Kotok, Edward S
The application of central staff principles to the fire control problems . 1947.

copy 2

THE APPLICATION OF GENERAL STAFF PRINCIPLES TO THE FIRE CONTROL PROBLEM

by

Edward S. Kotok

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of Master of Forestry
in the University of Michigan

Ann Arbor, Michigan
January, 1947

"....Large fires are usually due to preventable weakness in organization." (21)

E. W. Loveridge

ACKNOWLEDGEMENT

The author wishes to gratefully acknowledge the valuable assistance offered by various people, each of whom is far more experienced and qualified than the author to truly analyze the problems of Fire Control. Had it not been for the helpful suggestions of Dean S. T. Dana, Professor S. W. Allen, Professor K. E. Henion, and Mr. J. H. Price of the United States Forest Service, plus the many other Foresters who have patiently criticized the study, this paper would undoubtedly have been far less comprehensive and informative. To all of these I give my thanks.

E. S. K.

CONTENTS

CONTENTS

LIST OF FIGURES

LIST OF FIGURES

CHAPTER I

Introduction

A STATEMENT OF THE PROBLEM

Probably no problem in American forestry has received more thought and attention than the fire problem. Volumes of both popular and professional literature have been written on the subject. And yet, it is safe to state, there is ample room for additional thought to be devoted to the challenge of fire, from the development of new equipment to the highest levels of staff planning.(19)(12)

It is along the lines of staff planning that this work is devoted. It must be understood from the outset that although many of the concepts are drawn from the military, this author in no way proposes that the fire organizations of America be militarized. It is apparent, from much of the literature previously published, that the overall problems of Fire Control are analogous in many respects to the battle problems of an army.(20)(29) How closely this analogy can be made is a matter of personal beliefs. However, the fact that staff doctrine and staff techniques among the armies of the world have become refined and formalized is readily apparent to any student of the military. That these staffs have progressed through the centuries seems to have been proven.

It now becomes a problem for the "combat" forester, the fire specialist, to extract from this array of military

doctrine those parts that are applicable and pertinent, remold them to fit the fire problem, and from these new concepts create a better working and more efficient staff grouping.

Wherever men congregate with purpose, whenever there is a job to be done, some form of organization must exist. The structure of this organization, that is the form, may be one of planned origin or one of extemporaneous birth. For very obvious reasons the probability of success of the planned organization is far greater than what might be expected of the impromptu group. Such, it seems, is certainly the case in the fire problem. Foresters have long since discarded the notion that "pick-up" crews and makeshift planning are adequate to master the challenge of fire control. Time is too important a factor in fire supression activities. The days of haphazard plans and indefinite job assignments are thankfully a thing of the past. It has been found that to maintain the degree of efficiency that is essential to the creation and operation of a fire organization, planning is as inevitable as the fires themselves.(17) For the purposes of clarity, let us refer to this overall planning that must be carried on as a basic step in fire work, Staff Planning.

Among the doctrine of the military there are numerous "types" of staffs. As a basis for a fire staff organization this author has selected the General Staff "type", it

being considered the most applicable to the "combat" forester's needs. It is the General Staff form of control that is doctrine for all the many field activities of the army, especially those pertaining to the combat role. From the roots of the General Staff organization are built the combat units of the army. A pattern is established, principles are described, a fundamental doctrine established, and these apply with equal measure to squad, battalion, or Army Group. It is this fundamental concept that has been refined many times over, by Napoleon, Frederick the Great, and contemporaries. That it has reached its final form is doubtful, and that it is near perfect is debatable, but it must be conceded that the basis for an efficient and effective unit is offered by these principles.

It is to be further explained, at this time, that this paper does not attempt to describe how fires should be attacked in the physical sense. That is the practical problem that can justifiably be approached only by a man of great experience--experience on the fire line. It is felt, however, that much can be done to make the lot of the fire fighter an easier one, easier not in the sense that his comforts might be increased, but easier in the sense that he can attack the fire with the knowledge that above him and behind him are smoothly working staff groups, efficient, trained, and competent.(4)

A NEED FOR STAFF PLANNING

The principles of staff planning and organization that are developed in this thesis must, it would seem, have some overall value. It will be shown that these principles can be applied to pre-suppression activities, to the combating of small "normal" fires, and to the supreme challenge, the major conflagration. That different phases of staff doctrine must be applied to the different aspects of the fire problem is natural, but the underlying principles remain the same. A staff grouping that functions efficiently in the assembling of fire data for a particular area must be equally efficient in the "combat" phases as well. Such a versatile organization can be developed from the General Staff core. This becomes a fundamental challenge, to design an organization that will "fill the bill" no matter what the immediate problem may be.

It must be explained at this time that to facilitate the discussion of many of these staff principles, practical illustrations must be employed. This may perhaps lead to some confusion on the part of the reader. However, if it will be borne in mind that throughout the entire discussion, fundamentals are being examined, not specific details. As has been mentioned, the discussion and analysis of actual fire suppression, or any of the numerous technical approaches to the fire control problem, must be accomplished by a man of considerable experience. The underlying principles of staff technique AS APPLIED to the fire problem is the scope

of this work.

There are two dominant thoughts, two fundamental requirements, that govern the application of General Staff principles to the fire control problem. The first of these is the already mentioned need for staff planning and unified staff action. Without this requisite being met it becomes a near impossibility to arrange any permanent or unified staff body or any staff harmony. Needless to say, lack of planning resolves itself in lack of efficiency, wasted effort, wasted money. It will be pointed out in a later discussion that this lack of planning can result in greater fire losses, the final test, one can argue, in the entire fire problem.

THE NEED FOR STANDARDIZATION

The second dominant concept that is to be demonstrated is the need for some form of standardized structure to exist among fire organizations.(7) To carry this concept to its ultimate conclusion, this author can conceive of there someday being so complex and unified a nation-wide fire organization that it will encompass not only fire units of the Forest Service but all fire organizations, federal, state, and private.(17) It appears that the situation today existing among fire organizations in some degree is comparable to that in which the armies of General Washington found themselves during Colonial days: different military units from the different colonies, each with

its own weapons and organization, even different uniforms. To mold these heterogeneous bodies into a single fighting machine with a single objective was indeed a terrifying challenge, and that this was accomplished speaks of the leadership that a great soldier can impose in time of great peril. It is of course quite problematical that this goal can ever be attained among foresters, but it indeed can serve as an objective to fire control activities throughout the whole United States. The urgency of such a program is a matter of personal choice, but this author cannot help but believe that someday some such standardized fire organization will exist. Is it not possible to visualize such an organization in action, knowing no boundaries, divorced from self-interest, working for the common goal--to prevent, detect, and suppress all fires on forest and range lands?

CHAPTER II

ORGANIZATIONAL STRUCTURES, EXISTING AND PROPOSED

There have been in existence for some thirty-five years numerous fire fighting organizations, some quite simple and some extremely complex. That their effectiveness can be denied is a fallacy and a misbelief; however, it is conceivable to this student that there is the possibility that some other organizational structures might have proven more successful. It is but a problem of conjecture, indeed, and it is not the intention of this investigator to criticize in the least the many courageous pioneers in fire suppression nor their many valuable and lasting contributions. The great progress that has been made has not been the result of mere chance, but more the product of sustained effort and systematic study.(10)(3)(22)

There is one consideration, however, that appears to have great importance and value, a consideration that can hardly be overlooked. That is the question of standardization. From all available information it appears that no concerted effort has been made on the part of the various Regions of the Forest Service, or the Washington office, to organize and direct the various fire organizations in forming a structural pattern of a standardized nature. It can be argued, of course, that such uniformity is ill advised, and it is granted from the very outset that there are many obvious weaknesses in such a doctrine. It is apparent

that the Forest Service has followed a policy of individualism throughout its various Regions, and great pride is taken in individual accomplishments. In fact, it can be justifiably stated that without the freedom of action that has prevailed, the stimulus for initiative, the present efficiency of the whole Service would probably be lower than it is. This extreme individualism has been criticized, however, by recent writers. Sutliff states that because of a "...lack of adequate coordination of effort and dissemination of approved planning information..." much waste in time, effort, and money has resulted in "rediscovering" known facts and principles.(26) It has also been demonstrated in the armed forces that uniformity and standardization is imperative during periods of extreme action. And is not the fire problem one of battle action? What then should be the policy?

Before analyzing any actual organizational structure, either existing or proposed, let us first determine just what problems face the fire organization, what tasks they may be called upon to accomplish, and what effect the structure might have on the efficiency and competency of the unit, be it large or small.

The ultimate of the fire organization is to prevent fires. Prevention activities, mainly public education and control, must be along systematic and sound lines to be most effective.(15) Planning is essential.

Pre-suppression activities call for wise judgement and

a spending of money where the greatest returns can be realized. Planning is essential.(23)

The suppression of fires, large or small, requires skill and dispatch. Planning is essential.

The functions of the fire organization are well described in the Copeland Report.(34) "Speed of attack is the essence of successful fire control in city and forest alike. Once a fire starts it increases progressively in size as long as fuel is in its path and weather conditions are favorable for combustion, and the suppression task becomes progressively more difficult, more costly, and less certain. The ideal protection organization is built on the principle that fires be discovered and reported promptly to trained fire-fighting units capable of attacking the fire in the shortest possible time and also expanding to cope with any fire-control job that may develop. The frequency and occurrence of past fires and the rate at which fires spread, as shown by the fire history of a forest property, determine the number and placement of a mobile manpower prepared so to function. Provision also must be made for expanding auxilliary forces to supplement the regular first line of defense."

Thus it can be seen that the structure must be so designed as to provide speed to the line units, information gathering agencies that can function in close cooperation

with the line units, flexibility of size of a pyramidal nature so that units can be quickly and harmoniously enlarged during actual field conditions, planning agencies capable of determining in advance probable personnel and equipment needs, mobility, and an ability to operate over prolonged periods of time. Some additional functions might be procurement agencies, for both personnel and equipment, fiscal agencies, research agencies, etc.

EXISTING ORGANIZATIONAL STRUCTURES

How these numerous functions are accomplished in the Washington office and in the various Regional offices seems to be somewhat of a mystery. The very fact that this information is not available in printed form seems to indicate that no formal procedures are maintained. Certainly there is no indication that any attempts have been made to standardize practices and techniques among the various headquarters.

For purposes of large fire management and control the following plans are used by the Regions:

REGION 1

(Two camp fire) A Fire Boss is designated as supreme commander. He may be a ranger, supervisor, or in the case of a major conflagration, he may be from the Regional Office Staff. Under his immediate command are two Camp Foremen and as many Fire Scouts as are deemed necessary.

REGION 1 FIRE SUPPRESSION ORGANIZATION (2 camp fire)

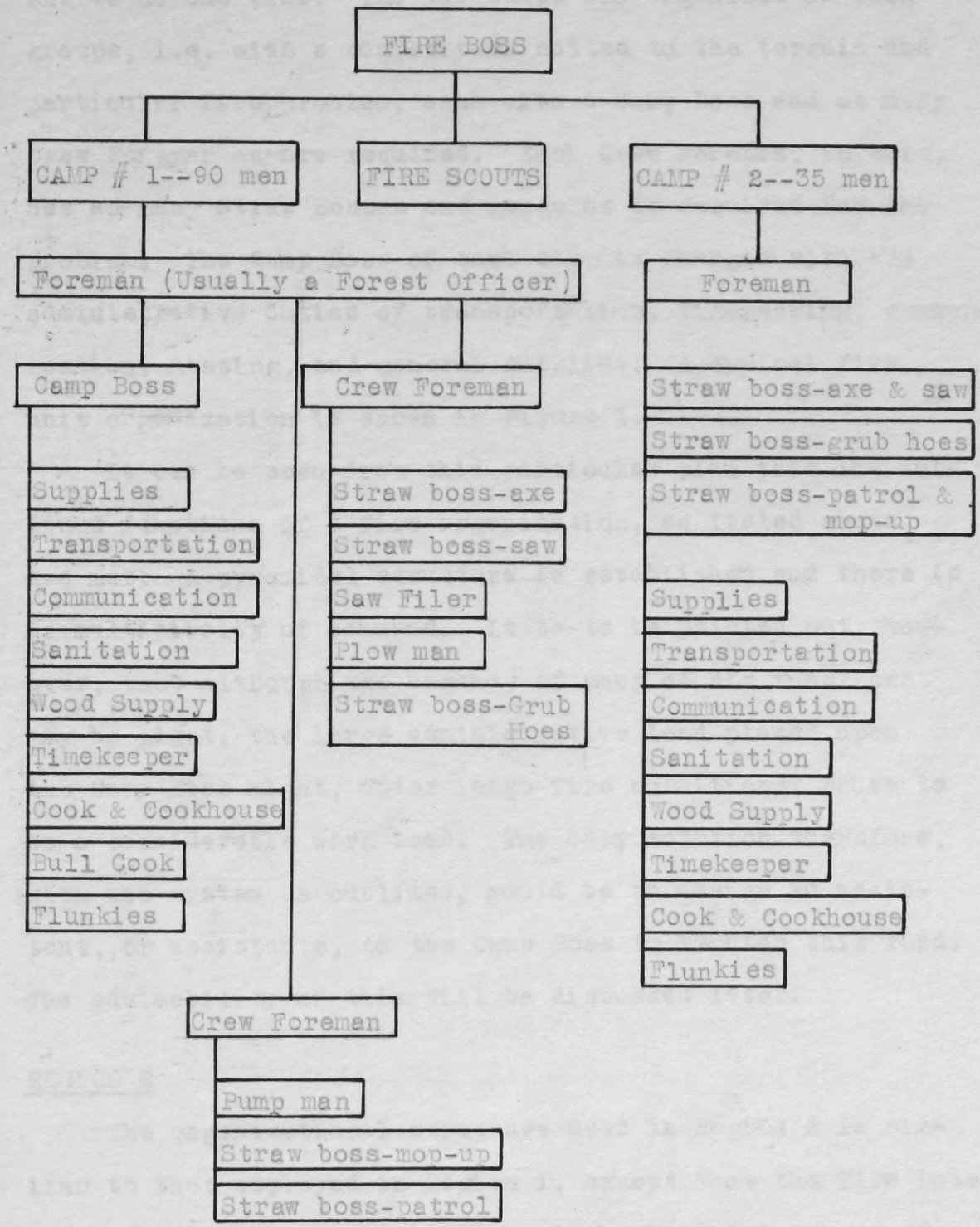


Figure 1.

These people are directly accountable to the Fire Boss and to no one else. The two camps are organized as task groups, i.e. with a composition suited to the terrain and particular fire problem, each with a Camp Boss and as many Crew Foremen as are required. Each Crew Foreman, in turn, has as many Straw Bosses and gangs as is required for the problem. The Camp Boss of each camp is charged with the administrative duties of transportation, timekeeping, communication, messing, and general supplies. A typical fire unit organization is shown in Figure 1.

It can be seen from this particular plan that the outlined functions of a fire organization, as listed above, are met. A pyramidal structure is established and there is no multiplicity of command. It is to be pointed out, however, that although the urgency of many of his functions may be light, the large administrative load placed upon the Camp Boss might, under large fire conditions, prove to be a considerable work load. The only solution therefore, with the system as outlined, would be to assign an assistant, or assistants, to the Camp Boss to lighten this load. The advisability of this will be discussed later.

REGION 2

The organizational structure used in Region 2 is similar to that employed in Region 1, except that the Fire Boss is almost invariably the Ranger of the District concerned.

REGION 3

The structure used in this Region is similar to that employed in Region 1, with a Camp Boss and Division Bosses equal in number to the number of Divisions employed on the fire. The principle difference is that the Scouts, instead of being responsible to the Fire Boss, are accountable to the Division Bosses. Figure 2 illustrates a sample fire organization.

REGION 4

This Region employs a system that is for all appearances the same as that used in Region 1. The Fire Boss is again assisted by a Camp Boss and as many Foremen as needed. The Scouts, in this case, are responsible to the Fire Boss directly. Figure 3 illustrates the organization used.

REGION 5

This Region employs the most complex organization of all the Regions reported, one that most closely resembles a military structure. In this case the Fire Boss is assisted by a Chief of Staff who is in a position to supervise and coordinate all the administrative functions of camp, supply, transportation, communications, and records. Each of these sections is headed by a Section Chief, responsible to the Fire Boss through the Chief of Staff. In this structure no part of the administrative load should become burdensome, there being an excellent division of duties within the staff

REGION 3 FIRE SUPPRESSION ORGANIZATION

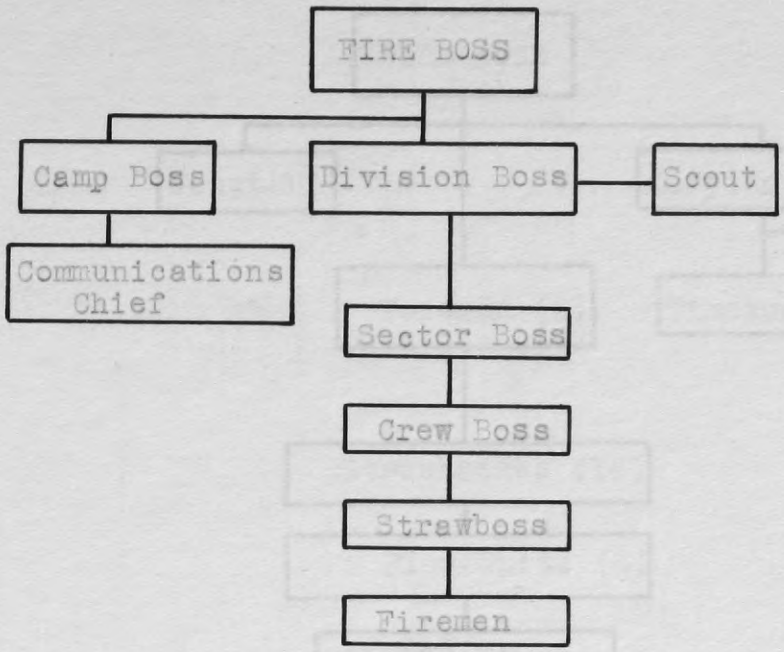


Figure 2.

REGION 4 FIRE SUPPRESSION ORGANIZATION

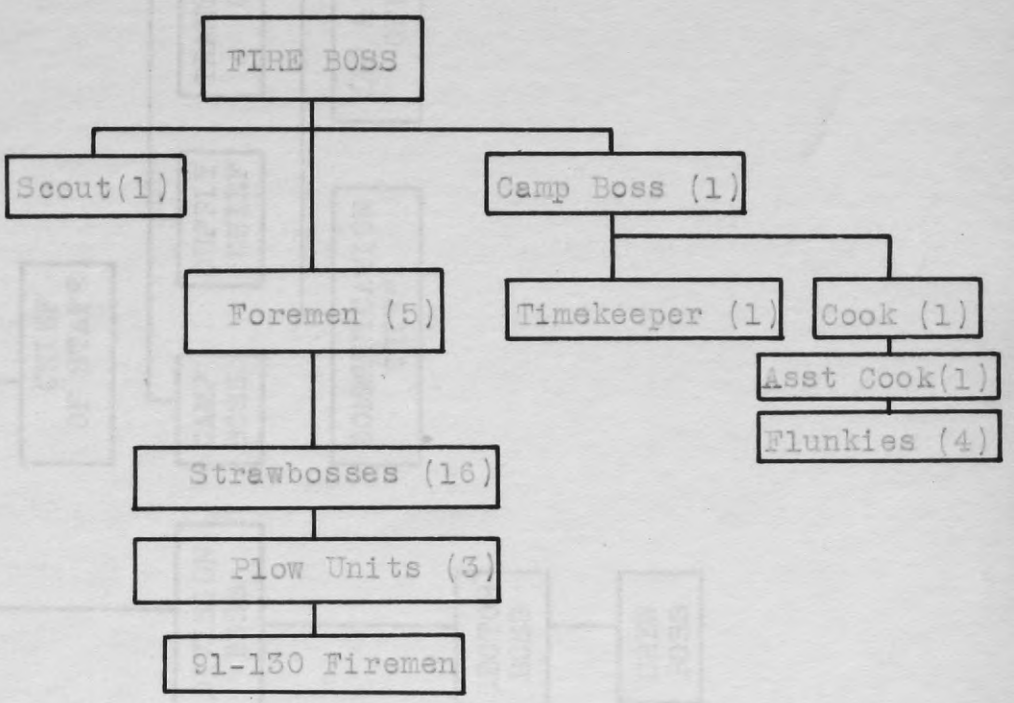


Figure 3.

REGION 5 SUPPRESSION ORGANIZATION ON LARGE FIRES

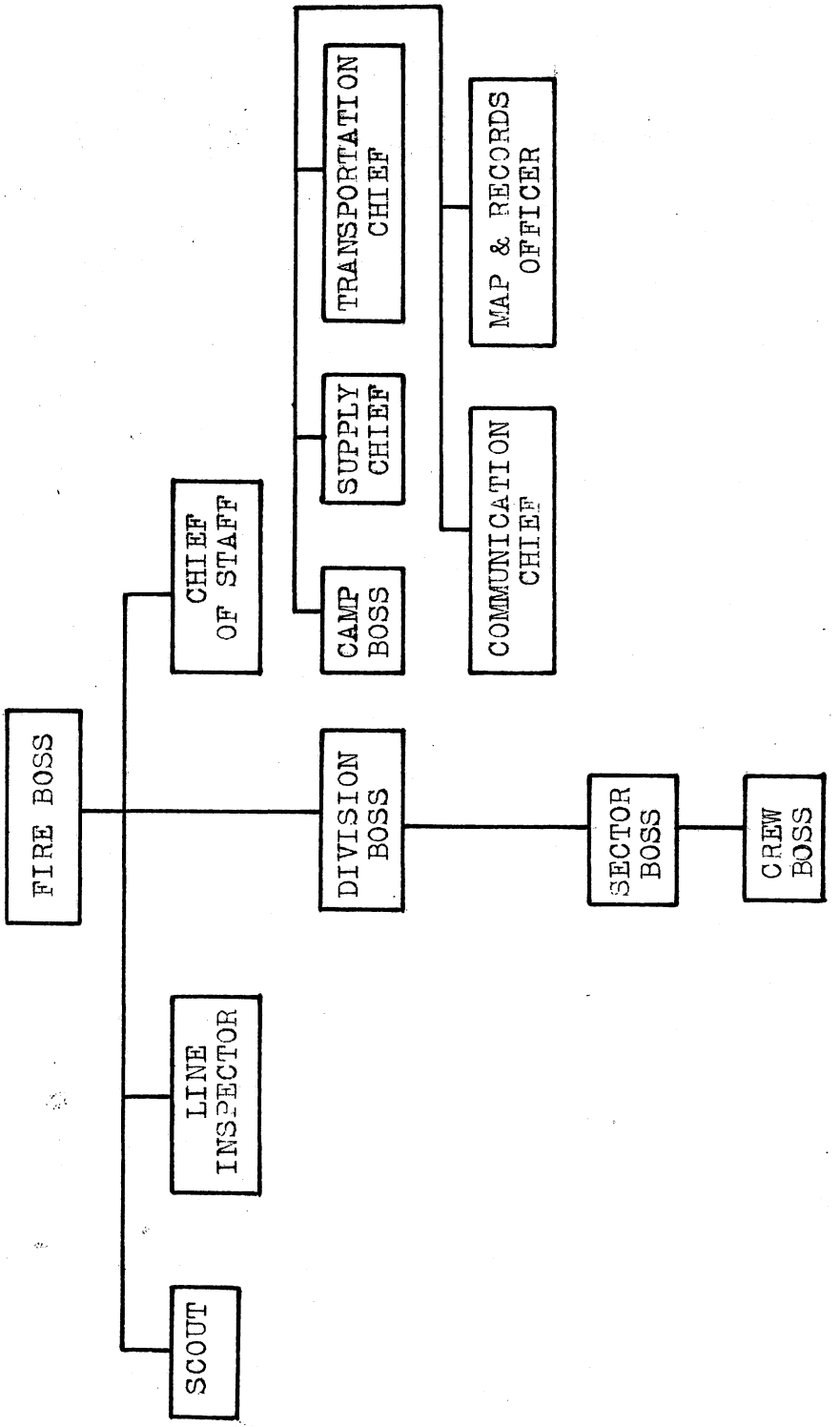


Figure 4.

group. The line units are headed by Division Bosses, Sector Bosses, and Crew Bosses in descending echelon. Directly responsible to the Fire Boss are the Scouts and the Line Inspectors. Illustrated in Figure 4.

REGION 6

This region operates on large fires with a Fire Boss, an Assistant Fire Boss, and a staff composed of Scout Boss, Division Bosses, and a Supply Boss. The Scout Boss is in command of the Ground Scouts, there being as many as may be required for the particular operation. Division Bosses command Sector Bosses and the Supply Boss commands the Camp Boss. Interposed between the various echelons are Line Scouts, responsible to the commander immediately above them. Line Locators are on a structural level with the Line Scouts who are under the command of the Sector Bosses. Figure 5 illustrates such a fire organization.

The other Regions, 7, 8, and 9, where the large fire problem is less of a menace, apparently have less formalized plans for large organizational structures.

LACK OF MASS ORGANIZATION

Two outstanding conditions loom out of this array of information. First, that no mention is made, and apparently no formalized structures exist, of the higher levels of control. That is to say, there seems to be no National,

REGION 6 SUPPRESSION ORGANIZATION

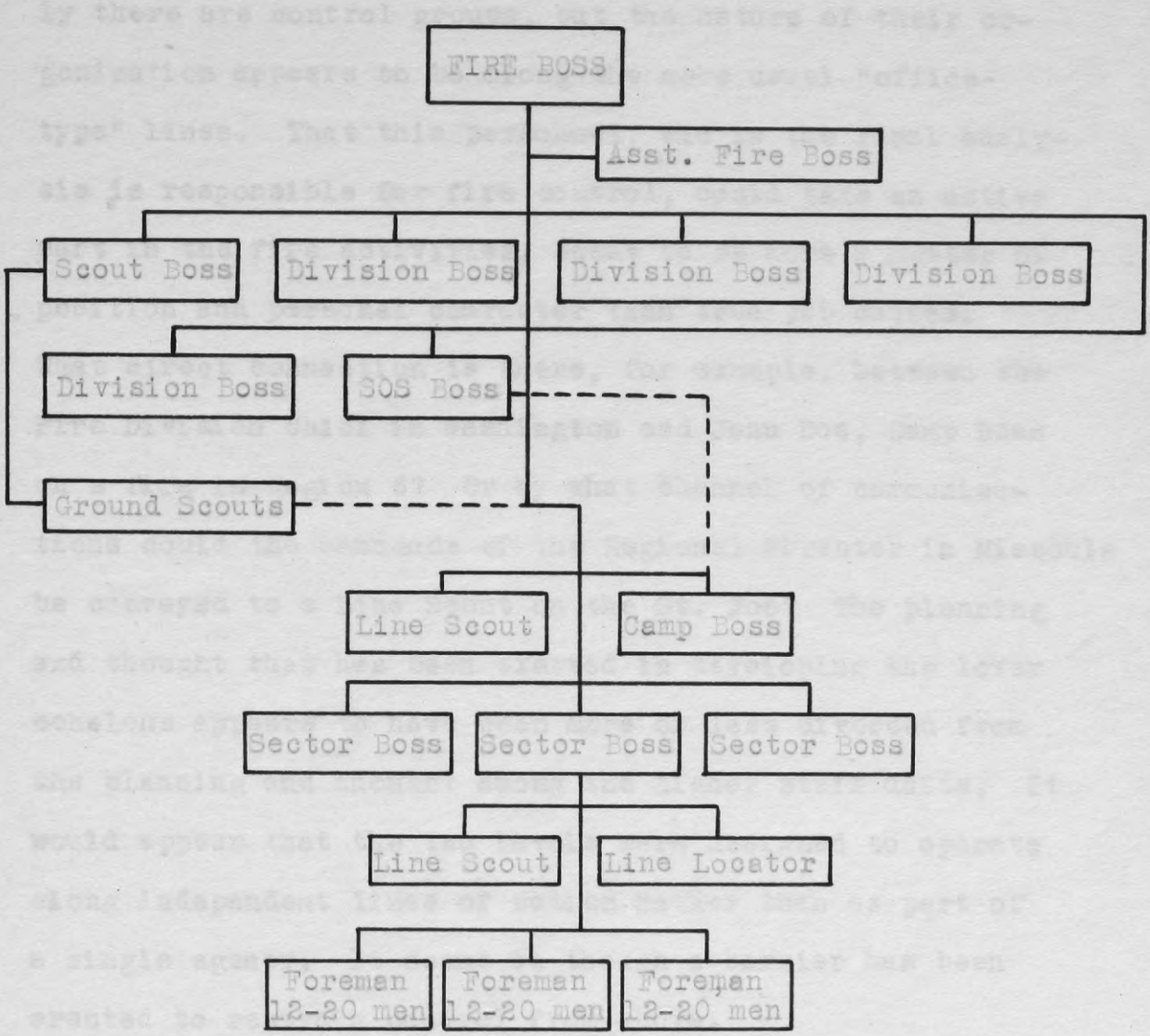


Figure 5.

Regional, or for that matter, Forest STAFF as such, whose sole duty is to direct Fire Control activities. Obviously there are control groups, but the nature of their organization appears to be along the more usual "office-type" lines. That this personnel, who in the final analysis is responsible for fire control, could take an active part in the fire activities, seems to be more a matter of position and personal character than true job duties. What direct connection is there, for example, between the Fire Division Chief in Washington and John Doe, Camp Boss on a fire in Region 6? Or by what channel of communications could the commands of the Regional Forester in Missoula be conveyed to a Line Scout on the St. Joe? The planning and thought that has been exerted in developing the lower echelons appears to have been more or less divorced from the planning and thought among the higher staff units. It would appear that the two levels were designed to operate along independent lines of action rather than as part of a single agency. It seems as though a barrier has been erected to restrain control from above.

This indirect instead of direct control from the higher Commanders is excused by the many other administrative functions that are also a part of each Commander's daily routine. At least in the author's mind, this is a wholly unjustified explanation for a refusal to take an

active part in fire control. Granted that these many other functions, especially in a long term view, are equally or even more important than fire control. Granted that already overloaded Supervisors and Regional Foresters have limits of endurance and movement. But all of this explanation and rationalization, that is so commonly offered for command failures, does in no way relieve them from the responsibility of Fire Control. If they, the Commanders, are willing to exchange deferable functions for immediate needs, for fire knows no appointment book, they must continue to content themselves with mismanaged fires, overentrusted subordinates, and subsequent large fire losses.

The alternate choice, and one in which this author sees considerable merit, is to establish an independent fire agency, an agency by its very definition freed from all but the protection functions of forest and range lands. Such an independent agency could function freely, responsibilities could be definitely fixed, and efficiency could be expected to attain its maximum.

LACK OF UNIFORMITY

The second weakness, even more distinct than the first, is the decided lack of uniformity that exists between the various Regions. Why, if the organization in Region 6 is sound, is it not applicable to Region 4? Isn't there, among

all these types of structures, a BEST one? Or is there still another form yet untouched that is still better? Granted that each Region has problems unique to that area alone, granted that the axeman so valuable on the Snoqualmie would be practically valueless on the Angeles. But the organization of the UNIT could be the same. Was not the squad that landed on Guadalcanal the same in structure as the squad that landed in Normandy? The "tools" were different, yes, but the structure the same. And so it should be in the woods. This same standardization should apply all the way up the line, to Forest, Region, and up.

The demands that are made of the fire organization today are even less exacting than those that will be made tomorrow. This author conceives of Fire Bosses, men really skilled in their jobs, serving on the line in Idaho at daybreak, relieving another Fire Boss in Colorado at sundown. It is even conceivable that whole crews might be transported over half a continent in a week's time. The point to be illustrated becomes obvious. If the man from Idaho is to fit into the fire organization in Colorado without delay and confusion, he must be already familiar with the organizational structure that he will find upon his hasty arrival. If it is more men he wants he must know upon whom to call, not by name, for names are meaningless, but by JOB. If he needs rations, he must be able, without

delay and unnecessary questioning, to pick up his telephone or radio and deliver his request. The interchange must be with the greatest of ease, with a reduction in confusion.

Even if the interchange of personnel is not so dramatically accomplished, would it not be easier and more efficient for men to pick up new jobs, knowing that they feel "at home" in the structure? Perhaps this weakness is not of sufficient magnitude on the small scale fire, on presuppression functions, to cause a loss of efficiency. However, it seems inconceivable that for the large scale fire menace the greatest degree of efficiency can be reached without standardization.

PROPOSED ORGANIZATION

It has been mentioned that the General Staff type organization is recommended as a source of doctrine. The proposed organization might line up something like this:

The National Fire Headquarters

The whole fire organization would be headed by its Washington Fire Headquarters. This National Fire Headquarters is to be more than an office staff. (See Figure 7) It must be prepared and equipped to take an active part in all the Regions, it must be concerned with each fire, whether of tenth acre or thousand acre proportions. Not that it would take so active a part as to actually direct small fires, but it must be more than a mere report gath-

BASIC STAFF STRUCTURE

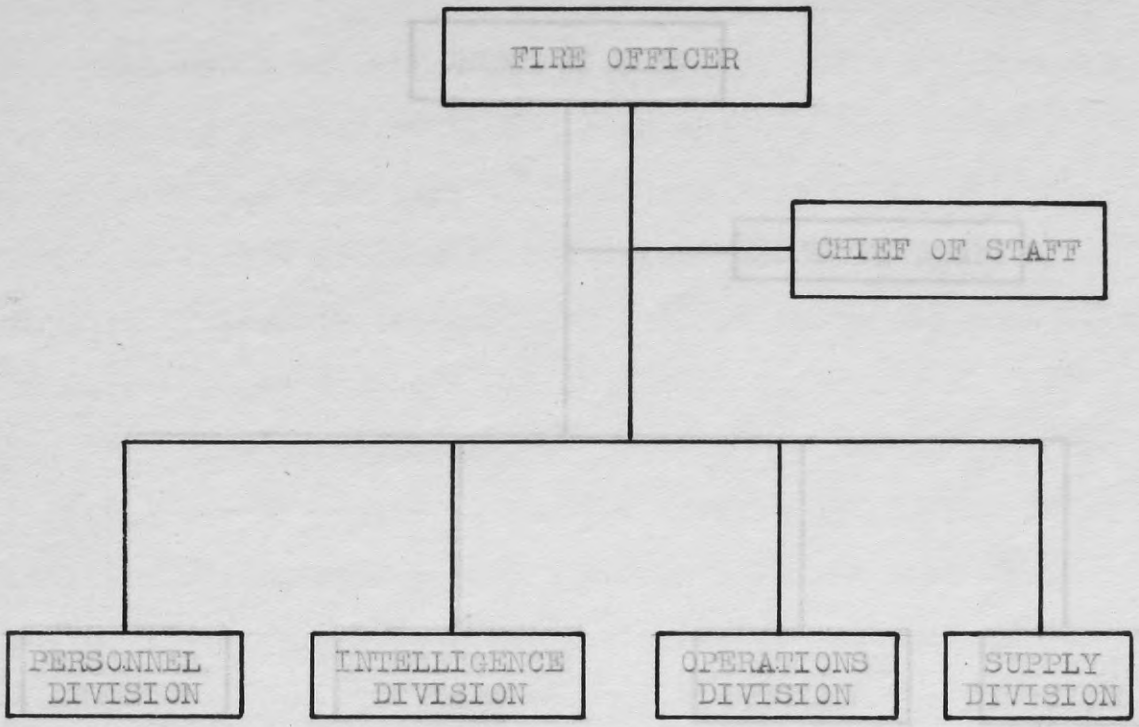
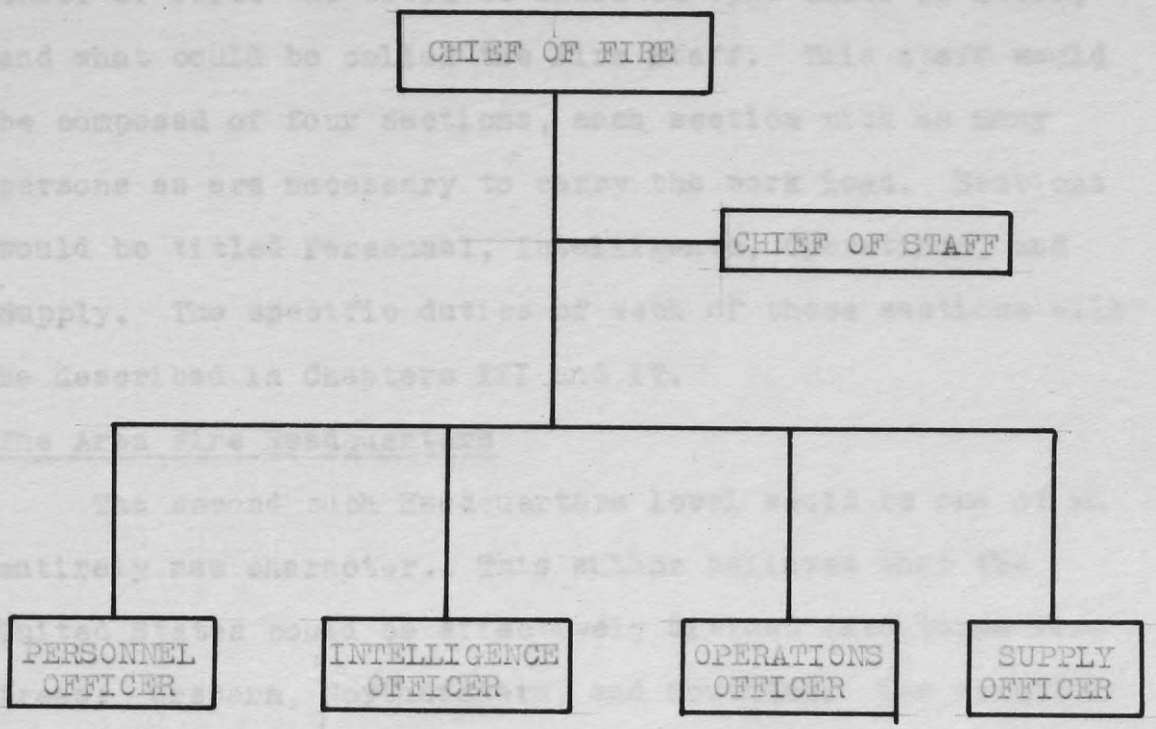


Figure 6.

NATIONAL FIRE STAFF



(plus the necessary assistants)

Figure 7.

ering, policy-making group.

The Washington Fire Headquarters would be headed by a Chief of Fire. He would be assisted by a Chief of Staff, and what could be called the Fire Staff. This staff would be composed of four sections, each section with as many persons as are necessary to carry the work load. Sections would be titled Personnel, Intelligence, Operations, and Supply. The specific duties of each of these sections will be described in Chapters III and IV.

The Area Fire Headquarters

The second such Headquarters level would be one of an entirely new character. This author believes that the United States could be effectively divided into three Fire Areas: Western, Northeastern, and Southern. The creation of this new echelon would enable the interchange of personnel and equipment between Regions to be effected on more than a cooperative basis. This would provide the necessary degree of flexibility needed in rapid and effective fire control. There would be a staff exactly the same as the National Fire Headquarters in style, although it would be much more skeletal in nature. Its military counterpart is the Corps Headquarters, in which administrative duties are kept to a minimum; these loads being carried by both higher and lower echelons, the staff serving as a tactical stop-gap between Armies and Divisions. (See Figure 8)

The Area Fire Headquarters would be headquartered in a

AREA FIRE STAFF

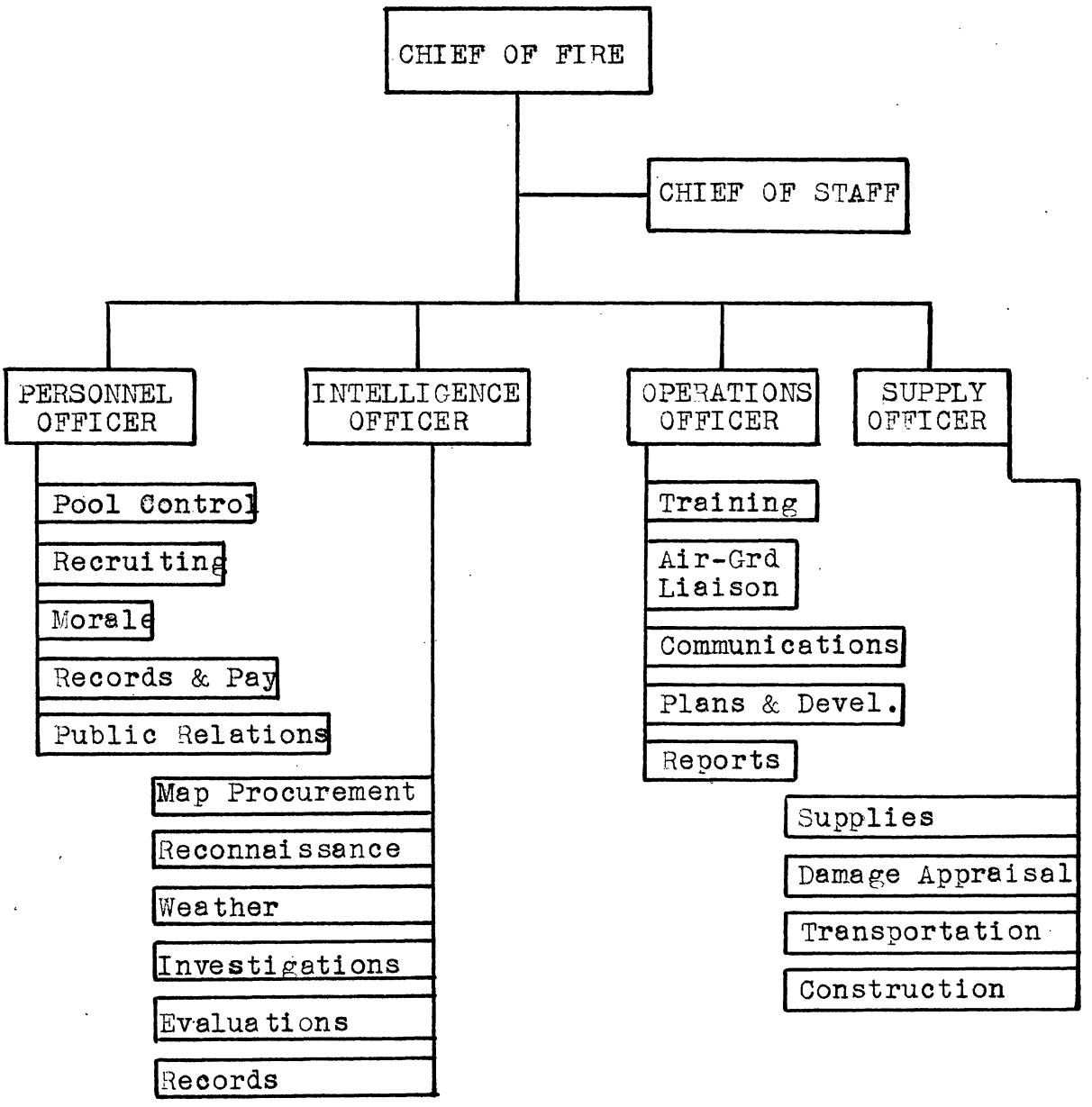


Figure 8.

fairly central location in respect to the Regions which served under its command. (Salt Lake City, for example, could be the Western Area Headquarters.) It would act as a control unit for all fire activities in the Regions, although it need not concern itself with such items as appropriations, personnel policy, etc. It would be strictly a tactical organization. During non-fire season periods, unless presuppression activities were of sufficient magnitude to warrant control, this headquarters could well be inactivated, especially in the Eastern and Southern Regions, where Regional boundaries are so great and numbers of Regions few. In these two areas it would greatly depend upon the possibility of developing intensive State and Private cooperation in the formation of the Fire Organization; if such were the case it would be justifiable, the author believes, to create this new level of command. It is felt by this author, however, that an ample amount of work could be accomplished during this period to justify the continuance of this staff group.

The Regional Fire Headquarters

The Regional Fire Headquarters is again similar in structure to the superior Headquarters. (See Figure 9) The following outline is suggested for duty assignments within each Staff section:

REGIONAL FIRE STAFF

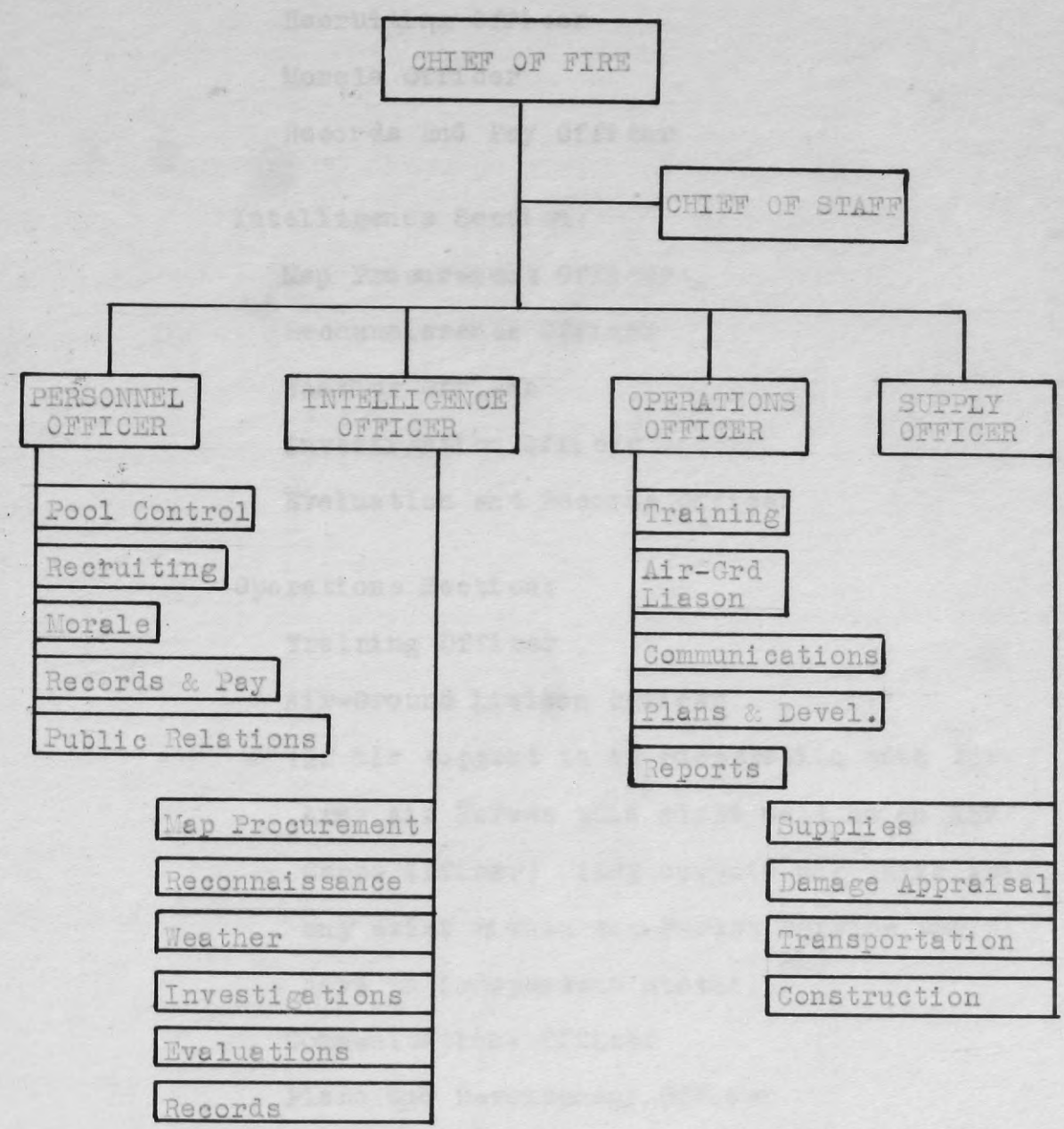


Figure 9.

Personnel Section:

Pool Control Officer

Recruiting Officer

Morale Officer

Records and Pay Officer

Intelligence Section:

Map Procurement Officer

Reconnaissance Officer

Weather Officer

Investigation Officer

Evaluation and Records Officer

Operations Section:

Training Officer

Air-Ground Liaison Officer

(If air support is in cooperation with the Army Air Forces this might well be an Air Corps Officer) (Any organic air units that may exist within the Forest Service would have an independent status)(29)

Communications Officer

Plans and Development Officer

Reports Section

Supply Section:

Supplies Officer

Damage Appraisal Officer

Transportation Officer

It is not essential that all of these duty assignments be filled with a separate individual. It is entirely conceivable that many of these jobs may fall on a single man as long as the jobs are all within the same staff section. It is not considered at all wise to have a single individual serve within more than one staff section.

It is also probable that there are many specific duties that this writer has omitted, and that there may be some unnecessary ones listed. The point though is this, that the four sections of the staff shall have assigned under their control jobs of a related nature. Whether Damage Appraisal falls within the scope of the Supply or the Operations sections is of little importance now. The issue is, that if it is a function of the Supply section in one level of command, so is it in the same section in all levels.

The Forest Fire Headquarters

The staff organization that is recommended for the Forest echelon is again fundamentally the same. (See Figure 10) Here, though, a still greater duplication of duties must be made to keep within the bounds of available and reasonable personnel limits. The only unique departure to be found in the staff composition at this level is that the Air-Ground Liaison Officer, if there be one, has a status on par with the staff sections. This is merely because the job is of

FOREST FIRE STAFF

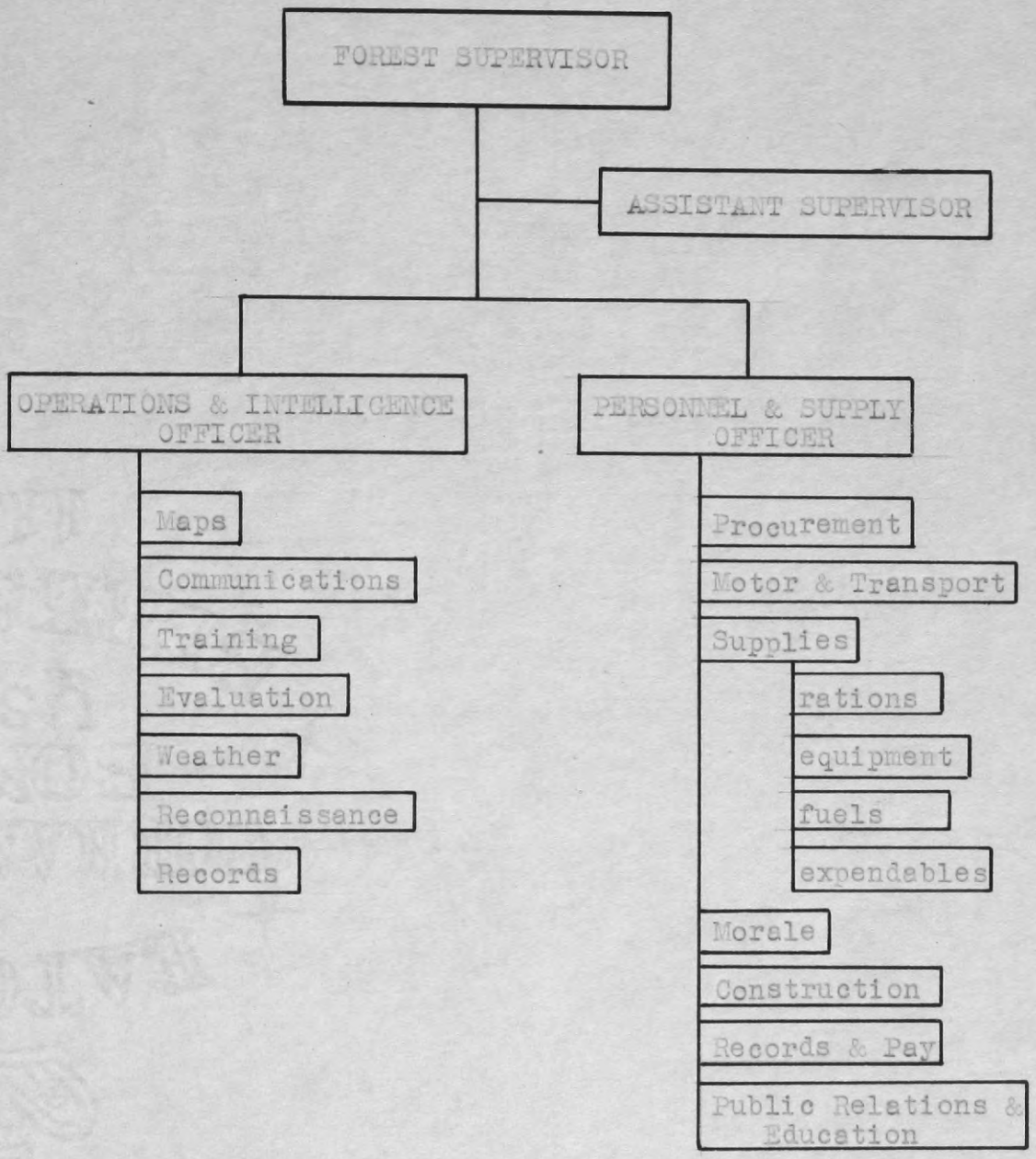


Figure 10.

such a specialized nature that to place a man in a staff section is leaving him open to conflicts, it being impossible for all the staff leaders of all the forests to appreciate the capabilities and limitations of aircraft. Other than this single departure, the staff structure is along the fundamental pattern.

To organize Ranger Districts along General staff principles is indeed an anachronism. However, in their thinking and in their behavior, Rangers should constantly have this staff concept in mind.

Fire crews will as a practice be organized along task-force lines, i.e. with specific missions in view, with specific strengths, tools, etc. This does not imply, however, that the direction of fire crews, the staff control group, is not to be organized along the fundamental staff structure. The staff can grow or diminish depending upon the size of the fire and the numbers of persons involved, and still maintain the standard pattern.

Standardized Staff Structures

It will be noted that the staffs of all echelons are now based on the same fundamental design. Except for the difference in complexity of duties, the Operations Officer from the National Staff would feel perfectly "at home" as Operations Officer on the Plumas. And by the same token, the Operations Officer of the Plumas would be at least

aware of his environment were he cast into the Operations Room of the National Fire Headquarters. This matter of standardization cannot be overstressed, for it is the backbone and the core of the problem.

Pyramidal Design

It will be also noted that the entire organization takes on a pyramidal design. That is to say, if the forces either of men or equipment, of two Forests, two Regions or two Areas, need be combined for a single purpose, the expansion builds up in a proportional and symmetrical pattern. Each man has his own superior; no man has two bosses. It is this pyramidal structure that facilitates mass action.

With the picture of this organization in mind and with the concept of the basic staff structure as a guide, we may now examine staff doctrine and staff duties in fuller detail.

CHAPTER III

DUTIES OF COMMANDERS AND THEIR STAFFS

There must be clear-cut lines of demarcation between the responsibilities and duties of the various Commanders and their staff groups. A properly organized staff is so designed as to best fill the needs of its Commander.(32) This premise is true for any type of staff, administrative or operational. Each function is assigned to but one section of the staff, although any single section may have more than a single assigned function. The number of functions assigned will be mainly dependent upon the size of the staff and the volume of work entailed, with an effort being made to keep related functions within the same staff section. The tendency to overstaff must be firmly controlled.

COMMAND RESPONSIBILITIES AND DUTIES

The responsibilities that rest upon the shoulders of the Commander are inescapable. He alone is responsible for all that those who enjoy his command do or fail to do. This fundamental maxim must be constantly observed, for to fail in this duty is a true failure to command. Although the Commander may delegate many of the detailed functions and decisions that are truly his to perform to members of his staff, he can by no means shift the responsibility for this to members of his staff or to subordinate commanders. The whole concept of Command Responsibility is of such importance

that the measure of success or failure that a Fire unit may realize can be weighed in this light.

The Commander's duties are as numerous as the duties of all the personnel under his command. Specifically, however, he is charged with keeping abreast of the current situation, forecasting a future plan of action, making decisions, and issuing orders. He must know all the members of his staff intimately, know their capabilities and their limitations, and keep a constant surveillance of their work. Although the Commander must be constantly active on the tasks at hand, he must refrain from doing those duties that can be more expeditiously performed by a staff member or a subordinate. The Commander must so detail the work at hand that his own load is never so burdensome as to cause a personal overload and the subsequent fatigue and inefficiency that is the inevitable result of such a course of action. By properly budgeting his own time and energies he can maintain a constant "working reserve" so that when the unexpected crises arise he will have ample energy to master the situation. The practice of detailing the work load is a very essential one to proper fulfillment of the Commander's assignment.

All orders from a higher to a subordinate headquarters are issued by the commander of the higher headquarters. That is to say, regardless of which of the staff officers may prepare an order for transmittal and in effect issue

such order, the name of the Commander is assigned to that order and it is the Commander and not the staff officer who is responsible for the effect that order may have on subsequent events. A Commander, likewise, who receives an order from a higher headquarters that is impracticable to comply with, should immediately inform the superior of such fact. If it is impracticable to communicate with the headquarters issuing the order, the subordinate Commander should act according to his own best judgement and follow the course of action that he feels will best satisfy the wishes and policies of his Commander. He must then report as soon as possible the action he has so taken and the reasons therefore.

To expedite the issuance of orders and to lighten the load of the Commanders, staff officers may communicate directly with other staff officers. It must be again mentioned, however, that all such exchanges of orders and information are in the name of the Commander, not the staff officers involved.

STAFF RESPONSIBILITIES AND DUTIES

"The purpose of the staff is to assist the Commander in the performance of his duties. The staff obtains information required by the Commander, submits recommendations, prepares the details of his plans, translates his decisions into orders, and causes such orders to be transmitted to

the operating units in the name of the Commander. It brings to the Commander's attention matters which require his action or about which he should be informed, makes a continuous study of the situation, and prepares tentative plans for probable future contingencies. Within the scope of its authority, it supervises the execution of plans and orders and takes such other action as is necessary to carry out the Commander's intentions."(31)

To make the above purpose possible it is imperative that the staff members be completely familiar with their Commander, his methods of doing things, his policies, and be alert to changes in his thoughts as the problems of the day arise. In other words, the staff must have the uncanny ability to think along with the Commander, always in harmony and always in assistance.

A free exchange of information between the various staff sections is essential to provide the degree of teamwork needed for a well functioning staff. This can be best accomplished by personal contact and a means established whereby orders issued and information received by individual staff sections is made available to all sections. The same degree of cooperation must exist between staff groups and subordinate units. It is quite obvious that a staff that fails to function as a team can be more of a liability than an asset, breeding disunity and confusion to Commanders and subordinate units who are dependent upon a smooth and exact flow of information and orders.

DUTIES OF SPECIFIC STAFF MEMBERS

With this general background of staff duties and staff responsibilities, essentials that pertain to all staffs, it is pertinent to discuss in detail the various staff sections and their own special functions. These sections are the Personnel, Intelligence, Operations and Training, and Supply Sections.

The Chief of Staff

These sections are coordinated and supervised by the Chief of Staff, who in addition to being the Commander's assistant is the Staff Boss. The Chief of Staff performs the following specific duties:

1. He is charged with announcing staff policies, based on the requirements of the Commander, and seeing that all staff members are thoroughly acquainted with the overall picture.

2. He coordinates all sections of the staff and subordinate units to effect a smooth flow of business.

3. When engaged in actual suppression activities, he keeps the Commander informed of the situation relative to the fire front location, rate of spread, direction of burn, and all other pertinent facts concerning the operation.

4. He keeps the Commander informed as to the strength, location, and mission of all adjacent and supporting units.

5. He keeps the Commander informed as to location, strength, morale, training, equipment, supply, and general

effectiveness of his own personnel.

6. He assumes command in the temporary absence of the Commander.

7. He allots the work load to the various staff sections, gathers their reports and recommendations, and after all necessary modifications have been made, presents the combined results to the Commander for final approval.

8. By personal observation, and with the assistance of the various staff members, he sees that the orders and instructions of the Commander are properly executed.

The functions of the Chief of Staff are many, his responsibilities great. His job is not merely one of being "second in command", or being an understudy of the Commander. He must be qualified and prepared to act on his own initiative in all tasks that requre overall staff coordination and cooperation. He is a boss in his own right. As the entire command succeeds or fails in proportion to the abilities of the Commander, so might the command succeed or fail with success or failure in the Chief of Staff, for it is only with proper staff functioning that the wishes of a Commander can be executed, and it is only with a capable Chief of Staff that a staff can properly operate.

The Personnel Section

The Personnel Section is charged with all functions concerning policy and supervision of personnel as individuals within the organization. In an advisory capacity to the

Commanding Officer, the duties of this section will be as follows:

1. It will prepare and maintain current strength reports showing the exact number, classification, and location of all personnel.

2. It will anticipate, within the limits of practicability, future requirements of personnel and submit requisitions for the necessary numbers to higher headquarters. (The basis for future requirements will generally be determined by the Operations and Training Section.)

3. It will administer all rewards and punishments.

4. It will keep the Commander informed as to the morale of the organization, and will take such positive action as to assure a high degree of efficiency within the organization.

5. It will be responsible for proper and adequate timekeeping on all members of the organization, and will be charged with the payment of all emergency personnel.

6. It will be responsible for sanitation and hygiene of all personnel and the areas occupied by the organization.

All other personnel functions, reports and records, classification, Public relations, etc., will be accomplished by this section.

The Intelligence Section

The second section, the Intelligence Section, will be charged with keeping the Commander informed as to all condi-

tions pertaining to fires, fire risks, and situations requiring action by the organization. This section will perform the following duties:

1. Collect, evaluate, and disseminate all available information regarding the situation, including terrain, weather, etc.

2. Prepare orders to subordinate units and requests to higher and adjacent units pertaining to the gathering of information.

3. Coordinate all observation agencies, lookouts, patrols, air reconnaissance, scouts, etc.

4. Cooperate with law enforcement agencies in the apprehension of arsonists.

5. Evaluate all reports to determine their probable accuracy, significance, and importance, as well as to form an estimate as to the future probable behavior of the fire.

6. Disseminate intelligence by periodic reports, special reports, situation maps, and terrain studies.

7. Determine and obtain the necessary maps and aerial photographs and supervise their distribution.

8. Formulate prevention policies and head the prevention program.(25)

It must be emphasized that the mere gathering of information regarding a fire or fire risk is NOT intelligence. Information in the form of reports and messages filed in the hands of the Intelligence Section are of no value to

anyone outside of the section. All incoming data must be thoroughly evaluated and disseminated before it can be classed as intelligence. This is of the utmost importance and too much stress cannot be made upon this concept. The success or failure of an operation can easily be determined by the performance of this section with respect to the fulfillment of all three of the necessary steps, Collection, Evaluation, and Dissemination.

The Operations Section

The third section, The Operations and Training Section, is charged with the bulk of the tactical load. Its specific duties include:

1. The mobilization and demobilization of temporary personnel, upon the Commander's announcement of the fire season.

2. The organization of units and a determination of location and necessary equipment for each unit.

3. The training of individuals and the organization as a whole.

4. To maintain a continuous study of the situation, in close cooperation with the other sections of the staff, emphasizing in such a study the location of personnel, their current physical and mental condition, the status and condition of all equipment, the locations and capabilities of all supporting and adjacent units, the terrain and the weather, and all other pertinent facts.

5. The responsibility of all movements of personnel, the selection of routes, determination of times of departure, and the preparation of a report of all transportation needs to the Supply section.

6. The development of a Plan of Attack based on the information and personnel available and the preparation, modification and alteration of a plan to meet the current situation, when involved in Suppression Activities.

7. Establishing liaison with all adjacent, higher, and subordinate units.

8. The responsibility of establishing and maintaining an adequate communications net.

9. Establishing priorities for the allocation of personnel and equipment.

10. The responsibility of preparing and distributing all Field Orders and Operations Maps. (The preparation of maps and orders will be in cooperation with all Staff Sections.)

11. Establishing a general location for Command Posts for the organization and for all subordinate units.

The Supply Section

The Supply Section is charged with advising the Commanding Officer in respect to the following specific functions:

1. Determining requirements, procurements, storage and distribution of all supplies and equipment.

2. Establishing supply, maintenance, transportation, salvage, and construction installations.(2)

3. Supervising all salvage operations.

4. Supervising all pre-suppression projects; construction and maintenance of roads, trails, bridges, lookouts, guard stations, etc.

5. The responsibility of all property and funds.

6. The responsibility of the procurement of real estate, shelter, and facilities, and the execution of all claims against the government.

7. The conducting of damage appraisals of all burns.

The Staff Officer

There are certain qualifications and characteristics that should prevail in all staff officers. They should have a complete knowledge of the organization and structure of all units they will deal with, have a complete understanding of the limitations and capabilities of such units, and be at all times able to visualize the "big picture", i.e. to fit their own unit and other units into their proper relationship one to another. The staff officer must be a man with imagination, perseverence, initiative, energy, loyalty, and a cooperative spirit. As an advisor to the Commander, he must be able to express his own convictions and recommendations when appropriate, but willing, on the other hand, to comply with the decisions of the Commander. It is this quality of personal flexibility that in the long

run will determine the value of the staff officer to his organization.

Some Staff Techniques

The staff officer can increase his value by the application of several techniques; he should visit periodically with the units subordinate to his own and with adjacent and higher units. Needless to say, he must frequently visit with his own unit. These visits should be of an informal nature, and should serve to acquaint the staff officer with the missions and needs of the line personnel. It is with such visits that a free exchange of information can be effected, a better understanding of the duties and responsibilities of all made, and a development furthered of the necessary team play between staff, command, and the line.

Occasional inspections, more formal than the previously mentioned visits, should be made to determine the condition of the unit, and to assist subordinates with technical advice. These inspections should never be of a haphazard nature, but should be definite, detailed, and exact. Reports should be made to the Commander of the results of such inspections, with all criticisms, when given, being of a constructive nature. Units inspected should be informed of the information and recommendations contained in such reports.

Liaison Officers

As an aid to staff operation, Liaison Officers should be detailed to higher and adjacent units when personnel is

available for such assignment. These agents of the staff can greatly expedite any interchange of reports and orders between units. The Liaison Officer, upon reporting to a unit, should outline to the Commander the situation and mission of his own unit. He should, immediately, arrange for a means of transmitting messages to his parent unit. He should become familiar with the situation of the unit to which he is attached. During his stay he should do as much as possible towards furthering a harmonious exchange of information between units, telling the unit assigned to as much as he can and passing on to his own unit all that he learns. It is with the use of these Liaison Officers that the greatest effectiveness of cooperation between units can be had.

Thus have been described the general duties of Commanders and their Staffs. How these various people are integrated into an operating unit follows. (30)(31)(32)(33)(43)

CHAPTER IV

THE OPERATIONS OF THE FIRE ORGANIZATION

The organizational structure of the recommended Fire Organization has been described, and some mention of the basic qualities and functions of staff and command personnel has been made. It is now pertinent for us to analyze and describe the Fire Organization "in action". To gain the overall point of view necessary for the fullest appreciation of the capabilities and limitations of this doctrine and correlated organization, we will discuss the "action" possibilities in three separate and distinct phases. First will be the normal, or routine fire problem; the fire that taxes nothing more than the physical energies of the local suppression force. Second, the limited area phase will be considered; fires whose magnitude and importance are matters of concern to Ranger Districts and Forests. Third, we will discuss the true conflagration, the project fire, where the battle resources of Forest, Region, or Area must be mustered to win success.

It must always be remembered in dealing with fires and fire discussions that rarely does the fire fighter know when first he breaks the surface litter at a fire site, what the size of that fire will be one hour from then, one day from then, one week from then. It must be the first mission of the fire organization to be able to cope with the fire as it expands. This is stated as one of Hornby's principles.(11)

In spite of the great advances that have been made in fire research dealing with the prediction of fires and their probable rates and directions of burn, no fire organization can content itself with being prepared for less than the worst possible situation at all times. That means that the group must be tactically awake at all times.

THE FIRE STARTS

Let us assume that our problem starts in the midst of a serious fire season. The weather has been favorable for fire over a prolonged period, fuel moistures are low, humidity low, winds gusty and dry. The stage is set for a major flare up, as it is in almost every high-risk area sometime during each fire season. A careless cigarette, a spark from a logging engine, a flash of lightning,(28) it matters not which of the many causes are involved, and another burn has started on its red, roaring trail.

THE SMALL FIRE

During this first phase, the "small fire" the attack and suppression of the hypothetical fire would follow a procedure somewhat like this:

As is the traditional practice in both Federal, State and most private organizations, a fire lookout spots the fire, fixes its location by some fire finder device, and transmits by radio or telephone the fire report to the next higher echelon. (This initial spot may well be made by patrol

aircraft, especially in those remote areas where lookout coverage is inadequate.) The report, or Flash Call, as this author prefers to call them, is transmitted to the dispatcher at the Forest Headquarters. He, with the power of action that he now possesses in the Forest Service, will take immediate action, dispatching the necessary initial fire crews.(36)(37)

The Dispatcher will be located at the Operations Room of the Forest Headquarters, the nerve center of the fire machine. Into this Operations Room flow all "tactical" communication nets, both radio and telephone. In this room data is gathered, plans are made, and from it orders are issued. The organization and methods of control employed in the Operations Room is too vast a subject to discuss completely at this time. Suffice to point out that this room is the hub of the wheel, the "brains" of the Fire Organization.

To continue with the model problem: Information as to the location, size, cover type, etc. of the fire are flashed to all four sections of the staff, Personnel, Intelligence, Operations, and Supply, as well as to the Forest Supervisor. It should be reiterated that at the Forest level a grouping of staff sections will be the practice, Operations and Intelligence being under a single staff head, and Personnel and Supply being unified. The general alarm is sounded to all staff groups and to their agents. In the normal Forest Head-

quarters this will be accomplizhed by means of alert 'phones, 'phones that are maintained between the Operations Room and duty stations, for the sole purpose of transmitting tactical information and commands. It must be emphasized, at this time, that in the construction and layout of any communications net both administrative and tactical radio and wire nets must be constructed and maintained. The purposes of these lines must never be compromised.

The Personnel Section, upon being alerted, alerts all members of the section to a stand-by status. Preparations are made to meet all Personnel needs that may arise. Although little or no information of a specific nature is available to the section at this time, plans must be made to accomodate the possible needs of the line units that may be called upon to be engaged in the task.

The Intelligence Section is immediately alerted upon receipt of the fire report. The Intelligence Officer, located at the Operations Room, establishes either radio or wire communications with the following units:

1. The lookouts who have this area in view, eliminating those from the common connection who are in the least favorable location. It is recommended that at least three lookouts be contacted.

2. Patrols that are in the vicinity. They are assigned to fire coverage of the fire AREA, keeping especial watch for spot fires, other starting fires, etc.

3. Suppression crews that are dispatched to the fire, which crews can provide, upon their arrival, the best and most accurate information concerning the fire.

4. Air Reconnaissance units that may be assigned. It is doubtful, however, that air units will be employed in the initial stages of fire suppression.

5. Any civilian, state, or other federal agencies that may be in or adjacent to the area of burn.

The Intelligence Section then proceeds to assemble all available information as it is received. This information is first recorded on the log book and map. (This now becomes the Intelligence Map, the same map--or overlays of same--to be continued through the fire to its conclusion.) Next, the information is evaluated, i. e. analyzed for accuracy, currency, pertinence, urgency, reliability, etc. It is justifiable for the Intelligence Officer to eliminate, condense, merge, or extend this data so as to present the most complete initial picture of the situation as it is in reality. This initial determination is a difficult and serious phase of the problem, for from this initial picture will be drawn the future plans. Obviously, the more accurate this picture is the fewer alterations must be made in later hours, the speedier the plans can be drawn for the operation, and the greater will be the efficiency of the entire organization.

During Phase I the Operations Section is alerted. From

the information available from the Intelligence Section a plan of Operations will be drawn. This plan will be placed upon a map (or overlay) and will become the Operations Map. In these initial phases it will generally suffice to draw up merely a rough draft plan, one capable of expansion or extreme modification if necessary, as the situation takes form. Communications will be immediately established with the Suppression Crews assigned to the operation.

The Supply Section will proceed on a pattern of behavior similar to the Personnel Section, planning in a rough manner for all potential developments. The blanket statement might be made at this time, in all cases plan for the worst.

The Supervisor, in this Phase I period, will be alerted, and his first act will be to assure himself that all staff sections are properly functioning. He will immediately establish communications with the suppression crews. He will also notify, by predetermined channels, the Regional Fire Headquarters of the existence of such a fire, its location, size, estimated starting hour, and cause if known. This channel of communications will be maintained for future reports.

The Regional Fire Headquarters, during Phase I, will receive and acknowledge the Fire Report, record it, and plot the fire on both the Intelligence and Operations maps. No further action need be taken at this time.

To complete Phase I we will assume that the fire is completely extinguished by the first assigned crews. Crews will be ordered back to their rendezvous points for rest and future action, records of each staff section will be closed, and supplies will be replenished to the suppression crews. The Supply Section will dispatch a damage appraisal agent to the scene of the fire as time permits. The Intelligence Section, with the cooperation of the law-enforcement officers, will dispatch its agent to the scene of the fire to determine the cause or causes thereof. It is advisable, in this procedure, to have the crew chief of the first suppression party that reached the fire accompany this investigation party. This, however, may not at all times be practicable. The Regional Fire Headquarters will be notified that the fire has been extinguished and that no further action is to be taken.

THE INTERMEDIATE BURN

Assume, however, that the fire is NOT immediately extinguished. Assume that it continues to burn and develops into what we have referred to as Phase II, a small burn within the limits of the local forces. This might be either an uncontrolled slow burning fire or a partially controlled, partially corralled fast burning fire, still beneath the conflagration proportions. Assume that the fire has burned for a three hour period covering 35-40 acres,

a perimeter of 100 chains, with continuing winds and little possibility of immediate control. The Supervisor estimates that he will be able to cope with the hazard with his available forces.

The Supervisor, the Commander, has directed the fire efforts, with the assistance of his staff, from the Operations Room at the Forest Headquarters. He will remain so located until such time as he may decide. Generally speaking, he will attempt to avoid moving his Fire group to the fire line, resorting to this direct assumption of the Fire Boss duties when the fire is truly of Project size. This decision rests within the powers of the Supervisor. It must be mentioned that moving to the fire site exposes other portions of the forest to added risk, involves some loss of time, and may involve using highly valuable overhead personnel for jobs which could be accomplished by subordinates with equal proficiency. It is only at those times that the fullest use of the Supervisor and his staff can be effected in limiting a serious fire threat that the group should be committed.

The flow of Intelligence data is still routed from all outside sources, i.e. radio and telephonic sources, to the Operations Room and to the Intelligence Section. There the data is continuously evaluated and disseminated to the other sections. The Intelligence Map is maintained depicting the present limits of the fire, showing rate and direction of burn. Map data is being constantly supplied by line scouts

and by air reconnaissance if provided. The maintenance of this map is of the greatest importance, for from the information contained on this map and the supporting information, plans for the attack of the fire will be drawn.

The Operations Section is meanwhile determining the best means of attack with as many alternate plans as are practicable. It is not the function of the Operations Officer to actually decide which of the plans is to be used; that is the duty and the responsibility of the Commander. Included in the plans, as drafted by the Operations Section, will be the numbers of crews required, routes of approach, tools required, deployment of crews, and all other specific details as to where, when, and how the attack will be conducted. These plans can be prepared most expeditiously in map form. All tentative plans are made ready for the Commander.

The Personnel and Supply Sections obtain from the Operations Section the probable requirements for transportation, rations, fuels, and additional manpower. (In particular, the future requirements for temporary manpower that must be drafted from local civilian resources.)

All of this planning phase is conducted simultaneously and in a very brief time. Much of the process has been done weeks or even months before. It merely becomes a matter of fitting previously conceived plans and procedures into a current situation.

While the staff is so going about its business, the Commander is making his estimate of the situation. This is merely a thought process, one in which he calls upon his past experiences, upon his best judgement, and upon his intuition. At a point along this thought process at which he feels confident that his viewpoint is near correct, the Commander will call for a Staff Conference.

The Staff Conference is by no means a formal affair. All that it amounts to is a meeting, a pow-wow so to speak, of all the staff members. At this time the members of the staff will be called upon to report what tentative plans their sections have drafted, and what possible lines of action they recommend. The Commander will weigh what they have said, judge it against his own solutions, and then make his Decision. His Decision is then issued to the staff as a Directive. The Commander merely announces what his plans are, what he intends to do.

With the Commander's Directive in the hands of the various staff members, each section now proceeds upon its own definite plans. To return to the problem of the apparent runaway fire, we now analyze the processes of each of the staff sections during this crucial Decision-Directive-Planning phase.

The Commander, at his staff conference, first calls upon his Intelligence Officer for a summary of the situation. The Intelligence Officer reports that the fire is

35 to 40 acres, with a perimeter of 100 chains, burning rapidly in open timber in a northwesterly direction. The rate of burn is estimated at 25 chains per hour. Humidity is now 18%, fuel moisture 4%. Fuel types in the immediate path of the fire are continuing. From the current meteorological message that has just been computed by the Forest Meteorological Section, it is reported that the humidity is falling, winds continuing in direction with increasing intensity. As a general summation, the situation can be reported as being very hazardous with increasing danger.

Any other facts and information of an Intelligence nature would of course be reported.

The Intelligence Officer presents his map, issues overlays of the current situation to each of the other sections, plus any other corroborating papers.

It is now the turn of the Personnel and Supply Sections to offer their reports. They, in turn, present the situation as to the location and strength of personnel and supplies, where additional units of each can be obtained, what rendezvous points can best be established, what transportation routes and equipment are available, and all other data pertaining to their two important functions.

Let us suppose that the Personnel Officer reports that all stand-by suppression crews of the Forest are either committed on other fires or being held in readiness at their respective stations. It is also reported that the Forest

Reserve Force is engaged in a maintenance project some five miles from the headquarters site.

It is necessary at this time to explain the meaning of the phrase Forest Reserve Force. It is planned, as a part of the proposed fire suppression organization, that each headquarters, in addition to maintaining "front line" crews in strategic positions, will maintain a reserve force in some centrally located position, which force can be committed into action at decisive moments. A further discussion of the methods and principles of handling reserves should probably be made at this time, but due to the limitations of the scope of this paper that discussion will have to be restricted to a mere statement of their existence and their general mission.

Thus we learn that the Reserve Force is available if needed. The Personnel Officer, in addition, reports that 100 men can be mustered, with four hours notice, from three logging camps in the vicinity; 50 men can be recruited in 8 hours from the local citizenry. No other forces are immediately available within the area unless enforced conscription of tourists, etc., is invoked.

The Supply Officer reports that field rations are available in Forest warehouses for a sustained period for all personnel that can be apparently mustered. He, however, reports that if fire forces are to be imported from outside the area, additional rations must be procured. He reports

that other supplies, tools, and equipment exist in sufficient quantities for all possible needs.

As soon as the staff completes its final plans, those plans are submitted to the Commander for approval. This is usually done only after the Chief of Staff has coordinated and approved the individual efforts of each section so as to present the most harmonious picture. As soon as they have been accepted and approved by the Commander the plans are converted to orders which are then issued to all concerned.

Let us assume that each of the Sections has completed its plans; the Personnel Section has reported its probable need for additional men from civilian sources, and that the Forest Reserve Force can be quickly assembled.

The Intelligence Section continues its report on the progress of the fire. It reports that all intelligence agencies are functioning, and that a steady and reliable flow of information is now entering the headquarters. It recommends that air reconnaissance be supplied to reinforce ground reconnaissance units.

The Operations Section reports, from data gathered from the Intelligence Section, that the course of the fire is known, and that the best attack is from the east flank of the fire, initial point of attack at a ridge line 600 yards from point X. (As shown on the Operations overlay). It further reports that the Reserve Force is immediately needed, that it can be routed to the fire site by road C as indi-

cated for the reserve. The section further reports that the communications net is in operation, with telephonic and radio nets overlapping and parallel.

The Supply Section reports that six trucks will be needed to transport the Reserve Force with the necessary supplies to carry the total force for an additional twenty-four hours. The necessary rations and other supplies are available at the depot warehouse at the Forest Headquarters.

The Commander accepts the plans as offered and instructs his staff to prepare orders to all affected units instructing them as to their courses of action.

It is advisable, in the opinion of this student, that the orders be issued in the form of a single order through the technique of the Field Order. The exact form could easily be adapted from the Military Field Order, which, it should be mentioned, follows a very strict and standard pattern.

THE CONFLAGRATION

From all available evidence, and from the best judgement of the Supervisor, it appears that the fire is beyond the local forces' power. The report is transmitted to the Regional Fire Headquarters (Operations Room) that the fire is an apparent runaway. The fire now moves into our third phase, the Conflagration class that requires still different treatment and attention.

It now becomes the responsibility of the Regional Fire Officer and his staff to take close interest in this particular fire. Although there may be several other equally large and dangerous fires existing in the Region as a whole, each fire that reaches the magnitude necessitating the commitment of the Forest Reserve becomes the immediate problem of the Regional Headquarters Fire group. It is possible that some acreage standard, or better yet an application of the Least Cost principle and the 10 a.m. rule, could be established for various fuel types, terrains, etc., whereby the Region would automatically assume the vital-interest role regardless of the status of the Forest Reserve Force.

Upon assuming this closer control, the Region requests hourly status reports from the Forest. It is recommended that for a communications media in these Forest-Region nets the commercial teletype be used. Such equipment is reliable, quick, and requires the minimum of trained personnel.

To return to the hypothetical problem once more, the Region notes that the Reserve is about to be committed and that local labor sources are to be requisitioned. The Region now makes plans to further support the Forest group with the Regional Reserve Force which may or may not be already committed elsewhere.

To further explain the functions of this Reserve Force, some elaboration is needed. It is conceived that each unit,

Forest, Region, and Area, will have a reserve force in strength commensurate with needs and funds available. These forces will be maintained at some centralized spot with air and motor and rail transportation facilities available.(24) The force will be engaged in odd jobs at slack periods. It is felt, however, that due to the wide ranges of activity that these forces will be called upon to operate, such slack periods will occur infrequently. The force will be committed to those spots where a sudden and uncontrollable menace has arisen. It is not the intention of the reserve, however, to arrive at a fire, battle it, and remain longer than is needed to assemble and transport local forces. The reserve must function as a shock-unit, i.e. dart in quickly at decisive and critical moments, and be quickly removed to some point of assembly, reorganized and thrust with equal suddenness into a new fire somewhere else.

But once again to the fire problem. We now find the Regional Staff making its preliminary plans, the Commander making his estimate. The whole sequence of events that have occurred hours before at the Forest Headquarters are now being repeated at the Regional level.

Suppose that the fire still burns free from control even after all the local forces have been committed. It has been three days now since the fire started, all local aid has been mustered and thrown into the fray, men are

growing tired and depressed, and the fire continues on its path of destruction. The Regional Fire Officer, who has by now been taking an active, although distant, interest in the fire, decides that the only possible solution is to now commit his own forces. He assembles his staff and the fire personnel, and after having made his final plans, moves out by the most suitable route (considering time and distance) to the fire site. Upon arrival he assumes command of the entire operation, supplanting the subordinate Forest Commander. Upon arrival his staff swings into action, makes its final plans, reports them to the Commander, and he makes his decision. Orders are issued and the battle continues as before, only now on an enlarged scale.

To go back a step. At such a time as the fire exceeded a certain size (other considerations, of course, must also be made: values, terrain, etc.) the Area Headquarters was advised by the Region of the fire locality, size, intensity, etc. The Area Headquarters now carries the fire in its Operations Room, tying in with the communications net, receiving reports, plotting the fire, and making plans. The Area Staff carries on in the same procedure as the lower units with its staff action. If it becomes evident that still further reinforcements are needed, or that certain fire specialists are required at the fire line, the Area Headquarters will commit its reserve forces or any part of them.

If the fire is considered the greatest single menace in the Area it is probable that the Area Fire Director will move with his staff and assume command.

As soon as the fire is under control, units will be withdrawn in the reverse order at which they arrived, at least down to the Forest level. The Area personnel will be first withdrawn, return to their respective assembly stations, and prepare for future operations. The Regional personnel will soon afterwards be relieved, leaving the Forest group to do the final mop-up and clean-up work. Undoubtedly, the civilian forces will be released from further duty next, with the remaining work being done by the suppression crews. Of course, if another serious menace has meanwhile developed within the same Forest, it may be necessary to shift at least part of the Forest Fire unit to that new fire, in which case mop-up work may have to be accomplished by a combined force of Service-civilian work parties.

It is realized that this sketch of the functioning of the Fire Staffs and Units has been in part very shallow, that in many parts of the discussion vital questions have arisen to go unanswered. It is hoped, however, that a general overall picture of the use of the fire units has been described. Questions as to problems in communications, supply, transportation, orders, etc. must of necessity be omitted in such an introductory discussion. That the methods and

techniques described will work is evident, it seems, from the successes of the armies of the world. That these methods are closely akin to the present practices of the Forest Service is indeed true, at least in many respects. It is hoped that the smoothly functioning organization that the writer visualizes can be also imagined by the reader.

CHAPTER V

RECOMMENDATION, SUMMARY, AND CONCLUSION

SUMMARY

It has been the intention of the author to analyze and describe the existing staff organization and staff planning found in the largest, if not the most efficient, Forest Fire Fighting machine, the United States Forest Service. It has been the further intention of this student to offer, as a basis only, a pattern for an improved structure; one based upon proven principles and practices. That this recommended organization is without weaknesses in detail is erroneous. However, as has been shown by the ease and efficiency with which armies of the world apply the General Staff control over large battle forces, the fundamental concepts are both workable and applicable to the Forester's challenge.

In brief this doctrine is based upon seven concepts: First, that both the responsibilities and powers of a Commander, regardless of in which echelon he may be serving, are without challenge. He, as the Commander, is solely responsible for the accomplishments and shortcomings of those who serve beneath him; likewise his authority is without contention, for to burden a leader with responsibility and limit him to authority can but lead to a loss of initiative, loss of efficiency, and disillusionment.(5)(6)(18) It is, by the very nature of the important command jobs, essential that each of these Commanders be the true leaders

of the organization. They must be not only natural leaders, the exact definition of which is as complex as the many duties that fall upon a Commander, but must be fully trained and be provided with competent subordinates to execute their plans. It is realized that in this paper insufficient emphasis has been placed upon the Commander's place in the pattern of the Fire Organization, but it must be assumed by the reader that the choice of these key men will be properly accomplished.

The second fundamental concept is that the Staff will be organized with systematic and practical divisions; that duties will be equitably distributed among the various staff sections so as to maintain as near a balance as can be attained in work loads. That this author has chosen four such sections is the result of a study and comparison of the needs of two varying "battle forces", the field army and the fire party. These two organizations, although their ultimate objectives are diverse, have more than a small portion of their immediate problems in common. Both are warring against weather, terrain, and time; both need more and still more information concerning their enemies, replenished supplies and manpower; and above all, the extreme flexibility and maneuverability that makes their professions unique. The author feels that by dividing the staff into four sections, Personnel, Intelligence, Operations, and Supply, all possible fields of activity can

find a logical niche. The assignment of many of these specific duties is obvious, e.g. matters related to the gathering of fire data is quite naturally an Intelligence function, however, many of the organization's activities will require deeper study and analysis to determine exactly which section would be best equipped to handle those functions.

This leads the reader to the third fundamental concept, that duties which fall within a certain staff section at one level must fall within that same staff section at all levels. Without such a uniform distribution it would certainly impede, if not completely wreck, all semblances of order, resulting in wasted time and efficiency. Duties, in the job sense, must be considered by all personnel, not as a matter of people, but rather as a matter of echelons of command and staff sections. That is to say, a Fire Boss, when requisitioning more fuel or rations, must not think in terms of Bill Jones, Supply Officer, but rather in terms of Fuel-Supplies; Rations-Supplies; Supplies-Supply Section. It is only in this way that the freedom of shifting personnel from job to job, as their talents develop or are proven, can be accomplished without damaging the operational efficiency of the unit.

The fourth concept, and one of the basic keys to the whole structure, is that complete Standardization must exist throughout the entire Fire Organization, from the very

heights of the Washington office to Ranger Districts and Suppression Crews. Granted, that at each level a different degree of complexity of organization must exist, but the basic pattern of a Commander and four supporting staff sections must exist throughout. It is only by such standardization that the full worth of a full-scale organization can be tested. Certainly this issue has been many times proven, not only in the organization of armies the world over, but by police and urban fire units, large business organizations with a sales objective, and other Federal bureaus and departments.

Through such standardization the sixth concept naturally develops, that the organization is so designed as to expand in a pyramidal fashion. By such expansion, the combining of forces, one to another, can be accomplished to fulfill expanded missions, never losing the first concept, that there be at all times but a single Commander, alone responsible and alone in final authority. It is through this pyramidal growth that the necessary flexibility can be attained, and the added weight, so often needed, assembled and thrown into battle at the proper instant.

Coupled closely to this concept is the concept of the Reserve Force. Upon immediate examination it might appear to the hasty reader that it is planned to withhold a portion of an already too small fire organization. Such an understanding must be immediately dispelled, for the entire

concept of Reserves is that a force exists, assembled, mobile, and highly trained, that can be used continuously if need be, but only at those places where final and decisive results can be achieved. It is the proper use of the Reserve Forces that have frequently distinguished the successful from the unsuccessful military commander. As has been mentioned earlier, the doctrine of the proper use of Reserves is a subject within itself, and cannot be treated in nearly its entirety in this work.

There are many other minor details that have been discussed and explained in the chapters preceding, some of a rather obvious nature and some probably comprehensible only to one with some military experience. The plan as a whole is linked, however, to the outlined fundamentals mentioned above. In the mind of the author it is a matter of all-or-nothing-at-all, for to omit any one of these principles is to omit one of the cogs of the machine.

RECOMMENDATIONS

As has been mentioned earlier, this author visualizes as an end-product, although it must be projected well into the future, a single, nation-wide, Forest Fire Organization. Such a huge, single organization is not beyond possibility nor without precedent.(38) We have but a single army, but a single postal service, a single Federal Bureau of Investigation, etc. Why, then, is it impossible to have a single

Forest Fire Organization? As one contemplates the notion of a single organization it becomes more and more alluring, for it seems inconceivable that such an organization could do less than improve what is in many parts of the country a critical situation. Year after year the fire losses have occurred, some barely preventable, some completely without excuse. Apparently it will take more than a strong public opinion to halt the dizzy losses; perhaps the creation of a single and unified Fire Organization could stimulate the cause.(1)(12)(16)

To those who oppose forest regulation and federal "interference" in all its ramifications, there is some concurrence. At least there are economic and moral issues involved to which no known formula can be applied. But it must be the universal cry of timber owners and timber custodians alike to keep fire losses down. There can be but one objective, and whether one applies the "Economic Theory" or the "10 a.m. rule", or any other method of determining fire efforts and justifiable costs, the objective remains the same.(9) It is indeed pleasant to visualize such an organization, free from boundaries political or economic, free from the plagues of special interests and petty rivalries, united in its stand against fire.

To create such an organization would require no special

legislation. The Weeks Law, as amended by the Act of 1924, was designed for just such a pooling of effort as is suggested here. The law could easily be applied. All that would be required would be the consent of the various States in whose boundaries the organization would operate, suitable appropriations from the various state legislatures, funds contributed from the private landowners involved, and a matching sum, not to exceed the legal fifty per cent. appropriated by the Federal Congress. It would seemingly be money well invested by all parties.(8)

As a more immediate objective, the author recommends that the Forest Service modify, standardize, and expand their Fire Organization, keen as it is today, to meet the standards outlined in this work. Such a change would require further training, a full analysis of needs, plus time and effort. The author would recommend that any reorganization undertaken be started, not at the lower echelons, as might appear most economical, but with no less than one Region, preferably a group of Regions. It is felt that in this way only, the truest merits of the plan could be realized.

Such a reorganization would first require a personnel inventory to determine which people within the Service could best fill the various Command jobs, which the Staff jobs, and which, although presently valuable to the Service, should best be omitted from the Fire Organization roster. The

The selected group should definitely be select; men keenly interested in the fire problem, aggressive in spirit as well as on the ground, willing to probe into the unknown, mentally free of preconceived notions as to fire organization.

When such a group has been selected, the next immediate problem is to fully train these persons in the Command and Staff methods that they will need to fully understand to fulfill their new roles. With such training many pitfalls and misunderstandings can be avoided.

To accomplish this end, it is recommended that a Command and Staff School be organized on a permanent basis. Such a school would be patterned after the Army Command and General Staff School at Fort Leavenworth, Kansas. (It should be noted here that the State Department was recently authorized to form such a school, to be patterned after the military school, for the training of their officers.)

The school would teach fundamentals; doctrine that would be equally useful for all fire people no matter what their future assignments may be or where they may serve. The curriculum could include such subject matter as command techniques, personnel methods, training methods, maps and aerial observation, movement of supplies and personnel, the use of air support, communications, evaluating fire data, the study of weather and fuels, the behavior of fire, the

effects of terrain, and innumerable other basic subjects. It is impossible here to outline completely all the numerous subjects with which the fire specialist must be entirely familiar, but suffice to say that all would be adequately covered in the fire curriculum.

Teaching methods could well be patterned after the Army's school, from which school, incidentally, all other military schools take their teaching techniques. By cooperative agreement with the Army, observers could be first sent to study the methods employed at the Command and General Staff School, and from this object lesson develop the Forest Service Staff School. It can be said, with the fullest sincerety, that few schools have taught so many so much in as short a time as the Command and General Staff School.

The general presentation of subject matter could follow this pattern: First, a lecture introducing and explaining the subject. During this period a full discussion of the subject can rarely be accomplished, however, it is not necessarily important that the students depart from this introductory phase completely informed; better to leave some of the information on the subject to later periods. The introduction would, however, completely familiarize the student with the nomenclature of the subject, the general importance of the subject, and the interrelationship that

exists between that subject and other fire affairs.

Following the lecture phase, which may, of course, cover any number of lecture hours, depending on the relative importance and complexity of the material to be offered, the class participates in a conference period. During this teaching phase, questions are asked both from the classroom floor and from the lecture platform. It is during this phase of the instructional ladder that many minor details will become clear in the students' minds, that a general consolidation of what has been learned is accomplished, and that the class, because there are always bound to be students of different backgrounds and capabilities, can establish itself on an even footing.

After a sufficient amount of instruction has been completed in a certain subject matter, the class will form in small tutorial groups, 8 or 10 members to each group. During this period, some type of a joint problem will be solved under the direct guidance of a qualified instructor. Members of the group will be called upon to contribute portions of the solution. It is during these periods that members may offer to the group topics of pertinence based upon their own personal experience and background. These sessions can be most productive if properly organized and if student participation and interest is properly aroused.

Since almost all fire problems can be reduced to some

type of a map problem, and since any graphical solution is much more impressive than word solutions, Map Exercises will be conducted as a final test, so to speak, of the students' comprehension of each subject matter. These may be either of a group type, in which the student groups are organized into "play" staff and command sections, each man with a "play" job-designation, or of an individual nature. The student is offered as realistic a problem as can be devised, being given what necessary data he will need to organize the problem and fit the teachings he has received into a suitable solution. This method of instruction is an excellent way of determining both the initiative of a student and his grasp of a subject matter.

After all of the subject topics of the curriculum have been covered, fully and with the greatest thoroughness, a final set of tasks is placed before the student. In the Command and General Staff School curriculum, these are referred to as Map Maneuvers. For the Map Maneuver, the class is broken down into staff groups, as in the Map Exercise, but into such an array so as to have all echelons of the Fire Organization represented. A problem is introduced to the class as a whole, and the entire class participates in its solution, each man with his own specific assignment, each "play" echelon relying upon its subordinates and being relied upon by its superiors. The only jobs that are, of

course, not "played" are those of a manual type, such as suppression crews, etc. All command, staff, and specialist advisor jobs are filled, however, with a random assortment of personnel. It matters not what a man's real-life job is, what his grade, or what his primary interests are. For the matter of the proper "play" of the Maneuver it is his responsibility to learn the job to which he is assigned and to "play" that job to the best of his ability.

It might be suggested, in connection with Map Maneuvers, that a clever technique in presentation is to speed up the "play" clock, i.e. have, for example, one clock hour equal four Maneuver hours. This will help in speeding up the problem, for it is quite obvious that to allow the problem to bog down and drag on would only result in a lagging interest on the part of the participants.

It is not at all objectionable, on the other hand quite effective, to continue the last of the Map Maneuvers over a 48 hour period. This would, obviously, closely approximate true field conditions, necessitating the various Commanders to assign their staffs on a "shift" basis, seeing that each man receives as much relief as is necessary for him to most efficiently perform his duties. Such a practical problem could serve as a sort of "final examination".

The whole matter of a Command and General Staff School for Fire personnel has been discussed at such great length

in this paper because it is the firmest conviction of the writer that without some sort of high level training, even the best designed, best created, best intended organization will be filled with misunderstandings, misapplications of techniques and practices, and a general weak condition. It is too often the rule that men in the higher level key positions are assumed to be perfect; that they are assumed to be perfectly trained in their job assignments, and that no further training effort need be expended on them by the Service. Such, of course, is far from the true situation. Innumerable instances can be cited where key men DIDN'T know their jobs, where top ranking forest officers have been embarrassed by the superior knowledge of their subordinates, and field efficiency has been proportionately low. It is felt that this is a topic of prime importance if any reorganized Fire Organization is to take the field. It is likewise equally valuable if no such reorganization is effected.

CONCLUSION

In conclusion it must be again stated that this author has by no means intended this discussion as a criticism of the Forest Service nor of the Service's Fire record. Likewise, the author in no way suggests that the Service be militarized, for militarism cannot be easily, or willingly, superimposed on a civilian organization. It is felt, however, that because of the great similarity that exists

between the field problems of the Fire Organization and the combat problems of an army, certain of the proven doctrine of the military can be transposed, modified, and adapted to the foresters' needs.

BIBLIOGRAPHY

1. Allen, E. T., Cooperation in Forest Protection, American Forestry, 1911, Vol. 17, p. 665.

2. Brown, A. A., Design of National Forest Transportation Plans to Meet the Fire Control Problem in Northern California, Journal of Forestry, 1942, Vol. 40, p. 597.

3. Buck, Shirley, Progress in Forest Fire Fighting Methods and Equipment, Timberman, Jan., 1926, Vol. 27, p. 79.

4. Burchett, Ed, What Constitutes an Efficient Fire Fighting Organization, Timberman, Nov., 1926, Vol. 28, p. 84.

5. Cowan, C. S., Fire Fighting Organizations in Logging Camps, Timberman, Nov., 1923, Vol. 25, p. 51.

6. Cowan, C. S., Perfecting the Fire Fighting Organization, Timberman, Nov., 1930, Vol. 32, p. 90.

7. Compton, W. M., Organizing For Common Defense, American Forests, 1939, Vol. 45, p. 189.

8. Dunwoody, C. G., Who Should Bear the Responsibility of Providing Fire Protection on Lands Outside The National Forests, Journal of Forestry, 1929, Vol. 27, p. 151.

9. Flint, H. R., Adequate Fire Control, Journal of Forestry, 1928, Vol. 26, p. 624.

10. Gisborne, H. T., Mileposts of Progress in Fire Control in Fire Research, Journal of Forestry, 1942, Vol. 40, p. 597.

11. Gisborne, H. T., Hornby's Principles of Fire Control Planning, Journal of Forestry, 1939, Vol. 37, p. 292.

12. Graves, Henry S., Fundamentals of the Fire Problem, American Forestry, 1910, Vol. 16, p. 629.

13. Graves, H. S., The Protection of Forests from Fire, American Forestry, 1910, Vol. 16, p. 509.

14. Greeley, W. B., Meeting the Red Menace, American Forests, 1928, Vol. 34, p. 711.

15. Headley, Roy, Who Starts These Fires?, American Forests, 1939, Vol. 45, p. 191.

16. Headley, Roy, National Fire Protection Association, Journal of Forestry, 1938, Vol. 36, p. 710.

17. Humiston, W. D., Fire Fighting Organization and Equipment, Timberman, Nov., 1923, Vol. 25, p. 54.

18. Joy, G. C., Fire Fighting Organizations in Logging Camps, Timberman, Nov., 1923, Vol. 25, p. 53.

19. Kotok, E. I., Fire, A Problem in American Forestry, Scientific Monthly, Nov., 1930, Vol. 31, p. 450.

20. Lee, K. F., Handling a Big Forest Fire, American Forests, 1929, Vol. 35, p. 199.

21. Loveridge, Earl W., The Opposite Point of View, Journal of Forestry, 1935, Vol. 33, p. 105.

22. Lyman, C. K., Principles of Fuel Reduction for the Northern Rocky Mountain Region, United States Forest Service, Progress Report No. 1., March, 1945.

23. Morris, W. G., Coordinating Plans for Fire Protection Facilities, Journal of Forestry, 1939, Vol. 37, p. 861.

24. Norcross, T. W., and Grefe, R. F., Transportation Planning to Meet Hour Control Requirements, Journal of Forestry, 1931, Vol. 29, p. 1019.

25. Reynolds, H. A., The Human Equation in the Forest Fire Problem, Journal of Forestry, 1927, Vol. 25, p. 783.

26. Sutliff, C. B., Coordinating Fire Control Plans, Journal of Forestry, 1940, Vol. 38, p. 627.

27. Silcox, F. A., How the Fires Were Fought, American Forestry, 1910, Vol. 16, p. 631.

28. Silcox, F. A., Men Against the Flames, American Forests, 1939, Vol. 45, p. 194.

29. Show, S. B., Fire Supplies from the Skies, Timberman, 1940, Vol. 41, p. 11.

30. Field Service Regulations-Operations, War Department Field Manual, FM 100-5, June 15, 1944.

31. Field Service Manual-Administration, Command and General Staff School, February 1, 1946. (replaces FM 100-10)

32. General Staff Officers' Manual, Command and General Staff School, October 1, 1945. (revised February 1, 1946) (replaces FM 101-5)

33. Staff Officers' Field Manual-Organization, Technical, and Logistical Data, War Department Field Manual FM 101-10, August 1, 1945.

34. A National Plan for American Forestry, Senate Document Number 12, 73rd Congress, 1st Session, 1933.

35. The Finished Work Principle, Unnumbered and undated bulletin, United States Forest Service.

36. Fire Control Handbook for Forest Guards, Region 5, United States Forest Service, 1937.

37. Fire Control Handbook-Part III, Region 5, United States Forest Service, 1940.

38. Washington Office Information Digest, United States Forest Service, May 21, 1946.

39. Fire Control Notes, United States Forest Service, Vol. 7, No. 1, April, 1946.

40. Fire Control Notes, United States Forest Service, Vol. 7, No. 2, July, 1946.

41. Fire Control Notes, United States Forest Service, Vol. 7, No. 3, October, 1946.

42. Forests Protected by the CCC, United States Civilian Conservation Corps, 1938.

43. Course Notes, Command and General Staff School, Ground, G. S. No. 24, 1945.