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FM 1–195

WAR DEPARTMENT

# ARMY AIR FORCES FIELD MANUAL

THE SERVICE CENTER

September 26, 1942

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FM 1–195

# ARMY AIR FORCES FIELD MANUAL

## THE SERVICE CENTER



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WAR DEPARTMENT,
WASHINGTON, September 26, 1942.

Pending the development of detailed doctrines and methods of air force logistics, FM 1–195, Army Air Forces Field Manual, The Service Center, governing the operation of a service center in the field, is published for the information and guidance of all concerned.

[A. G. 062.11 (8–21–42).]

BY ORDER OF THE SECRETARY OF WAR:

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(For explanation of symbols see FM 21–6.)

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# ARMY AIR FORCES FIELD MANUAL

## THE SERVICE CENTER

### CHAPTER 1

### OPERATION


| | | Paragraphs |
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### SECTION I

### GENERAL

■ 1. GENERAL.—In modern warfare no combat unit can live off the land and no squadron can be encumbered in a combat area with the machine tools and technical equipment necessary for its more extensive maintenance requirements. For these needs there are provided in the theater of operations the service center which resembles the zone of the interior air base and subdepot, and the air force general depot which resembles the army general depot. As the equipment of the air force general depot air section alone requires 55 freight cars for transportation, there will seldom be more than one air force general depot sent to a theater of operations. The service center, on the other hand, is a mobile establishment designed to fill many of the maintenance, supply, salvage, construction, and transportation needs of the combat squadrons.

■ 2. STRENGTH.—The service center is capable of supplying and maintaining two combat groups of any type of aircraft and for a short period can service additional units. The strength of the service center is 1,250 to 2,500 men, the number being dependent on the amount of security needed and on the

amount of construction work going on. The strength is based on average day-to-day operations with consideration for emergency situations. Priorities may be set up to provide essential services in such situations. For example, when all trucks are required to haul bombs, the delivery of rations can be stopped and organizations required to carry on with emergency rations until the emergency is passed.

■ 3. METHOD OF OPERATION.—The area in which a service center operates is called a service center area. Requisitions, expenditure reports, and strength returns are transmitted by the dispersed squadrons in its area to the service center. On the basis of these, supplies and replacements are moved forward to their airdromes. The service center furnishes third echelon maintenance service of all arms and services to air force units in its area. For organization of the air force service command, see figure 1.

## SECTION II

## ORGANIZATION, FUNCTIONS, AND REQUIREMENTS

■ 4. GENERAL.—All Army Air Forces personnel for the service center comes from a service group. Other personnel is furnished by units of the various arms and services. (See fig. 2 for organization and app. II for functional organization.)

■ 5. SERVICE GROUP.—A service group is composed of a headquarters, a headquarters squadron, and two service squadrons. When there are less than five combat squadrons to be served, only one service squadron will be necessary.

■ 6. HEADQUARTERS AND HEADQUARTERS SQUADRON.—The headquarters and headquarters squadron provides the sections required to administer the service center. In addition, it provides the instrument landing, photographic, chemical, finance, ordnance, and quartermaster sections. Its motor transport section is generally physically separated from the service center motor transport pool but may be placed under its control. The headquarters and headquarters squadron provides personnel for its own operation—a headquarters, a mess, a supply room, and similar overhead.

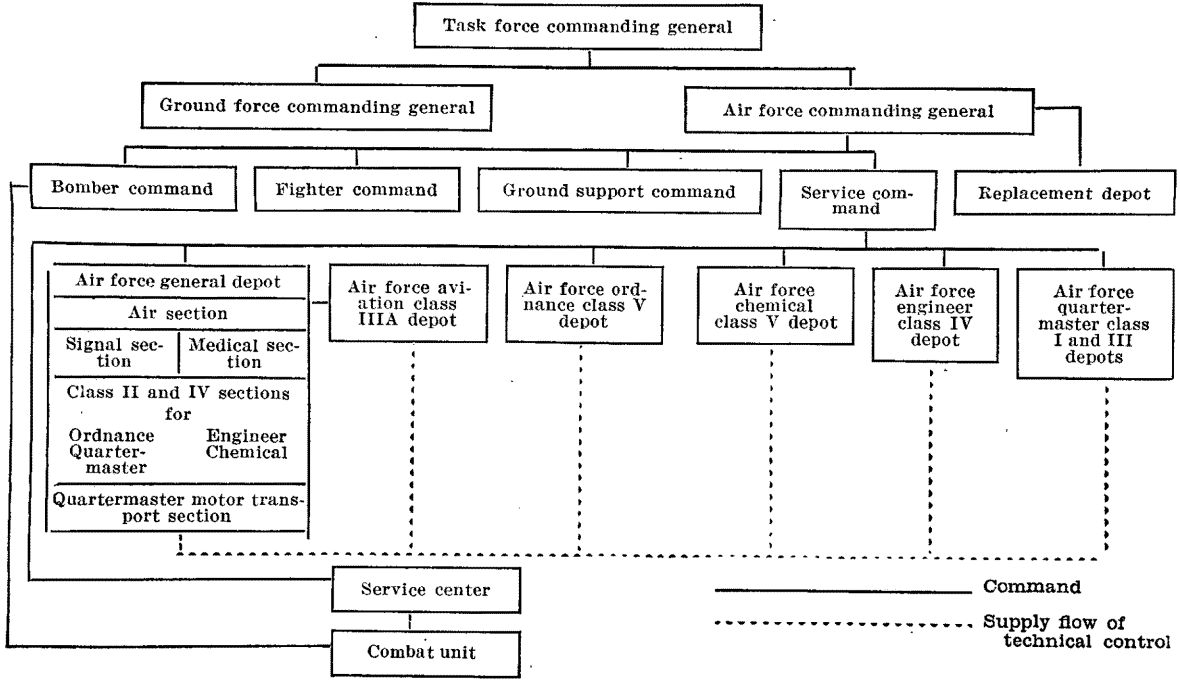



FIGURE 1.—Organization of air force service command.

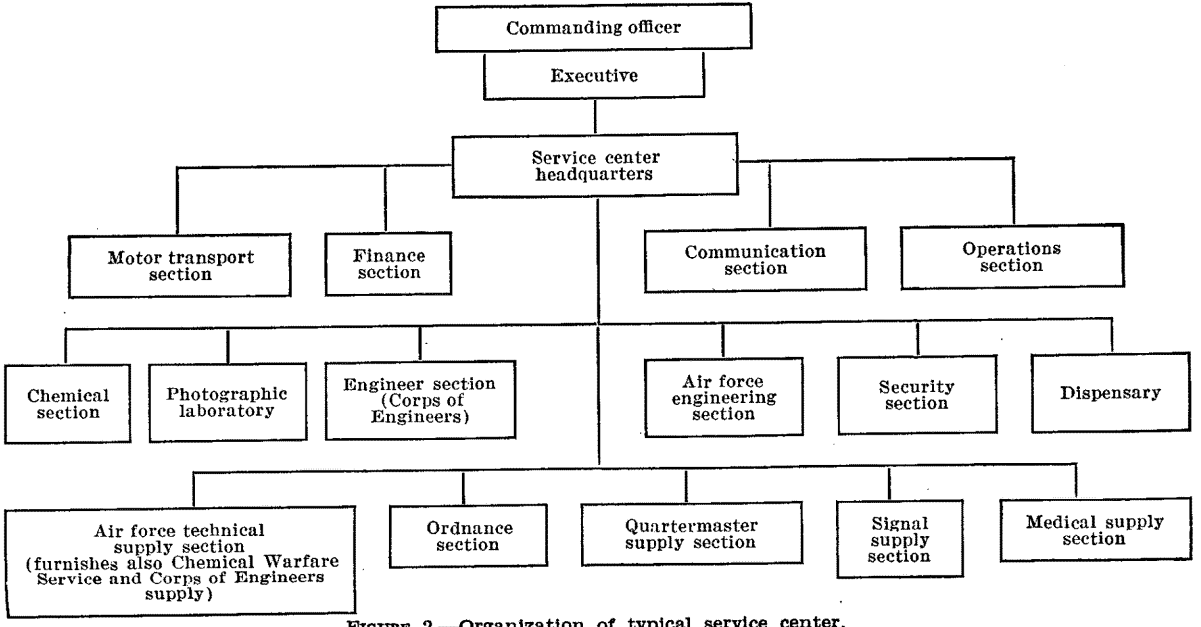



FIGURE 2.—Organization of typical service center.

■ 7. SERVICE SQUADRON.—Each service squadron provides personnel for the various shops of the service center air force aircraft engineering section, for the air force technical supply section, and a flight section for the service of attached and transient aircraft. It furnishes the same squadron overhead as does the headquarters and headquarters squadron.

■ 8. PERSONNEL.—A typical service center would likely include the following:

*a. Headquarters and headquarters squadron.*

| | *Officers* | *Enlisted men* | *Warrant officers* |
|---|---|---|---|
| Headquarters service center | 11 | 21 | |
| Squadron headquarters | 2 | 34 | |
| Instrument landing section | | 3 | |
| Transport section | 1 | 17 | |
| Photographic section | | 8 | |
| Chaplain | 1 | | |
| Chemical section | 2 | 8 | |
| Finance section | 2 | 15 | |
| Medical section | 4 | 19 | |
| Ordnance section | 2 | 5 | |
| Quartermaster section | 3 | 6 | |
| Total | 28 | 136 | |
| *b. First service squadron.* | | | |
| Squadron headquarters | 3 | 32 | |
| Engineering section | 2 | 108 | |
| Technical supply section | 1 | 29 | |
| Transport section | | 36 | |
| Medical section | 1 | 8 | |
| Total | 7 | 213 | |
| *c. Second service squadron* | 7 | 213 | |
| Total (*a*, *b*, and *c*) | 42 | 562 | |
| *d. Allied arms and services.* | | | |
| Signal company, service group | 2 | 70 | 1 |
| Ordnance company, aviation (air base) | 4 | 60 | |

| *d. Allied arms and services*—Con. | *Officers* | *Enlisted men* | *Warrant officers* |
|---|---|---|---|
| 2 ordnance companies, medium maintenance (Q) (aviation) | 4 | 92 | |
| 2 quartermaster truck companies (aviation) | 6 | 198 | |
| Quartermaster company, service group | 5 | 76 | |
| Military police company (aviation) | 4 | 100 | |
| or air base security battalion or both. | (18) | (422) | |
| Total | 25 | 596 | 1 |
| Grand total (*a*, *b*, *c*, and *d*) | 67 | 1,158 | 1 |

*e. General functions.*—The personnel referred to in *a*, *b*, *c*, and *d* above, with their equipment, are capable of keeping the maximum number of airplanes in the eight combat squadrons flying and of keeping the necessary quantity of all types of bombs and other ammunition at the combat squadron airdromes. The functions and capabilities are discussed in some detail in connection with the operation of the service center headquarters and other service center sections.

## SECTION III

## HEADQUARTERS

■ 9. HEADQUARTERS AND COMMAND.—*a. General.*—The headquarters is responsible for adequate supply arrangements and third echelon aircraft maintenance for all air force units in its local service center area. It maintains a clearing office for all requisitions and service requests from all air force units assigned to its airdrome. It supervises and coordinates all supply and maintenance organizations at the service center. This manual is intended to serve only as a general guide for the employment of service center personnel. Special or unusual conditions will arise affecting the operation of the service center. Officers will be responsible for meeting such conditions. Typically, the service center headquarters functions as explained in *c* below.

*b. Personnel and organization.*—The service center headquarters is operated by the headquarters of a headquarters and headquarters squadron, service group. Figure 3 shows the personnel and a typical organization plan of the Army Air Forces personnel in the headquarters; personnel for the special staff sections similar to that of the engineering officer and the air force technical supply officer are provided in the same Table of Organization for chemical, medical, ordnance, and quartermaster sections.

*c. Commanding officer.*—The headquarters is headed by the service group commander who is responsible for the administration and technical functions of all organizations of the service center. He is assisted in these command functions by the officers in command of each one of the service center sections. These officers comprise his special staff. The staff is primarily for the assistance of the group commander in performing his mission.

*d. Equipment.*—The equipment of a typical service center headquarters includes at least—

2 large wall tens.
1 fly (or equivalent shelter).
15 desks (or tables) and chairs.
6 typewriters.
1 safe.
1 mimeograph machine.
Various other office supplies.

■ 10. SERVICE CENTER STAFF.—*a. Executive.*—The service group executive acts in similar capacity to that of the chief of staff in higher units. He is the principal assistant and adviser to the service center commander and acts for the commander during his temporary absence or when authorized to do so. The duties of the executive are normally administrative in character and tactical operations are handled by the service center operations officer. This is a matter of policy and is determined by the commander. The service group staff officers also serve as staff officers of the service center.

*b. S–1 and adjutant.*—The duties of the service center adjutant correspond to those of the G–1 section and the adju-

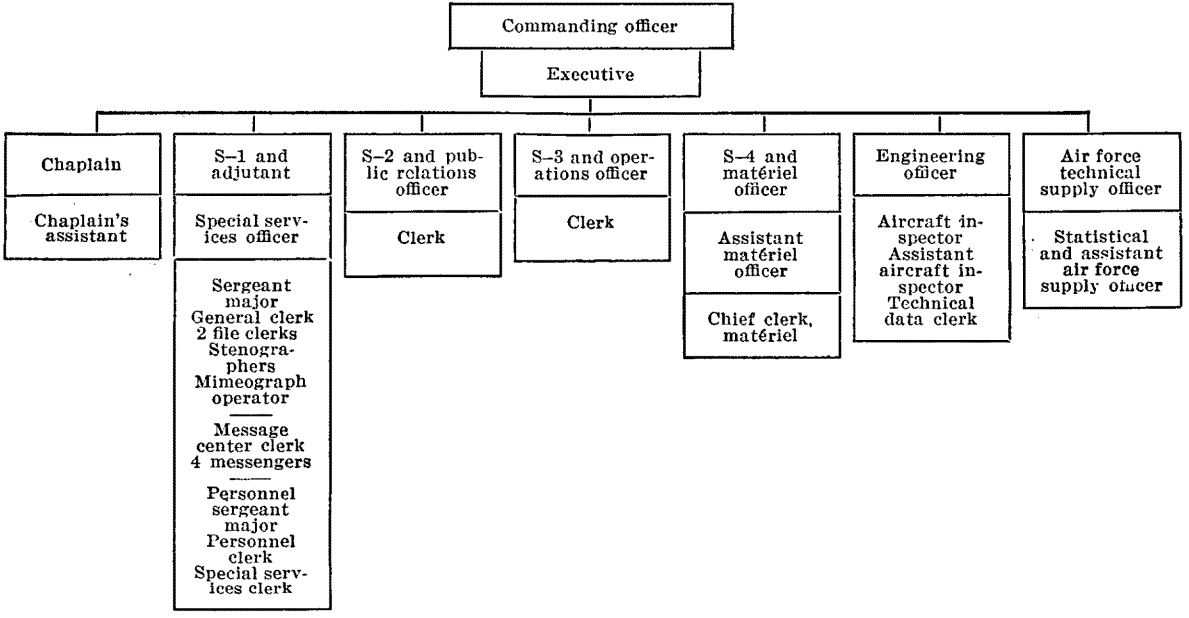



FIGURE 3.—Organization of typical service group headquarters.

tant general of larger commands. In general, these duties consist of—

(1) Handling official correspondence for the service center (except that pertaining to tactical or flying operations).

(2) Maintenance of records of officers for the headquarters.

(3) Authentication and distribution of all orders and instructions except those pertaining to flying operations.

(4) Handling all matters pertaining to personnel as individuals; and consolidating and submitting reports pertaining to strength, casualties, and incidental returns rendered by units of the service center.

(5) Operation of a general follow-up system for service center headquarters for administration matters and recommendations of similar arrangements for squadrons and other units.

(6) In accordance with approved policies, handling—

(*a*) Classification of all individuals joining the command and subsequent assignment, reclassification and promotion, transfer, retirement, and discharge.

(*b*) Procurement and replacement of personnel for the service center.

(*c*) Leaves of absence and furloughs.

(*d*) Custody of records of all personnel belonging to the service center which are not kept in some subordinate unit.

*c. S–2 and intelligence officer.*—The principal duties of the service center intelligence officer are to—

(1) Advise the commander on matters pertaining to intelligence.

(2) Evaluate and insure the prompt transmission to higher headquarters of all information obtained by the service center.

(3) Assist in training of individual members of the command in matters pertaining to intelligence work.

(4) Train and properly employ personnel of intelligence section.

(5) Procure maps and keep up to date all maps, reports, and files pertaining to intelligence.

*d. S–3 and operations officer.*—The S–3 and operations officer is charged with functions relating to organization, training, and operations of the command. He is responsible for making such tactical and training inspections as the com-

manding officer may direct. He is head of the operations section. (See par. 29.)

(1) The planning consists of preparing and coordinating plans of—

(*a*) Mobilization.

(*b*) Organization and equipment of units (coordinated with S–4).

(2) The operations officer prepares and supervises the execution of tactical plans covering the following matters:

(*a*) Reconnaissance and security.

(*b*) Tactical employment. (Coordination with S–4 for movements requiring transportation in addition to organic transportation, for routes, for supply, and for evacuation. Coordination with S–2 for capabilities of the enemy and with S–1 for morale of troops.)

(*c*) Defense of administrative installations and line of communication.

(*d*) Establishment of liaison.

(*e*) Supervision of signal communication.

(3) The operations officer also prepares, supervises, and coordinates plans for training of units and individuals, including—

(*a*) Preparation of training directives, programs, and orders (coordination with S–2 for intelligence training).

(*b*) Selection of training sites and firing ranges (coordination with S–4).

(*c*) Organization and conduct of schools (coordination with S–1).

*e. S–4 and matériel officer.*—(1) *General.*—(*a*) One of the most exacting administrative duties of the service center commander and in turn through his S–4 section is that of establishing and maintaining an efficient system of supply for the service center area. Prior to combat service, this responsibility involves the training of officers and enlisted men in the drawing, issuing, maintenance, and accounting of all individual and organizational supplies necessary to accomplish the mission for which the unit is designated. While engaged in warfare this responsibility increases manyfold, for the strength of every attack can be no stronger than its line of supply installations and resources. It is obvious that supply

channels must therefore be intelligently formed, accurately operated, and carried out with enthusiasm and resourcefulness. The efficiency of any supply system is proportional to the knowledge of its administrators and their willingness to furnish wholesale cooperation.

(*b*) In the service center there are grouped all necessary arms of the services to combine and furnish from a single source all the supply requirements of the combat groups. To assist these officers and their staffs and to prevent oversupply in one unit and undersupply in another, the War Department has set up definite supply standards known as Tables of Basic Allowances and Tables of Allowances. These tables are the results of studies of boards of officers of the several arms and services and contain fixed quantities of supplies for the using units. In the war effort, the demand of all arms and services for supplies has increased many times over peacetime requirements. Because of changes in design or the development of new material, it is impossible to maintain at all times sufficient supplies to equip a newly organized or expanded army. It can be expected, therefore, that shortages of supply will exist in certain items before an army can take the field. For this reason, the Services of Supply has set up a system of supply control designed to release the necessary equipment where it is most needed, and in quantities which will expedite the training of priority units. To facilitate this policy the supply designations in (2) below have been formulated.

(2) *Priorities.*—(*a*) "Controlled items" will be designated by the chiefs of the supply arms and services and will consist in general of major items of equipment the mobilization shortage of which has been anticipated. This list is revised from time to time as the status of the items changes. Shipments of controlled items will be initiated by the chiefs of the responsible arms or services at the direction of the Commanding General, Services of Supply, and in accordance with the priorities established by the Army Air Forces.

(*b*) "Credit items" will be designated by the chiefs of the supply arms and services and will consist in general of articles included in Tables of Basic Allowances for mobilization, which can be made available at the times and in the quantities required.

(*c*) A third group of property consists of items not classified in the controlled or credit groups and therefore available as fast as the flow of supply will permit.

(3) *Duties.*—The service center S–4 and matériel officer administer in the name of the commander the various complexities of the supply problem and coordinates the activities of the Quartermaster Corps, Corps of Engineers, Signal Corps, Ordnance Department, Medical Corps, Chemical Warfare Service, technical supply, and aviation engineering, so far as they affect supply and matériel. He must keep the commander constantly informed of the supply situation and be prepared to make suitable recommendations on all problems to the commanding officer. In this, he must exercise proper judgment and with due regard to the recommendations of the respective department or special staff head. The administration of supply must be carried out willingly and vigorously to be at all effective. His objective should be a resourcefulness to get things done, and not excuses for failing in accomplishment or looking for circumstances in mitigation of events.

(4) *Specific problems.*—(*a*) Procurement, storage, and distribution of all supplies.

(*b*) Location of supply, evacuation, and maintenance establishments.

(*c*) Transportation of supplies.

(*d*) Construction and maintenance of roads, trails, and airdromes.

(*e*) Maintenance of equipment.

(*f*) Recommendations for allocation of small-arms ammunition and antitank mines.

(*g*) Traffic control.

(*h*) Construction, operation, and maintenance of utilities and other facilities relating to supply, shelter, transportation, and hospitalization.

(*i*) Evacuation and hospitalization.

(*j*) Assignment and movement of supply, medical, and technical troops.

(*k*) Salvage.

(*l*) Collection and disposition of captured supplies and equipment.

(*m*) Recommendations as to area boundaries.

(*n*) Property responsibility.

(*o*) Funds and priorities of expenditure.

(*p*) Recommendations as to new types of equipment.

(*q*) Procurement of real estate, shelter, and facilities, including their leasing, repair, maintenance, and disposition.

(*r*) Improvement of airplane bases.

(*s*) Preparation, authentication, and distribution of administrative orders both fragmentary and complete (coordination with S–3 for details of the tactical plan and S–1 for details pertaining to the activities supervised by the personnel section).

(*t*) General supervision of all station supply and maintenance sections and branches including air and motor transport.

(*u*) Responsibility for the provision of adequate supply arrangements for all units located within the service area.

(*v*) Maintenance of a clearing office for all requisitions and request for services received from all activities within the service area.

(*w*) General supervision of all supply points provided by the service center in the service area.

■ 11. SERVICE CENTER SPECIAL STAFF.—There is an ordnance and a quartermaster staff section, each headed by a special staff officer, in the headquarters. These special staff officers are part of the headquarters. All other special staff officers are also commanding officers of the various service center sections. All special staff officers advise the commander in the fields in which they are specialists, advise other staff officers, and coordinate the work of their own activities with that of other service center organizations.

■ 12. REFERENCES.—In the administration, supply, maintenance, and repair work performed by the service center the following Field and Technical Manuals will prove invaluable aids:

Administration, FM 100–10.
Automatic pistol, caliber .45 M1911, and M1911A1, FM 23–35.
Aircraft propellers, TM 1–412.

Aircraft engines, TM 1–405.
Aircraft sheet metal work, TM 1–435.
Defense against chemical attack, FM 21–40.
Elementary map and aerial photograph reading, FM 21–25.
Equipment, clothing, and tent pitching, FM 21–15.
Grinding machines, TM 1–422.
Hand, measuring, and power tools, TM 10–590.
Heat treating and inspection of metals, TM 1–423.
Infantry drill regulations, FM 22–5.
Interior guard duty, FM 26–5.
Lathes, TM 1–420.
Milling machines, shapers, and planers, TM 1–421.
Military training, FM 21–5.
Military sanitation and first aid, FM 21–10.
Military courtesy and discipline, FM 21–50.
Motor transport, FM 25–10.
Operations, FM 100–5.
Parachutes, aircraft fabrics, and clothing, TM 1–440.
Physical training, FM 21–20.
Property accounting, TM 10–310.
Quartermaster operations (for transportation by motor, rail, and air), FM 10–5.
Soldier's handbook, FM 21–100.
Storage and issue, TM 10–250.
The Army cook, TM 10–405.
The Army baker, TM 10–410.
U. S. rifle, caliber .30 M1, FM 23–5.
Welding, TM 1–430.

## SECTION IV

## LAY-OUT

■ 13. LOCATION.—Suitable terrain for an airdrome is the first requirement in locating the service center. It is equally important that the service center be conveniently located for supply, maintenance, and communication to the airdromes to be served. The service center airdrome is a necessity because transport airplanes must land with emergency supplies—airplane spare parts, engines, and other items which

are required in a hurry. Liaison airplanes must land in the service center as a vital addition to the wire and radio communication nets. Damaged airplanes must land for repair; and repaired airplanes, whether they were flown in or trucked in, must be able to take off. (See fig. 4.)

■ 14. OPERATIONS SECTION.—The operations section, to control the activities of the airdrome and to service attached and transient aircraft, must of course be located at the airdrome, taking advantage of whatever camouflage is available or constructing camouflage where none is available.

■ 15. HEADQUARTERS, COMMUNICATION, AND FINANCE SECTIONS.—The service center headquarters, as the nerve center of the service center and of the airdromes served, should be located as near the service center airdrome as camouflage permits. The communication section, the nervous system of the service center and its outlying airdromes, furnishes radio, telephone, and teletype communication. It must therefore be located as close as possible to the headquarters. The small finance section is the money installation for the service center area; it should be located primarily with a view to camouflage and security.

■ 16. AIR FORCE ENGINEERING SECTION.—The air force engineering section works on airplanes which are to take off when repaired, so it should be located near one of the airdrome runways but concealed and separated from the headquarters units.

■ 17. SUPPLY SECTIONS.—There are five supply sections which deal in supply from seven arms and services and which perform some maintenance functions. The air force technical supply section also handles Corps of Engineer and Chemical Warfare Service supplies. Its location should be dictated by the factors of camouflage, dispersion, and convenience to the engineering section. The ordnance section must be located primarily from the point of view of dispersion; the ammunition area, if it is separated from the rest of the section, must be located from 1 to 3 miles from the nearest installation and it should be located to leeward of the airdrome, that is, to the leeward of the prevailing wind. The medical supply sec-

tion and the dispensary are located with concealment as the first consideration; also with the consideration of dispersion and convenience to the personnel of the service center and to personnel likely to be sent to it from outlying airdromes.

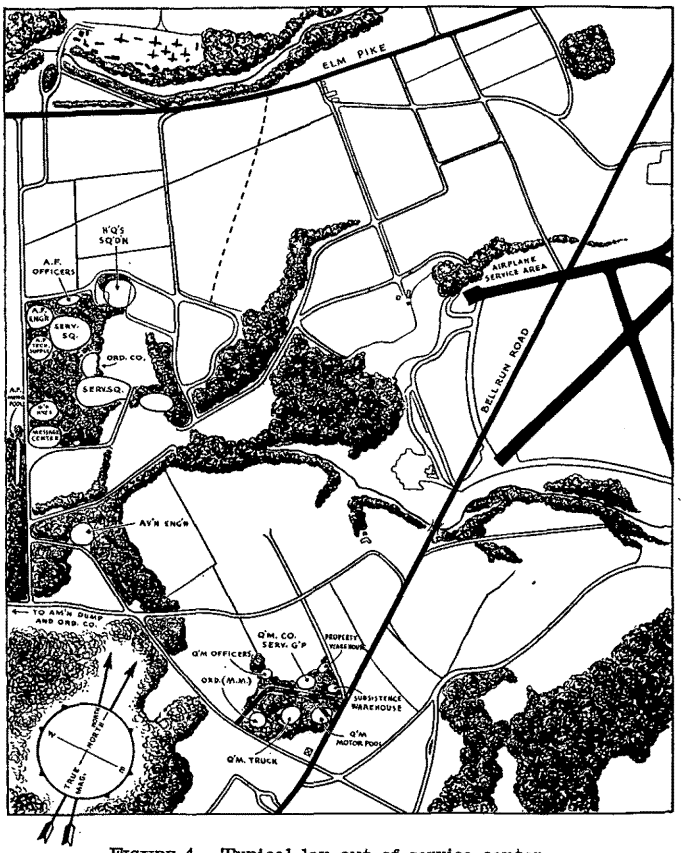



FIGURE 4.—Typical lay-out of service center.

■ 18. MOTOR TRANSPORT POOL.—The motor transport pool is one of the most vital sections of the service center as it may

be the only means other than by air of transporting ammunition and other supplies to the combat airdromes. It probably will have to be located a mile or more from service center headquarters in order to secure sufficient camouflage. It must be located near the best highway in the vicinity and personnel operating within the service center must be very careful to use only existing roads or roads that have been hewn through woods to supplement the road net.

■ 19. OTHER SECTIONS.—The photographic section, the headquarters squadron, the one or two service squadrons, the military police company, and the aviation engineer battalion if one is present are all located with camouflage and dispersion as primary considerations; once these requirements are satisfied, consideration is given to locating them near the points where they function.

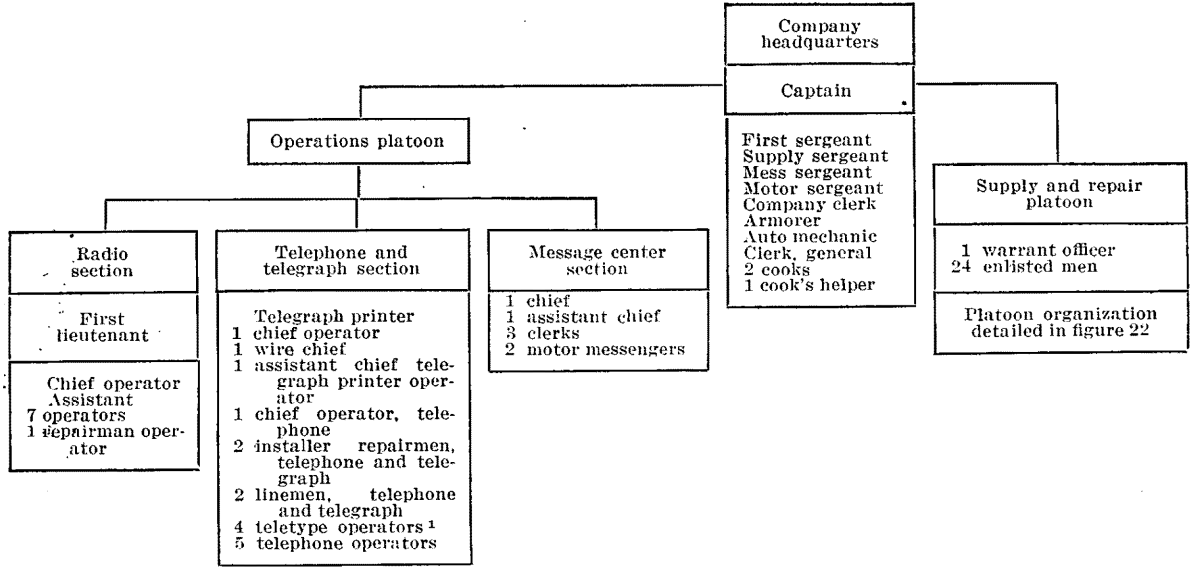
## SECTION V

## COMMUNICATION SECTION

■ 20. ORGANIZATION.—The communication section is operated by the operations platoon of the signal company, service group. The company and operations platoon organizations are shown in figure 5.

*a. Company commander.*—The company commander commands and administers the company, supervising the work of the headquarters and the two platoons. He also is special staff signal officer and in this capacity, coordinates the work of the signal company with that of all other service center organizations and advises the service center commander on signal matters.

*b. Communication officer.*—The commander of the operations platoon of the signal company, service group, is communication officer for the service center. The communication officer is required to know in complete detail the state of the communication net. At any given moment he must know exactly who can be reached by each type of communication. He must know what element of the net is bearing the heaviest load to each agency, and he must use this knowledge in recommending to the service center commander a system of priorities for messages.




[1] Half of the teletype operators must be qualified for tone telegraph.

FIGURE 5.—Organization of signal company, service group.

■ 21. MESSAGE CENTER.—The message center receives messages from service center headquarters and encodes and transmits them as desired; receives messages from other headquarters by radio, wire, or messenger and decodes and delivers them.

■ 22. TELEPHONE AND TELEGRAPH SECTION.—The telephone and telegraph section operates a telephone and either a teletype or a tonal telegraph service. The teletype is of particular advantage for transmission of the daily message. Half of the teletype operators are capable tonal telegraph operators, and the section is provided with tonal telegraph equipment for use if the teletype fails. The teletype is highly desirable for speed of operation but requires a fairly constant frequency attainable in the field only with exceptional care in power generation and insulation of wiring. Its major items of equipment are—

6 teletypewriter sets EE–97.
3 perforator sets TG–11.
3 reperforator sets TG–13.
1 telegraph central office set TC–3.
1 telephone central office set TC–4.
1 telephone central office set TC–12.
40 field telephones EE–8–A.
10 miles wire W–110B.

■ 23. RADIO SECTION.—*a.* The radio section operates the radio service for the service group and the units it serves. It operates two SCR–188 receiver transmitters and four additional receiving sets. The SCR–188 set includes thirteen antennas of six different types. Its voice range is 30 to 200 miles; its CW (continuous wave) range, from 75 to 1,000 miles. The variation in either type of transmission is caused by atmospheric, local electrical, and terrain conditions. The set is mobile and is for ground use. Its transmitting band is 1500 to 12500 kilocycles; its receiving band is 400 to 13000 kilocycles.

*b.* The other four receiver sets are to increase the range when it is necessary to guard frequencies other than those used for regular traffic. They are—

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| *Type* | *Range (kilocycles)* |
|---|---|
| 2 radio receivers BC–342C | 1500 to 18000 |
| 1 radio receiver BC–779 | 100 to 20000 |
| 1 radio receiver SCR–244 | 540 to 20000 |

*c.* For ideal operation there should be an operator for each set. However, under wartime conditions the seven operators of the section will likely be used so that two or three operate on the 8-hour shift with the heaviest traffic and one or two operate on each of the other two shifts. Each set is tuned to a different frequency but one operator can handle all, except under peak load conditions.

■ 24. PERSONNEL.—*a.* Personnel for each section is provided so there will be someone on duty at the message center—at the telephone, at the telegraph, and at the radio—at all times.

*b.* The wire unit, which consists of a chief, two installer-repairmen, and two linemen, sets up and maintains the wire system at the service group camp.

■ 25. POWER.—Power for the sections comes from the company's three PE–75–D power units. They are portable, lightweight, and have very efficient motor generators, 110-volt, 60-cycle, 2½-kilowatt.

## SECTION VI

## FINANCE SECTION

■ 26. ORGANIZATION AND PERSONNEL.—The finance section consists of two officers and fifteen men. They operate the various sections constituting an average disbursing office. (See fig. 6.) The disbursing office will handle all military and commercial vouchers of the service group itself in the normal way.

■ 27. MILITARY VOUCHERS.—Military vouchers for personnel of the eight airdromes serviced will be forwarded via mail (message center) to the disbursing office. Check payments will be mailed; cash payments will be made by an officer from the disbursing office 1 or 2 days per month at each airdrome. Monthly enlisted pay rolls will be paid at each airdrome by class A agent officers who will obtain cash from the disbursing office.

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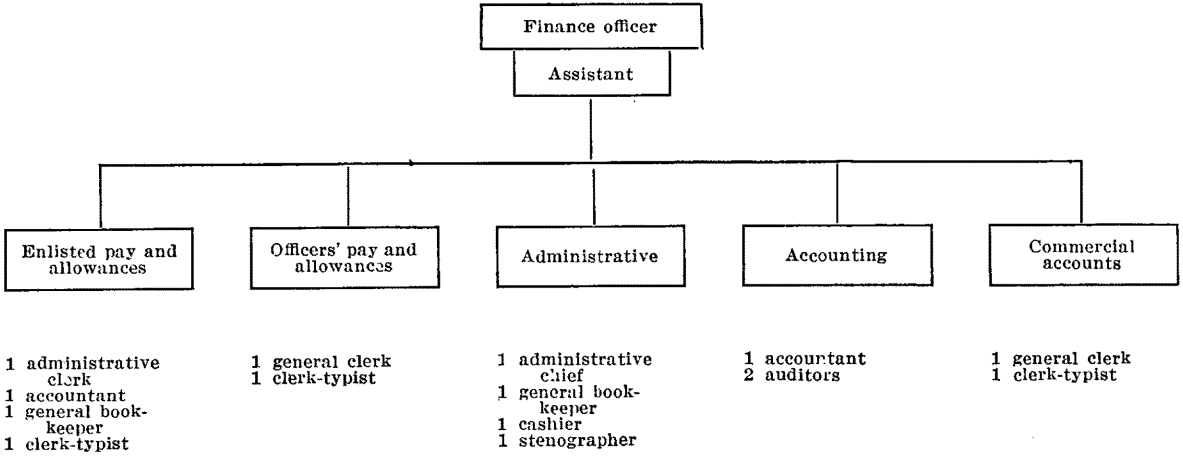



FIGURE 6.—Organization of typical finance section.

■ 28. COMMERCIAL VOUCHERS.—Commercial vouchers for purchases of all airdromes will be paid by check from the disbursing office, as all purchase orders and supporting papers of each airdrome will be routed through the center purchase and contract officers.

## SECTION VII

## OPERATIONS SECTION

■ 29. ORGANIZATION AND PERSONNEL.—The operations section operates the landing field like any controlled airport. See figure 7 for its personnel.

*a. Officers.*—The operations officer and the assistant are the service center S–3 and assistant. The operations officer is responsible for the operation of the service center airdrome; his duties include the following:

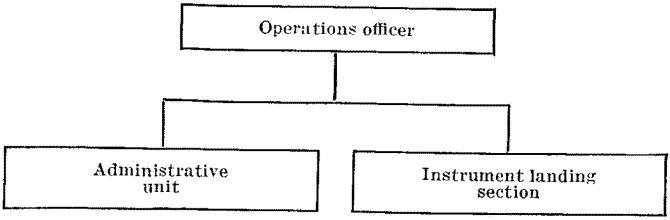
(1) Maintaining records pertaining to the flying activities of pilots in the service group—hours flown, results of missions, and expenditure of ammunition.

(2) Securing from the weather section and disseminating the latest meteorological data.

(3) Supervising operation of aircraft assigned to the group.

(4) Supervising operations of operational control towers when needed in the service center area.

*b. Instrument landing section.*—On direction of higher authority, the instrument landing section is provided with instrument landing equipment by the air force general depot signal section and is responsible for furnishing instrument landing service at designated airdromes in the service center area. When not so employed, the instrument landing section personnel is used in the shops of the service center engineering section.




1 clerk clearances, flight plans, aircraft schedules, aircraft rosters, and aircraft status reports
1 clerk flight records and flight orders

1 radio mechanic
2 radio truck operators

*Equipment*

2 trucks, each with two-way radio, charts, and compasses

FIGURE 7.—Organization of typical operations section.

## CHAPTER 2

## AIR FORCE ENGINEERING SHOPS


| | | Paragraphs |
|---|---|---|
| SECTION I. | Engineering section | 30–32 |
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| III. | Mobile repair section | 34–37 |
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| VII. | Paint and fabric shop | 46–47 |
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| XI. | Parachute shop | 56–57 |


## SECTION I

## ENGINEERING SECTION

■ 30. SERVICE CENTER ENGINEERING OFFICER; ENGINEERING PUBLICATIONS.—*a.* The service center engineering officer is the service center commander's special staff officer for air force engineering and in that capacity he keeps the commander advised on the accomplishments and needs of the air force engineering section. The service center engineering officer; in addition to his special staff duties, is in charge of the service center engineering section. He is assisted by the two service squadron engineering officers, and in the preparation of reports by the two service squadron statistical officers. The engineering officer is responsible for—

(1) Direct supervision of the operation, production, and maintenance methods used by the engineering section.

(2) Preparation of all orders and instructions pertaining to the maintenance, salvage, and reclamation of air force equipment being processed through the engineering section, including its mobile units.

(3) Operation of the air force system of maintenance inspection within the service group, making certain that all equipment is maintained in a serviceable condition and that all standards of construction, workmanship, and changes as prescribed in the existing orders are followed.

(4) Scheduling of work from activities being served by the service center.

(5) Preparation or coordination of all correspondence emanating from the engineering section concerning maintenance and maintenance inspection matters.

(6) Overhaul, repair, remodeling, inspection, or reconditioning of all air force equipment in use or in storage and of all other air force equipment as may be received by the service center whenever such work is required; the manufacture when necessary of such equipment, parts, and tools as may be required to meet the immediate needs; and for all other equipment as may be ordered from higher authority.

(7) Maintenance of a prescribed number of complete sets of the following publications, conveniently located to all shops and units of the engineering section:

(*a*) Air Corps Circulars.

(*b*) Air Corps Technical Orders.

(*c*) Air Corps Specifications.

(*d*) Authorized blue prints.

(*e*) Air Corps Stock Lists.

(*f*) Such other technical publications and manuals as refer to air force subjects and as are required for the operation of the engineering department.

*b.* The following list indicates some of the standard Army Air Forces forms and circulars that are of common use and with which certain engineering personnel should be familiar:

| *Circular* | *Subject* |
|---|---|
| 15–0 | Index and Requisitioning of Army Air Forces Forms. |
| 15–1 | W.D., A.A.F. Forms Nos. 1 and 1A—Airplane Flight Report. |
| 15–14 | W.D., A.A.F. Form No. 14—Technical Report of Aircraft Accident Classification Committee. |
| 15–16 | Radio and Telegraphic Reports of Aircraft Accidents. |
| 15–30 | Forced Landing Report. |
| 15–43 | W.D., A.A.F. Form No. 43—Armament Inspection Record. |
| 15–46 | W.D., A.A.F. Form No. 46—Parachute Record. |

15–48 W.D., A.A.F. Form No. 48—Work Order.
15–50 W.D., A.A.F. Forms Nos. 49, 50, 51, 83, and 83A—Parts and Identification Tags.
15–52 Engine Block Test Report.
15–54 W.D., A.A.F. Form No. 54—Unsatisfactory Report.
15–55 W.D., A.A.F. Form No. 55—Technical Order Compliance Report.
15–58 W.D., A.A.F. Form No. 58—Parachute Inspection and Drop Test Card.
15–60 W.D., A.A.F. Forms Nos. 60A and 60B—Technical Instruction Compliance Record.
15–61 W.D., A.A.F. Form No. 61—Propeller Historical Record.
15–81 W.D., A.A.F. Form No. 81—Stores Charge.
15–82 W.D., A.A.F. Form No. 82—Stores Credit.
15–97 W.D., A.A.F. Form No. 97—Purchase Request.
15–99 W.D., A.A.F. Form No. 99—Memorandum Receipt (Credit and Debit).
15–241 W.D., A.A.F. Form No. 241—Instruction Slip.
15–242 W.D., A.A.F. Form No. 242—Foreman's Progress Report.
15–243 W.D., A.A.F. Form No. 243—Bill of Material.
15–249 W.D., A.A.F. Form No. 249—Stores Exchange.
15–250 W.D., A.A.F. Form No. 250—Time Card.

31. FUNCTIONS.—The air force engineering section is charged with third echelon maintenance and repair.

*a. Echelons of maintenance.*—(1) First echelon aircraft maintenance is that performed by the air echelon of the combat unit. It corresponds to first echelon maintenance for all other Army Air Forces equipment, which is the maintenance performed by equipment operators.

(2) Second echelon aircraft maintenance is that performed by the ground echelon of the combat unit, air base squadrons, and airways detachments. It corresponds to second echelon maintenance for all other Army Air Forces equipment, which is the maintenance performed by the using organization.

(3) Third echelon aircraft maintenance is that performed by service groups and subdepots. It is the same echelon as

that for all other Army Air Forces equipment, that is, the maintenance performed by service center organizations.

(4) Fourth echelon aircraft maintenance is that performed by air depot groups and control depots. It corresponds to fourth echelon maintenance for all other Army Air Forces equipment, which is maintenance performed by depot organizations.

*b. Third echelon maintenance.*—Third echelon, or service center, maintenance cannot be exactly defined. The service center organization's capabilities are limited by the number, experience, and aptitude of its technicians and by the quantity, condition, and type of its equipment and supply. Third echelon aircraft maintenance embraces repairs and replacements requiring machine tools and other equipment of such weight and bulk that ground means of transport is necessary. This echelon includes field repairs and reclamation, removal and replacement of major unit assemblies, fabrication of minor parts, and minor repairs to aircraft structures and equipment. Normally this echelon is limited to repairs which can be made within a certain period of time, the period to be determined by the prevailing situation.

*c. Variations in capabilities of a given echelon.*—The echelons of maintenance will likely vary from time to time, even within the same air force area.

(1) At times it may be impracticable for the combat unit to perform normal routine inspections due to lack of men or equipment. In such cases it would call on the service center for assistance.

(2) Frequently it may be necessary for the service center to turn over to the depot repairs which appear to be minor; for example, small repairs which require heat treating beyond the capabilities of the facilities of the service center. Also, overload conditions may require air force depot assistance.

*d. Disposition of repair work.*—Third echelon maintenance and repair is performed both in the service center and to a considerable extent in the squadron airdrome by employment of the mobile repair units. The engineering section determines whether aircraft which has crashed within the service center area or other aircraft reported to be damaged can be repaired at the scene or must be moved to the service center

for repair. In event the damaged aircraft appears beyond the capacity of the service center, the service center engineering officer must decide the question and call on the air depot engineering officer for ultimate disposition. If the air depot engineering officer decides that the aircraft is damaged beyond service center repair, he has three courses of action open to him: he may send out a depot mobile repair section, consisting of heavier equipment than that assigned to the service center mobile repair section, and repair the aircraft at the scene; he may cause it to be transported to the depot for repair; or he may cause the parts to be salvaged either by depot or service center personnel. Under wartime conditions, echelons of repair lose much of their peacetime significance—the squadron which in time of peace may decide that someone else should do the repair job may in war perform engineering work normally assigned to third echelon maintenance. The service center, under wartime conditions, may practically manufacture new airplanes out of old parts. The personnel, functions, and equipment of the various shops are detailed in succeeding sections.

*e. Maintenance by flight section.*—Although the echelon of maintenance at the service center is said to be third, so far as personnel at the service center operates equipment they must perform the operator's first echelon maintenance on it; and to the same extent the organization must perform the using unit, or second echelon of maintenance. To provide second echelon maintenance for the airplanes assigned to it and for transient aircraft, there is a flight section in each service squadron engineering section.

■ 32. COMPOSITION AND EMPLOYMENT.—The service group usually contains two service squadrons (see fig. 8), but the engineering section of one squadron may under some conditions be detached and sent to a part of the service center area where the maintenance load is heaviest. When both service squadron engineering sections are at the service center their personnel will be pooled to form the engineering section administration and shop units. The section will be under the direct control of the group engineering officer. Officers and enlisted men at the disposal of the group engineering officer will consist of—

*a.* A total of five officers, two warrant officers, and 218 enlisted men.

(1) Group engineering officer (from service group headquarters).

(2) Two airplane inspectors (from service group headquarters).

(3) The engineering section from two service squadrons, each composed of two officers, one warrant officer, and 108 enlisted men.

*b.* The assignment of personnel to shop sections will be determined by the group engineering officer and will differ according to circumstances. Figure 8 shows a typical disposition of personnel, one which has worked successfully under field conditions.

## SECTION II

## ADMINISTRATION SECTION

■ 33. FUNCTIONS AND EQUIPMENT.—The administration section directs and coordinates the functioning of the various engineering shops. It maintains all routine correspondence, records, and various technical files; draws sketches for parts of airplanes that must be manufactured; maintains a record of all jobs being performed; and places with the technical supply section all orders for supplies and parts needed for the engineering section. By maintaining and studying records of performance of various airplanes serviced, the section anticipates future needs and plans for them. It is housed in a hospital ward tent, two large tents, or equivalent shelter. It needs seven tables, four typewriters, and other office equipment.

## SECTION III

## MOBILE REPAIR SECTION

■ 34. NUMBER OF UNITS AND PERSONNEL.—*a. Number.*—Each service squadron includes four mobile repair units, hence the service group has eight. The number is determined by the theory that there should be as many mobile units as there are combat squadrons. They may be used, however, at any point in the service center area where they are required, including

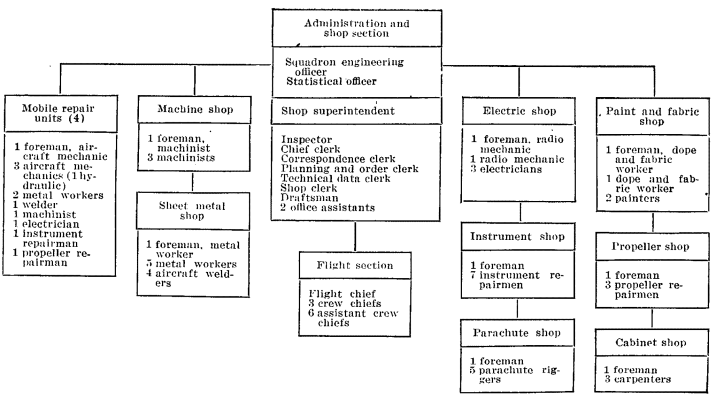



FIGURE 8.—Organization of one squadron, engineering section.

the service center itself; more than one may be sent to a single squadron if the maintenance load requires.

*b. Composition.*—Mobile repair units are usually of a fixed number and composition. Each consists of four aircraft mechanics, one aircraft instrument repairman, two sheet metal workers, one aircraft welder, one machinist, one aircraft electrician, and one propeller mechanic. On occasion the unit may be tailored to fit a particular job by adding other specialists.

■ 35. FUNCTIONS AND EMPLOYMENT.—*a. Disposition.*—The mobile units are sent to dispersed airplane positions and may be left there after the job is done. Then they may be dispatched direct to another job.

*b. Work.*—The mobile units do the combined work of the propeller, electrical, metal, machine, and instrument shops, though on a smaller scale. They do engine changes, cribbing and crating, and wing repairs. Work on the surfaces and structures of an airplane often amounts to rebuilding. Such work is limited by the unit's tools and supply of spare parts and stock, therefore it cannot always rival the neatness and durability of the job performed at the service center shops. On the other hand, mobile units have rebuilt wings so well as to pass air depot inspection.

■ 36 EQUIPMENT.—*a. Transportation.*—The unit operates, out of three 2½-ton quartermaster cargo trucks, an engineering truck with winch for hoisting boom operation and various machines and tools, a technical supply truck, and a truck to carry personnel and their personal dunnage. There may also be attached a 1-ton, two-wheel trailer for mess equipment; it is taken on a project for use by an attached cook whenever it is not known that the technicians can mess with other organizations on the road. Normally they will mess with the combat squadron upon whose airplanes they are working.

*b. Engineering equipment.*—The engineering truck will carry certain items of the service center engineering section Table of Basic Allowances equipment. The items are prescribed by Army Air Forces Technical Order. The arrangement of the engineering truck is left to local option. The equipment includes—

1 electric power plant, type Corps of Engineers 3-kilowatt.
4 50-foot extension cords.
1 portable air compressor, 5-cubic-foot capacity, gasoline-engine driven.
1 portable hoist assembly.
4 airplane jack assemblies: 2, 20,000-pound, 2, 10,000-pound.
2 nacelle hoist slings.
3 engine lifting eyes.
4 crew chief maintenance stands.
1 portable electric drill, ½-inch capacity.
1 gasoline blowtorch.
1 vise.
1 5-ton hydraulic jack.
1 energizer assembly.
1 inertia starter.
Gages and hydrometers.
Flashlights.
Gasoline and milk cans.
Funnels.
1 refueling pump and unit assembly.
Clamps.
Soldering copper.
Taps and dies.
Drills.
Wrenches.
Fire extinguishers.

*c. Supplies.*—The technical supplies will vary somewhat with the type of aircraft to be repaired. A typical list might be as follows, depending upon the kind of job to be performed:

2 pounds safety wire, brass, 0.051, mostly for armament.
200 each, pins, cotter, 1/16- by 1-inch, mostly for armament.
50 each, pins, cotter, 3/32- by 1-inch, mostly for armament.
24 each, pins, cotter, ⅛- by 2½-inch, for airplanes.
1 gallon oil, lubricating, SAE 20 (for oilcans, etc.).

1 gallon Prestone (preferably in 1-gallon can).
3 rolls tape, friction.
1 roll tape, rubber.
40 pounds rags.
12 each, batteries, flashlight.
1 gallon oil, Curtiss speed reducer, No. 1 (for propeller).
5 pounds grease, mobile No. 2 (for power gear in propeller).
3 pounds grease, cup, medium, specification 661 (miscellaneous use).
½ pint instrument oil.
1 pound graphite grease (cooling pumps).
1 can instrument sealing compound.
1 can joint sealing compound.
4 each, electric floor plugs (gang type, 4 outlets).
50 feet ½-inch rope.
50 feet ¾-inch rope.

■ 37. EXAMPLES OF MOBILE UNIT WORK.—Some of the major repairs performed by the four mobile units of one service squadron in a 6-week period are outlined below.

*a.* Wings replaced on four P–40 airplanes.

*b.* Innumerable engine changes in various types of airplanes.

*c.* Extensive sheet metal repair on five DB–7 and A–20C airplanes.

*d.* Reclamation of a B–25A airplane from an ocean (near the beach).

*e.* Work on a total of over 50 airplanes.

## SECTION IV

## MACHINE SHOP

■ 38. GENERAL.—All the repair shops of the engineering section of the service center perform all kinds of third echelon repair. Their equipment is heavier than that of the mobile units, as they have more electric power; they have more types of taps and dies; they have an arbor press, a lathe of 7-inch swing and 32-inch bed, a countershaft, milling attachments, and lathe mandrels. The machine shop is often combined with the sheet metal shop (see sec. V) with only one foreman

for the machinists, metal workers, and welders who make up the two shops.

■ 39. PERSONNEL.—There are only a foreman and three other machinists to operate the machine shop. Even if it is not combined with the metal shop, the equipment of the two shops is often pooled. Always the equipment of one shop must be available to the other, and a close cooperation exists among the personnel.

■ 40. FUNCTIONS.—A large portion of the machine shop work is for tools and ground equipment. Its work for aircraft consists of repairing parts and fabricating them when they are not in stock or readily obtainable from the air depot. Together with the metal shop, the machine shop does very extensive repairs, ranging from the rebuilding of a wing to replacing a single loose rivet. In a 2-week period the two shops have repaired three badly damaged wings, rebuilt the nose section and pilot's compartment of a DB–7, and manufactured many parts such as cowlings and oil lines. The machine shop made shafts for carburetor scoops and innumerable stud wrenches for the various shops. The welders did much routine welding and built two bocms for mobile units. This example is of the performance of shops of an unusually efficient engineering section; in an area under enemy attack even these shops would likely have had production cut down.

■ 41. EQUIPMENT.—The machine shop is located in a semitrailer (or other available shelter) and canvas lean-to's which are shared with the metal shop. The semitrailer used by some shops is illustrated in figure 9.

*a.* The lathe can be set for the proper thread and the stop can be set for the length of thread cut. The threading tool is set on a cross feed. It can be used with many sizes of collets for small-diameter stocks: 1/16-inch, 2/16-inch, and up to 1-inch. There is a chuck for bigger work. There are boring bars to attach. There are milling-machine attachments for small- and medium-sized work that take the place of a shaper and milling machine; with this attachment it is possible to cut gears and make ratchet wheels. There is a slotting attachment to cut keyways on gears and shafts.

*b.* There is an arbor press, distance of center spindle to

column 6 inches, leverage 45 to 1, which gives an even, steady pressure and may be used to remove or replace bearings and bushings.

*c.* There is an electric bench grinder, two-wheel, 6-inch diameter, for smoothing and reducing surfaces and for work on tools for the various engineering shops. A hand grinder is used for smoothing and cleaning surfaces of soft metals.

*d.* The shop's power is generated by a B–6 generator set, 110-volt, single-phase, 60-cycle, gasoline-operated.

## SECTION V

## SHEET METAL SHOP

■ 42. PERSONNEL AND FUNCTIONS.—*a.* The sheet metal shop is manned by a foreman metal worker, five other metal workers, and four welders. They do all the work on the wings, nacelle, and tail surfaces of the airplane, as well as whatever metal work or welding is required elsewhere in the airplane and for the service center installations.

*b.* The sheet metal shop works in close cooperation with all other shops of the engineering section, but most particularly so with the machine shop; it is usually located under a lean-to adjacent to the machine shop trailer.

*c.* This shop can go far toward rebuilding the surface of an airplane and in time of stress can rebuild the structure. As most aircraft sheet metal contains aluminum and is seldom over 2/5 inch in thickness, it is easy metal with which to work. The shop has stocks of both annealed and hardened sheet metal; when annealed metal is used it is tempered with the electric hot plate or even with the welding torch.

*d.* Riveting is usually accomplished by using a bucking bar under the surface of the metal to be riveted, the old-fashioned solid rivet, and pneumatic hammer. There is a special riveter for corner riveting. The explosive rivet is of questionable value in aircraft work because it may look perfect on the surface and yet have failed to expand underneath the metal surface to be joined. The sheet metal shop is equipped to use the Goodrich rivet, which is used when the undersurfaces cannot be reached with a bucking bar. The rivet and tool are pushed through a hole in the metal surface, and the

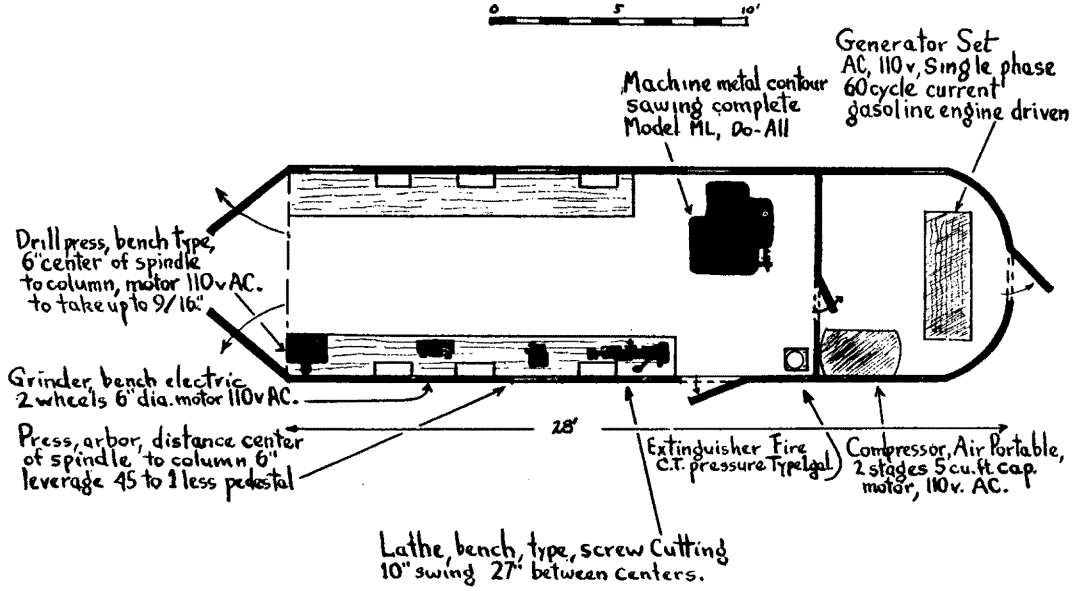



FIGURE 9.—Floor diagram of typical machine shop trailer.

tool twists the base of the rivet back against the undersurface against the head of the rivet. Because its hollowness weakens the Goodrich rivet, it is generally not used where stress will be placed upon it; rather, it is used for de-icing and like equipment.

*e.* The sheet metal workers do whatever wire work and wire splicing are necessary for mechanical appliances of the airplane.

*f.* Most aircraft welding is on exhaust manifolds and other untreated ferrous metal parts and structures.

■ 43. EQUIPMENT.—The equipment of a typical metal shop includes—

1 portable air compressor, 5-cubic-foot capacity, 100-volt, a-c.
150 feet air hose, ⅜-inch diameter.
1 air nozzle.
1 pneumatic riveting hammer, offset handle.
1 pneumatic riveting hammer, pistol grip.
1 pneumatic riveter.
1 bench type drill press, 6-inch center of spindle columns, ¼-inch capacity.
3 portable electric drills.
56 straight-shank twist drills.
1 two-wheel electric bench grinder, 6-inch diameter, 110-volt, a-c.
1 portable grinder, buffer, and sander, flexible shaft, complete, 110-volt, a-c.
1 quart gasoline blowtorch.
1 acetylene torch.
Tanks of acetylene and oxygen with hose.
Welder's gauntlets and goggle assemblies.
Welding torch igniters and regulators.
Hacksaws and handles.
Pliers, punches, screw drivers, and wrenches.
Portable workbench.
Eyecup goggle assembly.
Clamps, files, and forceps.
200 sheet holders.
Metal-cutting shears.
Flat tools, vises, and hollow-rivet cutters.

## SECTION VI

## ELECTRIC SHOP

■ 44. FUNCTIONS.—*a.* The electric shop operates the electric power and lighting system for the service center. It manufactures conduits, charges storage batteries for aircraft, and performs third echelon maintenance of the electrical equipment at the service center and combat squadron installations and third echelon maintenance of aircraft electrical equipment. The shop also performs using-unit or squadron maintenance on radio equipment of the six service group airplanes and any transients. The signal supply and maintenance section (sec. VII, ch. 3) performs all third echelon radio maintenance for the service center area.

*b.* Whenever the whole electrical system of an airplane has to be torn out, the service center electric shop does the job; for any circuit breaks the combat squadron or the mobile repair section does the repair. Blue prints are necessary in replacing airplane electrical systems and they should be in the possession of the combat squadron.

■ 45. EQUIPMENT.—*a.* The equipment of a typical electric shop includes—

1 large wall tent or equivalent shelter.
1 Corps of Engineers 3-kilowatt-ampere field lighting set.
2,000 feet of No. 8 wire for main line.
3,000 feet of No. 14 wire for attachments and lead-ins.
100 sockets.
105 lamps.

NOTE.—Double the amounts given may be needed in a thoroughly dispersed service center.

*b.* Battery testing and charging equipment:

2 storage-battery testing hydrometers.
1 short-circuit type storage-battery tester.
1 gasoline-operated water still, 1-gallon-per-hour capacity.
10 1-gallon stoneware crocks.
2 glass funnels.
1 32-ounce beaker-shaped graduate.

c. General electric testing and repair equipment includes—.
1 volt-ohm-milliammeter, portable, a-c and d-c.
1 double-coil growler. (This tests an armature but not the field; a field winding growler is necessary for this purpose.)
2 battery rectifiers, 6-ampere rate. (These change alternating current to direct current and can be used to charge storage batteries.)
Motor and 1-phase, a-c, 60-cycle, 110-volt generator.
1 electric soldering copper.
1 gasoline blowtorch.
1 lead burning torch with 4 tips.
1 air nozzle, with push button, ⅜-inch hose end (for use on some other shop's compressed air system on the few occasions when compressed air is necessary).
3 electrician's tool kits of hand tools.
2 radio mechanic's tool kits of hand tools.

## SECTION VII

## PAINT AND FABRIC SHOP

■ 46. FUNCTIONS.—This shop does practically all the patching and placing of new fabric on airplane ailerons and tail surfaces. It camouflages airplanes. Where necessary, it paints parts of airplanes which are at the service center for other repairs and performs whatever painting is required of it for the various service center camp area installations.

■ 47 EQUIPMENT.—The equipment of a typical paint and fabric shop includes—
1 portable air compressor, 5-cubic-foot capacity, 110-volt, a-c.
4 suction-feed paint spray tubes.
2 paint spray guns, with oil and moisture separators.
1 paint-striping machine.
2 hand-operated stencil-cutting machines.
2 dope and fabric worker's kits.
2 aircraft painter's kits.
Brushes, tape, shears, and paint.

## SECTION VIII

## AIRCRAFT INSTRUMENT SHOP

■ 48. PERSONNEL.—This shop is operated by a foreman, six other instrument repairmen, one repairman qualified for bomb sight and bomb sight stabilizer work, and an apprentice. The bomb sight repairman must be a technician of high order, and the chronometer and gyro instrument technician and the automatic pilot technicians also require much training. The other repairmen work on pressure instruments and electrical instruments. The shop foremen by training achieve as much interchangeability as time and native abilities of the men permit.

■ 49. HOUSING AND LAY-OUT.—The shop may be housed in a semitrailer the arrangement of which is left to local option. If no trailer is available, a portable warehouse, tent, or shack will be used. Its power plant is made up of two motors and generators: one 110-volt, 3-kilowatt, a-c; the other 24-volt, 2.5 kilowatt, a-c. The trailer contains an air-conditioning unit to maintain pure air and semiconstant temperature to insure proper conditions for working on delicate aircraft instruments. (See figs. 10 and 11.)

■ 50. EQUIPMENT.—*a. General.*—(1) Perhaps the bulk of man hours of labor performed by this section is in trouble shooting, that is, in locating the exact part of an instrument which is the malefactor. Particularly is this true if the crew is not composed wholly of experienced instrument mechanics, a condition likely to exist under rapid military expansion. Often, once the trouble is located, a unit assembly can be interchanged; even if parts must be fabricated, the time involved is likely to be comparatively short.

(2) The elaborate installation can locate any aircraft instrument failure and make needed repairs or substitution of unit assemblies. This function cannot, because of lack of trained personnel and highly specialized equipment, be performed at the combat squadron airdrome. It is necessary that it be performed at installations much closer to the airplane than the air depot.

*b. Testing.*—Typical equipment for testing and its uses follow:



FIGURE 10.—Interior of typical instrument trailer.

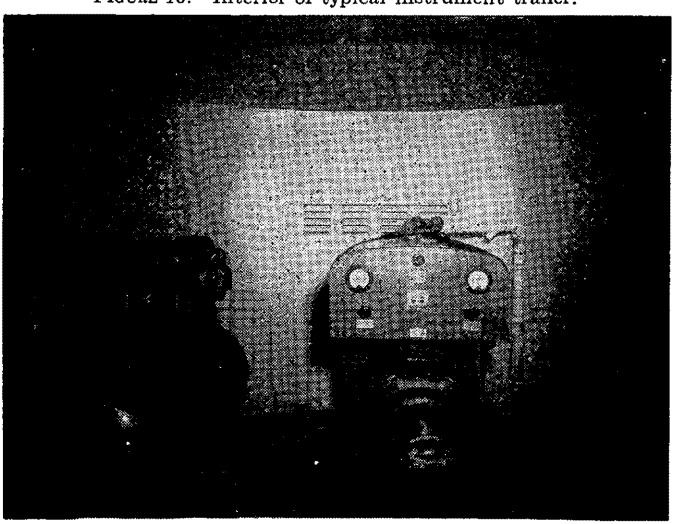


FIGURE 11.—Power unit of typical instrument trailer.

(1) A bench type drill press of 8-inch swing and ¼-inch capacity for sheet metal and an arbor press of 5-inch distance center of spindle to column and a leverage of 36 to 1. These presses are used to fabricate or repair parts, to make frames for instruments, etc.

(2) A machinist's bench vise with swivel base used to hold balky instruments or to hold instruments for accurate setting.

(3) Two pressure-gage testers for the engine oil pressure and for the landing gear.

(4) A fabricated luminosity tester which is an 18-inch dark chamber with peepholes at one end and an opening for the luminous-dialed instrument at the other.

(5) A vacuum pump with a 450-cubic-inch vacuum chamber. The pump is used to test all gyro instruments. The pump is used in conjunction with a motor-driven turntable assembly to test bank and turn indicators, magnitude-of-turn indicators, and other gyro instruments. The vacuum chamber is used with a mercury manometer for checking altimeters, rate of climb, and suction gages.

(6) A galvanometer with analysis cells, used for testing fuel mixtures.

(7) A field instrument-testing frame assembly, including master compass to check or swing aircraft compasses and a test fixture assembly to test tachometers, either mechanical or electric. Here altimeters may be tested by use of the vacuum chambers. A water manometer may be used to test airspeed indicators; and a mercury manometer, in conjunction with a vacuum chamber, may be used to test altimeters, rate-of-climb indicators, manifold pressure gages, and relief valves. Compressed air may be coupled with the water manometer to test the airspeed indicator.

(8) A thermometer stand assembly, two-unit capacity, with a range of —40° C. to +200° C., and two laboratory thermometers with range of 0° C. to 250° C. and —50° C. to +100° C.

(9) A portable motor-driven oil pump, ¼-horsepower, 110-volt, 60-cycle, 1-phase, a-c, for testing automatic pilots.

(10) Small equipment kept in drawers or boxes such as a stop watch, a bench level, and a photographic interval timer.

*c. Repair*—The repair equipment includes—

Drill and arbor presses (*b*(1) above).
1 stationary 3-cubic-foot air compressor.
50 feet of ⅜-inch hose, air nozzle, and push button.
1 universal motor-driven bench type buffer and polisher (can be used as a lathe in emergency).
1 electric soldering copper, ⅜-inch point.
1 cast iron bench block.
1 oil and moisture separator.
Tools in seven instrument repairman's kits: various types of wrenches, screw drivers, drills, and fittings.

*d. Supply.*—The instrument shop has large oxygen tanks from which it recharges the smaller tanks of the combat squadrons.

## SECTION IX

## PROPELLER SHOP

■ 51. FUNCTIONS.—The propeller shop functions are limited to testing propellers, balancing them in some instances when they are not true, replacing propeller blades with unit assemblies, and testing for and repairing oil leaks in hydromatic propellers. The shop is not expected, except under exceptional combat need, to attempt to straighten a bent propeller blade. This is a depot or factory function. In case of extreme emergency, the service squadron or depot repair squadron can straighten slight bends. As a propeller blade is bent in at least one of every two airplane crashes, it is essential that a large supply of spares for all aircraft be carried at the air depot.

■ 52. EQUIPMENT.—The equipment of a typical propeller shop includes—

1 large wall tent or equivalent shelter.
1 1-ton spur gear chain hoist.
1 propeller dolly.
1 double-beam studio scale.
4 movable type propeller storage stands.
1 portable electric drill, ¼-inch capacity.
28 straight shank twist drills (in sizes varying from 1/16 to ½ inch by 32ds).

1 vernier height gage.
1 toolmaker's service gage.
1 alemite gun.
1 electric pressure lubricator.
1 bench vise.
Various hand tools.

■ 53. POWER.—This shop draws its electric power from the electric shop.

## SECTION X

## CABINET SHOP

■ 54. LOCATION AND FUNCTIONS.—The cabinet shop is situated in a large wall tent or equivalent theater-of-operations type structure. The shop does any kind of woodwork for airplanes, including parts for wooden or part wooden airplanes; it manufactures or repairs spars, ribs, and wing tips for observation, cargo, and liaison airplanes. It fabricates map cases for all airplanes, makes wood horses for engine supports, and makes other rigging and cradles. Cradles may cut in half the man hours required to repair an engine. The shop manufactures much equipment for the service center installations, such as cabinets for the mobile repair sections, dies and patterns for sheet metal, and numerous other items of equipment.

■ 55. EQUIPMENT.—The equipment of a typical cabinet shop includes—

1 portable workbench.
1 portable 8-inch electric saw, universal motor, 110-volt.
1 pattern maker, 7- by 19½-inch jaw.
2 3-gallon buckets.
1 32-gallon corrugated can.
1 fire extinguisher.
Flashlights.
4 aircraft carpenter kits of hand tools containing planes, hammers, screw drivers, chisels, files, awls, augers, and hand drills.

## SECTION XI

## PARACHUTE SHOP

■ 56. FUNCTIONS.—The parachute shop is required to inspect completely every parachute prior to repacking for service use. The inspection and repacking are done at least once each 60 days in domestic service and every 30 days in insular service or where climatic conditions necessitate more frequent inspection.

*a.* The shop performs third echelon inspection and repair of parachutes. First echelon inspection performed by the combat squadron must be performed by a qualified parachute repairman. It consists of a visual inspection not less than every 10 days and a complete inspection, including airing and repacking, every 60 days, or oftener if there is any question as to the condition of the parachute.

*b.* Third echelon inspection includes the complete repacking. Its maintenance includes washing the parachute in fresh water if the parachute has been immersed in salt water for several hours. If the parachute has been in salt water more than 24 hours, it must be sent to the depot; if less than 24 hours, all parts except the canopy are replaced.

*c.* Work on harness or parts, breast strap, diagonal back strap, and fittings, consists largely of replacing units; however, if the main lift webs are damaged, a unit harness replacement should be made.

*d.* Repair of pack is limited as follows: Small holes or seam rips are repaired and the silk canopy may be darned at the service center shop if the hole is not greater than 6 inches in radius.

*e.* The rip cord assembly must almost always be replaced as a unit and the damaged unit sent back to the depot.

*f.* Other work performed by this shop, some of it giving precedence to parachute repair duties, includes checking life rafts and vests; inspection of safety belts; manufacture or repair of turret covers, tail wheel boots, airplane upholstery, propeller and propeller starter slings, navigation kits, cross-country bags, and flying clothing; and occasionally the manufacture and repair of tents and flies, particularly those for use with semitrailers.

■ 57. EQUIPMENT.—Equipment of a typical parachute shop includes—

1 hospital ward tent or equivalent shelter.
1 sewing machine.
1 electric heating unit for drying.
1 drying compartment, a 20- by 8- by 5-foot canvas on metal frame with pulleys and rope suspension, capable of drying eight parachutes at a time and requiring about 24 hours for a wet parachute.
Records of service and tests of parachute.
6 tube leather rotary punches.
Shears.
Washer set to replace washers on packs.
6 parachute repairman's kits.
2 temporary rip cords.
2 paddles for packing.
6 shot bags.
Weight, harness needles, chuck, and dies.
Car fasteners for lift-the-dots.
Hand tools.
4 sizes of grommet sets.

## CHAPTER 3

## SUPPLY AND MAINTENANCE


| | | Paragraphs |
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| II. | Air force technical supply section | 62–63 |
| III. | Chemical Warfare Service | 64–65 |
| IV. | Corps of Engineers | 66–67 |
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## SECTION I

## SUPPLY

■ 58. CLASSIFICATION.—Formal classifications of supply appear in appendix I. Supply is further classified in methods of handling as heavy, bulky, and frequently used supply and equipment or as light, easily handled equipment or supply. Where possible, bulky shipments are sent direct from an air force depot to the using unit, and very often more than one refilling point will be set up in a service center area for the purpose of handling such heavy supplies. Lightweight supplies on the other hand are generally supplied through the service center.

■ 59. RESERVES.—*a. Air force technical supply.*—One of the first factors to be considered in a military supply system is the reserve of supplies to be maintained by the using units. No fixed quantities can be decided in advance as the situation, particularly with reference to danger of cutting of communications, is a compelling consideration. The theater commander prescribes the reserves of supply for all organizations in the theater. Generally, the combat squadron air echelon keeps a 3-day technical supply in its crew chiefs' kits and a 10-day supply in its squadron engineering kit. The service center will likely keep a 30-day technical supply; and the air force general depot, a 90- to 150-day supply.

*b. One-day supply.*—One-day supply is an arbitrary and hypothetical unit when applied to air force technical supply. On any given day, aerial combat might cause the squadron the loss of all tail surfaces from every airplane. Such an occurrence and the resulting need cannot be foreseen and replacements stocked.

*c. Supply of arms and services other than Army Air Forces.*—The reserves will generally be 2 days for rations and other supply. As ammunition is the supply most difficult to haul and handle and the supply for which the need varies most with the situation, the required reserves may vary even from day to day. It is vital that bombs and other ammunition are available at a moment's notice; two missions for each airplane of all types of bombs likely to be used in the sector must be kept at a distributing point close to the squadron airdrome.

■ 60. CHANNELS FOR REQUISITIONS.—Requisitioning, requesting, or reporting the need for additional or replacement supply and equipment is always performed by a communication from the combat squadron to the service center. A large amount of such reports will be included in a daily telegram or teletype report including such information as the actual strength of the unit, the estimated strength for the day 3 or 4 days in advance, the amount of aviation gasoline and lubricants (class IIIA) on hand, the amount of motor transport and cooking gasoline (class III) expended the previous day, the number of airplanes assigned, and the number of airplanes in commission. This covers automatic supply items. Calls for ammunition will usually be included in the daily message with a report of amount and type expended. Supplies which are urgent, such as airplane parts and ammunition, are reported by telephone, teletype, or radio to service center headquarters. Other items of supply are requested by written communication through the message center.

■ 61. DISTRIBUTION OF SUPPLY.—*a. Controlled items of supply.*—(1) Items are controlled at each echelon of supply. The echelon where control first becomes necessary depends on the relative scarcity of the item. In considering P–40A propellers, if there were millions of them, every squadron supply officer

would stock them but nevertheless would not issue them to pilots before replacements were needed. If there were a number in the air force somewhat greater than the number expected to be needed before replacement from the zone of the interior could be effected, reserves might likely be set up in the service center. On the other hand, if the number in the air force exactly equaled the number of the estimated expenditure, the whole reserve would be at the air depot or at least controlled from it; otherwise, all the P–40A's in one service center area might require propeller replacements, none in the other areas, and one service center's supply would not suffice.

(2) In practice, the result is that a replacement-controlled item may be located only at a supply point seemingly remote from the using squadron and a control officer's assent may be necessary to the issue. Otherwise, controlled items are requisitioned and distributed in the same manner as other supply.

*b. Special delivery.*—A request for supply or equipment will state if immediate delivery is necessary. If it is, delivery will be performed by specially dispatched motor transport. Otherwise, such supply is handled like other items.

*c. Distribution from service center.*—(1) Where the service center has the desired item in stock or at refilling points under its control, it will cause delivery to be made from that source. Delivery will be by specially dispatched motor transport if the occasion requires it, otherwise by daily run.

(2) The service center requisitions items from the air force depots. It does this on a consolidated requisition normally. Where immediate replenishment is needed, an individual requisition will be sent to the depot by radio or wire communication.

*d. Distribution from air force depot.*—Requests for supply which the service center cannot satisfy are forwarded to the depot in consolidated reports where there is no need for haste, or by indorsement where haste is needed and the depot may elect to supply direct to the combat squadron. Direct delivery to the squadron may be effected by air, motor transport, or rail. Normal routine would consist of a shipment by depot

to service center and reshipment by service center to the combat squadron by daily run.

*e. Organization for handling supply.*—(1) In handling classes I, III, and IIIA supplies, the service center with its personnel operates refilling points for the service center area. With respect to other supplies which are heavy, bulky, or used in large quantities, such as bulk chemicals, engineer camouflage, construction, and fortification materials, landing mats, and ammunition, the service center furnishes necessary refilling-point sections to operate refilling points where rail communication is substantially closer to the squadron airdromes than the service center. With respect to all other chemical, engineer, and ordnance supplies, the service center carries reserves for all squadron airdromes.

(2) There is much similarity in the manner of performance of supply functions of each of the six sections from the seven arms and services which supply the service center and the combat squadrons.

## SECTION II

## AIR FORCE TECHNICAL SUPPLY SECTION

■ 62. PERSONNEL.—The air force technical supply section is normally operated by the personnel of two service squadron technical supply sections less three or four men from each to handle service squadron technical supply. The personnel will be pooled in the service center air force technical supply section. Each section would furnish the following personnel:

*a. Administrative office.*

1 supply officer.
1 chief clerk or assistant.
3 administrative clerks.
1 record clerk.
1 general clerk.
1 stenographer.
1 stock records clerk.
1 office assistant.

*b. Warehouse section.*

1 chief storekeeper.
5 storekeepers.

4 stock records clerks.
1 technical supply clerk.
1 administrative clerk.

c. *Shipping and receiving section.*
1 foreman.
1 carpenter packer.
3 storekeepers.
1 general clerk.

■ 63. FUNCTIONS.—*a. Administrative.*—This section handles all daily messages and other requisitions for supply of all services, verifies the form and description of all orders, and follows up orders for supply needed immediately. It handles records of all orders for, and distribution of, supply. The work is technical and highly specialized as there are over 150,000 different items of technical supply, each requiring a separate designation for record keeping and orders.

*b. Warehouse.*—For storage and handling, technical supply is generally divided into Table 1, which is subdivided into lubricants, small parts, and bulk articles; and Table 2, Organization Equipment List.

(1) *Table 1.*—(*a*) Table 1 is supply and equipment used by all types of aircraft. A perpetual inventory is maintained by posting all receipts and withdrawals on bin cards. Small parts are kept in many small drawers, each with a bin card, all housed in a semitrailer (fig. 12) if one is available; if not, under a fly or equivalent shelter. It includes the multitude of screws, gaskets, nuts, bolts, etc., which are standard size for airplanes.

(*b*) Also included are lubricants which generally are so bulky as to require separate storage space, such as a tent or shack. Paints and varnishes are stored at the same place.

(*c*) In addition, there are several bulky items, such as gasoline drums and oxygen and acetylene cylinders, which are best stored in a third space.

(2) *Table 2.*—(*a*) Another unit handles Table 2 supply consisting of parts and equipment designed and useful for only one or a few types of airplanes. Storage is in a trailer if available, otherwise under tentage or other shelter.

(*b*) Another unit handles Organization Equipment List equipment. So far as this is equipment for service center units, the function consists merely of ordering replacements, checking them in, and supervising delivery to, and accounting with, the unit. For other air force units served by it, it is necessary to store fairly large volumes. This equipment may be stored in a semitrailer (figs. 13 and 14), in tents, or in shacks.

(3) *Total.*—The warehousing might easily total 5 tons and 10,000 cubic feet.

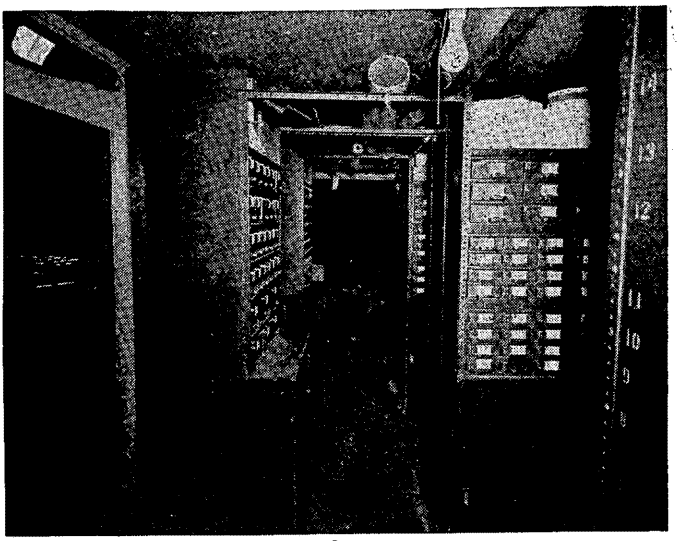
*c. Shipping and receiving.*—This unit does packing, shipping, and receiving for the service center. Medical supply is packed by the medical supply section; Chemical Warfare Service supply is packed by or under the general supervision of the service group chemical section. All Corps of Engineers, Signal Corps, and aircraft supply is handled by this section. It acts much like any factory shipping section.

*d. Agency.*—An agent office is operated at the service center engineering section in order to speed the delivery of parts and material to that section.

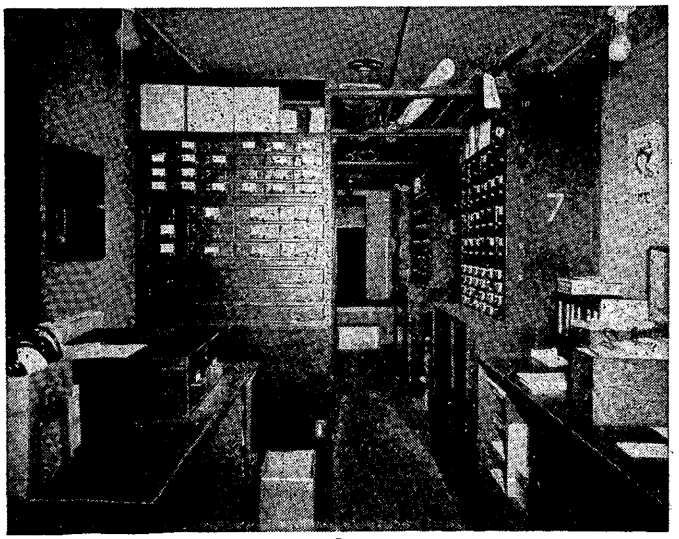
## SECTION III

## CHEMICAL WARFARE SERVICE

■ 64. CHEMICAL FUNCTIONS OF SERVICE GROUP.—*a. General.*—The service group is an organization designed to man and operate a service center the function of which is to serve two groups of aviation of any type. In order to meet this requirement there have been permanently assigned to the service group only those Chemical Warfare Service officers and enlisted men who are necessary to the proper functioning of the service center with any type of aviation. This personnel comprises a special staff section in the headquarters of the headquarters and headquarters squadron service group and consists of two officers and eight enlisted men. The senior officer is the chemical staff officer for the service center. He will prepare the chemical annex to the service group administrative order. This annex will contain the plan for the supply of chemical matériel, including ammu-

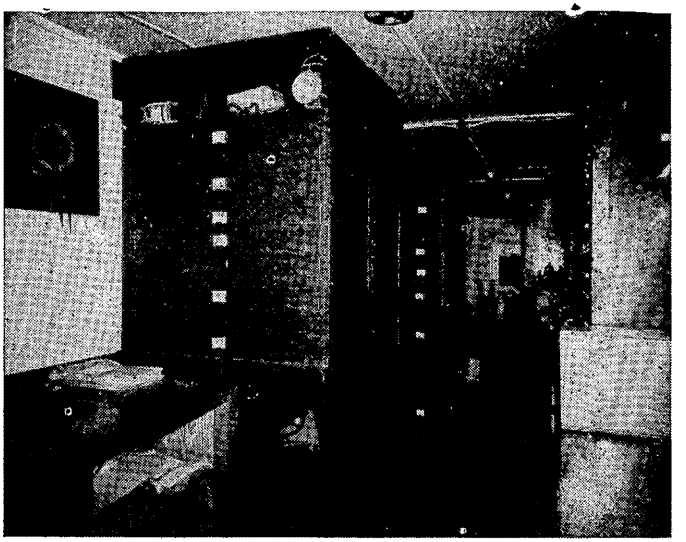


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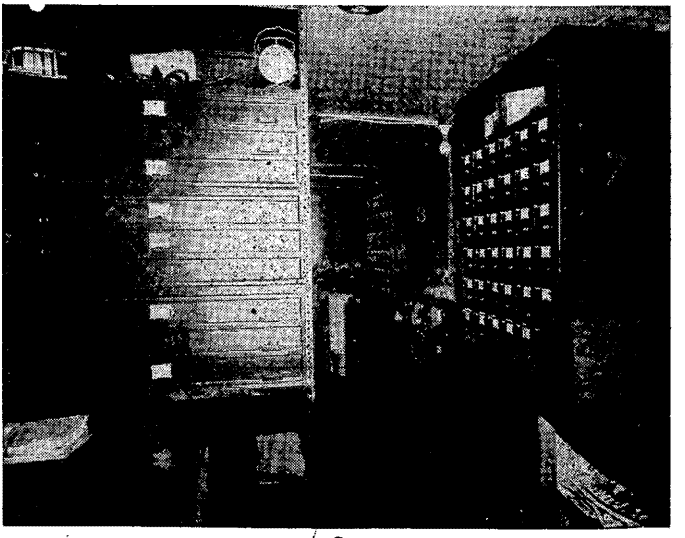


②

FIGURE 12.—Interior of Table 1 supply trailer.



①



②

FIGURE 13.—Interior of toolroom trailer.

Work bench and issue counter to be made of wood and to be constructed locally.

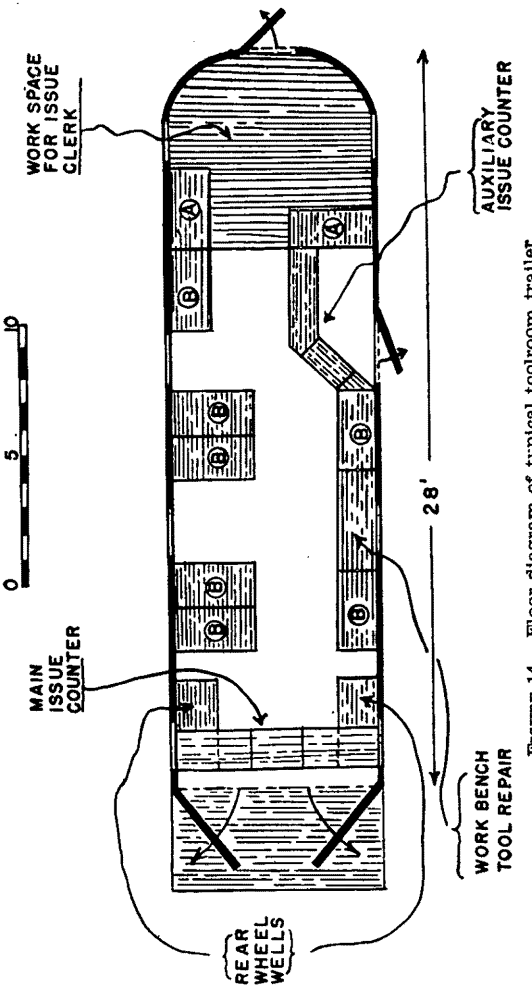



FIGURE 14.—Floor diagram of typical toolroom trailer.

nition, to the dispersed squadrons in the service center area. When chemical operations peculiar to a definite type of aviation are contemplated, the necessary additional Chemical Warfare Service personnel is supplied to the service center through the attachment of the proper number of chemical companies, air operations.

*b. Functions normal to all types of aviation.*—(1) There are certain chemical warfare requirements that are common to all types of aviation and to all organizations of the arms and services with the Army Air Forces. These requirements include—

(*a*) Instruction in the standard methods of defense against chemical attack, including decontamination operations following such an attack.

(*b*) Issue of authorized protective equipment and decontamination supplies.

(*c*) Actual decontamination of equipment and areas after a chemical attack.

(2) The chemical section in the headquarters of the service group provides sufficient personnel to conduct the necessary instruction of unit gas officers and gas noncommissioned officers for the organizations served by the service group. Instruction of unit gas officers and gas noncommissioned officers in the theater of operations should be necessary only in those cases where loss or filler replacements for these positions have not been properly trained prior to arrival at the front, when new developments in friendly or enemy chemical methods render additional instruction advisable, or when refresher courses for the purpose of maintaining unit gas personnel in a high state of training are indicated.

(3) Chemical equipment and supplies other than ammunition for organizations served by the service center are received, stored, and issued by Army Air Forces personnel of the service squadron of the service group. The chemical warfare officers and enlisted men of the staff section render such assistance in this connection as may be necessary but are not assigned exclusively to supply duties.

(4) The decontamination of equipment and areas is carried out by the personnel of the organization concerned under the supervision of the unit gas officer and with the

assistance of the unit gas noncommissioned officers of that organization. The number of men required to decontaminate successfully an area of any appreciable size is such that the provision of special Chemical Warfare Service personnel for this purpose would result in an organization that would be both unwieldly and undesirable. The chemical section of the service group is available to render supervisory assistance in decontaminating operations when needed.

*c. Functions peculiar to certain types of aviation.*—When a service center is serving one or more bombardment groups, it may be called upon to furnish chemical ammunition in the form of incendiary bombs or bulk chemical agents for use from spray tanks, or both. The supply of incendiary bombs and bulk chemical agents are as follows:

(1) *Incendiaries.*—Incendiaries required by combat squadrons are shipped from the chemical depot to the service center where they are received by personnel of the ordnance company air base assigned to the service center and are stored in the ammunition area as are other bombs. These munitions are transported to the ammunition area of the using squadron by quartermaster transportation and are there turned over to the personnel of the combat squadron for storage and use.

(2) *Bulk chemicals.*—When decision has been made to use chemical spray, one chemical company, air operations, is attached to the service center for each bombardment group that will be required to fly chemical munitions.

■ 65. CHEMICAL COMPANY, AIR OPERATIONS.—*a. Organization and functions.*—The chemical company, air operations, is a specialized organization designed to provide the necessary service in connection with delivery of filled chemical tanks to the combat squadrons of one bombardment group and, with the removal from the airdrome, maintenance and refilling of such tanks as may be brought back by returning airplanes. It consists of a company headquarters containing the usual overhead, including a mess, one refilling-point section designed to operate the company refilling point or toxic gas yard from which bulk chemicals are delivered by quartermaster transportation to the chemical service point

in the vicinity of the using airdrome, and four platoons each of which is organized and equipped to set up and operate a chemical distributing point in the vicinity of a combat squadron. The company has four officers, each of whom commands a platoon when all platoons are actively engaged in filling operations.

*b. Employment.*—Chemical companies, air operations, are provided on the basis of one company per bombardment group. These companies are normally held as units under the control of the air service commander and are not attached to service groups (except for purposes of training) until chemical operations are about to be initiated. This procedure permits the companies to continue unit training until just prior to actual operations, provides for the maximum flexibility in their employment, and aids in keeping personnel of forward airdromes to a minimum.

## SECTION IV

## CORPS OF ENGINEERS

■ 66. TABLE OF BASIC ALLOWANCES EQUIPMENT.—*a.* Engineer Table of Basic Allowances equipment and supply is handled by the service center air force technical supply section. It is handled exactly like technical supply except that the section obtains this type equipment from the engineer section instead of the air section of the air force general depot. The bulk of this equipment is very small; a 6-month supply for an average air force could be contained in a room 10 by 10 by 10 feet.

*b.* All other engineer supply, including camouflage, fortification, and construction materials, and landing field steel mats, is handled by the engineer depot direct or by refilling-point sections set-up of engineer troops under the air force service commander.

■ 67. ENGINEER BATTALION AVIATION.—Such battalions are likely to be more or less permanently attached to the service center or located in the area served by the service center.

*a. Function.*—Aviation engineer units are especially organized, trained, and equipped to meet the needs of the Army Air Forces for engineer work in a theater of operation. They are

assigned to air forces and air task forces as required. Aviation engineers have the general engineer mission of facilitating the advance of friendly forces and hindering that of the enemy. This is accomplished usually by engineer construction and at times by taking part in combat. For the Army Air Forces, the most important tasks are to construct advanced airdromes rapidly, to camouflage these airdromes, to maintain them under enemy bombing, and to assist in their defense.

*b. Organization.*—Aviation engineer battalions, both separate and in the regiment, consist of a battalion headquarters company and three lettered companies (see figs. 15, 16, and 17).

*c. Equipment.*—(1) The equipment of aviation engineer battalions has been designed with the special objective of airdrome construction and includes a number of items of heavy equipment, such as carry-all scrapers, large Diesel tractors, sheep's-foot rollers, rubber-tired rollers, emulsion distributors, and soil stabilization machinery not organically assigned to other engineer units.

(2) Aviation engineer battalions are equipped and trained with the rifle and antiaircraft machine gun, calibers both .30 and .50. Their equipment includes a number of half-track vehicles and the 37-mm gun. They are fully motorized. With this fire power and mobility, these units can participate effectively in the defense of an airdrome against air or ground attack.

(3) Tools and transportation are the primary items of equipment of engineer troops. As a general rule, tools and machinery issued are standard commercial items. Labor saving machinery and mechanical devices form part of the equipment to as great an extent as practicable, consistent with mobility. As a general rule, the heavier and more technical equipment in each unit is retained in the headquarters unit either for performance of highly technical work that forms a small but important part of the engineer mission or for assignment to subordinate units for reinforcing the unit's ability to perform engineer work.

(4) All engineer transportation is motorized. It consists principally of command cars, pick-up trucks, and ¼-ton,

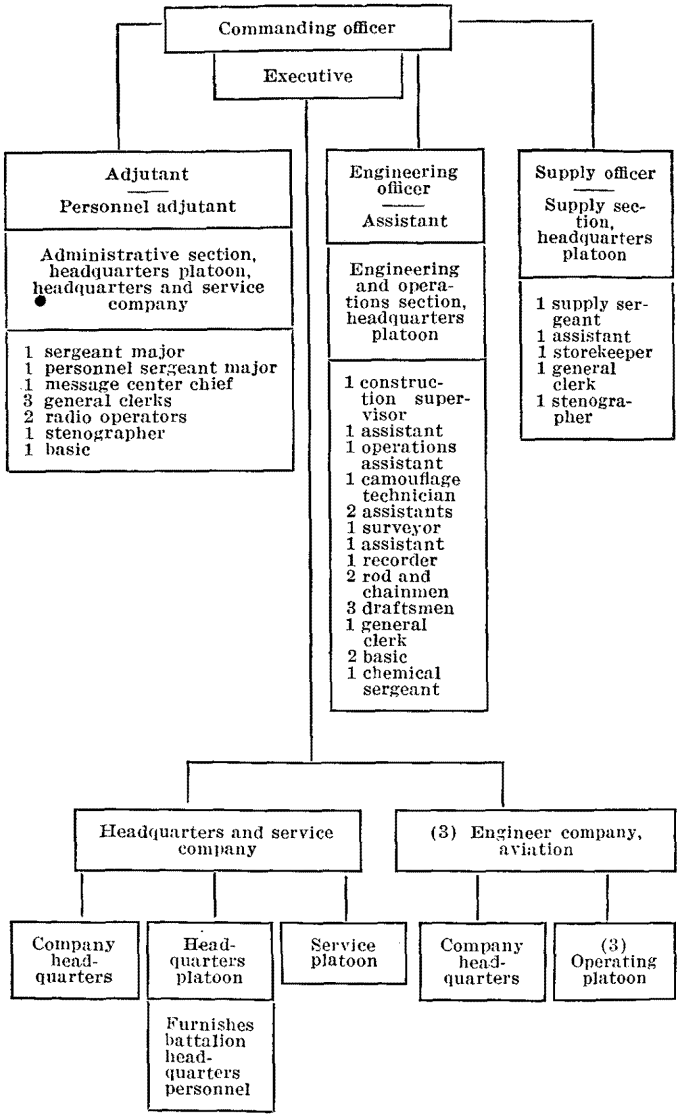



FIGURE 15.—Organization of engineer battalion, aviation.

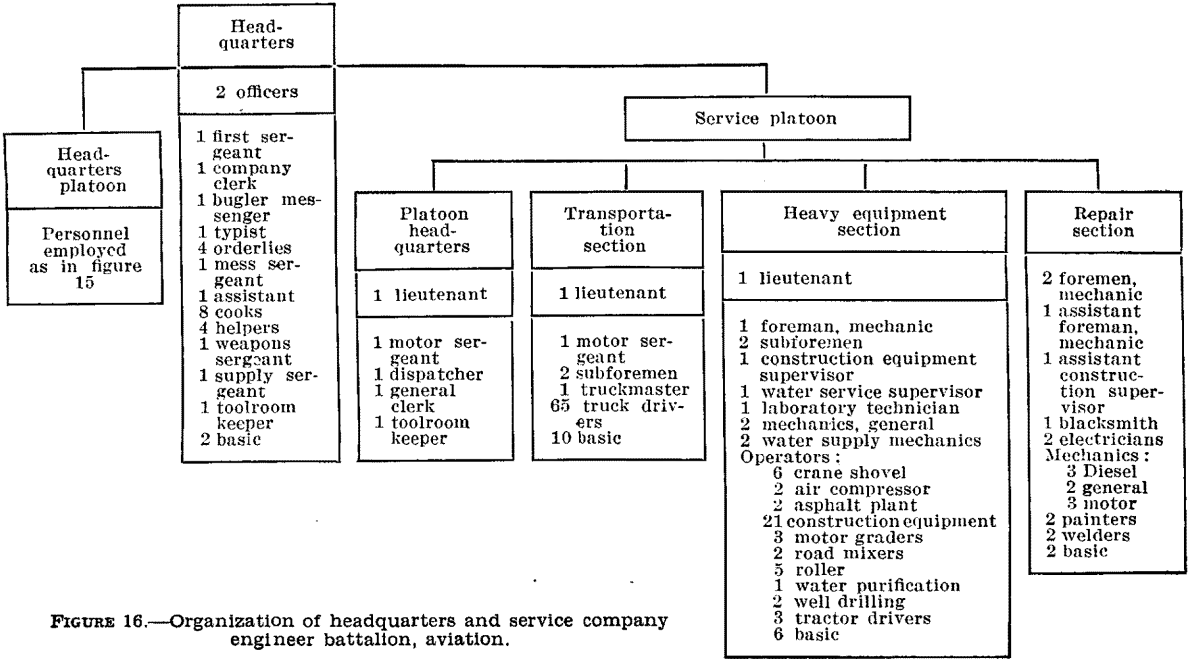



FIGURE 16.—Organization of headquarters and service company engineer battalion, aviation.

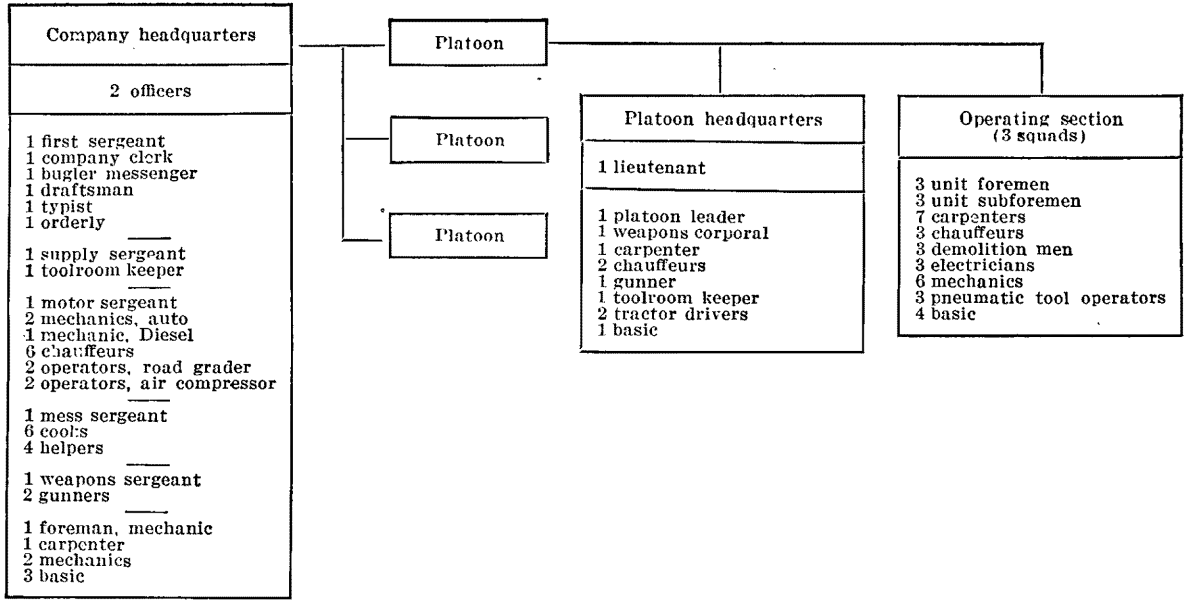



FIGURE 17.—Organization of engineer company, aviation.

4 x 4 vehicles (jeeps) for reconnaissance and inspections; light trailers for tools, equipment, and supplies; light dump trucks for hauling materials, supplies, and personnel; heavy cargo trucks and trailers for carrying heavy equipment and machinery; and half-track armored vehicles.

## SECTION V

## MOTOR VEHICLE AND ORDNANCE SECTIONS

■ 68. ORDNANCE SERVICES IN SERVICE CENTER AREA.—The Ordnance Department is responsible in a service center area for third echelon motor vehicular maintenance and supply for all air force units and installations. It is likewise responsible for third echelon maintenance and supply of armament and third echelon supply of ammunition. The responsibility for motor vehicle maintenance is assigned to two ordnance companies, medium maintenance (Q) (aviation). The armament and ammunition functions are performed by an ordnance company, aviation (service group), formerly designated as ordnance company, air base.

■ 69. SERVICE CENTER ORDNANCE OFFICE.—Ordnance services in a service center area are under the general supervision of an ordnance officer. An ordnance section of two officers and five enlisted men is provided in the service group headquarters squadron. The ordnance officer is on the special staff of the service center commander. In that capacity he advises the commander on all matters concerning the quantity and condition of all service center transportation and of all other ordnance equipment. The ordnance officer advises the commander of the service center concerning stock levels of ammunition. He makes recommendations to the commanding officer on all matters pertaining to ordnance. He coordinates the activities of the ordnance sections with those of other sections of the service center and with the combat squadrons and air force ordnance depots. He is particularly concerned with ordnance relations with the air force technical supply section which receives all orders from the using organizations, with the quartermaster transportation pool which transports all ordnance equipment and supplies from the service center to the squadron airdromes, and with the chem-

ical section in connection with handling of incendiaries by the ordnance sections.

■ 70 MOTOR VEHICLE MAINTENANCE SECTION.—Motor vehicle maintenance and supplies for all types and classes of motor vehicles in the service center area are furnished by the service center motor vehicle maintenance section.

*a. Organization and personnel.*—The motor vehicle maintenance section is formed by pooling the personnel of the two ordnance (formerly designated quartermaster) companies, medium maintenance (aviation) (Q), that are assigned to the service group. The senior company commander is service center motor vehicle maintenance officer and is officer in charge of the section; the junior acts as his assistant. Similarly, the senior officer or chief of a section in each company acts as head of the corresponding section in the motor vehicle maintenance section, and the junior acts as his assistant. Each medium maintenance company (2 officers and 46 enlisted men) is organized as shown in figure 18.

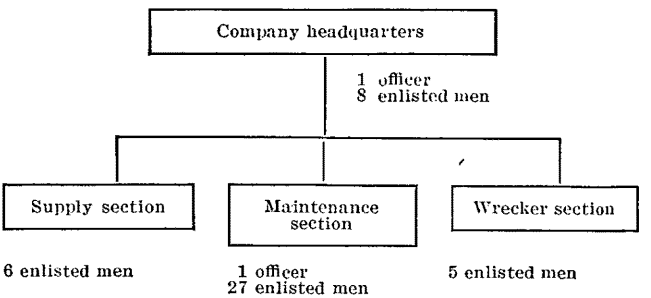



FIGURE 18.—Organization of medium maintenance company.

*b. Company headquarters.*—The headquarters of each company furnishes personnel for usual company overhead and furnishes the officer in charge or assistant and the section foreman or assistant to the motor vehicle maintenance section. Each company is so small that its mess facilities will normally be pooled with those of the other medium maintenance company and, when local conditions make it advisable, with the ordnance company, service group.

*c. Functions.*—The motor vehicle maintenance section provides third echelon motor vehicle supply, maintenance, and salvage for the service center area. It may, for convenience, be located near the quartermaster motor transport pool, which will often prove its largest single customer. However, except as priorities may be set up by the service center commander or higher authority, no preference will be given any one organization or installation over another. The extent of third echelon maintenance varies with respect to motor vehicles as it does for all other equipment, depending in a like manner on the proficiency, training, numbers, and morale of the technicians and on the repair equipment and stockage available. Generally, the motor vehicle maintenance section can rebuild bodies and do very extensive engine repair and chassis work on a thousand vehicles of all types, even under extensive combat conditions. Normally, there are about 900 air force vehicles in a service center area.

*d. Supply unit.*—The supply unit is made up of the two six-man supply sections of the medium maintenance companies. It furnishes a supply service of spare parts, repair equipment, and stock in the same way the other service center supply sections do.

*e. Maintenance unit.*—This unit is a pool of the two company maintenance sections of an officer and 27 enlisted men each. It does the motor vehicle repair work which requires machine tools. It does most of its work at the service center but is equipped with two mobile elements of 2½-ton trucks, one for supply and the other for repair equipment. The mobile repair elements do third echelon repair at the scene of the accident or at the squadron airdrome.

*f. Wrecker unit.*—Each company wrecker section provides this unit with five enlisted men, a 4-ton wrecker, and a 2½-ton wrecker. The wrecker unit brings to the motor vehicle maintenance section any motor vehicles needing repair when the vehicles are not capable of traveling under their own power. The unit also collects all wrecked, abandoned, or otherwise unserviceable vehicles and strips them of usable parts; and the air force motor vehicle depot is informed by the motor vehicle maintenance officer of the presence of the residue.

■ 71. ORDNANCE MAINTENANCE AND GENERAL SUPPLY SECTION.—*a. Ammunition requirements.*—As successful air warfare is offensive, it is necessary to keep available to each bomber squadron such bombs as it may require. It is necessary also that the bomb dumps be located at such distance from the airdrome that detonation of the bombs will destroy no airplane or pilot. The task of keeping each bomber armed with any type bomb which the tactical situation requires, involves storage and transport of tons of bombs for each squadron each day. It may be that to insure the bomber's operational efficiency it must have immediately available a choice of 100-, 300-, 500-, 1,000-, and 2,000-pound bombs at least and at least five sizes and types. The sizes run up to 4,000 pounds at present and down to 20-pound fragmentation bombs; and the types also include demolition, gas, smoke, armor-piercing, depth, and general-purpose aerial mines and aerial torpedoes. In some combat situations, airplanes will fly three, four, or six missions per day, depending upon the availability of airplanes and pilots.

*b. Reserves.*—For the reason given in paragraph *a* above, it will often be necessary to keep two missions of each of five types of bombs, or of any special type that is required, at the squadron airdrome's ammunition area. The service center will generally be about 4 hours' truck distance from each squadron airdrome. It is necessary to keep at the service center one mission of each type of bomb likely to be used by any of the squadrons in the area. The air force ordnance depot also keeps at least one mission of all types of bombs on hand for all combat groups in the air force area, one mission of each of the five weights of bombs previously mentioned, and one mission of other ammunition; the necessary signal flares will amount to approximately 245 tons, or 100 2½-ton quartermaster truckloads or 12 freight-car loads. To keep on hand one such mission for each of eight squadrons would require a 2,000-ton supply, or 800 2½-ton truckloads or 96 freight-car loads. Safe storage space of 300 acres located 1 to 3 miles from the service center will be required.

*c. Functions.*—(1) From the point of view of daily labor and transportation load, eight squadrons, each of which has performed one mission the preceding day, will have expended

an average of 8,000 pounds of bombs per airplane. One hundred ninety-two 2½-ton trucks are required to move such a load. A similar quantity must arrive each day from the air force ordnance depot. Many men and much equipment are necessary to handle the 300-acre ammunition area and to unload 245 tons of bombs from railroad cars and load them onto trucks.

(2) In addition to handling these vast quantities of bombs, the service center ordnance section supplies all ammunition to air force units in the service center area and maintains third echelon ordnance repair shops.

*d. Organization.*—The functions described are performed by an ordnance company, aviation (service center), with the aid of unskilled labor supplied by the service center. The company is organized as follows:

| | *Officers* | *Enlisted men* |
|---|---|---|
| Company headquarters | 1 | 8 |
| Maintenance and general supply section | 1 | 18 |
| Ammunition section | 1 | 28 |

*e. Company headquarters.*—(1) The headquarters performs the usual company administrative functions. It supervises and coordinates the work of the company's two sections. It learns expected ordnance requirements from the service center ordnance officer and causes the company to fill them.

(2) The headquarters personnel consists of—

Commanding officer.
First sergeant.
Mess and supply sergeant.
Company clerk.
Chauffeur.
2 cooks.
Cook's helper.

(3) Equipment for company headquarters consists of—

1 five-passenger sedan.
4 pistols.
10 rifles.

■ 72. MAINTENANCE AND GENERAL SUPPLY SECTION.—*a. Organization.*—The personnel of the maintenance and general supply section is shown in figure 19.

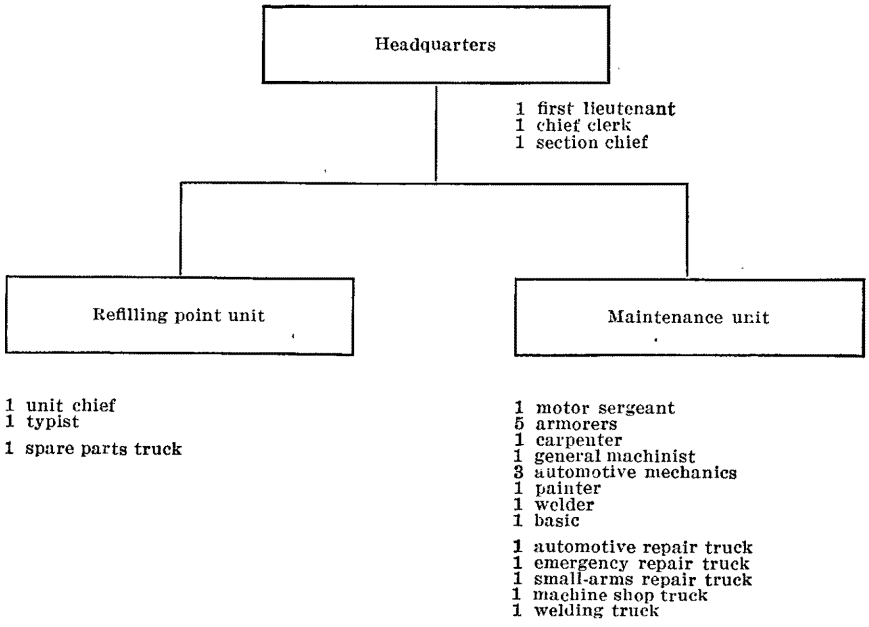



FIGURE 19.—Organization of maintenance and general supply section.

*b. Supply.*—(1) The refilling-point unit is usually located with or near the maintenance unit and the section headquarters, and their services are coordinated. The ordnance general supply functions for the service center ordnance section are performed by the refilling-point unit. It receives, stores, and issues such supplies and maintains records of status and issue of such supplies.

(2) The combat squadron ordnance section has spare parts and equipment for the particular type aircraft in the squadron, a combination of the old squadron 72-hour kit and the 10-day ordnance DP kit. The service center maintains a small supply of parts and equipment for all types of airborne armament.

*c. Maintenance.*—(1) *Echelons of ordnance maintenance.*—(*a*) First echelon, by the gunner or combat crew, consists of no more than cleaning, making minor adjustments, and keeping guns in operating condition.

(*b*) Second echelon maintenance, by the squadron ordnance section, consists of making minor replacements (including barrels) and making more accurate tests and adjustments than are possible in first echelon. The squadron ordnance section is equipped with several gages and by their use can make precision tests and adjustments that the gunner must make by "feel." For example, the gunner can judge fairly accurately by eye and by touch the head space of a gun, but the gage accurately measures it. Similarly, gages measure the depth and height of a T-slot, length of firing pin, forward erosion in the shoulder of the chamber, and adjustment of the bolt lock cam. The squadron ordnance section also can adjust the cyclic rate on flexible guns.

(*c*) Third echelon maintenance at the service center includes all items of second echelon maintenance performed with a higher degree of accuracy. The service center ordnance machine shop can fabricate almost any spare part if stock is available.

(2) *Maintenance at service center.*—The maintenance unit maintains aircraft machine guns and all weapons of the ordnance company, air force units, and special troops and also repairs ordnance automotive equipment. The unit has equipment to perform nearly all degrees of maintenance. Over-

loads will be passed back to the medium maintenance company which will be stationed at the air force ordnance depot.

(3) *Equipment.*—(*a*) The unit's equipment includes a spare parts truck which is the section refilling point. It carries hardware, parts, and material required for maintenance operation at the service center and for replenishments to ordnance sections of the combat squadrons. Often there will be an adjunct to this spare parts unit in a tent or equivalent shelter.

(*b*) The section has an emergency repair truck which carries a limited number of spare parts, small tools, and other equipment to damaged matériel at outlying airdromes. The tools are such as might be contained in a combination armorer's, automobile mechanic's, and carpenter's kit. There is also some welding equipment.

(*c*) There is a small-arms repair truck equipped with the necessary machine tools and sets of hand tools and gages for repair of all types of small-arms matériel. The truck is equipped to carry small quantities of spare parts. It has a portable electric generator, 1½-kilowatt, a-c.

(*d*) The machine-shop truck is a general-purpose machine shop. It is equipped with a drill press, portable drills, grinders, a lathe, a hydraulic ram, a shaper, and the necessary tools for the operation of these machines. The usual hand tools and measuring instruments used by first-class machinists are also included in the equipment. Electricity is furnished by a 5-kilowatt, a-c generator operated by a power take-off from the truck motor.

(*e*) The welding truck constitutes a complete welding unit. It is equipped with both electric and acetylene welding equipment, a portable grinder, a power hacksaw, and the necessary welding rods and tools used by first-class welders. Electricity is furnished by a 5-kilowatt, a-c generator operated by a power take-off from the truck motor.

■ 73. AMMUNITION SECTION.—*a.* The organization of the ammunition section is shown in figure 20.

*b.* The ammunition section is responsible for receipt, storage, issue, and maintenance of all ordnance ammunition. For air force units having no ordnance units, it delivers completely assembled bombs, pyrotechnics, and belted ammunition to combat airplanes. This delivery of ammunition to

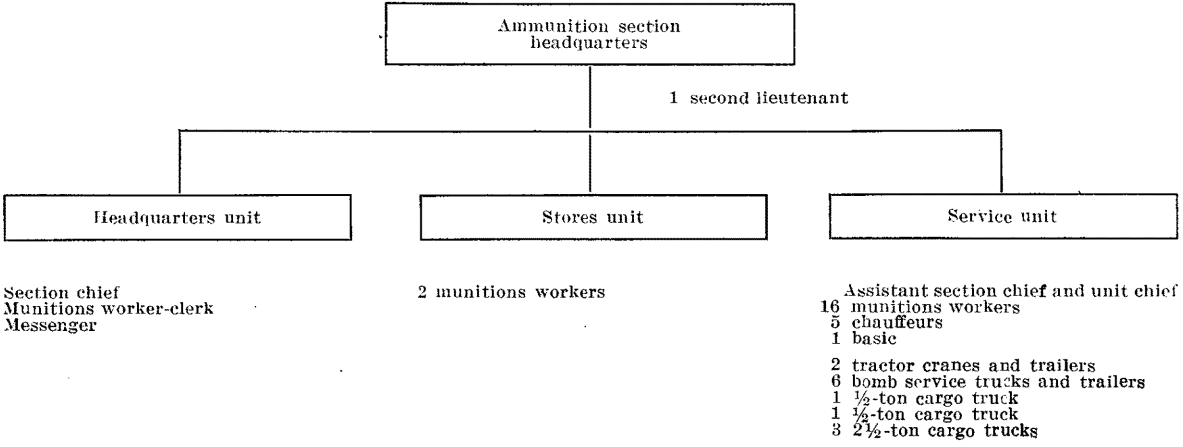



FIGURE 20.—Organization of ammunition section.

combat aircraft is first priority. Other activities of the section are carried on without interference with required deliveries to airplanes.

*c.* The ammunition section installs and maintains the service center refilling point for ammunition; this refilling point contains reserve stocks for prompt replenishing of airdrome distributing points and it contains stocks for immediate delivery to combat airplanes at the service center airdrome. The ammunition section receives and stores ammunition; it unloads railroad cars and trucks, removes crates or shipping bands, inspects each item, makes necessary repairs, and installs equipment. It calls on the service center labor pool for whatever additional labor is necessary. Quartermaster truck companies transport ammunition from the refilling point to the squadron airdrome dumps.

## SECTION VI

## QUARTERMASTER SUPPLY SECTION

■ 74. ORGANIZATION AND FUNCTIONS.—This section is operated by quartermaster company, service group (aviation). Its organization is shown in figure 21.

*a. Supply platoon.*—The quartermaster supply section procures, stores, and distributes all quartermaster supplies for the air force units and establishments in the service center area. Class I and class III supplies are handled in a separate manner from other quartermaster supplies because of their weight, bulk, and comparative uniformity of expenditure. Supplies other than class I and III consist mainly of clothing and personal equipment and organizational equipment such as tentage, fire extinguishers, tools, buckets, and stoves. This and other supply sections operate exactly like the aircraft supply section except the distribution of all other supply sections is controlled by the air force technical supply section shipping room. Maintenance and repair of quartermaster equipment is confined to collecting and sorting materials for salvage and to shipping it back to the quartermaster depot concerned.

*b. Class I supply platoon.*—Rations and other class I supplies are handled through a separate unit. If the situation

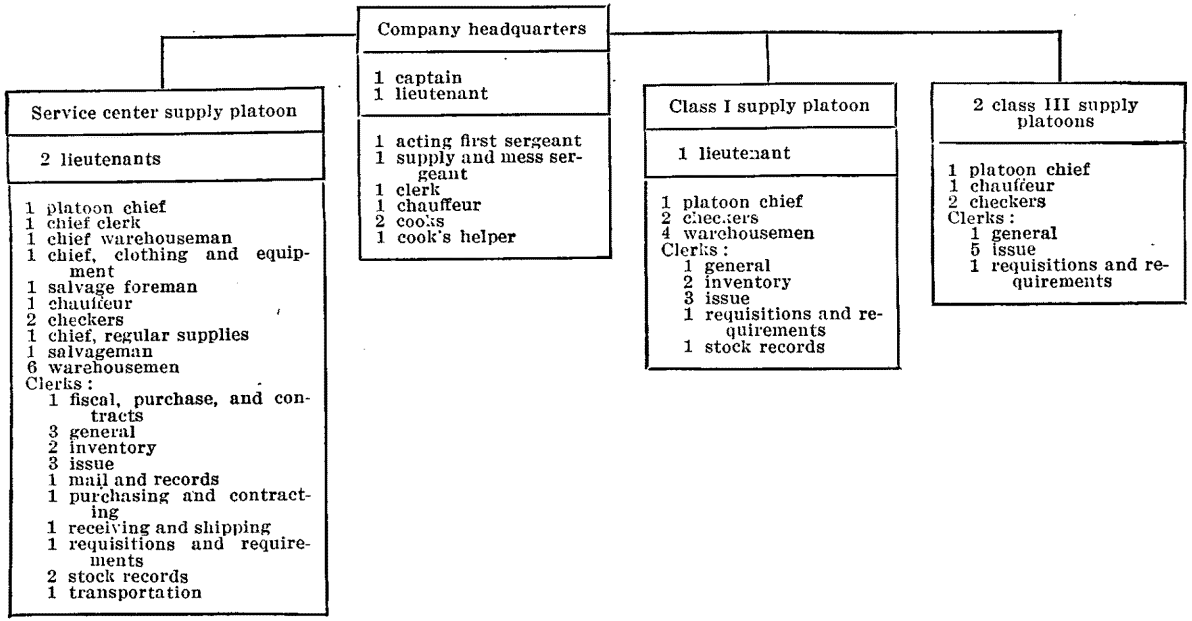



FIGURE 21.—Organization of quartermaster company, service group.

arises, an additional section can be set up from the quartermaster supply platoon personnel. The class I supply platoon operates a refilling point conveniently located to the source of incoming supplies and to the air force unit to be served. Were the ideal situation to arise, railroad transportation would run direct to the squadron airdromes. In such a case, there might be two or even three class I refilling-point sections to sort and distribute shipments from the depot. The most typical situation is one of scarcity of railroads, such that delivery will require long motor transportation hauls. In this case, there will likely be one refilling-point section located near the service center, which distributes class I supplies to the combat squadron airdromes by service center motor transport. There is no hard and fast rule, but the quartermaster supply section is so organized that it is capable of meeting any field situation. Transportation of any kind will be at a premium; rations alone will total ¾ ton a day for each combat squadron airdrome and the method must be chosen which will cut to the minimum the motor transport daily total of ton-miles.

*c. Class III supply platoons.*—(1) The class III supply platoons are governed by the same considerations as to location and operation that were mentioned for class I. There are some 800 motor vehicles, a large number of which are 2½-ton trucks, operated in the area each day. The average daily consumption of quartermaster gasoline varies with the situation, but it may exceed an estimated maximum of 80 tons. For this reason, it is essential that gasoline stations be set up at convenient locations.

(2) A great many records must be kept by this and other supply sections. They are essential not only to insuring adequate supply for the day, but they also make possible planning for the future. Where each gallon of gasoline may have to travel over 10,000 hazardous miles to the using unit, it is highly necessary that planning for future needs be effective.

*d. Unit administration.*—This quartermaster company, service group (aviation), together with the truck companies, is under the command of the service center staff quartermaster as he is the highest ranking quartermaster officer present. Each company will have its own orderly tent and

unit administration, but the quartermaster company, service group, will normally pool its mess personnel and equipment with that of a truck company. The truck companies will each operate its own mess to provide the same mobility for the company mess as the situation may require for the company itself.

## SECTION VII

## SIGNAL SUPPLY AND MAINTENANCE SECTION

■ 75. FUNCTIONS.—This section is responsible for procuring, storing, distributing, and maintaining third echelon signal equipment for all air force units in the service center area. It is part of the signal company, service group (see fig. 5).

■ 76. ORGANIZATION.—Organization of the signal supply and maintenance section is shown in figure 22.

■ 77. STORAGE AND ISSUE SECTION.—*a.* A typical storage and issue section consists of—

1 warrant officer (platoon and section commander).
1 warehouse foreman.
1 assistant.
2 general clerks.
2 stock records clerks.
1 checker, receiving and shipping.
1 construction carpenter.

*b.* The section handles requisitioning, storing, and issue of signal equipment in the same manner the supply section does, although it depends upon that section for shipping and distribution.

■ 78. RADIO REPAIR SECTION.—*a.* A typical radio repair section consists of—

4 radar electricians.
4 radio repairmen.

*b.* First echelon maintenance performed by the operator consists, with respect to radio, of watching for shorts, changing tubes, and checking connections. Second echelon, performed at the combat squadron, amounts only to the making of very small repairs by the use of hand tools, that is, the

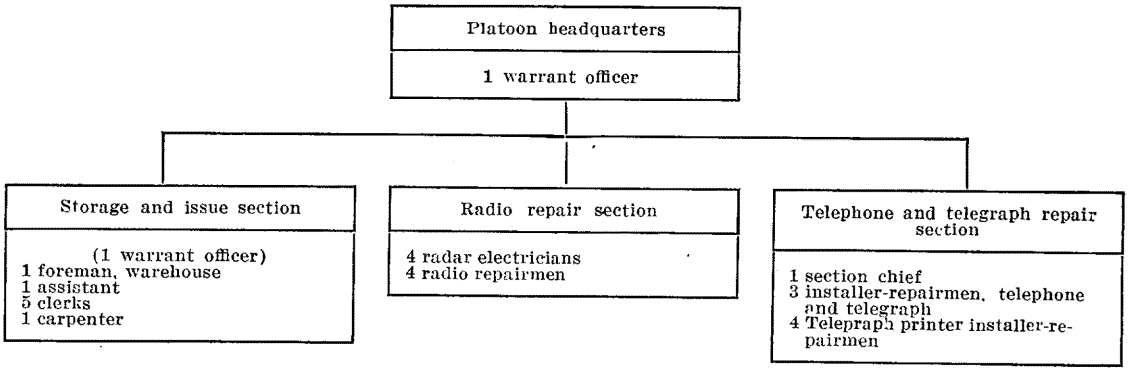



FIGURE 22.—Organization of signal supply and maintenance section.

replacing of a burned resistor, etc. Third echelon maintenance by the radio repair section consists of making unit replacements of receivers, transmitters, and other radio parts; repair work on condensers and transformers; and general testing, adjusting, and tuning. Radar maintenance is of the same order.

*c.* The section's equipment consists of an RC–68 and an RC–70 radar test equipment set containing a very large number of tools and extra-sensitive voltmeters and ammeters and a TE–52 and a TE–53 radar tool set. Its radio equipment includes TE–41, 45, 46, and 48 sets. Each radio repairman has the GE–48. The section also has an ME–9 set of general radio maintenance supplies.

■ 79. TELEPHONE AND TELEGRAPH REPAIR SECTION.—*a.* A typical telephone and telegraph repair section consists of—

1 chief telephone electrician.
3 telephone and telegraph installer-repairmen.
4 telegraph printer installer-repairmen (who are also operators).

*b.* The section is equipped with teletype and telephone repairmen's kits. Its third echelon maintenance of switchboards and teletype printers consists of inspection, testing, and replacing of almost any worn parts, such as type bars, clutches, fiber gears, and motors.

*c.* Its equipment consists of—

TE–44 tool equipment for work on central office telephone and telegraph control office sets.
TE–47 set of many tools for all types of telephone and telegraph repair.
TE–49 tool equipment carried by telephone repairman.
TE–50 tool teletype repairman's kit.
ME–7 teletype maintenance supplies.

## SECTION VIII

## MEDICAL SERVICES

■ 80. FUNCTIONS.—The primary function of the medical service is to conserve the fighting strength of the command. In a theater of operations no two stations will present the same

problems. Group surgeons must use all their ingenuity to adapt their medical service to the situation and will not hesitate to depart from existing customs and routines in order to accomplish their mission. The group surgeon operating under S–4 will advise the commanding officer on all matters regarding the sanitation and health of the command, care of sick and wounded, hospitalization, evacuation, and medical supply.

■ 81. OPERATIONS.—*a. General.*—(1) The medical section of the headquarters squadron and two service squadrons are made up of six officers and 35 enlisted men. These medical troops are pooled and organized to operate a group surgeon's office, a dispensary, and a medical supply section; also various aid stations, if necessary.

(2) The group surgeon's office, under the group surgeon, will plan and perform staff functions. It will make sanitation surveys, health surveys, medical estimates of the situation, medical plans for defense against air attack, and medical plans for defense against chemical attack and treatment of chemical casualties, and will supervise medical supply which will be performed by the medical supply section. The group surgeon, assisted by his office, is also responsible for providing plans for hospitalization and evacuation and for technical supervision of the service group dispensary.

*b. Sanitation.*—(1) In many theaters of operations, sanitation will be the biggest problem confronting the group surgeon. The efficiency of the service center may be more handicapped by illness and disease of its personnel than by any other factor. For this reason, the group surgeon must advise the commanding officer on sanitary features in the location of the service center. The sanitary features in some cases may even overshadow the tactical considerations in choosing the location for the service center. Each location presents a special study in itself and no hard and fast rules can be laid down.

(2) After the service center has been established, the group surgeon and his office must continually strive to improve its sanitation. When the immediate needs of medical facilities have been taken care of, medical personnel should be used in collaboration with personnel of the unit to be served in build-

ing sanitary facilities. The custom of limiting the use of personnel to duties corresponding to their ratings is contrary to the interest of economy and Army Air Forces policy. The fact that a man has a surgical technician's or chauffeur's rating is no reason he should not perform other duties needed to accomplish the medical mission.

*c. Health measures.*—Pertinent Army Regulations will be used as a guide in the control of communicable diseases which must be a never-ending task for the medical service. Special nutritional studies and consequent recommendations must often be made.

*d. Medical estimates of the situation.*—The group surgeon must prepare the medical plans to be carried out in case of air or ground attack. He must determine suitable locations for casualty collecting points and routes for evacuation in case of attack. Rehearsals of medical plans against air or ground attack must be carried out in detail. Medical plans for local care of wounded will be incorporated in the plan of air and ground defense published for the service group. Dispersion and concealment of medical personnel and supplies against air and ground attack must be a prime consideration.

*e. Chemical attack.*—In collaboration with the chemical section, the group surgeon's office will coordinate plans for treatment of chemical casualties. This will include a gas-proof decontamination and treatment station. Coordination with the quartermaster section will provide for the issuance of new clothing.

*f. Medical supply.*—A medical supply section consisting of a medical administrative officer and six enlisted men is provided in the medical section of the headquarters squadron. This supply section may be augmented by a medical supply platoon, if necessary. The medical supply section, working in collaboration with the air force technical supply and the quartermaster supply sections, will provide for distribution of medical supplies to air force units in the local service center area in the same manner in which other class II and class IV supplies are distributed. The section is provided with an MS–9 maintenance unit: a 10,000-man, 30-day kit of expendable medical supplies. These supplies are principally medicines.

*g. Hospitalization.*—The responsibility for hospitalization in the theater of operations is charged to the commanding general. The group surgeon will ascertain what hospital facilities are available to the service center and will make arrangements for their use.

*h. Evacuation.*—All evacuation of personnel in the theater of operations, except air evacuation, is the responsibility of Services of Supply. The group surgeon will fit the evacuation system from the service center area into the system set up for the theater.

*i. Air evacuation.*—Liaison and transport airplanes will be used when available to evacuate seriously sick or injured personnel to the nearest hospital. Although the air evacuation group provides large-scale evacuation of wounded, it is not an element of every air task force.

*j. Service group dispensary.*—The dispensary draws its personnel from the group medical sections (see par. 82). It has equipment with which to operate a 12-bed dispensary and by use of additional shelter can expand to a 50-bed capacity. Conservation of fighting strength as weighed against all other military considerations will determine the type of case to be treated in the dispensary. In exceptional cases, or in the case of a geographically isolated service group, a surgical team and equipment may be added to provide a small field hospital. Normally, only minor illnesses and injuries will be cared for in the service center dispensary.

■ 82. PERSONNEL AND EQUIPMENT.—*a. Personnel.*

| | Headquarters squadron | First service squadron | Second service squadron |
|---|---|---|---|
| Squadron surgeon | 1 | 1 | 1 |
| Chief clerk | 1 | | |
| Section leader | 1 | 1 | 1 |
| Section leader, dental | 1 | 1 | 1 |
| Medical technicians | 2 | 2 | 2 |
| Surgical technicians | 1 | 2 | 2 |
| Dental technicians | 1 | | |
| First-aid men | 2 | | |
| Chauffeurs | 2 | 2 | 2 |

*b. Equipment.*—In addition to the supply carried by the medical supply section, the medical sections are provided with some 1,600 pounds (80 cubic feet) of medical supplies and equipment, including an X-ray machine. Other medical equipment is contained in the medical, surgical, and dental officers' and technicians' individual kits.

## SECTION IX

## MOTOR TRANSPORT POOL

■ 83. GENERAL.—The motor transport pool is a vital installation. In many oversea situations there will be little rail communication and there may be very poor waterway connections for available shipping. The size of the section depends upon the activity in the area, the availability of rail and other facilities, the distances between the service center and the combat squadron airdromes, the distances between the refilling points and the airdromes, and the type and number of roads available. Generally, the distances will not exceed 4 hours by truck.

■ 84. ORGANIZATION.—*a. General.*—Available to the service center commander normally will be two quartermaster truck companies and the transportation sections of each of the two service squadrons and of the headquarters squadron. Some or all of these units may be pooled, either physically or for control purposes. The extent to which any two or more of the above organizations are pooled is a question for the service center commanding officer. Factors affecting his decision are the kind of motor transport service required at the time and likely to be required in the future, the location of the units to be served, the lay-out of other organizations and installations at the service center, and the terrain available to the motor transport units.

*b. Typical organization.*—A common method of employing motor transport consists of giving the quartermaster truck companies one set of transport missions and the service group motor transport sections a different set. Typical jobs assigned the quartermaster transportation are the daily run to all squadron airdromes (for delivery of rations and other supplies the need for which was manifested on the daily tele-

gram of a few days before), hauling ammunition, and movement of advance sections and of ground echelons of combat squadrons. Typical details for the service group transportation are moving wrecked airplanes, spare parts, engines, and material for the service center and combat squadron engineering sections. Because of the difference in missions and because dispersion of trucks is necessary for security, it will often work to better advantage to have a quartermaster and an air force motor transportation pool physically separated from one another.

■ 85. PERSONNEL.—The pool may contain the following personnel:

| Arm or service | Unit | Officers | Enlisted men |
|---|---|---|---|
| Quartermaster | Truck company | 3 | 99 |
| | Company headquarters | (1) | (19) |
| | 2 platoons | (2) | (80) |
| | 2 platoon headquarters | (2) | (4) |
| | 4 transportation sections | | (76) |
| Quartermaster | Truck company | 3 | 99 |
| Army Air Forces | Headquarters squadron, transportation section. | 1 | 17 |
| | 2 service squadron transportation sections. | | 72 |
| Total | | 7 | 287 |

■ 86. MOTOR TRANSPORT VEHICLES.—A picture of transportation available to the pool is best portrayed by a typical consolidated motor transport report (fig. 23). Vehicles from any unit in the service center may be called into service in case of necessity. If an emergency required it, ordnance prime movers could be used to haul wrecked aircraft instead of service squadron motor transport; or Signal Corps trucks could be used for emergency hauls of rations or aircraft parts.

■ 87. OPERATION.—*a.* The quartermaster truck companies, as well as the quartermaster company, service group, are under supervision of the service center quartermaster. The service group headquarters squadron includes a quartermaster section composed of three officers and six enlisted men. This

quartermaster section operates the service center special staff quartermaster office. The officers are a quartermaster, an assistant, and a motor transportation officer. The enlisted men are clerical assistants. The officers advise the commanding officer of quartermaster matters, supervise the operation of quartermaster organizations, and coordinate their work with that of other organizations of the service center and with that of the air force depots.

*b.* The service center motor transport section carries all supply forward to the squadron airdromes from the service center and from refilling points. In many instances, the refilling point will be located at or near the service center. In highly favorable situations, one or more refilling points may be located fairly close to the combat squadron airdromes, depending upon the railroad net.

*c.* The motor transport section has the duty of moving the ground echelon of any tactical squadron from one airdrome to a newly assigned one, and such a movement would require at least the transportation of one truck company. The section is responsible for furnishing all motor transport for the service center and for deliveries of all supplies and equipment up to the squadron airdromes. In event the service center itself is moved, this section moves it, augmented if possible by truck companies of the air force.

*d.* The use of motor transport varies greatly with the situation. The minimum daily calls would likely require eight large trucks to deliver rations, four to pick up food procured locally, and ten for work at or near the service center. The remainder of the trucks, even when there is no movement of a squadron taking place, will have plenty of work in transporting gasoline and ammunition. It is entirely possible that the section might be called upon to move 2,500 tons of bombs and other ammunition and 250 tons of aviation gasoline. In event an airdrome is being newly occupied by a heavy bombardment squadron, the ammunition load would be far greater because the section must place at a position available to the squadron two missions of each type of bomb likely to be needed.

*e.* When the service group is equipped with the prime mover and two 2,000- or 4,000-gallon refueling units, the air force

CONSOLIDATED MOTOR TRANSPORT

(T=total assigned. A=available)

July 1942

| | 2½-ton GMC | | 1-ton trailer | | ½-ton pick-up | | ¾-ton command car | | ¼-ton reconnaissance GP | | 5-passenger sedan | | 1½-ton light cargo | | ¾-ton carry-all | | Special service vehicles | | Grand total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T | A | T | A | T | A | T | A | T | A | T | A | T | A | T | A | T | A | T | A |
| Quartermaster company, truck | 51 | 47 | 42 | 41 | 3 | 0 | 1 | 0 | 4 | 0 | | | | | 1 | 0 | 3 | 0 | 105 | 88 |
| Quartermaster company, truck | 50 | 48 | 42 | 39 | 3 | 0 | 1 | 0 | 4 | 0 | | | | | 1 | 0 | 3 | 0 | 104 | 87 |
| Quartermaster company (M. M.) | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | 6 | 0 | 13 | 0 |
| Quartermaster company (M. M.) | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | 6 | 0 | 13 | 0 |
| Quartermaster company, service center | | | | | 1 | 0 | 3 | 0 | 1 | 0 | | | | | | | | | 5 | 0 |
| Ordnance company, aviation (A. B.) | 3 | 3 | | | | | | | 1 | 0 | 1 | 0 | 1 | 0 | | | 14 | 0 | 20 | 3 |
| Headquarters squadron | 2 | 2 | 3 | 2 | | | | | 5 | 0 | 1 | 1 | | | 1 | 0 | 4 | 0 | 16 | 5 |
| Service squadron | 7 | 3 | 5 | 2 | | | 1 | 1 | 20 | 6 | | | | | 1 | 0 | 19 | 0 | 53 | 12 |
| Service squadron | 7 | 3 | 5 | 1 | | | 1 | 0 | 20 | 9 | | | | | 1 | 1 | 19 | 0 | 53 | 14 |
| Total | 122 | 106 | 103 | 85 | 9 | 0 | 9 | 1 | 57 | 15 | 2 | 1 | 1 | 0 | 5 | 1 | 74 | 0 | 382 | 209 |

FIGURE 23.—Typical service center motor transport report.

pool will transport aviation gasoline to the combat squadrons, its drivers acting as checkers for the supply section. When gasoline must be delivered in 55-gallon drums, the quartermaster pool will normally effect delivery.

## SECTION X

## PHOTOGRAPHIC LABORATORY

■ 88. FUNCTIONS AND PERSONNEL.—This section of the headquarters squadron has a photographic officer, a section chief, and 11 other aircraft photographic technicians. With its developing and printing laboratory equipment, it provides photographic laboratory service for all air force units and establishments served by the service center, including all combat units which are not equipped with laboratory facilities. The technicians commonly employed are three in printing, two in developing, one in finishing, two in work with chemicals, and one as clerk.

## SECTION XI

## SERVICE CENTER SECURITY

■ 89. GENERAL.—Responsibility for security in any unit, including the service center, is on its commanding officer. In his organization there must be appointed a defense commander.

■ 90. DEFENSE COMMANDER.—The appointment of the commander is wholly within the discretion of the service center commanding officer. The job is sufficiently important that the officer should have no other duties. His responsibility is protection of the service center against ground attack whether in force, by infiltration of small units, or by saboteurs, and against air, parachute, and air-borne troop attacks.

■ 91. DEFENSE BY SERVICE GROUP UNITS.—The service center must be organized for all types of defense even if no auxiliary units are present and regardless of the aid of an aircraft warning net. A comprehensive plan must be made to include—

*a.* Reconnaissance of the local area.

*b.* Setting up of a guard of the whole service center with particular attention to vital communication, supply, maintenance, and operations installations.

*c.* Setting up of a local lookout service, regardless of the fact of an aircraft warning service, and making certain its communication facilities.

*d.* Setting up of a mobile striking force for use against the enemy at any point of attack.

*e.* Preparation of gun emplacements at key points and of slit trenches for personnel.

*f.* Assignment to specific personnel of the duty of unmounting any removable weapons from aircraft and of employing them.

*g.* Dispersion and camouflage of all installations and vehicles.

*h.* Coordination with defense activities of higher and lower echelons.

*i.* Communication under any conditions which may arise.

*j.* Training, with emphasis on the factors of—

(1) Vulnerability of parachutists in the air, on the ground before they get to their weapons, and before reserves are dropped to them.

(2) Probability of superiority in numbers and fire power of the enemy.

■ 92. DEFENSE BY AUXILIARY AIR FORCE UNITS.—One or more air force units, highly trained for security measures, may be present. Such units are—

| | *Officers* | *Enlisted men* |
|---|---|---|
| Engineer battalion, aviation | 30 | 775 |
| Air base security battalion | 18 | 422 |
| Military police company, aviation | 3 | 100 |

## APPENDIX I

## DEFINITIONS

*Air base.*—A permanent station of the Army Air Forces in the zone of the interior operating as a supply and service agency for units using it.

*Air depot.*—An agency for the procurement, storage, and distribution of supplies peculiar to the Army Air Forces. Under the air service command are several control depots located at key points in the zone of the interior, and hundreds of subdepots are located at or near each military airdrome in the United States. In the theater of operations there is at least one air depot for each air force.

*Air force.*—A task air force operating in one or more theaters of operations.

*Air force area.*—The entire territory occupied by units of an air force. It may extend from the zone of the interior to the combat zone and include portions of both.

*Air force depots.*—Agencies for the storage and distribution of supplies from all arms and services required by an air force in a theater of operations.

*Service center.*—An air force service installation capable of producing all kinds of supplies and third echelon maintenance for two combat groups. Generally there are two service centers for each air depot group.

*Service group.*—An Army Air Forces organization composed of a headquarters and headquarters squadron, two service squadrons, and attached organizations of arms and services other than Army Air Forces. It operates the service center.

*Army Air Forces.*—All aviation of the Army of the United States.

*Classification of supplies.*—In addition to those listed in FM 100–10, there are two classes of supplies provided and used by Army Air Forces:

*Class III (A).*—Aviation fuels and lubricants.

*Class IV (E).*—Complete airplanes, airplane equipment, and all spare parts and supplies required to keep the complete airplanes in commission.

*Echelons of maintenance.*

*Airplanes:*

*First echelon.*—That maintenance performed by the air echelon of the combat unit.

*Second echelon.*—That maintenance performed by the ground echelon of the combat unit, air base squadrons, and airways detachments.

*Third echelon.*—That maintenance performed by service groups and subdepots.

*Fourth echelon.*—That maintenance performed by air depot groups and control depots.

It is impossible to establish any formula defining just what maintenance and repair operations constitute first, second, third, or fourth echelon; nor is it necessary or advisable. Each echelon is primarily limited by the specialists provided in its Table of Organization and the equipment provided in its Table of Basic Allowances. To a very large extent it is limited by the initiative, ability, and aggressiveness of the personnel of the organization concerned. In wartime each organization, in the interest of efficiency, does everything it possibly can and passes on up to the higher echelon only that which is necessary. In this way accumulation at a higher echelon of work that could have been done in a lower echelon is avoided. The specialists and equipment of the higher echelon can then be concentrated on the work they of necessity must perform. The echelon in some cases may be determined by the length of time required to repair an airplane. Where considerable time is required, it may be inadvisable to keep the airplane and repair crew at a forward vulnerable airdrome.

First echelon will normally consist of servicing airplanes and airplane equipment, preflight and daily inspections, and minor repairs, adjustments, and replacements. All essential tools and equipment must be transportable by air.

Second echelon will normally consist of servicing of airplanes and airplane equipment, performance of the periodic preventive inspections, and such adjustments, repairs, and replacements as may be accomplished by the use of hand tools and mobile equipment authorized by Tables of Basic

Allowances for issue to the combat unit. This includes engine change when the organization concerned is at the location where the change is required. Most of the tools and equipment for second echelon can be transported by air but certain items, such as transportation, radio, etc., necessitate ground means of transportation.

Third echelon of maintenance embraces repairs and replacements requiring mobile machinery and other equipment of such weight and bulk that ground means of transportation is necessary. Units charged with this echelon of maintenance require specialized mechanics. This echelon includes field repairs and salvage, removal and replacement of major unit assemblies, and fabrication of minor parts and minor repairs to aircraft structures and equipment. Normally, this echelon embraces repairs which can be completed within a limited time period, this period to be determined by the situation prevailing.

Fourth echelon of maintenance includes all operations necessary to restore completely worn or damaged aircraft to a condition of tactical serviceability and the periodic major overhaul of engines, unit assemblies, accessories, and auxiliary equipment; the fabrication of such parts as may be required in an emergency or as directed in technical instructions; the accomplishment of technical compliance changes as directed; replacement, repair, and service checking of auxiliary equipment; and the recovery, reclamation, or repair and return to service of aircraft incapable of flight.

*Motor vehicles.*—Echelons of maintenance of service units of the air force conform to echelons of aircraft repair, that is—

*First echelon.*—Maintenance performed by equipment operators.

*Second echelon.*—Maintenance performed by the using organization.

*Third echelon.*—Maintenance performed by service center organizations.

*Fourth echelon.*—Maintenance performed by depot organizations.

*Echelons of reclamation.*

*First echelon.*—First echelon reclamation is a function of the air echelon of the combat squadron. It is limited to the turning over of damaged, unserviceable, or excess equipment on hand to the second echelon.

*Second echelon.*—Second echelon reclamation is a function of the ground echelon of all air force units operating or maintaining airplanes. It is limited to the assembly for transport of damaged, unserviceable, or excess equipment on hand and notification of the third echelon as to the type, amount, and location of such material.

*Third echelon.*—Third echelon reclamation is a function of subdepots and service groups. It embraces the collection from distributing points of damaged, unserviceable, or excess equipment and the determination as to the most economical disposition of damaged or unserviceable equipment. Excess but serviceable equipment is returned to stock.

*Fourth echelon.*—Fourth echelon reclamation is a depot function. It embraces the final disposition, that is, disassembly, repair, and return to stock of component parts and salvage or destruction of material worn or damaged beyond use or economical repair.

*GHQ aviation.*—GHQ aviation, as used in FM 100–10, formerly theater of operations aviation, not otherwise assigned, now corresponding to the air task force or an air force.

*Kinds of airdromes.*

*Airdrome.*—A landing field at which military facilities for shelter, supply, and repair of aircraft have been provided. (See AR 95–35.) This is the generic term for all military air fields.

*Air base.*—A command which comprises the installation and facilities required by, and provided for, the operation, maintenance, repair, and supply of a specific air force. (See AR 95–35.) In its strict sense, the term "air base" can be applied only to an area. However, most existing military airfields are now called air bases

because it is contemplated that, under operational use, they will provide supply and repair facilities for a large number of units concentrated in the vicinity on auxiliary airdromes.

*Auxiliary airdromes.*—An airdrome in use by military units which does not have the servicing, supply, and repair facilities sufficient for its own operation and is operated as an annex to a nearby air base. This type of airfield is also called a satellite field.

*Satellite field.*—This term is of foreign derivation and is applied to an occupied airdrome which is not completely equipped with the servicing, supply, and repair facilities sufficient for its unaided operation. This type of airfield is identical in concept with an auxiliary airdrome.

*Alternate airdrome.*—An airfield available for the use of military units in lieu of the airdrome to which assigned.

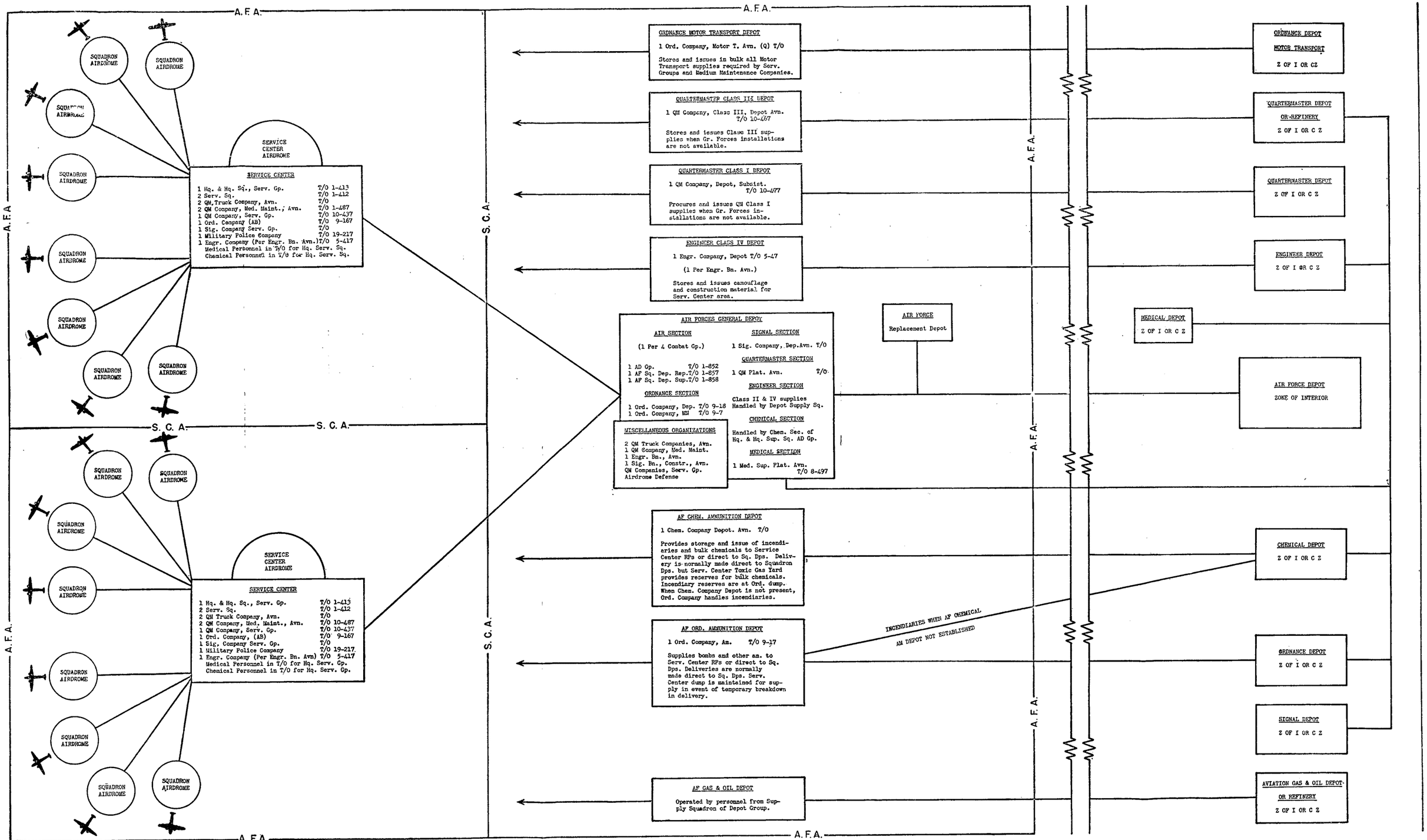
*Advanced landing field.*—An area of land near the general front available for the take-off and landing of aircraft. Minimum facilities for servicing only are available. Permanent occupancy by aircraft is not contemplated.

*Staging field.*—A landing and take-off area with minimum servicing, supply, and shelter provided for the temporary occupancy of military aircraft during the course of movement from one airdrome to another.

*Dispersed airdrome.*—An airdrome in which the facilities for supply and repair of aircraft and shelter have been spread out and removed so far as possible from the immediate presence of the landing and take-off area.

*Dispersal parking area.*—Areas of land in the vicinity of an airdrome, not suited for landing and take-off of aircraft, which are used for the parking of aircraft. Dispersal parking areas may or may not be contiguous with the normal landing and take-off areas but are connected thereto by taxi tracks suitable for the use of any aircraft which may be parked in the dispersal parking area.

# AIR FORCE ORGANIZATION FOR SUPPLY, SHOWING FLOW OF SUPPLIES




FUNCTIONS OF SERVICE GROUP ORGANIZATIONS

Hq. & Hq. Sq., Serv. Gp, provides Serv. Center Hq. including Medical, Finance, Chemical, Ordnance and QM Special Staff Sections. It also provides Instrument Landing and Photographic Sections, Transportation Section for the Gp. Organizational Motor Pool and the Squadron Hq.

Serv. Squadrons provide equipment and personnel to operate AF Engineering Section and Technical Supply, for 3rd echelon of maintenance, and supply for Serv. Center area.

QM Truck Companies provide motor transport for delivery of supplies for all units of Serv. Center area except local units of Serv. Gp.

Ord. Companies, Medium Maintenance, provide 3rd echelon of Motor Transport Maintenance for 400 vehicles each.

QM Company, Serv. Gp., operates Class I and Class III refilling points, stores and issues Class II and Class IV supplies for AF units, and provides Class I and Class III Dp. for Serv. Gp.

Ordnance Company (AB) stores and issues Class II and IV Material (Ordnance) for SC area, operates a reserve supply dump of Ord. Class V supplies and incendiaries for emergency use in SC area, and operates required Ord. Class V and incendiaries RPs. in SC area and Ordnance Repair shop for 3rd echelon repair of Ordnance equipment.

Signal Company, Serv. Gp., stores and issues all classes of Signal equipment for SC area; operates SC Wire, Radio and Telephone systems; installs and maintains wire lines for SC; performs 3rd echelon repair of Signal equipment for SC area.

Engr. Company provides new construction or repairs and operates SC RPs. for camouflage and construction material where Gr. Forces supply points are not available.

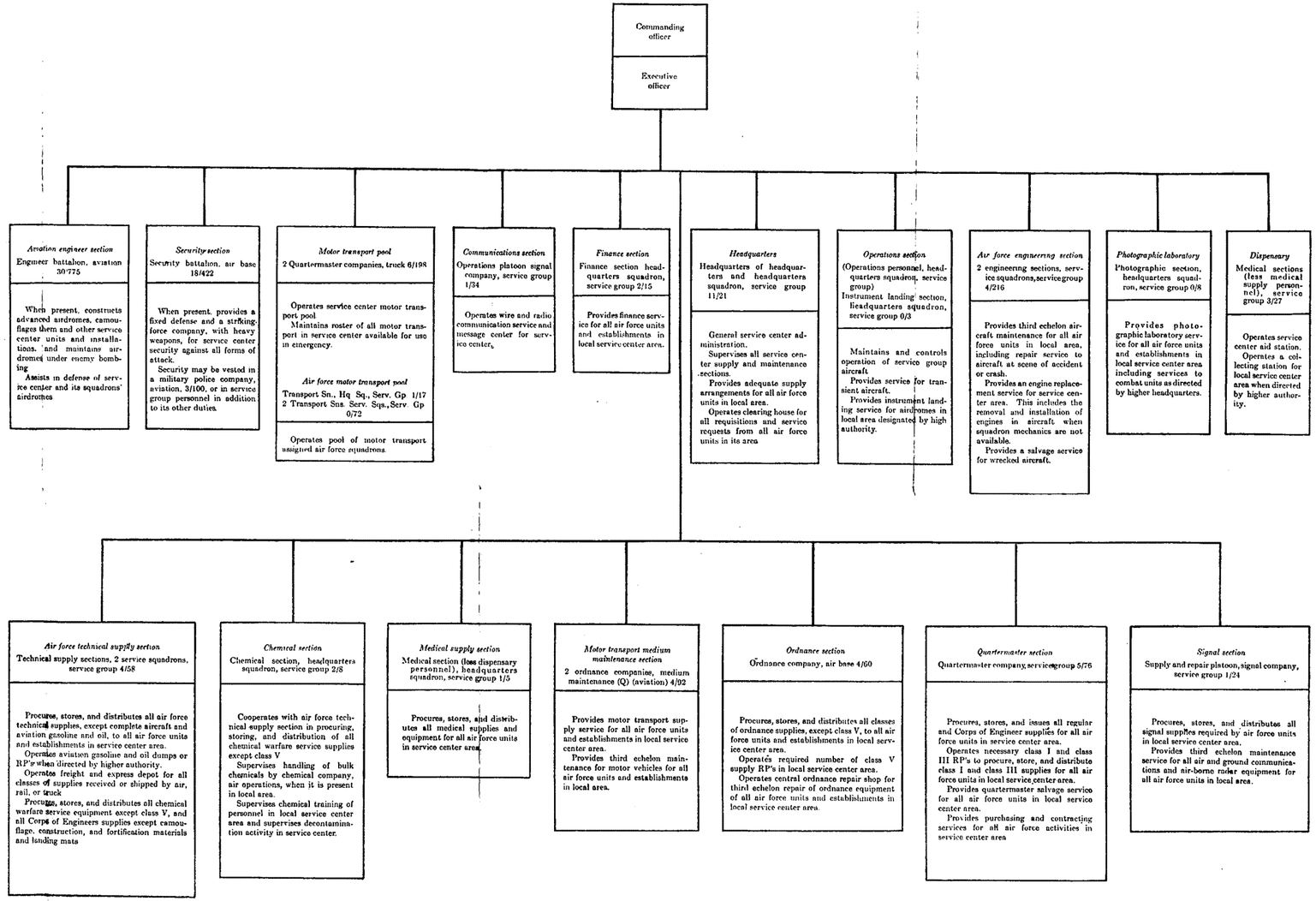
Chemical Staff is provided in Hq. & Hq. Sq., Serv. Gp., to supervise CWS training of SC personnel, decontamination and activities of Chemical Company, Air Opn., when present. Also supervises storage and issue of CWS material except bulk chemicals and incendiaries by the Technical Supply Officer. Chemical Company Air Opn. when present operates SC RPs. and Airdrome Dps for bulk chemicals. If bulk chemicals are not used, Ordnance Company handles incendiaries.

Military Police Company provides Interior Guard for all elements of SC.

Medical personnel is provided in T/O's for the Serv. Gp., and Engr. Bn. provides for Medical and Dental Service and for storage issue of medical supplies to all units within the SC area.

## APPENDIX II

## FUNCTIONAL ORGANIZATION OF THE SERVICE CENTER




*Legend:* The fractions in each of the sections of the chart mean:
Numerator: Number of officers and warrant officers.
Denominator: Number of enlisted men.

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