying political ideologies can be openly expressed, any shift towards autocracy required to maintain government control will also increase the chances of terrorist development particularly when encouraged by a sponsor state. Nations governed by totalitarian regimes are always susceptible to terrorist activity. Only harsh

repressive measures of a police state prevent such activity from flourishing. However, such regimes have particular difficulty at times when a transference of power from a departing leader to a successor is required. The power vacuum occurring before a new government consolidates, presents an opportune time for terrorism and violence to effect change if sufficient discontent exists within the masses. Discontent does exist in many nations of the socialist world that have been affected by the same social and economic pressures impacting on the Third World and the western nations.

All things considered a likely scenario regarding terrorism in the year 2000 could be postulated as follows:

Situations and political conditions will exist in numerous nations which preclude free expession of political thought and reasonable possibilities for desired political, economic, or social change. Resulting frustrations will result in formation of groups so desperate for recognition and expression that they will resort to violent acts for political ends. Terrorist movements will exist both national and international.

National governments recognizing the cost and destructiveness of formal warfare will have explored alternative methods for exerting political or economic influence over advisory nations. They will recognize the practicality and small expense of sponsored terrorism plus the unique ability of the terrorist to operate in urban environments against highly visible targets. Consequently, sponsor nations will support client terrorist groups.

Terror applied by groups and/or governments against governments and/or populations exists as an accepted form of warfare by a majority of nations of the world. The United States will express abhorance of this idea but realize it as a fact of life. Inconclusive debate will continue in international forums.

Proliferation of terrorist groups will reinforce the feeling of legitimacy of each terrorist. He will feel he is on the just side in a noble cause. Targets, victim types and numbers, and weaponry will range greatly between different terrorist philosophies.

Terrorist actions, both internal and international will continue and become more violent. This is particularly true in Third World nations. Caution will be exercised by sponsor nations to avoid direct confrontation that might escalate to formal war.

Weapons used by terrorists will increase in lethality and destructiveness. Special terror weapons such as genetic disrupters, mind altering chemicals, and crop destroying biologicals or chemicals will be added to their arsenals.

Strategies for combatting internal and international terrorism will be developed by all governments. Options will vary from stringent repression to major concessions in accordance with the situation anticipated.

Military forces will be structured, equipped, and trained for counter-terror missions as well as commitment in formal warfare.

Partial successes as well as factional disagreements will fragment many terrorist movements into opposing groups thereby decreasing their effectiveness.

Some terrorist movements will attain their goals and others will fail. More will fail than succeed because of their inability to win sufficient support from the population. Enough will succeed to perpetuate the concept.

In conclusion it should be emphasized not to overexaggerate the importance of terrorism in influencing the behavior of nations in world affairs. While it can be useful to a nation-state in influencing the behavior of another, it will never substitute for threat of formal war (or war itself) in the management of disputes between sovereign states. While terrorism is a nuisance and a threat to the internal stability of a state, it can be controlled or reduced to insignificance (never totally eliminated) if the state wishes to pay the necessary price (either by repression, concession, or reform) to do so. The questions for a nation-state to consider then are, how can it use the effects of terrorism to its advantage if need be and how can it minimize the disruption to its system if terrorism is used against it.

INSURGENT WAR

An insurgency is defined in JCS Pub 1 as a condition resulting from a revolt or insurrection against a constituted government which falls short of civil war.[6] The insurgent leadership has as its goal the gaining of political influence within the attacked nation. The primary objective of insurgent warfare is the destruction or erosion of the will of the established government to resist or to pursue its aims. The power of the government and its will to resist are

inextricably interdependent. Therefore, the government's power is also susceptible to erosion through attrition by insurgent use of arms. As defined by the JCS, this is a level of warfare below a civil war. Civil war indicates that the insurgents have sufficient military power to openly contest the power of the government. The focus of civil war shifts somewhat from the destruction of will to the destruction of power. Conversely, in an insurgency the insurgent power is initially insufficient to effect major change and the most available and sensitive target is national will.

The above over-simplified analysis of insurgent war is required to highlight its objectives so that proper focus on its means can be made. It is obvious that because of the imbalance in will and power in the insurgent organization the arenas for action will differ noticeably from other type wars. There will be heavy emphasis on the political and psychological/sociological elements and then secondarily on economic elements which have implications on morale and power. Lastly, military capability, technologically enhanced, poses new dimensions in destructiveness for both adversaries.

There are two major long-term trends in the evolution of mankind that need indentification. Their progression will influence the nature of future insurgencies. The first is "egalitarianism."[7] That term of the French revolution which in essence is concerned with the dignity of the individual and which in civics has come to define the basis by which governments rule. Whether real or perceived, governmental authority needs to act in the name of the masses. (The

class warfare of Communist states places primary emphasis on this precept.) When this is not the case, a government may be overwhelmed by this idea.

The second long-term trend that impacts widely but unevenly on the world is technology. As Samuelson states, technological gain is the most dominant element of economic growth.[8] Derived from the long-term trend are several recognizable medium-term trends (early 20th century developments) that have significance to insurgency. Mass communications for the transfer of information and gains in transportation have brought populations closer to that element attempting to influence. A corollary medium-term trend is the urbanization of populations.

On a short-term basis (since World War II) trends that are both significant and appear to be more than cyclical patterns must be briefly identified. Foremost among these is the decolonization of West European empires. This has left some governments of the Third World with ill-defined international power relationships and narrow bases of political support. Decolonization has nearly run its full course and is not a trend as such. But the resultant ill-defined internal and external power system is a status that portends conflict well into the 21st century. A second critical development is the legitimacy of violence within countries. This is an aberation of long-term "egalitarianism." As Samuel Huntington has pointed out, "the democratization of government in a Society in which violence is a key part of government also means the democratization of violence."[9] Going further, as the masses perceive the legitimacy

of their goals, the more legitimate becomes the exercise of violence. The third short-term trend is the enormous increase in weapons production worldwide. The availability of these weapons to all elements of society and the growth in military establishments worldwide (military growth exceeds economic growth in developing countries) makes readily available the means to commit violence.[10] These are the macro-trends emanating from the 17th century or earlier, from those which are outgrowths of industrialization and from the restructuring resulting from cataclysmic world war. These trends appear to possess the intensity to carry into the 21st century. For the analysis of the nature of future insurgency these trends will provide an initial basis. Possible micro-trends useable in insurgent warfare will be identified in the development of a description of an insurgency around the year 2000.

The 21st Century Insurgency

The hostage of insurgent war will not change. The fight by insurgent and constituted governments for population control is central to the political, economic, and military basis of power. It is the uncommitted element of this population for which the contending parties vie. Overt commitment is not necessary; simply denial of this base value is sufficient.

The Geographical Arena

The relative success of the Maoist type rural insurgency will cause its emulation in the future. The greater the percentage of the population found in the countryside the greater will be the

propensity and chance of success for this type of insurgent war. The closer a nation is to a subsistance economy, the less counterguerrilla capability the established government can generate and conversely, the more dependent it is on the agricultural sector. It is unfortunate but one of the core characteristics of these least developed countries is that they are ruled by elitist factions only nominally concerned with needs of the general populace and/or they are extremely crude, unsophisticated political regimes enjoying no significant power base. Projecting an improbable but extremely high economic growth rate for these least developed countries over the next thirty years would still place many of them at the marginal subsistance level. It is quite obvious that both economically and politically some countries of Latin America and Black Africa will be fertile ground for rural insurgency. What has been lacking is a disciplined cadre of dissidents with an appealing revolutionary creed. The marriage of a viable creed with the tested and refined rural guerrilla warfare techniques will pose difficult problems to these regimes.

The other arena for insurgency is in the urban areas. The phenomenal worldwide growth of the megopolis has tended to lessen the influence of the rural community in many areas since urban growth is associated with some degree of industrialization and serves as an outlet for rural dissatisfaction. The insurgencies experienced to date have had little support in the large urban areas. It is recognized that the post-World War II insurgencies have not focused on the cities but even in the case of success they have generally experienced an apathetic urban population as they came to dominance. What, then

are the ingredients for a viable urban insurgency and what is its plausibility in the year 2000? It was pointed out by Herman Kahn that generally speaking, populations migrating to the city do not become immediately militant because of rising expectations but rather are somewhat pacified because even the poorest conditions are somewhat better than the rural status. Secondly, the thrust for betterment normally takes economic overtones and not political.[6] The new urbanite is not the powerful source of revolution as sometimes assumed. Nor would this element provide sufficient base. The industrialized working class is a larger segment with political/social aims. If this element's well-being is threatened and it has little leverage with the power elites (e.g., strong unions) and can be offered a viable revolutionary creed, then urban insurgency can take place. It should be noted, however, that this blue collar class has many alternatives to insurgency. A crisis in its well-being tends to promote cohesion and militancy that demands the attention of power elites. These facts tend to illustrate nothing more than the historical development of unionism, the welfare state and the failure of the Communist theory of the proliterian struggle. However, if a ruling elite is sufficiently rigid and an economic crisis of major proportions takes place, then a viable urban insurgency may take place. The western world experienced some narrow escapes in the great depression of the thirties.

Several economic clouds loom in the horizon of the 21st century that could foster urban insurgency. Energy, food, resources, population, and international inflation are highly interdependent problems that with even marginal acceleration could have profound impact.[12]

The 3 to 5 percent decline in gross supply of oil to the United States caused by the Arab Oil Boycott is illustrative of the impact minor fluctuations may have. A 3 to 5 percent decline in total energy sources would be disastrous. Because of the interdependence of these variables they have, of course, a synergistic effect.

The impossibility of prediction of economic events thirty years in the future makes it equally impossible to gain an indication of where the decisive factors would coincide for a viable urban insurgency and if given the factors, an urban insurgency would actually take place.[13] One result of Carlos Marighela's attempts at urban insurgency in Brazil and the Tupimaro's in Uruguay was the efficacy of their collateral urban terrorism. This, coupled with rural insurgency, has not yet been experienced by the world.

The Word

The primary offensive of an insurgency is on the populace. To secure the uncommitted, degrade the desire to continue costly war, propose acceptable alternatives, for all those uses of propaganda instruments that further the cause, communication is the key. The required technology is becoming available for the rapid transmission of massive amounts of information. The populace of a country experiencing an insurgency will be inundated by both sides with propaganda. It is impossibe to predict which side will be the most effective. The government will have the advantage of semi-fixed installations, quantity of information, control of printed information, and jamming advantage of the fewer insurgency coherent light/electro-

magnetic transmissions. The government must deliver on promises of reform which they propagandize. The insurgent only needs to keep promising delivery at the conclusion of warfare.

The Forces

The use of the laser for computers and information transmission supplemented by secure electro-magnetic processing and transmission will also vastly increase the command and control of military forces and their weapons systems. The evolution of the microfiche of today and initial attempts now being made to apply the laser to information processing portend the processing of vast amounts of information by miniturized communications equipment with a degree of flexibility not experienced in today's computer/information industry. This will have a vast impact on intelligence, target acquisition, weapons selection and accuracy, timeliness and, as indicated above, command and control. It is extremely difficult to discern which side will benefit from these technological improvements. The regular forces in recent insurgencies have enjoyed quanturm differentials in information processing over their adversaries but the outcomes do not appear to have any direct relationship to this fact. Because of the real lowering in the cost of electronic equipment in the last 20 years it is expected some rather sophisticated equipment will come within an insurgent group's budget in the year 2000. (One needs only to look at the falling prices over the years of radios, TV's, calculators and computer power to substantiate this.) This will give the insurgent much greater flexibility. When the insurgent military forces were

decimated in the past, a major cause was the inability of his command and control system to alter preset patterns. Probably of greater impact, and ultimately, seriously detrimental to any revolutionary cause, is the great likelihood of highly efficient and effective population control by the government. Based on information processing capacity, the credit card, individual recognition techniques, such as voice print and fingerprints and other known technologies of today, a threatened government will be able to develop population control systems that will strike directly at the insurgent movement.

Very relevant to the power developing country is the fact that these command and control/information systems are and will be available on commercial markets and when considering the stakes, will be relatively cheap.

The insurgent and the established government will not be so fortunate in the field of weaponry. Without a largesse from a highly industrialized state, neither side will be able to afford the newest weapons systems. The arms market will, however, be glutted with weapons of the 1970's and early 1980's. It is not foreseen that these poorer states will have the technological capacity to indulge in any significant internal arms production.[14] Therefore, an insurgency isolated from external influences will be nearly totally dependent on the commercial arms market.

It is necessary to interject at this point some speculation as to the plausibility of help from industrialized states to either contending party since this help will alter spectacularly the level of violence, duration, tactics, strategy, and termination of the war.

The Chinese dismal failure at promoting revolution in Africa in the 1960's and the failure of Cuba to do the same in Latin America indicate that an insurgency must have its impetus from within its boundaries. Once started, however, it must take on some ideological overtones, be they a political "ism," religious, racial, or anticolonial themes, there must be an appealing ideological thrust before outside aid can be effective.

The massive Soviet repressions in Eastern Europe from World War II through the Czechoslovakian invasion indicate a constant and steely resolve to maintain her hegemony over these nations. Her supply of armaments to Palistinian guerrillas, to the Middle East, in small quantities to African movements, to Indochina, to Cuba for subsequent shipment to Latin America, to the IRA of Northern Ireland, to India, indicates a massive propensity to supply arms worldwide. The quantity and quality of these arms shipments varies directly with the Soviet national interests. The forecasts by all knowledgeable world watchers that the US-USSR confrontation will continue throught the year 2000 indicate a continuing competition for influence in the Third World. The ideological overtone will in general determine which side of the conflict the Soviets will take. Although the larger perspective of world power must first be viewed. As she now provides small amounts of arms to the right wing sector of the IRA in order to perplex the British resolution of the conflict, the USSR may act similarly in the future to divert the power of the United States or a West European state. The continuing development of the Russian fleet with general purpose forces for power projection will reinforce her capability to deliver armaments worldwide with greater impunity.

China's disappointing experience in Africa, the regional nature of her power and her own internal economic problems will limit her desire and ability to subsidize insurgencies not on the periphery of the country. because of the facility of transport and the desire to influence proximate states she will support insurgencies in the Pacific basin.

The United States supplies arms to established governments worldwide. Her stock in trade has been the playing off and support of one power elite faction against another rather than the support of insurgent movements. Her single attempt at insurgency in Cuba was a colossal failure. These factors, coupled with the fact that most insurgent movements have had extreme leftist political motivations, has quelled any United States desire to enter on the side of an insurgent. Because of the forcefulness with which the USSR pursues her interests in Eastern Europe the United States has totally refrained from promoting insurgencies in that area. The United States does, however, maintain a capability to support insurgency. The primary mission of the Special Forces is to support and enhance the potential of guerrilla movements. But because of United States reluctance to unleash leftist elements in insurgencies and the alternatives available of subscribing to other power elements in a nation, the plausibility of the United States to support insurgents will be small. One final set of factors concerning United States propensity to support an adversary in an insurgency must be identified. Her anguished experience in Vietnam may tend to retard direct entry into an insurgent situation. It is significant that the announced Nixon Doctrine of assisting

selected countries who want to help themselves in their security is a stated policy of armanents supply to countries within US national interests. This policy was initiated ironically at the height of anti-Vietnam, neo-isolationist sentiment in the United States. With the amelioration of neo-isolationist sentiment over time the propensity to support other governments should increase.

The ability and desire of other industrialized powers to support insurgency antagonists is limited. As ties with former colonial domains become more remote and tenuous, the less interest will be evinced. Soviet satellites will continue to exert no international influence that is not condoned/dictated and supported by the USSR. As previously stated, the great power relationships will continue, thus restricting the volition of the second tier of powers. As raw materials become more scarce and as their desire for economic well-being continues, there can be a predilection by these powers to secure supply sources indirectly by force. These middle powers will be compelled to be circumspect in this type of support and only in dire circumstances would high visibility major weapons systems be provided.

In summary, there is high plausibility of the United States to support existing governments and there is high plausibility of the USSR to support insurgents. Support rendered by other industrialized nations, while possible, will decreasingly be undertaken.

In light of the above, the insurgent war becomes more onerous. The weapons systems then obtained by the contestants are current or perhaps only one generation behind. Because of their accuracy,

lethality, and range, the conduct of the insurgency becomes extremely destructive of human life and materials. This would imply that the war would be shortened because of exhaustion of the forces involved. The antagonists, however, have a pipeline for material support; therefore, it is primarily exhaustion of the populace that will decide the issue. And this, of course, returns to the basic ingredient of insurgent war that determines the degree of will and the power base, the population. The pro-government and uncommitted populace will fix the responsibility for concluding the war on the established government since it is formally vested with power. Whether the existing government can fulfill its responsibility in a timely manner so that dissaffection and desertion do not occur is the question.

The tactics of the insurgent war will be altered by the characteristics of the weapons systems of the year 2000. The lethality of these systems will severely restrict battlefield mobility. Mechanical conveyances used to improve mobility and firepower will leave a detectable trace, regardless of its structural composition. Heat, electronic emission, and reflective surfaces are known now. Other characteristics will also become detectable in the future. The present ability of a single man to passively detect and then launch destructive power against these vehicles is also known. Further, the cost differential between the expensive vehicle and its cheap destroying weapon will increase. Therefore, the capability for battlefield mobility will decrease drastically. This will have unfavorable effects on the quantity of troops needed to surpress insurgents. However, in the opposite sense the local protection of population

centers will be performed by fewer troops with greater capability and possibly more aggressively than in past experience. Overall, the lack of mobility and greater defensive capability indicates some of the characteristics of position warfare. Taken with extensive population control this would deny Mao's fish the sustenance of the population sea and would be deadly if forceable entry were tried. Obviously, a purely defensive concept would not defeat the insurgent and in fact would prolong the war in his favor. Offensive capability is foreseeable by exercising extreme economy of force. Multiple simultaneous operations without high mobility are too costly in terms of manpower and equipment requirements. However, with the exotic detection systems known today and being refined and extended, plus those foreseeable by combining disparate technologies of today, extremely accurate battlefield intelligence should be possible. This should favor the established government because the insurgents requirement for clandestine operation of any like system will lead to some inefficiencies.

Thus far an analysis has been made of the area, propaganda, participants, forces, weapons and tactics that might be prevalent in a 21st century insurgency. Various facets favored the insurgent, others the established government. No pattern evolved that indicated a decisive shift to either side. The conclusion must therefore be drawn that insurgent warfare may still be a viable form of warfare in a political setting not unfamiliar to us today.

Recent examples of Minor Wars would include the 1969 Soccer War between Honduras and El Salvador, the India-Pakistan and Bangladesh conflicts, and the Six Day and Yom Kippur Arab-Israeli Wars. These are labeled minor because of their relative size when viewed from a world perspective, not as an indication of lesser importance from the participants' point of view. They are certainly not labeled minor as disparagement of their danger to world stability through escalation and involvement of other nations. Indeed, the danger of involving other nations is perhaps greater for a minor war than for any other for the peculiar reason that the small power nations likely to clash do not have the economic and industrial wherewithal to field and equip large forces in sustained combat. They must have major power sponsors to provide them with a significant capability to fight for any length of time.

It is an unfortunate conclusion that the current ideological conflict between the world's two most powerful nations will prevail well into the 21st century.[15] This fact alone fosters the sponsor concept of supporting and assisting those nations friendly to one or the other of the two major ideologies and wooing those nations professing ideological neutrality. Added now to the ideological impetus to support friendly countries is and will be the increasing importance of the smaller countries as they become important as sources of raw materials and trade partners. The net result will be a greater effort by the major power to sponsor the smaller developing countries.

This support for small nations--support coming in the form of trade and industrialization benefits as well as arms and weapons technology--will tend to encourage adventurism among the small nations. The seeds of adventurism already exist. Many national boundaries are disputed. Territorial claims in international or contiguous waters are likewise contested. Again, the growing awareness of the significance of raw materials will exacerbate the existing disputes over territorial rights. Witness Greek and Turkish arguments over possible oil deposits in the Aegean Sea. Herman Kahn foresees many small "classic" wars developing over such disputes.[16]

Granting therefore the distinct possibility, if not probability, that regionally limited minor wars between two or more small power nations will occur near or after the turn of the century, what will their nature be? Obviously, it will be a direct function of great power sponsorship--who, how much, and how long.

It is this relationship which dictates the wide diversity in the nature of possible minor wars. Two contiguous nations with little or no sponsorship, limited to small, ill-trained armies equipped with obsolete circa 1980 or earlier weapons and weapons systems, will fight a very "uninteresting" war indeed. The margin for victory will depend primarily on standard factors such as relative size of the nations' armies, economies, and leadership. Superiority of individual weapons systems, logistics, and support activities, etc., will be relegated to secondary importance, because relative differences should be slight unless the primary factors are disproportionate to begin with. It will be war on a small scale much like war as we know it today.

Conventional weapons will be employed traditionally with locally intense but short duration sea, infantry, and tank battles receiving limited, somewhat ineffectual tactical air support. Such wars will be of short duration. Once initial stocks of arms and supplies are exhausted, the war will necessarily grind to a halt. Without sponsorship (i.e., resupply of arms) to negate mediation incentives, negotiated settlements will practically be forced on the quickly exhausted participants. Incentives to continue the struggle will be minimal. The danger here is major power disputes erupting over the settlement conditions and attempts to take political or economic advantage of the situation.

The opposite extreme to the above "two-small-weak-nations-and-almost-nobody-cares" minor war is the one where the participants verge on, major power status and are sponsored by the two major superpowers and/or their allies. Efforts to limit the conflict now become inextricably entwined with efforts to resupply and sustain the proxy nations' relative strengths thus assuring military superiority and strong negotiating positions. The putative root cause of the war may become submerged in major power interests.

The nature of this level of minor war is far more devastating, especially when projected to the year 2000. Superpower sponsorship will almost surely dictate the employment of modern weapons and all the sophistication and horror implied thereby. The probability of escalation to tactical type, short-range precision nuclear weapons cannot be totally dismissed. Israeli officials have been quoted as saying that if it looked like they were being pushed into the sea, "they'd take a hell of a lot of Arabs with them."[17]

Even if most futurologists and strategic experts are correct in their belief that nuclear weapons will never be used, an all out superpower--supported minor war in the year 2000 portends to be mind-boggling in its ferocity and destructiveness. The weapons available will run the gamut from those in current inventories to their successors exhibiting orders of magnitude improvements in efficiency, lethality, and sophistication.[18] This trend has already surfaced in the Yom Kippur War of October 1973. The unprecedented intensity of that relatively small war of only 18 days' duration was instrumental in the total destruction of more tanks for one side (the Arabs)[19] than the entire tank inventory of all the Allies in the spearheads of the World War II Western Front in late 1944.[20] This level of destruction, using the embryonic so-called smart weapons of today, when extrapolated 26 years hence along the technological growth curve will drastically revise the nature of the battlefield as we know it. Offensive and defensive developments will tend to make one-on-one duels mutual suicide. Each side will still attempt to deploy conventional-type weapons (tanks and airplanes) because if one side doesn't, the other side will have an advantage--and because the leaders of tomorrow will still be psychologically oriented toward application of new developments in the "good old fashioned" standard way. But by then, the widespread application of lasers in offensive, defensive, communication, and command and control systems, coupled with remotely controlled computer-operated self-protecting reconnaissance, electronic warfare and interdiction vehicles made of exotic new, vastly improved materials, etc., will drastically alter battlefield tactics. Increased emphasis

will be placed on behind-the-lines interdiction of logistics and communication choke points. Battles will be short, vicious contests of attrition very costly to both sides and to the sponsors. Initial inventories will be used up in a matter of days and resupply will tax the superpower sponsors both logistically and economically. The end result will be initial high intensity engagements dwindling rapidly to attrition forays amid mounting pressures to negotiate as net costs force alternative solutions.

Escalation of such a minor war to include direct involvement of the major powers is a distinct danger. Submarine transports, giant jets, and surface logistics vessels run the risk of interdiction, and contingency alert forces in the area run the risk of attack. What happens, for example, if a supporting nation's integral defense posture is seriously degraded by sudden destruction of key intelligence, communications, command and control, and/or surveilance systems being made available to assist one of the combatants? And how tolerant will a major or superpower supporting nation be of a minor nation's attempts to hold industries, citizens and/or captured advisors hostage for withdrawal and non-involvement demands? Also the political, demographic or geographic situation might foster direct intervention miscalculations on the part of one or more sponsor nations. In short, there are any number of scenarios which could happen to escalate a minor conflict into a more serious major confrontation. For this reason, a premium will necessarily be placed on diplomacy, effective communications, mutual respect, and genuine desire for conflict termination on the part of the sponsors to avoid escalation consequences.

Under anticipated future conditions of engagement it would appear that neither side will have much to gain by war. Only by a fait accompli surprise attack are initial objectives likely to be attained.[21] Thus it would seem to appeal to reason on both sides to negotiate first from positions of intact strength rather than later from positions of attrited strength augmented by increased enmity.

MAJOR WAR

The type of world that the following scenario portends can be called the "Conflictual World". It is characterized by"the willingness of individual powers to subordinate their interests to long range schemes for cooperation. The atmosphere of international relations is one of distrust of intentions of other countries and competition for narrow national advantage. There is a greater willingness to put diplomatic, economic, and military pressure on other countries when interests clash, and the force of international opinion as a deterrent to pressure politics has weakened."[22] The opposite type of world is one of cooperation, however, in spite of a seemingly growing detente between the superpowers, the contemporary world and its growing problems do not presage cooperation in the future.

Power relationships in this world of the year 2000 are best described by Harold von Ricknoff in his article "The Atlantic Alliance and the Strategic Equilibrium." Rickhoff portrays the world as a "three-tiered multi-dimensional system within a bipolar setting." In this arrangement nations are divided into: (1) Tier I-Russia and the U.S. (2) Tier II-Nations with high economic and industrial development, that are tied by treaty or other means, to a superpower; and (3) Tier III-Nations that are underdeveloped.[23]

Nations in Tier II possess the wherewithal, including potential for development of the actual possession of nuclear weapons, for waging a highly sophisticated war with improving naval, air, and ground forces. This war could involve the use of tactical NBC weapons on the battlefield, but not their strategic use. Moreover, if the U.S. and Soviet Union were involved in the conflict, it is assured that they would limit their use of NBC weapons to the tactical variety. Therefore, a major war would become total as soon as strategic exchanges occur between the superpowers.

It is not likely that a major war would break out between a Tier II nation and one of the superpowers, The nuclear balance, even in the year 2000, militates strongly against this eventuality. Even border skirmishes between China and the Soviet Union will probably be kept closely circumscribed and will not exceed the "incident" level.

It is assumed that the two major military alliances will not have changed appreciably since the 1970's. It is, however, expected that NATO will enlarge its purpose beyond that of essentially European defense. Further, it is perceived that the likelihood of a major war in the time frame considered is remote.

Perhaps the most important trend bearing on the potential for major wars is the relative balance of power existing between the United States and the Soviet Union. Although the Russians have caught and passed the United States in several areas of quantitative power, the United States still enjoys a considerable lead in qualitative power. There exists then an assymetrical balance of power. A balanced condition should

continue to at least the year 2000. It appears unlikely that either nation will permit the other to gain a significant advantage. Perhaps more unlikely is a situation wherein one of the superpowers disarms unilaterally.

Inextricably tied to the superpowers are those Tier II nations that look to the former for security. Russia or the United States claim to provide the nuclear umbrella or the conventional shield for many nations. Unfortunately, this kind of relationship could drag the superpower into an undesirable situation beyond its capability to resolve peaceably. Another built-in danger to the major war is that the stakes are normally so high that a superpower cannot afford, in most cases, to let others decide the outcome.

India on 18 May, 1974, launched what may be a growing trend toward nuclear proliferation. Other nations such as Israel, Japan, West Germany, to name but a few, are fully capable of acquiring nuclear weapons if they desire to do so. However, nuclear proliferation does not necessarily have to bring instability. On the other hand, some nations such as Pakistan, may feel compelled to develop their own nuclear weapons as soon as they discover that neighbors have joined the club.

An obvious danger in proliferation is the loss of control over the nuclear trigger. A few nations are more apt to work out suitable safeguards than will others. Another fragile arrangement is the superpower dictating nuclear employment to the surrogate, especially

when the latter has not only his own capability, but conflicting national interests. It is possible in this situation for the superpower to be pulled into a conflict it neither wanted nor was prepared for.

Another significant trend is the current diffusion of technology. Any nation, which can afford it, can buy needed technology on the market even though they are unable to produce it at home. As Herman Kahn asserts, more than one hundred nations "will have access to the military technologies of the 1970's and 1980's--in other words, more advanced than the United States and Russia today--and most will have access, in the year 2000, to the even more modern technologies of the 1990's."[24]

A continuing trend that has great importance for conflicting potential is nationalism. A nation still pursues its own interests first and foremost. France is probably the best example, but there are many others. An excellent case in point is the conduct of the European members of NATO relative to the United States during the October 1973 Arab/Israeli War. This trend is certainly likely to continue. The immediate implication of this trend is that we will see more examples of nations linked by treaty to the superpowers frustrating the latters' interests. Yet the superpowers must thwart these efforts in order to maintain a balance of power.

The recent energy crisis pointed up the growing competition among nations for scarce commodities. Oil received most of the headlines, but many other strategic materials will be in short supply in the year 2000. Unless alternative sources can be found, the race

for what remains could lead to conflict. It is doubtful that any industrialized nation will sit idly by using candlelight while her neighbor boasts of energy surpluses.

What follows is not intended to be an all-inclusive description of a major war and the tools used to wage it. The portrayal attempts to emphasize those capabilities that will have the greatest impact on the nature of war in the future.

Those readers who believe that certain descriptions are not possible in this time frame, are referred to the 1937 report on "Technological Trends and National Policy." After an exhaustive study, the authors forecasted the "kinds of new inventions which may affect lining conditions in America in the next 10 to 25 years." Others became available within the following 10 years, that the report failed to mention, such as atomic energy, antibiotics, radar, and jet propulsion.[25] One thing is certain. A soldier of 1970 vintage will immediately conclude that all weapons of the year 2000 will possess far greater accuracy, lethality, and range.

If one is to rely on the strongest trends for predictions it appears that the major war of the year 2000 will be caused by one or a combination of the following factors: (1) Competition for vital resources; (2) Conflicting National interests; (3) Miscalculation.

The central cause of the war, however, will quickly become enmeshed in the peripheral issues. Nations will be extremely reluctant to enter the conflict, but "entangling alliances" and uncontrollable events will undoubtedly deny them the flexibility of remaining neutral. This

will be especially true in Europe where a high density of Tier II nations exist. Both sides will attempt to keep the conflict circumscribed. Moreover, the belligerents will be aided in their efforts to limit the conflict by the superpowers.

A major war occurring in Europe in the year 2000 seems to be the most plausible among the possible candidates. Another likely pair of nations for a major war is China and Russia. Still another possibility is a conflict between China and Japan. From an industrial capability standpoint, China will not reach Tier II status until well after the year 2000. For this reason, it appears that China will vigorously avoid the creation of incidents that could lead to war and an arresting of her steady march to modernity.

For a major war that occurs in Europe, the weapons of the combatants will only be limited by the constraints imposed by the superpowers. Most nations will possess tactical nuclear weapons. All Tier II nations of Europe will have the capability to produce nuclear weapons.

Admittedly, nuclear weapons will not be used haphazardly. Each combatant will be aware of the great potential for escalation. There may be incidents, however, where tactical nuclear weapons are used out of actual or a perceived fear of annihilation. For example, a task force commander at sea could resort to nuclear depth charges if he becomes convinced that his force will be destroyed unless he does so. A similar situation could occur in a land battle. Once nuclear weapons are used by either side, regardless of the reason, escalation could be almost immediate and, once this threshold is crossed, it is unlikely that any of the combatants will be willing to voluntarily deescalate the conflict.

Chemical weapons will also be available to the combatants. By the year 2000, all Tier II nations will probably possess a variety of lethal chemical weapons to include nerve and blood gases. On the other hand, defenses will tend to keep pace too. Protective devices, antidotes, and recuperative techniques will lessen the lethality of the weapons. One chemical munition, a mind altering drug similar in effect to LSD, can be used to neutralize entire cities without killing the population.

Perhaps one of the most potent weapons in the year 2000 will be bacteriological. By then most, if not all, of the diseases of the 1970's will be extinct. Synthetic diseases, however, will be created that are deadlier than anything man has known.

It is not likely that the more lethal chemical and bacteriological weapons would be used early in a major war for the same reason that combatants will hedge on the use of nuclear weapons--fear of escalation. Nevertheless, there is always a chance of the "cornered rat" situation where one of the sides may resort to his "Sunday punch" out of desperation.

The economic costs to the participants of a major war in the year 2000 will be astronomical. Cost will certainly be a factor determining the length of the war. Unless one side or the other is sponsored by a superpower, it is not likely that the combatants can support the requirements of a long war even if they wanted to.

Another major consideration in the duration of the war is the role the superpowers choose or are forced to play. We think that Russia and the United States will exhaust every effort to end the war quickly. To them, each day raises the chance of further escalation and further superpower involvement.

The battlefield in Europe will be within a primarily urban environment. By the year 2000, the area from the English Channel to the Oder River will be a vast megapolis. This situation will present significant problems for the ground maneuver of forces and the isolation of the civilian populace from the battle. Shelter programs will probably be abandoned because of their prohibitive costs. Refugees will clutter lines of communication and strain military facilities. Because of the built-up nature of the ground environment, there will be few, if any, set-piece battles in the year 2000. There may, however, be a spate of combat-in-cities similar to what the allies experienced in the European theater during World War II.

The chore of the defender will be made easier, however, by the type of weapons that will be available to him in the year 2000. Flame-throwers, anti-tank missiles and anti-aircraft missiles will be miniaturized, and rather than requiring a crew to operate them, one man will possess these capabilities in a hand-held weapons system.

The war at sea in the year 2000 will truely be Buck Rogerian. Surface Effect Ships--SES will have all but replaced the slow surface fleets of the 1970's. Most seafaring Tier II nations will have a Navy to support their level of competition for commodities. The SES will be either nuclear or solar powered. Speeds of 100-150 knots for the heaviest ships will make international straits and canals militarily and commercially insignificant. Weather will also lose its importance for naval activity. Even typhoon winds won't affect ships that glide gracefully over the highest waves and employ laser gyroscopes for

navigation. Surface Effect Ships cruising at 125 knots will be able to span over 3000 miles in one day. Ice and offshore obstacles will no longer restrict naval maneuver. Deepwater ports and channels will also lose their significance. The polar icecap will be traversed almost as easily as Walden's pond.[26]

The speed and maneuverability of SES will enhance their capability for raiding ports and cities near the sea coasts. This tactic will be employed by both sides and points up the special vulnerability of built-up areas close to a littoral during this time frame. Most SES will be armed with missiles, rapid-fire guns, and rocket-launched torpedoes. Guidance systems will employ both radar and laser. Infra-red and nuclear-particle detection systems will make it especially difficult for enemy submarines to maneuver with impunity.

SES will make amphibious assaults more plausible in the year 2000 than they appear to be in the high intensity environment of the 1970's. One hundred ton air-cushion landing craft will be available that can be launched from dispersed high speed transports within a one hundred mile radius of the objective area. Widely separated and maneuvering at 75 knots, the craft will not have to mass until just prior to reaching the objective.

All of the nations in Tier II will be able to afford and most will possess the most sophisticated aircraft available in the year 2000. The tactical war, however, will end almost as quickly as it begins. Tactical air defenses in the year 2000, that will include hand-held anti-air weapons, will be essentially impenetrable. Aircraft will, however, have the capability of "standing off" at distances of up to 75 miles and acquiring their targets with radar and laser.[27] VTOL aircraft,

some with a troop-carrying capacity of up to 1000 men, will be available to all of the combatants of a major war to ferry personnel and supplies over short distances to the scene of the battle. These aircraft will be extremely vulnerable, however, and can only be used in a permissive environment.

Perhaps one of the greatest advancements in warfare will be in the area of Command and Control. All commanders in the major war of the year 2000 will be capable of communicating directly, and immediately, with seniors and subordinates, not only orally, but visually through the medium of television. Moreover, national leaders on both sides will be able to talk directly to their counterparts in other nations. Perhaps the greatest advantage that will obtain from better command and control is the opportunity to talk to the adversary and keep the conflict limited where possible.

A significant difference between the armies of 1970 and the year 2000 can be found in their size and content. The army of the year 2000 will be small in contrast. Moreover, personnel in the year 2000 will require greater specialization because of technological advances. It is not likely that the type of recruitment, volunteer or conscription, will appreciably affect the efficiency of the armies as long as the essential skills are available. Volunteer armies will, of course, be more expensive for a Tier II to maintain, but all can afford it. Furthermore, all of the combatants can resort to a substantial mobilization base if required.

Finally, the major war of the year 2000 will terminate either by

escalation to total war or because the superpowers agree to impose an end to the war.

TOTAL WAR

Andre Fontaine, author of History of the Cold War, observed in "Le Monde," in May 1969:

> Today coexistence has replaced the cold war. It may not be peace--that would suppose a heartfelt reconciliation--but it is at least an armistice. Its basis is the division of the world into two spheres of influence, and neither Washington nor Moscow believes that it has the power to alter this balance in the near future. Hence, feelings of apprehension have diminished, indeed very nearly disappeared. . . .

"No one, in fact," he noted a few months later, "aside from diplomatic and military circles and a few rightest politicians, believes now in the reality of a Soviet threat."[28]

It would appear that the USSR has abandoned the original Leninist quest for world revolution by direct overpowering force, and will instead employ other means to arrive at this same goal. As Leonard Gross has indicated:

> War between great powers is impermissible, but wars of national liberation are fine. Confrontation is out, but competition is in, particularly for influence among the nations of the third world. The richest irony, perhaps, is that Russia now stands watch against Lenin's True Believers and revolutionary custodians, the Chinese.[29]

Many scholars are of the opinion that as a result of the US and USSR possessing the capability for mutual annihilation through the use of nuclear weapons that a situation of stability will exist in

the foreseeable future. It is further suggested that the Soviet and American systems are drawing together and that one day, through a series of modifications of their respective institutions, the gap between them would be so slight that cooperation would be assured.

But there must be taken into account the possibility of a widening gap with consummate noncooperation and ultimate violence. What then of the frightening arsenal of nuclear weapons? Nuclear proliferation certainly provides questions as to the use of these weapons by other than superpowers. In a follow on to the scenario provided in regard to major war, it would be necessary to extend this type of war to its possible extension--total war.

J.C.S. Pub. 1 does not discuss total war as such, but refers to general war wherein there is armed conflict between major powers in which the total resources of the belligerents are employed, and the national survival of a major belligerent is in jeopardy. Within the scope of this study, the terminology total war is defined as an extension of the J.C.S. definition of general war in which the armed conflict between major powers includes the involvement, directly or indirectly, of all nations of the world. Directly, the involvement may take the form of active engagement with all available resources on the side of or against one of the major belligerents or its allies. Indirect involvement entails receiving, to some degree, the results of the active engagement of the belligerent nations or those which have become directly involved. The results may be the death of many citizens due to nuclear fallout or the contamination of water and foodstuffs through chemical/biological effects. Whatever the causes,

it is considered that the general war will be of such a magnitude that virtually every person will feel the detrimental effects of such an action.

Basic trends shaping the nature of future warfare have been previously discussed within the scope of this paper (see Chapter II). The underlying trend which would lead to a total war is the result of the failure to successfully resolve the multitude of technological, economic, and political problems which surface between 1974 and 2000. In the essential area of arms control, for example, efforts have been made since World War II to negotiate arms control and disarmament measures. Without a central world political authority, nation-states have endeavored to impede the serious consequences of a chaotic arms race through restraints based on national self-interest. Attempts to prevent the nuclear proliferation have been met with little success. The SALT negotiations are the latest in a series of attempts by world powers to limit the use of nuclear armament. In spite of talks, plans organizations, and ideologies, proliferation continues. The recent detonation of a nuclear device by India portends further problems in the control of nuclear weapons. The trend in this area appears to be continued failure to effectively control this devastating force.

Economic failures are multitude. The energy crisis of today stands as an example of the lack of coordination between nations to resolve difficulties which arise in this essential area. Should this trend continue, armed force could well be utilized possibly leading to the total war.

Political maneuvers to resolve conflicts have met with failure in many areas. The lengthy Vietnam War serves as an illustration of the results of such political failure. This action could have evolved into a total war should the US and Russia have intervened with nuclear weapons. The scenario for such an escalation is easily seen.

Continuing failure in the political area would result in a situation in which a nation will find itself requiring maximum effort against another to protect its very survival. The ultimate outcome of such effort would be total war.

Total war will consist of the maximum use of all available weapons by the nations actively engaged in the conflict. On the sea, nuclear depth charges will be employed in an effort to destroy submarines firing undersea-launched missiles. Surface Effect Ships with speeds of more than 100 knots will range throughout the world's waters firing guided missiles capable of destroying other ships as well as inland cities. Remote controlled sea anchored missiles will be employed to seek destruction of enemy cities. The unique survivability of devices such as this insure that devastation will continue despite the surface environment. Aircraft carriers with speeds in excess of 100 knots will be used to launch sophisticated aircraft with a vast arsenal of weapons. With nuclear or solar propulsion, these ships will be able to remain at sea indefinitely, providing great survivability as well as being able to proceed to the most effective launch sites.

The most formidable weapon system will remain the submarine. Advanced technology in antisubmarine warfare will not keep pace with

the developments found in quieter, faster undersea crafts. An increase in the number of weapons carried by each submarine combined with independently targetable manueverable reentry vehicles will give each vessel the capability to destroy entire nations. During total war, maximum utilization will be made of this most powerful weapons system.

In land action, large formations of ground troops will become immobilized and rendered ineffective due to the massive use of land missiles and sea and air launched devices. To overcome this, land forces must be organized into small, highly mobile formations equipped with enormous capabilities for destruction. Because of impenetrable hardened sites, land-based weapons will be able to withstand the most powerful blast and be launched against a multitude of targets. At present, missiles are dispersed in concrete silos embedded in the ground. In the future, advanced ICBM will be put on railroad flatcars, trucks, and barges capable of being moved around and increasing their survivability.

In space, total war will include the use of manned and unmanned orbiting satellites with missiles which will be guided to their targets. Lunar missile sites will also be employed as a launch platform. With radio warning, a nation could launch its moon missiles long before the site could be attacked.

Total war will also involve the use of chemical and biological weapons. Faced with conceivable destruction, rational decisions may be disregarded, and nations will unleash potent elements of disease and ultimate death through blood and nerve gases as well as lethal pollutant bacteria.

The duration of such total war will be numbered in days during the active exchange of weapons. Command and control over the launching of weapons will only be viable for hours at which time communications will be lost between launch sites and headquarter's control. The remaining uncontrolled period will consist of sea, land, and space stations firing their weapons as a result of prearranged initiatives.

Life on earth will be restricted to small areas where chance has left them unaffected by the NBC weapons. The remaining population will make an attempt at beginning civilization again. Their success or failure is a matter of will to continue after such a holocaust.

CHAPTER III

FOOTNOTES

1. Emile Benoit, Defense and Economic Growth in Developing Countries, Chapter 1, "Conclusions."

2. Thomas C. Schelling, Arms and Influence, p. 34.

3. US Army War College, Readings and Agenda for Special Study Group on International Terrorism, 13 September 1973.

4. US Department of State Conference, Bureau of Intelligence and Research and The Planning and Coordination Staff, State Department Conference on Terrorism, 29 December 1972.

5. Schelling, p. 34.

6. JCS Pub. 1, Joint Chiefs of Staff, 3 January 1972, p. 156.

7. Louis J. Halle, "Does War Have a Future?" Foreign Affairs, October 1973, p. 42.

8. Paul Samuelson, Economics, 9th ed., p. 672.

9. Samuel B. Huntington, Changing Patterns of Military Politics, p. 73.

10. Benoit, Chapter 1.

11. Interview with Herman Kahn, Hudson Institute, Croton-on-Hudson, New York, 10 May 1974.

12. Opening Address by Secretary General of the UN Kurt Waldheim to the Special Session of the UN General Assembly for World Economic Matters, 17 April 1974.

13. Carol J. Loomis, "The New Questions About the U.S. Economy," Fortune, January 1974, p. 69. This article devotes itself to the gross imprecision of economic forecasts.

14. Oskar Morgenstern; Knorr; and Heiss, Long Term Projections of Power: Political, Economic, and Military Forecasting, Chapter 5, "Technological Capacity Prediction."

15. Alternative Futures, 1974-2000, Department of the Navy, 1974, p. vii.

16. Interview with Herman Kahn at Hudson Institute, 10 May 1974.

17. Interview with Air Vice Marshall, Director General of the Royal United Services, London, 22 April 1974.

18. "Visions of the Next War," Newsweek, 22 April 1974, p. 55.

19. Kenneth S. Brower, "Yom Kippur War," Military Review, March 1974, p. 25.

20. B.H. Liddell Hart, History of the Second World War, p.559.

21. Andre Beaufre, "Battlefields of the 1980's," Unless Peace Comes, ed. Nigel Calder, p. 236.

22. Alternative Futures, 1974-2000, p. iii.

23. Ibid., p. vi.

24. Harvey S. Perloff, The Future of the US Government Toward the Year 2000, p. 191.

25. United States Marine Corps in 1985: A Long Range Study, Vol. I, p. B-1-1.

26. L. C. Gonzales, Lt Col, "Riding the Waves of the Future," Marine Corps Gazette, September 1973, pp. 32-38.

27. "Visions of the Next War," Newsweek, April 22, 1974.

28. Le Monde, May 1969.

29. Leonard Gross, 1985--An Argument for Man.

CHAPTER IV

CONCLUSIONS

Types of War

Contemporary definitions of war are not likely to be useful in the remaining years of this century. Even now most commonly accepted definitions describe only the kinds of conflicts engaged in by the superpowers. For example, North Vietnam waged total war against the United States during the period 1965 to 1973. Yet by US definition, the conflict in Indochina was a limited war. The current concept of limited war has become almost completely interchangeable with conventional war and now confuses regional limitations with weapons usage limitations. With the expected proliferation of nuclear weapons, their increased precision and reduced size greatly changes the limitation aspects of future wars. Thus, some wars constrained to rather well-defined regional limits could conceivably escalate to include nuclear weapons. Yet, a worldwide war could be fought using only conventional weapons. And what meaning will "conventional" have in the year 2000? Cold War, too, has become an anachronism. General, central, and total have been the descriptive words often applied to the conceptual war which fortunately has not transpired since atomic weapons brought World War II to an end. The need for an updated taxonomy of war is evident.

New terminology has been proposed such as Conflict Prevention, Conflict Control, Conflict Limitation, and Conflict Termination. These terms, while useful in certain context, do not provide a mental picture of the types of war which may occur in the future.

The five levels of conflict described in Chapter III cover the full spectrum of warfare considered likely during the first part of the 21st century. The quintet of Terrorism, Insurgency, Minor, Major, and Total War provide clarity and expressiveness and are useful in delineating degrees of violent conflict. These definitions have been developed primarily for conflict classification from a United States perception but are adaptable to the frame of reference of any nation.

Impact of Technology

The kind of war that technology will make possible in the year 2000 will have profound effects on military establishments as we know them today. Armies will be smaller because of the increased firepower and lethality of weapons and the prohibitive costs of large forces. Personnel will be highly specialized in order to handle advanced weapons systems and increased training will be necessary to develop proficiency. Because of the destructive power of weaponry, major wars will tend to exhaust themselves more quickly. The short duration of the conflict may negate the need for excessively large reserve establishments and mobilization bases but require an increase in the readiness of the in-being Reserve components. The sudden onset of total war, however, could mean that only those nations with a well-equipped and highly dispersed Reserve establishment would retain any capacity for recovery and ultimate victory.

Despite the tendency to let the mind become over-imaginative when contemplating war technology of the year 2000, much of it is either in-being or is on the present drawing boards. This does not preclude

technological breakthroughs; but production costs and long leadtimes will have a tempering effect on gradiose ideas for a spate of new weapons systems. Military leaders can reasonably predict what weapons will be in their arsenals 25 years hence by simply looking at what is plausible or presently under development.

Weapons development which once focused on mass area destruction now is turning towards one-on-one precision both defensively and offensively. While cities will remain hostages in political statements of deterrence, the ability to spare many cities or parts thereof will become a military option. This is possible because of accuracy and size trends which will permit precision ICBM's and penetration techniques (electronic and MIRV) which assure target destruction. There exists also the option of using chemical and biological weapons (CB) ranging from lethal nerve agents to incapacitating disease organisms and mind-altering substances. CB weapons might also be directed against crops, animals, or water supplies.

Little hope can be held out for less expensive weapons in the future. However, there are some exceptions. Mini-computers and small electronic devices will be both plentiful and less expensive. Weapons systems such as ships and planes will remain expensive. Labor costs will continue to rise worldwide as will the cost of component materials. Substitute materials may reduce costs marginally but not substantially.

The technological growth curve appears to be on a downward trend from the exponential shape experienced over the past 300 years. This attentuation has been forced by resource (both humans and natural) and financial limitations. In the United States, this generates a need for more integrated

efforts in scientific exploration and research and development, especially in the defense sector. It implies at least more correlation in the military among the departments and more centralized direction based on national objectives, policies, and military strategy projections in support thereof.

Likelihood of War

As much as practicable, man will increasingly seek to achieve his needs and desires in a peaceable manner. If, however, his efforts are frustrated, he may still resort to force. The nature of man has so dictated throughout history and it is realistic to conclude that war will continue to be an accepted means of satisfying political and economic disputes through the year 2000. Recent trends do indicate however that war may become less and less acceptable as a means of settling differences, at least among the more advanced nations of the world. Ironically, the destructiveness of weapons has profoundly influenced these trends. In the future national leaders will consider long and hard before subjecting their cities and populace to possible destruction over less than the most critical interests. Likewise, it can be expected that adversary nations will also be less apt to press for unreasonable demands. It is important to emphasize, however, that what one nation considers unimportant may be vital to another.

Although much has been written that suggests the demise of nationalism and the rise of regional and world organizations, nationalism, with its attendant dangers, will still be a major decisive force in the year 2000.

Among the less developed nations of the world, war will still be an accepted means for achieving national interests. These wars, however, will likely be kept partially circumscribed by the deliberate efforts of the developed nations which fear great power involvement.

It is likely that Russia and the United States will continue their adversary relationship into the 21st century. A rough balance of power will exist between the two nations making the likelihood of major or total war low. In spite of this power balance, however, both giants will compete vigorously in the political and economic spheres for the favor of other nations and for their own aggrandizement.

Because of the destructiveness of nuclear war, it is doubtful that any rational leader will consider it a viable option. Nevertheless, the nuclear club will probably increase its membership markedly by the year 2000. Current nuclear powers have no lasting secret and it is but a matter of time before many nations of the world acquire a nuclear capability. Only time will tell if man's rationality will prevail in the non-use of nuclear weapons. Historical precedence implies the inevitability of their use.

Implications for the United States

War in the year 2000 is likely to occur for many of the same reason found throughout history. Because of greater interaction between nations and the ever increasing arms buildup, the chance for sudden outbursts of military conflict are likely to increase. Although technological advances will likely alleviate much of the shortfall in strategic resources and

food, competition for these scarce commodities could be a major factor in a nation's decision to go to war. The potential for conflict will be much greater for the less developed countries than the developed, for the latter will have used technology to overcome shortages.

Because of a trend toward shorter wars in the future, the results of the conflict will greatly depend on a nation's readiness for war at the commencement of the hostilities, rather than its potential for sustaining a drawn-out war. Therefore, the United States must be continually capable of deterring war across the spectrum of conflict or, if deterrence fails, be capable of marshalling sufficient force to defeat aggression. To be credible, the United States must have versatile forces in-being that possess the requisite qualifications to achieve national objectives in any type of war.

SELECTED BIBLIOGRAPHY

Books

1. Angell, Norman. The Great Illusion: A Study of Military Power to National Advantage. New York: Putnams, 1913.

2. Aron, Raymond. Peace and War: A Theory of International Relations. Garden City: Anchor Books, 1973.

3. Baade, Fritz. The Race to the Year 2000. Garden City: Doubleday, 1962.

4. Baldwin, Hanson W. Strategy for Tomorrow. New York: Harper and Row, 1970.

5. Beaufre, Andre. An Introduction to Strategy. New York: Fredrick A. Praeger, 1965.

6. Bell, Daniel, ed. Towards the Year 2000. Boston: Houghton Mifflin, 1968.

7. Bell, Daniel, ed. Toward the Year 2000: Work in Progress. Boston: Beacon Press, 1967.

8. Benoit, Emile. Defense and Economic Growth in Developing Countries. Lexington, MA: Lexington Books, 1973.

9. Benoit, Emile, ed. Disarmament and World Economic Interdependence. New York: Columbia University Press, 1967.

10. Blainey, Geoffrey. The Causes of War. New York: Free Press, 1973.

11. Bletz, Donald F. The Role of the Military Professional in US Foreign Policy. New York: Praeger, 1972.

12. Bloomfield, Lincoln P., and Leiss, Amelia C. Controlling Small Wars: A strategy for the 1970's. New York: Alfred A. Knopf Inc., 1969.

13. Boulding, Kenneth E. Conflict and Defense, A General Theory. New York: Harper, 1962.

14. Boyko, Hugo. Science and the Future of Mankind. Bloomington, IN: Indiana University Press, 1965.

15. Buchan, Alastair. War in Modern Society. New York: Harper and Row, 1966.

16. Calder, Nigel, ed. Unless Peace Comes: A Scientific Forecast of New Weapons. New York: The Viking Press, Inc., 1968.

17. Carovillano, Robert L. and Skehan, James W., S.J. Science and the Future of Man. Cambridge, MA: MIT Press, 1970.

18. Chapin, Ned. Computers, A Systems Approach. New York: Van Nostrand Reinhold Co., 1971.

19. Cohen, Jerome B., ed. Pacific Basin Development: The American Interests. Lexington, MA: Lexington Books, 1972.

20. Desmonde, William H. Computers and Their Uses. Englewood Cliffs: Prentice Hall, 1964.

21. Elliot-Bateman, Michael. The Fourth Dimension of Warfare. New York: Praeger, 1970.

22. Erickson, John; Crowley, Edward L.; and Cola, Nikola, eds. The Military-Technical Revolution: Its Impact on Strategy and Foreign Policy. New York: Frederick A. Praeger, Inc., 1966.

23. Falk, Irving A., ed. Prophecy for the Year 2000. New York: Julain Messner, 1970.

24. Feld, B. T.; Greenwood, T.; Rathjens, G. W.; and Weinberg, J.; eds. Impact of New Technologies on the Arms Race. Lexington: MIT, 1971.

25. Forrester, Jay W. World Dynamics. Cambridge, MA: Wright-Allen Press, 1971.

26. Friedman, Irving S. Inflation: A World-Wide Disaster. New York: Houghton Mifflin, 1973.

27. Gross, Leonard. 1985: An Argument For Man. New York: W. W. Norton & Co., Inc., 1971.

28. Gabor, Dennis. Innovations: Scientific, Technological, and Social. London: Oxford University Press, 1970.

29. Halberstam, David A. The Best and the Brightest. New York: Bantam Books, 1969.

30. Halperin, Morton H. Defense Strategies for the Seventies. Boston: Little, Brown and Co., 1971.

31. Hauser, William L. America's Army In Crisis. Baltimore: Johns Hopkins University Press, 1973.

32. Heilbroner, Robert L. The Future As History. New York: Harper, 1960.

33. Heilbruner, Otto. Conventional Warfare in the Nuclear Age. New York: Praeger, 1965.

34. Hirshman, Albert O. National Power and the Structure of Foreign Trade. Berkeley: University of California Press, 1945.

35. Hitch, Charles J. and McKean, Roland. The Economics of Defense in the Nuclear Age. Cambridge: Harvard University Press, 1960.

36. Huntington, Samuel P. Changing Patterns of Military Politics. New York: The Free Press of Glencoe, Inc., 1962.

37. Huntington, Samuel P. The Soldier and the State. Cambridge: Harvard, 1957.

38. Ikle, Fred Charles. Every War Must End. New York: Columbia University Press, 1971.

39. Janowitz, Morris. The New Military: Changing Patterns of Organization. New York: Russell Sage Foundation, 1964.

40. Janowitz, Morris. The Professional Soldier. New York: The Free Press, 1960.

41. Kahn, H. and Wiener, A. J. The Year 2000. New York: MacMillan, 1967.

42. Keeskemeti, Paul. Strategic Surrender. New York: Atheneum, 1964.

43. Kissinger, Henry A., ed. Problems of National Security. New York: Frederick A. Praeger, 1965.

44. Knelmon, Fred H. 1984 and All That. Belmont, CA: Wadsworth Publishing Co., Inc., 1971.

45. Knorr, Klaus. Military Power and Potential. Lexington, MA: D. C. Heath & Co., 1970.

46. Knorr, Klaus. On the Uses of Military Power in the Nuclear Age. Princeton: Princeton University Press, 1966.

47. Knorr, Klaus. Power and Wealth. New York: Basic Books, Inc., 1973.

48. Lasswell, Harold D. and Kaplan, Abraham. Power and Security. New Haven: Yale University Press, 1950.

49. Liddell Hart, B. H. History of the Second World War. New York: G. P. Putnam's Sons, 1970.

50. Liddell Hart, B. H. Strategy. New York: Praeger Inc., 1972. 2d ed.

51. Meadows, Donella H. The Limits to Growth. New York: Universe Books, 1972.

52. McHale, John. The Future of the Future. New York: George Braziller, 1969.

53. Morgenstern, Oshar, et.al. Long Term Projections of Power. Cambridge, MA: Ballinger, 1973.

54. Morrison, Samuel Eliot. Strategy and Compromise. Boston: Little, Brown, and Co., 1958.

55. Norman, A. V. B. and Pottinger, Don. A History of War and Weapons 449 to 1660. New York: Thomas Y. Crowell Co., 1966.

56. Pauling, Linus. No More War! New York: Dodd, Mead & Co., 1959.

57. Perloff, Harvey S., ed. The Future of the US Government: Toward the Year 2000. New York: George Braziller, Inc. 1971.

58. Platt, Thomas Gordon. Understanding Doomsday. New York: Simon and Schuster, 1971.

59. Possony, Stefan T. and Pournelle, J. E. The Strategy of Technology; Winning the Decisive War. Cambridge: University Press, 1970.

60. Price, Derek J. DeSolla. Science Since Babylon. New Haven: Yale University Press, 1961.

61. Rapoport, Anatol. Clausewitz on War. Baltimore: Penguin Books, 1968.

62. Roberts, Chalmers M. The Nuclear Years. New York: Praeger Publishers, 1970.

63. Rothschild, J. H. Tomorrow's Weapons: Chemical and Biological. New York: McGraw-Hill, 1964.

64. Russett, Bruce M. and Stepan, Alfred. Military Force and American Society. New York: Harper and Row, 1973.

65. Samuelson, Paul. Economics. New York: McGraw-Hill, 1973. 9th ed.

66. Schelling, Thomas C. Arms and Influence. New Haven: Yale University Press, 1966.

67. Schlesinger, James R. The Political Economy of National Security. New York: Frederick A. Praeger, 1960.

68. Schlesinger, James R. The Strategic Consequences of Nuclear Proliferation. Santa Monica, CA: Rand Corp., 1966.

69. Sidovenke, A. A. The Offensive (A Soviet View). Moscow: 1970. (Translated and published under the auspices of the United States Air Force.)

70. Sokolovsky, V. D., ed. Military Strategy. Moscow: Military Publishing House, 1968.

71. Toffler, Alvin. The Futurists. New York: Random House, 1972.

72. Tompkins, John S. The Weapons of World War III. Garden City: Doubleday & Company, Inc., 1966.

73. Van Doorn, Jacques, ed. Armed Forces and Society. Netherlands: Houton & Co., 1968.

74. Waitley, Douglas. The War Makers. Washington: Robert B. Luce, Inc., 1971.

75. Wall Street Journal. Here Comes Tomorrow! Princeton: Dow Jones Books, 1966.

76. Wallia, C. S. Towards Century 21. New York: Basic Books, Inc., 1970.

77. Walsh, Maurice N., ed. War and the Human Race. New York: Elsevier Publishing Company, 1971.

78. Wasserstrom, Richard A., ed. War and Morality. Belmont, CA: Wadsworth Publishing Co. Inc., 1970.

79. Weigley, Russell F. The American Way of War: A History of United States Military Strategy and Policy. New York: MacMillan Publishing Co., Inc., 1973.

80. Wheldon, John. Machine Age Armies. New York: Abelard-Schuman, 1968.

81. Wright, Sir Michael. Disarm and Verify. New York: Praeger, 1964.

82. Wright, Quincy. A Study of War. Chicago: University of Chicago Press, 1964.

83. York, Herbert F. Race to Oblivion. New York: Simon and Schuster, 1971.

Periodicals

1. Aliano, Richard A. "The American Military: A Reappraisal." Military Review, January 1972, pp. 51-57.

2. Beaumont, Roger A. "The Principles of War Revisited." Military Review, December 1972, pp. 63-69.

3. Brower, Kenneth. "Yom Kippur War." Military Review, March 1974, pp. 25-33.

4. Carpenter, Clifton C. "Modern Technology and Political Geography." Military Review, January 1973, pp. 69-76.

5. Cetron, Marvin J. "Technological Forecasting: A prescription for the Military R&D Manager." Naval War College Review, April 1969, pp. 14-39.

6. Chapman, Kenneth R., MG, USAF and Gander, John F., LTC, USAF. "Options in the Future." Air University Review, May - June 1973, pp. 2-20.

7. Coles, Harry L. "Strategic Studies Since 1945: the era of overthink." Military Review, April 1973, pp. 3-15.

8. Crews, George C. "Lethality/Vulnerability: the Touchstone for Progress." Air University Review, May - June 1973, pp. 56-64.

9. "Defense Debate Focuses on Kind of War to Plan For." New York Times, 18 March 1974.

10. "Exploring the Universe." The Futurist, Vol. 2, April 1971, pp. 65-67.

11. Fowler, Delbert M. "A NATO-Warsaw Pact Assessment." Military Review, November 1972, pp. 77-88.

12. Goeke, Joseph R. "America's Future as Reflected in Public Opinion Trends." The Futurist, Vol. 2, April 1971, pp. 79-84.

13. Goldrich, Robert L. "The Need for Positive Change." Military Review, April 1973, pp. 44-53.

14. Gonzales, J. C. "Riding the Waves of the Future." Marine Corps Gazette, September 1973, pp. 32-38.

15. Gormley, Dennis. "NATO's Tactical Nuclear Option: Past, Present and Future." Military Review, September 1973, pp. 3-18.

16. Graham, William B. "RMVs in Aerial Warfare." Astronautics and Aeronautics, May 1972, pp. 36-47.

17. Halle, Louis J. "Does War Have a Future?" Foreign Affairs, October 1973, pp. 20-34.

18. Hamil, Ralph E. "Moving Beyond the Earth." The Futurist, Vol. 2, April 1971, pp. 68-71.

19. Harrison, Stanley L. "Strategy for Tomorrow." Military Review, August 1972, pp. 57-70.

20. Horowitz, Irving Louis. "Political Terrorism and State Power." Journal of Political and Military Sociology 1973, Vol. 1 (Spring), pp. 147-157.

21. "How Two Allies Fare With Volunteers." US News and World Report, March 1, 1971, p. 35.

22. Huntington, Samuel P. "After Containment: The Functions of the Military Establishment." Annals, March 1973, pp. 1-16.

23. "If US Tries an All-Volunteer Army--." US News and World Report, March 1, 1971, pp. 32-34.

24. Janowitz, Morris. "The Decline of the Mass Army." Military Review, February 1972, pp. 10-16.

25. Janowitz, Morris. "Toward an All-Volunteer Military." The Public Interest, Spring 1972, pp. 104-117.

26. Janowitz, Morris. "Volunteer Armed Forces and Military Purpose." Foreign Affairs, Vol. 50, April 1972, pp. 427-443.

27. Janowitz, Morris. "Volunteer Armed Forces and Military Purpose." Military Review, July 1972, pp. 15-22.

28. Jennings, Richard M. "Another View of the Need for Change." Military Review, September 1972, pp. 82-94.

29. Kellerstrass, E. J., LTC, USAF. "Drone Remotely Piloted Vehicles and Aerospace Power." Air University Review, September - October 1973, pp. 44-54.

30. Kuzmack, Arnold M. "Foreign Policy and Military Force Planning." Military Review, August 1972, pp. 13-22.

31. Leider, Robert. "The Emerging International Environment." Marine Corps Gazette, February 1974, pp. 16-22.

32. Moorer, Thomas H., ADM, USN. "General Purpose Forces Compared." Commanders Digest, 15:16, 18 April 1974, pp. 3-20.

33. Neale, William D. "Oldest Weapon in the Arsenal: Terror." Army, August 1973, pp. 11-17.

34. "Nuclear Propulsion May Enable Man to Escape Solar System." The Futurist, Vol. 2, April 1971, p. 60.

35. Paine, Thomas O. "What Lies Ahead in Space?" The Futurist, Vol. 2, April 1971, pp. 61-64.

36. Parker, David M., LTC, USA. "Facing the NBC Environment." Military Review, May 1974, pp. 24-38.

37. Pease, Charles C., LCDR, USN. "How Adaptive Has the Military Been to Technological Change?" Naval War College Review, March-April 1973, pp. 26-31.

38. Poirer, Lucien. "Deterrence and the Medium-Sized Powers." Military Review, November 1972, pp. 22-34.

39. Rose, Sanford. "Our Vast Hidden Oil Reserves." Fortune, April 1974, p. 59.

40. Rosser, Richard F., COL, USAF Ret. "A 20th-Century Military Force." Military Review, March 1974, pp. 42-54.

41. Sandler, Stanley. "History and the Military." Military Review, January 1972, pp. 26-31.

42. Sargent, Lyman. "Utopian and Distopias in Contemporary Science Fiction." The Futurist, IV:3, June 1972, pp. 93-98.

43. Schultz, Kenneth W. LTG, USAF. "Air Force Reviews: Swords, Plowshares, and Progress." Air University Review, September - October 1973, pp. 30-43.

44. Schreckeneost, Raymond C., COL, USMC Reserve. "Science, Technology and Change: Implications for the Navy." Naval War College Review, November 1971, pp. 1-16.

45. Smith, George W. "Clausewitz in the 1970's: RX for Dilemma." Military Review, July 1972, pp. 85-93.

46. Stoehrmann, Kenneth C., LT, USAF. "The Lead Time Problem: Theory and Application." Air University Review, July - August 1973, pp. 36-45.

47. Taylor, Edmond. "The Terrorists." Horizon, Vol. XV, Summer 1973, pp. 58-65.

48. Thomas, James A. "Limited War." Military Review, February 1973, pp. 75-82.

49. "Vissions of the Next War." Newsweek, 22 April 1974, pp. 52-55.

50. Walker, Sir Walter. "A Glance at the Future." Military Review, September 1972, pp. 21-30.

51. Will, George F. "The Unpredictable Future." The Washington Post, 15 January 1974.

Government Documents

1. Department of the Army, Engineer Strategic Studies Group Office, Chief of Engineers. Patterns of Transition: The Changing World 1970-2000. February 1971.

2. Hudson Institute. Prospects for Mankind, The Role of "Futurology" Ideologies, and the Current Hudson Institute Panegole Study. Draft, Vol. II.

3. Nixon, Richard. US Foreign Policy for the 1970's: The Emerging Structure of Peace. Washington: GPO, February 9, 1972.

4. Schlesinger, James R. Annual Defense Department Report FY 1975. Washington: US Department of Defense, March 4, 1974.

5. Sokolovsky, V. D. Military Strategy. Foreign Technology Division, Air Force Systems Command, Wright-Patterson AFB, Dayton, Ohio, 3d ed., 1968.

6. United States Arms Control and Disarmament Agency. Army Control and National Security. 2d ed., Publication 49, August 1970.

7. US Army War College. Army Tasks for the Seventies. Carlisle Barracks, PA: June 1972.

8. US Army War College. Readings and Agenda for Special Study Group on International Terrorism. Carlisle Barracks, PA: 13 September 1973.

9. US Department of Defense, Department of the Army, FM 100-5. Operations of Army Forces in the Field. Washington: GPO, September, 1968.

10. US Department of Defense. Dictionary of Military and Associated Terms: JCS Pub 1. Washington, DC: GPO, January 1972.

11. US Department of Defense, "The Dynamic Balance of Strategic Power." Commanders Digest, Vol. 15, April 11, 1974.

12. US Department of Defense, Navy Department, Department of the Navy. Alternative Futures 1974-2000.

13. US Department of Defense, US Marine Corps, Department of the Navy. United States Marine Corps in 1985: A Long Range Study, Vol. I.

14. US Naval War College. The Long-Range Future of the Navy. 15 April 1971.

15. US Naval War College. The Long Range Future of the Navy 1972-1985. 19 June 1972.

16. US State Department, Bureau of Public Affairs. The Role of International Law in Combating Terrorism. Washington: GPO, January 1973.

17. US State Department. Conference Sponsored by Bureau of Intelligence and Research and Planning and Coordination Staff. State Department Conference on Terrorism. 29 December 1972.

Interviews

1. Barnaby, Frank, Dr.; Director, Stockholm International Peace Research Institute. 24 April 1974.

2. Bidwell, John, Brigadier Deputy Director General, Royal United Services Institute, London. 22 April 1974.

3. Franklin, Raymond, LTC, USMC, American Research Project Agency. Arlington, VA, 6 May 1974.

4. Halle, Louis J., Prof., Graduate Institute of International Studies, Geneva. 26 April 1974.

5. Kahn, Herman. Director, Hudson Institute, Croton-On-Hudson, NY. 10 May 1974.

6. Klaver, Vice Admiral, Royal Dutch Navy. 23 April 1974.

7. Lumsden, Malvern. Staff Researcher, Stockholm International Peace Research Institute. 24 April 1974.

8. Martino, Joseph, COL, USAF. Defense Electronics Supply Center, Dayton, OH and Technological Forcasting Editor, Futurist Magazine. 27 April 1974.

9. Menaul, S. W. B., Air Vice Marshal, Director General, Royal United Services Institute, London, 22 April 1974.

10. Miller, Carl, Dr., Technical Director, Deputy for Reconnaissance, ASD, AFSC, Wright-Patterson AFB, Dayton, OH, 30 April 1974.

11. Pinder, John H. M., Director, Political and Economic Planning Group--SSI, London. 19 April 1974.

12. Portune, Walter J., Jr. Deputy Director, Air Force Avionics Laboratory, Air Force Systems Command, Wright-Patterson AFB, Dayton, OH, 30 April 1974.

13. Price, D. L., Staff Researcher, Institute for the Study of Conflict, London, 19 April 1974.

14. Whittington, J. O., COL, USA; Director of Academic Affairs, NATO Defense College, Rome, 29 April 1974.

Other Sources

1. Adelphi Papers. "Force in Modern Societies: Its Place in International Politics." International Institute for Strategic Studies. London: Winter 1973.

2. Adelphi Papers. Hackel, Erwin. "Military Manpower and Political Purpose." International Institute for Strategic Studies. London: December 1970.

3. Adelphi Papers. Wood, David. "Conflict in the Twentieth Century." International Institute for Strategic Studies. London: June 1968.

4. The Americana Annual, 1974, Encyclopedia Americana. USA: Grolier Inc., 1974.

5. Aron, Raymond. "Power, Glory and Idea or On the Goals of Foreign Policy." National Security & American Society: Theory, Process, and Policy. Kansas: University of Kansas Press, pp. 53-62.

6. Cotton, Ernest. "Energy and the Environment, Implications for National Security." Address given at US Army War College, Carlisle Barracks, PA. 29 August 1973.

7. Historical Evaluation and Research Organization. Historic Trends Related to Weapon Lethality, Vol. III. Washington, DC: 15 October 1964.

8. Institute for the Study of Conflict. The Peacetime Strategy of the Soviet Union. February/March 1973.

9. Joseph E. Seagram & Sons, Inc. A Scientific Symposium Report. The Next Hundred Years. 22 November 1957.

10. Nixon, Richard. "International Economic Report of the President." Washington, DC: US Government Printing Office. February 1974.

11. "Prospects for Mankind," Vol. II. 1973 Synoptic Context on the Corporate Environment 1975-1985. Hudson Institute, eds. New York: Croton-On-Hudson, (Draft).

12. The Military Balance 1973-1974. The International Institute for Strategic Studies. London: 1973.

13. Security Studies Project, UCLA. Arms Races and Stable Deterrence. CA: UCLA, 1969.

14. Security Studies Project, UCLA. Problems of Nuclear Proliferation. CA: UCLA, 1966.

15. Wright, Quincy. "Causes of War." National Security & American Society: Theory, Process and Policy. Kansas: University of Kansas Press, pp. 85-91.

16. Wright, Quincy. On Predicting International Relations, the Year 2000. (Monograph Series in World Affairs) Denver: University of Denver Press, 1969.