How to Change an Army

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In this November 1984 article for* Military Review*, then Colonel Huba Wass de Czege, lead author for the 1982 version of US Army Field Manual (FM) 100-5, Operations, and the founding director of the School of Advanced Military Studies (SAMS), Fort Leavenworth, Kansas, discusses the basis for change and a methodology for its rational implementation. The article reconfirms the need for SAMS, which was about a year old, and also outlines the need for the Center for Army Lessons Learned, which would not be formally established at Fort Leavenworth until August 1985. Brigadier General Wass de Czege, now retired, adds, "While I make a pitch for SAMS in the article, the issue is how to manage change, and that problem is with us in spades today. The article is still relevant. We are still `tinkering' our way into the future. The 1993 FM 100-5 took a step backward in evolving a sound theoretical basis for evolution into the future."

KNOWING WHY, WHEN and how to change is key to maintaining an Army's effectiveness. Not only is knowing why, when and how to change becoming more difficult, but so is the conduct of war. The Army must always be immediately ready to deploy, to fight and to sustain its operations, even though it is continually evolving. Although armies in the past have always had to do this, the rate of evolution in methods, hardware and organizations and the degree of complexity of modern warfare are, and will continue to be, unprecedented.

This will place great intellectual demands on the profession of arms. While there must be a continued emphasis on pushing technological frontiers, we must be ever mindful that technological superiority alone has very rarely been decisive. What has most often been decisive has been excellence in the knowledge and application of the science of war to forging combat-effective forces and superiority in the practice of the art of war in the conduct of engagements, battles, campaigns and wars.

The US Army is presently undergoing more substantive change than at any time since the period from 1938 to 1941. There are fundamentally new ways to train and organize soldiers. There are 40 major new hardware items (a total of more than 500 items counting all). And there is a fundamentally revised doctrine. These changes respond to new technological opportunities, to new threats and missions, and to a large number of other stimuli. It is the rare individual in the US Army who has not come into contact with the effects of these changes—often dramatically.

Periods of change have never been easy. Decisions about change have always been risk-laden. History abounds with examples of armies which lost because they did not change or because they made the wrong changes. More importantly, the task of maintaining our Army's effectiveness is becoming increasingly more difficult because we must make choices about change at an accelerating rate against a wide backdrop of uncertainties. As the conditions of warfare change, the methods and techniques of our doctrine must evolve with them. Hardware choices, which constitute considerable long-term investments, must be made more frequently as armies become more "capital intensive" and as the range of technological options expands.

The risks associated with these and other choices grow as time between changes becomes compressed. We must become masters at integrating the right changes smoothly and effectively. Knowing what to change will be more difficult and risk-laden as the rapid rate of technology and the relative brevity of future high-to-mid-intensity conflicts combine to create a situation where the consequences of peacetime choices can be irretrievable in war. And knowing how to change so that the effects of turbulence on

readiness are minimized will become more critical as more change is introduced in a given period of time. In short, we need a sound basis for the preparation for and the conduct of war. We need more than just a few "thinkers" versed in "some obscure theories." The entire military profession needs to operate from a higher threshold of theoretical and practical understanding about war. We need to begin a program of deeper and broader education in the science and art of how to prepare for and conduct war. We also need to better organize and institutionalize the study and advancement of both the science and the art of war in the Army. These two needs are inseparably related; we cannot advance in the one area without advancement in the other.

The Problems of Institutionalizing Change

We are a pragmatic Army. We pride ourselves in our ability to solve problems, to improvise solutions and to devise new methods based on a process of rational examination of the readily apparent elements of the problem. But pragmatism alone will no longer be sufficient to maintain an effective Army as the rate of change in missions, technology and battlefield conditions continues to accelerate.

Much like the Wright brothers, Wilbur and Orville, of Dayton, Ohio, Cyrus H. McCormick of reaper fame and that inveterate tinkerer, Thomas A. Edison, we in the Army still rely on "1-percent inspiration and 99-percent perspiration" to get the job done. We discount the role of theory in our business because, as action-oriented individuals, we have little time for it. We tinker our way into new methods, new procedures, new force structures and new weapons. We simply discard and forget the old.

In essence, we tend to deal in practical formulas within the Department of the Army staff, the US Army Materiel Development and Readiness Command, the US Army Training and Doctrine Command (TRADOC) and in the field, and we treat these new "blessed" formulas as matters of faith. But the "just-tell-me-how-to" approach no longer works (if it ever did). The business of war has never been simple, and those who tried in the past to reduce its practice to mere formulas were invariably defeated.

That lesson applies ever so much more today. Modern warfare is much more complex at all levels. Comparing World War II and present formations, we see that present division operations compare more to World War II corps operations in range, scope and complexity and that today's decisions, coordination, movements and execution must be accomplished in less time. Moreover, all indications are that this complexity will increase exponentially and not linearly. We must learn how to deal with these higher levels of complexity both in a theoretical and pragmatic sense. Purely pragmatic approaches which make sense in a sterile peacetime exercise context may not work in real war.

Modern officers need to know more about increasingly complex weapons and hardware. Combined arms integration is more difficult to achieve because we have larger numbers of more effective weapons at all levels; more complex command, control, communications and intelligence (C^3I) challenges; and more complex logistical support requirements. Not being able to spend enough time in simulated combat situations to become comfortable with this increased complexity, too many of our officers seek simple formulas, recipes and engineering solutions to make order of potential chaos.

Today's officers must be able to do with fewer forces than their World II counterparts. Fighting outnumbered and at the end of long and vulnerable lines of supply places a premium on the competency increase this competency.

Rapidly changing technologies and conditions of war make training in today's methods a transient goal. Any specific methods we teach will have decreasing relevance as changes occur on future battlefields. We must, therefore, learn how to learn in this environment. A system of officer education which emphasizes how-to *training* applicable only to present methods, means and conditions will fail to provide the needed *education* the Army officer corps will need to be adaptive in the uncertain future. More officers must be educated in theories and principles which will make them adaptive and innovative.

Trying to devise methods of fighting on the basis of the tinkering approach is much more dangerous today. Such approaches may have been adequate when man was building airplanes out of bicycle parts and tanks from farm tractors. But the age of the F16 airplane and the M1 tank has arrived, and these kinds of equipment are not designed or built by tinkerers. There is a great science behind the building of an F16—a long train of "if this, then that" principles in aerodynamic thermodynamic theory, finely tuned methods and procedures in fabrication and assembly, a knowledge of capabilities of materials and components and so forth.

Of course, there still remains the small component Edison called inspiration—the *art* of design or the judgment and insight of the accomplished practitioner of the sciences. This is analogous to the art in the science and art of war. No matter how scientific one's approach becomes, little can be done in any field of

endeavor without a touch of art. Therefore, we must now apply both science and art to the design of modern systems for fighting and to their proper use in deterring or conducting war.

A System for Introducing Change

In a *Military Review* article, General Donn A. Starry identified several prerequisites for effecting orderly change in military methods and for developing new capabilities:

- *There must be an institution or mechanism to identify the need for change, to draw up parameters for change and to describe clearly what is to be done and how that differs from what has been done before.*
- *The educational background of the principal staff and command personalities responsible for change must be sufficiently rigorous, demanding and relevant to bring a common cultural bias to the solution of problems.*
- *There must be a spokesman for change. The spokesman can be a person…; an institution such as a staff college; or a staff agency.*
- *Whoever or whatever it may be, the spokesman must build a consensus that will give the new ideas, and the need to adopt them, a wider audience of converts and believers.*
- *There must be continuity among the architects of change so that consistency of effort is brought to bear on the process.*
- *Someone at or near the top of the institution must be willing to hear out arguments for change, agree to the need, embrace the new operational concepts and become at least a supporter, if not a champion, of the cause for change.*
- *Changes proposed must be subjected to trials. Their relevance must be convincingly demonstrated to a wide audience by experiment and experience, and necessary modifications must be made as a result of such trial outcomes. This framework is necessary to bring to bear clearly focused intellectual activity in the matter of any change.…*[1]

Starry preceded these comments with a discussion of pre-World War II changes in the major Western armies and the difficulties of introducing new methods of warfare.

The essence of the framework to do this is in place in our Army; the levers and mechanisms are essentially there. The way it is intended to work is that concepts developers in TRADOC try to pull together a vision of what war will be like at some future time like the year 2000. They examine extrapolations of current trends to predict future conditions of war-threat, geographic areas of concern, state of technology and so forth. From these, they deduce the best methods to fight in that future period of time.

This, then, becomes the basis for stating "requirements" for fighting and sustaining systems-the premise being that we have arrived at a stage of development where we can almost invent on demand. Combat developers take these requirements and begin the lengthy process of providing the next generation of hardware. Force designers are then brought into play to design the units around the new methods and new weapons. Once that is done, new doctrinal manuals are published. Finally, the new units are organized around new tables of organization and equipment (TOEs), with new equipment and with people trained to operate the new equipment and to fight according to the new methods in the doctrinal manuals.

Between the initial vision of the future and the final product, concepts and weapon criteria are continually revised as the vision comes into clearer focus, conditions are more accurately gaged and consensus is being built throughout the Army. This system is truly novel and it can work even though it is a radical departure from past military practices. It can be argued that this is the only way to stay current in an era of exponential change in technological capability. This argument can be doubly convincing when the system can be shown capable of reacting to unexpected breakthroughs in technology.

The Need for a "Common Cultural Perspective"

The system described here is a system designed to build an F16 or an Abrams tank, operated by individuals trained and equipped to build airplanes out of bicycle parts or tanks out of tractor parts. In Starry's words, there is need for one final ingredient to make the system work:

In the process of bringing about change, there must first be a conceptual notion of what must be done to fight successfully in the battle environments of today and tomorrow. That conceptual thinking can only result from close, detailed and reflective study of a wide spectrum of technology, threat, history, world setting and trends. That kind of thinking can only be done by imaginative people who have trained themselves or have been trained to think logically about tough problems. That kind of intellectual development is one of the most important functions of our Army school system, especially at the staff college level.

It is perhaps here that we have not yet fully equipped ourselves with the requisite means to achieve change. The US Army lacked that great strength of the German system—the intellectual

prowess and staff brilliance of its general staff officer corps. US Army officers lacked the cultural commonality that was brought to bear through the process of the German General Staff system, and that was the most impressive, if not the most effective catalyst in making it possible for them to change quickly—even under the pressures of wartime.[2]

Starry and others have pointed to the relative ease with which new ideas were accepted in the pre-World War II German system. They have all pointed to the thorough common theoretical preparation of the German General Staff which resulted in little theoretical debate on the "why" level. These officers may have begun their careers in different branches, but they became combined arms officers with a common perspective. This we lack.

Today, there is no common combined arms perspective in the Army. There are strong branch prejudices and biases on many issues involving current change. Not only this but, if there is no common theoretical framework within the officer corps, the rationales for change are not understood and not accepted. At present, we rely on the intuition and the professional judgment of the fine officers "working the system" and their long hours involving numerous "scrubs" and endless coordination. In short, we rely on the 1-percent inspiration and 99-percent perspiration of these officers to find our solutions. This may be all right but, by a more scientific approach, we can replace some of the "perspiration" with "perspicacity."

The Need for Rational Integration of Methods and Capabilities

The development of methods and capabilities must go hand in hand. That is the intention of our new Concepts-Based Requirements System. A scientific approach demands that longstanding principles and appropriate theories guide this process as well.

The "tinkering approach" relies almost exclusively on existing branches of the service to develop improved prototypes of branch-related hardware. A new tank replaces the old tank, and a new howitzer replaces an old howitzer and so on. Occasionally, a new type of system is developed which is radically different. When something appears which does not clearly fit into any current functional category, a problem develops. Note the difficulties encountered by the introduction of the tank before the establishment of the armor branch. The same difficulty currently plagues our full exploitation and development of helicopter and electronic warfare technology. What happens is that branches focus on their principal assigned function and do their best within that charter. We expect no more.

There must be integration across branches and functional proponents based on scientific principles. The theory of combined arms must be applied across branches to determine needs. We must look for holes or gaps in functional capabilities and fill those. The result must be an all-arms organization suitable to execute the preconceived methods derived from a clear-minded application of theory which ultimately is based on longstanding principles. The result should be coherent fighting organizations of soldiers, weapon systems and supporting systems, trained and designed to fight a certain way.

The requisite integration is difficult to achieve today because the "integrating center"-the Combined Arms Center at Fort Leavenworth, Kansas-is not able to overcome the intellectual weight and bias of the branch centers. First, the intelligent and hard-working officers at Fort Leavenworth are themselves biased by branch mentalities-they mentally still wear their branch colors rather than combined arms "BDU (battle dress uniform) camouflage." That is not their fault individually; it is the Army's problem collectively. Second, lacking a clear theoretical framework to do otherwise, they yield the initiative to the branch schools in the generation of new ideas and, as a result, often are able to do little more than negotiate tradeoffs at the margin.

In our school system, we must provide for the development of a combined arms mentality at some point. This should be done at Fort Leavenworth. There must be more thorough cross-training between branches-if not for all, then at least for some. More depth in the knowledge of current capabilities is vitally needed and is more difficult to get on the job because of the complexities of modern weapons. But learning and teaching the capabilities of what is now available is essential, both to the formulation of new methods and the effective employment of present capabilities in the near term.

The Need for Better Theory

There is a need for one more ingredient beyond those outlined by Starry. The growth of theory must feed into this process of change. If the why of current methods is forgotten and the why of new methods is not clearly delineated and recorded somewhere, then we will lack the scientific continuity to make the many corrections to our methods which will be required of the best-thought-out schemes.

The Army has benefited greatly, in recent years, from the use of operations research techniques to help design new force structures, weapons, tactical techniques and so forth. These efforts must continue,

but the results of such studies must be couched in a broader analytical framework which also incorporates the intangible variables in war. Operations research and systems analysis is a method of study. Sound scientific practice depends on sound theoretical constructs to relate pertinent variables.

Therefore, *the fundamental key to controlling and integrating change effectively is to raise the level of the knowledge and practice of the science and art of war in our Army.* Let us examine what the science and art of war really is. Once we have done that, we can approach the business of how to change the Army into the adaptive organism it must become.

A Science and An Art

Modern military endeavor consists of both science and art. There is no question that it is both. Military science consists of the systematized knowledge derived from observation, study and experimentation carried on to determine the nature, principles, means, methods and conditions which affect the preparation for or conduct of war. The art of war is the application of this knowledge to a given situation: to prepare for war, to deter war or to conduct it successfully.

The Science. The science of war consists of a systematized knowledge of theories (a relationship of principles); the systematic development, examination and dissemination of appropriate methods; and the systematic development, examination and understanding of capabilities. The study of methods and means (or capabilities) is always done on the basis of a systematized study and awareness of changing conditions. But there is more to the successful conduct of war.

The Art. It should be known that the commander who brings the best-thought-out theories, the most enlightened methods or the most potent capabilities (either numerically, qualitatively or in combination) to the battlefield is not always the commander who wins. Although these make his task far easier, it still remains a matter of tactical, operational or strategic skill-a matter of judgmental application of the science of war to the conditions at hand.

Such judgment depends on knowledge of great depth which goes beyond a superficial knowledge of mechanical factors and simple force ratios. It depends on inspired practice of the art of war. Sound preparations for war also constitute an art. Time and other materiel or moral resources are always fundamentally necessary to proper preparations. But, beyond this, the skillful application of sound scientific approaches demands the application of sound judgment in the weighing of intangibles.

Developing a Science of War

Having defined the science of war, we must address what can be done to establish it on a more scientific basis. As in any other science, this involves an active and purposeful effort to develop the branches of knowledge, disseminating what has been learned to others in the field and having those others practice the science, develop it further and then pass on the newfound knowledge to still others.

This continuous cycle must turn within a system of institutions designed to sift, organize and store the body of knowledge, to build a body of theory with this knowledge and to educate practitioners of the discipline. Regretfully, we have not progressed far beyond where Marshal Maurice de Saxe found the state of the science of war in the 1740s:

War is a science covered with shadows in whose obscurity one cannot move with an assured step. Routine and prejudice, the natural result of ignorance, are its foundation and support. . . . All sciences have principles and rules; war has none.[3]

It turns out that what de Saxe means by the last sentence is that there are principles, but they are not passed on to others. The forms and methods only are passed down from the successful practitioners; they are learned and taught to succeeding generations of soldiers only interested in the how-to. The why is usually not recorded and is lost. De Saxe points to the successful methods of Gustavus Adolphus, the 17th-century Swedish king, as an example. His disciples were successful in employing the forms of his methods for a time but, not knowing the principles behind his methods, they began losing as those particular methods no longer applied to changed conditions.

This pattern is a continuing one. The forms and methods of Frederick the Great became outdated and were defeated by the new forms and methods of Napoleon Bonaparte. Napoleonic methods were studied and emulated by many armies, including our own. Often, Napoleonic maxims were misinterpreted as conditions changed.

Such was the case when inappropriate organizations and concepts of war lost the war of 1870 for France as new forms and methods of operational maneuver were introduced by Helmuth von Moltke. Over-reliance on the forms and methods of von Moltke and Alfred von Schlieffen and misinterpretation of underlying principles and their application to new conditions led, in the end, to the stalemate of World War I. The World War I forms and methods as applied to the tank led to inadequate armor doctrine by the Allied armies early in World War II.

An M1 Abrams and M113 at *REFORGER 82* experiment with AirLand Battle techniques prior to fielding of all envisioned equipment.

US Army

Therefore, what generally happens is that, in their haste to get on with practical matters, soldiers learn and teach methods, but they usually fail to learn and teach why those methods were (or are) successful. In other words, soldiers are practical people, and they generally fail to learn and apply well-thought-out theories and principles and to develop and change methods to comply with new conditions. Sometimes, also, soldiers fail to realize that conditions have changed. This results from a kind of wishful thinking we soldiers are all prone to fall into which compounds the problem of adapting to change. A good example of this phenomenon was the slow and agonizing death of the horse cavalry long after the conditions on the battlefield made it obsolete.

The Need to Organize Knowledge

We are much in need of a modern-day Karl von Clausewitz. We need theoretical constructs which place our analytical studies in the context of the totality of war—a balance between analysis and synthesis. Currently, the knowledge about the preparation for and conduct of war is not disciplined. This body of knowledge is currently expressed and recorded as doctrinal principles and methods in doctrinal texts. It is embodied in functional descriptions of capabilities of units as expressed in TOEs, set forth in TRADOC 525-series concepts pamphlets and explored in the historical *Leavenworth Papers* series.

This body of knowledge is dealt with in a multitude of study reports and technical reports preserved by the Defense Technical Information Center. It is recorded in numerous internal studies of various agencies, often filed and forgotten when incumbents change. And it is examined in articles in the various professional journals—*Parameters, Military Review* and branch periodicals—which are not read by many and are soon forgotten.

Many of our efforts to broaden our knowledge are focused on finding answers to short-term questions. In short, while the knowledge of facts is growing (the "information explosion" phenomena), it is not well-organized for long-term utility, nor is there even a system for organizing, developing, refining and distributing it. There is little funding for "pure research" in the science of war. No organized hypothesis formulation and testing is conducted. As a result, we continually reinvent the wheel and cannot advance in sophistication beyond it. One purpose of "disciplining," or organizing, this body of knowledge is to build better theory.

The Need to Develop and Teach Theory

Theory is the foundation of any science. We must build a firm theoretical base and then constantly challenge, test and improve it. We must build on it, enlarge it and reinterpret it as discoveries shed new light. Finally, we must spread theoretical knowledge throughout the profession-primarily in our schools but also in the professional media. Theoretical efforts should not be conducted in a vacuum and for their own purposes. Their purpose must be to measure, enlighten, guide and drive change and action. It is not enough to have a small band of thinkers charged with developing new theories and new means and methods.

We must also place greater emphasis on theory in the development of doctrine. For instance, not only must we define the fire support coordination line and detail its uses, but we must somewhere record its history, why it was developed, what rationales are behind its uses and what success it has had. Such information is vitally useful when doctrinal change is contemplated. It is also useful when the doctrine is taught in our service schools.

Such information is not only unavailable for old doctrinal devices, such as the probable line of deployment for the night attack, but it is also lost for new devices such as the "area of influence." This latter term already had a previous meaning in Field Manual (FM) 101-5-1, *Operational Terms and Graphics*, the Army dictionary and the NATO glossary. This was either not realized by the coiners of the new area of influence, or an old term was redefined to suit a new purpose. In either case, confusion resulted.

A precise terminology and language are absolutely necessary for the accurate transmission of ideas. Without a precise language, we can hardly have a "science." Someone has to be the "vicar" of the language. The expression "combat power," for instance, has many meanings, yet it is usually used to try to convey a precise concept. It is often used to describe the inherent properties of a unit-its capability in absolute terms. At other times, it is a relational concept. FM 6-20, *Fire Support in Combined Arms Operations*, defines it as fires and maneuver. FM 100-5, *Operations*, defines it as a relational concept comprising the elements of the effects of fire, maneuver, protection and leadership. There are many others. This may sound like a small matter, yet we wonder why we cannot communicate between branches of the Army, much less between the Army and the other services.

We must also encourage new and profitable theoretical thinking. The subject of warfare is so broad and so complex that one theoretical construct cannot explain it all. The disciplines of political science and economics have benefited from the practice of systematic organization of quantifiable and nonquantifiable variables into models of reality.[4] These models slice the pie different ways, and each provides a particular insight into the science and art of war.

If these reasons are not sufficient to impel us to devote more time to theoretical concerns, let me add another. Our potential opponent on the battlefield does study theory and understands the why behind his methods. That is a marked advantage for him. In our position of relative physical inferiority, we must do better than he intellectually. And we can.

We must teach more theory and principles in our service schools. A deeper theoretical understanding of war must be more widespread throughout the officer corps. At Valley Forge, Baron Friedrich W. von Steuben quickly recognized the need to explain to the American soldier why a method was to be adopted before he would embrace it. And von Steuben was amazed at how quickly and how well he learned the methods when he understood why. We are not much different today. Therefore, we must both develop theory and teach it. And it is right and proper that this activity should be conducted in the Army's school system by its teachers as generally occurs in other disciplines at the university level.

There is no need to overwhelm our students with theory, but we do need to teach our fundamental doctrinal underpinnings. It would not hurt to expose students to such thinkers as Sun-tzu, Clausewitz, Henri Jomini, J.F.C. Fuller, B.H. Liddell Hart, Ardant du Picq, de Saxe and others. A good survey text at the US Army Command and General Staff College (USACGSC) would suffice; this text would relate the thoughts of these writers to FM 100-1, *The Army*, and FM 100-5.

A basic common theoretical framework and the systematic thought processes such a framework conveys are important to an intelligent exchange of ideas which is necessary to the development of a science. Currently, there may be little room in the bulging 10-month USACGSC practical curriculum to add more subject matter. But we must look for ways to fit it in. The education of staff officers at Fort Leavenworth must bring about the common cultural bias of which Starry speaks. One major purpose of ongoing curriculum revision at the USACGSC has this in mind.

One way to bring about this common culture bias is to educate a select group of officers beyond the 10-month Command and General Staff Officer Course. They would provide a useful leavening of higher level theoretical knowledge about preparing for and conducting war throughout the Army. Such indi-

viduals are necessary in key leadership positions so that this Army will have a greater capacity to adapt to and channel change. Knowing the why behind current methods and the conditions to which such methods apply, these officers would more readily recognize the need for change and the direction change should take.

The Advanced Military Studies Course at Fort Leavenworth is designed to fill this need. Not only does this course teach more theory, but it also provides a broader base of practical knowledge in the science and art of preparing for and conducting war at the tactical and operational levels. The Army is currently selecting 48 officers to attend the third 48-week session to begin in June 1985.

Scientific Methodologies for the Study of Conditions, Methods and Means

Besides the study of pure theory, the science of war deals with the study of conditions, methods and means of war. While all components of the science are interrelated, different methodologies may apply to their study and scientific development. In some cases, "soft science" approaches are more appropriate while, in others, we may benefit more from "hard science" or quantitative approaches.

Conditions.—A systematic and thorough study of conditions may borrow approaches from all of the sciences. One set of conditions critical to means and methods is technological innovation-conditions resulting in new weapons or logistic capabilities. Examples are the needle gun, the chassepot, the railroad, tinned food, the machinegun, the tank, aircraft, antiair missiles, antitank missiles, electronic warfare, nuclear warfare, chemical warfare and attack helicopters. The list is ongoing. Other conditions we must study are the threat, the geographical setting of future combat, the means available for conducting war and the future intended purposes of our forces.

Conditions which affect military methods have also been political, economic and social. The rise of medieval mounted armored combat resulted in smaller, costlier "high-technology" armies because sovereigns could not afford to raise and equip larger forces. This, in turn, had social and political implications, and those, in turn, fed back to create the forms and methods of medieval warfare. Likewise, current political, economic and social trends will determine important new conditions. The huge mass armies of World War II may be eclipsed by new technological, political, economic and social conditions which we see dimly, as yet, to forge the next, most appropriate, methods of warfare. These conditions all require constant close scrutiny.

Methods.—Another component or branch of the science of war is concerned with devising new methods, or altering old ones, based on accepted theories of war and a careful analysis of changed or changing conditions of war. This branch of the science of war must adopt disciplined approaches from primarily the soft sciences, but it can gain useful insights from operations research methodology. Such insights must then be placed in context by soft science methodologies.

Means.—In addition to a systematized knowledge of principles, conditions and appropriate methods, the science of war has to encompass a systematized knowledge about current and future means of war. The development of future means cannot be left only to technicians. Educated soldiers must look into evolving technological developments to find concepts which will be useful in terms of accepted theories. They must view these with an understanding of the underlying theory of combined arms so that complementary and reinforcing capabilities are added to those which already exist. This is because the current means embodied in the establishment of our units can be changed only over a long period of time and at great expense.

This branch of the science of war must borrow disciplined ways of thinking from both the soft and hard sciences. Capabilities of systems and system design lean on the hard sciences, but how these capabilities are used and how they fit into overall schemes depends on disciplined ways of thinking borrowed from the soft sciences.

One way to advance the development of the science of war is to establish an agency associated with the USACGSC to:

- Study the historical record of change in military methods.
- Examine the impact of conditions on methods.
- Evaluate our current methods routinely—updating our methods as we go, in light of new conditions.
- Record, learn and teach why we do things the way we do.

This agency could have several purposes. It could study the content of short-term studies of other agencies here and abroad for ideas and concepts of long-term significance and weigh these against more established knowledge. It could provide a common synthesis between the related subdisciplines of the field of knowledge—such subfields as leadership, C^3I and the more hardware—related fields.

It also could keep us from reinventing the wheel continually. It could maintain an up-to-date institu-

Soldiers at Fort Riley, Kansas engage in live fire from a jeep-mounted TOW.

US Army

tional memory of change and why it came about. It could be responsible for writing and updating the key doctrinal manuals which integrate the branches of the discipline-FM 100-1 and FM 100-5. It could review the concepts and doctrinal efforts of all other Army agencies for consistency and doctrinal clarity. It could publish theoretical papers like the *Leavenworth Papers* for circulation and study throughout the Army community. The agency could conduct instruction about military theory for USACGSC instructors, students and outside agencies on request.

Further, it could conduct (or commission) studies of changing battlefield conditions (threat, technology, and so forth) and publish papers on their possible impact. It could monitor change in the Army at large and as such serve as a useful feedback mechanism in its role of internal critic and thoughtful evaluator of the comments of external and other internal critics. It could serve as the focal point for the study of methods and conditions to trigger the examination of the need for change by the publication of "think papers." Investment in such an agency would be analogous to the pure research funded by industries with a view to future payoffs that may not be immediately realizable.

Developing the Practice of the Art of War

Historical experience underscores the fundamental truth that an army which must fight outnumbered, under difficult circumstances and with limited resources, must rely heavily on the professional excellence of its officer corps. Therefore, it must place a high priority on the excellence of its officers' professional training and education. Military excellence has always depended on an officer corps which could think creatively about war-one which understood and practiced the art of war.

In today's Army, there is less time to develop professional excellence on the job. This is partly because of turbulence in key developmental jobs and the shorter period of time our officers serve in operational troop billets compared to years past. It is also partly because our units and staffs must maintain unprecedentedly high states of readiness to fight upon short notice. Our officers must be better trained and educated to perform on arrival in their units.

Having examined what is required to raise the level of the science of war, let us examine what is required to develop its practice-the art of war-to a higher plane. The artful practitioner is a master of the science of war. His judgment is enhanced by the knowledge

of theories, methods, capabilities and the effects of conditions. But his judgment is honed by experience which gives him a facile grasp of these foundations or fundamentals and the dynamics of their interrelationships. Working out solutions to tactical, operational and strategic problems repeatedly and under different conditions disciplines his mind to sort through trivial data rapidly, to weigh the essentials from an informed basis and to make decisions quickly and decisively.

Obviously, the art of war is best learned in combat through the course of several campaigns. But, in a time when war may be very short, when so much depends on the initial performance of our leaders and when so much depends on proper planning and preparation to ensure the success of units during the initial days of the next conflict, there must be great emphasis on developing sound military judgment in peacetime. While experience with units in the field is important, proper military schooling is vital.

There is nothing magic about developing the artful practitioner. It does not depend on an inborn sense or what the Germans call *Fingerspitzengefuehl*-a magical feel in the end of one's fingers. It depends on a carefully patterned mode of thinking about military concerns. It is how to think and not what to think in solving military problems.

The officer must have demonstrated a desire and interest in fighting lore and military matters. This we routinely assume but find too often to be exceptional. This desire and interest must be cultivated with a carefully selected set of readings in military history. After all, military history is nothing more or less than the record of trial and error on which today's principles and methods are based. The purpose of this reading should not be the accumulation of mounds of trivia to be called forth to impress others with one's erudition but, rather, the distillation of enduring principles and insights. Insights are, after all, rudimentary theories or hypothesis.

For instance, people change little over time. Knowing what enabled a commander to impose his will on his own troops and ultimately on those of enemy is valuable indeed. That which kept John B. Hood's 15th and 47th Alabama Regiments from taking Little Round Top at Gettysburg, Pennsylvania, or caused the 24th Wisconsin to prevail on Missionary Ridge at Chattanooga, Tennessee, is as useful today as ever.

Also, the study of methods is valuable if one discovers the reason for their success and can deduce underlying principles. A knowledge of ancient weapons is worthwhile if one discovers the relationships between weapons and arms and the fundamentals of combined arms theory. Operational military history is more valuable for gaining insights into the conduct of war than institutional military history, yet we have tended to stress the latter in the past. Nor should the US officer limit his study to this nation's military history. Doing so severely limits the available vicarious experience.

Weapons and conditions change, but principles, relationships, patterns and mental images remain. In the early 18th century, de Saxe warned against entrenchments as a method of defense and advocated a system of redoubts and cavalry counterattacks. The soldiers of World War I relearned that same lesson late in the war as they adopted mutually supporting strongpoints and counterattacking reserves.[5] Our latest doctrinal revision of FM 100-5 again draws on this image as it advocates the combination of static and dynamic elements rather than linear dispositions in the design of modern defensive methods.

Developing the artful practitioner, therefore, depends on the right kinds of relevant real, simulated or vicarious experience. Relevant real experience is rare and, in today's rapidly changing world, it has an increasingly shorter half-life. Long periods of peace interrupted by short wars, either ours or those of others, allow for periodic updating of real or vicarious experience.[6] War games and simulations are one apparent solution to gaining some kinds of relevant experience, and the Army has made great strides in this area.

Learning from war games, however, is also fraught with danger. War games in the hands of the untutored are dangerous in that incorrect conclusions and patterns of thought can be developed. For instance, students can develop fatalistic attitudes based on a too confining belief in the inescapable judgment of force ratios. There are too many cases in history where the results have defied the odds. Again, the 20th Maine Regiment at Little Round Top and the 24th Wisconsin at Missionary Ridge are two of many such examples.

War games must be scientifically designed. The inner workings of the games must rest on a firm foundation of enduring principles, or the wrong lessons will be learned. Too often, the inner workings or decision logic of these simulations is hidden from view. Gamesmanship and not military art is learned from improperly designed war games and simulations.

War games never allow the full manipulation of all variables the combat commander must deal with in real situations. They simply cannot portray all variables-especially the human factor. The players must avoid developing biased thought patterns. They must be constantly made aware of variables which are not portrayed at all, which are given arbitrary constant values or which are lumped with other variables in a roll of a die.

War games in the hands of soldiers who understand their limitations are excellent training tools. Most of us have all played *DUNN-KAMPF*, *CAMMS* (Computer Assisted Map Maneuver System) and *FIRST BATTLE*. However good these are-and they are certainly better than what was before-they teach firepower-biased lessons in which soldiers are never unwilling, afraid, cold, hungry, tired, sleepy, surprised or skilled (or unskilled). We can move or shoot. We can service targets, coordinate fires (in a sense) and practice some of our tactical methods and communications procedures.

However, in war games, combined arms effects are simply additive and seldom portray the real synergism of effects in which the integrated whole is greater than the sum of its parts. We cannot attack the will of the opposing commanders and soldiers which is, after all, the essence of victory and defeat in warfare. Their units and ours continue to fight until only so many soldiers or pieces of equipment remain. Then, we remove them to oblivion. In short, of necessity, we make war very simple in these games. We make it manageable. And that is the crux of the problem—we may be teaching only the management of war and not how to think of creative strategic, operational and tactical solutions and how to lead soldiers in battle.

In the end, the art of war consists of the artful practice of the science of war. Something akin to *Fingerspitzengefuehl* can be developed. But, first, the professional soldier must master the fundamentals of his science at his particular level. Then, he must gain a variety of experience (classroom war gaming and discussion will suffice for a beginning) until his mind is disciplined and ordered. Finally, more experience and reflection can lead to near intuition as he reaches the plateau of familiarity with the conduct of war. In sum, the art of war demands disciplined intellectual activity.

To develop the artful practitioner, we need to look at our officer education and training system. An examination of recent trends in the curriculum of the Command and General Staff Officer Course at the USACGSC is a case in point . The 665 hours of tactical and operational training and education available to students in 1951 had been reduced to 173 by the close of the 1970s due to the need to add other pertinent matter.[7] A recent USACGSC solution was to revise the curriculum to expand the warfighting curriculum and to seriously reconsider the expanded two-year curriculum of the decade before World War II. General of the Army Omar N. Bradley paid this tribute to the USACGSC and the men it trained during that decade in his postwar work, *A Soldier's Story:*

While mobility was the `secret' US weapon that defeated [Field Marshal Karl] von Rundstedt in the Ardennes (in December 1944), it owed its effectiveness to the success of US Army staff training. With divisions, corps and Army staffs schooled in the same language, practices and techniques, we could resort to sketchy oral orders with an assurance of perfect understanding between US commands.[8]

It is important to emphasize that almost all of his division and corps commanders and many of the principal staff officers of the corps and field armies of his own Twelfth Army Group were two-year Leavenworth men. The new Advanced Military Studies Course at Fort Leavenworth could again provide a corps of officers with the higher order warfighting skills and knowledge needed to conduct modern war successfully.

The emphasis in this new course is on how to think and not necessarily on what to think about military affairs. Students study military theory and its applications to preparing for and conducting war in great depth at the division and corps level. They receive an education in all of the G1, G2, G3 and G4 functional areas at those levels. The course combines the study of historical and contemporary cases and problems. It promotes the learning of creative but practical solutions to tactical and operational problems. It develops an understanding of the theory behind Army doctrine and builds the common cultural bias of which Starry speaks.

The course also provides a deeper practical knowledge about "how the Army works" in many areas. In addition, students gain a deeper understanding about how corps operations fit into higher level operational and strategic schemes at the joint and strategic levels. They also gain a wider base of knowledge across the entire spectrum of conflict from terrorism to thermonuclear war. While in the Regular Course we must necessarily concentrate on the most important of the possible conflict scenarios, this course allows us to prepare at least a portion of the officer corps to deal with concepts and methods relating to others which are perhaps less dangerous but more likely.

Summary

The challenges we face today are considerable but manageable—if we take a long-term view. Quick fixes will have a continually shorter half-life as the rate of complexity of war and preparing for it continues. We must take steps now to ensure that we enter the 21st century with an effective fighting capability. We must first develop a real science of war—a more disciplined way of thinking about our profession. That work must begin at the USACGSC and requires a suitable

investment in intellectual activity. As a first step, we must systematize knowledge about the conduct of war and teach it in a systematic way.

Finally, we must develop the artful practice of war by our officer corps based on a firm foundation in the fundamentals of the science. This will require an investment of some of our best minds in adequate numbers at our service schools. And we must be willing to invest the time of our best young officers in military education for the long term. We now tend to favor short-term training in skills which are perishable. We need both. Other first-rate armies around the world recognize this need and invest much more heavily in long-term education than we do.[9] One reason why we resist longer schooling for our officer corps is because we have relatively shorter careers. Therefore, we need to investigate ways that will enable us to keep our best professionals for longer periods of time.

It has been a historical commonplace in other armies that change as sweeping as is here proposed is only acceptable after a crushing defeat.[10] Hopefully, we can see that the business of war has become so complex that we have no choice but to devote more thought to how one should conduct it successfully. Only by developing a firmer grasp on both the science and the art of war can we hope to win in the future. If we do these things, we will know how to change the Army effectively. ***MR***

NOTES

1. General Donn A. Starry, "To Change an Army, *Military Review*, March1983, p23.
2. *Ibid*., p. 26.
3. Maurice de Saxe, "Reveries on the Art of War, *Roots of Strategy*, edited by Brigadier General "Thomas R. Phillips, Military Service Publishing Co., 1940, p. 189.
4. One such model is Colonel John Boyd's decision cycle theories. Another is Colonel Huba Wass de Czege's "combat power model," and there are others.
5. De Saxe, *op. cit*., p. 184-85.
6. For a good discussion of this problem, see Michael Howard, "Military Science in an age of Peace," *RUSI Journal*, March 1974, p. 4.
7. This figure does not include three college-wide exercises in which all students and most departments participate.
8. General of the Army Omar N. Bradley, *A Soldier's Story*, Popular Library, N.Y., 1964, p. 464.
9. *Review of Education and Training of Officers (RETO)*, Department of the Army, Washington, D.C., 1979, Annex E. This is a study of the military education system of the US Army for the chief of staff, US Army.
10. The systematized study of the science and art of war and the establishment of the *Kriegsakademie* of the German General Staff by the Prussian army can be traced to Prussia's crushing defeat by the Napoleonic forces at the Battle of Jena. One can argue that the key to the effectiveness of the German Wehrmacht early in World War II was not so much due to the general staff system. Rather, one can argue that it was due to the sophistication of military thought which permeated the professional ranks of the German army as a result of the education of a few who passed their sophisticated modes of thought on war to the rest of the army over a number of years. Note: Erwin Rommel, Hermann Balck and other excellent commanders were not general staff officers.

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