AIR UNIVERSITY REVIEW

TRENDS IN MILITARY THOUGHT . . . ORIGINAL U. S. CONCEPT OF NATO . . . DRIFTING ICE STATIONS . . . A PENTAGON FABLE

SEPTEMBER - OCTOBER 1966

AIR UNIVERSITY
REVIEW

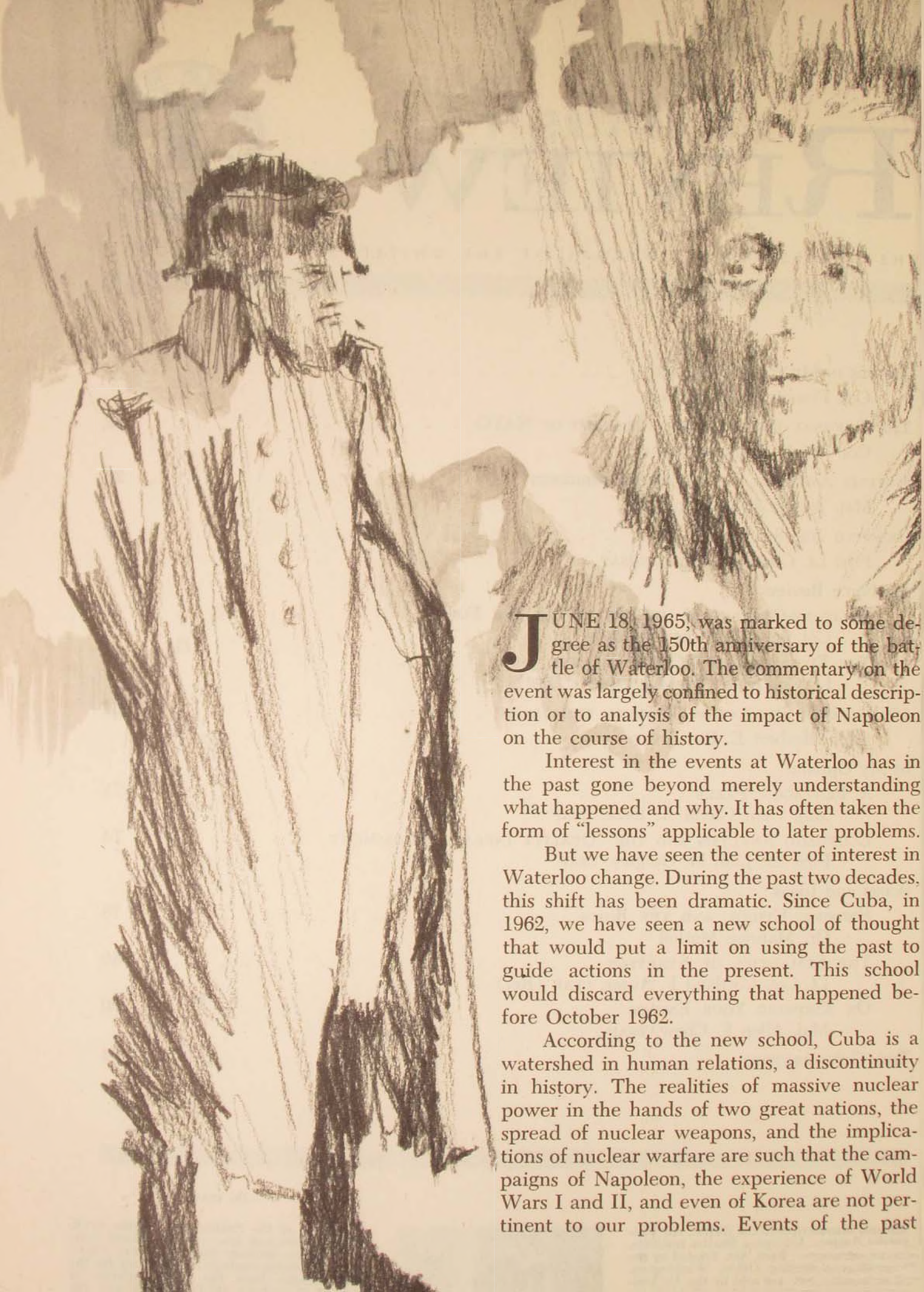
THE PROFESSIONAL JOURNAL OF THE UNITED STATES AIR FORCE

Address manuscripts to the Editor, *Air University Review*, Aerospace Studies Institute, Maxwell Air Force Base, Ala. Printed by the Government Printing Office, Washington, D.C. Subscriptions are sold by the Air University Book Department, Maxwell Air Force Base, Ala.: yearly $4.50, back issues 75 cents. USAF RECURRING PUBLICATION 50-2.

Vol. XVII No. 6 SEPTEMBER-OCTOBER 1966

the cover

This issue of the *Review* cuts a wide swath through time and space: With Colonel Kane we consider military feasibility from Napoleon's Waterloo strategy to deterrents for the next decade; from the North Atlantic of Colonel Braucher's NATO origins and the Arctic of Lieutenant Smith's ice stations to Major Martino's tropical Emergian village; to General Kent's enigmatic glance at cost effectiveness. Several of these time-and-space ventures have been reflected on the cover.



JUNE 18, 1965, was marked to some degree as the 150th anniversary of the battle of Waterloo. The commentary on the event was largely confined to historical description or to analysis of the impact of Napoleon on the course of history.

Interest in the events at Waterloo has in the past gone beyond merely understanding what happened and why. It has often taken the form of "lessons" applicable to later problems.

But we have seen the center of interest in Waterloo change. During the past two decades, this shift has been dramatic. Since Cuba, in 1962, we have seen a new school of thought that would put a limit on using the past to guide actions in the present. This school would discard everything that happened before October 1962.

According to the new school, Cuba is a watershed in human relations, a discontinuity in history. The realities of massive nuclear power in the hands of two great nations, the spread of nuclear weapons, and the implications of nuclear warfare are such that the campaigns of Napoleon, the experience of World Wars I and II, and even of Korea are not pertinent to our problems. Events of the past

TRENDS IN MILITARY THOUGHT

COLONEL FRANCIS X. KANE

Les grands événements ne dépendent que des causes morales.

—Thiers

are ruled out as having any present or future significance.

A way of examining this new antihistorical point of view is to see what the trend has been in prior analyses and thus try to gain insight into what the future may hold. Waterloo is an excellent vehicle for such an inquiry.

1945

Before World War II, Waterloo had ceased to have any importance for the use of modern weapons. While the maps that were used to explain the course of events still showed "days of march" and "hours to maneuver," these details were not significant. Cause-and-effect relationships between events and the application of principles were sought. In brief, quantitative considerations became unimportant; the qualitative aspects of battle predominated the study of Waterloo. Let us examine some of the factors of interest twenty years ago.

From the point of view of strategy, Napoleon's choices in 1815 lay between a defensive strategy to keep the allies out of France and an offensive strategy to defeat them in the field. He chose the latter and then applied a second principle, namely, to operate on interior lines so as to attack the allies separately and thus defeat them in detail. The numbers of troops involved actually and potentially made this offensive strategy more attractive to him. The allies had 700,000 troops in the field by early June 1815 versus Napoleon's 500,000 actual and 900,000 potential troops under arms. These actual forces included some 300,000 troops who had been repatriated and who had joined Napoleon because they were humiliated and dissatisfied by the allied occupation of France. But which enemy should he strike first?

The coalition organized to destroy Napoleon was composed of his determined enemy, the British; his hated foe, the Prussians; his sometime allies, the Austrians, Saxons, Würtembergers, and Bavarians; his nemesis, the Russians; and the Swedes under his former subordinate, Bernadotte. In contrast to this coalition was the unified support of his forces in the field. Napoleon chose to act first against his most formidable foes, the British and Prussians, who in late May were concentrating in the north. Napoleon therefore directed his thoughts and an army toward the north and started on the road to Waterloo.

This principle of the offensive was the basis for his tactical plan against the British and Prussians, another application of a concept in specific circumstance. Napoleon deliberately drove his force between the British and the Prussians and threw almost his entire weight against the latter before the two armies could join. Thus, instead of having 225,000 men against him, Napoleon had 120,000 Prussians opposing his own 122,000 troops. When he attacked Blücher with almost complete surprise at Ligny on 16 June, Napoleon threw 66,500 French troops against 69,000 Prussians. In one of the most savage and bloody of any of his battles, he defeated Blücher and drove him wounded from the field; it was Napoleon's last victory. On 18 June he still had 105,000 troops to turn against Wellington's 95,000. The strategy and tactics which Napoleon had used up to this point had been effective. The principles of the offensive, divide and conquer, and surprise were applied in a classic manner.

Throughout this entire operation ran the use of a quality vital in past military affairs—leadership, both political and military. An insurrection in the Vendée had cost Napoleon 20,000 troops, stationed there to preserve order. With this exception, he had rallied national support and had regained the almost unlimited loyalty of his soldiers. At Ligny, one of his divisions lost all its generals. Napoleon's total losses for the day were 15,000 against 12,000 for Blücher. When Napoleon toured the battlefield at the end of the victory, the French wounded cheered, "Vive l'Empereur!" while on the Prussian side 12,000 men were deserting. Two days later at Waterloo, the remnants of the Guard, swearing never to surrender, escorted Napoleon from the field in the face of unceasing attacks from all sides. The devotion which Napoleon inspired in his men stimulated acts of bravery on that day so disastrous to his fortunes and their country.

But even these striking examples of the successful application of abstract principles serve only to point up the fact that Napoleon was defeated at Waterloo. The causes of his defeat have been the subject of much discussion and analysis. According to the classic criticism of his actions at Waterloo, Napoleon's defeat is traced to eight basic reasons. Among them are lack of reserves, failure to secure his flank, delay in pursuing the Prussians, and absence of one-third of his force from the field of battle. In other words, the outcome of Waterloo is commonly traced to failures on the part of Napoleon to use other principles of war properly.

This brief summary of "lessons," the qualitative aspects of command, and quasi laws which were derived from experience illustrates that the interest of military commentators and analysts lay principally in the internal mechanisms of war. The techniques of war were considered the business of the expert, the career military man, and past experience was studied to gain further insight into those techniques.

1955

In the next decade, interest in military affairs—perhaps we should even say, the center of gravity of study of military matters—shifted to decision-making. Increasing complexity of operations and the rapid rate of change of technology had led to a greater emphasis on the analysis of alternatives made well prior to the course of events. Also, new techniques of analysis and new devices such as the computer had given additional impetus to decision-making in advance, based on "inventing the future" by mathematical or other theoretical models. Implicit in this new approach to military affairs was a conflict that did not become apparent until some years later.

The content of the change in outlook and the basis for this conflict can be illustrated by the following fictitious events which could have taken place at Ligny on the night of 16 June 1815. Napoleon's secretary, Bourrienne, opens the dialogue.

BOURRIENNE: Sire, there is someone here who says he must see you most urgently. He wants to assist you in your decision about what to do concerning the Prussians whom you have just defeated. He wants to help you decide what to do in the face of the uncertainty of Blücher's

actions and the probability of what Wellington will do now.

NAPOLEON: Where did you get these crazy terms—probability and decision-making in the face of uncertainty? Who is this seer and how can he help me?

BOURRIENNE: It is le Comte de Laplace.

NAPOLEON: I don't need to see that crackpot. He was my math teacher in military school, and I fired him in 1799 when he was Secretary of the Interior and tried to use his mathematical ideas to run the ministry.

BOURRIENNE: But, Sire, Marshal Ney insists that you should talk to him. Here is a letter from Marshal Ney: *(reading)* Your Majesty, you well remember the Comte de Laplace because of his excellent work in mathematics for the Artillery School during the 1780's and 90's. He has come up with some new ideas which seem promising to me, and I recommend that you hear him out. Your obedient servant, Ney, Prince of Moscow, Marshal of France.

NAPOLEON: Well, if that crazy redhead recommends the savant, I'll talk to him.

LAPLACE *(entering)*: Good evening, Your Majesty. I am most gratified that you have taken the time to discuss the ways in which I may be able to help you in preparing for Waterloo.

NAPOLEON: You know I am skeptical already, and I wouldn't even talk to you except that Marshal Ney recommended you, so let's get on with it. What are you trying to sell me now?

LAPLACE: From April of last year until March of this year, I did a very intensive analysis into all your past campaigns. I have laid out a very complete model which shows exactly what you did and how your past experience applies to the events of today. I was trying to apply the principles of artillery trajectories, planetary mathematics, and my two books on probability which I wrote in 1812 and 1814 to military matters. I have prepared a paper on warfare which I intend to give to the Académie Française next year when I run for its president.

NAPOLEON: You didn't have to make such a model. I have all my experience in my head.

LAPLACE: Sire, the attraction of my scheme is that I can use this mathematical approach to forecast what is going to happen when you meet Wellington on the 18th.

NAPOLEON: Well, I have been pretty good at forecasting in the past, so let's compare notes. What did you think would happen today at Ligny?

LAPLACE: Sire, I calculated that your probability of winning the battle against Blücher was 78.5 percent.

NAPOLEON: What does that mean? I was certain that I would defeat Blücher. What is this probability stuff you are giving me?

LAPLACE: As I said, Your Majesty, I went through all your past campaigns and computed within various ranges of limits of certainty based on all the parameters involved exactly what would be the outcome of the battle. You had a very good chance of winning.

NAPOLEON: My chance of winning was 100 percent, to use your terminology. After all, I was fighting against Blücher. He is over 70 years old. I have defeated him every time I ever met him. So why should I even doubt that I would defeat him at Ligny today?

LAPLACE: Your Majesty, there are certain circumstances of terrain and disposition of the forces which made your probability less than you thought. For example, you had to detach Marshal Ney and send him to Quatre Bras to hold off Wellington.

NAPOLEON: The facts show that the probability was exactly what I thought—100 percent.

LAPLACE: There is the decision on disposition of your forces. Now, according to my advance calculations, you should have sent about one-fourth of your troops to hold Wellington while you dealt with Blücher.

NAPOLEON: I am not surprised that that was your calculation, because that is exactly what I did. But the reason you came up with the right

number was that you undoubtedly looked at what I had done at Marengo when I detached Desaix and at Jena when I detached Davout. So, if you used my past experience, it is only logical you should come up with the same number that I did. You don't have to make a calculation to tell me that my tactics are as sound as ever—and equally successful, I might add.

What do you think I should do now to handle both Blücher and Wellington separately? What is your new calculation?

LAPLACE: Your Majesty, the first thing you must do is to learn where Blücher is and what he intends to do.

NAPOLEON: Exactly. Now, how are you going to help me do that? This morning, I had to climb the tower of a windmill to study how Blücher had his forces disposed on the field of battle. I had to listen to the sound of Ney's cannon to find out whether he was supporting me by attacking Wellington at Quatre Bras. The only way I can communicate with my commanders is to send my marshals and nobles on horseback over battlefields and roads to send orders and bring back messages. How are your calculations going to help me overcome these technical limitations?

LAPLACE: Your Majesty, you must send out a force to reconnoiter.

NAPOLEON: That is exactly what I intend to do. Now show me how you would calculate the size of the force and where I should send it.

LAPLACE: Sire, taking into consideration the size of Blücher's force, Wellington's force, and your own, the rates of movement of all three forces, and the amount of time necessary to transmit messages, I calculate that you should detach about 30,000 of your troops and send them in pursuit of the Prussians. Also in arriving at this number I have applied your Maxim XLVII in which you stated, "Infantry, cavalry, and artillery cannot do without one another."

NAPOLEON: Berthier wrote that to confuse Jomini.

LAPLACE: Well, Sire, this table shows the composition of your forces which I recommend to carry out this reconnaissance in force. Also, I recommend that they begin immediately. I have made various calculations of rates of advance over the road network in this area, and I think the troops should begin their reconnaissance now if you are to know what Blücher is going to do before he can join with Wellington.

NAPOLEON: Well, Monsieur le Comte, it's obvious that your calculations don't take into account the effects of human weaknesses. My troops have been marching for a week. They have just fought the bloodiest battle of all my campaigns. They are out there sleeping in the field with their dead comrades and the dead Prussians, and you think I should wake them up and send them in pursuit of Blücher. After all, there are certain limits which even an Emperor has to take into account.

And furthermore, let me ask your calculations another question. To whom should I give the command of this reconnoitering force?

LAPLACE: Your Majesty—uh—my calculations do not permit me to take into account the differences in personalities among your commanders.

NAPOLEON: That's exactly the rub. If you really understood my campaigns, you would grasp the principle that an objective beyond the capability of one commander is well within that of another commander with the same weapons. But where are the marshals among whom I can choose? Bernadotte and Berthier have betrayed me and are with the enemy. The Prince Murat is another deceiver. He tried to seize Italy for himself, and I have had to put him in disgrace. Masséna has long been absent from the ranks, crippled and worn out. Where are those great inspiring combat leaders I once could call on? Oh, that Desaix were here to command this detached force as he did at Marengo before he turned defeat into victory! If Lannes were only still with me! He took unnecessary risks in the Wagram campaign and lost both his legs before dying so horribly in the Schönbrunn Palace. All of them are gone except Ney, and I need the "bravest of the brave" when I meet Wellington. How can your calculations solve that problem?

LAPLACE: Sire, they cannot. But you have the one choice which you must make yourself.

NAPOLEON: I must make all the choices, not just this one. I have chosen Grouchy. He is an able commander. He went all the way to Moscow with me. Perhaps he will do better with Blücher than Macdonald did on the Katzbach.

How can your calculations help me to operate within the art of the possible? I can't invent new commanders overnight.

LAPLACE: Yes, but there is something further I must call to your attention. There are many alternatives available to both Wellington and Blücher, and you must analyze each of them in order to know your optimum course of action.

NAPOLEON: What are you talking about? An optimum course of action. I have only one course of action—to cope with events as they unfold, and with Wellington. Blücher is out of the picture. If he tries to come back, I'll handle him after I have thrown Wellington from the field. Goodbye, Monsieur le Comte.

LAPLACE: But, Your Majesty . . .

NAPOLEON: I said goodbye.

LAPLACE *(to Bourrienne, in Napoleon's doorway)*: When will these generals learn to use new techniques and new methods to help them solve their problems?

NAPOLEON *(to Bourrienne, back in the farmhouse)*: When will these savants learn that military affairs are a matter of experience? How can Laplace capture the human spirit in those cold numbers? How can he translate that cry of "Vive l'Empereur!" which my troops give whenever they see me, into calculations which give weight to my side on the field of battle? As my historian Thiers will say one day, *"Les grands événements ne dépendent que des causes morales."* (Really great occurrences spring only from human sources.)

Also, I notice that the great mathematician did not attempt to translate into numbers my Maxim LXXXII in which I said, "The great actions of great generals are not the results of chance and destiny; they come from planning and from genius." Obviously, he wouldn't because the concept of probability depends on repetitive events. My whole psychology and my planning are unique; they come from my personality and initiative. After all, the way to learn how to make decisions is to make them in the face of uncertainty. You can't depend on someone else to calculate all these alternatives and then show you the one alternative you must follow. The heart of military affairs cannot be reached through mathematics.

Remind me to ask Marshal Ney why he sent that crackpot to see me. I was right when I fired him from Interior back in 1799.

1965

The next ten years saw Clemenceau's aphorism carried to its logical conclusion: not only is the conduct of war too important to be left to the generals; thinking about war is also. In the period from 1955 to 1965 the "defense intellectual" and "strategist" seized from the military in the U.S. the intellectual terrain which controls the course of military affairs. We saw the appearance of new theories about war. This eventuality had been forecast by the impact of science on decision-making in the preceding ten years. Once scientists, particularly the mathematician and the operations analyst, had entered this domain, the road was open for the economists, the psychologists, and social scientists as a group.

The center of gravity of their interest was far removed from the technical details, from the empirical data, from the principles that had been gleaned from battles like Waterloo during the time up to 1945; nor did it lie in the application of physical sciences to decision-making. It lay in the effort, conscious or not, to transpose whole bodies of theory and thought from the academic disciplines to questions of strategy, especially "grand strategy."

Another fictional dialogue may serve to point up how some of these theories have been transferred to strategy.

AMERICAN STRATEGIST: The *sine qua non* of strategy in the nuclear age is stability. Just as

in economic theory, where we see the forces of the market dampen out around a level of stability, so also in strategy have we seen conflict dampen out.

The events surrounding Cuba in 1962 proved that the stability principle is valid for strategy. We have achieved a "balance of terror" that makes nuclear war unthinkable. Also, now that we have achieved stability, it is vital that we do not disturb it. New weapons, be they manned bombers or an active defense against ICBM's, must be carefully examined to weigh their effects on the stability of the general-war balance.

FRENCH GENERAL: I agree with you that we have stability at the level of all-out nuclear war. We have had it for some years, and we did not need Cuba to prove it. We recognized that stability existed, and we were the first to support your strong stand over Cuba. Because the West had forestalled the use of direct strategy, we felt it vital to stop the indirect thrust launched through Cuba.

However, we disagree with you that we in the West have to avoid destabilizing moves. As we interpret your strategy, you believe in creating certainty in the minds of the Soviets that war will be unprofitable. We feel that stability is insured by creating uncertainty.

If the Soviets face two, three, or four possible nuclear responses to their aggression and they cannot analyze the future course of events with certainty, they will be dissuaded militarily.

GERMAN STRATEGIST: I think we all agree that we want the Soviets to know with certainty that their aggression cannot be profitable for them.

FRENCH STRATEGIST: We agree that the outcome of the calculation to initiate aggression must be certain—the Soviets must never conclude that direct aggression in nuclear war is profitable. We are talking about the method for insuring certainty of the results of those deliberations. We assert that the surest way is to create uncertainty about the future.

That was the basis for our opposition to the MLF. If it were to be under control of only one nation, the Soviets would have an easier time in evaluating what to do about it. What we need is several independent nuclear forces such as our *force de frappe*. As long as the Soviets have to cope with multiple reactions to their aggression, they will not disturb the status quo.

SOVIET MARSHAL: You capitalists will never understand that there is no status quo. The dialectic of conflict creates a continuing state of tension. Waterloo should prove that to you. The internal contradictions of the capitalist world led to Waterloo. You can prattle all you want about counting the number of dead after a battle and asking the question, "Why war at all?" Napoleon didn't ask that question. Hitler didn't ask it. You will not ask it either when you attack us.

CHINESE COMMUNIST: You surprise me, Marshal. You seem to have forgotten that Khrushchev betrayed Marxism by stating that war between the capitalist and communist worlds is not inevitable. You talk as though you think the West will attack you.

SOVIET MARSHAL: You Chinese refuse to learn anything from history. Lenin showed that Marx was wrong in stating that the "revolution of the proletariat would be spontaneous." Lenin showed that the elite have to lead the proletariat.

So, we have learned that Lenin's interpretation of Clausewitz has to be updated: War is not a continuation of policy by other means. War is a political process. Nuclear war may be unprofitable now, but conflict, particularly by an indirect strategy, can be profitable.

FRENCH GENERAL: I'm glad you made that point, Marshal. We in the West are on the defensive politically, and our planning is built around the offensive use of military power when you take action against us. You, on the contrary, are concentrating on the defensive use of your general-war forces, but you are on the offensive politically. Naturally, I expect you will change your military strategy when your technology gives you a decisive superiority in general war. You are just like many operators in the market place: you are constantly seeking a competitive advantage and are deliberately destroying the stability of the market. Because

we are on the defensive, we are always reacting to restore the level of stability.

CHINESE COMMUNIST: What you are really saying, Monsieur le Général, is that the Russians do not understand Marxism at all. They talk as though they deny its validity, yet their thinking demonstrates its vitality.

AMERICAN STRATEGIST: I find the introduction of philosophy quite out of place in our discussion of strategy. After all, we each recognize that military power is under civil control, and our political leaders are not bound by any abstract philosophy in their solution of the day-to-day problems of state and international conflict. Their actions are ad hoc.

EUROPEAN PHILOSOPHER: You are sadly mistaken, my friend. Those who do not live by a philosophy cannot comprehend that others do and that their philosophy is a guide to short-term decisions. The Communists are living proof of the role of philosophy in conflict.

AMERICAN STRATEGIST: The fact that the Communists are guided by a philosophy doesn't mean that we must follow suit. Their philosophy makes it difficult for them to understand reality. We have to know what is going on; we should not seek to implement doctrinaire principles blindly.

FRENCH GENERAL: A good point. Well, let's spend some time considering how war starts.

AMERICAN STRATEGIST: It's clear to me that accidents, miscalculations are the most likely sources of World War III. We must prevent them at all cost. That is why we believe that we in the West must have the ability to fight large-scale wars in Europe with nonnuclear weapons.

If there is third-party mischief, if the Soviets probe our resolve, or if they stumble into war, we must be able to respond without going all the way to mutual annihilation. We must be able to do what the allies did at Waterloo—defeat the aggression without leveling the homelands of the belligerents.

FRENCH GENERAL: If we try to defend Europe with nonnuclear weapons, we will lose. There is no stopping a large-scale conventional offensive.

EUROPEAN STATESMAN: My people would have a hard time distinguishing the difference between nuclear annihilation and total destruction with nonnuclear weapons. The experience of two world wars has brought this fact home to them.

BRITISH STRATEGIST: That is why it is all the more vital that we deter future Napoleons from starting on the road to Waterloo. In other words, we look on the problem as one of preventing a deliberate decision to go to war, such as the decisions made in 1815 and 1939.

FRENCH GENERAL: In my opinion, you Americans have placed too much emphasis on Sarajevo in reinterpreting the causes of World War I. Your assertion is that that war just happened because no one took the trouble to foresee where his decisions were leading him and what the possible outcomes would be. This is essentially a complete reversal of the between-wars period in which hundreds of histories were written to try to "prove who was guilty" for the start of World War I. Now you appear to assume that no one caused it, that everyone was equally involved because everyone was stupid, shortsighted, or opportunistic.

While I agree with the necessity for avoiding a war that comes by accident, I rate the likelihood of such a war as almost nonexistent. The dominant problem is to dissuade deliberate—I should even say rational—aggression.

EUROPEAN PHILOSOPHER: I'm glad you brought up that consideration because rationality is supposed to be the foundation of stability. If we don't understand rationality, we will never see our way out. After all, Napoleon was rational. We may not think so today, since Napoleon lost. But before the fact, the decision to commit aggression was rational to him because his sense of values was different from anyone else's. His personal gains were potentially great; his personal losses minimal compared to his status as a deposed exile. His power was so great that he could command and lead others to give up their lives for him, so

great that he could lead all of Europe down the road to war. In other words, as long as dictatorships, be they individuals or oligarchies, exist with their own standards of what is logical and rational, the possibility of another Waterloo will exist.

The theory of rationality in international affairs assumes symmetry of points of view on fundamental problems. There is no evidence that such symmetry exists in the world of 1965 or that it will exist in 1975 any more than it did in 1815.

SOVIET MARSHAL: It has been well said that you capitalists have too limited a point of view. You must, as Marx and Lenin have proven, look at the entire historical process and all the elements of the environment. Waterloo and Cuba also were the products of dialectical materialism. With your search for stability, for preserving the status quo, you're sure to go down like Napoleon.

AMERICAN STRATEGIST: There is really only one answer. We Western strategists must create forces with maximum flexibility to cope with whatever unknowns and uncertainties the future brings. That means multiple options for action to cope with the unexpected. It means absolute control of our military forces. And it means that we must be able to manage any crisis so that we can terminate it on the most favorable terms.

Ideally, the allies should have prevented Waterloo at Fontainebleau in 1814 rather than to have fought it in 1815. But, given our own circumstances and our own problems today, we must have stability of power at the general-war level, and we must maintain it by deterring aggression through certainty of the knowledge of its outcome. Regardless of doctrines or philosophies, national leaders will act rationally in achieving their national interests. Therefore, it behooves us in the West to act in concert, both to deter aggression and to cope with the unexpected.

1975

The mid-60's saw much confusion of strategic concepts and division of ideas among allies. The apparent simplicity of general-war strategy of the Fifties gave way to increasing complexity as the aspects of general war were researched and refined in greater and greater detail. Guideposts and bench marks from the past, like Waterloo, lost their validity, and attempts were made to supplant them with theories drawn from human experience other than war.

As we look forward to the coming decade, when we shall mark the 160th anniversary of Waterloo, we could well ask what the shape of events will be, and how we will look at military affairs then. Will our outlook be as remarkably changed as it has been at the end of each of the past three decades?

We can see already some of the major factors that will influence the environment of the next ten years. Our forecast now is that Communist China will be a nuclear power by 1975. While this capability may not be as great as that of the U.S. or the U.S.S.R., it could well be a significant factor in determining the course of affairs. The other great factor, which is exceedingly hard to anticipate for its impact on our outlook, is man's conquest of the moon. By the end of the next ten years, we shall have seen some of the most dramatic and striking events in the history of mankind. There will be periods of a week in which the world will hold its breath while men maneuver to land on the moon's surface and return from those eventful voyages of discovery. Also, many of the great personalities who dominate international affairs today, such as Khrushchev's successors and De Gaulle, undoubtedly will have passed from the scene of world history. We do not know who will take their places or what their outlook, goals, and attitudes will be. We cannot identify all the weapons that will be in the hands of military forces ten years from now. Significant efforts at disarmament lie in the future, and they will tend to have an effect on the course of military affairs. On the other hand, the onrush of technology will have diminished in no way, and the major question to be resolved will continue to be the application of that technology to weapon systems and national defense. Furthermore, the threat from Communism will still be great.

Our future ability to cope with the course of events may well be determined by a significant deficiency. By 1965 it had become apparent that our "bank account of ideas" was running low. While it is true that the intellectual community was continuing analysis of deterrence, defense, and disarmament, these investigations were the result of the impetus of the preceding decade. Old themes were rehashed; variations were researched in infinite detail. There was need for a new leaven of insights and new approaches to security.

To counteract this malaise, we have to overcome the psychology that we can discard the past. We must re-energize the understanding of human affairs by the use of past experience. For example, we must try to evaluate the effects of Napoleon's occupation of Prussia as a factor in his defeat at Waterloo. We must speculate about the motives of an individual such as Blücher and the reasons why he became the key figure in this decisive battle. Wellington and Napoleon have dominated the traditional analyses of that battle, but it seems clear that it was the determination of Blücher which led to the defeat of Napoleon. Defeated, wounded, driven from the battlefield at Ligny on the 16th, Blücher, in spite of his more than 70 years, led an attack two days later against Napoleon's right flank. Thus, his years of effort to defeat Napoleon decisively and completely were brought to fruition through his strength of will and the leadership of his troops, who loved him like a father.

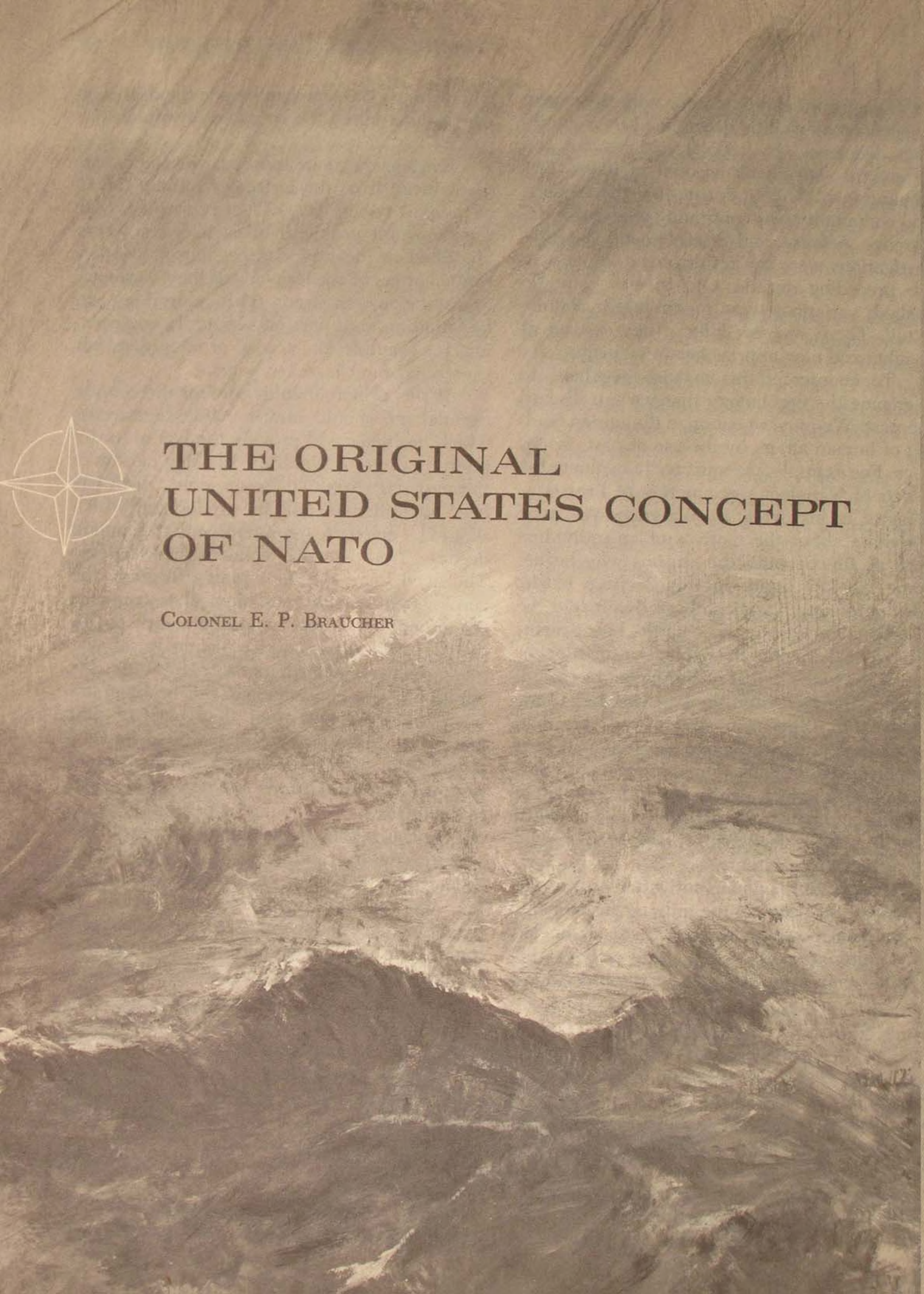
Insights into human motivation are needed if society is to control the military instruments of national power and keep them channeled into legitimate pursuits. An aid to such insights would be an understanding of the individuals who were on the scene and made the decisions which determined the course of events in the past.

Even in the short term, one principle can be deduced from the history of military ideas of the past twenty years. That principle is that the dominant problems of each decade were identified in the period preceding it and become matters of concern only as they "surface," to use the current jargon. This cultural lag can be found in other parts of society. In engineering, for example, the spread of new ideas has usually taken at least ten years.

If this principle holds true for the coming decade, we should now be able to forecast which problems will provide the key to future interpretations of Waterloo. Looking back over the past ten years, we see an issue which has been identified in military circles and which should be given greater attention in the coming decade. That issue is technological strategy. The need for a specific strategy to guide the employment of the technological instruments of national power was pointed out early in this decade. Attempts to write technological war plans followed soon thereafter. However, recognition of the importance of this problem has been following the usual slow pace of past issues. An understanding of the need for new organizations, new procedures, new divisions of responsibility, and, above all, new approaches to the future has been lagging behind the need.

In this age of technology, these problems should have been addressed long ago. This is especially true because technology has always led military strategy and national strategy. A technological strategy must emerge in the coming decade, with attendant changes in organization, if we are to prevail at future Waterloos.

Washington, D.C.



THE ORIGINAL UNITED STATES CONCEPT OF NATO

COLONEL E. P. BRAUCHER

BY EARLY 1966 the future of the North Atlantic Treaty Organization had become uncertain. There had for some time been differences among the NATO partners regarding the substance of military strategy and the question of control over nuclear weapons. But probably the source of greatest concern to the other NATO nations as the alliance rounded out its seventeenth year was the possibility that President Charles de Gaulle would announce his intention to take France out of NATO one year after 1969, when, in accordance with the terms of the North Atlantic Treaty, the member nations have the option of renouncing it.

The world of 1966 is, of course, different from the world of 1949. The present attitudes of the member nations toward NATO are almost sure to be different in certain respects from their original concepts of the alliance. As the United States considers the present situation in NATO and the probable future of the alliance, it should be instructive to review the original concept which the United States had of the North Atlantic Treaty.

Unwanted involvement of the United States in two world wars (which it had presumably done nothing to start but also very little to prevent) had by 1943 convinced the majority of its citizens that this nation could not, in isolation, adequately provide for its own security. Bitter experience had taught them that a breach of the peace anywhere in the world, and particularly in Europe, was a threat to U.S. security. Thus, the maintenance of international peace was recognized as vital to the national security.

Despite the inability of the League of Nations to prevent World War II, most Americans did not reject the concept of a general international organization for collective security. The majority view seemed to be that the League failed because it had not been provided with adequate enforcement capability —and because of the failure of the United States to participate. By the time of the Anglo-American meeting at Quebec in August 1943, President Franklin D. Roosevelt had come to view the creation of an international organization open to membership to all nations as an important step in preventing future conflicts among the great powers. At this conference the American delegation tabled a draft of a four-power declaration calling for the creation of such an organization. The Congress supported the President. In the Fulbright Resolution, passed on 21 September 1943, the House of Representatives expressed itself as "favoring the creation of appropriate international machinery with power adequate to establish and maintain a just and lasting peace among the nations of the world. . . ."[1] The Senate was more explicit with respect to the form of this machinery. In its Connally Resolution, passed on 5 November 1943, the Senate recognized "the necessity of there being established at the earliest practicable date a general international organization, based on the principle of the sovereign equality of all peace-loving states, and open to membership by all such states, large and small, for the maintenance of international peace and security."[2] These resolutions provided the basis for United States participation in the activities which led to the establishment of the United Nations in 1945. The United Nations Charter was adopted on 26 June in San Francisco.

In 1945 the hopes of most Americans and other peoples of the world for the preservation of peace reposed in the commitments which the signatory nations had made when they signed the United Nations Charter and in the peace-keeping machinery which was to be set up in accordance with its provisions. Article 43 of the charter envisaged the negotiation of agreements "as soon as possible" by which the member nations would make available to the Security Council armed forces, assistance, and facilities required by it to fulfill its primary responsibility for the maintenance of international peace and security, assigned in Article 24. Without such an international peace force, the United Nations would be as powerless as the League of Nations before it to maintain international peace and security. As President Harry S Truman said on 27 October 1945: "We are convinced that the preservation of peace between nations requires a United Nations Organization composed of all the peace-loving nations of the world who are will-

ing jointly to use force if necessary to insure peace."[3]

But the agreements called for by Article 43 of the United Nations Charter were never negotiated. In the absence of unanimity among the great powers, manifested by the Soviet Union's frequent recourse to the veto to block Security Council action on substantive matters, it proved to be impossible to establish an international force within the United Nations.

With the end of World War II there was a rapid deterioration in East-West relations. As President Truman later wrote in his memoirs:

> Many differences among the Allies had been subordinated during the war, but now that the common enemy was defeated, the problems of peace had brought these differences to the surface. We had already discovered how difficult the Russians could be, but in the months that immediately followed the war this was revealed even further.[4]

It soon became clear that the Russians were not in earnest about peace; they were planning world conquest.

By the end of 1947 it had become obvious to the free nations of western Europe that the United Nations did not have and was not going to be given the capability to protect them against the threat posed by the Soviet Union, which by that time had consolidated its control over eastern Europe and attempted to extend its power into the Near East. They would have to look elsewhere for security. Their individual capabilities for defense being clearly inadequate, they would have to get help. Their first step was to exercise their inherent right of collective self-defense, which had been explicitly recognized in Article 51 of the United Nations Charter.

On 22 January 1948 Ernest Bevin, the British Foreign Secretary, called for the formation of a "Western Union." The Communist coup in Czechoslovakia on 24 February 1948 served to expedite action on Bevin's proposal. Eight days after the coup, delegates of the United Kingdom, France, and the Benelux nations met in Brussels and drafted a 50-year treaty of economic and social cooperation and common defense against aggression.[5] Known as the Brussels Pact, it was predicated on American aid, which President Truman, in an address to a joint session of the Congress on 17 March 1948 (just as the pact was being signed), made clear would be forthcoming:

> This development deserves our full support. I am confident that the United States will, by appropriate means, extend to the free nations the support which the situation requires. I am sure that the determination of the free countries of Europe to protect themselves will be matched by an equal determination on our part to help them to do so.[6]

The signing of the Brussels Pact was warmly received by the United States, which was very much in favor of all steps toward European self-help, mutual aid, and integration. But it seems clear that the United States was not then contemplating formal association with the Brussels Pact nations. President Truman made no reference to such an association in his address to the Congress. General George C. Marshall, who was Secretary of State at that time, viewed the Brussels Pact as a purely European initiative. In a statement to the House Foreign Affairs Committee on 1 August 1949 he said:

> In the late fall of 1947, Mr. Bevin spoke to me about an idea he had for the formation of some union in Europe, and he had in mind a statement by this Government at the same time he made his proposal. I declined the idea of such a statement, first because the proposal was then in too indefinite a form, but more importantly because I felt that the initiation of the action should be purely European to demonstrate their determination to organize for mutual cooperative defense against aggression. The Western Union soon followed, with the Brussels Pact or Treaty.[7]

President Truman, having in mind the lesson of President Wilson's inability to bring the United States into the League of Nations in 1920 because of Senate opposition, saw the necessity for Congressional confirmation of his declaration of support for the Brussels Pact nations. Even as the State Department was working out the details for this support (which were incorporated into the Mutual Defense Assistance Act of 1949), Under Secretary of State Robert A. Lovett and Senator Arthur H.

Vandenberg, Republican foreign policy spokesman, were collaborating on a Congressional statement of policy. This became Senate Resolution 239, which received overwhelming approval of the Senate on 11 June 1948. Known as the Vandenberg Resolution, it put the Congress on record as favoring "association of the United States, by constitutional process, with such regional and other collective arrangements as are based on continuous and effective self-help and mutual aid, and as affect its national security."[8] This resolution provided the basis for United States participation in NATO.

The North Atlantic Treaty

On 2 July 1948 President Truman approved a policy statement that the Vandenberg Resolution should be implemented to the fullest extent possible. Talks with the Brussels Pact powers and Canada got under way on 6 July. By 9 September the conferees had reached agreement on the necessity for a North Atlantic security pact. By late October there was agreement in principle on the negotiation of such a pact. By the time of President Truman's inauguration on 20 January 1949, the work on the treaty text was nearly completed, so that he was able to make the first public allusion to the North Atlantic Treaty in his inaugural address:

> We are now working out with a number of countries a joint agreement designed to strengthen the security of the North Atlantic area. Such an agreement would take the form of a collective defense arrangement within the terms of the United Nations Charter.[9]

The President's announcement was followed over the next six months by a series of addresses and statements by Administration officials intended to convince the American people that it was in the best interests of the United States to depart from precedent and participate in peacetime in a military alliance with nations outside the Western Hemisphere.[10] From these addresses and statements and from the statements of Congressional leaders and the published conclusions of Congressional committees, it is clear that the United States conceived of the North Atlantic Treaty as a commitment which would be very much in its interest.

The treaty was expected to

—enhance the national security of the United States

—deter aggression in the North Atlantic area

—contribute to the maintenance of international peace and security

—strengthen the United Nations

—promote the economic recovery and political stability of the free nations of Western Europe

—contribute to the solution of the German problem

—encourage European integration

—reduce the long-term cost to the United States of its economic and military aid to European nations.

—enhance the national security of the United States

The continued intransigence and aggressive activities of the Soviet Union persuaded many, probably most, Americans in 1949 that the accession of the United States to the North Atlantic Treaty was consistent with its long-term national security interests. President Truman expressed this point of view in a message of 12 April 1949 transmitting the treaty to the Senate: "This treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom."[11]

The importance of European security to American security had been highlighted by Secretary of State Dean Acheson on 18 March in an address to the nation shortly after the text of the treaty had been released:

> We have learned our history lesson from two world wars in less than half a century. That experience has taught us that the control of Europe by a single aggressive, unfriendly power would constitute an intolerable threat to the national security of the United States. We participated in those two great wars to preserve the integrity and independence of the European half of the Atlantic community in order to preserve the integrity and independ-

> ence of the American half. It is a simple fact, proved by experience, that an outside attack on one member of this community is an attack upon all members.[12]

The United States needed allies, as Secretary of Defense Louis A. Johnson was to testify to the House Committee on Foreign Affairs on 29 July 1949: "Our security depends, in my opinion and in the opinion of the National Military Establishment, depends first on our own strength, and second on the strength of our allies. We can no longer isolate ourselves from the rest of the world, nor rely on our own arms alone."[13] On 5 July Senator Tom Connally had expressed his strong support for the North Atlantic Treaty in a speech in the Senate:

> There is one final benefit which, in all candor, should not be overlooked. If our efforts for peace fail and war is thrust upon us we shall not stand alone. Our strategic positions will be greatly improved and we shall have a much better opportunity to make effective use of our armed strength. Eleven friendly nations, with a vigorous population and vast industrial production, pledge to stand with us and to resist the attack from whatever quarter it may come.[14]

The United States anticipated that its security and that of the other signatories of the treaty would be steadily enhanced as each nation gave effect to its commitment by doing its utmost to help itself and its partners develop their collective capacity to resist armed attack. Senator Connally also stressed this point:

> This leads me to mention yet another great advantage to this country: I refer to the pledge of self-help and mutual aid to maintain and develop the individual and collective capacities of the member states to resist armed attack. We must never forget that in this collective enterprise their strength is our strength. Their weakness is our weakness. It would be inimical to our own national interest and to the cause of world peace if the free countries of Europe were to become so weak and defenseless as to invite disaster, one by one. That would indeed be the road to war.[15]

Finally, the United States viewed the treaty as providing the basis for greater security for the North Atlantic nations by enabling them to formalize their natural association before it became necessary for them to improvise once again, as in two world wars, under the pressure of threatened catastrophe.[16]

—deter aggression in the North Atlantic area

In Article 5 of the North Atlantic Treaty the signatory nations established the principle that an armed attack against one or more of them was to be considered an attack against them all. President Truman saw in this commitment a powerful deterrent to aggression. The primary purpose of the treaty, he told the nation in his inaugural address, was "to provide unmistakable proof of the joint determination of the free countries to resist armed attack from any quarter. . . . If we can make it sufficiently clear, in advance, that any armed attack affecting our national security would be met with overwhelming force, the armed attack might never occur."[17]

Secretary Acheson, in a statement to the House Committee on Foreign Affairs on 28 July 1949 in connection with its consideration of the Mutual Defense Assistance Act of 1949, expressed this concept in very straightforward terms:

> The North Atlantic Treaty provides for concerted action in defense of an area which is absolutely vital to our security interest. That common defense will cancel out an advantage which marauding nations have always had in Europe. I mean the advantage of piecemeal aggression, the technique of the fait accompli that dictators have used to absorb independent nations before and since World War II.
>
> The fundamental pledge of the treaty, that an attack on one signatory will mean an attack on all, closes the door to piecemeal aggression.
>
> Does this mean, then, a determined aggressor nation will take the desperate angle of an all-out war? I do not believe that in the light of the pledge of the treaty, and with the military program now proposed, any aggressor at this time would dare to do so.[18]

—contribute to the maintenance of international peace and security

"The principal benefit to the United States

is the great promise this treaty holds for world peace," Senator Connally had said.[19] The report of the Senate Committee on Foreign Relations on the North Atlantic Treaty also saw its influence for peace extending beyond the North Atlantic area to the world as a whole:

> The security of the North Atlantic area is vital to the national security of the United States and of key importance to world peace and security. . . . The committee strongly believes that it would be in the best interests of the United States and indeed, the entire world, to sustain and encourage the momentum of confidence that has been building up in Europe, by ratifying the treaty at an early date.[20]

President Truman, in his 12 April message, pointed out another way in which the treaty contributed to world peace—its effect as an example to the world of international cooperation to assure the future of freedom:

> Together, our joint strength is of tremendous significance to the future of freemen in every part of the world. For this treaty is clear evidence that differences in language and in economic and political systems are no real bar to the effective association of nations devoted to the great principles of human freedom and justice.[21]

—strengthen the United Nations

The North Atlantic Treaty was expressly subordinated to the purposes, principles, and provisions of the Charter of the United Nations. The Senate Committee on Foreign Relations saw it as designed to foster those conditions of peace and stability in the world which are essential if the United Nations is to function successfully.[22] This is evidence that in 1949 the United States still looked to the United Nations as the long-term best hope for worldwide peace and security. Secretary Acheson in his 7 April 1949 letter to the President transmitting the North Atlantic Treaty stated: "The foreign policy of the United States is based squarely upon the United Nations as the primary instrumentality of international peace and progress."[23]

But it was also generally recognized that the United Nations had not yet become effective in the maintenance of international peace and security. Senator Connally, in his 5 July 1949 speech to the Senate, reviewed the situation:

> No international document was ever endowed by the people of the world with greater promise of security and prosperity. In the very first article [of the United Nations Charter] the signatories pledged themselves to maintain international peace and security, and to that end 'to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of aggression or other breaches of the peace. . . .'
>
> Yet here we stand, 4 years away from San Francisco, with undiminished belief in the Charter, in the correctness of its work and spirit, and in the fundamental need for a universal United Nations. But no sincere and realistic person can blind himself to the fact that peace is still remote and the security we long for is yet to be attained. The long catalog of 30 Soviet vetoes and the frustrated efforts to write a peace treaty with Germany bear eloquent witness of how effectively the peace and security machinery of the world has been hampered.[24]

The United States believed that the United Nations must be strengthened. In 1948 this had been the purpose of the Vandenberg Resolution. In 1949 this was viewed as one of the important objectives of the North Atlantic Treaty. Ambassador Warren R. Austin told the United Nations General Assembly in New York on 14 April 1949:

> Its framers have kept actively in mind, throughout the negotiating period, the great measure of strength and support which this defense arrangement should bring to the United Nations, the paramount international organization for the maintenance of peace and security.[25]

It is evident from the statements of Administration and Congressional spokesmen that, while reiterating that the North Atlantic Treaty would strengthen the United Nations, they saw this being done in ways rather more indirect than direct. Secretary Acheson stated that the treaty was "designed to strengthen the United Nations by providing for the orderly and coordinated fulfillment of the obligations of the

participating nations under the Charter."[26] Ambassador Austin saw the treaty as strengthening the United Nations "by expressing the cooperative spirit which is necessary to animate any great voluntary peace effort."[27] The Senate Foreign Relations Committee urged ratification of the treaty because, among other things, it was "designed to foster those conditions of peace and stability in the world which are essential if the United Nations is to function successfully."[28]

Some Americans apparently supported the North Atlantic Treaty as a necessary and therefore practical step but still looked forward to the day when the United Nations would be able to fulfill its promise as—in President Truman's words—"a great instrument for peace and security and human progress in the world."[29] Representative Helen Gahagan Douglas, a member of the House Foreign Affairs Committee, seemed to be speaking for these Americans when she said in the committee on 28 July 1949:

> I for one believe that the United Nations can be strengthened; that it will be strengthened and there will be an international police force under that world organization.
>
> In the meantime, we can either sit idly by and wring our hands or take positive action. The Atlantic Pact goes as far as possible under present conditions. It is a program for collective security. It is not an aggressive program but a program of defense, a program that can be a pilot plant for a future world police force.[30]

—promote European economic recovery and political stability

In the aftermath of World War II only the United States was in a position to provide relief to the devastated nations, victors as well as vanquished. As President Truman was to write in his memoirs: "In the first two years that followed V-J Day the United States provided more than *fifteen billion dollars* in loans and grants for the relief of the victims of war."[31]

By the spring of 1947 it had become evident to the United States that piecemeal emergency assistance, while relieving suffering, was not rebuilding the economy of Europe. The United States also became convinced, according to President Truman, that "if the nations of Europe could be induced to develop their own solution of Europe's economic problems, viewed as a whole and tackled cooperatively rather than as separate national problems, United States aid would be more effective and the strength of a recovered Europe would be better sustained."[32] This concept was also given expression by Secretary of State George C. Marshall in his famous 5 June 1947 speech at Harvard University. The response of the European nations was immediate and enthusiastic; the European Recovery Program, known as the Marshall Plan, was the ultimate result.[33]

It was generally considered essential that Western Europe's economic recovery be given priority over its rearmament. However, it became apparent that West Europe's economic recovery could not be completely achieved in the atmosphere of insecurity and fear which the Soviet threat had induced in its peoples. In his address to the Congress on 17 March 1948 President Truman stated: "While economic recovery in Europe is essential, measures for economic rehabilitation alone are not enough. The free nations of Europe realize that economic recovery, if it is to succeed, must be afforded some measure of protection against internal and external aggression." He continued with a reference to the Brussels Pact: "The movement toward economic cooperation has been followed by a movement toward common self-protection in the face of the growing menace to their freedom."[34]

During the negotiations in the fall of 1948 which resulted in the North Atlantic Treaty, President Truman perceived that the need to create a sense of security in Europe in order to facilitate its economic recovery was "the key point."[35] It became one of the Administration's principal arguments for the North Atlantic Treaty. One of the clearest and most complete statements of this concept was provided by Secretary Acheson on 8 August 1949, to the Senate Foreign Relations and Armed Services Committees during their joint hearings on the Military Assistance Program:

> With respect to Europe, primary emphasis has been placed upon the revival of the economies of the free peoples as the necessary

foundation of their social structure and political organization. The European Recovery Program has in fact achieved a gratifying degree of economic rehabilitation. It also has produced salutary results in the form of greater political stability and renewed confidence in the future.

Yet, it has become increasingly clear that economic measures alone are not enough. Economic recovery itself depends to a considerable degree upon the people being inspired by a sense of security and the promise of the future to put forth their best effort over a long period. This sense of security and faith in the future in turn depend upon a firm belief in the ability of the free nations to defend themselves against armed aggression. Such a belief is notably lacking in Western Europe today. Therefore, the capacity of mutual self-defense on the part of the free nations of Europe must be increased, largely by their own effort, without impeding progress toward economic recovery. We must not now, by failing to recognize fully the fear of security which is growing out of the clear pressures exacted from the East, lose the gains already made. Prompt action is imperative to create the conditions that will allay that fear and will erase the conditions that might encourage an aggressor to resort to military force.

It is for these reasons that the European Recovery Program, the North Atlantic Treaty, and the proposed Military Assistance Program are elements of a broad and soundly conceived policy with definite and attainable objectives. Two of the pillars are in place. Favorable action on the Military Assistance Program is vitally necessary now as an essential element of the structure.[36]

—contribute to the solution of the German problem

The German problem in the late 1940's had two aspects. First, there was the problem of relations between the Soviet Union on the one hand and the United States, Great Britain, and France on the other. Second, there was the problem arising from the quite different attitudes of the United States and Great Britain on the one hand and France on the other toward Germany. The United States and Great Britain wanted Germany's economic revival to reduce the burden on them which a destitute Germany imposed. France was fearful of Germany's economic resurgence because of what it would mean in terms of restored German war potential.

The North Atlantic Treaty, besides offering additional strength to the Western powers in their dealings with the Soviet Union, appeared to present a solution to the problem of France's very real fear of Germany. This point was not emphasized as much by Administration spokesmen for the treaty as by the Senate. In its report on the North Atlantic Treaty the Senate Foreign Relations Committee characterized it as "essential to the development of that degree of unity and security among the North Atlantic states which will make possible the reintegration of Germany into western Europe and the ultimate solution of the German problem."[37]

Senator Vandenberg addressed the German problem in some detail in a speech to the Senate on 6 July 1949 in defense of the North Atlantic Treaty:

> The treaty is here for another reason. We have not finished World War II until the German problem is settled. There can be neither peace nor economic stability in western Europe until the German problem is liquidated. There can be no release for us from our own burdensome occupational responsibilities in western Germany until free and self-sufficient government is reestablished in these areas. This means, on the one hand, that the Germans must have a reasonable and hopeful opportunity to build a sound and healthy economy for themselves and to resume their place in the family of nations. But it requires, on the other hand, that this recovery shall not restore the aggressive military potential which, twice in our lives, has plunged the world in war.
>
> This time there must be no mistakes upon this score. Germany's immediate neighbors cannot be blamed for special solicitude in this respect. They cannot be blamed for insisting that German recovery must be subordinate to these protections. To meet this elementary need, . . . we have now signed this pending 20-year pact with our western allies. . . . It would apply just as promptly and effectively to a German aggressor as it does to a Communist aggressor. But by the same token it also is a powerful and well-nigh indispensable aid to maximum German recovery—and therefore to European recovery—because it

permits greater recovery latitudes than Germany's twice-ravished neighbors would otherwise tolerate.[38]

—encourage European integration

During this period there was great interest in the United States in European integration. Its value was reviewed by Secretary Acheson in a statement to the Senate Committee on Foreign Relations and the House Committee on Foreign Affairs, meeting in joint session on 8 February 1949 to consider action on the European Recovery Program:

> I believe that we have recognized here, from the very beginning, and so have the participating countries, that the greater the unity, both economic and political, among the free nations of Europe, the greater the progress towards the restoration of those conditions of economic health, social tranquillity, political freedom, and security which represents our common goal.[39]

The European Recovery Program, like the Brussels Pact, was viewed by the United States as a step toward the closer integration of the free nations of Europe. Although two non-European nations were signatories of the North Atlantic Treaty, it also was seen as contributing to European integration. In its report on the treaty, the Senate Foreign Relations Committee stated:

> Since 10 of the nations forming the North Atlantic Pact are European nations, the committee considered the possible effect of the pact on the development of European integration in the economic and political fields. Much practical integration has already been achieved through the Benelux union and the Brussels Pact. The European recovery program, which should insure a degree of lasting economic integration of the participating nations, and the proposed Council of Europe, which has as its objective cooperation in the political field, are concrete and encouraging steps toward unity.
>
> The committee believes that the North Atlantic Pact, by providing means for cooperation in matters of common security and national defense, creates a favorable climate for further steps toward progressively closer European integration. Moreover, cooperation for common security gives added momentum to the movement toward unification.[40]

—reduce the long-term cost of European aid

The Senate, rather than the Administration, appears to have taken the lead in advancing the idea that one of the consequences of cooperation under the North Atlantic Treaty would be lower long-term costs to the United States of its economic and military aid to European nations. The Foreign Relations Committee expressed its conviction that "the greater the degree of coordination achieved the greater will be the results at the least cost to each participant."[41] Senator Connally, in his 5 July 1949 speech to the Senate, stated: ". . . I am certain that article 3 will enable all of us to consider defense measures on a very practical basis, to comprehend rational arrangements that will in the long run help to reduce the burden of armaments."[42] He also envisaged savings in economic aid resulting from the treaty:

> With this protection afforded by the Atlantic Pact, western Europe can breathe easier again. It can plan its future with renewed hope. New business enterprises, increased trade, and planning for long-range recovery should be the direct results.
>
> The treaty is thus a logical and necessary complement to the recovery program. Through it we shall protect our past and future investments in that famous calculated risk [the European Recovery Program] which already has paid remarkable dividends. We might even look forward to the time when we can anticipate rather substantial savings in our ECA [Economic Cooperation Administration] expenditures, once the full impact of the treaty has been felt in Europe.[43]

In the beginning of NATO the United States felt that the principle of common defense inherent in the treaty would have to take the form of an integrated defense with a division of responsibilities among the nations.[44] The idea was that the nations of Western Europe could no longer maintain complete, balanced defense establishments on an individual basis. Each would specialize in the kinds of forces and the production of weapons for which it

was best suited and which would best fit into a pattern of integrated defense.

Secretary Acheson, in a statement to the Senate Committees on Foreign Relations and Armed Services on 8 August 1949, expressed the view that savings would accrue from this division of responsibilities:

> The practical application of this principle will ultimately bring into being a defensive strength far more effective than the sum total of what the member countries might be able to achieve individually, and at a considerable over-all saving. This concept is of particular interest to the United States as promising not only a revitalized defense force for western Europe but also one which the Europeans in time can support without further direct assistance from us.[45]

In an address to the NATO Parliamentarians' Conference in New York on 4 October 1965, NATO Secretary General Manlio Brosio said:

> In the western world, it is universally accepted by the allied governments that the Atlantic Alliance is today as necessary as ever. At the same time, all of us are agreed that the world has changed since 1949, and that the alliance may have to change with it, though here, of course, is where the divergencies start, . . .[46]

Any American contemplating the future of NATO would do well to consider the original concept which his country had of this organization.

Air War College

Notes

1. U.S., Congress, House Concurrent Resolution 25, *Participation in World Peace,* (Fulbright Resolution), *Congressional Record,* 78th Cong., 1st Sess., 21 September 1943, LXXXIX, Part 6, 7706.
2. U.S., Congress, Senate Resolution 192, *Collaboration for Post-War Peace,* (Connally Resolution), declaratory of war and peace aims of the United States, *Congressional Record,* 78th Cong., 1st Sess., 5 November 1943, LXXXIX, Part 7, 9222.
3. Harry S Truman, "Restatement of Foreign Policy of the United States," address delivered in Central Park, New York City, on 27 October 1945, *Department of State Bulletin,* XIII, 331 (28 October 1945), 655.
4. Harry S Truman, *Memoirs,* Vol. I, *Year of Decisions* (Garden City, New York: Doubleday & Company, Inc., 1955), p. 516.
5. Margaret Ball, *NATO and the European Union Movement* (New York: Frederick A. Praeger, Inc., 1959), pp. 9-11.
6. Harry S Truman, address to a Joint Session of the House and Senate, *Congressional Record,* 80th Cong., 2d Sess., 17 March 1948, XCIV, Part 3, 2997.
7. U.S., Congress, House, Committee on Foreign Affairs, *Hearings on H.R. 5748 and H.R. 5895, Mutual Defense Assistance Act of 1949,* 81st Cong., 1st Sess., 28 and 29 July, and 1, 2, 5, and 8 August 1949, p. 74. Hereafter cited as MDAA Hearings. Secretary of State Dean Acheson, in a 7 April 1949 report to the President on the North Atlantic Treaty, stated: "In establishing it [the Brussels Pact], they repeatedly advised us that, despite their determination to do their utmost in self-defense, their collective strength might be inadequate to preserve peace or insure their national survival unless the great power and influence of the United States and other free nations were also brought into association with them." *Department of State Bulletin,* XX, 512 (24 April 1949), 532. However, Secretary Marshall's comment and President Truman's memoirs invite the inference that, while Secretary Acheson's statement may be true, the United States did not then (in early 1948) encourage the European nations to believe that it had made its decision to associate formally with them.
8. *International Peace and Security Through the United Nations,* S.R. 239 (Vandenberg Resolution), *Congressional Record,* 80th Cong., 2d Sess., 11 June 1948, XCIV, Part 6, 7791.
9. Harry S Truman, "Inaugural Address of the President," delivered on 20 January 1949, *Department of State Bulletin,* XX, 500 (30 January 1949), 124.
10. Charles E. Bohlen, "The North Atlantic Pact: A Historic Step in the Development of American Foreign Relations," address before the *Philadelphia Bulletin* Forum on 23 March 1949, *Department of State Bulletin,* XX, 509 (3 April 1949), 430.
11. Harry S Truman, message transmitting the North Atlantic Treaty to the Senate, 12 April 1949, *Department of State Bulletin,* XX, 514 (8 May 1949), 599.
12. Dean Acheson, "The Meaning of the North Atlantic Pact," address delivered on 18 March 1949 over the combined networks of the Columbia and Mutual Broadcasting Systems, *Department of State Bulletin,* XX, 508 (27 March 1949), 385.
13. MDAA Hearings, p. 45. See also "The U.S. Military Assistance Program," *Department of State Bulletin,* XX, 516 (22 May 1949), 645.
14. Tom Connally, speech to the Senate on the North Atlantic Treaty, *Congressional Record,* 81st Cong., 1st Sess., 5 July 1949, XCV, Part 7, 8818. See also *Military Assistance Program,* Joint Hearings before the Committee on Foreign Relations and the Committee on Armed Services, United States Senate, 81st Cong., 1st Sess., on S. 2388, 8, 9, 10, 11, 17, 18, and 19 August 1949, Washington, GPO, 1949, p. 125, for response by Honorable W. Averell Harriman, United States Special Representative in Europe for the Economic Cooperation Administration (ECA), to question from Senator H. Alexander Smith on this subject. Hereafter cited as MAP Hearings.
15. *Ibid.*
16. MAP Hearings, p. 646; Bohlen, p. 430; Charles E. Bohlen, "The American Course in Foreign Affairs," address made before the New York State Bar Association in New York City on 28 January 1949, *Department of State Bulletin,* XX, 501 (6 February 1949), 159.
17. Truman, "Inaugural Address of the President," pp. 124–25. Subparagraph (4) of the Vandenberg Resolution uses the following language in this regard: "Contributing to the maintenance of peace by making clear its determination to exercise the right of individual or collective self-defense under article 51 should any armed attack occur affecting its national security." Quoted from Senate Document No. 48, *North Atlantic Treaty,* documents relating to, 81st Cong., 1st Sess., Washington, GPO, 1949, p. 88.
18. MDAA Hearings, p. 16.
19. Connally, p. 8818.
20. *North Atlantic Treaty,* Senate Executive Report No. 8, Report of the Committee on Foreign Relations, 81st Cong., 1st Sess., Washington, GPO, 1949, pp. 7 and 27. Hereafter cited as Senate Executive Report No. 8. See also Ambassador Warren R. Austin, "U.S. Answers Soviet Charges Against North Atlantic Treaty," statement made before the plenary session of the United Nations General Assembly in New York City on 14 April 1949, *Department of State Bulletin,* XX, 513 (1 May 1949), 554.
21. *Department of State Bulletin,* XX, 514 (8 May 1949), 600.
22. Senate Executive Report No. 8, p. 27.
23. Acheson, *Department of State Bulletin,* XX, 512 (24 April 1949), 532.

24. Connally, pp. 8816–17.
25. *Department of State Bulletin,* XX, 513 (1 May 1949), 552.
26. *Department of State Bulletin,* XX, 501 (6 February 1949), 160.
27. Warren R. Austin, "The Proposed North Atlantic Pact," excerpt from an address made before the Vermont Historical Society on 24 February 1949, *Department of State Bulletin,* XX, 505 (6 March 1949), 299.
28. Senate Executive Report No. 8, p. 27.
29. In an address made before the Final Plenary Session of the United Nations Conference on International Organization at San Francisco on 26 June 1945, *Department of State Bulletin,* XIII, 314 (1 July 1945), 4.
30. MDAA Hearings, p. 25.
31. Harry S Truman, *Memoirs,* Vol. II, *Years of Trial and Hope* (Garden City, New York: Doubleday & Company, Inc., 1956), p. 110.
32. *Ibid.,* p. 113.
33. In spite of the tremendous amount of prior work and planning that had to be done by the European nations and then by the Administration, the Foreign Assistance Act of 1948 was sent to the Congress on 19 December 1947 and was signed into law on 3 April 1948.
34. *Congressional Record,* 80th Cong., 2d Sess., 17 March 1948, XCIV, Part 3, 2997.
35. Truman, *Years of Trial and Hope,* p. 248. At the signing of the North Atlantic Treaty on 4 April 1949, President Truman said in this regard: "We are determined to work together to provide better lives for our people without sacrificing our common ideals of justice and human worth. But we cannot succeed if our people are haunted by the constant fear of aggression, and burdened by the cost of preparing their nations individually against attack." *Department of State Bulletin,* XX, 511 (17 April 1949), 482.
36. MAP Hearings, p. 6.
37. Senate Executive Report No. 8, p. 28.
38. *Congressional Record,* 81st Cong., 1st Sess., 6 July 1949, XCV, Part 7, 8893.
39. Dean Acheson, "ERP Gives New Faith in Vitality of Democratic System," statement made before the Senate Committee on Foreign Relations and the House Committee on Foreign Affairs on 8 February 1949, *Department of State Bulletin,* XX, 503 (20 February 1949), 234.
40. Senate Executive Report No. 8, p. 25.
41. *Ibid.,* p. 10.
42. Connally, p. 8814.
43. *Ibid.,* p. 8818.
44. The envisioned division of responsibilities was outlined by General Omar N. Bradley, Chief of Staff, United States Army, in a statement to the House Committee on Foreign Affairs on 29 July 1949 (MDAA Hearings, p. 71):

> First, the United States will be charged with the strategic bombing. We have repeatedly recognized in this country that the first priority of the joint defense is our ability to deliver the atomic bomb.
>
> Second, the United States Navy and the Western Union naval powers will conduct essential naval operations, including keeping the sea lanes clear. The Western Union and other nations will maintain their own harbor and coastal defense.
>
> Third, we recognize that the hard core of the ground power in being will come from Europe, aided by other countries as they can mobilize.
>
> Fourth, England, France, and the closer countries will have the bulk of the short-range attack bombardment, and air defense. We, of course, will maintain the tactical air force for our own ground and naval forces, and United States defense.
>
> Fifth, other nations, depending upon their proximity or remoteness from the possible scene of conflict, will emphasize appropriate specific missions.

45. MAP Hearings, p. 8.
46. *Congressional Record,* 89th Cong., 1st Sess., 21 October 1965, CXI, 197, p. 27105.

SYSTEMS ANALYSIS AND COUNTER-INSURGENCY

Major Joseph P. Martino

THE TERM "counterinsurgency," although of fairly recent coinage, has already become a much-used one. Considerable attention is being paid to the problems of counterinsurgency. By now almost everyone knows that "military victory is not enough." In addition to defeating the insurgents, we must "win the hearts and minds of the people," through programs designed to ease their lot.

It is at this point that an old familiar problem again presents itself. Our resources are not unlimited. We must use those we do have to pursue the most essential and promising of the possible military and nonmilitary programs. The problem considered here is that of allocation of resources: how much to spend on each program to achieve the greatest result.

The allocation of resources is a familiar problem in design and procurement of weapon systems. Consider, for instance, the procurement of an air defense system with a fixed budget. The system consists of ground-based radars and interceptor aircraft. We must be sure to purchase the right mix of interceptors and radars. Too much of one and not enough of the other will mean having a system whose performance is not as good as the performance that could have been obtained, *at the same cost*, with the optimum mix. The techniques of systems analysis are widely used for answering such questions.

Similarly, in allocating resources to counterinsurgency efforts, we must ensure that we do not end up with too much of one thing at the expense of a shortage of something else. We should use systems analysis to ensure that our resources are allocated in an optimum manner. Before trying to apply systems analysis to the problems of counterinsurgency, however, we must be clear on what system it is we are trying to analyze.

The thesis of this article is that the country in which a counterinsurgency effort is to be made must be considered as an *ecological system*. The system we wish to consider is that consisting of the people, their physical and biological environment, and the interrelationships between the people and between the people and their environment. This is clearly no easy task. To illustrate the approach, we will resort to a hypothetical example.

The analysis series that began in our January–February 1966 issue continues in this issue with Major Joseph P. Martino's article illustrating how the techniques of systems analysis can be applied to the conduct of counterinsurgency operations. The point of view is not restricted to military operations; it encompasses economic, social, military, and political matters. Basic to the article is the assumption that the interaction of these elements constitutes a system. Using a hypothetical country, the author describes how the elements can be related quantitatively to solve the specific problem of allocation of resources.

East Emergia

Let us consider the country of East Emergia. It is a former colony of a European country, and it gained its independence in the years after World War II. It is a tropical country with an area of 120,000 square miles. It is bordered by the sea on the east and south. There are 70,000 square miles of coastal plain and river delta on the east and south. The northwest portion of the country is highland, with an area of 50,000 square miles. Population density in the lowlands is 208 people per square mile; in the highlands it is 50 people per square mile. Total population is 17.1 million people. The capital is Groongtape, which is also the country's only major seaport, located at the mouth of the largest of the country's three major rivers. Groongtape is the origin of a sketchy system of all-weather highways which penetrates to the interior of the country and goes all the way to the northern and western borders. The country has a total of 1420 miles

of all-weather road, outside the major cities. This road net can be considered to serve about 4 million of the citizens of East Emergia. The remainder are served only by cart tracks, which are passable only in dry weather. The country has three recognizable seasons: a rainy season from June through September, a cool dry season from October through December, and a hot dry season January through May.

To keep the illustration simple, we will consider a highly aggregated and simplified model of a village in the delta country, well away from any all-weather roads. This village is almost completely self-contained and has very little contact with the outside.

To start with, the village consists of people. The distribution of people by age in the village is shown in Table I. It will be assumed

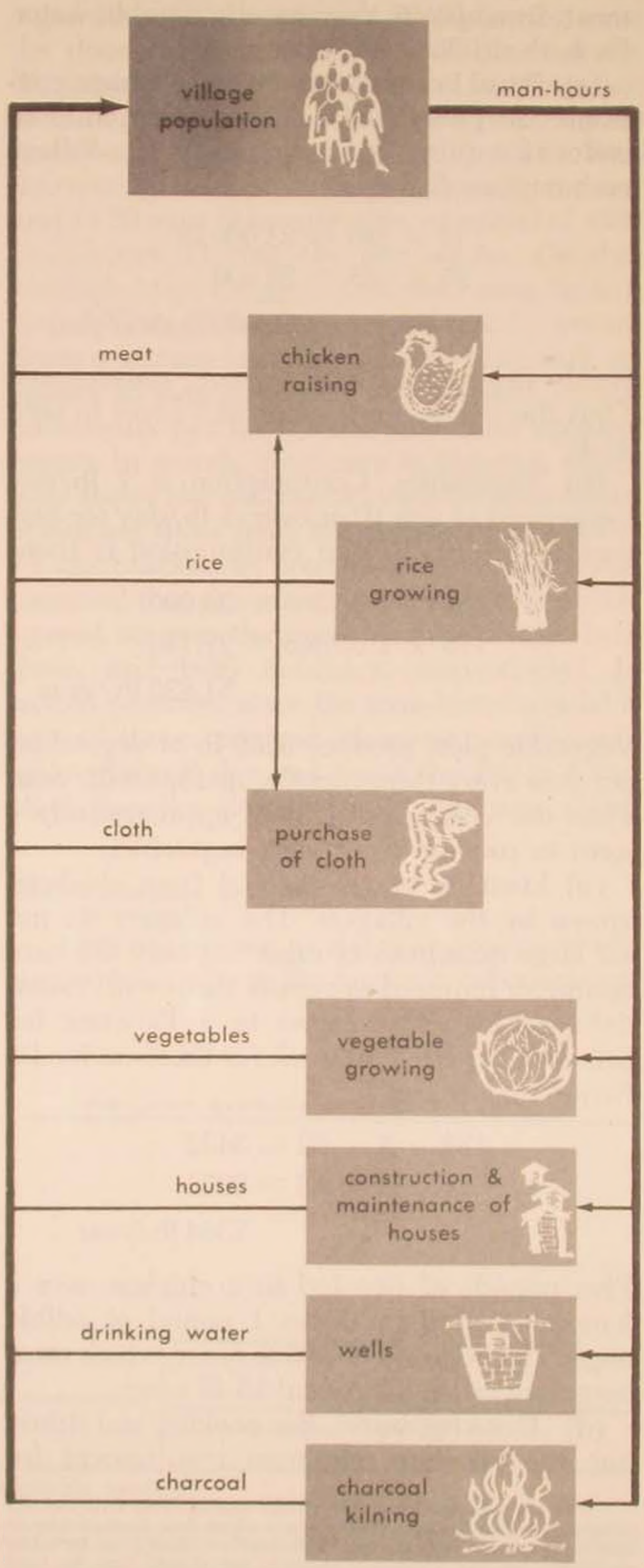
Table I. Distribution of Villagers by Age

Age Bracket	*Number of People*
0 - 4	82
5 - 9	50
10 - 14	27
15 - 19	18
20 - 24	12
25 - 29	6
30 - 34	4
35 - 39	2
40 - 44	2
45 - 49	2
50 - 54	2
55 - 59	1
	208

that the population between 15 and 54 years of age is evenly divided between men and women and that the one person over 55 is a man.

These people do not exist in a vacuum. They require food, clothing, and shelter. They must obtain these essentials from their immediate environment. To get these essentials, they must apply man-hours of labor. Figure 1 shows schematically that the output of the village population in man-hours of labor returns as input to the village population in food, clothing, and shelter. The boxes indicating transformation of man-hours into essentials do have definite input-output relationships

Figure 1. Input-output model of East Emergian village



(even though they are not black boxes or filled with electronics). We will examine these relationships.*

The villagers eat rice, vegetables, and meat. In addition, they require potable water, for both drinking and cooking.

(a) Rice. Persons over 10 years of age consume 525 pounds of rice per year; children under 10 require 250 lb of rice per year. Village consumption is then:

$$\begin{aligned} 132 \times 250 &= 33{,}000 \text{ lb} \\ 76 \times 525 &= \underline{39{,}900} \\ & \quad 72{,}900 \text{ lb rice/year} \end{aligned}$$

Paddy fields yield 2000 lb/acre, unfertilized. Thus the village must plant 36.5 acres to feed itself.

(b) Vegetables. Consumption is 1 lb/day for persons of age 10 or over, ½ lb/day for persons under 10. Village consumption is then:

$$\begin{aligned} 132 \times \tfrac{1}{2} \times 365 &= 24{,}090 \\ 76 \times 1 \times 365 &= \underline{27{,}740} \\ & \quad 51{,}830 \text{ lb/year} \end{aligned}$$

Vegetable plots produce 3250 lb of vegetables per acre every three months, or 13,000 lb/year. Thus the village must plant approximately 4 acres to provide itself with vegetables.

(c) Meat. Meat is obtained from chickens grown by the villagers. The villagers do not eat large quantities of meat but only the bare minimum required to supply them with essential proteins. This comes to 1 lb/week for persons over 10, ½ lb/week for those under 10. Requirements are:

$$\begin{aligned} 132 \times \tfrac{1}{2} \times 52 &= 3432 \\ 76 \times 1 \times 52 &= \underline{3952} \\ & \quad 7384 \text{ lb/year} \end{aligned}$$

Five pounds of rice fed to a chicken over a 3-month period produces 1 pound of edible meat. This requires 36,900 lb/year, which must be grown on an additional 18.45 acres.

(d) Drinking water. For cooking and drinking, the absolute minimum requirement for water is 60 gallons/day. Thus the village wells must produce this much, even during the dry season. During the rainy season, the well flow is greater and is supplemented by rainwater.

Cooking food requires charcoal. Annual consumption is 5000 pounds of charcoal. The annual growth of hardwood on one acre of woodlot produces 2500 lb of charcoal, after kilning. Thus the village requires two acres of woodlot to produce its charcoal.

Shelter for the village consists of 25 houses each containing 150 cu ft of bamboo. Houses last on the average five years before requiring rebuilding. Thus the annual consumption of building material is 750 cu ft. One acre of the proper kind of bamboo will produce 250 cu ft/year. Thus the village requires three acres devoted to growing bamboo for building material.

Clothing for the villagers is made from cotton cloth, which is bought from an itinerant peddler who comes through by oxcart once a year during the dry season. The requirement is two square yards per year for persons under 10, six square yards per year for persons over 10. This totals:

$$\begin{aligned} 132 \times 2 &= 264 \\ 76 \times 6 &= \underline{456} \\ & \quad 720 \text{ sq yd/year} \end{aligned}$$

Rice is traded for cloth at the rate of 4 pounds for one square yard. Thus the village must grow an additional 2880 pounds of rice per year, on an additional 1.44 acres.

Total acreage in rice, for all purposes, comes to approximately 57 acres. Vegetables require 4 acres, wood for charcoal requires 2, and building material 3. Total area of the village, including pathways and residential use, is about 75 acres. The village population of 208 persons is equal to the average population per square mile. Thus villages in the delta are about one mile apart and are separated by large stretches of unused land. There will be some contact with neighboring villages, perhaps on holidays, but no significant contacts beyond the immediately neighboring villages, since there are no roads, only cart tracks that are passable only in dry weather.

Having examined the output of the sub-

*In the examination of the village model, some hypothetical numbers will be used. While some effort has been made to ensure that these numbers are realistic, they should not be taken as typical for any particular country, nor should they be used in any analysis other than hypothetical.

systems by which man-hours are transformed to necessities, we will now look at the input to these subsystems: the man-hour output of the villagers.

Each villager requires 8 hours' sleep per day and an additional 4 hours for personal necessities. The remaining 12 hours are available for work or leisure. Women in the age bracket 15 to 34 average only 75 percent of the effectiveness for heavy work of men of the same age, because of pregnancies, care of infants, preparation of meals, etc. Thus the adult man-hours available for heavy work outside the home are:

women aged 15–34	$20 \times 12 \times .75$	$= 180$
women 35 and older	4×12	$= 48$
men 15 and older	25×12	$= 300$
total man-hours/day		528

Children aged 10 to 14 are assumed to be able to do light farm work at 50 percent of the effectiveness of an adult male, but they are not able to do such heavy work as rice planting, rice harvesting, or irrigating.

In the material which follows, we will ignore time spent in repair of houses, hauling drinking water, making charcoal, and care of chickens. Time consumed in these activities is assumed to be negligible by comparison with the activities which we will consider.

Vegetable tending requires 25 man-hours per day per acre, or 100 man-hours per day. This can be done by children aged 10 to 14, if necessary. Tending growing rice requires 120 man-hours per day during the rice-growing season. This work can also be done by children aged 10 to 14, if necessary. Rice planting must be done during the period 1–15 June, at the beginning of the rainy season. Planting one acre requires 120 man-hours, or a total of 6840 man-hours required to plant 57 acres. Rice harvesting is done during February and requires 80 man-hours per acre, or a total of 4560 man-hours. During the dry season, October through May, the vegetable plots must be irrigated. Water is hauled in stone jars, by oxcart, from a stream near the village. This work requires 25 man-hours per day per acre, or 100 man-hours per day. These man-hour requirements, by month, are shown in Figure 2, which also shows the maximum available man-hours, including those from the children in the 10 to 14 age bracket. In preparing the figure, it was assumed that rice planting and harvesting were spread out over the available time period (1–15 June, and 1–28 February, respectively). In actual practice, since the man-hours available exceed those required, everyone would probably work all day and finish the job in fewer days than the climate would otherwise allow.

East Emergia's growing needs

We have now a model of an ecological system which, as far as the human components are

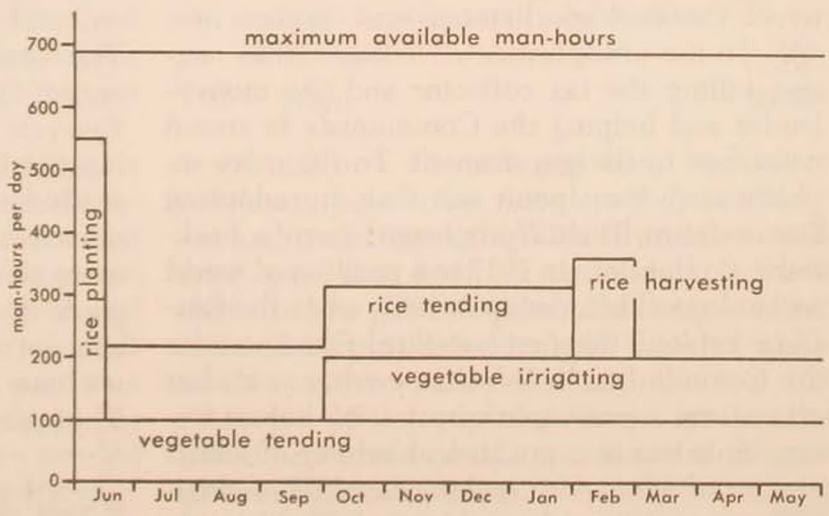


Figure 2. Man-hours required by farming activities

concerned, is almost completely self-contained (a complete model, including the monsoon rains, would have to include the earth and sun as well). Viewed as a system, it passes the acid test: that of survival and continued existence. The village has been on its present site for well over a century; its population has remained essentially constant during that time and has never been in danger of starvation. The system works.

However, by Western standards, the system does not work very well. Although the villagers have as much of the bare essentials as they need, they have little else. Health conditions are abysmal: out of every 16 children born, fewer than 3 live to the age of 15. Until a decade or so ago, the villagers were reasonably content with their lot. Life was hard, but they had nothing else to compare it with. Now, however, things are changing. The people are beginning to realize that they do not have to live that way. Despite their isolation, word of the outside world does filter in. Stories about the wonders outside are brought in by peddlers, by monks on pilgrimage, and by word of mouth from one village to the next. The villagers may not have a clear picture of the outside world, but they realize there is a better way of life out there, and they want their share of it.

The Communists offer a simple solution: tear apart the social and political fabric of the nation, smash the economic machinery, and rebuild a new world on the ruins. In the terms we have been using, the Communists wish to wreck this ecological system and create a new one. To the unsophisticated villager, they suggest killing the tax collector and the moneylender and helping the Communists in armed resistance to the government. To the more sophisticated, they point out that, by adopting Communism, Russia progressed from a backward, feudal state in 1917 to a position of world technological leadership in 1957, when the Russians orbited the first satellite. China, under the Communists, in less than twenty years has come from a position of prostration before foreign invaders to a position as arbiter of affairs in most of Asia and is making rapid technological progress, as evidenced by its being the only Asian nation to possess nuclear weapons.* Their siren song is that, by adopting Communism, the East Emergians too can have the good things of life that they have been hearing about.

And our East Emergian villagers have been hearing the Communists' story. Infiltrators from across the border in West Emergia, which is a Communist satellite, have been visiting the village. They have been pointing out that the government does nothing for them. There are no roads, no schools, no doctors. The laws are not enforced, the people are not protected against criminal gangs that rustle their water buffalo and steal their rice. The only contact they have with the government is a tax collector who comes through the village every two or three years and tries to squeeze some rice out of them. It is not a question of undermining the loyalty of the villagers to the government; as far as they are concerned, there is no government for them to be loyal to.

The loyalty of the villagers is the prize for which the Communists and the government will compete. If the government is not to let their loyalty go by default to the Communists, it must start acting like a government. It must have access to the villagers, which means building roads. It must enforce the laws and punish lawbreakers. It must adjudicate civil disputes among its citizens. It must provide public services such as schools. It must demonstrate that it is acting to raise the living standards of the citizens.

The government of East Emergia cannot do all these things out of its own resources. It will call upon the United States for assistance. The United States has no particular stake in seeing that the present government of East Emergia is perpetuated in office. After all, it has not been a very good government. But we really have only two alternatives: throw it out ourselves and replace it with a government more to our liking or see the Communists replace it with one to their liking. However, we can not afford to let the second happen, and we have chosen not to take the first alternative. Thus we have no choice but to support the

*The reader may not agree with this Communist evaluation of world affairs, but it sounds awfully impressive to the East Emergian.

present government, attempting simultaneously to improve it. In the words of Dr. R. N. Hazelwood, Chief Scientist of U.S. Strike Command, our approach is "to support the host country in building its economic, social, political, military and police establishments into a viable nation." Furthermore, according to Dr. Hazelwood, the real problem in an emerging nation is "to find ways of resolving the conflict between the haves and the have nots while building a viable country."[1]

Since we have eschewed the Communist approach of tearing the system apart and starting over, we must take the approach of trying to *improve* the system *while it continues to function.* This places three major requirements on our assistance. First, anything we do must be a genuine improvement, after all its ramifications and side effects are taken into account. Second, even the improvements must be implemented in such a way that they do not disrupt the functioning of the ecological system which is the country. Finally, since our resources are limited, we must apply them in the most effective fashion. In the current jargon, this means that of all the improvements which we might make, we must select those which have the greatest "cost effectiveness."

systems analysis applied to East Emergia

We now see the significance of the systems approach. Having viewed the nation as an ecological system, we can use the techniques of systems analysis to manipulate the model, to see what effect our actions will have and which actions will achieve the desired results at minimum cost, or achieve most results at a given cost.

Our model of a village in East Emergia is already rich enough to allow considerable investigation. We might, for example, determine how many full-time insurgents the village can contribute and still be able to feed itself *and them.* We might examine the number of adult male man-hours available for use in part-time insurgency. However, we will investigate the minimum-cost allocation of resources needed to suppress insurgency in a prescribed area.

We will consider an area 100 miles square. This will contain 10,000 typical villages, of the kind we have modeled, and a total population of 2,080,000 people. The first requirement for this area is that the government build all-weather roads into it. Without these roads, the government really has no access to the area. Ten miles is about the greatest distance one can go by oxcart, have enough time to transact some business or do some shopping, and still make it back home in the same day. A longer trip by oxcart means remaining away from home at least one night, and so it becomes a major expedition. Thus the maximum distance that a village should be from one of these roads is 10 miles. Five hundred miles of road, properly arrayed, will bring each village in the area within 10 miles of a road. The road-building cost will come from U.S. foreign aid. Once the government has access to the area, it must provide various services. If the system we are working to obtain is to be viable, it must be capable of supporting itself. This means that the people in the area served must be able to pay for the new services out of taxes, without a cut in living standards. Services provided and the yearly cost *per village* are as follows:

1 schoolteacher, at $300/year	$300
1 judge, at $400/year, serving 20 villages	20
maintenance of roads, at $1000/mile/year, and .05 mile/village	50
reimbursement to village chief for acting as policeman and justice of the peace	50
Total	$420

Until now the villagers have had no incentive to grow more rice than they needed to eat and trade for cloth. With all-weather roads now open, they have access to markets where they can buy goods for cash. Furthermore, they can sell surplus rice for cash. Looking at the adult man-hours available and the fact that there is a 15-day planting season, we see that the village could plant a maximum of 66 acres of rice. This is 9 acres more than that now being planted. This extra acreage will bring in $900,

since rice sells at 5¢ per pound. Thus the villagers can afford to pay for their new services and still have some spendable cash income.

This is not the whole story, of course. The 100-mile-square area we are considering has 2500 West Emergian infiltrators in it. They are visiting the village, pointing out the inefficiencies and blunders of the government officials (who, after all, are human), and telling the villagers that even though they now have a road and a few luxuries they are still not living as well as the people whose pictures appear in the magazines that are reaching the village. In short, despite the investment the U.S. has made in roads, the U.S. and the East Emergian government are still not home free.

It is clear that there are still two requirements: Action must be taken to raise the villagers' standard of living further, and action must be taken to suppress the infiltrators and the insurgents they have recruited.

Examining the model of the village, we see that the most effective way of increasing income is to increase the productivity of rice growing. One way might be to establish agricultural experiment stations, to develop a better strain of rice. Another might be to build fertilizer factories. Agricultural experts might suggest yet other methods. One way of suppressing the insurgents might be to establish an "iron curtain" at the border to stop infiltration. Another might be to station troops in the area, troops who will engage vigorously in patrolling and who will visit the villages regularly to establish a government "presence." Other methods might also be suggested. A decision-maker will require the assistance of systems analysis in order to choose the proper mix of the "options." To illustrate the technique, we will consider the trade-off between building fertilizer factories and stationing troops in the area.

If a fertilizer plant were built, the villagers could borrow money to buy fertilizer and pay off the loan out of the extra income derived from the increased production. Each dollar invested in a fertilizer plant buys 10 pounds per year production capacity. Each pound of fertilizer applied to the land produces an additional 7 pounds of rice (up to 100 lb per acre, beyond which point no further increase results). Cost of fertilizer, including interest to the moneylender, is 10¢ per pound. So each dollar invested in a fertilizer plant produces an additional $2.50 increase in *net* rural annual income, after the fertilizer is paid for.

Stationing troops in the area will hamper the activities of the insurgents. The insurgents are now in the Communists' classical Phase One, that is, they are propagandizing the villagers and gathering recruits. The presence of troops will hinder their activities. Each soldier costs $200/year, including salary, mess, housing, uniform allowances, etc. This will be paid by taxes levied on the villages in the area. The initial investment in equipment for the troops, including weapons, vehicles, camp buildings, etc., comes to $300 per soldier. This will be paid for with U.S. aid funds.

We will assume that the U.S. has quit dividing its foreign aid money into the artificial categories of economic aid and military aid and that an aid dollar can be spent on whatever will be most effective. We are thus faced with a problem of resource allocation. How much money should be invested in building fertilizer plants, and how much should be invested in military equipment to be given to the East Emergians?

In considering the growth of the insurgent forces, we must consider both the rate at which the insurgents recruit new members and the rate at which insurgents are killed or captured by the troops. The insurgent recruiting rate increases with increasing numbers of insurgents: the more there are, the more villages they can visit in a given time. The insurgent recruiting rate decreases with increasing numbers of troops: the more troops there are hunting for each insurgent, the more time he has to spend in evasion and the less recruiting he can do. The insurgent recruiting rate decreases with increasing per capita income: the more money people have, the less dissatisfied they are with the government.

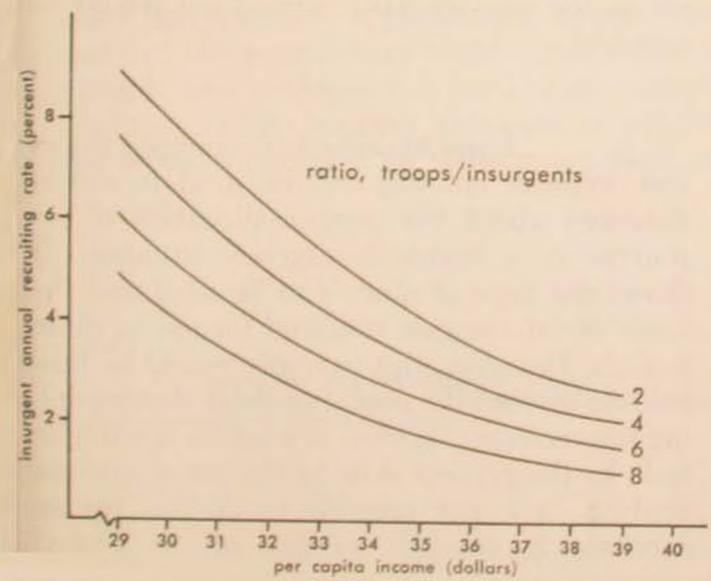
The insurgent loss rate increases with increasing per capita income: the better satisfied the people are with the government, the more intelligence information they will give the troops about the insurgents. The insurgent

losses increase with increasing numbers of troops: the more troops there are hunting for each insurgent, the more likely it is that some insurgents will be killed or captured and the more protection from insurgent terrorism the troops can give their informants. The insurgent losses also increase with increasing numbers of insurgents: the more there are, the more likely it is that some will be caught or killed.

These common-sense considerations still do not give any quantitative information about insurgent losses and gains. They do, however, indicate which factors ought to be important and the general relationship between these factors and the gain or loss rates. What we would like to have is a set of curves relating these factors. There is no theory that will tell us what these curves will look like. To determine what they are in a particular case, they must be measured (more properly, estimated) in the area in question. Intelligence data, as well as data from polls, surveys, and censuses, must be combined (by statistical methods which are beyond the scope of this article) to obtain the curves needed. For the area we are considering in East Emergia, these curves have been obtained and are shown as Figures 3 and 4.

Figure 3 gives the percentage of their initial force that the insurgents will recruit in one year, as a function of per capita income after taxes, for various ratios of troops to insurgents. Figure 4 gives the percentage of their initial force that the insurgents will lose in one year, as a result of government action, as a function of per capita income after taxes, for various ratios of troops to insurgents.

Figure 3. Insurgent gains



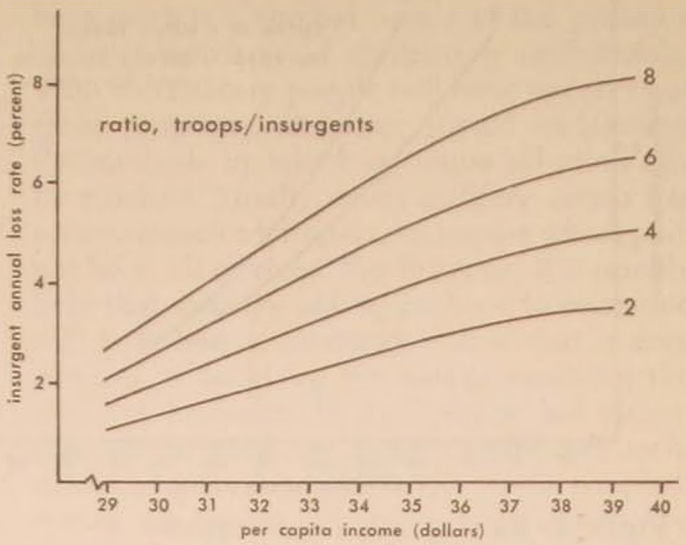


Figure 4. Insurgent losses

Comparing Figure 3 with Figure 4, we can see that for a given ratio of troops to insurgents there is some level of per capita income at which the insurgent recruiting rate is exactly balanced by the insurgent loss rate. For instance, with a ratio of troops to insurgents of 6, and a per capita income of $32.30 after taxes, the insurgents gain and lose 3.7% of their initial force in one year. Figure 5 shows the ratio of troops to insurgents at which gains exactly equal losses for the insurgents, as a function of per capita income. Curve *a* is for per capita income after taxes; curve *b* is for per capita income after the taxes to pay for the government services described above, but before taxes to pay the salaries of the troops involved in counterinsurgency action. For instance, at a troops/insurgents ratio of 6, per capita income before taxes must be $33.70, and the government will collect a per capita tax of $1.40 to pay for the troops.

A given ratio of troops/insurgents requires a certain investment of U.S. aid dollars in military equipment. In addition, the amount the U.S. must invest in fertilizer plants is deter-

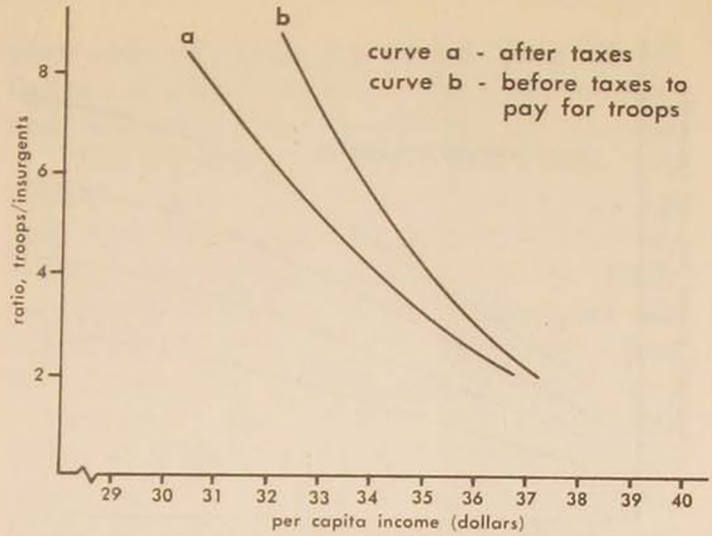
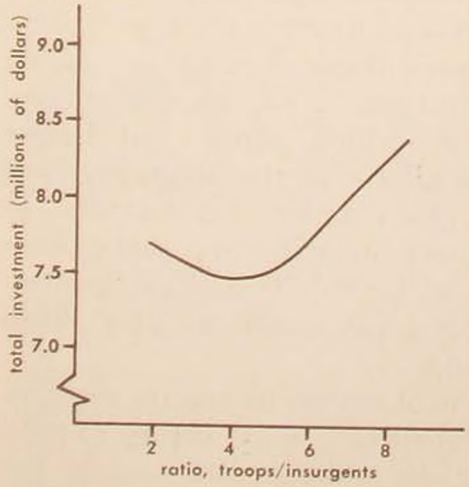


Figure 5. Ratio of troops to insurgents as a function of per capita income

mined from curve *b* of Figure 5, which shows the level of per capita income which must be achieved at a given ratio of troops to insurgents. Thus there is a trade-off: the greater the investment in troops, the smaller the required investment in fertilizer plants, and vice versa.

Figure 6 shows the sum of these two investments as a function of the ratio of troops to insurgents. The minimum investment occurs at a troops/insurgents ratio of 4, and the investment required is $7,460,000. At a ratio of 2, investment required is $7,700,000; at a ratio of 6, the investment required is $7,750,000. Thus

Figure 6. Total investment as a function of ratio of troops to insurgents



the optimum ratio of troops/insurgents is 4. Note that to obtain this curve it was necessary to use the present per capita income, which is $29.75 and which includes the rice consumed by the village, valued at its selling price.

It might appear that the savings from using the optimum troops/insurgents ratio of 4, as against a ratio of 2 ($240,000 or 3.21% savings), or against a ratio of 6 ($290,000 or 3.9% savings), are not particularly impressive. On the other hand, the flatness of the curve of Figure 6 indicates that the optimum is not particularly sensitive to errors in the data used; hence the decision-maker can make his choice with much greater confidence in its correctness. If the curve of Figure 6 showed a sharp minimum at some ratio of troops to insurgents, it would probably be necessary to go back and collect much more data to provide an adequate level of confidence in the results.

A condition in which the insurgents' gains and losses are equal may not be the most desirable state of affairs, but certainly it is the minimum acceptable condition. If some other situation is desired, such as an insurgent net loss rate of 10% per year, the optimum ratio of troops to insurgents can be computed in the same manner as above. In doing this, we must keep in mind that the action will be subject to a law of diminishing returns. It might be more effective to use the U.S. aid money for some totally different project in East Emergia or even in some other country. An analysis more complex in detail but the same in principle as the one we have carried out would be required.

THIS hypothetical example shows how systems analysis can be used to aid in decisions about the proper allocation of resources in a counterinsurgency situation. It shows the type of models to be used and the kinds of information required for use in those models. However, this example would be misleading if it led the reader to think that modeling the ecological system of a nation is a simple task. In the present state of the art of systems analysis, it is not possible to do this for an economy as complex as that of the United

States. Even in the case of the primitive economy of an emerging nation, it is not possible to prepare a *complete* model. However, because of the low level of technology in an emerging nation, the ecological system which *is* the nation is strongly constrained by the physical environment. This means that it is possible to construct models which are both simple enough to use and adequate to describe the situation with a satisfactory degree of accuracy. Systems analysis is not going to perform miracles for counterinsurgency any more than it does for any other type of problem. Because of the nature of the problems of counterinsurgency, however, systems analysis is both useful and necessary.

Granted for the present moment that systems analysis is essential to a proper solution of problems of counterinsurgency, it might be asked why military people should get involved. After all, we are not responsible for the whole program, or even a major share of it. Decisions on allocations of resources between military and economic aid are going to be made at political levels much higher than the military services. Yet there are a number of reasons why military people should concern themselves with this type of problem.

First of all, the primary U.S. government users of systems analysis during the last decade or two have been the military. We in the services have a large body of experience which can be brought to bear on the problem, experience which would be hard to match in any other government organization. Second, in many of the areas where counterinsurgency is going to be a problem, it is hard to get enough civilians, either because the area is remote and works a hardship on those going there or because it is a combat area and the presence of large numbers of civilians is undesirable. Thus the military people will have to carry out these programs, and they should understand the methods by which optimum solutions can be reached. Finally, every military action has some nonmilitary impact, an impact which may not be at all obvious. For instance, it is usually held that military aid, in contrast to economic aid, is at best a necessary evil in that it does nothing to build up the nation receiving the aid. Yet Professor D. L. Spencer has shown that military aid can have a significant technological and economic impact on the recipient nation, an impact which has been overlooked previously by both military and economic planners.[2] If we in the military do not understand these nonmilitary impacts of our actions, and if we do not insist that they be included in the analyses which lead to decisions on allocation of resources for counterinsurgency, then we cannot count on the other agencies involved to include them for us.

The conclusions of this article are simply stated. Systems analysis is essential to the solution of problems encountered in counterinsurgency. Military people can and should become involved in the analysis of these problems. Military people with experience in systems analysis should become concerned with the problems of counterinsurgency. Military people concerned with the problems of counterinsurgency should be aware of what systems analysis can do for them and should make use of it. Finally, research should be pushed vigorously to fill existing gaps in our knowledge about emerging nations and to advance the state of the art of systems analysis.

Air Force Office of Scientific Research

Notes

1. In "Revolution and Insurgency—A Challenge for Systems Research," speech to Florida Chapter, Society for General Systems Research, 18 November 1965.

2. In "An External Military Presence, Technological Transfer, and Structural Change," *Kyklos, International Review for Social Sciences*, Vol. XVIII, 1965, fasc. 3.

DRIFTING ICE STATIONS

First Lieutenant Charles L. Smith

THE ARCTIC OCEAN is one of the largest remaining unexplored areas in the world, comprising one twenty-third of the total area of all the oceans. Connected to the Pacific Ocean by the shallow and narrow Bering Strait and linked with the Atlantic Ocean by the Norwegian and Greenland seas, it is bounded by over one million miles of shoreline in small, ill-defined seas. Many rivers of the Eurasian land mass enter this ocean, but few flow into it from North America.

Throughout the year, approximately 75 percent of the Arctic Ocean's surface is covered by pack ice, composed mainly of ice floes. These floes average from 6 to 9 feet thick during the summer and 9 to 12 feet during the winter. Their surface is uneven because of pressure ridges and rafting or overriding of the floes. The other form of ice in the Arctic Ocean comes from a large ice shelf along the northern coast of Ellesmere Island. Pieces of this shelf break free in the form of large tabular icebergs up to 200 feet thick. They are called ice islands.

As recently as the early twentieth century, exploration of the arctic has been inhibited by the lack of proper vehicles to traverse the vast areas of ice and water. This technological deficiency affected not only the travels of explorers themselves but also the transport of food, supplies, and equipment necessary to sustain life in the harsh, inhospitable environment. In 1925 a breakthrough was made when an airplane made a successful landing on pack ice. This event ushered in one of the most interesting eras in the history of exploration. The airplane provided the means for the establishment and maintenance of scientific stations on the drifting ice.

Much of the early information about the Arctic Ocean was acquired from ships frozen into the ice and drifting with the pack. One such ship was the *Fram,* which left Norway in 1893 for the Arctic Ocean. The captain of the *Fram,* Fridtjof Nansen, had her built to withstand the pressure of the ice pack and hoped to prove his theory that the currents of the ocean passed close to the North Pole. Depth soundings taken from the *Fram* revealed that the Arctic Ocean was deeper than had previously been thought, and the course of drift indicated that the currents in the region where the drift began do not pass close to the North Pole.

The first recorded drifting ice station was established in 1918 by Storker Storkerson when his party occupied a section of ice about 190 miles north of Alaska. It is now believed that the 7-by-15-mile piece of drifting ice may have been an ice island. The station was in operation for 6 months and drifted about 440 miles. It was evacuated in late 1918 when Storkerson became ill.

Soviet ice stations

In 1934 an event occurred which was to have an important bearing upon the development of drifting ice stations. The Soviet passenger ship *Chelyuskin* was trapped in the pack ice north of the Soviet Union in late 1933. On 13 February 1934 the ship was crushed by ice pressure and sank. The 103 passengers and crew members, including women and children, were able to establish a camp on the surrounding ice floes. The last survivor of the *Chelyuskin* was evacuated from the ice by aircraft two months later. This first mass airlift in the arctic was significant for transportation techniques later used in support of arctic research.

The fate of the *Chelyuskin* made the Soviets realize the need for additional data regarding the ice, meteorology, and hydrology of the Arctic Ocean, in order to operate the Northern Sea Route successfully. In May 1937 they established a drifting ice station called *Severny Polyus* or North Pole, to collect the necessary information. Because of World War II the second Soviet drifting ice station, North Pole-2, was not placed in operation until 1950. They have established a total of 14 stations, each with the name North Pole and a numerical suffix. Since 1954 the Soviets have maintained or tried to maintain two stations in operation at the same time. Only one of the 14 stations was on an ice island, North Pole-6. This station lasted longer than any other Soviet station, 1243 days, and drifted farther.

Because it was on more stable ice, North Pole-6 did not encounter some of the problems experienced at the other stations. Ice pressure


ARCTIC OCEAN
Alaska
Bering Strait
Wrangel Island
Chukchi Sea
East Siberian Sea
U.
S.
S.
Laptev Sea
New Siberian Islands
Beaufort Sea
Severnaya Zemlya
Kara Sea
North Pole
Franz Josef Land
Novaya
ELLESMERE ISLAND
Spitsbergen
Greenland Sea
GREENLAND
Baffin Bay
Norwegian Sea
NP-1
NP-2
NP-3
NP-4
NP-5
NP-6
NP-7
NP-8
NP-9
NP-10
NP-11
NP-12
NP-13
NP-14
180°
85°
80°
75°
70°
Scale
0 300 600 miles

Station	Dates of Operation	Position At Establishment	Floe Size At Establishment	Floe Thickness	Crew Size	Position At Abandonment	Floe Size At Abandonment	Total Drift	Straight Line Drift	Rate of Drift
North Pole-1	May 21, 1937 Feb. 19, 1938	89° 25′ N 78° 40′ W	2.5 by 1.2 miles	10 feet	4	70° 48′ N 19° 48′ W	150 by 100 feet	1273 miles	1086 miles	4.6 mi. per day
North Pole-2	March 31, 1950 April 9, 1951	76° 03′ N 166° 30′ W	several square miles	10 feet	16-11	81° 45′ N 162° 20′ W	131 by 230 feet	1615 miles	400 miles	4.3 mi. per day
North Pole-3	April 9, 1954 April 20, 1955	86° N 75° 45′ W	1.8 by 1.2 miles	9.5 feet	22	86° 00′ N 31° 45′ W	N/A*	1156 miles	512 miles	3.1 mi. per day
North Pole-4	April 8, 1954 April 20, 1957	75° 48′ N 175° 25′ W	2.7 square miles	9 feet	20	85° 53′ N 0° 00′	.04 square miles	43275 miles	1311 miles	3.9 mi. per day
North Pole-5	April 21, 1955 Oct. 8, 1956	82° 10′ N 156° 51′ E	N/A	N/A	N/A	85° 18′ N 63° 20′ E	N/A	2347 miles	671 miles	4.4 mi. per day
North Pole-6**	April 19, 1956 Sept. 14, 1959	74° 24′ N 177° 04′ W	9.17 by 5.15 miles	30-40 feet	25	82° 06′ N 3° 56′ E	N/A	5371 miles	1809 miles	4.3 mi. per day
North Pole-7	April 23, 1957 April 11, 1959	82° 06′ N 164° 11′ W	1.4 by 1.5 miles	7-20 feet	15-17	85° 14′ N 33° 03′ W	.4 square miles	2186 miles	770 miles	3.0 mi. per day
North Pole-8	April 15, 1959 March 19, 1962	75° 42′ N 163° 10′ W	4.5 miles in diameter	N/A	17	83° 13′ N 132° 37′ W	N/A	1891 miles	621 miles	1.7 mi. per day
North Pole-9	April 16, 1960 May 16, 1961	77° 15′ N 163° 35′ E	1.8 by 1.1 miles	6-10 feet	N/A	86° 36′ N 176° 00′ W	N/A	1561 miles	789 miles	3.7 mi. per day
North Pole-10	Oct. 17, 1961 April 30, 1964	75° 27′ N 177° 10′ E	N/A	10 feet	14	88° 30′ N 115° 00′ E	N/A	3274 miles	991 miles	3.6 mi. per day
North Pole-11	April 17, 1962 April 20, 1963	77° 15′ N 167° 00′ W	N/A	N/A	N/A	81° 08′ N 139° 18′ W	N/A	1191 miles	420 miles	3.3 mi. per day
North Pole-12	May 1, 1963 April 28, 1965	76° 30′ N 165° 00′ W	N/A	N/A	10	81° 20′ N 146° 00′ W	N/A	N/A	N/A	N/A
North Pole-13	April 15, 1965 continuing	73° 53′ N 166° 17′ W	N/A	N/A	20	still in operation	N/A	N/A	still in operation	N/A
North Pole-14	May 1, 1965 continuing	74° 43′ N 175° 05′ W	N/A	N/A	N/A	still in operation	N/A	N/A	still in operation	N/A

*not available
**ice island

Soviet drifting ice stations

proved to be one of the most common problems at the stations. It caused many of the ice floes to fracture and split and was one of the primary reasons for abandoning the stations. North Pole-8 was reported to have fractured 22 times in one year, and North Pole-5 fractured 111 times in a period of 536 days. Fracturing also forced some crews to relocate their camp sites and hindered the evacuation of two stations. One problem common to all the stations was that the melting ice during the summer made the surface slushy and difficult to walk upon. On numerous occasions the camps had to be moved because the tents and huts protected a portion of the ice floe and created pillar-like structures under the buildings. The radio antenna at station North Pole-2 fell down because the supporting wires would not stay anchored in the melting ice.

If a Soviet drifting ice station survived the forces within the ice pack and appeared to be leaving the Arctic Ocean through the Greenland Sea, the decision was made to evacuate it. This happened with North Pole-1, 5, 6, and 7. North Pole-7 was abandoned north of Greenland in 1959 and was sighted in 1961 off the eastern coast of Baffin Island, a distance of 1200 miles from where it was abandoned. A team of Canadian scientists visited the station and observed that approximately 14 feet of ice had melted from the surface of the floe since its establishment in 1957. The scientists found a hut, food, and other supplies which the Soviets had left on the floe.

As the Soviets gained experience with drifting ice stations, they improved their arctic equipment. One example is the improvement in sleeping quarters. The crews of North Pole-1 and 2 used fur-covered tents and sleeping bags. The crews of North Pole-3 and 4 had heated huts, which allowed them to sleep in beds without sleeping bags. North Pole-5 in 1955 marked

courses of Soviet drifting ice stations

the first use of collapsible huts mounted on skids. Other equipment used at the stations included jeeps, tractors, trucks, boats, and helicopters. The helicopters and later small airplanes served several purposes. They enabled the scientific parties to conduct research at points far from the camp. They were also used to transport supplies to the camp from the landing strip used by the large resupply aircraft. These landing sites were often 5 miles from the camp, and at North Pole-4 the distance between camp and landing strip was 17 miles.

Only one of the Soviet stations was visited by Americans, although some of the Soviet and American stations maintained radio contact. A plane en route to an American station on 6 May 1962 flew over station North Pole-11. The pilot made a few low passes over the camp and then landed. The crew of the airplane was not taken into the main camp but was warmly received at the landing strip. After about fifteen minutes of smiles, handshakes, and photographing, the American plane took off and proceeded on its way to ARLIS II, the eighth American drifting ice station to be established in the Arctic Ocean.

American ice stations

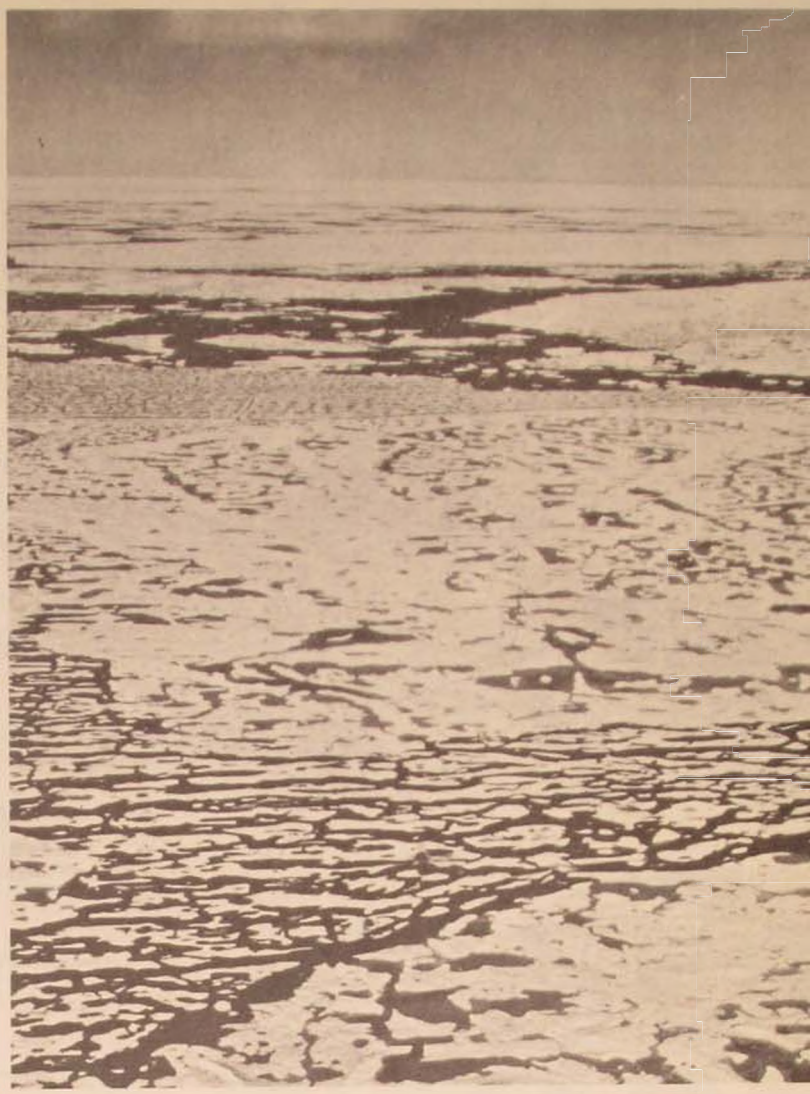
The Americans have operated a total of eleven ice stations, although four of them have been on the same ice island, T-3. The first American station, the Polar Ice Pack Station established in 1951, lasted only 19 days and was destroyed by pressure within the ice pack. The United States has been fortunate enough to use two ice islands in its drifting ice station program. The ice island T-3, which has been occupied for eleven of the last fourteen years, was the site of the second American station in 1952. The station was abandoned in 1954 when it drifted close to the weather stations on Ellesmere Island. During the International Geophysical Year the United States decided to maintain two drifting ice stations, Alpha and Bravo. Station Alpha was established on an ice floe, and station Bravo was located on T-3. The ice floe on which Alpha was situated was subjected to a great deal of pressure and had to be evacuated after eighteen months. Bravo remained in operation for over four years and was finally abandoned after grounding in shallow water. The first five U.S. stations were operated and maintained by the Air Force; station Charlie, which lasted less than one year, was a joint Air Force and Navy project. The first Arctic Research Laboratory Ice Station, ARLIS I, was supported by the U.S. Office of Naval Research through the University of Alaska and the Arctic Research Laboratory, as all subsequent American drifting ice stations have been. ARLIS II was located on an ice island and remained in operation from 1961 until May 1965, when it entered the Denmark Strait between Greenland and Iceland. The two latest American stations, ARLIS III and IV, were of a temporary nature, being established on ice floes and lasting 96 and 80 days respectively. Ice island T-3 was occupied again by the Arctic Research Laboratory in 1962, and this station is still in operation.

Equipment utilized at American stations has undergone change just as Soviet equipment did. Early stations used Jamesway huts as quarters and required heavy equipment such as tractors and bulldozers to maintain runways on which C-124 resupply airplanes could land. Station Bravo was equipped with insulated commercial trailers that served as quarters. ARLIS I and the American drifting ice stations operated by the Arctic Research Laboratory marked a departure from the previous methods of operating the stations. Light aircraft, including the Cessna 180 and 195 and the R4D (C-47), were used to establish and maintain the station, and thus the requirement for heavy equipment and mechanics at the station was eliminated. Another innovation was the use of prefabricated huts that could be transported in an R4D. Also, the number of support personnel at the camp was greatly reduced, the scientists performing some of the camp chores themselves.

American stations are, of course, subject to the same destructive forces within the ice pack as the Soviet stations. Ice pressure reduced the area of many stations; for example, Charlie, when abandoned, was one-fourth its original size. The pressure destroyed the Polar Ice Pack Station and caused the evacuation of Alpha. The ice islands used by the Americans

were not without their problems. T-3 was reduced in size while grounded and is now only 6 by 3 miles in size as compared to its original measurements of 10.36 by 5 miles. The ARLIS II ice island fractured shortly after the station was established, and its width was reduced from 3½ miles to 1½. An unusual incident occurred at ARLIS II when a large melt-water lake began to empty through holes in the bottom. Investigation revealed that the pool had formed above a dome in the bottom of the ice island which had been covered by only twelve feet of ice.

A comparison of the length of occupation of Soviet and American drifting ice stations, as of 1 September 1965, shows that the Soviet stations were occupied for a total of 8794 days and the American stations for 5999 days. The Soviet stations were occupied for an average of 627 days while the American average length of occupancy was 545 days, based on a separate counting of each period of occupation of T-3. ARLIS II was in continuous operation longer than any other American or Soviet station, 1499 days; however, T-3 was in operation for a total of 3432 days, although not continuously. North Pole-6 was the longest-lasting Soviet station, being occupied 1246 days.



Effects of summer melting, seen in mid-August at M'Clure Strait, turn the floe surface into innumerable pools and puddles, difficult to traverse.

Soviet findings

Many of the later Soviet findings on drifting ice islands have not been translated into English. The Soviet scientists have obtained a great deal of information concerning the physical geography of the arctic basin. They found that the Lomonosov Ridge extends from near the New Siberian Islands across the floor of the ocean to the continental shelf near Ellesmere Island. North Pole-6 recorded one peak of this ridge only 2472 feet below the surface of the ocean. North Pole-4 discovered another ridge west of the Lomonosov Ridge. It is called the Mendeleyev Ridge (Alpha Rise by Americans) and stretches 932 miles from the vicinity of Wrangel Island toward Ellesmere Island, reaching within 4592 feet of the surface. Depth soundings taken on North Pole-2 revealed the existence of a large feature north of the Bering Strait, named Chukchi Cap. One of the most interesting findings of North Pole-3 was that the station had passed over a submarine volcanic eruption on 24 November 1954. As the station approached the area of the eruption (near the Lomonosov Ridge), the ice floe felt a series of strong shocks and cracked. Sulfuric gases were responsible for the death of one crew member. Soviet stations have located at least seventeen sites of volcanic deposits and three sites of volcanic glass that has been dated as less than 5000 years old. These sites lie in a great-circle arc, which the Soviets believe marks a fault line extending in part along the western side of the Lomonosov Ridge for about 300 miles.


Alaska
Bering Strait
180°
U.
S.
S.
R.
East Siberian Sea
Wrangel Island
Chukchi Sea
Laptev Sea
New Siberian Islands
Beaufort Sea
ARLIS IV
ARLIS III
ARLIS II
ARLIS I
Charlie
Alpha
ARCTIC OCEAN
Severnaya Zemlya
T-3
North Pole
Kara
Franz Josef Land
Novaya
ELLESMERE ISLAND
85°
80°
Spitsbergen
Greenland Sea
GREENLAND
Baffin Bay
75°
Norwegian Sea
70°
Scale
0 300 600 miles

Station	Dates of Operation	Position At Establishment	Floe Size At Establishment	Floe Thickness	Crew Size	Position At Abandonment	Floe Size At Abandonment	Total Drift	Straight Line Drift	Rate of Drift
Polar Ice Pack	Feb. 20, 1951 March 10, 1951	180 miles north of Alaska	8 miles in diameter	N/A*	8	130 miles north of Alaska	N/A	N/A	N/A	N/A
T-3**	March 19, 1952 May 14, 1954	88° 00′ N 156° 00′ W	10.36 by 5 miles	160-190 feet	3-8	84° 40′ N 81° 00′ W	10.36 by 5 miles	1691 miles	351 miles	2.4 mi. per day
T-3	April 25, 1955 Sept. 24, 1955	83° 57′ N 88° 00′ W	10.36 by 5 miles	160-190 feet	5	82° 19′ N 98° 00′ W	10.36 by 5 miles	N/A	126 miles	N/A
T-3 (Bravo)	March 7, 1957 November, 1961	82° 46′ N 99° 30′ W	10.36 by 5 miles	160-190 feet	25	71° 45′ N 160° 00′ W	39 square miles	2553 miles	1553 miles	2 mi. per day
T-3	Feb. 17, 1962 continuing	73° 24′ N 161° 18′ W	6 by 3 miles	160-190 feet	15-25	continuing	N/A	N/A	N/A	N/A
Alpha	April 15, 1957 Nov. 6, 1958	80° 42′ N 159° 20′ W	2 by 2 miles	10 feet	8-29	86° 12′ N 113° 00′ W	800 by 1000 feet	1958 miles	530 miles	3.5 mi. per day
Charlie	April 13, 1959 Jan. 7, 1960	74° 48′ N 159° 00′ W	7 by 4.5 miles	10-12 feet	20-28	76° 55′ N 169° 00′ W	.25 original size	1366 miles	224 miles	4.5 mi. per day
ARLIS I	Sept. 8, 1960 March 25, 1961	75° 12′ N 136° W	2.3 by 3.5 miles	6-8 feet	7-14	74° 59′ N 169° 50′ W	.25 square miles	920 miles	540 miles	4.6 mi. per day
ARLIS II **	May 23, 1961 May 11, 1965	73° 10′ N 156° 05′ W	3.5 by 2 miles	40-80 feet	5-20	66° 43.5′ N 27° 01′ W	1.5 by 2 miles	5000 miles	N/A	2.5-4 mi.
ARLIS III	Feb. 10, 1964 May 16, 1964	73° 00′ N 151° 03′ W	1 square mile	N/A	3-5	72° 50′ N 154° 00′ W	N/A	N/A	N/A	N/A
ARLIS IV	Feb. 25, 1965 May 16, 1965	73° 05′ N 152° 12′ W	1 by 2 miles	10-16.5 feet	3-5	73° 07′ N 155° 12′ W	N/A	N/A	N/A	N/A

*not available
**ice island

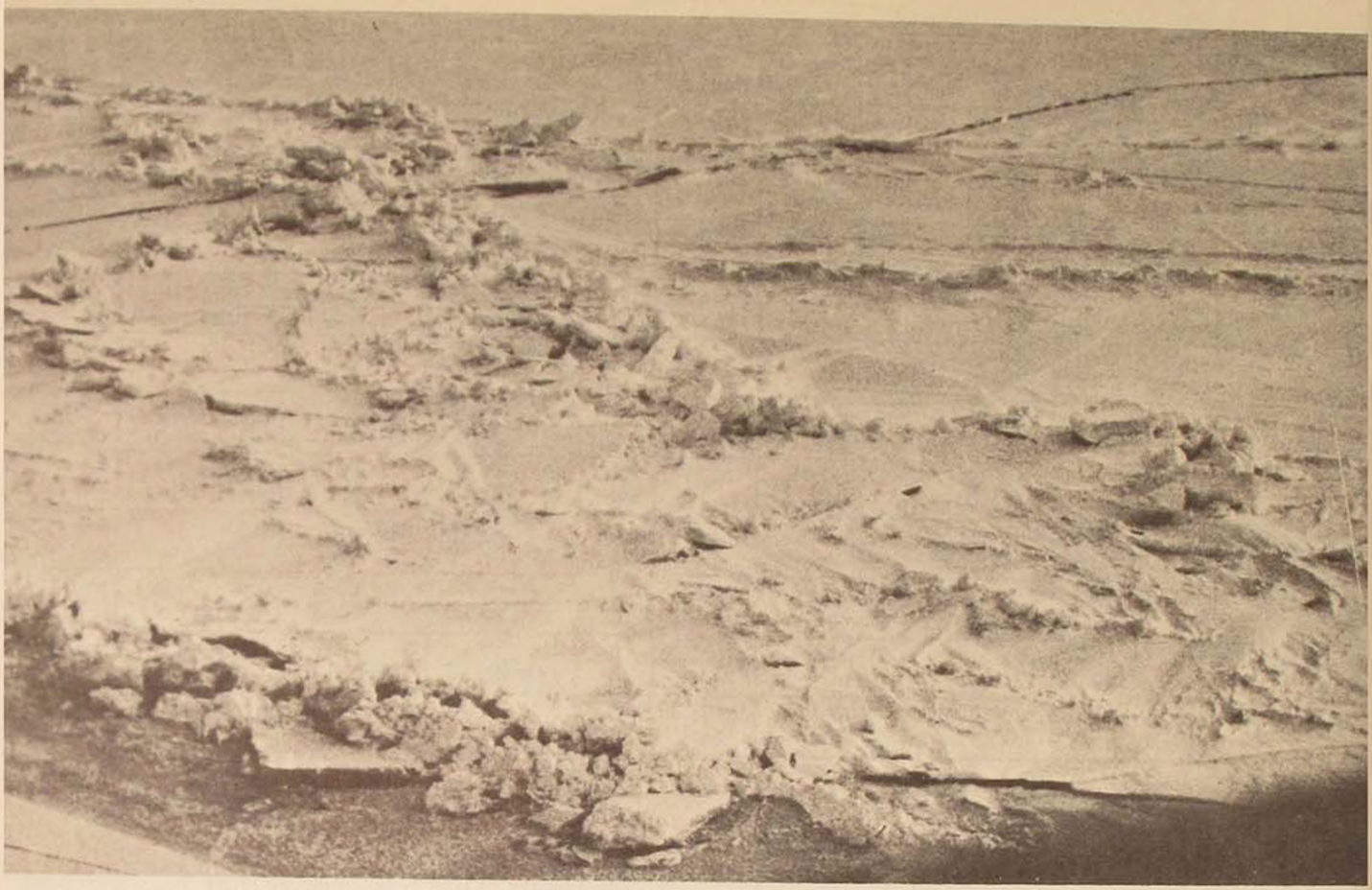
U.S. drifting ice stations

Investigations conducted at North Pole-1 led Soviet scientists to the conclusion that a second magnetic north pole was located near 80° N and 178° W, with magnetic medians extending across the Arctic Ocean to the other magnetic north pole. Later observations disproved the existence of a second magnetic north pole, and a large magnetic anomaly was shown to extend across the arctic basin. This magnetic anomaly led one Soviet scientist to the conclusion, before discovery of the Lomonosov Ridge, that a large ridge of folded rock existed under the Arctic Ocean.

The Soviet drifting ice stations made many observations regarding the currents and drifts of the Arctic Ocean and found that water from the East Siberian and Laptev seas moved westward toward the Greenland Sea. There were two smaller currents formed from this large current, one in the Laptev Sea and another near Franz Josef Land. Another current begins in the Chukchi Sea and Bering Strait and flows toward the Greenland Sea, passing over the North Pole. This has shown that Nansen had the right idea about the existence of currents but that he began the drift of the *Fram* in the wrong area. When the two large currents enter the Greenland Sea, they join. The currents in the Beaufort Sea, north of Alaska, generally form a closed circle, moving in a clockwise direction. This closed circulation, called Pacific Gyral, is caused by wind and atmospheric pressure factors and is centered at approximately 82° N and 120° W.

courses of American drifting ice stations

Early Soviet research indicated the presence of four distinct layers of water in the Arctic Ocean. Additional studies have provided the Soviets with sufficient data for a clearer picture of these ocean layers. The upper water from the surface to about 164 feet deep on the Atlantic side of the ocean and to depths of 328 feet on the Pacific side is a layer of arctic surface water. This water has a salinity of only 30 parts per million compared to a salinity in other oceans of 35 parts per million. Below this there is an intermediate layer to depths of 656 or 850 feet with an average salinity of 34 parts per million. A layer of Atlantic water moves north and eastward at depths from 984 to 2626



Pressure ridges, large masses of tumbled ice, make travel across the ice pack very tedious.

feet and has a salinity between 34.7 and 34.9 parts per million. Cold waters form a layer at depths below 2626 feet. North Pole-3 observed that the deep water on the Atlantic side of the Lomonosov Ridge was colder and less saline than water at the same depth on the Pacific side. Observations of a layer of Pacific water at a depth between 164 and 328 feet of the surface, made by the Soviet scientists, showed that this water has the higher temperatures and higher salinity and extends from the Chukchi Sea to the North Pole.

Soviet meteorologists have been very active at drifting ice stations. By January 1959 a total of over 15,000 meteorological observations had been taken. Meteorological data obtained at North Pole-1 invalidated the older theory of a permanent high-pressure cell over the Arctic Ocean. A relatively stable high-pressure cell is situated over the central Arctic Ocean in the winter, but during the summer a low-pressure cell of an unstable nature hovers over the area, causing a large number of intense cyclonic storms to pass through the region. Unstable weather, overcast skies, precipitation, and fog are often associated with these storms. In the spring these storms are often accompanied by strong winds, snow or other precipitation, and blizzards, and they seem to intensify over the central Arctic Ocean. During the winter the high-pressure cell tends to keep cyclonic storms out of the Arctic Ocean, and visibility is generally good. The dominant high-pressure cell of the winter is associated with cold temperatures. This cold, high-pressure air mass was found to be similar to the cold air mass situated over Siberia at the same time of the year; however, temperatures in the arctic are approximately 25 degrees higher than those over Siberia. The Soviet drifting ice stations observed that July is the warmest month in the Arctic Ocean, but temperatures seldom rise above 32°. North Pole-3 recorded a high temperature on 1 June 1955 of −14° even though there were 24 hours of sunshine.

The lowest temperature reported by a Soviet station was −46.8° at North Pole-1.

Another field of Soviet investigation on drifting ice stations was the stratification of the atmosphere. The lowest stratum of air is strongly cooled by the ice of the ocean and has a maximum thickness of about 120 feet in the fall. Temperatures in this layer are frequently inverted. North Pole-3 reported that temperatures at the top of this layer were from 27 to 36 degrees higher than those at the surface. The tropopause, or zone between the troposphere and stratosphere, was reported by North Pole-4 to occur at a height of 7½ miles in January. In September the tropopause was observed only 2.6 miles above the surface of the Arctic Ocean. Temperatures in the stratosphere were found either to be constant or to rise with increased height.

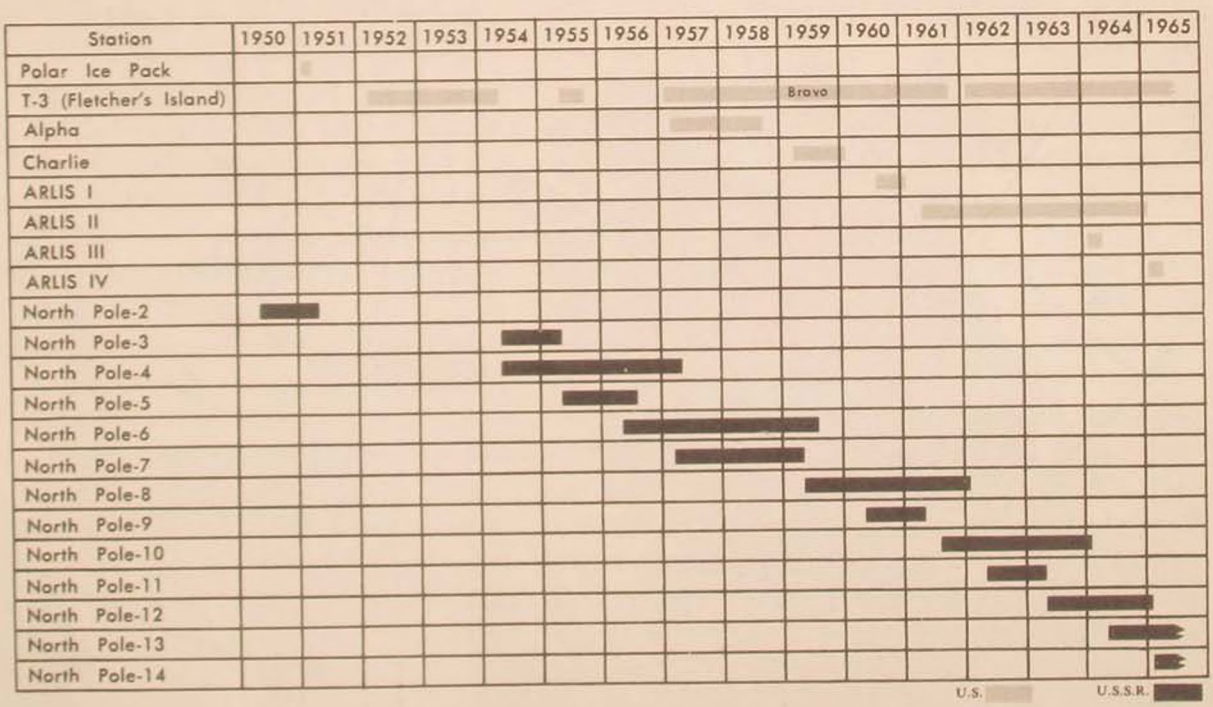
The large number of zooplankton and phytoplankton collected by Soviet marine biologists destroyed the old idea that the Arctic Ocean was barren. These biologists also discovered new species of zooplankton in the Pacific side of the Arctic Ocean, probably the result of blockage of deep-water exchange by the Lomonosov Ridge. Abundant organic life was found where the water from the Pacific Ocean enters the Arctic Ocean and in the vicinity of the Lomonosov Ridge.

American findings

Because only one of the eleven American drifting ice stations, ARLIS II, has drifted west of 180°, American studies in the Arctic Ocean have generally been restricted to the area north of the Chukchi Sea, Beaufort Sea, and Canadian Archipelago. The Alpha Rise was first observed by American scientists when station Alpha drifted across the rise twice and then drifted along its lineal direction. They found the Lomonosov Ridge to be 1118 miles long and from 37 to 124 miles wide. The minimum depth of water over the rise was found to be 3739 feet. A profile of the Alpha Rise obtained by station Alpha suggested that it is an area of fault-block mountains.

One submarine feature studied by four American drifting ice stations was the Chukchi

Drifting ice stations in the Arctic Ocean through September 1965




Alaska
Bering Strait
180°
U.
S.
S.
Wrangel Island
East Siberian Sea
Chukchi Sea
Laptev Sea
New Siberian Islands
Beaufort Sea
Pacific Gyral
ARCTIC OCEAN
Severnaya Zemlya
North Pole
Kara
Franz Josef Land
ELLESMERE ISLAND
85°
Novaya
Transpolar Drift
80°
Spitsbergen
Greenland Sea
GREENLAND
Baffin Bay
75°
Norwegian Sea
East Greenland Drift
70°
Scale
0 300 600 miles

Cap, which was found to have a greatly dissected surface at an average depth of 925 feet. Although the Chukchi Cap rises to within 807 feet of the ocean surface, the ocean floor on the northwestern side of it reaches a depth of 9955 feet. T-3 discovered another ridge on the floor of the Arctic Ocean during its early drift. It has been named the Marvin Ridge and is not as extensive as the Lomonosov Ridge or the Alpha Rise. These three ridges join to form a broad submarine shelf north of Ellesmere Island. ARLIS II reported that the Markarov Deep, which is enclosed by the three ridges, is an abyssal plain averaging 9187 feet below the surface of the ocean. ARLIS I discovered another submarine feature to the southeast of the Chukchi Cap, the Northwind Seahigh, which is smaller in size but has surface relief and elevations similar to the Chukchi Cap.

American scientists were able to add to Soviet information regarding ice drift. Studies at T-3 indicated that the pack ice usually drifted at angles between 30° and 50° to the right of the surface wind direction. The rate of ice drift varies from one-fortieth to one-eightieth of the speed of the surface winds, with an average rate of one-fiftieth. Since all American drifting ice stations have drifted in the area of closed clockwise circulation north of the North American continent, the Pacific Gyral, this region has been studied in detail. The water level near the center of this area is slightly higher than surrounding areas. Water flows out of this height anomaly to lower levels and is turned to the right. The observed drift of T-3 from 1952 to 1962 showed that it takes approximately ten years to make one revolution in the outer portion of the Pacific Gyral.

Research on American drifting ice stations has revealed considerable information regarding water stratification. In the Canadian Deep the water to a depth of about 500 feet has low salinity and a temperature near freezing. From 500 feet to 3000 feet there is a layer of water with a salinity between 34½ and 35 parts per million. This is a layer of Atlantic water that enters the Arctic Ocean near Spitsbergen. The bottom layer of waters in the Arctic Ocean has a salinity just under 35 parts per million. This water is also Atlantic in origin, being formed in the Norwegian Sea and sinking below the arctic waters. Water entering the Arctic Ocean from the Pacific Ocean mixes with water from the Chukchi Sea and becomes part of the water in the Pacific Gyral.

Scientists at both T-3 and ARLIS II studied the formation and structure of ice islands. The age of the ice at these stations varied from 450 to 5800 years. Core holes drilled in T-3 revealed pockets of fresh water in the ice. At one location, eight feet of ice lay over eight feet of fresh water. ARLIS II was discovered to be a section of glacial ice from the Ellesmere Island ice shelf which was bordered by sea ice. At the point of contact between the gray glacial ice and the blue sea ice, there were numerous enlongate, narrow areas of fresh-water ice and mud concentrations.

American meteorological findings showed temperatures remaining below zero degrees for five consecutive months during the early drift of T-3. The daily range of temperatures during the summer was small—in July 1952, only 2 degrees. A daily range of 14 degrees occurred in the fall and winter. The highest temperature reported by an American drifting ice station was 43° at T-3 during June. The lowest temperature noted by an American station was −72.5° recorded by T-3 on 30 and 31 January 1964. The temperature had to be estimated, as the only available thermometers would not record temperatures below −70°. Prior to 30 January 1964 the temperatures at T-3 had been lower than −60° for three days. ARLIS II, which was also in operation at this time, recorded a temperature of almost −55°. Studies at T-3 from 1952 to 1955 indicated that surface temperature inversion was evident 82 percent of the time from November to April. From June to August this type of inversion occurred about 11 percent of the time and averaged 56 percent on a yearly basis. The greatest difference of temperatures in this inversion was almost 55 degrees.

Contrary to the old theory that the Arctic Ocean was devoid of plant life, research on

ctic Ocean surface currents and
fts and the sites of volcanic activity

American drifting ice stations has produced considerable evidence that planktons are relatively common but much less numerous than in other oceans. Station Alpha observed that large diatom colonies which were attached to the underside of the ice floes formed the beginning of a food cycle. Crustaceans fed on the diatoms, fish ate the crustaceans, the fish provided the principal food of seals in the ocean, and finally the polar bear, ruler of the arctic region, fed on the seals. Polar bears were a hazard at the ice stations, and American crew members usually kept their rifles near for protection.

the programs compared

The Soviet government has always sent only scientists with the highest qualifications to serve on their drifting ice stations. American crews have often included members with less training and experience, although the leaders were men who ranked with the Soviet scientists. Once a Soviet or American had served at one drifting ice station, he was likely to serve at another. Many of the Soviet scientists who served on these stations have become leaders in the Northern Sea Route Administration, the Hydrometeorological Service, and other agencies. Similarly, American scientists have moved on to head institutions and agencies that can benefit from their knowledge and experience.

Although the varied drifts of the Soviet drifting ice stations have enabled their scientists to conduct research in many sections of the Arctic Ocean where American stations have not visited, both groups of scientists have made significant discoveries regarding the topography of the ocean floor. One of the most important early findings was that the ocean floor was not as flat as had previously been thought. The findings of Soviet stations have provided data which make the interpretation of American findings much clearer. For instance, the Soviets discovered a rise in the Arctic Ocean, and later the American station Alpha drifted along the top of it; a better understanding of the true nature of this feature was gained from the findings of both nations. Although Soviet stations have found evidence of volcanic activity in the Arctic Ocean, American stations have not.

One problem in the use of depth soundings taken from early drifting ice stations was the difficulty in determining exact locations. Early Soviet bathographic charts did, however, provide valuable information regarding the entrance to the Arctic Ocean from the Bering Strait. This information was used by the U.S. nuclear submarines *Nautilus* and *Skate* when they first entered the Arctic Ocean in 1958. The USS *Skate* surfaced at station Alpha on 11 August 1958, proving that submarines could surface through the pack ice and operate in the Arctic Ocean. Submarines have demonstrated an ability to take depth soundings over a large area in a shorter time than drifting ice stations, but the stations can provide more data regarding bottom topography and ocean sediments. For this reason drifting ice stations remain one of the best modes for study of the Arctic Ocean.

Both Soviet and American scientists have investigated the subject of ice drift, and their findings are similar. The Soviet and American findings regarding water stratification contain a few minor differences, but in general they agree. It should be pointed out that the characteristics and depths of the water strata were often measured at different locations and at different times of the year. The same is true of the recording of different temperatures in the upper strata of water by American stations Alpha and Bravo (T-3).

Soviet and American scientists have been in general agreement in their meteorological findings, especially as to atmospheric pressures and temperatures. Whereas American station T-3 recorded both the highest and lowest temperature in the Arctic Ocean, both American and Soviet drifting ice stations reported and made records of frequent surface temperature inversions in the Arctic Ocean. In no area of investigation has a disagreement of major importance developed.

The prime purpose of Soviet drifting ice stations was to obtain meteorological and hydrological data. The information secured at these stations was very useful in the develop-

Bathymetric map of the Arctic basin


Alaska
Bering Strait
U.
S.
S.
East Siberian Sea
Wrangel Island
Chukchi Sea
Chukchi Shelf
Laptev Sea
New Siberian Islands
Beaufort Sea
Beaufort Plateau
Beaufort Deep
Chukchi Cap
Canadian Deep
Hyperborean Basin
ARCTIC OCEAN
Alpha Rise
Ridge
Marvin
Merkarov Deep
Lomondsov Ridge
Severnaya Zemlya
Nansen Basin
North Pole
Eurasian Basin
Mid-Ocean Ridge
Fram Deep
Franz Josef Land
Kara Sea
Novaya
CANADA
ELLESMERE ISLAND
BAFFIN ISLAND
Baffin Bay
GREENLAND
85°
80°
Spitsbergen
Greenland Sea
75°
Norwegian Sea
70°
Scale
0 300 600 miles
80° Latitude 90°
ICELAND
NORWAY
SWEDEN

ment of the Northern Sea Route. The success of the weather and ice forecasting, as well as the development of faster and stronger ships, was reflected in the discontinuation of the Northern Sea Route Administration in 1963. The Soviet government believed that the meteorological observations were still needed because of the effect of the weather of the Arctic Ocean on the climate of the Soviet Union. The first American drifting ice station was established along the flight lines of aircraft that were making meteorological observations over the Arctic Ocean. This station served primarily as a search and rescue station but also made meteorological observations.

PRIOR TO the development of intercontinental ballistic missiles, both the Soviet Union and the United States realized the importance and need for information concerning the Arctic Ocean. The meteorological data obtained were necessary in the planning of possible military operations in arctic regions and were of significance in submarine operations. Also of major importance to arctic submarine operations was the information provided to the Office of Naval Research by ARLIS II when it drifted from the Arctic Ocean, passing through the Greenland Sea and Denmark Strait. Since this is the only deep-water entrance to the Arctic Ocean, it was important to know its nature.

The final index to the value of drifting ice stations is the continuation of the programs by both the Soviet and American governments.

Arctic, Desert, Tropic Information Center (ASI)

CORRECTION: In the May–June issue of *Air University Review*, in the article entitled "Exercise Deep Furrow 65," the 322d Air Division was erroneously identified as a unit of United States Air Forces in Europe (USAFE). The 322d Air Division was a USAFE unit prior to 1 April 1964 but is now a unit of the Military Airlift Command (MAC).

Air Force Review

MILITARY-CIVILIAN MANPOWER IN THE AIR FORCE

COLONEL JAMES F. RISHER, JR.

THE CURRENT Department of Defense project for the replacement of some 75,000 military personnel with a somewhat smaller number of civilians has been treated in the news media as a rather original management concept. Most news accounts of these plans have failed to make even passing note of the fact that for years civilian employees have constituted a substantial portion of the operating forces of the Department of Defense. Such treatment may leave an impression that the feasibility of employing civilians in many support jobs has been overlooked in the past by military management.

Such an impression regarding the Air Force would indeed be erroneous. We can look over the span of the past twelve years or so and say that—taking an average of the many fluctuations of the manpower program and on-board strength—approximately one in four of Air Force personnel at any point in time has been a civilian. During this span of years civilian employees have performed not only in the support and administrative functions referred to in recent news accounts concerning the DOD announcement but also in most types of assignment except those requiring rated specialties or command of Air Force units. Even these exceptions require some qualifying explanation. We have had civilian flight instructors, employed on a contract basis, at various periods throughout Air Force history. Many Air Force command pilots on active duty today shot their first landings and many subsequent ones under the watchful eyes of a civilian instructor. And while I can cite no record of a civilian employee exercising command of an Air Force unit, civilian employees of the Air Force have served in a vast number of senior supervisory capacities. Air Force civilians have supervised and evaluated the performance of Air Force officers through the rank of colonel in a variety of assignments and circumstances.

These preliminary generalities are so well

known to most Air Force readers that our purpose in citing them may be questioned. Our purpose is most assuredly not to suggest an attitude of resistance to the latest Department of Defense program for selective replacement of military personnel with civilians. On the contrary, these familiar facts are cited as an introduction to a discussion of related but less familiar facts which will show that the Air Force has long pursued the management objectives of this DOD project.

A review of Air Force manpower management history of the past twelve years reveals several massive projects and numerous lesser ones designed to make maximum use of civilian personnel in lieu of military. These projects have all had the purpose of determining and achieving the proper military-civilian mix (to use a popular term) in the Air Force personnel structure at a particular point in time. The term "mix" refers to the *total* manpower capability that is purchased with Department of Defense funds to carry out the Air Force mission—not only in-service military and civilian personnel but also contractual services. Contractual services will be covered in more detail at a later point in our discussion.

Our primary purpose here is to trace the more significant of those actions taken from time to time to establish the optimum force mix of in-service military and civilian personnel. Although we make frequent reference to historical documents, we make no pretense of completely documenting this facet of management history within the scope of this article. At most, we hope to provide an outline of the Air Force approach to this aspect of force management, the criteria employed, problems encountered, and results achieved.

Project Native Son

An early, if not the earliest, studied effort to make maximum practical use of civilians on an Air Force-wide basis was conceived in September 1953. While this project, officially known as "Native Son," was concerned primarily with overseas areas, its implications and effect were not limited to these areas. Late in 1953, Hq USAF dispatched a team of staff representatives to Far East Air Forces (FEAF) and United States Air Forces in Europe (USAFE) to determine, in collaboration with these commands, how many military and Department of the Air Force (DAF) civilian personnel could be replaced with native personnel.

The criteria for substitution took into consideration the requirements for security, requirements for mobility and quick reaction time of tactical units and their support functions, availability of local labor resources, local training capabilities and potentials, and other factors essential to such actions. As a result of these surveys, approximately 43,000 military (some DAF civilian) personnel authorizations were programmed for retrieval in fiscal years 1954 and 1955 by replacement with some 31,300 native personnel.[1] (The difference between military spaces retrieved and native substitutions is explained, no doubt, by savings in the military pipeline, reductions in training overhead, etc.—essentially the same factors that enter the current DOD calculation that 60,000 civilians will replace 75,000 military.)

Speedy and aggressive action was taken to implement this program. The greater portion of the two-year objective was achieved in FY 1954 and the remainder, as planned, in FY 1955.[2]

The significance of Project Native Son cannot be easily overstated. In the first place, the approximately 43,000 military authorizations saved constituted about half of the over 86,000 total military reductions which were achieved or firmly programmed through a variety of management actions in the 1953-55 time period. These actions were all part of a concerted effort to bring Air Force manpower in line with the ceilings imposed. In the second place, the difference in cost of native salaries and the overall cost of maintaining the equivalent military and DAF civilian force overseas resulted in very significant monetary savings. From the standpoint of benefit to native economies, promotion of good community relations and understanding, and other intrinsic aspects, Native Son was a very significant program.

This is not to say that there were no disadvantages to be overcome. Difficulties and limitations did occur, and they varied considerably from one location to another. Broadly speaking, there was an overall loss of productivity in individual jobs until training programs could improve skill levels of native personnel. This was true even though native personnel were employed for the most part only in the more routine and uncomplicated administrative and general support functions. Even today, despite much-improved training programs developed over the years, we must accept some loss of efficiency in order to attain the overall advantages of hiring native personnel to perform Air Force jobs around the globe.

Another type of disadvantage, recognized in preparation and defense of the FY 55 manpower program, was that civilian substitutions tended to make the ratios of officers to airmen and of NCO's to lower-grade airmen apparently top-heavy. It was explained that this was because the civilian substitutions were generally in the lower grades of airmen and that the trend in military ratios would be deceptive unless the basic cause was understood. The FY 55 program was approved with knowledge of both trend and cause.

Changes in numbers and types of units in the overseas commands have caused fluctuations from time to time in the ratios of native personnel to Air Force military and DAF civilian personnel. This is inherent in the periodic application of acceptable criteria to current unit and mission composition. However, it appears that Native Son set a pattern for management of overseas personnel resources which has continued, with refinements, to the present.

Project Home Front

Project Home Front was begun in 1954 as a corollary of Native Son, which was terminated as a formal project in that year.[3] The objective was to make feasible substitutions of civilian for military personnel, primarily in the enlisted ranks, in the United States.

The Home Front project was prompted not only by the success of the overseas project but by an increasing shortage of airman skills resulting from the expiration of enlistments contracted during the Korean conflict. The project developed, therefore, as a closely controlled substitution of civilian authorizations and personnel for military as skill shortages occurred or were firmly forecast. The time period of Home Front as an active project was late FY 55 through FY 56.

This substitution program employed essentially the same criteria as the previous overseas program. Security requirements, mobility and response capabilities of tactical units and their direct support functions, availability of civilian manpower in the required skills, local training capabilities and potentials for sharpening and orienting available skills to Air Force job requirements—all these factors were applied to the many local situations involved. The foremost additional criterion, which was closely monitored from Air Force headquarters, was the maintenance of or, in some cases, adjustment to an acceptable ratio of zone-of-interior to overseas (ZI/OS) in the various skills. This was considered necessary in order to avoid excessive or unusually protracted overseas duty among airman skills where the ratio was not sufficient. Personnel staffs contended, with convincing logic, that failure to control this factor would affect re-enlistments adversely and in the long run compound a situation the correction of which was one of the objectives.

In order to attain the overall balancing of skills in this respect (the ZI/OS ratio), military authorizations were actually increased in some skills under Home Front, although the main objective and trend were in the other direction.

Home Front ceased as an active project on 30 June 1956, with provisions for completion of unfilled major command hiring objectives by early 1957.[4] The original goal of approximately 30,000 substitutions was essentially achieved.

There is little need to belabor these two early Air Force projects in view of the many subsequent changes in manpower programs and force composition. They were self-generated projects, employing criteria generally acceptable to the Air Force commanders concerned. Yet together the two projects substituted approximately 61,000 civilians for some

73,000 military personnel during the 1954–56 period—approximately the current DOD objective for at least the first phase of substitution in the entire defense structure.

total manpower resource

The concept of management that gradually emerged required selective use of and strict accounting for contract services as a part of the total manpower mix. Thus the function of manpower contract management was established in the Air Staff (Directorate of Manpower and Organization) in 1959,[5] to be the focal point for Air Staff action on contractual services involving manpower. It was recognized that management of the Air Force dollar expenditure for manpower involves coordinated management and administration of three distinctly different manpower resources: military manpower, in-service civilian manpower, and manpower obtained through contract.

We use the words "distinctly different" advisedly. Before continuing the discussion of more recent developments from the standpoint of overall Air Force management, let us indulge in a rather elementary discussion of the matter from the viewpoint of the Air Force commander—whether of squadron, base, or major command—in performance of his mission.

If there were no differences in the manner in which civilian and military personnel are administered and paid, no difference in classification and promotion procedures, no difference in legal rights and privileges, there would be small choice—from the responsible commander's viewpoint—as to which jobs under his control were occupied by military and which by civilians. Contractual services represent still another resource available to the Air Force commander.

It seems reasonable to say that the commander's degree of positive control over the personnel resources allotted to his particular mission is in the following order: first, military; second, in-service civilian; and, third, contractual services.

Thus the commander whose mission calls for execution of contingency plans and other immediate responses, or for frequent overtime and unusual hours to fulfill unprogrammed requirements, will be most reluctant to have a significant portion of his in-service personnel civilian, and he will not willingly accept contractual services as a part of his resource. By contrast, the limit of his control for movement or overtime of the military resource is the limit of human compassion and endurance. His control over the in-service civilian is largely circumscribed by his funding ability to provide for overtime. (This is no disparagement of our loyal and industrious civilian employees; it is an administrative fact of life. When funds were not available, civilians of all grades have worked overtime for compensatory time off, often never realized. Furthermore, civilians in executive positions do not distinguish between normal time and overtime in "getting the job done." The basic funding limitation on overtime in a large work force, however, is obvious.) With contractual services, of course, the commander is limited by the terms of the contract.

On the other hand, the commander whose mission assures him of a reasonably firm prediction of requirements will welcome contractual services for many functions. His burden of training and supervision is removed, and he is concerned only with quality of performance or services provided. The contract has actually purchased some degree of relief from responsibility and supervisory workload. Similarly, he may welcome or prefer civilian employees because his mission can thus be accomplished with a smaller military force to be supported and administered on a 24-hour basis.

Any discussion of this matter must recognize that these three elements of manpower represent not only divergent potentialities and limitations to the Air Force commander. They represent and are subject to divergent interests and pressures on the national economic and governmental level. Furthermore, the Air Force's ability to manage the primary resource, the professional Air Force officer and the enlisted airman, is inescapably dependent upon how well the total force is blended. It is dependent, to a great extent, upon how well the

various pressures of rightful interest are objectively evaluated and balanced to provide reasonable stability in the manpower program.

Two extracts from Air Force management history, spanning the 1960–61 period, provide graphic record of these pressures in action.

> . . . During this period [July–Dec. 60], an increasing number of requirements have been laid on . . . to provide data and information to various Congressional groups and to answer specific inquiries regarding the Air Force policy on the utilization of military, in-service civilian and contract service manpower resources. *Operating under fixed manpower ceilings and policies and procedures which do not fully reflect the integrated management of all types of manpower resources required by the Air Force, the Air Force is faced with explaining an increasing number of problems that result from the adjustments which must be made among various types of manpower resources to accomplish changing workloads. Continued effort is being made . . . to establish mutually consistent policies and to have these policies accepted throughout the Air Staff, the Department of Defense and by the Congress.*[6] (Italics supplied.)
>
> . . . No let-up was experienced in the number and variety of Congressional inquiries and hearings received during this period. All could be broken into one of two categories—those concerning the replacement of contract personnel by inservice personnel or those concerning the replacement of civil service personnel by contract personnel. The inquiries covered subjects as varied as motor vehicle maintenance, BMEWS, SAGE, Missiles, pilot training, etc. . . .[7]

It is beyond our scope to trace the numerous fluctuations of the force structure resulting from developments in aircraft, weapons, and equipment, the changes and adaptations of operational concepts and techniques, the reaction to world tensions (the Berlin Crisis of 1961, for example), and the adjustments to the hard facts of budgetary limitations and manpower ceilings. However, an examination of any single year's M&O history will identify numerous actions to improve efficiency of operations, reduce manpower costs, shift resources to priority missions, and make management decisions to properly adjust the manpower forces among the military, in-service civilian, and contractual services elements.

Many of these actions were in response to guidance from the Department of Defense. Some were in response to the DOD's continuing drive to consolidate functions and services common to all departments. Still others—less in scope but no less significant—originated within the major commands and subordinate organizations in response to the Air Force's continuing management improvement program. These ranged widely in scope of action and variety of organizations and activities concerned. They involved periodic surveys and manning adjustments of various headquarters staffs, major organizational realignments among and within the major commands, and decisions to contract or not to contract various support functions. These actions involved significant numbers of personnel, both military and civilian, and sizable funds.

In the period 1962–64 a comprehensive review of the entire Air Force structure was conducted with the purpose of revalidating and revising, as necessary, guidance to field commanders for determining the proper balance of manpower resources. This review, actually initiated in late 1961, in its first and final phases involved the entire Air Staff. The staff, each element working in its primary functional area, developed proposed manning criteria by type of resource (military, civilian, and contract services) for all the many Air Force functions. These recommendations were incorporated in instructions to the major commands, which were requested to review and comment on the Air Staff's proposed criteria. Fund limitations, personnel ceilings, and ZI/OS personnel ratios were not considered in this analysis, since the objective was to establish a "pure" requirement.[8]

In due course, detailed recommendations from all major commands were received, involving every function and every type of job in the Air Force. Analysis of command recommendations revealed a number of areas in which there was general agreement on substantial conversions from one type of man-

power to another. While these recommendations were being reviewed by the Air Staff, the Department of Defense requested the Air Force to develop views on a proposed conversion of 6000 military authorizations to 4500 civilian (primarily in MATS aircraft maintenance) and to perform a survey of all Air Force military positions for possible conversion to civilian authorizations (OSD Project 6). The Manpower MIX project proved timely indeed to the Air Staff in response to the requests.[9]

principles of manpower mix

A most significant result of the Manpower MIX and Project 6 studies was the synthesis of their findings into updated policy and criteria, which were reflected in Air Force Regulation 26-10, "Manpower Utilization," 24 February 1964 (superseding AFR 40-3, "Utilization of Civilians within the Air Force") and a revision, 9 June 1964, to AFR 25-6, "Use of Contractual Services," 5 October 1960.

Three distinct principles of management, which are complementary and mutually supporting, are delineated in the first paragraph of AFR 26-10.

The first of these principles we may call that of *the total force:*

> . . . Both military and in-service civilian personnel are made available to the Air Force by Congress and the Department of Defense; this manpower is supplemented, as required, by contract services. Selecting the best mix of these resources for a function, workload, or mission, depends upon many factors. . . . They should be considered carefully in their relationship to each other and to the specific circumstances of time, place, and objective of the function in question.

The second principle we may refer to as that of *the primary military mission and organization:*

> . . . Since it is a military organization with combat missions and must maintain an essential military posture, the Air Force must depend on military personnel for the major part of its in-service manpower. However, the need for continuity in essential activities, together with the cost of training military personnel for skills already available in the civilian labor market, contributes to a need for civilian manpower as an integral part of in-service manpower. . . .

The third and by no means least significant principle we may refer to as that of *the military-civilian team:*

> . . . The Air Force military-civilian team concept has proved highly successful over the years; each member of each segment of this team effectively contributes his or her part to the successful accomplishment of the total Air Force mission. This team concept should be fostered and encouraged to continue as the Air Force further develops its managerial ability in selecting the proper person for each position. . . .[10]

Whatever else may be apparent from our review of management history, the dynamic, continually shifting nature of the Air Force personnel structure is evident. For this reason if no other, we hesitate to speak of permanence in discussing any aspect of its management—even such an abstract thing as a management principle. Yet, is there any manager who will contend that the Air Force can do other than think and manage in terms of the *total force,* with all the subtle factors involved? Is there any managerial logic that can eliminate or bypass the *primary military mission and organization* principle? Or, is there any recent development in management techniques that can or should outmode the Air Force's principle of the *military-civilian team?*

In the absence of positive evidence to the contrary, one is tempted to suggest that there is an enduring quality in these principles which will make them basic to force management for the foreseeable future.

We make no such suggestion of longevity about the existing composition of the force, however, or about the specifics of criteria which may implement these principles at any given time. We have already recognized that application of current criteria brings some degree of change on almost a daily basis. Periodic major reviews, such as we have discussed, will bring substantial alterations of the force composition, because of the complicated nature of the mission and organization and the shifting factors that play upon them.

Periodic and timely reviews of criteria may be expected to eliminate or reduce the significance of certain elements, while perhaps introducing new considerations. The definitions of direct and indirect support of tactical (combat) units, for example, may have different connotations and applications in the age of manned satellites and space vehicles. There may be an evolution of thought and experience as to the balance between military and civilian in supervisory and staff positions. The problem of overseas rotation of personnel (maintenance of an acceptable ZI/OS ratio) may be diminished with reduction in overseas force commitments. The many impeding disparities in administration, pay, promotion, and legal rights and status between military and civilian personnel may be corrected or alleviated. Should this latter occur, the Air Force's concept of the "total force" would be considerably enhanced.

This recognition of inevitable change is not, by any means, a suggestion of change for its own sake. We may predict that our present criteria may be revised in due course without implying that we should waive or discredit current guidelines hastily. The only force we can bring to bear on this management problem is human judgment, fortified by experience and a knowledge of and appreciation for the Air Force mission in all its intricacies.

Our past experience has amply demonstrated that significant alterations of the force structure should be made only after the most searching analysis of the many factors involved. Although we have reviewed several major projects that improved overall force management, we have no reason to contend that all past personnel substitutions, either one way or the other, have been good for the Air Force from the standpoint of personnel management. Many substitutions were made in response to influences and necessities not directly related to accepted management principles. And of course we have no reason to hope that the future will shield us from the necessity of making drastic alterations, in either direction, which must be recognized as undesirable from the standpoint of the Air Force's internal management. If overriding national objectives, of whatever nature, require this, the inescapable adverse effects upon career integrity, morale, and motivation of the military or civilian element must be recognized. The inevitable costs of these human reactions cannot be truly evaluated because of the many elusive factors involved, but they cannot be discounted.

With reference to the current Department of Defense project, we may assume that past actions of the Air Force in this area of management will be the base line for future changes of force structure. We cannot speculate as to the number of civilian substitutions that may be profitably made in the Air Force at this time. We do, however, have reason to believe that Air Force management is prepared to provide a realistic answer to this question.

Aerospace Studies Institute

Notes

1. *History of the Directorate of Manpower and Organization*, Hq USAF, DCS/O, 1 July–31 December 1953, p. 18. Hereafter cited as History, M&O.
2. History, M&O, 1 January–30 June 1954.
3. History, M&O, 1 January–30 June 1955.
4. History, M&O, 1 January–30 June 1956.
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THE EVOLUTION OF NCO ACADEMIES

LIEUTENANT COLONEL ERNEST M. MAGEE

The backbone of the Army is the Noncommissioned Man!

LATE IN the last century when Kipling penned this line, it served to emphasize the key role of the noncommissioned officer in the profession of arms. The line has been uttered down through the years, repeated ad infinitum by commanders and staff officers until it has achieved the dubious distinction of a cliché. And like most clichés, it has become a somewhat stale statement, used perhaps more often as a handy verbal crutch than as an honest assessment of the NCO's worth.

Before World War II, the image of the army NCO was not always a sparkling one, at least not in the eyes of the general public. To a great many people the term "NCO" suggested a tough-talking, rough-acting, pear-shaped martinet whose mission in life appeared to consist of bellowing orders to hapless recruits. On the movie screen, Wallace Beery and others did nothing to destroy this image.

The coming of age of the airplane in World War II signaled a change in the NCO corps within the air arm of the U.S. Army that is still evolving in today's Air Force. (Similar changes occurred, of course, in other branches of the Army, but this discussion is limited to the impact on Air Force personnel.) Literally overnight, hundreds of thousands of enlisted personnel, most of them new to military life, were thrust into assignments requiring a certain degree of technical know-how. The rapid expansion of military aviation at the same time created heavy demands for senior enlisted people who could accept enlarged areas of responsibility. A new breed of NCO, spawned by rapid technical advances in a wartime situation, began to develop.

After the letdown following World War II, the fighting in Korea re-emphasized the critical need in the newly formed U.S. Air Force for enlisted personnel who could be trained as middle managers to handle an ever increasing range of responsibilities. As time went on, the accelerated development of a family of powerful missiles, and then involvement in Vietnam, accentuated the obvious: since most of the people in the Air Force are supervised by NCO's, these enlisted supervisors must of necessity be better educated, more skillfully trained, and more fully aware of current directions and techniques in leadership and management.

Today there appears to be a general recognition of the vital role that NCO's play in the effectiveness of the Air Force. Their number alone is impressive: approximately 265,000 NCO's currently are on active duty.

To illustrate the importance of NCO's in accomplishing the Air Force mission, consider these three extremely unlikely possibilities:

(1) An Air Force made up completely of airmen below the rank of staff sergeant. Here we would have plenty of youth and muscle and vigor, a limited amount of know-how, and almost a complete lack of executive talent. All Indians, no chiefs.

(2) An Air Force consisting entirely of officers. Here we would have a highly educated group with an abundance of executive know-how, but a great deficiency in worker skills. All chiefs, no Indians.

(3) An Air Force made up wholly of NCO's. Here we would find a mature group possessing worker skills to a high degree, coupled with the capability—to a large extent—of planning, organizing, and directing. A blend of Indians and chiefs. It would appear, if a choice among these three possibilities had to be made, that an Air Force composed of NCO's might be the most useful over the long run.

The continuing important role of the NCO in the Air Force was brought sharply into focus

in the spring of 1965 in a speech by the Air Force Chief of Staff, General J. P. McConnell, when he told his major commanders: "The authority vested in NCOs is different than that vested in commissioned officers only in degree. The closeness of NCOs to their subordinates in carrying out their daily responsibilities sets a most serious and exacting task."[1]

In 1950 certain senior Air Force commanders recognized that a new breed of NCO was developing and decided to do something about it. General John K. Cannon, then commander of the U.S. Air Forces in Europe, is credited with establishing the forerunner of today's NCO academies. The original school for NCO's was in Wiesbaden, Germany, and was called the USAFE Academy of Leadership and Management. Its curriculum was adapted from portions of the Senior Military Management Course and subjects offered by the Wharton School of Finance and Commerce, University of Pennsylvania.[2]

In the early 1950's, the Strategic Air Command began operation of four NCO academies. The first one was established by SAC's 7th Air Division in England, and when it proved successful an NCO academy was started in each of the numbered SAC air forces. Other major commands eventually followed suit. Today, there are NCO academies in the Military Airlift Command, Tactical Air Command, Air Force Systems Command, Air Defense Command, Air Force Logistics Command, U.S. Air Force Security Service, and Headquarters Command, USAF. Several other major commands are currently studying the establishment of similar academies. SAC, which had trained over 100,000 NCO's and airmen first class in its leadership schools and NCO academies, temporarily closed all its NCO school facilities in March 1966 because of manning problems related to the conflict in Southeast Asia.

Since NCO academies were originally designed for the two most senior airmen grades then authorized, they came to be known as "senior NCO academies," a title that is still occasionally applied. For the sake of brevity, they are also frequently referred to as NCOA's. Selecting airmen to attend an NCOA is considered a command prerogative. Most of the seven commands that have academies enroll only technical sergeants and higher enlisted grades. A typical student enrolled in an NCOA in 1966 would be a technical sergeant, about 35 years old, with approximately 15 years of military service.

An interesting offshoot of the NCO academy program as time went on was the establishment in several major commands of so-called NCO preparatory schools, now called leadership schools. These are base-level schools of three weeks' duration for promising airmen first class and staff sergeants. The curriculum generally is patterned after that of NCO academies, but it is pitched at a lower level. Since there are considerably more enlisted personnel eligible for enrollment in NCO leadership schools than in NCO academies, the growth of leadership schools has surpassed that of the NCO academies. Until March 1966, when Air Training Command and SAC shut down their leadership schools, six major commands supported over 40 such schools, which produced approximately 10,000 graduates annually.[3]

As the enrollment in NCO academies began to approach the 1965 total of around 6000 students, it was realized that the curriculums and operating procedures had to be standardized. Accordingly, a basic regulation, AFR 50-39, entitled, "Noncommissioned Officer Training," was developed. It specified the policies and curriculum necessary for accreditation by Headquarters United States Air Force.

At present an accredited NCO academy must schedule 225 hours of Air Force approved subjects over a period of at least five weeks. The curriculum emphasizes the principles of leadership, management, and communicative skills, both oral and written. Approximately 25 hours are devoted to the study of world affairs, with particular emphasis on the ideological conflict between democracy and communism. While at an academy, students are given intensive refresher training in military customs, courtesies, drill, and ceremonies.

Basic textbooks have been developed over the years for each subject, and they are continually revised by instructional staffs. The material used in the textbooks has been largely derived from other USAF instructional publica-

tions, such as AFROTC manuals, which have been rewritten and edited especially for the NCO student.

Most of the instruction is conducted as seminars or guided discussions. Guest speakers are frequently scheduled to give special presentations, however. At the MAC NCO Academy, to cite one example, Lieutenant General Lewis H. Brereton (USAF, Ret) has spoken on the subject of leadership to over 65 separate classes. Several academies have also started using programmed instruction on a limited basis, and they report excellent results to date.

NCOA faculties are comprised for the most part of former students who have shown exceptional promise while going through the academy course of instruction. The majority of instructors have completed some college work, others have college degrees, and a few have advanced degrees. Early in their tour of duty as instructors they attend the Academic Instructor course at Air University. Not surprisingly, a large percentage of those who attend this course gain Distinguished Graduate status. The intense interest, dedication, and professionalism of NCOA faculties have continually impressed visitors and students alike.

The mission of NCO academies and leadership schools, broadly stated, is to prepare students for more advanced leadership and management responsibilities.

When he is graduated from an NCO academy, each student receives a diploma and a training certificate. On return to his home station, an official entry is made in his Form 7 to the effect that he was graduated from an NCO academy. A student who does exceptionally well is identified as a Distinguished Graduate. He receives an official letter of recognition from his major command headquarters, and the letter is authorized by AFR 50-39 to be classified as a "Category A" document for inclusion in official files. Graduates are also entitled to wear a distinctive ribbon.

Most NCO's recognize the importance of attending and graduating from an NCO academy. Although decidedly not cutthroat, the competition for Distinguished Graduate status is intense. The academic standards at all academies are high, but the failure rate usually runs less than two percent. The loss rate for emergency, disciplinary, or other reasons is normally even less.

It has been my personal observation, after previous tours of duty with the AFROTC program and the Air Command and Staff College,

that NCO academy students are as fully motivated as AFROTC cadets and student officers in their thirst for new and useful knowledge. Whereas an officer can look forward to the Squadron Officer School, the Air Command and Staff College, the Air War College, and possibly even the National War College or the Industrial College of the Armed Forces, an NCO knows that the only opportunities he will have for formal military professional education are at the leadership schools and NCO academies.

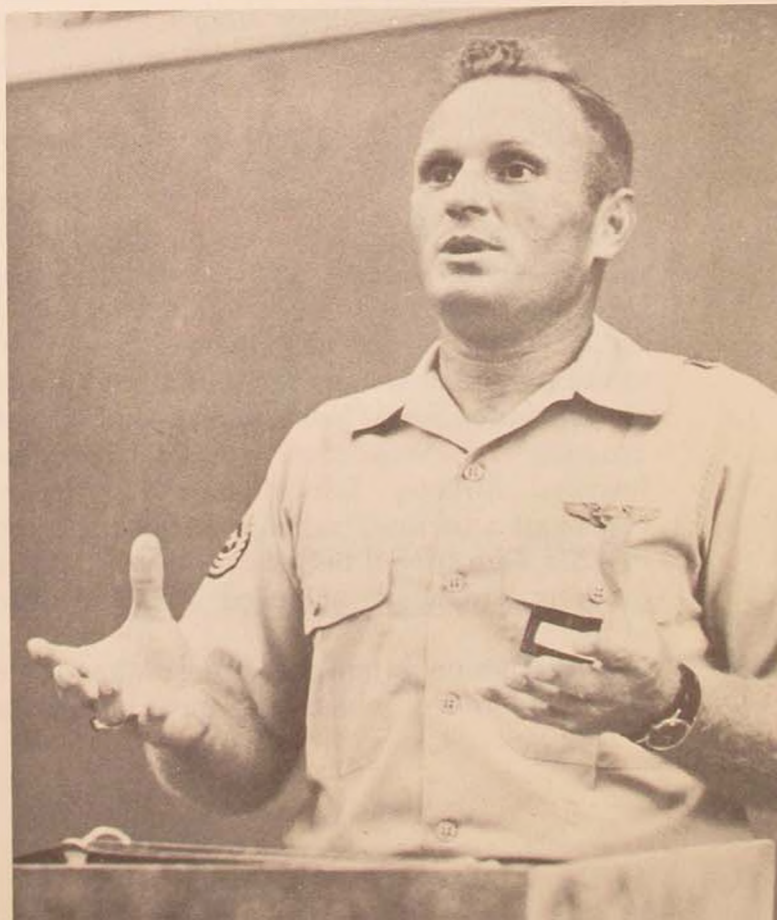
During his stint at an NCO academy, a student is kept extremely busy. Normally his day begins with a reveille formation at about 0530 hours, six days a week. He marches in formation to and from class. His classes are about 50 minutes in length, with a ten-minute break in between. His school day ends with an athletic or drill formation late in the afternoon, except on Saturday when classes end at noon. Outside reading assignments keep him busy after classes.

Commanders often take advantage of the pool of NCO experience in an academy class. MAC Commander General Howell M. Estes, Jr., regularly asks students at the MAC Academy to study special command problems and make recommendations for solutions. In effect, the command school serves as a consultant to the MAC commander and his staff.

Students appear to truly appreciate the opportunity they have for professional development, if the results of class critiques are any indication. During the past year, for example, students at the MAC NCO Academy, largest in the Air Force, consistently rated all academic aspects of their course of instruction above 4.5 on a 5-point scale. Other NCO academies have noted similar results. A more significant evaluation of NCO effectiveness resulted, however, from two independent surveys conducted by the Military Airlift Command last year. One survey asked a cross section of graduates to what extent they felt they had improved back on the job as a result of having attended an NCO academy; a similar survey was made of the commanders of the same graduates. The replies indicated that a great majority of former students noted substantial improvement in most areas of performance. Their commanders were even more enthusiastic in their ratings.

In a letter of 12 February 1965 to the conferees at the 1965 Air Force NCO Academy Conference, General McConnell noted the value of the NCO academy and leadership programs: "We know that these programs . . . are essen-

ded Discussion—Most classes at NCO academies conducted as seminars or guided discussions.



Speech Practice—Oral and written communication constitutes 54 hours of the academic curriculum. With instructor help, students evaluate speeches.

tial in providing leadership education. The quality of the graduates has constantly improved as demonstrated by their effective supervision in units throughout the force."

It is obvious that the unskilled worker is as obsolete in the military today as he is in the factory and on the farm. The need to continually upgrade the caliber of all personnel becomes more obvious each day as the complexity of operations and management increases throughout the Air Force. The challenge to NCO academies—as well as other professional military educational activities—is to turn out graduates who can think, act, and communicate more effectively.

All pertinent factors confirm that today's Air Force NCO's are more intelligent and better educated than they have ever been. President Lyndon B. Johnson, speaking before a National War College audience, obviously was not referring to commissioned officers only when he said, "The military career today demands a new order of talent, and training, and imagination, and versatility."[4] Today over 70 percent of all enlisted personnel on duty in the armed forces are high school graduates, compared to less than 55 percent in 1955.[5] In a typical class at the MAC NCO Academy, about 95 percent of the students enrolled possess a high school diploma or its equivalent; approximately 20 percent have some college credits. Students at other NCO academies have similar academic backgrounds.

The overall NCO academy program has continued to gain stature. Another major step forward was taken in the fall of 1965 when the basic Air Force regulation on NCO academies and leadership schools was thoroughly overhauled at an NCO academy conference. Quite a significant change, in the opinion of those close to the program, was the revision in the title of the regulation from "Noncommissioned Officer Training" to "Noncommissioned Officer Professional Military Education." This departure from a narrow, training viewpoint to the broader *educational* outlook signified that the program had finally achieved a full measure of maturity.

Another important recommendation of the 1965 conference, which was incorporated in the revised regulation, was the requirement for Air University to prepare and distribute annual bibliographies on the curriculums of NCO academies and leadership schools. This new requirement should greatly enlarge the scope of reference material available to students and faculties. Procedures for the acquisition of such reference material are being investigated at the present time.

Problem Solving—During the five-week course, students participate in problem-solving sessions, some of which involve actual Air Force problems.

The 1965 conference also established the requirement for an annual conference to review and recommend changes in the NCO academy program. Prior to 1965 conferences were held infrequently, the last previous one being in 1959.

Perhaps one of the most unusual features of the entire NCO academy program is the sponsorship of graduate associations. Authorized by the 1965 revision of AFR 50-39, these associations are chartered and supervised by those major commands having NCO academies. Association chapters are formed with a fourfold purpose: (1) to be of service to local commands and bases, (2) to provide a fraternal organization of NCOA graduates dedicated to the welfare of the civilian and military community, (3) to provide a medium through which graduates can further fulfill their responsibilities to the military and civilian community, and (4) to improve and utilize the leadership, management, and supervisory qualities of graduates through sponsoring worthwhile projects as a group. NCO involvement in association affairs varies considerably, of course, from base to base. Graduate association chapters are providing both a valuable outlet for graduates' talents and an effective management tool for base commanders. Senior commanders have recognized the worth of the NCO graduate groups and have encouraged full support for them.

In March 1966 the commandants of all USAF NCO academies and representatives of interested major commands made a number of recommendations to Headquarters USAF at their annual conference. One significant recom-

mendation currently being reviewed at the Pentagon pertains to the feasibility of a single major command, such as Air University, taking over the responsibility for the administration and operation of all NCO professional military education. Implied in this recommendation is the consolidation of existing NCO academies and leadership schools, plus a more equitable distribution of student quotas throughout the Air Force. The distribution is distorted at present because some commands do not operate either NCO academies or leadership schools.

Another important recommendation concerned the stiffening of accreditation requirements for NCO academies and leadership schools. Currently these requirements are considered by many in the program to be minimal. The development of new accreditation standards in such areas as facilities, faculties, teaching methods, and equipment is calculated to raise the level of the entire program.

IT WOULD APPEAR that in the first fifteen years of their existence the NCO academies, like Topsy, just "growed." It now appears, however, that the great need which NCO academies fulfill finally has been recognized and appreciated.

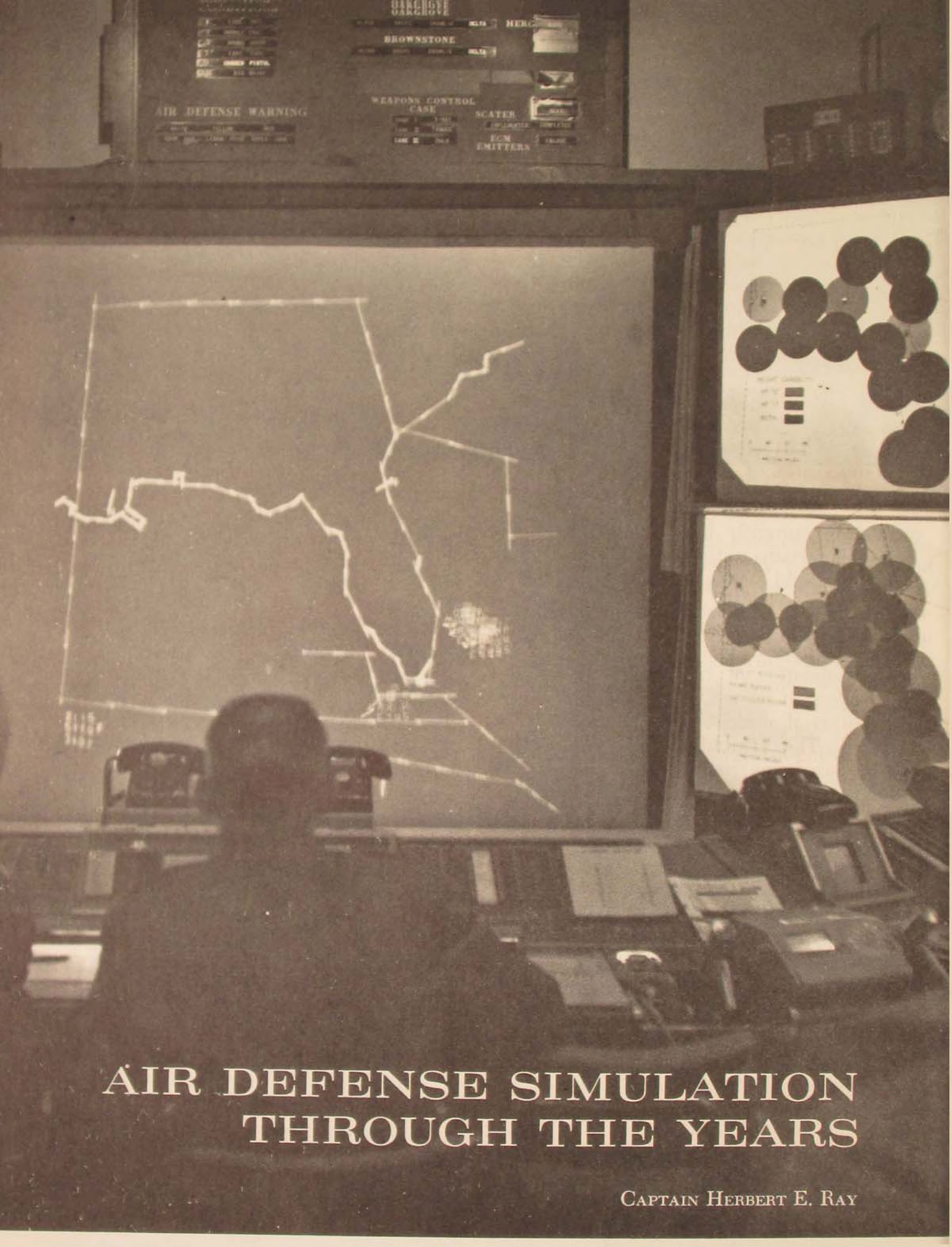
General McConnell, in speaking of NCO's and their responsibilities, has said, "The ability of the NCO to perform his job largely depends upon the degree to which he has been informed and supported."[6]

NCO academies have obviously played an important role in the Chief of Staff's expressed desire to keep NCO's fully informed. Despite recent cutbacks in part of the NCO professional military education program caused by the demands of Southeast Asia, it is apparent that the value of the program is firmly established. From this observer's viewpoint, there is no doubt that the program is essential to the full professional development of NCO's in the United States Air Force.

1380th School Squadron (MAC)

Notes

1. *Supplement to AF Policy Letter for Commanders*, No. 7, July 1965.
2. *USAF TIG Brief*, Vol. 17, No. 3, 18 January 1965.
3. "NCO Leadership Training in the USAF," *USAF Fact Sheet*, 6-65.
4. *This Changing World*, Armed Forces Information and Education, DOD, For Commanders, Vol. 4, No. 6, 15 September 1964.
5. *Ibid.*, p. 2.
6. *Supplement to AF Policy Letter for Commanders*, No. 7, July 1965.



AIR DEFENSE SIMULATION THROUGH THE YEARS

Captain Herbert E. Ray

THE FULL battle staff is in position. The air defense commander watches the progress, analyzing each move as dozens of enemy aircraft enter his area of responsibility.

Each man on the battle staff busily carries out his duties. The intelligence officer constantly evaluates simulated inputs and advises the battle commander accordingly; the fighter officer quietly monitors the availability of fighter-interceptors and provides information on the latest aircraft status; the communications and electronics officer gazes in all directions, checking the radar operation capability of the prime radars, the status of the computer, and the condition of the electronic displays.

To the uninformed eye, it appears that North America is under attack. Such is not the case. Rather, the entire semiautomatic ground environment (SAGE) operation is being exercised via a SAGE System Training Mission (SSTM).

Two hours later it's all over. The bogies have been splashed, the interceptors are returning to home base, and once again the situation display consoles are showing only routine traffic. Everyone from the commander to track monitors in the surveillance room wearily moves away from the positions occupied for the last two hours.

As the threat of air attack against North America grew in the period after World War II, military leaders realized the need for a relatively inexpensive method of attack simulation to supplement the live missions. It had to be realistic, versatile, and designed to exercise all elements of the Air Defense System.

Prior to official moves toward a compre-

The System Training Program was implemented when manual direction centers acquired special simulation materials and adopted working procedures. Equipment and personnel were located in operations buildings similar to that shown (foreground) at Tyndall AFB, Florida.

hensive training system, commanders of air defense units throughout North America and overseas saw the need for synthetic air defense training, and they filled the requirements as best they could. The procedures and equipment used varied from squadron to squadron, but the effectiveness was quite limited.

The early Fifties saw the beginning of disorganized efforts in this direction. Simulated attack environments were indiscriminately concocted at the start of the operations crew's eight-hour shift. These training missions were unsophisticated, poorly planned ventures into air defense simulation, and the crews soon became bored with the whole effort.

Imaginary tracks would be originated from various locations, and the position of these "canned tracks" was passed by voice circuits from radar site to radar site. This gave the plotters standing behind the Plexiglas boards an opportunity to practice writing backwards—a rather deficient total result. As veterans of this era of radar operations crew training will attest, a little of this type of activity went a long way, especially in the wee hours of the morning.

Even though this training was dull and laborious to say the least, there were times when "Yankee ingenuity" devised ways and means to "put a little sparkle into the training schedule."

Those on aircraft control and warning (ACW) duty in northern Japan during the early Fifties vividly recall running simulated tracks toward Russian territory. Soon the heavy radars adjacent to Sakhalin and the Kuriles were painting live Russian aircraft that had scrambled out to patrol the line against aircraft reportedly in the area. Obviously, other ears were tuned to the HF net. The thought of scrambling pilots out on a wintry Siberian night in pursuit of a simulated track apparently beefed up the "fun factor" for ACW personnel.

Such locally devised training programs served to pass the time, perhaps, but the value in skill upgrading was, of course, quite restricted.

During 1952, plans were initiated for the System Training Program (STP). The RAND Corporation began work on a program designed "to exercise and train the various levels of the operational air defense system through realistic simulated inputs of great variety and complexity." Purpose? To increase the operational effectiveness of the system.

An air defense direction center was set up at RAND headquarters in Santa Monica, California. In order to observe the system's behavior under various situations, methods were developed for simulating the system environment. Following each mission the crews were given information about their performance and allowed to discuss and interpret their actions. Crew improvement was immediately obvious. These procedures and techniques were then adapted for use in training crews at operational direction centers. Following a highly successful test in an Air Defense Com-

During the early Fifties USAF plotters under simulated attack conditions logged positions of "canned tracks" by writing backwards on Plexiglas maps.

STP enabled the manual direction centers to train their intercept directors and technicians by simulation before letting them control live aircraft.

mand division, STP was accepted for installation throughout the command.

According to the people who designed the program, STP is based on five well-established learning principles.

Train a functionally complete unit. The missions are designed so that they may be conducted at any level in the air defense network; however, they are usually run on the air division level. Such a unit is small enough to make regular training practical, yet is functionally complete—a unit that receives, processes, and takes action on all essential information generally available within the system.

Simulate the real environment of the system. In order to maximize the transfer of training to actual operations, the simulation of air defense environment must be sufficiently realistic to enable the system to respond as if it were a real situation.

Train the system to operate under stress. If the system is to develop and maintain a high level of proficiency, it must be trained to handle a variety of stress situations effectively. STP problems can be produced that contain heavy traffic loads, realistic invader attacks, electronic countermeasures (ECM), battle damage, and other stress situations not encountered in day-to-day routine.

Give the system knowledge of results. If members of the system are to improve in their performance, they must know the results of their actions. During system training missions, detailed performance records are kept by trained observers. These records permit operators to systematically evaluate their actions, identify specific problems, and work out solutions.

Train the system frequently. Operational personnel require continual practice in dealing with a variety of air situations if they are to develop and maintain flexibility in the use of system skills and procedures. As more and more of the aircraft control and warning squadrons and air division control centers implemented STP, an upsurge in personnel proficiency was apparent.

In the manual system, which carried the entire air defense load prior to the advent of SAGE, simulated blips appear just as though they were actual aircraft radar returns. These simulated targets come from a special problem film that is fed into the AN/GPS-T2B problem-reproducing equipment.

"Old heads" of radar operations at the aircraft control and warning level recall that it didn't take long to see that these missions were going to be useful far beyond their expectations.

In the beginning, the simulated problems were run to exercise each ACW operation separately. Later, of course, the adjacent subsectors were included in the division-wide missions, and the scope of the training was further broadened. Lateral tell between stations had always been a problem. Now a comprehensive training aid had been developed to rectify this persistent problem of maintaining tracking continuity.

Thanks to STP, a realistic method of improving the proficiency of the weapons controllers and radar operators also was available. Of course, simulation lacks the overall psychological impact of live activity, but it provided a good program to bring the weapons director's experience level up to a good jumping-off point for the live intercept work.

Dozens of humorous stories are told and retold concerning some of the weird happenings in air defense operations when STP first came on the scene. Hopefully, no records exist showing how many times live interceptors were scrambled against a track that had somehow lost its simulated identity.

Embarrassing? Yes—but our people were learning. Perhaps "the tail wagged the dog" for a while, but ADC's air defense boys soon cut the monster down to size and made it work for them.

Those who worked in manual air defense years ago and those assigned to manual operations today recall the large numbers of training aids and materials involved in running a mission. The problem aids package consists of films, punched cards, magnetic tapes, maps, scripts, and lists. They contain much data, of course, used by the operations crews to create a synthetic air defense situation and to observe and record the system's performance during a training mission.

As students of air defense will remember, it soon became apparent that the manned-bomber threat against North America was changing. The Soviets had developed and reportedly would produce hundreds of supersonic jet bombers. To counter this threat, air defense planners saw a two-pronged need for the future: (1) an all-supersonic jet interceptor force and (2) a radar detection and weapons

system capable of responding to this jet-age threat. Thus were born the century series of all-weather fighter-interceptors and SAGE.

Here was a system with a capability of coping with the jet-age air defense needs, a *modus operandi* by which the Air Force could summon the forces of computer technology to assist it in the complexities of defending North America against supersonic manned-bomber attack.

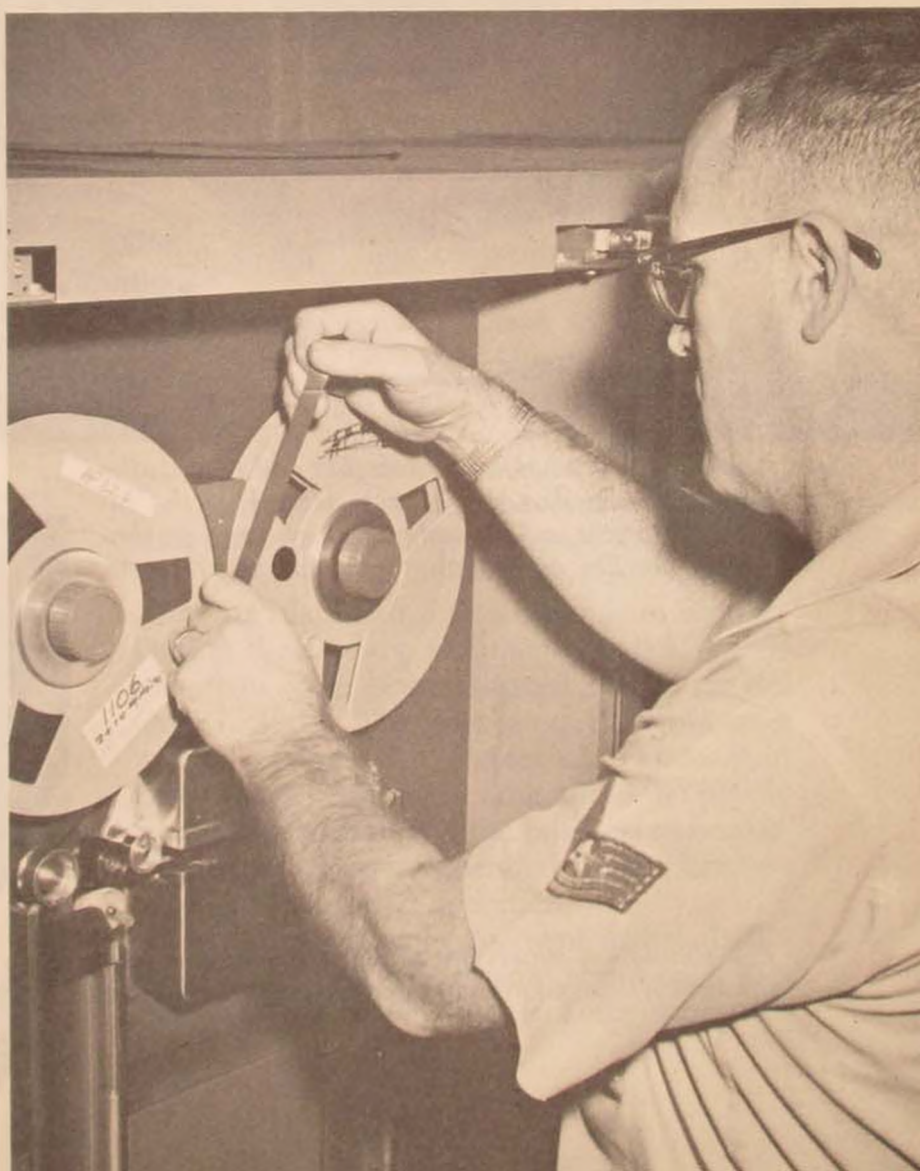
Development of SAGE began in 1951. The Lincoln Laboratory, established under Massachusetts Institute of Technology, used a Whirlwind I computer in its initial research into the semiautomatic ground environment. Seven years of testing and development culminated in the first operational sector in 1958.

What about training? The need for day-to-day personnel proficiency development had been proven in the advanced stages of the manual program. It would no doubt be needed in SAGE. Would it be necessary now to go out and design a training system compatible with SAGE? Not a chance!

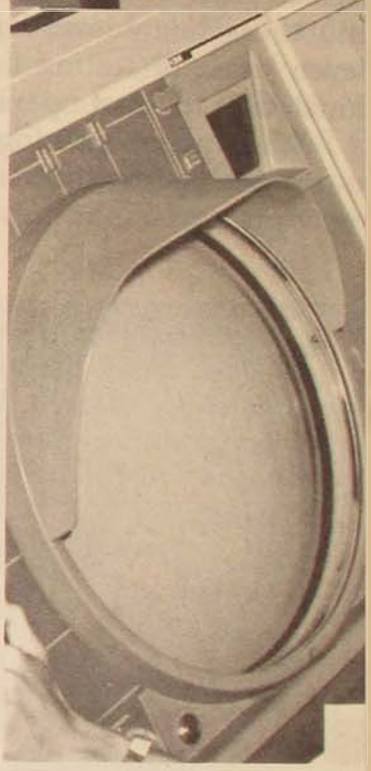
Need for a specially designed training system was clearly defined by air defense planners early in the game. The SAGE System Training Mission program was designed concurrently with the SAGE system and was ready to go when the first sector became operational. This program was developed by the System Development Corporation, formerly a branch of RAND Corporation.

As experienced air defense personnel began to "cuss and discuss" the SSTM program, they found it an old friend (or adversary) dressed up in new and refined toggery. The simulation techniques used for the Manual System Training Program have been carried forward to the SAGE system. However, these

Team members plot their strategy for simulated attack during a SAGE System Training Mission. Weaknesses from previous missions help dictate the makeup of subsequent plans.



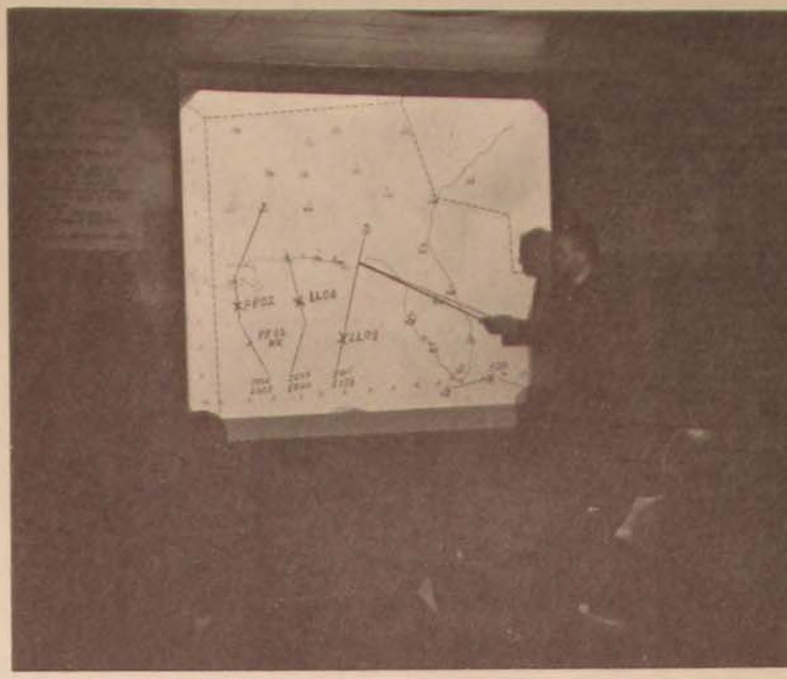
A member of a SAGE computer section loads a tape that will feed simulated flights and situations into a computer, allowing practice intercepts without actual flights.



A training section observer watches and records the voice transmissions and switch actions of the intercept director and his technician, who engage simulated hostiles as though they were live targets.

The simulation supervisor of the training and battle simulation team coordinates and monitors team action.

imulation team members direct their interceptors ›ward approaching enemy aircraft during a simulated ission. By using switch actions, the "intercept pi-ots" are able to guide their aircraft to the target.



At the debriefing, division members discuss the mission results, pointing out strengths and weaknesses in target pickup, tracking, and interception.

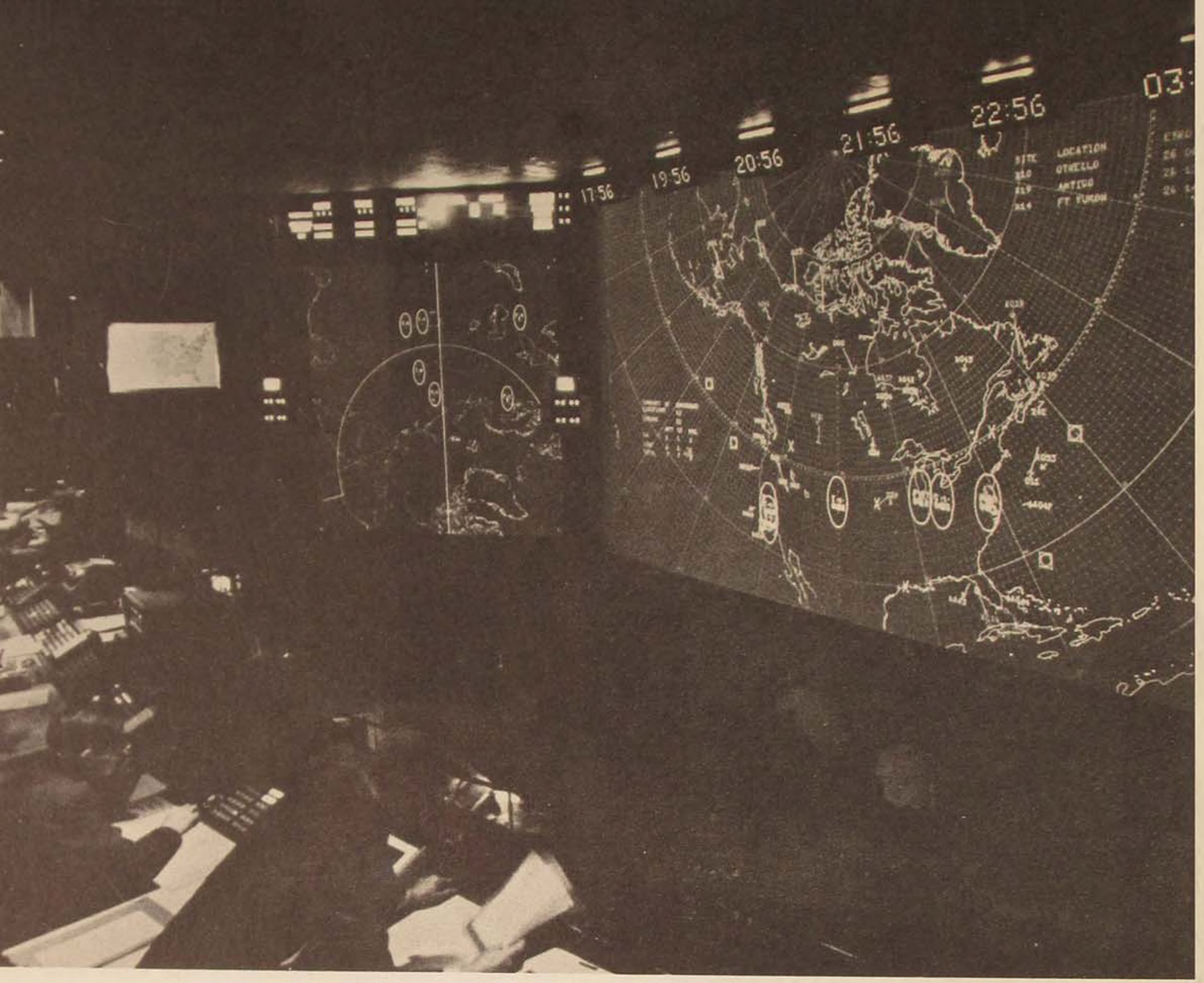
simulation techniques have been expanded to include the SAGE computer, with more emphasis on the man-machine relationship. Even today training requirements are constantly reviewed to keep pace with the ever changing technology of weapon systems and the dynamic man-machine concept.

The SAGE air defense system has been the keystone in North America's air defense for eight years. During that time, operations crews have been exercised on a weekly basis. In addition, once each month the battle staff and battle staff support center are brought into play.

Everyone gets a chance to evaluate his air defense know-how. Although the SSTM's are primarily for crew and battle staff training, the entire NORAD system is exercised quarterly via the "Desk Top" missions.

As discussed earlier, the RAND Corporation and the System Development Corporation (SDC) have since 1952 been involved in developing simulated air defense problems for ADC. During these years, RAND and SDC field representatives have been assigned to the air defense facilities. The purpose of their presence was to oversee the project and assist field units where possible. In SAGE, these SDC people have actually designed the missions to be run. Design, of course, depended upon observed weaknesses in crew operation.

An important development in the design and scripting of SSTM's came about on 1 July 1965. On that date, the Air Force took over



While "Desk Top" missions are being conducted, members of the North American Air Defense Command combat operations center are given the opportunity to exercise their procedures and make judgments regarding the simulated air battles being waged thousands of miles away.

these responsibilities from SDC. This new program is called the Site Production and Reduction System. Military personnel can, through the use of this SDC-developed program, accomplish everything from start to finish in building a simulated war on tape.

So simulation in Air Defense has gone full circle. In the early days Air Force people planned and executed unsophisticated ventures into attack simulation. Succeeding years saw the RAND Corporation and SDC develop and monitor highly effective simulation problems in manual and SAGE systems. The air defense system drilling is now back in the hands of those wearing the blue uniform—not a spur-of-the-moment, locally devised "time killer" but a realistic, versatile training system.

32d Air Division (ADC)

In My Opinion

A PENTAGON FABLE

MAJOR GENERAL GLENN A. KENT

Foreword

It is well known that analyses cannot possibly take into account all the many factors involved in the complex problems of modern warfare. Many factors are intangible and simply cannot be quantified. Even so, it is quite useful to conduct analyses that take into account those things that can be quantified. Such analyses display the outcome —for example, the cost of doing a given job—for a given set of inputs, based on a rigorous and logical treatment of those inputs. But things go astray if the decision-maker focuses only on those things that have been displayed by the analyst, since the analyst can only choose those factors that are amenable to being fed into a computer.

The protest here is against the prevalent practice of decision-makers' ignoring, in effect, those factors that cannot be quantified, even when those factors—intangible though they may be—are sometimes crucial to the decision. Can it be that too much attention is paid to the "dollars"—and "dollars only"—in "cost effectiveness"?

THE SCENE is an office in the Pentagon. The discussion has to do with selecting a new tactical fighter from among several proposals. Some fighter pilots are making (or trying to make) the case that what we should do is select the best d—— tactical fighter that U.S. industry can produce. But they are brought up short by a scholarly gentleman schooled in econometrics who insists that "what we really must do is buy the most 'cost-effective' tactical fighter." Our scholar then adds thoughtfully, "This may not be the most expensive or best."

The fighter pilots proclaim their dismay regarding the overall concept of "cost effectiveness"—it will never take the place of military judgment. But, all in all, when the dust has cleared, one has the feeling that the recommendations based on cost-effectiveness studies will surely have an important bearing on the decision as to which fighter aircraft is to be developed and procured. The fighter pilots seem doomed to inglorious defeat in trying to have their way.

But wait! One lone fighter pilot, more heady than the rest, actually seems willing to take on these veteran analysts in the airy battlefield of econometrics. He rallies his forces with the clarion cry, "We have just begun to analyze!" He states, incredibly enough, that

it is precisely in the arena of cost effectiveness where a compelling case can indeed be made for the "best d—— fighter," and he launches into a lengthy technical discourse to make his point.

"Let us take the following example, gentlemen. Design studies by industry have just been completed. We have five candidate aircraft of varying effectiveness, ranging in cost from X million dollars for the least expensive, Candidate A, to 3X million dollars for Candidate E, the best and most expensive aircraft—at least on a unit basis. Now suppose that with the assistance of a magic computer model we have calculated how many of each type of aircraft are required to accomplish a given overall 'job.' (This job is the same for all candidates.) The computer tells how many aircraft are needed for this 'constant job' if we use Candidate A, how many if we use Candidate B, and so on through E. Now, knowing the cost of each aircraft, one can compute the cost of the overall force to do the 'job.' According to the normal standards of cost effectiveness, the aircraft that 'wins' is the aircraft that can accomplish the 'job' at least cost for the entire force. It may not be the aircraft with the lowest unit cost nor the aircraft with the best individual performance.

"Now suppose that it turns out that the 'force cost' ranged from Y million dollars for Candidate C to 2Y million dollars for Candidate E. Thus Candidate C is the 'winner,' and Candidate E, the fighter pilots' favorite, is a dead last—at least so far.

"But up to this point we have only kept track of one kind of 'cost'—money from the U.S. Treasury. However, there are other 'costs.' So let's go back to the computer and ask it to print out another 'measure of merit'—How many pilots were killed, for each candidate aircraft, in accomplishing the 'job'? We can now plot a 'scatter diagram' (Figure 1) with 'pilots lost' on the ordinate and 'dollars spent from the U.S. Treasury' on the abscissa.

"To remind you, in each case we are accomplishing the same 'job'—with Candidate C for Y dollars and with Candidate E for 2Y

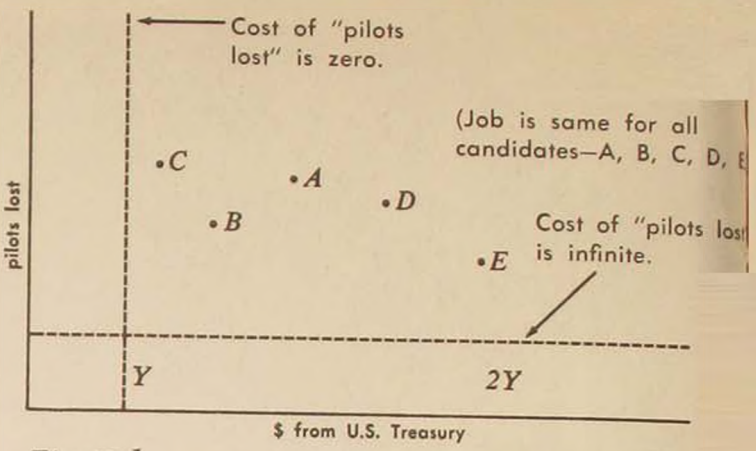


Figure 1

dollars. The first thing we note is that as we spend more money from the Treasury, we lose fewer pilots. This is not unexpected and certainly agrees with one's intuition or, better still, one's judgment. Another thing we note is that Candidate A is 'dominated' by Candidate B in both 'measures of merit.' Candidate A has a higher 'force cost' than B and also has more 'pilots lost' than B. Thus A can be discarded. But how do we choose among the others?

"There is a well-known technique for making this choice. It is very simple. All one has to do is put both 'measures of merit' in the same currency—dollars. Then draw equal cost lines. Note that these equal cost lines take into account the sum of the cost of the two commodities being spent. That is, everywhere on the line we are spending the same amount of money (total), and the candidate that 'wins' is the candidate on the lowest of these equal cost lines. The diagram in Figure 2 illustrates this point.

"Forgive me," the young officer asks, as he peers out over his colored goggles, "for boring some of you with this digression on techniques used by those schooled in econometrics. But I did want to establish clearly how this technique is used in cost-effectiveness analyses. And now back to Figure 1, which portrays our real problem about tactical fighter aircraft.

"Unfortunately, here there is a serious

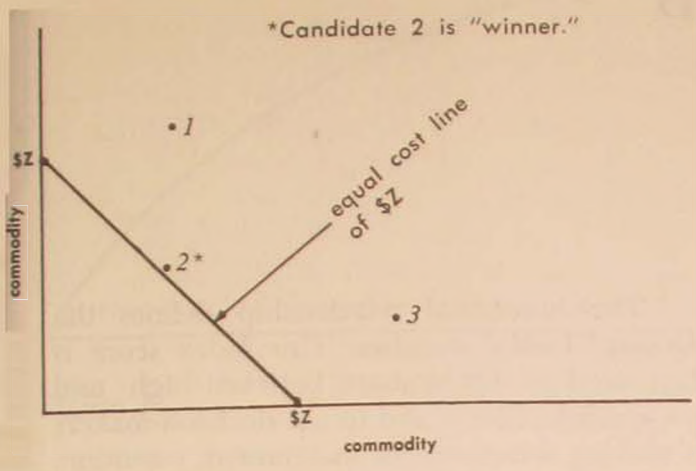


Figure 2

problem of drawing an 'equal cost line.' In the little schematic diagram I just gave you, Figure 2, it was easy—both the ordinate and abscissa were in the same currency, namely dollars. But how do we convert 'pilots lost' to the currency of dollars?

"Note now we are not talking about the cost of training and feeding pilots—that can be measured in dollars and is included in the costs on the abscissa. Rather, we are talking about costs that, for want of a better name, I will call 'political costs.' These costs are rather intangible. It is difficult to put a price on losing Americans in battle. Perhaps you will note that the 'cost' of the commodity on the ordinate (and not the cost on the abscissa) is most prominent in the discussions of the war in Vietnam. The cost might be as high as forcing the U.S. to take fewer measures than the situation demands when based strictly on military considerations. In fact, in some instances, the anticipated cost on the ordinate might be so high that the U.S. would refrain from taking positive action in the first place or be forced to abandon military action even though other factors argued against such a course.

"Suffice it to say, the cost of pilots lost in terms of dollars is incalculable. But we can make some limiting statements. If the dollar cost of 'pilots lost' is zero, then the equal cost lines are vertical and Candidate C is clearly the 'winner.' If the cost of 'pilots lost' is infinite (very large in terms of U.S. Treasury dollars), then equal cost lines are horizontal, or nearly so, and Candidate E is clearly the 'winner.'"

Now our hero presses for the kill.

"I, for one, would not be foolhardy enough to try to establish the slope of such a line. However, it is my contention that the slope is more nearly horizontal than vertical. On this point, I may have some bias. But I am surely closer to the mark than those who do cost-effectiveness analyses with the inherent assumption (by not treating this matter explicitly) that the slope is vertical. I demand that the cost of all commodities be accounted for—'total cost effectiveness' if you will. Once it has been established that *all* commodities are to be considered, including the cost to the nation of losing pilots, I intend to haggle vigorously about the slope of the line."

Hq United States Air Force

ECONOMIC ANALYSIS AND THE "QUALITY INDEX"

A Comment

First Lieutenant John M. Quigley

IN A recent issue of this journal, Major Richard W. Haffner proposed and derived an interesting "Q Index" for measuring the relative quality of Air Force officers.[1] He then proposed that this index be used to construct a rank ordering of all officers in the Air Force or of all officers in a particular career utilization field: "The higher the index number, the more valuable the officer, according to the criteria considered." (p. 60) The author further argued that the "Q Index" can measure the "degree of competence" of an officer and can have wide application in the selection of officers for retention, promotion, and assignment.

In this short comment I shall argue that the "Q Index," as proposed, is seriously deficient and that its usefulness to military managers is severely limited.

The author's model consists of the function

$$Q = T \log (E \times S \times G) \qquad (1)$$

where

Q is the "Quality Index"
T is total active military service (TAFMS)
E is education level
S is skill level
G is military pay grade.

In the model, T is a continuous variable measured in years; G is also continuous, ranging in value between 1 for second lieutenants and 6 for full colonels. E, education level, is quantified on the basis of 4 for officers possessing a doctorate, 3 for master's degree, and 2 for baccalaureate degree; fractional values are permittted for officers with some college training but no degree, for those possessing two master's degrees, etc. The skill level variable S is quantified on the basis of the last digit of the officer's Air Force Specialty Code (AFSC), and the permissible values are 1, 4, 5, and 6.

The functional relationship defines the "Quality Index" number. This index score is then used to differentiate between high- and low-quality officers and to aid decision-makers in making selections for assignment, retention, and promotion. The author gives a few numerical examples to illustrate how the "Q Index" can be calculated both for the individual officer and for the "normal" officer in a given personnel utilization field.

At the outset it is hard to argue that Major Haffner has overlooked the relevant variables. It is obvious that experience, education, skill, and rank contribute to the overall competence of an officer, just as these same indicators contribute to the effectiveness of any executive or manager in the business world.[2]

But even if these four variables are the determiners of quality, an *arbitrary* functional relationship can never be postulated among them.[3] In a problem such as this, the analyst must specify the functional relationship on the basis of some hypothesis if the results are to be meaningful. To analyze the "Q Index," one should recognize that the quality-indexing problem is formally identical to the "production function" of conventional economic theory.[4] The "output of the firm" (in this case the quality of an officer) is some function of the combination of the "raw material inputs" (in this case the raw indicators of quality, T, E, S, and G). In productivity analysis the economist is given the measured quantities of the inputs and outputs, and, on the basis of certain *a priori* hypotheses and assumptions, his problem is to specify the relationships among the inputs in such a way that the measured output is obtained. For many firms and industries, the production function is derived from purely technological considerations. The "Quality Index" problem is further complicated, however. The analyst must first specify the func-

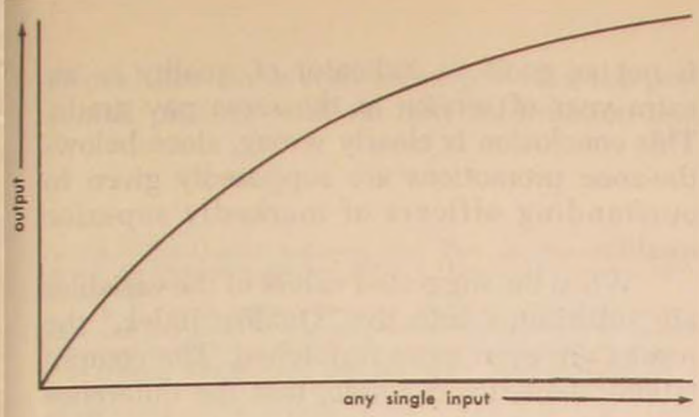


Figure 1

tional relationship among the inputs (T, E, S, and G) solely on the basis of *a priori* knowledge. Then he uses the derived relationship to estimate the level of output (or quality) obtained.

One important aspect of this indexing problem is called the principle of "diminishing marginal returns to an input factor."[5] This principle simply states that if other inputs are held constant, incremental output (i.e., the successive additions to output) will decrease as more units of a single input are added. To illustrate this point, consider the output of a farm as more and more labor is added to constant amounts of land and capital. Initially the increased labor may permit specialization; but fairly soon after these economies have been realized, further applications of labor will result in successively smaller increases in output. (Indeed, one can visualize a point at which further additions to labor will actually decrease output as the workers begin tripping over each other!) Thus the total product curve gradually levels, as in Figure 1.

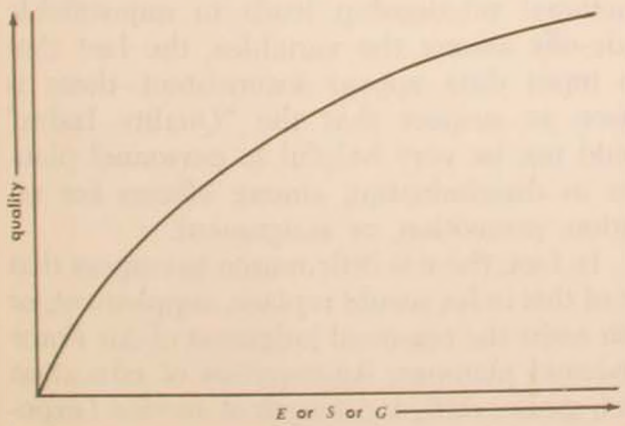


Figure 2

In the proposed "Quality Index" the principle of diminishing marginal productivity is encountered for the inputs E, S, and G; but for some unexplained reason, the principle is ignored for T. The productivity curves, derived by treating as constants all the parameters but one in equation (1), are as illustrated in Figures 2 and 3.

From the curves it is apparent that successive increments of education, skill, and grade increase "quality" by smaller and smaller amounts; but every additional year of service at any grade, skill, or education level increases

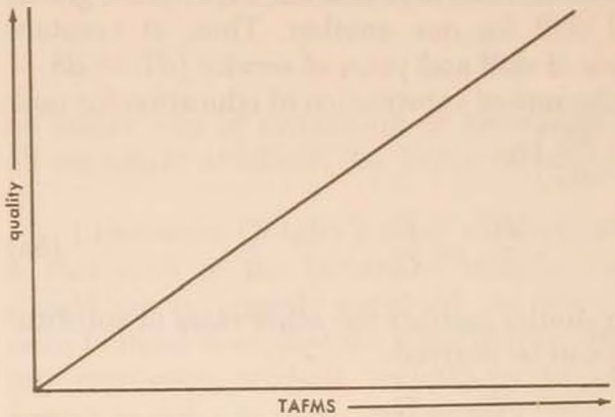


Figure 3

"quality" by *exactly* the same amount! Thus the additional "quality" produced by a baccalaureate captain between the 6th and 7th years of service is *exactly* the same as the baccalaureate captain produces between the 14th and 15th years of service. The "Quality Index" does not seem very rational when viewed in this light. Does it not seem more reasonable that after a certain point (which may be different for each grade or which may be constant throughout the broad career time-spectrum) successive time units increase "quality" by a less than proportional amount?[6]

The "Quality Index" also has strange properties when the economic trade-offs among the variables at any quality level are considered. To illustrate these curious properties, for convenience we express equation (1) as

$$Q = f(T, E, S, G) \tag{2}$$

and take its total differential

$$dQ = \frac{\partial f}{\partial T}\, dT + \frac{\partial f}{\partial E}\, dE + \frac{\partial f}{\partial S}\, dS + \frac{\partial f}{\partial G}\, dG \tag{3}$$

Substituting the values from equation (1):

$$dQ = \log (E \times S \times G)\, dT + \frac{T}{E}\, dE + \frac{T}{S}\, dS + \frac{T}{G}\, dG \tag{4}$$

At a constant level of quality ($dQ = 0$), the above equation shows the trade-offs (or rates of substitution) of education, experience, grade, and skill for one another. Thus, at constant levels of skill and years of service ($dT = dS = 0$), the rate of substitution of education for rank $\left(-\frac{dE}{dG}\right)$ is

$$-\frac{dE}{dG} = \frac{E}{G} \tag{5a}$$

In a similar manner the other rates of substitution can be derived:

$$-\frac{dG}{dS} = \frac{G}{S} \tag{5b}$$

$$-\frac{dE}{dS} = \frac{E}{S} \tag{5c}$$

$$-\frac{dE}{dT} = \frac{E \log (E \times S \times G)}{T} \tag{5d}$$

$$-\frac{dG}{dT} = \frac{G \log (E \times S \times G)}{T} \tag{5e}$$

$$-\frac{dS}{dT} = \frac{S \log (E \times S \times G)}{T} \tag{5f}$$

It appears that there is no logical justification for the above rates of substitution. The first three rates imply that, other things being equal, one unit of education can be substituted for one rank or for one skill level, and overall quality will be unaffected. Why? What evidence supports this? The last three rates imply, among other things, that a below-the-zone promotion is not as good an indicator of quality as an extra year of service in the same pay grade. This conclusion is clearly wrong, since below-the-zone promotions are supposedly given to outstanding officers of markedly superior quality.

When the suggested values of the variables are substituted into the "Quality Index," the results are even more farfetched. The computations show, for example, that the difference in quality between a non-college-graduate and a Ph.D. is smaller than the difference in quality earned by going from the 1 to the 5 skill level. After the first year of service, upgrading to the 5 skill level can be traded off for three additional years of service for baccalaureate-level officers. These conclusions are reached *despite the fact* that upgrading to the 5 level is virtually automatic after two years of service in many AFSC's.

Is the fully qualified captain with 9 years of service really "better" than his contemporary who is promoted below-the-zone to major with 8 years of service? Is the first lieutenant who has no college degree but has 4 years of enlisted experience *invariably* of higher quality than the first lieutenant who has earned a Ph.D. but has only 2 years of service? Is the colonel with no college degree and 25 years of service *invariably* "better" than the officer on the last colonels list who had a Ph.D. and only 17 years of service?

Yet these are the conclusions that the "Q Index" gives the personnel planner.

For all these reasons—the fact that the "Quality Index" is at variance with firmly established *economic principles*, the fact that the functional relationship leads to unjustifiable trade-offs among the variables, the fact that the input data appear inconsistent—there is reason to suspect that the "Quality Index" would not be very helpful to personnel planners in discriminating among officers for retention, promotion, or assignment.

In fact, there is little reason to suspect that use of this index would replace, supplement, or even assist the reasoned judgment of Air Force personnel planners. Aggregation of education level, grade, skill, and length of service (expe-

rience) into an overall index provides the personnel planner with no new information and will often lead to erroneous conclusions.

Directorate of Personnel Planning, Hq USAF

Notes

1. "The Quality Index—A New Tool for Personnel Planners," *Air University Review*, XVII, 2 (January–February 1966), pp. 57–65.

2. It can be argued, however, that to include *both* experience and pay grade in a quality-index relationship is to include the same factor twice. Given the nature of the military promotion system, TAFMS and pay grade are intercorrelated by a factor of $r^2 = .91$; that is, at any given year of TAFMS, an officer's rank can be correctly "guessed" 91% of the time. (These calculations were made using Major Haffner's own data. See p. 60, paragraph 2.) This means that two variables are included in the quality index which, mathematically at least, are virtually identical. In addition to implying inequities in the quality index, this phenomenon gives rise to complicated statistical problems in estimation which are insurmountable.

3. "The logarithmic function is used only to obtain a linear curve, the slope of which is somewhat easier to interpret." Haffner, p. 59.

4. For a discussion of the production function, see, for example, J. M. Henderson and R. E. Quandt, *Microeconomic Theory* (New York: McGraw-Hill Co., 1958).

5. This maxim was popularized by the Englishman Alfred Marshall in *Principles of Economics* in 1890, but its roots go back at least to the Austrian economist Karl Menger in 1871.

6. Let there be no mistake; the argument here is not that an officer's absolute product (or "quality") declines after a certain point in time and grade. But rather, after some saturation point, the extra quality produced by another year of service in the same grade is less than it was for the previous year. This is the economic rationale behind the Air Force's policy that every officer should be considered for promotion at regular points in time, to prevent "quality stagnation."

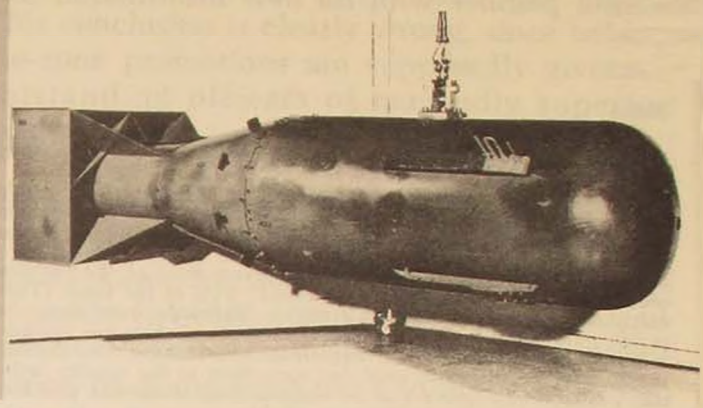
Major Haffner makes reply:

There are two principal points that I should like to stress. First, the "Q Index" was not intended to be a predictive number; rather, it is strictly a comparative number. Lieutenant Quigley is looking for a predictive device as one might surmise from his criticism, and for him the Q Index does not do the job. The second point is that although Lieutenant Quigley has dissected the Q Index with great skill, he offers no better way of evaluating or measuring the all-important attribute, Air Force officer quality.

Lieutenant Quigley's most valid criticism is that each of the factors within the Index should not be equally weighted. As time permits, I intend to explore the possibility of applying regression analysis techniques to these factors in order to refine the basic Q Index.

R. W. H.

Books and Ideas



HISTORY, ETHICS, AND THE BOMB

Dr. Maurice Matloff

OF ALL THE fateful decisions of World War II, none continues to arouse greater interest than the decision to drop the atomic bomb. For the explosion at Hiroshima did more than speed the conclusion of a war; it laid a shadow across the future of mankind and raised fundamental questions of the nature of warfare, politics, morality, and international relations. Twenty years after Hiroshima, in a world poised in uneasy balance between two super powers and faced with the growing spread of nuclear weapons, scholars and writers continue to be fascinated by the steps that led to that fateful decision and the opening of a veritable "Pandora's box."

In the flow of accounts since the end of World War II, certain questions continue to be raised. How did the fateful decision emerge? Was the decision to make the bomb justified? Was the decision to drop the bomb justified? What were the alternatives, and were they properly considered? Was the decision an act of vengeance, of calculated immorality? What was the role of the President, his civilian advisers, the scientists, the military leaders and planners in the decision? What was the relationship among political objectives, strategic plans, and moral considerations in the concluding phases of the war against Japan out of which flowed the decision?

While all the facts are still not known, enough evidence has been accumulated to date to suggest that the story is complicated and multifaceted. There is a scientific side: the brilliant research that led to the development of the bomb, the work of Szilard, Fermi, Oppenheimer, and a host of extraordinary scientists, and the wrestling of scientists with their consciences once the test proved successful. There is a military aspect—from General Groves and the Manhattan District down to the actual delivery of the bomb by the 509th Composite Group over the target, and the relationship of strategic planning to the bomb. There is also a diplomatic-political side—the political objectives of Presidents Franklin D. Roosevelt and Harry S Truman, the unconditional surrender goal, the conclusions of the civilian Interim Committee, the dealing with Churchill and Stalin at Potsdam, and the Japanese, Soviet, and American diplomatic maneuverings in the concluding phases of the war. Most accounts that have appeared to date have chosen to deal with one or another of these aspects.

How did the decision emerge? From the accounts published to date, it is clear that the decisions to make and to drop the bomb grew up outside the normal channels of strategy and diplomacy. The decision to make the bomb emerged in the first instance from prewar de-

cisions of FDR (the preliminary decision of October 1939 largely upon the advice of foreign-born scientists, and the crucial decision of 6 December 1941, a day before Pearl Harbor, to enter the race before the German scientists won through). For a long time during the war, the problem was essentially scientific and technological. Only a handful of officials—civilian and military—knew of the project, and diplomatic and strategic planning for most of the war went on as though such a bomb might never come to fruition. Indeed, when Truman became President in April 1945, he had not heard of it. And one ingenious strategic planner in the War Department who had innocently suggested looking into the military application of atomic energy found himself the center of an investigation.

Only gradually, as the forecast of scientific and technological success became certain, did the prospective weapon become a potential strategic and diplomatic problem. But by then, the framework of decision had changed. Germany was well on its way to defeat. And a weapon that began as a deterrent against one foe was eventually used to end the conflict with another, Japan. From the late spring of 1945 the question of its use became enmeshed with the unconditional surrender formula and with questions of conventional strategy that had grown up in compartments entirely separate from the development of the bomb. It also became enmeshed with questions of relations with our allies, particularly the U.S.S.R. To tell or not to tell the Soviet Union was the question. Should the United States back off from its invitation to the Soviet Union to join in the war against Japan and retreat from the "concessions" made at Yalta in February 1945? Then too there were questions of morality and postwar controls to be considered.

All these threads began to come together in the late spring of 1945, with the succession of Truman to the Presidency, the surrender of Germany, and the formation of the Interim Committee. That committee, a high-level civilian committee established by President Truman at the suggestion of Secretary of War Henry L. Stimson, considered the questions of whether and how to use the bomb against Japan. For the first time the compartmented factors began to be drawn together, and the bomb began to enter the mainstream of high-level policy and planning. After considerable soul-searching, the committee reached the decision to use the bomb, use it against a military target, and without prior warning. It decided to override the objections of some of the scientists, particularly those at the Chicago Metallurgical Laboratory who had second thoughts about its use and were fearful of postwar international repercussions. Nor could the Scientific Panel come up with a feasible alternative to dropping the bomb (e.g., a demonstration) that might lead the Japanese to yield.

It is important to recognize the political and military assumptions that were guiding the American President and his military and civilian advisers at the time. On the political level President Truman continued the objective of unconditional surrender that he had inherited from FDR. Like Roosevelt, he pursued the objective of military victory with the fewest possible American casualties in the shortest possible time. To the military, particularly to Army strategists, the political objective reduced to military terms meant planning for the invasion of Japan. Despite misgivings by Air Force and Navy leaders, the Army strategists saw no alternative to planning a large-scale invasion of the home islands. On the basis of casualty figures, in the light of Japanese resistance encountered in previous island campaigns, the cost of such an invasion could be expected to be high—as high as one million lives. Though Japan appeared beaten, she refused to admit defeat. In the opinion of Stimson, a shock weapon would be required to induce surrender and reduce American casualties. Sensitive as he was to prospective relations with Russia in the postwar period, in the final analysis military necessity in the immediate war took precedence.

The final steps in the decision were taken at the time of the Potsdam Conference in July 1945. A day after Truman's arrival came word of the successful test at Alamogordo. Quickly calling his key advisers together, he once more received confirmation of the decision to use the bomb. By then another alternative to the military possibilities (invasion or bombing and

blockade) and the scientific-technological (use of the atomic bomb) suggested itself: the political approach. By the time of Potsdam Truman and his advisers knew of Japanese feelers to Russia to intercede and mediate a peace with the West. Indeed much of the literature dealing with the bomb and the surrender of Japan has concentrated on raising a cluster of questions about the timing and content of the Potsdam Declaration, the virtue of an outright promise to preserve the imperial institution, and an attempt to capitalize more actively on the known Japanese peace feelers to Russia. It is patently clear that Truman followed the advice of Secretary of State James F. Byrnes, who in turn listened to former Secretary of State Cordell Hull, and that the advice of Stimson and Joseph C. Grew of the State Department to announce the sparing of the imperial institution was overruled. Domestic considerations, as well as fear that repercussions in Japan would stiffen its resistance, evidently persuaded Hull that the time was not ripe to make such an overture.

For a brief moment the curtain of secrecy was pulled aside and Truman let Stalin know that the U.S. had acquired an unusual weapon in its arsenal. Much has been made of Stalin's indifference, pretended or real, though there is reason to believe, in the light of the postwar spy revelations, that he already knew the secret. Although by then the Americans had cooled on the need to have the Russians in the war against Japan, a marked change in attitude since Yalta, it would have been difficult to keep them out, particularly after having urged them for so long to enter. While Stalin told the Americans of the Japanese peace feelers, there is no indication that he told them how urgently the Japanese were seeking to get out of the war or that he was leaving them dangling. In the light of subsequent events, it would appear that he was not in a hurry to close the door on the Japanese bid until he was ready to enter the war, that he was playing for an overt invitation from the Allies to enter the war, and that knowledge of the bomb probably speeded his entry into the war against Japan. In the final analysis, the Americans, aware though they were that an internal struggle was going on in Japan and that the Japanese cables insisted on the preservation of the imperial institution, did not actively pursue the political approach at Potsdam and in the closing weeks of the war. Americans chose to emphasize the references in the cables to "fight-to-the-death rather than accept unconditional surrender." And when the Japanese chose to "ignore" the Potsdam Declaration, which was silent on the position of the Emperor, American military plans and preparations to drop the bomb, already put into motion, were allowed to go ahead.

Much of the postwar criticism of the American decision revolves around the steps taken or not taken at Potsdam vis-à-vis the Russians and the Japanese. The sequence of events is well known. On 6 August Hiroshima was bombed; on 9 August Russia entered the war against Japan, and Nagasaki was bombed; on 10 August the Japanese sued for peace. The evidence suggests that the Russians probably speeded their entry into the Japanese war, but there is no clear evidence that the Americans decided to use the bomb to try to forestall Russian entry.

While the basic lines of the story are now familiar through the works of Hewlett and Anderson, Feis, Butow, Groves, Stimson and Bundy, and a host of others, new accounts focusing on one or another aspect of this fascinating story can be expected as we get more perspective on the decision. Two accounts have recently appeared: one by Giovannitti and Freed, titled *The Decision to Drop the Bomb*,† is subtitled "A Political History"; the other, *The Irreversible Decision, 1939–1950*,†† by Batchelder, stresses the ethical side of the story. Both stress the need to understand the decision in its historical context. Both follow the main lines of the story as it has emerged from the basic work of the scholars who have

†**Len Giovannitti and Fred Freed, *The Decision to Drop the Bomb* (New York: Coward-McCann, 1965, $6.00), 348 pp.**

††**Robert C. Batchelder, *The Irreversible Decision, 1939–1950* (New York: Macmillan, 1965, $2.45), 306 pp.**

plowed the ground before them. Both are eminently readable, provocative, and interesting books. Giovannitti and Freed, who turned out a television documentary based on their research, have produced essentially a synthesis of the main outlines for the general reader. On balance, they agree that the decision was justified. Batchelder takes a tack somewhat different from most of the previous writers in that his interest is in pursuing ethical considerations at key points along the way to the decision; in raising questions about morality, the bomb, and warfare for the postwar period; and in the need for a new ethic.

It is clear that for this multifaceted decision the particular account the author gives will depend in large measure on what time frame he chooses and what he selects to emphasize within it. Giovannitti and Freed have chosen to concentrate on the period from Truman's accession to the Japanese surrender. Their account is primarily of American leaders wrestling with the problem of whether and how to use the atomic bomb against Japan in the hectic 117 days from 12 April 1945 to the fateful act of 6 August 1945. While their account goes over ground familiar to specialists, some lively vignettes and useful insights emerge. The authors draw interesting portraits of leaders in the stress of decision-making: the President, scientists, statesmen, and military leaders. There is Leo Szilard, the brilliant refugee scientist and one of the original instigators of the atomic project vis-à-vis Germany, in the summer of 1945 whipping up petitions against using the bomb on Japan. As the scientists wrestled with their consciences, Stimson, the old Secretary of War, equally sensitive of conscience and the future judgment of history, weighed the military, scientific, and diplomatic claims and in the end reached the decision that the bomb must be dropped. He agreed with Grew, student of Japan and Acting Secretary of State, in arguing for keeping the institution of the Emperor and thereby softening the unconditional surrender formula. There is Byrnes, newly appointed Secretary of State, experienced in domestic politics, who comes on the scene toward the end and at a decisive point overrules Stimson and Grew. There is Major General Leslie R. Groves, single-minded and dedicated to his mission, conscientiously bent on producing the bomb and using it.

The account goes into considerable detail as to the soul-searching among the scientists and notes that, though many reversed themselves on the issue, there were splits among them even at the Chicago Metallurgical Laboratory in the forefront of the scientific dissent. There is also the portrait of President Truman falling heir to the problem, polling his advisers, and in the end unhesitatingly ruling for the bomb.

Giovannitti and Freed examine the familiar charges and possible alternatives, and they believe that on balance the bomb had to be used. They reach the conclusion that the use of the bomb was justified to save lives and to get the war over with quickly. They stress as a secondary reason that Europe was sinking into an economic morass and that there was danger the Soviet Union might take over Europe as well as the Far East. On this latter point, however, the evidence of motivation of American leaders, it must be noted, is not fully and decisively clear. In summing up the alternatives, the authors do not feel that a prior demonstration of the bomb would have helped. They do offer one qualification: that a prior warning should have been given. In that event, they feel, the Americans might have been spared the postwar feeling of guilt.

On the question of what really induced the Japanese to surrender, the account is not quite consistent. In general it supports the theory of multiple causation—the accumulated effects of the fire-bomb raids and of blockade and economic strangulation, carrier air attacks, the Russian entry, the dropping of the atomic bomb, and the threat of invasion. At other points it leans toward the atomic bomb as more important than the Russian intervention in inducing Japanese surrender. Here, on a point on which scholars are still not in agreement, some of the interviews with Japanese leaders cited in the appendix do not bear out the author's conclusion.

While one may be disposed to quarrel here and there with a specific point or nuance in interpretation, on the whole the authors have

offered a sympathetic and balanced account of the story they have set out to tell. They have presented a lively synthesis, if not a really original account. But on reading the Giovannitti-Freed account, one comes away with a sense of Greek tragedy in the reaching of the decision. Sensitive, conscientious officials found themselves toward the end of a bitter global struggle caught in the toils of war to the point where, as the authors indicate, they could hardly decide other than to use the new weapon. Heightening the sense of ineluctable progression toward the final outcome are the indicators at key points in the account that the primary actors in the drama suffered from a failure of communication, an inability, or even an unwillingness at times, to understand each other. There are the scientist and the political leader who simply did not talk the same language: "If Szilard, the volatile Hungarian, with his quick aggressive mind, his accent, his sometimes brusque manner, made an 'unfavorable impression' on Byrnes, the impression was reciprocated." (p. 64) Even more important were the positions set forth by leaders of the opposing nations—President Truman and Premier Suzuki—on the question of unconditional surrender. "Had he [Truman] wanted to soften his position, he could not have taken the chance of saying so directly, in the face of Congress and public opinion, any more than Suzuki in Japan could soften his position, in the face of the military. Suzuki had to say he would 'fight to the very end.' Truman had to demand 'unconditional surrender.'" (p. 72)

There remains further the gnawing question, Did the United States in July 1945 miss an opportunity to end the war earlier "by failing to evaluate correctly the Japanese efforts to mediate peace through the Soviet Union"? (p. 217) In other words, did the United States, firmly conditioned toward unconditional surrender, fail to read the signals correctly, as some authorities have maintained, and thereby pursue its by then needlessly relentless course toward the destruction of Japan? These examples can be multiplied in the failure of the Japanese and Russians and the Russians and Americans to communicate their intentions in the concluding phase of the war. Whether bridging the gaps would have led to a different outcome is, of course, still a moot point. Indeed, the authors of *The Decision to Drop the Bomb* conclude that the United States could "probably not" have exploited the Japanese peace feelers.

Few will quarrel with the authors' stress that the momentum for the decision had been building since the project was launched. Many of the steps along the way were merely "passive" decisions to let the plans and preparations continue. "In the end the decision was made because a decision not to use it [the bomb] could *not* be justified." (p. 316) More controversial is the authors' contention that Truman came to Potsdam with the main intention of bringing the Red Army into the war against Japan but that in the following 21 days he and his advisers apparently changed their minds. They advance the argument that the use of the bomb as a political weapon against the Russians threatening in Europe and making claims on the Far East was an additional rather than a primary reason. While signs of Russian intransigence were mounting even before the death of FDR and American dealings with the Soviet Union had begun to stiffen in the spring and summer of 1945, the authors' thesis of a secondary and added purpose, insofar as it applied to the Russians and the bomb, remains a hypothesis, however plausible, still to be proved.

In the opinion of the authors, two errors of judgment were made. One was the failure to estimate accurately the destructive power of a single atomic bomb; the second was the failure to grasp the extent of the collapse of communications within Japan which kept the Japanese leaders from learning the situation at Hiroshima for almost 48 hours. But even here the authors hedge—and properly: The second bomb was "probably" not necessary. "But the error—if it was an error—was one of military and political miscalculation, not of calculated immorality." (p. 318) And they doubt that the Japanese would have surrendered earlier than they did even if they had been forewarned of the destructive force of an atomic bomb to be used on their cities. In the final analysis, they conclude, the decision, far from being an act

of vengeance, was one made by men of good faith who primarily sought a quick way of ending a barbaric war with least loss of life. And in the Potsdam Declaration, despite the "unconditional surrender" slogan, they held out to the Japanese the promise of human rights and freedom and retention of their industries.

WHILE Giovannitti and Freed focus on the political, diplomatic, and military strands behind the decision during the last four months of the war, Batchelder concentrates on the interplay of events and moral principles relating to the decision in the period 1939 to 1950. His main concern is to examine the influence of ethical considerations in the making of the crucial decision and to analyze the ethical debate that resulted from it. In narrating the historical context of the decision, Batchelder retraces in the first part of his account much the same ground. Subjecting a longer bite of the recent past to his ethical probes, he too emerges with valuable and provocative insights.

The unique contribution of Batchelder's *The Irreversible Decision, 1939–1950* is the story of the transformation of ethical standards held by American scientists, political and military leaders, and even churchmen under the impact of World War II. It shows how the scientists overcame their moral and professional scruples to enter the race for an instrument of mass destruction out of fear lest Hitler's Germany win the race for the bomb and submerge Western civilization. Their justification was that of the "lesser evil." Later, when the war with Europe was over, many of them, ridden with guilt and fear over the Frankenstein monster they had released, argued against using the bomb on Japan. American political and military leaders entered the war opposed on moral and military grounds to indiscriminate bombing of civilian areas and committed to a doctrine of daylight precision bombing of purely military objectives. Under the demands of "military necessity," they ended by adopting and justifying obliteration bombing against cities and came to regard the bomb as just another military weapon to that end. Despite his later scruples about applying the bomb against Japan, Szilard, a scientist of sensitive social conscience, would have been willing to use it against Germany. Stimson, who had spent thirty years arguing for morality in war, wrestled with his conscience and overcame whatever scruples and uneasiness he had about the judgment of history and postwar relations with the Soviet Union. In the end the practical utility of saving American lives and shortening the war swayed him and President Truman to advocate use of the bomb against Japan. Again it was the choice of the "lesser evil," the impact of tangible, short-range considerations rather than the long-term, intangible consequences. "Churchmen," Batchelder asserts, "proved only slightly more resistant than political leaders to this erosion of moral principles during wartime." (p. 213) Some Christian moralists justified obliteration bombing; others retained the principle of noncombatant immunity but remained silent.

On the basis of his study Batchelder concludes that historical context is important to the understanding and application of ethical principles. What conscientious men favored in one historical situation was the exact opposite of what they advocated in another. Behind the specific choices along the way leading to the final decision lay the hardening American attitude toward the nature, aims, and conduct of the war. The priority of military over political considerations, the concept of total war, the goal of military victory, the concentration on unconditional surrender—all paved the way for the bombing of Hiroshima. The overemphasis on the military aspects of the war led to a shift in attitude toward the atom bomb as the war progressed, from the scientists' original view of it as insurance against its use by Hitler to its being regarded as "just another weapon" to insure military victory. Gradually, under the impact of war grown total, the traditional ethical restraints of the doctrine of "just" war (limited means to a limited end) were twisted out of shape, forgotten, or pushed aside.

According to Batchelder, Americans emerged from World War II prepared in theory, armament, and attitude "for only two extreme possibilities: total atomic war or abo-

lition of all war." (p. 268) Although polls soon after the war showed that the American public felt that the use of the bomb was morally justifiable, leading churchmen regarded its use as morally indefensible. Again the traditional Christian doctrine of the just war was thrown out of joint by the preoccupation with total war concepts of the World War II variety; the tradition was under strain, and Christian moralists, disturbed over the use of the bomb, were in a dilemma. Church moralists, as well as secular strategists, however, overlooked the "middle ground of limited military action."

As the 1950's wore on and no major confrontation occurred between the two major super powers possessing atomic arsenals, and as the conflicts that did break out were limited or brushfire engagements (Korea, Indochina, Suez, etc.), the need for a doctrine of limited war became apparent. Along with the challenge to the inevitability of total war, an urgent need has arisen for a new ethic of limited warfare in the nuclear age, to link morality, politics, and war—to put restraints on the ends and means of war "in support of enlightened and creative national goals." Batchelder believes that the doctrine of just war, far from being outmoded, may gain fresh relevance in the nuclear age.

In hindsight, Batchelder offers perceptive, if not always certain, judgments about the decision. Thus he points to the role played by "ignorance and miscalculation" as well as scientific genius and vision in the decision to make the bomb—an ironical reference to the overestimation of German progress in wartime atomic research. He denies that the atomic bomb resulted in a last-minute change to keep the Russians out of the Pacific war. On the basis of evidence to date, the reviewer believes this author is here on sounder ground than Giovannitti and Freed. Batchelder concludes that American leaders overestimated Japan's ability to resist at the end and underestimated the number of casualties to be expected from atomic bombing. Like Giovannitti and Freed, he feels the bomb was the decisive factor in the surrender of Japan, since it threw the war party off balance and allowed the peace party to win out. The use of the bomb, he concludes, saved lives; conventional means, with or without invasion, would have exacted many more casualties than the lives lost at Hiroshima and Nagasaki. He admits that the bomb probably shortened the war by months. But he also feels that a demonstration against a purely military target, followed by a warning, might have catapulted Japan out of the war without other use of the bomb. At any rate, in his opinion, the bombing of Nagasaki was unnecessary, and he regrets that a stern warning and adequate time between the dropping of the two bombs were not given to Japan.

Batchelder too points to a political failure: that had the peace feelers in the Japanese cables been taken seriously and followed up skillfully by diplomatic and political approaches, the decision to use the bomb might have been averted. He goes so far as to suggest that a "political" rather than a "military way of thinking" might have precluded or tempered the use of the bomb and ended the war by diplomatic means. On this score the account is open to the charge of too facile generalization. The author overlooks the political objectives of FDR in the war, general though they were, and fails to link unconditional surrender with FDR's hopes for a brave new world and a new international organization to keep the peace. Such judgments in hindsight lead the author into the realm of Monday-morning quarterbacking, and his account becomes less certain and hedged with "probably" and "might have." There is no assurance that a "political" rather than a "military way of thinking" (itself a questionable distinction), or a military demonstration followed by a warning and a diplomatic approach, would have necessarily led to any different decision about the bomb.

INTERESTING and stimulating as these two books are, a number of basic questions about the decision remain to be answered. At what point, for example, did the implicit decision to use a nuclear bomb against Germany evolve to the idea of its use against Japan? Or, put another way, when did the notion of the bomb as a deterrent give way to its projected use as just another military

weapon? It appears that FDR was prepared in his own mind to use it—and this was long before the obliteration bombing had its effects on Japan, and long before the peace feelers from Japan began, and long before the Russians entered the war. The agreement he worked out with Churchill at Hyde Park in September 1944 appears to foreshadow the bomb's use against Japan. Neither book has grappled satisfactorily with FDR's motivations and political objectives, difficult enough in the light of available evidence but part and parcel of the story of the decision.

In retrospect, it would appear that the decision to make the bomb was in effect the decision to use the bomb. In this respect, an account focusing on the last four months of the war, after FDR's death, necessarily tells only part of the story: it obscures the full impact of the original decision and its relationship to FDR's approach to problems of war and peace. It obscures too the momentum generated by the decision itself from the beginning, and from this standpoint the last four months may be viewed as anticlimax, rather than climax. This may help explain why so many of the decisions in the concluding phase of the war were essentially "passive" and matters of detail, of *how*, *when*, and *where*. Indeed, members of the Interim Committee later testified that the question of whether to use the bomb appeared to be a foregone conclusion when they met.

Similarly, an account that stresses the hardening of American moral attitudes under the impact of war also tends to obscure FDR's motivations and objectives—in large part based on his reading of the past, of the history of World War I and the period between the two world wars. Thus the doctrine of unconditional surrender, which he announced in January 1943, does not really emerge as a mark of a changed ethical framework during the war so much as it was FDR's rallying response at a critical time in Allied fortunes and a reflection of his interpretation of Wilson's experience with the Fourteen Points, the rebirth of German military power, and the growth of Nazism after World War I. He was determined that Germany should not again be offered escape clauses and that this time she would have to admit that her armies were defeated in the field. The same approach he extended to the other aggressor, Japan.

It is not enough to stress unconditional surrender as the progenitor of an invasion strategy, the abettor of Russian entry into the war against Japan, and the catalyst of brute force, the bomb. Unconditional surrender was consistent with FDR's stand, taken even before the United States entered the war, that it was folly to negotiate with dictators. It was also consistent with his desire to wipe the slate clean and set up a new international order and international organization in which community of interest would replace the old balance-of-power notions. Thus, both accounts, sensitive though they are to the claims of history, are incomplete history and tend to oversimplify the historical and political framework of the decision.

It is also true that FDR rarely recorded motives for his decisions, and so the historian is hard put to interpret and reinterpret on the basis of the scraps he does have. Indeed, the complete story of FDR's part in the decision may never be known. Unfortunately, in this respect, neither of these accounts, which are based largely upon published sources and selected interviews, really advances our knowledge of this part of the story.

Similarly, assuming there had been a viable ethic of limited war, would the decision to use the bomb have been different? Would the political alternative then have been pursued more actively and the "military way of thinking" subordinated? Here too the answers may always remain in doubt. Suffice it to say here that in good measure the difficulties of terminating the war on some kind of rational basis do not appear to have been essentially those of ethics so much as of communication—the unwillingness of the Japanese and Americans to deal directly with each other and the apparent inability of each to read the other's mind correctly at the end. Furthermore, even if any of the alternatives proposed in these and other accounts had been followed (for example, demonstration, warning, or a more active follow-up of the Japanese peace feelers), there is no as-

surance that the other side would necessarily have yielded. Ethics, Batchelder suggests, may be relative, a reflection of the times. They would also appear to be comparative: It takes two to discuss as well as to tango. Whether the Japanese ethic and politico-military matrix could have been affected by less catastrophic means is a question still to be answered. In any event, both these accounts, like those before them, fail to solve the question of feasible and practical alternatives convincingly or completely.

There is much in the story of the decision to drop the bomb and the surrender of Japan for students of warfare, statecraft, and ethics to ponder. On the basis of the experience with Japan, defeat and surrender may be regarded as two separate acts requiring different techniques. The precise causes of the Japanese surrender remain a controversial subject; on the basis of evidence to date, it is safest to assume that multiple factors were involved. While the growing literature on World War II has tended to play down somewhat the effect of the bomb in inducing the surrender of Japan, the bomb is still regarded as an important factor; to many it was the all-important catalyst.

The surrender of Japan suggests that force and diplomacy as the twin arms of foreign policy have as important a role in the termination of a conflict as they have traditionally played in steps leading to the outbreak. The Japanese surrender also raises the question of the need for flexibility in ends, objectives, and even methods in approaching the termination of war. As positions and attitudes harden on both sides during the course of struggle, freedom of action becomes limited and strategy frozen: toward the end the problem of communication becomes especially difficult. In that event, a determined third party, with lines of communication open to both the contenders, is in a favored position and may pick up the chips at little cost to itself. The lack of American receptiveness to the Japanese surrender overtures and the long deferment of the decision over the retention of the Emperor, it may be argued, permitted the Russians to benefit.

Yet, after all the known evidence is carefully weighed, the gnawing question remains: Would the policy-makers in the hard-pressed circumstances of mid-1945 have been justified in a decision not to use the bomb? Twenty years after the event, with all the advantages of hindsight, the reader may well ask himself: Faced with the decision in the summer of 1945, what would my answer have been?

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THE SEMANTICS OF STRATEGY

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NOT TOO frequently there appears a book which, despite its generally unheralded birth, sooner or later is discovered by the *cognoscenti* as being a work both germinal and provocative. I feel that Stanley Hoffmann's *The State of War*† is such a book. The author succeeds in bringing together essays on the theory and practice of international politics and merging them into the meaningful pattern of a complete analysis.

It almost borders on the truistic to make the observation that many students in the main

†Stanley Hoffmann, ***The State of War: Essays in the Theory and Practice of International Politics*** **(New York: Frederick A. Praeger, Inc., 1965, $5.95), 276 pp.**

disciplines of human knowledge may far too often be guilty of remaining immobile, static within set frameworks of thought. This immobility might first take the form of their uncritical acceptance of terms and phrases used to represent "key" concepts within an area of study or to announce principles upon which responsible policy-makers might act. Unless the words of a discipline are frequently examined in terms of their connotative relationships to the real world, too often the abstract verbalizations lose contact with the "actuality" of events, and consequently statements describe "maps" and not "territories." Certainly any degree of semantic confusion is detrimental to clear thought and expression in the area of political science, but particularly in the special province of international relations, such confusion may be tragic. Concurrently, at times, apathy of a kind might affect the unthinking, so that the creative exercise of the intellect working upon the subject matter of a discipline diminishes, and necessary alertness ceases.

It is fortunate, then, that there are qualified scholars who are not bound by the seeming restrictions of words or by the apparent inflexibilities of definitions, who are therefore able to break these barriers of inertia, who are able to "think aside" as Arthur Koestler describes the process), and who are able to get outside the limitations of their own field to gain perspective and re-examine the "axioms" and "principles" that have been uncritically accepted and used and reused without reference to changes in the world. A primary part of any critical re-examination of concepts is an analysis of the meaning of key and crucial ideas. Mr. Hoffmann has done a semantic service for readers, especially for students of international relations and the policy-makers in foreign affairs. Moreover, all literate, thinking citizens should examine this work, for, to re-adapt an observation from Georges Clemenceau and Raymond Aron, strategy is too important to be left to the political scientists! A *sine qua non* for any reader of Hoffmann's book is that he have an open mind, a mind, in fact, ready and willing to be jarred. Chairborne and large-mahogany-desk strategists may turn aside from their precious shibboleths, if they will permit Hoffmann to have his say, for among many other accomplishments he has sifted and sorted out theories and terms that have lost meaningfulness in these critical years of the twentieth century.

Hoffmann aspires to clarity. He succeeds. Among the requirements for a study in the area of international relations, he stresses the need for "pure theoretical research." He feels that good understanding is necessary before action. Many concepts used again and again by political scientists or would-be political scientists are fuzzy, he states, and so he recommends that it is time for an examination to be made of *what phenomena* are covered by *what terms*. He stresses the need for "precise typologies." Hoffmann's hope and realism combine in his stating "political philosophy must include . . . both the quest for an ideal that corresponds to the values which inspire it and the presence of a constant awareness of limitations."

Hoffmann at least is sure of one political reality—the uncertainty that characterizes many aspects of the international relations and policy fields. His observations in this respect recall Heisenberg's principle of indeterminacy —there are so many variants and degrees of uncertainty. Hoffmann does not hesitate to enumerate them and cite their significance to political theorists today. One thing he points out, among others, is that there are uncertainties in strategic-diplomatic behavior; there are other uncertainties that derive from the theorists' belief in the idea of causality in social action in these spheres. Regarding theory itself, Hoffmann repeats important questions from the work of the internationally famous political theorist Raymond Aron concerning how many of the present features of the real international world "invalidate past theory."

In describing the problem of men in the modern world seeking peace, he appropriates the classical myth to which Albert Camus has given new life in our time. Hoffmann writes that man's condition is epitomized in the myth of Sisyphus, whose punishment was to be constantly pushing a heavy rock to the top of a hill, only to have it immediately roll down again. If the rock means for us the problems

and complexities of international relations, we must as realists unsentimentally accept the fact that the rock is ever going to continue to roll. Unmetaphorically, then, we have to do all we can by concerted action to cut down violence. The political scientist feels that if the searchers into theory exercise a healthy skepticism, the "nature of the approach should not hinder the continuance for a search."

Having established the need for re-examination of the meaning of political concepts and having described the mood in which this investigation is to be made, Hoffmann in another chapter turns to one aspect of the historical-philosophical background of a search for theoretical meaning in international affairs. He restores Jean Jacques Rousseau to a place as a theorist on international law, war, and peace, and there is much that is relevant for today's questers after certainty in what the Frenchman wrote. Many of Hoffmann's statements are allied to Rousseau's. For example, both men feel that there is no "general society of mankind"; that nothing else than the human condition has brought men together into a "society." Both Rousseau and Hoffmann are convinced, however, that the roots of violence are not in man's nature. This pertinent historical excursion keeps the reader within the atmosphere of realism in which Hoffmann continues his analysis.

Many readers, I feel, may be surprised to note the contemporaneity of Rousseau. His views on war are indeed less assuring than those of the more famous Hobbes. Hoffmann concludes that, in our century, war derives many times from the fragmentation of power among states. Very often, *interdependence*, instead of fostering good will, works in the opposite way and breeds suspicion and antagonism.

Further along in his examination, Hoffmann labels the idea of restraint in "a common interest" by the great powers as fictitious. Because of his awareness of the extensive examination of international relations and systems made by Rousseau and Kant, he hears in the background of any twentieth century discussion purporting to focus on world peace as a goal echoes of the permanent dialogue between Rousseau and Kant.

The transition which Hoffmann makes to what he feels to be a necessary analysis of international law is a natural one after the discussion about Rousseau and Kant. He is cautious as he proceeds carefully to examine and describe international law vis-à-vis domestic law. International law, he finds, is characterized by a low degree of institutionalization, by numerous gaps, and by the exercise of limited authority.

International law, he well emphasizes, is "caught between the Charybdis of universality at the cost of vagueness and the Scylla of precision at the cost of heterogeneity." His metaphors are again exact and appropriate. Imaginative readers, conscious of his employment of such figures of speech, might well regard the author as an alert and intelligent Ulysses fit to perform this extensive odyssey through the realms of international politics from the Hades of limited war to the Aeolian winds of endless political bargaining.

Concluding, Hoffmann finds among the gaps existing in international law the omission of any definition of the "upper limits" of airspace. Again, there is an uncertainty about traditional rules as well as the widespread belief that present international law contains much that is obsolescent, much that reflects only a dead system. After examining many of these factors, Hoffmann feels that numerous social scientists do not study international law because they think they would be studying that which is irrelevant.

Hopefully, the author believes that a historical sociology of international relations would help "to put the study of international law in situation." No one concerned with these very important matters should avoid, according to Hoffmann, a study of the underlying political realities. The approach he thinks best is that of looking at and underlining the "links between international law and historical international systems." He feels that the social scientist can contribute much to this task, which must be approached with a certain amount of modesty. By so doing, they may achieve an "inventory and delimitation of uncertainty."

Hoffmann is admirably frank in focusing upon what he considers the weaknesses of

America's approaches to her international problems. One great shortcoming, in his eyes, is clearly demonstrated in what he identifies as America's "engineering approach to solutions." For him there is too much reliance upon this type of solution, creating an apparent mood of certainty which in fact is not justified by and does not correspond to all the aspects of reality. In addition, he shows that there are discontinuities in America's policies, a fact which indicates America's interest in only the immediate solution. Situations arise that are unanticipated, and America finds herself improvising solutions and thereby constructing, at best, a piecemeal policy. Allied with these negative aspects are the qualities of impatience and of faith in an omnipotence on the part of her policy executives.

A restraint of another kind which Hoffmann discovers working against the proper execution of policy is the application of Parkinson's Law. While a number of mushrooming agencies may provide positions for many worthy citizens and experts, there is a proliferation of personnel in the field. Consequently, this explosion in the number of commissions or agencies of experts makes it difficult to secure a consensus among those who have a hand in foreign policy.

After his frontal attack on the shortcomings in the execution of American international policy, Hoffmann expresses the hope concerning the international situation that there might be a gradual change in the "game" and in the "rules of the game." He even envisions an end to bipolarity. One way he sees in which history might favor American policy is in situations where Soviet plans of domination over new nations show themselves. Then America's exercise of respect for the national independence of the emergent nations might result in a positive policy.

Hoffmann reserves his final negative criticism for game theories. He is of the opinion that the combination of variants in any conflict situation is too abstract and therefore predictions regarding outcomes cannot be made with accuracy. Games and solutions do not and cannot take into consideration the interrelationships and the interplay of personalities and characters in war. Rounding the circle then, Hoffmann comes back to the many types of uncertainties that exist for the problem analysts. At the heart of the matter is the basic "conceptual uncertainty" regarding what particular abstractions mean or do not mean. Uncertainties surround as well the factors of time, geography, and the number of nuclear players involved. Appropriately, when he comes to examine the matter of technical uncertainties related to a nation's search for invulnerability, he recalls Franz Kafka's neurotic animal searching for "peace and security" and frantically digging a burrow in many directions to avoid feared dangers.

The great paradox in the present system is the need for force coupled with the fear of it. He sees the present system as dual-faced: one of the faces is that of bipolarity—power in the hands primarily of the Soviet Union and the United States. The other face is that of "polycentrism" in view of these same powers' impotence to use nuclear weapons. Hoffmann feels that the facts of weapon proliferation and the concurrent and continuing paradoxes of instability and stability in international affairs must give the knowledgeable reader pause for deep and extended thought.

With clarity still, Hoffmann confronts a few of the paradoxes regarding war. He points out that war on the one hand might appear to be "the outlet of barbaric impulses," yet it results, in actuality, from man's identification with the state in which he is a citizen. Consequently man's acts in war result from or are involved with an ambivalence; the feeling of community, Hoffmann indicates, often demands sacrifice.

He concludes too that violence in the past may have led to beneficial changes but that today's tragedy springs from the "autonomous growth of the means of war." Whether we like it or not, the total wars of our century have brought about the extreme in dislocation, the predominance of annihilative aims in society, and the militarization of our peacetime economy. War in this century has proven dysfunctional. In the last analysis, then, in our era the tragedy of war, Hoffmann avers, may blot out meaning.

One with the tone and the approach is his conclusion about the degree of "indeterminacy" that exists in international relations and systems today; in fact, for him, indeterminacy becomes a prerequisite for the freedom of the policy-makers as they choose a course. Questions essentially revolve about the "margin of freedom" enjoyed by the "effective units in international relations." Significant are the queries as to how much choice exists and how effective the choices will be once they are made. It is up to the social scientist to define the constraints on policy-making and to exploit the uncertainties of his examination. Hoffmann closes appropriately by pointing again to what the uses are of the social sciences: to show the limits of our knowledge and to provide tools for analysis.

Hoffmann hopes that the facts of international life and relations will ultimately, but soon, move in the direction of international law. He writes that if we are "given the quasi certainty of annihilation," then "we must use the freedom we have" to reach "a world without a major war."

Hoffmann's examination, then, deserves consideration by the political scientist, but certainly not by him alone. It should be read carefully by the discerning and discriminating historian (military or civilian), by the sociologist, and by the military policy-maker. Each is sure to agree that in depth, perception, and in coverage this work equals the best studies in this field. In my opinion the book is essential to clear thinking, understanding, and theorizing about the "state of war."

The great relevance of Hoffmann's book lies in its questioning approach and the inevitable disturbing effect it will have on thoughtful readers. The work is directly concerned with the discipline of political science, to which many disparate elements of the Air Force have committed themselves. Individuals responsible for the formalized and extended education of the Air Force officer have a double obligation to read, to absorb, and to study this work. Knowledge of the problems of which Professor Hoffmann writes is especially important to the Air Force policy-makers or power wielders, for indeed action or inaction by members of the military often may significantly augment the complexities of problems in the foreign relations field.

Inevitably, Hoffmann's book will have its effect upon such analysts as Huntington, Janowitz, Rapoport, and Lasswell, and their reactions will appear and be read in many places. Until then, the literate and alert citizen should take up the work for serious reading as a simple matter of conscience. Hoffmann writes: "It is man's task to enlarge the margin of freedom, to strengthen the conditions which are conducive to life as against those which are conducive to death." It would indeed be a disastrous mistake in our individual life and in our national life if we were caught, as he phrases it, "in stereotyped alternatives of thinking."

Yorktown Heights, New York

ON KNOWING YOUR ENEMY

MAJOR ALLEN F. CHEW

RAYMOND GARTHOFF'S latest book† should be of some interest to the American officer, even though it is not as valuable as some of the author's previous works. His *Soviet Strategy in the Nuclear Age* overshadows the present volume in clarity and cohesion, being a concise, factual distillation of post-Stalin military views as reflected in Soviet profes-

†**Raymond L. Garthoff, *Soviet Military Policy: A Historical Analysis* (New York: Frederick A. Praeger, Inc., 1966, $6.50), 276 pp.**

sional service periodicals. In *Soviet Military Policy*, Dr. Garthoff has attempted, as he says, "to coordinate historical, political, sociological, strategic, and 'Kremlinological' approaches." It is not surprising, therefore, that he has produced a work of uneven quality: best in those portions dealing directly with military policy, which is his field of primary competence, and weakest when concerned with historical analysis. Since it is all too easy to criticize, let us first note the book's strong points.

Chapters 2 and 3 discuss the Soviet officer corps in its social and political setting, clearly and concisely tracing its evolution from tsarist times to the present. Here Dr. Garthoff provides penetrating insight into the status of our counterparts in the camp of our strongest potential enemy. Many a U.S. general officer may covet his Soviet counterpart's relative immunity from interservice rivalry, but the reasons for that immunity—and some of the results—are not always enviable.

The author is in his own field of expert specialization when discussing contemporary Soviet military thought in Chapter 5. Among other aspects, he examines current Russian pronouncements in the debate about the probable length of a general nuclear war. Prior to 1960 the Soviet leaders held firmly to a belief in a protracted war; since then, one can find conflicting views in their military press. On the one hand, there are arguments for stockpiling resources (increasing "state reserves"), dispersing and duplicating industrial capacity, etc., in order to maintain production after hostilities begin. On the other hand, there have been at least a few public expressions of the belief that a nuclear war could not last long, with a corresponding emphasis on forces in-being. The *Red Star* article of 7 January 1966 which stated that "rocket-nuclear weapons . . . make it possible to attain *decisive results in war* within the *briefest time* (emphasis mine) is not likely to end the discussion. A cautious Soviet military leadership is still preparing for *both* eventualities.

Pertinent to this dispute is the question of the value of mass armies and conventional weapons in the nuclear age. Dr. Garthoff briefly notes this issue but does not develop it as fully as he did in some of his previous books. Despite sizable reductions since Stalin's death in 1953, the Soviet military establishment still maintains a very strong "balanced forces" nonnuclear capability. The rationale for such expensive additions to the nuclear delivery forces was reiterated in an article by Marshal of Artillery Kazakov in the 9 January 1966 issue of *Soviet Russia*, in which he repeated the common Soviet theme that "a rocket-nuclear war is unthinkable without numerous ground troops . . . ." This conventional force gives Russian planners the option of possibly decisive offensive action without *their* initiating mutually destructive thermonuclear warfare. It also poses profound problems for United States military planners.

Although this particular concept has not appeared in the open Soviet press (to the best of this reviewer's knowledge), the disparity between the conventional forces of the Soviet Army and those at the immediate disposal of the NATO powers in Europe may influence Soviet strategic planning in terms that could present the United States with a terrible dilemma. Assume that an exchange of nuclear rockets destroyed both American and Russian industry and completely disrupted both nations' power, transportation, and communication facilities (the 1965 East Coast power blackout makes this event easy to visualize). Assume also that highly mobile Soviet ground forces speedily dominated Western Europe to the English Channel. With neither the Soviet nor the American economy functioning, the captive industrial capacity of Western Europe could be decisive for world domination. Problem: What would we do—resort to nuclear attacks on the industrial centers of the defeated NATO allies (the Saar, the Ruhr, etc.) or surrender? The avoidance of that dilemma is an excellent reason for strengthening NATO, but unfortunately there are many in Europe who refuse to face up to such a horrible possibility.

The retention of mass armies should not obscure the fact that the Soviet leaders are also emphasizing rocket-nuclear "deterrent" forces. There is a danger, simply because of these large Soviet ground forces, that some uninformed Western observers may continue to

judge Russia's present capabilities by her past performances. It is true that in former wars Russia traditionally relied on overwhelming numbers of troops rather than on technical quality. This even reflected the outlook of many of her own incompetent military leaders in the twentieth century. For example, General Kuropatkin, the Russian commander in chief during the war with Japan in 1904–1905, relied excessively on costly mass bayonet attacks in the face of deadly Japanese firepower. In 1915 there were even notorious instances of infantrymen being sent into the line unarmed, with instructions to secure rifles when their comrades were wounded. Costly frontal attacks by mass infantry formations were also recorded during the war with Finland in 1939–40. Even during World War II manpower was expended recklessly, as in the clearing of minefields by simply charging through them. However, this stereotype of masses of unskilled cannon fodder is no longer applicable to the Soviet Army. While remaining large, it is nevertheless highly mechanized, mobile, and equipped with tactical nuclear weapons as well as modern conventional arms. In fact, even the Red Army of World War II was better than either the Germans or the Americans had estimated. The disparaging opinion that American Lend-Lease "saved" the U.S.S.R. ignores the fact that Hitler's 1941 blitzkrieg failed before Western materiel was received by Russia in any significant amount and that (as Dr. Garthoff notes) most of it arrived *after* Russia's triumph at Stalingrad. An underestimation of the power of the Soviet Army of today could be disastrous.

In this regard, the unfavorable comparison of the Soviet gross national product (GNP) with our own should not be overemphasized because a disproportionate share of Russia's resources has consistently been allocated for heavy industry and military requirements ever since the late 1920's. Stalin's emphatic views on the urgency for industrialization were dramatically presented in his famous speech of 4 February 1931:

> To slacken the tempo would mean falling behind. And those who fall behind get beaten. But we do not want to be beaten. No, we refuse to be beaten! One feature of the history of old Russia was the continual beatings she suffered because of her backwardness. She was beaten by the Mongol khans. She was beaten by the Turkish beys. She was beaten by the Swedish feudal lords. She was beaten by the Polish and Lithuanian gentry. She was beaten by the British and French capitalists. She was beaten by the Japanese barons. All beat her—because of her backwardness, military backwardness, cultural backwardness, political backwardness, industrial backwardness, agricultural backwardness. . . .
>
> We are fifty or a hundred years behind the advanced countries. We must make good this distance in ten years. Either we do it, or we shall be crushed.

Stalin's "ten years" has been indefinitely extended; the program has remained essentially the same ever since.

In the only two instances when this "guns over butter" policy was even partially challenged *in practice* (as contrasted to the *propaganda* emphasis on consumer goods), the challengers were eventually driven from power. The military, in the person of Marshal Zhukov, supported Khrushchev versus Malenkov because of the latter's cuts in military appropriations in 1953 and 1954. Khrushchev's force reductions of 1960–61 and 1963–64 and his announced shift away from defense industry in the fall of 1964 probably contributed to his sudden removal in October 1964. Dr. Garthoff discusses both these instances in detail in Chapter 3.

Other strong points in the book are Chapters 6–9, which present concise reviews of the military aspects of the Berlin Blockade, the Cuban missile crisis, and Soviet relations with China and the nations of Eastern Europe.

Weak points include Chapter 4, which for 32 pages belabors the self-evident facts that Soviet foreign policy is flexible, opportunistic, and expansionist without limit. The chapter as a whole will probably interest only a few political scientists, and it is doubtful if even they will find much value in its five pages of gratuitous language lessons.

Chapters 10 and 11 are mainly a rehashing of Sino-Soviet polemics, containing little that is new to anyone familiar with that controversy. The final chapter discusses the theoreti-

cal and practical relations of "revolutionary" Russia with the "capitalistic" West. While it is well written, it does not tie the book together into any cohesive conclusion. This is, indeed, a general fault of the book, due partly to the author's overly ambitious objective (noted at the beginning of this review) and partly to the fact that it is mainly a collection, with modifications, of Dr. Garthoff's previously published articles.

To a historian, however, the weakest portion is Chapter 1, which creates a negative impression at the very beginning. The attempt to cover most of Russia's complex foreign relations from 1860 to 1965 in 26 pages results almost inevitably in superficial and even misleading presentation. For example, the unqualified description of Finland as "a former Axis power" does great injustice to the gallant Finns. It ignores the pertinent facts that Finland did not sign an alliance with Germany until June 1944; that after capturing what were basically the areas seized by Russia in 1940, Finland deliberately fought a defensive war, consistently refusing Nazi requests to join the attack on Leningrad; and that she fought the Germans in Lapland from September 1944 to April 1945. The United States Government was so far from considering Finland an "Axis power" that it did not even declare war on her.

The single paragraph devoted to the Russian role in the Spanish Civil War may easily be misinterpreted by an uninformed reader as implying that this was merely another Soviet attempt to subvert and take over a country in the interests of world Communism. Actually, Russia's role and motives were much more complex: in the hope of winning Anglo-French support for her current policy of "collective security" against the Axis threat, she was trying to prevent a Franco triumph *without* making Spain a Communist nation, which would only frighten the Western democracies. Eventually, especially after Munich, even the determination to defeat Franco was lost, as *rapprochement* with Hitler was under strong consideration. Dr. Garthoff probably did not intend the faulty impression, but this is the result of oversimplification of complicated issues; the book would have been better without this chapter.

The unqualified acceptance of a Yugoslav Communist's version of Stalin's advice to Mao Tse-tung is also annoying to a historian. Stalin may very well have advised the Chinese Communists to forego their immediate revolution in 1945–46, but this cannot be flatly stated on the basis of such unverifiable evidence.

In a later chapter, another historical error appears. According to the author, the creation of the Comintern and the Commissariat of Foreign Affairs was "a result" of the conflict of interests between Soviet diplomacy and world revolution that was revealed in 1918. In fact, the latter office had been established in November 1917, and Lenin had clearly called for the creation of the new International in 1917 (point 10 of his "April Theses").

A historian could also take exception to Dr. Garthoff's generalizations about tsarist Russia's strengths and weaknesses, but I do not wish to create an unduly negative impression of a book that has some excellent chapters. In general, however, the busy Air Force commander or plans or intelligence officer would be better advised to spend his limited time in reading Dr. Garthoff's earlier book, *Soviet Strategy in the Nuclear Age*. In spite of its date (1958, with slight revisions in 1962), it is still a more valuable work. The author's 1953 volume, *Soviet Military Doctrine*, is also excellent, but its value is now mainly historical.

United States Air Force Academy

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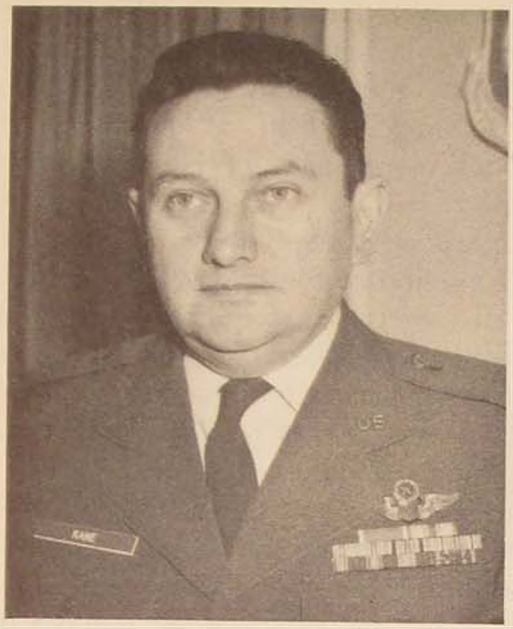

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AWARD

The Air University Review Awards Committee has selected "The Liberal Challenge in the Military Profession" by Major William E. Simons, USAF, as the outstanding article in the July-August 1966 issue of *Air University Review*.

ATTENTION

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