AIR UNIVERSITY QUARTERLY REVIEW

SPRING 1955

Vol. VII No. 4

ATTENTION

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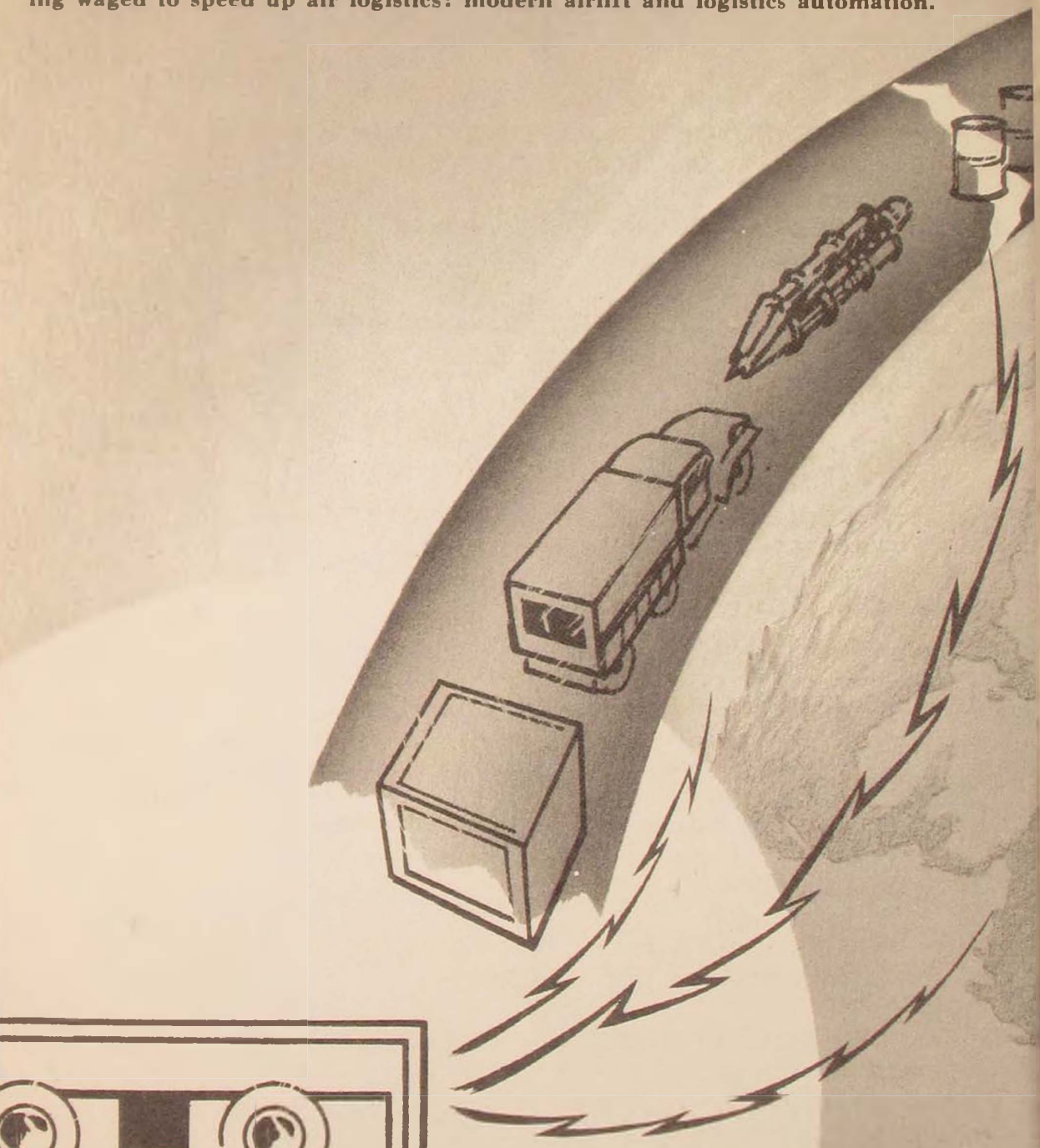
THE
UNITED STATES AIR FORCE
AIR UNIVERSITY QUARTERLY REVIEW

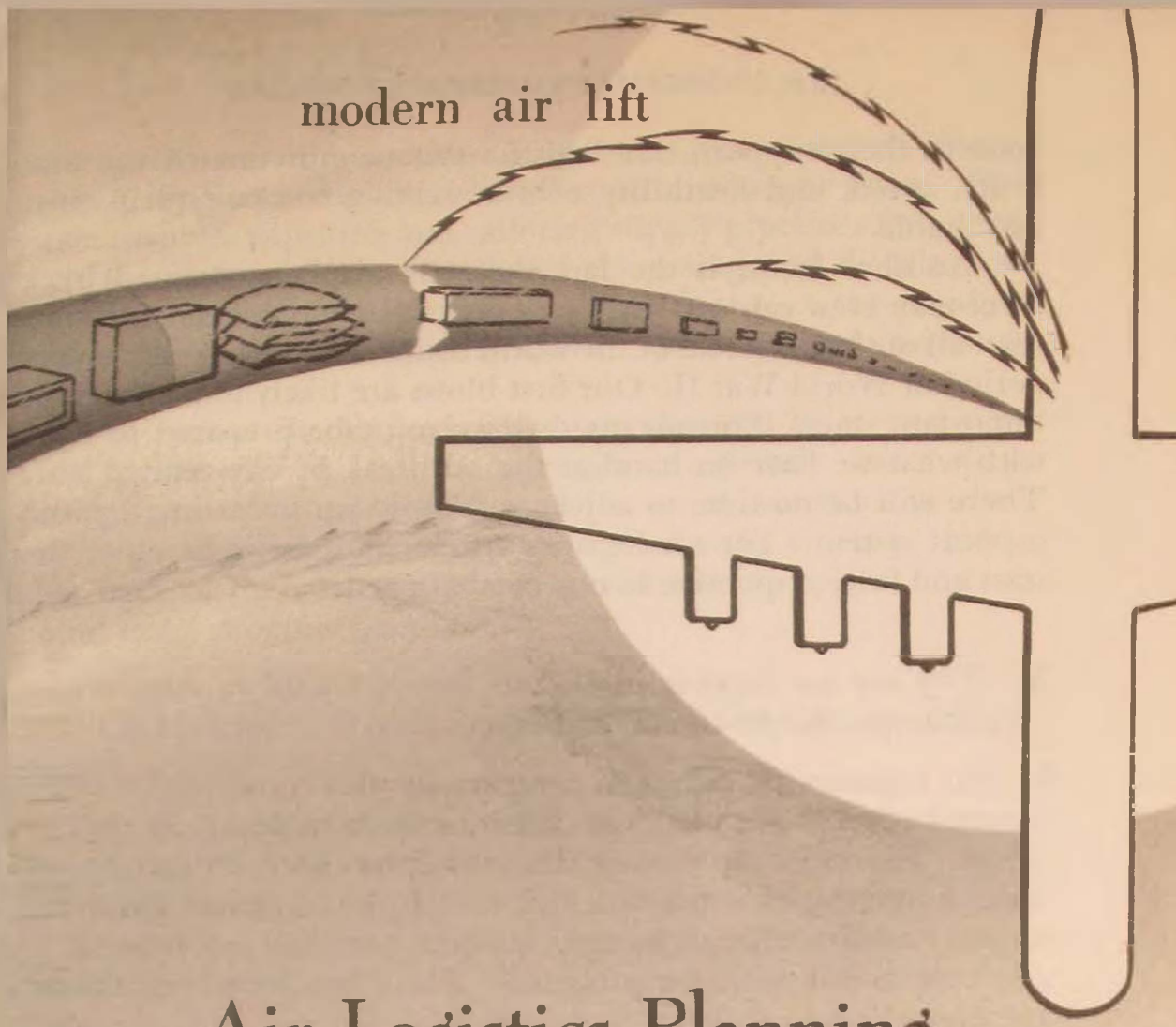
VOLUME VII SPRING 1955 NUMBER 4

Published quarterly by the Air University, Maxwell Air Force Base, Alabama. The printing of this publication has been approved by the Director of the Bureau of the Budget, 3 July 1952. Students and faculty of the Air University schools are provided free copies as textual material. Printed by the Government Printing Office, Washington, D. C. Price, single copy, 50 cents: yearly subscription, $2, from Air University Book Department, Maxwell Air Force Base, Ala. Properly credited quotations are authorized. USAF Periodical 50-2.

The transformation of the Air Force mission from support of theater surface forces to frontline defense around the world sets up an enormous problem in logistics. Traditional requisitioning and stockpiling have become economic and physical dodoes. Yet the vital striking power and flexibility of jet-atomic air forces must not be shackled by logistics starvation. At the request of the *Quarterly Review*, Honorable Roger Lewis, Assistant Secretary of the Air Force for Materiel, and General Edwin W. Rawlings, Commander of the Air Materiel Command, survey the two-pronged attack now being waged to speed up air logistics: modern airlift and logistics automation.



automation



Air Logistics Planning in the Atomic Age

A Quarterly Review Interview

with

HONORABLE ROGER LEWIS

Q ***What elements in the air logistics picture are new or have intensified since World War II?***

A The principle of air logistics as we know it today has actually evolved since World War II. This change in logistics has resulted from some new factors and the intensification of all factors in logistics. For one thing our strategy has changed. Our national strategy calls for the Air Force to maintain combat-ready strike forces. We must be ready to fight general war or limited war, whenever and wherever it may occur. This means we need greater mobility, speed, and flexibility in our combat forces than ever before in our history. Since our combat forces are only as

good as their support, our logistics system must match the mobility, speed, and flexibility of our striking forces, and it must be reliable.

Another factor is the fact that one airplane manned by a three-man crew can carry more destructive energy in one mission than all of the air forces of the world could carry during the entire period of World War II. Our first blows are likely to be the most important ones. This means that we must be prepared to fight with what we have on hand at the outbreak of any general war. There will be no time to adjust and build up a wartime logistic support system. The air logistics system must be in-being at the start and fully responsive to our combat needs.

Q *Why are we lagging in the air logistics field in comparison with, say, the jet-atomic field?*

A Air logistics has lagged in comparison with certain other fields because of emphasis placed on these fields in building up the Air Force. The emphasis during this period has been on getting the bases open, the men trained, and the airplanes flying. Priorities among functions, forced by tight budgets, have had real bearing on our various development programs. There has been competition for every budget dollar.

In addition air logistics is more than the movement of materiel by air. Air logistics is a system of which airlift is only a part, although an indispensable part. There has been some tendency to consider that airlift is the cure-all for any logistics problem. This is far from true. The Air Force recognized this and realized that only by using a system approach to our logistics problems could we realize the increased support-effectiveness and economies which were both necessary and desired.

The revised system encompasses all areas of logistics: supply, maintenance, procurement, and transportation. The system is being designed around the use of electronic computers for the collection and processing of logistics data. The use of these elec-

National strategy calls for the United States Air Force to maintain strike forces ready to counter general or limited aggression at any time or place. This global strategy proposes greater mobility, speed, and flexibility in our combat air forces than ever before. Combat forces being no better than their support, the logistics system not only must be reliable but also must match the mobility, speed, and flexibility of the striking forces. Hon. Roger Lewis, Assistant Secretary of the Air Force for Materiel, answers a number of questions posed by the Editors of the *Quarterly Review* on the philosophy and development of USAF air transport.

tronic machines will enable us to maintain more accurate inventories of supplies and give us better control over our assets. The system involves adjusting and tailoring supply pipelines and stock levels to take advantage of reduced processing and distribution time. Our procurement programs will be based on these reductions and on more accurate inventories and improved consumption data.

The part of the air logistics system that can be started now is the airlift portion. Airlift of engines is already under way. More progress can and will be made as we obtain from production better air-freight aircraft. Once we solve the airlift problem, other parts of the air logistics system will fall into place, and we should make progress rapidly.

Q ***What kind and size airlift capability do we need for the immediate future?***

A The Air Force needs three kinds of airlift within its air logistics system. There is a need for airlift for the movement of people and things between the United States and overseas areas. A second need is for airlift of people and things within overseas areas and within the United States. A third need is for the movement of people and things in and out of relatively isolated locations such as radar and missile sites.

The amount of airlift capability we need is determined primarily by combat unit deployment requirements which cannot be expressed in numbers here. What we must have is a capability to deploy rapidly our combat strike forces wherever they are needed. If the capability is adequate for the deployment mission, it will be more than adequate for the logistics support mission.

Q ***How does this need for more airlift translate into aircraft? What are the general categories of aircraft required, and how close are we to getting these aircraft?***

A There certainly is a need for more transport aircraft, but it is not so much a question of more as it is better aircraft. Our current fleet, composed of C-54's, C-97's, C-124's, and others, is expensive to operate. The new generation of transport aircraft holds promise of better aircraft. They are faster, can carry greater loads, and can do more work. They have more economical engines and are more easily and rapidly loaded and unloaded.

The C-133, which should be available in 1957, promises to

be a much better aircraft for the transocean mission. This aircraft will be able to overfly most en route staging bases and should be economical to operate.

The C-130 aircraft is in production and should be an excellent aircraft for use within theaters of operation.

We must admit that there still is not any aircraft to meet the light haul mission into isolated areas, but development of such an aircraft is under way.

Q ***In planning these new transport aircraft, what has been the order of priority among the old criteria of range, speed, and payload?***

A The criteria of range, speed, and payload are always considered simultaneously, but the order of priority varies with the mission to be performed. In the case of the transocean aircraft, range was given first priority in order to reduce our dependency on the use of en route bases.

In the design of a transport for support of isolated units, short-field landing characteristics on hastily prepared landing strips is an added criterion.

Loadability features, with emphasis on rapid, easy loading and unloading, are given priority in the design of all our new cargo transports.

Q ***Has the planning for a new family of air transports come up with any new answers to the old problem of the multiple missions assigned to transport aircraft? Are they still expected to be able to transport a tremendous variety of shapes and densities of cargo?***

A We have not necessarily come up with new answers but have attached new values to some answers because of changed conditions, particularly for transocean aircraft. In transocean traffic we know that cargo cannot be economically and efficiently carried in passenger-type aircraft or aircraft laden down with air-drop and pressurization equipment. We know also that cargo aircraft are not efficient for transporting people. In other words logistics aircraft cannot be compromised by multiple-purpose design criteria and still produce the efficiency and economy desired.

Multiple-mission transport aircraft are satisfactory for use within the theater of operations, where the mission is more varied and payload presents less of a problem. Cargo transports will still be required to haul a variety of shapes and densities of cargo.

Q ***Is the build-up of air transport capability the only angle of attack on the problem of producing a faster and more flexible logistics system?***

A No, as I indicated earlier, increased transportation speed alone is not the only factor affecting our over-all logistics picture. By combining speed in transport of critical items with accuracy of forecasting and inventory, we can achieve a higher degree of dependability in the flow of our supplies. With such dependabilities the need for huge reserve stockpiles at overseas depots will be greatly reduced. Depot requirements can then be reduced. At the same time supply support could be kept more closely aligned with the requirements of our combat forces.

Q ***What will be the role of the Civil Reserve Air Fleet if the Air Force develops a larger air transport capability in-being?***

A The Civil Reserve Air Fleet will continue to play an important role in our future plans. The Civil Reserve Air Fleet and the military fleet are not competitive but complementary. CRAF capability is carefully considered in the development of the military fleet and in developing the capability to meet our wartime needs. The CRAF contribution at present is primarily in passenger lift. Therefore the USAF is concentrating on cargo transports. As the civilian industry's cargo capability increases, an attempt will be made to integrate this capability into CRAF in lieu of further expansion of the military fleet.

Department of the Air Force

A New Equation for Jet-Age Logistics

Electronics Steps Up Air Supply

General E. W. Rawlings

AIRLIFT + automation = fast and flexible air logistics. That is the new equation which is at last emerging from our efforts of the past decade to create a global logistics system geared to the speeds of modern air weapons and to the strategy of the jet-atomic age.

Very briefly defined, the air logistical problem boils down to this: logistical flexibility is the capacity for supporting military forces at the same speed with which they can be employed tactically or strategically. In surface warfare of other times the foot soldier and the cavalry lived to a great extent off the land through which they moved, carrying their munitions with them. More recently, as in World War II, military forces were supplied from pre-positioned stockpiles that were built up at strategic points as close as possible to areas of operations. Great increases in the variety and amount of equipment and in the geographical scope of operations made logistics extremely complex, but on the whole surface logistics was not too far out of step with the speed of surface tactics.

The same was not true for the air war. By the end of World War II it was obvious that the existing system of surface logistics imposed crippling restrictions upon air power's inherent mobility. In the American Revolution the average speed of supply to American troops had been about 1 1/3 miles per hour. As World War II ended, an average of 106 days was required for delivery of an item requisitioned by forces in Germany. The average speed of supply was about 3½ miles per hour. In the air the jet engine had made its debut. We were on the verge of a striking power that could be thrown against an enemy at speeds faster than that of sound. Yet we could sustain and support it only at a tortoise

crawl. Moreover the costliness of the new air materiel now outlawed extensive stockpiling as a compromise. It was painfully apparent that we *must* find a new formula for air logistics or face the permanent hamstringing of our air potential.

Airlift has become a vital element of that formula. Its importance cannot be overemphasized, and we have worked persistently to make it a practical reality. It is possible, however, that our very stress upon airlift may have tended to create the impression in the general understanding that it is our only approach to accelerated jet-age logistics. That is not the whole truth or a true perspective. Actually, while we have been developing and refining the concept of airlift, a new prime-moving force has taken shape which immensely broadens the picture and offers innumerable new angles of attack on the problem of flexibility.

This article is an appraisal and a progress report on that new force, that second element of the equation, *automation,* and its impact upon Air Force logistics. Like airlift, automation, in its complete, fully integrated sense, is not with us yet. We have only the first few, isolated pieces of the big jigsaw puzzle that fitted together will become the new jet-age logistics. But if we are to see the shape of the future in true perspective and grasp its full possibilities, the time for appraisal and planning is *now.*

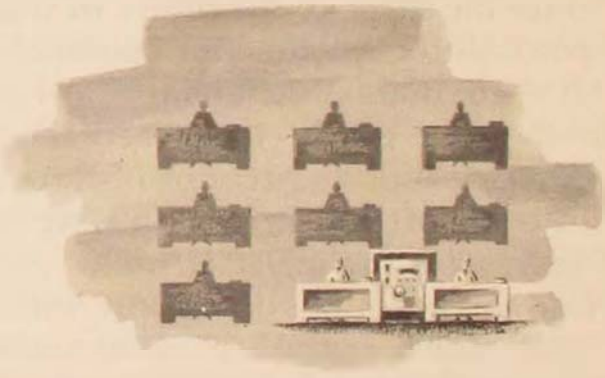
It is not unusual for about 80 per cent of our present support cycle—the time which elapses between requisition of supplies by an operating unit and receipt of those supplies—to be consumed not in transport but in transmitting and processing paper-work and processing the materiel itself. Airlift can and does greatly increase the flexibility of support within that 20 per cent arc of the cycle which comprises actual transport time. But our best efforts at airlift are inevitably impeded by the great drag chute of paper-work and processing, infinitely complicated by the world-wide scope of our operations and the number and complexity of items of equipment required to keep a modern air force flying. Only in limited areas have we been able to reduce this drag—and then only by the use of manpower which we cannot afford across the board. Automation, systematically applied throughout the preponderant processing phases—permeating our communications, data processing, inventory control, materials handling—can galvanize the whole support cycle into new life.

It can do more than that. In revitalizing the roots of air logistics—the production of air weapons—it can eventually help to ensure a faster, cheaper, and more plentiful supply of the materiel that makes for victory.

Increase operational effectiveness

eliminate stockpiling by quickly focusing materiel on given area

Increase economy of operation



save in manpower

Increase depth of industrial potential

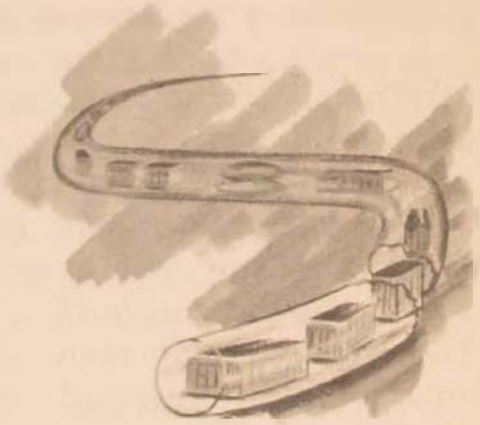
stabilize industrial planning

Automation

eliminate manpower bottleneck at critical moment of mobilization

provide stable, predictable expansion factor

save in unit cost of equipment



save in initial materiel investment (less units needed in shorter pipeline)

make industry more quickly responsive to emergency needs

THE term "automation" itself is not new. By simplest definition it is the substitution of machine energy for human energy, mental or physical. It is a concept as old as the water wheel, literally electrified and fused into a powerful new expression by advances in science and technology during and since World War II. The first industrial revolution, triggered by the development of steam power, resulted in men running machines for faster, cheaper mass production. Automation, which has been called "the second industrial revolution," is largely an outgrowth of the science of electronics. It ushers in an era of machines running machines, toward the goal of the completely automatic industrial operation.

In its full development automation has, of course, awesome possibilities for the betterment or disruption of our economic system. In industry both management and labor are studying it warily, but with increasing confidence that it can be constructively channeled for the common good. Our Air Force logistics mission is so closely linked to the nation's production potential, and our need for speed and economy is so great, that we also have a major stake in automation. It has great promise for us in three particular areas of logistical concern.

First—and of primary importance to our Air Force mission—*automation can greatly increase our operational effectiveness.* Logistics is the muscle of striking power, as strategy is the brain. The effective application of air power on a global scale poses innumerable problems of support. The high cost and rapid rate of obsolescence of modern air materiel forbid, in the long alert ahead of us, the practice of world-wide stockpiling which carried us through the last war. For stockpiling we must substitute a flexible mobility that will allow us to focus quickly an effective stream of our limited materiel support upon any given area of operations.

Airlift alone cannot accomplish this. Proportionately it affects too small a segment of the whole support cycle. But if automation can substantially reduce the time required to send a requisition, process it, and get it on its way, then we shall have quickened the whole pulse of support. This speed-up of the reaction time between "need" and "have" is the essence of logistical effectiveness. We have already seen, on a limited scale, the proof that this can be done, that automation can reduce to hours processes that have formerly required months for completion.

Moreover automation can do much to ensure our continued

effectiveness when effectiveness is most crucial, at the moment of meeting the stresses of any future all-out mobilization. Manpower will always be one of our critical shortages in an emergency mobilization, our Achilles heel in any contest with the massed millions of the Communist complex. Even the maintenance of technological superiority—more men on more or on better machines—can pose a tight squeeze, as we discovered in World War II when we struggled continually to maintain the vital balance between the manpower allotted to the armed forces and that essential to defense production. In the rapid build-up after the Communist aggression in Korea, we at Air Materiel Command found manpower our greatest bottleneck. Even in that limited war, which drew upon only a comparatively small part of our national manpower pool, the time-lag of training and adapting the human work force was a major contributing factor to our sluggishness in mobilizing. In any future all-out mobilization we shall have no such margin to gather our forces.

By trimming the manpower variable to a minimum, automation can give us increased stability, a more reliable and accurately predictable expansion factor. It will allow us to concentrate available qualified manpower at the key directive points, throughout the Air Force logistical system and in industry. The machines, with minimum human intervention, can, if necessary, work 24 hours a day to give us the essential emergency output. In short they can constitute a tremendous stand-by force, a canned power pool far beyond any which the national economy could conceivably support in terms of manpower.

The second great promise of automation to our Air Force

Flexibility and speed in air logistics are not to be achieved with cargo aircraft alone—since enough airlift to transport all supplies by air is unlikely to be soon practical. And even if total airlift became available, it would not reduce total pipeline time by more than 20 per cent, the other 80 per cent being in the clutches of paper-work and of getting the supplies under way. The necessary drag of the transmittal of requirements, the processing of orders, the filling of orders, and the packaging of materiel offers a big-pay target for reduction. At the request of the Editors, General E. W. Rawlings, Commander, Air Materiel Command, reviews the progress made in reducing pipeline time through automation—the integrated replacement of hand operations and human direction by machine power operating in pattern with self-digested "instructions." Ranging from electronic computers that perform prodigious calculations at lightning speed to self-directing conveyor belts that lift the pulse-beat of huge depots, automation is already revolutionizing Air Force supply. In the next few years it promises even greater returns, as modern air logistics moves up to match the pace of the jet air age.

logistical mission is economy. If we are to sustain a ready striking force for the indefinite duration of the cold war, maximum economy is imperative. We must pare the cost of long-term airpower to a soundly supportable percentage of the national resources. Otherwise as a nation we shall make ourselves "insurance poor," sapping the very economic vitality which is essential to our continued freedom.

The saving in total manpower, an expensive and always strictly limited commodity in our operations, is self-evident. Since the beginning of the Air Force build-up we have provided for steadily expanding logistical responsibilities under fixed manpower ceilings. In fact Air Materiel Command's work force has been reduced within the last few years. If the multitude of purely repetitive tasks of the logistical system can be taken over largely by machines, we shall be able to use the manpower available to us at higher levels of skill, with a far better return for our investment in terms of per capita production. Substantially improved logistical production has become a necessity if we are to support more air power with proportionately fewer people.

We can also anticipate that the greatly increased volume of industrial production made possible by a similar optimum use of available industrial manpower will eventually reduce the unit cost of our equipment. Though the adjustments of the transition period may delay the full effect of this natural law of economics, it is an eventual certainty.

Actually, however, these possible economies are greatly overshadowed in our logistical mission by potential savings in the initial materiel investment. By speeding the entire support cycle, automation, once firmly and consistently established, will drastically cut the "length" of our support pipelines. This means great savings in the total amount, and consequently the cost, of materiel to fill those pipelines.

For the past several years, we have been conducting exhaustive studies and service tests on the airlift of spare engines, a prime, high-value item in our materiel inventories. By speeding up actual transport time in the supply cycle from 150 miles per day to 150 miles per hour, airlift can radically reduce total pipeline time, and, consequently, investment in pipeline stocks. We found, for instance, that when pipeline time was cut from 4½ to 3 months the number of engines needed for a given operation could be reduced by at least one third. When we are dealing with jet power plants, which in some instances cost as much as did an entire fighter aircraft of World War II, that kind of a reduction in re-

quirements is a very major economy. It has already allowed us to cut back substantially our program for procurement of new engines.

In this instance we also achieved the substantial elimination of the paper transmission and processing time by a system of forecasting and automatic shipment, made precise by means of serial number reporting. For the great mass of our other items, however, airlift constricts only the small arc of the support cycle that represents actual materiel flow, time in transport. If we consider the quadrupled opportunity for pipeline reductions offered in the much larger area of information flow—the area to which we can apply the stimulus of automation—the prospect of economy through automation is an urgent incentive to its full exploitation.

As a third expectation automation offers a greatly increased depth of defense, through a stabilized and infinitely more productive industrial potential. It can be, in essence, a kind of blood transfusion for the whole of industrial planning. Whatever makes American industry more productive, in turn gives our armed forces a broader and stronger backing, always provided, of course, that it is achieved within a national framework of economic and sociological health. By its very nature automation can also make our industrial defense arsenal much more quickly responsive to any future emergency mobilization, a cardinal consideration in view of the swift deadlines which would characterize the conflict.

Briefly and broadly those are the reasons why we consider the automation element of the new logistical equation to be of such importance. They are the thrust behind the progress which we have already made.

Our Air Force emphasis upon automation has differed, naturally, in some significant respects from the emerging pattern of its development in industry. Automation is so flexible that it means many things to many operations. The scope and mass of our logistics mission tend strongly to accent certain areas, such as those of data processing and communications, which would be germane only to the largest industrial operations. Therefore in surveying the present "state of the art" throughout our logistical system, I shall define automation as *we* see it, subdivided roughly into the five broad areas of operations in which the trend has already begun. These are (1) data processing, (2) communications, (3) inventory control, (4) materials handling, and (5) manufacturing methods.

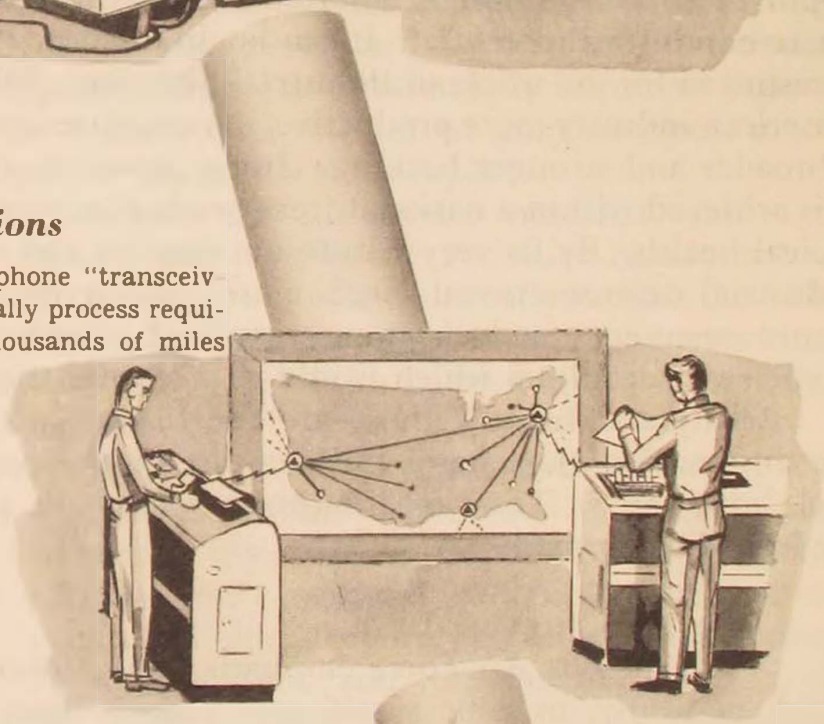
Application

data processing

UNIVAC provides errorless accounting of items of inventory and speedy solution of the tremendous calculations involved in present and future planning

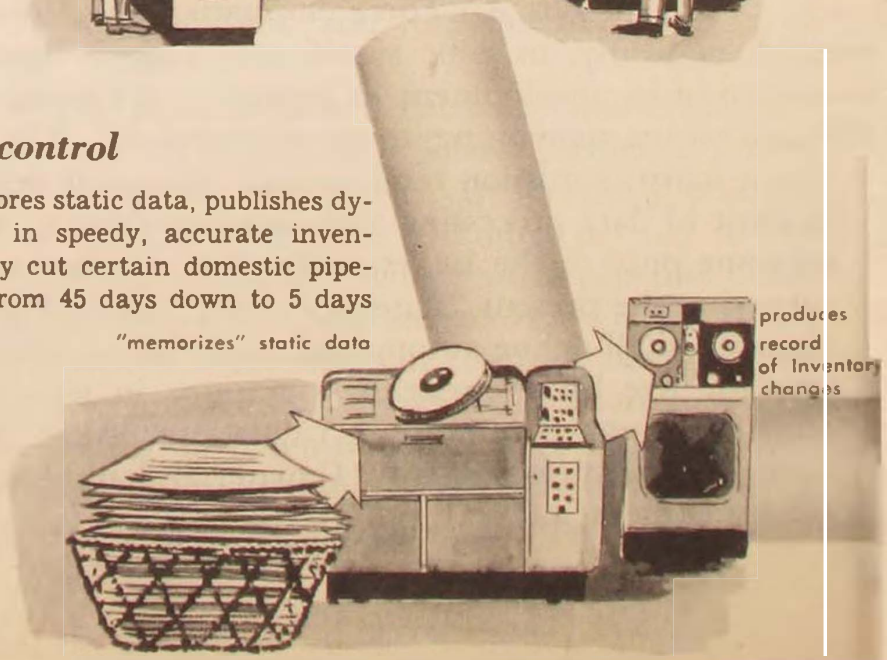
communications

radio and telephone "transceivers" electronically process requisitions over thousands of miles



inventory control

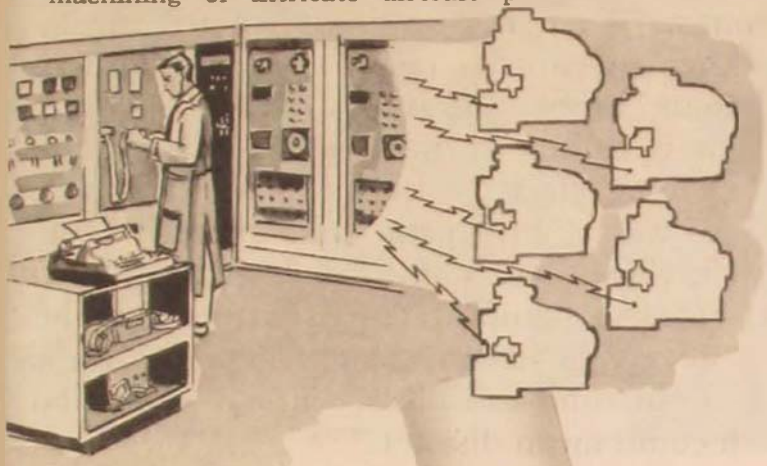
ELECOM stores static data, publishes dynamic data in speedy, accurate inventorying; may cut certain domestic pipeline times from 45 days down to 5 days



# of Automation

manufacturing methods

electronics numerically directs milling machines and other machine tools in the machining of intricate aircraft parts



materials handling

conveyor systems channel material automatically through all phases of receiving and shipping

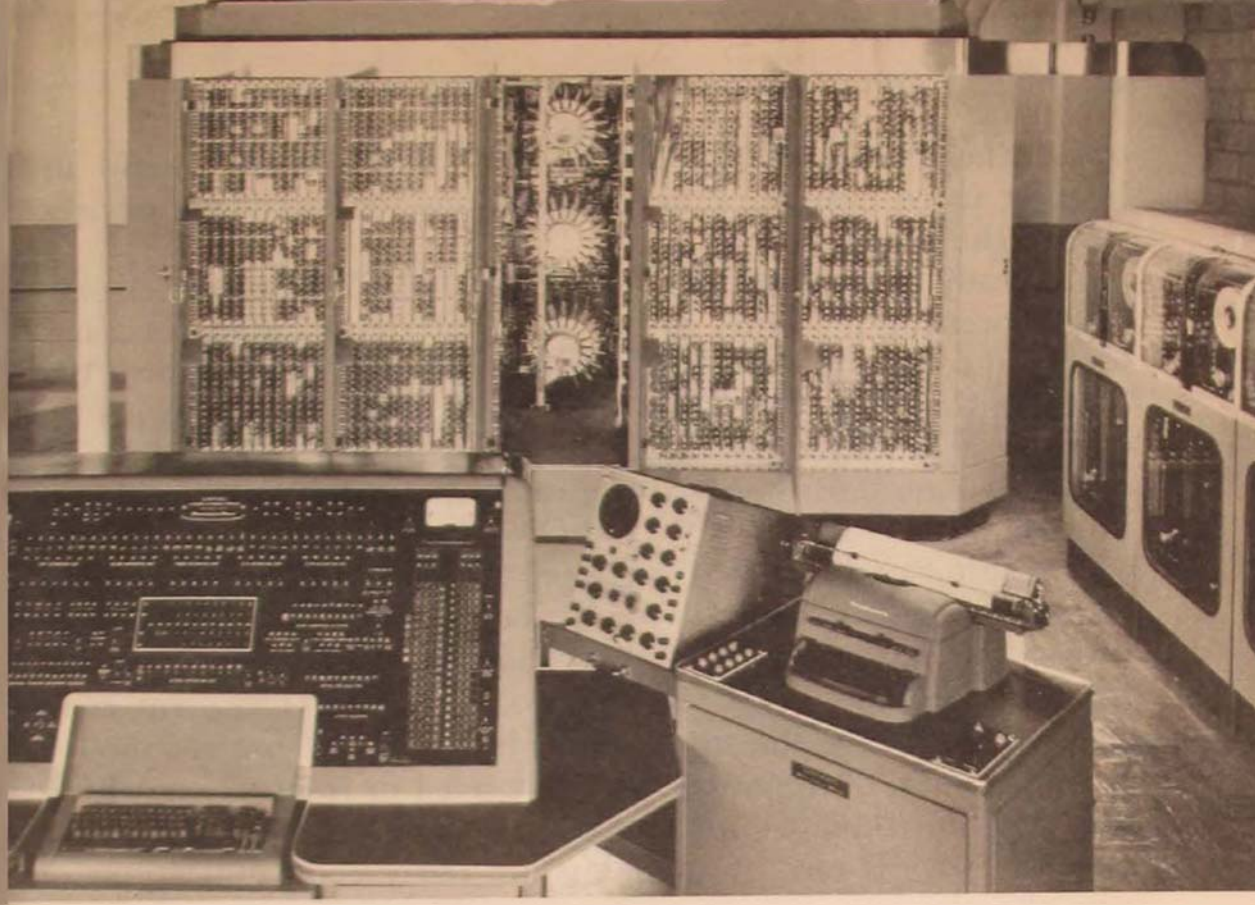
Data Processing

Accurate and rapid data processing is the cornerstone of sound logistics. It is the basis for determining how much of what equipment is needed to perform a given mission; how much money will be required to procure it; how soon and in what quantities it will have to be replaced. In addition, when this equipment is so bulky or complex that it taxes available production facilities, advance long-term planning is essential to ensure that it can be procured at all. Air Force inventories include about a million and a quarter separate items, supplied to bases all over the world. Much of this equipment is constantly undergoing modification and improvement, a fact that affects its normal life expectancy, as do shifts in usage rates within any operational theater. Keeping the shelves stocked involves a veritable flood of data which must be sorted and reduced to significant totals with maximum speed and accuracy, if we are to have the right amount of the right equipment at the right time and place, without waste and without the delay which could mean disaster.

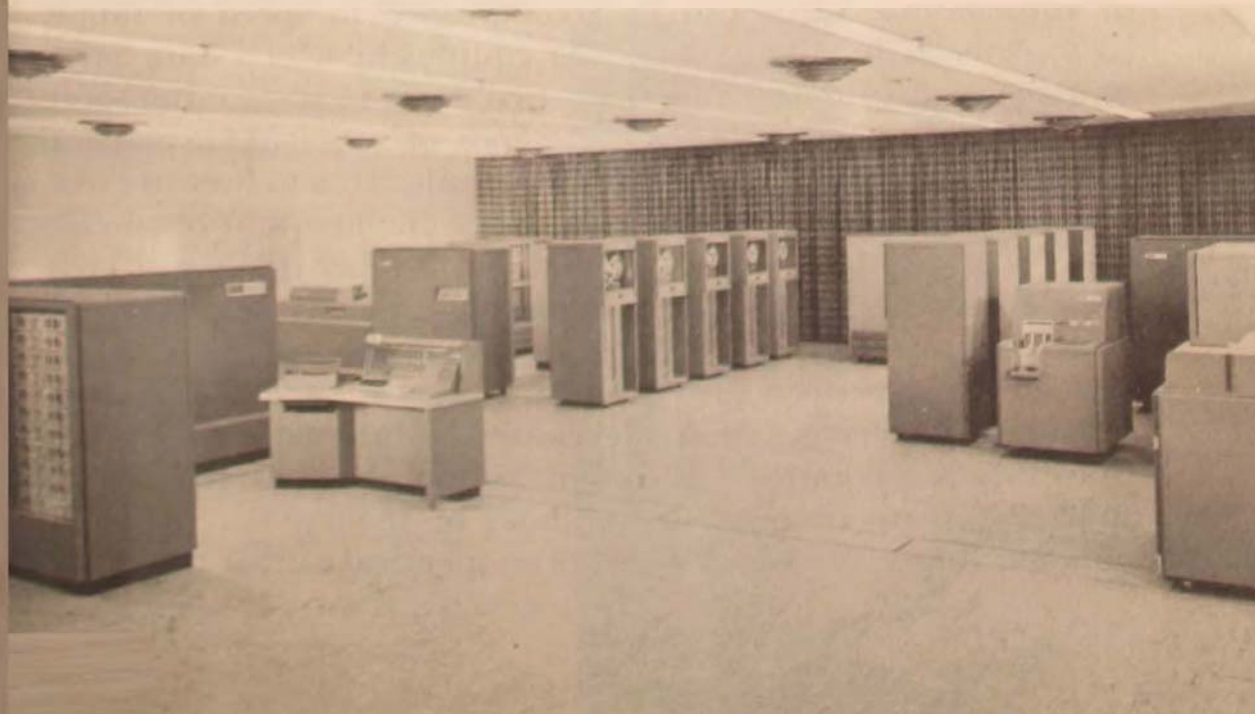
Electronic data-processing equipment gives every promise of yielding the solution. We now have installed at Headquarters, Air Materiel Command, Remington Rand's room-size electronic system known as UNIVAC. It follows taped instructions, adds, multiplies, divides, sorts, remembers, and reports results with lightning speed. It can perform long sequences of operations without human intervention, accomplish in minutes work which would require weeks of human computations. It is self-checking and cannot make a mistake—because the moment its dual, simultaneous processings do not agree, the system stops and waits for the indigestible error to be removed.

We are just beginning to exploit the infinite possibilities of UNIVAC. Typical complexes of data processing now being explored for application of UNIVAC are logistics budget computations, including a major portion of the Fiscal Year 1957 logistics financial plan, analysis of technical failure, engine management, air logistics transport schedules, flying hours and aircraft inventory factors, government-furnished aircraft equipment allocations, and several problems associated with industrial planning.

UNIVAC is proving itself a fundamental management tool in its adaptability to a variety of problems which seems to be limited only by our facility in isolating and expressing them to the machine. It is already improving our ability to reflect rapid changes in Air Force programs and inventory balances and to plan more accurately for future support. It is, in a sense, the axis



The USAF supply system covers an inventory of a million and a quarter items, but Air Force bases around the globe must be fed without the waste and delay that invites disaster in the jet-atomic age. This vast dispersion of materiel involves a flood of data that must be sorted and reduced to significant totals rapidly and accurately. Remington Rand's UNIVAC (above) and the International Business Machine 702 computer (below) help bring data processing in step with air operations. Following taped instructions, these room-sized computers add, multiply, sort, remember, and report results with lightning speed. Both UNIVAC and IBM 702 work computations in minutes that would require weeks of human effort—and without human error. Yet this equipment is soon to be outstripped in performance. Successors to UNIVAC and IBM's 702 will double the present speed and accuracy.



of our beginnings in automation and is consistently useful in helping us to evaluate other applications for electronic devices within the system.

We are now concluding plans to use IBM Type 650 electronic data-processing machines in our Air Materiel areas, depots, and logistical control groups, the filter points for overseas supply. We estimate that in key spots the electronic systems will give us an emergency potential for expanding operations to four times the present volume, with only a very small increase in personnel and other equipment.

The data-processing equipment in use at this time or projected for the immediate future is actually only a threshold approach to what will be available before long. Remington Rand, for instance, has recently announced UNIVAC II, a giant computer with double the speed and capacity of the present model. A similar ratio of improvement is expected in International Business Machine's 705 computer, due out soon as a successor to the current 702. These developments are fairly good indications of one characteristic feature of automation which augurs well for progress. You don't have to push it; it pushes you. The main problem at this point is to set a course that will make the most of its built-in momentum.

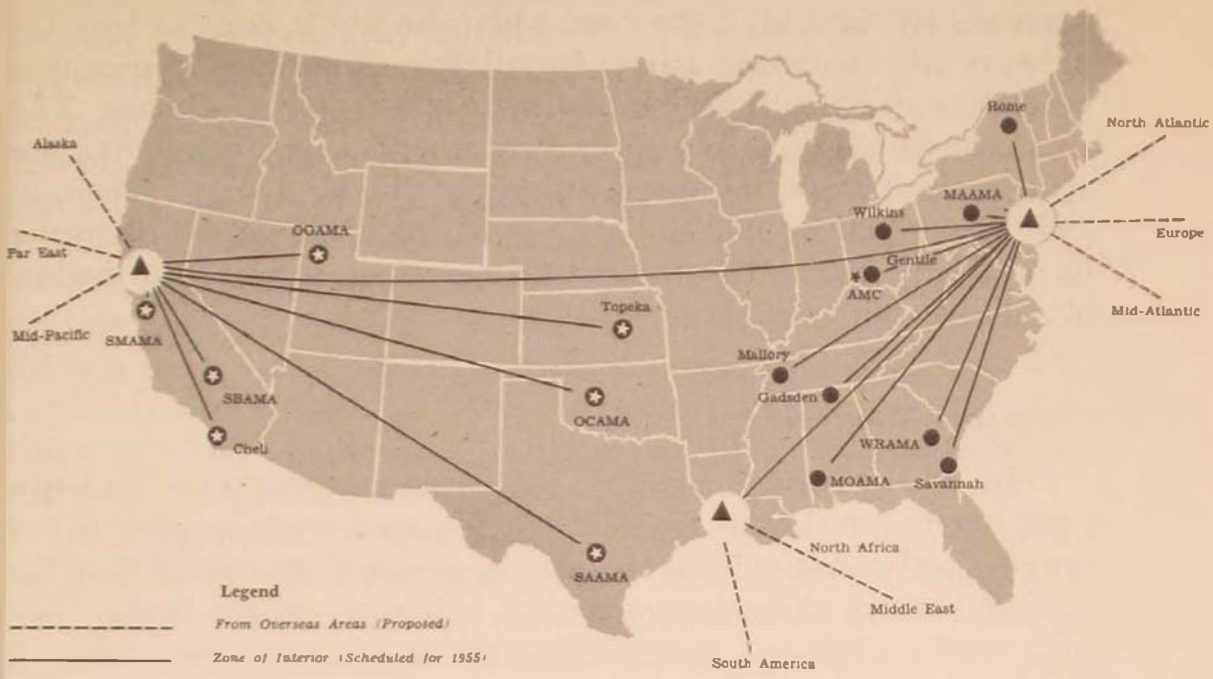
Communications

In the field of communications, automation is by no means new. The automatic dial telephone and the wire photo service are two of a number of long-established examples. Communications offer a natural area for further extension of the principles of automation. Little can be accomplished in speed of supply or pipeline reduction by airlifting equipment which must originally be requisitioned by methods tied down to surface transport. On the other hand faster oral methods of requisition, practical only in an emergency, are particularly vulnerable to human error.

In March of this year we established the first unit of an electronic communications system that by October 1955 will completely link our coast-to-coast supply network. By next year it is scheduled to extend to overseas installations.

Heart of this system is the "transceiver," a desk-size transmitting and receiving device developed by International Business Machines Corporation. Electronic impulses from coded card impressions are transmitted hundreds or thousands of miles to another transceiver, which punches an identical card at the receiv-

USAF Logistics Transceiver Network



In a logistics operation as enormous as that conducted by the USAF, the preparation and transmittal of supply requisitions for specific items out of the 1,250,000 items in the Air Force inventory have been a time-consuming process. Standard methods of processing requisitions manually and transmitting them by mail or teletype inevitably added days to pipeline time and offered many chances for human error. Communications automation can substantially reduce supply time. As long as requisition paper-work is processed manually, airlifting of supplies can only trim total pipeline time. In March 1955 Air Materiel Command installed the first unit of an electronic communications network that by October will link together AMC's ZI supply system (above) and by 1956 will extend to overseas installations. Heart of the system is the "transceiver" (right) that transmits impulses from coded cards over vast distances to another transceiver that punches an identical card at the receiving end. The system is expected to cut ZI pipeline time by 10 to 20 per cent.

ing end. Within the United States transceivers will be connected by leased telephone lines. Overseas installations will have radio connections. A cut of from 10 to 20 per cent in pipeline time is expected by the end of the year, when the whole Zone of Interior network will be in operation. Installation of overseas transceivers will effect another 10 per cent cut, at a conservative estimate. The resultant savings in inventory investment alone through more accurate and responsive requisitioning will be a very high multiple of the half million dollars a year which the system is costing us on a lease basis. In communications there remains no shadow of a doubt that automation will pay its way handsomely.

Inventory Control

Inventory control is always the potential quagmire of a logistical system. It is the area in which paper-work sprouts like a fungus, and constant re-evaluation is essential to ensure that the cost of control does not outweigh inventory value itself. The continually shifting, multi-billion-dollar global inventories of the Air Force pose an almost unique problem in this respect. We cannot safely trim provisioning to the most economical minimums unless our stocks are completely and immediately at our command at all times. Yet by present manual or punched-card methods the paper-work essential to keeping track of our inventories in itself so impedes and slows the requisition cycle that it tends to accumulate excess inventories as a necessary margin of safety. Also, the more ponderous the machinery of control becomes, the less accurate and timely is its reflection of the data which influence management decisions concerning requirements, distribution, transportation, packaging, and handling. It is a vicious circle, from which we believe the data-processing systems may help to extricate us.

One of the first of our applications of automation to the inventory-control problem is Underwood's ELECOM 125, a general-purpose electronic computing system scheduled for installation in June of this year. It will be installed at Mallory Air Force Depot in Memphis, Tennessee, world-wide supply center for antifriction bearings and a number of other property classes.

ELECOM is an experiment in an integrated and consolidated control system, a kind of master switch in which the various threads of inventory control are drawn together into an automatically functioning nerve center. The whole paper-work cycle of filling a requisition from depot stocks can be accomplished by

ELECOM in about one second. All filing is handled on magnetic tapes, at a tremendous saving in record storage space, always a major problem in the handling of mass data. Moreover all static data stay in the machine, and only the dynamic data come out as paper-work. As a large percentage of our present paper-work is made up of static data ("no change from last report"), the basic clerical workload is greatly reduced. One manufacturer has estimated that the incidence of error in this type of equipment is about once in five billion operations.

We expect the system in full operation to reduce domestic pipeline time of low-value equipment in the supply classes to which it is applied from the present 45 days to 5 days. Coupled with air transport for high-value materiel, it can cut pipeline time within the Zone of Interior to a single day. The overseas pipeline will show comparable shrinkage.

A computer of generally similar capabilities, the IBM 702, will also be installed this year at our large depot in Oklahoma City. We anticipate eventual electronic systems at all our fifteen major depots. These first installations are, of course, research pilot projects intended to parallel and "look over the shoulder" of the current supply systems until the reliability of the equipment has been proved and our people have learned to apply it with full effectiveness.

Materials Handling

Carrying true electronic automation through from the paper-processing phases of supply to materials-handling functions still remains a major problem for the future. The big computers can sort, memorize, and act upon data, but they are lacking in the physical senses which perceive the differing properties of matter. One of their most ardent proponents has admitted, for instance, that they will probably never be able to pick cotton.

However, we have been able to accomplish a great deal on the level of mechanical automation—with some electronic "boosters"—in the materials-handling field. Many of our major depots now have—and all will eventually have—specially designed conveyor systems which channel material automatically from the commercial carrier through the various procedures of receipt, vouchering, sorting, inspection, processing for storage, and delivery to the storage area. The systems, of course, provide the complete return trip for material being issued from stock, through packing, banding, marking, and weighing and, finally, to shipping.

The layouts include all types of powered and nonpowered conveyors, including chain conveyor systems with which a series of wheeled trucks can be hooked onto a moving sunken chain, unhooked at destination, and rolled to the storage shelves on processing units without further intermediate handling.

At many points along the closed circuit of the conveyors, machines add speed and accuracy to the operation. Electronically timed units to push off materials into predetermined receiving bays speed the initial sorting job. An automatic box-lid-removing saw drastically cuts uncrating time and preserves for repeated reuse costly containers which formerly were salvaged only as used lumber. Automatic canning machines in the unit pack areas provide rapid protective packaging, especially vital for delicate electronic parts and instruments subject to shock damage and corrosion. We are now investigating an electronic method of photographically transferring shipping ticket details to shipping containers, aimed at greatly increasing accuracy and reducing the time required for such identification markings.

The conveyor system at our Ogden Air Materiel Area Depot, one of the first installed, has now been in operation more than 18 months. Our records—based on a comparison of actual man-hour costs per ton of materiel handled during the last year of the old system and the first year of the new one—are ample proof of the results which can be attained through even this necessarily limited approach to automation. Man-hours per ton dropped from 1.93 to 1.49. Total savings for the first year of operation in shipping and receiving, processing, inspection, research, and packing were $1,003,916. Savings in the first nine months completely amortized the cost of installation. By normal industrial standards such an investment would have been a sound one if the system could be amortized within the first two to ten years of operation. But automation has quickened both the pace and the pay-off of progress.

Manufacturing Methods

In the fifth and final area of automation, manufacturing methods, we are, in a sense, silent but very active and vitally interested partners. We manufacture none of our own equipment, but it is of crucial importance to us that industry be able to produce superior weapons in sufficient quantity for our needs at prices within our budget limitations. Where such a great bulk of highly specialized equipment as we require is concerned, this

Computers can substitute for human mental energy but they cannot physically store, pack, mark, and issue stock. Mechanical automation is needed to speed up materials handling. All major Air Force depots will be equipped with towveyors (above). Their sunken chains move endlessly, pulling wheeled trucks that are hooked onto the chain, unhooked at destination, and rolled to storage shelves or outgoing processing units without intermediate handling. At points along the conveyor machines add speed and accuracy. Electronic units select and hasten the initial sorting, automatic saws open crates, and canning machines provide for rapid packaging.

is never a simple matter of off-the-shelf procurement. We must help to create the necessary industrial capacity by lending assistance with facilities, financial backing, materials, machine tools, and advance industrial planning which will help to ensure industry's ability to deliver the goods. The investigation and sponsorship of promising new manufacturing methods is one aspect of this responsibility.

It was inevitable that we should become interested in industrial automation in its earliest phases. Back in 1948 and 1949 we were studying and developing machine-tool requirements for the heavy-press program. In connection with this work we financed a contract for the design and construction of a numerically controlled milling machine. The Servomechanisms Laboratory at Massachusetts Institute of Technology designed the machine system and completed it in March of 1952. It was a pioneering step

in industrial automation, since used experimentally in many applications. Electronically directed by means of punched tapes, the machine can sink dies, make templates, machine large structural parts of airframes, finish forgings, contour complex three-dimensional parts, finish castings, etc. The control system can direct more than one milling machine or any number of other machine tools in completely automatic operation.

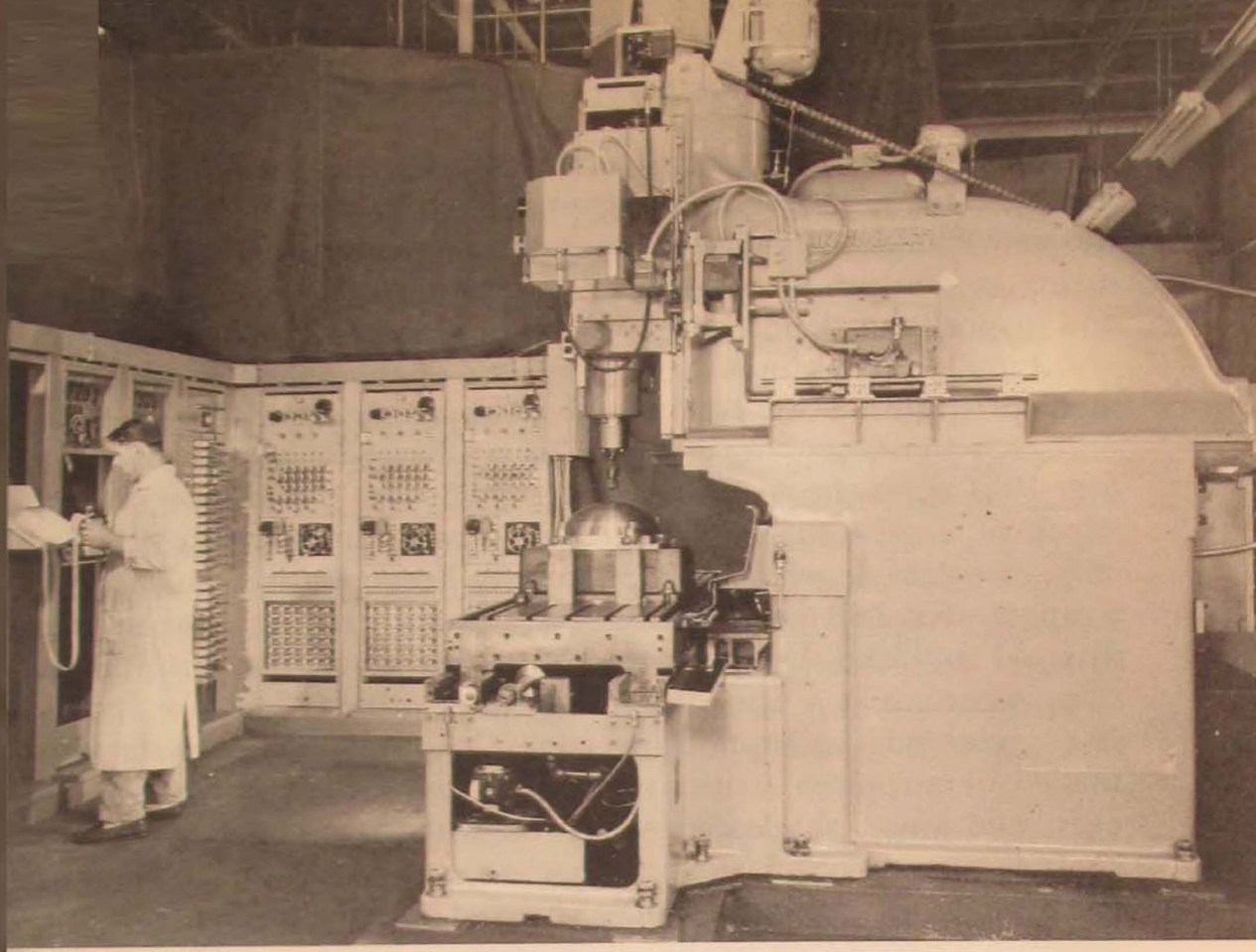
Production machines now under development by the aircraft and machine-tool industries, with controls based on derivations of the MIT system, should save a substantial amount of tooling dollars and considerably cut lead time on the manufacture of aircraft parts. It is estimated that on some parts they will eliminate as much as 85 per cent of the time now spent. Moreover they will open the way to rapid expansibility of production in the event of mobilization and provide a large degree of built-in quality control. The systems foreshadow a new era in aircraft production methods, a prospect of deep significance to air logistics.

Those are a few of our approaches to automation in five major areas where its impact is unmistakable and the advantages that it has to offer are already clearly evident, even in this embryonic stage.

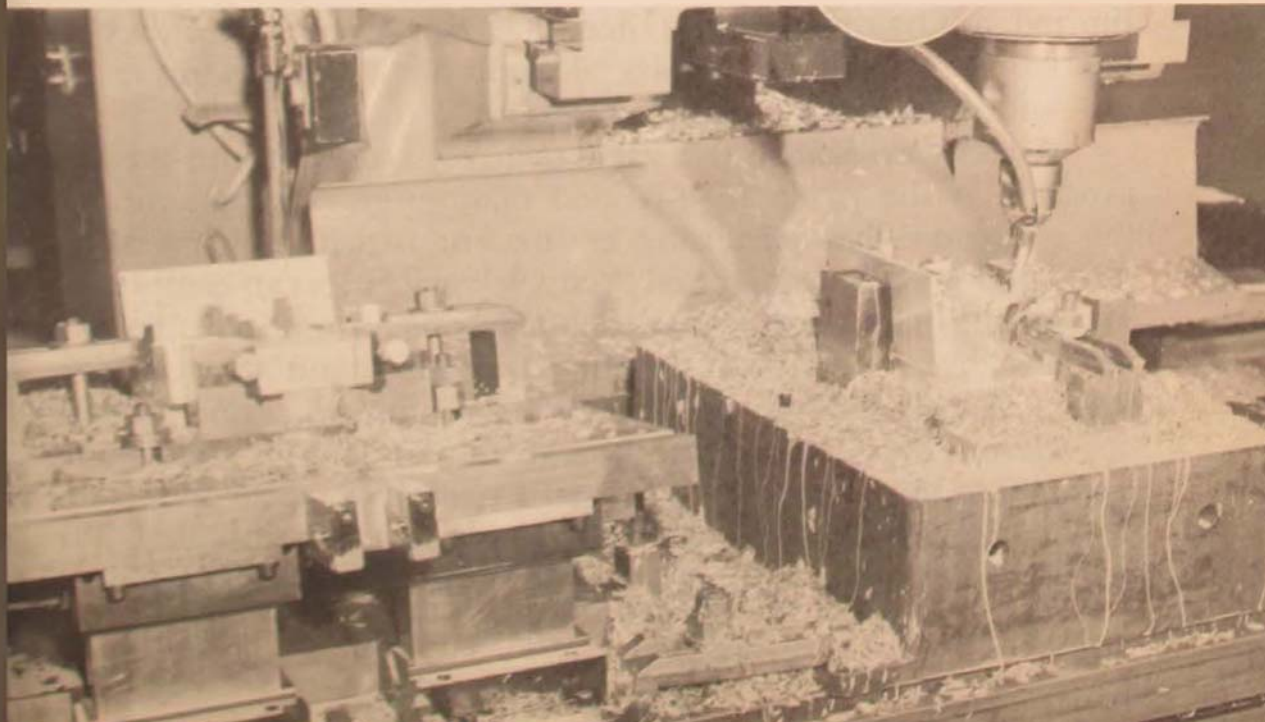
At first we took automation as it came, developing it more or less independently in each area as the opportunity offered. However, automation is an absolute. A little of it is not practically effective. Applied in patchwork fashion, its power is diffused and dissipated. Complete systems must be automatized and synchronized if the whole tempo of output is to be accelerated. Obviously an isolated automatized machine or subsystem, dependent for input upon a long series of manual or nonautomatic operations, can do little to speed the entire cycle, which will be governed by its slowest common denominator.

We realized, therefore, that we would have to plan for integrated automation. Our first step has been a detailed outline plan completed early this year for modernizing USAF logistics utilizing electronic data processing.

The study presents in considerable detail a three-to-five-year plan for automation in the Air Force logistical-data flow system, what the system should be by 1960, and how the transition can be accomplished. It sets forth the organizational structures and procedures best adapted to optimum utilization of automatic



Highly specialized and varied Air Force equipment can not be purchased off the shelf. Yet manufacturing costs have to be held down, and emergency-quantity production made quickly possible. Production-line costs are lowered and manufacturing change-overs speeded by such recent advances in industrial automation as the numerically controlled machine tool, shown above with the electronic director (left) and the milling machine (right). Directed solely by punched tapes, this tool can sink dies, make templates, machine large structural parts of airframes, and perform a variety of other jobs to minute tolerances. The intricate control system can direct more than one milling machine (below) or numbers of other machine tools.



systems and the steps toward achieving the goal, from acquiring the basic tools, through testing phases, to full-scale operation of the new system. It analyzes progress to date and specific requirements in equipment, personnel, communications, and facilities; and it spotlights definite areas requiring further exhaustive study.

Finally it examines the dollar sense of the projected development program. Total cost would be approximately 42½ million dollars, a big figure until placed in perspective. In the calendar year 1954 alone the Air Force disposed of some 575 million dollars worth of surplus material, much of it equipment which had become obsolete or which had previously been required to support weapons that had become obsolete. Under existing systems this disposal could not be considered waste any more than hospitalization insurance is a waste in a year when illness does not strike. It represented the support necessary in our logistical system to make our airpower a sustained reality in war. It is large, however, and since obsolescence will be with us as long as we are keeping abreast of advancing air science, we must of course keep surpluses to a minimum. The projected electronic data-handling program, besides radically shortening pipelines, will greatly increase our precision in developing requirements for Air Force support. If it could effect just a 10 per cent saving in the initial capital investment in inventories—and this is a conservative expectation by present indications—it would more than compensate for the entire cost of the three-to-five-year program.

Optimistic as we are concerning the tremendous potentialities of automation in the new logistical equation, we have already become sharply aware of its problems. The ultimate use which we can make of it and the speed with which we can progress are limited, not by the machines themselves nor even by the inflexible restriction of available dollars. Manpower is the governing factor—and the human thought process.

Already evident in this early stage of transition into the new program is the pinch in qualified manpower. Programming of the electronic data-processing equipment is a highly specialized skill. Not even these so-called "miracle" machines can compensate for human inaccuracy or inadequacy in operating them. To date we have been largely dependent upon the manufacturers from whom we lease the systems for training of our own people in their operation. This summer the Bureau of Standards is establishing facilities in the nature of a peripatetic school for on-the-spot training at the depots where the systems are actually installed. Primarily this training is intended for top and middle management.

However, detailed training in operation will be given by special instructors attached to each of the groups. We must not only educate our people to handle the equipment themselves but must also ensure that they are capable of training others in their turn, if we are to accomplish the major shift in skills required for the transition to automation.

A problem far more difficult of solution, even given time, is that of teaching ourselves to "rethink" the whole logistical job. Automation is not just a newer, faster method of following old procedures. It is a radically new approach to the solution of the classic problems of logistics. It cuts across methodology which is deeply entrenched, sanctified by tradition and usage. Changing our way of doing a specific thing is comparatively easy. But to free our minds of the encrustations of habit and force ourselves into the lonely and uncharted territory of whole new patterns of thought is the supreme challenge.

The English have an old adage: "The tools to him who can handle them." Vision and bold originality of conception alone can realize the full potential of automation. These will be slower growths than any immediate programming or operating skills which can be taught. They are the master elements which cannot be built into the machines. We must develop them within ourselves.

The equation is clear before us today. Two tools are at hand—airlift and automation—which, combined, can give us the first truly flexible logistics for an air age. It remains for us now to prove that we can handle them.

Headquarters Air Materiel Command

Loyalty

The Military Touchstone

Brigadier General Cecil E. Combs

SOME people assume that the versatility and effectiveness of modern machines have reduced the importance of the individual in warfare. The opposite is true, particularly in today's Air Force. When technical equipments enable one man to do what was formerly the work of many men, the responsibility which once fell on the leader of many men then rests on the shoulders of the one man who controls the machine. The destructive force of a large flight of heavy bombers in World War II was entrusted only to a senior, proven commander. Nowadays an even greater force may be put in the hands of a single crew or a single individual who becomes ultimately responsible for the disposition of this force. In short, the greater the complexity of the machine and the greater the military value of the weapon, the greater the responsible leadership required of the individual officer.

Consider the nature of the responsibility which the individual officer will have to assume in a combat role in the future. One young officer alone and unsupervised may be responsible for executing an extremely difficult and hazardous mission which may destroy a vital segment of an enemy's strength. One officer may have the responsibility for stopping an enemy aircraft which is capable of wrecking one of our cities. The rated officers of the Air Force must be men to whom responsibilities such as these can be entrusted with complete confidence.

Just what are the qualities in a man that enable us to give to him with confidence responsibilities such as these? The words duty, honor, country spring to mind. But what are the qualities in a man that make these terms meaningful? When we think of such men, we think of courage and endurance and integrity and all that is included in the term "leadership." These traits are somewhat descriptive of what we are trying to determine, but they do not add up to the whole man. The element of purposeful

meaning must be included. Courage for what? Endurance in what service? Integrity with respect to what ideals? What purpose in life must a man have that will permit these human qualities to appear before us in action as the performance of duty? For the answers to these questions we must look into the things officers live by and for. And it would seem logical that we should seek to identify these things within ourselves.

When we look within ourselves, we find what our experience has put there. We find the scars of our own past failures as well as monuments of worthy examples. One thing I think we all find—that we have neither the strength nor the will to live alone. We have need for a purpose; for a cause bigger than ourselves; something that requires us to take strenuous action if necessary, to face danger if necessary, against the opposition of instinctive impulses to avoid such discomfort or danger. We also find a need for some sort of measuring stick by which we can evaluate the multiple choices for decision and action which life puts in front of us.

Each of us making such an inquiry will come up with somewhat similar findings. When I look at the officers in the Air Force whom I know and respect, I feel sure that I can detect things they hold in common. One of these common denominators is this need of which I have been speaking. Those officers who command our instant and continuing respect are invariably those who, whatever their abilities in whatever position of responsibility, put their responsibility first and foremost in all that they do. This common attribute may best be described as loyalty. If I am right in this assumption, these men have shared the common human experience of needing a goal in life and have found that goal in their loyalty to the cause they serve—a loyalty that serves them both as an incentive and as a guide, and sometimes as a very hard taskmaster.

Leadership is often regarded as the unique quality of a few gifted men who are sublimely self-sufficient in divining courses of action and who have astonishing power to inspire other men to follow them, even into the valley of Shadows. These traits may of course be conceded to rare genius. But how does a concept of rare genius serve the Air Force in its requirement for a broad base of thousands of first-class leaders who can step out maturely and competently in an atomic age that may suddenly visit even a junior officer with fateful responsibility? In a thoughtful appraisal, Brigadier General Cecil E. Combs, USAF, Deputy Commander of Crew Training Air Force, suggests a wellspring of leadership may be struck in the individual Air Force officer by intelligent inculcation of the ancient warrior's virtue of loyalty, shaped for today's world as loyalty to the collective responsibilities that are charged to the prime order of defenders of the homeland.

It is not surprising that we should instinctively focus our attention upon loyalty. Loyalty has always been considered a warrior's virtue. Throughout history a legion of men have been true to their colors and died for their causes, and some were pretty small causes, and many were lost causes. The one noble thing that shines forth from all the bloody pages of history is this capacity of man for loyalty. Perhaps this is proof enough that we are talking about one of man's greatest needs as well as one of his attributes of greatness.

If loyalty is a compelling human need, then our problem may, in part at least, be one of precisely defining the objective of our loyalty. The cause we seek must be tangible enough and concrete enough to be a specific guide for decision and for action. It must be a cause that we can comprehend, that we can make our own in a personal way, and to which our own personal contribution, however small, will be of some significance.

Do we not have such a common cause—we who have taken the Oath of Office as commissioned officers in the United States Air Force? In that Oath we swear faith and allegiance to a cause which does command our loyalty and our lives. Let us examine this cause for a moment. I believe that a study of the Constitution will show that it proceeds from several fundamental ideas. One is the conviction that man amounts to something as an individual, that the individual is good and can become better and stronger and wiser. It is a belief that this American people can build a nation that can endure and that can offer to each of its citizens an abundant life, personal liberty, and the fellowship of free men.

Despite the many changes in economic theory and in international relations, this marvelously flexible instrument still stands for the enduring ideals and aspirations of the American people. Perhaps some day these ideals will be those of a world federation of governments to which we can all give wholehearted support. That time is not yet. At the moment it seems clear we can serve humanity best only by serving our own country well. For these American ideas and ideals cannot be considered as accomplishments even here in America. They are goals that we Americans are still trying to achieve. They are difficult objectives which may never be achieved but which will certainly demand our best efforts and should command our entire devotion.

This cause has been well and truly served by loyal men throughout the history of our country. Such progress as we have made toward our goals can be attributed to the sacrifices and the

service of these loyal men. Today the country and particularly the Air Force has need of such men in greater numbers than ever before. To meet this need, we must direct our training toward the development of loyalty in its deepest sense. There are many obstacles to be overcome. Recent years have seen the growth of many things that are destructive of loyalty. Mere growth itself is such an obstacle. Communities of people can inspire loyalty, but if a community becomes so large that the identity of the individual is lost, then the common purpose will be weakened and loyalty will diminish. When family ties are weakened another source of strong loyalties is weakened. As a government grows in size and complexity, its capacity for attracting loyalty decreases. The result of all this is that many men have confused loyalties. Many are loyal to small or unworthy causes which are in conflict with those of other loyal men. Some people have taken refuge in denying all loyalties save their own self-interests.

The greatest obstacle of all seems to be the materialistic philosophy that has dominated the teaching of our young people. The average cadet entering preflight training has all too frequently been taught at home and in school that material prosperity is the only valid measure of success in life and that personal and financial security are the only worthwhile goals. These may be superficial attitudes but they take time to change. The first step seems to be one of inducing a searching criticism of such preconceived ideas. The next is to get a young man to think for himself. The practical aspects of a military career must be realistically presented. These cannot be evaded by philosophic generalities. An officer is entitled to a decent standard of living—a way of life which, while not offering luxury, does permit dignity and respect. Once this minimum is assured, it is possible to present the real challenge of the service.

We have still much to learn about the problem of developing in the young men who enter our officer-training programs a willing acceptance of these ideals of loyalty and service. Educational theory and methods have improved greatly in technical fields, and we have been able to adapt these methods directly to many training problems. In the field of character development there is no similar basis of organized experience available. As the Dean of the Harvard Graduate School of Education, Dr. Henry W. Holmes, said a few years ago, "In one vital field—education for character, through the development of the power of moral discrimination and an affirmative grasp of ideals—we have made

hardly a beginning." Recently Dr. John A. Hannah, in testifying for an Air academy before Congress, said that he had not earlier been in favor of an Air academy because he felt that the civilian colleges could meet the need, but that he had since become convinced that they cannot because they do not attempt to develop the ideal of devotion to the service of the country nor to develop the qualities of character and integrity required for that service. While this statement would seem to confirm our objectives, it does not imply that we can do what others have not attempted.

Here again it may be true that the difficulty of the problem should not be overestimated. It may be true that a clear understanding of our objectives will in itself shed light on the paths we must follow toward the goal. It is not that we are entirely lacking in precedent. The service academies and similar institutions have for a long time by traditional methods produced great leaders—not always many and not always soon but enough loyal men to lead us through the great emergencies. Effectiveness of traditional methods and of precedent would appear to be historically demonstrated. The problem is to keep tradition and precedent in tune with changing requirements and situations. This may in turn only require that we keep our objectives clearly in front of us and realistically in tune with the problem. Similarly our country must realistically face the challenge that democracy faces as a prerequisite to the job of producing men who can serve its cause without reservation. If our national purposes are clear, the emotional and intellectual appeal of the challenge of service to these ideals is equally clear. Then it becomes necessary merely to instruct in the need that the country has in order to find many who are willing to devote their lives to that need.

Fortunately most of us need to tie our loyalties not only to a cause but to an organization. Morally and intellectually our objectives may be clear, but practically and personally speaking we need a team to which we can belong. While our feelings toward the Constitution of the United States may be solemnly reverent, we love the Air Force.

Perhaps this intense identification with an organization is a human weakness. Certainly it is also a source of our strength. In the unit pride and *esprit de corps* of any good combat organization is to be found perhaps the greatest expression of human genius for loyalty. It may also be true that one reason we have so much difficulty in achieving interservice cooperation at the top is the fact that it is a rare individual who can ever place himself entirely above and beyond his organization. There is as yet no supraservice

in which all separate associations and loyalties can be combined. Similarly conflicts of loyalty occur even within services, as between major commands.

These conflicts of loyalties are a good thing in that they force us to consider larger purposes in a critical fashion. The cause we serve would not be loyally served if ours was a blind, unquestioning obedience. The great danger and tragedy of the Communist movement is the fact that it has become a perfect instrument for a fanatical and insensitive loyalty. Our loyalty requires that we be critical of ourselves, of one another, and of our service and country, while at the same time it must ensure a discipline based not on fear but on willing obedience derived from confidence in the moral integrity of our leaders and in the essential soundness of our cause.

I BELIEVE our objective of building a stronger loyalty can be accomplished by traditional means. I include in these traditional means the intellectual problem of establishing the need of the country for loyal officers. I include moral problems which can best be solved by the power of example. I include disciplinary training based on a man's pride in his powers, his unit, and his country. We cannot *make* officers in any training program. All we can do is present the challenge, point out those obstacles in the way that must be overcome, and give the help and guidance to the individual in overcoming them. In this way, and subject always to the power of example, the young men in this country who have the potential will make themselves into the officers the Air Force needs. This is a continuous process which does not stop when a man is commissioned a second lieutenant. This objective must be pursued steadfastly by all of us all the way through in the face of all manner of temptations and distractions which tend to divert us from our goal. We are all shot through with human imperfections and we shall all fall short of our highest ideals; but if in this loyal brotherhood we find helpful understanding, human sympathy, and affection, then the strong will help make the weakest of us stronger, and together we will find our powers multiplied many times over.

Finally there is needed the sympathetic understanding of the country at large. The profession of an officer of the Air Force must be recognized for what it actually is, a profession in which the officer is a man of honor and integrity who puts his loyalty

to the service of his country above all else. In his person he must exemplify American ideals. This means that the officer corps must deserve this reputation. It also means that the country must deserve the loyalty of the people who serve it. It is inconceivable that any democracy could survive whose existence depended on the devoted loyalty of a few while the many lived by other standards in pursuit of other aims. I for one am as confident that the officers of the Air Force can earn and hold the complete trust of the nation as I am that this nation will forever deserve their loyalty.

Headquarters Crew Training Air Force

Bomber Command of the Royal Air Force

Air Marshal Sir George H. Mills

BOMBER Command can trace an unbroken descent from the first strategic bombing attack ever made. That was 40 years ago, in September 1914. We have travelled a long road in those 40 years. It began with a small 80-horsepower Sopwith biplane and a bomb weighing 20 pounds aimed by eye from low level; it has led to the "V" bomber with the atom bomb aimed by radar from the stratosphere. Since no other bomber force can claim such distant descent, the story of our growth from those small beginnings provides a unique study of the evolution of strategic bombing and of the reasons behind it.

In 1914 the British Navy and Army each had its own flying Service, the Royal Naval Air Service and the Royal Flying Corps. When all the R.F.C. flew to France with the Expeditionary Force, the Admiralty took over the air defence of Great Britain in September 1914. The biggest threat then was from Zeppelin attacks. With characteristic breadth of outlook the Admiralty began a vigorous air offensive against any of the enemy's airships which could possibly be reached. This was in line with the long-established naval tradition of hitting the enemy as far away as possible—a tradition which dates from the time of Drake at least.

The first attempt was by four pilots on 22d September 1914. It failed because of bad weather in the target areas. But by the middle of 1915 a series of attacks had destroyed four airships in Germany and Belgium, and no more bases were maintained within range of these aggressive Naval pilots and their tiny aircraft. The campaign succeeded because hydrogen-filled Zeppelins were such vulnerable targets that small aeroplanes carrying small bombs

Aside from the United States only Great Britain has been able to build a modern strategic air arm in defense of the free world. Naturally the strategic, political, and economic considerations that shaped the Royal Air Force's Bomber Command differ considerably from those which molded our Strategic Air Command. At the request of the Editors of the *Quarterly Review*, Air Marshal Sir George H. Mills, Commanding-in-Chief, Bomber Command, reviews the significant developments in the history of Bomber Command from its birth in World War I to the present.

could inflict decisive damage. But success was not complete. Despite several attempts the rudimentary seaborne aircraft of those days could not deal with the bases in northwest Germany which were beyond the range of landplanes. So range won, and the Zeppelins continued their campaign until defeated over England by night-flying aeroplanes.

With the Zeppelins out of range and no other decisive targets offering, the Naval bombing forces switched to targets more directly connected with the war at sea and on land, submarine and other enemy naval bases on the Belgian coast inevitably taking much of the effort. Meanwhile the Admiralty pressed on with the development of greater range and better bomb loads. Others, too, began to see the potentialities of bombing. Twice in 1916 representatives of the Allied flying services agreed that the German bombing attacks ought to be matched by attacks on Germany herself. At first, although some aircraft with the necessary performance were available, they could not be spared from the Somme battles then about to start. But in October 1916 the British Admiralty and the French were both able to establish small bomber forces in the Nancy area of France, their primary targets being steel works in the Saar, the only part of the German homeland within range. Steel works were chosen because they were basic elements in German munitions production as a whole. Furthermore the British Admiralty had a particular interest in reducing the supply of steel for submarines because of the increasing severity of the U-boat campaign.

There is no doubt that the underlying motive behind these attacks was the feeling that the German homeland must be attacked. It was intolerable that the German people should go free while the Allied people were increasingly subjected to bombing, to say nothing of having so much of their territory occupied or ravaged by war. This phase was short lived and produced no tangible results, for the force had to be dispersed after a few months to play a more direct part in the great land battles which began in the spring of 1917. The period is notable for the introduction of the first true British bomber, the famous twin-engined biplane developed by Handley Page for the Admiralty and able to carry three-quarters of a ton of bombs.

In spite of these early setbacks 1917 was to be decisive in the development of British strategic bombing. The Germans, seeing that the aeroplane must replace the airship, produced the twin-engined Gotha early in 1917 and with it began a daylight bombing campaign against Great Britain in May. Beginning with

World War I was nearly three years old before Britain moved decisively to develop a strategic bombing force. Yet it was a British Sopwith Tabloid (top) that on 6 October 1914 made the world's first strategic bombing attack. An 80-horsepower biplane, the Sopwith dropped a 20-pound bomb that destroyed Zeppelin Z IX in its shed at Dusseldorf. The pilot crash-landed 20 miles from Antwerp, completed his journey on a borrowed bicycle. Britain's first true bomber was the twin-engine Handley Page 0/400 (right). It had a top speed of 97 mph and a one-ton payload. The 0/400 was deployed in 1917-18 against industrial targets and became the best known Allied heavy bomber. The RAF's first four-engine strategic bomber, the Handley Page V/1500 (bottom), carried a crew of six and a bomb-load of nearly four tons at a speed of 99 mph. It had a range of approximately 1300 miles. This Super-Handley Page was built in October 1918 specifically for bombing Berlin from England, but too few were completed in time to undertake the operation.

coastal towns, this campaign culminated in two famous attacks in June and July when formations of fourteen and twenty-one Gothas flew unmolested across London in broad daylight, causing severe casualties and damage. The outcry which followed really stirred the Government to action. The most important result was the eventual unification of the two flying services into the Royal Air Force, though this took some months to complete. More immediately the bombers in France were often diverted from the land battles to attack the Gotha airfields, and great efforts were made to strengthen the home defences with modern fighters in place of the obsolete types which had been good enough for the Zeppelins.

These purely defensive measures were not enough. The call for retaliation became insistent in Government circles. It became more so when the Germans switched to night attacks, against which there was no effective fighter defence at the time. The German attacks had by now become a serious nuisance; they were beginning to have some effect on munitions production and on morale, and could not be ignored. This naturally intensified discussion on the legality of bombing so-called open towns, and there is an interesting extract from a memorandum on the rules of war prepared for the War Cabinet at that time which reads:

> No legal duty has been imposed on attacking forces to restrict bombardment to actual fortifications, and the destruction of its public and private buildings has always been regarded as a legitimate means of inducing a town to surrender. . . .

Another factor which weighed heavily in favour of bombing Germany was the stalemate which had followed the great land battles of 1916 and 1917. This naturally predisposed the Government towards a plan which seemed to offer a chance of breaking the deadlock and of hastening the end of the war, while avoiding the tremendous slaughter of the previous two years.

Opposition came mainly from Field Marshal Haig, who argued that all possible air effort should go to supporting his forces in the field—a view that was natural and indeed perhaps inevitable. But the Government were determined that the bombing should go ahead, and in the autumn of 1917 General Trenchard, commanding the Royal Flying Corps in France, was told to organize a force to bomb German munitions factories. To do so, he formed a united wing of one Naval (Handley Page) and two Army (single-engined) squadrons, which he based in the Nancy area. This wing began operations against Germany in October 1917, and they continued with growing weight to the end of the war. By June

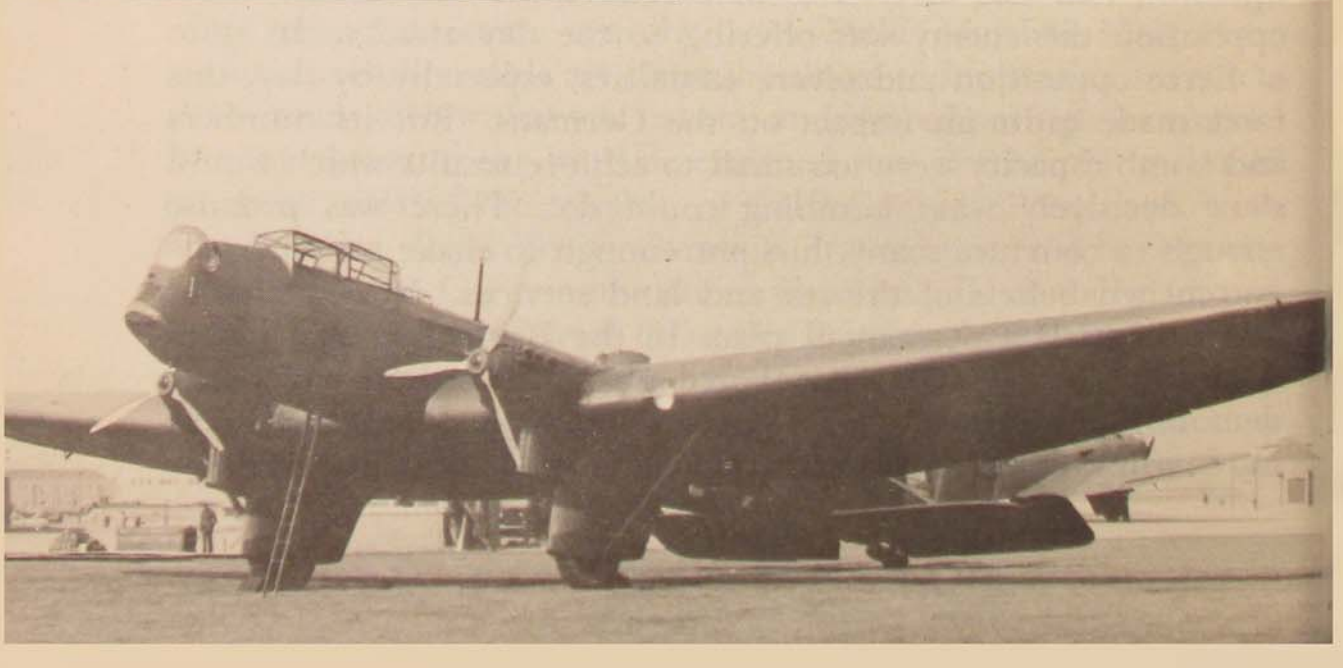
1918 the wing had become the British Independent Air Force, and negotiations were afoot to make it an Allied Independent Air Force by the inclusion of French, Italian, and United States squadrons. At the same time its importance was recognized by the appointment of General Trenchard himself as commander.

The relations of this independent force with Field Marshal Haig, and later with the Allied Generalissimo Marshal Foch, were never precisely defined. The British Government were insistent that the operations should be independent of the commanders controlling the land campaign in France, and these commanders were equally anxious that operations against Germany should not continue at the possible expense of the land campaign. The disagreement was often sharp, so much so that at one time the British considered the possibility of operating from the United Kingdom if the French airfields should be denied them. In any case the first of the new four-engined Handley Pages which appeared in October 1918 would have operated out of England had the war lasted a few days longer, though there were other sound operational and administrative reasons for this, particularly as their main objective was Berlin. As it was, this lack of precise arrangements never really mattered in practice, for the Independent Force was invariably switched to assist the armies when the situation demanded—as in the German break-through in March 1918 and in the final Allied offensives in the late summer and autumn.

WHEN the war ended in November 1918, the Independent Air Force—still all British—had grown to nine squadrons: four of day bombers, four of long-range (Handley Page) night bombers, and one short-range night-bomber squadron. One fighter squadron had also arrived to help reduce the very considerable opposition the enemy was offering to the day attacks. In spite of fierce opposition and severe casualties, especially by day, this force made quite an impact on the Germans. But its numbers and bomb capacity were too small to achieve results which would show decisively what bombing could do. There was promise enough to convince many, but not enough to shake seriously the entrenched beliefs of the sea and land services. Nevertheless it had won itself a permanent place in the British defence forces. True, the Independent Air Force was dispersed in the hectic demobilization which followed victory and its squadrons disbanded or, in a few cases, sent overseas on policing duties. But when in

Bomber Command Between Wars

Between World Wars I and II British bomber development lagged because there was no clearly defined enemy. In the 1920's Handley Page's Hyderabad (top) was a standard RAF bomber. Its two 450 hp engines gave it a top speed of 110 mph. The Handley Page Heyford (left) was the last heavy biplane bomber to be used by RAF squadrons. It had a cruising speed of 142 mph at 13,000 feet. At 21,000 feet the Heyford had a range of nearly 1000 miles. First of the monoplane bombers, the Fairey Hendon (below) was adopted by the RAF in 1935. It had a maximum speed of 143 mph, a service ceiling of 27,000 feet, and a range of 1000 miles. The Fairey Hendon was the last of Britain's pre-World War II bomber aircraft.



1922 the Government realized that things had gone too far and decided that provision must be made for the air defence of Great Britain, Sir Hugh Trenchard, by now Chief of the Air Staff, secured the inclusion of a substantial bomber element in the force to be raised.

One important factor, however, seriously reduced the value of this force for many years. In default of a clearly defined opponent, France came to be recognized as the only country that could threaten Great Britain by air. The very unlikeliness of this threat took much of the urge out of bomber development, but, worse still, the short distances involved if France were the enemy combined, with shortage of money, to stifle the quest for range, always such an expensive item. Looking back, this was probably an important factor leading to the Second World War. British policy was seriously cramped during the critical years of German and Italian resurgence in the 1930's because there were no means of threatening their homelands directly. Not until 1939 was Bomber Command any real threat to Germany, and even then it was still too small and too late to influence events.

With an independent bombing force in being from the start, the story of strategic bombing in World War II is a story of development rather than of evolution. We see the same stresses and strains influencing policy, sometimes easily recognizable, sometimes in somewhat different guise. Retaliation, for instance, at first worked in reverse. The bomber force was poised and ready to attack from the outbreak of war, but it was not until June 1940 that any but strictly military targets like ships and airfields could be attacked in Germany. The fear of retaliation, particularly on the French, kept us back. By late in 1940, the 1917 situation had been repeated; the effect of the concentrated German attacks on our towns could not be ignored. This pressure led to the beginning of the massed Bomber Command assaults which eventually reduced so many German towns to ruins. The enemy could not be allowed to reap the advantages of bombing without being made to suffer the disadvantages. And, once again, stalemate elsewhere led to increased effort for the bomber offensive. The position in 1940, when there was no other way of attacking Germany, led to priority being given for the expansion of Bomber Command. A front line of 4000 was planned, although changed circumstances in later years modified the decision considerably and the highest figure reached was about 1700 in April 1945.

It was natural, too, that we should see commanders fearing, as Haig and Foch had in the previous war, that they might not be

World War II Bombers

Britain entered World War II with a small bombing force poised and ready to attack, but fear of retaliation delayed strikes on any but military targets until June 1940. Earliest RAF night raids over Germany were flown by the Vickers Wellington (left) from 1940 to 1942. The twin-engine 250-mph Wellington had a range of 3200 miles at 26,300 feet. It also saw extensive service in the Norwegian and North African campaigns. From 1942 to 1945 the Avro Lancaster (center) was the mainstay of all RAF night bombing operations over Germany. Capable of carrying a 20,000-pound "blockbuster," this four-engine aircraft flew at 310 mph with a range exceeding 3000 miles. The de Havilland Mosquito (below) was the main fighter-bomber of the RAF during and after the war. Highly versatile, the Mosquito had a top speed of over 400 mph, could carry a 1000-lb. bomb-load more than 1000 miles.

supported in a crisis; for a bombing campaign must be conducted with great stubbornness if the cumulative effect of its work is not to be frittered away. Their very flexibility always endangers air forces through demands for air "parcels" to do various jobs. As in 1917 and 1918, in practice the bomber campaign never went on so stubbornly as to disregard what was happening elsewhere. At times of real need the bombers were always diverted, and they played an increasingly effective part in the other campaigns. The support given to the invasion of France and the attacks on the "V" weapon sites are two excellent examples. This again was natural, for the force had become so important that broad direction had to be assured by the Government through the Chiefs of Staff.

There was one doctrine left unproved in 1918 which was triumphantly vindicated in this war: the bomber's best role in air defence is a relentless offensive where it hurts the enemy most. There is ample evidence to show how the bomber offensive forced the Germans to put so much effort into defence that eventually they were quite unable to maintain any effective bomber force.

In none of this was there anything really new or surprising. Indeed perhaps the only real surprise of the war was the extraordinary resilience of a well-organized country under heavy bombing, whether of cities or of specific targets. This was absolutely fundamental, for, with the growing effectiveness of fighter defences, it put a premium on numbers to force a way through and to do enough damage. At times the bomber war even began to be unwholesomely like the land battles of 1916 and 1917, and signs were not wanting that despite great courage and skilful direction the rapidly improving technique of defence might again have led to stalemate—this time in the air instead of on land. But weight of numbers and persistence won before this point was reached, and from mid-1944 onward the bomber forces were able to attack selected target systems with tremendous effect—greatly helped, we must remember, by the successful invasion of Europe.

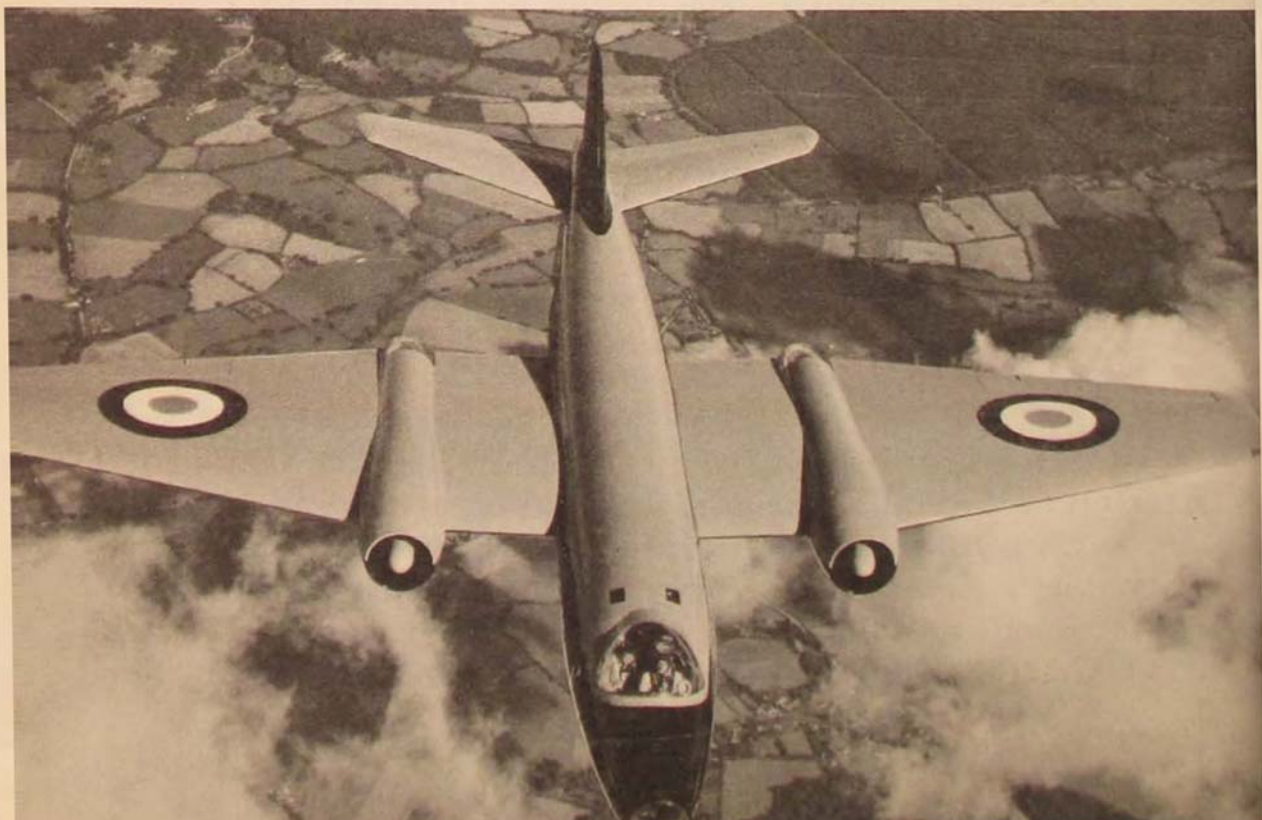
ALTHOUGH weight of numbers was the dominant factor up to the end of the war, the creation of the atom bomb, coming when it did, set the tone for postwar British thought on the bomber force. We can see now that this really saved the situation for Bomber Command. True to pattern, the end of the war found Great Britain completely exhausted financially. At the

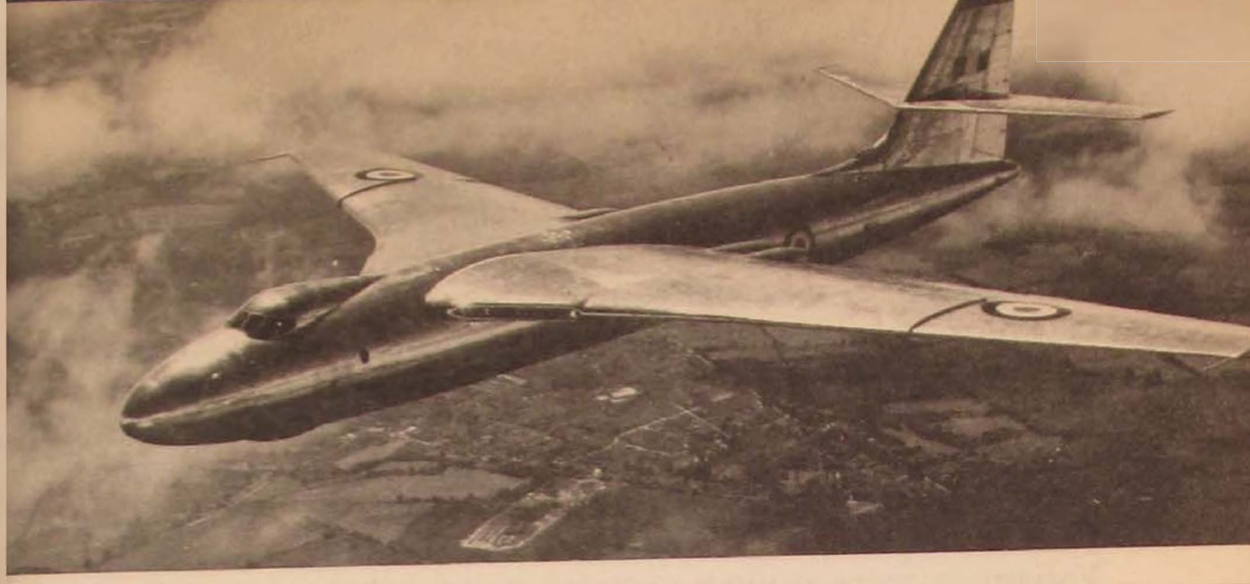
same time the change of threat from Germany to Russia made our war-time bombers practically useless overnight; their range had been adequate for Germany but could be stretched no more. They were no threat to Russia proper. In these circumstances the retention of a large force would have been of little real value even if it had been possible financially. The arrival of the jet, with its initial problems of range and with the great increase in cost per aircraft, simply emphasized this unhappy state of affairs.

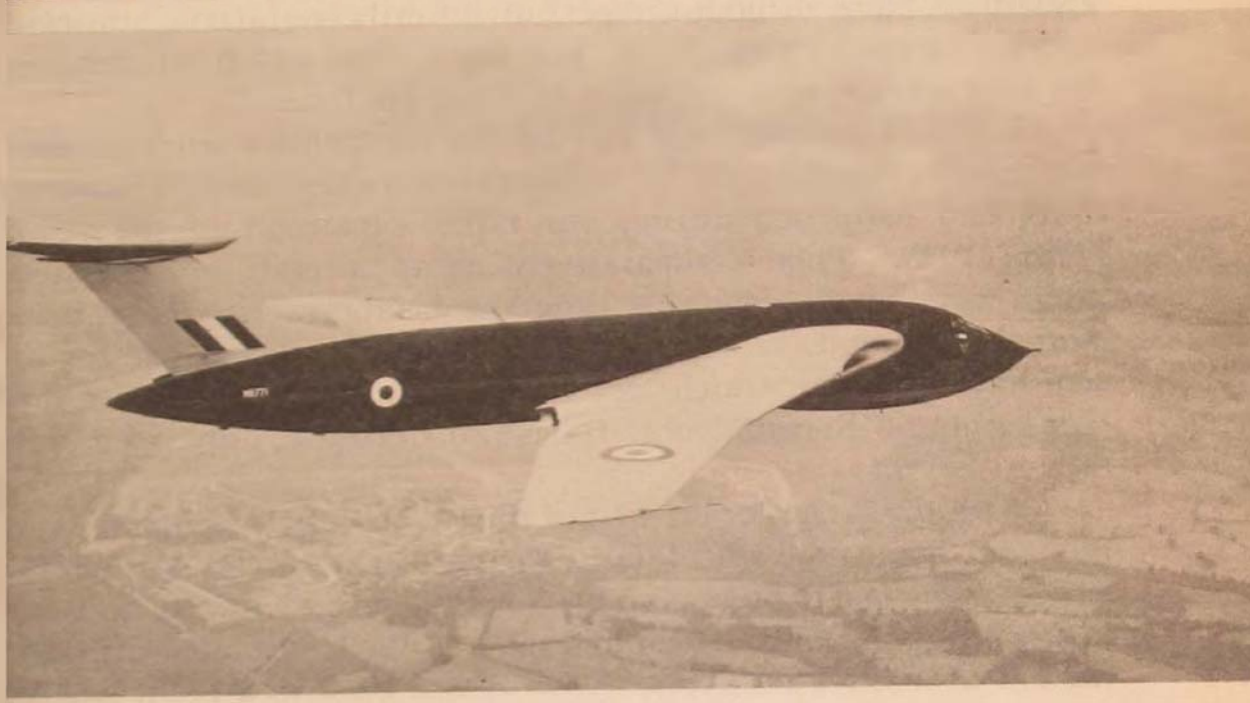
This is the background against which the decision was taken to put all our bomber effort into stratospheric jet atom carriers

Britain's Bombers Today

The atomic bomb and the shift in threat of aggression from Germany to Russia in the years after World War II made the Royal Air Force's wartime bombers practically useless overnight. Unwilling to finance an interim replacement, Britain decided to gamble on peace during the extra years it would take to move directly from heavy conventional bombers to advanced-design jet bombers—a bold decision certainly but one made easier by British trust in the USAF Strategic Air Command with its up-to-date force and atomic capability. The one interim type selected was a light jet bomber, English Electric's Canberra (below). In service for over four years the high-altitude Canberra is in the 500-mph class at 40,000 feet. For the future, three types of heavy, four-jet bombers—the "V" bombers—were ordered. The Vickers Valiant (right top) is more orthodox in design than the other two and is now in service with the RAF. Handley Page's crescent-wing Victor (right center) and the Avro Vulcan (right bottom), the world's largest delta-wing aircraft, incorporate very-advanced design features. All three "V" bombers can deliver the atomic bomb.







with the necessary range and to go for no temporary replacement which would quickly become obsolete. A bold and difficult decision certainly, but one which was made easier by our trust in Strategic Air Command with its then more up-to-date bombers and its atomic capability. Three types of four-jet bombers were ordered. These are the "V" bombers—the Avro Vulcan, the Handley Page Victor, and the Vickers Valiant. Two of them, the delta-wing Vulcan and the crescent-wing Victor, incorporate very advanced design features which have never been tried out to any extent. For this reason prudence called for the inclusion of the Valiant, a more orthodox type but nevertheless a true strategic bomber by modern standards. It is the Valiant which is now coming into service, with the other two not far behind.

Practical necessity did call for an inexpensive interim type to prepare crews for the "V" bombers when they came. The same thing had happened during our rapid expansion in the years before 1939. Then comparatively cheap aircraft of restricted range were invaluable; this time the Canberra has more than paid its way and, at a price which we could afford, has let us acquire experience which was essential if we were to meet the "V" bomber with confidence. It has also, of course, proved a useful tactical bomber.

With the arrival of the first of the "V" bombers, coupled with the atom bomb, the wheel has turned a fearful circle. We began where a few small biplanes with small bombs could be decisive in an extremely small and limited sphere. We have passed through the era of massive numbers. Now we are back to a point where a few aeroplanes and their bombs can again be decisive, but this time on a scale that can bring catastrophe to nations.

On this journey Bomber Command is still in company with two firms who made some of the earliest bombers, Avro and Handley Page. In those early days both were built for the Admiralty, a timely reminder of the debt which we owe to Naval thoughts and tradition—a very natural link when we consider the similarities between the mediums in which we fight. But we also remember that two soldiers did more than any others to establish the strategic bombing force which has grown into Bomber Command: Field Marshal Smuts, who had been a Boer general in the war of 1899-1902, and Lord Trenchard, who had fought against him in that war and who was a major with nineteen years' Army service when he joined the Royal Flying Corps in 1912.

In 1917 it was Field Marshal Smuts who convinced the Gov-

ernment that the two flying services must be amalgamated. It was he who wrote at that time:

> The day may not be far off when aerial operations with their devastation of enemy lands and destruction of industrial and populous centres on a vast scale may become the principal operations of war, to which the older forms of military and naval operations may become secondary and subordinate.

It was Lord Trenchard who built the Royal Air Force and, both as Commander and as Chief of the Air Staff, set the Bomber Force so firmly on the road to meeting the grave responsibilities which the fulfilment of Field Marshal Smuts' prophetic words entails.

Headquarters RAF Bomber Command

The USAF in Europe works . . .

. . . at being the guest in Allied countries

Hands Across the Street

A Quarterly Review Staff Study

THE European smiles wryly at the American and asks, "How would you like it . . .

". . . if the quiet, orderly life of your pleasant little home town in the United States was suddenly shattered by the arrival of what seemed to be hordes of foreign airmen?

". . . if these airmen, outnumbering the population of your little town four or five to one, spoke a foreign language, ignored or callously violated your customs and traditions and culture, laughed at the railroads, the cars, the plumbing, even the food you ate and the drinks you drank—always contemptuously comparing things to the vastly superior civilization from which they had come to lend a patronizing helping hand to you second-class citizens of the world?

". . . if these airmen were paid four to five times as much for their work as people in your own country, so that they outbid you for the roof over your head, bought up the best items in your stores, pushed up all prices?

". . . if these airmen crowded your best restaurant, filled your favorite nightclub with raucous laughter, disturbed your sleep with noisy antics in the street, made love to your women with handfuls of currency and the glamour of far places?

". . . and if all these physical evidences of their presence were only surface annoyances compared to the deep-rooted, humiliating fear that these strangers were there in your town because you and the other men of your town and your country could no longer do what your fathers and grandfathers had done—defend your country and your homes against all comers?"

This is the situation that now exists in hundreds of localities in Europe. Of course this is not the first time that American troops have been in Europe. In that sense the situation is no different than it was in World War I or World War II. And of course there is always a certain amount of friction between a large military base and the civilian population even when

the troops are on home soil. But American participation in NATO has an element never present before: it is the first time that large numbers of American troops have been based more or less indefinitely in European countries *in time of peace.* This is not occupation; it is not liberation; it is not covered by the degree of latitude or the sense of urgency present during wartime. American troops are in Europe as guests of the various countries, to participate with them in the building of the defenses of Western Europe. It may be true that the Europeans should be thankful that American forces are there; most of them are. But it is also true that a powerful defense structure for Western Europe is in the best interests of the United States, or the American troops would not be there. So the sporadic American outbursts of "well, if these people don't appreciate us, we'll just pack up and go home and leave them to stew in their own juice" are not only childish but sadly misinformed. This attitude seems to imply that American forces are in Europe only out of kindness to the Europeans and not because the fate of Western Europe is of vital strategic importance to the United States.

Early in the life of NATO, American officials realized that special measures would be necessary to ensure good relations between the American forces in Europe and the civilian populations of the various countries in which troops would be stationed. There were bound to be hundreds of small incidents and irritations when large numbers of military moved in near the towns and villages of the people of a foreign country. If unchecked and unremedied, this friction could have dire consequences at every level of military and diplomatic operations. A base commander might soon find himself with a serious morale problem on his hands, if irritated local officials refused to help in finding housing for military dependents or in allowing the airmen to visit the town. In hundreds of small ways his unit's operational efficiency might be whittled down by the open or passive opposition of the local authorities. On a national and international level, public opinion,

When the United States entered into the NATO alliance, it undertook the unprecedented step of basing large numbers of its troops on the soil of sovereign allies for an indefinite length of time. Many American commanders had grave misgivings as to how the presence and behavior of these troops would affect the structure of the alliance. It had always been a military axiom that troops based on foreign soil were bound to be a major irritant. But if NATO was to be strong, it had to be done. Several years have passed since the first American soldiers and airmen moved into bases in France and England. Much has been seen in the press on the various incidents that have arisen. Much attention has been given to the humanitarianism of individual Americans and of groups of Americans in extending help to the unfortunate and destitute in various European countries. Little has been said of the large behind-the-scenes effort of the command line of the American forces. One American commander remarked that he had "spent more time on community relations than on any other phase of operations, and it was worth every minute of it." To fill out the perspective on community relations in Europe, the Editors of the *Quarterly Review* survey the Air Force's effort to show our European allies that we are in their countries as guests, working with them in a common cause.

brought to the boiling point by an accumulation of unsettled grievances, could make officials much less cooperative in negotiations for additional American bases, for warehouses, for public utilities, for pipelines, for all the elements needed in support of modern military forces. Eventually bitterness both in the foreign populations and in the American forces could corrode away the wall of Western unity.

The dangers in the situation were realized early in the development of the Western alliance. As the NATO forces have grown, so too has the effort put into the community relations program. For a year or two after the signing of the North Atlantic Treaty in April 1949, the problem was largely academic. The American ground and air forces that were to be committed to the defense of Europe were still being trained and equipped in the United States. Bases still had to be built to receive them. Even before these could be built, complicated international and NATO agreements had to be reached on the nature of the bases, the size and type of forces that would use them, the command structure, the finances, etc. The first American troops brought in under NATO were in a sense reinforcements for the occupation troops already in West Germany. Although the West German government was being granted more autonomy each year and "occupation" was becoming more and more of a technicality rather than the actual governing authority, the framework of occupation remained. American forces could be brought in to West Germany without the complications which attended their entry into sovereign countries such as France and England. While the Americans in Germany were "guests" of the Germans in the sense that they lived there and that much of the cost of the occupation was paid for by the Germans, they were not invited guests. A different psychological climate existed in Germany than in France or England.

Even within one country the different sections reacted quite differently to the presence of American forces. In the Rhineland, for example, the people have for centuries been accustomed to troops—German, then French, and latterly American—being billeted among them. It was one of the facts of life to them, and they had no real adjustment to make beyond the one of getting used to a new set of customs. But in Bavaria the people had had comparatively little contact with the military. Hence the shock was much greater to them. The same contrast was true in France between the areas of, say, Alsace-Lorraine, always a military football, and the area in south-central France around the huge American depot at Chateauroux. Not only were there different degrees of experience with the military in these regions, but entirely different sets of customs, prejudices, and outlook.

As American forces began to move into England and France, as well as Germany, it became increasingly obvious that the most practical way to handle community relations was at the base or unit level. This has become the key to success in community relations in Europe. There are command programs, there are joint committees at the national level, there is a theater program. In the Air Force the whole of the command line is involved to a remarkable extent in the program, and almost every operational decision is conditioned in some degree by its relations to the problem of getting along

with the local populace. But the heart and soul of community relations is the program at the individual base. Only here can the small, the by-itself-unimportant irritation be settled. Any community relations program is only as good as are the alertness, the patience, and the tactfulness of the men at each base.

The top of the community relations structure for American forces in Europe is in the senior American headquarters in the theater—Hq EUCOM [European Command]—near Paris. From here emerge the general policies and the coordination of community relations in Europe. Then in most countries a joint committee operates on the national level to handle problems beyond the scope of the local level or to deal with deep-seated trouble of which the local problems are only visible symptoms.

Within the USAF in Europe, the chief office is in the senior air headquarters—Hq USAFE [United States Air Forces in Europe], in Wiesbaden, Germany. Hq USAFE hammers out the Air Force policy on community relations in Europe. Its programs are further spelled out at the headquarters of its two air forces—Third Air Force, London, England; and Twelfth Air Force, Ramstein, Germany. With broad guidance from these headquarters the individual bases carry the main load of day-to-day community relations on which the success of the whole program stands or falls. At each level of the command structure the office specifically charged with implementing and monitoring the important community relations program is the Office of Information Services.

Community relations has been one of the functions of the Offices of Information Services throughout the Air Force, and it was proper that they should work full-time on the man-sized job in Europe. For community relations is right down their line of responsibility—public relations, and internal and external information. But it would be a gross oversimplification of the USAF program in Europe to say that it began and ended with the Office of Information Services. The most remarkable part of the effort is the degree to which all levels and elements of the command line participate in winning and holding the good will of the peoples of Europe. Every day, in every headquarters, policies are modified and operational procedures altered in the interest of better relations with the community. Today there are few commanders who feel that this degree of concern for the way of life of their European neighbors is no better than mollycoddling. They see it for what it is—hard common sense. It was never the intention to make concessions that impaired the build-up or the training of the forces. Jet aircraft unfortunately are as noisy in peacetime as they are in war, but they must continue to fly. Such things cannot be stopped, but they can frequently be made less damaging to local good will by rerouting the take-off and landing pattern so that it avoids built-up areas, or by rescheduling the flying hours so that they fall during a part of the day that is less objectionable to the local inhabitants. In cases where these moves are impractical from an operational standpoint, it is usually very helpful to describe just why such flights are necessary and how these "annoying" activities fit into the plan of NATO defense.

Let us look closer at the operations of the community relations program in each of the three chief countries where American troops are stationed: Germany, France, and England.

West Germany

WEST GERMANY is perhaps the best example in Europe of how the enlightened self-interest of a community relations program has paid off. In the years after the war the main job was the always-ticklish one of occupying a defeated nation in a way that would nurture healthy roots of political and economic stability. To achieve this end without leaving a deep-seated residue of hatred and resistance toward the occupying powers required a sensitive blending of firmness and persuasion.

That this policy has in large measure succeeded has been quietly but dramatically demonstrated in recent months. Now that the Paris Accords are ratified, West Germany has become an independent nation once again. The occupation is ended. Yet American, British, and French troops will remain on German soil—not as occupiers but as codefenders with the Germans against any aggression from the East. The very quietness of this transition, the unquestioning assumption both among the Allies and in Germany that this should and would be the pattern of the immediate future, is proof positive of the success of the occupation and of its community relations.

Obviously such a transition did not occur by accident. Long before the official termination of the occupation, the Allies had turned over to the Germans all but a fragment of final authority. Beginning with the resentment of the West Germans to the aggressive behavior of the Communists in East Germany and in Eastern Europe and solidified by the tremendous Allied psychological victory in the Berlin Airlift, the West Germans came more and more to accept the Allied troops as defenders rather than occupiers. Public opinion polls taken each year by the office of the U.S. High Commissioner have shown a steady decline in German opposition to the occupation and to the presence of American troops. In the 1954 poll only 12 per cent of the Germans questioned wanted the Americans to go home, as opposed to 18 per cent in 1953 and 22 per cent in 1952.

This transition in German thinking was both aided and hampered by a number of factors. Credit for a major assist must be given to the Soviet Union, whose Iron Curtain and reduction of her Eastern European satellites to the status of slave states offered the West Germans a very unpleasant set of alternatives if they chose not to align themselves with the West. Another major factor fostering good relations has been the economic resurgence of West Germany. Since 1948, when German currency was stabilized and the Bonn government got firmly on its feet, West Germany has been booming. Industrial production has zoomed from an index of 45 in 1948 to 175 in 1953. The amount and quality of consumer goods has steadily increased. Throughout Europe and even abroad German goods again have begun to offer stiff competition on the world market. War-torn German cities and

industries, which Allied experts had predicted would be 20 to 50 years in rebuilding, are being cleared and rebuilt at a phenomenal rate. All this rise in the standard of living, while largely due to the natural vitality of the German people and to the able leadership of Chancellor Adenauer's government, has also reflected credit upon the occupation powers.

German awareness of its improved lot in the postwar years is probably more keen than anywhere else in West Europe. This awareness is created and kept alive by the steady stream of refugees who slip across the border from Communist territory. Since the end of the war some 11,000,000 people from eastern Europe have found sanctuary in West Germany. They are still coming at the rate of 2000 a day. The West Germans have done a heroic job of assisting and finding homes and work for this huge influx. A large number of the refugees have more than repaid their debt, since many are skilled craftsmen badly needed in the rebuilding program. As a group they have made another significant contribution: this great mass of newcomers has been assimilated throughout West Germany, with the result that on every farm and in every factory and home the people have heard first-hand of the desolation, privation, suspicion, and terror which is life in the Communist satellite countries. No information program or newspaper stories could have convinced the German people of the terrible realities of living under Communism as have these legions of personal tragedies told by the people who have lived them or seen them happen.

In another way this mass migration from Communism has complicated the life of the West Germans and has intensified the most awkward community relations problem confronting the American forces in Germany. This is the matter of housing. War damage alone had created a drastic housing shortage in Germany, and this has of course been enormously complicated by the stream of people pouring in from the East. They must also have places to live. Although housing is being built at the rate of 400,000 units per year, West Germany still needs another 4,000,000 houses. In such a situation the thousands of houses which the occupation forces have requisitioned for use by the military and their dependents are a very sore subject. USAFE personnel alone require 10,190 housing units in Germany. As long as most of these houses were requisitioned, each of them represented one unhappy property owner, not to mention his relatives and friends.

The German Federal government grew more and more concerned as the years went by and comparatively few houses had been derequisitioned. Finally the government approached USAFE with a plan covering the 1000 houses under requisition in Wiesbaden: the Germans would build housing for the American forces if the Americans would agree to derequisition a like number of units so that they could be returned to their owners. USAFE agreed and 252 apartments were built under this plan. Another 78 are now being built. Under a slight variation of the plan, nearly 700 more apartments are being built by the American forces out of funds provided by the Germans to pay for the cost of occupation. On these apartments the German government has handled all construction outside the units—paving, sewage and utility connections, and landscaping. Since this amounted to about one third

of the total cost of construction, the funds could be stretched to build many more units than would have otherwise been possible. This is being done all over the American zone. USAFE still has some 2100 houses under requisition, but they will be turned back as fast as the replacement housing is completed. In another two years all requisitioned houses should have been returned to their owners. Meanwhile the visible signs of progress have done much to quiet German discontent on this subject.

A second major problem in Germany and in all the countries in Europe is the one of differences in language and cultures. Hq USAFE has recently launched an attack on this problem. All USAFE personnel are required to take a 30-hour course in the language of the country in which they are stationed. The only people exempted are those who can demonstrate a reasonable proficiency in the language or those who are already taking that language in the courses offered by the University of Maryland. No one is under any illusion that 30 hours of a language will turn out polished linguists, but it should provide a basic vocabulary for social and business conversation.

Community relations is a two-way street. It is not enough to explain yourself to the people in a foreign country; you must also prepare your own people for what a tour abroad will entail. USAFE is planning a considerable revision of the orientation given to personnel headed for Europe or transferring to other countries in Europe. This program will place new emphasis on the community relations responsibilities of all personnel, including dependents. Realizing how much the morale and therefore the efficiency of the entire command is affected by a smooth trip over from a personnel and a financial standpoint and by how the facilities, dependent housing, and surroundings measure up to the preconceived picture, USAFE decided that the attempts at orientation were too little and too late. The new system will operate on both ends of the overseas trip. This orientation program will be much more complete and individualized than the standard one. USAFE is confident that it will more than pay its way in terms of a better reenlistment rate, better morale, in less money cost of the transfer to the individual, and in better community relations.

To handle all these and other problems that are lumped together under the term community relations, the German government and the American military services take up problems at various levels. For example, the Minister President of each German state meets with the senior military commander in that district. At the town and city level it is the *Burgermeister* who meets with the local military commander. At the local level the Air Force not only encourages official contact with the local authorities but encourages all organizations and individuals to meet with the Germans in the community socially and in such activities as sports events and the exchange of professional knowledge.

It takes no trained psychologist or opinion analyst to see that a lasting improvement in community relations is produced only by tangible acts of comradeship and kindness which convince the local people that these foreign visitors are genuinely friendly. Here again the Air Force encourages its mem-

USAFE's New Orientation Program

1. For the individual on overseas orders:

   - Orientation before departing his base in the ZI—detailed, practical information on his personal affairs, such as finances, currency conversion, bank accounts, and transportation of his car, and on the local conditions at his overseas station—housing, clothing, etc.
   - Orientation at the Port of Embarkation.
   - Orientation at the Port of Debarkation.
   - Orientation by unit receiving the individual upon his arrival in Europe.

   For the individual returning from Europe, a similar orientation program is provided, but in three steps rather than four.

2. For the unit on overseas orders:

   - Detailed orientation before departing the ZI. USAFE orientation teams will go to the base in Europe to which the unit will be assigned, will gather information on the base and its facilities, on the surrounding country and towns, will take color slides of the base and its surroundings. A tape lecture will be prepared, with the color slides accompanying it as illustrations. All this will be sent to the unit for presentation before it leaves the ZI.
   - A second, more-detailed briefing will be given the unit when it arrives at the overseas base.

3. Orientation for intercountry transfers of individuals and units within Europe will be handled on the same basis as those coming to Europe from the ZI.

bers to take part and assist in all sorts of community and charitable activities and also officially sponsors and supports some activities itself. Perhaps no one gesture on the part of the American forces is more widely known throughout Western Germany or has met with more appreciation from the German public than USAFE's "Operation Kinderlift." Each summer for the past several years cargo planes from USAFE have flown 1500 German children from isolated Berlin to West Germany, where they have spent their vacation as guests, some in the homes of American service people. Cooperation from the German Red Cross and from all USAFE has been splendid. The Ger-

man children and the Americans have come to know one another and have attained a better and more lasting understanding of each other by living together.

Many organizations have found their own way of contributing to better relations between the peoples of the two nations. American wives in Europe have formed an organization known as the Friendly Hand, which collects and distributes clothes, food, and toys to needy Germans. At Ramstein Air Base the NCO Club adopted a German orphanage, has contributed money and equipment, has sponsored Christmas parties for the children, and has set up and equipped a summer camp for German children.

More sporadic but widely appreciated has been the prompt and constructive USAF assistance to disaster areas. In the last two years floods in England, Holland, and southern Germany have brought the Air Weather Service helicopters into action. Supplies have been air dropped to isolated families. Last year USAFE aircraft flew to Pakistan to bring help to flood victims. Air Force C-124's flew halfway around the world to bring home the French survivors of the Dienbienphu disaster in Indo-China.

These numerous manifestations of American good will are doubly impressive because some of them are official and as such represent the intent of the United States and others are purely voluntary sacrifices on the part of groups and individual Americans. In the aggregate they have had a tremendous impact on the German people. Their impact has accumulated over the years as they have continued to grow in number and in scope. In one way or another they have touched the life of thousands of German families. All of this has made it very hard for the Germans to believe Communist propaganda about the "American capitalists and imperialists" who have come to exploit Germany for their own vicious ends.

France

TODAY, and for some time to come, the most serious community relations problem facing the USAF in Europe is in France. The difficulties are more intensely local in nature than in Germany and are compounded by difficulties which any authority has in dealing with the ruggedly individualistic French people and by the increasingly complex problem of housing. The NATO air build-up in France has moved American airmen into rural areas where provincialism makes any stranger resented; where many small farmers, whose horizons of interest are largely bounded by their own acres, do not distinguish between friendly foreign troops stationed in France by French invitation and the German troops that occupied France during the war.

The French people have a long tradition of individually making up their own minds on what they consider to be the merits or demerits of a case. As a result their democracy sometimes seems to the American or the Englishman to be a constantly rocking boat. If the American tells the Frenchman about the greater stability and continuity of a government featuring only two political parties, the Frenchman spreads his hands and shrugs. This is

not democracy to him. Under it man has a choice of only two points of view. Under his system the Frenchman can vote for any of 16 or 20 shades of political belief—and does. In the meantime any expression by a voice of authority, whether it is within the French government or from one of the Allies, is not likely to coincide with his particular credo. Therefore he instinctively resists authority. In such an atmosphere community relations becomes not so much a matter of large and expansive gestures, of which Americans are overfond, but something more akin to door-to-door salesmanship. Each Frenchman has to be met on his home ground, where he can be convinced by concrete action that these "allies" are worthy to live in his community on terms of mutual respect.

Consequently community relations in France, even more than elsewhere, are most effective when conducted on the local level. There is a national-level organization, to be sure—The Inter-Allied Council Committee. A subcommittee, the Franco-American Affairs Community Relations Working Group, is composed of representatives from the French Liaison Mission, the U.S. Embassy, Hq EUCOM, the Paris Office of Hq USAFE, and representatives from the American bases in France. This group meets once a month in Paris to review problems in Franco-American relations and to hear from the local representatives their plans for dealing with the problems. If it appears that a problem can better be met by a higher authority or on a more coordinated basis, the matter is referred to higher authority. But wherever possible, issues are resolved at the local level.

A variety of subjects and types of cases are considered at these meetings. At one meeting the American representatives point out to the French that they regret they were not informed when France recently had a national safe-driving day. Had they known about it in advance, the American bases would have been glad to cooperate in the campaign. The French representative assures them that in future they will be notified. At another meeting the French representative complains because an American staff sergeant, who had sued his French landlord in the French courts for rent-gouging, had been pressured by his military superiors into dropping the suit. The French representative asserts that law suits are one of the best ways to discourage such practices on the part of landlords; he feels the sergeant should have been encouraged. Another time the French point out their reasons for feeling that the American officials at the local level must be very careful to clear actions and press releases on local affairs through the local French authorities. The speaker recognizes that in some cases this is contrary to American practice at home. He explains that this is in no way a form of censorship, but merely makes sure that no slip of the tongue will aggravate rather than improve local relations. The friendly give and take in these international meetings has done much to show each side the point of view of the other. The highest achievement of the group probably lies in the future troubles that it has averted rather than in past troubles that it has smoothed over.

On the local level the committee system which operates in Germany is not used in France. For one thing, the Germans had used local committees

as a front for imposing their directives on French communities, so joint committees had awkward precedents. Also the multiplicity of local problems and local differences of opinion in France suggested another method. A Frenchman, approved by the French government, is hired by each American air base as a consultant to the commander. It is his full-time job to study the local situation, to recommend actions which will make for better community relations, and to act as liaison officer in dealings between the base and the local officials. When he goes to talk to the mayor and the prefect, he has a unique advantage in that they know he represents both the French government and the local American authorities. This system has been in effect only a short while, but it is already showing promising results. Particularly has it reduced antagonism in the local French press. Since these consultants are perceptive men who understand the differences between the two nationalities, they are able to anticipate many of the small squabbles that occur. For example, last year the American grade school at Chateauroux arranged with the local French school for the students to exchange schools one day a week. After the American children came home from their first visit to the French school, the Information Services officer had to write a letter to the director of the French school on behalf of the indignant American parents, protesting that at the lunch for the children wine was served instead of milk or fruit juice. While no French reply is recorded, it is likely that the director's feelings were hurt because he was criticized for his well-intentioned preparations for a gala occasion.

The greatest single problem of course is housing. In spite of recent relief measures, this will remain a sore spot for some time to come. In accord with the decision by SHAPE that many air bases in Germany were too close to the Iron Curtain and that these NATO forces must be redeployed to the rear so that they would be in less danger of surprise air attack and of being overrun on the ground, the USAF will move some of its air units into crowded France. More units will come to France direct from the U.S. More airfields are being built. More dependent housing must be built. At some bases people must live as far as 50 miles from their base. Not only is commuting over such distances expensive and wearing on the individuals, but from a military standpoint it is almost impossible to maintain a genuine alert. Rentals are high almost everywhere, and utilities, especially heat, seem very expensive by American standards. Many units are submarginal in cleanliness, healthfulness, and comfort. Another source of trouble is our unfamiliarity with standard French rental practices, especially on such questions as the landlord's versus the tenant's responsibility for paying road, property, and other taxes, on insurance provisions, on inventories of furniture, on maintenance and repair responsibilities, and other technicalities that differ considerably from American practices. All these difficulties have damaged morale and have seriously affected the reenlistment rate. Obviously they are also the root of many troubles with the local authorities and people.

France itself is already facing a serious housing shortage. While not as severely damaged as Germany was during the war, the bombing and ground fighting nonetheless took a heavy toll of French prewar housing. Since the war

the precariousness of the French economic position has not encouraged large-scale building efforts either by the government or by private investors. As an incentive to private investors the U.S. provided a system for encouraging private capital to construct housing near the American bases. Under this program the Americans would guarantee the builder that the house would have 95 per cent occupancy for five years. Even this has not proved too attractive to the French investor. Most of the air bases are located out in the French countryside, surrounded only by farms and small villages. Many of these villages have not substantially changed in population in the last 100 years. They depend on farming for a living, and the local farms have long since supported the maximum number of people. So the investors see little chance of renting the new houses locally once the Americans move on. Most of the housing projects seem poor long-term investments. In the last year interest in the plan has picked up somewhat, but to date less than 1000 units have been built or approved for construction under this plan.

The U.S. government has not appropriated any funds for construction of permanent housing for military dependents in Europe. Recently several other moves have been made to alleviate the situation, especially in France, where a total of 5000 housing units is required for Air Force personnel. Of a total authorization for 5000 trailers service-wide (USAF, Navy, and Army) to be purchased with housing funds and set up on bases overseas for rent to military personnel, 1725 will go to the USAF in France and 807 to stations in England.

What has been said so far of conditions and community relations in France is a somewhat bleak picture. The largest problem in the community relations program in Europe does center in France. But much progress has been made. Both nationalities have gradually learned to be more tolerant of the other. Serious incidents, such as street brawls, overturned cars, severe criticism in the newspapers (not counting the Communist papers), have dwindled almost to nothing. One seldom hears jeering remarks in the streets as Americans pass and rarely sees "Americans, Go Home" painted on walls. (One group of American airmen passing down a street saw a Frenchman scrawling one of these signs on the wall, stopped and helped him finish it, and walked off leaving the bewildered Frenchman staring after them.) One of the most important signs of progress is the documented fact that the strength of the French Communist Party has dropped substantially in almost all communities adjacent to American air bases in France. This may in part be due to the opportunity that local Communists have of seeing for themselves the fallaciousness of Communist claims about the Americans, but it is also due to the economic impact of Operation Native Son, under which the American air bases hire local labor to fill many of the maintenance, clerical, and custodial jobs.

Constantly impressed upon the American personnel is the fact that they are guests in France and that they must act accordingly. Nowhere does one find signs along the highways calling attention to American military bases. In many cases people living only a few miles away are unaware that bases are in the vicinity. What was in some places a vocal French resentment at

the "GI invasion" first subsided into indifference and has slowly been replaced by a growing interest in how these people live. This interest is reflected in French grumblings that the Americans tend to create their own communities, with their own stores, their own social life, their own amusements, and do not mix in the community.

Many problems remain. Even if the central bugaboo of housing were alleviated tomorrow, there would be plenty of other causes for friction and misunderstanding. This is inevitable when two different cultures are placed side by side. There is still the language barrier, although Americans and their dependents are gradually taking more interest in learning French and the compulsory language courses instituted by USAFE should help develop a general ability to cope with the rudiments of conversation. There is still the large wage differential between the French and the Americans, which makes for some bitterness on the part of the French. There is still the economic pressure generated by the money which U.S. troops make and spend. American servicemen in France last year poured as much money into the French economy as did all the much-publicized American tourist travel in France. The trouble with the serviceman's money is that it is spent for the most part in the rural areas or small towns in France, not in Paris or the Riviera or other tourist spots. Consequently the serviceman's money has a much greater inflationary impact on the local communities, frequently driving up the prices of housing, clothes, and entertainment which the less-well-paid Frenchman is also trying to buy. There is still the all-too prevalent conception among Frenchmen that all Americans are millionaires and must be charged accordingly. This impression is not lessened by the tendency of some Americans to boast of or exaggerate their standard of living. On the American side, there remains the tendency to lump all Frenchmen into a composite picture derived from pirating landlords, forgetting that they had known that type before in Dayton, Ohio, and Washington, D. C.

But when all this has been said, there has been substantial progress in community relations in France. Most of it has been quietly done on a local scale. It is not as spectacular as some of the achievements in Germany, but there has been no occupation in France. The basic concept seems to be paying off: once we convince our own personnel and their dependents that they are guests in France to the point that they behave like guests, the French begin to behave like hosts.

England

In England the USAF officers responsible for the community relations program grin wryly when one mentions problems on the continent: "Yeah, they all tell us we haven't got a problem because here the people speak the same language. In the first place, it's *not* the same language. If you think it is, wait until the English garageman tells you that your car doesn't have a hood, but a bonnet; doesn't have fenders, but wings; doesn't have a horn, but a hooter. It doesn't even have the same horsepower, weigh the same number

of tons, or hold the same number of gallons of gasoline—I mean, petrol—as it did back home. In the second place, have you ever considered the new problems you get when the other guy *can* understand an unguarded conversation—say in a pub, when an American with a couple of pints of ale under his belt starts airing his gripes about England and things English?"

All this notwithstanding, community relations between the USAF forces in Great Britain and the English people are probably better than they are around most bases in the United States. There are several reasons why this is so. For one thing, the American forces are on their best behavior. They are working at the business of getting along. For another thing the great majority of the English people are sympathetic with their reason for being there—indeed are somewhat reassured by their presence—and so are inclined to be tolerant and friendly.

Not so many of the English were sure that they would feel this way when it was first announced several years ago that certain bases in England were to be leased to the Americans. They remembered the last war, when millions of Americans thronged into crowded Britain. They remembered a lot of boisterous behavior and some downright violence. More respectful of law and order than his American cousin, the Englishman was not sure that he was looking forward to another such experience.

But he had some pleasant surprises in store for him. The numbers were much smaller this time—only some 45,000. Most of them were professional airmen of the postwar Air Force—pretty solid citizens. On the average most of them were older and less rambunctious than the World War II crowd. About half of them not only were married but had brought their families along this time—a total of 21,000 dependents. Many of those who had no dependents to bring are acquiring them in England. The marriage rate of American airmen and English girls is running about 250 a month.

Of course these American families needed housing, and this did create a problem. England, like the rest of Europe, was already critically short of housing. How could she accommodate a new influx of visitors who not only wanted a place to live but who, by English standards, were pretty fussy about where they lived? As in France, most of the airfields are located in rural areas, where the small towns and villages have very little housing slack. The result is that many airmen and their families live from 30 to 50 miles from the air base. Unlike Germany, but as in France and the United States, there were no rent controls. In some areas landlords raised the prices sharply when they saw the Americans coming. Under present plans 807 of the 2500 odd trailers which the Air Force is buying for use in Europe will be allocated to bases in England that are having the most difficulty finding adequate local housing.

The organization arrangements for handling community relations in England are patterned after those in France. This is logical because American troops in England, as in France, are guests in a sovereign country and not occupation forces as they were in Germany. Therefore the Air Force command line must be, and wants to be, in the background. The British government has taken the lead from the beginning in organizing a relations

program and in trying to anticipate and minimize any difficulties. At the national level a Central Coordinating Committee is headed by Lord de L'Isle and Dudley, Minister for Air, and has as its English representatives members of national organizations such as the Trades Union Congress and the English Speaking Union. U.S. members are officers from Third Air Force and representatives of the U.S. Embassy. This committee meets irregularly, usually about twice a year, to review the progress of community relations and to formulate broad policies. Their decisions are passed down to the local Hospitality for Americans Committees and to the local American commanders.

Most of the community relations program is carried out on the local level, with the method varying according to local conditions. At three of the Air Force bases the British Air Ministry has recently hired English consultants to advise the Information Services officer and the commander and to work with the local British authorities and organizations. The chief difference between the consultants in England and the ones in France is that in England the British government hires and pays them, whereas in France they are approved by the French government but hired and paid by the USAF.

Here again the officials at each base are responsible for their own program but know that they can count on higher headquarters for support when needed. An example of this occurred some time ago at the 7th Air Division base at Brize Norton. B-47 wings were rotating from the ZI to Brize Norton for 90-day training periods. On one side of the field the hardstands were close to the barns of a farm. The farmer bred prize pigs. One of the first B-47 wings arrived at the time that the farmer's pigs were in farrow. The big jet bombers would start their engines in the early hours of the morning and taxi away from the hardstands in a crescendo of noise. This would wake up the pigs, who would then give birth to their litters and kill them before the farmer got up to begin his day's work. The noise from the jets cost the farmer some $5000 worth of prize porkers. He filed a claim, which was duly paid, and the matter was forgotten. Some months later the farmer's pigs were again in farrow, and he heard that another wing of B-47's was moving into Brize Norton. Seeing that history was about to repeat itself, the farmer went to the American commander and told him his problem. The commander thought it over and then asked 7th Air Division for permission to vacate the hardstands near the pig farms until the pigs had farrowed. Permission was granted, the B-47's squeezed together on the other side of the field, the pigs were born in orderly fashion, and the USAF had won some converts.

Incidents of this nature sound trivial in themselves, but they are the heart of community relations. Two or three such incidents around one base, if unheeded, could turn the whole community against the Air Force. Then the local newspapers would begin to reflect this antagonism by slanting their news stories to put the worst interpretation on the Air Force role in each situation. The decrease in adverse news stories on the activities of the USAF in England is one of the more tangible evidences of the success of community relations. Three years ago the small segment of the British press that we would call "dirt sheets"—and it is a much smaller proportion than in the United States—took great glee in distorting any story in which Americans

were involved to make them the villains of the piece. In this practice they were abetted by the representatives of some of the American news services, who relayed these distortions to the U.S., frequently with embellishments of their own. As these stories continued to appear in the papers in the United States, there gradually grew up the feeling that the strained relations between the Americans and the English were reaching the proportions of an international crisis.

One such story was the case of an indigent English family living in a ramshackle house on the edge of an airfield in northern England that was being turned over to the USAF. In the course of renovating the airfield, the Air Force erected a security fence. The English family's house was inside this new fence. An English newspaper burgeoned forth with banner headlines claiming that the Americans were holding a poor English family prisoner within the fence of an American air station, that the children were not even allowed out to go to school, and that all this was a calculated plot to force the family to get out of their house. The facts of the case were that the father in the family, formerly unemployed, had been given a job on the base, that the Air Force delivered free milk to the family's door every morning, that Air Force transportation carried the children to the gate every morning so they could go to school. The family was better off than it had been for some time and certainly had no desire to leave or to complain about being inside the fence. Of course this newspaper account of the case was much more sensational than the true facts. Once it was out no amount of denials or rebuttals would get the same amount of attention. The problem is to prevent such stories from originating.

A more representative view of the attitude of the English press is reflected by the editor of the paper in historic Cambridge. In an editorial he told of being visited by a writer from an American wire service who had heard rumors that there had been troubles in Cambridge between the local inhabitants and the Americans at a nearby air base. The American writer's attitude seemed to be one not of investigating the rumors but of writing the most lurid version he could of whatever complaints the local inhabitants had to make against the Americans. This annoyed the English editor. He told his visitor that there were no such problems in Cambridge, that he personally objected to the very term "community relations" because it in itself implied that there were bound to be some sort of relations to worry about. The American newsman scurried back to London, and the editor wrote his editorial recording his position.

Perhaps a better view of what the local bases do in the way of community relations can be gained from looking at the program of one typical air base. RAF Manston is located in southeastern England, in the rich orchard country of Kent, not far inland from the southern bank of the Thames Estuary, where the river merges with the English Channel. Like the other American air bases in Britain, Manston does not advertise itself as being American. It retains its RAF designation and there is still a small RAF complement on the base, with an RAF station commander. As a "guest" on the base is the USAF 401st Fighter-Interceptor Wing, one of the two American F-86 wings in

England. Much of its community relations work has been channeled through a committee made up of representatives from the base and from the Rotary clubs in the three nearby towns—Ramsgate, Margate, and Broadstairs—where most of the American families live. Three men from each of the Rotary clubs and three Air Force representatives meet informally to discuss local problems.

One of their enterprises involved two or three local car-rental agencies that were renting cars to American airmen without checking to see that they had the required driver's licenses, insurance, etc., and without being too careful of the roadworthiness of the cars. Inevitably there were accidents. Complications arose when the airmen did not have the proper papers. Some of the local people began muttering about this being another evidence of American irresponsibility. The matter was discussed at the committee meeting. The English members, all of them responsible citizens in their communities, went back to their towns and put the matter before the Chambers of Commerce. The car-rental agencies were called on the mat. The irregularities ceased. Mission accomplished, and without the Air Force appearing in the matter in any way. The English had done their own policing and had done it gladly, because in this case, as in most others, it is to the interest of the community as well as of the Air Force that these troubles be ironed out.

As a result of a series of such successes, friction is now at a minimum. The initial resentment found in the local papers has disappeared. When the Americans first came to Manston, they organized a series of dances for the airmen. English girls were collected in Air Force buses, brought to the dances, and then delivered to their doors again. To forestall any criticism, the dances were carefully chaperoned, only soft drinks were served, and an officer rode back on the bus to see to it that all the girls got safely home and that all the airmen who rode with the girls to town came back to the base on the same bus. So that there would be absolutely no trouble, the escort-officer was instructed to see to it that there was no kissing on the bus trip. The local newspaper found out about this order and came out with a story to the effect that the American officials did not consider the local girls good enough for American boys to romance with. For a guest organization in another country, there is no comeback to an article like this except patience and tact and assiduous education of the communities. Recently no such stories have appeared.

In an effort to educate the airmen to their new environment Headquarters Third Air Force produces a monthly information program that is selling like hotcakes. It succeeds where others have failed because it is a professional performance. A master of ceremonies introduces a number of sequences. One section is given over to an interpretation of important global events of the past month. This is done by a professional radio announcer, using colored slides and maps to illustrate his talk. Another section is a skit on some phase of communism. Again most of the performers are professionals working from a professional script. Another section is on the Third Air Force, explaining some phase of its mission and operations. The final section is a skit on Anglo-American relations.

One of these latter featured an American airman and an English truck-driver who met in a pub, played a game of darts, and compared notes on their standards of living, the furnishings of their houses, and their likes and dislikes. Done with humor and graphic realism, the skit had many of the Americans in its audience squirming at the patronizing air and the bragging exaggerations of the airman. Some of the writers and actors in this program are Air Force personnel and some are hired professionals from the London stage and from among American students studying in English universities. Once a show is put together, the cast makes a swirling tour of American bases all over Britain, hitting a different base almost every day. The show is so well done and carries such a punch that commanders who were reluctant to spare their personnel for the hour's time of the show now heartily endorse the project.

American servicemen in England still face housing shortages, customs differences, and still find that many things they considered necessities at home are in the luxury category in England. But community relations are perhaps best summed up by the peculiar problem that has confronted Third Air Force each of the last two Christmases. Notices have been sent to the newspapers explaining that there simply would not be enough unattached Americans to go around to all the English families who had invited an American for Christmas dinner. As one English paper put it in its headline, "You Can't Have a Yank for Christmas." The demand has exceeded the supply. Then astute community relations turned the deficit into an advantage. The excess British invitations were turned over to officers wives clubs and NCO wives clubs, who replied with a counter-invitation to the British to visit the American homes. This has been an overwhelming success.

A REPORT on our community relations program in Europe must conclude that while there will always be work to do, real progress has been made. We might be said to be over the first big hump. Even in the difficult spots we have been accepted at least to the extent that we are no longer actively opposed. How much farther we can go in making a positive contribution to understanding between the various NATO countries depends upon the tact, imagination, and energy with which we make ourselves a contributing part of the European communities in which we operate. This must be done with deeds as well as words. We must educate our own people as well as the Europeans. It is a job for the command line, for the Offices of Information Services, for all Air Force organizations, and for the individual Air Force member and dependent in Europe. We have never tried a job like it in peacetime. It is a challenge. And Americans are supposed to like challenges.

Air University Quarterly Review

Air Power, Global Force in a Global Struggle

COLONEL EPHRAIM M. HAMPTON

INCREASINGLY we hear it said that air power is decisive only in all-out, atomic war.

Large segments of the world's population are coming to believe that air power and nuclear weapons are inevitably synonymous with the destruction of cities, populations, and of civilizations and that destruction is the total and sole contribution that air forces make to decision in conflict. The implication is that we must find some other means of winning a "limited war," a view that constricts the primary role of air power, both as a deterrent to war and as a central means of gaining decision in war.

Such views are associated with the belief that to use nuclear weapons under any conditions—for instance, in tactical operations in limited war—will automatically lead to general war. The person accepting these views must rationalize that without nuclear weapons air forces can be only of secondary value as an instrument of policy or of war, and that planners therefore must rely on the man with the bayonet or at least on a surface strategy for winning all wars short of total war. This, he further rationalizes, is proven by the fact that the Communists have continued to make gains in spite of the dominance of our atomic-armed air forces.

Such opinions stem from a general lack of true understanding of what air power really is and how it can and should be employed. Evaluations of the potential, capabilities, and employment of air power are made on the basis of an extremely limited perspective. Here we must free ourselves from the confines of land-based thinking. To assess its true worth, we must examine air power against the background and problems of a troubled world situation rather than against the relatively small backdrop of "limited" or "little war" conditions.

Air power has global capabilities and a potential global effect—this was clearly revealed by our air forces' activities during the war in Korea. Yet the powerful tendency remains to ignore the entity of air power with its requirement for centralized con-

trol at the appropriate level. We still cling to restricting theater arrangements and overlapping and complicated command structures. We compartment our air power and impose arbitrary and unnecessary command jurisdictions upon it. Unless this is stopped, the full benefits of air power's flexibility, mobility, nuclear firepower, or any of its other capabilities will never be attained.

Even the most ardent air power enthusiasts too frequently lose sight of air power's global nature and mistakenly attempt to defend their beliefs on the same narrow basis that generated the very points at issue. This has been illustrated in the arguments and misconceptions involving air power's effectiveness in the Korean War.

United States Air Force Basic Doctrine, AFM 1-2 (1955), in clear and concise language outlines the basic truths shown by experience and study to be the fundamentals of air power. This doctrine applies to all elements of our military air power, *not* solely to the United States Air Force. In effect it blueprints air power—what it is, what it can do, and how it should be utilized and controlled in the interest of national economy.

With reference to the USAF basic doctrine manual and in the broad context—the global one—let us analyze certain opinions that have expressed or implied doubts on the essential functions of air power on the basis of interpretations of the Korean air war.

The Charge: Interdiction Failed in Korea

On 13 October 1952 General L. C. Shepherd, Jr., U.S. Marine Corps Commandant, speaking in Washington, D. C., implied that although we had control of the air we were unable to prevent the reinforcement, supply, and resupply of the Communists and that therefore air forces had failed the surface forces.

In a very limited sense this implied failure of the Air Forces might be considered true. But this view of the Korean air war

The capabilities of modern air power are global. Their global impact must be fully evaluated if air forces are properly understood and exploited. Feeling that enthusiasts who attempt to defend air power on the grounds of what did or did not happen in Korea often lose sight of air power's global and indivisible nature, Colonel Ephraim M. Hampton, Deputy for Evaluation, Air War College, examines air power against the yardstick of arduously developed and proved Air Force doctrine. This, he advances, is the only valid approach in an air age of shifting alignments and gradations of war. Only in the context of sound doctrine can the global air capability of the United States Air Force best serve the nation as a deterrent to Communist aggression and as an instrument of world peace and good will.

ignores certain important aspects. No one will deny that the U.N. forces had control of the air. But not everyone really understands what control of the air is, why we had it, and what it actually accomplished in support of our objectives in Korea.

"Control of the air" is defined by the USAF basic doctrine manual: *United States air forces are employed to gain and exploit a dominant position in the air both in peace and in war.*

> The desired dominant position is control of the air. Control of the air is achieved when air forces, in peace or in war, can effect the desired degree of influence over other specific nations. Control of the air is gained and held by the appropriate employment of the nation's air potential. It can be exploited continuously through a resultant ability to exert desired influence on the actions or attitudes of a nation or nations in peace or in war.

This definition is new and strange to the many persons accustomed to thinking of control of the air merely in the narrow sense of "air superiority." Originally "air superiority" referred predominantly to the security that air forces gave to ground forces on or just behind the battleline. Certainly the ability to furnish air support and security to ground forces is undeniably a beneficial aspect of control of the air. But this contribution of air forces to surface strategy is, regardless of the opinions of the surface forces, frequently less important to national security than other missions that air forces perform simultaneously.

Only because we maintained a dominant position in the air over Korea were our forces able to conduct surface actions of the nature of those in the Korean War. This air dominance only partly stemmed from the fact that we kept the Korean skies clear of enemy air forces. More importantly the world, including the enemy, recognized and accepted the fact that we had in being an atomic air striking force that had no equal, one that could be instantly brought to bear when and where required. Although the Communists had massed an imposing jet air force behind the Yalu, no serious effort was made to use this air force as far south as the battleline. Why? Because we had indicated that our response to any such action would be an air campaign against Manchuria in which our atomic striking force might abandon its passive role.

The war in Korea remained limited because (1) the U.N. controlled the air locally, and (2) the USAF maintained a global air dominance. Had the Communists decided to take decisive air action, they would have risked expanding the local conflict into a general war that might bring the full force of our atomic weapons system down upon them. Today this is easier for us to understand than it was in the stress of 1951 and 1952.

The Charge: Close Support Failed in Korea

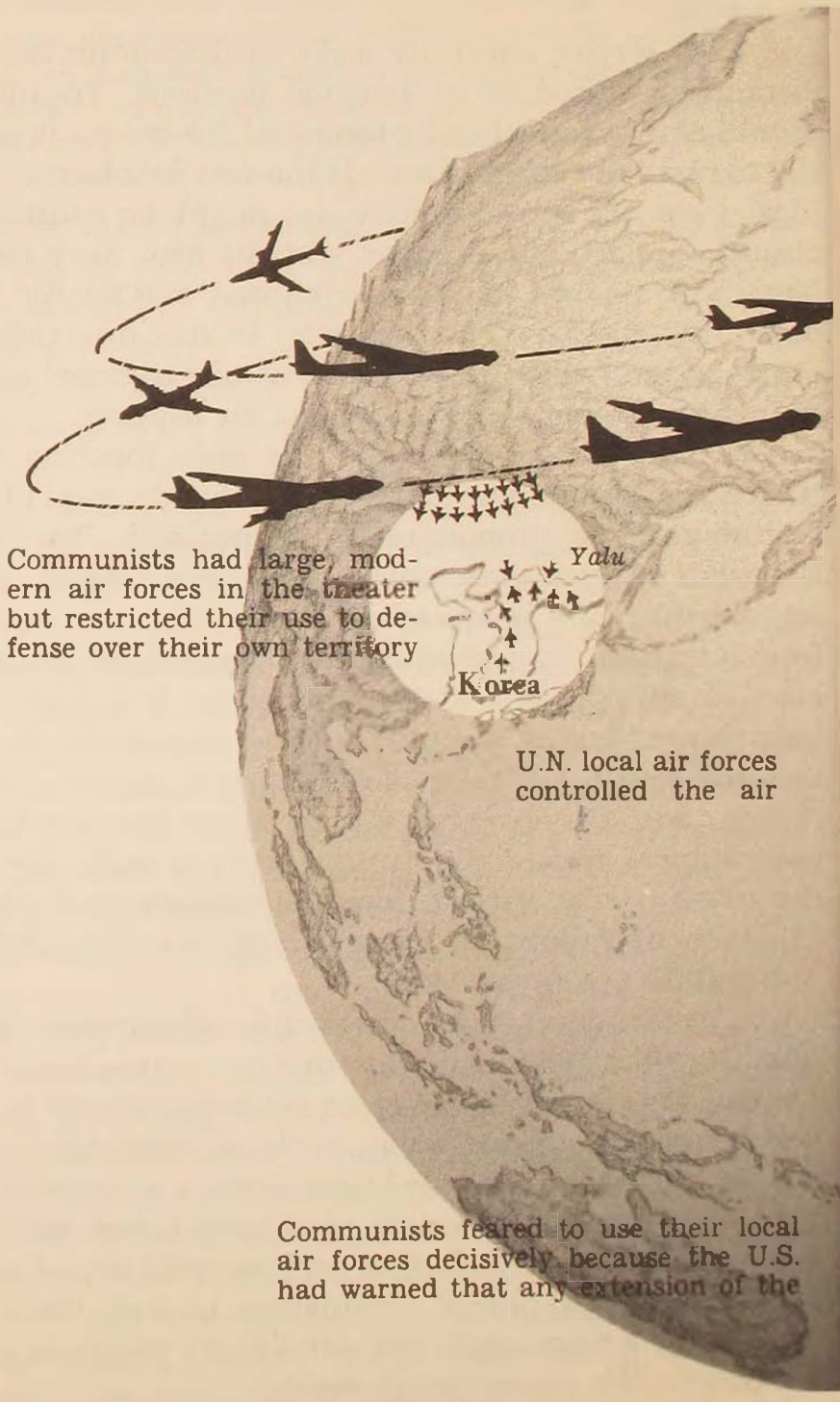
A great deal of controversy has raged over the quality of the close air support furnished by air forces to ground forces in Korea. Typical of this school were the remarks of Colonel W. W. Ford in his article in the March 1951 United States Army Combat Forces Journal. *Here he expressed the view that the Air Force in Korea did not work well with the ground troops, that the Army would have had better close air support had it had its own tactical air.*

Each service naturally seeks to determine the weapons and tactics best suited to its assigned missions. Ideally each service should also have within its forces *all the means* it considers essential to carry out its missions. If the cost involved in attaining this ideal were not so prohibitive, we might be confronted with the absurd spectacle of an Army with its own navy and air force, a Navy with its own army and air force, and an Air Force with its own army and navy. A long step in this direction would be to organize and maintain a segment of our national air power solely to furnish ground forces with close air support.

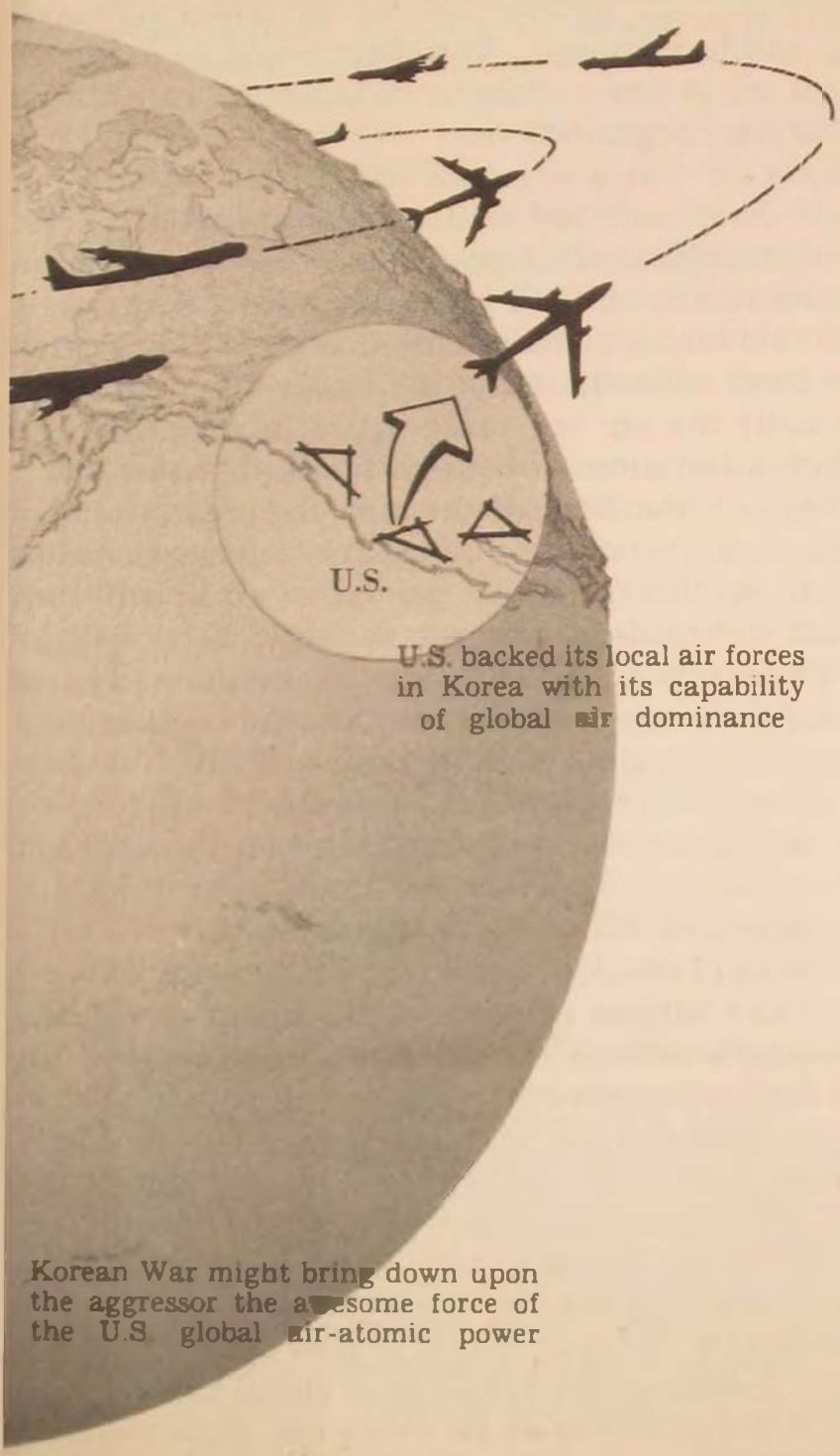
If close air support were the *only* function of tactical air power, the formation of an elite and highly specialized air arm to furnish close air support might be justified. But there are other functions of tactical air power, including control of the air, local air defense, and isolation of the battlefield. Frequently these functions must be performed by the same air forces that furnish close air support, and at the same time. It is basic organizational common sense that the only way air forces can do all these jobs simultaneously, swiftly, and efficiently is to give a single air commander authority over all the air forces that are assigned to that geographical area. Continuing efforts to make air forces a mere extension of the surface forces' firepower and strategy is clear evidence of failure to comprehend the true meaning of the indivisibility of air power.

The Army often advocates close air support of the type and quantity that Marine air doctrine prescribes for Marine ground forces. This lavish use of close air support may be defensible in highly specialized operations such as amphibious landings, but not in large-scale, extended-time ground operations. For the Air Force to attempt a similar close-air-support strategy for Army forces would be an inefficient and wasteful use of air power, even assuming the taxpayers' willingness to foot the bill. It would subvert on a grand scale the Air Force's principle of the unity of air power: *Air forces are an entity.*

Global Air Power Shaped



the Korean War



U.S. backed its local air forces in Korea with its capability of global air dominance

Korean War might bring down upon the aggressor the awesome force of the U.S. global air-atomic power

> The medium in which air forces operate—space—is an indivisible field of activity. This medium, in combination with the characteristics of air vehicles, invests air forces with the great flexibility that is the basis of their strength. In order for this flexibility to be exploited fully, the air forces must be responsive at all levels of operations to employment as a single, aggregate instrument.[1]

If control of our national air power is parceled among the various services, then the effectiveness of air power as "a single, aggregate instrument" will be lost; one of air power's greatest assets, flexibility, will be sacrificed. The effect would be to reduce the capabilities of air power merely to enhance the capabilities of less decisive military organizations.

In this context air forces were not handled as an entity in the Korean War. They were not centrally controlled at a level that could make them sufficiently responsive to obtain in minimum time the maximum return on their great flexibility. Fortunately dominance of our air forces, globally as well as locally, prevented the Communists from seriously contesting by air our position in Korea. Consequently the air war proceeded at a pace that permitted the utilization and control of our air forces—U.S. Air Force, Naval, and Marine—on the basis of the time-honored system of "essential coordination" between commanders of these elements.

In any future conflict involving air forces equipped with supersonic aircraft and nuclear weapons, the time factor will be all important. There will be no time for the committee system of decision making and command control. Yet the complex and cumbersome command structures in Europe and the Far East still rely to a very large degree upon such methods. Modern air forces operate at speeds that demand simple and direct command systems. Our survival may well depend upon how quickly a decision can be made and transmitted to these forces.

The rapid strides in developing nuclear weapons for delivery by tactical air vehicles further emphasizes the fallacy of viewing tactical operations in a narrow instead of a global context. In terms of nuclear destructive power the payload of modern tactical aircraft is rising by leaps and bounds. The time is fast approaching—indeed it may already be here—when the only distinction between strategic and tactical operations will be one of range.

Will we, in the face of this fact, continue to compartment the tactical air weapon and thus gear its employment predominantly to the dictates of surface strategy? To do so is to deny the advantages of air power's flexibility and to ignore its global nature.

In speaking of the flexibility of air forces one must also con-

[1] AFM 1-2 (1955).

sider such additional characteristics as speed, range, and mobility. These inherent characteristics endow air forces with a capability almost exclusively peculiar to them. They need not be physically in an area to exert a powerful influence on that area. The Communists are now taking fullest advantage of this unique quality of air forces by constructing a vast air base complex in China.

> In their efforts to dominate the sky, the Soviets have built up satellite air strengths as well as their own. Of even more significance to us is the large and ever-increasing system of Communist air bases in China. They have realized that the inherent flexibility of air forces is multiplied by a wide network of air bases. Many air bases in China makes it possible for the Soviets to move aircraft in quickly from Russia. Communist air strength in the Far East could be doubled overnight.[2]

Unfortunately for the West this massive construction program is proof that the Communists have also come to appreciate the powerful influence exerted by the mere existence of a network of air fields in strategic locations—influence extending to areas of the world far removed from the geographic location of the bases themselves.

I do not think we are flattering ourselves when we say it is most likely that the Communists learned this lesson from bitter experience with the many checkmates imposed on their aggressive plans by our globe-girdling system of air bases. It would be almost impossible to pinpoint the precise degree to which our global air base system, with its substantial elements of our national air power in position in the NATO area and the Far East and with its facilities for swift and massive redeployment of our air power, had on the course of events in Korea. Certainly the Soviets had to weigh these factors, and certainly they must have been the compelling consideration in their decision as to just how far and in what ways they dared support their junior partner in the Korean War.

The Charge: Air Forces Were Not Decisive in Korea

"Why wasn't air power decisive in Korea?"

This is a question frequently asked by those who do not fully understand the role of air power in the Korean conflict. In the early days of the war our toe hold on the peninsula hung in the balance. If our supply and reinforcement routes to Korea at this time had been jeopardized in the least by enemy air action, it could have been disastrous for our hard-pressed ground forces. But our operations were not hampered. We moved vast amounts

[2]General Nathan F. Twining in a speech to the Pittsburgh Chamber of Commerce, 16 February 1955.

of men, equipment, and supplies destined for Korea into and out of Japan without once having to worry about air attack. We used Japan, highly exposed to air attack, openly and without fear as our advance base of operations. Amphibious operations were conducted without encountering any enemy air opposition. Not so with the enemy. Our air offensive forced the Communists to move supplies and troop reinforcements almost exclusively in the hours of darkness. So heavy a toll did our air forces take of the enemy's troop and supply movements that in the last two years of the war he could never mass enough manpower and supplies at the front to launch and sustain a major offensive. Even for minor actions the Communists were forced to hoard supplies and ammunition long in advance. A limited perspective of air power would attribute these conditions entirely to the presence and actions of our air forces in the Korean area. But there is yet the global effect to be considered. In Korea the record shows that within the limitations imposed upon its use and control, air power accomplished its mission.

If we had based the requirements for air forces exclusively on what happened in Korea and allocated a greater amount of our existing forces to this effort, our dominant global air position might have been seriously weakened. Quite possibly this would have opened the door to disaster. Certainly the returns to our ground forces in Korea from an all-out local air effort would not have been worth the world-wide risk.

The Answer: Return to Fundamental Doctrine

The charges which we have examined are among the most often repeated of the many that have been leveled against the effectiveness of Air Force strategy in military operations. But when examined against the yardstick of fundamental doctrine set down in the Air Force's basic doctrine manual, AFM 1-2, these various charges are clearly shown to stem from misunderstanding and misconception of the true value of air power. Usually the critic has been preoccupied with only one facet of the indivisible role of air power in providing for our future security.

It seems to be an American characteristic to seek the absolute solution. We like to think that no matter what may come we have figured out the "answers" for fighting and winning any big or little war. Until we have such "answers," we are likely to feel uneasy. Undoubtedly much of our progress as a nation may be attributed to this characteristic. But this is also a characteristic that, uncon-

trolled, can lead to serious trouble in this nuclear age. Since any future general war may well be as absolute as anything in this world of ours can be, it has been simpler and therefore much more tempting to find the "answer" and thus "package" our concepts for waging such a total war. Yet this "answer-package" does not apply to conflicts of more limited extent. It is becoming increasingly apparent that we can never be sure in advance exactly where on the face of the globe we may have to fight a "little war" or against what type of enemy. Nor can we be sure what kinds of targets we shall have to hit or under what conditions.

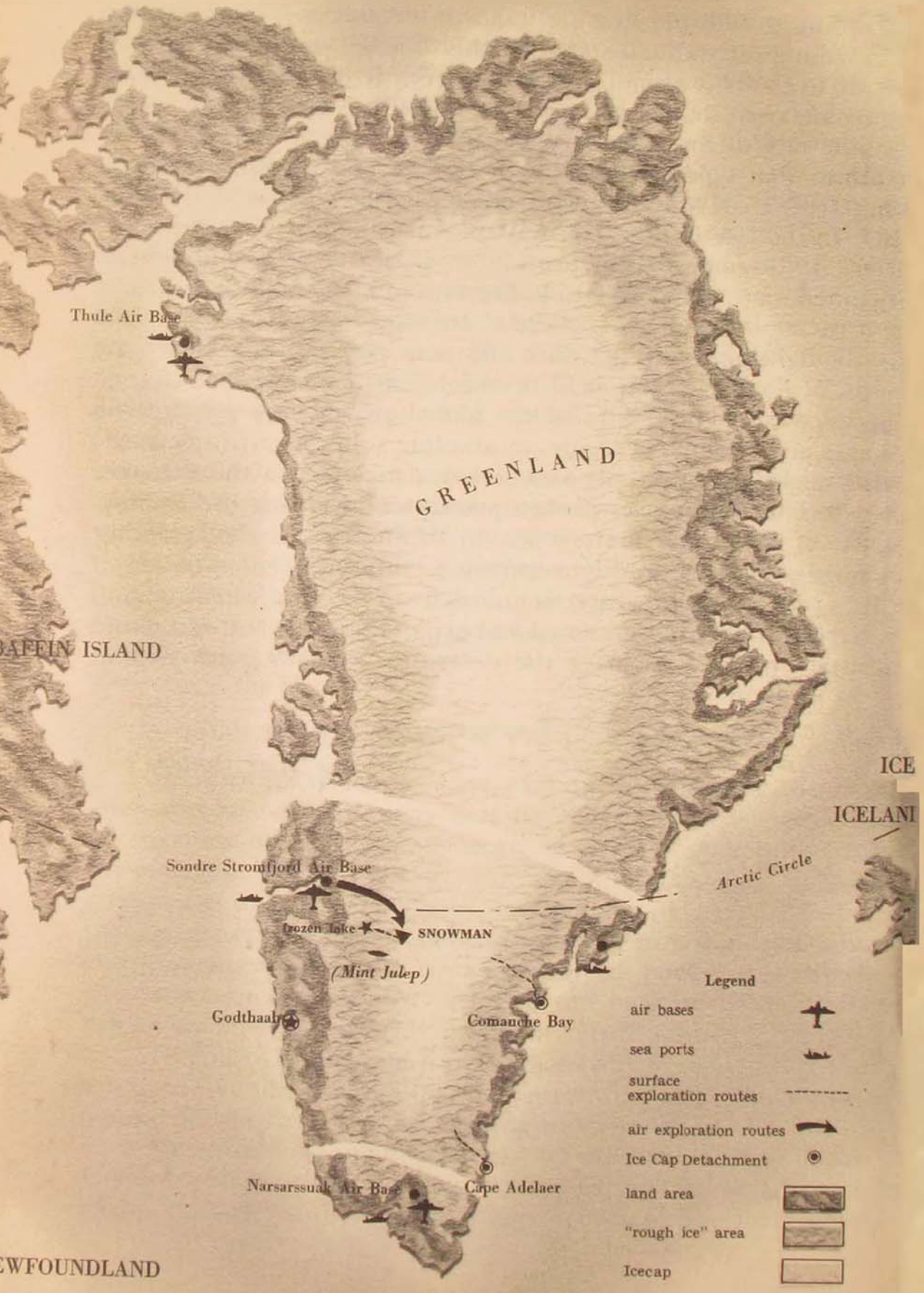
In the face of these circumstances it is difficult, if not impossible, to attempt to blueprint how tactical forces will fight a "limited war," except in terms of certain fundamentals of doctrine. Yet we see evidence everywhere of attempts to seek a pat solution to the fighting of limited wars, efforts to establish neat little patterns of how air power is to be employed in this or that type of "little war." The nature of the global struggle we are now in makes any attempt to secure an absolute solution, with its inevitable rigidity of thinking and action, dangerous in the extreme.

Let us hold to our proven principles governing the employment of air forces. Only if we do this and resist the tempting mirage of package solutions can we retain our freedom of action and vision. General Kuter summed it up recently when he said, "A true air doctrine, accepted and exploited, is the key to a sound military policy. We have the doctrine. Now we must exploit it in a common strategy."[3]

[3]Lt. General Laurence S. Kuter, "No Room for Error," *Air Force*, November 1954.

Air War College

The Greenland Icecap



early Air Force explorations of the interior ice . . .

The Greenland Ice Plateau

A Quarterly Review Staff Brief

POTENTIAL bastion of defense on the northern perimeters of the Western hemisphere, the snow-capped interior of Greenland has challenged explorers for 75 years. But only the development of the airplane has made it readily accessible. With the positive and constructive approval of the Danish Government the United States Air Force has read many secrets of the icecap in the past fifteen years.

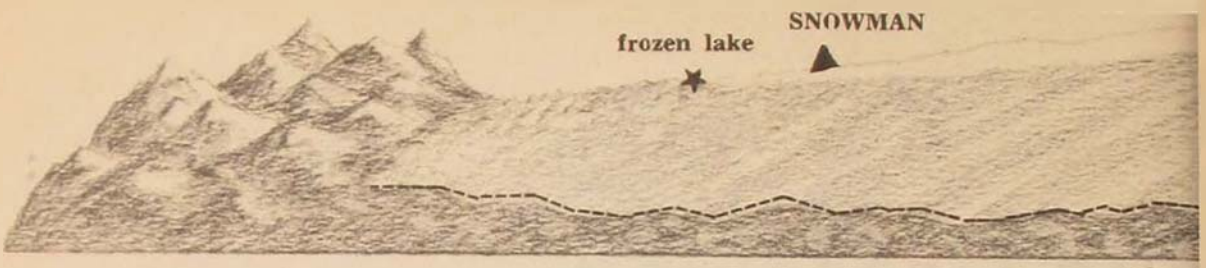
For the early explorers who had to travel over land the interior of Greenland was well protected by its icy outer barriers. Most of the coast line is rock-strewn and rugged, serrated by deep fiords. Beyond the coastal strip lies a band of virtually impassable rough ice, fissured by deep crevices and threatening rapid changes in its surface.

The first expedition to breast these forbidding defenses and arrive on the interior icecap was led by the Danish geographer Nordenskiold in the summer of 1870. The first coast-to-coast transit of the icecap was achieved in 1888 by the Norwegian explorer Nansen. Other crossings followed, and other expeditions explored diverse regions of the enormous icecap. Over the years knowledge of the interior gradually accumulated, and when the coming of the air age made reconnaissance possible from the sky, a rough sketch of the icecap's major lineaments was drawn.

Air Force interest in the interior of Greenland began shortly after the entry of the United States into the Second World War. It was compounded of several factors. Obviously a northern air route to Europe was demanded, with bases along the way to stage the comparatively short-range aircraft of the time on the long journey. In 1941 the Danish-American agreement relating to the defense of Greenland was negotiated. The agreement, according

In southern Greenland a strip across the vast island from Comanche Bay Station to the great wartime U.S. air base Bluie West 8, now Sondre Stromfjord Air Force Base, was the scene of the early efforts of the U.S. Air Force to penetrate to the interior of the great icecap and find ways of operating from its high frozen plateaus.

Cutaway View



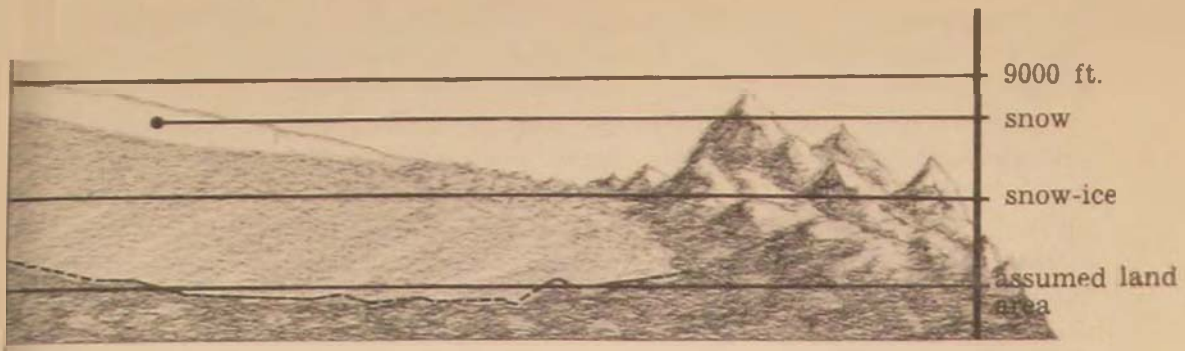
Greenland's icecap is a huge block of ice and snow 1400 miles long and six hundred miles wide. The layers of snow and ice are as much as 8000 feet thick. To the interior beyond the coastal rock and rough ice, the icecap presents a fairly level surface that rises gradually to a crest slightly east of the mid-point. The southern part of the cap culminates in a flattened dome reaching 9000 feet high. Toward the north the elevation falls off to 8000 feet and then rises again to another flattened dome cresting at 10,600 feet. The snow slopes of the icecap are

to which the United States assumed the responsibility of assisting Greenland in the maintenance of its status, permitted the United States to build bases in Greenland to protect the American Continent against any possible attack. Even as the bases were being built, it was obvious that aircraft would be forced down on the icecap in transit and that needful information for rescue parties was lacking. Conduct of air operations in this area also called for weather stations in the interior. Finally it became advisable for one of the Allies to move military forces into Greenland to neutralize the outposts that the Germans had established along its northeast rim.

The first official action within the United States Army Air Forces that indicated interest in the Greenland icecap was a directive issued by Headquarters AAF on 23 June 1942, providing for the organization of an expedition to establish weather reporting and rescue stations. This expedition, which became known as Task Force 4998-A, began operations in the Comanche Bay area in June 1942.

The three officers, seven enlisted men, and three civilians composing the force reconnoitered the rough-ice zone by air and picked out a temporary route through it to the inland ice. After constructing a beachhead station on Comanche Bay shore, the party worked inland some 16 miles and constructed a building to serve as a weather station and as a point of departure for icecap operations. The task force soon found itself too small and too poorly equipped to maintain the advance station and was forced to retreat to Comanche Bay, where it maintained weather observations throughout the winter in spite of extremely poor living conditions. The most positive contribution of that year was assistance in the rescue of the crew of a B-17 that came down on the icecap in a flight along the northern air route.

In 1943 the task force was enlarged to six officers and twenty-three men. It became formally known as the Ice Cap Detachment of the Greenland Base Command. Two coastal supply stations were set up, on the mainland behind Cape Adelaer Island and at Comanche Bay. Plans called for the establishment of three weather-rescue stations on the icecap itself. Two were to be situated on the southern dome of the icecap, one on the northern.



gentle in contour but are frequently scarred by small snow ridges carved by the wind. These ridges, known as "zastrugi," vary in height from a few inches to several feet. The limited observations made in the interior before World War II indicated that in general the weather was much colder than along the coast—with low temperatures plunging to -85° Fahrenheit and high temperatures recorded at 29°—but that visibility was generally good and the wind was considerably less severe.

The indispensable preliminary to establishing the inland station was to discover suitable routes through the rough-ice area. To establish the stations, the routes had not only to be passable for a dog-team party or for a man on skis but open for safe travel by mechanized vehicles to move the necessary tonnage of supplies and prefabricated buildings to the inland sites. For months small parties probed the treacherous rough ice for a path with some degree of safety for the T-15 oversnow tractors.

Explorations at the Cape Adelaer station found no safe way through for the mechanized vehicles. At Comanche Bay station fortune was somewhat better. There, in the fall of 1943 and the spring of 1944, parties attempted to establish a weather station on the crest of the southern dome of the inland ice. The fall expedition reached a point some 42 miles inland before the mechanical troubles that plagued the T-15's forced them to turn back. In the spring another convoy reached 53 miles inland. Here the

In response to reader interest and comment aroused by the* Quarterly Review *Staff Brief on "Project Mint Julep" in the Winter 1954-55 issue, the Editors, with the aid of the USAF's Arctic, Desert, Tropic Information Center, now present the story of earlier Air Force explorations in Greenland. The overland treks of the Ice Cap Detachment, Greenland Base Command, in 1942-44 and the overflight of the rough-ice zone with the pioneering landing and take-off of ski-equipped aircraft on the surface of the icecap by Project Snowman, sent out in 1947 by the Atlantic Division of Air Transport Command, were essential forerunners that established the feasibility of air operations from the icecap and justified subsequent investigation, such as the larger expedition of Mint Julep in 1953. Mint Julep's scientific investigation was in a very real sense a studied confirmation of the vision and an extension of the exploratory findings of the earlier expeditions. Whatever operational value the Greenland Icecap may have in the future is possible only because of the strenuous early efforts depicted in the present story.

convoy cached their supplies and returned to Comanche Bay to load up again and get safely past the rough ice before it deteriorated under the warm season ahead.

Before they could return to the icecap, the detachment received orders that the mission would be considered completed by 1 August 1944. The early termination date forced plans to be modified, and it was decided to set up the inland station at the 53-mile point. On 18 July the permanent building at this site was completed. A temporary weather camp was set up 24 miles further inland, and in a one-week exploratory trip from it two members of the expedition traveled another 92 miles inland to a point west of the crest line and returned.

On 1 August the expedition returned to Comanche Bay, and in January the Ice Cap Detachment was returned to the United States.

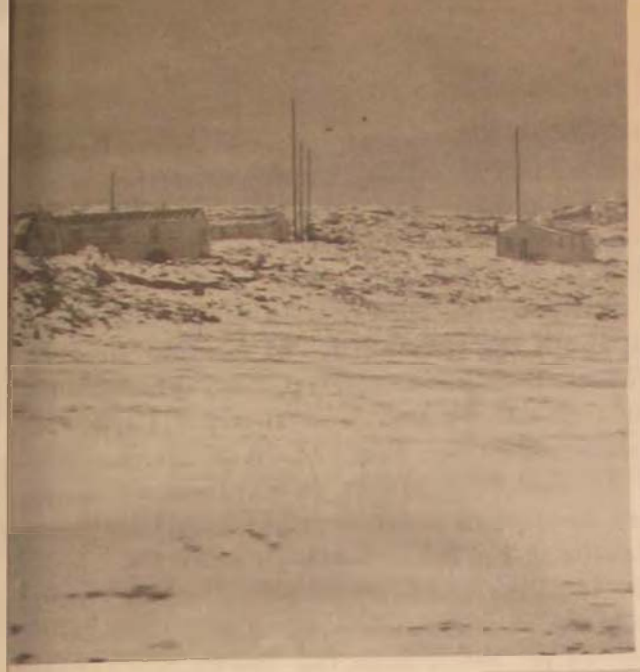
By the opening of 1945 the war in Europe had turned decisively in favor of the Allies. In 1944 the last of the German weather stations on the northeast fringe of Greenland had been abandoned, and danger no longer existed from that source. As the war build-up shifted to the Pacific, demand rose for all available shipping. Supply of an arctic exploration would have been exceedingly difficult, and for the remainder of the war no further attempts were made to set up inland stations on the Greenland icecap.

Viewed in retrospect, the accomplishments of the Greenland Ice Cap Detachment might seem meager and inconclusive. No wide-scale exploration of the icecap itself was made. No one of the three projected inland stations was established. In fact the expedition penetrated only once as far inland as the sites of the projected stations, and that in one quick lunge by a two-man team. But the results from the Ice Cap Detachment, though principally negative, were not as meager as they may at first have appeared. Through extended stay in the area and many experiences with the weather and terrain of the rough ice and the inland ice, the expedition reported extensively on the problems of exploration in Greenland and did much to mark the character of future explorations.

The trials of the Ice Cap Detachment were sufficient to indicate that no stable inland sites could he organized, supplied, and maintained if their connecting link with the coast was to be on the surface and over the rough-ice area. The experiences of the Ice Cap Detachment further highlighted certain deficiencies of equipment to be remedied before travel on the icecap could be made with any confidence of success.

But Greenland was not forgotten in postwar Air Force considerations of hemispheric defense. The three coastal air bases that had been constructed there in the early years of the war were maintained. Aircraft still flew over Greenland on the arctic route to Europe, and several rescue operations on the icecap by the 1st Arctic Search and Rescue Squadron in the years 1945 and 1946 added bits of information to the still limited fund of knowledge.

By 1947 international optimism was dwindling about the chances of peace. Europe again became a focus of international tension, and the emergence of the Soviet Union as the chief threat to the security of Western civilization emphasized again the importance of the Arctic and of its approaches. In June of 1947 two Air Force general officers, Major General William H. Tunner, then Commanding General of the Atlantic Division of Air Transport Command, and Major General Earle E. Partridge,

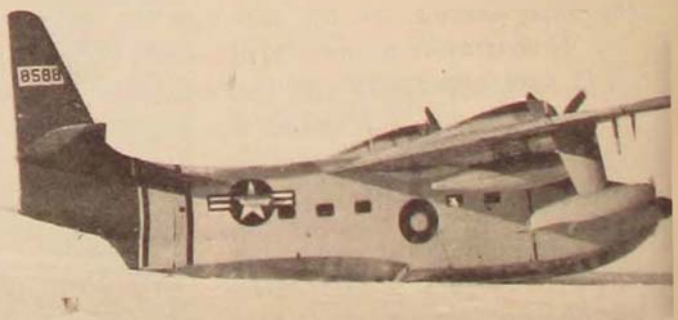


The Ice Cap Detachment Expedition. In the summer of 1943 the small group of men at Comanche Bay on the east coast of Greenland was reinforced for a sustained attempt to penetrate the rough-ice zone and establish weather-rescue stations on the icecap. By October all the buildings at Comanche Bay Station had been completed and were in use (top left). But winter was drawing on, and frequent heavy snowstorms soon left the radio masts as the only visible sign of habitation, with the buildings completely covered (top right). In the spring of 1944 teams crossed the rough ice and made their way 53 miles inland. In the center photographs a convoy of T-15 oversnow tractors pauses 8 miles out as the crews map their strategy for getting supplies to the advance base. At the 53-mile point a weather station (bottom) was constructed in July. A brief series of observations was made here before personnel returned to Comanche Bay on 1 August.

then Assistant Chief of Staff for Operations, Headquarters USAF, were flying south from Thule toward Narsarssuak Air Force Base on an inspection trip. As the aircraft passed over the vast snow-covered area of the Greenland icecap, General Tunner was impressed by the smooth flat areas of the icecap in contrast to the rough, mountainous coastline that bore the existing air bases. From the air the interior of Greenland appeared to offer ideal sites for landing strips. When he asked about the possibilities of landing aircraft on the surface of the icecap, General Tunner discovered that information was practically nonexistent. Both General Tunner and General Partridge were convinced of the necessity to determine if air bases could be constructed.

General Tunner immediately decided to organize an exploratory expedition, using ski-equipped transport aircraft to jump over the rough-ice area along the coastline and attempt landings on the smooth interior ice. This was the beginning of Project Snowman. As plans developed, Project Snowman was set up as a 30-day exploration of a 50-mile area of the Greenland icecap by an 8-man team that was to be flown into the icecap area from Sondre Stromfjord Air Force Base in ski-equipped C-47 aircraft and to be supplied by air for the duration of their stay. Permission for the exploration having been granted by Denmark, the expedition took off from Westover

Since Greenland Base Command Ice Cap Detachment and the Snowman expeditions, Air Rescue Service of Military Air Transport Service has conducted experimental as well as actual air rescue operations on the icecap. The first SA-16 aircraft to land on the icecap, in August 1951, rests on the snow at an experimental survival camp, at about 5500 feet elevation, near the Snowman-Mint Julep sites.



Air Force Base on 29 July 1947. By 2 August the entire party had assembled at Sondre Stromfjord Air Force Base in Greenland.

For three weeks, until 21 August, a major activity of the expedition was aerial reconnaissance in a B-17 to search for a suitable site where ski-equipped C-47's could land on the icecap and a camp could be set up for surface exploration of the icecap. It was discovered that within 100 miles north or south of Sondre Stromfjord Air Force Base no route through the rough ice existed that was good enough to pass mechanized equipment. Yet since no landings had ever been made on the icecap, a land route back to Sondre Stromfjord Air Force Base was essential if the aircraft could not take off from the icecap.

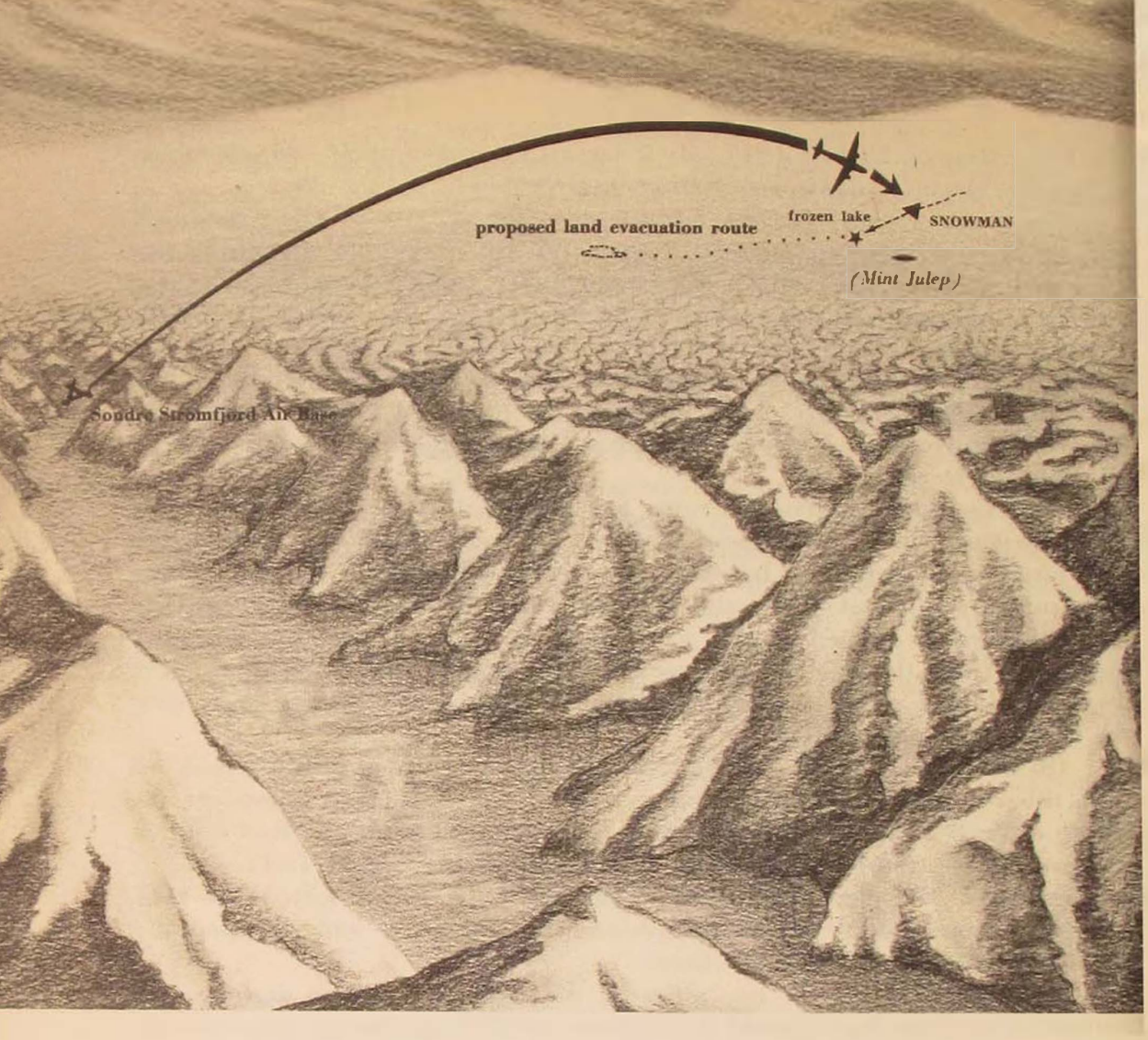
Need for a land evacuation route was important in determining how far to the east of Sondre Stromfjord the icecap site should be. A suitable site was found approximately a hundred miles east of Sondre Stromfjord. Some forty miles to the west of the site a frozen lake was spotted. The best land evacuation route seemed to run west from the camp site to the lake and then west from the lake to an area near the rough ice where there were several bodies of water on which a seaplane could land to fly the party over the rough-ice zone to safety.

On 21 August one of the two C-47's assigned to the expedition took off with the necessary equipment and personnel to establish a camp on the icecap. The B-17 preceded it as guide. The chosen site for the first landing was found obscured by an overcast, forcing the aircraft to fly farther to the east in search of a clear site. When a substitute had been located, the B-17 dropped a parachute flare to determine wind direction and dropped two bags of lampblack for snow markers.

Making a dry run at low altitude, the C-47 observed a discouraging pattern of zastrugi that showed the surface forbiddingly rough from the air, but there seemed nothing to do but take the plunge. The C-47 came around and touched down on the icecap at 1420, two hours after the take-off from Sondre Stromfjord. The landing was smooth. And the precaution that had been taken to land with the skis in the retracted position so that the wheels protruded approximately six inches through the skis to assist in absorbing shock proved unnecessary. Indeed the friction from the wheels in this position made it impossible to taxi the aircraft.

Passengers and equipment were unloaded, and at 1920 the C-47 turned into the wind to attempt the take-off. This proved to be less simple than the landing. As soon as the aircraft had come to a stop, the skis had frozen solidly to the snow and no amount of mechanical power could make them turn loose. This problem was solved by inserting strips of aluminum pierced-plank matting under the wheels and then clearing the snow from under the skis, an operation that took the better part of two hours. (This difficulty was later eliminated by parking the aircraft on a ramp of aluminum pierced-plank matting.) Again there was trouble. Once the aircraft was moving, it could keep moving without freezing to the snow but it was difficult to get up enough ground speed to take off. After a long run the C-47 finally rose from the snow.

The primary difficulty was the 7000-foot altitude of the camp site, which so limited engine power that it could not overcome the resistance of soft snow surface to skis. On days when high temperature softened the snow and



when there was little wind, the C-47 could not get up to speeds more than 50 to 55 miles an hour even with light loads and full engine power. When JATO bottles were used for additional power, speed increased about 10 miles an hour, but still the skis would not break loose from the snow. The pilot would finally have to break them loose from the snow by abrupt movement of the controls and stalling the aircraft off the ground. Once in the air the engine power and the JATO rapidly gained the necessary speed. During the 26 days in which the ice camp site was in use the C-47's made seven round trips from Sondre Stromfjord Air Force Base to the site, and six of the trips involved landing and taking off from the unprepared snow surface of the icecap.

Once safely landed at the camp site, the first project for the expedition was the erection of the temporary camp. Three-man tents similar to those designed for the Byrd expeditions were erected. Radio communication was maintained with Sondre Stromfjord Air Force Base, as well as with Narsarssuak and the Danish town of Godthaab.

Next came the surface explorations to take a fair sampling of icecap terrain and to explore the frozen lake 40 miles to the west for a suitable landing area for wheeled aircraft. Two 2-man parties were organized to go out with dog sleds. The first team departed the camp on 27 August and set out toward the east, with the view of going 50 miles in that direction.

Project Snowman was a unique demonstration of the ability of air power to use the air medium in reaching areas otherwise inaccessible to man. Few places in the world are better guarded by rugged natural barriers than the Greenland icecap. As the artist has shown (top left), at Sondre Stromfjord Air Force Base the deep fiord fortunately penetrates the first barrier —the coastal mountains (top right), made jagged and precipitous by thousands of years of glacial erosion—but the rough ice (bottom), remains impassable ahead, a treacherous belt of crevasses and fissures produced by the fierce winds and by internal tensions in the ice as it moved over ridges and valleys of the base rock. For man to use the smooth surfaces of the icecap inland from Sondre Stromfjord AFB, he must yet fly personnel and material over the rim of rough ice and land on the snow or on strong, smooth lake ice. Snowman tested this concept.

The ski-equipped C-47's had no trouble in landing on the icecap, but take-offs were more of a problem. As soon as the aircraft stopped, the skis froze to the snow and could not be worked loose. The answer was to dig the snow from under the wheels, which extended in part below the skis, being careful not to disturb the snow under the skis. Lengths of aluminum pierced-steel matting were then slipped under the wheels, and the remaining snow was shoveled from under the skis, permitting the wheels to settle on the support of the planks. In subsequent landings the aircraft was parked on a ramp of matting. The six take-off runs made differed considerably depending on the wind speed. The shortest run, 1135 feet, was made in the face of a 40-mph wind. On one calm day the take-off run stretched out to 10,320 feet. Variations in the surface and in the cargo loads also had effect.

Once the camp had been set up, several days had to pass before either men or dogs could move around without becoming quickly fatigued in the thin air at the 7000-foot altitude. It was a week after the initial landing before the first team was able to set forth from camp by dog sled to explore the adjacent surface of the icecap.

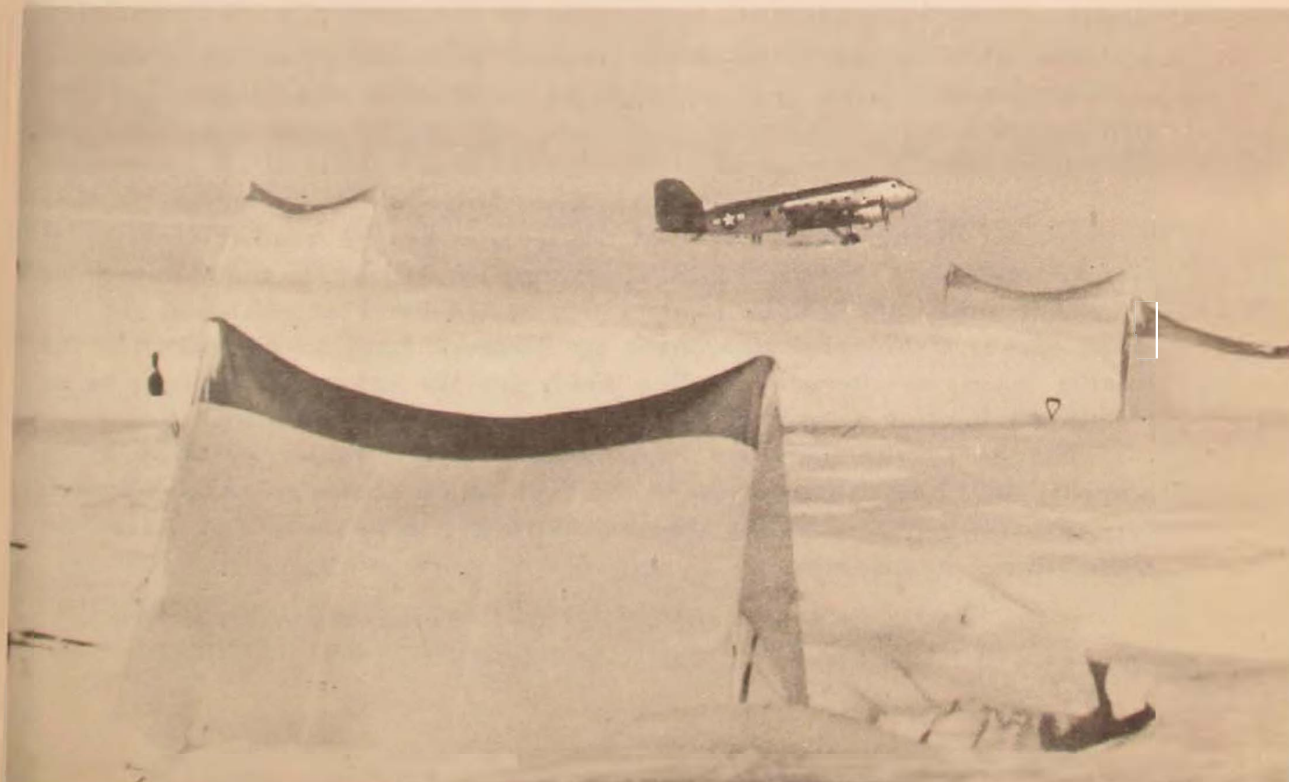
Because of unusually bad weather it had hard and slow going, covering only 36 nautical miles and back in eight days.

The second exploratory party left the camp on 8 September, heading due west toward the frozen lake. Early on the third day the team arrived at the lake and remained there for three days. Examination of the surface of the lake showed that the ice was smooth and extremely thick, offering excellent landing for wheeled aircraft. Radio contact was established, and on 12 September a C-47, acting on the advice of the ground team, landed wheels down on the lake without difficulty. It picked up the team and returned it to the camp that same day.

Thus was completed the basic mission of Project Snowman. All personnel and equipment were evacuated from the icecap in the C-47's on 15 September and returned to Westover AFB five days later. In the 26 days the expedition had spent on the icecap it had proved that ski-equipped aircraft could land and take off from the unprepared snow surface of the icecap and that at least one of the frozen lakes that dotted the western fringe of the smooth ice area was suitable for landings by wheeled aircraft of considerable size. It was this latter discovery that prepared the way for the later Project Mint Julep.

The results of Snowman definitely suggested that it was possible to construct temporary or even semipermanent air bases on the surface of the Greenland icecap. This was not to say that it could be done immediately. More information on the weather, the structure of the snow, the terrain features, the effects of the warm season upon the surface, and much other data would have to be gathered before any large-scale investment could be contemplated.

Diplomatic considerations were also involved. In 1949 the United States, Canada, and ten European countries, among them Denmark, signed the North Atlantic Treaty. In the over-all strategic picture of allied defense, Greenland was for geographic reasons bound to come into the foreground. The Communist attack on South Korea in 1950 became a decisive factor in



speeding up NATO planning for the defense of Greenland, and in the spring of 1951 negotiations between Denmark and the United States resulted in defense-of-Greenland agreement that replaced the 1941 agreement. Under its terms the Danish Government gave permission for the United States to establish and operate such "defense areas" as the two governments, based on NATO plans, might agree to be necessary for the defense of Greenland and the rest of the North Atlantic area, and which Denmark would be unable to establish and operate singlehanded. The other members of NATO were also granted rights of access to the defense areas in Greenland in fulfillment of NATO plans. Another provision of the agreement gave the United States permission to make technical and engineering surveys in selecting defense areas in Greenland after obtaining Danish approval. Immediately after the conclusion of the agreement, the construction of the Thule Air Base began on the site granted by the Danish government. And it was under the last quoted provision that the Danes authorized the 1953 expedition of the USAF, "Project Mint Julep."

As recounted in the Winter 1954-55 issue of the *Air University Quarterly Review*, Project Mint Julep, directed by Headquarters USAF and under the supervision of Air University's Arctic, Desert, Tropic Information Center, returned to the frozen lake area some 90 miles southeast of Sondre Stromfjord Air Force Base and 40 miles west of the Project Snowman site. From May through August 1953 a 12-man team of research specialists made a series of scientific tests on the frozen lake and in the area surrounding it.

Mint Julep discovered that ridges between valleys proved to be better sites for air strips than the frozen lakes. The ridges were basal glacial ice, strong enough to support landings by any aircraft now in operation. Further explorations demonstrated that near the Mint Julep site the exposed glacial ice extended in a belt some ten miles wide at an altitude of 5000 to 6000 feet. Aerial observations and photographs suggested that this same belt extended along the fringe of the rough-ice area for hundreds of miles to the north and south along the west coast of Greenland. Many of these strips of exposed glacial ice could probably be used as landing fields in all seasons, while others would not be usable during the four to six weeks of summer weather.

The discovery of a choice of virtually ready-made landing strips for any size aircraft in an area of much better weather and in territory that affords much better approach conditions than do the coastal air bases of Greenland offers a number of possibilities in many fields of air operations. Such landing areas are the logical bases from which to launch further explorations of the snow surface of the icecap. Future weather observation stations, air rescue operations, and other support activities in the maintenance of global air routes will be made much easier by their existence. In the event of war their value to combat air forces is hard to overestimate. As staging bases, as alternate landing fields for the sake of dispersal, or as emergency landing areas they offer a wide range of possibilities.

Thanks to the generous cooperation of the Danish government in allowing the USAF to participate in the exploration of this great Danish territory of Greenland, the NATO Alliance is stronger in its posture of defense in the northern hemisphere.

Atomic Weapons and Theater Warfare

COLONEL ROBERT C. RICHARDSON III

Part III: Atomic Weapons and Tactics, Organization, and Doctrine

MAJOR new weapons systems have always changed the structure of combat forces. In the past such changes came about gradually. New doctrines, tactics, and organizations were developed by trial and error—generally in battle or as a result of combat experience with the weapons. In today's world this leisurely process invites catastrophe. The very power and nature of the atomic weapon decree that the side best equipped during the first days of a war both to absorb and deliver these weapons

that the necessary change is to be merely a shift from one fixed condition to another. On the contrary, the change we now face is far more complex, involving a readjustment not only from the old to the new but from the fixed to the fluid. Henceforth we will have to modify tactics, organization, and doctrine progressively to keep step with the evolution of weapons and their availability to both sides. It will be a process of constant change in which one optimum solution exists only when related to one point in time.

We saw in Part I of this study why atomic weapons will inevitably become a normal part of our military arsenal. We also saw why this development need not necessarily mean that future wars and the destruction of civilization are synonymous.

In Part II we discussed the concept of atomic warfare, par-

ticularly as it stemmed from the presence of accumulated stockpiles of such weapons on both sides. The likelihood that the war and its decisive phase would begin at the same time emphasized the need for D-day readiness to absorb and to deliver, as well as to have in being, already prepared in peacetime, the plans for the exploitation phase.

THESE factors will have a far-reaching impact on tactics, organization, and doctrine—the posture of the forces. It would be presumptuous to attempt to draw final conclusions at this early stage in the development of this subject. What we can do is analyze the situation caused by the introduction of atomic weapons in quantity into the land-air battle. We can then try to isolate some of the obvious problems that this threat will present and to derive a general indication of the nature and rate of the changes that will have to be made.

First attempts at analyzing a hypothetical land-air battle in which atomic weapons were used in reasonable quantities produced predictions of fantastically high losses. Planners seriously debated the outcome of the battle in the standard terms of having advanced or retreated. Yet on each side only a very small percentage of the forces had survived the decisive phase. This was clearly theoretical. The most elementary experience with human endurance under combat conditions suggests that such a battle would have been decided long before both contestants had deteriorated in strength to the extent of practically committing mutual suicide.

No sound plan can contemplate the probable loss of the bulk

In Parts I and II of "Atomic Weapons and Theater Warfare," published in our Winter issue, Colonel Robert C. Richardson III, of the Office of the Air Deputy, Hq SHAPE, assumed that a future war might begin with a mutual atomic blitz designed to knock out opposing forces in a few days. He outlined the drastic revisions this assumption imposes on planning, strategy, deployment, tactics, and supply of surface and air forces in an overseas combat theater. Now, in Parts III and IV Colonel Richardson analyzes the impact of these revisions on the posture—tactics, organization, and doctrine—and the survival of air, land, and naval forces committed to combat under atomic situations. He points out the three basic elements that will form future power equations: (1) the atomic stockpile, (2) "control of accessibility"—the capability to deliver atomic weapons to selected targets and to deny delivery by the other side, (3) the conventional forces necessary to support effective delivery of atomic weapons and to prevent the enemy from advancing into vital friendly areas before the atomic attack can control his aggressive operations.

of the forces during the initial operations. This would leave no margin, either for error or for exploitation of success. Caution dictates that national security—which in future will rest more heavily than ever on the outcome of major military operations—not be governed by one throw of the dice. Yet we would be doing just that if we passively accepted the loss rates foreshadowed by the simple addition of atomic weapons to modern arsenals and did not attempt any compensating adjustments in the posture of our forces.

Unless we readjust military formations to the atomic threat before D-day, unit commanders will themselves readjust to survive the onset of the war. With each unit improvising its own survival plan, effects upon operating rates, striking power, and ability to accomplish the mission will become completely unpredictable. No formation endowed with human discretion could be expected to continue to present an unnecessarily vulnerable posture in the face of inevitable destruction. After the first attack, surviving elements can be expected to readjust as best they can. Their first thought will be to reduce their future losses to tolerable limits, notwithstanding the effect on operations of their modified posture.

It could be argued that well-trained organizations—particularly regular formations—would continue to fight effectively regardless of the degree of loss that they sustained. Even if this were true—if all our forces stood fast on a do-or-die basis and accepted the losses inflicted upon them—it seems likely that a too-rapid deterioration rate would swamp command and communication echelons with problems of disaster control, rehabilitation, and recuperation. These and psychological and morale problems might be of such magnitude as to prevent the coordinated direction of the war effort. This could well occur while there still remained a substantial theoretical capability, in terms of inventory, that was superior to that of the enemy at the time.

In short, if we neglect in peacetime to adjust the posture of our forces to the atomic threat, we will not only cost ourselves an indefensible number of casualties, but may also jeopardize the outcome of the war. If not adjusted in an atomic-war posture, forces will (1) readjust themselves with unpredictable results; (2) lack the recuperative power to exploit any success achieved in initial operations; and (3) suffer paralysis of command and communications because of excessive destruction of forces and resources in a short period of time.

Thus the finger is pointed at the posture of our forces—their physical presentation to atomic attack—as a new variable in the

planning equation. It is clear that from now on we must modify the physical presentation of our forces to atomic attack to fit a given time, magnitude, and nature of atomic threat. The importance of this factor *as a variable* has only recently been understood. Traditionally plans and operations were developed by the interplay of two basic variables, the forces or resources and the mission or task. In conventional war plans and operations the posture of the forces was generally treated as relatively constant for any given era. This was not because we failed to appreciate that major changes in posture would have an effect on the outcome of such plans or operations but because such changes were long-term, gradual affairs. Atomic war has introduced another major variable in the planners' problem:

Conventional war: Forces + Mission = Plan or Operation
Atomic war: Forces + Mission + Posture = Plan or Operation

Since the enemy has an atomic capability we have no alternative but to readjust our organization, tactics, and doctrine—our posture—sufficiently to ensure our survival if he should elect to exploit that capability. Readjustment is indicated even if it means the progressive abandonment of a conventional capability for large or small wars. As discussed in Part I, we find ourselves face to face with the inevitable use of the atomic weapon in any future important conflict.

In our search for guidance in readjusting posture we must keep in mind the objective that we seek. At first it might appear that the sole purpose of modifying posture is to achieve security and survival. This is unquestionably one of our objectives. But it should not be considered the end objective. As planners of our defense in a war where the existence of Western civilization would be the stake, we cannot allow the question of casualties to be our sole determinant. Rather we must take the larger view of what effect such casualties or losses will have on our operational capability and hence on the accomplishment of the mission. The true objective is to balance our survival capability with operating effectiveness under any given set of conditions. Our minimum goal must be to remain above the threshold of maximum tolerable loss—losses a force can sustain during any given period and still maintain effectiveness.

If it were possible to establish a valid maximum limit to tolerable loss, the survival problem would be greatly simplified.

We would possess minimum criteria as to the effectiveness of various postures at any given time. While this possibility should be given further study, particularly by competent operational analysts, there are so many immeasurable factors involved, such as psychological conditioning, that it does not seem practicable now to establish any valid limits for readjusting tactics, organization, or doctrine.

In the last analysis it seems clear that there are only two valid principles for surviving atomic attack. The most important is not to present a fixed or worthwhile target. Next, if presenting a fixed, known target is unavoidable (*i.e.*, runways, barracks, ports, cities, etc.), the forces should *not* be on the target if and when it is hit.

The first aim, not to present a target, can be achieved in two ways. We can decentralize our forces so that no element subject to destruction by one weapon is worth that weapon's expenditure in light of stocks available. Or we can rely on a combination of dispersion, mobility, and cover to prevent the enemy from pinpointing his target, regardless of its size or worth. Since our greatest concern is the initial surprise attack, we can greatly increase our chances of survival by minimizing the number of worthwhile targets attached to known, fixed geographical points. We must compel an enemy either to reconnoiter before striking—thus giving us warning and a chance to counterattack his delivery forces—or to launch haphazard and wasteful strikes.

The second aim, not to be on the target when hit, can be achieved only by exploiting our advantages of warning. Our forces will still be wedded to a good many fixed targets for some time to come, particularly to runways, barracks, ships, and ports. This places a premium upon the ability to obtain some warning of enemy attack and to exploit that warning for survival purposes.

Even when the enemy is granted the initiative, there is a limit to the degree of surprise that he can achieve. He cannot completely prevent us from using the warning supplied by our radar. To this extent we have the power to prevent total surprise. There are many other considerations that, properly exploited, should give us the benefit of further, though highly equivocal, warning. With this much warning we can protect our forces by evacuating obvious targets before they can be hit. While this measure will require a high order of readiness, adequate mobility, and dispersal plans that can be implemented on very short notice, it promises to be useful under some circumstances.

Increased mobility, a higher standard of alert and readiness,

organizational adjustments to exploit both of these, and the ability to live and operate as much as possible away from known, fixed geographical points constitute definite objectives in readjusting the posture of our forces for atomic war. These general indications apply to all forces alike. But beyond this point the problem of atomic posture will be different for each military service. Since there is no common solution, we have to consider not only the nature of the force but its general location with respect to the enemy, its role—and hence its value to the enemy as a target—and the dependence of the force concerned on known geographical points that can be preplotted for attack.

Land Forces. The problem in the case of land forces is undoubtedly the most complex. Any changes in the posture of land forces, particularly in organization, equipment, and dispersion, must automatically entail changes in tactics and doctrine, since land forces will be obliged to fight in whatever new posture is introduced.

A first objective might be to adjust the posture of land formations so that no one weapon can be expected consistently to neutralize any large tactical force responsible for the defense of a major sector. That is, a land organization controlling both forward and reserve elements in one sector and having sole responsibility for a sector of the front should be so organized and disposed as to have a high probability of continuing its defensive mission under normal atomic attack conditions. This does not mean that lesser elements might not be totally destroyed if located and bombed. The aim is to retain the continuity of the front. One weapon should not be allowed to create such a complete breach in the line that some other organization must be diverted from another mission to replace the loss.

On land the achievement of these aims indicates a need for greater dispersion with attendant increases in mobility and in communication facilities. Combat units can no longer maintain weapons systems and vehicles with heavy logistic "tails" requiring fixed lines of communications and concentrations of support vehicles and stocks. These weapons systems are incompatible with the basic need to present a minimum target and to increase mobility. This is particularly true of the heavy drag imposed by conventional artillery and by the fuel and supplies required if mobility takes the form of an increase in heavy vehicles and armor.

The trend should be toward small, economical, and light transport coupled with airlift. Firepower previously provided by massive artillery action must in the future come from a proper

balance between very light weapons and atomic devices. Only through the concentrated power of atomic weapons can we hope to get the desired effects without handcuffing ourselves to mass and quantity.

The concentrating of land forces to an extent that they present atomic targets can be attempted only under cover of darkness or if an intelligence black-out can be maintained. This means that land forces will probably be faced with a tactical dilemma. They must be able to concentrate forces for an advance against a defended enemy position and yet be able to disperse before atomic attacks. If a battle develops in a prepared area between two major land forces when both have adequate atomic means, the side on the defensive will have the advantage so long as the availability of weapons to both sides remains relatively constant.

Naval Forces. In the case of naval air forces the carrier itself is the primary concern. But here the survival solution must differ from that of land-based air, since the passive defense measures that carriers can adopt are limited. In the last analysis carrier survival will probably depend upon improved active defenses and upon keeping carriers well out of areas where they can be readily located and attacked—areas where the offense has a distinct advantage over the close-in defense.

Carrier air survival measures seem to fall mostly in the category of not presenting a target—or not being located without prior enemy reconnaissance. The fact that they are not constantly at a known geographical point gives carriers a distinct advantage over fixed bases, particularly in surviving a D-day surprise attack. On the other hand the ability to get off the target—the ship—is denied naval air as a useful survival measure. Loss of the ship entails also the loss of immediate support, maintenance, and operating facilities necessary for continued effectiveness of the unit, even though the aircraft themselves might be away from the carrier at the time of the attack. A greater percentage of land-based air establishment can evacuate its base when threatened and then can return if the threat fails to develop or move to a secondary site should the fixed establishment be destroyed. Moreover, land bases also have a rehabilitation or salvage value regardless of the damage sustained.

Greater intervals between ships in convoy will be required for naval surface forces. When required dispersion within a convoy becomes so great that close-in submarine protection by accompanying escorts becomes impractical, the convoy system will have to be re-evaluated as to its relative worth. A careful balance between dispersion and protection will have to be struck, particu-

larly at night. This will introduce new problems of communication and control of surface movements.

Concentrations of ships in ports present obvious known targets that must be minimized. In forward areas idle ships being unloaded or awaiting unloading will certainly be incompatible with survival. The use of secondary ports and across-the-beach unloading will tend to reduce the number of fixed preplottable targets that the sea line of communications normally presents. Again, once they are located there is little that these surface forces can do to get off the target. Emphasis must therefore be on minimizing the worth of any one ship or concentration of ships as a target in light of the probable enemy stockpile and in avoiding areas where its location is likely to be known to the enemy.

Air Forces. For air forces, with which we are particularly concerned since they constitute our primary means of retaliation, survival measures come more generally under the category of passive defenses. They involve dispersion, mobility, alert and evacuation planning, and, in selected instances, increased physical protection for materiel and personnel. The atomic threat to air forces need only be considered as it applies to the base itself at this time. Thus the problem is somewhat simpler than in the case of land forces. The measures to be taken to reduce the sensitivity of our units and of their bases need not necessarily entail major changes in the combat or in-flight doctrine, although they may affect sortie rates.

The principal problem on the air side stems from dependence on fixed runways. The base—more particularly the runway—violates in every respect our first principle of not presenting a known, fixed target. In fact it constitutes the perfect fixed target. Thus the obvious goal is ultimately to eliminate the need for such runways and the accompanying base installations. But for some time to come we are wedded to runways, so we must go to our second principle of not being on the target when hit. Here we must first consider decentralizing our operations to maximize the number of fixed targets, since we cannot eliminate them. Secondly, we must be able to exploit any warning by evacuating these certain objectives at the critical time, while retaining an operational capability.

A combination of these two measures is possible through increasing our normal off-base dispersal activities outward from the fixed target. The worth of this expedient will vary with the relationship between the size of the enemy's weapons and the distances that we can practicably disperse to without unduly reducing our

effectiveness. This measure would seem to serve a useful purpose for some time to come, particularly if we can develop some assurance of warning and a land mobility in our aircraft and heavy equipment, so that we do not need reinforced taxiways for off-base dispersal.

The alternative of going to more and more bases with less and less equipment on them seems to me to have little appeal from the long-range survival standpoint, particularly in forward areas and in theater warfare. So long as we know that we can occupy more bases than the enemy has weapons to allocate against our air complex, we are achieving protection. But since it seems reasonable to assume that one can build bombs quicker and more cheaply than bases, a race of this nature shows a profit only as it relates to a limited enemy capability. It does not further either of our basic principles. It simply creates more known fixed targets, without directly improving our ability to evacuate them when they are subjected to attack.

Conversely a progressive increase in off-base dispersal, along with the organizational changes minimizing centralized exposure of equipment and personnel, would seem to show immediate benefits. If we disperse from the aiming point—the runway—to points beyond the destruction diameter of one average weapon, an attacker is obliged to choose between destroying the runway or offsetting his attack to hit our units. This immediately multiplies the effort required for decisive results. Next, as the circumference of our dispersal area grows, any slight outward increase tremendously enlarges the size of the dispersal area. This correspondingly increases the number or the yield of weapons required to ensure a worthwhile return if our personnel and equipment are to be the objective.

Off-base dispersal seems likely to yield more lasting survival benefits than would decentralization to many small-unit bases. This will be particularly true where ground mobility can be combined with warning to allow a balance between the equation of cost, peacetime operational needs, and the degree of dispersal normally maintained, *versus* the degree of dispersal adopted under various alert conditions. Even then off-base dispersal cannot be considered the ultimate solution since it does not prevent the destruction of the base and the possible trapping of the equipment in dispersal areas.

This problem of loss of the base will exist as long as we retain a base of any sort. As a result loss need be considered only in connection with survival measures that are predicated on inde-

pendence from fixed bases. Until development permits operations of that nature, our only recourse is to provide certain alternate sites that we can hope will not be attacked because to the enemy's knowledge they would not be occupied during the initial strikes. While his reattack capability will naturally bring them into focus, the counterair effort by then should have begun to equalize the situation. We will have warning from the prior reconnaissance an enemy will have to make if he is not to waste weapons.

The readjustment of the posture of air forces for atomic war must therefore include a greater degree of ground mobility, an increase in the capability for operations and maintenance (even if only dispersed around one fixed installation), and emphasis on obtaining warning and on alert procedures and techniques to exploit such warning to the greatest degree possible.

As we develop improved launching capabilities for aircraft, we can foresee the ultimate use of launching devices to recover equipment saved by off-base dispersal but left up in the air by the destruction of the runway. Following this we might even be able to institute launching from dispersal areas, using runways only for recovery. Lastly, we would hope to achieve the complete abandonment of the known target—the runway—and proceed to mobile operations from undefined locations. This action would oblige the enemy to reconnoiter and identify the target almost immediately prior to attack. With this kind of tip-off to enemy intentions, we would have the necessary warning to implement our survival plan and the time to trigger off our counterattack against his delivery vehicles.

Most of the survival measures and adjustments in posture we have discussed can only be taken at the expense of some effectiveness in operating rates. This loss, however, will be more than offset by the increased striking power of aircraft with atomic weapons. Thus as part of our readjustment we can accept a reduction in operating capabilities and in the tempo of the war effort. Obviously there will be no profit in adopting measures which will decrease our unit effectiveness more than if the unit absorbed the attack against which it is being protected. There may be extreme cases in which the nature of the threat is such that all active, passive, and organizational measures to keep us above the minimum survival threshold—while retaining effectiveness—have

been exhausted. In this extremity we may progressively have to abandon attempts to carry out that particular mission. This is a theoretical and distant ultimate, because the survival problem is relative on both sides. If the enemy fails to keep up with weapons development, his antiquated formations will be an easy mark, and the outcome in our favor will be a foregone conclusion. If he does evolve, his effectiveness will be reduced in like proportion to ours.

For the first time in history we are faced with the absolute necessity of modifying radically the posture of our forces in peacetime. We must risk the outcome on untried solutions. This places a high premium on analytical studies and scientific advice. All of us must give the greatest attention to this problem so that our new postures are certain of being the most practical. In past wars attrition built up gradually in intensity from D-day onward. This time scale permitted us to begin with the lessons of a previous war and modify these to fit new situations and weapons. Today the presence on D-day of decisive destructive power on both sides no longer allows the luxury of a training period. We will probably have to stand or fall on our ability to solve the problem on paper, in advance. The outcome may well be a foregone conclusion before the first shot is fired and have depended on the competence of the contestants to grasp the problem and to generate sound solutions.

Provided we face up to the necessary modifications, our land, sea, and air forces in combat theaters should continue to serve a useful role in atomic warfare. This should remain true until such time as the technique of using the atomic weapon may change from one of application to selected targets in support of specified tasks to one of area destruction or of barrier-type operations. The cost, quantity, and magnitude of weapons required for such applications and the multitude of problems that they would create make their adoption unlikely for some years to come.

Part IV: Balance of Power in the Atomic Age

FOR the past year the press—and the statesmen—of the Western world have been speculating about the impact of atomic weapons on international relations in peace and war. Their conclusions have been diverse. Some advocate the concept of massive retaliation, others the banning of all atomic weapons unless they are first used against us. All point to the dire consequences to civilization from the unrestricted use of so-called weapons of mass destruction.

While the North Atlantic Council endorsed a strategy of atomic defense in Europe* and pressed for a German contribution, a well-known British militarist, Captain Liddell Hart, argued in a recent series of articles in the London *Times* and *Picture Post* that theater forces would be of "little value" in a major atomic war and that what NATO needed in the theater was "an extensive gendarmerie." While Colonel Walkowitz, in the February 1955 edition of *Air Force* proposed a counterforce strategy for future "hot" wars, Air Marshal Sir Robert Saundby, in the February 11th *Spectator,* concluded:

> . . . full-scale global war has become unthinkable, so long as both East and West have the power simultaneously to destroy each other. And the more clearly the peoples of the world understand the nature of thermo-nuclear warfare, the more quickly shall we reach the stage at which all nations will realize that they must renounce war as an instrument of policy, or accept the probability of the extinction of the human race.

The effects of atomic arms on world affairs are by no means clear. Many questions are unanswered. Without pretending to solve all problems, we can narrow down some of the unknowns by applying to the broader field of power relations the lessons derived from the analyses of the use of these weapons that were undertaken earlier in this series. Of principal interest in this respect are (1) the inevitability of using the atomic weapon, forced on us by the changes we must make in the posture of our

*See Hanson Baldwin, "Use of Atomic Arms," *New York Times,* 21 December 1954.

forces in light of the atomic threat; (2) the obvious change in the tempo of hostilities brought about by atomic stockpiles; (3) the enhanced importance of D-day ready forces in comparison to the mobilizable base; (4) the effect of new weapons on the survival of land, sea, and air forces; and (5) the obsolescence of any concept of a long-drawn-out war of attrition.

The revolution in military capabilities brought about by these and related changes will certainly alter the balance of power among nations. In the past, mobilizable manpower, economic potential, and natural resources determined to a large extent the potential strength of a nation. Today atomic stockpiles, delivery capabilities, and their supporting ready conventional forces are the sole major factors that influence a nation's military worth. These new factors are more tangible and less dependent on the circumstances of geography, size, and population. On the other hand the cost of the atomic weapon and particularly of the attendant delivery systems is so enormous that many nations are being priced out of any independent capability.

In a recent article in the *New York Times** Mr. C. L. Sulzberger suggested that the day will come when not only great powers but also smaller nations will have access to atomic weapons and will regard them as conventional. "The international balance has already altered as weak countries with large deposits of fissionable material have assumed new importance. It will alter again when little lands possess arms capable of blowing up the world." He further suggested that when this time comes the atomic bomb will be "the equalizer that the six-shooter was in the days of our own Wild West. The revolver gave the small man a chance against a bully. Now the little nation will be capable of completely hyperbolic action." In effect he was proposing a variation on the old Western saying about men and Mr. Colt—"God made *nations* large and small but the *atom* made equals of them all."

The importance of ready atomic force in the power equation makes it theoretically possible for these "little nations" to become as powerful as their larger neighbors. Yet clearly the trend today is toward a more black and white distribution of strength than in the past. Until recently all modern countries had a war-waging potential of varied effectiveness. Now the world is being divided into "have" and "have not" nations: the "have" can afford an atomic arsenal and its accompanying delivery system; the "have not" cannot afford these and, in many instances, can no longer afford balanced conventional forces.

*See "Foreign Affairs," *New York Times*, 20 November 1954.

WHAT are the factors that enter into an assessment of a nation's strength in the atomic age? Obviously the atomic weapon itself, with its vast destructive capabilities, is a major consideration. For the first time in the history of conflict, the means of destruction are practically unlimited. Inability to destroy an accessible target need no longer restrict the scope of operations in a future war. One constraint has been lifted—inability to destroy. Thus other considerations must govern our planning—such as the objective, the ability to deliver and to absorb atomic attack, etc.

Next in importance to the advent of the atomic weapon is "accessibility."* A nation that "controls accessibility" can be said to combine the ability to deliver anywhere in the world while denying like freedom to an opponent. The first requirement is air power with sufficient range to strike any target on earth; the second requirement is an offensive/defensive performance adequate to ensure the survival of the delivery force.

In the past, distance and geographical barriers afforded a high degree of protection to favored nations. The advent of modern aircraft with global range and strike capabilities has made all parts of the world accessible to atomic attack. "Without accessibility resources are valueless. The most important strategic factor [in the air age] is then seen as control of accessibility."** Air power adequate to control "accessibility" is therefore a vital element in determining a nation's strength.

We must now ask ourselves where conventional forces come into consideration. These forces, of all services, now constitute a substantive element of national strength only to the extent that they are needed to ensure effective atomic delivery and to prevent undesirable enemy operations pending the outcome of our own atomic attacks. Air forces will be needed to saturate enemy defenses, to intercept his attack, and to reconnoiter for the delivery forces. Land forces must prevent the enemy from physically occupying friendly areas by infiltration, subversion, or other means that are not subjects for atomic attack. Naval forces must defend lines of communication until the enemy's offensive submarine

*[For a more detailed analysis of accessibility and its implications, see "The Power to Penetrate," *Air University Quarterly Review*, VI, 4 (Winter, 1953-54), 29. The Editors are constrained to accept the term "accessibility" as used here. In normal usage, it would be the target that had the property of accessibility, not the attacking aircraft. Since no other useful term exists for this important aspect of air power's flexibility, it is employed here in the special military sense defined by the author.—*The Editors.*]

**Eva G. R. Taylor, *Geography of an Air Age* (London: Royal Institute of International Affairs, 1948), p. 55.

capability can be destroyed at its source. Conventional forces in the atomic age should therefore be considered as an adjunct to the atomic delivery system, whether the weapons are delivered by air or ground. The purpose of these forces is to ensure effective employment of the atomic weapon.

If it were possible to envision an immediate payoff from the atomic destruction of any given target system, we might dispense with most conventional requirements for major wars, as was recently suggested in the articles by Captain Liddell Hart. But there is a time factor involved in the act of atomic delivery, whether strategic or tactical, and a further time lag in payoff. Also some targets must be adjusted to the capabilities of the weapons. Thus enemy formations that can move and disperse rapidly, such as most land formations or naval units, must be opposed by their counterparts who will locate them and force them to concentrate into worthwhile targets.

It seems clear, therefore, that a certain level of conventional forces must be taken into account in assessing a nation's strength. It is equally clear that once a country or coalition attains the force level required to ensure the effective application of its atomic weapons system, any further increase in conventional forces will be of little or no consequence to the outcome of the battle. Such an increase may even prove to be a liability, since it must lead to greater concentrations and, hence, to greater losses for each atomic weapon absorbed, without in any way bettering the atomic delivery capacity.

The importance of mobilization and industrial potential has been changed by the atomic weapon. We have noted in the previous parts of this series that the decisive phase of an atomic war would be of short duration. There simply would not be time to mobilize untrained manpower or to convert and expand industry from a peacetime to a wartime economy. This factor is no longer of real consequence in assessing the strength of a country. Only force in-being on D-day matters, a fact which greatly facilitates the analysis of the relative power of nations because it eliminates a highly speculative, intangible element from consideration. In wars of attrition, particularly the last two wars, the aggressor lost through his failure, or inability, to assess properly the mobilization potential of his enemies. This nebulous element with its psychological—will to resist—counterpart introduced a high risk in every act of aggression. Future aggressors will be able to estimate with relative accuracy the ready capability—atomic, conventional, delivery, and defense systems—of his opponent.

There are therefore three basic elements in the power equations of the future—(1) the atomic stockpile; (2) "control of accessibility"—including the ability to deliver and to deny delivery to the other side; and (3) conventional forces, to the extent required to ensure effective delivery and to prevent the enemy from advancing in vital areas pending the payoff from the atomic attack. There are many secondary factors which admittedly affect the balance of power, such as the national psychology, the will to resist, and warning of attack. But these are so overshadowed by the three basic elements that they need be considered only if and when a general balance exists among the basic elements, and when the ensuing situation is sufficiently tense to make marginal differences of consequence.

Atomic weapons are now available only to those countries able to obtain the necessary technical knowledge and to support the cost. For some years hence this is likely to be a relatively small group. Even in cases where these weapons might be ultimately provided or developed, the steady increase in cost of delivery systems and of supporting conventional forces threatens to price many governments out of an independent military establishment. This entails an attendant loss of freedom and authority in foreign affairs.

The value of military forces to a nation—in backing up a foreign policy or in discouraging minor war—is not necessarily in direct proportion to their over-all strength. Differences in strength have always existed, yet diplomatic relations among both large and small countries have been effectively supported by forces of varying size. This worked in the past because a balanced, independent force—even though small in size—could be expected to put up sufficient defense either to make aggression costly and uncertain or to gain time during which allies and world opinion could be solicited in their support. The key factor was the quality of the forces resulting from a *balanced, properly diversified,* and effective military establishment.

Most countries today seem to believe that they possess a useful, balanced, independent military capability, at least in conventional forces. On this capability they establish their precedence in the line-up of world powers. In my opinion such an independent military capability no longer exists in many of these countries. This is true not merely because in lacking atomic weapons they

lack the basic ingredient of modern military power. It may be that in a few years atomic weapons will have come down in price to a point where most nations can afford them. But there is no indication that this will happen in the case of the attendant delivery system. The increased intricacy of all weapons systems and the greater demands that they place on the economy for rare materials, technical perfection, manpower, and complicated manufacturing techniques have priced many of them out of national arsenals. The cost factor is slowly, quietly eroding away the balance—and therefore the effectiveness—of many national military establishments.

Up until World War II nearly all major countries maintained armed forces which included elements of all important weapons systems. Navies had both capital ships and submarines. Air forces ran from heavy bombers to fighters. Armies possessed all worthwhile categories of tanks, armored vehicles, and artillery weapons. In 1955 few countries even attempt to budget for such items as heavy bombers, carriers, capital ships, heavy tanks, or large guided missiles. These weapons were not dropped from their military requirements because of obsolescence or for tactical or strategic reasons. Rather it was because the governments concerned could no longer afford them. Since those few remaining nations that can afford all these weapons continue to maintain them, it seems clear that failure of other countries to do so reflects a weakness or unbalance and in most instances is not attributable to tactical or strategic considerations.

If these prohibitively expensive weapons systems were only those associated with major world wars, the matter might not be so serious. In this day and age most smaller powers do not presume to fight a world war without allies to balance out their team. Thus if the weapons systems that they can procure and maintain are useful in a joint defense effort such as NATO and also provide that minimum balance necessary for their overseas and local security and for other lesser national needs, these governments could be satisfied that they still had national armies in a sense. Yet this is not the case. The gradual loss of independent military capability on the part of most nations is not limited to their ability to prosecute major wars. The cost factor is well on its way to reducing a small nation's force to little more than a constabulary, of value only for internal police purposes. If this trend continues most nations will be totally unable to claim any military backing for their foreign policies, or the ability to contribute to the "control of accessibility" in a collective defense effort.

For example few nations today are building light bombers or guided missiles of consequence. Many are still constructing fighter aircraft, but more often than not with the financial assistance of one of the larger countries. Although these countries could probably initiate a program to build a modern jet fighter force on their own, it is highly doubtful if they could do so a few years from now when the 1955 models are being replaced by supersonic types now in the experimental stage. These aircraft are far more costly and demanding in engineering skill, materials, and productive capabilities than current jets. They will be as far beyond the economic and financial means of most nations within the next few years as medium bombers are today. The next step for such nations is to eliminate a combat air force from their force structure, since the fighter is at the bottom of the ladder of air weapons in terms of cost and intricacy. Without an air force no country can claim any effective military capability. The same applies in varying degrees to other services. Future navies without atomic engines and armies without guided missiles cannot be deemed fighting forces. Assuming that atomic weapons eventually become available to these nations, they would still lack the means to deliver.

All these considerations suggest that only two or three major world powers can hope to maintain effective independent military establishments during the next decade. Other nations must look for their security to coalitions, federations, or regional defense pacts. Even within such alliances the smaller nations will have further to centralize their armament programs if they are to make an effective contribution to the group effort. Had the European Defense Community countries appreciated the futility of their struggle to retain national forces in face of the cost of modern weapons systems, their combined efforts could have lifted them out of the "have not" category for some years to come. The proposed Brussels armament pool does attempt to salvage the loss and should temporarily fill the gap with respect to the NATO group.

Thus we see both the atomic age and the cost of weapons acting as a catalyst for coalitions, alliances, and federations. Yet in entering these unions the countries find that, "What we make on the beer we lose on the peanuts." In return for the collective capability afforded by a balanced team, they must sacrifice some independence in foreign affairs, since all members obviously must agree on any objectives that might lead to the use of the collective military establishment.

In summary the net effect of atomic monopolies and increased costs of armament of all types is to limit the number of powers, or power groupings, in the world. For practical purposes we need only deal with two such factions in considering the balance of power at this time—NATO and its allies on the one hand and the U.S.S.R. and its satellites on the other. The possibility of creating a balance of military power by the use of a so-called third force seems to be limited. There are aspirants to a third-force position, but their influence, for lack of the major elements of independent strength, is largely restricted to the cold-war propaganda and psychological field.

Some of the current East-West tension can no doubt be attributed to the sensitivity of the balance of power in a two-party game. When a third power served to balance two conflicting areas, a wide range of military capability on the part of the third power could tip the scales on one side or the other. This acted as a dampener, and fluctuations in the capabilities of the primary contestants did not arouse undue concern. Loss of this stabilizing element, together with the advent of weapons of mass destruction on hand and in decisive quantities, has placed a high premium on marginal differences. If either man takes his eyes off his opponent for a split second, he is likely to get shot. This generation must face life on the *qui vive*.

We have seen how the ability to wage war is gradually being centralized within a very few nations or coalitions whose strength is basically atomic. It is inconceivable that a nation, or coalition, without atomic weapons could defeat an opponent who had and used nuclear force. Since these weapons are the key to real power in this day and age, we must consider how they might be used in conflict, and what the consequences would be. This will allow us to gain some insight into the relative capabilities of the East and West for either global or peripheral war during the next decade.

In modern war the application of force can be divided into two broad categories: first, that applied against the heartland of the enemy to destroy the national will and ability to wage war; and second, that applied against an enemy's combat potential, generally in the field, to prevent this potential from achieving specific military objectives. In considering the use of atomic weapons in both situations I shall, for the sake of convenience,

refer to the former as the "strategic" use and to the latter as the "tactical" use. This differentiation in no way implies that any delivery system or type of targets comes solely under either category. It relates only to the nature of the objective to be furthered by attacking certain specific targets.

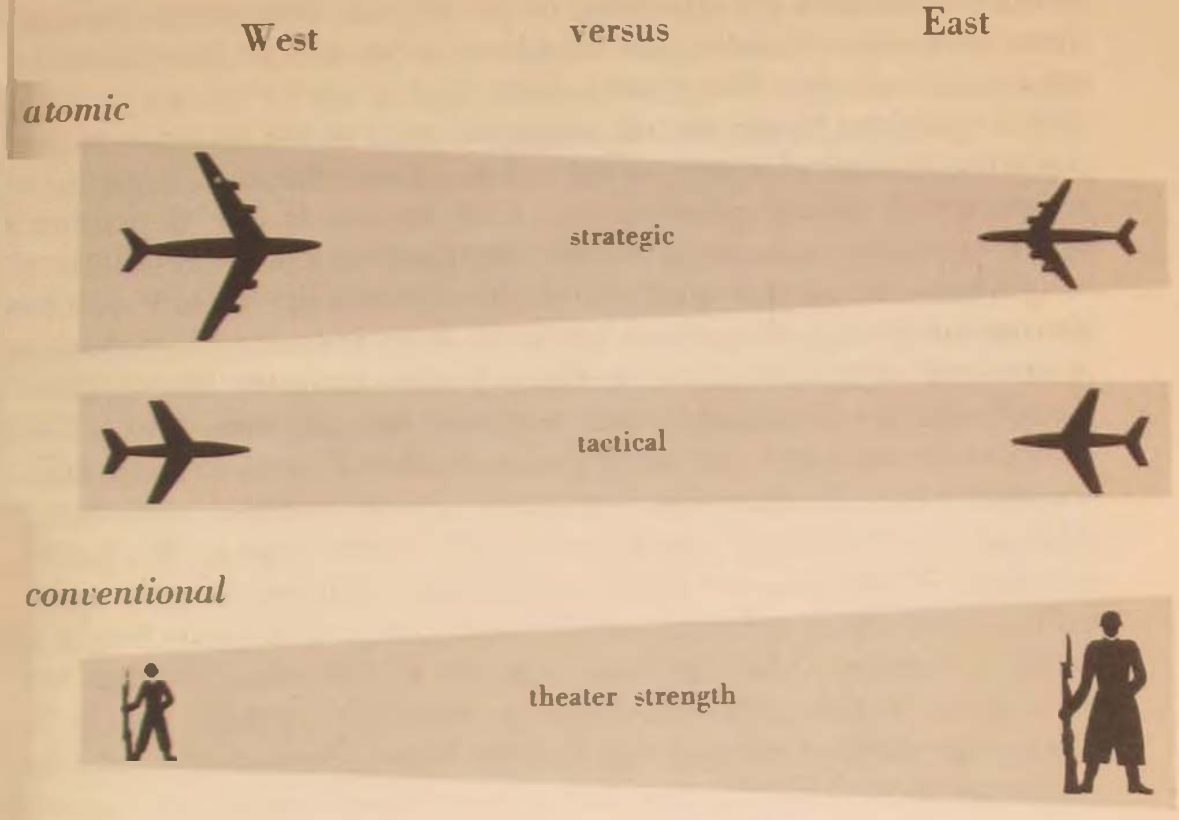
Should a global war develop, it will inevitably be atomic—for the reasons discussed in Part I of this series. A major atomic war can only take two forms: (1) total war where atomic weapons are used in both the tactical and strategic senses, and (2) limited or peripheral war where these weapons are used only in the tactical sense, as defined above, and where operations may also be limited to a specific area. A solely strategic exchange is not considered a realistic possibility, since this would postulate that all other forces remained idle.

Strategic Atomic Warfare. Where do we stand in a total war that subjects both the national will and the ability to fight, as well as the military forces, to atomic attack? Under these conditions it is theoretically possible for both sides, should it serve their purpose, to carry mutual destruction to such extremes as to be synonymous with what is commonly called "national suicide." The fact that this capability exists need not imply that it will be used. The operative phrase becomes "if it serves their purpose."

Total war involving the massive atomic exchange of sizable stockpiles could not last in an organized fashion for many days. Modern society is highly dependent upon communications, distribution of essential supplies, transportation, and community relationships. The simultaneous destruction of most major centers of population in any country would create problems of catastrophic proportions. These, coupled with the ensuing epidemics and panic, could be expected to swamp the capability of any remaining government to maintain order and perform its functions. When a single atomic attack against a major population center can produce some 30 million wounded and 9 million deaths, it is hard to envision a human endurance that could endure such catastrophe and still conduct organized warfare and readjust remaining national resources to support a prolonged war of attrition.

No rational government would intentionally submit its people to such extensive devastation. The outcome would be too indefinite. Even if ultimate victory could be rationalized and foreseen, it would be a Pyrrhic victory. This type of operation against the enemy hinterland makes sense only so long as there

Power Relationship Today



are good-to-excellent prospects of keeping it one-sided. This is the situation today, in which the Western powers are dominant in the strategic atomic, or global war, capability. Both the weapon and accessibility factors are on our side. Conversely we are inferior in the conventional mass, or local war, capability.

Under these circumstances if the Soviet exploits his superiority in conventional mass in actions against peripheral areas of major interest to the West, we can retaliate in the strategic nuclear field and do so with reasonable certainty that his strategic counterattack capability is sufficiently limited to warrant the risk. This, in an oversimplified way, tends to explain the current reliance of the West upon "massive retaliation;" a formula which can only be valid so long as one side has a clear advantage in strategic capability.

As we analyze all of the ways the East might initiate and prosecute a major war today, with today's relative capabilities, we find that the balance of power lies in favor of the West. If the East should attack under almost any set of circumstances, the West can react so as to defeat them with our decisive strategic

and atomic superiority. The only profitable course of action open to the East under these circumstances would be to strive for limited objectives by attacking in peripheral areas with conventional forces, withholding all atomic weapons except in retaliation against Allied use. The gamble here is that the West can be prevailed upon not to use atomic weapons, even at the expense of the probable loss of the peripheral areas. Thus the only course of action which would promise the East success is one dependent upon the Allies not using atomic weapons except in retaliation.

When the atomic stocks and the accessibility factors of two nations or groups of nations are such as to promise an exchange of strategic destruction, regardless of who initiates the conflict, the advantages of strategic war to either side are less clear. The weapons systems and the strategy involved will tend to neutralize one another. At this point a condition of balance commonly referred to as "atomic parity" or an "atomic stand-off" would develop. This is a condition where the strategic atomic capability has reached sufficient proportions on both sides to produce decisive results. The delivery systems versus the defenses are such as to make effective delivery relatively certain for both sides—regardless of who strikes the first blow. Neither side wholly "controls accessibility."

In a situation of relative parity any attack to destroy the sources of national power must be carefully weighed against the inevitable retaliation in kind by the opponent. The outcome of such an exchange would be uncertain, provided always that the atomic and accessibility factors remain relatively equal. Both sides would suffer devastating losses. Mutual destruction sustained under these circumstances can hardly be shown as being advantageous to either side. It seems probable that when the atomic and delivery capacities of two powers assume a balanced relationship, a strategy of massive retaliation will not be initiated except as a "last resort." This last resort might arise if the enemy's success in pursuing a conflict by other means, hot or cold, so "cornered" the other side as to leave him no alternative between being occupied and annihilated or gambling on mutual suicide. This suggests that in the atomic age it may be critically important not to pursue any local or initial military success to the extent of forcing a dire choice—such as unconditional surrender—on an enemy who still has a strategic nuclear capability.

Some spokesmen have claimed that when an atomic stand-off occurs between two powers, a valid deterrent to hot war will exist. I consider this to be wishful thinking. It assumes that total

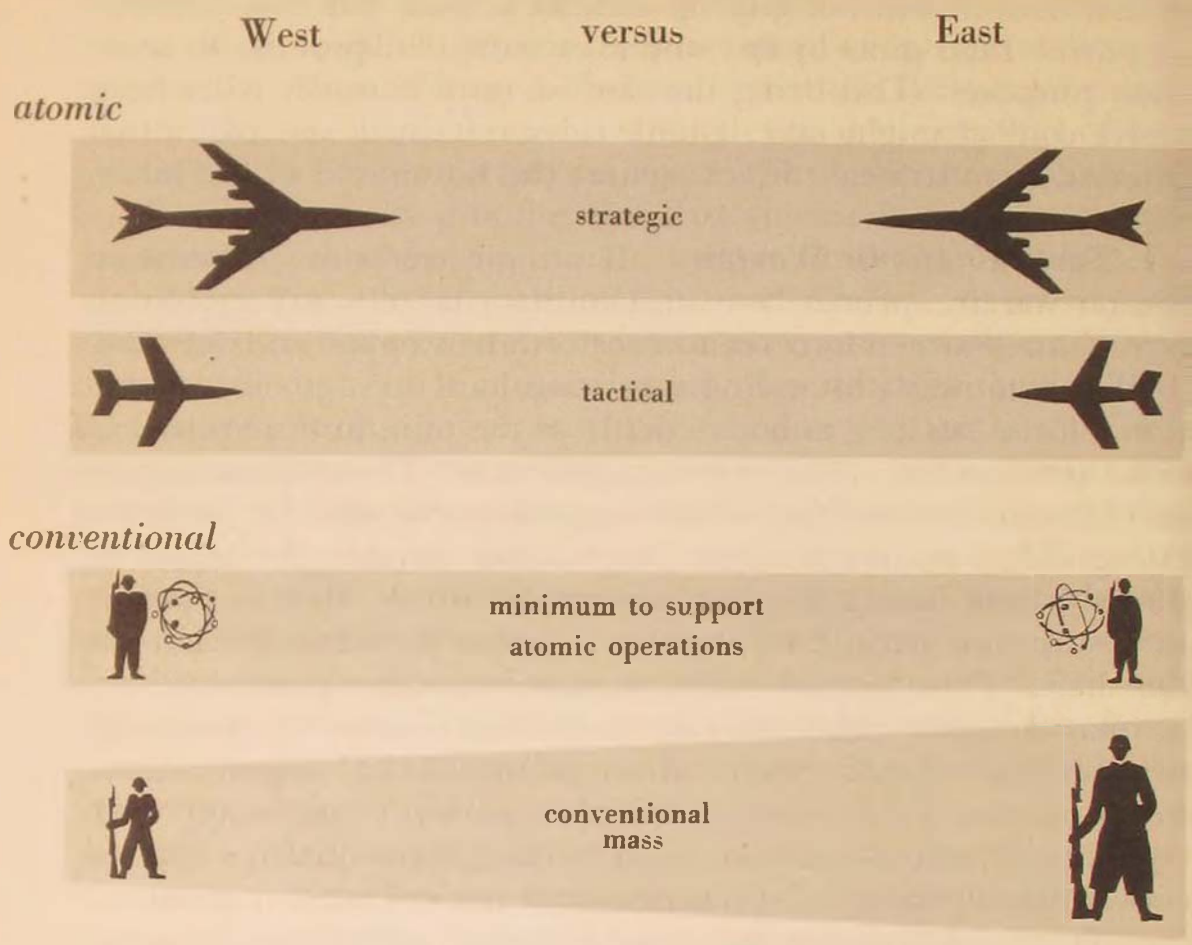
atomic war must inevitably result from any sort of active warfare, even though nothing is gained thereby. A far more realistic view is that nations will not give up conflict as such but will continue to pursue their aims by any and all means that promise to serve their purposes. This being the case we must consider what form active conflict might take if both sides refrained, out of mutual interest, from strategic attack against the hinterland of the other.

Tactical Atomic Warfare. If atomic weapons are used in theater warfare, primarily against military targets, any aggression by organized armed forces can henceforth be stopped and defeated. This is true notwithstanding a relative local strength in conventional forces, so long as both sides have the minimum required to make their atomic delivery systems effective. The nondiscriminatory characteristics of the atomic weapon, responsible for its devastating effects against strategic targets, also provide the means of directly annihilating the enemy's armed forces. If it is possible to destroy the arrowhead, there is no need to break the bow or the shaft. Thus tactical use of atomic weapons against military or quasi-military objectives can maintain a balance of power. If necessary, war can be waged through the tactical use of atomic weapons when the Soviet atomic and accessibility factors approach equality with those of the Allies, even though an equality of Allied conventional power vis-à-vis the Soviet's has not been reached.

The NATO powers have the economic, political, and technical capacity to maintain parity, if not superiority, with anything the enemy can develop in the nuclear field or in "controlling accessibility." In addition we can maintain with little difficulty that minimum level of conventional forces necessary to support our atomic delivery capability. But should we fail to use atomic weapons in theater warfare out of fear that their use would spread to the strategic field, the East would have a decisive local advantage in their superior conventional capabilities. This would create an unbalanced situation and invite Soviet aggressive ventures on the periphery, particularly against NATO and other areas. This could happen any time we gave the Soviet reason to assume that massive retaliation would not be used unless his aggression were pursued to the point of last resort.

When we can no longer safely checkmate Soviet force with predominant massive retaliation, the substitution of tactical atomic weapons can redress the balance of power. At that time the West and East may be considered essentially equal in the atomic and accessibility field, both tactical and strategic. Both can main-

Power Relationship Tomorrow



tain conventional forces in those minimum quantities required to make their tactical atomic capability effective and hold vital areas pending the payoff. And the East can maintain additional conventional strength.

Assuming a strategic stand-off, strategic aggression obviously will not be initiated. Should it take place, the West can retaliate in kind, and both would suffer with no benefit to either. If the East attempted local aggression, the West would have both the atomic and conventional team required to halt their attack. Any superior conventional strength that the East commits will be a liability to the extent that it will increase their concentrations in the combat areas and thereby provide greater returns to our weapons. Thus we can say that provided the strategic, tactical, and minimum conventional forces are kept approximately equal, or are believed equal by those concerned, a relatively stable situation will exist. Neither side can hope to conduct successful military operations against the other with any degree of certainty as to the

outcome. There is no "invitation to aggression." Thus the maintenance of East-West balance of power in the event of atomic parity depends upon ability to make tactical use of the atomic weapon.

The only valid argument against using atomic weapons in theater warfare is that this will progressively lead to their strategic use. This is admittedly a debatable point. A recent analysis of the subject by Cyril Falls in *The Spectator** concluded that "the sober view must be that while the tactical weapon would not necessarily or logically bring down the hydrogen bomb, there is a grave risk that it would." I am inclined to believe that the risk is not very great, mainly because no rational government will commit an act which will not further its objectives and will also obviously be to its ultimate disadvantage. Individuals, and in certain instances dictatorships, have taken steps that could be described as "mad" or unreasoned, but sound planning cannot assume that great powers in the modern world are likely to act this way. The limiting factor in expanding from tactical to strategic employment of atomic weapons will be the objective pursued at the time. Demarcation should occur at whatever point the objective changes.

To illustrate this, let us assume that both sides in a contested peripheral area elect and are able to use atomic weapons. The aggressor's objective is clearly the occupation of the area. The defender's objective is to prevent the occupation. By no stretch of the imagination can we expect the immediate objective on either side to be the conquest of the other's heartland. If it were, we would not be dealing with a local act of aggression. This being the case, let us assume that the adversary destroys the screening forces protecting the area. What would be the defender's reaction? Bomb the aggressor's seat of government? Why? It does not serve *directly* the purpose of defending the contested area. The objective in destroying the screening forces would be to open the way for invasion. The countereffort would logically be directed at the destruction of the invasion force, either in its home stations or en route as a substitute for the holding action previously envisioned. This would maintain the conflict within the scope of the objective to conquer or defend the local area.

In retaliation for destruction of the invasion force the aggressor might conceivably attempt to destroy the bases from which the atomic bombs were launched against his invading force. Again this would constitute a reasonable continuation of the objective in that it eliminates the threat against further attempts at invasion. But at this point the conflict can be stabilized, and the progression from local to general war should cease. All forces directly

*11 February 1954.

concerned with defending and attacking the contested area have been brought into the fight.

If the aggressor extends his target system to, say, London or Washington or if the defender in turn elects to attack Moscow or Peking, the objective must change. The defense or conquest of the contested area would no longer be the primary aim. Rather the defeat or conquest of the U.S.S.R. by NATO or, vice versa, of NATO by the Soviets, would become the objective. Had the greater objective been desired by either contestant, he would not have started the conflict in the comparatively disadvantageous setting of a local operation. Because of the disadvantages of extending the fight to a case of "last resort," the tactical use of atomic weapons in a local situation with local objectives need not necessarily lead to an extension of the conflict to total war. In fact the retaliatory aspects of atomic weapons, in the sense of their destructive capabilities, will tend to mitigate against the expansion of local conflicts far more effectively than if they were not employed.

THE atomic age will not necessarily eliminate "hot" wars. Nor will these "hot" wars necessarily lead to the destruction of civilization. A more rational view is that man will continue to adjust his means to his ends. The atomic weapon will be used only to the extent that it will further someone's objectives. In due course this, when coupled with the advantages of quick-payoff targets and the imminence of posthostilities considerations in a short war, will act as a constraint against massive wanton destruction by either side. The vital thing is to maintain a balance of power between the East and the West at each stage in our evolution.

Thus we see that as two contestants with unequal conventional capabilities move toward strategic atomic parity they are obliged to introduce tactical atomic weapons if a balanced situation, and hence peace, is to be retained. With the introduction of these weapons it is then possible to establish a tactical-atomic and conventional-force combination against which conventional forces above certain minimums would be of little consequence.

Introduction of the atomic weapon into theater warfare, rather than constituting a threat to the existence and security of the free world, is the one factor which will permit us to maintain the desired balance of power between the East and the West. By the same token the raising of a German contribution to provide the necessary minimum force to support our tactical atomic de-

livery effort in Europe for the next few years without resorting, except in the last resort, to strategic warfare is another valid requirement in furtherance of a stable world condition. It is interesting to note in this regard that the two main objectives of Soviet diplomacy have been to prevent the West from considering the use of atomic weapons in warfare, either strategic or tactical, and to prevent the achievement of the German contribution.

The Soviets perceive quite clearly that if they are successful in either one of the above objectives, all they have to do is await the period of atomic parity and then exploit their conventional superiority in peripheral areas, including NATO. As long as they were careful not to push the U.S. into an extremity where, defeat of our own system being unavoidable, we would just as soon make it mutual, they could hope to conquer the greater portion of Eurasia.

The rapid growth of the Soviet strategic atomic capability is evidenced by advances in thermonuclear weapons announced in February by Mr. Molotov and by the appearance of heavy jet bombers and missiles in the Soviet arsenal. It would seem that the adoption by the North Atlantic Council in December of authority for SACEUR to plan the use of tactical atomic weapons was none too soon. The Allies may well just have got under the wire in maintaining a balance of power and hence preventing any aggressive adventures, at least against NATO areas and the Western periphery as a whole.

Paris, France

THE SUPRA-STAFFS

Part I

The Eisenhower Administration's Defense Organization Concept*

MAJOR RUSSELL P. STRANGE

"AS a former soldier who has experienced modern war at first hand and now as President and Commander-in-Chief of the Armed Forces of the United States," said President Dwight D. Eisenhower in his message to Congress on 10 April 1953, "I believe that our Defense Establishment is in need of immediate improvement." The state paper which followed this introduction explained the President's plans and purposes in asking Congress to authorize the later approved reorganization of the Department of Defense. The President's message transmitted Reorganization Plan No. 6 of 1953 to the Congress and, at the same time, included copies of a report by the Committee on Department of Defense Organization, known as the Rockefeller Committee. As the Committee on Government Operations of the House of Representatives was reminded: "These three documents (the President's message, Reorganization Plan No. 6, and the Rockefeller Committee Report) must be looked upon as a single package, and to evaluate the effect of the Reorganization Plan it is necessary to take note of the provisions of the other two documents."

In 1789 the First Congress created a single executive agency for national defense—the War Department—that was given jurisdiction over the naval as well as the land forces. Nine years later the Navy Department was established. And one hundred and fifty-eight years later the Department of the Air Force became the third military department. At the same time a Department of Defense was created to coordinate and give unified direction, under civilian control, to the Armed Forces of the United States.

The present defense organization emerged in three steps: the National Defense Act of 1947, the Amendments of 1949, and Reorganization Plan No. 6. In reality the 1947 Act created a federation of Armed Forces with the title of National Military Establishment. The Secretary of Defense was given "general" direction, authority, and control over separate departments of the Army, the Navy, and the Air Force. The powers of the Secretary of

*Based on messages from President Eisenhower to Congress and the Secretary of Defense; testimony, reports, and committee prints of the Committee on Government Operations of the House of Representatives; public laws; press releases; and Department of Defense directives.

Defense were specifically delegated and limited by provisions in the act that all powers and duties relating to the Army, Navy, and Air Force "not specifically conferred upon the Secretary of Defense by this Act shall be retained by each of their respective Secretaries."

Two years of experience and a close examination by the Hoover Commission resulted in the National Defense Act Amendments of 1949. The Amendments designated the services as "military" departments, thereby canceling their cabinet rank. This was an improvement in that it gave a single cabinet officer, the Secretary of Defense, the responsibility for the security of the United States. The limiting word "general" was dropped from the provision for the Secretary's authority. A major shift in power came as the Congress gave the Secretary the residual powers formerly held by the military departments—thus ending the federation.

The third and latest step was taken by the Eisenhower Administration's Reorganization Plan No. 6. "The first objective toward which immediate actions already are being directed," the President pointed out, "is clarification of lines of authority within the Department of Defense so as to strengthen civilian responsibility." He further stated: "Our second major objective is effectiveness with economy." In conclusion he added: "Our third broad objective is to improve our machinery for strategic planning for national security."

Both of these objectives were to be accomplished through the Reorganization Plan *and* by administrative action. Congress was informed that the Key West defense functions agreement would be administratively modified so that a military department, not an individual member of the Joint Chiefs of Staff, would be named as executive agent for a unified command. In this way a politically accountable civilian official would control the unified commands of the United States in the application of military power in war or peace. Thus the principle of civil supremacy was strengthened because the service Secretary was to be responsible, through the Secretary of Defense, to the President and the people. This was in striking contrast to the previous system whereby the professional military leaders of the services, answerable to the Joint Chiefs of Staff, were agents of control over the unified commands.

As the role of the Air Force expands in national defense and in international security affairs, more and more Air Force officers are being called upon to leave their familiar organizational environment and to represent or to perform staff duty for all three services, the nation, or even international organizations. Many supra-staff organizations in which the Air Force has only partial responsibility issue policy decisions that greatly affect the climate of Air Force operations. In an effort to provide Air Force officers with a better understanding of the functions of these agencies, the *Air University Quarterly Review* has asked Colonel George G. Byrnes, Jr., USAF, Assistant Chief of Staff, NATO Standing Group, and Major Russell P. Strange, USAF, of the faculty of the United States Naval Academy, to characterize in summary the organization of the Department of Defense, the Military Staff Committee of the United Nations, and the NATO Standing Group.

Through the Reorganization Plan itself the Administration wanted to make the responsibility of the Secretary of Defense clear and unchallenged. He was to be provided with a more efficient staff organization. In actual fact a civilian "general staff" was brought into existence. Functions were to be assigned to the Secretary of Defense and not to officials, boards, or agencies subordinate to him—this was the greatest step in clarifying the Secretary's authority. The Plan authorized nine Assistant Secretaries of Defense and raised the office of the General Counsel to equivalent rank. Although the duties of the Assistant Secretaries were not specified in the Plan, the Secretary of Defense was authorized to prescribe their duties. And while neither the Plan nor the President's message specified what duties were contemplated, the Rockefeller Report made detailed recommendations that Congress and the Secretary of Defense used in deliberating and implementing the Plan.

Certain changes in the organization of the Joint Chiefs of Staff were made that bolstered the position of the Secretary of Defense and improved the administrative operations within the Staff itself. Selection and tenure of the Director of the Joint Staff, serving the Joint Chiefs, were made subject to the approval of the Secretary of Defense. At the same time the selection and tenure of members of the Joint Staff were made subject to the approval of the Chairman of the Joint Chiefs of Staff. The function of managing the Joint Staff and its Director was transferred from the Joint Chiefs as a committee and given to its Chairman. Obviously these changes were made to strengthen the position of the Secretary of Defense and to relieve the Joint Chiefs of many administrative responsibilities.

Hence the Eisenhower concept was to create a channel of responsibility from the President through the Secretary of Defense to the Secretary of each military department. The latter would, in turn, have responsibility and authority over each service and the unified military commands. Strategic direction and operational control of forces would remain with the professional military chiefs under civilian control. The use of civilian Secretaries is important because they leaven military policy with political and economic considerations. Equally significant, though seldom appreciated, is the fact that the civilian secretariat is the agency of the people through which public military policy makes its transition from the politically partisan or bipartisan legislative and executive formulation into nonpartisan national action.

To reinforce this channel, the Secretary of Defense was to be assisted by an adequate staff. As an experienced military administrator, President Eisenhower's organizational theorizing on this point is particularly valuable. "In an organization the size of the Department of Defense," he observed, "true effectiveness with economy can be attained only by decentralization of operations, under flexible and effective direction and control from the center." In pointing out that sound management of a decentralized system required flexible machinery at the top, the President asked that unwieldy boards and other staff agencies whose duties were rigidly assigned by law be abolished. The Secretary of Defense was to be given Assistant Secretaries to serve as staff advisers *without imposing themselves* in the direct lines of responsibility

and authority. Mr. Roger M. Kyes, then Deputy Secretary of Defense, succinctly told the House Committee on Government Operations that the Administration was "trying to make the military Secretaries the chief operating officers, the operating vice presidents, so to speak." There was not to be a shift of authority from the service Secretaries to the Office of the Secretary of Defense.

A third aspect of the Eisenhower concept involved freeing the Chiefs of Staff from administrative detail, thus permitting them to concentrate on the broader problems of national security. This was accomplished by assigning greater responsibility for staff direction and administration to the Chairman of the Joint Chiefs. Deputy Secretary Kyes explained this point to the Congress, saying that the purpose was to take the management work from the "most vague and generalized control" by the Joint Chiefs of Staff and to assign this task to the chairman of the staff group. "You cannot have good managerial responsibility," Secretary Kyes declared, "unless you pinpoint to an individual both authority and responsibility; and if you are going to have a good operation, you have got to have good, efficient people to get the job done."

Congress permitted Reorganization Plan No. 6 to become effective on 30 June 1953.

In evaluating the result of the Eisenhower Administration's reorganization of this nation's defense structure, one fact stands above all others. The Secretary of Defense has full, complete, and supreme power over the Department of Defense, all its agencies, subdivisions, and personnel. The Secretaries of the military departments, the Joint Chiefs of Staff, all military officers and all other personnel are under the Secretary to assist him in carrying out his national defense responsibility to the President and to the people. When Congress designated the Secretary as head of an executive department of the Government, it established his power and authority as being of the highest order in the Department of Defense. The National Defense Act makes the Secretary of Defense "the principal assistant to the President" in matters relating to defense. This in effect makes the Secretary a deputy of the Commander-in-Chief and establishes a command relationship over officers and personnel of the Defense Department.

Congress has limited the Secretary's power only slightly. He may not disturb the combatant functions of the services, directly or indirectly. The three military departments cannot be merged by the Secretary. Nor may the Secretary establish a single commander of all the Armed Forces, an operating supreme command, or a supreme military general staff. Furthermore the Secretary must report to the Armed Services Committees of the Congress any transfer, reassignment, abolition, or consolidation of specific functions assigned by law to certain officers or organizational segments of the Department. Congress specifically protected the right of the Secretaries of the military departments to present recommendations directly to the Congress with the provision that they first notify the Secretary of Defense.

Another noteworthy fact about the reorganized defense structure is that

the Chairman of the Joint Chiefs of Staff has not become the bugaboo that the opponents of the Reorganization Plan forecast. Rather he is the manager for the Joint Chiefs. The individual members have not been overawed by their Chairman by virtue of his rank, prestige, or supervision of the staff.

In contrast it would seem that the host of Assistant Secretaries of Defense provides the most potent trouble area. Their requests for information from the services can soon take on the air of rather strong recommendations. Their informal contacts with the subordinate staff sections of the military departments are more likely to overawe and influence the operations within the three services. In the interests of uniformity, rather than unity, the Assistant Secretaries are likely to assume functions, direct consolidations, or establish policies that do not conform to the separate needs of the individual services. This was recognized by the President in his message to Congress:

> Without imposing themselves in the direct lines of responsibility and authority between the Secretary of Defense and the Secretaries of the three military departments, the Assistant Secretaries of Defense will provide the Secretary with a continuing review of the programs of the Defense Establishment and help him institute major improvements in their execution.

From the standpoint of American political philosophy the strengthening of civilian control of the military establishment is the most important aspect of the Eisenhower reorganization. Inasmuch as the unified commands exert American military influence in world affairs, it is good logic to have those commands answerable to a single military department headed by a politically accountable civilian Secretary whose professional executive is a military leader.

President Eisenhower summarized the intent of the reorganization:

> Because we are not a military-minded people, we have sometimes failed to give proper thought to the problems of the organization and adequacy of our Armed Forces. Past periods of international stress and the actual outbreaks of war have found us poorly prepared. On such occasions we have had to commit to battle insufficient and improperly organized military forces to hold the foe until our citizenry could be more fully mobilized and our resources marshaled. We know that we cannot permit a repetition of those conditions.

Part II

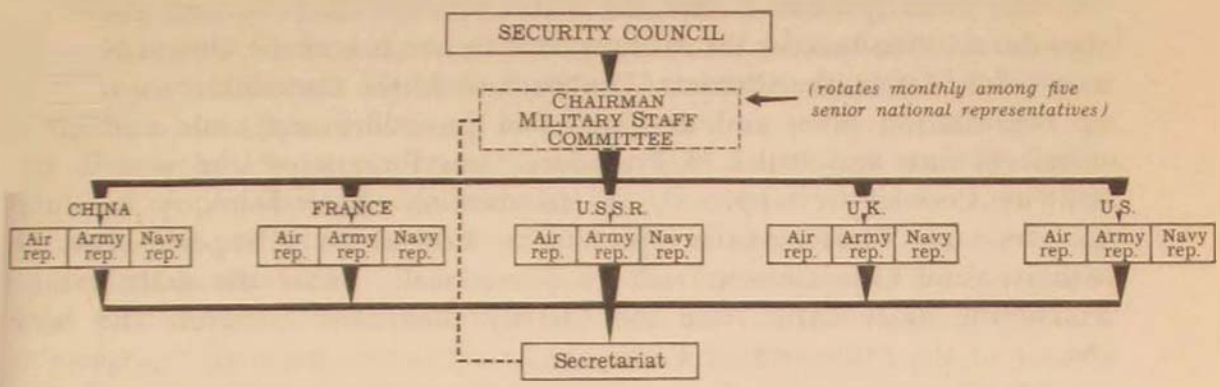
The Military Staff Committee of the United Nations*

MAJOR RUSSELL P. STRANGE

IF fifteen oriental and occidental faces were arranged according to seniority on an ornamental and hollow totem pole gaily colored by fifteen different uniforms, it might be symbolic of the Military Staff Committee of the United

*Based on United Nations, Security Council, Military Staff Committee, and Department of Defense documents; interviews with officials in the office of the Assistant Secretary of Defense for International Security Affairs; and correspondence with officers presently and formerly assigned to the Military Staff Committee.

Organization of the United Nations Military Staff Committee



Nations as it currently exists. In theory it represents a world "Supreme Military and Naval Staff." The worth of this committee has not been either proved or disproved.

The prologue of the past is apparent. Just as the United Nations grew out of the victorious coalition of nations which fought the Second World War, so too was the Military Staff Committee of the United Nations based on the experience of the highest international military staff group, the Combined Chiefs of Staff. Likewise the Permanent Military, Naval, and Air Commission of the League of Nations established the precedent that in international organizations the big-power "council" should be advised by a professional military group.

With this experience to look back upon, the planners at the 1944 Dumbarton Oaks Conference proposed that a Military Staff Committee be established to assist the Security Council of the United Nations on all questions relating to the military requirements involved in the maintenance of peace and security, employment, and command of forces placed at the disposal of the United Nations and the regulation of armaments and disarmament.

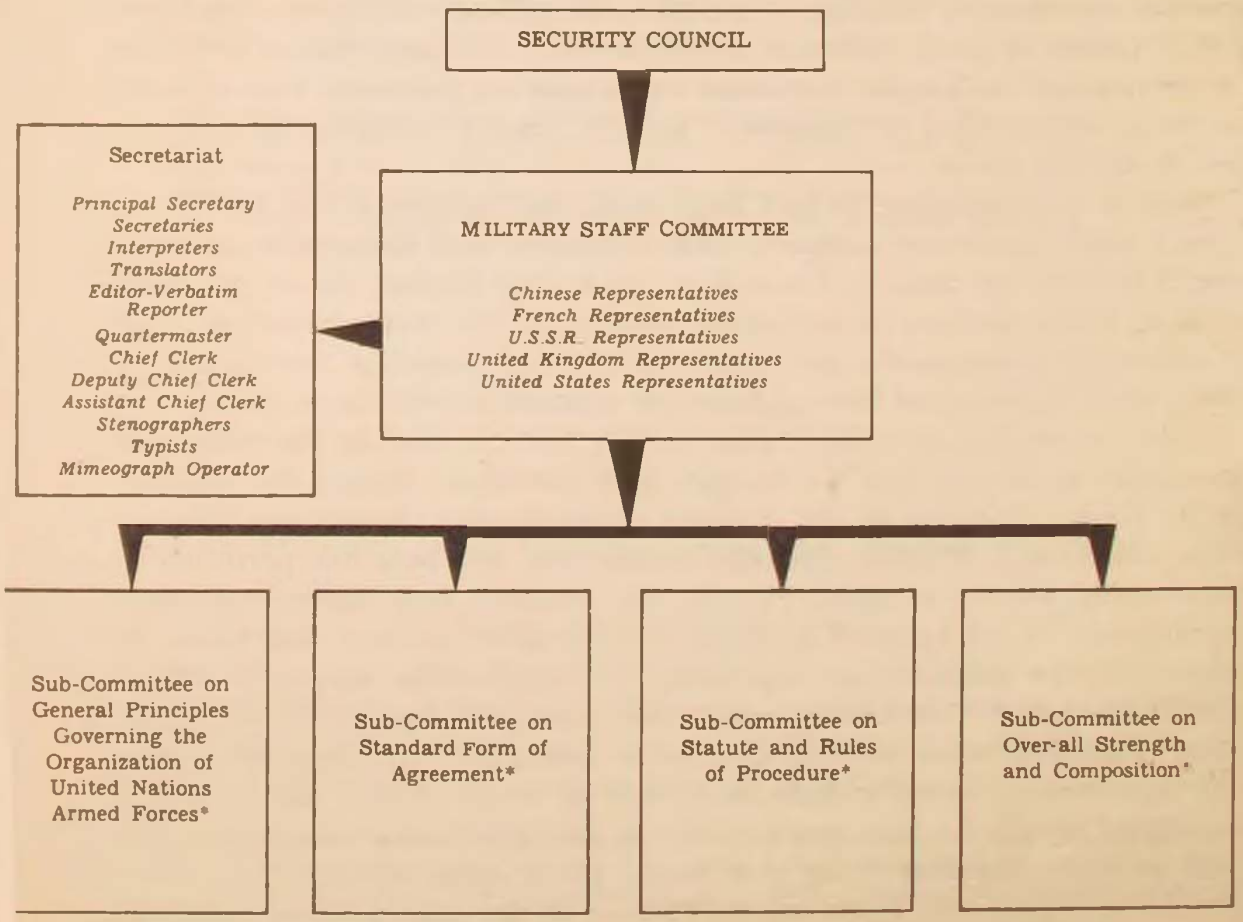
At the San Francisco Conference in May 1945 an effort by the Philippine delegation to provide that the Military Staff Committee should be composed of the Chiefs of Staff of all the members of the Security Council was rejected. The reasons are of continuing significance: the members not permanently represented would be asked to join the Military Staff Committee when appropriate; if the forces of a nation were used, its military staff would be consulted; the initiative for expanding the membership should be left to the Military Staff Committee; composition should be limited to the permanent Council members in order to avoid a committee with constantly changing membership; Allied military machinery of World War II functioned in a manner similar to that provided for by the Dumbarton Oaks proposals; and since the function of the staff would be to make military decisions, it should be kept small. Therefore the Charter of the United Nations contains

specific provisions for the Military Staff Committee and as such serves as the basic governing charter for this international military group.

On 25 January 1946 the Security Council requested its permanent members to appoint representatives to meet in London on 3 February. In addition the Security Council directed that when the chiefs of staff assembled they should then become the Military Staff Committee of the United Nations, as provided for by the Charter. The first task of the Committee was to draw up organization plans and draft rules of procedure and basic statute. A "Draft Statute and Rules of Procedure" was formulated and sent to the Security Council for approval. At its meeting of 16 February 1946 the Security Council referred the report to the Committee of Experts while the Military Staff Committee carried on provisionally under the draft statute. Today the draft statute and the Charter provisions constitute the basic charter of the Military Staff Committee.

In a broad sense the internal structure of the Committee is relatively simple. There is a delegation from each of the five nations that are permanent members of the Security Council. Each delegation in turn is composed of an Air, an Army, and a Navy representative. The chairmanship of the

United Nations Military Staff Committee



(composed of an officer representative from each member nation of the Military Staff Committee)

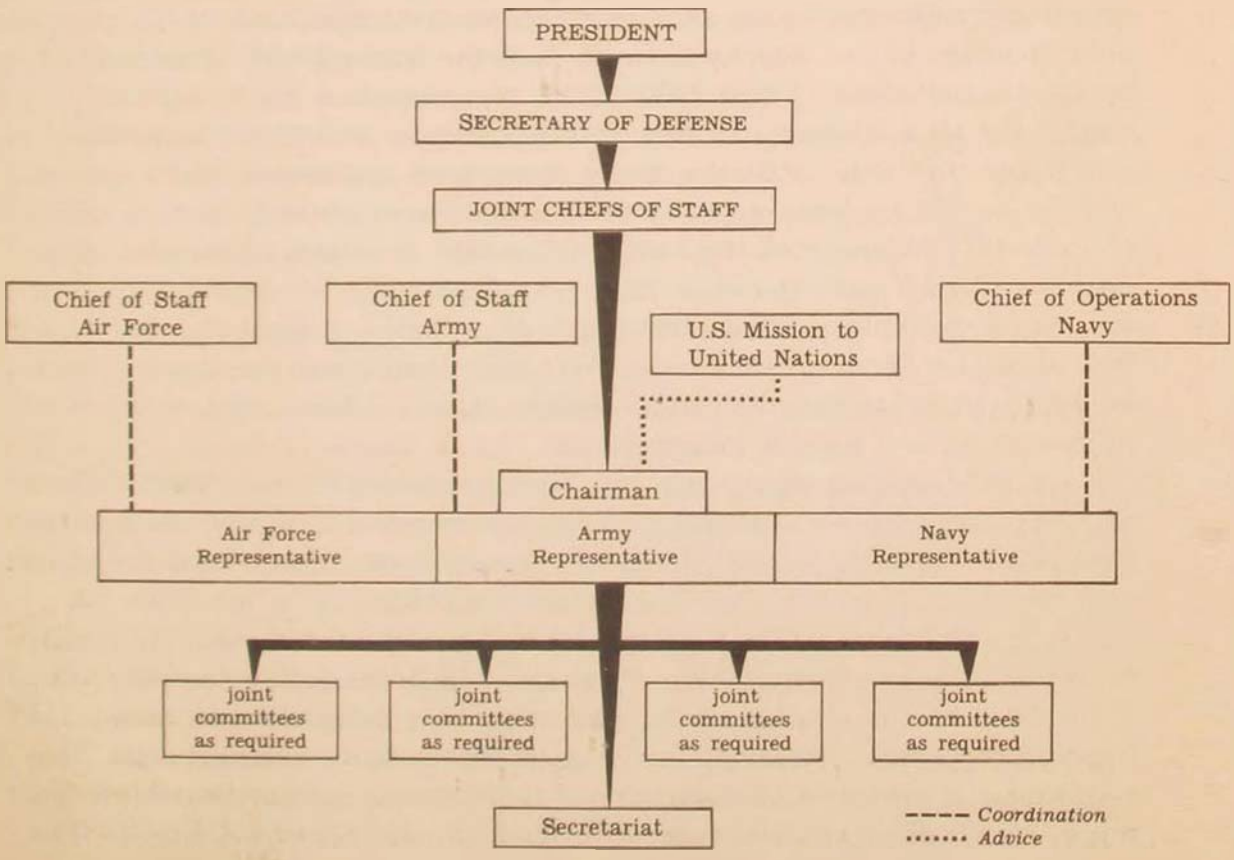
staff rotates monthly among the senior representatives from each nation. A secretariat services the staff, and the position of Principal Secretary is filled by an officer from the same delegation as the officer serving as Chairman.

The Military Staff Committee works through functional subcommittees which are created as the need arises. As presently constituted, there are four subcommittees: General Principles Governing the Organization of United Nations Armed Forces, Standard Form of Agreement, Statute and Rules of Procedure, and Over-all Strength and Composition.

Because of the particular status of the Staff Committee and the serious problem of physical and documentary security, the secretariat of the Staff Committee is independent of the Secretariat of the United Nations. This specialized secretariat has on it a military officer secretary and an interpreter from each nation. Other functional positions, such as translators, clerks, and mimeograph operators, are allocated to specific countries.

The United States Delegation to the United Nations Military Staff Committee is directly answerable through its delegation chairman, the senior Armed Forces officer, to the Joint Chiefs of Staff and through that group to the Secretary of Defense and thence to the President. Each service represent-

Organization of the U.S. Delegation United Nations Military Staff Committee



ative coordinates his activities with the chief of his service. As a committee the United States military delegation advises the United States Mission to the United Nations. The chairman of the military group represents the President, the Secretary of Defense, and the Joint Chiefs of Staff on items of a military nature. Joint working committees are appointed as required within the delegation.

"The Military Staff Committee shall consist of the Chiefs of Staff of the permanent members of the Security Council or their representatives. Any Member of the United Nations not permanently represented on the Committee shall be invited by the Committee to be associated with it when the efficient discharge of the Committee's responsibilities requires the participation of that Member in its work." In these words paragraph 2 of Article 47 spells out in the Charter of the United Nations that the United States, China, France, the Soviet Union, and the United Kingdom—the Big Five—shall comprise the Military Staff Committee.

In the beginning, the nations used officers of general or flag rank on the Committee. After late 1948 a tendency to lower the representatives can be discerned. An analysis of the representation indicates that the United States, alone among the great powers, has continued to attach to the Military Staff Committee the prestige that it was originally accorded. In the early period the United States had utilized at different times two four-star Air Force generals and two four-star admirals on its delegation. And since February 1949 there have been Army and Air Force lieutenant generals and Navy vice admirals as service representatives.

If the international political importance attached to the Staff Committee can be determined from the rank of representatives from each of the permanent members of the Security Council, then the Soviet Union is second only to the United States. Until 1950 Soviet representation was comparable to that of the United States. In that year a Soviet naval representative was no longer present. Since 1951 the Soviet Army man has been a major general and the Soviet Air Force representative a lieutenant general. But regardless of rank the chairman of the Soviet delegation has been the senior Army member. Other nations either have permitted some of their positions to remain vacant or have filled them with officers below general and flag rank. It is of passing interest to note that there have been fewer personnel changes in the Soviet delegation than in any other. Also, air force representatives of all powers have enjoyed a longer tenure.

United States representatives are initially selected by each service Chief of Staff. The selection is then forwarded for tentative approval through the channels of the Defense Department for formal nomination by the President and for final approval by the Senate of the United States.

In a small international group, as the Military Staff Committee clearly is, voting is generally very uncomplicated. Each delegation has one vote. A majority vote is binding on all staff committee delegations in matters of internal procedure. Recommendations to the Security Council must have unanimous approval of all delegations. If unanimity cannot be achieved, a report of all divergent views must be made to the Security Council. The

draft rules of procedure provide that each delegation shall have one spokesman at meetings to express the official views of his delegation.

Budgeting for the Committee is not performed in one operation. The budget for each delegation is the responsibility of each of the five nations on the Committee. Office supplies, furniture, and equipment are handled by the Department of Conference and General Services of the United Nations Secretariat. The only true budget operation is for personnel of the secretariat of the Military Staff Committee. It is performed by the secretariat itself and is given legislative sanction by the General Assembly. Appropriations, for example, run from $165,000 for the financial year of 1949 to $109,200 for 1955.

The Charter of the United Nations is the best source for a description of the functions of the Military Staff Committee. To begin with, the Committee is to assist the Security Council with the formulation of plans for regulating armaments. It aids the Security Council in determining the strength and degree of readiness and employment of the national air force contingents made available by Members of the United Nations. Article 46 states: "Plans for the application of armed force shall be made by the Security Council with the assistance of the Military Staff Committee." General authority is contained in Article 47 which charges the Committee "to advise and assist the Security Council on all questions relating to the Security Council's military requirements for the maintenance of international peace and security, the employment and command of forces placed at its disposal, the regulation of armaments, and possible disarmament." In addition the strategic direction of any armed forces placed at the disposal of the Security Council is a responsibility of the Military Staff. In summary, then, the Committee provides professional military assistance to the Security Council and through it to the United Nations as a whole.

The work of the components of the Military Staff Committee, all located at United Nations Headquarters in New York, is of a subsidiary nature. The functions of the secretariat are routine and need not be detailed. Sub-committees work only as the need develops. With the deadlock in the Security Council over the Committee's work, the need seldom develops.

In addition to participating in the work of the Military Committee, the United States delegates furnish professional military advice to the American political representatives in the United Nations. Military advisers participate in the deliberations of committees handling problems with possible military or strategic import before the General Assembly or the Security Council. Military advice would be considered on such problems as Korea, disarmament, and bacteriological warfare. Of course the United States military representatives also keep their service superiors in Washington informed.

At the point of discussing achievements, the water becomes extremely shallow. The United Nations *Yearbook* shows that since 1947 the Military Staff Committee has held regular meetings, usually every two weeks, and has reported no substantial progress in its work.

A vital task was assigned to the Committee by the Security Council at its twenty-third meeting, on 16 February 1946. The Committee was directed to examine, from a military point of view, the provisions of Article 43 of

the United Nations Charter, which provided for making armed forces available in accordance with special agreements. The Committee believed that the first step should be the formulation of basic principles to govern the organization of United Nations forces.

For a year the military delegations of the Big Five discussed these principles. Finally, in December 1946, the General Assembly saw fit to call on the Security Council to accelerate the placing of armed forces at the disposal of the United Nations. As a result, the Security Council called for a report from the Military Staff Committee on 30 April 1947. The report, *General Principles Governing the Organization of the Armed Forces Made Available to the Security Council by Member Nations of the United Nations,* contained forty-one articles, twenty-five of which had been unanimously agreed on. This report remains bottled up in the Security Council to this day and represents the nearest thing to an achievement that can be claimed for the Military Staff Committee.

Success or failure of the Committee depends entirely on the success or failure of the Security Council itself. For the last seven years the work of the Committee has been held up pending action by the Council on the principles to govern the organization of United Nations armed forces. The special agreements on United Nations forces were considered at San Francisco to be an important safeguard for world peace. This remains true today.

The problem in the Military Staff Committee is not, as some scholars contend, to ensure its representativeness. Rather it is to make the Committee responsible, efficient, and capable of action. If armed forces are to be placed at the disposal of the Security Council, the bulk of the forces will be supplied by the Big Five. Since speed of decision is vital in military operations and the committee process is slowed down as the size of the committee increases, it is difficult to imagine substituting a thirty-three man committee of chiefs representing all members of the Security Council for the present committee of fifteen officers.

Indication of the reduced prestige and hopes for the Committee is reflected in the trend, following the deadlock over Military Staff Committee business in the Security Council, to reduce the military status of the representatives of the Big Five. This is further evidence that the mission of the Committee is not being performed satisfactorily.

The real test of the Committee remains for the future to apply. It was not possible to put the machinery in gear for the Korean action. In any event the existence of the Committee serves to remind the United Nations as a whole that there are *original concepts* of an effective world organization still to be fulfilled. It also indicates that there are military considerations ever present in the world's political affairs and that these simply cannot be overlooked.

The individual delegations to the Military Staff Committee serve a very real purpose in advising the national delegations to the United Nations about the military implications of the political and economic problems and actions before the world organization. The importance of this function should not be dismissed by looking at military issues as something apart.

Part III

NATO's Top Military

Colonel George G. Byrnes, Jr.

UNIQUE among military organizations is the arrangement to furnish top military direction and guidance to the North Atlantic Treaty Organization field commanders and military advice to the NATO civil authorities.

Topping the command ladder in the fourteen-nation alliance is the North Atlantic Council. A civilian organization, the Council consists of representatives, normally with the rank of ambassador, from all member nations. Located in Paris and staffed by an international secretariat under the direction of the Secretary-General, the Council is in permanent session. From it stem the broad political and economic guidance that represents the collective will of all the governments and forms the basis on which the military forces of NATO must operate.

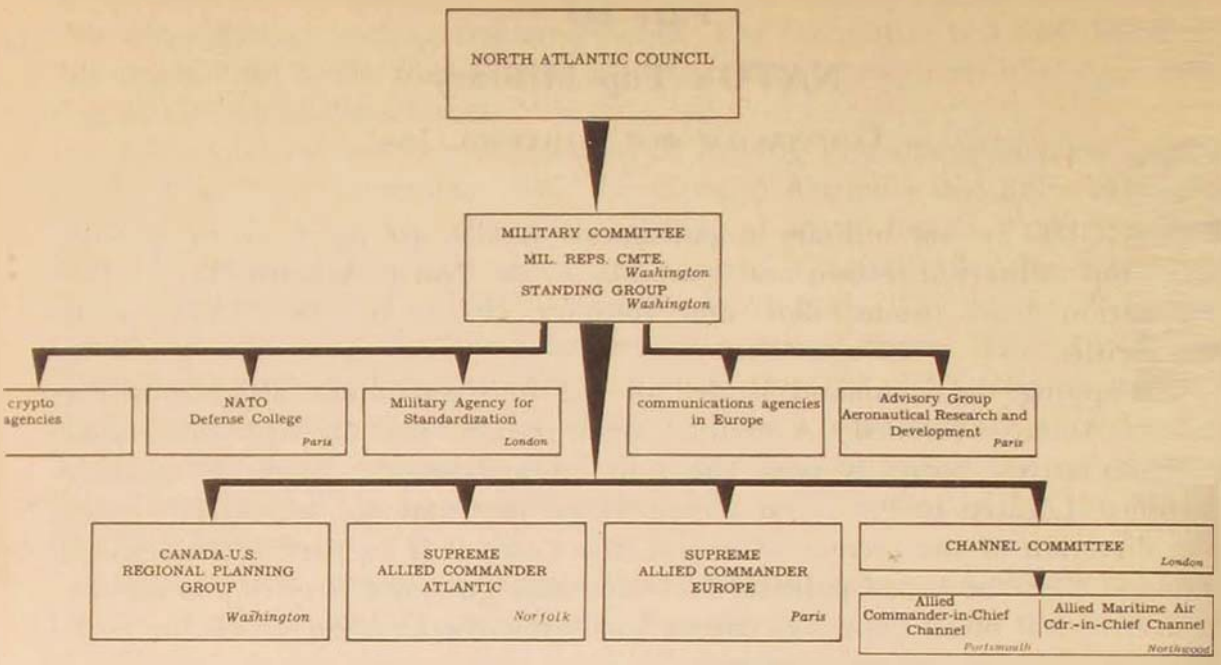
In an organization where the highest field commanders are termed "Supreme," it is difficult to find adjectives to describe the highest military authority. Still there are three purely military bodies that are, at least collectively, superior to the "Supreme" commanders. At the apex of the NATO military structure is the Military Committee, composed of one of the Joint Chiefs of Staff or their designated representative from each of the member countries. Iceland, which has no military forces, may be represented by a civilian. The first United States representative was General of the Army Omar N. Bradley, who held the position as an additional duty to his Chairmanship of the Joint Chiefs of Staff. But in September 1953 the President decided the job should be full-time and appointed General J. Lawton Collins, former Chief of Staff of the Army and a former member of the Joint Chiefs of Staff, to the Committee.

The lofty Military Committee normally meets only once or twice a year and then primarily to take final decision on long-range plans and policy that have been formulated since the preceding meeting. They also review actions taken by the full-time military agencies during the preceding year. The last meeting was held in Paris immediately before the December 1954 meeting of the NATO Council of Ministers.

Two dovetailing organizations have been established in Washington to carry out the day-to-day task of providing the over-all strategy and conducting the day-to-day business of the Military Committee. The Military Representatives Committee represents all nations except Iceland and normally meets two or three times a month. Members receive guidance from their respective governments and ensure that all nations and areas of NATO are considered in NATO military planning.

Heart and core of the entire upper level of NATO's military structure

North Atlantic Treaty Organization



is the three-nation Standing Group, also located in Washington. The Standing Group is the executive and steering agency of both the Military Committee and the Military Representatives Committee. This little known body has a profound influence on the course steered by the NATO military machine. The Standing Group is composed of the Military Representatives of France, the United Kingdom, and the United States. Each member is assisted by a small staff of approximately 25 officers, mostly of the rank of colonel, who are referred to as "Planners." Each staff is balanced as closely as circumstances permit among the three services—land, sea, and air. General Collins is the member of both Military Representatives Committee and Standing Group for the U.S., as well as the Military Committee. His deputy is an Air Force major general, and a Navy captain serves him as Chief of Staff. Three general planning teams, each composed of an Army, a Navy, and an Air Force officer, do the bulk of the general planning work. In addition there is a Logistics-Materiel Planners team and several specialist officers who deal with communications, public relations, intelligence, and security problems. Where possible these specialist assignments are rotated among the services. The French and United Kingdom elements of the Standing Group are organized similarly. The three national staffs are backed up by an international secretariat headed by a brigadier general, who is furnished in rotation by the three countries. Directly under the control of the Standing Group are a number of specialized agencies, such as the NATO Defense College in Paris and the Military Agency for Standardization in London.

The Standing Group, as the top military agency in full-time operation, receives politico-economic guidance from the North Atlantic Council and military guidance from the Military Committee and the Military Representatives. The Standing Group, in turn, guides the commands—the Supreme Allied Command Atlantic, the Supreme Allied Command Europe, the Channel

Command, and the Canada-United States Regional Planning Group—which in their turn guide the forces in the field.

For national guidance the U.S. representative to the Standing Group turns to the Joint Chiefs of Staff, with whom he may sit when NATO matters are under discussion. The French and British are similarly guided by their governments. The Standing Group maintains a liaison office at the headquarters of the North Atlantic Council in the Palais de Chaillot, Paris.

This "top command" structure did not spring into being full blown. Like most of NATO it has evolved under the pressure of circumstances. The Treaty itself was signed in April 1949 and constituted the first time in history that the United States had entered a formal military alliance that committed it, *in advance of hostilities*, to guarantee the territorial integrity of any other nation.

In its most basic concept the North Atlantic Treaty Organization is simply an alliance of friendly countries banded together to protect each other from aggression by a predatory power—in other words, collective security.

To the professional military man Article Five of the Treaty is of the utmost significance. It states, "The parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all." It further states that in case of attack each party to the Treaty shall take "such action as it deems necessary, including the use of armed force, to restore and maintain the security of the North Atlantic area."

The military history of NATO stems back to the Brussels Treaty of 1948. Much of the early planning by Field Marshal Montgomery and his Western Union staff was picked up by NATO and carried to completion. The Standing Group was established, under the authority of the Military Committee, in December 1949 and actually began operations the following January. The other nations provided "Military Representatives Accredited to the Standing Group."

Early planning staffs were very small and the pace relatively leisurely until the outbreak of hostilities in Korea provided the proof that the threat of aggression was more than hypothetical. Early planning studies resulted in a "Strategic Concept, Terms of Reference for the Commanders," a delineation of the responsibilities to be assigned the international commanders versus those to be retained by the sovereign member nations. Much of the preliminary work was done by "regional planning groups" operating under the direction of the Standing Group.

The Treaty, the early brave pronouncements, and initial planning were all aimed at accomplishing a threefold objective:

1. A major deterrent to aggression.
2. A successful forward defense in Europe.
3. A high measure of confidence and security during the cold war.

Bearing these very broad objectives in mind and considering the complex inter-relationships of sovereign nations, it is not surprising that top-level NATO military planning is sometimes a time-consuming process. The dia-

gram which shows this process may somewhat resemble a plumber's nightmare, but it is the only way that all interested parties may be fairly represented. The drama of planning has many scenes and involves many actors. The players in this particular presentation might include:

The North Atlantic Council (Paris)
The Standing Group Liaison Officer (Paris)
The Standing Group (Washington)
The Steering Committee (Washington)
The Standing Group Director and Secretariat (Washington)
International Planning Teams (Washington)
The Commanders (Paris, Norfolk, U.S.A., and Portsmouth, England)
National Ministers of Defense (all NATO capitals)
Military Representatives Committee (Washington)
The Military Committee (usually Paris)

In a typical case, one of the Supreme Commanders, after considerable study, would draw up a detailed proposal and forward it to the Standing Group for approval. The Standing Group Director would, after consultation with the three representatives, issue a directive to an international planning team to examine the proposal and come up with a recommendation. Unless previous action had established a clear precedent, the individual members of the international planning team would recommend to their respective chiefs that the matter be studied by their national Chiefs of Staff for the purpose of formulating a national position. After receiving guidance the planners would meet to negotiate a proposal that would be satisfactory to all three.

The Steering Committee, composed of the deputies to the Standing Group members, would then meet to consider further the paper prepared by the international planning team. They might make further modifications, which normally would produce a refined proposal for the Standing Group itself to consider. Meanwhile there might be a considerable exchange of messages with the various Chiefs of Staff as negotiations progressed. Following Standing Group approval, the paper would be forwarded to the Military Representatives Committee for their comments and eventual approval. The Military Representatives in all probability would turn to their respective Chiefs of Staff for national guidance. Then they would meet and put final approval on the arrangements. In the case of extremely far-reaching decisions, further approval might be required from the Military Committee at its annual meeting. If important economic or political factors are involved the Military Committee decisions would be subject to further approval by the North Atlantic Council. Obviously at all stages of the planning process a great deal of informal coordination is required among staff officers at all levels.

It is obvious that this procedure has allowed everyone a chance to have his say. The final result must be approved unanimously. Where differences of opinion are initially involved, the usual result is a reasonable compromise.

Concurrently, of course, there have been literally hundreds of studies under consideration. They cover almost the entire range of military planning.

They deal with supply, attrition rates, communications matter, intelligence, concepts of future operations, standardization, and many other matters.

NATO has made remarkable progress in its six years of existence. Combat-ready forces have been organized and trained in much greater numbers and to much greater effectiveness than before the Treaty was signed. Commands have been activated. The Alliance has been strengthened by the addition of Greece and Turkey. Plans have been made for the defense of the entire area, and the commitments by nations for its common defense have been agreed upon. It has taken a lot of hard work by many people, and the job is not yet finished. But the thousands of instances of give and take and a feeling of sharing in a mutual cause have resulted in the creation of an effective alliance backed by a *military* organization capable of causing potential aggressors to think twice before acting.

Washington, D. C.

LETTER to the Editor

more about jet streams

Congratulations on the excellent article, "Jet Streams: Fact and Fiction" by C. N. Touart, in your Winter 1954-55 issue. I hope that Mr. Touart's ideas will be widely read and understood.

As Mr. Touart indicated, the "jet stream" is a controversial subject even among meteorologists. He points out correctly that the density and accuracy of our wind measuring network does not enable us to accurately describe the details of the wind field. One can increase the density of wind observations by properly instrumented aircraft, but I think it remains to be established that such wind observations are more accurate or even as accurate as those obtained using ground based wind measuring equipment. In his illustration, figure 4b, based on wind observations from the ground weather stations, he has quite properly recognized the inaccuracy of the observations by drawing smooth contours. In figure 4a, which is based on possibly less accurate aircraft observed winds, he has drawn quite irregular contours rather precisely fitting the data. The actual wind field was undoubtedly more complicated than that shown in figure 4b, but much less complicated than that shown in figure 4a. Moreover, he has quoted some figures on page 80 illustrating how extreme the horizontal and vertical variation in wind speed can be. He says, "Horizontal differences of up to 40 knots in 10 miles have been reported" and "There is some evidence of higher values." I am reminded that a few years ago, when the flying saucer craze was at its height, there were reports that little men had debarked from one of these strange craft in Mexico. Satisfactory supporting evidence was not produced and the report was not taken very seriously by most people.

I am inclined to be an optimist and to believe that there is something systematic and reasonable about nature. In particular, I believe that atmospheric motion conforms with the commonly known laws of physics, not to some diabolical and supernatural force that drives it in an unexplainable behavior. We must continue to collect evidence on the "jet stream" and other aspects of the atmospheric motion, but the evidence must be carefully evaluated for accuracy. Evidence that is not subject to objective evaluation should at least be assessed on the basis of its physical plausibility.

There is a tendency for most of us to "get on the bandwagon" when something spectacular is publicized. There has been a great deal of publicity regarding the "jet stream" in magazines, newspapers and even in technical journals, which has contained at best only half-truths and at worst no truth at all. Such publicity serves to confirm that scientific "discoveries" announced in newspapers and magazines are almost always not true.

Mr. Touart puts "jet streams" in their proper perspective on page 87 when he points out that winds in general, including the "jet stream," provide Air Force commanders opportunities to reduce flight time, extend range and

increase payloads. Exploitation of these opportunities requires coordinated cooperation of many members of the operations team, including the weatherman.

Another article in the *Quarterly Review*, "A Better Mousetrap" by Brigadier General H. W. Bowman, is pertinent to this subject. Eight years ago, the Air Weather Service developed a theoretically and practically sound system for applying wind data to the Air Force's flight planning problems. The techniques were new to the Air Force and involved changes in familiar patterns and habits. We were not successful in selling the idea and the techniques were not widely applied in Air Force operations. The commercial airlines however, driven by somewhat different motives than Air Force commanders, did further develop and apply the techniques. Recently as news of the commercial airlines' successes, occasionally spectacular and steadily profitable, has become available, a more receptive Air Force attitude has developed. Current development work on these techniques by the Air Research and Development Command, with the cooperation of MATS and the Air Weather Service, should result in a more salable and effective product.

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The Quarterly Review Contributors

HONORABLE ROGER LEWIS (B.A., Stanford University) has been Assistant Secretary of the Air Force for Materiel since April 1953. He was in aviation industry continuously after his graduation from Stanford University in 1934. At Lockheed he started in the sheet-metal shop, rose to be Director of Materiel during the war, and afterward Assistant General Sales Manager. In September 1947 he joined Canadair, Limited, in Montreal as Sales Manager, later Vice President. He was with Curtiss-Wright in similar capacities from May 1950 until he assumed his present position. In the Air Force Mr. Lewis has over-all responsibility for plans, policies, and programs relating to materiel, contracts, and industrial resources; Air Force participation in the Mutual Defense Assistance Program; transportation; communications; and civil aviation. He is the Air Force member of the Air Coordinating Committee, the Mutual Defense Assistance Management Council, the Maintenance Facilities Board, and the Research and Development Policy Council.

GENERAL EDWIN W. RAWLINGS (B.A., Hamline University) has been Commander, Air Materiel Command since August 1951. Five years after winning his wings and commission in 1930 he began his first tour of duty in the Materiel Division at Wright Field. Two years later he was one of two Air Force officers selected to attend the Harvard University Graduate School of Business Administration, from which he graduated *cum laude* in 1939 with a Master's degree in industrial management. After four more years in materiel at Dayton he was transferred to Washington in 1943 to head the scheduling of materiel and critical components needed to maintain wartime production in the entire aircraft industry. As victory in Europe neared, his job became production cutbacks. In September 1945, in addition to this work, he was made head of the Procurement Division, Air Technical Service Command, at Wright-Patterson. In July 1946 he returned to Washington to organize the new office of Air Comptroller, which he headed—from 1949 onward as Deputy Chief of Staff, Comptroller—

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AIR MARSHAL SIR GEORGE H. MILLS, KCB, DFC, has been Britain's Air Officer Commanding-in-Chief, Bomber Command, RAF, since April 1953. When war broke out in 1939 he was in command of No. 115 Bomber Squadron, flying Wellingtons, and later served at Headquarters, Bomber Command, and on the Directing Staff of the RAF Staff College. A graduate of that college (1936) and of the RAF College, Cranwell (1921), he has filled a variety of important posts: in the Air Ministry as Director of Policy (1943-45) and Director of Plans (1947-49); as Air Officer Commanding, No. 1 Group (Bomber) (1949); as head of the United Kingdom Military Delegation to the Western Union Military Staff Committee (forerunner of SHAPE). His foreign tours have been in Iraq (1922-24); in India (1929-33); as Air Officer Commanding the Balkan Air Force (1945); as Air Officer in charge of Administration, Middle East Air Force, Egypt (1946); and as Air Officer Commanding, Malaya, for the two years preceding his present assignment.

COLONEL EPHRAIM M. HAMPTON (U.S.M.A.) is Deputy for Evaluation, Air War College, Air University. He served five years in the Infantry and five in the Chemical Warfare Service before winning his pilot rating and transferring to the Air Corps in 1941. After several assignments as logistics staff officer, air inspector, and base commander, he served in 1945 as Deputy Commander and then Commander of the 463d Bomb Group, Fifteenth Air Force. A postwar tour followed in Hq USAF as Chief of Logistics Plans; then he returned to Europe with the Air Transport Command and commanded its base at Rome in 1946-47. His next assignment, in the Policy Division, Directorate of Operations, Hq USAF, ended in his selection to attend the National War College. After graduation in 1951 he again returned to Europe and served as Chief, War Plans, Hq USAFE and on the logistics staff of Allied Forces Central Europe until his present assignment in July 1954.

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MAJOR RUSSELL P. STRANGE (B.A. and M.A., University of Maryland) presently is instructor in American Government and United States Foreign Policy at the United States Naval Academy. Commissioned in the Air Force in 1943, he has filled administrative positions at various levels from Adjutant General of the Hawaiian Air Materiel Area to assignment in the Air Adjutant General's Office. His article "Atlantic Conference: The First Roosevelt-Churchill Meeting" appeared in the April 1953 *United States Naval Institute Proceedings.*