THE GENERAL BOARD

United States Forces, European Theater

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AMMUNITION SUPPLY AND OPERATIONS,

EUROPEAN CAMPAIGN

MISSION: Prepare Report and Recommendations on the Principles of Ammunition Supply and Operations in the European Campaign.

The General Board was established by General Orders 128, Headquarters European Theater of Operations, US Army, dated 17 June 1945, as amended by General Orders 182, dated 7 August 1945 and General Orders 312 dated 20 November 1945, Headquarters United States Forces, European Theater, to prepare a factual analysis of the strategy, tactics, and administration employed by the United States forces in the European Theater.

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AMMUNITION SUPPLY AND OPERATIONS, EUROPEAN CAMPAIGN

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AMMUNITION SUPPLY AND OPERATIONS, EUROPEAN CAMPAIGN

Prepared by:
Colonel Nelson M. Lynde, Ord, 017730, Chief, Ordnance Section
Capt. Roger C. Hawley, Ord, 0480395, Ordnance Section

Principal consultants:
Colonel John P. Daley, FA, 018358, Field Artillery Section
Lt. Col. Alvin H. Parker, GSC, 0341989, G-4
Lt. Col. Clayton A. Rust, CE, 022916, Engineer Section
Major Cecil F. Evans, CWS, 0214875, Chemical Warfare Section
Capt. Charles H. Starling, CE, 0312193, Engineer Section
Capt. John A. Cowie, CWS, 01035441, Chemical Warfare Section

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AMMUNITION SUPPLY AND OPERATIONS, EUROPEAN CAMPAIGN

CHAPTER 1

PURPOSE OF THE STUDY

SECTION 1

INTRODUCTION

1. Foreword. The purpose of this study is to relate the history of ammunition supply in the European Theater of Operations from the approval of the "Overlord Appreciation and Outline Plan" by the Combined Chiefs of Staff in August of 1943 to the close of the European Campaign in May of 1945. This campaign was an action of many armies whose efforts were directed by army groups of Allied Nations coordinated by a supreme headquarters. Problems in allocating available supplies among the various armies and army groups in accordance with their planned activity called for procedures to be developed that are illustrated only by a study of the European Campaign.

2. Problems. The problems encountered in ammunition supply in the European Campaign fall into three general categories.

a. Accounting and Administration. Ammunition not properly inventoried and definitely located might as well never have been received. Poor accounting and administration frequently nullified the efforts of Ordnance Service to provide adequate ammunition supply. Shortage of ammunition of various types was frequent. As each echelon of command became involved in this problem, new expressions for units of measure were developed to express the quantity of ammunition available or desired.

b. Storage and Issue. The quantities of ammunition required, the mobility of the situation, the scarcity of certain types, and the weather required new technique in ammunition storage and issue. Necessity for segregation of artillery ammunition by lot numbers was appreciated and efforts were made to accomplish segregation.

c. Enemy Ammunition. The precipitous withdrawal of the enemy from Western Europe and his subsequent defeat in Central Europe uncovered stores of enemy ammunition which constituted both a source of danger and a valuable prize of war.

3. Method of Treatment. The supply of ammunition will be presented in chronoligical order, with a discussion of each of the three problems at the end of each phase of the campaign.

CHAPTER 2

AMMUNITION SUPPLY IN THE EUROPEAN THEATER OF OPERATIONS

PRIOR TO D-DAY, AUGUST 1943 TO 5 JUNE 1944.

SECTION 1

STOCKING THE THEATER

4. Stock Levels. On 1 February 1944, the ammunition supply level for the European Theater, based on the then current War Department day of supply, was reduced from 120 to 75 days of supply. A critical review of ammunition stocks by ground Ordnance officers with experience in other theaters indicated that in some types the quantities on hand were inadequate to support coming operations, and in other types there were excessive quantities. Based on estimated expenditures for the initial assault phase, additional requirements were placed on the Zone of the Interior.[1] From a purely tonnage basis, there was sufficient ground force ammunition in the European Theater to adequately support the operation.[2,3] Air Force ammunition, except common user items, was ordered and handled by the Air Force.

SECTION 2

THE ORDNANCE PLAN

5. Organization for Planning. The Ordnance Officer and the Ammunition Officer, First US Army, joined the Planning Group, First US Army, in London in February 1944. This Planning Group was responsible for the preparation of plans for continental operations. Planning was complicated by the need for coordinating the requirements of British, French and United States air, ground, and sea forces, in view of the limited port facilities in the United Kingdom, the inadequate tonnage lift, and restricted beach facilities on the far shore.[1] First US Army Group exercised general supervision over the plans prepared by the Planning Group, First US Army.[4]

6. Requisitions. A separate requisition was prepared for each craft and ocaster for the period D to D + 1 inclusive. Thereafter, requisitions were prepared for each day for the period D +2 to D + 14, and a single requisition for the period D + 15 to D + 30. The minimum level of reserves to be ashore was established at two units of fire on the night of D + 2; five units of fire for all troops ashore by D + 14; and seven units of fire for all troops ashore by D + 27.[1]

7. Airborne Assault and Re-Supply. Supply plans for the airborne assault and airborne re-supply were prepared by the airborne divisions concerned and were reviewed by the Ordnance Officer, First US Army.[1,5]

8. Relations with Advance Section. Subsequent to D + 30, the responsibility for requisitions rested with the Advance Section, Communications Zone. Information of the proposed locations of army ammunition installations was furnished the Advance Section for planning purposes. It was planned that Advance Section would take over beach operations when the Engineer special brigades were relieved from attachment to First US Army and that inland dumps would be transferred to Advance Section when the beachhead was sufficiently deep to permit army to move its service areas forward.[5]

9. Missions. Initial missions assigned Ordnance ammunition battalions required one battalion to operate all ammunition service in Utah Area and another to operate in Omaha Area. Five companies were to operate a like number of beach maintenance dumps, two in Utah Area and three in Omaha.[5]

SECTION 3

EXECUTION OF PLANS

10. Engineer Special Brigades. Staffs of Engineer special brigades did not include qualified ammunition officers. In March 1944, the executive officer and several company officers of First US Army ammunition battalions were placed on detached service with Engineer special brigades.[1]

11. Loading. Corps and division Ordnance officers were required to be present at the loading of all craft and coasters for the assault and the floating reserve. Craft were found to hold less ammunition than had been planned, requiring additional craft and a reduction of the quantity expected to be carried in the assault. Space was reserved for ammunition of special types which was not available for loading until 25 May 1944. Restrictions on available lift and beach capacity required reserves to be held at a low figure. Some slight insurance against bad weather was obtained by a small number of dumb barges to be beached on D + 1 and D + 2.[1]

SECTION 4

AMMUNITION ACCOUNTING AND ADMINISTRATION

12. Day of Supply for Ammunition. In order to affect the automatic supply of ammunition to theaters of operations more readily, the unit of measure known as a day of supply for ammunition was established by the War Department in February 1943. The day of supply was the unit of measure used by the War Department in establishing theater reserves, in supplying theaters and in procurement. It was defined as the estimated average expenditure of various items of supply per day in campaign, expressed in quantities of specific items per weapon per day. Theater commanders were enjoined to make detailed analyses of expenditures and requirements and to recommend changes.[6] The War Department day of supply was revised in November 1943.[7] In December 1943, a recommended day of supply for the European Theater of Operations was prepared by the Chief Ordnance Officer, European Theater, after long and exhaustive research of ammunition expenditures of United States and British forces in Africa, Sicily and Italy.[8] A comparison of the War Department day of supply, (Column 2), and the recommended day of supply for the European Theater of Operations (Column 3), appears in Appendix 2. A study of these shows that the War Department day of supply was excessive in small arms ammunition and deficient in mortar and medium and heavy artillery ammunition.[9]

13. Unit of Fire. The War Department letter publishing the day of supply in February 1943, referred to in paragraph 12 above, established the term unit of fire as a measure of tactical supply within theaters. This unit of measure was used for supply purposes from a tactical point of view, and was modified by theater commanders as they found revision to be necessary for each individual theater.[6] In October 1943, the Commanding General, First US Army, recommended a unit of fire for use in the European Theater. The proposed unit of fire was submitted to a board of senior officers in London, and after antiaircraft rates had been considerably increased, it was accepted and published in December 1943.[11]

The unit of fire was defined as follows:

"The unit of fire is a yardstick or unit of measure used in the supply of ammunition during initial stages of combat and in specifying stock levels for army depots. It is that amount of ammunition which may be expected to be expended in one day of intense combat or two and one-half days of average combat. It is expressed in rounds per type weapon."

In applying the unit of fire to planning and actual operations, the following doctrine was to be followed:

a. In operations, supply on the unit of fire basis should be used only so long as is absolutely necessary. Replacement on the basis of numbers of rounds of specified types should be inaugurated at the earliest possible moment.

b. The unit of fire has no application to the basic load.[11] It is noted that the unit of fire was the measure applied to stock levels, reserves, and anticipated expenditures throughout "Operation Neptune".

14. Basic Load. Formerly the quantity of ammunition carried by the individual soldier, the vehicle, unit trains and service trains was prescribed in tables of basic allowances. With the publication of tables of organization and equipment, this information was no longer available. Accordingly, both First and Third US Armies published basic loads of ammunition containing this information.[1,11] The basic load was defined as that amount of ammunition which a unit should carry for tactical reasons, limited by transportation, and was expressed as follows:

a. Rounds per individual or per crew-served weapon.

b. Rounds carried in small unit transportation.

c. Rounds carried in transportation of higher echelon (Battalion, regimental or divisional).[12]

Unit commanders were required to keep on hand at all times the full prescribed basic load.[10,13]

15. Desired Expenditure Rate. This unit of measure was first adopted at a conference conducted by the G-4 Section, First US Army Group, and attended by representatives of armies, the European Theater of Operations, and army group. It represented the considered opinion of the average expenditure in rounds per type weapon per day, which, when applied to all organic weapons of the field forces, would be a basis for computation of ammunition requirements of the army group for the period D + 30 to D + 90.

SECTION 5

STORAGE AND ISSUE

16. Segregation by Lot Numbers. Prior to the invasion of the continent, a test was conducted to determine the variations in range between different lot numbers of ammunition for 105mm howitzer, M2A1. This test indicated that wide variations existed between ammunition of varying lot numbers, and, in some cases, between rounds of the same lot number. It was demonstrated that these variations were so great as to have an important and undesirable effect on artillery fire. It was further determined that ammunition should be classified into groups of lots

having similar range characteristics. However, 50 per cent of the lots were so small as to render classification impractical and it was necessary to use classified, unclassified and rejected lots of ammunition to meet the requirements for "Operation Neptune".

17. Marking. The Chief Ordnance Officer, European Theater, was requested to adopt a system of geometric markings for ammunition items which might be confused with each other during the operations on the beach.[1]

18. Skid-Loads. Palletized loads consisting of one and one-half tons of like ammunition on skids were made available for requisition by unit commanders.[5] This proved of value in maintaining integrity of lot numbers.[1]

19. Loading. It was planned that all types of ammunition should be available in a minimum of four vessels for each beach. Holds of ships were vertically loaded, each layer containing a balanced supply of complete rounds of all types of ammunition for the force to which the ship pertained. Medium and heavy artillery units were directed to carry an overage of primers and fuzes, and all units required to execute demolitions carried an overage of electric and non-electric blasting caps.[5]

20. Class V CWS and Engineer. Administrative control of requisitioning, loading, storage and distribution of all Class V, including Chemical Warfare and Engineer supplies, was assigned to Ordnance. Stock levels were the responsibility of chiefs of those services.[5]

21. Reports. Expenditures and status of stocks reports were required to be submitted to the army ammunition officer at the advanced command post on D + 4.[5]

22. Bomb Disposal. Navy was responsible for beaching and removal of obstacles under water. Army bomb disposal squads were responsible for removing other unexploded bombs.[1]

23. Salvage. It was directed that salvageable inert ammunition components be turned in to the nearest ammunition supply point, after careful examination to insure freedom from explosives.[13]

SECTION 6

CAPTURED ENEMY AMMUNITION

24. Serviceable Enemy Ammunition. Serviceable captured ammunition in original containers, excepting mines and grenades, was to be evacuated to the nearest ammunition supply point or depot. Quantities too large to be hauled were to be reported to higher headquarters for disposition. Enemy ammunition in original containers was to be stored separately from United States ammunition, and at a substantial safety distance.

25. Unserviceable Enemy Ammunition. Unserviceable and loose enemy ammunition was to be destroyed where found. Personnel not specially trained were cautioned not to move or disturb loose, scattered, fired or damaged enemy munitions. Under no circumstances were enemy grenades to be moved and enemy mines, either loose or in original containers, were to be disposed of by Engineer troops.[13]

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10. After Action Report, Third US Army, Ordnance Section.

11. Letter, Headquarters European Theater of Operations, "Unit of Fire", file AG 471 MGC, dated 10 December 1943.

12. Circular No. 3, Headquarters, First US Army, 9 January 1944, subject: "Basic Loads of Ammunition".

13. Ordnance Standard Operating Procedure for Combat, Headquarters, First US Army, 21 February 1944.

CHAPTER 3

AMMUNITION SUPPLY DURING THE INITIAL LANDINGS AND SECURING OF THE BEACHHEADS, 6 JUNE TO 24 JULY 1944

SECTION 1

EXECUTION OF PLANS

26. Initial Supply. The situation on Utah Beach permitted a beach maintenance area to be established on 6 June 1944. On Omaha Beach however, enemy resistance kept early elements of ammunition companies pinned down for hours. Dumb barges and landing craft could not be brought in and the pre-loaded DUKW's and salvage were the only source of supply. By 0120 hours, 7 June 1944, a small dump of 200 tons had been established near one of the beach exits and two initial dumps were opened to handle ammunition. The ammunition situation on Omaha Beach remained critical until 10 June 1944, due to enemy action and losses suffered by the Engineer special brigades.[1]

27. Establishment of ASP 501. On 10 June 1944, ASP 501 was established near Formigny to be operated by the 100 Ordnance Battalion under army control, and ammunition was moved directly from the beach to this ASP. Despite the delay in execution of the ammunition plan on Omaha Beach, there was no critical shortage of ammunition except in small arms and hand grenades, which was caused by abnormal consumption of these types in the hedge-row fighting. Air lift was used to bring in 300 tons of needed items.[1]

28. The Storm. A period of bad weather occurred on 19 June 1944 which stopped unloading across the beaches for three days. Again it was necessary to depend on air lift to maintain stock levels.[1]

SECTION 2

AMMUNITION ACCOUNTING AND ADMINISTRATION

29. Rationing. Ammunition stocks were below target levels and initial restrictions on artillery expenditures were imposed 15 June 1944. These restrictions were relaxed somewhat during the period 4 July to 15 July 1944 and expenditure rates decreased reserves at the rate of 0.2 unit of fire per day. The stock level approached only six units of fire in nearly all items. To build up a reserve and still carry on tactical operations, it was necessary again to impose strict restriction on expenditures. Over a 30-day period, First US Army imposed a ration on the corps of that army, calculated to build up the stock level to the desired seven units of fire. This ration was known as the army ration to corps. Since the calculation included anticipated receipts, it was necessarily based on information contained in manifests. Information was inaccurate and the ration was unnecessarily severe.[1]

30. Day of Supply. On 10 June 1944, the War Department again revised the day of supply for ammunition, establishing figures for the European Theater. Small arms and antiaircraft were revised downward and mortar, medium and heavy artillery were increased,[2] correcting in part, the deficiencies of the previous day of supply.

31. Supply Objective. During this period, it was possible for the European Theater to progress from automatic supply on the basis of the day of supply to a system of semi-automatic supply based on periodic ammunition supply reports. The supply objective for ammunition in the European Theater was computed by adding to the authorized level (in rounds)

the quantity of ammunition expended during the month multiplied by the factor 2.0, representing the time lag between date of submission of the ammunition supply report and the arrival of the ammunition. The application of the supply objective was made in the Zone of Interior.[3]

32. Integration of Class V Supply. Ammunition supply was handled in initial and beach maintenance dumps by the Engineer special brigades. The handling of Class V in dumps containing all classes of supply did not afford the flexibility or control required of an ammunition situation especially when reserves were small. As a result of emphasis on tonnages rather than needed items and the urgent requirement for needed items, early action was taken to integrate ammunition activities under ammunition staff officers, a method of control never departed from in First US Army and also adopted by other armies.[4]

33. Unit of Fire. Rationing emphasized ammunition in terms of rounds per weapon per day, and the tendency to utilize this terminology started a trend away from the unit of fire as a measure of ammunition supply.[4]

34. Credit System. Because of established basic loads, no credits were necessary below the army level. Rationing was effected in the command channels and with the basic load maintained at its established value, the need for reports to the Ordnance officer from the using arm was eliminated. Control was maintained by replacing withdrawals from ammunition supply points with shipments from the army reserve.[1,4]

SECTION 3

STORAGE AND ISSUE

35. Field Storage. The fields of Normandy afforded sufficient hard standing to permit field storage and the relatively congested area of the beach-head, as well as the limited road-net and heavy traffic caused by the build-up, would not have permitted another method.[5] A diagram of a typical field storage installation is included as Appendix No. 3.[6]

36. Method of Operation. Methods of operation used during this period were ASP methods, as prescribed in FM 9-20. A 2,000 ton ASP was divided into at least four 500-ton sections, each containing a balanced stock of all types. This method was prescribed to decrease the possibilities of loss due to enemy action.[5]

37. Difficulties Encountered. Emphasis was placed on movement of tonnages across the beach. Ammunition on hand which was impossible to locate or not properly inventoried might, however, just as well never have been received. Trucks were unloaded 24 hours a day, and sections would receive for 24 hours, inventory and re-stock for 24 hours, and then issue for 24 hours. Such operations precluded accurate inventory, since each item might be stored in several places and its status in each fluctuating rapidly. Many small items such as ammunition for small arms, grenades, fuzes and primers easily became lost. Truck drivers dumped their loads hastily by tying their cargo nets to a tree and pulling the load off. Truck chits were of such a poor degree of accuracy that they could not be used in accounting. Truck cranes were utilized to the maximum, and all personnel worked continuously to stack the ammunition dumped from the cargo nets. Eventually, sorting bays were established and in spite of double handling, tended to reduce most of the difficulties.[5] Considerable difficulty is attributed to inability of ammunition troops to adequately inventory and account for stocks on hand, which was the result of insufficient training in handling ammunition in and out of ASP's under all conditions of weather and darkness during periods of peak loads. Personnel found in ammunition companies were generally of low intelligence and could not inventory accurately.[4]

38. Establishment of Additional ASP's. As the beachhead was

deepened, additional ASP's were established to service the corps. Target level was 2,000 tons in the normal case, with a daily re-stockage of 400 to 500 tons. On occasion, these were too close to the front lines and a retrograde movement had to be executed. As a scale of work done, the following figures are cited. ASP 502 was moved five miles to the rear, using tank transporters to handle 1,500 tons of Class V in five hours. ASP 1901, operated by one ammunition company, supported the attack on St. Lo where the artillery preparation required a daily issue of 6,350 tons in 24 hours with a daily average of 43,000 rounds of 105mm howitzer ammunition for a three day period. Using units assisted in loading their own vehicles and as many tail-gate issues were made as possible. ASP 501 was designated as a depot and reverted to Advance Section, Communications Zone, on 9 July 1944.[5]

SECTION 4

CAPTURED ENEMY AMMUNITION

39. Employment. Little use of enemy ammunition was made during this period, except in the case of 8cm mortar.[7]

40. Bomb Disposal. Extensive use of projectiles as improvised land mines, as well as other unexploded ammunition components and dropped missiles, occupied the effort of bomb disposal squads.

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4. Letter, Ordnance Officer, First US Army, to Ordnance Officer, The General Board, August 28, 1945. (Appendix No. 4)

5. Unit History, 100 Ordnance Ammunition Battalion.

6. Diagram of Typical Ammunition Field Storage Installation. (Appendix No. 3)

7. Remarks of Lt. Col. A. G. Hutcherson, Ammunition Supply Officer, First US Army, throughout the European Campaign (Appendix No. 7)

CHAPTER 4

AMMUNITION SUPPLY DURING ADVANCE THROUGH FRANCE TO THE MOSELLE RIVER, 24 JULY 1944 TO 30 SEPTEMBER 1944

SECTION 1

ADVANCE TO THE EAST

41. The Logistical Situation. 12 Army Group assumed control of United States forces, 1 August 1944, as Third US Army became operational. Advance Section, Communications Zone, became responsible for support of both armies. First US Army moved its army ammunition depots to the vicinity of La Loupe, and Third US Army moved to the east so rapidly that no depots were established until they were installed near Fontainebleau. VIII Corps remained in the Brittany Peninsula. The Seine River was crossed on 19 August 1944, and the pursuit continued until the armies stood on the borders of Holland in the north and Germany in the east.

42. Communications Zone. During this period, information as to availability of ammunition in both the forward and rear areas of Communications Zone was indefinite. Off-loadings of ships had slowed down, transportation to haul supplies to follow the armies was inadequate, and ammunition stocks were so unbalanced as to preclude accounting for them.[1]

43. The Armies. Both First and Third US Armies established ASP's that lasted only three or four days before the armies had outdistanced them. ASP's were established across the Seine on 27 August 1944 and ammunition supply was rapidly advanced to the east. Operations were directed towards speed in the organization and operation of supply installations.[2,3]

SECTION 2

AMMUNITION ACCOUNTING AND ADMINISTRATION

44. Rationing. Shortage of critical types of mortar and artillery ammunition available for issue to the Armies caused 12 Army Group to limit expenditures to a fixed number of rounds, commencing with the first week of August 1944.[1]

45. ASP Stockage Charts. Charts were prepared by Third US Army establishing target levels for each separate type organization in the army to enable rapid calculation of levels of supply for ASP's.[2]

46. Activation of Ordnance Ammunition Groups. The magnitude of ammunition operations caused both First and Third US Armies to take action to provide an Ordnance group headquarters to administer and operate ammunition activities. The 71 Ordnance Group was activated by First US Army on 30 July 1944, from ammunition personnel of that army.[3] The 82 Ordnance Group was activated by Third US Army through expanding the headquarters of an existing ammunition battalion.[2] Both groups were given command of all ammunition troops.

47. Levels of Supply. 12 Army Group had moved more than 400 miles without stopping and was not backed up by supplies needed to mount a full-scale coordinated attack on the Siegfried Line at any time during September.[3] Critical types of ammunition were closely controlled to insure the most economical application of the small quantities available and using arms were required to report daily on status of critical types in their basic

load during the period.[2]

48. Accuracy of Information. During the month of September, army requisitions for fast-moving artillery items were frequently zeroed by Communications Zone depots. Not until stocks were exhausted was the army commander informed as to stock levels behind him.[3]

SECTION 3

STORAGE AND ISSUE

49. Truck-borne Ammunition Supply. The tendency to accelerate operations caused First US Army to establish a mobile ASP. A Quartermaster truck battalion with 225 trucks, 2½ ton cargo, and two self-propelled antiaircraft artillery batteries for defense were attached to the Ordnance ammunition group to provide a mobile supply of ammunition which could be pushed up behind the advancing armies.[3] Third US Army frequently pushed ammunition laden convoys behind their advancing columns, following them for several days before unloading in a favorable location.[2]

50. Storage. During its advance to the east, Third US Army tried roadside storage and found this method adaptable to a fast-moving situation.[2] First US Army continued to use field storage until inclement weather required the use of hard standings afforded by the verges of roads, both to keep stacks from disappearing in the mud and to permit vehicles to have access to the stacks. Roadside storage created additional labor problems not encountered in field storage. In field storage, labor sections were maintained in each ammunition bay, and checkers could process numerous trucks simultaneously. In roadside storage, it was necessary to form a labor pool in the receiving unit, and dispatch checkers and laborers with each truck to its destination to process it. When ASP's reached 4,000 tons, the road-net was approximately 15 miles long; consequently, a truck delivering or drawing ammunition frequently had to travel a long distance within the ASP to complete its mission. Included as Appendix 8 is a diagram of a typical roadside ammunition supply point.[4]

51. Operations. First US Army advanced its ammunition depots from La Loupe to Hirson and finally to the vicinity of Liege. Rail became available to Liege on 26 September 1944 and the exhausting truck runs were supplemented by rail transportation. Nearly 1,000 trucks had been utilized in bringing stocks from La Loupe and Hirson requiring the assistance of temporarily inactive field and antiaircraft artillery battalions.[3]

SECTION 4

CAPTURED ENEMY AMMUNITION

52. In the Armies. The rapid advance of the armies precluded any activity on their part in handling enemy ammunition.

53. In Communications Zone. With the assumption of responsibility for the large area now constituting the Communications Zone, it was necessary to announce a policy for handling captured enemy ammunition. On 30 July 1944, Headquarters, European Theater of Operations, published letter instructions on the subject of collection, salvage and disposal of explosive munitions and hazardous materiel in the Communications Zone.[5] Salient points of policy were:

a. Collection, salvage and disposal would begin immediately and continue until the effects upon military operation and civil life were removed. In army areas, the responsibility of army commanders was limited to that required for the accomplishment of the military mission.

b. Use of troops in civil areas was kept to a minimum consistent with proper supervision.

c. Civil agencies and labor were used whenever and wherever possible under proper supervision.

d. Disposal or preparation for salvage was performed by Ordnance units or under Ordnance supervision.

e. Technical training of military and civilian personnel became an Ordnance responsibility.

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4. Diagram of Typical Ammunition Roadside Storage Installation. (Appendix No. 8)

5. Letter, Headquarters, ETOUSA, file AG 400, 93 OPGD, subject: "Collection, Salvage and/or Disposal of Explosive Munitions and Hazardous Material in Communications Zone", dated 30 July 1944.

CHAPTER 5

AMMUNITION SUPPLY IN "OPERATION DRAGOON"

SECTION 1

SUPPORTING THE ASSAULT AND PURSUIT

54. D-Day to D + 16. On 15 August 1944, Seventh US Army, consisting of three US infantry divisions and selected French forces, landed on the Southern coast of France in the general area midway between Toulon and Nice. Termed "Operation Dragoon", the assault penetrated coastal defenses immediately and Seventh US Army raced up the Rhone River valley in pursuit of disorganized enemy forces. Ammunition supply activities commenced shortly after H-Hour on D-Day and featured the employment of six Ordnance ammunition companies, all landed on D-Day. Three companies were designated to operate four main beach dumps and three were scheduled to support the combat divisions as the latter moved forward. Initially, all six companies worked in the beach dumps under the control of Engineer combat regiments. Ammunition was carried from ships to beach dumps by DUKW's exclusively. Class V was slow coming ashore because of gasoline shortages during the first day of operation. As unloading speeded up, the ammunition companies were swamped with receipts; as many as 200 DUKW's awaiting unloading at one time. Unloading, storage and issue were complicated by use of cargo nets in the DUKW's which contained more than one type of ammunition. By D + 3, ammunition troops were near exhaustion and civilian labor was difficult to obtain.[1]

The three army ammunition companies were moved from the beach dumps on D + 7 and attached one to each infantry division. The companies operated division supply points and while not directly under army Ordnance control, were supplied by army transport. This system, while unorthodox, functioned satisfactorily because of the extremely rapid forward movement of the combat troops.[1]

During the assault phase, French forces were also supplied ammunition by American troops. However, French troops took over the actual operation of ASP's as soon as possible. The Seventh US Army Ordnance ammunition battalion was charged with the control and supervision of French installations as long as French forces were under army control.[1]

55. D + 17 to D + 32. On 1 September 1944 the Ordnance ammunition companies were relieved from direct support of the infantry divisions and placed under control of the 62 Ordnance Battalion. Ammunition supply functioned in a normal manner for both US and French forces, with all operations and installations controlled by the Ordnance Officer, Seventh US Army.

Sufficient ammunition to support army operations was received over the beaches but transportation was not available to bring it forward. The situation became so critical that an ammunition company was converted into a truck company by diverting vehicles from army Ordnance depot stocks. This company was designated to haul ammunition exclusively and was always under control of the army Ordnance officer.[1]

SECTION 2

SITUATION IN 6 ARMY GROUP

56. Regrouping and Supply Build-up. By 15 September 1944, Seventh US Army and French forces, both now under 6 Army Group, had advanced some 400 miles. The original plan for phasing in supplies proved inade-

quate because of extended supply lines and shortage of transport. At this time army group endeavored to regroup troops and build up forward supply points. To accomplish the latter, tonnage allocations were assigned the armies. A system of ammunition credits, based on actual availability, became necessary to apportion the critically short supply of ammunition in forward areas. Army group instructed its supply agency, Southern Line of Communications, as to the ammunition to be shipped to each army.[2]

SECTION 3

AMMUNITION ACCOUNTING AND ADMINISTRATION

57. Units of Measure Employed. As in the assault on the Normandy beaches, unit of fire figures were used in "Operation Dragoon" for initial planning and shipping of ammunition. At the termination of the assault phase, resupply was effected based on day of supply figures for the North African Theater of Operations. Later, when 6 Army Group came under control of the European Theater of Operations, the day of supply for the European Theater was employed.[1]

58. Supply of French Forces. Slightly different methods of operation, plus language difficulties, caused complications in accounting and administration of the French army ammunition supply. French troops transported, stored and issued their own Class V, but the Seventh US Army Ordnance ammunition battalion was responsible for supervision of operations and preparation of status of stocks reports. Liaison was poor during the period that French forces were under Seventh US Army and adequate records were not maintained.[1]

SECTION 4

STORAGE AND ISSUE

59. Methods of Storage. Field storage was employed for beach dump sites and for all ASP's until the middle of September. When inclement weather set in, roadside storage was adopted and maintained until the cessation of hostilities. Difficulty was experienced in locating adequate road nets that were not too dispersed and that would not interfere with the tactical movement of troops. Seventh US Army instructed its ammunition companies employing roadside storage to place 50-ton stacks at 50-yard intervals, rather than small stacks at lesser intervals as was general practice. It was felt that in case of fire, larger stacks and greater safety distances would lead to fewer losses and be easier to control.[1]

60. Issues. All issues to combat troops were for replenishment of basic loads, although Seventh US Army did not publish a basic load. The basic load was the ammunition that unit commanders could carry on available transportation.[1]

SECTION 5

CAPTURED ENEMY AMMUNITION

61. No Problems Encountered. Because of the swift movement of US and French forces and the lack of fixed enemy positions in the path of advance, negligible amounts of enemy ammunition were overrun during the phase of "Operation Dragoon".[1]

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CHAPTER 6

AMMUNITION SUPPLY DURING AIRBORNE OPERATIONS IN HOLLAND

17 SEPTEMBER TO 28 SEPTEMBER 1944

SECTION 1

PLAN FOR "OPERATION MARKET"

62. The Plan. First Allied Airborne Army was to assist the British 21 Army Group in the latter's attempt to outflank the north of Germany's industrial Ruhr area. The airborne army was to land, capture and hold crossings over the canals and rivers on the main axis of advance of the British Second Army. The operation was scheduled for 17 September 1944. US forces involved were two airborne divisions and one airborne engineer battalion. Original landings were to be by parachute and glider and all classes of supply were later to be brought in by the same method.[1] Further provision for ammunition resupply of the US divisions was made by assembling three Quartermaster truck companies in the vicinity of Brussels, loaded with ammunition for the airborne units. These companies were to be ready to roll forward any time after 18 September.

SECTION 2

EXECUTION OF THE PLAN

63. Execution. Air drops and glider landings were successful on 17 and 18 September 1944. However, unexpectedly stiff resistance was encountered by all airborne units and the British Second Army did not advance as far or as fast as expected. Bad flying weather on 19 September hampered further troop landings and resupply. United States forces, after bitter initial fighting, cleared their areas and maintained defensive positions. Resupply of ammunition by air was sufficient to meet their requirements and there is no record of the three truck companies being employed as planned. British airborne units in the vicinity of Arnhem, virtually surrounded and running dangerously low on all classes of supply, had to withdraw.[1]

SECTION 3

AMMUNITION PROBLEMS

64. Accounting and Administration. Since resupply for "Operation Market" was by air, no Ordnance ammunition units were directly involved. Ammunition accounting and administration was maintained on a division level.

65. Storage and Issue. Ammunition dropped in para-crates was collected, stored and issued from small unit dumps.

66. Enemy Ammunition. Airborne units normally made every effort to employ enemy weapons and ammunition. Due to the small area covered by the airborne units in "Operation Market", no problems concerning enemy ammunition developed.

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CHAPTER 7

AMMUNITION BUILD-UP TO SUPPORT A WINTER OFFENSIVE

1 OCTOBER 1944 TO 16 DECEMBER 1944

SECTION 1

LOGISTICAL SITUATION

67. 6 Army Group. During the latter part of November, the First French Army attacked through the Belfort Gap to the Rhine River south of Mulhouse and the Seventh US Army advanced through the Vosges Mountains to the Rhine River at Strasbourg. Operations were proceeding against Colmar when events further north required the army group to assume the defensive.[1]

68. 12 Army Group. Critical status of supply caused suspension of offensive operations until 7 November 1944. Third US Army besieged Metz, later surrounding that city, which fell on 22 November 1944, and crossed the Moselle River to sieze bridgeheads across the Saar River. Ammunition depots were established at Verdun and Nancy.[2] First US Army with Ninth US Army, now operational on the left (north) flank of 12 Army Group, endeavored to reach the Roer River and to capture the dams on that river. First US Army established its army ammunition depot at Herve.[3] Ninth US Army established no depot at this time, allowing Advance Section to build up ammunition stocks behind it.[4] Stock levels in army ASP's of 12 Army Group could not support offensive operations at the beginning of the period due to inadequate back-up in forward installations of Communications Zone. However, the situation improved appreciably during the period.[3,5]

69. Communications Zone. Late in September 1944, requisitions of the armies for items on 12 Army Group ration list were zeroed by Communications Zone forward depots. It became apparent that off-loadings at ports were behind schedule, and that inadequate overland transportation kept ammunition from reaching forward depots. Lack of balance in stocks of ammunition in both forward and rear Communications Zone depots precluded correlation of these stocks in terms of units of fire.[5]

70. Southern Lines of Communication. The major problem in ammunition supply involved long lines of communication. The breathing spell afforded by regrouping permitted ammunition to be brought forward.[6]

SECTION 2

ACTION TAKEN

71. Summary of Conditions. When requisitions for ammunition items were zeroed at Communications Zone depots, it became apparent that behind the cloak of indefinite and over-optimistic evaluation of tonnages in depots, a serious situation had arisen. Communications Zone depot stocks of mortar and artillery ammunition were negligible, although sufficient ammunition was available in ships off shore to meet current requirements and scheduled shipments from the United States would cover future needs. Off-loading of ships had to be brought to a minimum of 12 ships simultaneously and this ammunition had to be forwarded by rail to depots of Advance Section immediately in rear of the armies where it would be sorted and distributed to the armies. An interval of time was necessary to effect this plan and it was estimated that 7 November 1944 was the earliest date at which the armies might benefit. Unless these conditions could be met, dire consequences would result.[5]

72. Establishment of a Credit System. 12 Army Group allocated critical types of ammunition to the armies as it became available in depots east of Paris. Based on these allocations, Communications Zone established army credits in designated depots. Copies of credits were sent to the command concerned and to the regulating stations. Requisitions submitted to the regulating station by the armies carried the credit number and designation of the appropriate depot carrying the stocks. Credits expired 30 days from date of issue. All previous reserves were rescinded. New credits could either be expended or held in army reserves. Expenditures from basic load were replaced from army reserves.[7]

73. Effect of Plan. The immediate effect of the plan was to shut off the armies from re-supply for a short period until stocks could be built up in forward depots of Advance Section. As a result, field artillery fires were executed by tank and anti-tank weapons and the use of captured enemy materiel.[2] An immediate improvement was noted in the build-up of stocks in the armies and Advance Section. By the end of the period, desired levels were approached in all types.[5]

SECTION 3

AMMUNITION ACCOUNTING AND ADMINISTRATION

74. Army Group Desired Maintenance Rates. During this period, the term unit of fire fell into discard. Since this term was easily converted into tonnages, there was a very real danger that unbalanced stocks expressed in tonnages would not reveal discrepancies that existed in critical types. It is significant to note that the unit of fire was used in the 12 Army Group G-4 Periodic Report of 10 October 1944, but after the realization of the serious situation in regard to mortar and artillery ammunition expressed in the report of 17 October 1944, levels of supply were always expressed in terms of daily rates of rounds per weapon per day.[5] Desired expenditure rates had been used to determine ammunition requirements over a long period of time, as early as May 1944. This terminology was now revised to desired maintenance rates. These rates, if maintained for a period of not less than six months, would meet the requirements of a major command. The rates were average maintenance rates for a long period and took into account periods of relatively low activity. They had to apply to the total weapons list of the command in order to satisfy operational requirements. Reserves equivalent to 20 days of maintenance had to be established for the entire weapons list. As the weapons list varied, the reserve was to be adjusted. Communications Zone was advised of these rates and their application.[8] The term maintenance rate was preferred over expenditure rate.

75. Activity Factors. Since the availability of ammunition, especially of critical types, did not afford unlimited firing, it was important to apply the limited resources in such a fashion that our maximum fire could be used to further the tactical plan. Accordingly, an activity factor was computed for each army and all ammunition available to the army group during a stated period was divided between the armies in that proportion. For an example of the computation involved, see Appendix No. 5.[9]

76. Forecast of Availability. During the period that 6 Army Group was supported by Southern Lines of Communication, quantities of ammunition requisitioned by that army group were separated from quantities requisitioned by Communications Zone for 12 Army Group. In the event that total quantities could not be shipped, a proportionate reduction was made in accordance with quantities of weapons in hands in the two army groups. In effect, allocation of ammunition between army

groups was made by the port of embarkation since ports of entry were separate.[10] The amount of ammunition in each pipeline was thus available to the appropriate army group. In 12 Army Group, forecasts of availability were made for 30-day periods, the first 10 days of which were firm forecasts and the remaining 20 days being estimates. The forecast was a prediction of ammunition expected to be available in Advance Section depots, and enabled army commanders to plan their operations.

77. The Regulating Station. Regulating stations were assigned to support each army. Armies placed their Class V requisitions on the Ordnance Officer, regulating station, who called the shipment forward to the indicated railhead. The principal service rendered by the Ordnance Officer of the regulating station became tracing shipments, trains and wagons.[11] The regulating station operated as an agency of Advance Section and did not assume the important role indicated in FM 100-10. The armies continually maintained large liaison detachments with Communications Zone; a requirement that might have been performed by a sufficiently large and aggressive Ordnance section of the regulating station. It is noted that any system of segregation of artillery ammunition by lot numbers involves maintenance of records of lots on hand in the army ASP's and depots. Ammunition lots, of necessity, must be called forward to the proper ASP or depot to insure proper segregation. This function must be performed by the Ordnance Section of the regulating station and the Communications Zone.

SECTION 4

STORAGE AND ISSUE

78. Segregation of Artillery Ammunition by Lot Numbers. During the stable situation which marked this period, and with decreased receipts of ammunition, it was possible to investigate the situation with respect to mixed lots of artillery ammunition. This problem was doubly important at this time because extreme accuracy of fire would reduce expenditures and the supply situation demanded the utmost economy. Third US Army inspected one ASP containing 7,445 rounds of shell, high explosive, with M48 series fuze for the 105mm howitzer M2A1 and found it contained 308 lot numbers. Tabulation of lot numbers of 105mm ammunition received in a single depot on three successive days during October showed 545 separate lots were received.[12] First US Army expended 25,000 man hours in segregating the artillery ammunition on hand prior to 3 November 1944.[13]

79. Action Taken. The Chief Ordnance Officer, Communications Zone, European Theater, outlined steps to be taken to correct this situation. Only one lot number was to be loaded on a single car, and this was to be indicated on the way bill. As the result of correspondence with the Zone of Interior late in 1943, ships coming from the United States carried sizeable quantities of individual lots, a minimum of lots, and these block-stowed by lot. While this was understood, emphasis on speed of ship loadings and off-loadings prevented full realization. In October 1944, ammunition off-loading was limited to three ports. Ammunition companies were provided at each port to correct segregation in unloading. Sorting was continued at forward Communications Zone depots, and as already indicated, loaded cars were segregated by single lots. Frequent inspections were made to insure maximum effort along these lines.[14] Some improvement was noted towards the end of the European Campaign. Obviously no real benefit can be had unless the initial procurement is sufficiently large to insure that the lot flows through the pipe-line in a block. If this is accomplished and reasonable care is exercised during ship loading,

off-loading, storage, shipment and receipt within the theater of operations, a solution is possible. With the ammunition troops provided a field army, segregation cannot be accomplished in the combat zone unless backed up by the maximum effort from the Zone of the Interior and Communications Zone.

SECTION 5

CAPTURED ENEMY AMMUNITION

80. Employment. During the advance across Western Europe, combat troops generally did not carry captured enemy weapons with them. However, the static situation of the armies during the fall and winter months, combined with the critical supply of medium and heavy artillery ammunition, made the employment of captured weapons and enemy ammunition a desirable and profitable undertaking.

81. Third US Army. Extensive use of enemy ammunition was made by troops of XX Corps, especially during the period 26 September to 6 November 1944, when the necessity for moving Communications Zone ammunition stocks forward caused a halt in ammunition issues from forward depots. Seven French 155mm howitzers pressed into German service were recaptured and since this piece is identical to the American 155mm howitzer 1917-18, on which much of our artillery personnel was trained, their use imposed no problems. Ammunition was found in several captured dumps near Verdun, in the Argonne Forest and at Soissons. This ammunition was also used in the American 155mm howitzer M1. The curtailment of ammunition receipts was counteracted in XX Corps by an extensive survey of captured materiel and ammunition. During a period of limited objective attacks, artillery fire support was limited to use of tank and anti-tank weapons in their secondary role[2] and the employment of captured materiel and ammunition.[15] Fort Driant was encircled by a tank battalion firing nothing but recaptured French ammunition for 75mm guns. During the crossing of the Moselle River, enemy artillery observation posts were smoked exclusively with recaptured French 155mm HC shell, which was called forward for this specific purpose.

82. First US Army. The motor carriage, 155mm gun M12 was used extensively against the concrete emplacements of the Siegfried Line. Approximately 7,000 rounds of recaptured French high explosive shell for 155mm gun was used during this period. Due to the use of this ammunition, a saving of shell, high explosive, M101, for the 155mm gun M1 was effected. Since this ammunition had been manufactured for use in an identical cannon, its employment was entirely satisfactory. German 10.5cm howitzers were obtained from Communications Zone and issued to two field artillery battalions who fired 30,000 rounds of captured German ammunition, thereby reducing the drain on our own limited supplies of 105mm ammunition. Approximately 300,000 rounds of shell, high explosive 8cm mortar were used in our 81mm mortars, enabling mortar fire to be increased.[16]

83. 12 Army Group. In reporting on use of captured enemy ammunition during the period 1 December 1944 to 22 March 1945, 12 Army Group reported the following known amounts:[17]

88mm Gun: 14,500 rounds
105mm German LFH: 34,400 rounds
155mm Gun: 2,500 rounds
8cm German Mortar: 18,000 rounds

84. Summary. Where the weapon was similar or identical with

American materiel, the use of captured enemy ammunition was entirely feasible. Captured enemy ammunition suitable for use in American materiel also proved practical. The use of German ammunition and material was less practical due to lack of firing data and fire control equipment. The use of German materiel and ammunition by United States forces achieved a desirable morale effect on our troops just as it was unfavorable to the morale of the enemy.[2] However, units using enemy materiel and ammunition were generally apprehensive. In the case of the German 10.5cm howitzer, many complaints were received of faulty obturation due to use of steel cartridge cases.

85. Corollary. The critical ammunition situation was alleviated in other ways. Considerable use was made of United States naval projectiles for the 8-inch gun. British 25-pounders were obtained from 21 Army Group with a supply of ammunition and issued to three American battalions. A battalion was also converted to a rocket unit and equipped with 4.5-inch rockets mounted at first in 3/4 ton trucks and later on light towed mounts.

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CHAPTER 8

AMMUNITION EXPERIENCES IN THE ARDENNES AND ALLIED COUNTER OFFENSIVE, 16 DECEMBER 1944 TO 7 FEBRUARY 1945

SECTION 1

LOGISTICAL SITUATION

86. German Ardennes Offensive. On 16 December 1944 the Germans launched a powerful offensive through the Ardennes Forest, an area lightly held by US forces. The enemy's objective was to split the Allied armies and to over-run large supply installations in the Liege-Namur area.

The attack separated VIII Corps from the remainder of First US Army and put the American forces on the defensive along the whole battle front. VIII Corps was assigned to Third US Army, and First and Ninth US Armies were placed under operational control of British 21 Army Group. The 12 Army Group retained operational control of Third US Army only, but held administrative responsibility for all three armies. Third US Army turned north to strike the southern flank of the German drive; 6 Army Group assumed a defensive role. First US Army held the north shoulder of the drive and prepared to counter-attack. Ninth US Army sent troops south and at reduced strength, went on the defensive.

Having spent its momentum without reaching our critical areas, the enemy attack was pushed back until all losses were restored by 5 February 1945.[1]

SECTION 2

SITUATION IN ADVANCE SECTION, COMMUNICATIONS ZONE

87. Forward Dumps. In the months of October and November, 1944, ammunition stocks were built up for the offensive against the Siegfried Line and the advance to the Rhine River. Advance Section, Communications Zone depots were well forward and on 13 December 1944, contained 146,000 tons.[2] In considering the possibility of a German offensive along the thinly held line north of Luxembourg, it was believed that such stocks would not be in danger.[1] The proximity of the depots at Liege, and Soissons, helped immeasureably in supplying the forces engaged in the Ardennes; however, had the enemy been able to cross the Meuse River and over-run the two depots, he would have captured one-third of all ammunition available in the Communications Zone.

SECTION 3

SITUATION IN THE ARMY GROUPS

88. 12 Army Group. Of the three armies under 12 Army Group, First US Army bore the brunt of the German attack. Forward supply points were evacuated or destroyed and service units moved west of the Meuse. Lines of communication were disrupted; ammunition supply was piecemeal, but sufficient quantity was made available by providing mobile ASP's and temporary installations at railheads.

Switching the axis of support for Third US Army created difficulties. Although rear depots were well located for the change, forward supply points had to be swung 90 degrees counter-clockwise. Initial requirements were met by maintaining rolling reserves until dumps could

be established in the Luxembourg area.[1]

89. Situation in 6 Army Group. As Third US Army moved north to meet the enemy attack, 6 Army Group extended its front and halted offensive operations. Seventh US Army was particularly weakened, and was ordered to withdraw if attacked rather than run the risk of having any forces cut off.[3]

SECTION 4

AMMUNITION ACCOUNTING AND ADMINISTRATION

90. Disruption of Normal Methods. In 12 Army Group the system of forecasts of availability and credits to armies was strained during the counter-offensive due to the unusual and critical situation, but it continued fundamentally as intended and all emergencies were met satisfactorily.[1] Within the army group, units and ammunition were transferred between armies. Advance Section provided both ammunition and transportation without regard to credit allocations.[4,5] Paper work was adjusted later. All energy was directed to meet emergencies and the ammunition supply system proved flexible enough to withstand all demands.

91. Initiation of European Theater Maintenance Day of Supply Rates. Prior to the consolidation of Southern Line of Communications and Communications Zone supply agencies, ammunition requisitions were being dispatched to the Zone of Interior by both agencies. There was in effect two supply organizations and each American army group was supplied through separate ports. When Communications Zone became responsible for all supply in the European Theater, one consolidated requisition was submitted for ammunition. Ammunition was divided between the army groups on a weapons basis.[6] Early in January 1945, the US staff in Supreme Headquarters, Allied Expeditionary Forces, found it necessary to provide the army groups with firm ammunition figures based on amounts available or to become available by 1 May 1945. Maintenance day of supply rates were established for the European Theater.[7] These rates were, in all classes of critical ammunition, lower than the 12 Army Group desired maintenance rates. The European Theater rates allowed for the establishment of 27 days of supply within the army groups and ten days in theater reserve.[1] The figures were reviewed each month and changed as production in the Zone of Interior and receipts warranted.

The ammunition credit allocation system now functioned in the following manner: Communications Zone furnished a weapons list which was used to compute the current European Theater maintenance day of supply rates and to determine the breakdown between army groups. Army groups furnished Communications Zone the quantities of ammunition which each army was to receive. These quantities were derived from a study of the weapons in each army and an activity factor determined by G-3 of the army group.[8] Communications Zone wrote credits on Advance Section depots for each army, and the army was free to call forward the ammunition as needed.[6]

SECTION 5

STORAGE AND ISSUE

92. Change in Demand for Ammunition. During the Ardennes campaign, emphasis on ammunition supply was changed from artillery to small arms, anti-tank mines and rockets. In view of the fact that all available tonnage had been used for the transportation of artillery items up to 16 December 1944, the supply status of small arms and anti-tank items in the forward areas was critical. Anti-tank mines were available in Communications Zone rear depots and were moved forward. All stocks of small arms, especially machine gun ammunition, in the forward depots were allocated and available quantities in rear depots brought forward. The demand was

so great that continental stocks and normal in-flow were inadequate. It was necessary to call in two ships for priority unloadings and to follow through with expedited truck transport direct to the armies.[1]

93. Evacuation of Forward Dumps. First US Army had two ASP's located in the path of the advancing enemy forces. ASP 126, southeast of Malmedy, was over-run 17 December 1944 but not until over 400 tons of types readily usable by the enemy were destroyed by ammunition troops. Plans had been made for evacuation of critical types but could not be accomplished in time. However, the Germans were later partially cleared from the area and the ASP was depleted by issues to combat units. ASP 128, northeast of Bastogne, was over-run 18 December and 2,000 tons of ammunition lost to the enemy. ASP 128A was established at Chaplon, using as stock 1,500 tons then enroute to ASP 128. This point was also captured by the Germans and 800 tons of ammunition lost. Another First US Army shipment of ammunition to ASP 128 was kept on rail cars and moved from one railhead to another, just ahead of the advancing enemy. This finally arrived at Virton, where a railhead was established and turned over to Third US Army.[5]

First US Army also transferred two ammunition supply points to Ninth US Army due to a change in army boundaries. First US Army was reimbursed by transfer of Ninth US Army credits on Advance Section depots.[5]

First US Army deemed it advisable to withdraw as much ammunition as possible west of the Meuse River, and maintain limited stocks only in forward ASP's. Arrangements were made to take over a sub-section of an Advance Section ammunition depot west of Liege, and convert it to an army depot. Over 10,000 tons were evacuated from forward depots and ASP's into this depot.[5]

94. Establishment of Rolling Supply Points. With the limits of the German drive undetermined, it was decided to keep as much ammunition on wheels, either rail or truck, as was possible. Railheads were employed by First and Third US Armies and issues made directly to combat troops.[4] On 24 December 1944 a 125-truck mobile ASP was established by First US Army to support VII Corps in its attack on the enemy salient.[5]

95. Ammunition Supply by Air. American troops in Bastogne had been surrounded and cut off by the German attack and were running low on all classes of supply. Although hampered by bad flying weather, 850 tons of all types of supply were flown in and dropped by parachute or landed in gliders.[1]

96. Improvement in Ammunition Manufacturing Processes. In January 1945, First US Army Ordnance conducted firing tests of 105mm howitzer ammunition to determine whether ammunition lots of late manufacture had improved in accuracy over those tested in the United Kingdom in 1944. Results of the test proved that while dispersion between and within lots was only half that encountered in the previous tests, it was still entirely too great.[9]

SECTION 6

CAPTURED ENEMY AMMUNITION

97. No Change. Since the action during this period involved no gains in ground, there were no developments in handling enemy ammunition.

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CHAPTER 9

ADVANCE TO THE RHINE, 8 FEBRUARY TO 25 MARCH 1945

SECTION 1

LOGISTICAL SITUATION

98. Resumption of Offensive by Allied Forces. The failure of the German Ardennes counter-offensive and the subsequent withdrawal of his forces left the enemy weak and disorganized, enabling our forces to breach the Siegfried Line. First and Third US Armies forged ahead steadily, Third US Army crossing the Saar River on 22 February 1945 and First US Army crossing the Roer River on 23 February. Ninth US Army crossed the Roer River on 24 February. Further north, the British and Canadian armies advanced, and in the south, Seventh US Army and First French Army moved up. The attack gained momentum on all fronts and armored columns raced ahead to the Rhine River. First US Army captured a railroad bridge over the Rhine at Remagen.

99. Advance Section Capabilities. Advance Section, Communications Zone, capabilities were unchanged.[1] Forward ammunition depots had been established prior to the Ardennes campaign and having been restocked, were in an excellent position to support the offensive.

100. 12 Army Group. First US Army, having evacuated ammunition across the Meuse River, had the problem of moving it forward again, which required extensive use of motor transportation. Third US Army, after successfully changing the axis of forward dumps, had new areas reasonably well developed forward. Ninth US Army had remained in place and continued to build up stocks. As a result of previous rationing, ammunition stocks improved to the extent that 12 Army Group was able to partially discontinue rationing. At the beginning of operations in this phase, army ammunition stocks were sufficient to permit expenditures in excess of army group desired rates. Despite these increased expenditures resupply was sufficient to maintain army stocks at desired levels.[1]

101. 6 Army Group. Having fought a defensive action early in January, 6 Army Group resumed its offensive against the Colmar pocket 20 January 1945. The defense and assault exhausted First French Army ammunition reserves and depleted army group reserves. G-3 artillery officer, 6 Army Group, reported 1 February 1945 that it would not be possible to resume offensive operations eastward until 30 days after the Colmar pocket was eliminated, due to state of ammunition reserve. By 10 March 1945 ammunition stocks were sufficient to support a Seventh US Army drive to the Rhine and an assault across the river.[2]

SECTION 2

AMMUNITION ACCOUNTING AND ADMINISTRATION

102. Items Removed from European Theater Maintenance Day of Supply Rate. The original maintenance day of supply rates published by the US staff in Supreme Headquarters contained 42 types of ammunition. Of these types, 26 were slow-moving items. As a result, large quantities accumulated to the army groups' credit. Since these items were slow-moving, there were not sufficient stocks in forward depots to cover the credits accumulated, although quantities were available in rear depots. To save moving unneeded ammunition forward, 12 Army Group proposed that 30 days of supply of the slow-moving items be maintained in forward depots and that the items be removed from the list of maintenance day of supply rates.[3] This proposal was accepted.

103. Termination of European Theater Maintenance Day of Supply Rates. By March 1945, forecasts of availability indicated that the European Theater maintenance day of supply rates would continue to be met at the then current level. The maintenance rates were accepted as the supply target instead of a rationing procedure and were not thereafter revised. However, the availability of artillery ammunition, as indicated by the maintenance day of supply rates, was still lower than the 12 Army Group desired maintenance rate.[2,4]

SECTION 3

STORAGE AND ISSUE

104. Village Storage. Spring thaws in the latter part of February 1945, found most Army ammunition supply points employing roadside storage on narrow secondary roads. These roads, standing up under heavy traffic while frozen, collapsed with the advent of warmer weather. Ammunition stacks toppled and trucks plowed through a sea of mud, causing operations to halt almost completely in some ASP's. All armies, experienced the same difficulty.[5,6] First US Army adopted village storage to facilitate ammunition supply. The village of Buir, Germany, was cleared entirely and ASP 139 established, using the village streets for stacking ammunition.[6] Ninth US Army employed the same means of storage.

SECTION 4

CAPTURED ENEMY AMMUNITION

105. No Change. The area gained in this phase contained no large ammunition holdings. Since the advance was rapid and major emphasis was on forwarding our own stocks of ammunition, little consideration was given to enemy ammunition.

BIBLIOGRAPHY

CHAPTER 9

1. Field Force Logistics, 12 Army Group, G-4 Section, 31 July 1945.

2. History, Headquarters 6 Army Group, Chapter XI.

3. G-4 Periodic Reports, 12 Army Group, dated 141200 August 1944, 211200 August 1944, 281200 August 1944, 041200 September 1944, 111200 September 1944, 162400 December 1944, and 1 March 1945.

4. After Action Report, 6 Army Group.

5. After Action Report, Third US Army, Ordnance Section.

6. Unit History, 100 Ordnance Ammunition Battalion.

CHAPTER 10

ADVANCE THROUGH GERMANY, 26 MARCH 1945 TO 9 MAY 1945

SECTION 1

LOGISTICAL SITUATION

106. Crossing the Rhine and Pursuit of Enemy. At the start of this phase, First US Army had already secured and built up a firm bridgehead at Remagen, Germany. Third US Army started to cross the Rhine south of Mainz, Germany. On 23 March the British 21 Army Group assaulted across the Rhine with the aid of two airborne divisions dropped on the far shore. Ninth US Army crossed under British command. To the south, Seventh US Army and French First Army moved across the river. All armies advanced rapidly. Gains of 60 to 70 miles a day were recorded against a disorganized and retreating enemy. Advances were limited only by extended supply lines and the problem of disposing of thousands of prisoners.

SECTION 2

AMMUNITION ACCOUNTING AND ADMINISTRATION

107. Cancellation of Allocations. Because of low expenditures, both 6 and 12 Army Groups had built up large reserves of ammunition.[1,2] The army groups received no allocations from Communications Zone during the last week of the war. Within the army groups, the armies requested that further allocations not be made.[3]

SECTION 3

STORAGE AND ISSUE

108. Change in Demand. Ammunition expenditures greatly decreased as far as medium and heavy artillery were concerned, but expenditures of tank and small arms ammunition increased considerably. Sufficient ammunition was available to meet all requirements.[4] At the close of hostilities, the armies had built up to 30 days of supply; the only problem during the last weeks of the campaign was one of transportation.[2]

SECTION 4

CAPTURED ENEMY AMMUNITION

109. Cessation of Hostilities. Because of the rapidity of movement during the campaign in the European Theater and demand upon personnel and transportation, little attempt was made by the armies to evacuate enemy ammunition, except when it interfered with military operations, until after cessation of hostilities. To portray the magnitude of disposal activities, the following statistics recorded in Fifteenth US Army history are given: Area covered, 11,400 square miles; miles travelled, 21,071; number of installations reported, 860; number of installations cleared, 112; tonnage reported, 57,151; tonnage collected, 8,024; tonnage destroyed, 5,205; tonnage inventoried, 20,548. Fifteenth US Army fulfilled an occupational mission from 16 April to 10 July 1945 and during this time occupied an area approximating 14,000 square miles, comprised of much of the Rhine Valley, the Saar, and part of the Ruhr industrial area.[5]

110. Types of Installations. The type of enemy ammunition installations captured varied from caches of small arms and hand grenades in

buildings, former gun emplacements containing a few rounds, and scattered small dumps to large depots totaling 5 - 10,000 tons. Much of the ammunition was found in a disordered and hazardous condition which demanded immediate evacuation or disposal by qualified personnel. Other installations were found in relatively good condition with recognized safety requirements being met. Photographs of typical enemy ammunition stacks showing method of storage and illustrating mixed and tumbled conditions are attached hereto as Appendix 9.[6]

111. Major Commands Responsible. No detailed procedures for collection and disposal of the ammunition were published for the European Theater as a whole until after the cessation of hostilities. Under authority contained in letter, Headquarters ETOUSA, file AG 400.93 OPGD, 30 July 1944, subject: "Collection, Salvage and/or Disposal of Explosive Munitions and Hazardous Material in the Communications Zone." (as amended by letter, same file number, under date of August 10, 1944) the responsibility for collection, salvage and disposal of enemy ammunition was placed upon Advance and Base Sections, Communications Zone, and Army Commanders for their respective areas. Each major command was therefor confronted with the problem of working out its own procedures in dealing with enemy ammunition during the campaign and early stages of occupation.[7]

112. Source of Supply to Saboteurs. Although little known use was made by saboteurs to hinder military operations of Allied forces, the threat existed and might well have assumed serious proportions.[5]

113. Hazard to Military Installations and Lines of Communication. Delay in establishment of command posts, gun positions and other installations resulted from the necessity of having to clear the area of enemy munitions and explosives. For security reasons, enemy ammunition near main supply routes, bridges, tunnels and railways demanded immediate evacuation. To reduce the fire hazard and danger of explosion because of poor storage or exposed condition of ammunition, evacuation from villages or other areas where troops were billeted was essential.[5]

114. Danger to Civil and Military Personnel. Because of the sensitivity of certain types of ammunition and ignorance of the danger involved, especially on the part of children, as well as the fact that many installations were mined or booby-trapped, frequent casualties resulted from tampering with enemy ammunition. Souvenir hunting and idle curiosity enlarged the menace. Large quantities of ammunition were rendered unserviceable and unstable by wanton destruction of containers and scattering of contents, thus retarding collection and disposal activities.[8]

115. Guarding. The desirability of guarding all enemy ammunition installations was recognized, but because of the large number of installations, it was impossible to accomplish. Wherever possible, however, guards were posted on installations affecting military operations and roving guards were used to patrol larger installations.

116. Disposition. The large quantity of enemy ammunition necessitated accelerated means of destruction.

117. Casualties. Listed in Appendix 10 to this report is a compiled chart of typical accidents resulting from the handling of enemy ammunition.[9] From study thereof, it is noted that insufficient training, carelessness on the part of workers, and instability of the ammunition were the primary causes for accidents. Attached as Appendix 11 are photographs showing the effects of a blast of a stack of enemy ammunition, and photographs showing the results of an explosion of a 23 car train loaded with enemy ammunition.[10] Cause for the detonations are unknown, although the train explosion is believed to have resulted from

improper stowage and lack of sufficient ventilation.

118. Plan for Area Clearance. In preparation of a plan for area clearance, the following factors were considered:

a. Definite assignment of area responsibility within Advance and Base Sections of Communications Zone and Army areas.

b. Training of personnel to supervise the handling of enemy ammunition.

c. Maximum use of civilian and prisoner of war labor.

d. Centralized depots to obtain maximum use of trained specialists; to consolidate the number of installations for guarding purposes; to provide for greater efficiency in salvage, reclamation and destruction; to insure the maximum degree of safety; and to simplify inventory.

119. Disposal. Provision had to be made for inventorying serviceable enemy ammunition which was captured from the enemy before final disposal could be made. Supreme Headquarters, Allied Expeditionary Force, in Administrative Memorandum No. 5, revised 6 March 1945, outlined the procedure to be used in the European Theater of Operations for reporting enemy war material. Publication of the Enemy War Materials Inventory List, Section I - Ammunition - by the same Headquarters in April 1945, greatly assisted in identifying enemy ammunition and provided a uniform system for reporting.

120. Destruction Techniques. Because of the quantities of enemy ammunition involved, and to accelerate destruction methods, it was necessary to deviate from methods prescribed in TM 9-1900, Ordnance Safety Manual, O.O. Form No. 7224 and other pertinent publications. Paragraph 66h, Ordnance Safety Manual, relative to the destruction of small arms ammunition, outlines the use of a barricaded burning pit with an inclined chute, by means of which cartridges are fed into the fire. The time required to destroy large quantities of small arms ammunition by this method is prohibitive. Consequently, methods were devised whereby much greater quantities could be destroyed at one time. Quantities totaling 10 - 15 tons were placed in destruction pits, covered with powder from propelling charges and ignited by means of a powder train. Another highly satisfactory means of destroying small arms ammunition was the use of pill boxes where considerable quantities could be placed and burned by the use of propelling charges. It was found that five or ten ton stacks of artillery ammunition could be blown by the use of beehives and shaped charges detonated by primacord. Although this method resulted in many duds scattered within an area of 200 yards, the destruction sites were so selected that area policing could be easily accomplished. Maximum use of prisoner of war labor was made in all destruction activities after V-E Day, although extreme difficulty was experienced in securing qualified personnel due to their reluctance to admit knowledge of the subject. Attached as Appendix 12 are photographs of demolition grounds and destruction activities.[11] Disposal by burning or detonation of large quantities of enemy ammunition, such as encountered in the European Theater of Operations, was costly in time, material, and casualties. Transportation and other facilities being available, dumping at sea provided the speediest, most economical and safest means for disposing of large quantities of enemy ammunition. Considerable quantities of ammunition were disposed of in this manner by the Bremen Port Command.

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CHAPTER 10

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2. After Action Report, 6 Army Group.

3. After Action Report, Third US Army, Ordnance Section.

4. Field Force Logistics, 12 Army Group, G-4 Section, 31 July 1945.

5. History, "Fifteenth US Army in Germany, 16 April - 10 July 1945."

6. Photographs of Typical Enemy Ammunition Stocks. (Appendix 9)

7. Letter, Headquarters, ETOUSA, file AG 400.93 OPGD, subject: "Collection, Salvage and/or Disposal of Explosive Munitions and Hazardous Material in Communications Zone", dated 30 July 1944.

8. Letter, Headquarters, ETOUSA, file AG 323.3 OP ORD, subject: "Enemy Ammunition Dumps," dated 3 December 1944.

9. Tabulated Results of Typical Accidents in Handling of Enemy Ammunition. (Appendix 10)

10. Photographs Showing effects of Explosion of Enemy Ammunition. (Appendix 11)

11. Photographs of Demolition Grounds and Destruction Activities. (Appendix 12)

CHAPTER 11

CONCLUSIONS

SECTION 1

AMMUNITION ACCOUNTING AND ADMINISTRATION

121. Control. Ammunition supply was integrated under a single administrative and operational command, and was physically and administratively separated from other classes of supply.

122. Credit System of Ammunition Supply. Ammunition credits and allocations were not applied below the army level except for critical types. Control of critical types was effected by limiting expenditures through command channels.

123. Basic Load. Ammunition re-supply of non-critical types was based on maintenance of basic loads. Unit commanders were required to replenish expenditures from prescribed basic loads as expeditously as possible.

124. Expenditures. Withdrawals from ASP's were considered as expenditures and were automatically replenished from army reserves. Expenditure reports were required by the Ordnance Officer only in special cases.

125. Stock Control. Inaccurate stock control and unreliable statistical information curtailed availability of ammunition. Ammunition personnel were not realistically trained to accomplish their mission.

126. Day of Supply. The ammunition day of supply prescribed by the War Department for automatic supply of ammunition to all theaters of operations initially did not place sufficient mortar and artillery ammunition in the European Theater. Corrective action was taken early in 1944 to remedy this situation, but ammunition supply failed to meet the demand until the last few months of the campaign.

127. Unit of Fire. For initial planning purposes the unit of fire was used but was later supplanted by expressing requirements in terms of rounds per weapon.

128. Desired Expenditure Rates. Desired maintenance supply and desired expenditure rates, expressed in rounds per weapon per day, were used by army groups to determine projected ammunition requirements over a period of time.

129. Units of Measure. Other terms describing units of measure for ammunition had no continuing application.

SECTION 2

STORAGE AND ISSUE

130. Segregation of Artillery Ammunition by Lot Numbers. Every effort was made to obtain segregation of artillery ammunition by lot numbers but it was not accomplished at any level.

131. Field Storage. In inclement weather, field storage was impractical.

132. Roadside Storage. During all conditions of weather, roadside storage was practical.

133. Village Storage. As an expedient combining the desirable features of area and roadside storage, village storage was satisfactory.

134. Truck-borne Ammunition Supply. In fast moving situations, truck-borne ammunition supply was necessary.

SECTION 3

CAPTURED ENEMY AMMUNITION

135. Use. Relatively little use was made of captured enemy ammunition.

136. Loose, Scattered and Damaged Enemy Ammunition. When loose, scattered and damaged enemy ammunition did not constitute a hazard, it was avoided by army Ordnance units and left for Communications Zone units to evacuate or destroy.

137. Serviceable Enemy Ammunition. When found in original containers, enemy ammunition was collected, stored, and inventoried.

138. Bomb Disposal and Ammunition Personnel. Many fatalities and accidents occurred which may have been prevented had bomb disposal and ammunition personnel been adequately trained in handling enemy ammunition.

CHAPTER 12

RECOMMENDATIONS

SECTION 1

AMMUNITION ACCOUNTING AND ADMINISTRATION

139. Control. Recommend that the operation and administration of ammunition supply be controlled by Ordnance group and battalion headquarters, specifically designated and trained as ammunition units. Such units must be furnished technically qualified personnel with the proper military occupational rating.

140. Credit System. Recommend that ammunition credits and allocations extend only to the army level and that rationing of critical types within the army be effected by limiting expenditures through command channels.

141. Basic Loads. Recommend that basic loads for all units be prescribed by the theater commander and that each unit be required to replenish depleted basic loads as rapidly as possible.

142. Expenditures. Recommend that withdrawals from ammunition supply points be considered as expenditures, that re-supply of ASP's be on basis of automatic replenishment of withdrawals, and that combat unit expenditure reports be required only in special cases.

143. Stock Control. Recommend that the appropriate War Department agencies modify existing field manuals and training directives to provide sufficient realistic training of ammunition units to enable such units to maintain accurate stock control and inventory records. Furthermore, recommend that during field exercises each ammunition company of the peace time army be provided with a minimum of 1,000 tons of cast-iron billets representing separate loading projectiles, charges and fixed rounds, to enable realistic training to be carried out.

144. Day of Supply. Recommend that the War Department establish an ammunition day of supply for each theater of operations to govern procurement prior to the stockage of the theater. The theater day of supply must be realistic appraisal of probable needs and adjustments must be made as soon as discrepancies are discovered.

145. Unit of Fire. Recommend that the unit of fire be continued only as a tactical unit of measure to express the ratio at which ammunition will probably be expended.

146. Maintenance Supply Rate. Recommend that maintenance supply rates, expressed in rounds per weapon per day, be adopted as a unit of measure for planning purposes, initial stockage and for general purposes within the theater of operations.

SECTION 2

STORAGE AND ISSUE

147. Lot Number Segregation. Recommend that artillery ammunition be manufactured in large lots, shipped to a single theater of operations by lot and be stored, recorded and issued by lot in all ammunition supply installations. It is further recommended that efforts be continued to improve methods of manufacture to attain standard functional uniformity of ammunition of any one caliber.

148. Roadside Storage. Recommend that roadside storage be adopted as standard operating procedure for ASP's.

149. Mobile ASP's. Recommend that provisions be made for truck and rail-borne supply of ammunition in fast moving situations.

SECTION 3

CAPTURED ENEMY AMMUNITION

150. Personnel. Recommend that five or six enlisted men and one officer of each ammunition company be specially trained in the handling of enemy ammunition to provide qualified on-the-spot personnel to deal with storage, salvage, reclamation, substitute issue, and disposal of enemy ammunition.

151. Training. Recommend that bomb disposal squads be given additional training in characteristics of enemy ammunition so that during operations they may be used to augment trained personnel of ammunition companies and that after cessation of hostilities their services be used to supervise the collection and handling of enemy ammunition.

152. Disposal. Recommend that methods of bulk destruction of enemy ammunition be studied by recognized experts in a theater of operations and that continuing instructions be published as a guide for personnel required to do this work.

E X T R A C T

TWX dated 30 August 1945, Msg Cen No. 513, DARA V DAAA NR R8236/30, from Ordnance Service, TSFET (Rear), APO 887, US Army, to Ordnance Officer, 15 US Army, APO 408

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CITE ORD - 10600-LOGISTICAL INFORMATION YOU REQUESTED FROM COLONEL DAVISSON IS AS FOLLOWS:

PRE-INVASION COMPUTATIONS BASED ON CONTINENTAL REQUIREMENTS OF 7500 LONG TONS OF CLASS V PER DIVISIONAL SLICE PER MONTH. CLASS V EXPENDITURE AT 3.24 AND 1.83 POUNDS PER MAN PER DAY, ARMORED AND INFANTRY DIVISIONS RESPECTIVELY.

EXPERIENCE DATA TO JANUARY 1945. WITH LARGE FORCES ENGAGED INDICATED CLASS V EXPENDITURE CAME TO 2940 LONG TONS PER DIVISIONAL SLICE, OR 1345 AND 1103 TONS PER MONTH PER ARMORED AND INFANTRY DIVISIONS RESPECTIVELY.

APPENDIX NO 1 COMPARISON OF DAYS OF SUPPLY AMMUNITION

(1) WEAPON	(2) WD 10 Nov 43	(3) Recommended by ETOUSA 29 Dec 43	(4) WD Approved for ETOUSA 10 June 44	(5) WD Approved for ETOUSA 1 Sept 44	(6) Recommended by 12 USAG 2 Feb 45	(7) Recommended by 6 USAG 3 Feb 45	h(8) R/W/D Expended From June 44 thru Jan 45	(9) Recommended by ETOUSA 15 Mar 45	(10) WD Approved for ETO 29 Apr 45
Carbine	2	1.5	1.5	1.5	1.5	1	b 0.4	1	1
SMG	10	6	6	6	6	3	b 1.9	3	3
Rifle, Cal. .30, M1903	4	4	3	3	3	1.5	b 0.6	1.5	1.5
Rifle, Cal. .30, M1	4	4	3	3	3	3	b 1.5	3	3
BAR	45	30	30	30	30	10	b 8.4	10	10
Cal..30, MG	100	100	70	70	70	70	b 32.5	50	45
Cal..50, MG	50	40	25	25	25	9	b 4.1	9	9
37mm Anti-Aircraft	10	10	8	5	2	4	1.9	c 3	3
40mm Anti-Aircraft	10	10	8	8	2	4	1.3	c 2	3
90mm Anti-Aircraft	10	10	6	6	6	6	g 5	c 6	7
60mm Mortar	7.5	7.5	7.5	10	8	8	5	8	5
81mm Mortar	5	15	12	15	20	20	d 10.3	20	18
37mm Tank & Anti-Tank	10	10	6	5	1.5	1.5	0.8	1.5	1.5
57mm Gun	10	7	7	7	7	6	d 1.1	4	1.5
75mm Gun	10	10	10	10	6	10	2.6	4	3
75mm How	40	40	20	15	20	20	9.6	e 15	14
76mm Tank	10	10	13	10	6	10	2.3	4	3.5
76mm Anti-Tank	10	10	13	13	6	10	2.3	4	3.5
3 inch Anti-Tank	10	10	13	13	8	10	4.2	6	6
90mm Tank	a 9		9	9	10	10	6.2	10	7
90mm Anti-Tank	a 15		15	15	10	10	6.2	10	7
4.5 inch Gun	20	25	25	28	28	40	d 13.2	28	26
105mm How M2	30	40	40	40	45	50	d 20.3	45	41
105mm How M4	a 30		20	20	45	20	f	f	4
105mm How M3	20	20	20	20	20	20	d 12.1	20	17.25
155mm How M1	20	20	25	25	35	40	d 13.4	35	25
155mm Gun	15	15	25	25	25	35	12.3	25	22.2
8 inch How	10	12.5	18	20	25	30	d 6.2	25	25
8 inch Gun	10	10	10	15	15	20	d 4.8	15	15
240mm How	5	7	7	7	15	25	d 4.3	15	13

a. Added by WD letter "Ammunition Supply Policies" AG 471 (2 Dec 43) OB-S-SPRMT-M, 20 Jan 44.

b. Figures represent withdrawals from ASPs only and do not include expenditures for retraining reinforcements.

c. Recommend 120 days of supply for distribution and to absorb fluctuation in expenditures.

d. Expenditures limited by short supply.

e. Recommend level of 105 days of supply to absorb high rate of expenditure by airborne divisions when engaged.

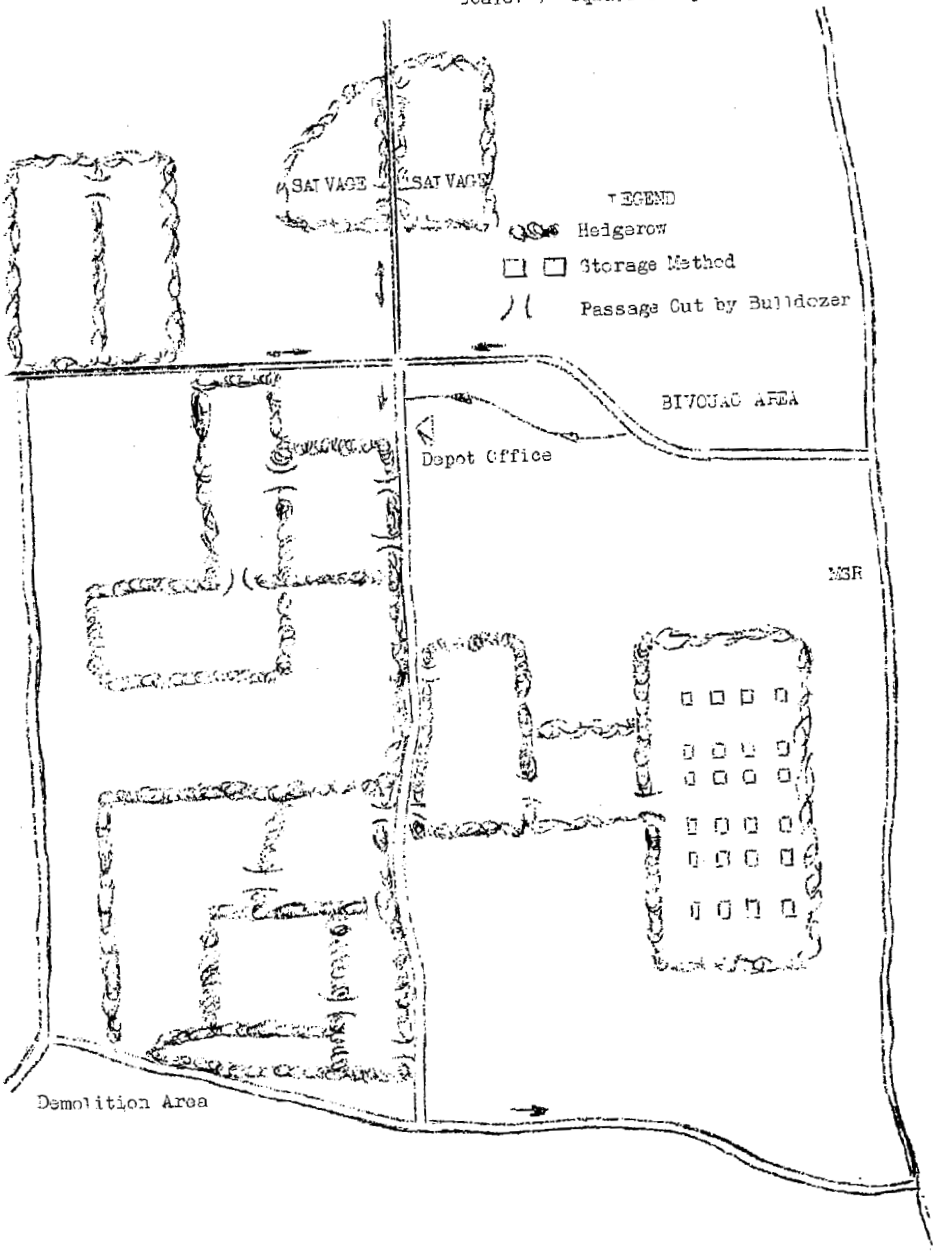
f. Lumped with How 105MM M2A1 and How Motor Carriage 105mm M7 because of relatively small number.

g. Expenditures by Antwerp defenses against V-1 not included.

h. Rounds per weapon per day.

App

TYPICAL FIELD STORAGE
ASP 104 Ten Miles South of St. Lo.
August 1944
Scale: 1" equals 200 yards



Appendix No. 3.

Extract of letter from Colonel Bruce Medaris, Army Service Forces, Headquarters, Fifth Service Command, Fort Hayes, Ohio, formerly Ordnance Officer, First US Army, dated 28 August 1945, to Colonel N. M. Lynde, Ordnance Officer, The General Board.

* * * * * * * * * * * * *

Primarily, Class V supply is inherently a problem of extreme flexibility. I believe it essential that Class V supply not be mixed up with Class II and IV at any point and I am more strongly than ever convinced that our method of having separate group responsibility for and integrating all Class V supply is the best solution. With smaller forces, the same thing could be accomplished by a battalion but, in each case, it should be directly responsible to and under the control of the ammunition officer of the responsible tactical headquarters. The unit of fire, so far as an accurate measuring stick, is useless. It has no purpose beyond being used as a shotgun yardstick in getting up initial supplies for an operation and should be eliminated from consideration as a unit of measurement the moment that resupply can be put over on to a demand basis, allowing stock levels to change as often as are necessary to keep them balanced according to current expenditures. The best system is based on progressive averages, allowing current expenditures to gradually influence stock levels up and down. The General Staff dislike to deal in ammunition by rounds and there is an overpowering tendency to want to find some fictitious unit that can be referred to. We were able to gradually eliminate this tendency and in the closing months of the war, all reports in our headquarters, including the daily reports to the Chief of Staff, were stated in rounds per gun.

As a second major principle, I would say that in a large operation the credit system is essential, as between the Communications Zone and the Combat Zone, but is a definite handicap within the Combat Zone. In other words, credits must be available to armies in Communications Zone depots, and the sizes of these credits should be controlled by the distances and time factors involved. After army receives the ammunition, however, there should be no further thought of a credit system and the Class V supply throughout should be based on a system of withdrawal of expenditures and automatic resupply from army reserves. Where rationing is necessary because of short stocks, the rationing should be placed on expenditures and enforced in the tactical command channel and should not take the form of a limitation on withdrawals which immediately sets up the requirement for complicated bookkeeping. If you will explore this thought, you will see that the establishment of a definite basis for basic loads to be maintained at the specific level at all times by the unit commander is essential to the operation of such a system. The moment any fluctuation is allowed in the stocks on hand in the unit, you give rise to the requirement for daily reports from using units and the evaluation of army reserves by adding or subtracting the difference in units over or below basic loads. Immediately, we have a handful of unnecessary paper work. Our experience adequately proved that it was not necessary for field artillery units or others to carry, or have on hand, quantities in excess of established basic loads, except under the most extreme tactical conditions of attenuated supply lines. Whenever such additional stocks are necessary, we may assume that Ordnance service has failed in its mission.

With respect to ammunition troops, the greatest training lack encountered has to do with the accurate accounting for stocks on hand. This, in turn, is the result of insufficient training in handling ammunition in and out of ASP's under all conditions of weather and light and darkness and with peak loads and varying demands. It is also traceable in some part to not providing sufficient intelligent personnel in ammunition companies for maintaining the records. Ammunition supply is

simple if you know all the time just how much you have and where it is. This is a universal complaint from all armies and can only be corrected as a part of the fundamental unit training of ammunition companies. There must be a recognition of the need for this intelligent personnel to the extent that ammunition companies are provided with sufficient checkers and stock keepers who do not have to take off their shoes to count above 10.

The actual functioning of the office of the ammunition officer varies widely with tactical requirements. Under normal conditions with movement of the army limited to perhaps five miles per day and with tactical conditions influencing expenditures remaining fairly constant, the supply section of the ammunition officer's office confines its activities to determining requirements from the rear for resupply and calling forward the necessary stocks against credits in Communications Zone depots. Under such conditions, resupply of expenditures from ASP's may even be consigned as a responsibility to the ammunition group. All ASP commanders may be allowed to file their daily report of issues as a call for additional stocks. However, whenever new ASP's are to be set up, the ammunition division must time the establishment of the installation and must direct initial shipments thereto in detail. In doing so, it must take advantage of new requirements in the forward installation to complete the clean up of old ASP's and ship additional stocks from depot in only sufficient quantities to balance availability.

On the other hand, when the army is moving forward rapidly, or gets into a critical situation such as occurred during the bulge, the ammunition officer must leave to his assistant the problem of resupply from the rear and must devote his attention to controlling in detail the shift of supply points or evacuation of critical supplies and under such circumstances, he will practically write personally every transfer order between forward ASP's. This requirement, in turn, emphasizes the need for the ammunition officer being available at the tactical headquarters of army during such periods. The ammunition officers of corps are his eyes and ears. They must be sufficiently indoctrinated with the operating methods of the army to be willing to take independent action at the ASP when time or a break in communications necessitates. On the other hand, their normal activities are confined to acting as liaison between the corps commander and the ammunition officer of army, translating the tactical plans for corps into information that will assist the ammunition officer in setting up correct quantities of ammunition at the appropriate ASP.

HEADQUARTERS
TWELFTH ARMY GROUP
APO 655

16 November 1944

Memorandum from G-3:

ALLOCATION OF AMMUNITION FOR THE PERIOD 110600 NOVEMBER TO 110600 DECEMBER

1. In accordance with G-3 activity factors, it is recommended that all ammunition available to the army group for the period 110600 November to 110600 December be divided between armies so that the total available to the three armies for the period 080600 November to 110600 December is in the proportion:

First US Army	46%
Third US Army	30%
Ninth US Army	24%

2. The derivation of these factors is given below:

First US Army

9 active divisions for 25 days	.60	9x25x.60 =	135
9 inactive divisions for 8 days	.25	9x8x.25 =	18
3 inactive divisions for 3 days	.25	3x33x.25 =	24.75
			177.75

Third US Army

8 active divisions for 25 days	.40	8x33x.40 =	105.6
1 inactive division for 33 days	.25	1x33x.25 =	8.25
			113.85

Ninth US Army

5 active divisions for 25 days	.60	5x25x.60 =	75
1 inactive division for 33 days	.25	1x33x.25 =	8.25
5 inactive divisions for 8 days	.25	5x8x.25 =	10
			93.25

Army Group

8 active divisions for 33 days	.40	8x33x.4 =	105.60
14 active divisions for 25 days	.60	14x25x.6 =	210.00
14 inactive divisions for 8 days	.25	14x8x.25 =	28.00
5 inactive divisions for 33 days	.25	5x33x.25 =	44.25
			384.85

Percentage:

First US Army $\frac{177.75}{384.85} \times 100 = 46.2\%$

Third US Army $\frac{113.85}{384.85} \times 100 = 29.6\%$

Ninth US Army $\frac{93.25}{384.85} \times 100 = 24.2\%$

Appendix 5.

Remarks of: Lieutenant Colonel John Ray, Ammunition Officer, First US Army, from November 1943 to 17 December 1944.

The adequacy of training of our troops in the Zone of Interior is questionable. As pertains to ammunition-handling troops at company, battalion and group, the training was grossly unsatisfactory. Our company had never handled any tonnage of live ammunition prior to our opening of ASP's in England in 1943. Furthermore, the soldiers in our depot offices ought to have been taught to count before movement overseas.

The regulating station was an ADSEC agency which dealt directly with staff officers in army headquarters. To my knowledge, they had no contact with the army groups. I used the regulating station to transmit requisitions to the Ordnance Officer, Communications Zone. We then tried to assume that we need not concern ourselves with those requisitions until the receipt of the goods in question. That is, we were supposed to expect that the regulating officer would run them down in order to insure prompt delivery on a pre-conceived schedule. These requisitions were prepared daily. In order to implement his responsibility, the regulating officer placed a small checking agency on our railheads and sometimes in our depots when shipment was by truck. The purpose of this check was to compare requisition numbers as placed and as received and to compare receipt by item with requested items. On paper, this sounds satisfactory. However, because of the lethargy of the Belgian and French railway systems and the inadequacy of the railway operating battalions, and certain ground rules in the rear Communications Zone depot areas (to wit: that a single depot must load a complete train at any one time), the shipments became completely confused. Train loads were received pertaining to as many as ten requisitions. Some shipments arrived two weeks late; some as much as six weeks late; some not at all. We were unable to determine from the regulating officer or from Communications Zone Ordnance or from the ADSEC transportation officer when a particular requisition should be expected to arrive in the army sector. Sometimes even in the case of air shipments we would receive shipments destined for Third or Seventh US Armies, and conversely. Since this unhappy situation prevailed, we informally changed the mission of the Ordnance staff officer of the regulating station and charged him with the responsibility of running down each shipment from point of origin to point of destination and providing us with advice of expected time of arrival. In several cases, the regulating officer provided us with excellent service in the matter of re-routing shipments already on rails; for example, considerable trans-shipment and transportation was saved by high-balling complete trainloads through the Liege depot area up to ASP 127 in the vicinity of Aachen.

As a general comment, the Ordnance officer of the regulating station was not sufficiently independent, powerful or aggressive to overcome the difficulties mentioned above. From time to time he performed grand services, but usually we had to fight out each requisition as a separate battle.

Remarks of: Captain Jerome Belsky, Ammunition Officer, XX Corps, throughout the European Campaign.

Extensive use of enemy ammunition was made by troops of the XX Corps, especially during the period 26 September to 6 November 1944, when, due to retroactive rations, no American artillery ammunition and only small quantities of other types were available. Just prior to receipt of these rations, seven French 155mm Howitzers (similar to the American M1917) were pressed into service to be used by a 240mm howitzer battalion, ammunition for these weapons being located in several captured dumps in the city of Verdun, the Argonne forest, and at Soissons. So successfully were these weapons employed, that this ammunition was tried in the American 155mm M1 howitzer with comparable success. When forced by the ammunition ration to curtail the firing of American ammunition, the Ordnance Section, Headquarters, XX Corps, immediately set out to locate every possible type of foreign artillery weapon and at the same time the ammunition.

The tactical results of the use of these weapons are best indicated by the fact that artillery units maintained firing at the enemy during this entire period, that our infantry was able to continue limited objective attacks assisted by mortars and artillery firing foreign ammunition almost exclusively, that after the fall of Metz, Fort Driant was encircled by a tank battalion firing nothing but French 75mm ammunition under specific orders from the Commanding General, XX Corps, who fully appreciated the necessity for conserving American ammunition, and that foreign artillery and observation positions opposing the crossing of the Moselle were smoked exclusively by French 155mm HC shells rushed up from the Citadel of Verdun when the need for this type firing became apparent.

Remarks of: Lieutenant Colonel A. C. Hutcherson, Ammunition Supply Officer, First US Army, throughout the European Campaign.

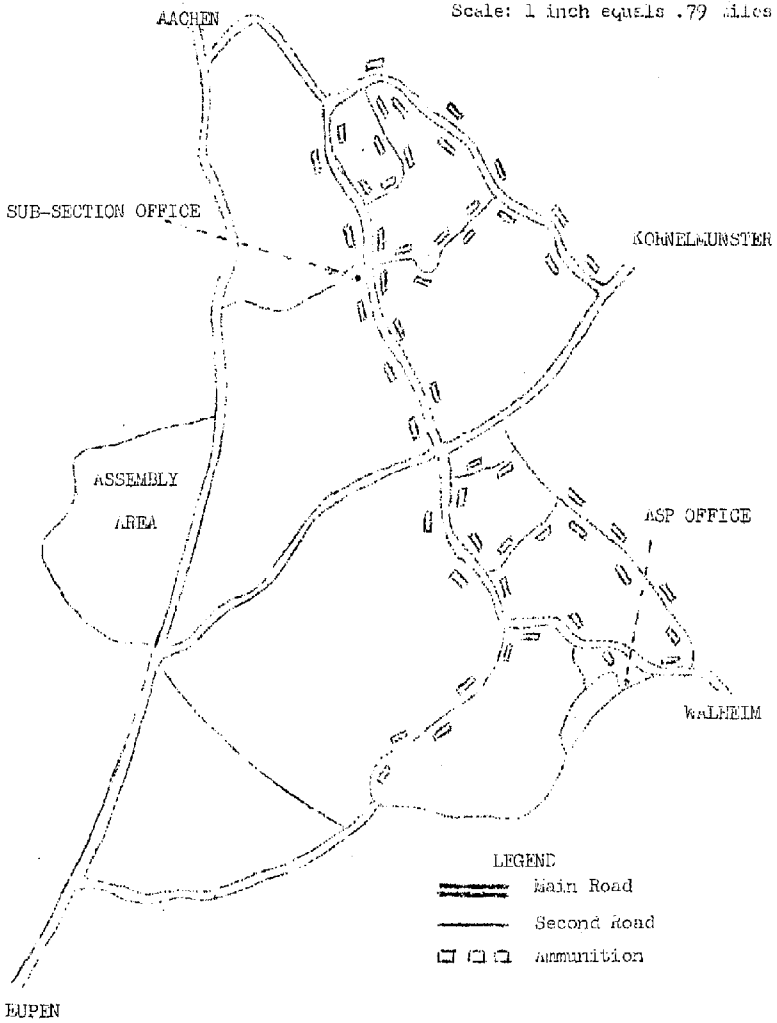
Approximately 7,000 rounds Shell, HE, 155mm Gun, GPF (French), 30,000 rounds Shell, HE, 10.5cm Howitzer (German), 300,000 rounds Shell, HE, 8 cm mortar (German), and an unknown quantity of German rockets of various sizes were used by troops of the First US Army. The GPF rounds were used from our own self-propelled 155mm guns with charge, propelling, 155mm gun M1917-18. The tactical results were satisfactory and saved a like number of Shell, HE, M101, 155mm gun, for use in the M1 guns. The 10.5cm was used with German weapons and assisted in alleviating a critical shortage of 105mm ammunition. The 8cm mortar ammunitionm is interchangeable with standard 81mm mortar ammunition and enabled using units to increase their mortar fire without affecting their allocation of standard type ammunition. Various type German rockets were used, but no reports are available as to tactical results.

Extract: Message, 12 US Army Group to SHAEF.

"Since 1 December 1944 to 22 March 1945 captured ammunition has been used to supplement our requirements in these known amounts: 88mm 14,500 rounds, 105mm German LFH 18 - 34,400 rounds, 155mm Gun - 7,500 rounds, 80mm German mortar - 18,600 rounds."

TYPICAL ROADSIDE STORAGE
ASP 127
October - December
1944

Scale: 1 inch equals .79 miles



Appendix 8.

Appendix 9

Photographs of Typcial Enemy Ammunition Stacks

The following 16 photographs of enemy ammunition installations located in the vicinities of BONN (F5230) and AHRWEILER (F5515), Germany, show methods of storage and illustrate mixed and tumbled conditions encountered. These photographs were taken 15 August 1945.

15 cm Granate 19 Stahlguss
Shell, 19 HE (Cast Steel), 15 cm Field Howitzer.

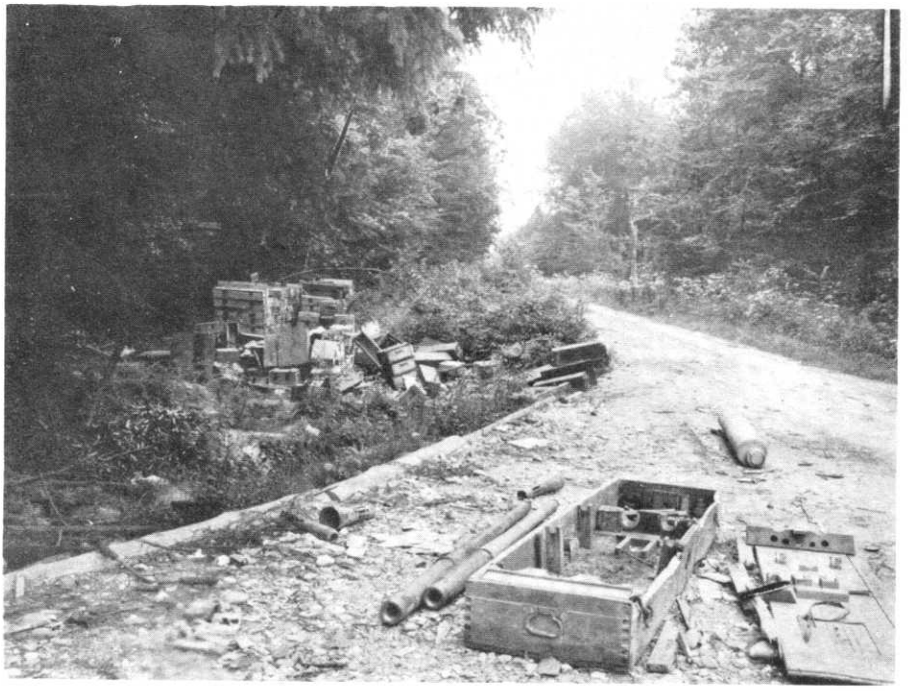
8 cm Wurfgranate 34 für Granaterwerfer
Bomb, 34, H.E., for 8 cm Mortar

8 cm Wurfgranate 34 für Granaterwerfer
Bomb, 34, H.E., for 8 cm Mortar

30 cm Wurfkörper Spr 4491/B
Rocket, H.E., 30 cm

7.5 cm Patrone für Kampfwagen
Shell, H.E., for 7.5 cm Gun

15 cm Granate 19 Nebel
Shell 19, Smoke, for 15 cm Long Howitzer



A disorderly array. Close-up of ammunition stacked in background is shown below.

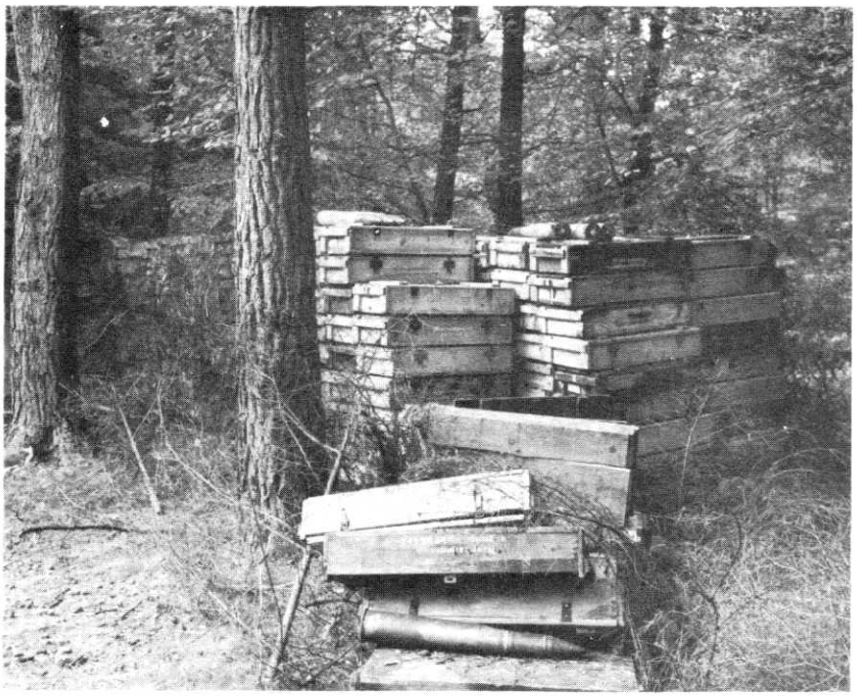
Assorted Mortar, Small Arms and Anti-Aircraft ammunition.

A mined and booby-trapped area.

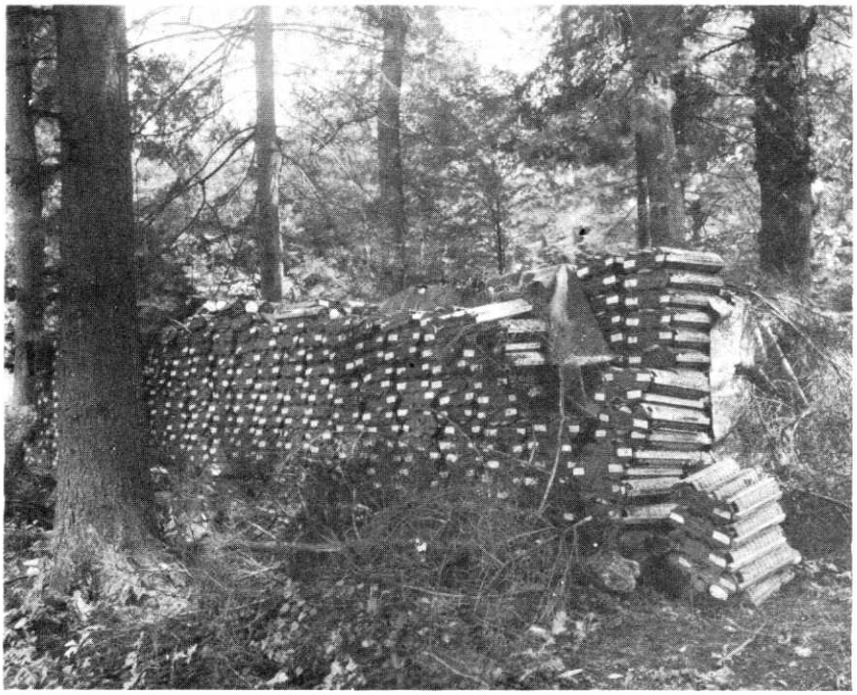
Assorted small arms ammunition.

Scrap brass and powder sticks

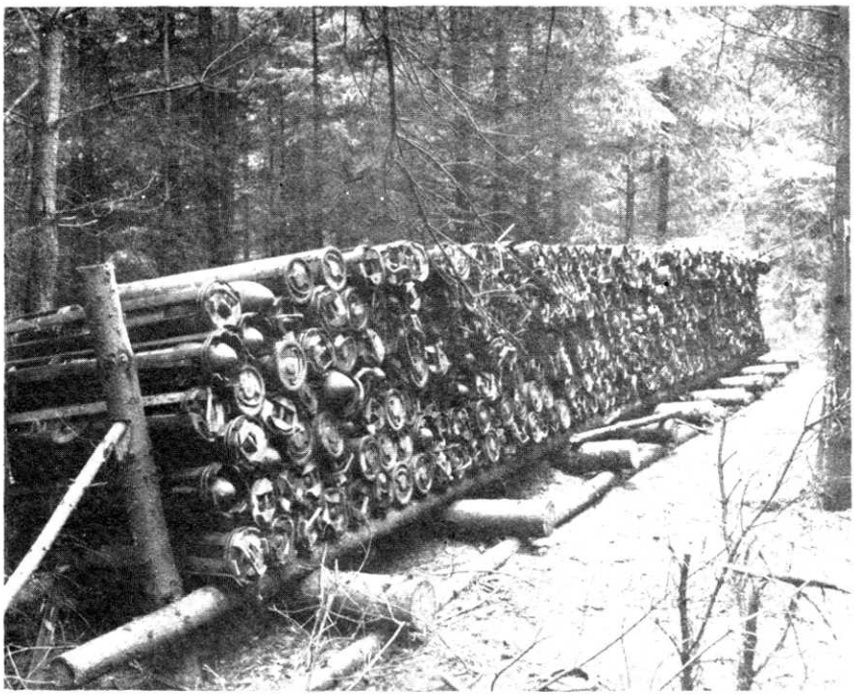
Panzerfaust 60
Grenade, Type 60



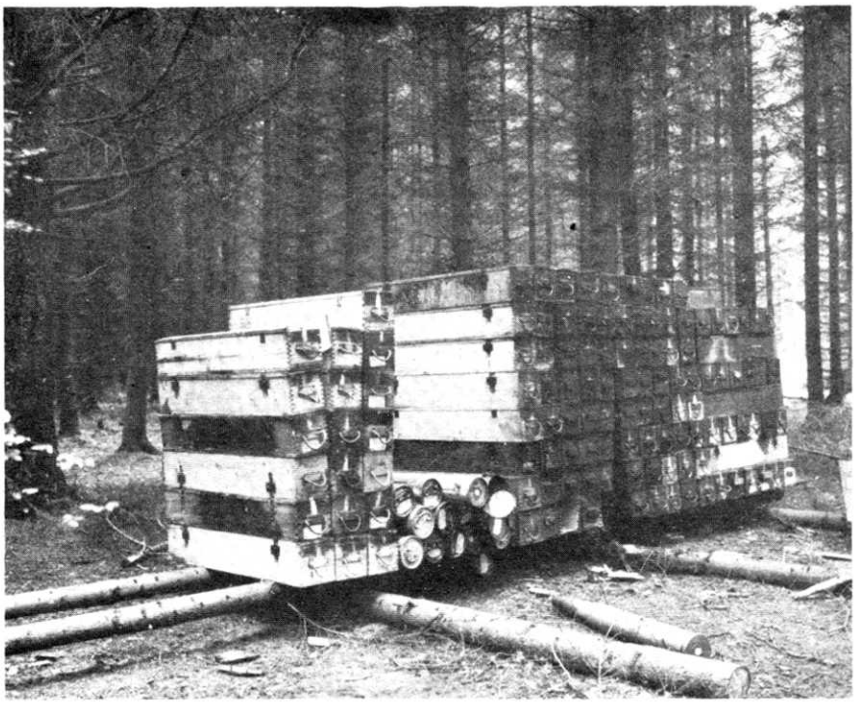
7.5 cm Panzergranate Patrone 39 Kampfwagen Kanone 40
Shell 39, A.P., for 7.5 cm Gun



Hulsenkartuschen (2) für 7.5 cm Feld Kanone 16nA
Charge, propelling, for 7.5 cm Field Gun



15 cm Wurfgrante 41 Spreng
Bomb, 41, H.E. for 15 cm Rocket Projector



8.8 cm Panzergranate Patrone 39/43
Shell 39/43 A.P. for 8.8 cm Tank Gun

TABULATED RESULTS OF TYPICAL ACCIDENTS
IN HANDLING OF ENEMY AMMUNITION

Unit	Type of Operations	Casualties Injured	Casualties Killed	Cause
641 Ord Am Co	ASP unloading	1	3	Defective pins in mines.
637 Ord Am Co	ASP		1	Sensitivity of Panzerfausts.
Depot 0-910	Loading on truck		9	Boxes thought to be booby-trapped.
637 Ord Am Co	Unloading from truck		6	Unknown. Grenades & mines involved.
11 Armd Div	Unloading from rail cars.	4	13	German soldier dropped Teller mine off rail car.
69 Ord Bn	Preparing Riegel-mine for destruction by BD personnel	3	1	Unknown.
69 Ord Bn	20mm ammunition being prepared for destruction		1	Sensitivity of fuse.
69 Ord Bn	Smoke rocket being destroyed		2	Rocket blew out of pit, landed 2 miles away, killing 2 civilians.
762 Ord Bn	Cleaning railhead under Ord supervision	2	1	Panzerfaust dropped on bed of 2½ ton truck.
620 Ord Am Co	Truck load of Panzerfausts enroute to demolition area		7	Unknown.
66 Ord Am Co	ASP, handling propelling charges	40	2	Propelling charges ignited.
66 Ord Am Co	Unloading of Panzerfausts	1	1	Panzerfaust thrown onto ground by PW.
66 Ord Am Co	Unloading Panzerfausts	2		Panzerfausts carefully placed in demolition pit. After placing last round, explosion took place.
691 Ord Am Co	Cleaning up ASP on Utah Beach		28	Accumulation of enemy and US ammunition, much of which was unserviceable. (FUSA Depot 101)

TABULATED RESULTS OF TYPICAL ACCIDENTS
IN HANDLING OF ENEMY AMMUNITION

Unit	Type of Operations	Casualties Injured	Casualties Killed	Cause
689 Ord Am Co	Cleaning up Bastogne area	14		Unknown
100 Ord Am Bn	Demolition of Panzerfausts	2	1	Unknown. All known precautions taken.
100 Ord Am Bn	Moving salvage ammunition by truck	1	3	Unknown.
100 Ord Am Bn	Unloading from rail cars to trucks		6	Sensitivity of Zondbutchen or primedetonators.
15 US Army	Preparing for demolition of mine	1		Unknown.
15 US Army	Transporting of Panzerfausts	2		Unknown.
15 US Army	Unloading of Riegelmines	1	1	Unknown.
15 US Army	Delayed action dud near ASP fire		1	Man was attempting to extinguish fire in ASP when detonation occurred.
15 US Army	Demolition		24	Unknown. Ammunition being handled was 15.5 cm artillery rounds.
15 US Army	Demolition		1	Thought to be supersensitivity of Riegelmine, due to nearby shelling and exposure.
40 BD Sqd	Demolition	1		105mm AP shot blown from pit. Injured girl in village, one mile distant.
28 Inf Div	Loading for demolition	10	5	Sensitivity of Panzerfausts.
117 BD Sqd	Unloading prior to demolition	1	8	Unknown. Panzerfausts and blasting caps involved.
		86	125	

Note: Casualty list includes both military and non-military personnel. Breakdown by type reveals: US troops injured - 51, US troops killed - 71, non-military injured - 35, non-military killed - 54.

Appendix 11

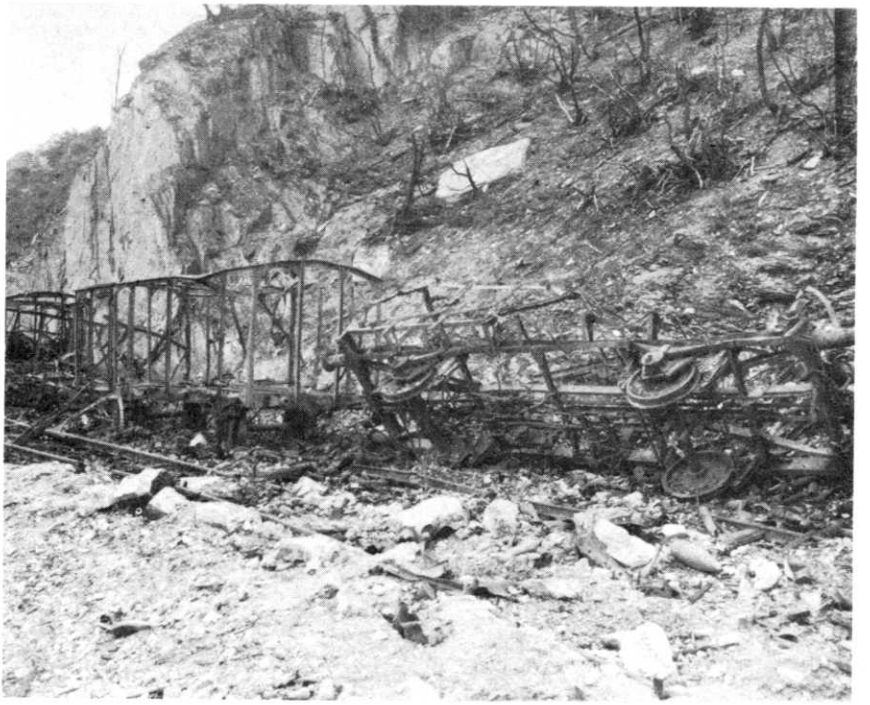
Photographs Showing Effects of Explosions

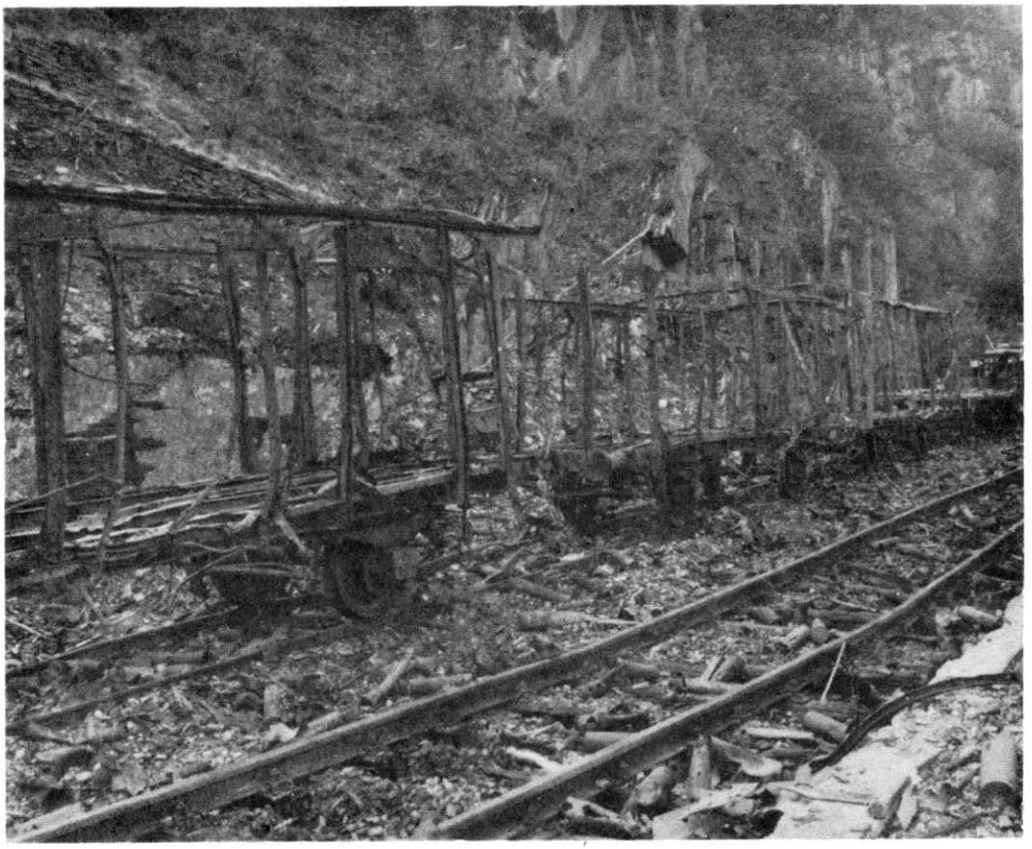
The following photographs illustrate the effects of explosions of enemy ammunition.

The first series of three photographs show the effects of a blast resulting from the explosion of a stack of enemy ammunition.

The second series of four pictures show the extent of destruction caused by the explosion of a 23 car train loaded with enemy ammunition at ALTENAHR, Germany (F4812).

Photographs were taken 15 August 1945.

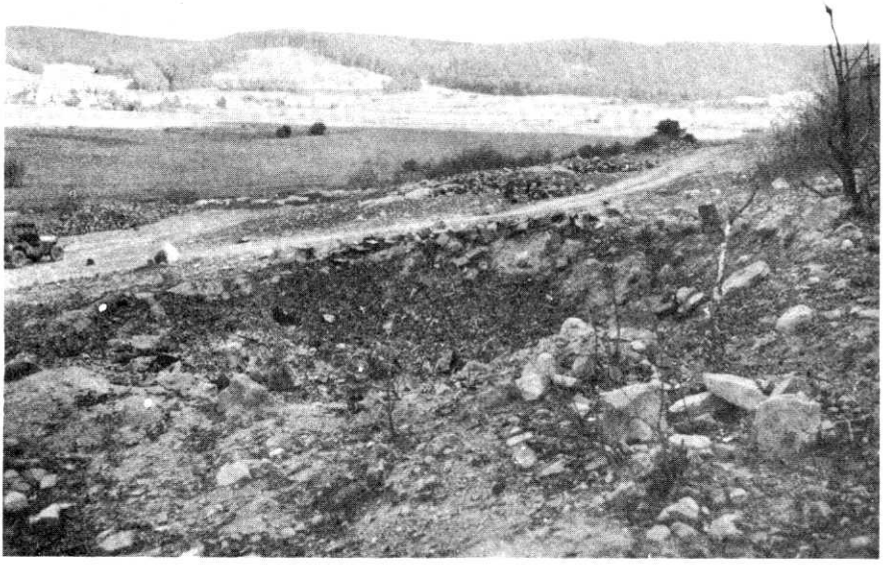




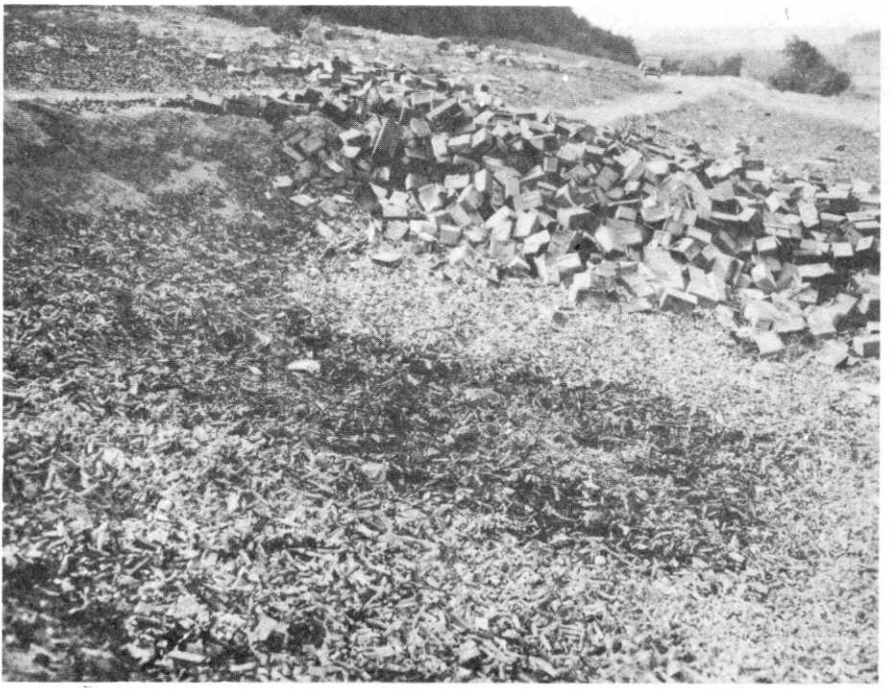
Appendix 12

Photographs of Demolition Grounds and Destruction Activities.

The following photographs taken 2 October 1945 at Depot 151, MARBURG (G7346) Germany, show demolition grounds and activities in connection with the destruction of American ammunition. Destruction work was supervised by personnel of the 91 Ordnance Bomb Disposal Squad.

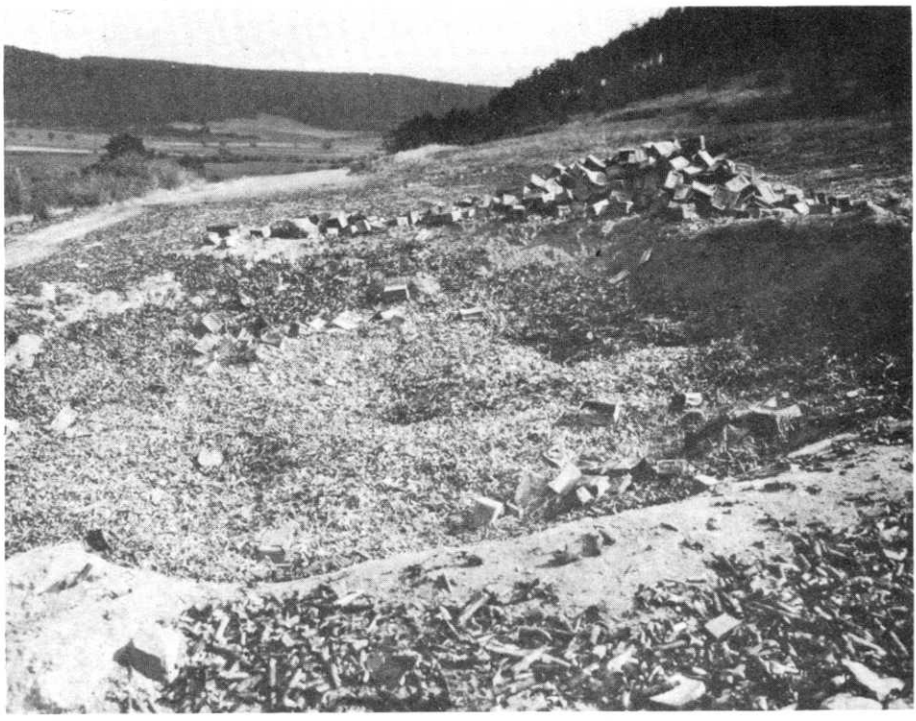


Small arms burning pit and surrounding area.



Pit after burning - an incomplete burning, the darker area is only smoke blackened and undetonated.

Pit before burning - propelling charge is spread on ammunition to depth of 2 to 3 inches and ignited by powder train.



Pit after burning - a complete burning.

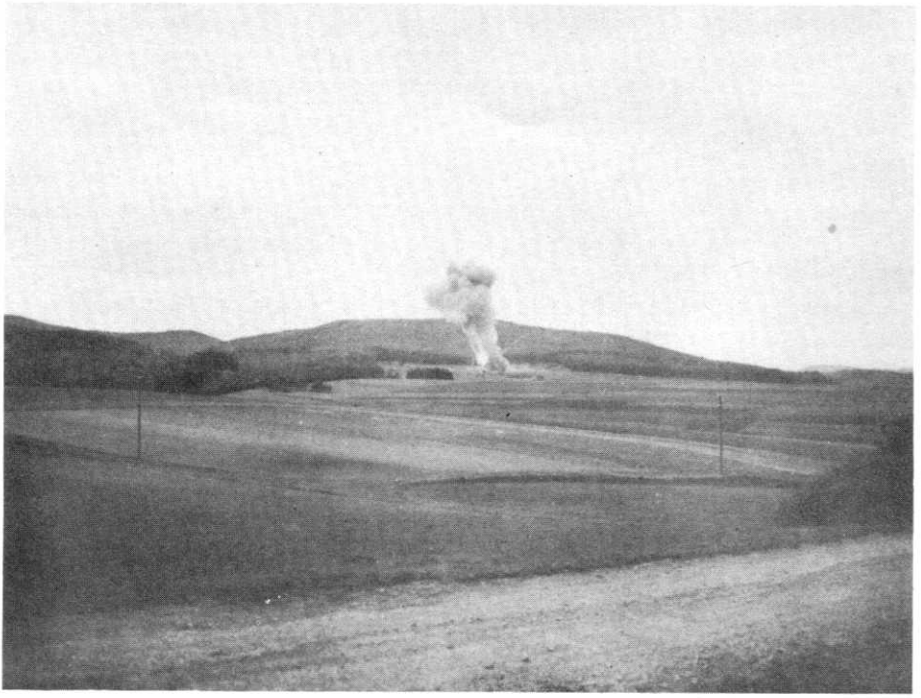
American soliders and German PW's placing 37mm AA ammunition in pit preparatory to destruction.

Connecting prima cord to British "B-Hives".

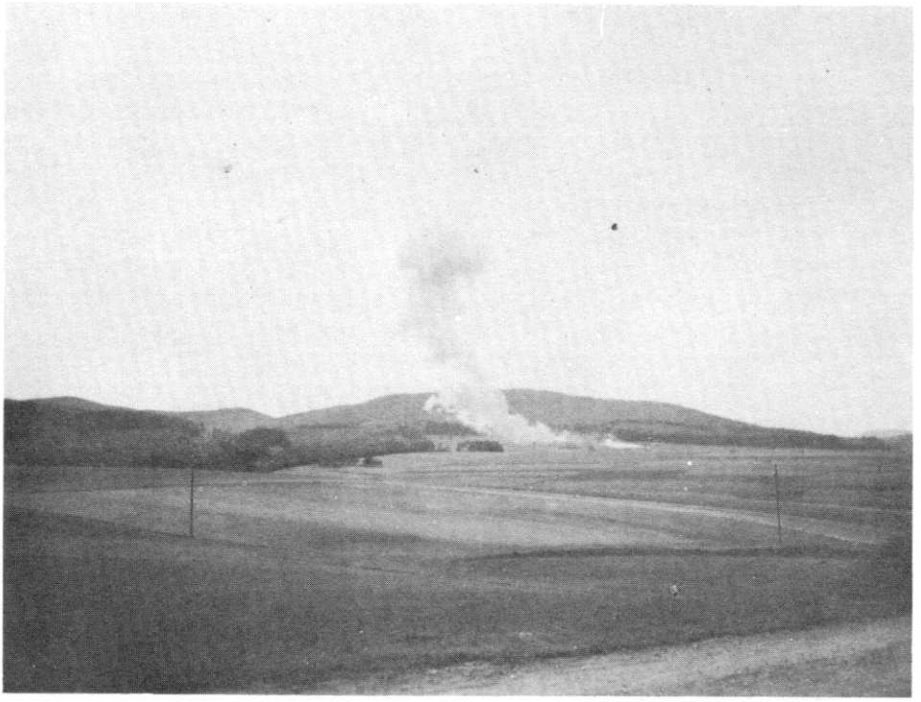
Wiring charge to blasting machine.

Prepared stack ready for demolition.

Safety bulwark. Prepared stacks are detonated from this dugout.



Pit detonating. Note smoke trail of shell arcing to the right.



Pits have been blown. Note WP shell burning to right of pit location.