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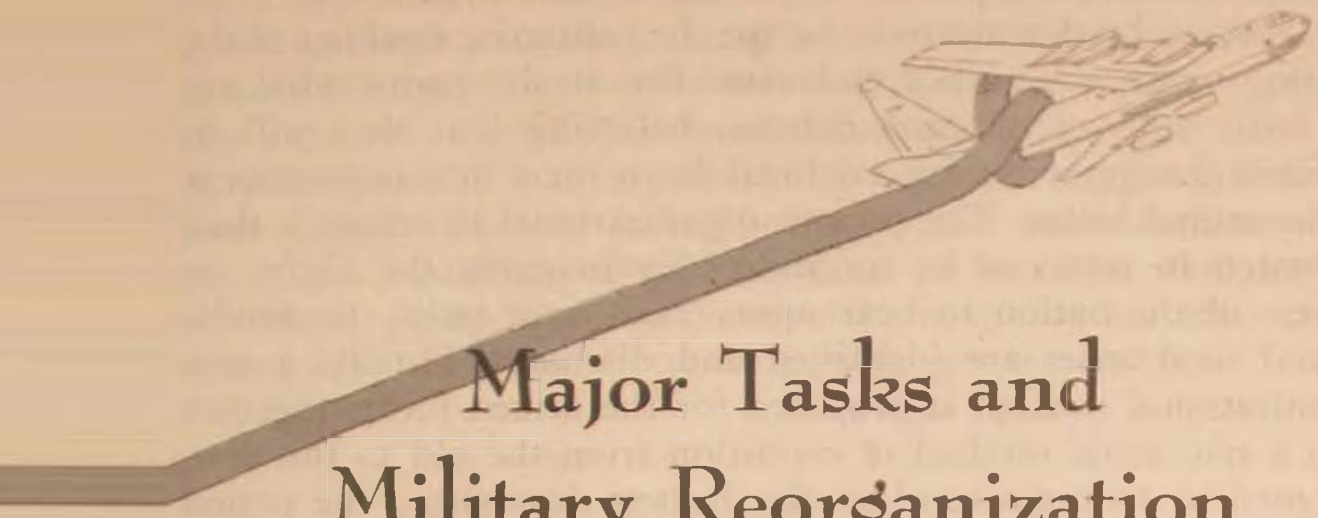
After ten years of hard experience in the realities of planning against atomic war, a central contradiction continues to plague formulation of national policy and shaping of the military forces to carry it out. Policy emerges as tasks to be accomplished, while the military forces that are to execute the tasks remain topographically ranked in armies, navies, and air forces. The Editors of the *Quarterly Review* present three articles bearing on this central problem: Colonel Albert P. Sights proposes a reorganization of U.S. national defense based on military tasks rather than military services; Colonel Wendell E. Carter arrives at much the same conclusion through analysis of the dilemma in our budget system; and Brigadier General W. Barton Leach, USAFR, summarizes principal British views on their similar problem of discovering and effecting the best organization for national defense.



Major Tasks and Military Reorganization

COLONEL ALBERT P. SIGHTS, JR.

TODAY'S military organization is not expressly tailored to perform the military tasks dictated by present-day technology and international relationships. Rather it is a product of historical evolution over many centuries and in many lands. Today's interservice disputes are not alone the manifestations of "healthy competition"; they are the inevitable by-products of an outmoded concept of military organization—an inherited compartmentalization that imposes mental barriers and that corridors the vision of those men who must identify our basic military tasks and determine the means for their fulfillment.

After all we do have an army and a navy. We have had them for a long time and the words are found in all our dictionaries. The term "air force," though comparatively new, has already gained a similar measure of recognition and acceptance. We are accustomed to thinking of military power in terms of soldiers, sailors, and airmen. For the sake of argument, let us assume that we have no armed forces at all and are faced with the problem of safeguarding our lives, property, and way of life in the presence of today's unfriendly nations possessed of today's implements of war. Under these circumstances would we recreate the Army, Navy, Air Force, and Department of Defense precisely as they now exist or would our evaluation perhaps lead to something altogether different in the way of organizational structure for the armed forces? Remember that an organization is not needed simply because it exists,

nor even because it has existed throughout the pages of history. An organization is needed to perform specific tasks that are recognized as desirable at the present time. It should be designed to perform contemporary tasks—not those of some bygone era.

Seeking by this means to escape the restrictive confines of the existing order, the author endeavors first to determine what are the basic tasks of national defense—believing that they will in themselves suggest the logical breakdown for a new organization of the armed forces. The present organizational structure is then evaluated in terms of its suitability for bringing the entire resources of the nation to bear upon these basic tasks. Its fundamental weaknesses are identified and discussed. Finally, a new organizational concept is proposed for the armed forces together with a systematic method of evolution from the old to the new, designed to maintain combat effectiveness throughout the period of change-over.

Let us not confuse the basic tasks of war with the so-called "principles of war." Tasks define what must be done. The time-hallowed principles of war are common-sense maxims that suggest how the tasks should be carried out. Many authorities would have us believe that these "principles" are immutable. Perhaps this is so, despite the immense technological revolution since the days of Napoleon and Clausewitz. Be that as it may, surely no one will maintain that the military tasks of Nineteenth Century America have not been changed by the airplane, the atomic bomb, and the present world-wide pattern of international alliances.

Though our tasks have changed, our military organizational structure remains fundamentally unchanged. It is still a division of responsibility based upon separate modes of transportation that in the context of modern war are so interrelated and interdependent as to be virtually inseparable. It is an artificial division of responsibility that does not embody but rather trisects the basic tasks, thereby creating a bewildering complexity of difficulties in coordination. Just as a diamond cutter follows the natural planes of fissure in cutting a precious stone, so should the organizer delineate his delegations of authority according to the natural subdivisions of his over-all task. Yet not one of the basic military tasks of the United States can be accomplished by employing only those resources available to a single service. A portion of the resources of each service must be applied to each task. Moreover wide divergences in training of personnel, types of equipment, and concepts of employment vastly complicate the problem of combining different service elements into an effective cooperative effort.

The none-too-happy solution has been the creation of joint organizations for achieving such tasks. The joint commander has "operational control" of his forces—a convenient device that affords apparent, but fictitious, unity of command. Actual control is retained and jealously guarded by the parent services that man, fund, and supply the joint command as it may suit their respective purposes. Under these circumstances it is to the credit of the joint commander that he can take an engine from Ford, a chassis from General Motors, and a body from Chrysler and assemble them into a running, though squeaky, automobile. Can we not in some way help this joint commander by giving him a complete automobile assembled from compatible parts?

Basic Tasks of National Defense

The basic tasks of the military establishment derive from the national objectives of the United States. As a nation we have many objectives but paramount is the protection and preservation of our American way of life. As a peace-loving people we would prefer to do this by peaceful means but will not hesitate to fight when we are convinced that there is no other honorable alternative. Inasmuch as force is still the final arbiter of international disputes, we must maintain a position of military strength adequate to meet foreseeable threats to our security. We must identify these threats and define the military tasks required to counter them.

The primary objective of national defense is to counter the threat of nuclear war. Two basic military tasks are dictated by this requirement. First, we must maintain a long-range nuclear striking force capable of inflicting mortal damage upon any would-be aggressor; and second, we must present a defensive shield for the protection of our own sources of strength against enemy attack.

While our primary concern is with the threat of nuclear war, there is another longer road that leads circuitously but just as surely to eventual disaster. The peril of this route lies in permitting a hostile nation gradually to attain a position of overwhelming superiority through a process of piecemeal encroachment and usurpation of the sovereignty and territory of neighboring countries. Such a position of superior power might be achieved over a period of years by a series of diplomatic maneuvers and limited military actions. No one of these moves would provoke general war, but their cumulative effect could grievously erode our mili-

tary potential through the subjugation or neutralization of our allies, surrender of our geographical advantages, isolation from sources of raw materials vital to our economy, and loss of control of the sea and air lanes beyond our shores.

It may be said that we would exercise the threat of nuclear war to halt this sort of creeping imperialism. But with our form of democratic government can we be certain that such a decision would be made? Is there not a possibility of shortsighted complacency—an unwillingness to act when the ultimate consequences of a failure to act seem remote and obscure behind the veil of the future? Surely it will be a difficult decision to make when the immediate consequences are so grimly evident in the enemy's power to retaliate. The launching of unrestricted nuclear warfare would hardly be to our advantage unless there were no other practicable means by which our objectives could be attained.

Clearly we must have alternative means with which to checkmate the illegal aggrandizement of territory by a hostile power. It may be that piecemeal expansion can be prevented by political or economic action—or by the threat of military action. However, it is by no means certain that these actions will succeed unless they are accompanied by an evident capability and willingness to employ military force if required. The best indication of such an ability and intent is the actual presence of military forces in the threatened area. Defensive strength deployed around the perimeter of a hostile power will discourage aggression by denying opportunities for unopposed advance. This is our first line of defense for protection of the Free World against defeat in detail. To be sure it is a long line of outposts that must be thinly manned in many sectors; but it can be supported by ready reserve forces capable of rapid movement to threatened sectors of the defensive front. And of course the control of sea and air lanes is an essential element of this strategic concept.

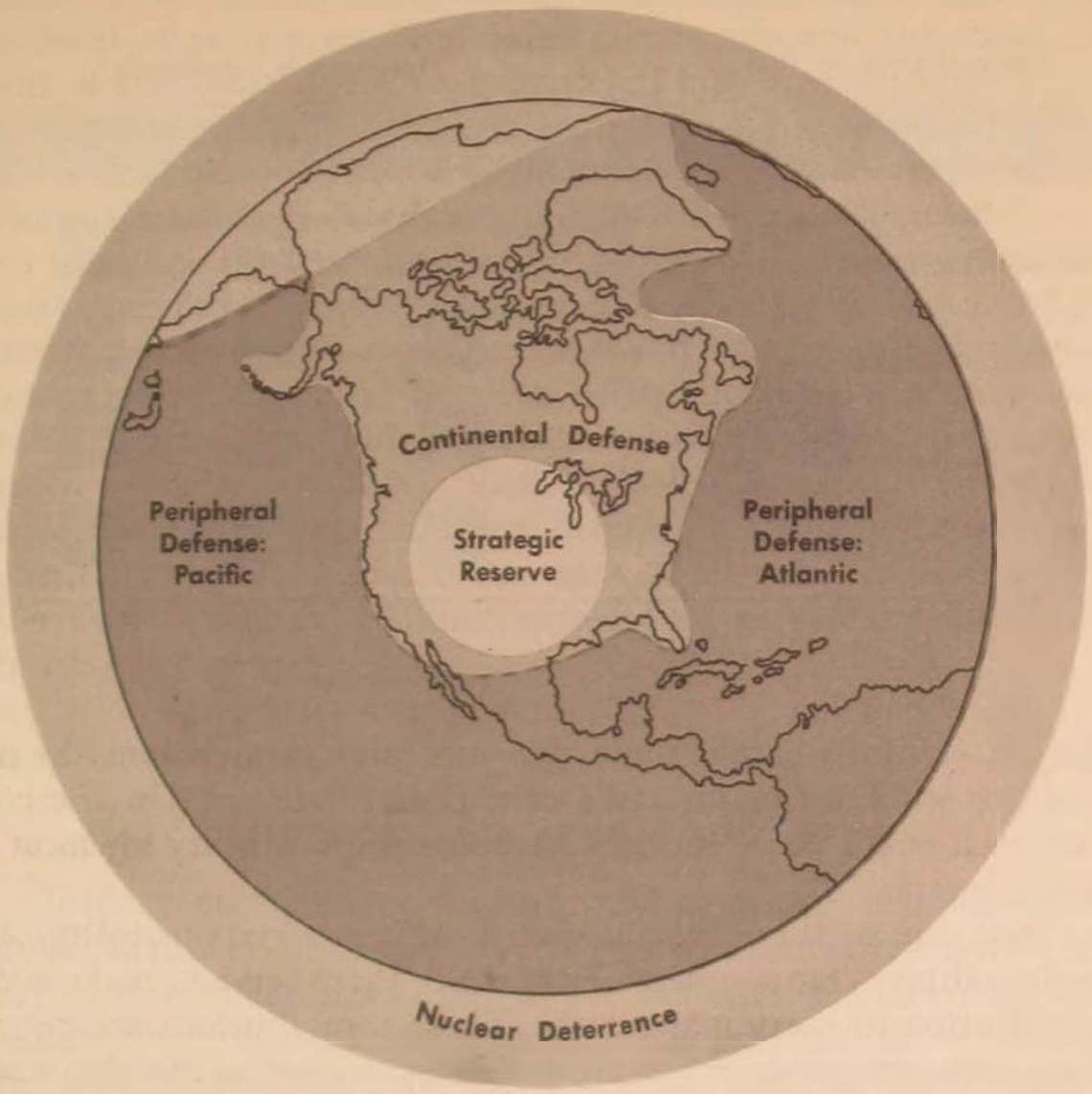
To summarize the foregoing analysis, hostile forces pose two major threats to our national security—first, the launching of direct nuclear attacks upon our homeland; and second, the ultimate attainment of overwhelming military strength through piecemeal territorial aggrandizement. Each of these two major threats imposes two basic tasks upon our armed forces:

The threat of nuclear attack requires us—

To maintain a deterrent force capable of decisive nuclear attack upon the sources of enemy strength

To defend against any direct attack launched against the United States.

Proposed Combat Commands by Tasks



The threat of territorial aggrandizement requires us—

To maintain peripheral defenses contiguous to the national boundaries of any hostile power

To maintain mobile strategic reserves for reinforcement of peripheral defenses.

Now consider the present organization of the armed forces in terms of its suitability for the accomplishment of these basic tasks. Under central direction of the Secretary of Defense are three principal divisions of the military establishment representing forces trained and equipped to fight on land, on sea, and in the air. Within each of these major divisions are various organizational segments created by functional or geographical subdivision of the broader responsibilities for conducting land, sea, and air

Present Division of Responsibility

National Defense Tasks	Responsible Commands		
	Army	Navy	Air Force
Nuclear Deterrence		✓	✓
Continental Defense	✓	✓	✓
Peripheral Defense	✓	✓	✓
Strategic Reserve	✓	✓	✓

warfare. Unfortunately these divisions and subdivisions do not correlate with the major tasks of national defense. On the contrary each of the three services has some responsibility for most of the basic tasks.

Not one of these crucial tasks is the sole responsibility of a single military commander. Two of the three services make some contribution to every major task. These contributions are not all of the same magnitude but are scaled according to the characteristics, capabilities, and concepts of the particular service. All four tasks are important, though by no means equal in importance when it comes to the allocation of resources. Yet under the present arrangement it would be difficult indeed for a service to acknowledge the relative unimportance of a task to which it must make the major contribution. Under these circumstances, how can the basic tasks of national security be weighed, evaluated, and balanced with any real objectivity by a governing committee consisting of the chiefs of the three rival services? Is it any wonder that the services differ widely on matters of strategy and priorities?

It may be asserted that this matter has been resolved by the assignment of responsibility for basic tasks to joint commands such as the present Continental Air Defense Command. But the concept of joint command is more of an improvisation than a solution. A joint commander exercises his authority within narrowly circumscribed limits. A joint command does not represent

true unity of command because the requirements of its commander are met, in the final analysis, according to the individual judgments of each of the three service chiefs sitting at an intermediate level of review between joint commands and the executive head of the Department of Defense. Thus, any objective evaluation that might be made by the joint commander almost unavoidably is deformed by the stresses and strains of interservice rivalry before it reaches the civilian chief for final consideration.

It is time to recognize that the Nineteenth Century organizational concept of dividing military tasks between the land and sea sides of a shore line is no longer valid and that the introduction of another division of tasks between earth and sky has merely compounded the error. This is not to say that soldiers, sailors, and airmen must be abolished. Rather they must give primary allegiance to the real tasks of national defense, in the same manner that an artillery captain supports the tasks of his infantry division. In other words, the services must be made the servants, not the masters, of grand strategy.

Reorganization on a Task Basis

It is easy enough to criticize an existing organization but quite another matter to eliminate the defects without at the same time creating new difficulties as bad as the old ones. Furthermore, if a proposal for reorganization is to have any practical value, it must offer some reasonable promise of finding approval and support among those people who will have to make it work. The theoretically perfect laboratory solution of a problem in human relationships can seldom be applied to a real life situation without some degree of compromise and concession.

There are many subscribers to the abstract idea that we need a single integrated service; very few of these critics bother to suggest what specific actions are required and when and how they should be undertaken. In any reorganization there is a first step to be taken, followed by a second and a third, and so continuing until the new pattern has fully emerged. It is in the selection and timing of these steps that one encounters hard, uncomfortable, and often contradictory facts that obstinately refuse to be sorted and arranged in the neat, logical order of the theoretical solution. However cold the water may be, it is a plunge that must be taken.

Let us start with the basic tasks of national defense, assuming for the sake of further discussion that they are the four tasks previ-

ously listed. There may be more or fewer and they may de differently stated. Be that as it may, the fundamental objectives of the proposed reorganization are to provide unity of command for the essential tasks and to subordinate service interests to task accomplishment. The specific actions suggested for the attainment of these objectives are: (1) to regroup elements of the existing joint- and single-service combat commands into new "task commands" that are directly related to the basic tasks of national defense; (2) to place these task commands under the centralized direction and control of a single military authority; and (3) to redefine the roles of the three services—Army, Navy, and Air Force—to support but not to control combat operations. Each of these will be discussed in detail.

Taking a look at the broad structural pattern of armed forces organization we find that there are, within the three services, approximately seventeen different commands that have significant responsibilities in connection with combat operations. On the other hand we have listed only four basic military tasks for the armed forces and have noted that no one of these four tasks is the sole responsibility of the Army, or of the Navy, or of the Air Force. Neither is any one of the seventeen subordinate commands responsible for the complete fulfillment of any one of the basic tasks. Some commands, such as the Strategic Air Command and the Continental Air Defense Command of the Air Force, have responsibilities that fall entirely within, but do not fully encompass, a single basic task area. Other commands, such as the Continental Army Command and the Navy's Pacific Fleet, have responsibilities in more than one of the basic task areas. Despite such gaps and overlaps it is suggested that task-centered commands could be created without insuperable difficulty through a time-phased program of consolidation and rearrangement of existing combat elements. An examination of the purpose, composition, and employment of task commands that might be dictated by the four basic tasks will illustrate this proposal in more specific terms.

Task No. 1—To maintain a deterrent force capable of decisive nuclear attack upon the sources of enemy strength.

An organization designed to perform this task would constitute the principal deterrent against any attack in kind by a potential aggressor. It should incorporate those elements of all three services whose primary function is to strike decisive blows with the most effective weapons available against the sources of enemy strength in whatever part of the world they may be found. Weap-

on systems and techniques should be chosen to afford an optimum combination of great offensive power and low vulnerability to enemy counteraction. Whether they be airplanes or missiles and whether launched from land or sea, they should be evaluated and selected solely on the basis of the task to be done.

This task organization might appropriately be named the "Strategic Atomic Command."* It should stand at all times ready for the instant commitment of every resource to its assigned task. It is the great deterrent to unrestricted nuclear war. Its deterrent power is the product of its readiness for action, its offensive potential, and its own invulnerability to destruction. The Strategic Atomic Command may be visualized as constituting the present-day counterpart of Mahan's "position of menace." It must be maintained as a force-in-being and not diverted to other tasks in such a way as to compromise the deterrent effect of its menace.

Task No. 2—To defend against any direct attack launched against the U. S.

This task establishes the requirement for an organization specifically designed to shelter the heartland from nuclear attack and invasion by land, sea, or air. Such an organization might be called the "Continental Defense Command." It would be an essential partner of the Strategic Atomic Command in deterring any enemy attack against the sources of our own national strength. It should combine in a single, integrated defense system all elements on the North American continent, at sea, and overseas, whose primary function is to detect, intercept, and destroy hostile forces or nuclear weapons launched by whatever means against the heartland of the United States. Like the Strategic Atomic Command, it would be a separate force-in-being. Units of the Continental Defense Command should not be diverted to other tasks but rather should be held in constant readiness for total commitment to defense of the heartland against surprise attack. Only after an outbreak of total war should any of its units revert to strategic reserve for redeployment, and then only after the security of the heartland had been clearly established.

Task No. 3—To maintain peripheral defenses contiguous to the national boundaries of any hostile power.

Geographically North America may be viewed as an insular land mass that is surrounded by, and at the same time surrounds, the Eurasian continent. It faces two great oceans, the Atlantic

*In the suggested title of this command, the word "atomic" is used to retain the abbreviated title, "SAC," for the principal nuclear striking force. Unless otherwise indicated, the words "atomic" and "nuclear," as used in this article, are intended to encompass all types and sizes of such weapons, including fusion as well as fission reactions.

and Pacific, that not only provide broad avenues for attack upon the United States but also provide by these same avenues the opportunity for projecting our own military force upon the continent of Eurasia and its satellite islands. As indicated before, one important element of our national strategy is to extend our outer defensive perimeter to the very borders of Communism. To do this we must face in two directions—East and West; cross two oceans—the Atlantic and Pacific; maintain bases on two continents —Europe and Asia; and deal with two distinct civilizations—Occidental and Oriental. Thus does geography logically divide the over-all task of outer peripheral defense into two separate organizational compartments whose functions, though similar, are associated with profoundly different military, political, economic, and psychosocial factors. For this reason two task commands are suggested for the maintenance of outer peripheral defenses: an "Atlantic Defense Command" and a "Pacific Defense Command."

Although these two commands face in opposite directions, their objectives are the same—to resist Communist encroachment on the Free World and, as a corollary, to afford a maximum degree of defense in depth for the United States. No power vacuum should be left unfilled on the periphery of the Soviet bloc. Effective barriers should be maintained on all avenues of enemy attack or infiltration. The main burden of this task must be carried by our allies and by the neutral nations but there must be a means by which we can make our own full contribution to collective action when the need arises. It would be the role of the proposed Atlantic and Pacific Defense Commands to provide that means: to control the sea and air lanes between the United States and the other free nations of the world; to maintain forces on permanent station in overseas areas to augment local defenses; to prepare mutual defense plans; and to establish command relationships with the military leaders of other nations that will ensure coordinated effort in pursuance of our common goal—the defense of the Free World.

Task No. 4—To maintain mobile strategic reserves for reinforcement of peripheral defenses.

The Communist-controlled land mass extends over some 60 degrees of latitude and 180 degrees of longitude. Despite an inadequate rail and road net, the Communists can transfer their forces so as to achieve local superiority over Western forces at any selected point on the land mass periphery. Therefore the success of the West's plan of containment hinges in large measure on the

availability of uncommitted reserve forces and on the speed with which they can be brought into action. In surface warfare the Communists can strike either east or west or in both directions at once. America lies geographically about midway between these areas of possible enemy expansion. Therefore it is a logical base for the major reserve forces of the Free World. These strategic reserves should not be committed in advance to either the Atlantic or the Pacific Defense Command because only the enemy knows with certainty where he will strike, when, and in what force. Hence the requirement for another task organization. For purposes of discussion it may be called the "Strategic Reserve Command."

The Strategic Reserve Command should comprise all military combat elements in-being that are not required as integral parts of the other four task commands. These reserve forces should be maintained in constant readiness for assignment to the other task commands and deployment in whatever part of the world the unfolding situation may require. Command of forces thus committed should pass to the augmented task command and revert to the Strategic Reserve Command when the augmentation forces are no longer required.

In summary, it has been proposed that five task commands be created that are compatible with and directly related to the four basic tasks of national defense.

Division of Responsibility

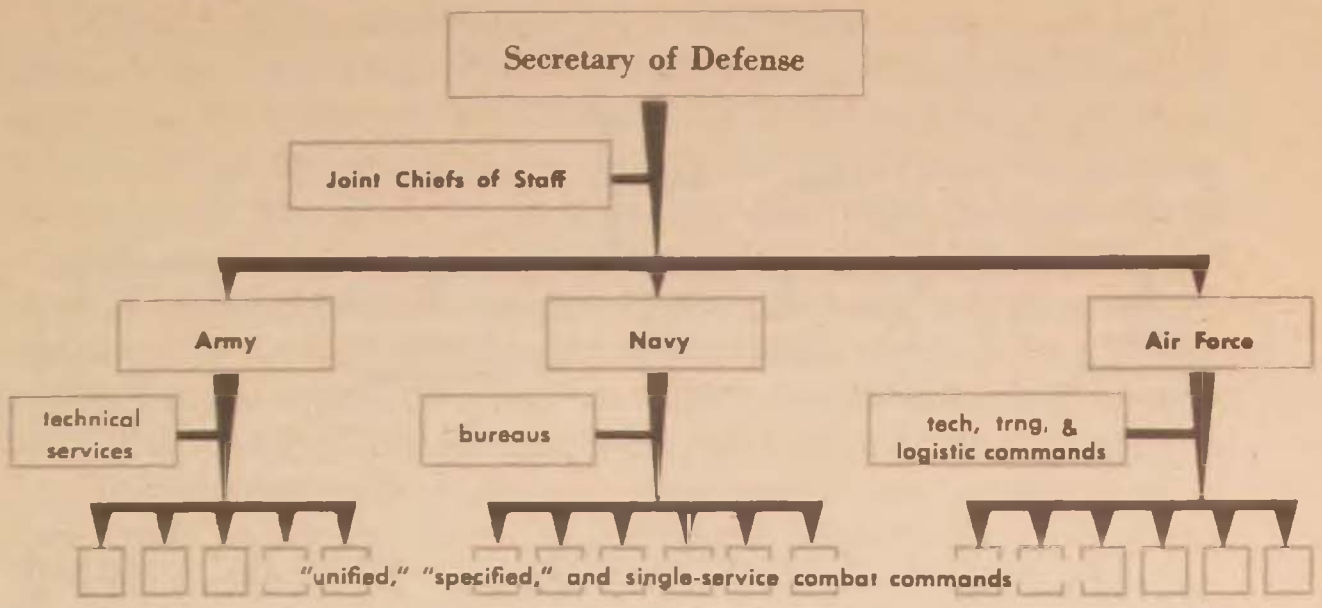
Present Responsible Commands			National Defense Tasks	*Proposed Responsible Commands*				
Army	Navy	Air Force		SAC	CDC	ADC	PDC	SRC
	√	√	Nuclear Deterrence	√				
√	√	√	Continental Defense		√			
√	√	√	Peripheral Defense			√	√	
√	√	√	Strategic Reserve					√

Except for peripheral defense there is a single functional organization designed to accomplish each basic task. As previously indicated, the functional task of peripheral defense logically divides into two broad geographical compartments for which two separate task commands have been designated. Resources can in each case be assigned to a single commander for the accomplishment of a single clearly defined basic task. This is not to say that the requirement for "operational control" has been entirely eliminated. Irrespective of organizational structure, the need for flexibility in fluid and rapidly changing situations will always necessitate the temporary attachment of supporting and augmentation units. But the proposed organization would simplify the commander's task by placing his major force components under his direct authority and by reducing to the level of subsidiary activities those undesirable but unavoidable requirements for command by coordination, cooperation, and negotiation.

Aside from the advantages that accrue from functional homogeneity, perhaps the most promising aspect of the suggested regroupment lies in the opportunity for centralized command and control of all combat operations. The number of combat commands has been reduced from about seventeen in the present Department of Defense to five in the proposed organization. One man should be able to administer five commands. As a matter of fact each of the present service chiefs does now supervise at least five such combat commands in addition to a considerable number of separate technical, training, and logistic commands. Therefore it should be quite feasible to place the five suggested combat commands under the central direction and control of a single military authority, perhaps designated "Chief of Military Operations." Unity of command for combat operations is a principle of military organization so widely recognized and accepted by military leaders that it is surely unnecessary to list its advantages.

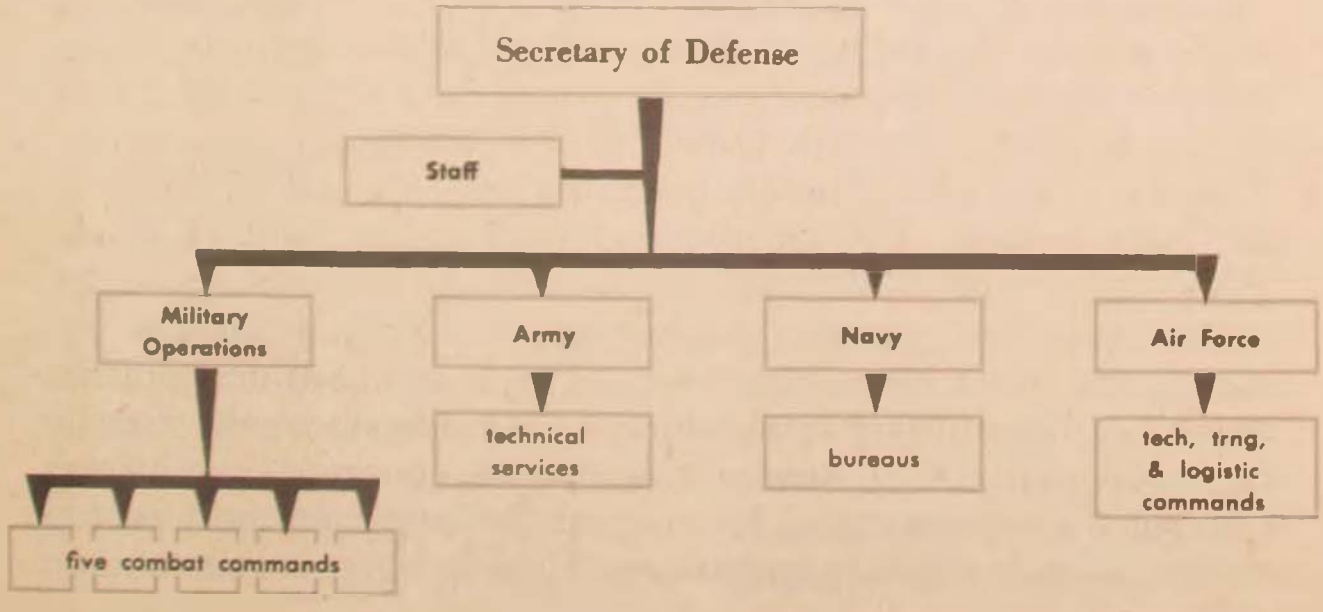
In the present organization of the Department of Defense, the three service chiefs are interposed between commanders of the seventeen combat commands and the Secretary of Defense. If these seventeen combat commands were reduced to five and placed under the direction of a single military authority, as suggested, then this intermediate level of supervision would become unnecessary and undesirable. Since all combat functions would be withdrawn from the three services—Army, Navy, and Air Force—and distributed among the five combat commands, there would be no reason for these service chiefs to appear in the chain of command for combat operations.

Present Organization ...

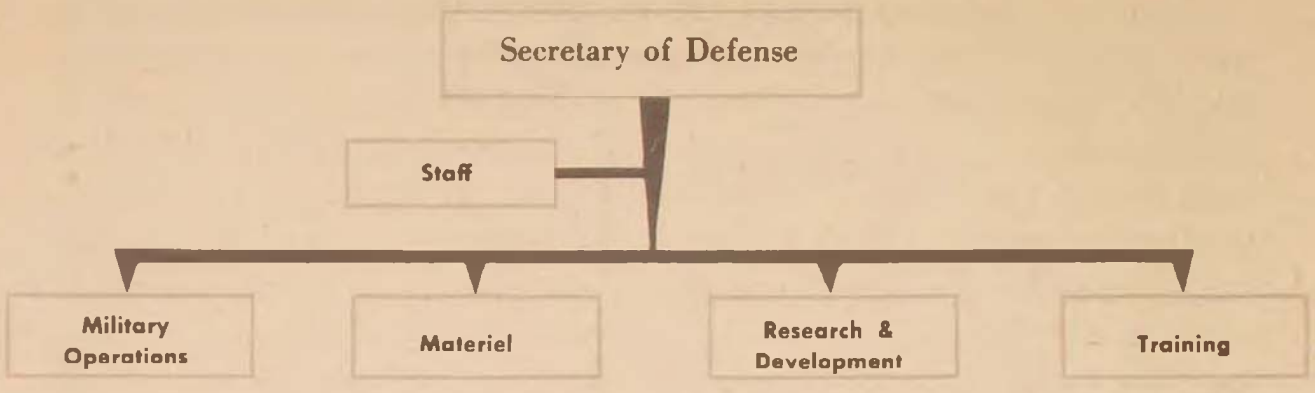


The Three Services. What role, then, would be left to the three services? Should they, as some have suggested, be abolished in favor of a single monolithic military department with a fully integrated administration and a common uniform? This may be a correct prescription for the ailment but it would be a heavy dose for the patient to swallow in one gulp. We are properly admonished not to be hidebound by tradition. However, tradition does have a value. It is closely associated with morale and morale is worth more than guns or ships or planes because it motivates men.

Proposed Reorganization ...



Possible Evolution to a Single Service ...



The process of organization is the logical and systematic grouping of men and functions to attain a common purpose. If the organization is to succeed, its members must be made to feel that they have a stake in the common purpose. Through the years each of the services has developed traditions, loyalties, ideas, and ideals that condition the attitude and behavior of its members. How would they react to an organizational merger imposed by legislative decree? The answer is indeterminate but it is not hard to imagine a bureaucratic convulsion of unmanageable proportions. The members of our military clique might, under a surface veneer of amiability, still carry deep-rooted pride, prejudice, and suspicion that would largely negate effective teamwork in spite of similar uniforms. On the other hand such fears may be groundless. Nevertheless the course of prudence suggests a gradual, evolutionary approach to service integration, if indeed that should prove to be a desirable goal.

Because of these doubts and misgivings on the question of a single service, it is suggested that the Departments of Army, Navy, and Air Force be retained but be placed in a supporting rather than a directing role with respect to the combat task commands. Thus far in the discussion attention has been focused on the combat tasks because they are the end products of military effort. These tasks cannot be accomplished without an efficient supporting organization to provide procurement, supply, training, research, and other essential services. This is the "business organization" of the military establishment. Here is where the knowledge and skill of civilian administrators, business executives, engineers, scientists, and educators can be employed most profitably to support military operations. Here is where "civilian con-

trol of the military" can best be exercised to prevent the emergence of that bogeyman, the military dictator.

The three services, minus their combat functions, can be left intact with their various units and activities as now established. It may be desirable to consolidate some activities along functional lines, such as the proposal for a common supply and services department by the Hoover Commission. Any such analysis of the support organization is beyond the scope of this study. It may be noted in passing that functional consolidation of separate service activities in such areas as materiel, research, and training is one means by which service identities could be gradually and systematically submerged into a single integrated Department of Defense.

In the present organization there are a great many combat commands under the direct or "executive agent" control of the three service chiefs. These service chiefs are in turn supervised by a nonmilitary Secretary of Defense whose primary source of staff advice on controversial military matters is a three-man committee composed of the chiefs of the very operating departments that have generated the controversy. Such an arrangement is a contradiction at the highest level of the basic principles of line and staff organization.

Under the proposed organization the number of combat commands is reduced to manageable proportions. They are placed under the direction of a single "Chief of Military Operations." Requirements originated by the combat commands are based upon objective task analyses, undistorted by service interests and viewpoints. They are submitted without preoccupation or debate over which of the supporting service agencies will provide them. They are related to support capabilities by the Secretary of Defense, with the advice and assistance of a suitably balanced staff of military and civilian specialists who have no operational responsibilities within subordinate departments.

Obstacles to Reorganization

Any proposal for reorganization of the armed forces has to consider the means by which the change might be accomplished without weakening combat effectiveness during the period of transition. However desirable may be the ultimate objective, it is hardly worth the candle unless our military strength can be maintained throughout the process of change. What actions, then,

are required to carry out the reorganization—also what objections are likely to be raised and how might they be overcome?

First of all, the proposed reorganization does not involve a drastic and sweeping shake-up of the entire military establishment. On the contrary it is confined to a revision of command and control arrangements for combat operations in the first and second levels of delegation below the Secretary of Defense. By and large the composition, deployment, and operation of commands at lower organizational levels would be unaffected by the reorganization itself, although the hope is that the resultant improvements in top management structure would in time lead to significant changes in the composition and employment of forces at all levels. The proposal does not suggest any modification of support elements other than to point up possibilities for functional regrouping in the direction of a single service. On the other hand, the reorganization does entail the abandonment or revision of certain traditional concepts of long standing in the armed services. For that reason a methodology of change must be sought that is generally acceptable to those who must implement it.

The reorganization itself can be reduced to the following separate actions, which will be used as a basis for analysis and discussion:

> Consolidation of the various combat functions now dispersed among some seventeen "unified," "specified," and single service subordinate organizations of the Army, Navy, and Air Force into five autonomous task-centered combat commands.
>
> Appointment of a Chief of Military Operations responsible for the centralized direction and control of all combat forces in peace and war.
>
> Definition and delineation of the new role of the three services as supporting elements to the combat organization.
>
> Establishment of a combined civilian and military staff to advise and assist the Secretary of Defense in forming broad strategic goals and in directing the one combat and three support commands.

With the precedent set by joint command during and since World War II, the diverse elements of the Army, Navy, and Air Force should be consolidated in support of basic tasks with relative ease. But two obstacles are immediately apparent. In the first place, there is really no precedent for joint command in the literal

sense. In practice, "joint command" is simply a phrase used to describe a relationship in which a designated commander is empowered, within vaguely expressed but nonetheless real limits, to direct the activities of otherwise autonomous organizations whose allegiances are primarily to their parent services and only secondarily, if at all, to their joint commander. As a result there is no established system for the administration of such a composite force. Yet a commander without administrative control of his subordinates is not really a commander at all in the usual military conception of the term. Rather he is a committee chairman who rules by suggestion, persuasion, and charm of personality. In the proposed organization the combat commander must command in the full sense of the word because he is divorced from control by the three services. Therefore, the establishment of autonomous combat commands must be preceded by the construction of sound administrative foundations upon which the operational structures may be erected.

A second major obstacle to the consolidation of combat functions lies in finding agreement on what specific tasks should be chosen as the basis of the new organization. Perhaps some authorities would say that there are seventeen basic tasks corresponding to the seventeen combat commands in our present organization, hence, no requirement for any change. Others might contend that there are ten or five or possibly only two—offense and defense. It is a question of how basic one should be in the definition of basic tasks. If one subscribes to the idea that all combat operations should be directed by a single commander then some broad parameters can be established on the number of tasks by application of the management principle of "span of control." In the lower levels of combat organization, span of control is usually in the neighborhood of three or four subordinate units to a commander. A squadron has four flights, a company four platoons, a group three squadrons, and a battalion three companies. At higher levels there is generally an increase in the number of ancillary supporting units but the number of major combat subcommands is seldom more than four or five. It would seem that five is a reasonable limit on the number of combat commands for one-man control and, by a fortunate circumstance, there are only five task-centered combat commands in the proposed organization.

If there are truly only five functional tasks, then what are we eliminating by reducing the number of commands from seventeen to five? Basically we are not eliminating functional duplication

per se, but rather we are drastically reducing the geographical compartmentalization of these functions. For example, the proposed Continental Defense Command would embrace not only the present Continental Air Defense Command but also major segments of the Alaskan, Northeast, and Caribbean Commands. Similarly, the European Command, Atlantic Fleet, and Mediterranean Fleet would be brought into the proposed Atlantic Defense Command; and the Far East Command and Pacific Fleet would be joined to form a Pacific Defense Command.

It may be said that such commands would comprise areas too vast and weapon systems too diversified for one man to control. This is a viewpoint frequently expressed with respect to all sorts of organizations. However, it is based on a fallacy—the erroneous belief that any soundly conceived organization can be too large and too complex for one man to control. To hold that an executive department is too big to be managed by one man is to deny the practicality of having an executive head for the national government itself. It is not size or complexity that makes an organization unmanageable. Rather, it is unsound subdivision of the work, incompetent subordinates, uncertainty as to the mission. In short, it is poor management.

It will be said that officers who have had previous experience in only one of the services would not be competent to command units of another service. That this opinion is widely held may be confirmed by examining the staffs of today's joint commands in which the assumed incompetence of each key officer is illustrated by the presence of sister service "deputy," "assistant," or "executive" appendages as insurance against his insufficient knowledge, distorted judgment, or excessive partisanship. The idea that no one officer can command land, naval, and air units is analogous to saying that no one man can be Secretary of Defense. The fallacy of this concept lies in its overvaluation of technical knowledge and its undervaluation of the broader qualities of leadership that enable a man to scale the ladder in his own particular field. An officer who rises to the top levels of leadership within one of the services demonstrates by that very process his competence to command any military organization, regardless of whether it operates on land, on sea, or in the air. Specialized technical knowledge is essential to the organization as a whole; but to insist that it must be embodied in the leader himself is an absurdity. The president of RCA need not know how to repair a radio. The commander of a joint combat command need not know how to drill an infantry company, or how to dock a vessel, or how to fly an airplane. These

things will be done by specialists, and done well, if the commander simply understands and applies the fundamental principles of military leadership.

Some critics may concede that a single commander could theoretically command a multiservice organization but will maintain that his full leadership potential could not be applied in practice because it would be circumscribed and delimited by service loyalties inherent in "the system." This argument has a great deal of validity. The present system does not provide any means by which an officer can rise above the level of his own service or transfer laterally to another. As a result he is reared in the cloistered company of his own fellows, schooled in the concepts of his superiors, insulated during his formative years from access to opposing concepts, and encouraged by pressures of apparent self-interest to regard service interest as the measure of all new ideas. If this officer is suddenly extracted from his single-service environment and given a multiservice combat command, will he consider his new problems with objectivity? Perhaps not, since it is difficult to change habits of thought acquired over a period of years. Nevertheless it must be done because the alternative is even less palatable—the perpetuation of committee rule with its attendant weaknesses.

The consolidation of diverse combat elements into five major combat commands that are administratively self-sufficient is a task of such complexity that several years might be required to complete it. While that action was in progress, much could be done to broaden the horizons of all officers in the armed forces by enlarging the scope of instruction in military schools, expanding the interservice exchange of officers for familiarization purposes, and clearing the way for lateral transfers of officers between services without loss of pay, rank, or opportunities for further advancement.

With the development of administratively self-sufficient combat commands, steps should be taken to create a staff organization that would fulfill the requirements of the "Chief of Military Operations" when he is appointed to take over direction of all combat operations. To preserve continuity of effort and avoid staff duplication, the Military Operations Staff should be established within the framework of the present Joint Staff of the Joint Chiefs of Staff. This staff is now dealing with the same types of basic problems that would confront the new Headquarters for Military Operations. The present Joint Staff structure should be expanded and broadened in order to deal with the many details

of operation and administration now handled by the separate services. Similiarly, the staff of the Secretary of Defense should be realigned with an appropriate representation of military officers so that it will be able to fulfill its new staff role in directing one combat command and three support commands. When the combat commands are severed from the "executive agent" control of the three services, the Chief of Military Operations and the Secretary of Defense must have competent and well-organized staffs in-being. The Chief of Military Operations must be prepared to plan, organize, direct, and control combat operations on a world-wide scale. The Secretary of Defense must formulate national military strategy and ensure that the support elements are closely coordinated with the combat commands in support of that strategy.

Objections are certain to be raised that this phase of the reorganization creates a Prussian general staff—anathema to our democratic form of government; that it places too much power in the hands of one man—the Chief of Military Operations; and that it removes from military control those supporting functions that are essential to the combat mission. These objections need examination.

First, what exactly is this Prussian general staff that we have learned to abhor? In our minds we visualize a sinister, militaristic group of men who glory in their historic pre-eminence in the art of war, who advocate the use of armed force to promote national interest, who secretly contrive diabolically clever military campaigns for the attainment of their objectives, and who subvert and dominate the lawful civilian government in order to carry out their warlike schemes. Certainly we do not want to encourage the development of any such clique in this country. These undesirable characteristics, however, do not stem from centralization of authority per se. It takes Prussians to make a Prussian general staff. Furthermore, a favorable environment is a prerequisite to the rise of militarism. We would have to be prepared to revise our American concept of liberty, our ideas of right and wrong, and our traditional patterns of behavior. In the nuclear age to hold that there is a threat of militarism that requires the continuation of divided and ineffective military command is a dangerous delusion. Speed of reaction against hostile threats has become a vital element of national defense and survival. But speed, unfortunately, is not one of the attributes of committee rule. For quick decision and reaction there is no substitute for direct command.

The fear of concentrating too much military authority in the

hands of one man has another aspect. This is the argument that two minds (or more) are better than one—a viewpoint expressed by Air Marshal Sir Robert Saundby who draws an analogy between the aberrations of Hitler and the sounder collective judgment achieved within the British system of committee rule. Of course Hitler did embody one-man rule in the narrowest sense of the term. But as head of state rather than a military leader he was insulated from the pressures normally brought to bear on a military leader operating in the framework of democratic government. It is erroneous and misleading to imply from the example of Hitler that direct command of military forces necessarily means hasty, ill-advised decisions based upon the intuitive judgment of one man. The concept of direct command does not rule out the application of collective judgment to a problem—unless all members of the commander's staff be unprincipled "yes men." Direct command simply provides the means by which a decision can be reached when it is required.

The third objection asks where should we draw the line between combat and support functions? or between military controlled and civilian controlled functions? Some feel that a commander should exercise authority over those elements required for the accomplishment of his mission. Others that modern war requires the total resources of the nation—all of our labor and wealth — organized into a single gigantic cooperative effort to achieve victory. Each new advance of technology has brought a reduction in the number of combatants in actual contact with the enemy and a corresponding increase in the number of workers required to sustain these combatants in the field. The trend is toward fewer and fewer men in the fighting ranks with more and more men in the supporting role. There can be little doubt that the military leader should command armed forces in contact with the enemy. But how far back should his authority extend through the various echelons of support? Surely it cannot encompass them all without an abandonment of civil government, for support leads ultimately back to the soil itself, the basic source of military strength. Where then should the dividing line be drawn?

In the proposed reorganization exclusive military command should extend only to the combatant forces and their integral supporting components. Professional military men should establish the quantitative and qualitative requirements for men and materiel and subsequently direct their employment in battle. Granted this concept may suppose an attitude of mutual confi-

dence and trust between military and civilian leaders beyond what has thus far been achieved, it is nonetheless attainable on the common ground of patriotic devotion to the duty of national defense. The assertion is frequently made that research, procurement, training, and supply cannot be entrusted to civilian administrators. The reasons for this generally center on doubt of the competence and integrity of civilian leadership. Delegation of authority, however, must postulate able subordinates who will unselfishly apply themselves to over-all objectives. In that broad area, which has been called the "business organization of the Department of Defense," it matters little whether the executives are military or civilian so long as they are competent and dedicated to the task of supporting the combat commands in furtherance of grand national strategy.

This discussion has been limited to a consideration of the major obstacles to reorganization. There are, no doubt, many lesser difficulties that would require resolution during the period of change. If the basic premises are sound then the obstacles, though high, should not prove insurmountable. The reorganization is extensive but not revolutionary. It can be introduced through a process of orderly change.

Steps to Reorganization

THE WAGING of modern war may be viewed as a single over-all task involving the cooperative effort of millions of men and the expenditure of vast quantities of material resources to attain an objective. That this large-scale enterprise may be efficiently managed, it must be divided into functional areas of responsibility. The traditional subdivision of war into land, sea, and air components is a legacy of the past that tends to obscure the existence of new functions created by technology. Through the artifice of "joint command" an attempt has been made to adapt a new functionalism to the incompatible framework of an outmoded inheritance. Organization does not determine the tasks of war. Tasks dictate organization. A military unit exists to perform a task that is essential today—not to preserve and perpetuate the tasks of earlier days, however glorious may be their memories.

There is no military task today to fight a war only on the ground, only on the sea, or only in the air; but there are military

tasks to launch direct nuclear attacks against the sources of enemy strength, to defend the United States against attack, and to project effective military strength into distant areas in furtherance of national interest. It is the latter, not the former, upon which the organizational structure of the armed forces should be erected. All combat elements of the three services should be grouped into homogeneous functional combat commands designed to perform these basic tasks. Five such commands were proposed here.

To CARRY out the reorganization proposed in this study here are some recommended steps:

- Establish a program designed to broaden the knowledge of all officers in the coordinated employment of all types of weapon systems in warfare. The program should include interservice exchanges and transfers of personnel and formal training in the school system.
- Consolidate and regroup according to a time-phased plan all existing combat functions into five "JCS Unified Commands" under "executive agent" control of services as indicated below: (This regrouping is only a temporary expedient and follows very generally the lines of our present military organization; the exception, of course, being the role of the Army as a reserve force.)

  Strategic Atomic Command—Air Force
  Continental Defense Command—Air Force
  Atlantic Defense Command—Navy
  Pacific Defense Command—Navy
  Strategic Reserve Command—Army.

Concurrently with the above reorganizations:

- Introduce a standard system of administration in combat commands so that the new "Department of Military Operations" can function as a separate autonomous unit.
- Expand and realign functions of the "JCS Joint Staff" in preparation for its assumption of staff responsibilities within the Department of Military Operations.
- Revise the staff structure in the Office of the Secretary of Defense to incorporate civilian and military components as required for effective staff supervision of the one combat and three support commands.

When the preceding actions have been completed:

- Designate a Chief of Military Operations to assume command of the five combat commands.
- Discontinue the office of the Joint Chiefs of Staff.
- Transfer the JCS Joint Staff to the Department of Military Operations.
- Terminate "Executive Agent" control of the combat commands by the three services.

When these steps have been taken the defense of the United States will no longer be confined to a squeaky, antiquated, tradition-bound organizational vehicle. It will be equipped with one as modern as the weapons used today.

Headquarters USAF

Composite Air Strike Force

BRIGADIER GENERAL HENRY P. VICCELLIO

THE composite air strike force is relatively new as an instrument of war and, like any implement or instrument, was created to meet a definite need. Historically the idea of a small, mobile force, highly trained for a specific area and task, is not new. The application of this force to modern times and situations is new.

The concept of the composite air strike force has grown out of three factors. The first of these factors was the emergence of the "massive retaliation" policy. In the years after World War II this country constructed a force in the Strategic Air Command that made the thought of a general war very grim indeed. Imagine the midnight oil that must have been burned in the Kremlin when full appreciation of SAC's capability became apparent to the Russian rulers. The realization of what nuclear weapons delivered by SAC could do to their warmaking potential must have been quite a revelation. Especially when it is remembered that until this time the Russians had relied on defense in depth, with a vast army and massed artillery as their primary weapon. It didn't take long for them to see the light.

This leads into the second factor. The Communists were properly impressed by the ever-present threat of SAC retaliation. Their next moves toward world domination were more subtle, both as to means and as to choice of area, so that the United States reaction would fall short of an attack against the homeland of Communism. Thus was born the peripheral, or limited, war, supported by the U.S.S.R. but not involving actual employment of organized Soviet forces.

Korea is the number one example of a limited war. The conditions were ideal. It had been fairly well established by United States actions and words that a military vacuum existed in South Korea. Military strength below the 38th parallel was at its lowest ebb. Manipulating and if necessary sacrificing the pawn armies of North Korea and Communist China seemed to involve no risk for

the Soviets, and the prize would obviously be worth the effort. Korea did not, of course, turn out as planned. Indo-China, a comparable situation, showed a much greater return for the effort expended.

Even prior to Korea, the need for a tailored force to operate in situations of less than total war was foreseen. The Korean conflict made the need for such a force even more apparent. A series of military vacuums existed around the world, many of them snug up against the iron or bamboo curtain.

During this period the Tactical Air Command was developing a capability among its fighter-bomber units that was to provide the third and final ingredient to the finished composite air strike force concept. The art of delivering the atomic bomb by fighter aircraft was being perfected. At the time few saw the impact this capability would have on the future. Realization was not long in coming. If a force of nuclear-armed fighter-bombers could be moved to the trouble spots of the world quickly enough, it could effectively counteract the obvious Soviet policy of quick jabs at the soft spots in the Free World.

Many nations were newly independent and weak, perfect targets for conquest by the Communists. Governments were generally shaky, and in almost every case a strong Communist underground movement was present. Against this background then, the Composite Air Strike Force (CASF) was born. The United States could not afford to station forces in-being on a permanent peacetime basis in every locale, sufficient for any eventuality. But a small, lethal force, only hours away from any area of the world would be a deterrent, limited only by the effectiveness of the force and the time required to move it to a troubled area.

The USAF is uniquely fitted for the task. Its fighters carry more destructiveness in one squadron than entire air forces or

How to deter or, if need be, to fight a limited war has been a major headache of atomic-age strategists. It is not feasible, economically or militarily, to station forces in-being at every probable trouble spot, sufficient for any eventuality. The air alternative is the Composite Air Strike Force, a miniaturized version of a tactical air force. Tailored by Tactical Air Command to function in situations of less than total war, the CASF is capable of rapid deployment and sustained operations in any area of the world. To plan for the deployment and employment of the CASF, to train its units, and, finally, to command it, TAC activated the Nineteenth Air Force. Brigadier General Henry P. Viccellio, Commander, Nineteenth Air Force, examines the concept of the Composite Air Strike Force, its relationship to over-all United States-USAF strategy, and its role in the varying contingencies of limited war.

armies carried during World War II. The speed of its aircraft combined with now-commonplace air refueling enables it to deploy these fighters to any area in a minimum of time, and with its heavy transport airlift, it can supply this force with the myriad impedimenta of modern combat units.

With this capability to move strike units thousands of miles in a matter of hours, the United States could, for a relatively minor investment, hold a small force in readiness at a central location and cover the trouble spots of the world, rather than attempt to station and support expensive forces throughout the various areas. The centralized force has one other obvious advantage. It could be deployed to any area of the world and employed in that area without disturbing the posture of existing defensive or counter-offensive forces. Theater forces could then concentrate on and train for their primary task. They would not have to shift to other areas to meet emergencies, thereby opening gaping holes in a barely adequate defense establishment. Also the SAC "massive retaliation" potential would not be affected. Uncommitted and poised for action, it would act as a valuable restraint on any thoughts of expanding the local conflict into a general war.

The mission to provide a precisely configured force capable of rapid deployment and sustained operations in any area of the world has been given to the Tactical Air Command. Within this command lie the inherent mobility and flexibility to fight a war of this type. It has the "Sunday punch" in its nuclear-armed fighters and tactical bombers. It is being equipped with tankers to extend the range of its combat aircraft during both deployment and employment. It has reconnaissance aircraft of various types to enable it to fully utilize the fighters and bombers. Transport aircraft are available within TAC to aid in deploying and supporting the force; and various TAC support organizations are trained to provide vital services. Not the least of these services is the system of tactical control, including radar, communications, and systems for control and direction of aircraft to targets. With these forces to draw from, it is TAC's job to produce a miniaturized version of a tactical air force and be able to deploy it overseas with the greatest possible speed.

Although many units have been deployed overseas, some using air refueling, nothing of the magnitude of a CASF deployment compressed in time to a matter of days had ever been tried before. It would require careful planning, detailed coordination, and intensive training. The Nineteenth Air Force was activated specifically for that purpose.

The Nineteenth Air Force is a rarity among tactical air forces. Within the TAC framework it is for all purposes assigned to the Ninth Air Force and is responsible to Ninth Air Force for the CASF mission. It has a small headquarters with only about one hundred people authorized. It is operational in nature, with only skeleton staffs for logistics and personnel and with no special staff except an adjutant. The headquarters has no logistics, personnel, or administrative responsibilities other than those normally associated with one hundred people. It commands no units except during actual combat deployment and operations. It is thus free to expend all its energies and talents on the problems of the Composite Air Strike Force. The mission of Nineteenth Air Force is to plan for the deployment and employment of the CASF, to train the units of the CASF as a force capable of deploying and fighting in any area of the world, and, finally, to deploy itself and command the CASF.

When this mission was assigned, the potential trouble areas of the world had already been identified, and the composition of the CASF had been determined. Airfield complexes suitable for the operation of the CASF and within reach of the trouble areas were then selected. Specific units within TAC to comprise the CASF were identified. Based upon these factors, deployment routes were decided upon and detailed plans drawn up.

The detailed plan for the deployment of a CASF was prepared by Nineteenth Air Force. The actual deployment will be controlled by Ninth Air Force through an air operations center and, in some instances, through an additional advanced air operations center.

A system of primary and alternate routes has been developed. This was necessary to ensure uninterrupted passage of the force if political upheaval in areas not controlled by the United States or major weather disturbances make one route untenable for any length of time. Each of the routes was subjected to careful, detailed study, and a comprehensive plan developed. Logistics requirements are furnished for the information of base commanders along the routes. The positions of rescue aircraft along the routes are shown. Detailed flight plans, including refueling rendezvous points, are provided. SOPs are included for use of all participating units. Project officers at each en route base are designated. Movement control teams are scheduled to be positioned at strategic locations along the routes to coordinate the activities of the various

participants. Maintenance teams are provided at en route stops. A common reference hour for both tankers and fighters has been devised to allow a controlled flow of traffic along a route. This allows detailed flight planning far in advance of an actual movement.

Flow charts are also included in the plan to provide all participants with the expected flow of tactical and airlift traffic along the routes.

Deployment of the support elements of the CASF is independent of, although interrelated with, the tactical elements. MATS controlls the movement of the support airlift provided by its own aircraft and those of Eighteenth Air Force.

In addition to the basic plan, participating units have devised local implementation for plans. These plans provide for the alerting and assembling of personnel, the assembling and loading of materiel to meet a prearranged airlift schedule, and the composition of flights, en route maintenance teams, etc.

The force is composed of the various types of fighter-bomber, day-fighter, tactical-bomber, reconnaissance, refueling, and transport aircraft that are carried in the TAC inventory. These flying units are supported by communications, aircraft control and warning, and other support organizations. Over all is the command element provided by Headquarters Nineteenth Air Force. All units are of squadron size, austerely manned. They will take with them only enough support personnel to provide a small augmentation to the air base organizations that the theater has in place, or will emplace, at the employment bases. Each squadron is a separate entity and will deal directly with the CASF commander. Where more than one squadron is located on an employment base, a small cell will be formed to represent the CASF commander in dealings with the commander of the base.

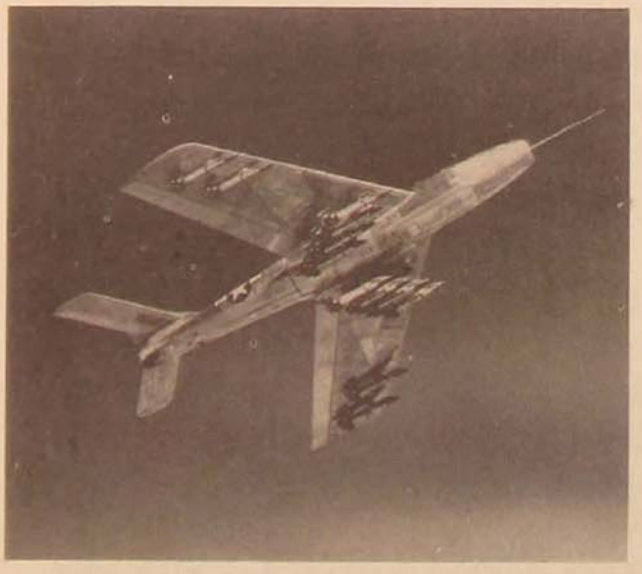
All units committed to the CASF are equipped with aircraft that are air refuelable. It is this fact that makes the CASF concept a reality now. Only by air refueling can such aircraft deploy rapidly. Also with their combat radius of action thus increased, all potential trouble areas lie within their reach from existing bases.

Special attention has been given to the equipping of these units. Flyaway kits will be the primary means of keeping aircraft in commission during the first thirty days of any operation, with replenishment of the kits coming from the theater or Air Materiel Command. To reduce airlift requirements, supplies and equipment are prepositioned wherever possible. As a general rule, units will take only those items of equipment peculiar to their aircraft.

The Air Force Answer to Limited War

What are the qualities required in a Composite Air Strike Force? The CASF must maintain a constant state of readiness. It must be equipped with the newest and most advanced aircraft and weapons. It must be able at a moment's notice to provide a strike force tailored to the specific political and military requirements of the emergency. The CASF must be mobile, able to move great distances in minimum time. Once deployed, units of the force must be capable of immediate combat operations, on a self-sustaining basis for the first weeks. The Composite Air Strike Force must have great flexibility,

F-100

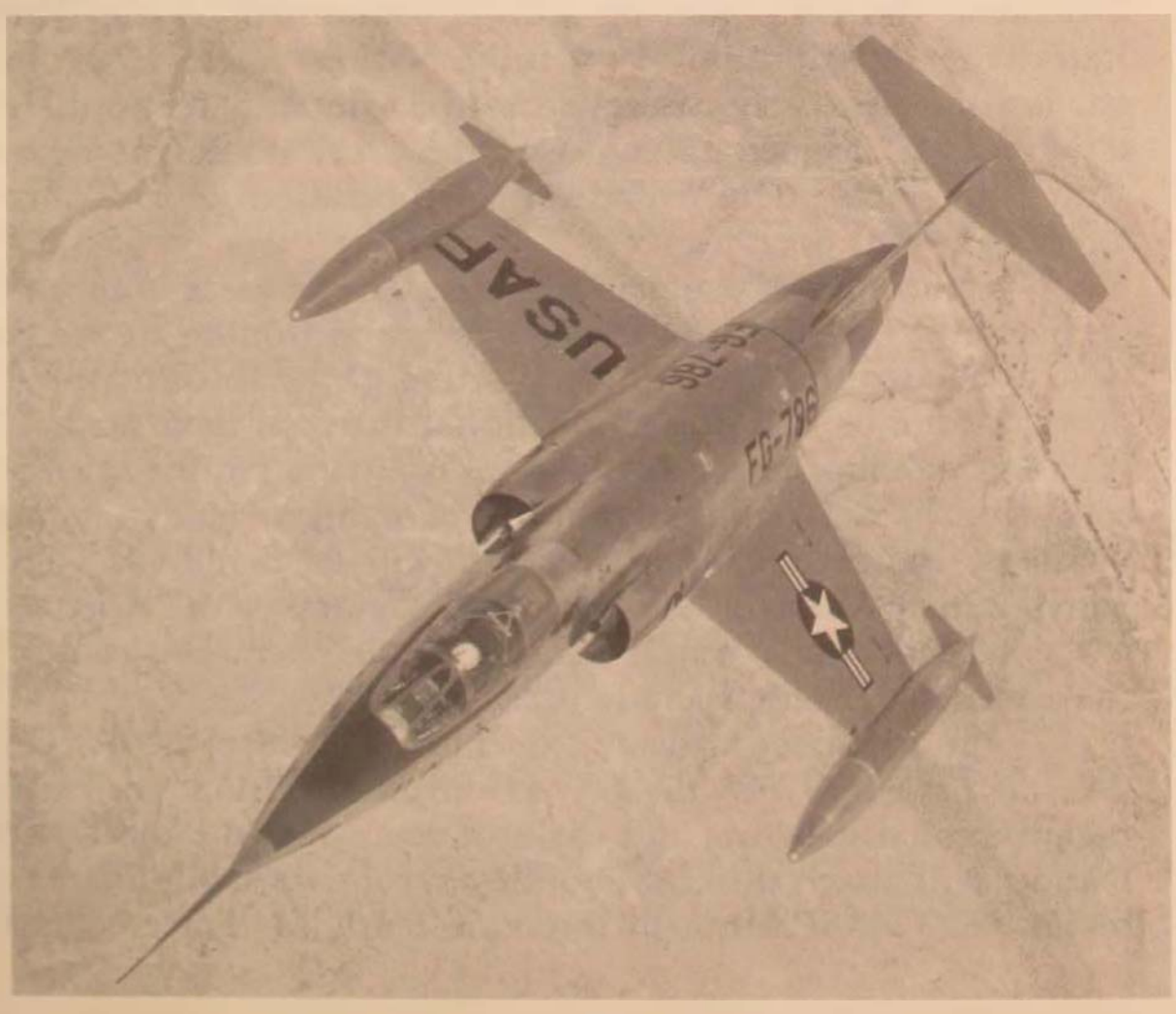


F-84F

B-66

KB-50

capable of anything from a show of force to combat, using either conventional or nuclear weapons. To deliver the nuclear and conventional punch the CASF will use fighter-bombers—the F-100C and D, the F-84F—and tactical bombers—the B-66. The RF-84F will do the aerial reconnaissance. KB-50 tankers will extend the radius of action. Future aircraft on the horizon for the CASF include the F-104 Starfighter and, not shown, the F-105.



F-104

A COMPOSITE air strike force can be used in any of several ways. It provides a trained, equipped, and ready force, part or all of which may be rapidly dispatched to virtually any area of the world that has the facilities to support it. It may be used alone in a purely air effort or it may be assigned as the air portion of a joint or combined operation. Its activities may vary from a mere show of force to engagement in hostilities. In combat it can use the present equivalent of World War II conventional high-explosive ordnance or it can deliver atomic weapons.

In areas where the possibility of hostilities exists, the deployment of a CASF might, like Teddy Roosevelt's use of the U.S. Navy to carry out his "speak softly, but carry a big stick" policy, convince the quarreling factions that their differences could be peaceably settled. Rebellious groups may be less inclined to start shooting when they have observed that jet-fighter, fighter-bomber, bomber, and reconnaissance aircraft can be overhead in a matter of hours, or at most a few days. Thus the known existence of the CASF may in itself deter local wars.

Despite this known potential, local shooting wars may develop. If they do the CASF is ready to move into action. If such a war is considered by the United Nations to require a forceful settlement, the CASF can be quickly committed by the United States as its contribution to a United Nations force. If the local war is a sufficiently serious threat to the United States, unilateral action may be decided upon. Again the CASF is ready to be committed to action, in an exclusively air operation or with surface forces in a joint operation.

Overseas theater commanders are aware of areas in or on the perimeter of their theaters that are potential trouble areas. They have calculated the size and composition of the force required to prevent, contain, or bring to a halt, hostilities in these areas. If a situation develops to the point where action is required, a CASF consisting of the required number of fighters, fighter-bombers, bombers, and reconnaissance aircraft will be deployed. Accompanying the CASF will be a command element of the Nineteenth Air Force, including people to man an air operations center, or the air side of a joint operations center.

Upon arrival in a theater, operational control of the CASF will be passed to the theater commander. Using his existing organizational structure and chain of command, the theater commander will attach the CASF to the appropriate subordinate command. The CASF, through the Nineteenth Air Force command

element, will carry out the directives of the theater commander. In the case of a United Nations effort, operational control of the CASF would pass to the commander of that force, and operations would be conducted in accordance with his directives through the Nineteenth Air Force command element.

Committed to action, the CASF will conduct counterair and interdiction missions as the circumstances dictate. In event of a joint operation, close-support missions will be flown. The proportion of the effort allocated to each type of mission and the phasing of these missions will obviously depend upon the capability and action of the enemy. Acquiring reconnaisance information and intelligence will also have high priority. The laying on of missions and reporting of missions flown will be handled through the air operations center.

There is another possible condition in which a CASF might be used. Trouble might occur so suddenly in a remote area that the best force available to cope with that situation would be units located within the nearest theater of operations. The few days required to move a CASF into position might make it too late. Under these circumstances it might be decided to accept the dislocation of a portion of the theater forces and move them into the trouble area while the CASF was moving to the theater to replace the displaced units. The further development of the situation would determine whether or not the CASF would replace the theater forces at the scene of action.

The training of the CASF has some unique aspects. Only operationally ready units are committed to the force. That is, units capable of accomplishing their assigned tactical mission. Once assigned to the CASF, their training is largely limited to the specialized requirements of the CASF. Intelligence pertaining to the existing and potential trouble areas of the world is forwarded to these units for study. These area studies include material on political matters, weather, terrain, and possible targets, as well as on escape and evasion.

Nineteenth Air Force will conduct frequent exercises to train and test the units in mobility, deployment route, employment area, and target familiarization. These exercises will be conducted in a simulated tactical environment. Also it is planned to deploy a part of the CASF to Europe and to the Far East each year to give the units training and experience in actual deployment and theater orientation.

The first test, or rather partial test, of deployment of a CASF was conducted in September 1956. In an exercise known as Mobile

Baker, a token CASF consisting of one squadron of F-100C day-fighters, one squadron of F-84F fighter-bombers, a flight of B-66 tactical bombers, and a flight of RF-84F reconnaissance aircraft deployed from their U.S. bases to Europe. All units deployed simultaneously over four different routes. One unit "island hopped," while the others used one, two, and three air refuelings, respectively, in the Atlantic crossing. After arrival in Europe all aircraft participated in a European exercise under the operational control of USAFE through its subordinate numbered air forces. This exercise was a deployment test rather than an employment test. It did confirm several of the basic concepts. It demonstrated that the coordinated movement of various types of aircraft over several routes in a brief time period was possible. The capability of these aircraft and crews to make the Atlantic crossing safely was proven beyond doubt. Valuable experience was gained concerning airlift and support requirements, movement control, and operational conditions in the European theater. This experience will be used in developing future plans for deployment and training.

IMPORTANT as the CASF mission is, obviously the entire effort of Tactical Air Command is not devoted to it. First, not all units are always trained and equipped for this fast reaction and immediate commitment to combat. Units lose their combat effectiveness during periods of conversion to new equipment, through loss of personnel, and for other reasons. Such units would not be available for deployment.

Second, basic proficiency training must be completed before such assignments are possible. Some units are in training and therefore are not ready to be committed.

Third, TAC has other missions that are not necessarily compatible with the fast reaction time required of a CASF unit. It provides, on a rotational basis, a number of units to NATO, for example. These units would not be readily available for a CASF commitment.

Fourth, the total number of units required in the CASF is less than the total number of units assigned to TAC.

Last, even if all TAC units were committed to the CASF, it would be impossible to move them all in a short time or to support them in an overseas area if they could be moved.

The maximum number of TAC units required in the CASF

has been calculated. That number of units has been assigned the primary mission of participating in the CASF if required. These units are fully equipped and trained. They are in a constant state of readiness to move out rapidly. They devote their time to increasing their proficiency in their CASF tasks. This does not prevent their performing other tasks as well.

Within TAC, Ninth Air Force has responsibility for over-all training, administration, and logistic support of all fighter-bomber, fighter, tactical bomber, and reconnaissance units. It selects the units that will be committed to the CASF. It passes to Nineteenth Air Force the operational control of certain of the wings from which CASF squadrons will come. These wings remain under the operational control of Nineteenth Air Force for specified periods of time. Nineteenth Air Force has responsibility for exercising CASF units and for control of the CASF if it is deployed.

Assignment of units to the CASF will change from time to time. The goal will always be to have the newest operational equipment in the force as soon as possible. Thus units that have converted to new aircraft, completed their training, and reached a state of readiness will replace units in the CASF equipped with older aircraft. Units withdrawn from the CASF are then available for other missions or for re-equipping and retraining.

New aircraft and equipment for the CASF are already on the horizon. The F-104 and the F-105 are the next new aircraft in view for inclusion in the force. They will soon join the TAC inventory as day-fighters and fighter-bombers.

Still in the realm of "wishing" and research are the vertical-take-off fighters. They are particularly attractive. One of the obvious problems existing now is locating bases to handle present-day jet aircraft. Lengthy sturdy runways with facilities to handle jets are hard to come by in the remote areas where local wars may develop. The VTO has the potential of being operated from small pads. If equipped with VTO aircraft that could live in modern aerial combat and perform the necessary missions, a CASF could operate from areas where no suitable facilities now exist. Such a force could be more widely dispersed and hence less vulnerable.

New weapons also will be worked in as the capabilities to deliver these weapons are acquired in TAC. With "bigger bangs" coming in smaller packages as time goes on, the exact composition of the future CASF is difficult to visualize. With the increase in effectiveness of weapons, a corresponding decrease in the size of the CASF can be expected. But the use of conventional weapons cannot be forgotten. In a limited war it may not be practical for

a variety of reasons to operate with atomic weapons. Thus the ability accurately to deliver conventional bombs, rockets, napalm, and machine-gun bullets must remain with the CASF.

It may be seen that the CASF utilizes a number of the basic principles of war. Mobility, both tactical and strategic, is provided for in that the tactically mobile aircraft are capable of moving great distances in short periods of time. Flexibility of employment is ensured by the fact that anything from a show of force through combat using conventional weapons, to delivery of nuclear weapons, is possible by all or part of the force. Concentration of force is provided for through the centralized control that can direct the full power of the force on the most lucrative target.

As the CASF establishes itself, gains experience and capability, it will take its place as a factor for world peace. As SAC is a deterrent to major war, so will the Composite Air Strike Force be a deterrent to limited war.

Headquarters Nineteenth Air Force

Pursestrings and Pressures

COLONEL WENDELL E. CARTER

NO major military decision can be made and no significant plan can be considered without an assessment of its financial implications. Decision makers must be sure that resources are available; if they are not, the decision makers must be sure that they can be obtained by getting new appropriations or by eliminating some previously planned and budgeted action. Each year thousands of decisions and plans already approved have to be revised, eliminated, reduced in scale, stretched out, or redone because of budgetary actions taken by agencies external to the Air Force. This all-pervasive influence of the dollar sign is a relatively new phenomenon to Air Force officers.

Two Hoover Commissions have studied the problem of getting more defense for the taxpayers' dollar and have duly reported that billions could be saved. Other advisory committees to the executive agencies, several Congressional committees, and countless voluntary experts have studied and reported potential savings of other billions by various recommended actions. The military departments themselves make a fetish of reporting annually "management improvements" that "save" hundreds of millions of dollars. Yet appropriations continue now at a higher rate than at any previous time in United States peacetime history, and top officials have said that they will continue at this rate in the future. The Federal budget teeters near imbalance during a period of unprecedented prosperity and high national income. In spite of these things, the military services all feel that they need more funds than they are getting.

The general nature of the control over the military forces at the national level has remained substantially the same throughout the history of the nation. This is the control that Congress holds over the pursestrings, the money without which there would virtually be no military. The process works something like this. The nation, through its elected representatives, sets a national policy. Then it sets its military objectives based on this national policy, establishes a plan for meeting these objectives, and checks

The budget figures cited in this article are approximate round numbers and are not to be construed as official USAF statistics. *The Editor*

on the progress being made on them. Congress can thus regulate the size and the activities of the armed forces by granting or withholding appropriations. The degree to which Congress exercises this control can be measured by the way it answers two fundamental questions: What size military force do we need to defend ourselves and to carry out our foreign policy? Can we afford such a military force? A third corollary question stems naturally from these two: Is the nation getting as much military power for its money as it can, and if not why not?

Beginning with about Fiscal Year 1950 (the financial birthdate of the autonomous Air Force) the national security problem has assumed new and vastly greater complexity. For the first time in our history we face the existence of an aggressor who constitutes a real and direct threat to our national existence.

Our national leaders agree that this threat is likely to be a continuing one, requiring the maintenance of large standing forces ready for immediate action. These standing forces must be adequate to deter aggression against the United States or her allies or to defeat such aggression if it comes. Our position as a world power and our commitments to our allies on a global basis have brought new foreign policy complexities that, in turn, require a new approach and introduce new difficulties into effective answering of the question, what size force does our nation need?

The second question, what size force can our nation afford, has similarly become a great deal more complicated to answer. Expenditures for national defense now consume one-eighth of our national income. The Department of Defense alone directly employs one-fifteenth of our national labor force. A further substantial share of the labor force is employed by industry which depends upon defense orders for continued existence. Federal individual income taxes, Federal excise taxes, and corporation income taxes affect the majority of the voting citizenry and create real pressures for tax relief that cannot be ignored by the Congress and the President. Actions taken to change the tax structure or to affect the Federal debt structure have direct effects on the economy. Since the cost of defense is about 60 per cent of the Federal budget, the amount that is to be devoted to defense has a direct effect on taxes and is of crucial importance in many areas of our national life.

The corollary question, is the nation getting as much military power for the resources invested as it ought to be getting, is likewise getting much more difficult to answer. In its recent report on the business organization of the Department of Defense, the

Hoover Commission pointed out that the Department has many characteristics that make it unlike any organization known to the Free World. It is, by any yardstick, the largest organization. Its assets, real and personal, approximate $134 billion—equal to the value of all privately owned land in the United States. It has activities in all 48 states, 16,000 cities, and 52 foreign countries. Its operations encompass a wider range than those of any other, including counterparts of almost any civilian, commercial, or industrial enterprise, in addition to those that are peculiarly military.

Other new problems plague the decision makers who must control the military establishment. The tremendous advance in the importance of air power has introduced other questions: What kind of defense forces do we need—air power, sea power, or land power, and in what combinations? The introduction of atomic weapons in relative plenty gives rise to the question of what kind of air power, sea power, or land power do we need?

Because of the swift technological revolution during the last two decades in fields other than atomics the amount that must be invested in research and development to keep ahead of the Communists becomes increasingly hard to predict. Similarly the amount of money needed to produce weapons to keep the standing forces appropriately superior is difficult to arrive at. The lead time required to make a decision effective in terms of hardware further compounds the matter. It may take from three to eight years to put a weapon in the hands of troops after the decision to produce it has been made. A wrong decision at a critical time with respect to the development of a possible new and decisive weapon can tilt the scales in favor of an enemy eight to ten years in the future in a manner that may possibly be irretrievable.

Such a brief inventory of the problems belies the simplicity of their answers. They must be answered by political leaders who are responsible to voters. But these voters, because of the secrecy involved, or because of lack of interest or time, will never fully understand the issues involved. The average citizen will probably never understand, let alone be able to form an intelligent judgment on them.

In practice, the first step in answering the fundamental questions outlined above is the process of arriving at a proposal by the President. The requirement of law that the President shall deliver to the Congress a message on the State of the Union and a message on a specific proposed budget for the following fiscal year generates these formal proposals. The second step is the

action of Congress in acting upon these proposals of the President or substituting proposals of their own.

There has been a great deal of talk about reforming and reorganizing the defense budget. Serious criticism has been addressed to the pressures and counterpressures that squeeze and stretch it in a three-way fiscal taffy-pull to shred out the money among the services, compounding the difficulty our planners and decision makers face in deciding what should be bought and how to measure what they are buying against the undeniable requirements of the national defense.

But budget planners, the President, and the Congress work in an environment that affects what they can do. Our first step, therefore, is to try to understand the environment within which any reforming action would have to be taken.

The Environment of Control

There are four general conditions that "overhang" the entire decision-making process and limit the action the President or the Congress may take:

- The unresponsiveness of the national fiscal system over a short range of time.
- The inertia inherent in the national production system.
- The inertia and lack of clarity in the national budget process.
- The inertia of national doctrine about how war shall be conducted.

the national fiscal system

While the entire national fiscal process is incredibly complex, it is possible, at some risk of oversimplification, to isolate certain facets that greatly limit the freedom of action of any group attempting to solve the fundamental questions of controlling national defense forces by the pursestrings of the budget.

The fiscal system makes it particularly difficult for either the executive or legislative branches to respond effectively in a short time (one to two years) to pressure for tax reduction from the fifty million voters who pay individual income taxes. A deliberate

reduction of such taxes (a legislated cut as opposed to shrinkage in tax income due to reduced national income) will require either a reduction in what the government spends or an increase in the national debt. Since the nation now sometimes operates as near as one billion dollars to the legal debt limit and since Congress is very reluctant to increase the legal debt limit, an action to reduce taxes means, in effect, a concurrent action to reduce expenditures.

Yet for a given fiscal year the expenditures that will take place during that year are very largely the result of appropriations granted during previous years; hence expenditures for a given year cannot be reduced during that year without repudiating payments legitimately due on government obligations. This is true for the portion of previous appropriations for which contracts have been made or for which government obligations were created. For example, Fiscal Years 1954 and 1955 both started with unspent appropriations greater than the amount scheduled to be spent during the year from old and new appropriations. The result of this situation is that, unless the debt is to be allowed to rise, action taken to reduce taxes requires a cut in prior years' appropriations or a rescheduling of payments; or the action must be effective for a future year with present requests for new appropriations cut to allow future payments to be less.

Some of the appropriations made available during a current year will be spent during that year. A desire to reduce current expenditures for a tax reduction does have the effect, therefore, of abnormally increasing the pressure for cuts on the portion of proposed new appropriations that will be spent during the current year. In the case of military appropriations, this takes the form of a strong pressure to reduce appropriations that pay salaries, travel expenses, telephone bills, and other current expenses.

the national production system

The "overhang" of unavoidable expenditures is to a great degree the result of what I have termed the inertia in the national production system, the lead time to produce weapons. Aircraft, ships, and other complicated weapons simply cannot be produced in a short time. A contract for one hundred aircraft may require work and payments over four years before production is complete. For example, although new contracts planned to be let by the Air Force for "Aircraft and Related Procurement" were expected to total $3.5 billion for FY 1954, payments during that year were scheduled to total $6.9 billion. For the same purpose new con-

tracts for FY 1955 were expected to total $2.8 billion, while payments were expected to total $6.5 billion. The differences reflect the impact of work and payments on contracts let in previous years from previous appropriations. A substantial part of the high payments reflected the results of contracts let in FY 1951.

While the fiscal aspects of this lag between appropriations and expenditures cause problems in coordinating tax reductions, of greater significance to the problem of military planning and phasing is the fact that decisions made to buy weapons will not produce tangible combat equipment in the hands of active forces until two to four years after the decision, the length of time depending on the status of production lines and upon the complexity of the weapon. For this part of the appropriations request the President and the Congress must deal with the questions of what weapons our forces will need three to seven years from the day of decision and provide the authority to contract (appropriations) that far in advance to make those decisions effective.

Uncertainties as to the rate of our technological advance and as to the probabilities of the potential enemy's progress obviously create difficulties in obtaining facts for such decisions. A new weapon system, such as a long-range missile, that is not tested and proved must overcome reluctance of the fiscal experts "to gamble on the engineers" and to allow the administrators of funds the freedom essential to take advantage of specific technological advances as they present themselves. This tends, of course, to delay rapid development and production of new weapons.

Other pressures lie in the temptation for political leaders to be overly optimistic about the danger of a period that may lie beyond their term of office. Unless clear evidence is available to show that new weapons must be purchased or developed, the temptation is to refuse to allow it if real and present fiscal pressures are against it. The knowledge that authority granted today to buy aircraft will greatly limit flexibility to meet tomorrow's pressures for tax reduction encourages the decision makers to keep future procurement commitments as low as possible.

On the other hand, evidence may exist that the enemy is making enough real weapon-development progress, such as the U.S.S.R. with its long-range missile, to worry the decision makers. In this case the knowledge that funds committed today to buy long-lead-time items that will not result in immediate expenditures may cause the decision makers to raise appropriations without regard to future consequences. This encourages the services to use "scare techniques" to obtain approval for new equipment expenditures.

It tends to produce an uneven flow of funds, pressure for more than can be used when the political leaders are worried, and pressure for less—for stretch-out programs—when they are tranquil.

The practical results of these pressures may be illustrated in the manner the Eisenhower administration tried to balance the budget and reduce taxes. The large expenditure "overhang" from the Truman-approved budgets during the Korean action prevented effective expenditure reduction during FYs 1953 and 1954. To get a balanced budget, defense expenditures had to be reduced to about $35 billion a year. Although new defense *appropriations* were reduced to $34.5 billion for FY 1954 and held at about that level, the previous appropriations of $60.4 billion for FY 1952 and $48.8 billion for FY 1953 caused defense *expenditures* to be $43.6 billion for FY 1953 and $41.6 billion for FY 1954. Thus expenditures could not be leveled off at about the $35 billion level until FY 1956.

The manner of bringing expenditures down to the $35 billion level is equally significant. When new obligating authority for defense for FY 1954 was set at $34.5 billion (a reduction of $14.5 billion from 1953 levels), the Army was cut $2.5 billion, the Navy by $3.1 billion, but the Air Force was cut by almost $9 billion. Substantially the entire Air Force cut was taken from the appropriation for purchase of aircraft. This kept Air Force expenditures at about their existing level of $15.5 billion instead of allowing them to build to something on the order of $21 billion for FY 1956. It also, of course, "stretched-out" the Air Force build-up program.

There may have been good reasons other than fiscal for the actions taken, but it is also true that they are what was needed from the fiscal point of view alone to obtain a balanced budget. The purpose here, however, is to examine pressures, not to speculate as to cause and effect.

the national budget process

The third general condition is the inertia and lack of clarity in the national budget process. The inertia is the result of the lengthy cycle required to formulate a defense budget and to prepare the substantiating material that must be submitted to Congress. The lack of clarity grows out of the conflict between the way the budget is actually presented and the way it should be presented for effective consideration of alternatives.

The process of preparing and explaining a proposed budget

for a given fiscal year occupies eighteen months preceding the beginning of the year in which the funds are to be used or obligated. Because no year ever follows precisely the ideal pattern of budget formulation, very real problems arise. Most important of these is the fact that the initial planning actions require extraordinary clairvoyance regarding the world situation, the requirements of United States foreign policy, and the progress of technology both in the United States and in Russia two to six years hence. Difficult as this "crystal ball" process must be, the problem is further complicated by the extreme complexity of the requirements process that tries to answer the questions: How much force do we need? How much will it cost? How can we get the most for the money?

There is a further complication. In a democracy the electorate and their elected rulers tend to respond to the need for defense according to the mood of the moment as determined by the feeling we really are or are not in danger of war. The effect of this public attitude cannot be evaluated, but a comparison of any budget cycle with a chronology of world events of the same period is revealing. Eight hundred million unasked-for dollars for B-52's in June 1956 is a case in point. The budget-formulating machine is not built to respond rapidly to change. When changes are demanded rapidly the machine creaks and groans badly and much heat is suddenly generated.

Another difficulty is that any single year's appropriations request is in no sense representative of the cost of operating the forces. Rather it is a combination of funds required for current year's expenses, funds required to buy supplies for delivery and consumption in a future year, and funds required to contract for equipment that will be delivered two to four years hence and operated perhaps five to ten years in the future. Many of the costs of current operations are met from supplies bought from prior years' appropriations. A current year's appropriation requests do not usually recognize this.

The problem of understanding the budget is also complicated by the fact that it is presented in terms of organizational entities of the services rather than related to the basic missions of the forces. The cost of the air defense of the United States, the mission that belongs to Continental Air Defense Command, will be buried throughout the Army, Navy, and Air Force appropriation requests in a manner that defies a summary in terms of CONAD's mission. In the same manner, within a service's appropriations the classifications used do not relate to the service's missions or

contributions to forces, but relate instead to "capital items," "current expenses," and special interest items such as the National Guard and reserve forces.

The budget is not expressive, either, of the maintenance cost of forces in-being, the cost of build-up of forces, or the cost of modernizing weapons or mobilization stocks. Although information necessary for a rational consideration of the budget may be partly available or actually presented in a disjointed way, it is not deliberately brought together in such a way as to permit decisions to be made on these issues.

Certainly the form of the budget does not permit presentation of the financial issues in terms that the Joint Chiefs of Staff like to think of them. What is perhaps worse, the budget system and its data do not permit the pricing of alternative potential force and weapon structures. It offers no way of obtaining the most advantageous force arrangement within a given set of fiscal limitations.

national doctrine

The fourth general condition, the inertia of national doctrine in planning how a war shall be fought or prepared for, grows out of the nature of the Joint Chiefs of Staff organization. The Joint Chiefs must agree on a national strategy if their deliberations as to how much force the nation needs are to result in the required unanimous decision. Military planning that rests on military doctrine and national policy will determine the strategy we employ in an all-out war. That doctrine successful in prior wars is clung to tenaciously long after changing technological conditions make it obsolete.

Our land, sea, and air forces do not now subscribe to a wholly common doctrine. For example, Army doctrine says, in Field Manual 100-5, with respect to the "decisive force":

> Army forces as land forces are the decisive component of the military structure. . . . During the course of military operations Army forces, because of their decisive capabilities, are supported from time to time by other military components. . . . [referring to sea and air forces]. In any case, the efforts of all components are directed toward insuring the success of the land force operations.

In other words, "the infantry is the queen of battle."

Air Force doctrine, in AFM 1-2, takes another view:

> With air forces and modern weapons systems available, it no longer is necessary to defeat opposing armed forces as a prerequisite to conducting major operations directly against an opponent either

> in his sovereign territory or in any other locality. . . . Of the various types of military forces, those which conduct air operations are most capable of decisive results. . . . The paramount consideration for the security and well-being of the United States is the timely provision of adequate air power.

And Naval Warfare Publication 10 sounds as though it is somewhere between the other two:

> The mobility of attacking units and the distances from which they can strike enemy targets are strong factors in increasing the effectiveness of pressure [on an enemy]. Actual occupation or control of enemy territory is the optimum of pressure in that it has an overwhelming effect on the enemy's capacity to wage war. Belief on the part of an enemy that this optimum of pressure can and will be exerted may induce his submission in advance of actual occupation.

While the above quotation from Naval doctrine almost sounds like another way of stating the Air Force point of view, NWP 10 also says: "Air strategy, designed to seek a decision primarily by air action . . . is in the process of historic development and . . . will become more clearly definable with the passage of time."

While there are many points of agreement in service doctrines, there appears to be a wide range of opinion on the point as to which is the decisive force. Since plans are based on doctrine, and forces are based on plans, there is little wonder that strong arguments arise about national strategy and the relative size of forces required to implement its growth from three divergent roots. This is where the battle of the budget starts.

While some observers conclude that the dominant nature of air power has now been recognized in national policy, it is relatively certain that the wisdom of this decision (if it has in fact been made) has not fully percolated down to all the subordinates who contribute to planning activities. It is significant, too, that the national policy was set by the President on his own initiative and was not the result of the unanimous advice of his military advisers. This may put the lid on the pot, but it is doubtful that the fire has been turned off under the bouillabaisse—or that it will be until the services have a more nearly common viewpoint.

Toward a Rational Budget

Ever since the report of the Hoover Commission recommended the "performance budget," students of the military budget have been attracted by the apparent simplicity and clarity that

would be possible if the fund requirements for defense could be expressed in terms of the mission or "performance areas" of the services. While there is usually some disagreement as to what the performance categories should be, discussions of the subject as it applies to the Air Force usually refer to "strategic air," "tactical air," and "air defense." What categories are selected is unimportant for our illustrative purposes—the important thing is the desire to cast the budget in these terms.

Most efforts to describe practical action to achieve a budget in these terms end in confusion. The difficulties of relating the budget to the selected categories or end purposes, involving the procurement of equipment, the procurement and distribution of supplies, and the maintaining of services of "support" commands or activities, are staggering. Thus the "inertia" in the fiscal system. Continued action within the Department of Defense to install stock funds and industrial funds may change this.

It is the feeling of the author that the following existing factors may cause substantial changes in the organization of the Department of Defense:

General dissatisfaction with the confusing nature of the present defense budget.

Great pressure within and without the services to clarify the confusion.

Continued failure of the services to agree about the military requirement for forces.

The presence of new fiscal devices to eliminate some present obstacle to change.

The impact of the wide use of air vehicles and missiles by all the services making it increasingly difficult to tell one from another.

The present organization of the Department of Defense cannot be considered sacred; it has already been changed several times since its inception. Mr. Finletter, former Secretary of the Air Force, noted this aura of change: "The evolution of the Department of Defense is moving so fast that it would be rash to say that even so drastic a step as the elimination of the Army, Navy, and Air Force as separate services may not soon get on the active legislative list before the Congress."

General George Marshall is reported to have said before a House Armed Services Committee that the heart of the interservice bickering was the lack of funds. Certainly pressure for greater economy in defense efforts has been a prime mover among

the pressures making for continued reorganization of the armed forces.

Recent Hoover Commission recommendations, reflecting the efforts of various Congressional groups, that a defense supply and service administration be formed show that there is no reluctance to experiment with the organization when a theoretical chance to save money seems available. These recommendations are usually repelled only after the military express grave doubt about the result of such action on the effectiveness of the services. But the continued insatiable demands for funds by the services on the one hand and the pressure to reduce defense expenditures on the other may well generate enough heat eventually to ignite a further full-scale exploration of Defense Department organization.

It seems entirely conceivable that some dollar-motivated group or individual may yet construct a line of reasoning that would be a great deal harder to repel because it squares so easily with the current trends within the Department of Defense. Here are gathered some current ideas of defense leaders of the three services. Although they have been heard before, they take on a new significance when put together:

▼ The nature of the war threat facing the United States today has generated a new set of problems that its defense establishment must meet. Whereas in the past it was enough to have a naval force and a land force in nucleus form that could be mobilized to full strength after the nation became engaged in war, now the nation must have forces-in-being strong enough to react instantly when a threatening move is made by the enemy.

▼ In the past the necessary size of the force was not easily calculable and needed only be large enough to provide a nucleus for expansion. Today's threat calls for standing forces such as a strategic force, a home-defense force, and a NATO force. The job facing each of these forces can be spelled out in specific terms, and their relative importance is fairly clear. If it is necessary to take a calculated risk so as to save money, we must be sure that the most important force is as strong as it need be, then the second most important force, and so on, until the calculated risk is taken by eliminating the least important forces.

▼ A force commander with a specific mission must have the right to choose whatever weapons the national arsenal can provide that suit his purpose best and will do the best job for the least cost. This includes weapons having a land, sea, or air environment. Air warfare's global nature accentuates this requirement.

▼ The best way to judge the necessity of a force is to look at the job it has to do in a specific war plan. This should not be difficult, since the Joint Chiefs have (or should have) current at all times specific war plans to meet all contingencies. It should be easy to look at these plans and determine the forces that have missions to perform and to query the force commanders as to the weapons they want to do their job.

▼ The best way to determine the usefulness of a proposed weapon is to look at the job it can do for the force that will employ it, as compared with other weapons available for the same job. Force commanders now do this. While existing weapons will probably not be discarded unless the nature of the environment makes their value doubtful and a better weapon is available, certainly each new weapon proposed for development or procurement should have a specific job to do for a specific force commander; and he is the one who should say that it is the best from an economic as well as from an effectiveness point of view.

▼ The distinctions among the services are becoming less and less marked. Each is becoming predominantly air-and-atomic-weapons-minded. Standing forces are now multiservice in many cases, and with the advent of missiles may be even more so in the future. The notable exception is the Strategic Air Command. But with supercarriers, long-range water-based aircraft, and ship-launched missiles in the Navy, the latter's forces would be able to do a strategic job. A missile-equipped Army could have a strategic capability. Yet if there is to be only one strategic force, these weapons and forces should logically belong to the Strategic Air Command or to a new multiservice strategic command. So the trend in force composition is toward integration of personnel and weapons of all services into "forces" that are multiservice. As technology changes, weapons will change, and personnel will need to be shifted among the weapons of a force that will retain the same basic mission. If one can evaluate the needs of a force in terms of its job and the weapons it needs and if its priority in the defense problem facing the nation can be evaluated, then the best way to evaluate the financial needs of the nation for defense is through the pricing of the needs of the force commanders.

▼ If all support establishments are operated under revolving funds (stock and industrial funds), then the force commanders can budget their operating requirements and buy from the support establishment with their own money. This automatically causes budgets for operating requirements to be structured in

terms of "performance areas" and eliminates this part of the lag between appropriations and expenditures that now plagues the President and the Congress. There seems little reason why force commanders cannot also translate their needs for research or production of new weapons into dollar terms and pay the proper part of the support establishment to do the research or procure the needed weapons. Something like this was done in procurement in the case of the Ordnance Management Fund of the Army, with the various services as customers.*

▼ Since the support establishment serves all forces and since by the nature of the jobs they are multiservice forces, it would be simpler to consolidate the support elements into a single agency that would serve all. This agency would of course have to be divided into subagencies, such as one for aircraft, one for ordnance, and one for clothing and food. Since this is already the direction in which we are going, an extension of the idea does not appear unreasonable. It might be simpler all around to have a single service to allow more flexibility in the assignment of personnel and to simplify the use and retraining of personnel whose jobs have been abolished or altered by advancing technology.

THE ABOVE is not the recommendation of the author or of any other single individual or group, so far as is known, in its total form. But every statement is characteristic of a truism or an accepted point of view, in whole or in part, of one or more of the services.

Where is all this likely to lead? No one can really say. But in view of the eager seeking after ways to "save" money in defense and the recommendations already of public record, the foregoing line of reasoning may not be too farfetched. The Department of Defense has already gone part way and is continuing in the direction of most of the points outlined.

Perhaps it is time to pause and take stock of where we are and where we are going before our political decision makers get even more dissatisfied with their present difficulties in financing defense and undertake some militarily unacceptable formula as the answer to the problem.

Headquarters Alaskan Air Command

*The U.S. Army Ordnance used a management fund during the Korean action to finance the manufacture of ammunition for the services. I have substituted revolving funds for management funds and the word "force" for service. The technical feasibility is beyond doubt.

. . . pros and cons of water-based aircraft

Runways at Sea

A Quarterly Review Report

A RECENT public announcement heralding the development of a large, high-performance seaplane has focused increased attention of the United States Air Force on the potentialities of water-based aircraft for bombardment and transport missions. A number of strategists are reviewing the seaplane as a possible weapon system for easing the Air Force's total dependence on the hard-surface runway. Such a capability would go a long way toward relieving one of the biggest worries the USAF has in the jet-atomic age—the vulnerability of its air strike force on the ground.

This Air Force glance seaward followed the improvement of water-based aircraft to near-landplane proficiency through such technological developments as the hydroski, the hull with high length/beam ratio, the jet engine, and—upcoming—the nuclear engine. The seaplane is no longer the slow, awkward, helpless flying boat. A new era is just around the corner.

The advantages and disadvantages of water as a base of operations in modern air warfare must be examined carefully. Even the most enthusiastic proponents of the water-based strike-force concept realize that taking any real advantage of it still will require a lot of doing and that the process will be expensive. On the other hand any possibility that water-based aircraft might under certain conditions assume a significant role in the strategic future of the Air Force, must be thoroughly considered.

THAT jet-powered seaplanes can approach the high performance of B-47's and B-52's comes as a surprise to those who have not followed the discoveries and developments in seaplane design and construction since 1945. Most of the scientific research was begun in the laboratories of the National Advisory Committee for Aeronautics (NACA). Other Government agencies and private corporations have carried it on, expanded, and further developed it.

Weight Reduction. From the beginning, efforts to improve seaplane performance have centered around the design of the hull. The large and bulky hull with its low length/beam ratio had long been held necessary in water-based aircraft. Ruggedly built and rigidly reinforced to take the severe beating of the ocean, the hydrodynamic requirements of the flying boat hull seriously hampered aerodynamic performance. The first essential step was to design a

hull having the desired hydrodynamic characteristics without extra penalties in weight and drag.

Before World War II there was very little exact data about the stresses on seaplane hulls during landing and take-off. Following wartime experience with naval seaplanes operating in open seas, the NACA activated an impact basin at Langley Air Force Base and initiated intense theoretical and experimental research to determine the size, weight, configuration, and strength of the optimum seaplane hull.

The first breakthrough came in 1945 when an NACA study disclosed that the method of computing exterior stress on hulls during landing and take-off was incorrect. Within a year an NACA experiment demonstrated that acceleration stresses during take-off could be greatly reduced by lengthening a forward portion of the hull. The reduced stresses in the lengthened hull permitted the lightening of the hull. Further developments have saved considerable weight, with an accompanying increase in seaplane performance.

Development of the hydroski initiated another advance in seaplane performance. During take-off the hull of an ordinary flying boat absorbs substantial punishment as it races through the water—thus requiring a bulky, reinforced hull. The hydroski absorbs the punishment and permits the use of a lighter hull that is more efficient aerodynamically. When the seaplane is resting on the water, the hydroski, being on the bottom of the hull, is submerged. As the airplane accelerates for take-off, the hydroski lifts the hull out of the water at a relatively slow forward speed. Once the hydroski gains the surface, it acts as an aquaplane until the entire airplane leaves the water. On landing, particularly if the sea is rough, the advantages of the device are even greater. The V-shaped bottom of the hydroski, rather than the hull of the aircraft, takes the high-speed impact of the waves.

At gross weights of 150,000 pounds and above, the performance characteristics of the landplane and the seaplane are comparable, because at this approximate weight the landing gear of one compensates the extra weight of the other's hull. One designer, writing in *American Aviation* in August 1953, went so far as to say that a seaplane could be 15 per cent lighter than a comparable landplane.

Performance. While research was under way to reduce the weight of the seaplane, NACA was also studying ways to improve its water-handling characteristics, rough-water seaworthiness, and aerodynamic performance.

The growing destruction potential and the global capability of modern air weapon systems in the jet-atomic age has prompted a re-evaluation of the vulnerability of the USAF's striking forces. Against the proposition that aircraft may be more vulnerable to attack on their own bases than over enemy territory, the increase in performance of water-based aircraft to near-landplane proficiency has led to suggestions that here may be the answer to the problem: a seaplane-equipped strategic strike force would eliminate dependence on the hard-surface runway. The Editors of the *Quarterly Review* report on the concept of water-based operations in modern air warfare and its role in the future of the United States Air Force.

In 1946 the National Advisory Committee for Aeronautics reported that lengthening the afterbody of a seaplane substantially reduced the ballooning effect when landing in waves. Then in 1949 it was discovered that a hull with a high length/beam ratio was less likely to reach a dangerous attitude during take-off and that the take-off was easier and less violent than with the old stubby hull. Hydroflaps—large, flat plates on the bottom sides of the hull—were developed in the early 1950's. These flaps can be extended into the water individually by toe pressure on the rudder pedals for steering at slow speed, and simultaneously, by a separate lever, for braking.

Water-handling performance was enhanced in 1951 by the development of a steep V-bottom hull. With this design there was an improvement in the center-of-gravity aspect, the spray characteristics, and the rough-water handling. Another problem in seaplane design was eliminated when the jet engine obviated propellers and the problem of keeping them clear of the water.

The results of these advances have been dramatically proved in operational tests of new aircraft incorporating them. A U.S. Naval Test Center report in 1952 states: "So many of the old seaplane [handling] problems have been removed that a pilot can easily [afford to] become careless in some of the hard-learned fundamentals of seaplane operations."

Simultaneously with the research on water operation of the seaplane, studies were under way to improve its aerodynamic performance without penalizing the hydrodynamic qualities. Always any improvement of performance in flight has been necessarily subordinated to the first-priority consideration of performance on the water.

In 1947 NACA announced that it had discovered a number of ways to improve the performance of seaplanes, both aerodynamically and hydrodynamically. Studies indicated that a high length/beam ratio resulted in a smaller frontal area and a consequent reduction in drag. The reduction has naturally meant increased range, speed, and payload. But the payoff question is, can the air performance of the large seaplane be made to equal or nearly equal that of the comparable large landplane? More improvements must first be made in range, speed, and pay-load. The claim to equality of performance has been made in the past, though no seaplane proved useful as a strategic bomber in World War II. If equality of performance now is attainable, this must be considered a revolution in aircraft design and performance.

Vulnerability

Atomic-age air strategists have to face the proposition that bomber and transport aircraft may be more vulnerable to enemy attack on their own bases than over enemy territory. Their vulnerability on base is currently regarded as the more critical.

On the Surface. The vulnerability of large land bases is widely recognized. The similar vulnerability of the home base of large seaplanes is obscured by claims that the water provides indestructible "runways." But seaplanes, like landplanes, must have established facilities for maintenance, supply, and

repair. Large bases are required to support year-round operations for any force that maintains a state of readiness. Main bases, for landplane or seaplane, must have repair shops, warehouses, barracks, mess halls, and many other buildings. The vulnerability of these facilities on a typical large coastal seaplane base is approximately the same as on a comparable landplane base. Any enemy may be expected to know the location of our main seaplane bases as well as of our land bases. Seaplane bases are by their nature more subject to attack from the sea, and, because of good radar resolution of shore lines, they are easily pinpointed with modern bombsights.

If either type of main base is subjected to an aerial atomic burst, the above-ground facilities will probably be destroyed or put out of operation. The landing area for a seaplane obviously cannot be destroyed. The concrete runways of a landplane can be, but it takes a direct hit with a high-yield surface or subsurface burst, since they are relatively invulnerable to airburst. On any airdrome the most sensitive target is not the land runways or the water landing area but the buildings. The more difficult destruction of the landing area of a main base is not the prime consideration, since destruction of the facilities and aircraft alone will render it unable to perform its mission.

Thus the extensive facilities of large land installations required by both seaplane and landplane bombers and transports are extremely vulnerable. The real problem of defense of the airdrome itself is to make sure its facilities can continue to perform their necessary function.

Satellite bases are actually an adjunct of and directly supported by the main base. Their primary purpose is to relieve its congestion and to diminish total vulnerability by dispersal. Fuel, ordnance, and other provisions on hand permit a satellite base to provide logistic support for several missions. A satellite base to support a half-dozen seaplanes could be composed of a seaplane tender and a few logistic vessels. For limited operations the inherent flexibility of satellite bases at sea seems to offer the air planner a dividend in safety not likely to accrue to a comparable land installation. The flexibility of a satellite base, centered around a group of surface craft, is limited to the flexibility and speed of the surface craft. The significance of any surface movements at naval speeds must be viewed in the perspective of air reconnaissance capabilities. A reconnaissance aircraft operating at medium altitude can scan an area of 15,000 square miles in 20 seconds. Three B-36's can scan an area equal to the Mediterranean in 3 hours and the whole North Atlantic in less than 24 hours. But the vulnerability of a satellite base may be less than that of a main base by reason of some capability for movement in secret and because of the fact that several bases are harder to bomb than one main base even after they are located.

In the Air. Comparison of the vulnerability of the seaplane and the landplane in flight hinges on relative performance capabilities. Other determinants—tactics, countermeasures, aborts, errors, and enemy opposition—apply equally to both. Speed and operating ceiling are among the most important performance characteristics to be considered in air survivability.

With a speed and altitude approaching those of the B-47 and B-52, the modern seaplane apparently will meet the current aircraft requirement to

penetrate to the target with a good chance of survival. While critics of the seaplane argue that it lacks the supersonic speeds that will probably be desired in all future aircraft, especially for bombardment, there is no reason to disbelieve that technology will develop supersonic speeds in seaplanes, perhaps with the advent of the nuclear aircraft engine. In 1952 *Flight* magazine quoted Air Chief Marshal Bowhill as stating: "There is not the slightest doubt that the large modern flying boat could be every bit as fast as the large modern landplane."

Flexibility of Operations

Flexibility of a strategic strike force is improved by increasing the variety of methods for attacking a target or by developing a capability to bomb in areas previously inaccessible.

For air transport operations, flexibility is improved by reducing the time required to deliver or evacuate personnel and supplies to or from any desired geographic location. The status of the proposed landing area at the sensitive point is the prime factor affecting flexibility in transport operations.

A casual examination of the capabilities of water-based aircraft may leave the impression that seaplanes can operate from any sheltered, unprepared water surface, day or night, the year around. This is not true. Approach and take-off obstructions, water depths and hazards, tides and currents, must be considered carefully. Runway lights, landing aids, weather service, and all the other support functions will be needed in varying degrees at all the landing areas. Without such aids the force becomes limited to daylight, good-weather operations. The availability of sheltered waters, lakes, and rivers, the problems of cold-weather operations and open-sea operations, and the provision of maintenance have bearing on the flexibility of seaplane operations.

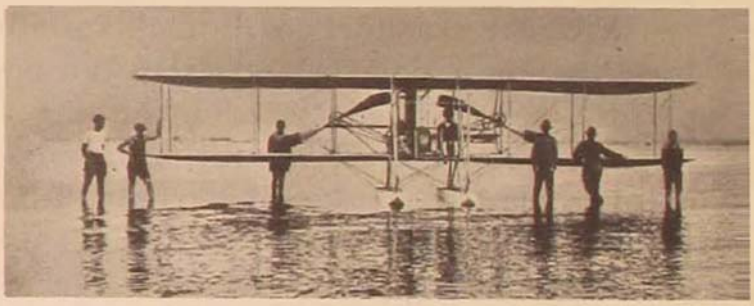
Sheltered Waters. The range of present USAF heavy bombers operating from the United States and of air-refueled medium bombers operating from U.S. or overseas bases is sufficient to reach all possible wartime operating areas.

The supposition that water-based bombers will be able to maintain this same target coverage, if for political reasons access to overseas land bases is denied by the local government, is not entirely substantiated. Large-scale seaplane bases capable of year-round operations require ice-free, sheltered water areas, such as coves and inlets, where rough seas will not interfere with maintenance and routine flying. This requirement means that such overseas seaplane bomber bases are subject to the same possibility of political denial as are land bases. Most sheltered waters are within the national boundaries of some sovereign power. Otherwise the capability of the sea-based bomber to land on sheltered water appears to offer a promising solution to the dispersal problem. An offensive force in-being might thus be diffused to such an extent that the enemy could not hope to neutralize it. The forces then subject to concentrated attack would be those aircraft undergoing major maintenance at the main base or those otherwise assembled for operational purposes.

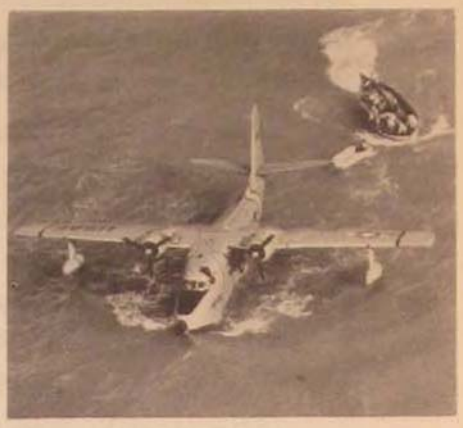
Since air transport operations are not likely to be as hot politically as

Seaplanes in the USAF

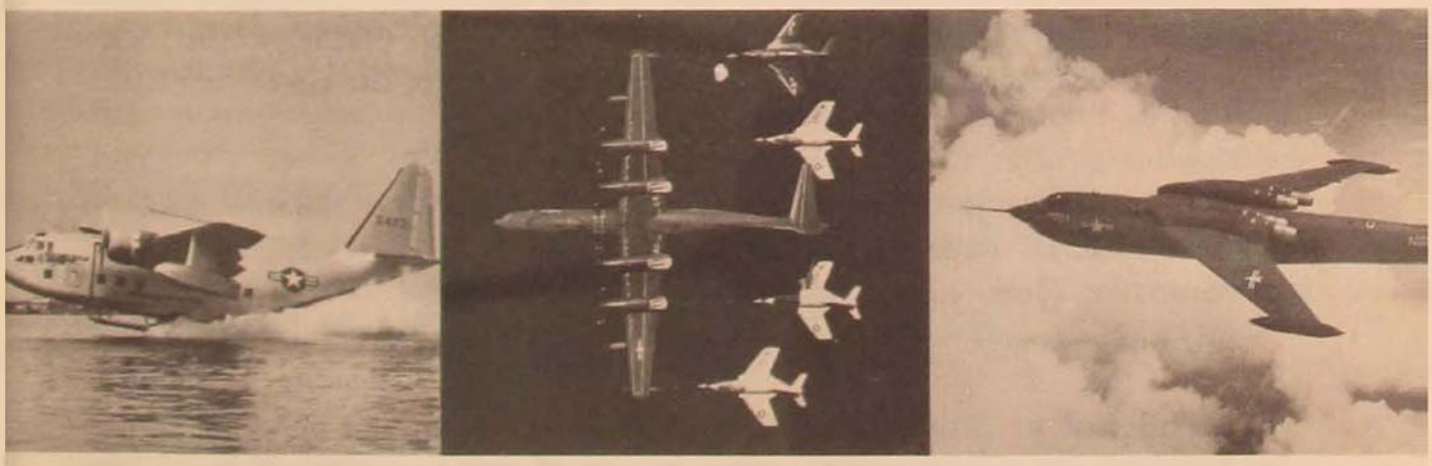
Interest in the hydroairplane for coastal defense and interisland communication marked the earliest days of the Air Force. By 1913 the float plane had a prominent part at the Signal Corps' first Aviation School just established at North Island in San Diego Bay. In 1916 came the first big appropriation for military aviation. The six squadrons to be added to the line, then consisting primarily of the 1st Aero Squadron on the Border with Pershing, would include float planes as well as landplanes for such stations as Manila, Oahu, and Panama. Through the Twenties pontoon-equipped aircraft featured in the "age of great flights" that stimulated public interest in the airplane for peaceful uses. Water-based aircraft entered the war operations of the Air Force during the island-hopping days of the Pacific campaigns of World War II, as transports and to recover airmen downed at sea. Since then the USAF has used seaplanes almost exclusively for its air-sea rescue mission. If further developments of new seaplane designs should produce aircraft offering a net gain in performance of an Air Force mission, the seaplane might someday find a place among the offensive weapon systems of the USAF.



The minuscule Signal Corps flying training section at Parañaque, Manila Bay, in 1913 was proud of its Wright Type C, for either wheels or pontoons. Hoisted aloft for maintenance, one of the Army Douglas biplanes that made the first round-the-world flight in 1924 shows off its pontoon alternates for wheels. Lieutenant Jimmy Doolittle posed with the 610-hp Curtiss Racer, winner of the 1925 Schneider international seaplane trophy. In the same year one of five Army Air Service Loening COA-1's heads south on a 22,000-mile good-will tour of 25 Latin-American capitals.



Numerous Allied airmen downed over the sea in World War II were rescued by Air Force Consolidated Catalinas, often within minutes after they hit the water. Catalinas and Martin PBM-3 Mariners ranged the Pacific to supply remote but strategically important island outposts of U.S. forces. Landing off Okinawa during the Korean War to transfer a seaman stricken with appendicitis from ship to hospital on shore is a Grumman SA-16 of the United States Air Force Air-Sea Rescue Service.



Hydroskis on a C-123 transport, modified for water and land operations, lift the heavy hull from the water as speed is increased. Convair's turboprop Tradewind, with performance comparable to that of a World War II land-based fighter, is designed as a water-based assault transport and tanker. Proponents of water-based air power currently place hopes on the 600-mph, jet-powered Martin SeaMaster.

bomber operations, the capability of water-based air transports to land on sheltered coastal water greatly widens the number of locations available for them. Thus water-based air transport also appears to be a profitable means of moving personnel and supplies to and from any water-bordered land. Its foremost advantages are that construction of landing areas is not required and that suitable operating areas would be so numerous the enemy could deny use of only a small part of their total.

Cold-Weather Operations. Seaplane operations in the Arctic are hazardous. Water freezes on floats, windshields, and wings at 32° F. in fresh water and at 13° to 17° F. in salt water. Contact with floating ice can cause serious damage. Since the ice is sometimes difficult to see, operations must be restricted in questionable areas. Care must also be taken to ensure that the seaplane will not be "frozen in" while moored and then further damaged by the shifting ice when it thaws.

The most ardent advocates regretfully admit that water-based aircraft do not have the capability to operate satisfactorily in cold-weather areas.

Open-Sea Operations. Much discussion has been devoted to the advantages offered by operating from the open sea. In the past, several small operations have been so conducted. One, for example, took place in World War II during the invasion of Saipan when seaplanes operated from a support tender five miles offshore for about two weeks until a harbor had been secured. Recently great advances in the seaworthiness of seaplanes have given impetus to the possibility of open-sea operations. The claim that a water-based aircraft now in the experimental stage will operate in 6- to 8-foot waves seems reasonable since the SA-16 can operate in 4½-foot waves.

Assistant Secretary of the Navy J. H. Smith, on the other hand, has been more conservative. While generally enthusiastic about seaplane operations, he indicated that normally operations would be from sheltered waters, only emergency operations being conducted from the open sea. The wisdom of this conservatism is confirmed by data in an oceanographic report on sea conditions in the Pacific. At four stations in the north Pacific, waves higher than eight feet occur during the following percentages of the time:

	Station A	B	C	D
Winter (Dec, Jan, Feb, Mar)	41.6	26.9	18.0	23.4
Transitional (Apr, May, Oct, Nov)	34.6	13.9	7.7	6.4
Summer (Jun, Jul, Aug, Sep)	4.9	12.4	2.1	1.0
Annual average	26.1	17.2	9.3	10.3

While the need to conduct operations on the open seas may not perhaps be essential, the ability to land safely in case of emergency would be of great value, especially for transports carrying hundreds of passengers. Emergency landings at sea, besides saving lives, could also save aircraft. Unless caught by rough water, the aircraft would remain afloat and, under many circumstances, could taxi some distance to a haven.

Operations on Lakes and Rivers. Speeding the delivery of supplies and personnel to the vicinity of combat is a paramount problem of logistics. The

movement of supplies and personnel from the communications zone to the combat zone and subsequently within the combat zone is subject to serious delay for the primary reason that the means of surface transportation in the exterior zones display no peacetime development adequate to support the traffic imposed by the requirements of wartime logistics. In addition to an original deficiency the transport system is usually damaged during the fighting, and the constant overloading and inadequate maintenance reduce traffic capacity to a fraction of its peacetime potential.

The desirability of having the airhead as close to combat forces as conditions permit is appreciated by all who have been concerned with logistics. This appreciation is evidenced by the effort to construct airstrips close to the front as soon as a location is secured and the necessary construction facilities can be brought up from the rear. The glowing reports of the speed with which certain airstrips were constructed in World War II still cannot minimize the time-consuming and costly process of taking and holding the area and bringing the construction equipment and personnel into position. Furthermore, since one well-placed nuclear weapon can put an airstrip out of commission, the theater air defense force will find difficulty in defending locations close to the enemy when he possesses first-class air capability.

Water-based transport is a proposed means of airlifting combat troops, for example, without the necessity of constructing forward landing areas. Since water landing areas are not always situated where militarily needed, water-based planes may not provide a complete air transport system. They are rather a supplement to the land-based transport system that will improve the dependability of airlift in the event of an intensive enemy campaign against a world-wide airfield complex.

Maintenance. Maintenance and servicing of water-based aircraft must be considered more difficult than for land-based aircraft located at large main bases. Seaplanes have, in addition to the usual maintenance requirements of landplanes, a difficult corrosion problem, particularly in salt-water operations. Another difficulty encountered in maintenance comes from the absence of a steady working platform. It is practically impossible to perform maintenance on a seaplane in very rough water because of violent rolling and pitching. And on fairly calm water the gentle rocking induces seasickness in some individuals. Efficient ground- or water-handling equipment for support and maintenance of water-based aircraft, both afloat and ashore, has yet to be developed. Equipment development could be almost as big a problem, and as expensive to solve, as the aircraft itself.

Concepts of Operation

Bombardment. One concept of operation that has recently been proposed would have a water-based aircraft leave its main home base with a nuclear bomb aboard, land at a predetermined location and refuel, continue on its mission, drop its bomb, and return home, landing en route if necessary for another refueling. This method of range extension increases the vulnerability of the operation, especially on the way to the target, by requiring that

the successfully launched bomber mission be interrupted to land for fuel—at which time aircraft are most vulnerable.

Another possibility is the integrated force, consisting of perhaps a half-dozen seaplanes, a seaplane tender, and a number of submarines for logistic support. Under this concept the operating base at sea would remain far to the rear and support the seaplane operation for an indefinite period of time. Some protection would be gained by frequently shifting the location of the tender.

Tacticians have also considered arming a portion of the seaplane force and dispersing the armed planes individually to secret water landing areas in advance of impending operations. This dispersal would serve further to minimize surface vulnerability and to protect a part of the weapon stockpile. An enemy, even on surprise attack, would have to track down each seaplane individually in order to destroy a retaliatory force.

This concept may be further refined to provide for sustained operations and yet retain the advantage of individual dispersal of aircraft. A main base would exist for the heavy support of seaplane operations to be conducted from a dozen or more satellite bases, each with a seaplane tender and a number of submarines. The satellite bases would shift periodically and thereby gain some security. The seaplanes supported by the satellite bases would be rotated to individual dispersal points, a constant number of seaplanes to be in instant readiness with weapons aboard. This theory is attractive in that it permits maximum protection by dispersal without limiting the strategic force to a one-strike operation. Even though the vulnerable main base might be destroyed, the dispersed satellite bases could support operations for a limited number of missions.

Transport. In determining the suitability of water-based aircraft as transports the main factor is the landing surface: Is suitable water available? Outside the fact that land-based transports operate from the ground and water-based transports operate from the water, other characteristics make them, in general, equally suitable.

Contemporary discouragement for the water-based transport exists in the fact that the U.S. is geared to land-based aircraft. Vast amounts have been expended in developing land operating bases. The training and experience of crew members and maintenance personnel have been limited principally to land-based operations. Specialized maintenance tools and cargo-handling equipment have been developed for land-based aircraft. These factors would contribute heavy resistance to the acceptance of water-based transport. How justifiable and unyielding this resistance may continue cannot be predicted.

In past wars ships have been the primary carrier of combat troops and equipment for assault operations against an enemy that enjoyed the protection of a water boundary. Airlift in such operations has been limited to what could be delivered by glider, paradrop, and free fall. The reason for this limited application was not only the insufficiency of airlift capacity and the expense and shortage of parachutes but also the lack of landing strips. If adequate landing strips were available for seizure, a larger force could be quickly shuttled into the area.

In nuclear war an enemy would certainly attempt to destroy any airfield that could be used against him. If he were largely successful in his attempt, air delivery of friendly troops and supplies would probably have to await the construction or reconstruction of suitable airstrips. The employment of water-based transport conceivably could greatly modify the existing tactics. A fleet of large-capacity, water-based transports could deliver an assault with speed and surprise to an enemy shore and furnish initial support without the necessity of airfield construction. Diversity against surface counter-operations could be achieved by a scheme of translocating the landing areas along the coast and by utilizing inland rivers and lakes.

The operation of water-based transports is not limited to the shore lines. Lakes, rivers, and man-made water areas also can be used for operations within an enemy nation. The capability to operate from water opens up additional tactics for exploitation, especially for the vertical envelopment maneuver heretofore delegated to paradrop and glider operations. An entire division could be delivered well within an enemy's boundaries. The possible water-landing areas for the maneuver may be so numerous that, even though the enemy could have knowledge of them, surveillance would be difficult and unrevealing, since no advance preparation of the landing surface would be required. The operation could thus possibly be firmly established before counterair could be brought to bear.

Water-based air assaults would also best be staged from the U.S. or as close to the U.S. as the range of the transports allows in order to minimize the loss to enemy action. Cost of operating from staging bases in overseas waters would have to include the loss from exposing a logistic tail.

The evacuation of personnel and equipment from the combat area, necessitated by military defeat, often has entailed extensive losses. Although plans are generally made for the possibility of defeat, they seldom receive the attention given to the offensive action because the withdrawal or retreat is often the unforeseeable result of mistakes, enemy surprise actions, or other unpredicted circumstances.

For withdrawal or evacuation the water-based transport offers many advantages. Since its landing area cannot be destroyed, serious vulnerability would be confined to the relatively short time required for evacuation.

An evacuation problem often faced by a nation occurs at the outbreak of hostilities. Because of global commitments France, Britain, and the United States must be prepared for large and hasty evacuations. On occasion it may become necessary to evacuate quickly military as well as civilian personnel from areas not having adequate airfields. A speedy evacuation capability would have been a godsend when the U.S. was forced to surrender the Philippines in 1942. The same was true when the French conceded Indo-China and the British surrendered 70,000 troops to the Japanese at Singapore.

The water-based transport offers a solution. If suitable water is available, it provides an indestructible landing area; and the speed of the aircraft enables the accomplishment of the mission in minimum time.

A successful fighting force must have personnel and supplies delivered in quantity and on time. The timetable of nuclear war makes surface trans-

portation virtually incapable of timely support. The need would be for more air transport and for greater load capacity.

The air supply function is performed mainly by the Military Air Transport Service (MATS). This service is unique in that it largely pays its own way in peacetime, flying missions every day during peace or war. The primary peacetime requirement of MATS for increasing its airlift capability is merely additional aircraft. The integration of water-based transports into MATS would add little or nothing to its peacetime capability, since adequate routes and terminals have already been developed. During hostilities MATS would need additional aircraft and bases in the principal area of operations.

Since many of its present points of interest are located near water, much of MATS' airlift could theoretically be accomplished by water-based transports. In case of war the use of seaplanes would enable it to serve new locations of interest without additional runways. If airfields were destroyed, water-based transports could make the necessary deliveries at the nearest water landing. This, plus the capability of seaplanes to disperse easily, would decrease the surface vulnerability. The ability of water-based transports to land on unprepared surfaces could add to the over-all flexibility of MATS.

The principle of aerial refueling to extend the range of a fighter or a bomber is sound, although a duplication of first-line aircraft is required in that the tanker aircraft must have flight characteristics matching those of the plane it services. It must carry a heavy load a great distance and at altitudes and speeds similar to the bomber or fighter in order to accomplish the refueling without penalty to the strike force.

Land-based tankers can perform their mission satisfactorily, but have the same surface vulnerability to enemy attack as does the land-based bombing force. This vulnerability is a vital factor in survival in nuclear war.

Water-based tankers have less surface vulnerability. They afford a possibility of wide dispersal in numerous coastal areas as well as on lakes, reservoirs, and rivers in the interior. Such dispersal would make the water-based tanker an elusive target for the enemy, although the problem of its own base remains. The seaplane tanker could also perform the refueling mission at greater range by landing and refueling at a closer water area instead of returning to its base. In addition to serving as an aerial tanker, the water-based tanker could serve as a surface refueler to water-based bombers if they were integrated into the long-range strike force.

Implications for the Air Force

Adoption of a new weapon system cannot be seriously considered without first analyzing the effect it will have on the existing and programed weapon systems and also on the national defense budget. New aircraft are extremely expensive. The smaller the quantity purchased, the higher the price paid per item. It is therefore desirable that the incorporation of a new type aircraft be not merely a token effort but a vigorous and sound program of sufficient size to take advantage of the low rates afforded by quantity buying.

The incorporation of two comparable types of aircraft into an air transport or strategic weapon system is not as economical as if only one type were

adopted. The reasons are manifold: high cost per item, because of small quantity purchased from each manufacturer; cost of training two sets of crews and maintenance personnel; cost of duplication of maintenance equipment; and cost of maintaining duplicate stocks of spare parts.

These costs pertain to aircraft that can use the same airfields and facilities such as hangers, aids to navigation, servicing vehicles, technical supply units, machine shops, etc. The integration of an aircraft that can share none of the facilities and servicing equipment offered by an established base is obviously an expensive undertaking. It has been estimated that it would cost $10,000,000 more per year to support an overseas seaplane base than a landplane base with the same number of aircraft.

Another major factor that would demand careful consideration is the cost of constructing seadromes, not a small item. The theoretical savings of the cost of concrete runways would be but a small percentage of the total expense. Seadromes would be considered additional or duplicate facilities, adding little to the utility of the over-all transport or offensive weapon system, except to accommodate seaplanes. A second factor would be the cost of building support vessels, which in turn would have to be protected by combat vessels. Extra maintenance costs would provide a further factor of expense. Thus is it apparent that immediate economy could not be the salient return from any transition to water-based transports or bombers.

If the USAF started from scratch and with the existing budget began to incorporate a large seaplane strike force into the family of strategic weapons, it would mean curtailment or elimination of some other weapon system. High-performance, water-based aircraft now being tested by the Navy for its primary mission of aerial mine laying may have the necessary range, altitude, and speed characteristics to perform the Air Force's strategic bombing role. If tests by the Air Force could prove this capability, and if it should be definitely established that water-based bombers would reduce the over-all vulnerability of our strategic strike force, the USAF could procure these already researched and designed aircraft to supplement its present strategic force.

Air Force seaplane enthusiasts are in general agreement that the problems and expenses associated with water-based transport aircraft are so great as to deter their integration into the Air Force now or in the near future. Only if water-based combat aircraft—bombers and reconnaissance planes—also are adopted might any switch to water-based transports be justified.

A BIG BOOST to the possibility of water-based airplanes for strategic bombing may be expected from the advent of atomic-powered aircraft. The first nuclear airplane engine may possibly be installed in a water-landing craft because the weight of the power plant and the radiation shields will probably necessitate the unlimited water runway for the long take-off. The desirability of operating over clear areas during early trials with an airborne nuclear engine also points to the water-based airplane.

Air University Quarterly Review

Chairborne Minutemen

Colonel Lloyd W. Brauer

WHEN one reviews the impressions of various flyers and others concerned with combat readiness training, or "proficiency flying" as it was called for so many years, one is struck with the diversity of beliefs among both authorities and laymen.

Many nonflyers often refer to staff-assigned aviators as belonging to the "Chair Corps," an organization existing solely to permit pilots to collect their flying pay. The citizen-taxpayer, too, sometimes takes a distorted view of this program when a local boy lands at the home-town air base in time to spend the holiday or weekend with the folks—apparently using government transportation for private convenience. The object of the criticism probably made the flight as another step in his training schedule, and did it on his otherwise free weekend after a full week's work in an office.

The majority of such flyers, young or old, believe that keeping current in air experience is vitally essential, important enough to claim a good share of the time beyond normal duty hours that could otherwise be spent in rest or diversion. Unfortunately too little emphasis has been given to the flyer's views or to the Air Force's reason for requiring him to maintain continuity in his flying training. The isolated cases in which flying privileges were abused attract the public eye more often than the cases deserving "well done" citations. The resulting misplaced emphasis becomes another link in a chain of misunderstandings.

The old yet prevailing concept that an officer should develop through company grade, into field grade, and then to general officer rank testifies that career guidance programs intend specialization to augment rather than supplant broadened experience. Especially is this true as an officer reaches the more senior and managerial stages of his career. It is a corollary, therefore, that to produce the commanders of an effective Air Force their learning must be expanded and tempered with specific knowledge of operational problems of the day.

During the demobilization period following World War II, Army Air Forces' policies included strong emphasis of the idea that the flyer could not justify his retention in the service on the basis of being just a "throttle-jockey." Many cases of separation from the service were decided by comparisons of one officer with another on the basis of how well each had qualified himself in duties beyond his flying, or how well each had maintained his flying capability while performing other duties. The one who had limited himself in his career became the candidate for separation.

What then should be done to retain and upgrade the talents of the well-rounded flying officers who were to form the nucleus of a new Air Force? There seemed to be at least two possible alternatives. The flyer could serve solely in a nonflying position for a time, then rotate to a flying job; or he could be afforded facilities to continue flying training concurrently with his performance of other duties.

The first of these solutions, often posed by the critics of the combat readiness training program, would place the flyer-officer in an "on-again, off-again" status throughout much of his post-flying-school career. Besides the fluctuation in his direct association with current flying problems, his pay scale would bounce and rebound accordingly. He would, no doubt, avoid nonflying assignments whenever possible. The alternative course would detract as little as possible from the officer's successful fulfillment of his allied duties and yet allow him to maintain association with flying procedures, programs, and equipment.

Throughout the history of flying proficiency directives the decisions have been consistently in favor of continuity of flying training regardless of primary duty assignment.

Too often justification of proficiency flying is equated with justification of flying pay. This obscures the central question of whether such flying is a valid military requirement. Colonel Lloyd W. Brauer, a member of the faculty, Air War College, centers his discussion on the reasons for the existence of the present program and the necessity for maintaining the flying proficiency of a large number of staff-assigned officers. Because of the irregularities in the Air Force profile of pilot rank and experience, pilot reserve can only be evened off by inclusion of World War II-trained aircrews who have moved up to responsible staff positions, but whose cockpit skills, if given the exercise of continued training, will always be valuable. He finds the program largely satisfactory except for the obsolescence of the aircraft in which the staff-assigned pilot has to train.

The Aim: a Mobilization Potential Reserve

Justification for a flying proficiency program must be founded on more serious national interests than the incomes and interests of a proportionately few individuals. Such justification exists.

Those responsible for mobilization plans find cause to maintain a potential, described as a rated mobilization and professional resource (RMPR), through the medium of combat readiness training. The word "potential" implies that this pool of skills is not a completely combat-ready resource; that additional training will normally be required before the pilot can fill a combat cockpit position; that it is a resource that can be drawn upon according to allowable time for supplemental training; and, lastly, that it pertains to pilots or other crew members who are not presently assigned to primary duties involving flying.

Such a mobilization reserve is a useful potential, the proof of which can be seen even under conditions of less than all-out war. An example is the Berlin Airlift. Here the Air Force relied on many combat readiness training (CRT) pilots to augment regular transport unit operations. During the Korean War one third of the rotated combat personnel came from or had at one time relied upon CRT flying to maintain their skills. These skills were valuable for the Air Force directly through their use in emergencies and indirectly in allowing the Air Force to accelerate operations and rotate combat crews without drawing too much on the forces held for possible all-out war.

The capability of the mobilization potential reserve to provide for limited wars or police actions, thereby maintaining greater integrity in our larger retaliatory forces, seems in itself adequate justification for the small expenditure involved. Even in the years since 1954, when T-33's provided a token modernization, the direct costs of CRT flying were only about ¾ of one per cent of annual Air Force expenditures. Deducting the amount of such flying chargeable to needed airlift, liaison, etc., the cost of that performed solely for CRT was less than ¼ of one per cent of total USAF expenditures—a significant fact if training only is used as a basis of cost comparisons.

This statement may be criticized as too lightly made when involving millions of dollars. The matter of comparative costs will be reserved for fuller treatment in the discussion to follow. But the amount arrived at by the second of the above computations sufficed to pay for *the annual flying of 38.6 per cent of all USAF rated pilots and other rated personnel!*

The mobilization potential reserve has a role in the big picture as well. As a reserve it affects the duration of an all-out war. The Berlin Airlift and the Korean War permitted time to prepare replacement crews for rotational duties. But the more we shorten our time-factor assumptions in our concepts of all-out wars, the more we restrict the "potential" of the RMPR or any other type of partially ready augmentation force.

Today's emphasis on the reserve forces shows that our leaders hold the use of mobilization and augmentation forces as still valid to a reasonable degree; that we are not betting solely on a large retaliatory effort followed by chaos, confusion, and immediate capitulation of the enemy. While the first blows may be decisive, these will be followed by a series of exploitation campaigns until final capitulation.

After the D-day phases of such a war, crews, especially older pilots, of the RMPR may be called upon to perform flying duties in support of civil defense. Likely duties would include mercy missions; dispersal of key personnel to alternate headquarters; distribution of supplies, food, and medical services; and operation of high-speed courier services filling the gaps caused by disruption of our communications. As military support, the younger pilots and observers with recent tactical unit training could become a source of replacements for units requiring multiple crews, such as ADC and SAC units going to 24-hour-a-day operational status. That additions to our multiplecrew ratios are needed has been averred recently by commanders and their representatives in lectures delivered to the Air War College student body. Admittedly such talent would not be up to peak combat readiness, but it would be a welcome source of relief as crews or copilots in multicrew craft, and as quickly trained replacements in single-seat equipment.

These tasks would absorb much if not all of the available capability of such a reserve. Not all of the 18,000 to 20,000 pilots would be available for flying service because of higher priority command or staff tasks. Also conditions during the early days of the war may require reduced flying activities in other than direct combat or support missions.

This leads to the question: "Why maintain the training of the entire RMPR if only a portion of that reserve can or will be used?" Beyond the reason that no one has yet been able to plan the perfect war in terms of requirements and that, therefore, a dire emergency may demand the use of all capabilities, lie other supporting though less fatalistic reasons.

Retention of the Cockpit Point of View. There is an argument often heard that "the commander must retain a cockpit point of view." This was recognized in 1926 when Congress enacted a law requiring that all Naval aviation activities, afloat and ashore, be commanded by Naval aviators. This law is still in effect. The Air Force, acknowledging this concept, established a similar policy requiring that all Air Force activities having flying as their primary mission be commanded by a rated pilot. That the rated pilot who is serving or may serve in command and operational positions must continue active flying to maintain the "cockpit viewpoint" has been argued exhaustively in treatises ranging from the monographs of students of the Air Command and Staff College to the official expressions of the Department of the Air Force. The majority of opinions concluded that regardless of current assignment an officer expected to command or control flying activities must stay abreast of aviation advances, know the capabilities and limitations of the flyers and their machines, and, most important of all, gain and maintain the respect and confidence of the men he is to lead.

The bulk of seasoned "know-how" is presently represented by the veterans of World War II and the Korean action. This is the well-known "hump" of rank and experience that so often plagues the personnel planner as he seeks a proper time spread of talent, and is an asset that the Air Force cannot afford to let stagnate. During the next decade or so, the younger flyers will accumulate the degree of experience, in air hours and in command functions, that will permit their assuming the loads of today's senior officers. Until that time arrives we must husband our valued personnel assets, keeping in mind always the fact that combat superiority, derived from aerial training and experience, gave the U.S. flyers decisive advantages in two recent wars.

Provision of Supplemental Airlift. Another objective of combat readiness training is to use existing assets to provide needed peacetime airlift. In the United States this desire to achieve economies with training aircraft attracted the attention of the Hoover Commission. The Air Force was providing needed airlift of personnel and materiel as an added dividend of training flights, under the "more Air Force per dollar" concept. At the same time it was scrutinized for possible competition with civilian airlines. Fortunately no conclusions that might defeat such a program were reached by the Hoover Commission. Its studies indicated that many CRT-transported passengers—personnel on pass, aerial hitchhikers—would not have been lucrative prospects for civilian fares

and, further, that logistics airlift so performed often did not fit the economies of commercial route planning and frequency. Another finding was that airlifted items, if they had to be shipped commercially, might have been sent by surface means had bonus airlift not been available. "Available airlift," therefore, may have been competing with hired boat or train rather than commercial air. The comparisons thus become unmanageable. While the Air Force was not directed at that time to cease such practices, the fact that the principle was questioned left many responsible staff officers, including the writer, wondering "When is the practice of economy economical?" In the end the most direct action of the Hoover Commission consisted of a recommendation that the number of administrative aircraft be drastically reduced.

One could well go on toward justifying this particular objective of CRT by reasoning that money saved through the provision of airlift was in turn required and spent in other Air Force programs. Therefore the civilian economy realized equal benefits from budget expenditures and the Air Force saved itself money. Such logic seemed obvious.

There are, then, three basic aims of combat readiness training:

- To maintain the continuity of flying training of rated pilots and observers, thereby retaining their capabilities as members of the rated mobilization and professional resource.
- To maintain the currency of aerial experience and the "cockpit viewpoint" of those concerned with commanding or controlling flying operations.
- To provide needed airlift and consequent mobility for the Air Force as a valuable dividend of a peacetime training effort.

The Amount of Readiness Training

A Flight Status Selection System was adopted in early 1954 to determine the categories and the number of flying personnel who should make up the mobilization potential reserve at any given time.

The system, as proposed and subsequently adopted, was to fulfill three requirements:

- Ensure professional and moral competence among the rated officer corps of the United States Air Force.
- Remove from flying status those officers who cannot rea-

sonably be expected to occupy command, staff, or combat positions requiring a flying officer in event of war.*

- Recognize the need for rated flying officers in command or staff positions to provide professional leadership necessary for the successful direction of the United States Air Force.

The remaining problem is how much flying training the qualified aircrews should be provided, and in what increments.

Suspending the flying of members of the RMPR, or reducing such flying to a "pay qualification" minimum in the interests of economy, is a possible course—the "on-again, off-again" one. The retraining of returned prisoners of war suggested this some ten years ago, and several ex-POWs thought this alternative practicable if coupled with periodic courses of refresher or transition training in modern aircraft. Ideas on the frequency of such periodic refresher courses ranged from one month per year to a concentrated course of 60 to 90 days duration at least once each three years. A maxim heard in discussions of this topic was that "flying is like riding a bicycle; once you learn it you never forget it." The implication was, of course, that refresher training in modern aircraft would present no particular problems.

Little evidence was found to sustain this view. In fact available evidence refuted the claim that little skill was lost during periods of suspension from flying. If accident rates can be an index of pilot skill, a study in 1950 of flying time totals versus accident rates for a control group of 8122 pilots showed that those who flew from 1 to 24 first-pilot hours in a six-month period compiled an accident rate of 68.6 per 100,000 hours, whereas pilots who flew from 42 to 60 first-pilot hours during the same period experienced an accident rate of only 16.9 per 100,000 hours.

An absurd note was reached when someone countered that had these persons not flown at all during this period they would have had no accidents and would therefore have had a perfect safety record. As amazing as it may seem such mental gymnastics were found recorded in official correspondence on this topic.

Assuming that a flyer is one who flies rather than one who maintains a perfect safety record by not flying, the gains in Air Force capability and dollar economies appear to favor a safe level of flying training. For example, the 42 to 60 first-pilot hour group is nearly representative of the flying level performed in today's CRT program; if minimum requirements were reduced to the

*The rules were recently eased for older rated officers (35 years old, 10-14 years flying service) to leave flying status. See message from Air Force Director of Military Personnel, AFPMP-1-B 171591, 10 January 1957, and Air Force Manual "Flying Status, Aeronautical Ratings, Designations, and Parachute Jump Status."

statutory level of 4 hours per month or less, the accident rate would approximate that of the 1 to 24 hours group, or about four times higher than current. Any claim of economy under the latter reduced program would add to greater losses in aircraft and personnel than could be compensated by the saving of the $142.00 per hour, average direct cost of such flying. The Air Force would lose a proportionate quantity of usable flying skills. Rather than risk such loss the Air Force has, except during the exigencies of World War II, chosen a program of continuous rather than sporadic flying training for all its flyers.

The lowest estimate of annual flying needed by a pilot seems to be tied, for financial reasons only, to the minimum requirement for earning flying pay—4 hours per month, 48 hours per year. A search failed to produce any evidence for this 4 hours per month. It is a much lower figure than any found in studies of aerial proficiency. Although immediately following World War II this level of operation was judged adequate to maintain the flying skills in the postwar reserve components, the concept was soon denounced and reserve forces adopted levels of flying more nearly approximating those of the active Air Force.

The defeat of a 48 hours-per-year program, though it has been proposed several times in recent years, seems assured because an accident rate four times greater than that of current programs implies a much less economical or qualitatively acceptable standard of peacetime operations.

Leaving this for the moment, let us consider the high-side estimates and their meaning.

The Other Side of the Coin. The Baker Committee Report, as far back as 1934, found that 100 hours a year was the barest *minimum* for a pilot to maintain proficiency and further expressed the belief that 300 hours a year was the *optimum for a pilot assigned primarily to pilot duties.* Less formal expressions of opinion usually fell within the 100 to 200 hours-per-year bracket. General James Doolittle, for one, thought that 200 hours was about right.

Where such estimates usually fall short is in a breakdown in terms of night flying, navigation, and instrument flying. This breakdown is supplied now in Air Force Regulation 60-2, the USAF Peacetime Planning Factors Manual, and in various combat crew training standards.

Under the circumstances the present 100 hours-per-year proficiency or CRT program seems reasonable. Further, because of the 65 per cent of annual CRT flying programs that falls within "as needed" Air Force requirements, a close study of these latter

would be of advantage to everyone. As a final point, the CRT program should be comparable to the typical bomber, fighter, and transport training programs.

The Airplane for CRT

Now to fit the tool to the task. To maintain the continuity of flying training and retain the capabilities of members of the mobilization potential reserve, training aircraft should be comparable in type to those used in tactical organizations. But to use tactical unit aircraft at CRT rates would increase the cost of the program fourfold and aggravate the current shortage of maintenance specialists. Project "Wring-out" and like efforts to put the Air Force dollar into the austere 128-wing force structure make any such cost increase prohibitive.

The next choice is to adopt those second-line aircraft best suited for reasonable-cost training. These should be supplemented by additions of suitable new training and cargo aircraft whenever possible. Funds to replace the attrition of old World War II types now in use have already been released in small increments and after much debate. Only a few C-131's (Convair 340's) assigned as commander's liaison and VIP transport have been added to the inventory. Some improvement came from the diversion of surplus Training Command T-33's to CRT use. Though the procedural training received in today's second-line aircraft is valuable, the day must soon come when deterioration at accelerating rates will reduce our B-25 and C-47 inventories materially and attention will be focused on replacements.* The question is how many, what type, and why?

We should provide aircraft of appropriate types for continuation training of three general pilot categories—fighter, bomber, and transport. While the lines of definition that separate them are not clean-cut, the three categories are still used by Air Training Command and in personnel classification actions. This does not imply that we should stock heavy, medium, and light bombers, but that we should have types suitable for all bomber pilots to fly during staff and command assignments. Today these pilots should be flying something as modern as the B-57 or the cheaper twin-jet T-37 instead of the B-25. The same reasoning applies to providing suitable jet craft such as the T-33 or the T-37 for fighter pilots and modernized transports like the C-131 for transport pilots.

*The Air Force and Navy are considering buying "off-the-shelf" jet executive transports, the first of their kind.

The needed numbers of each category could be determined on a profile study showing the average man-hours of bomber, fighter, and transport pilots in CRT training at any particular time. The resulting figure would need refinement to compensate for density of assignment differences. For instance Air University or Headquarters USAF, with a large CRT population, could be assigned bulk numbers of the three categories more easily than could a small station with only a few pilots of each category. Some adjustment would be needed if the requirement for providing airlift should outweigh that for crew training. Should tactical unit mobility and airlift support become critical, as well it might in view of today's shortage of airlift, the number of transport aircraft procured and assigned for CRT use should be increased proportionately, and a cross-training of CRT pilots could be expected to result. While the B-57, T-37, T-33, and C-131 may be appropriate today, the scene changes rapidly. To do justice to the airplane the problem should be reviewed at least once a year with the latest aircraft inventory and production schedule at hand.

The final responsibility for any CRT program lies with the individual. To keep his cockpit point of view the pilot must see to it that he keeps abreast of the latest in weather and control problems. He must do his best to broaden his experience by maintaining close contact with the tactical units and by participating in their operational problems and training. If he will do his part the Air Force will maintain and no doubt upgrade the quality of the desk-bound pilot.

Air War College

HIGH DEFENSE ORGANIZATION

Some British Viewpoints

BRIGADIER GENERAL W. BARTON LEACH, USAFR

THE PATTERNS of British thinking on the higher organization of defense structure have held major interest for American airmen since the days in 1917-18 of their own abrupt entry into major-league military aviation. At that time Britain recognized the importance of air power by establishing an Air Ministry in the Government and elevating the Royal Flying Corps from auxiliary status in the Army to a third national service, the Royal Air Force.

In Great Britain, as in the United States, the integration and control of three armed forces have offered difficulties and stimulated a variety of opinion. This paper briefs a series of views, some from published sources and others not, expressed by influential persons in England concerning the current British defense organization and possibilities of its improvement.* Considering their experienced origin, these views may also be relevant to the development of defense organization in the United States.

These views include advocacy of

a. reducing the three present services to "arms" of a single service, eliminating the three service ministers and transferring their authority to the Minister of Defence, and substituting a single Chief of Staff for the present Chiefs of Staff Committee (Field Marshal Lord Montgomery and Lt. Gen. Sir Ian Jacob),

b. keeping things pretty much as they are (Marshal of the Royal Air Force Sir John Slessor),

c. merging the Royal Navy and Royal Air Force, leaving the Army as a separate service (Vice-Admiral John Hughes-Hallett),

d. strengthening the Minister of Defence (while still retaining the three Service ministers) and extending the use of civilian chairmen of inter-service committees (Air Vice-Marshal E. J. Kingston-McCloughry).

Since the time when General Leach compiled this material, the British Government has taken steps to modify its defense establishment. The announcements made in January 1957 indicate that the changes are most closely akin to the views found here in the statements of Air Vice-Marshal Kingston-McCloughry. For a more detailed examination of the British defense structure and the probable impact of the changes made in January, see p. 78.** ***The Editors.

Field Marshal the Viscount Montgomery of Alamein

In a lecture before the Royal United Service Institution on 12 October 1955 Field Marshal Lord Montgomery proposed decisive powers for the Minister of Defence.

. . . Looking into the distant future, we must take as our objective bringing the three Services more closely together; even to the extent of combining them into one. Until this is done we limit ourselves to approaching, but not achieving, an ultimate goal of economy of force in the real sense of the word.

Let us examine this problem.

Progress and development in the modern world have outmoded the old conceptions of the organisation of military forces. But we cannot see this, so strong are our habits and traditions. All the great nations today have three Services—Sea, Land, and Air. This separate existence of the three Services results, in every nation, in waste of money, waste of manpower and waste of time.

If the world was static, and present conditions could be projected indefinitely into the future, there would not be the same urgent reasons for change that exist today, except of course the permanent need for economy of force in manpower, materials, and finance.

But the greatest fact of modern times is that change is inevitable: change in politics, in economics, in techniques, in fact in every field. Progress is not inevitable. Progress depends on courage to make decisions to meet the needs of the times.

The impact of scientific progress makes it essential that we shall be able and ready to adapt ourselves to changes. But the present organisation of military forces is incapable of adaption to changes, neither quickly, nor economically, nor efficiently.

A factor which influences the problem is the intermingling of functions in modern war. Ground forces require the support of air forces; air forces require protection of their bases; both are served by ships which have to cross the oceans bringing fuel, food and ammunition.

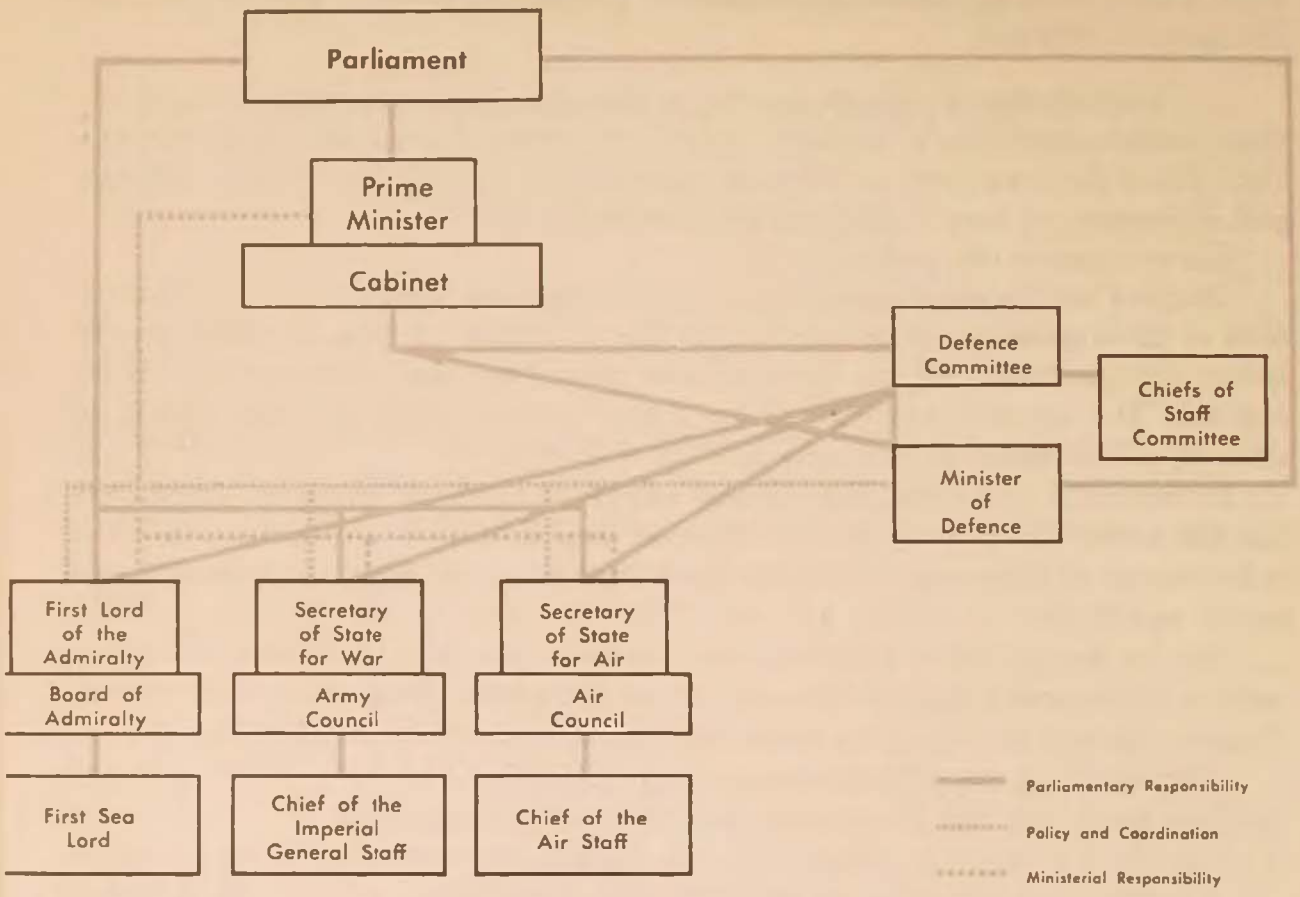
Navies at sea in war and in peace are greatly dependent on flying machines of many types; in addition they can, in many parts of the world, participate directly in the land-air battle with aircraft operated from ships. Today, all these intermingled tactical functions must be coordinated by joint staffs, by committees, by agreements between Services. I would add that any agreements reached are always compromises, and are seldom the best and most economical solution. . . .

When some function becomes obsolescent, vested interests and emotional attachments go into action to prevent it being abolished, and Service propaganda machines are put into top gear.

The basic reason for all this confusion is wrong organisation. The old feudal system, first of two Services and now three, has existed for too long and even today is not much more than a federation of powerful states. What we need is a system of close integration, with a proper function for each Service, on a cooperative and not on a competitive basis. . . .

But in the future, as political, economic, and technical changes accelerate, it is a grave question whether any large military organisation which is not closely integrated and gripped tightly at the top can adapt itself successfully to the required speed of modern life. If this is not done, the lack of adaptability of the organisation as a whole will tend continuously to promote individual Service interests over those of the nation concerned. Under such conditions, politicians have to step in to keep things going; they do this in the only way they know, i.e. by the creation

British Defense Organization



The diagram above portrays the British defense establishment as it was at the time that the views assembled here were written. The structure closely parallels that of the United States Department of Defense, the principal differences being the greater commingling in the British system of the legislative and executive, of the political and the military. The Defence Committee, for example, is parallel to the U.S. National Security Council. Composed of various Cabinet officers, including the Secretaries of the Services, the Defence Committee requires the attendance of the Chiefs of Staff of the Services to furnish professional military advice. The National Security Council is composed of the President, the Vice-President, the Secretary of State, the Secretary of Defense, the Director, Foreign Operations Administration, and the Director, Office of Defense Mobilization, together with other Secretaries and Under Secretaries as nominated by the President and approved by the Senate. The Service Secretaries and the Chiefs of Staff are only present when specifically requested to attend. In the British system the Minister of Defence and the Service Secretaries are appointed to their positions just as their opposite numbers in the U.S. system are appointed by the President. But the British appointees are also members of Parliament and must answer for their department to Parliament as well as to the Prime Minister. The merging of the political and the military continues on the level of the Air Council. In the British system this is composed of civilian as well

as military members. The Air Council is the ruling body of the Air Ministry, responsible for the control and administration of the Royal Air Force. The U.S. Air Force Council is composed purely of military members, who review Air Force programs and make recommendations to the Chief of Staff, USAF.

In January 1957, since the writing of the materials assembled by General Leach, the Prime Minister increased the powers of the Minister of Defence, adding responsibility for policy affecting the defense program and for the administration and efficiency of the armed forces as a whole. The Minister of Defence was given a Chief of Staff, who is the Chairman of the Chiefs of Staff Committee. The Prime Minister announced that the Service Departments would continue as separate departments with their ministers directly responsible to Parliament and that the responsibilities of the Chiefs of Staff as professional advisers to the Government would remain, the announced change being really one of procedure. Nevertheless the British have moved toward a tighter unification and a stronger Ministry of Defence, which has now acquired substantially the powers that the U.S. Secretary of Defense has had since the 1949 amendments of the National Security Act. The designation of the Chairman of the Chiefs of Staff as Chief of Staff to the Minister of Defence and as principal military adviser to the Government is in form different from the position of the U.S. Chairman of the Joint Chiefs of Staff; but in practice it probably will not prove to be significantly different from the way Admiral Radford has functioned as chairman.

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of *more* committees, and by *additional* bureaucracies for coordination and arbitration above those already existing. . . .

Each Service has developed within itself a system which provides for specialization where it is wanted, and yet ensures overall unity in direction. . . .

It seems to me to be ridiculous to go on in this way. Obviously we cannot today go over to one Service. But we might well introduce such a close integration between the three Services that the final step could be taken without confusion if it was ever decided it was necessary.

An essential step would be gradually to produce a new type of senior officer who was trained to be completely inter-Service from his earliest days. This could not be done unless we combined the Service cadet colleges, the staff colleges, and so on, and this I consider might well be done now. The final step would be to abolish the three Services as distinct entities, and organise them into one fighting Service under a single War Department.

I suggest three reasons for this.

First: the tasks of the three Services are not merely so differentiated as they used to be. The Navy flies; the Air Force devotes much of its effort to crippling the enemy's army and transporting our own.

Second: the advance of scientific discovery has produced ideas and weapons which do not fit neatly into the picture of three Services. They tend to unify warlike operations and it is more important than ever before that objective minds should examine the application of science to war.

And third: our nation is going to find it difficult to maintain defence expenditure at the present level. We cannot afford the luxury of duplication, and the waste which comes from adding together the demands of the three Services.

Time will not allow of attempting to answer the host of objections which will immediately be brought against such a scheme as this. No doubt the difficulties will be immense, and Service propaganda machines will make them appear impossible to overcome.

Tradition will be put forward as a reason against changes. Tradition is a wonderful thing but it must not become a bar to progress.

The point to note is that the rewards for success, and the penalties for inaction, are so great that something must be done: and done immediately. The changes would produce an equally good defence organisation, indeed it would be better. And the financial gains would be tremendous, resulting eventually in reduced taxation and a better standard of life for all.

. . . In modern times, a nation needs a Defence organisation on the following general outline.

A Minister of Defence who has real power of decision and action within the limits of Cabinet policy. He should be responsible for air, sea and land forces, and also for civil defence.

An Under-Secretary in each Service Ministry; these would direct the organisation and administration of their Services in accordance with the definite instructions of the Minister of Defence.

A Chief of Staff of the Armed Forces, who would be the professional adviser to the Minister of Defence. He would issue orders to the three Service Chiefs on defence matters and must have the power of decision in case of disagreements. He must, of course, be completely inter-Service on all matters.

A Chief of Staff of each Fighting Service who would be the sole professional adviser to his Under-Secretary.

Today it is impossible for a Head of Government or Minister of Defence to get true and unbiased inter-Service advice. Under the above system the Chief of Staff of the Armed Forces would give such advice.

The first and essential appointment is to make a Chief of Staff of the Armed Forces. It would then be necessary to work out the details of the modern system and to draw up the legislation necessary to give effect to it. The power of decision is then placed in the hands of the Minister of Defence, and Service empires disappear.

I suggest that under the above system responsibility would be clear cut, argument and vested interests would be stamped on, and things would get done. And after all, this is what we want: to get things done the right way, and quickly. . . .

Marshal of the Royal Air Force Sir John Slessor

In addition to holding such World War II commands as Commander in Chief, Coastal Command, and Commander in Chief, Royal Air Force Mediterranean, Marshal of the Royal Air Force Sir John Slessor had wide wartime experience as a planner, worked closely with both the British and U.S. Chiefs of Staff, and then served as Chief of Air Staff in 1950-53. He expressed strong opposition in *The Central Blue* (1956) to a superchief of a joint war staff as a supreme planning authority without command authority. He held the

present Chiefs of Staff Committee to represent about as good a method as could be devised for the higher direction of British defense.

. . . There are few things that could not be improved; but I think our Chiefs of Staff system as it has developed and matured over the thirty years which included the most testing time in our history, is about as good a method as could be devised for the higher direction of defence policy in this country. I do not say it is necessarily the best for other countries, though many have adopted it, or something like it; but nothing I know of the variations elsewhere, or the alternative systems in other countries (including Germany), leads me to believe they are an improvement on ours—even for the peoples concerned; I have certainly seen nothing I think we should emulate. It may be that we British are, by temperament and experience, better at working in committee than some other peoples. But to condemn the Chiefs of Staff system as 'making war by committee' is merely silly. The only alternative is to make war by one man. That may have worked all right with Napoleon—though he was ultimately defeated by the British. But even if a military dictator were acceptable in a democracy, there seems to me little evidence that military dictatorship is a sound working system with lesser men than Napoleon—it certainly was not in Germany.

. . . The three Chiefs of Staff are a Super Chief of the Defence Staff in commission, collectively responsible for tendering military advice to the Cabinet. At the same time, as individuals, they are the professional heads of their Services, responsible for their fighting efficiency and the direction of their operations in war. In that is implicit the golden rule which in my view is a *sine qua non* of any sound system for the higher direction of defence—the man who gives the advice to the Cabinet must be the same man who has the ultimate responsibility for putting it into effect. The Chiefs of Staffs and their principal subordinate staff officers must have their roots in their own Services and the responsibility for carrying out the plans which they recommend to their political masters. Power without responsibility is always dangerous, but nowhere more so than in matters of defence.

To my mind this is the major objection to the idea which periodically makes itself heard of having one single Super-Chief of a Joint War Staff as the principal military adviser to the Government. That idea is based sometimes on an evident failure to realize that we have in fact got a very effective Joint War Staff in the Chiefs of Staff machinery, with its Joint Planning and Joint Intelligence Staffs; sometimes on the quite erroneous impression that the German system had some peculiar excellence—which was far from being so; and sometimes on a more general woolly idea that the thing to do is to pick the right man, give him a small specially selected staff drawn from the three Services and let him sit back and think big, make the great decisions and put an end to these tedious inter-Service squabbles between admirals and generals and air marshals with 'vested interests.' Whatever the theory behind it and however superficially attractive it may appear, I am convinced that it is totally unsound. . . .

It simply would not work out that way—and, what is more, does not in the United States where something of the sort is in existence. I do not say it would be impossible, though I cannot believe it would be easy, to find a succession of very senior officers at the peak of their career who would bring to bear the balanced, experienced and resourceful mind envisaged. But it would be far more than a matter of this Super-Chief being able to call his soul his own; a more relevant point is that he could not call his own the souls of the professional heads of the three fighting Services. I do not believe that the Service Chiefs, anyway of the two other than his own Service of origin, would ever have the necessarily complete confidence in his

judgment and decisions that would be essential, especially in matters which they regarded as of vital importance and on which his judgment was opposed to theirs. Moreover, he could not have the ultimate responsibility for action. There is no analogy here between a Supreme Commander in a theatre of war and this suggested Super-Chief. Actually a Supreme Commander is more analogous to a Minister of Defence on a lower level; he is responsible in his theatre for the higher direction of strategy and, in varying degree, of political affairs; and he acts with the advice and assistance, not only of a senior political adviser, but of very senior officers who, as well as being his responsible specialist advisers, are under him the commanders of their own Services and have to put into effect the decisions arrived at by the Supreme Commander on their advice.

The Supreme Commander has a relatively easy job; it is (again with the advice of his three Service subordinates) to make the right military decisions and do the right thing with the forces at his disposal. The Super-Chief of Staff would have as a major responsibility advice to the Cabinet on the size and shape of the three Services and the allocation of resources between them—that is an essential part of the process of formulating long-range, world-wide strategy. But he could not be himself responsible for the result—he could not exercise effective responsibility for, say, the safe and timely arrival of convoys or the air defence of this country.

When there is a fundamental difference of view between two Chiefs of Staffs (and it happens far less frequently than sometimes seems to be imagined) it usually has its roots in financial or political ground and it can only be resolved on the highest political level—that is, by the Cabinet, on the recommendation of the Prime Minister or Minister of Defence. The same is true when the difference is on a more purely professional military issue. It is arguable that if such a difficult military decision has to be made, it had better be made by a man with long and wide military experience; but the very existence of the need to make the decision means that two men of the longest and widest military experience available have been unable to agree on the issue at stake—and the quality that now has to be brought into play is not military experience but statesmanship. Cabinets have often to make very difficult decisions between conflicting interests of which their members have no personal experience—that is what they are there for. And the best man to take a decision on an issue of this sort is a civilian statesman with no first-hand knowledge of any Service but with a keen brain, long political experience at Cabinet level, a man accustomed to weighing evidence, with the courage of his convictions and no preconceived prejudices. . . .

There followed a brief discussion of Winston Churchill's "massive qualities" in fulfilling this role. This man's personality, however, should not obscure the fact that in a democracy political authority is supreme over the military. Slessor continues:

In the United States they do have one officer as independent chairman of the Chiefs of Staff and principal military adviser to the President. With great respect to the United States Military Establishment, for which in many ways I have a great admiration, I do not think that the relations between their Service Chiefs in the Pentagon—or between the Joint Chiefs and other branches of government such as the State Department—are such as to encourage us to follow their example. But I have also had a good deal of experience, at a number of meetings of the Standing Group and Military Committee of N.A.T.O., of judging the relative efficacy of the American system and ours in that field—which is sometimes quoted as an argument in favour of the American method. For our part, the British Chiefs of Staff have recognized

the importance of continuity in working with N.A.T.O., and for that reason nominate the same one of their number to represent them at successive meetings over a long period—I did it for nearly two years. I was on terms of the closest co-operation and understanding with General Bradley, who as chairman of the U.S. Chiefs of Staff always represented them at these N.A.T.O. meetings, and count him and the other senior American officers whom I so frequently met on N.A.T.O. business in Washington and Lisbon, Rome or Paris, among my personal friends. But I could never see that General Bradley was in any stronger position as the representative of his country than I was. On the contrary I found that I had always at least as much and sometimes more latitude to give and take on behalf of my two colleagues than General Bradley seemed to have on behalf of the U.S. Joint Chiefs. That may have been due partly to a greater willingness on our part to delegate responsibility; partly to the principle that grew up with our own defence organisation that the Service representative on the military level must have full freedom of action if he is to be any good, but does not thereby finally commit his Government; and partly to our national aptitude for committee work, to which I have already referred. Anyway, I don't think it would be conceivably possible for the American Chiefs of Staff to delegate to one of their number, even their chairman, anything like the freedom to negotiate on their behalf that we are able to do. And my experience in N.A.T.O. gives me no grounds for supposing that an independent Chairman or Super-Chief would be of any advantage in that sphere.

Although the author distinguishes between the position of Chief Staff Officer and our Chairman, there are strong similarities.

If it is accepted that neither the Super-Chief of Staff with three Vice-Chiefs representing the Services nor the independent Chairman offers a satisfactory solution, there is only one alternative—the triumvirate system or 'Super-Chief of Staff in Commission' as ours was described by the Salisbury Committee, with the inclusion of the Chief of Staff Officer to the Minister of Defence (C.S.O.) who was introduced during the war in the person of General Ismay. That appointment is essential and its duties have developed considerably in the last few years. The C.S.O. must be a carefully picked man with the right background of experience and, if he is the right man, he can exercise an influence just as valuable as the independent chairman but without the disadvantage of power without responsibility. He is not a full member of the Chiefs of Staff Committee and does not sign their papers—i.e. he does not accept responsibility for advice. But in point of fact he can have a great influence on his colleagues and can make all the difference to the value of the committee. Having no departmental responsibilities to any one Service, he can devote his whole time to the work and does in fact develop an impartial inter-Service outlook. . . . He is a sort of high-level rapporteur, whose main task is to help the Chiefs of Staff to arrive at decisions, both in committee and by tactful individual discussion behind the scenes. He is obviously not a chairman but must be something much more than a secretary. He must be on a footing of equality with the Chiefs of Staff, so that he will be able to emphasize to them any aspects of a case to which he thinks they are giving insufficient attention, or advise them against a line of action towards which discussion is leading and which he feels is dangerous or unsound. In controversial matters he is able to get the sense of the meeting, listen to the various points of view and, as an impartial observer, can often distinguish the real difference of opinion from the misunderstanding between always busy and (especially in war) often rather tired men. When any subject has been sufficiently discussed and all points of view ventilated, the Chiefs of Staff can leave it to the C.S.O. to produce

for their approval the report or the wording of the decision required. It is then for him to consider all the implications, tie up the loose ends, initiate action on any aspects of the problem that require it, or suggest methods of reconciling conflicting points of view without on the one hand. committing a Chief of Staff to a course to which he is genuinely opposed or, on the other, merely arriving at a washy compromise.

It must be clear that, unlike the independent chairman, it is no part of the duty of the Chief Staff Officer to come between the Minister of Defence and the Chiefs of Staff or 'represent the views' of one to the other; on the contrary, an important part of his job is to see that they work sufficiently closely together, and any sort of go-between is fatal. It is true that not even the Defence Minister, still less the Prime Minister, can be in daily contact with the Chiefs, and the C.S.O. can and should keep Ministers informed of the problems with which the Chiefs are dealing and the way their minds are working. He may also be able to help the Chiefs of Staff by suggesting to them the possible political reactions to any particular event or to any proposed course of action (the appointment of an American as Supreme Commander, Atlantic and the consequent political rumpus is a case in point); but he is in no sense an intermediary with Ministers or with other departments of State. The Chiefs of Staff and their planners on their respective levels must, and do, work at all stages in direct consultation with the representatives on their levels of other interested departments—notably the Foreign Office, Colonial Office and Commonwealth Relations Office; and on financial matters the Permanent Under-Secretary to the Minister of Defence is always available for consultation and advice. Finally, in these post-war days when the great regional organizations for collective defence like N.A.T.O. and S.E.A.T.O. impose such an immense added burden upon the Defence Staffs, the Chief Staff Officer is virtually indispensable to co-ordinate the action of the different Services Staffs in that field, and deal with the mass of inter-Allied problems, including the work arising from the frequent conferences, and liaison with the British representatives at the headquarters of the regional organizations. . . .

One common criticism of the triumvirate Chiefs of Staff system is that it tends to result in an unsatisfactory compromise on matters which, by implication, should be susceptible of definite clear-cut solutions one way or another. That in the thirty years' history of the committee there have been so relatively few occasions on which the Chiefs of Staff have been unable to submit an agreed solution to Ministers, may appear to lend some support to this view. And it can be admitted that there have been examples of unsatisfactory compromises. . . .

But what is the alternative? Almost everything in life is a compromise of some sort. And in defence matters no more than in any other is it likely that two or three responsible people representing different aspects of a problem—whether it be the defence of Europe or the settlement of an oil dispute with Iran—will always arrive at complete unanimity on every point. It is no bad thing that every problem should be strongly argued by experienced people with different possible solutions—it certainly ensures that nothing is accepted that has not been subjected to a pretty gruelling test. But the only alternative to compromise of some sort is an imposed decision, which I have already argued can only be made by those who have the ultimate responsibility to Parliament.

The really important thing is that the Chiefs of Staff themselves should not hesitate to put the case forward for Cabinet arbitration rather than agree upon a solution that any of them are convinced is bad, merely for the sake of agreement. There must always be give and take, and a Chief of Staff who is incapable of making concessions to the views of his colleagues is a menace. But on something which he regards as a matter of vital principle he must be prepared to stick his toes in. No

Chief of Staff or senior staff officer should be afraid of being 'controversial,' provided he does it in the right way—and there is very much a right and a wrong way in these matters. To give in merely to avoid unpleasantness, or to give the impression of a unified opinion that does not really exist, is merely lack of moral courage and a dereliction of duty. But these controversies should be kept 'in the family,' thoroughly thrashed out and then, if no agreed solution is in sight, submitted to Ministers, whose ruling must then be loyally observed. No good can come of allowing (still less encouraging) inter-Service disagreement on the Chiefs of Staff level to leak out and become a subject of public debate in Parliament and the Press. Service Ministers should themselves be very chary of embarking upon controversy between themselves on professional matters. The time comes when it is for them, in their capacity as members of the Defence Committee, to help adjudicate upon a controversial subject—and that is the time when they have the opportunity and the duty to champion the cause of their Department. But these differences of opinion usually settle themselves satisfactorily without having to come to Ministers, and it is far better on professional matters to leave the professional Chiefs to have it out and settle it between them, and only step in either when the Service Chiefs cannot agree, or when Ministers consider the professional solution to be dangerously unsatisfactory—which, of course, they are not only entitled but in duty bound to do. . . .

The author traced the development of the British system through the last war. He concludes:

It is difficult to suggest how the system could be improved. One criticism of some weight was that, while in the Joint Planning and Joint Intelligence Staffs and a number of subordinate Joint Staff bodies there was ample provision for the formulation of strategic policy, the preparation of plans for future operations and the collation and evaluation of intelligence, there was no corresponding machinery for joint executive decision on day-to-day problems or the direction of current operations. It was partly this lack that tended to overload the Chiefs of Staff and compel them to deal with matters which might quite well have been handled on a lower level. The present system of the Vice-Chiefs meeting in committee with the authority of their Chiefs to handle matters other than of first-rate import may be enough. But I am inclined to think it would be desirable, in the event of another war on a really serious scale, to reproduce the Joint Planner system in the current operations field, with perhaps the Assistant Chief of the Air Staff (Operations) and his opposite numbers as the principals; something on those lines would relieve the Chiefs of Staff of a great deal of day-to-day work which could quite safely be handled on their behalf by officers of the rank of Air Vice-Marshal and equivalent.

On the Ministerial level we have introduced since the war the separate Minister of Defence, instead of combining that responsibility with the office of Prime Minister as in 1940-1945. That is no doubt inevitable in peace time and I have already argued that the Minister of Defence should be in the very first rank of Cabinet appointments. On the outbreak of a major war however, the conduct of war becomes the principal preoccupation and responsibility of Government; and whether the peacetime organisation would survive, or the portfolio of Defence again be taken over by the Prime Minister, would almost certainly depend on personalities at the time. There is, however, one matter which, while difficult to see how it could be improved, has some unsatisfactory features, and that is the position of the Ministers in charge of the Service departments, who are not members of the Cabinet. The present position is not only in some respects rather anomalous for them, but is not always easy for the Chiefs of Staff who, with the best will in the world, have to some extent a

divided loyalty. The professional head of the Service is responsible to his Secretary of State, who in turn is responsible to Parliament, for the fighting efficiency of his Service; at the same time he is a member of an inter-Service team who report to the Minister of Defence. And, while the Chief of Staff should always endeavour to keep his political chief in the picture, the latter cannot in fact exercise a definitive influence on strategic policy in its formative stage or until it comes up to the Cabinet Sub-Committee on Defence, of which he is a member. It has happened in the past that in the exercise of a policy in the formulation of which the Service Minister has had little or no say, something has gone wrong and the unfortunate Service Minister has had to defend it in the House of Commons. But that sort of thing does not happen often and, if it does, it must be for the Minister of Defence to take the responsibility.

While admitting the difficulties, I can see no solution of them. In point of fact they seldom become serious and, in a rather typically British way, an arrangement which contains some anomalies works, by and large, quite well—it is a matter for the exercise of tact and common sense by everyone concerned. In peace time its disadvantages can and should be minimized if the Minister of Defence insists on using to the full the good constitutional machinery that exists, and in particular on having frequent and regular meetings of the Defence Committee to give Service Ministers ample opportunity of considering strategic problems, of making their views known and their influence felt. In war, it would probably again be sufficient, as it was last time, if the Service Ministers, in addition to their membership of the Defence Committee, are invariably in attendance at all meetings of the War Cabinet at which any matters connected with the conduct of the war are under consideration—which will be more often than not. But that again is bound to depend primarily upon personalities at the time, and in particular upon the Prime Minister of the day.

Lieutenant General Sir Ian Jacob

Sir Ian Jacob, now head of the British Broadcasting Corporation, is the "Brigadier Jacob" so frequently referred to in Churchill's history of *The Second World War;* he served with General Ismay as the Prime Minister's personal military staff. Because of his experience in the higher direction of military policy, his wide range of personal contacts, and the high repute in which he is held, his views command attention.

In 1948 General Jacob seems to have favored a movement, as rapid as possible, toward creation of a single service, The Armed Forces of the Crown. Writing to the *Sunday Times* on 22 January, he comments:

. . . During the war . . . the framing of a common strategic policy, and the allocation of resources, were done by the Prime Minister and Minister of Defence working through a small Defence Committee and through the Chiefs of Staff Committee. The system worked very well, and the Services, given a lead from the top, were brought closer together than ever before. A joint Staff served the Prime Minister and Chiefs of Staff. At the end of the war the Government, after careful investigation, decided to perpetuate this arrangement, though they decided to create a separate Minister of Defence and to turn his office into a small co-ordinating Ministry. The principle which was to continue was that at all levels from the Chiefs of Staff downwards the work was to be done by the responsible officers drawn from the Service Ministries and working together as teams. The question that arises . . . is

whether this system really does work well enough in peace. . . . It may seem paradoxical that one should quarrel with a system which carried us through the greatest war in history simply because it does not work so well in peace. But it seems certain that our whole future will depend upon our condition at the outbreak of any further major war, and that the days when we had a long period after the declaration of war in which to pull ourselves together have gone. A really sound defence organisation in peace-time is therefore vital.

In war-time, when the whole resources of the nation can be called upon, and when strategy is the main preoccupation, a three-service triumvirate can reach sound conclusions, whereas in peace-time when the problem is the division between the services of a small amount of money and men, each member of the team finds it incumbent on him to fight for his own service. Prestige, rivalry, prejudice and similar regrettable but human motives come into play, and there is not the urgency of war to compel an objective solution. There is no-one except the Minister of Defence to judge between rival claims. The ideal of a balanced and sound joint military view being placed before the Minister is rarely attained, and wrangles at the centre tend to spread outwards and to drive the Services apart. The nation runs a grave risk of providing men and money for a defence plan which is merely the sum of those proposals from each Service which the others judge to be comparatively harmless from the point of view of their own interests.

This picture may be too gloomy. Much depends upon the quality of the Minister, and the desire and capacity of the Chiefs of Staff to set an example by sinking their service interests in pursuit of a really sound plan. Nor do I suggest that, given three Services to co-ordinate, the present system could be much improved. I think we have got to work towards a more radical solution. In the White Paper entitled Central Organisation for Defence . . . issued in October 1946, there occurs the following passage:

> During the war a unified defence policy was achieved by the assumption of executive control by the Prime Minister and the Minister of Defence. How is it to be achieved in peace?
> One method would be to amalgamate the three Services completely, and to place them under a single Minister of the Crown. This has been advocated by some as the logical development of the close relation which has been built up during the war between the operation of forces by sea, land, and air and as a means of giving full play to scientific developments in weapons; His Majesty's Government do not wholly reject this conception; it may be that at some stage in the future amalgamation might be found desirable. They have decided, however, that this is a step which could not and should not be taken here and now.

I believe that the time has now come when this decision should be reconsidered. It would be absurd to suggest that the Services could be unified by a stroke of the pen. It will be no easy matter to create "The Armed Forces of the Crown" as a single service. Many deep prejudices will have to be overcome, and many very real obstacles will have to be surmounted. But I do suggest that our aim should now be set at unification, and that we should deliberately move towards it. I am convinced that it is only by this final reform that we shall attain to a system of command in which modern weapons will be developed and utilized in an objective and unbiased fashion, and in which a defence plan will be framed giving the country the best value for the resources we can afford.

As of 1956 the General appears to be emphasizing the initial step: a "merging at the top"—that is, a stronger Ministry of Defence, a single chief of staff, and a single promotion list of all officers who have reached general, flag, or air rank. His lecture to the Royal United Service Institution follows:

. . . I suggest that our present organization has gone so far as it is possible to go along the road of co-operation and co-ordination. The goal set by the long-sighted men who created the Committee of Imperial Defence at the beginning of the century, and worked to develop and perfect the system of which it was the key member has been achieved. The question now is whether a new goal should be set for gradual achievement or whether we should accept what we have as the best possible. The new goal could only be a unification of the Services, by which I do not mean their abolition as separate entities, but their merging at the top. The goal would be a single Defence Council replacing the Board of Admiralty, the Army Council, and the Air Council, with a single Defence Minister and Ministry. There would be a unified list for officers who have risen to Flag rank or its equivalent. There would be a single Chief of Staff backed, of course, by an appropriately selected military organisation. The object of such an arrangement would be to carry into inter-Service life the conception which was long ago accepted in each particular Service. In the Army the arms and branches of the Service exist, and maintain their characteristics, esprit de corps, and traditions. But at the top all officers are members of the Army, no matter what their previous regiment may have been. The right man, chosen for his personal qualifications, his training and experience, is appointed to each post. A similar arrangement could be applied overall. The result would be that all senior officers would be in a position to form their views and to help in the taking of decisions from the point of view of military operations as a whole. They would have ceased to fight for their own corner, though their Service foundations would not have been destroyed.

Many obvious objections can be made to such an arrangement. I would not suggest for a moment that the case is proved for or against. I would simply say this: we should examine very carefully whether a new goal of this kind should be established, or whether we should leave the well-tried system based on three Services, coordinated and co-operating, unchanged. I suggest that an examination of this kind should be set on foot, perhaps by a successor of the Esher Committee of over 50 years ago. If the conclusion of this examination favours a change, then this should be accepted and made known, and every step from now on should be taken towards the ultimate goal. If it is against, then we should set our face against changes and should concentrate our energies on making the existing system work as well as may be. I do not think that we should allow matters to slide and merely leave to passing whim or chance the introduction of minor remedies when the system appears to show symptoms of disease. . . .

In a 1956 letter to Sir John Slessor, Sir Ian expressed his disagreement with the position set forth in *The Central Blue.*

I have got your new book which I shall read with very great interest, but so far I have been looking at particular passages which bear on the problem that I keep thinking about, namely the higher Defence organisation. I have thus been studying what you have written about the Chiefs of Staff and all that . . . I certainly agree with most of it, but I still don't feel that it is the whole story. Unless I have misunderstood your thought, you seem to be dealing with the idea of some kind of super Chief of Staff who would be called upon to operate in what otherwise is roughly the same set-up as at present, i.e. with three Service Ministers and Services, and with the Board of Admiralty and its two equivalents still there in their present shape even though the Service Ministers have lost some of their status. If this is so I agree with you that the idea has very little to commend it, and might be even worse than what has now been brought about by the creation of a Chairman of the C.O.S.

But I think we ought to consider something more far-reaching before we conclude that the present arrangement (minus the Chairman) is the right thing for the years to come. That is what I want to put to you.

I cannot get over the feeling that as weapons and methods develop the clear cut differences between the Services will become no more than those which have existed between say the cavalry and the infantry. After all it is only 30 years since the R.A.F. came into existence, and in that period the air has come to mean as much to battles at sea or on land as it does to itself. It has its own army too. The Navy is largely in the air now. Then in the future the aeroplane may itself disappear in many of its present roles and be replaced by missiles fired once more like artillery from the ground. In other words, the differences become increasingly blurred, and the problem is increasingly the application of resources to the best advantage to a given strategic or tactical situation and the economical utilization of science and its progeny in our defence problem. If this is so what is the real argument against doing in the interservice field what has for so long been done within each Service? Is a Service more than an "arm" on a greater scale? . . .

Carrying the matter on further, the top amalgamation would be carried out by creating a single Ministry of Defence. The three Ministries would disappear, and with them the three Boards or Councils. There would be a single Defence Council with one Chief of Staff.

Now, I believe that this kind of set-up makes sense, and would not be open to the kind of criticisms that we level at arrangements that have been suggested and which superimpose something on three separate Ministries and Services. Other kinds of criticism can of course be made, as they can be made of any set-up. It would be said that it would be too big, that too much power would be concentrated in one man, and that few men would be capable of filling so responsible a position as that of the single Chief of Staff of the Armed Forces. I doubt whether these criticisms are valid. After all the size and complexity problem is relative. One Service in the U.S.A. is a great deal bigger and more complex than all ours put together. . . .

However, my point is this. Either one concludes that the present system is the best that can be devised and will stand the test of the future, in which case we mustn't fiddle with it, or else one must look for something better. I see no direction in which to look than in the direction that I have very shortly and roughly discussed. Halfway houses do not really exist. I think we should look beyond the present set-up, and that we should go for a radical change of the kind I here suggest. The rate of change is ever increasing in military matters, and I believe the idea of three separate Services, unmerged at the top, is getting out of date. Please excuse so long a letter, but I thought it might amuse you to knock my ideas to pieces!

Sir John Slessor's letter of reply outlined his reasons for opposing drastic further integration of the services and urged the appointment of a new "Salisbury Committee" (whose 1923 report recommended the establishment of the Chiefs of Staff Committee) to consider all present proposals for change.

I've waited to answer your letter of the 26th because I wanted a bit of time to think about it. I knew already from you that your mind was turning in this direction; and there's no question of my "knocking your ideas to pieces"—I think there is much to be said for them, and something on the lines you suggest may be the answer ultimately. I rather doubt it, and anyway don't think the time is yet ripe for it. But God knows I'm not against change if change is going to be useful . . .

I think the real core of the whole problem is your own question, "Is a Service more than an 'arm' on a great scale?" I think the answer is—As far as the Army

and Air Force are concerned, Yes; the distinction is at present more blurred between the R.A.F. and the Navy (which as you say is now largely in the air); but it is not blurred between the Army and the Navy. Cavalry, infantry, armour, artillery and engineers are only arms of a Service which fights on land . . . The point, to me, is not whether the chap wielding the weapon sits on the ground or in the seat of an aeroplane; but whether his weapon is used for fighting in or from the air or ground. I do not believe guided missiles will entirely replace manned aircraft; and I think *all* the battle in and from the air should be controlled by one control and all the battle on the ground by one control. . . . I think even the short-range (i.e. 100 or 150 miles) guided weapon in the field (like Matador for instance) should be controlled by the same man who controls the fighter bombers—because it is simply a fighter-bomber without a pilot in it. This isn't a matter just of principle or amour propre but of practical battle use. I see awful possibilities of confusion, duplication, shooting our own people down etc., unless all the air battle is under one control, naturally tied in very closely at the top. . . .

This means surely that the khaki man controls on the battlefield and the slate-blue man above and beyond the battlefield. Query, where does the battlefield end, how far from the infantry's or armour's start-line? That's a question to which I don't think one can give a generalized answer but I believe it will usually be pretty obvious in practice—and anyway it is a truism from our past experience that the system of joint Army-Air control must be flexible and quickly adaptable to changing tactical conditions.

If you can go along with me this far, you may agree that from it emerges the reason why (I think) Armour and Artillery are *arms* whereas land and air forces are *Services;* namely that the raison d'etre for Armour and Artillery is to win a battle in the battlefield on the ground—to destroy enemy armour and artillery in battle and to occupy ground, or prevent the enemy occupying it. The job of bombers, fighters, fighter-bombers, guided missiles etc. may often be to help the Army to do their job on the battlefield by denying the enemy or his supplies access to the battlefield—and even on rare occasions to intervene in a crisis actually on the battlefield (Cassino, Caen, Battipaglia etc.). But even in a joint land-air campaign their primary job will be to prevent the enemy interfering with our Army or its supplies by creating air superiority such as we enjoyed in Italy or in Overlord. And it may well be that in a Third World War in this hydrogen age the battlefield would become altogether irrelevant.

In other words the reason why the Army and Air, are, and I think must be, different *Services*, not merely different *arms* of one Service, is the same as that why the Army and Navy have always been different Services—namely that as a general rule the battlefield was, and is, irrelevant to the Navy and vice versa. Occasionally—and as a rule not very usefully—the Navy intervenes on a sea-flank of a battlefield. But in the main, having put the Army ashore (or taken it off again as at Dunkirk) the Navy's job is perfectly distinct from that of the Army and neither much minds what the other is doing, as long as the Navy continues to ensure the flow of the Army's reinforcements and supplies and the Army continues to hold the Navy's bases.

It may be asked—what's all this about *arms* and *Services*—what's in a name? I think it's much more than a name. Except for the Fleet Air Arm (which I'm coming to in a minute and anyway is not all the Navy) the men who make up the three Services live, work, fight and have their being in completely different conditions, their problems are quite different, their dangers are different, and their whole training therefore must be different. Don't let's forget that, whatever the weapons, it is

the ordinary human beings, the men who wield the weapons, and their whole background and environment, who are the crux of the matter. You take, say, an ordinary Sapper captain or Cavalry subaltern who finds himself in an emergency in charge of a unit of another *arm*—a company of infantry in a Cyprus riot or a platoon in a jungle ambush in Malaya; his reactions may (in fact will) not be as quick as his experienced infantry opposite number, but he won't be a complete fish out of water. Put some unfortunate Squadron Leader R.A.F. or Lieutenant R.N. in the same position and he won't have the foggiest idea what to do—he is entirely unfitted to the job by his background and the training which has admirably fitted him for his own job in his own *Service*.

As far as the R.A.F. and the Navy are concerned, the distinction is in one way not nearly so clear as I think it is between the R.A.F. and the Army, and the Navy and the Army. I'm not going into all the reasons why I think the Navy should not take over Coastal Command—it would take too long and anyway the system worked admirably last time and, in the very unlikely event of our ever having another prolonged World War, I see no reason whatever why it should not work perfectly well another time. There are some who argue that the Navy and R.A.F. should be combined to make one Air-Sea Service. That may come some day. If it does, it certainly will not come in the way people . . . appear to want it to come—by an administrative act, waving a wand. If it comes, it will come by evolution, by merging gradually those parts of the R.A.F. and Navy which already overlap . . .

Perhaps I've laboured all this rather unduly, but I do so because I think this distinction between *Arms* and *Services* is rather fundamental to your case, and I wanted you to be quite clear why I don't think the Army, Navy and Air Force are just Arms like Infantry or Cavalry.

Now, you suggest that when an officer reaches the rank of Air Commodore and equivalent, he should come onto a General List of the Armed Forces, just as an Army Officer reaching the rank of Colonel leaves his arm and comes on the General List of the Army. As a matter of fact he doesn't really leave his arm . . . What he does is become eligible for any senior appointment in the Army other than a senior appointment in an arm other than his own. . . .

On your principle the Brigadier, Air Commodore and Senior Post Captain would come into a General List and be available for any job in the three Armed Forces other than a Command in a Force not originally his own or a staff appointment requiring specialized experience . . . I can see no objection to that—you presumably would not put the senior officers into some new funny uniform or call them by some new fancy titles. Indeed I think there is a lot to be said for it. We do do it in a small way already in a limited sphere—for instance at S.H.A.P.E. or in the Ministry of Defence—you pick a chap . . . because you think he's the best chap for the job, not because he's a soldier, sailor or airman. In fact for years we have been able to do it, but haven't . . .

There are limits to that sort of thing, of course. But in the high level inter-Service sphere we might carry it further than we do now, and should always be on the look-out for senior jobs in the three Services which could be filled by an officer of another Service, and do so whenever possible. Whether it is necessary to call it a General List I'm rather doubtful—don't see much point in it; in fact I think it would be rather a pretence.

That brings us to your real main point, that we should have a Single Ministry of Defence, that the three Service Ministries would disappear, together with their three Boards and Councils, and there would be a single defence Council with one Chief of

Staff. And there I'm afraid I don't go along with you. I don't think it would be too big (if you mean numerically big); as you say, the U.S.A.F. is bigger than our 3 Services put together. It's not a question of size, but of divergence and complexity of problems, functions, training, equipment and so-on. I don't think the argument that too much power would be concentrated in one man is a very valid argument—though I can conceive of political difficulties. And I'd hope we could find men capable of filling a position of so much responsibility as that of the single Chief of Staff. It's not a question of responsibility to my mind, but of qualifications, of experience, and of knowledge to fit him to take decisions, if necessary, against the advice of his subordinates. I confess I can't think of many officers in my experience who'd be capable of it. . . .

You say you'd scrap the three Councils and have one Defence Council. But could you really? . . . Honestly I doubt it. What I think would happen would be that you'd have a Minister of Defence with a Deputy, three Under Secretaries (who I think would each jolly soon find they'd have to have an Under-Under-Secretary) and three Great Panjandrums—Chief of Staff, Personnel and Supply—each of whom would have to have three Vices, Air, Sea and Land; and the net result would be you'd have very much what you started with, plus the three Panjandrums, and a bottleneck at the top which would make decisions even harder to get than they are now. And you don't mention the Ministry of Supply, which is where I think some radical reorganization is more necessary than anywhere.

I'm afraid this is all rather destructive and, as I say, I'd like to see a really high-powered Commission put on to go into the whole thing. I still think there is not much wrong with the present system—except this new Chairman of the Chiefs of Staff, which I think is not only unnecessary but undesirable. What was really needed was not to create a new post or change the organization, but to work the old organization properly.

Vice-Admiral John Hughes-Hallett

Vice-Admiral John Hughes-Hallett was commander of the naval force in the attack on Dieppe in August 1942. He is now a Conservative Member of Parliament. His maiden speech in the House of Commons on 1 March 1955 and a subsequent article in *Brassey's Annual, 1955* propose the merging of the Royal Navy and the Royal Air Force into a single service, with the Army left outside the merger.

. . . I for one do not question the need for a strong Army. Indeed, the Army is fortunate in being required to fulfil a role which is not only essential, but is also exclusive in the sense that it calls for training and qualifications which are quite different from those required of airmen and of seamen.

It is when we turn to the relationship between the Navy and the Air Force that we find cause for anxiety and that we enter an area of the strongest controversy. Many people in this country, and, I believe, many hon. Members in this House, are deeply concerned about the future of the Navy. . . .

My own view is that the future of the Navy is inextricably bound up with the future of the Royal Air Force. There is a wide field in which the functions of the two Services overlap. The defence against invasion, the defence of our trade routes, the blockade of an enemy, the carriage of troops and even, to some extent, the support of an Army are all functions which can be entrusted either to naval or to air forces, or to a combination of both. The extent to which it is expedient to rely on one arm

rather than on the other is nearly always a highly technical and highly contentious question. It is, indeed, a question on which laymen find it hard to reach conclusions or even to adjudicate with any confidence. Yet so long as the expert advisers are officers from two different Services who—and let us be quite frank about this—have an interest in seeing their own view prevail, it is too much to expect that ministers will always receive wholly objective advice.

There is much danger in this, and the danger is aggravated by the fact that for many years technical progress has usually tended to enlarge the scope of aircraft and to restrict and diminish that of warships. There are grounds today for believing that this trend may be about to change. The fact remains that hitherto the protagonists of a strong Navy have been forced into the embarrassing position of always seeming to deny or to belittle progress, while the champions of the air have too often been tempted to exaggerate, and sometimes grossly to anticipate, the march of invention.

May I give two current examples to illustrate this clash of interest? There is a school of thought today which believes that within the next 20 years the antisubmarine helicopter will not only have replaced all conventional fixed-wing aircraft but also all surface warships in antisubmarine operations. Whatever the merits of the case may be, it is a purely naval problem in the open seas; that is to say, it is a problem for the Admiralty whether we protect our convoys with escorts of frigates or with ships carrying helicopters, and it is a problem on which we can expect unbiased judgments and decisions. But when we turn to the protection of coastal shipping, the position is very different because, if shore-based helicopters are to replace warships, the process will be accompanied by an expansion of the Air Force at the expense of the Navy; that is to say, at the expense of the careers of quite a number of officers now wearing naval uniform.

My second example cuts the other way. Imaginative people have argued for many years that some kind of warship—possibly submarines, but that is irrelevant—capable of launching ballistic rockets will before long become more certain and more economical agents for so-called strategic bombing than are the long-range bombing aircraft of today. And I must say that there are solid technical and strategic reasons to support that view. Its acceptance, however, would divert considerable funds from the Air Force back to the Navy.

After reflecting on these problems, I reached the conclusion about six years ago that the most prudent course might be to fuse the Royal Navy and the Royal Air Force into a single Service as equal partners, and nothing that has happened in the years which have followed has led me to modify this conclusion. I can see no other certain way of bringing to an end the interminable and sterile arguments that have gone on for so many years between the champions of the Navy and the champions of the Royal Air Force. . . .

Those of us who advocate fusion can take comfort from the thought that there is much that is common in the training of an airman and a seaman. Both require knowledge of navigation, of radio communications, a ground work in electronics and engineering and, with the advent of guided missiles, both will need a fairly common weapon training. But if I were asked what is the secret of being a good seaman or a good pilot, I would say it was the same thing: an eye for relative movement, an almost instinctive appreciation of relative velocity; equally necessary, whether one is handling a ship, landing an aircraft or conducting sea and air operations from a plot.

In advocating a single air-sea Service, let me make it clear that I should be against anything sudden—no blue prints, no vesting days, no hybrid new uniforms are wanted. Rather I visualize a process which might be spread over many years, and a process which, in its detailed planning, can be empirical. . . .

In the *Brassey's Annual* article the author finds two objections to continuing the Navy and RAF as separate services.

Firstly, it is very bad for the morale of a corps of highly trained professional officers if their future prospects, and indeed their usefulness in their own eyes, is ceaselessly threatened by the technical advances of another service. . . . There is something basically wrong in an organization which gives to whole groups of zealous public servants a direct interest in advocating or in resisting technical developments which ought to be judged from a wholly objective and impersonal standpoint. . . . This brings me to a second objection to going on as at present: the Navy has become exceedingly uneconomical. . . . The present operational fleet is far smaller than that of twenty or thirty years ago. . . . [But] the number of officers has almost doubled, and—most strange of all—the number of captains and admirals has gone up although the number of sea commands for them must be less than half what it used to be. . . .

A union between the Navy and Air Force would overcome these difficulties. In the first place the rival claims of aircraft vs. ships would no longer involve a clash of interest or of personal ambition, or at least to nothing like the same extent as now. It would become possible to change from one element to the other without wasting trained personnel. It would often be possible to divert buildings and facilities originally intended for ships and seamen to the use of aircraft and airmen, or vice versa.

Admiral Hughes-Hallett gives as an example the transfer of helicopter pilots back and forth between the Air Force and the Navy as a desirable thing for the various missions. He continues by rejecting the inclusion of the Army into any merger—

. . . as unjustified and impracticable. It is unjustified because the case for amalgamating the Navy and RAF does not rest on the advantage of a large organization but on the existing interconnection between the two services which does not extend to the Army. It is impracticable because the training and qualifications of a soldier are fundamentally different from those of naval or air officers. Indeed the RAF have always had to make special arrangements to train pilots for the Tactical Air Force since these officers require a certain amount of basic military training. It may be convenient to mention now that under the scheme which I advocate, the manning of the Tactical Air Force would become the prime function of the Royal Marines. Historically the Marines have formed a sort of link between the Navy and the Army, and, if the Navy and RAF combine, it would be a natural extension of the same idea to make the Tactical Air Force the province of the Royal Marines. . . .

Air Vice-Marshal E. J. Kingston-McCloughry

Air Vice-Marshal Kingston-McCloughry, author of *The Direction of War* (1955) and *Global Strategy* (1956), puts forth less sweeping proposals without opposing more fundamental reform. He feels the need of a strengthened Ministry of Defence, and he sees great merit in inter-service committees with a civilian chairman, patterned after the Air Defence Committee on which he served.

In *The Direction of War* he wrote:

. . . The Ministry of Defence was created after the Second World War to coordinate the Service Departments together with the Ministry of Supply, the Home

Office and other non-military Departments. It was deliberately given terms of reference framed as only a first stage in co-ordination, leaving much of the real power with the three Service Departments. This new co-ordinating rather than executive Ministry is a highly complex organization and its subtle working is difficult to describe briefly. Certainly under present practice and procedure the title 'The office of the Minister of Defence' would be more descriptive than the Ministry of Defence.

Although the Minister of Defence is deputy chairman of the Defence Committee and can also when he wishes call a Chiefs of Staff Committee meeting and preside over it, his actual place in the direct chain of responsibility in military operational affairs is open to some doubt. The complication arises because, as professional military advisers of the Government, the Chiefs of Staff report direct to the Defence Committee. The actual wording of the charter is: 'On all technical questions of strategy and plans it is essential that the Cabinet and Defence Committee should be able to have presented to them directly and personally the advice of the Chiefs of Staff, as the professional military advisers of the Government. Their advice to the Defence Committee or the Cabinet will not, therefore, be presented only through the Minister of Defence.' Indeed, there are some who would probably argue that the Chiefs of Staff Committee is not strictly a Ministry of Defence Committee, though the wording of the charter reads 'At the same time, the organization on which they rely in their collective capacity will be within the new Ministry, and the Chiefs of Staff will meet under the Chairmanship of the new Minister whenever he or they may so desire.' In practice, the problem is evaded by the Minister of Defence seldom attending any Chiefs of Staff meetings, and thus the real power in military matters at present resides in the Admiralty, War Office and Air Ministry whose Chiefs constitute the Chiefs of Staff Committee.

It is clear from the foregoing that the relations between the Service officers and Civil Servants within the Ministry of Defence are the most subtle and elusive of those in all the Military Departments. Certainly they are the most difficult to explain, for their functions are primarily advisory rather than executive. It is probably because of this very reason that the relation of Civil and Service officials is more closely dovetailed than in any other military Department.

Over the years, the Admiralty, War Office and Air Ministry have set up numbers of committees and working parties to examine and report on their own organizations. Inevitably each has claimed its own model to be the best. Today we require an inter-service and non-partisan committee to examine the organization of the three Service Ministries collectively and to sort the best and the worst aspects of each. Perhaps the first step should be to give the Ministry of Defence a second instalment of power in the steady evolution of our defence organization. Moreover, a more frequent exchange of Civil Servants between the Service Ministries would also have its advantages.

. . . Let us turn to the aspect of the Chiefs of Staff work with which I was concerned during my time in the Ministry of Defence. For many years controversy had existed between the three Service High Commands on air strategy and other air matters, and, in particular, on air defence questions which concerned each Service not only separately but also collectively. The subject was so controversial and overlapped all three Services so much that the ordinary Chiefs of Staff procedure wherein each Ministry briefed its own Chief had over several years led to postponement and compromises over important issues. We have also seen that, in consequence, the high level *ad hoc* Air Defence Committee, which had been set up to make a general review and recommendations on air defence matters, was established as a permanent part of the Chiefs of Staff organization.

The novel and subtle part of the Air Defence Committee is that it has a neutral Chairman . . . Although there was much objection to the neutral Chairman from Fighter Command and Anti-Aircraft Command and other quarters, it is difficult to see how the Air Defence Committee could ever have tackled and resolved the many controversial air defence problems without his neutrality, for there were many hard sayings and much bitterness within the three Ministries on several of these matters. When there is inter-service rivalry, and there is much more than is allowed to come to the surface, an organization similar to the Air Chiefs of Staff procedure of each member getting his brief from his own Ministry and then taking inter-service decisions in Committee is inadequate when controversy arises.

The method of the Air Defence Committee was that each Service member received his brief from his own Ministry. In addition, the Chairman of the Committee received his brief from the Chief Air Defence Officer, who owed allegiance solely to the Ministry of Defence. In turn, the Chief Air Defence Officer received his brief from the Joint Air Defense Staff comprised of an officer from each Ministry specially nominated to serve him, together with his Secretariat officers. This team gave the Ministry of Defence work which affected air defence. The result of this procedure was that each member of the Air Defence Committee had his own Service brief, and the Chairman had an inter-service angle. Perhaps the foregoing is an oversimplification, because, on a staff level, the Chief Air Defence Officer and Air Defence Joint Staff were continually in touch with all three Ministries, the Air Defence Committee members and all other air defence authorities, and were thus able to iron out many misunderstandings and difficulties before ever they formally came before the Air Defence Committee.

There are some quarters still hostile to the Air Defence Committee but results show that it is an excellent organization for dealing with inter-service air defence problems of a controversial nature which have to be resolved between all three Ministries. Certainly, without it, the proper place for the A.A. gun in modern air defence would possibly still be undecided; and the right channels for responsibility for the future guided weapons—previously a highly controversial question between the Air Ministry and the War Office—would probably not have been resolved, while it is unlikely that the most important inter-service tie-up with the American forces on air defence matters would have been reached. The Committee provides the cutting edge in the Ministry of Defence which is necessary to resolve controversial inter-service air defence problems, and it should be developed and extended to other fields rather than curtailed. It is natural that the three Service Ministries are inclined to resist any development of this organization for the more it is achieved the more real power they themselves lose. It is disappointing that there is no driving force in the Ministry of Defence which sees this problem clearly and is prepared to take issue against the resistance of the Service Ministries.

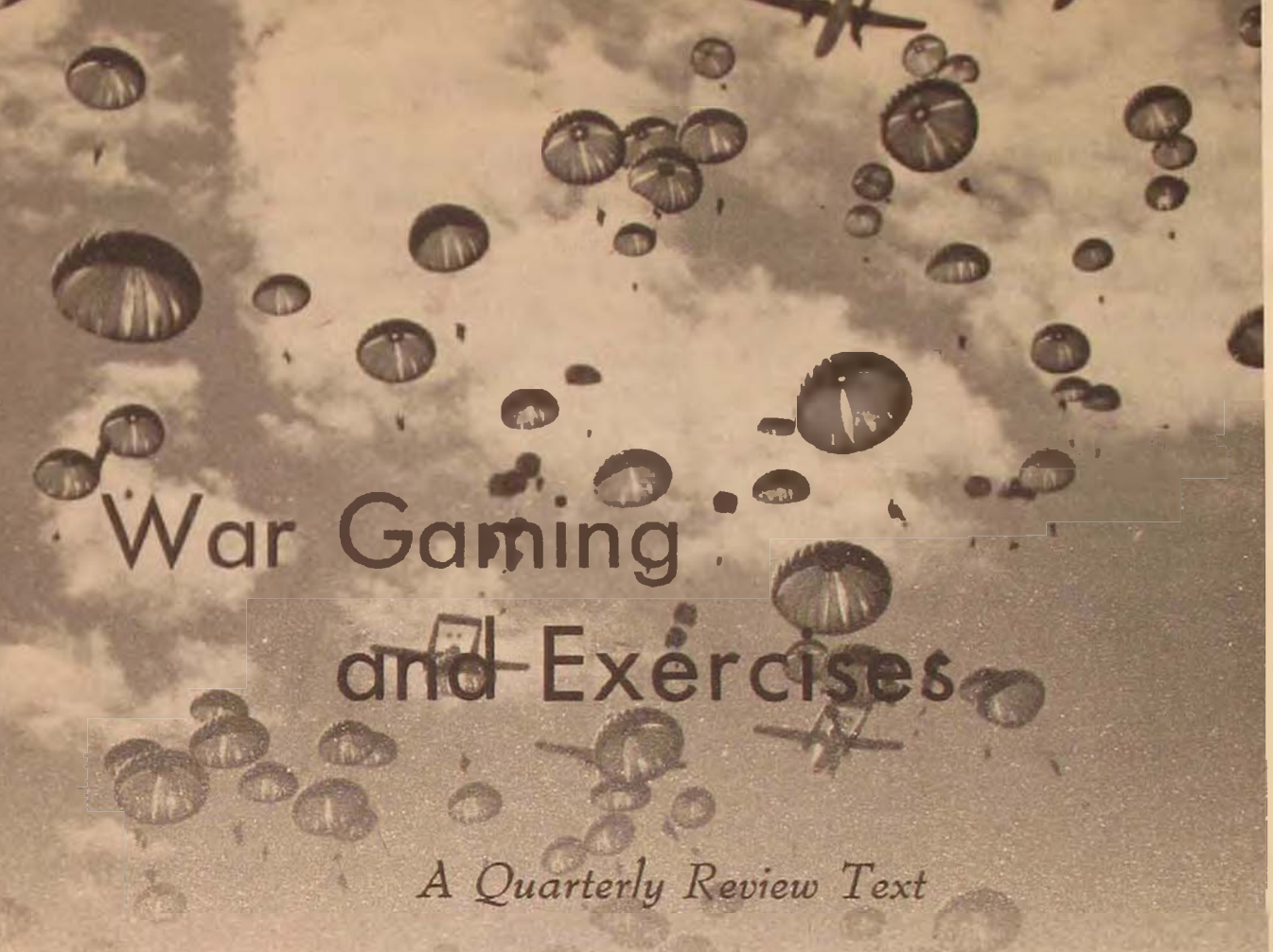
ORGANIZATION is not, and should never become, an end in itself. No one would agree to this more quickly or emphatically than the gentlemen that I have quoted here. Their seeming preoccupation with philosophies and details of organization is, of course, their earnest attempt to devise the best means toward the great end of best preparing their country to prevent war or to win any war that might be forced upon it. Like all men who have had the responsibility of managing or directing large segments of a nation's defense forces, these gentlemen are acutely aware that superior organization becomes more and more essential as the complexity of war expands and the

time-scale is compressed. There are many thoughtful analysts, both in Great Britain and in the United States, who would agree with the closing words of a recent article by Air Marshal Sir Robert Saundby, wartime second-in-command of RAF Bomber Command. In *The Aeroplane* magazine for 21 December 1956, Sir Robert concluded:

" . . . The inertia—even the active opposition—produced by vested interests is so great that it seems to be impossible to discard obsolete weapons and ideas, and plan boldly and objectively for the conditions of nuclear warfare. . . .

"However difficult and distasteful it may be, we must bring our ideas and our forces into line with modern conditions. If we are unable to do so, and do so quickly, we cannot look forward to much of a future."

Harvard University



War Gaming and Exercises

A Quarterly Review Text

COLONEL PAUL S. DEEMS

Drawings by Colonel Deems

ON OCCASION exasperated researchers have declared that war games are probably the least understood and least used of all military training aids. This is not altogether true. Although joint peacetime operations and maneuvers are sufficiently rare to attract wide publicity, many commands conduct tactical exercises or training operations that are in a sense war games. In joint tests Strategic Air Command and Air Defense Command have gamed the defense system annually for the past several years. Subordinate air defense commands in numerous command post exercises also conduct increasingly sophisticated "one player" war games. Some overseas commands, notably FEAF, have evolved exercise techniques that approach closely those of the war game.

Despite what appears to be increasing interest in gaming and exercise techniques, definitive works on the subject are comparatively rare—and up-to-date treatments are rarer yet. It is true that a considerable amount of research has been done on, in, and around the use of gaming techniques for military purposes. Also RAND, the Army's Combat Operations Research Group, and the Navy's Office of Naval Research and other groups have been impressive in marrying gaming mathematics and computers to military problems. Yet there exists not a single popular military text on the subject.

This is not to say that there are no texts on the subject of games. Some like *Strategy in Poker, Business and War,* by John McDonald, are relatively

easy to understand, even for the lay reader. Other classics, like the Von Neumann–Morgenstern *Theory of Games and Economic Behavior,* are considerably more difficult. There are numerous military articles, manuals, and reports dealing with field exercises, command post exercises (CPXs), maneuvers, and special games. These two bodies of literature have few common meeting points. Although there is a general feeling that games have a definite value for the military, directions on how to organize and play them are usually local in nature and application.

Real gamesters will complain that the following discussion is superficial as an exposition on gaming. This complaint will be justified. There will be no formula, tables, equations, and but few definitions. The object is to show some types of games, to suggest how the techniques of the various models may be used, and to discuss the planning process. It is a guide only.

There are certain implied similarities between games and exercises. To the Germans, as subsequent discussion will indicate, *Kriegsspiele* was a generic term applying to all types of games and exercises. The term "war game" will be used here with similar impartiality except when it becomes necessary to identify more specifically the various offshoots of the parent model. Later, in discussing organization, the term "exercise" will be used to indicate a one-handed rather than a two-handed game. Any exercise in which the outcome of a particular plan or strategy is not predictable by the players, even though it may be known to the umpires, will be treated as a game, although it may not be in the strict sense of the word.

Origins of War Gaming

Any discussion of war games must begin with chess, the oldest and best known of all such games. It has never lost its popularity as a mental discipline. The origin of chess is obscured, although it is generally agreed that the game was first played in India. Recent excavations in Iraq show that a similar game was played there as early as 3000 B.C. In its original form the game was known as *Chaturanga* and was played by four persons. The game as we know it today is a simplified version of the original, although still considerably more complicated than its Anglicized cousin, checkers. Ancient as it is, chess still satisfies most of the requirements of a war game and improvements for that purpose have been made only in detail:

The two players . . .

> employ forces of varying individual value but equal aggregate strength . . .
>
> according to a rational strategy or plan that is privy to each . . .
>
> in a common environment . . .
>
> according to accepted rules of engagement . . .
>
> while striving for a value (or win).

The real difference between chess and modern war games lies, first, in the

highly artificial nature of the forces and the geometry of their environment and, second, in the fact that each player has perfect intelligence concerning his opponent's force disposition.

The first European modification of chess for war-gaming purposes came in 1664 when Weikhman developed his so-called "King's Game." In those days the head of the state also normally commanded its armed forces in battle, and the King's Game was intended to train royalty indoors for the real thing. It consisted of an enlarged board with thirty pieces, ranked as follows: one king, one colonel, one marshal, one captain, two knights, two chancellors, two heralds, two chaplains, two couriers, two adjutants, three bodyguards, three halberdiers, and eight private soldiers. The number of different moves was increased to fourteen, complicating the game to the point that only very experienced players could play without a table of permissible moves and combinations. Although the inventor hoped it would encourage princely strategists to learn the art of war before practicing those skills on the field of battle, it is not recorded that the game achieved any great popularity. Some preoccupation did continue with the idea that war could be reduced to game dimensions. Between 1710 and 1774 two card games made their appearance, the "Game of War" and "The Game of Fortifications." Neither of these enjoyed any particular vogue as exercises.

By this time the formations and maneuvers of actual battle had become so stylized that war itself tended to resemble a game played by gentlemanly contestants according to specific rules. Von der Goltz says that "a true strategist of that epoch did not know how to lead a corporal's guard across a ditch without a table of logarithms." It was natural that subsequent gamesters should modify the dimensions of the game to accommodate the calculated maneuvers characterizing war in that period.

In 1780 for instance, Helwig developed a game on a board with some sixteen hundred and sixty-six squares. This was "improved" eighteen years later by Vinturinus, who, with his "New *Kriegsspiel*" and a chart board of 3600 squares, brought the game of that period to its highest degree of unreality and complication. This is not to say that it was not moderately successful, but when the master strategist, Napoleon, changed the character of European war, he placed all such games in disrepute.

It is frequently said that Napoleon planned most of his campaigns on maps with colored pins representing his regiments and beloved corps. Who

Nuclear weapons, missiles, and supersonic aircraft have arrived without battle-tested strategy, tactics, or men. In conventional wars, time and distance bought strategist and tactician the chance to prove their concepts and sharpen the use of the weapon during wartime. Since a future war may be decided in a few days, means must be found to prove strategy, tactics, and men before the potential D-day. For the answer, military planners are increasingly turning to exercises and maneuvers. At the request of the *Quarterly Review*, Colonel Paul S. Deems, Air Command and Staff College Director of Maneuver Planning for LOGEX, provides a broad discussion of the purpose, structure, and utility of war gaming and exercises.

Definitions

Many gaming terms have been used interchangeably. In the hope of avoiding subsequent confusion, at ieast for the purposes of this article, the following terms and definitions are offered:

game. An artificial environment in which two or more opponents exercise choice, according to a privy strategy but in accordance with common rules, to achieve some recognized value.

war game, n. An artificial military environment in which one or more opponents, bound by common rules, exercise choice in the movement of real or simulated forces according to a preconceived plan for the attainment of an objective.

war game, v. tr. To test the validity of a plan or concept by means of a series of simulated military actions by one or more opponents. To test, for purposes of selection, a number of alternative plans or concepts, by human or mechanical analysis. To illustrate, for instructional purposes, a plan, concept, or strategy by means of simulated conflict between one or more opponents. To simulate the command and employment of forces where the result of applying a preconceived strategy is not known beforehand to the player(s).

exercise. A practice for increasing the skill of the participants in their assigned tasks under simulated combat conditions.

command post exercise. Practice held in the regular military environment of the commander and his staff to test or evaluate communications by means of simulated conflict.

controlled exercise. One in which the plan for the exercise or subsequent action by the umpire circumscribes or limits the number of actions available to the player.

maneuver. A practice tactical operation involving troop deployments, against either real or simulated opposition, to test readiness, concepts, or plans.

map maneuver. A practice command operation involving the deployment of simulated forces, by means of maps and overlays, for training or instructional purposes.

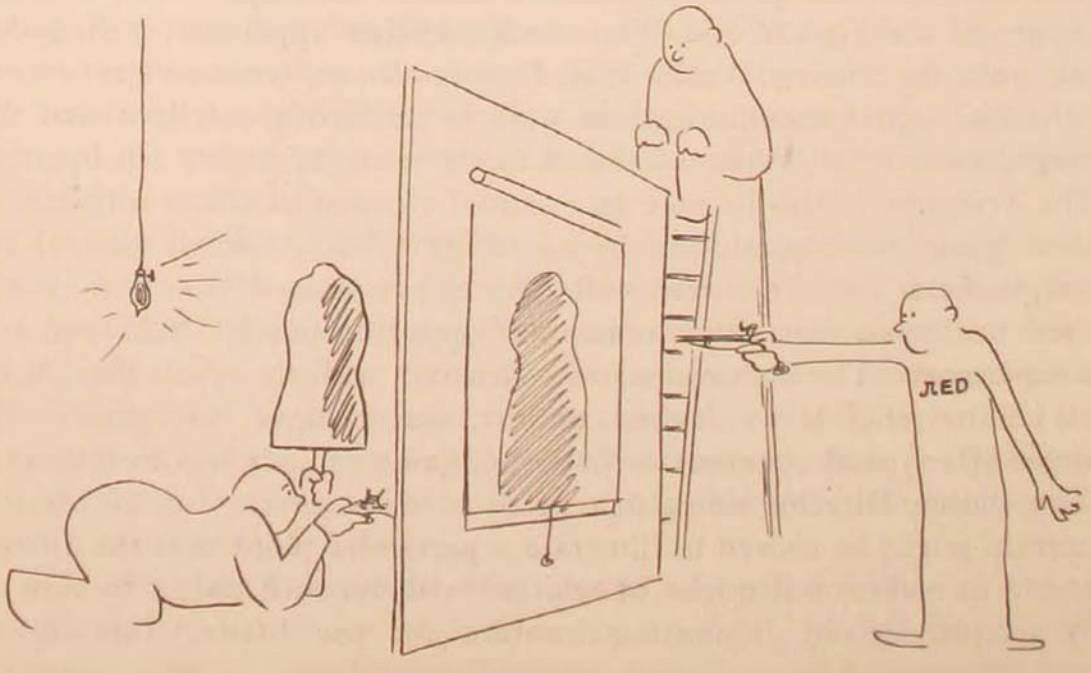
director. An officer or other official designated to assume the responsibility for, and to provide direction for, the planning and support of any of the above; most commonly used as Maneuver Director.

umpire. An officer or other official designated to ensure the propriety of player action and to adjudge impartially the results of such action, according to his own experience, statistical evidence, or arbitrary rules furnished by the Director.

Red and Blue. Limited intelligence was granted to both sides, with due regard for the fact that intelligence is often spurious or garbled. One side—Blues for instance—would be permitted a deployment, and intelligence concerning this deployment was transmitted by the Director to the opposing side. The opposing side—Red—had a limited time in which to react. Meanwhile Blue was permitted a second deployment, after which the game clock was stopped. The Director might then make a decision regarding the results of the initial deployment, or he might call on either or both sides to defend the deployment before judging its effectiveness.

The game continued in this way for a specified period, usually for two or three hours. At the end of the game an informal critique was held. If the game was set up with a particular objective in mind, the Director was expected to indicate whether or not and in what ways the game had taught its objective. At any rate he was supposed to have a sufficient understanding of the tactics and strategy employed to critique the play of both sides and to adjudge a probable winner. Besides the training in tactics for the players, the Germans considered that great benefit derived to the Director in the form of training, analysis, and critiquing and that additional benefit accrued from the opportunity of superiors to observe the Director's conduct during the game. Many felt that this was a good opportunity to assess certain personality features of the Director, if not his actual potential as a staff officer under combat conditions.

Kriegsspiele were also conducted for the command and staff at a much higher level of responsibility and with correspondingly greater detail. Special pains appear to have been taken that the harassments normal to field operations become commonplace. As night lights were turned out to simulate blackout for air raids and alerts, messages were deliberately garbled to test the ingenuity and perception of student players. Breakdowns in communications were not uncommon, and foreign maps requiring translation might

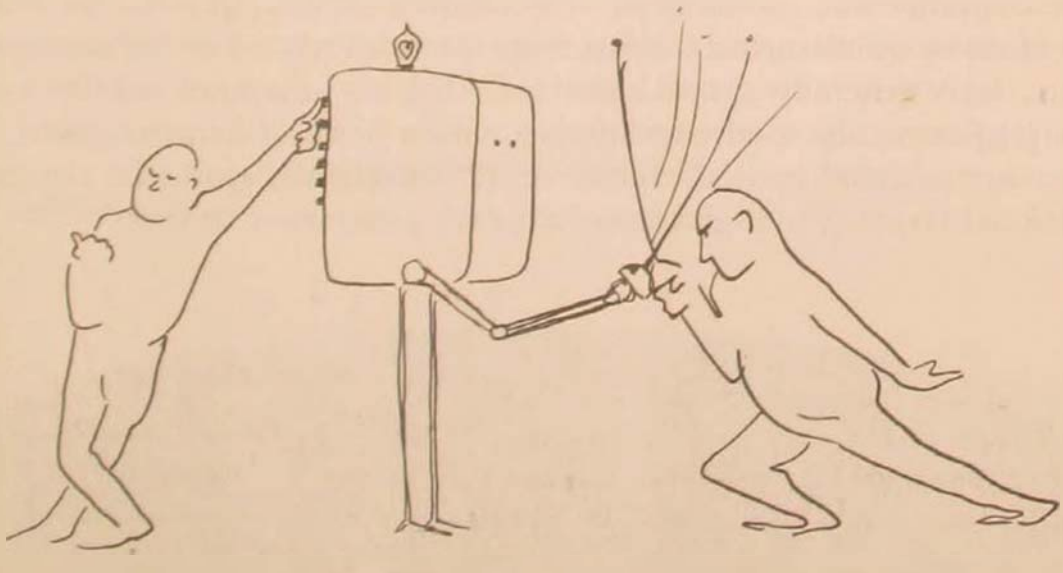


OLD-FANGLED TWO HANDED GAME

be injected into the exercise to further discomfit the player. Indeed so refined had the game technique become that actual plans of strategic operations were war-gamed before being put to the final, deadly test. The German invasion of the Ukraine (Operation Barbarossa) was war-gamed with such success that the early stages of the invasion were conducted with a minimum of direction by the field commander. In 1940 the German invasion through the Ardennes had been war-gamed beforehand. Under different circumstances, in November of 1944 Field Marshal Model was war-gaming a defense of the Ardennes forest when the Allied advance began. He quickly transferred control of the defensive operation to the game room with the result that—key commanders being already present—defensive deployments were made with unheard-of alacrity: field orders required only person-to-person transmission in the game room.

Perhaps in imitation of the same philosophy the Japanese gamed (with model ships and the dice cup) the grand naval campaign leading to Midway. There was a difference in the technique, and it was literally a difference with a vengeance. Not accepting the prediction of the dice that two carriers would be lost, the Japanese CINC overruled the decision of the umpire. One of the carriers was summarily refloated, and the other was ruled damaged only. The subsequent loss of the real battle was, of course, a crucial point of the war in the Pacific.

MEANWHILE in the United States a significant advance to gaming theory had been prepared by Morgenstern and the late Von Neumann. The essence of the discovery seems to have been that between two or more opponents in any game situation, either player can formulate a successful strategy with some certainty. Whatever the type of competition, one side can develop a plan that will offer more than minimum results, even if found out by the opponent beforehand. This is the essence of the Minimax theory. Any strategy based upon it, if adhered to by Blue, will also force Red to



NEW-FANGLED ONE HANDED GAME

follow a similar strategy. Knowing this, the Blue player has an irreducible advantage. These theories, or applications of them, were used extensively by the Allies in sub-hunting during World War II.

The draft caught, and the services held captive during the war years, a large number of scientists who not only brought a fresh outlook to the solution of military problems but who were, for the time being at least, intensely interested in these problems. One such problem was the detection and destruction of Axis submarines. The friendly assets available—search aircraft—could not be applied in standard tactical search patterns over the vast areas needing scrutiny. By randomizing the search patterns—that is, by flying nonstandard patterns at irregular and unpredictable intervals—the Allies inflicted heavier losses and forced the Axis submariners to adopt similar tactics themselves.

After the war calculators were developed that could, provided the data were of a nature that permitted programing, evaluate a great number of different outcomes from the application of a single strategy and thus determine its probability of success. Similarly a number of strategies could be processed, compared, and the most likely identified. This potential of cybernetics was early recognized, and the military services contracted with special study groups to determine the ability of the machine, if not to devise strategies, to at least indicate those which had the greatest probability of success. This preoccupation with machine gaming was further fostered and encouraged by an appreciation for the complexity of the new weapon systems available. Indeed the speed with which these weapons could react, each to the other, seemed to indicate that only a machine with vast memory and instant response could be expected to indicate a successful counter strategy in sufficient time to be useful.

One of the main weaknesses of any war game is that there is seldom time to evaluate the results of all the possible reactions that may stem from one particular play. Random events are always possible, like the sunken road at Waterloo—what was the probability that the whole Guard would be caught in it? What would have happened if the road had not been there? The computer offers some hope of evaluating—at least grossly—the eventualities of many simultaneous but different reactions related to the same point in time. It is generally agreed, however, that no computer readily available can (1) portray the total reaction of a nation in all of its psychosocial, political, economic, and martial aspects, or (2) successfully synthesize the rational-irrational response of a given commander's personality or staff.

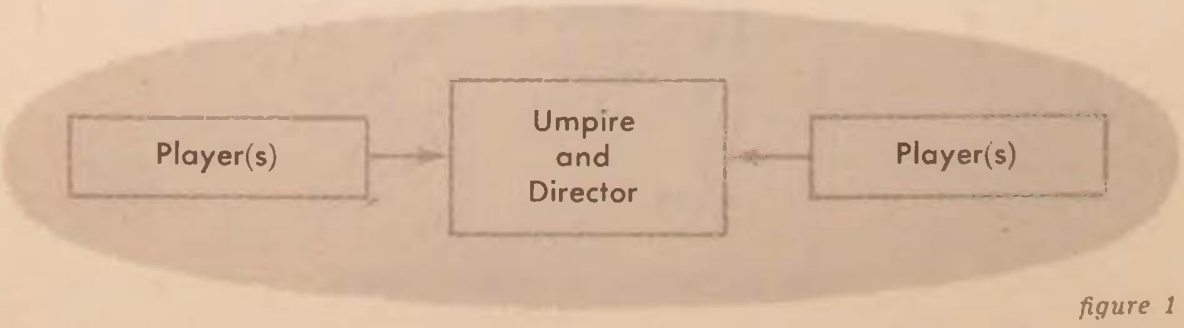


figure 1

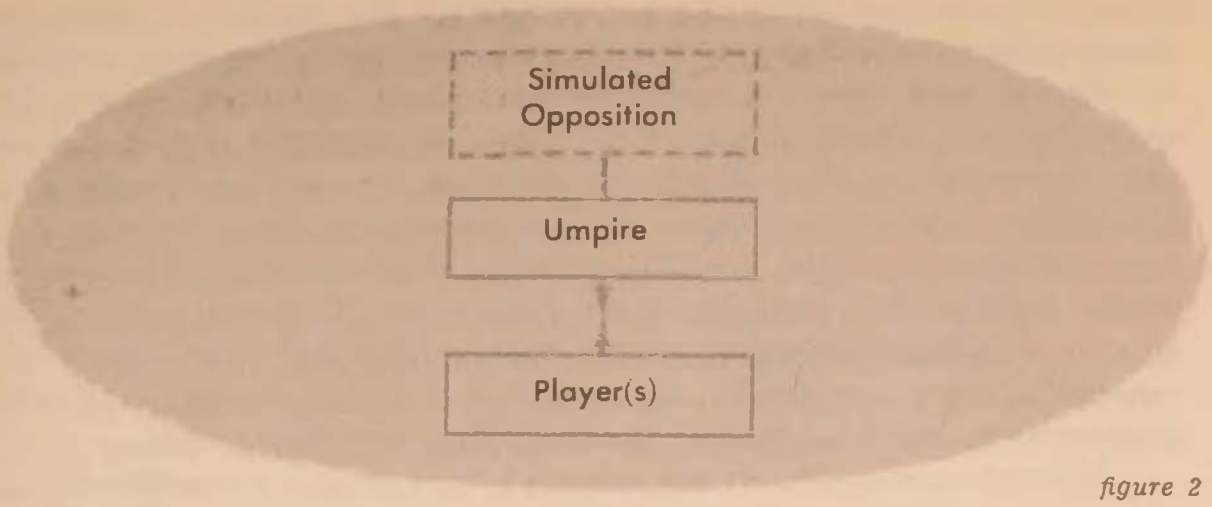


figure 2

Types of Games

At this point, three families of the war game have identified themselves. First there is the "pure" or two-handed game in which all actions are transmitted to and translated by a neutral and passive umpire-control, as in figure 1. The second family is also a game in that opposing strategies are involved. But the opposing player (s) and forces are simulated by the umpire, who abandons his passive neutrality and, inhibited only by his desire for realism, strives for some overt or covert objective. This single-handed play is popular for instruction and is the model for most CPXs, map maneuvers, and exercises. The basic arrangement is indicated in figure 2. The third family is a recent arrival in which the opposition is furnished by a simulator-computer, either from programed data or as activated by an umpire-operator, as in figure 3. This too is a single-handed game. Although this third family has limitations at present, it can be used in conjunction with other game organizations to distinct advantage.

The first family is further distinguished by the fact that several types of forces may be employed: real troops and real equipment, represented troops (symbols) and represented equipment, or simulations by map overlay. The second family, while usually using simulated forces, may involve the actual management of forces in their natural element against an imaginary opposition. The third family may use simulated forces only, except when combined into other game techniques or organizations.

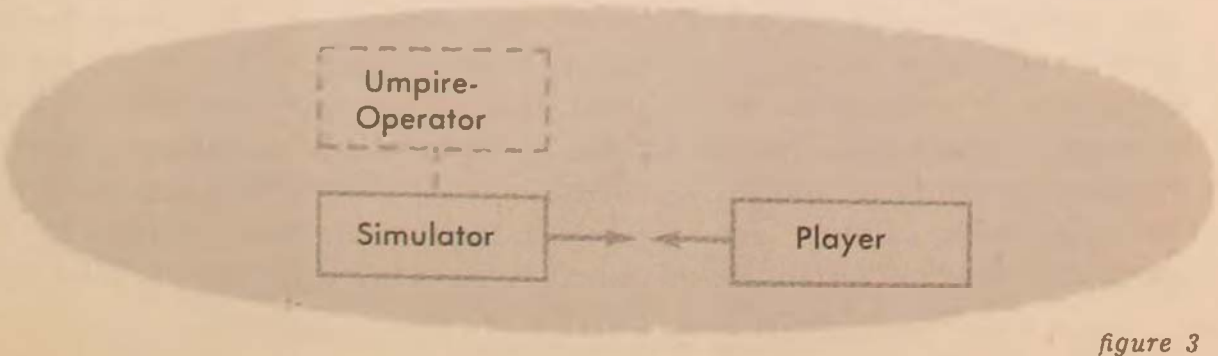


figure 3

In the two-handed game the umpire rules on the propriety of alternating moves—within the framework of rules governing the engagement—evaluates the effect of such moves, transmits (and translates) this effect to both sides as intelligence. The continuity of the game, the degree of realism attained, and the validity of the outcome are therefore the direct responsibility of the umpire. The demands upon the umpire are great and multiply on an exponential curve as the size and variety of forces increase. Consequently umpire staffs tend to multiply on the same curve. This would not in itself be an overriding objection, except that, while the curve representing responsibilities is exponential, the resultants of player actions that demand interpretation begin to resemble the staggering spiral of inflation.

Military actions are always attended by a degree of uncertainty, no matter how sophisticated the systems employed. Uncertainty is created by the vagaries of weather, mechanical malfunction, human ignorance or error, and enemy action. An analysis of past similar actions will provide some statistical evidence of the certainty or uncertainty of any event in the series taking place as planned. This type of experience is usually tabulated for the use of umpires in judging the success or failure of player-directed actions. In order, however, that the play will not be tainted by unconscious umpire prejudice, such statistics are usually applied against successive similar actions according to a listing of random numbers. Gambling tables, as for the frequency of certain dice combinations showing in a given number of throws, may also be used for this purpose. For less controllable events, such as a freely falling bomb, the mathematics of probabilities will determine the likelihood of the bomb striking within effective distance of the target. The swift assessment of such actions and the subsequent evaluation of the chain of events that one action begins are fundamental to modern air umpiring.

At this point the computer would appear to have great utility as a digestive mechanism for the umpire staff, at least, and as a means of presenting information to the players. War games of some complexity seem possible with this combination, provided that the force is a relatively pure military force, operating independently of other factors that becloud the issue and give both the umpire and his mechanical friend indigestion. The combination, in light of the present state of game machines, offers more than the calculator alone.

This opinion is at least partly verified by the Michigan Conference in War Games, 1955, which came to the conclusion that machines have a game utility provided that (1) the number of opponents is small, (2) psychosocial, political, and economic factors are ignored, and (3) the limitations of the machine are recognized in the analysis of results.

The simulator, on the other hand, in its present state of development, may have greater and greater importance as a game device. For the individual commander whose sensing (intelligence) of the opponent even under combat conditions is reduced to radar presentations, the fact that the opposing strategy is programed and invariable can have little difference. Given a realistic environment and realistic representations, he at least can solve *type* problems with validity, and great training benefit may derive. At his particular level of responsibility—whether an ADC controller, a pilot in a

flight simulator, or a flotilla commander in one of the more complex naval simulators—the decision process is about the same as if the opponent were actually seeking a decision over him.

An elaboration and combination of these techniques is to be seen in the SAC-CONAD exercises. Probably no game involving actual force deployment is purer, more easily evaluated in terms of system efficiency and training, nor offers greater realism to the participants. Staffs at all levels are exercised against an opponent whose capability and intentions are not, perfectly at least, known. The presentations are authentic; the decisions are authentic up to the point of simulated weapon release (CONAD) or beyond (SAC). If these games permit staff training in the management of CONAD assets (or the logistical aspects of air defense), then they offer the CONAD participants the ultimate in short-range war gaming.

No discussion would be complete without at least a passing reference to Sagebrush and Longhorn. These games were conducted on the grand scale, and the difficulties of organization were enormous. Once the game was launched, the task of the chief umpire must have been beyond ordinary mortal comprehension, and the fact that either game succeeded as well as it did is an enduring military monument to the diligence and perspicacity of the planners. Whether the results were commensurate with the effort is for the reader of the final report to judge.

There can be no doubt that lessons were learned; the summary for Sagebrush contained no fewer than 78 careful recommendations, and some of these have been acted upon and implemented at Department of Defense and Department of the Air Force levels. Whether or not these same recommendations could have been generated without the actual employment of forces and counterforces is questionable. To simulate the management problems alone would have severely taxed the most skillful of planners. On the other hand, the training value received by the individual at squadron and company level is debatable—unless one accepts the ancient military philosophy that troops should become accustomed to unusual exertions in peacetime, lest they consider exertions of war to be caused by commanders' mistakes.

The organization of the two-handed game may vary widely, and may be specially tailored to the objective. Figure 4, for instance, shows the umpire

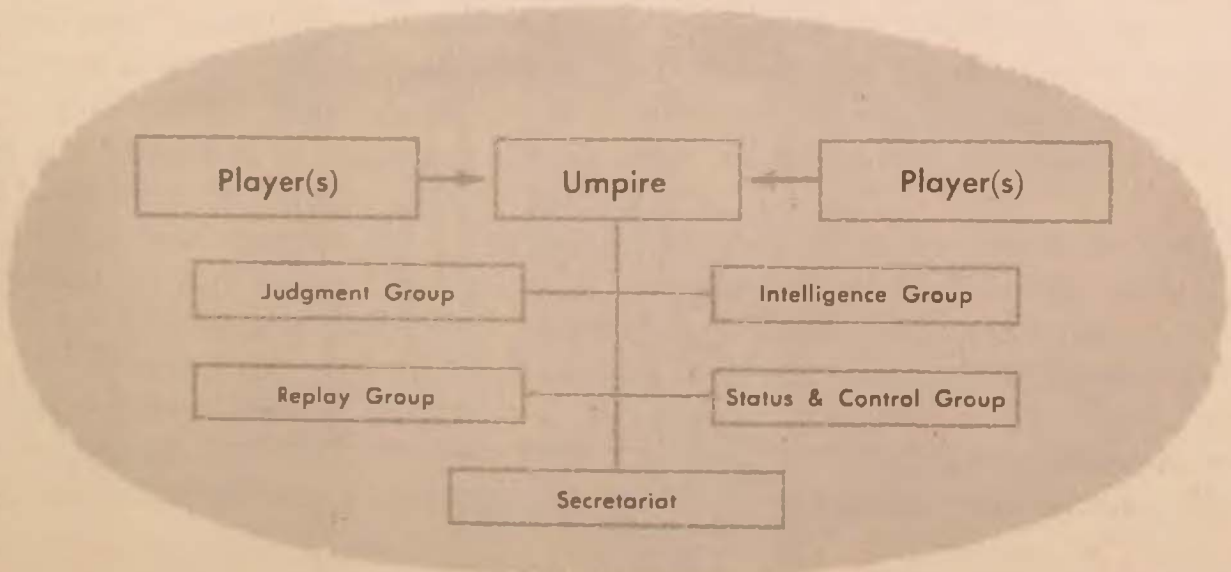


figure 4

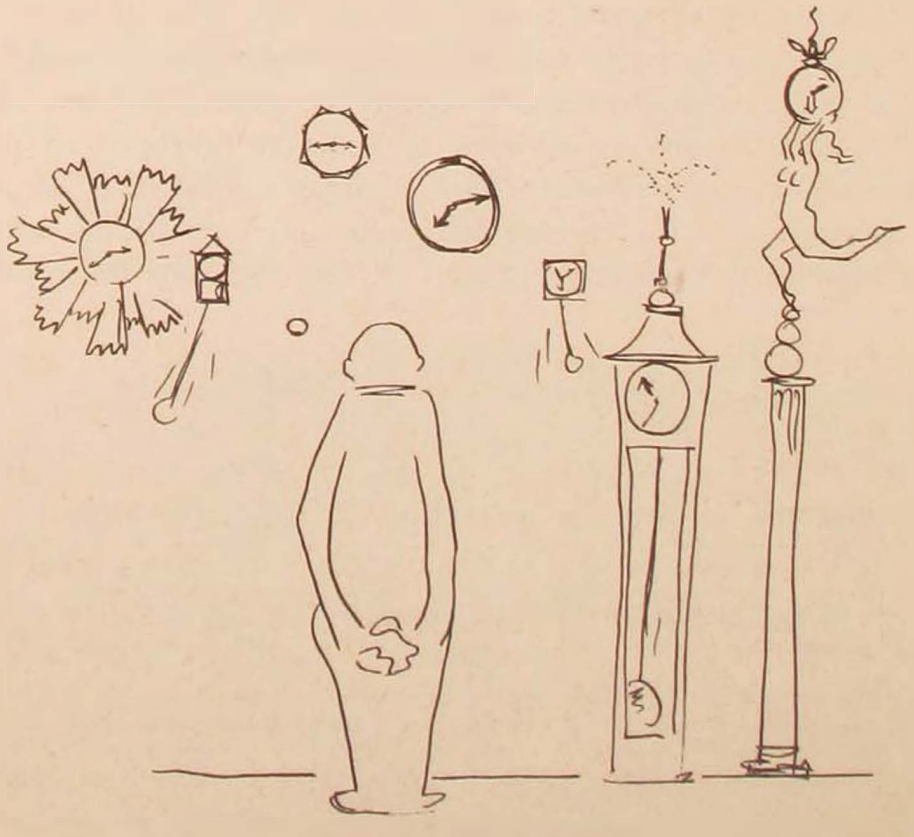
organization for the gaming of a special project in which the deployment of military forces is incidental to other player actions. This organization recognizes the need for a special body of consultants and researchers to rule on nonmilitary actions (Judgment Group) and also provides for the replay of actions from one point in time to other possible solutions (Replay Group).

Not the least of the problems of game design is that of time: what sort of clock should govern the play? There are start-and-stop clocks, two-for-one and one-for-one time scales, variable rate clocks (or calendars), and no-time clocks. Each has advantages and disadvantages: the one-for-one is the most realistic; the two-for-one (two hours of play for one hour of actual time) permits more and faster play, but it is twice as hard on the umpires, who may get bogged down even on the one-for-one scale. Games involving troop deployment must use the latter, but the calendar may be accelerated through certain intermediate periods.

In short, modern games for test and evaluation purposes are difficult to organize, harder to umpire, and the results are only as valid as the data provided. For training, however, games provide an excellent means to exercise command inexpensively and without costly penalties for error; they are equally useful for testing systems and the operating personnel; and they can duplicate the tensions of the war that cannot be rehearsed—the big one.

Game Planning

In the section devoted to definitions a distinction was made between games and exercises. Later, exercises were classed as one-handed games, and mainly the latter will be considered in discussing organization. The exercise depends for its motion on command and staff activity. This in turn requires



WHICH KIND OF TIME?

communications, so that any exercise using an established system is also a CPX. The terms are commonly interchangeable in practice and will be considered so here. And, according to its objectives and design, the CPX may also have many of the characteristics of a one-handed or two-handed game. If existing signal facilities can be used without additional installations, the one-handed exercise has a great deal to offer as an inexpensive and reliable training device. The only real limits to such an exercise are imposed by the requirement for maintaining command continuity, the number of players and umpires available for the exercise, the number of planning personnel allotted to the Director, and the physical plant to be used. The scope of the exercise, as planned and played, will therefore be determined by the importance that the sponsoring commander assigns to its objectives.

In addition to the simple test of facilities, an exercise may have any number of objectives. The objectives of the planners and the players may be complementary rather than supplementary; that is, the covert objective of the planners may not be to provide a training vehicle, even though this may be the announced objective. Or, the objective may be to develop a new concept of operations by placing experienced players in such a position that accepted criteria no longer provide adequate guidance.

Some of the more apparent objectives of an exercise immediately suggest themselves:

testing for readiness
testing established systems
evaluating proposed systems, doctrines, concepts, and organizations
development of new concepts, doctrines
training in procedures or positions
identifying of "grey" areas, or refinement of concepts
evaluating of personnel
practicing decision-making or problem solving.

Some of the listed objectives, though not enunciated, may appear as by-products of play for one or more of the announced or overt objectives. It is logical to assume that an exercise to test proposed doctrines will at least define the shape of required amendments if the proposal being played is deficient in any respect. Likewise the umpire staff usually will have an opportunity to observe the players under what may be new and pressing circumstances. Thus the testing of established systems may furnish important indicators on readiness, on the need for additional procedures, or on weaknesses in the staff problem-solving area.

A good example of the announced or overt objective versus the covert objective may be seen in a recent Air Command and Staff College exercise. This exercise was built upon the execution of strategic plans developed by the students (one plan for each seminar of fifteen students) for limited war. The overt objective was the test, by play, of the plan as developed. By permitting the student planners full freedom in designing the force-tabs to fight a limited war with foreknowledge of other national commitments and

the ever-present possibility of a global conflict, the faculty hoped to glean—as a by-product—the possible germ of a new concept for the employment of national forces in limited war. Similarly USAF participation in the Army Logex series has by-products in training as well as in identifying the "grey" areas between practice, doctrine, and joint agreement.

With the announcement of the overt objective the commander successively appoints a Director, determines the authorities of the Director in planning, identifies the planning staff for the Director, describes the depth of participation by staff or subordinate command elements, establishes funding and other limitations, and prescribes a time for the maneuver. In actual practice the commander-sponsor may defer some of these decisions until the Director has had a chance to inform his planning staff, meet with them, and develop a concept for the play of the exercise.

The concept, then, with certain necessary guidelines that will ultimately determine the character of the exercise itself, together with administrative detail, will be formalized by the commander as an exercise directive and forwarded to the participating agencies and command elements. A sample directive contains:

References, as applicable (such as command training directives, regulations, other correspondence, etc.)

Confirmation of the appointment of the Exercise Director

Location and date

Purpose of the exercise

Exercise guidelines (detailed guidelines may be referenced as an inclosure)

Development of the exercise:

a. Authorities of the Director
b. Special responsibilities of the Director for liaison, instruction, orientation, etc.

Participation by: staff
: command
: lateral or adjacent commands
: other commands and services

Responsibilities of participating agencies, to include manning the Director's planning staff

Observers, if any

Funding

Public information

Reports

Effective dates of the directive

This directive is elaborate, and the prototype was issued for a quasi-joint exercise for which the planning is accomplished by a permanent staff. An

intracommand directive might be considerably abbreviated and simplified, being reduced in the simplest case to a memorandum. It should, however, clearly indicate the who, what, where, and when of the exercise, leaving the "how" to the Exercise Director and his staff, within the parameters established by the accompanying guidelines.

It is not absolutely essential that the directive be in the hands of all planning members prior to the first meeting of the planners, but it is highly desirable. The more detailed the exercise, the more important that the planning sessions be begun early, the planning organization determined, and general agreement reached upon a common interpretation of the guidelines. Not infrequently one or more of the guidelines may require change or modification. In joint exercises involving high commands—where the guidelines may have been passed down from an under-secretary's office on a stone tablet —such adjustment may be time-consuming.

Based on his own experience, the overt objective, and the counsel of his staff, the Director next determines the gross pattern for play and organization of his staff for the planning function. The pattern for play will be "free," "rigid," or a tempering of one with the other. Where new doctrines and concepts are being flight-tested, so to speak, relative freedom is desirable, within the limits of expected umpire capability and the experience of the players. An exercise for training in procedures must manifestly be relatively rigid, with optimum umpire supervision. The same would apply to student exercises, where the overt objective is the application of approved and tried principles. If, in the latter case, the covert objective is an evaluation of the student himself, freer play can be endured short of allowing the play to get out of hand.

Free play, however, imposes the requirement of experienced, calm, and dispassionate umpires, devoid of interservice bias, and gifted with great imagination and insight. Since officers with these qualifications are rare, to say the least, some rigidity must inevitably be introduced. As a general rule the simpler the exercise, the freer it may be, unless joint forces are involved.

The gross pattern also should tentatively establish the size of forces involved, the air or ground environment (global, limited, and, for the latter, the theater), the player organization and general levels of manning, degree of interservice or other command participation, spectrum of play (will it include personnel, logistics?), time scale for play, and the organization for planning.

Although scope of play was mentioned as an agenda item for the planners' first meeting, some guidance may have been furnished the Exercise Director while discussing the formation of the exercise directive with the commander. If so, planning representatives may have been called in from other staff sections, and the discussions of spectrum will resolve themselves into discussions of desired detail in the respective areas. Such early representation also permits immediate organization into a planning staff and facilitates subsequent coordination. The planning staff will normally work only

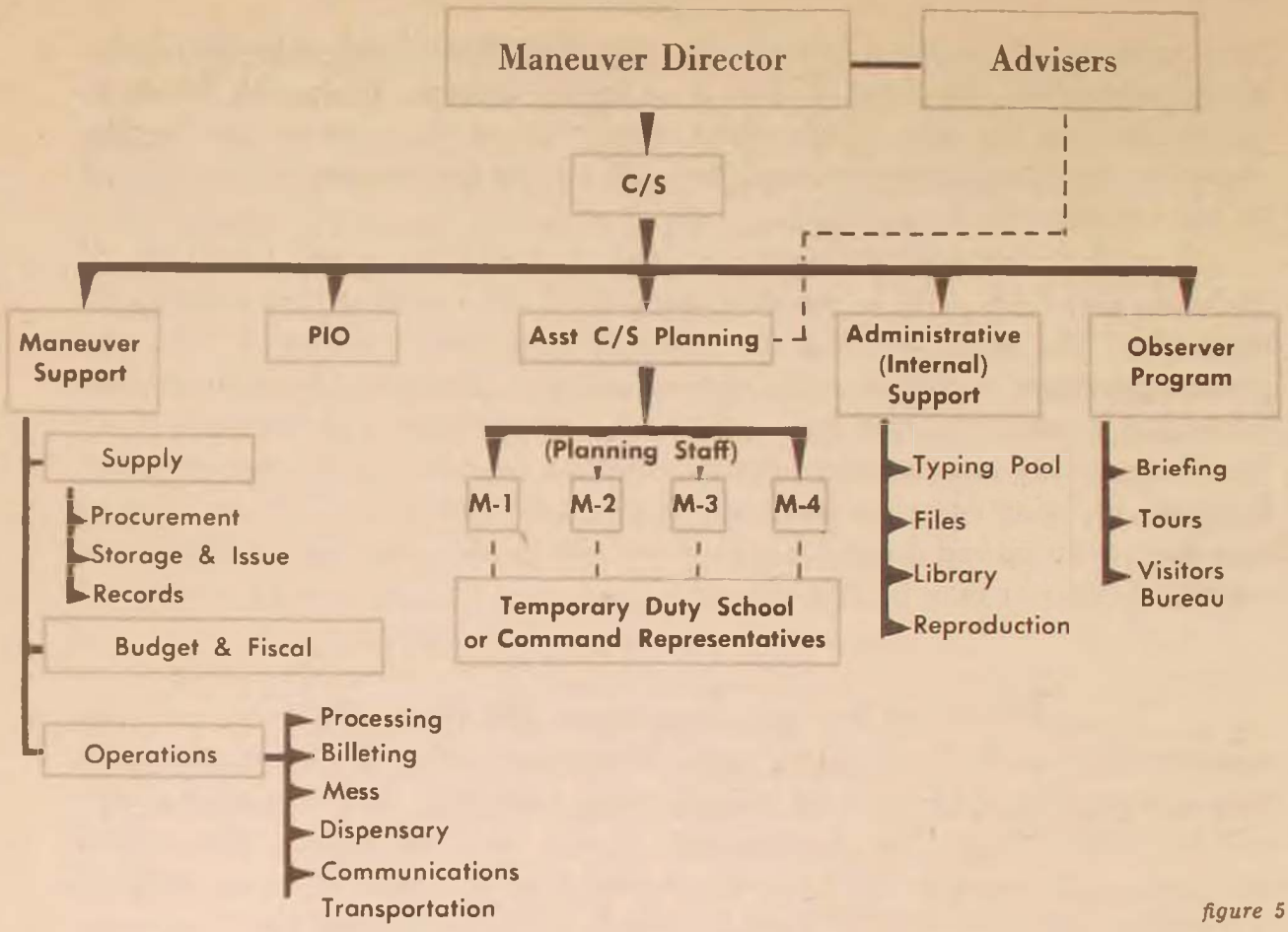


figure 5

part time: few commands can afford the luxury of a full-time Exercise Director, even though the direct costs of such a position may be far less than those resulting from the lost motion and wasted effort generally attendant on the tyro Director's first experience. Ideally the plans division of a command headquarters will have an officer permanently assigned as Exercise Director. His duty will be to integrate inter- and intracommand exercises into the annual training schedule. He will also familiarize himself with the mysterious rites attending exercise planning and culminating in the umpires' critique. Then he will be able to advise others on their specific problems.

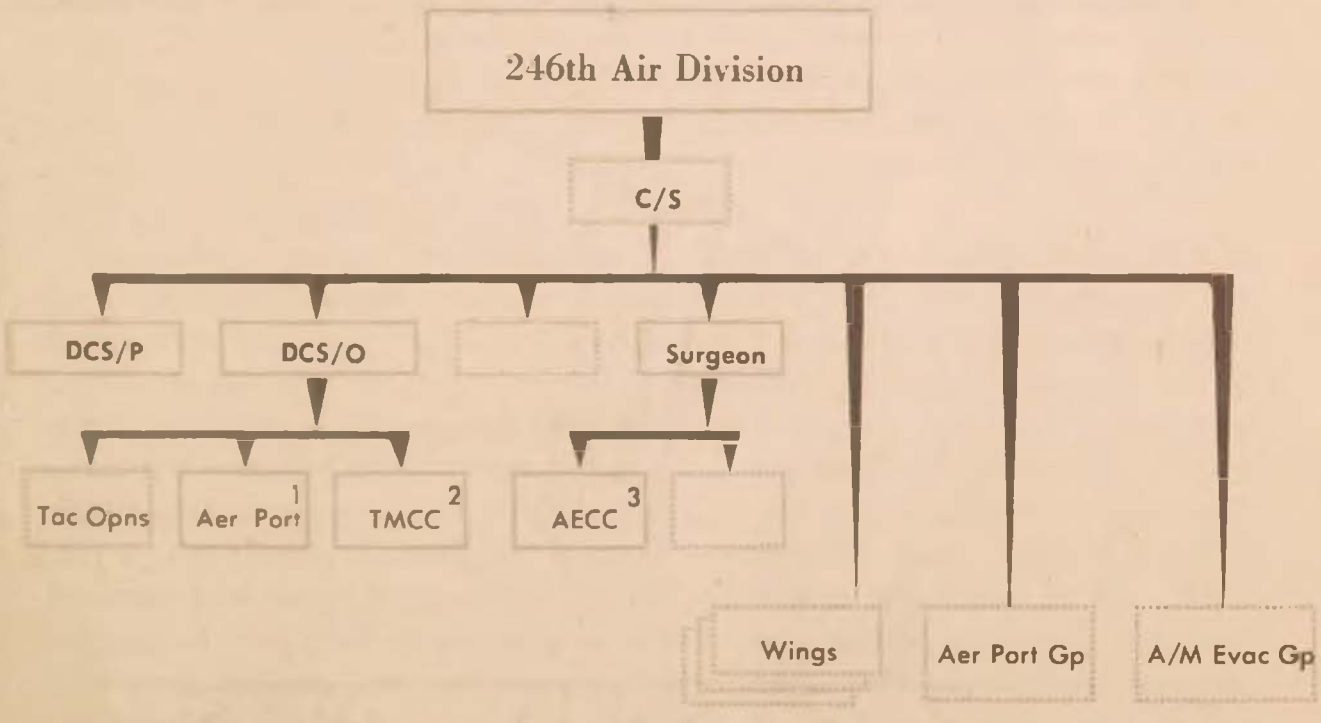
Depending on the detail and quantity of planning anticipated, the Exercise Director should consider the appointment at this time of a secretary. A certain amount of internal—that is, internal to the planning staff—administration will generate spontaneously. Forms will be devised, printed, and controlled; meetings will have to be planned and scheduled, and will probably be recorded in minutes; reports will be written and distributed. In addition to these simpler operations, the Director of a large game will most certainly require support assistance in processing observers, visitors, and umpires; in providing orientation, pre-exercise training, billeting, and umpire staff facilities; in transportation, clerical assistance, and communications; and in the form of an auditorium for the critique.

Caution: While nothing succeeds like success, no debacle can be more complete than an unsuccessful, halting, and poorly organized exercise. When an exercise fails, the Exercise Director not only falls flat on his face but

wishes he could continue through the floor to disappear forever. No detail can be too small in planning, and hours spent in organizing the planners will save literally aeons of remorse and anxiety. A staff organization of the Exercise Director's headquarters is suggested in figure 5.

THE objective of the exercise will usually determine the player organization. As a rule the objective will consist either of the same organization and positions that the player usually works in, or a similar staff set-up. It is axiomatic that players react more readily when the work environment is at least functionally familiar. In a new, untried organization, even when the overt objective is known to all participants as a test, there is a strong tendency not only to resist the innovation but to rearrange it into a more comfortable or understandable pattern. No detailed player organizations will be presented, on the assumption that the great majority of game-exercises will be superimposed upon or will parallel an existing authorized organization.

The number of players and played units should be roughed in at an early date. A played unit is a simulated unit represented either by a player designated for that purpose or by a player at a higher echelon representing one or more such subordinate commands. Likewise staff players may represent not only a section but all subordinate branches of that section. The player organization of a hypothetical troop-carrier air division, see figure 6, shows how the organization may be set up to include both the player positions and those played by some other position at a higher echelon. If it were



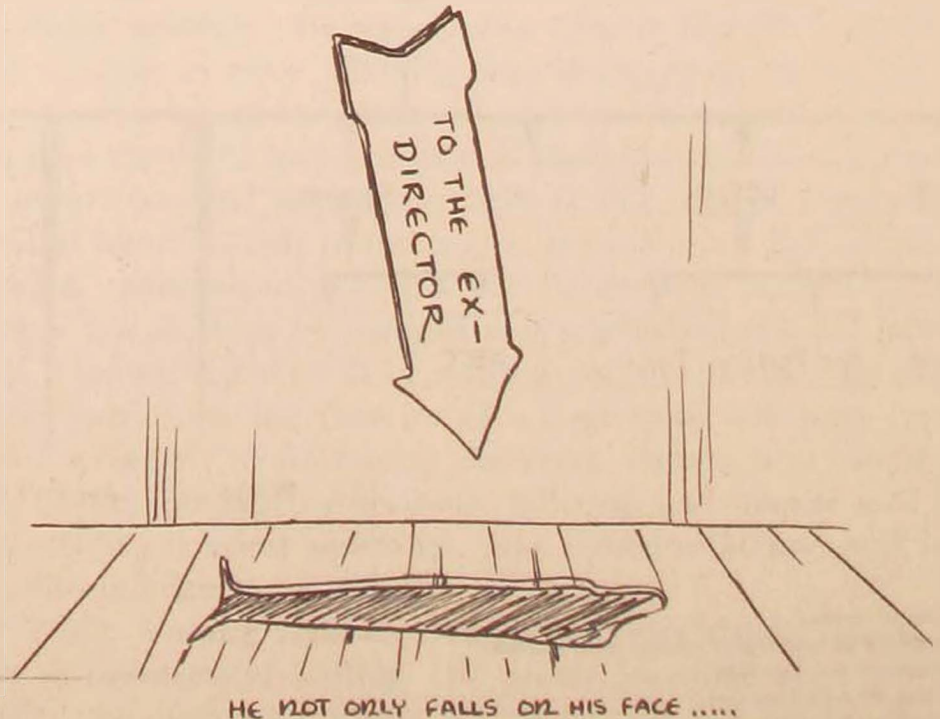
— player manned
----- manned by next higher echelon or as indicated
1 Plays all Aer Port Gps
2 Plays all A/M Evac Gps
3 Plays all TC wings

figure 6

desired to play items of supply, it would be necessary to add a DCS/Materiel position on the staff and also to man the wings so that the player representing the wings could also act for assigned units of the wing. Some of these positions might be reserved for umpires.

As soon as the player organization has begun to take shape, the umpire organization should be designed to fit on, around, or over it. For even the simplest sort of game or exercise, the umpire staff must be relatively elaborate. As stated earlier, the umpire and his staff are the key to realism and validity. Realism imposes the requirement of rapid, true, and careful decision, based upon all known factors affecting play, its continuity and its adequate control. In addition, validity imposes complete passivity and impartiality on the part of each umpire, powers of analysis, wide knowledge and experience in all areas of possible play, and an accurate portrayal of action and reaction. A type of umpire organization for gaming purposes is shown in figure 7.

The function of control is to act as the go-between agency for the player organization and the umpire organization. It functions as a time-delay device and as a distribution device. It may operate in accordance with certain ground rules to regulate play, while passing information on player action upward to the status board and disseminating simulated intelligence laterally to the players. Sample operations would be imposition of time lags incident to enciphering messages; or the regulation of air traffic in accordance with traffic density, weather, air speed, and load; or communication delays due to circuit saturation or enemy jamming. The control group is arbitrary in its function, but within the limits of the rules for play. It should not deal in probabilities



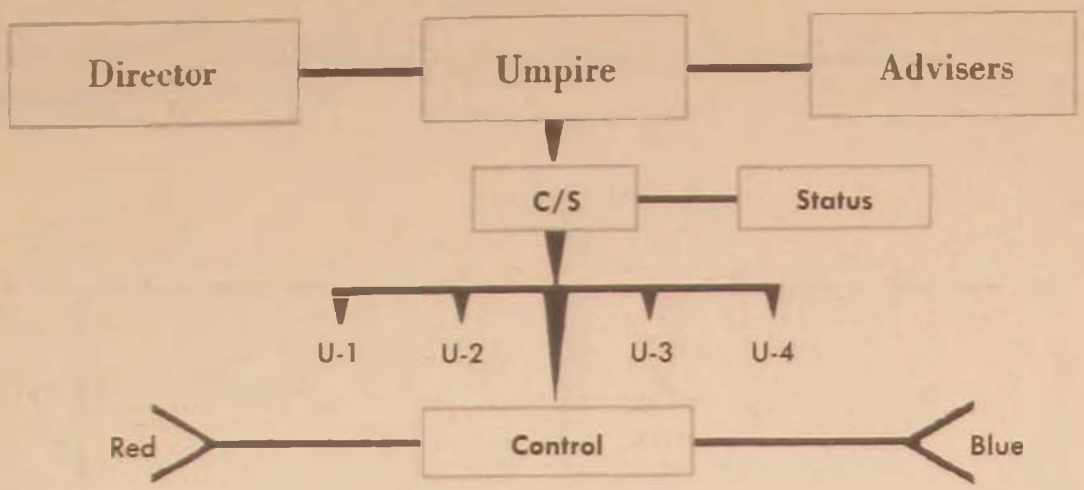


figure 7

or render decisions except as they may be indicated by the play regulations. All command actions by the players will be routed upward for umpire evaluation.

The status board is an essential adjunct of the umpire staff. It must portray up-to-the-minute information on the forces of both opponents, on location, current employment, weather, and ground assets. In short, status must summarize all the information necessary for the umpire staff, singly or in concert, to render decisions. No umpires are placed with the player organization unless the size of the player organization, the forces involved, or the geographic employment requires partial evaluation or decentralized control at the player level. Maneuvers involving the direction of live forces, as in Sagebrush, required a huge and widely dispersed umpire staff, both ground-based and air-based. Control of play continues, but certain aspects of control—chiefly those controls established to create realism—may be relinquished in favor of the natural dislocations of battle.

In other types of exercises, notably those of the single-handed family, the umpire staff must not only perform these same functions but also simulate the reaction of the enemy. As a rule (but not invariably) the opposing strategy and troop dispositions will have been "canned," and play proceeds less by extemporaneous readjustments than by a timetable or prepared sequence of simulated events. Umpires may be placed in the chain of command to represent lateral commands and other services, or simply be placed in juxtaposition to the players to evaluate, control, or transmit data. Figures 8 and 9 illustrate two such organizations in which umpire headquarters have been augmented by special umpire teams. These are designed as roving evaluators to observe, analyze, and report on special features of the play where the ramifications of a particular action are such that the regular umpire organization cannot handle them.

The status of play has also become a function of the umpire staff intelligence group. The staff, as well as the entire umpire system, communicate

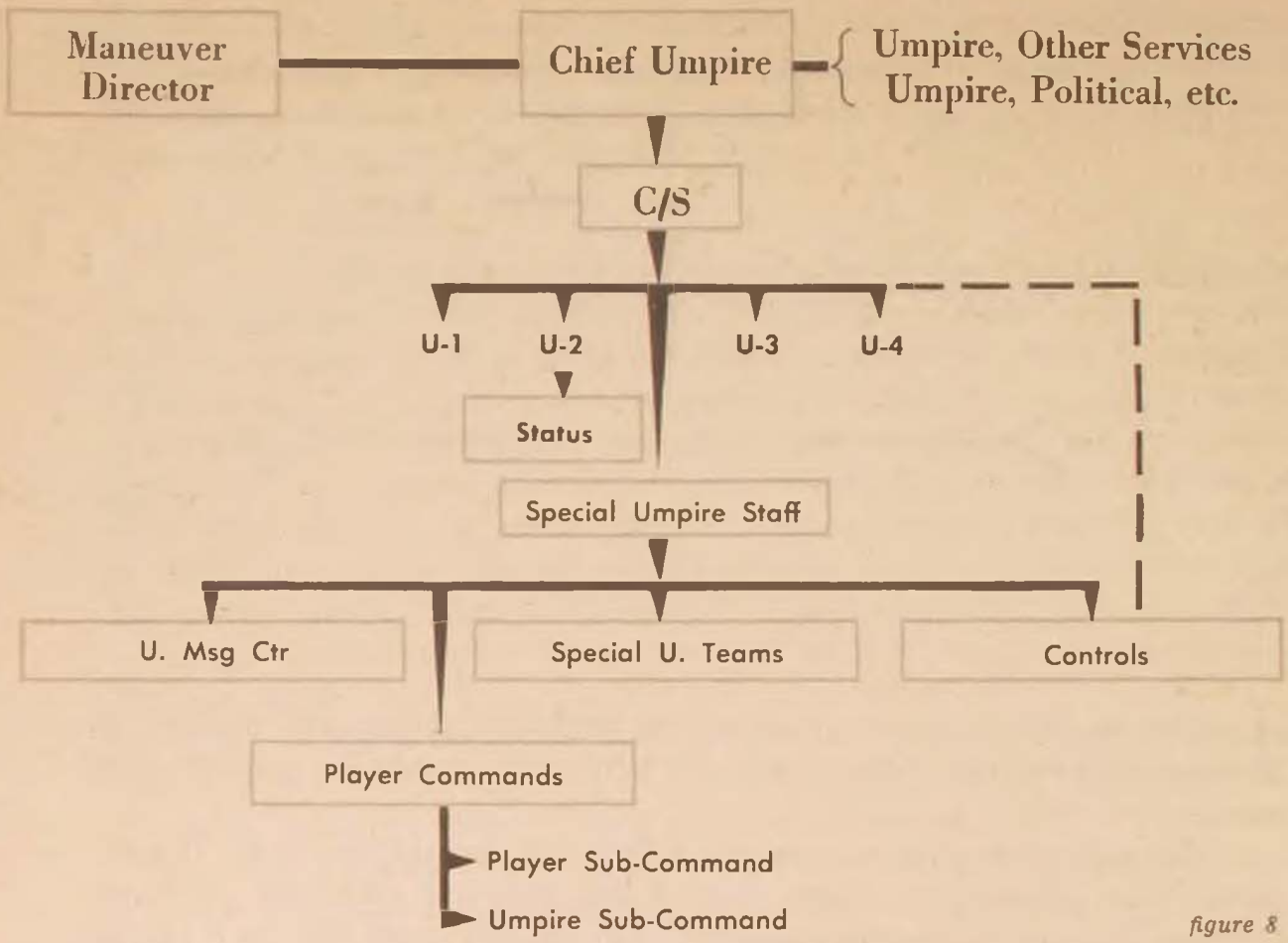


figure 8

through channels entirely distinct from player channels. This latter requirement for security exists to the degree that play would be compromised by umpire discussions or foreknowledge of impending actions.

Long before the umpires have been identified or their organization stabilized, the Exercise Director will have started the preparation of the *background* and the *scenario*.

The uninitiated is likely to conceive of the scenario as a vivid, imaginary narration of the expected actions that will constitute the backbone and rib cage of the over-all plot. In a sense this is true, but not in the Hollywood sense. The background is a synopsis of imaginary events with a high degree of possibility, and hence plausibility, that create the pseudo-historical position in which the players find themselves at the instant of beginning the exercise. The scenario, on the other hand, is a carefully calculated chronological listing of military situations that will generate purposeful effort among the players.

The background may exhibit several forms: pure narrative, intelligence summaries and reports, stock levels and lists of critical items, operations orders and simulated theater documents, POW interrogations, and various combinations of all these and more. Its purpose is to create a false but realistic historical climate for the player and to furnish him with all the normal data he would have acquired under the assumed circumstances. The background will usually be founded on the assumptions that certain events are, judging from

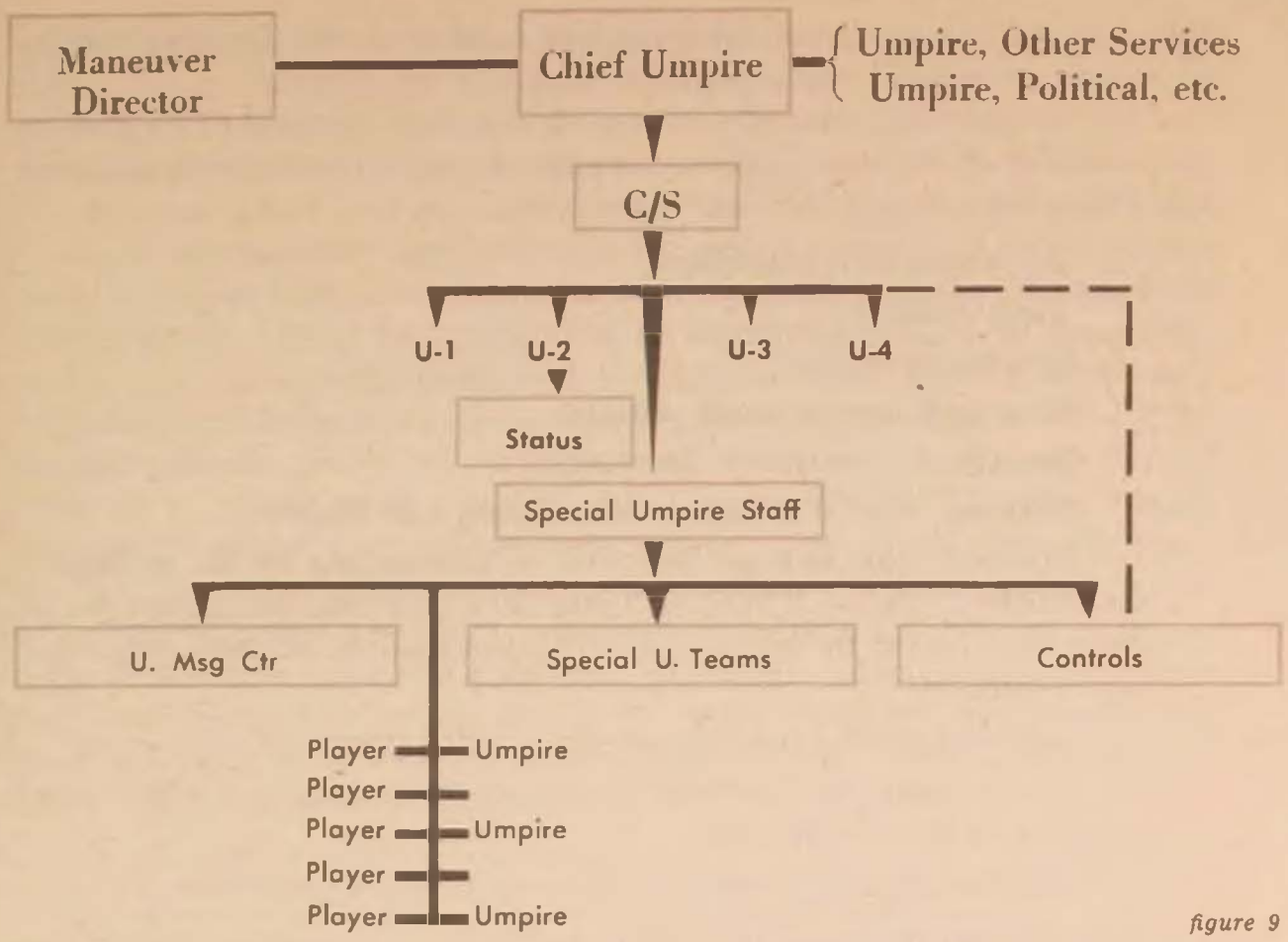


figure 9

past experience and the current military and political situation, possible if not probable. An assumption of war between Canada and the United States would create only incredulity on the part of the player, but war between the United States and any identifiable aggressor nation is always a possibility. Depending on the degree of security required, authentic information is highly desirable; it may, indeed, be a requisite to valid play if the game is for test purposes. The background is intended for player consumption and use. It must contain or reference all *common* data required by the players for orientation toward the announced game objective. In its simplest manifestation it might consist of only intelligence summaries, an operations order with annexes, operations overlays with the required maps, and the rules of play.

The scenario, on the other hand, is for umpire use. It lists, according to time and the date, the various preplanned situations that are required to stimulate player action in the desired areas. It should be noted at once that games involving an active opponent may not require a scenario. In fact, except for the most routine items, it might not even be possible to construct a scenario. A two-player game implies that situations will be created by spontaneous player command without prompting by the umpire. A one-player game requires that the stimulus be supplied by the umpire. Not all the situations have to produce meaningful effort on the part of the players. It may be desirable to introduce "filler" material to keep certain players occupied during slack periods or while awaiting umpire rulings. Generally, however,

situations will be sponsored by some staff agency of the planning staff to illustrate or emphasize some particular aspect of the exercise.

It is strongly recommended that a rigid format be adopted to describe each individual situation and to indicate the staff coordination required. The following is a sample of such a format:

Day situation is introduced

Block number

Sponsoring agency

Command or commands affected

SITUATION: a narrative description

PURPOSE: what it is hoped the situation will illustrate

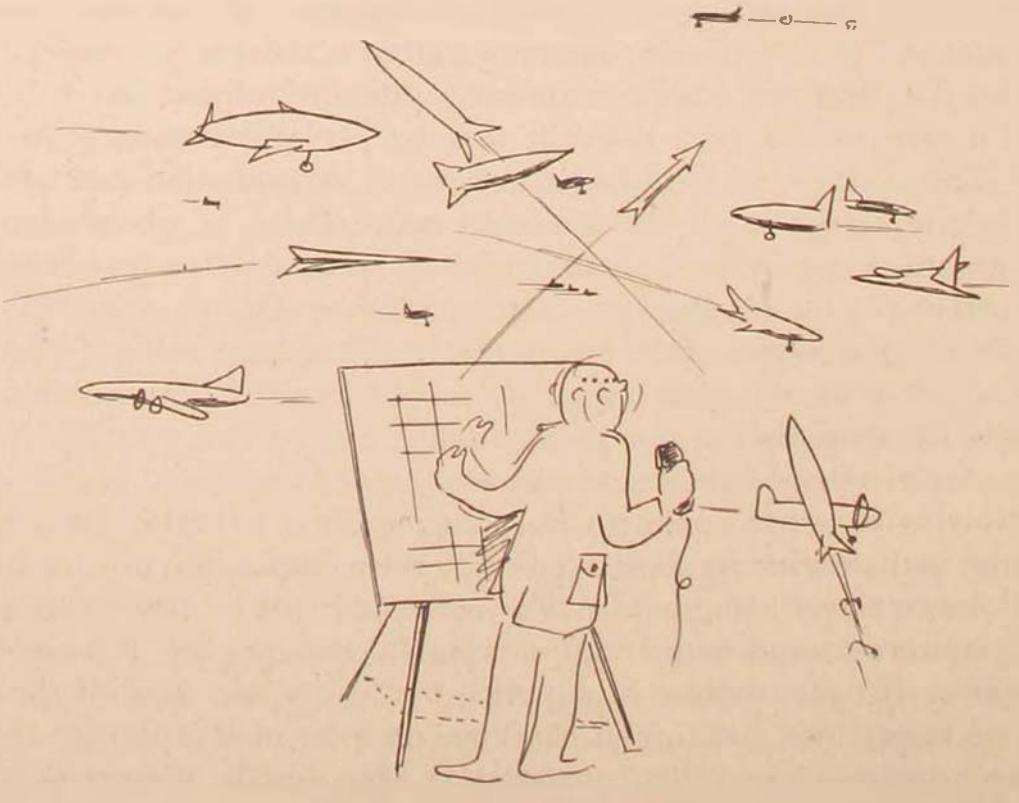
MESSAGE: any message form that is appropriate to the method of transmission: phone, TWX, or letter. Requires time-date group for release into system by umpire, security classification, priority, originator, and addressee.

ANTICIPATED PLAY: a synopsis of *expected* player action

INSTRUCTIONS TO UMPIRES: special instructions to get play started, cautions to be observed, etc.

Number of days to complete play, or expected carry-over

After all the situations have been developed and coordinated the planning staff should ruthlessly review and edit to ensure quality as well as a manageable quantity. A common mistake is to underestimate the actions re-



THE LOT OF THE UMPIRE IS DIFFICULT

quired by the player at his level of operation and to overburden him with trivia. On the other hand, a certain amount of administrative chaff is always admixed with the operational wheat, and total absence of it may lead to a feeling of artificiality, especially in the personnel and service areas.

In a war game, and especially in one that has been organized for the testing of revolutionary concepts, it is not always possible to create a hard body of umpire instructions. Certain duties may be perfectly obvious from the beginning, such as the requirement for the critique of the game and the final report, recommendations, and evaluation. Other umpire duties may be peculiar to the particular exercise. In most cases the umpire will (1) be familiar with the concept of play or concept being played, (2) keep himself informed of player activity in his area of responsibility, (3) keep himself informed of coming situations and inject them at the proper time, (4) supervise activities of subordinate umpires in his area, (5) make assessments of the results of player activity in accordance with rules for play or based on his own best experience and judgment, (6) require adherence by the player to realistic factors and capabilities, (7) be familiar with umpire channels and coordinate with other umpires as necessary, and (8) attend umpire conferences and make reports as required.

In addition, the chief umpire will:

Be responsible for supervising all umpire activities

Ensure that the necessary orientation and briefing for all umpires have been conducted prior to the exercise

Place in effect or modify any rules and instructions

Hold conferences as necessary

Simulate such other commands, boards, committees that are required for play but are not manned

Maintain records and data for the final report

Conduct a critique at the end of the exercise

A special caution with regard to the third item: to follow a bad decision by the umpire is better than trying to untangle and reshape the play after such a decision has been announced. The larger the exercise the truer this is. In a small game, or games where time is not running, such mistakes may be more easily rectified.

Air umpiring is a subject all its own. For descriptions of these highly specialized duties the reader should refer to Air Force Manual 1-10 (Confidential) and the documentation for Sagebrush or some similar recent maneuver. It would appear that statistical evidence from which to form rules for modern air warfare is largely lacking, and the character of future air engagements will bear so little resemblance to those of the past that such rules cannot even be extrapolated. This trackless area becomes even gloomier when one considers the implications of weapon systems now coming into use or programed for future production. The umpire's task of relating and assessing air-to-air and air-to-ground actions over the ranges and at the speeds now common has become—to say the least—formidable. Although the com-

puter offers some hope of relief, the data that the computer may assimilate has to be puréed, so to speak, and some chewy truths are necessarily lost in the process.

Game Umpiring and Reporting

As the date for play approaches, the player and umpire organizations will have become firm and the various participants will have been notified. In order to familiarize them with the area and the organization of forces the background information may be distributed to them in advance. It may even be desirable to preplay a few hours of a large exercise to ensure student understanding of the game structure. For several days before play begins additional information may be fed to the players in the form of recent intelligence, news clippings, and the like. Players will also have been given rules of play, common factors to be used, and an explanation of any artifices to facilitate play. The player will also have been issued the miscellaneous materials required for play, such as regulations and reference material, maps, pencils, computers, desks, and paper.

"Pipeline priming" is the term used for setting in motion the various systems that may be routine in a real operation and that would normally be functioning as the main play begins. Sample operations that are continuous in a military environment such as an overseas theater are the daily nonscheduled troop-carrier flights, surface shipping movements, supply receipts and issues, mail, cross- and joint-servicing arrangements, and air warning and control procedures. Pipeline priming is another responsibility of the Director.

The umpires, too, will have been briefed on the game plan by the Director and on special umpire requirements by the Chief Umpire. All necessary rules and other data for the play of the exercise will have been issued. The scenario will be distributed, explained, and special instructions given on security. The communications system will be checked out, preferably by CPXing a portion of the play. In a large game it is virtually mandatory that the umpire organization be exercised for a few hours on the day before play begins.

Sometime between activation of the umpire system and the beginning of the exercise a command relationship will be established between the Director and the Chief Umpire. In some exercises the Director maintains the dominant position during play, the Umpire staff being simply another of the Director's many agencies. In others the Director's staff may integrate itself into the umpire system as umpires or advisers. Careful consideration should be given by the commander himself to which of the two systems he prefers: there is always the possibility the Director may unduly interfere with or influence player action unless the umpire is permitted to function freely. On the other hand, a strong-minded umpire, handicapped by limitations in his understanding of the play concept, may distort the results through lack of cooperation or coordination with the Director and his staff.

In such a generalized discussion it is not possible to describe any typed play. The reader can visualize the player-umpire actions and coordination

necessary to direct a base recovery program from the major command level during a simulated general atomic war. Further, the emphasis in types of situations will vary between commands as the command missions vary. In a logistic command such as Air Materiel Command, situations will emphasize management of critical material assets. CONAD exercises will tend to emphasize the operational employment of integrated ground and air weapon systems against simulated raids. A more detailed discussion of the organization of a CONAD-type CPX is available in the Headquarters Joint Eastern Air Defense Force operations analysis study on "Suggestions on Procedures for Planning and Conducting a Command Post Exercise," dated March 1956.

Critiques

In any game the umpires must meet often enough to ensure unity of purpose and adequacy of planning and play. This is especially true if the umpires are scattered among player positions, if they are concerned with many different aspects of play, if corrections to burgeoning player action or rules are needed, or if the imposition of control is required. Daily umpire meetings provide the Chief Umpire with a continuous over-all assessment, ensure some measure of coordination between all levels and functional areas of the umpire system, and provide the basis for the final critique.

The critique itself may not include *all* the players, but it will usually include at least key players and commanders of played units.

Critiquing is something of an art in its own right. To a certain extent the critique must be extemporaneous, because it is most effectively given immediately after conclusion of play and before the dispersion of the players and umpires. This leaves little time for organizing a formal presentation. It is best given in a relaxed and easy atmosphere, with as much informality as possible on the part of the umpire—who is not, after all, an inspector. The final report will contain the detailed analyses and criticisms of play. The critique summarizes the purpose and the extent to which, in the opinion of the umpires and the maneuver director, the overt and covert objectives have been reached in play.

The critique period is also the proper place in which to acknowledge interservice assistance and to recognize meritorious effort on the part of individual players. A kindly thought for the Director (who still has the final report to worry about) would not be amiss.

Final Report

In the absence of a prescribed format the final report may be as short or voluminous as the Director wishes or the commander desires. It will probably include some or all of the following:

> Director's Report, consisting of reports on administration; support (further subdivided, possibly); visitors bureau; effectiveness of concept, planning, and play; and comptroller
>
> Chief Umpire's Report and those of his advisers, assistants (U-1,

U-2, U-3, U-4, etc.) and special teams

Conclusions

Recommendations.

If the report is very long, as in the case of Sagebrush, all the major features and recommendations should be summarized in the beginning for easy reading. The report may even include a separate section or volume containing, for record purposes, the documentation surrounding the planning and play periods, especially as they relate to joint agreements or other special procedures at variance with accepted doctrine. These latter, especially, are apt to implant themselves in the minds of participants to blossom months later as "Yes, *buts*. . ."

No real attempt has been made to portray a rigid sequence of events in the planning and play cycle, nor to indicate the chronology of Director actions. A detailed calendar, borrowed from the Sagebrush report, is included for possible modified use as a checklist (figure 10).

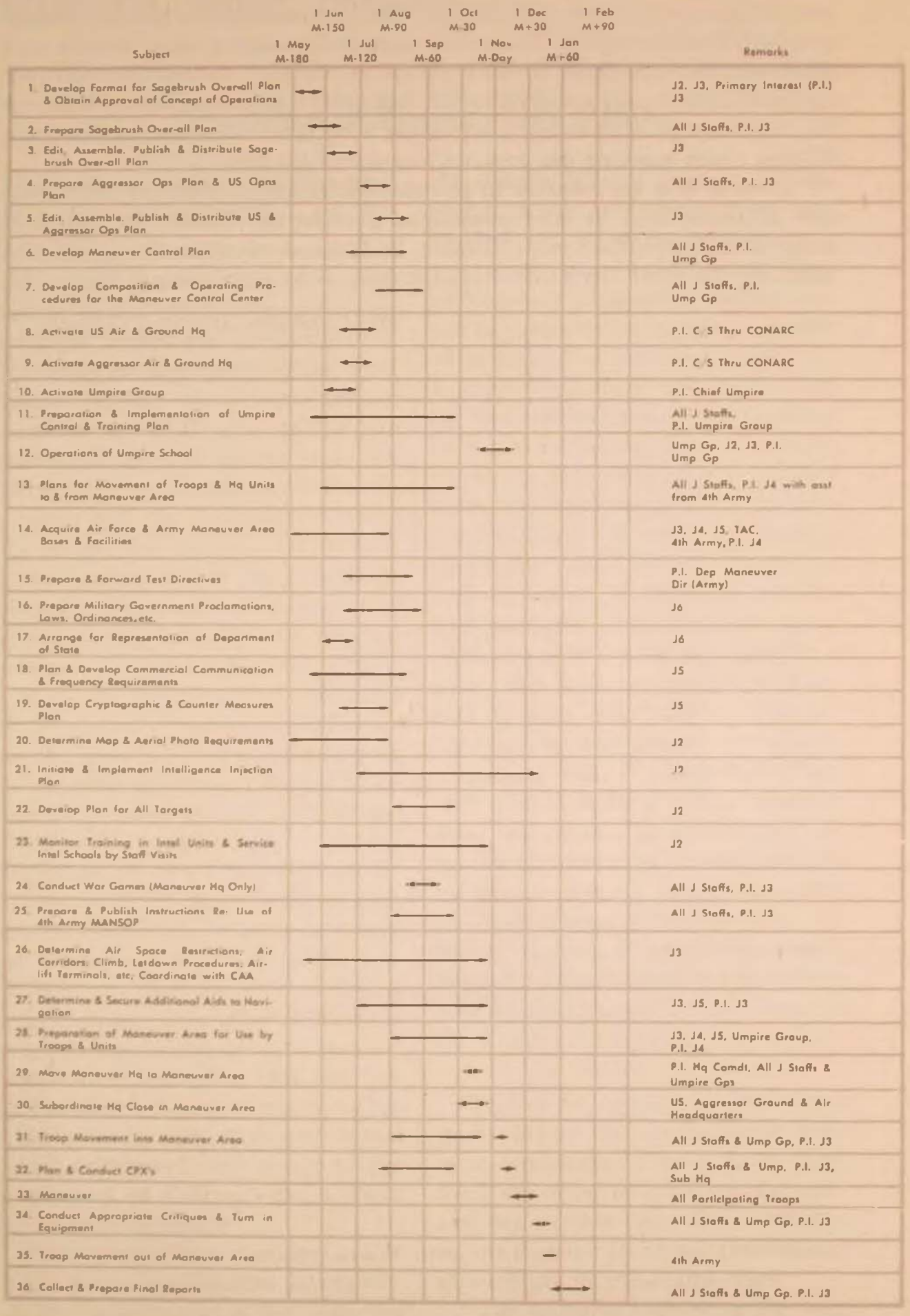
Generaloberst a. D. Franz Halder in the "Foreword" to *War Games* (Historical Division, U.S. Army Europe, MS No. P-094, 1952) says, "The acknowledged high standards of German officer training and the frequent successes of carefully prepared German operations are proofs of the high value of the war game." Later in the volume Generaloberst Hoffman comments:

> The special value of these games consists in the possibility of confronting the appointed unit commanders with a large variety of situations in quick succession. This gives them the chance to improve their grasp of strategic and tactical conditions and to test and develop their ability to make decisions and give their reasons for them, to adhere to them without being stubborn, to modify them as the basic circumstances change, and to issue the orders resulting from them . . . in all these games, training is thus seen to go hand in hand with testing. This condition prevails throughout a soldier's life, but it is particularly pronounced in these games and exercises.

My experience, from participation in the Logex series and observation of other exercises, has been that well-managed exercises promote enthusiasm among the participants even when the results are inconclusive. Some of this enthusiasm may be nothing more than relief from the daily routine of peacetime operations. Many others undoubtedly feel that these exercises afford the same grand opportunities for command and decision that seem to have characterized the German *Kriegsspiele*. Even if the game does not provide conclusive results, no observer can deny the excitement of a "Boston opening" for the command's war plan or the staff training benefits that result from such rehearsals.

While company-grade officers and the airmen spend most of their time polishing and exercising the individual skills that they will ultimately use, few such training opportunities present themselves to their commanders and staffs. There is no annual Yuma meet for senior officers. Nor is there any other method for evaluating staff skill except by an effectiveness report that is based on the performance of routine peacetime duty. Further, there is no other available planet on which the operation of global or theater plans can

Phased Schedule of Major Tasks – Exercise Sagebrush (Revised 22 May 1955)



Subject	Remarks
1. Develop Format for Sagebrush Over-all Plan & Obtain Approval of Concept of Operations	J2, J3, Primary Interest (P.I.) J3
2. Prepare Sagebrush Over-all Plan	All J Staffs, P.I. J3
3. Edit, Assemble, Publish & Distribute Sagebrush Over-all Plan	J3
4. Prepare Aggressor Ops Plan & US Opns Plan	All J Staffs, P.I. J3
5. Edit, Assemble, Publish & Distribute US & Aggressor Ops Plan	J3
6. Develop Maneuver Control Plan	All J Staffs, P.I. Ump Gp
7. Develop Composition & Operating Procedures for the Maneuver Control Center	All J Staffs, P.I. Ump Gp
8. Activate US Air & Ground Hq	P.I. C/S Thru CONARC
9. Activate Aggressor Air & Ground Hq	P.I. C/S Thru CONARC
10. Activate Umpire Group	P.I. Chief Umpire
11. Preparation & Implementation of Umpire Control & Training Plan	All J Staffs, P.I. Umpire Group
12. Operations of Umpire School	Ump Gp, J2, J3, P.I. Ump Gp
13. Plans for Movement of Troops & Hq Units to & from Maneuver Area	All J Staffs, P.I. J4 with asst from 4th Army
14. Acquire Air Force & Army Maneuver Area Bases & Facilities	J3, J4, J5, TAC, 4th Army, P.I. J4
15. Prepare & Forward Test Directives	P.I. Dep Maneuver Dir (Army)
16. Prepare Military Government Proclamations, Laws, Ordinances, etc.	J6
17. Arrange for Representation of Department of State	J6
18. Plan & Develop Commercial Communication & Frequency Requirements	J5
19. Develop Cryptographic & Counter Measures Plan	J5
20. Determine Map & Aerial Photo Requirements	J2
21. Initiate & Implement Intelligence Injection Plan	J2
22. Develop Plan for All Targets	J2
23. Monitor Training in Intel Units & Service Intel Schools by Staff Visits	J2
24. Conduct War Games (Maneuver Hq Only)	All J Staffs, P.I. J3
25. Prepare & Publish Instructions Re: Use of 4th Army MANSOP	All J Staffs, P.I. J3
26. Determine Air Space Restrictions; Air Corridors; Climb, Letdown Procedures; Airlift Terminals, etc; Coordinate with CAA	J3
27. Determine & Secure Additional Aids to Navigation	J3, J5, P.I. J3
28. Preparation of Maneuver Area for Use by Troops & Units	J3, J4, J5, Umpire Group, P.I. J4
29. Move Maneuver Hq to Maneuver Area	P.I. Hq Comdt, All J Staffs & Umpire Gps
30. Subordinate Hq Close in Maneuver Area	US, Aggressor Ground & Air Headquarters
31. Troop Movement into Maneuver Area	All J Staffs & Ump Gp, P.I. J3
32. Plan & Conduct CPX's	All J Staffs & Ump, P.I. J3, Sub Hq
33. Maneuver	All Participating Troops
34. Conduct Appropriate Critiques & Turn in Equipment	All J Staffs & Ump Gp, P.I. J3
35. Troop Movement out of Maneuver Area	4th Army
36. Collect & Prepare Final Reports	All J Staffs & Ump Gp, P.I. J3

figure 10

be tested beforehand. There is not even a suitable mechanism for testing such plans—in all their economic, political, and psychosocial implications—even in theory, let alone in actuality. But too many plans casually dismiss even the logistics aspects of combat support by stating that "supply and administrative arrangements will continue as normal." Indeed they will not, any more than the wing materiel officer will order a Report of Survey returned for correction to a squadron commander who is standing on the rim of a 400-foot crater marking the previous location of his base.

Even if it is not possible to test plans conclusively with the techniques now available, it is at least possible to glimpse the elusive and manifold shape of future conflicts and to harden, by fictional exposure, the officers who may some day come face to face with the hideous visage of the real thing.

Air Command and Staff College

Books and Ideas...

Roundup of Books from 1956

Atomic Quest: A Personal Narrative, by Arthur Holly Compton, pp. 370

Absorbing personalized account of the esoteric journey that led to the atomic bomb. With a minimum of technical matter the director of the Metallurgical Laboratory of the Manhattan Project during its decisive research sets forth the gradual unfolding of the undertaking from initial disbelief to the tremendous finale. A great deal has been written about the bomb, but no one has written more authoritatively and readably than Dr. Compton, who is one of the giants of our time in basic physical research. Accepted in the early Twenties in the University of Chicago's distinguished Department of Physics as the peer of Nobel Prize-winner Michaelson and famous Robert Milliken, he plunged into the study of the mysterious cosmic rays, winning therefrom his own Nobel Prize at the young age of 35. Soon he found himself in charge of the assorted group of top-flight research scientists and delvers into the shadowy theory of atom-splitting who after a year of urgent experimentation brought about on 2 December 1942 the first self-sustained controlled release of nuclear energy. Of that momentous scene underneath the stands at the University of Chicago's Stagg Field Dr. Compton writes:

"We entered onto a balcony at one end of the squash-court laboratory. At the opposite end of the room was the massive pile of graphite blocks, within which the uranium was embedded. On the balcony with us were twenty others, including Fermi. Most of these were engaged in making various adjustments and reading a variety of meters. On the floor below was George Weil, whose task was to handle the control rods. On a platform over a corner of the pile was a group of three men whom we jokingly called 'the suicide squad.' It was their responsibility, in case the reaction could not otherwise be stopped, to throw buckets of cadmium solution over the pile. Hilberry was ready with an axe to cut the rope holding a safety rod if the reaction should begin to grow with sudden violence. The door to the balcony was through a concrete wall. A hundred feet farther back, behind a second concrete wall, was another group of men, following the course of the experiments by remote control instruments and an intercommunication system. It was their task, if something should happen to those of us in the laboratory beside the reactor, to throw in the 'safety rods' by remote control.

* * *

"It was the middle of the afternoon before the preliminary tests were completed. Finally Fermi gave Weil the order to draw out the control rod another foot. This we knew meant that the chain reaction should develop on an expanding scale.

"The counters registering the rays

from the pile began to click faster and faster until the sound became a rattle. I was watching both a recording meter and a galvanometer. I could see the light from the galvanometer begin to move across the scale. The line traced by the recording stylus was now curved upward. Finally after many minutes the meters showed a reading that meant the radiation reaching the balcony was beginning to be dangerous. 'Throw in the safety rods,' came Fermi's order. They went in with a clatter. The spot of light from the galvanometer moved back to zero. The rattle of the counters died down to an occasional click. I imagine that I can still hear the sigh of relief from the suicide squad. Eugene Wigner produced a bottle of Italian wine and gave it to Fermi. A little cheer went up.

"Atomic power! It had been produced, kept under control, and stopped."

Oxford University Press, $5.

Lincoln Finds a General: A Military Study of the Civil War, Volume Four, Iuka to Vicksburg, by Kenneth P. Williams, pp. 616

Said the General in Chief in Washington, "When we consider the character of the country in which this army operated, the formidable obstacles to be overcome, the number of the enemy's forces, and the strength of his works, we cannot fail to admire the courage and endurance of the troops and the skill and daring of their commander. No more brilliant exploit can be found in military history." Thus Major General Henry W. Halleck on the capture of Vicksburg in his annual report to the Secretary of War in 1863. To Grant on the hot summer's day that Halleck read his "brief, soldierly" report on the successful conclusion of the Vicksburg campaign, he had wired, "In boldness of plan, rapidity of execution, and brilliancy of results, these operations will compare most favorably with those of Napoleon about Ulm."

The first three volumes of Professor Williams' projected five-volume history of Civil War operations from the point of view of high Union command have been strongly recommended in our earlier issues, not merely for their classic excellence as military history, where for our money they must take a prime place among writings addressed to the war of their subject, but as composing a brilliant text for the study of major leadership through examples of its failures among the inept and its qualities of success among the few who rose to dominate their hours of trial. (See *AUQR*, Vol. III, No. 3 [Winter, 1949], 88-92; Vol. V, No. 4 [Winter 1952-53], 162.) Professor Williams' definitive studies and their excellent presentation firmly cap the reputation of Ulysses Grant as the great commander of his time and offer a rich profit to the student, in any service, of the qualities of mind and character from which the events of his reputation derived. The *Lincoln Finds a General* volumes deserve a well-read place in every professional library.

Volume IV treats the campaigns in the West from mid-July 1862 through the turning point of the war in the decisive fall of Vicksburg on 4 July 1863.

Macmillan, $7.50

Arms and Men: A Study in American Military History, by Walter Millis, pp. 382.

A clear-cut analysis of the variegated interplay of geography, politics, industrial developments, social patterns; international environment and weapon development that shaped American military power from the day of the embattled farmers at Concord to the policy conflicts of 1956. Read simply as an accounting of why U.S. forces in the field were what they were, it is rewarding to all but the best-informed students of military affairs. In a larger view it offers substantial understanding of the vagaries and strengths of American responses to war and rumors of war. Required reading.

G.P. Putnam's Sons, $5.75

The Balkans in Our Time, by Robert Lee Wolff, pp. 618.
Well-written and authoritative modern Balkan history and general Balkanology, about two thirds of which is devoted to detailed discussion of developments from 1939 to mid-1955. Harvard Professor Wolff's encyclopedic knowledge is easily carried by his own intimate personal observations gathered first hand through extensive travel in the Balkans and during wartime duty as chief of the Balkan Section, OSS. Belongs to and adds lustre even to the distinguished "American Foreign Policy Library" published by Harvard University Press.

Harvard University Press, $8

Struggle for Asia, by Sir Francis Low, pp. 239.
The Editor of the *Times of India* from 1932 to 1948 has written a thought-provoking, condensed but readable examination of the historical, sociological, and psychological components of what is happening in Asia. Noticeable British viewpoint. Better on India than on East Asia.

Praeger, $3.50

The Rise and Fall of Nazi Germany, by T. L. Jarman, pp. 388.
An excellent history of the Third Reich for the general reader. Readable, with good coverage of sources. Annotation and a good working bibliography.

New York University Press, $4.95

Soviet Air Power, by Richard E. Stockwell, pp. 252.
A handbook on Soviet air power and its development, with a separate supplement containing characteristic tables for some 70 aircraft and 55 engines currently in use in the Soviet Union. The work is a remarkably detailed distillation from numerous sources with the result that, according to General George Kenney in his introduction, "all available information on this subject has been assembled. . . . It is the result of painstaking, authoritative research." Required reading.

Pageant Press, $7.50

The Direction of War, A Critique of the Political Direction and High Command in War, by Air Vice-Marshal E. J. Kingston-McCloughry, pp. 261.
Discusses British problems, but relevant beyond the shores of the United Kingdom. Beginning with Marlborough and former concepts of the political direction of war, the author reviews World War I, the beginnings of air warfare, developments between the two world wars, and Allied planning in World War II, concludes with his views on the conduct of modern war today. Air Vice-Marshal Kingston-McCloughry was head operations planner in the headquarters of the

Allied Expeditionary Force for the invasion of Normandy.

Praeger, $4

Strategic Intelligence and National Decisions, by Roger Hilsman, pp. 187.

Expository analysis of the function and organization of U.S. intelligence activities, attempting to answer the questions of how and by whom strategic intelligence should be produced, how it can be most usefully organized, how it can best be communicated to the persons who need it, and how it can be employed most effectively in making decisions of national policy.

Free Press, $4

The New Japan, Government and Politics, by Harold S. Quigley and John E. Turner, 456 pp.

A fair enough introduction to current Japanese politics and their background in Japanese history. The post-war period from 1945 to 1951 is sharply handled, but the "newer Japan" since the Korean war is generally pretty much passed over.

University of Minnesota Press, $5

The Soviet Secret Services, by Otto Heilbrunn, 216 pp.

An analysis of case material on espionage, subversion, and infiltration and on psychological warfare. Soviet intelligence in Germany during World War II is portrayed as a classic. Dr. Heilbrunn concludes that Soviet hidden operations must be assessed and capability created to deal with them.

Praeger, $4.50

Rescue!, by Elliot Arnold, pp. 340

Somewhat excitably phrased reporting of the adventures of the Air Rescue Service. The USAF sent Arnold, novelist *(Everybody Slept Here)* and journalist and former Army Air Forces officer (co-authored *Mediterranean Sweep,* 1944), a great many thousands of miles to interview and find out all about it. For the public.

Duell, Sloan & Pearce, $5

Libya: The New Arab Kingdom of North Africa, by Henry Serrano Villard, pp. 165

The first United States Minister to Libya offers a short, readable, and personalized account of the new nation. A good introduction.

Cornell University Press, $2.75

Turkey in My Time, by Ahmed Emin Yalman, pp. 294

A picture of the remaking of Turkey that began at the end of World War I and her emergence as a modern Western nation. By a Turkish liberal newspaper editor, schoolmate of Ataturk, and lecturer in America.

University of Oklahoma Press, $4

Pork Chop Hill: The American Fighting Man in Action, Korea, Spring, 1953, by S. L. A. Marshall, pp. 315

Exceptionally sustained realism of small-unit fire fights for a Korean ridge on which a lieutenant was a high-ranking commander. Fragmentary, like a set of dispatches composed for other purposes, General Marshall's book this time misses the climactic impact of his great narrative of the debacle of the Second Division, U.S. Army, killed in the Communist trap sprung in the bitter fall of 1950. Peerless reporting.

Morrow, $5

Vision: A Saga of the Sky, by Harold Mansfield, pp. 389

Vivid narration of the trials and triumphs of the Boeing Airplane Com-

pany over forty years, of air history filled with associations with the Air Force. Mansfield is Boeing's director of public relations. Both old-timers and new-timers will find his book an interesting and informative item for leisure reading.

Duell, Sloan & Pearce, $5

Atoms and Energy, by Professor H. S. W. Massey, F.R.S., pp. 174

A nontechnical but serious exposition of the developments in atomic physics that permitted the controlled, sustained release of atomic energy. The author, professor of physics in the University of London, was head of the group of British scientists working during the war in America on the bomb project. Clearly written and a welcome diversion from the journalistic popularizing that soups up an arms-length acquaintance with its subject by steady administrations of superficial "human interest" and a restless style.

Philosophical Library, $4.75

Men, Rockets and Space Rats, by Lloyd Mallan, pp. 335

The jacket of this one confesses that it is "the startling story of today's dramatic accomplishment in the exploration of outer space." We submit the principal fault of Mr. Mallan's book proceeds from the effort to live up to its adjectival billing, beginning with the slick point of view that writings must be loaded with human interest to interest readers, who presumably are too stupid to find real attractions in ideas, processes, rationality, things-in-themselves, theoretical, scientific, industrial, and business relationships, etc., or even in genius unless it depends on a brave woman standing behind it and has kiddies at home. We do not wish to belabor Mr. Mallan any more than the long string of others who heed their editors' surely not-perfect admonitions as to what the "reader" traffic will bear (he is merely the one immediately present). But it would be interesting to read sometime about just one real-life character engaged in some corner of the world's work, from sweeping out in the morning to fomenting space travel, who is not completely dedicated, self-effacing, and self-sacrificing, who is not possessed with an over-developed strain of nobility, but who is a plain, ornery cuss whose worthwhile and successful efforts—which are unaided by loyal dependents and, if the truth be told, uncomprehended by them—were undertaken at least in part to satisfy his own appetite for praise and reward.

If you can take the wide-eyed wonder along with the rockets, this is not a bad book for the layman beginner in its subject. Mr. Mallan had the co-operation of the Air Force in gathering his information. He, and dozens of others, could well endure the co-operation of an unsentimental editor with a big blue pencil.—*K.F.G.*

Messner, $5.95

Military History

Eisenhower's Six Great Decisions (Europe 1944-1945), by General Walter Bedell Smith, 237 pp, Longmans, Green, $3.95.—Eisenhower's wartime chief of staff reviews the major decisions during the European Campaign: from the final commitment of the Normandy invasion forces, to the decision to pursue the German forces into the Fatherland. Most of the book, which adds little except brevity to *Crusade in Europe*, was serialized in the *Saturday Evening Post* in 1946, and since that time the twelve-month

period it deals with has been exhaustively covered by military historians.

Soldier: The Memoirs of Matthew B. Ridgway, by General Matthew B. Ridgway, U.S.A., Ret., as told to Harold H. Martin, 371 pp, Harper, $5.—A full and meticulous account of 38 years' service, with some excellent reflections on the internal relationships in an army and their appearance in morale, discipline, and leadership. This is the kind of a book that can only be weakened by the intrusion of the "as-told-to" ghost, with the resulting uncertainty concerning exactly what are General Ridgway's "memoirs" of lesser detail and what are, presumably, Mr. Martin's strivings for color and slick "readability." As a consequence autobiography is converted into biography.

The Big Lie, by John Baker White, 235 pp, Crowell, $4.—The "big lie" was the mélange of deceptions, planted rumor, and propaganda employed by the British to screen their military intents and movements and in turn to befuddle the German command with fear and uncertainty of the outcome of their own. A combination of personal history of the author and a review of the psychological war.

Okinawa: Victory in the Pacific, by Major Chas. S. Nichols, Jr., USMC, and Henry I. Shaw, Jr., Historical Branch, G-3 Division, Hq U.S. Marine Corps, 332 pp plus section of folded-in situation and operations maps, Government Printing Office, $5.50.—A full, documented account of Marine Corps operations and their environment during the battle for Okinawa. This is the last of a series of fifteen official monographs prepared by the historical office of the Marine Corps to give the military student "an accurate and detailed account of the operations in which Marines participated during World War II." The series, which was begun in 1947, includes:

The Defense of Wake
Marines at Midway
The Guadalcanal Campaign
Marines in the Central Solomons
Bougainville and the Northern Solomons
The Battle for Tarawa
The Campaign on New Britain
The Marshalls: Increasing the Tempo
Saipan: The Beginning of the End
The Recapture of Guam
The Seizure of Tinian
The Assault on Peleliu
Marine Aviation in the Philippines
Iwo Jima: Amphibious Epic
Okinawa: Victory in the Pacific

The monographs are now being integrated into a final Operational History of the Marine Corps in World War II.

The Fateful Decisions, ed. by Seymour Freiden and William Richardson, 302 pp, William Sloane, $4. — First-hand accounts, translated from the German, of six major battles of World War II by the German generals who either made or carried out the command decisions: Battle of Britain, Battle for Moscow, El Alamein, Stalingrad, France (1944), and the Ardennes offensive. The separate pieces of General of the Air Force Werner Kreipe, General Gunther Blumentritt, Lt. General Fritz Bayerlein, Colonel General Kurt Zeitzler, Lt. General Bodo Zimmerman, and General Hasso von Manteuffel, respectively, are too short for adequate

military history of the sweeping battles they describe but are absorbing contributions to the understanding of the higher organization of the Nazi military and its incredible enfoldment by the personal and political stresses of the Third Reich.

The Inchon-Seoul Operation, by Lynn Montross and Captain Nicholas A. Canzona, USMC, Historical Branch, G-3, Hq U.S. Marine Corps, 361 pp, Government Printing Office, $2.50.—Volume II of an official series, *U.S. Marine Corps Operations in Korea,* the first volume of which, *The Pusan Perimeter,* has already been published. Volume II presents in documented detail "the operations of the 1st Marine Division and the 1st Marine Aircraft Wing as a part of X Corps, USA, during and immediately following the Inchon Landing on 15 September 1950."

Civil War on Western Waters, by Fletcher Pratt, 255 pp, Holt, $3.50.—The Civil War naval actions on the Mississippi and its tributaries. Standard Fletcher Pratt readability and once-over-lightly but adequate enough treatment for general information.

Panzer Battles: A study of the Employment of Armor in the Second World War, by Major General F. W. von Mellenthin, trans. by H. Betzler and ed. by L.C.F. Turner, 383 pp., University of Oklahoma Press, $5.—Attempts, says General Mellenthin, "to set out the main tactical lessons emerging from the war of 1939-45." Straightforward accounts and technical appraisals of the German use of armor. Von Mellenthin was Chief of Staff, 4th Panzer Army.

Lincoln and the Tools of War, by Robert V. Bruce, 368 pp., Bobbs-Merrill, $5.—Interesting, scholarly account of Lincoln's part in the arming of the Union forces in the Civil War. Reveals, in the aspect of what we call "hardware" today, the extent of the change the Civil War induced in the nature of war itself.

Napoleon, by H. Butterfield, 143 pp., Macmillan, $1.50.—

Marlborough, by Maurice Ashley, 144 pp., Macmillan, $1.50.—Pocket sized but hard bound, these brief biographies of Macmillan's new Great Lives Series are adequate surveys for the student who wants a bird's-eye view at the cost of a minimum of his time.

Technical

The Analysis of Structures, Based on the Minimal Principles and the Principle of Virtual Displacements, by Nicholas John Hoff, 493 pp, John Wiley & Sons, $9.50.—The principle of virtual displacements, the minimum of the total potential, the calculation of buckling loads, and complementary energy and least-work methods are the topics of the book's four main divisions. The author is head of the Department of Aeronautical Engineering and Applied Mechanics in the Polytechnic Institute of Brooklyn.

Aircraft Gas Turbines, by C. W. Smith, 448 pp, John Wiley & Sons, $8.75.—"The objective sought is a rounded picture of the aircraft gas turbine power plant, with somewhat greater emphasis on the theoretical aspects." Author is Adjunct Professor of Aeronautical Engineering at New York University and a researcher for the General Electric Co.

Aerodynamics; Propulsion; Structures and Design Practice, by E. Arthur Bonney, Maurice J. Zucrow, and Carl W. Besserer, 595 pp., D. van Nos-

trand, $10.—The second of several volumes to appear in a series entitled *Principles of Guided Missile Design* adds to the first volume, *Guidance,* coverage of the remaining missile component systems, indicated by its title. The following volumes (volume three is described below) will embrace sections treating operations research, armament, launching, systems engineering, range testing, and space flight. A guided-missile designer's handbook will complete the series. Volume two discusses the aerodynamics problems of guided missiles, with attention to wind tunnel, ballistics range, and missile flight tests; turbojets, pulsejets, ramjets, and rockets as employed in missiles, with consideration of propellants; and the design and packaging of airframe and contents.

Operations Research, Armament, Launching, by Grayson Merrill, Harold Goldberg, and Robert H. Helmholz, 508 pp., D. van Nostrand, $10.— The third volume of the series on *Principles of Guided Missile Design* described immediately above treats the technique of operations research as the basis for decision-making, the design of a missile warhead and its fuze, and the design and environmental relationships of missile-system launching components.

Rocket Propulsion Elements: An Introduction to the Engineering of Rockets, 2nd ed., by George P. Sutton, 483 pp., Wiley, $10.25.—Liquid and solid-propellant rocket fundamentals, their working fluids and substances, and their design, with general principles of thermodynamics, chemistry, heat transfer, flight theory, and testing methods as they apply. Includes a classified bibliography of 650 references in the technical literature.

Radio Telemetry, 2nd ed., by Myron H. Nichols and Lawrence L. Rauch, 461 pp., Wiley, $12.—A comprehensive enlargement of the first, limited edition prepared for the Air Force intending to gather together available published unclassified material on the theory, methods, and techniques of radio telemetry.

Political science for study or reference

China's Changing Map, A Political and Economic Geography of the Chinese People's Republic, by Theodore Shabad, 295 pp, Praeger, $7.50. —China's industry, agriculture, and transportation under Communism, with special attention to events since 1949. For reference rather than general reading. Part I treats physical setting, political framework, and economic patterns of Communist China; Part II deals in detail with the various regions. Maps and tables. Shabad, a member of the *New York Times* foreign news desk, has assembled an impressive body of detailed information, based almost entirely on Communist sources. A special feature is the listing of all contemporary place-name changes, the index containing all names mentioned in the text in two forms of transcription from the Chinese: the Wade-Giles system and the Postal system.

Latin America: A History, by Alfred Barnaby Thomas, 801 pp, Macmillan, $6.50.—A textbook organized into four divisions: "Colonial Latin America," the "Wars for Independence," "Modern Latin America," "Inter-American Affairs." Physically a book of excellent design and manufacture.

American Defense and National Security, by Timothy W. Stanley, 202 pp, Public Affairs Press, $3.25.—"In

these pages I endeavor to objectively trace the evolutionary pattern and describe the present structure, processes and people [of the National defense and security structure]—and the inter-relationships between them—as factually and concisely as possible." Chapters are devoted to political-military relations, the President and the Executive Office, the National Security Council, foreign affairs, international security affairs, the problem of defense organization, unification of the military services, roles and missions, the Korean War, and the Office of the Secretary of Defense. Appendices include the National Security Act of 1947, the Reorganization Plan of 1947, and the Key West Agreement. Bibliography and charts.

Suggestions for the personal library of arts and sciences

Sergei Rachmaninoff: A Lifetime of Music, by Sergei Bertensson and Jay Leyda, 464 pp, New York University Press, $6.50.—A comprehensive biography of the great Russian composer and giant of the piano, with a chronological list of his compositions and a discography. Clear and authentic.

"The legend states that Liszt was the greatest pianist the world has ever known. . . . Our age is providing a greater legend for the aftertime, a legend of a tremendous man who, while neighboring his three-score-and-ten, can summon all the power of youth to his fingers and control them with a sounder musical brain, in its full development than ever was possessed by the youthful Liszt."

Of the household-familiar Prélude, the public renown of which made it possible for him to come to America, Rachmaninoff said: "When I graduated from the Moscow Conservatory I was a boy of eighteen. Music is not a lucrative profession, even for those who have achieved fame, and for a beginner it is usually desperate. After a year I found myself out of pocket. I needed money, and I wrote this Prélude and sold it to a publisher for what he would give. I realized, all told, forty rubles out of it—that is about twenty dollars in your money. . . . But in this case the law of compensation has worked out nicely, and I have no reason to complain."

Ten Centuries of Spanish Poetry: An Anthology in English Verse with Original Texts, ed. by Eleanor L. Turnbull, with introductions by Pedro Salinas, 452 pp, The Johns Hopkins Press (1955), $5.—One hundred and fifty-six poems with Spanish text and English verse translation laid on facing pages in pleasingly open format. Among the extensive list of translators resulting from the editor's intent to choose "the best translations that had already been made" are Longfellow, Lord Byron, and John Masefield, in addition to the editor herself.

The Adriatic Sea, by Harry Hodkinson, 256 pp, Macmillan, $5.—A historical sketch of the Adriatic and a description of its two coasts as they appear to today's open-eyed traveler. Good for its own sake, as well as for introduction to its subject.

The Quarterly Review Contributors

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BRIGADIER GENERAL W. BARTON LEACH, USAFR, (A.B., LL.B., Harvard University) is Professor of Law at Harvard and consultant to the Chief of Staff, USAF. Upon graduating from Harvard Law School in 1924 he became secretary to Justice Oliver Wendell Holmes of the Supreme Court of the United States. He later turned to law practice in Boston and since 1929 has been a member of the Harvard law faculty. A private in World War I, he was commissioned in the Army Air Forces in World War II to be Chief of the Operations Analysis Division, a post he held until the end of the war. As consultant, General Leach represents the Air Force in many interservice and Congressional affairs. He founded the Harvard Defense Studies Program and has written extensively on national defense matters.

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ATTENTION

The *Air University Quarterly Review* is published to stimulate professional thought concerning air strategy, tactics, and related techniques. *Its contents reflect the opinions of its authors or the investigations and conclusions of its Editors and are not to be construed as carrying any official sanction of the Department of the Air Force or of Air University.* Informed contributions are welcomed.

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