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IN THIS ISSUE

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Editorial.....	"Rough Stuff Ahead".....	113
Ordnance Training Center Personnel.....	"Lt. Col. George W. Optland"	114
"Will Chemical Ammunition Plan an Important Role in Modern Warfare?".....	by Technical Sergeant H. R. Knickerbocker.....	116
"Know Your Army".....	"The New Army Setup".....	120
The Ordnance Viewpoint.....	"Ski Troops"....	123
"The Background of Military Courtesy".....	by Technical Sergeant H. R. Knickerbocker.....	124
PICTURE PAGES.....		128, 129, 161
Small Arms.....		127
Artillery.....		131
Automotive.....		133
Fire Control.....		137
Notes in Brief.....		139
Administration.....		141
Depot and Supply.....		143
The Ordnance Shop.....		146
Ammunition.....		149
Ordnance Aviation Activities.....		151
Ordnance Training Activities.....		155
Ordnance News Items.....		156
Library.....		157
Ordnance Department Facts.....		162
Gone with the Wind.....		164

THE COVER PHOTOS

Upper Center: Chemical Hand Grenades.

Left: M-56, Service Projectile (with Propellant).

Right: M-56, Practice Projectile, for 81mm. Mortar.

Lower Center: This photo shows an 81mm. Mortar, M01 in action. This is an excellent weapon and has been designed to permit Interchange of its ammunition with the 3" Stokes Mortar.

EDITORIAL

Take a glance at the illustration, and let's study it briefly. A few obvious facts are shown. The little lady has lost her grip on the leash and her bulldog is on the loose even if he is still on the leash. Because of this situation the doggie will find "Rough Stuff Ahead!" The kitty seems amply prepared for self defense. It is easy to believe that Mr. Bulldog is going to suffer; he will get scratches on his nose, and his ego will be considerably deflated. Had the little lady kept a firm grip upon the leash, this potential catastrophe could have been averted.

All this is very frivolous, you may think. But suppose we make a few simple assumptions. Let's say that the bulldog is your ambition; the black cat is the opposition you will meet in the future. The leash represents your control of your ambition or your self control. And, although you will probably find but slight resemblance, the little lady is YOU.

Now we can apply the frivolous illustration in a serious way. You are making a forced hike toward the future, or taking a leisurely stroll through life, just as you wish. You have ambition to some degree. It may be compared to a tiny Mexican Hairless or to a huge and ferocious bulldog, or to some compromise, for you make a choice of the intensity of your ambition, just as you select your favorite "pooch."

Common sense indicates that you, or your ambition, will meet opposition in some form and to some degree. It isn't safe to gamble on whether it can be compared to a sturdy Tom cat, who will show his claws and stand his ground, or to a timid Molly cat who will take one look and scurry up the nearest tree. But, you can be sure there will be some opposition.

Now, comes the matter of the leash,
(Continued on page 126)



Rough Stuff Ahead!

ORDNANCE TRAINING CENTER PERSONNEL

THE ORDNANCE SCHOOL represents a consolidation of the Ordnance School conducted at Aberdeen Proving Ground for officers and the Ordnance Field Service School for officers and enlisted personnel formerly located at Raritan Arsenal, Metuchen, New Jersey. Both schools were organized shortly after the World War. The consolidation was made in July of 1940.

The present staff and faculty of THE ORDNANCE SCHOOL consists of fifty-two officers and three hundred and fifty-seven enlisted personnel of the 40th Ordnance Company.

The Commandant of THE ORDNANCE SCHOOL is Lieutenant Colonel G. W. Outland, chosen by the Chief of Ordnance to administer the activities of the school during its growth and organization.

Colonel Outland's personality, education, and managerial experience enable him to analyze the difficult task at hand and expedite the solution in the most reliable fashion. His manners are formal and stately and colored by his own temperament. His openness of mind and superiority to prejudice are American in the truest and best sense, and he shows the same qualities in private life toward individuals which he displays in regard to his fellowmen of THE ORDNANCE SCHOOL. He has a blue and merry eye, which turns dark and piercing when business warms him or his temper flashes. He is almost always cheerful and jovial under all circumstances, but always ready for any work which requires his attention and supervision.

Not only is Colonel Outland the Commandant of THE ORDNANCE SCHOOL, but he is supervising the construction of the new camp for The Ordnance Training Center on land recently acquired adjacent to the Proving Ground. He was also the supervising architect on the stone buildings recently completed for THE ORDNANCE SCHOOL.

Colonel Outland was born in Ohio on February 21, 1895. He pursued an Engineering Course at the Ohio State University and was graduated in 1916 with a Bachelor of Architecture degree.

When the War broke out he resigned his job in an architect's office at Fort Wayne, Indiana, and reported to the officers' training camp at Fort Benjamin Harrison in Indiana. In view of his previous experiences he was assigned to an engineering company, and shortly thereafter was sent to Fort Leavenworth, Kansas, where he was assigned to the Engineering School.

On the 15th of August, 1917, he was commissioned as 2nd Lieutenant in the Engineer Reserve Corps, and placed on active duty at Fort Leavenworth as Assistant Instructor in the Engineering School.

During October, 1917, he was commissioned a Provisional 2nd Lieutenant of Cavalry in the Regular Army, and in the following January he was ordered to join the 13th Cavalry at Brownsville, Texas, where he was assigned to Troop C of the First Squadron, with station in McAllen, Texas. It was here that he gained his first experience in Army construction by building an Army mess with a crew of Mexican laborers. During this same year he was promoted to First Lieutenant.

Following the Armistice the regiment was transferred to Fort Clark, Texas.



LT. COLONEL G. W. OUTLAND

The Fort was too small to accommodate the requirements of the regiment, and the Commanding Officer detailed him on Special Duty as Constructing Quartermaster, where he supervised the design and construction of a power plant, sewage treatment plant, houses, barracks, warehouses, and an access road.

In September, 1919, he was detailed in the Ordnance Department and sent to the Ordnance School of Application at Aberdeen Proving Ground. He graduated, there, in June, 1920.

He was then assigned to duty in Washington, D. C., in the Tank, Tractor, and Trailer Division. In July he was promoted to Captain and transferred to the Ordnance Department. After three months in this office he was selected to go to the Massachusetts Institute of Technology where he received the degree of Master of Science in Mechanical Engineering in June, 1921.

His next station was the Syracuse Engineering Office in Syracuse, New York, where he spent many enjoyable hours associated with approximately forty engineers and draftsmen.

In June, 1922, he was ordered to Rock Island Arsenal, Rock Island, Ill., here he assisted in organizing a new design section and experienced two very interesting years on automotive development.

In the summer of 1924 he was assigned to command the 33rd Heavy Maintenance Company at Rock Island, Illinois. The company ran a training school and assisted in materiel repair operations assigned to the Arsenal. During this period he was also assigned as one of the shop officers in the manufacturing establishment.

In the summer of 1925 he was ordered to Fort Sill, Oklahoma, to the Field Artillery School, where he was put in charge of all Ordnance maintenance activities at the post.

During the spring of 1927 he asked for assignment to foreign station, and was ordered to Honolulu, where he reported in July. His assignment as Department Armament Officer provided an opportunity to broaden his knowledge of Ordnance maintenance and supply problems.

In the summer of 1931 he was ordered again to Washington, D.C., and assigned to duty in the Artillery Division. At the end of three years he was detailed to the Army Industrial College for the purpose of gaining further training in procurement planning. He was then assigned to the Ordnance Field Service School at Raritan Arsenal. Having received his Majority, he served as a director of this school for a period of three years, during which time many courses were revised under his direction, and most of the buildings, especially those used for theatre, barracks, and mess halls, were completely rebuilt and modernized under his supervision.

In June, 1938, he was sent to Aberdeen Proving Ground to design the new buildings authorized for THE ORDNANCE SCHOOL under P.W.A. appropriations. He was also placed in charge of the Engineering Division, where he supervised all engineering and construction work, including THE ORDNANCE SCHOOL during the following two years.

When the Ordnance Field Service School was brought to Aberdeen Proving Ground, he was assigned to the school but continued the supervision he had been exercising over school construction activities. In August he was promoted to the grade of Lieutenant Colonel. On January 1, 1941, when The Ordnance Training Center was activated, he was assigned as Commandant of THE ORDNANCE SCHOOL. He has in addition continued his supervision of the construction authorized for The Ordnance Training Center.

THE ORDNANCE SCHOOL is growing rapidly and should soon become such an institution of learning that all officers who pass through its portals can be proud of the training which they receive there under the able directorship of

(Continued on page 159)

WILL CHEMICAL AMMUNITION PLAY AN IMPORTANT ROLE IN MODERN WARFARE?

by Technical Sergeant Everett Knickerbocker, Ord. Dept.

(The full and unrestricted use of chemical agents must be conceded as an extremely likely eventuality).

The use of irritant and poisonous substances to diminish the resistance of an opponent is probably as old as organized warfare. Thusydides describes two instances of the use of burning sulphur and pitch in sieges in the Peloponnesian Wars. It was also used throughout classical times, and in the middle ages such methods were frequently employed, Greek fire being a device of this kind. As war became more mobile the range of action increased. The opportunities for the use of such a weapon in its primitive form disappeared, but in 1855 Lord Dundonald proposed a scheme for burning sulphur on a large scale under favorable wind conditions in order to reduce the Malakoff works during the siege of Sebastopol. The suggestion was rejected on the same grounds of inhumanity, and so on up through the years, at rare intervals the use of chemicals was suggested but in most cases was rejected on these very same grounds.

During World War I the use of chemicals reached its apex. At the outbreak of this war none of the combatants had made any preparation for their use. But as the situation became frozen and developed into trench warfare, the Germans in search of a means to again develop the situation into open warfare, tried as early as October of 1914, using an irritant substance in Shrapnel to assist the artillery barrage of high explosive. This was followed by their use of high explosive shell partially filled with a strong Lachrymator against the Russians in the early part of 1915, but due to the extremely low temperature the Lachrymator was ineffective.

The first effective use of gas can also be credited to the Germans. On April 22, 1915, the Germans discharged Chlorine from cylinders on a front of about 4m at Langemark. If the Germans had realized the effectiveness of the gas cloud and had prepared for it, they could have marched unresisted for several miles into French territory. Again, on April 24th, of the same year, Chlorine was released against the Canadians, but again the German Army failed to follow up its advantage, and in a few days the Allies were equipped with crude but effective respirators.

The Allies were quick to adapt retaliatory measures. Soon the use of chemicals became an intricate part of all tactical plans until at the end of the war approximately 30% of the ammunition used was some form of chemical.

Its use reached a peak in 1918 when as much as 80% of gas shell were allotted to some tasks.

From this historical background it is the writer's firm conviction that CHEMICAL AMMUNITION is certainly going to play a great part in any war fought during our time, and it behooves all of us to give it a part of our thought when discussing ammunition, its use, and storage. Because it has not been used to date is no indication that it will not be used tomorrow.

To properly approach the subject we must necessarily have some knowledge of chemical types that will be used. Due to the rigid requirements of a chemical

agent satisfactory for war use, there are only a few capable of fulfilling the task. Of these we can say there are five classes; Vessicant, Lung Irritant, Irritant Smokes (including Lachrymators), Screening Smokes and Incendiaries.

All agents of a blistering nature are classified as vessicants. An outstanding example of this type is Mustard Gas (Chemical Warfare Symbol H. S.). This type of chemical is by nature very persistent, and is normally used to deny ground to an enemy and contamination of bridgeheads that have been destroyed. No discussion of Vessicants would be complete without a word about Lewisite, (Chemical Warfare Symbol M1). This agent is very similar in nature to Mustard (H. S.), but contains the added chemical Arsenic, and has a somewhat faster action on personnel. At the time of development great secrecy surrounded this agent and it was commonly known as "The Dew of Death".

Our second class of agents are the Lung Irritants which affect the respiratory system of the individual only. Phosgene (Chemical Warfare Symbol C. G.), is a very good example of this type of chemical. These chemicals are generally of a non-persistent nature, with their tactical mission of making less effective the enemy fire during or just prior to an attack. Such chemicals being laid down in the form of gas clouds by the attacking force.

Both of the above mentioned types are considered toxic agents, and unless troops are properly protected against them a high percentage of casualties will result.

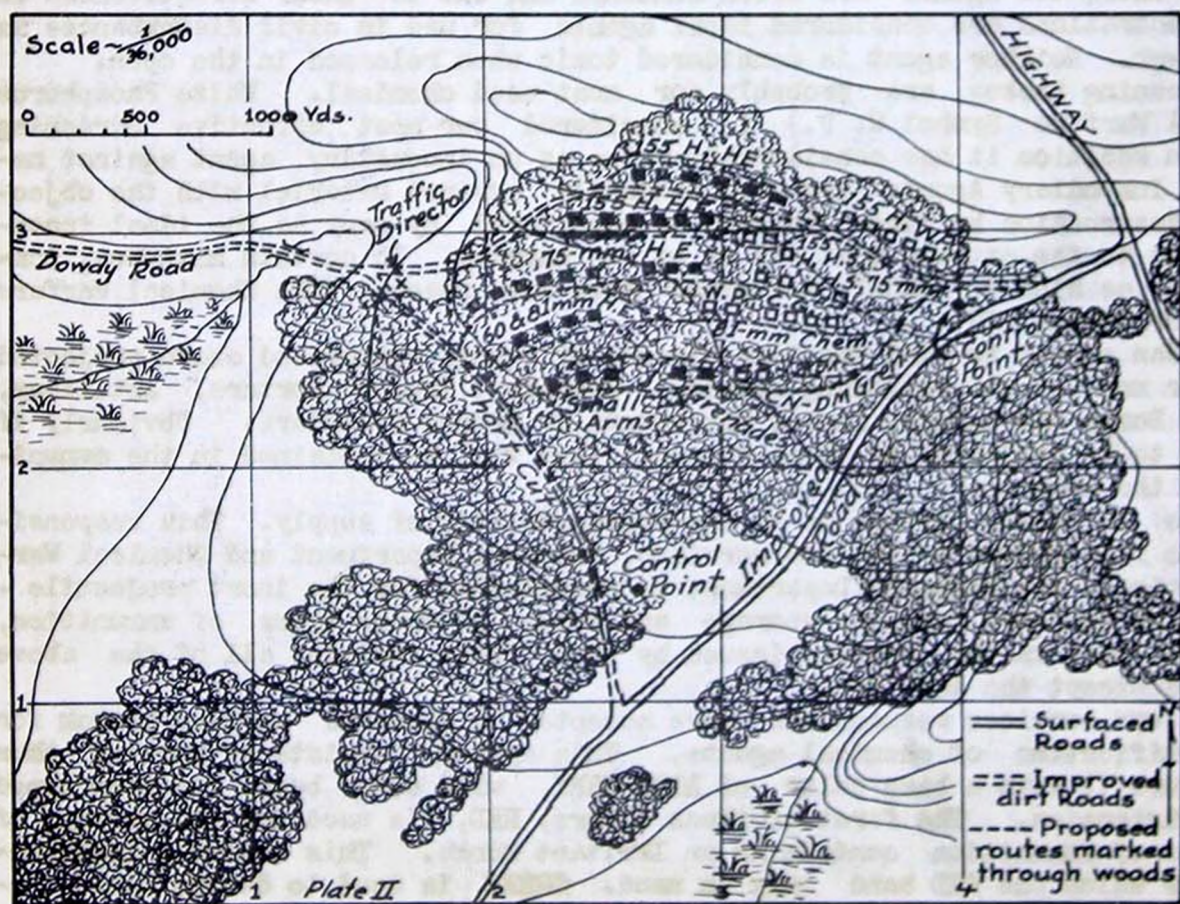
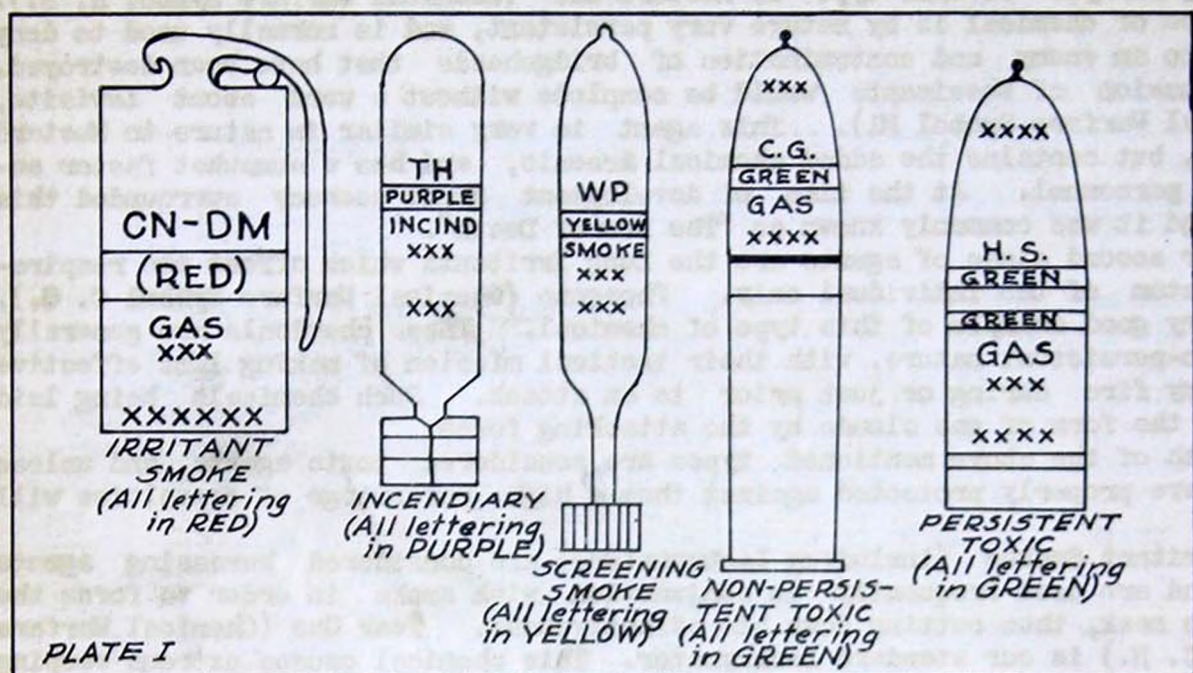
Irritant Smokes (including Lachrymators) are considered harassing agents only, and are used frequently in conjunction with smoke in order to force the enemy to mask, thus cutting down his effectiveness. Tear Gas (Chemical Warfare Symbol C. N.) is our standard Lachrymator. This chemical causes extreme weeping and pain in the eyes. Adamsite (Chemical Warfare Symbol D. M.) is our standard irritant smoke, causing extreme irritation of the nasal passage, and extreme nausea. These two agents are often combined and due to their effectiveness in low concentrations are considered ideal agents for use in civil disturbances as well as war. Neither agent is considered toxic when released in the open.

Screening Smokes are probably our most used chemical. White Phosphorus (Chemical Warfare Symbol W. P.) is considered our most effective Screening Smoke; in addition it has considerable value as an incendiary agent against materiel. Incendiary Agents are used primarily against materiel with the objective of destruction by fire. Thermit is considered by many as the ideal incendiary, due to the extreme heat set up by its burning. In certain mixtures, temperatures as high as 3000° Centigrade have been reached (The Chemical Warfare Symbol for Thermit TH).

We can expect to find the five classes of agents enumerated above projected by one or more of the following methods; Grenades, Trench Mortars, Artillery, Airplane Bombs and Sprays, Levins Projectors or Ground Cylinders. Obviously if they are to be projected by these weapons they will be contained in the ammunition for the weapons.

This of course brings us to the responsibility of supply. This responsibility we find shared by the two services, Ordnance Department and Chemical Warfare Service. The Ordnance Department is responsible for the inert projectile - fuzes, and boosters and the storage and issue of those types of ammunition, which are used in the weapons issued by them. This includes all of the above mentioned except the last two.

The two services responsible have accepted a standard marking system for the identification of chemical agents. This system consists of marking them (see Figure 1) with a base color of BLUE-GREY, with color bands denoting types and persistencies. The first of these colors, RED, is used for the marking of all types of ammunition containing an Irritant Smoke. This includes Lachrymators, for which one RED band only is used. GREEN is used to denote toxic a-



gents, one GREEN BAND for nonpersistent agents, two GREEN bands for persistent agents. YELLOW is used to denote Screening Smokes. This includes W. P., which is considered the most satisfactory of agents used for screening purposes. PURPLE is used to denote Incendiary Agents. This is the marking system standardized for all Chemical Ammunition issued and stored by the Ordnance Department.

At the present time very little Chemical Ammunition is stored or issued, but looking forward to the time when more will be used, several questions of proper handling arise. Our Ordnance Safety Manual is an excellent reference, insofar as Depot and Post Storage is concerned, but our field storage is a different problem. We are presented with the problem of setting up our supply area in such a manner as to best afford protection from air attack, efficient handling of incoming and outgoing stocks, and yet observe the necessary safety precautions.

Of course we all realize the necessity of isolating our Chemical Ammunition as far as possible, and yet having it readily available for issue. The accompanying sketch map sets up a hypothetical situation from which we can further discuss this problem (See Figure 2).

Assume the situation as follows: We have been ordered to set up an Ammunition Supply Point that will supply one division of a corps with one half-day of fire every 24 hours, 25% of which will be Chemical. Our detailed instructions tell us that the enemy is about fourteen miles to our front (north). Our 155mm. How. Artillery Ammunition will contain 15% W. P. Shell, and 10% H. S. Shell. Our 75mm. Artillery Ammunition will contain 25% W. P. Shell. Our 81mm. Trench Mortar Ammunition will contain 25% W. P. Shell and 50% C. G. Gas Shell. Our Hand Grenades will contain 25% CN-DM Grenades.

The Corps Ordnance Officer has notified us that our Ammunition Supply Point will be set up within the limits of the following coordinates; Y coordinates 1.5-3.5, and X coordinates 1.5-3.3. After checking the map our Ordnance Officer takes us forward to reconnoiter the area. The ground is found very solid with trees far enough apart for trucks to drive through any part of the area, if routes are marked in advance. Taking into consideration that the war is moving rapidly, a temporary setup only is considered. Our Ordnance Officer decides to take advantage of the existing road net, and sets up the Ammunition Supply Point proper within the coordinates, Y coordinates 1.8-3.5 and X coordinates 2.3-3.3. The setup, except Chemical, is indicated on the sketch map by solid blocks. The Ordnance Officer then asks our opinion regarding Chemical Ammunition, and states that he checked with the local meteorologist before we came out, and was told that at this season the wind is generally from the south or southwest.

After due consideration we offer these suggestions: The east part of the sector to be assigned to Chemical (as denoted on the sketch map by open blocks), and a wind vane placed on top of the ridge where all can see it; gas masks, and protective clothing for all men working in the area; the smallest number of men capable of handling the task to work in the area; Chloride of Lime to be furnished for the neutralizing of H. S. Gas; G. I. cans of water to be available in all areas where W. P. is handled; all men working in the Chemical Ammunition area to be properly instructed in chemical identification and first aid; the area to be well posted with signs denoting Chemical and type. After these precautions, and the instructing of all men that separate loading Chemical Shell must be placed on some type of dunnage on their base, we feel we are now ready to move in.

Of course this is a hypothetical situation from the mind of the writer, and no doubt the solution is questionable, but it could very easily be considered as one of the many possible approved solutions to this particular problem.

Incidentally, in regard to so much chemical in 81mm., it was brought to the

(Continued on page 126)

KNOW YOUR ARMY

(THE ORDNANCE SERGEANT believes that all Ordnance men are rightly interested in current developments in our rapidly changing Army. From time to time, articles pertaining to some of these changes will be published. Two current news items are here reproduced, with maps added for your information).

U. S. ARMY SET-UP IS CHANGED AS DEFENSE EXPANDS

ADMINISTRATIVE AND FIELD FORCES ARE SEGREGATED

By Griffing Bancroft, Jr.

International News Service Staff Correspondent

Washington, March 3. -- Under current defense expansion the set-up of the United States Army has been altered drastically, the chief purpose being to segregate the administrative work from the active field forces.

Gen. George C. Marshall, as Army Chief of Staff, is the connecting link between the two.

Directly under the Chief of Staff in the active set-up is General Headquarters, or "GHQ", of which Major General Lesley J. McNair is the chief.

Four Field Armies

Coming next under GHQ are the four big field armies. They have headquarters and commanding officers as follows:

First Army, Governors Island, N.Y., Lieutenant General Hugh A. Drum; Second Army, Memphis, Tenn., Lieutenant General Ben Lear; Third Army, San Antonio, Texas, Lieutenant General Herbert Brees; and Fourth Army, San Francisco, Calif., Lieutenant General John L. DeWitt.

Under the field armies are the nine active army corps, with headquarters as follows:

First, Columbia, S. C.; Second, Wilmington, Del.; Third, Monterey, Calif.; Fourth, Birmingham, Ala.; Fifth, Camp Beauregard, La.; Sixth, Providence, R. I.; Seventh, Fort McClellan, Ala.; Eighth, Fort San Houston, Texas; and Ninth, Fort Lewis, Wash.

Types of Divisions

Next unit in each Army Corps are the divisions. Those numbered one to nine are the 10,000-man "streamlined" Regular Army infantry divisions. No separate divisions are planned for draftees, who will be used to fill up Regular and National Guard units.

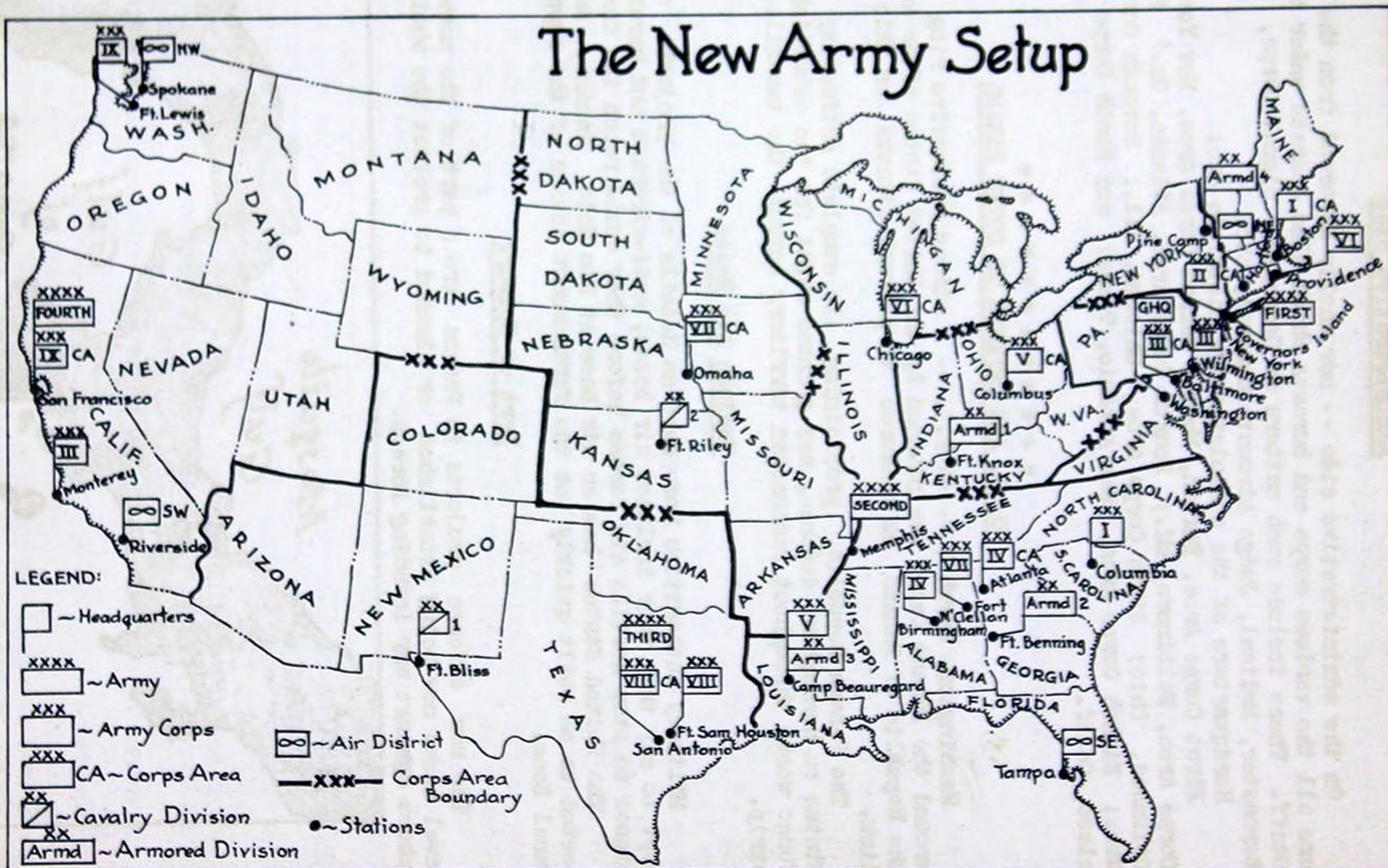
In addition, there are two Cavalry Divisions, and two Armored Divisions, with two more of the latter to be formed.

The head of the active air force is called General Headquarters Air Force, commanded by Lieutenant General Delos C. Emonds at Langley Field, Va.

There are four big air districts, each commanded by a Major General, with headquarters as follows:

Northeast, Hartford, Conn.; Southeast, Tampa, Fla.; Northwest, Spokane

The New Army Setup



Wash.; and Southwest, Riverside, Calif.

Administrative Side

On the administrative side -- now wholly divorced from the active forces -- are all the various corps and bureaus which also operate under the Army Chief of Staff. These include such matters as Ordnance, Signal Corps, Engineers, Quartermaster, Medical, Judge Advocate General, etc.

Headquarters of the administrative districts are:

First Corps Area, Boston, Mass.; Second Corps Area, New York, N.Y.; Third Corps Area, Baltimore, Md.; Fourth Corps Area, Atlanta, Ga.; Fifth Corps Area, Columbus, Ohio; Sixth Corps Area, Chicago, Ill.; Seventh Corps Area, Omaha, Neb.; Eighth Corps Area, San Antonio, Texas; and Ninth Corps Area, San Francisco, Calif.

U. S. AIR DEFENSE TO COVER PANAMA

Washington, March 7 -- (A.P.). -- A strong protective ring of air defense around the Panama Canal was planned by the United States after an agreement with the Republic of Panama on measures to prevent attacks on this vital two-ocean link.

The Panama Republic, proclaiming its complete solidarity with the United States on hemisphere defense, has granted right for the establishment of new defense works throughout Panamanian territory beyond the ten-mile-wide Canal Zone strip.

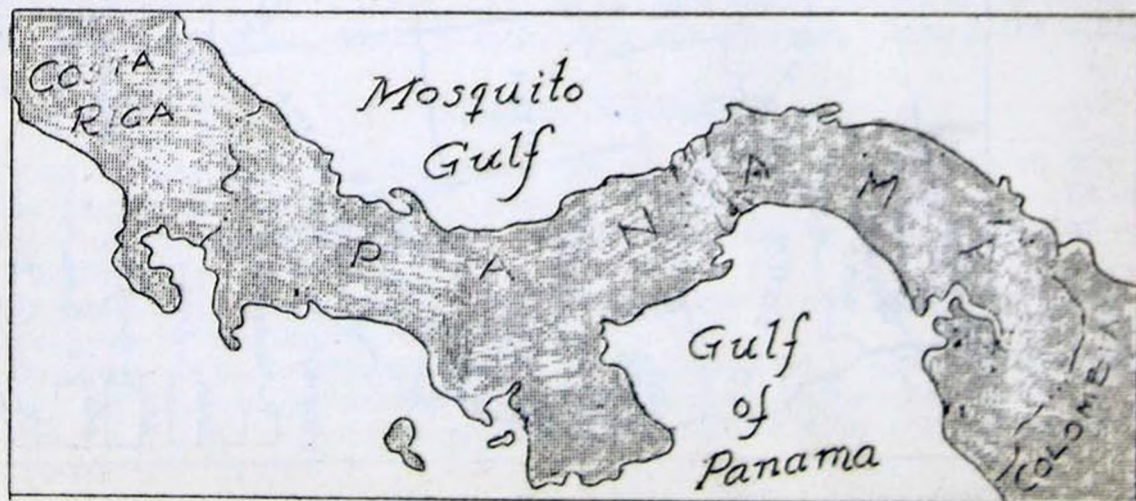
Include Air Bases

Military authorities here gave no details of the projects or locations except to say that they included air bases, anti-aircraft and warning stations designed to stop hostile air forces before they could reach the Canal itself.

The United States has an air base at Rio Hato, Panama. New ones were expected to be built quickly at the farthestmost points of the republic beyond the Canal Zone.

Part of Network

The new defense projects in Panama are a part of the network of air and naval bases now being established or planned to protect the whole Western Hemisphere against any invading forces.



With the acquisition of base rights in eight strategic parts of British territory in the destroyer-base trade last fall, these stretch from Newfoundland to the northern tip of South America.

(Note: These eight bases acquired from Britain were discussed in THE ORDNANCE SERGEANT for March).

THE ORDNANCE VIEWPOINT

(Each month) THE ORDNANCE SERGEANT brings you food for thought on this page, based on current news items).

ARMY SKI PATROL ENDS 7-DAY TRIP

Fort Lewis, Wash., Feb. 24, (A.P.). -- Fifteen officers and men of the 3rd division's ski patrol have completed a seven-day training trip over the southern crest of the Cascade Range -- a hazardous route seldom attempted even by the most expert skiers. The men carried full battle equipment. They made bivouacs in the snow, cooked and ate their meals there and spent the nights protected only by sleeping bags.

* * * * *

There is food for thought in the above news item. There is an opportunity offered there for some Ordnance man who can ski, and who has ideas which might be developed along the proper lines. Suppose we study briefly this recent development in Army transportation.

The ski made its appearance as United States Army equipment last November when Major General George A. White of the 41st Division, stationed at Camp Lewis, Wash., organized the Army's first ski patrol and sent it out to maneuver in Mount Rainier National Park.

Lieutenant Colonel Walter J. DeLong, Intelligence Officer on General White's staff, accompanied the patrol on its first foray, and returned much impressed with what he had seen.

"Ski troops must prove invaluable in any Winter war situation", he reported, "and under certain conditions they might even achieve decisive results.

"With relation to their regiments ski patrols can operate exactly as cavalry does in relation to infantry.

"The main body of the regiment could very well be mounted on snow shoes, which do not require the same degree of skill and training that skis do.

"Fast-moving ski patrols could then be sent out from the main body, either for reconnaissance or combat duty.

"The patrols could perform invaluable service by harassing the enemy at vulnerable points, preventing his reconnaissance and at the same time supplying the main body with exact information of the enemy's movements.

"Ski troops would be especially effective against an enemy not equipped with snow patrols of its own."

Colonel DeLong believes that ski troops would be of greatest value in the defense of Alaska should that become necessary.

No regulations for the arming of ski troops have yet been devised by the Army, so new are the formations. However, it is expected skiers will be equipped with the Garand semi-automatic rifle and light machine-guns.

It would appear that we have a Small Arms problem here. Of course, the use of automatic weapons would also create something of an ammunition supply problem in a combat situation.

It is evident that if the terrain proved suitable these ski patrols would be extremely mobile. They would move faster than anything we now have on land, and unless the ski patrol returned to the main body within a short time, it would be necessary to furnish it supplies by some means of transportation capable of covering the same terrain in almost as short a period of time. Study the situation from "THE ORDNANCE VIEWPOINT".

Could a ski patrolman, on his skis, be expected to keep Garand rifles and light machine guns in operating condition. They might be expected to do so, but do you believe that would be practical? Should an Ordnance mechanic accompany a ski patrol on a combat mission? If so, in view of the fact that he would carry all his equipment, of what should that equipment consist? If not, what arrangements should be made for the servicing of a ski patrol while it was detached, or during the brief periods it would accompany the main body?

Should special covers for carrying equipment be provided for the ski patrol to use in carrying its weapons? Have you an idea for the design of such equipment? How would you establish yourself in the field to cooperate with a ski patrol? How would you solve the ammunition problem?

Get your thinking apparatus in operation. You may suddenly find yourself on a pair of skis, with maintenance equipment on your back. You'll think then. It might be better to think about it in comfort, while you have no trees or rocks to dodge.

THE BACKGROUND OF MILITARY COURTESY

by Technical Sergeant Everett Knickerbocker, Ord. Dept.

Have you ever noticed how thoughtfully and wistfully the Oldtimer looks when this subject came up in the gabfests that are an ever present part of our Army, and how he would shake his head and sigh mournfully, "It ain't what it used to be," and no doubt he is right."

But this article is not written with the thought of correcting or injecting new courtesy. It is more with the hope of giving to all who read this a greater appreciation and respect for the type of courtesy peculiar to the profession of a soldier.

Many and varied are the backgrounds given to Military Courtesy, each perhaps containing a certain amount of truth. After reading, analyzing, and consolidating these historical references we begin to realize the significance of what courtesy really means.

In the early dawn of man's history, as he emerged from obscurity, we find the man an individual sufficient unto himself, and attacking all who would encroach upon his chosen territory.

Later, as the early men banded together, tribes were formed and the most powerful became the leader. Each of these tribes used simple forms of salutation peculiar to their tribe only. Perhaps we can call this the earliest form of Military Courtesy, for, of course, all men of the tribe were warriors.

As we move forward through history we find there are two groups forming -- the fighters and the non-fighters.

During the reign of Julius Caesar over the Roman Empire, the soldier was set apart and looked upon as the most honorable of professional men, and brains took the place of brawn in the position of leadership. With this came respect for the ability of the leaders to the extent that it was expressed with certain courtesies, such as the emptying of the sword hand, and the use of Military Salutations.

Our next big jump is to the Medieval Ages, or the Age of Chivalry as it is sometimes called. During this age it was believed that man was born to a position in life and leadership abilities were inherited. The upper class, or reigning Lords, and Land owners were also the leaders of the Military Forces.

With this came the special courtesies of addressing by rank the Leaders, or as we would call them "The Commissioned Leaders." In addition, the common people were required to address their leaders only when necessary, and no intermingling was tolerated.

And again from this age came the fore-runner of the modern salute. Knights of England, as we shall call them, when meeting in foreign lands, or in lonely places, emptied their sword hands and raised the visors of their helmets, that they might recognize each other. In the presence of the fairer sex the helmet was generally removed.

Again, we find a "Present Arms" of one type or another cropping up throughout history. The best known forms seemed to have been those used by the dualist during the reign of the French Monarchy, and the lowering of the swords and spears at the court of England when the rulers passed. The first was an acknowledgement of mutual respect, the second an expression of loyalty.

These forms of courtesies were carried down through the centuries with additions and subtractions as the mode of living and fighting changed. From this we lead up to the more modern forms of courtesy used by the armies of the world, primarily, the Salute, the "Present Arms", and the manner of speaking.

In any such discussion as this, a word must be said about the Prussian system: This perhaps was the most rigid form of discipline ever used by any army and worked very well as long as there was no shortage of trained leaders. But it was found that instead of developing the initiative of the common soldier, it was submerged in the mass.

Early in our own Army, it was found that a separation within the ranks was necessary, over which the members of each would not step. This of course has a very obvious reason, for as long as the separation is maintained the ability of the leaders to control their commands remains a matter of mere routine. In addition, this gives us a background from which to work in the development of morale in our Army.

Our own system has undergone changes from time to time, but in general the basic courtesies have been maintained. As a side light on this gradual development, and perhaps some of the Oldtimers remember it, the members of the Army of the United States at one time saluted with either hand -- the one nearest the Officer of Color being used for salute.

One of the hardest impressions to make on the mind of the new recruit is the reason for our use of the salute, and our manner of addressing Commissioned Officers. If we can instill in them that there must not be undue familiarity between Officers and Enlisted Men, and that we wish to have a form of salutation peculiar to our profession, the oldest in the world, we will soon have willing

soldiers, who take pride in the courtesies used by them in this, the Army of the United States of America -- the defender of this great and free country.

"ROUGH STUFF AHEAD"

(Continued from page 113)

which we have compared to your selfcontrol. You can keep a firm grip upon it, and thus control your ambitions; or you can hold it with a weak grip and permit your ambition to get away from you. In the latter case your ambition is going to expose itself to scratches, and perhaps even become deflated like the poor bulldog's ego. The damage might be difficult to repair. But, in the first case, you will keep your ambition under control, you will insure moderation in your progress, yet you will increase the chances of its undisturbed continuance.

The Ordnance Department is passing through a crucial period. Many men who are young, both in years and service, have been advanced in an unprecedented manner. It is for these men that this Editorial is intended. The writer is one of them, so he does not write in criticism, but from personal knowledge. Upon you the Ordnance Department is placing dependence. You have been given an unusual opportunity, and you must make the most of it, but --

CONTROL YOURSELF! Work and study slowly if necessary, but always carefully and surely. Meet opposition with both feet on the ground, and with a clear and determined mind. Control yourself, and you will materially lessen the potential dangers of the "Rough Stuff Ahead!"

CHEMICAL AMMUNITION

(Continued from page 119)

attention of the writer just a few days ago, that the 4.2 Chemical Mortar is obsolete, and it is expected that the 81mm. High Capacity M56 Shell, and the 81mm. Mortar will replace it.

In every case where a situation has become stalemated, Chemical Ammunition in some form, if nothing but crude fire throwers, has been used. We can expect no better in the present conflict, nor in any conflict in which we may become engaged.

Some readers have asked if THE ORDNANCE SERGEANT is interested in receiving manuscripts for publication. The answer is "YES", subject to a very few simple conditions. All material must be of interest to Ordnance men, and all articles must be informative and instructive. They may be of any length, and they may or may not be illustrated by drawings, maps, photographs, etc. Certainly there are many excellent ideas floating around among Ordnance Sergeants. Corner one of them and send it in. If you have benefited in any way from this publication, you can pay for it by adding to the information it contains. The address is: THE ORDNANCE SERGEANT, The Ordnance School, Aberdeen Proving Ground, Maryland.

SMALL ARMS

Conducted by Master Sergeant C. G. Goodman

THE M1 RIFLE

REPAIRS

(Stock, Front and Rear Handguard)

by Technical Sergeant H. L. Bagley, Ord. Dept.

The inspection and lubrication of the M1 Rifle have been covered in past articles. The last article covered the new and old front end, so we will start at that point and continue with repairs.

The front hand guard is the first part to consider. There is very little trouble encountered at this point. You will quite often find one split or cracked, but the guard will usually stay in place due to the fact that it is seated in its ferrule and the lower band. In replacing this part it may be necessary to remove a small amount of wood in order to seat it properly in the lower band. There should be a tight fit in the band.

The lower band is next in analysis. It should be held in place with its pin at all times. This pin is quite often left out or lost due to not being properly staked in place. This will cause trouble, as the lower band will rotate slightly on the barrel and rub or bind the operating rod and cause malfunction.

The rear hand guard will cause no trouble other than crack or become loose. If loose, the clip at the rear may be sprung together slightly in a vise, being careful not to split the wood, and replace or refit the guard.

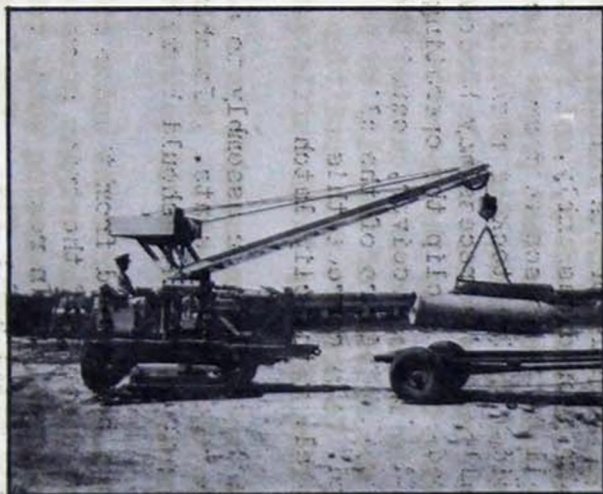
The stock is of black walnut and treated with linseed oil. Very little trouble will be encountered here. At times there will be trouble encountered due to swelling of the stock because of moisture or other reasons. This leads to bending of parts or trouble in assembly or disassembly, and functioning at times. In fitting a new stock, check all cuts to see that proper clearance is maintained. The cut in the left hand side of the stock, for the clip latch to function, should be watched. This small circular recess may be too small and, crowding the latch, in which case in loading the clip the operating rod will be released prior to the clip being seated in the receiver, causing the bolt to strike the back of the clip, or may cause the failure of the clip to be properly ejected on the firing of the eighth round. To correct this condition remove a small amount of wood from the recess to allow the clip latch sufficient room to function freely.

In case the trigger group is too hard to close on assembly to a new stock, the stock may be too high at the area where the group seats. It should require considerable force to close the trigger guard, but this should be well within an individual's power in his hands.

If the strain is too great, wood may be removed from the under side of the stock along the beveled area at the forward part of the trigger group opening - this is 10 degree bevel and should be maintained. In removing wood, very little should be removed, and then the parts tried for a fit. Equal amounts of wood should be removed from each side with a file or sand paper.

(Continued on page 130)

BOMB HANDLING



CRANE PLACING A 2000 LB. BOMB (LESS FUZES AND FINS) ON A BOMB TRAILER.



COMPLETING LOADING OF BOMB TRAILER WITH 500 LB. BOMBS (OLD STYLE)

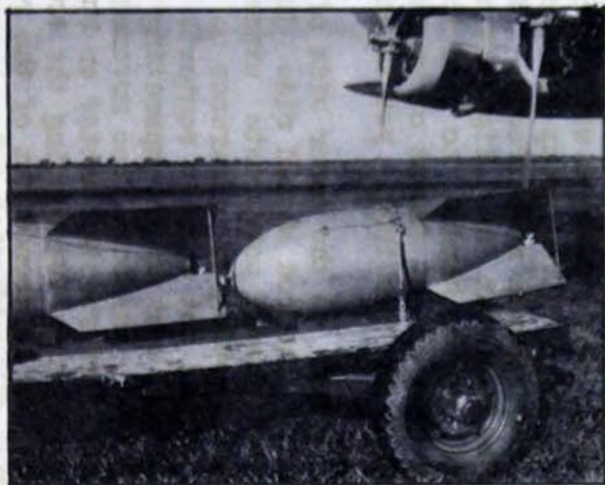


1100 LB. BOMBS REMOVED FROM AN IGLOO MAGAZINE.



800 LB. BOMBS LIFTED UNTO A BOMB TRAILER.

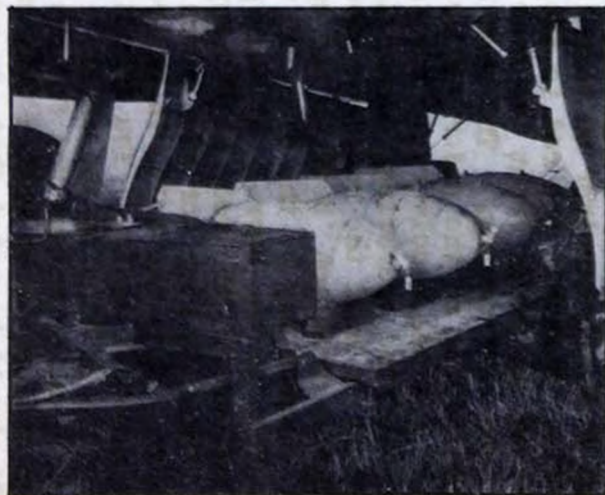
LOADING OF BOMBS



TWO 1100 LB. BOMBS TRUCKED TO ARMY BOMBER.



HOISTING OF 2000 LB. BOMB INTO AIRPLANE.



FOUR 600 LB. BOMBS TRUCKED UNDER OPEN BOMB BAY PRIOR TO HOISTING.



1100 LB. BEING SECURED IN THE BOMB BAY OF A LARGE ARMY BOMBER.

"SMALL ARMS"

(Continued from page 127)

At the rear end of the trigger group opening is a clearance cut for the heel of the trigger, which may cause trouble in the trigger pull at times. It is advisable to check this cut for clearance on fitting a new stock.

The clearance of all moving parts in the forward part of the stock should be watched. Often the binding or crowding of the operating rod may cause malfunctions. This part may be cleared by the removal of a slight amount of wood along the stock at points where the rod has been rubbing or binding.

Trouble may be encountered in fitting up the butt plate on a new stock. It may be necessary to remove a small amount of wood with a rasp or sand paper to fit the plate properly. The screws may enter the hard wood. This may be remedied by using a small amount of soap on the screw. This will reduce the friction on the screw and allow it to be seated down properly.

In the case of a loose stock on the receiver, two or three things may be done to remedy the defect. The replacement of the stock is a sure cure, but prior to doing this we should check the locking lugs on the trigger guard for wear. These two lugs are softer than the mating surface in the receiver and will wear, allowing the stock to become loose. In some cases this part may be replaced with a new part and cure the trouble and in very mild cases of looseness. These two studs of the trigger guard may be peened out and create a temporary remedy for the trouble.

REPAIRS ON RECOILING PARTS

OPERATING ROD

The operating rod is the connecting link between the gas pressure and the parts operating in the receiver. It transmits the power from the gases to the right locking lug of the bolt and becomes necessary for the part to function properly. The first thing is freedom of movement after assembly to the rifle. The rod should first be checked over for burrs on any points that might come in contact with the receiver or barrel and these burrs removed with an oil stone or fine file. Assemble the rod to the barrel and receiver group omitting the bolt. By tilting the rifle front to rear the rod should move freely. If not, check the points of binding. The handle may be bent out of alignment or twisted, causing the lug on the under side rear end of the handle to bind in the cut on the side of the receiver. There should be a slight amount of pressure of the rear end of the operating rod handle against the receiver, yet it should not be sufficient to hold the rod from movement.

Excess friction between the operating rod on the under side of the barrel at the chamber may be the cause of trouble. The rod should ride just as close as possible in the barrel at this point but should not create excess friction.

Next check the rod at the upper band noting the clearance as the rod is moved "front to rear" or vice versa. It should not come in contact.

Next, place the bolt in the receiver and hook up the operating rod and try the tilt method again. You should still have the same free movement, if not note points of binding the cause. You may find foreign matter or burrs in the recess of the operating rod for the right locking lug causing the trouble. The foreign matter can be washed out, or burrs may be stoned out of the recess.

It should be noted that on new rifles the parkerizing leaves a rough surface and makes this action seem rough. This condition will clear up as the rifle is broken in.

Next assemble the stock in place and again check the movement of the bolt and operating rod. Bending may again be encountered first at the stock ferrule. Check for pin in ferrule and alignment of ferrule. This can be remedied by the removal of a small amount of metal if the binding is slight or the ferrule may be spread out to allow the rod to clear, all depending upon the extent of the binding. The forward end of the operating rod handle may be rubbing against the stock along the chamber section. Wood can be removed along this point sufficient to clear the rod.

This discussion of repairs on the M1 Rifle will be continued in the May issue of THE ORDNANCE SERGEANT.

ARTILLERY

Conducted by Master Sergeant W. C. Minshaw, Ord. Dept.

INSPECTION PROCEDURE FOR THE 75-MM GUN MATERIEL, M1897A4

GENERAL APPEARANCE

If the weapon is found to be clean, free from rust, properly lubricated and well painted, you should find the weapon in fair mechanical condition.

BREECH MECHANISM

Test the smoothness of operation by opening and closing the breech-block several times. Disassemble and examine all parts for burrs. Test protrusion of firing pin. Examine breech-block arm and operating handle for looseness. Examine the safety bolt for proper functioning.

BARREL

Make visual inspection of bore for pits, cracks and pastilles. If three or more pastilles are found the barrel should be removed from service. Examine rear end of the powder chamber for bruises.

FORCING CONE

Measure the advance of the forcing cone with the forcing cone gage, if the gage is available (limit .25 inch). If the gage is not available, three selected projectiles may be used to measure the advance of the forcing cone.

STAR GAUGING

The diameter of the barrel should be measured with a star gage at approximately 10 per cent. and 90 per cent. of its estimated accuracy life in rounds fired, and thereafter at each 10 per cent. during the remainder of its service. Also, it should be star gaged at any other time the inspector may deem it necessary on account of doubtful condition, or when the bore shows signs of unusual wear (limit of wear .025 inch).

LEVELING PLATES

The leveling plates should be exactly parallel with the axis of the bore and free from all scratches and burrs.

PISTON ROD CUSHION

Test lost motion between recoil lug and coupler and add more leather washers if needed.

CLEARANCE BETWEEN JACKET ROLLERS AND LOWER ROLLER PATH

With the barrel in battery measure the clearance with a feeler gage. The clearance should not be less than .004 inch.

JACKET CROSS PIECE

Measure the clearance between the jacket cross piece and the upper roller path. The clearance should be less than .004 inch.

SWEPPER PLATE GUIDE WEAR

Measure the lateral movement of the barrel on the cradle. Movement should not exceed .06 inch.

MUZZLE ROLLERS AND COVERS

Examine for smoothness of action, lubrication, etc.

MODIFICATIONS

Inspect to determine if all modification work orders have been completed.

GUN BOOK

Determine if entries have been properly made. Total the number of rounds fired and enter in the gun book.

RECOIL MECHANISM

Test nitrogen pressure and determine the friction of the floating piston. Measure the friction of the piston and the piston rod stuffing box.

INCLINED PLANES

Measure the inclined planes with a special depth gage. Instructions are furnished with the gage.

ROLLER PATHS

Inspect for grooves, scratches, etc.

COUPLER AND COUPLER KEY

Inspect for wear, smoothness of operation, etc.

PISTON ROD STOP WASHER

Inspect for broken or missing washer.

FILLING AND DRAIN VALVE

Examine for leaks, missing parts, etc.

OIL INDEX

Examine oil index for leaks. Drain oil and refill the recoil mechanism to determine if the oil index is functioning properly.

RESPIRATOR

Examine respirator valve and valve seat for pits. Test valve spring for functioning.

TRUNNIONS.

Dismount, recoil mechanism and measure diameter of trunnions. Diameter should not be less than 2.008 inches.

ELEVATING MECHANISM

Test for lost motion in the elevating mechanism. Total lost motion should not exceed 5 mils.

TRAVERSING MECHANISM

Lost motion in the traversing mechanism should not exceed one fourth turn of the traversing hand wheel.

AXLE BRACKET

Examine for missing or loose axle bracket bolts.

HIGH SPEED ADAPTER

Examine for proper adjustment of all parts and assemblies.

THE ON-CARRIAGE SIGHTING EQUIPMENT

Test and adjust sight in accordance with instructions in TR 1410-126. Elevation error limits; plus or minus 3 minutes. Deflection error limits; plus or minus 2 mils.

"THE ORDNANCE SERGEANT"

invites criticism; in fact, constructive criticism is most welcome. Tell us what subjects will be most helpful to you in your work. When possible these very subjects will be covered in departments, or if there is sufficient demand they will be discussed in authoritative feature articles. Help this publication to become more and more helpful to YOU.

AUTOMOTIVE

Conducted by Master Sergeant J. W. Winslow, Ord. Dept.

THE ECLIPSE GENERATOR AND CONTROL BOX

by Technical Sergeant Floyd E. Coleman, Ord. Dept.

It has come to the attention of the personnel at the Ordnance School that many people associated with tank electrical work do not fully understand the functioning of the generator and control box used on these vehicles. We believe that the following discussion will help in comprehending the complexities of these units.

The generator is a device for converting mechanical energy into electrical energy. The construction of a generator is comparatively simple, it consists of the frame or yoke which carried the field coils and field shoes; the armature, which consists of a shaft on which is pressed soft iron stampings which form a laminated core around which is wrapped the armature windings. These windings are soldered to the commutator bars which are insulated from the laminated core, shaft, and from each other. Other parts of the generator are the front head, which carries the brushes and one of the armature bearings; the intermediate head which carries the other armature bearing; and the mounting head, that fastens the generator to the engine.

The field coils are wound around the field shoes in alternate directions to form electro-magnets with unlike poles together. Magnetic lines of force travel from the North pole to the South pole causing a magnetic field between the two unlike poles. When a conductor (wire) or a number of conductors are rotated, within this magnetic field current will be induced in the conductor and carried to the commutator where it is picked up by the positive brush, carried through the external circuit (battery, etc.) and returned to the armature winding by the negative brush. The field shoes are made of soft iron so that they will magnetize and demagnetize rapidly, retaining only a small amount of magnetism in order to have an initial magnetic field for use after the generator has been at rest. The magnetism retained in the field is known as residual magnetism. In order for the field windings to become energized, a current has to travel through them. This current is picked up from the positive brush and is branched off (shunted) through the field winding and grounded to the frame of the generator or in the control box.

As the speed of the armature is increased the current through the field windings and external circuit increased up to the point of complete magnetic saturation of the field shoes. By this it can be seen that the stronger the magnetic field the armature is rotating in, the stronger will be the current generated with a higher voltage or pressure. With this condition present the generator will burn up, and therefore it is easy to see that it is necessary to have a voltage and current regulating system combined with a shunt type generator. Either of these regulating units uses a resistance in the field winding of the generator when the voltage or current rises to a predetermined value to which each unit is adjusted. The three-unit control box which is used with the shunt type generator consists of the voltage regulator, current limiter, and reverse current relay, all of which operate on the electro-magnetic principle.

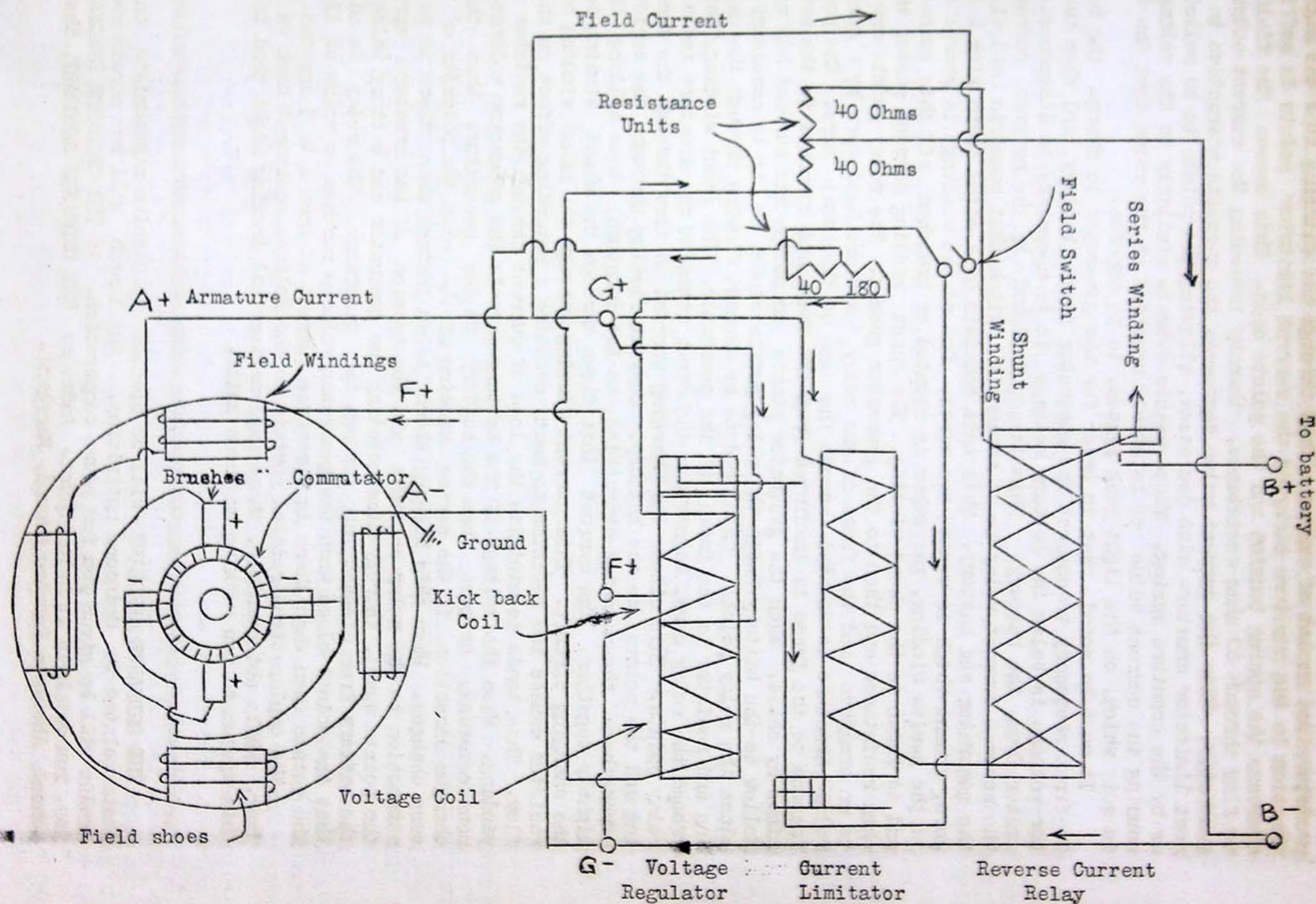
It must first be noted that in charging a battery the generator voltage or pressure must exceed the battery voltage in order to force a current through the

battery. As the battery nears a fully charged condition the resistance to the generator current increases and it takes a higher generator voltage to force current through the battery. The voltage must be regulated to a value high enough to fully charge the battery but not high enough to overcharge it. Overcharging would damage the battery and accessories. Voltage regulation is done by inserting resistance in the generator field circuit, causing a weaker magnetic field in the generator. The generator armature rotating in the weakened magnetic field will not have as much current induced in its windings, nor as much voltage or pressure impressed on this current.

The voltage regulator consists of a metal frame, on which is mounted a metal core. Around this core, and in opposite directions to each other, are wound the voltage and "kick-back" coils. Directly above this core is mounted an armature carrying one of the voltage points which is held in a closed position against the other voltage point by a spring. This spring is mounted on the voltage regulator frame. The current flowing through the voltage winding and a 40-ohm resistor is shunted or branched off from the main charging line in the control box. This current magnetizes the voltage core which attracts the armature carrying the voltage point. When the magnetic attraction becomes strong enough to overcome the spring tension on the armature it pulls the voltage points apart. The generator field current which had been flowing through the points without any resistance is now forced to take another path through 60 ohms resistance which will weaken the generator voltage. Some of the generator armature current goes through the 60 and 180-ohm resistance units to the "kick back" winding which, being wound in the opposite direction from the voltage coil and around the same core, will oppose the voltage coil, causing a quick collapse of the magnetic field around the voltage core. The spring will then pull the voltage points closed again, eliminating the resistance in the generator field circuit. This point vibration goes on so fast that it cannot be observed except by a slight sparking across the voltage points. The speed that these points open and close causes the generator voltage to remain almost constant at the value for which the regulator has been adjusted. In the case of the light tank which has a 12-volt system, the voltage regulator is adjusted at 14.5 volts.

To better understand the operation of the current limiter it must be noted that it does not operate unless there is an excessive current flow from the generator. There are several conditions which might cause excessive generator current but, assuming that the system is in good condition, there remain only two: discharged or low battery, and accessories. When the battery is in a discharged condition it offers very little resistance to the generator current, therefore, the generator voltage or pressure would be low, but the current flow would be high. Again it becomes necessary to lessen the current output of the generator. This is accomplished by inserting resistance in the generator field circuit as was done by the voltage regulator. When an excessive amount of accessories are used, even with a fully charged battery, the current flow from the generator would be high because electric current tends to follow the path of least resistance. It will be noted that with accessories in use, the battery resistance is partially eliminated from the charging circuit. If the battery resistance was entirely eliminated the accessories would be damaged.

The current limiter has a metal frame with a metal core, around which is wound the main charging line. The current limiter points consist of one point on an armature mounted to the frame and one point which is insulated from the frame. A spring holds these points closed. The generator field current passes through these points before reaching the voltage regulator points, so if either the current limiter points or voltage points are opened the generator field current has to go through resistance. The current limiter core is magnetized by the current flowing through the main charging line of the generator. When a



INTERNAL WIRING DIAGRAM FOR LIGHT TANK (GENERATOR AND CONTROL BOX)

predetermined amount of current flows through the charging line the magnetic attraction to the armature carrying the current limiter points is sufficient to overcome the spring tension and the points open. This causes the field current to flow through 60 ohms resistance, thereby lessening the current output of the generator. When the current value decreases the magnetic attraction to the current limiter armature also decreases, allowing the points to be pulled together by the armature spring. These points vibrate similarly to the voltage points causing the current value to be nearly constant at the value that the limiter is set; which, on the light tank system, is 55 amperes.

It must be noted that in order for the generator to charge the battery it is first necessary to connect the generator to the battery, and when the generator voltage is below the battery voltage it is necessary to disconnect the generator from the battery. This is accomplished by the reverse current relay. The reverse current relay is an automatic switch that connects and disconnects the generator and battery. This unit consists of a metal frame with a soft iron core, around which is wound two wires. One of the windings is coarse and known as the series winding, the other is shunted or branched off this coarse winding and is known as the shunt winding. The shunt winding current passes through 40 ohms resistance and then to the generator ground. The relay points are fastened to an armature and the frame of the relay, and are held open by a spring. The relay armature is mounted across the end of the metal core. The point that fastens to the frame is insulated from the frame and connects to the battery terminal by cable. When the generator starts to charge the current has no path to follow to the battery until the relay points close, so it is necessary to first close the relay points. This is done by current flowing through the shunt winding and resistor to the frame of the generator. The shunt winding, being wound around the relay core, magnetizes the core, attracts the armature and closes the relay points. This allows the charging current to flow through the series winding and the points to the battery. Current flowing through the series winding strengthens the magnetic attraction to the armature, thus holding the points tightly together. The current that flows through the shunt winding is lost to the charging circuit. This current flowing through the shunt winding and 40-ohm resistor causes the resistor to heat, creating a retarding effect on the current flow. This tends to minimize the loss of current through the resistor and shunt winding. When the voltage of the battery exceeds the generator voltage the current reverses, or goes from the battery to the generator. When the current changes direction in the series winding of the relay the polarity of the relay core changes. When this happens there is an instant when there is no magnetic attraction to the relay armature and the tension of the armature spring pulls the points apart, thereby disconnecting the generator and battery which prevents the battery from discharging through the generator. The relay is adjusted so that the points close when the generator voltage reaches a value of 13.5 volts. The points open when there is a reverse current of from 1 to 3 amperes.

The explanations related pertain to the Eclipse equipment used on the Light Tank. While not complete, these explanations and drawing might tend to simplify this system to men working on these units.

THE ORDNANCE SERGEANT will be pleased to receive manuscripts on all subjects related to Ordnance activities. Any length will be considered. Ample credit will be given you for your cooperation. If THE ORDNANCE SERGEANT helps you, you can help it help others. Address: THE ORDNANCE SERGEANT, The Ordnance School, Aberdeen Proving Ground, Maryland.

FIRE CONTROL

Conducted by Second Lieutenant R. L. Johnson, Ord. Dept.

ELEMENTARY OPTICAL PRINCIPLES

Part 4

(It is suggested at this point that the reader review Parts 1, 2 and 3 of "Elementary Optical Principles" prior to reading this installment. It is essential to a clear conception of the rest of this chapter. The more advanced principles of elementary optics, to be discussed from now on, consist of practical applications of the abstract principles which have been discussed previously).

The image formed by a diverging lens is illustrated in Figure 19.

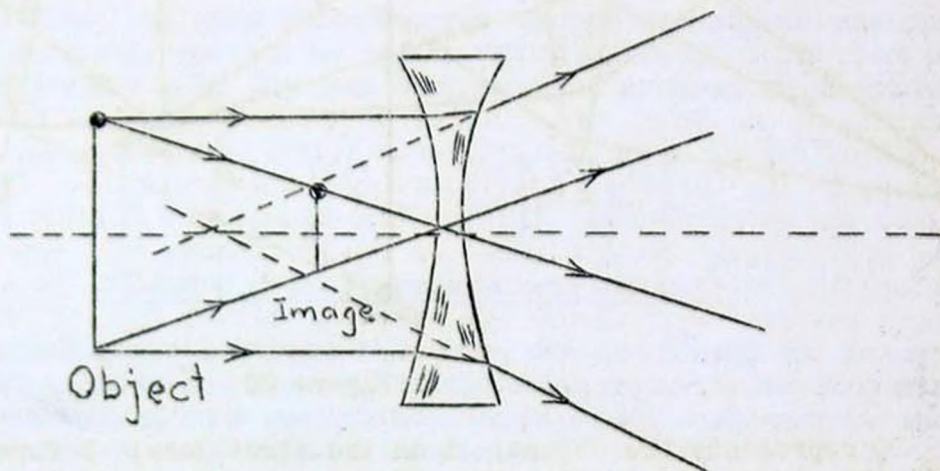


Figure 19

The image formed by a diverging lens will always be a virtual image; smaller, erect, and on the same side of the lens as the object, regardless of how near or how far the object viewed is to or from the lens. A close examination of Figure 19 will make this obvious. Note that it is impossible for the rays to ever converge after passing through the diverging lens shown. Consequently the above holds true.

In this case the image is virtual, erect, and much smaller than the object. Under these conditions it can be seen that the diverging lens does not magnify the appearance of an object, but instead makes it appear much smaller. However, it has one advantage. The field of view, which may be viewed through a small opening will be much larger than if only the unaided eye were used.

In reviewing the case of Figure 17 (Part 3) it can be seen that the lens formed an image of an object. The object may have been any distance in front of the lens from its focal length to infinity. In all cases the image would be smaller than the object. But in Figure 18 (Part 3) it is seen that when the object is between the lens and its focal length, the image would be formed on the same side of the lens, and would appear larger than the object. Now assume that it is desired to view an object which is at such distance from the observer that the unaided eye cannot distinguish details of the object clearly.

Then it is clear that if a lens similar to the one used in Figure 17 (Part

3) were used to form an image of the object, that the image $O'P'$ could be used as an object for the lens shown in Figure 18 (Part 3). The result would be that the final image formed by the second lens would be greatly enlarged, and would aid the observer in distinguishing details of the object. The combined system is shown in Figure 20.

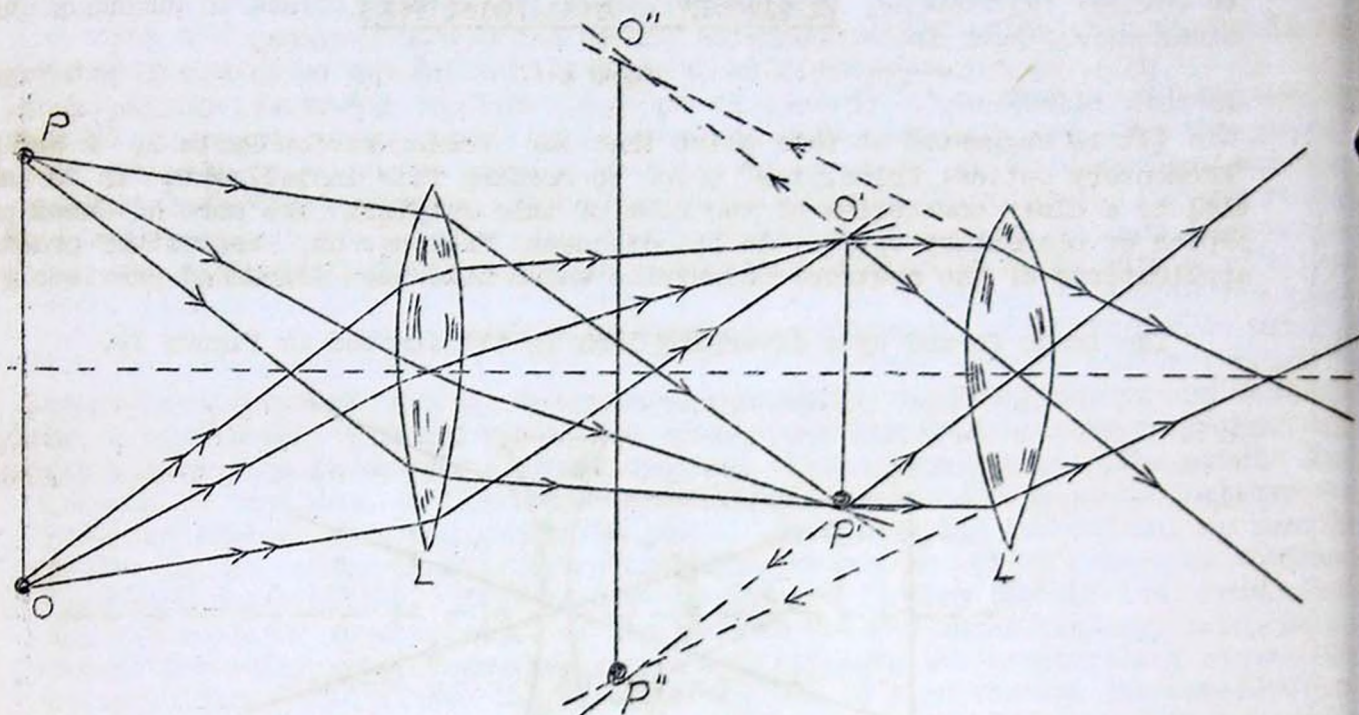


Figure 20

PO represents the object; L is the first lens; L forms an image of PO at $P'O'$; this image is smaller than the object and inverted. It is a real image. The second lens L' is so placed that the image $P'O'$ is between L' and its focal length; therefore L' will form a virtual image of $P'O'$ at $P''O''$. This image is greatly enlarged and still inverted. When the eye is placed to the right of L' the image of the object PO will be seen at $P''O''$.

In Figure 20 two lenses have been combined in what is really a simple telescope. We have taken the various abstract elementary optical principles studied and given them a practical application. By utilizing two lenses as shown above, we fix them rigidly in the tube at certain distances and have a simple telescope. The ratio of the apparent size of an object viewed through this telescope to its size as viewed with the unaided eye is termed the magnification, or the power of the telescope. Because the telescope still shows an inverted image it is called an astronomical telescope.

Such a telescope would in no way differ from the first telescope invented by Galileo in 1609 A. D. In keeping with the first telescope, however, it would be full of flaws, and though you could see through it, it would be impractical from our modern viewpoint. To bring it up to date we must go deeper into the principles of optics and discover why this telescope would be impractical; and how it can be made workable.

Two things are necessary before we can adequately do this. First, a knowledge of the various aberrations present in the lenses we are using must be obtained. Second, because the human eye is an optical system within itself, and will actually be another optical system added to our two lenses, we must under-

stand a little about the functioning of the human eye.

The aberrations to which lenses are subject will be discussed in the next installment, and the human eye in the next. Then we will be able to construct a modern, workable telescope, the same as the type which is incorporated into so many military observation instruments.

An aberration is a deviation from the normal, or expected path, as applied to optical instruments, or elements. All lenses are subject to numerous aberrations unless they are compensated for in one way or another.

We ignored the possibility of aberrations in the telescope we put together in this installment, to make it simpler, and not complicate the sequence. If the telescope described were constructed as shown, the vision would be sharp and clear, only in the close vicinity of the center of the field of view. The definition at the edges would be poor, distorted, curved and diffused. These various defects are known as "aberrations" and will be discussed in detail of Part 5 in this same space in the May issue of THE ORDNANCE SERGEANT.

If, at any time any questions relative to the principles discussed here arise, you are cordially invited to query THE ORDNANCE SERGEANT for further information, and you may rest assured that you will receive a prompt answer in these columns.

NOTES IN BRIEF

Detecting Small Amounts of Parallax

While inexperienced personnel find it rather difficult to detect small amounts of parallax in an instrument in the usual manner, the following method can be used advantageously for instruction purposes and inspections, where practicable, on instruments with focusing eyepieces.

Set a collimating telescope up in front of the eyepiece. Look through it; focus for sharpest and clearest definition of the field of view. Ignore the reticle. Note your diopter reading after doing this. Mark it down on a piece of paper.

Next look through the instrument, ignoring the field of view, and, employing a collimating telescope, focus for sharpest and clearest definition of the reticle. After doing this note your diopter reading and compare it with the previous one. If a difference exists in the two readings you have parallax present to that degree. With no parallax, the two readings should agree, since definition of the reticle and the field of view would be clearest at only one point -- the focal plane of the instrument.

Very small amounts of parallax can be detected in this manner which may be overlooked in the routine inspection, and yet seriously interfere with the accuracy of the instrument inspected.

Sight, telescopic, M1

The Sight, telescopic, M1, was recently made standard for the Cavalry .50 caliber machine gun, M2, heavy barrel. It is reviewed in S. N. L. 195.

Telescope, M5A1

The Telescope, M5A1, is standard for use with .30 and .50 caliber machine

guns and 37-mm gun as used in various models of combat cars and light and medium tanks. Exact use varies according to model of vehicle on which employed. Substitute and Limited Standard items for use instead of the M5A1 are the Telescope, M5; Sight, telescopic, M1918A2. (Telescope M5A1 is in S. N. L. F-174).

Sight, M4

The Sight, M4, is standard for use on 60-mm mortar mount M2 and the 81-mm mortar mount M1. The Sight, M2, and M2A3, are Limited Standard for use on the, 81-mm mortar mount M1. Sight, M4, is in S. N. L. F-175. The M2 and M2A3 are in F-148.

Standard, Substitute Standard and Limited Standard

For definition of the above three terms refer to AR 850-25.

Instruction Instruments

Instruments used for instructional purposes are often sectionalized, which allows the functioning of internal mechanisms to be viewed without interfering with the normal functioning of these mechanisms. Large instruments used for instructional purposes are seldom sectionalized, due to their cost and delicacy. If Lucite plates are used instead of side and top plates, all mechanisms can be easily viewed. Glass is impractical for this purpose. Lucite is a transparent plastic, commercially procurable in sheet form, of high tensile strength, and can be easily drilled, shaped, and cut with tools and facilities commonly available. Consequently, it is ideal for the purpose. It in no way interferes with the serviceability of the instrument. Plates made of Lucite protect the instrument, allow ready vision of all accessible parts, and can be taken off easily when desired, and the original side and top plates put on. Other similar uses will constantly crop up for this same material.

Odds and Ends

Antoni Van Leeuwenhoek invented the microscope in 1675. He designed more than 400 lenses in his lifetime, and built several hundred microscopes.

The famous Sir Isaac Newton, once decided that a lens could never be made achromatic. Because of this belief he invented the reflecting telescope, where chromatic aberration is not encountered.

And if you don't know what we are talking about -- dig out your file of THE ORDNANCE SERGEANT, and read up on "Elementary Optical Principles," and you soon will.

P.S.: We are still waiting for all those kinks and wrinkles from you men in the Field. How's about it!!!

WHAT IS AN ORDNANCE SERGEANT?

Every man will have a different definition. The Ordnance School has a definition which is approved by Ordnance authorities. It is contained in one of the interesting articles to appear in the May issue of THE ORDNANCE SERGEANT. Read it -- see if the definition correctly describes YOU!!

ADMINISTRATION

Conducted by Technical Sergeant C. K. Harper, Ord. Dept.

"SOURCES OF INFORMATION"

New training publications are constantly undergoing preparation, editing, publication, and distribution to the service. As an aid to Ordnance sergeants we hope to be able to bring to your attention in this department information relative to any such new training publications of interest to Ordnance Sergeants handling administration. Numbers and titles of such publications appearing here will cover only those NOT appearing in the latest edition of FM 21-6 (a list of the publications published by the War Department). The latest information from the War Department indicates that FM 21-6 is to be revised every six (6) months or more often if required so that it may be as up-to-date as practicable. The War Department further directs that FM 21-6 be consulted frequently and used to check training publications in use to assure the use of only the latest editions at all times. Out-of-date publications are to be destroyed or disposed of otherwise as directed by regulations.

Our list, for this month, of late training publications NOT listed in the latest edition of FM 21-6, October 1, 1940, is:-

<u>NUMBER</u>	<u>TITLE</u>	<u>REPLACES</u>
FM 12-105	Army Postal Service	-----
FM 21-100	Soldier's Handbook	-----
FSR 100-10	Administration	FSR-1923

LEGEND

FM - Field Manual
TM - Technical Manual
FSR - Field Service Regulations

To gain the greatest possible benefit from the information appearing here you should have, at all times, a copy of the latest edition of FM 21-6. When this Field Manual is republished, notice of that fact will appear here for your information.

Field Service Regulations 100-10 -- Administration, listed above, is the second volume published to replace our old Field Service Regulations - 1923. The first volume to appear was Field Service Regulations 100-5 -- Operations. The third volume, Field Service Regulations 100-15 -- Supply, has not yet appeared. These three volumes, used together, take the place of the 1923 Field Service Regulations.

Other late training publications are discussed under the "Library" Section of this publication.

CLOTHING ISSUES AND ACCOUNTS

Under changes promulgated by the War Department our clothing account and issue situation is somewhat different from that existing a short time ago. Under the present system there is no money allowance accruing to the individual enlisted man for an initial allowance nor for an annual maintenance allowance upon enlistment or reenlistment as heretofore.

Upon enlistment or reenlistment an enlisted man is entitled to an initial allowance of clothing based upon the mobilization allowances as prescribed by the Table of Basic Allowances for his arm or service, and perhaps modified locally due to local service conditions. This allowance may be drawn in kind only -- that is, clothing only. No money credit accrues to the enlisted man for anything NOT drawn. He should, therefore, draw his full initial allowance.

Replacement issues are made in kind (clothing) only to replace articles worn out and unserviceable. This is accomplished by turning in the unserviceable items by the enlisted man and the issue of replacement serviceable items to him. This is the only manner provided for the maintenance of the enlisted man's clothing "stock" in a serviceable condition.

Articles of individual clothing issued to enlisted men are accounted for on the same form as formerly (Individual Clothing Record, W.D., A.G.O. Form 32) or (W.D., N.G.B. Form 30 for the National Guard.) Articles of clothing entered on these forms which become unserviceable are turned in by the enlisted man for replacement. These items are inspected by a disinterested officer designated by the Commanding Officer. Upon determination by this inspecting officer that the items are unserviceable replacement issues are made to the enlisted men concerned. Any items of outer uniform clothing becoming surplus to the needs of an enlisted man may, if serviceable, be turned in to the Quartermaster by the organization commander on a Shipping Ticket and the enlisted man given credit therefor on his Form 32 (or Form 30). Pending revision of Form 32 the last two columns, of the present form will be used to credit the enlisted man with any such "turn-ins" made by inserting a written or printed caption "Turned in" over these columns. Obviously, no entries need be made in issuing items of clothing as replacements for unserviceable items turned in for replacement, as the basic purpose of the form is to show the "stock" of clothing in the hands of the individual enlisted man.

The usual W.D., Q.M.C. Form 409 (Requisition and Receipt for Clothing--in Bulk) is used by the organization to procure clothing in bulk for issue to the enlisted men of the organization. This form is accomplished, distributed, and handled as heretofore. The original copy eventually becomes the voucher to the Quartermaster Stock Record Account and the duplicate is filed with the organization records. The issues made of the clothing procured on this form to the individual enlisted men are entered on their individual clothing records on (Form 32).

Issues of clothing for the individual enlisted man, for example, to a newly enlisted man, are secured through the use of the Individual Clothing Slip, W.D., A.G.O. Form 35. This form is accomplished and handled very similarly to the Form 409 used for bulk issues. Where facilities permit and it is deemed advisable these Forms 35 of the various organizations of a unit may be consolidated by the Unit Supply Officer and requisition made by him for the clothing required. When this action is taken the Quartermaster ships the clothing to the Unit Supply Officer on a Shipping Ticket. The signed original of this Shipping Ticket then constitutes the voucher to the Quartermaster Stock Record Account, while the original Forms 35 accomplished by the organization commanders of the unit become the vouchers to the Unit Supply Officer's Stock Record Account.

Articles of organizational clothing (mackinaws, overshoes, etc.) are handled as formerly. They are accounted for on W.D., A.G.O. Form 33 of the individual enlisted man and are drawn and replaced through Unit Supply Officers as before.

It is well to note several facts. First, that replacement of unserviceable clothing, individual or organization, are basically similar now. Replacements are secured through the turn-in of unserviceable items and the issue of a serviceable item. Second, that the same forms are used to account for clothing

issues to enlisted men as before WDAGO Form 32 for individual clothing and WDAGO Form 33 for organizational clothing). Third, bulk issues are secured from the Quartermaster on Form 409 as before. And fourth, that issues to individual enlisted men are secured through the use of the relatively new Form 35, either direct from the Quartermaster or through the Unit Supply Officer, depending upon local administrative directives.

DEPOT & SUPPLY

Conducted by Technical Sergeant G. W. Akers, Ord. Dept.

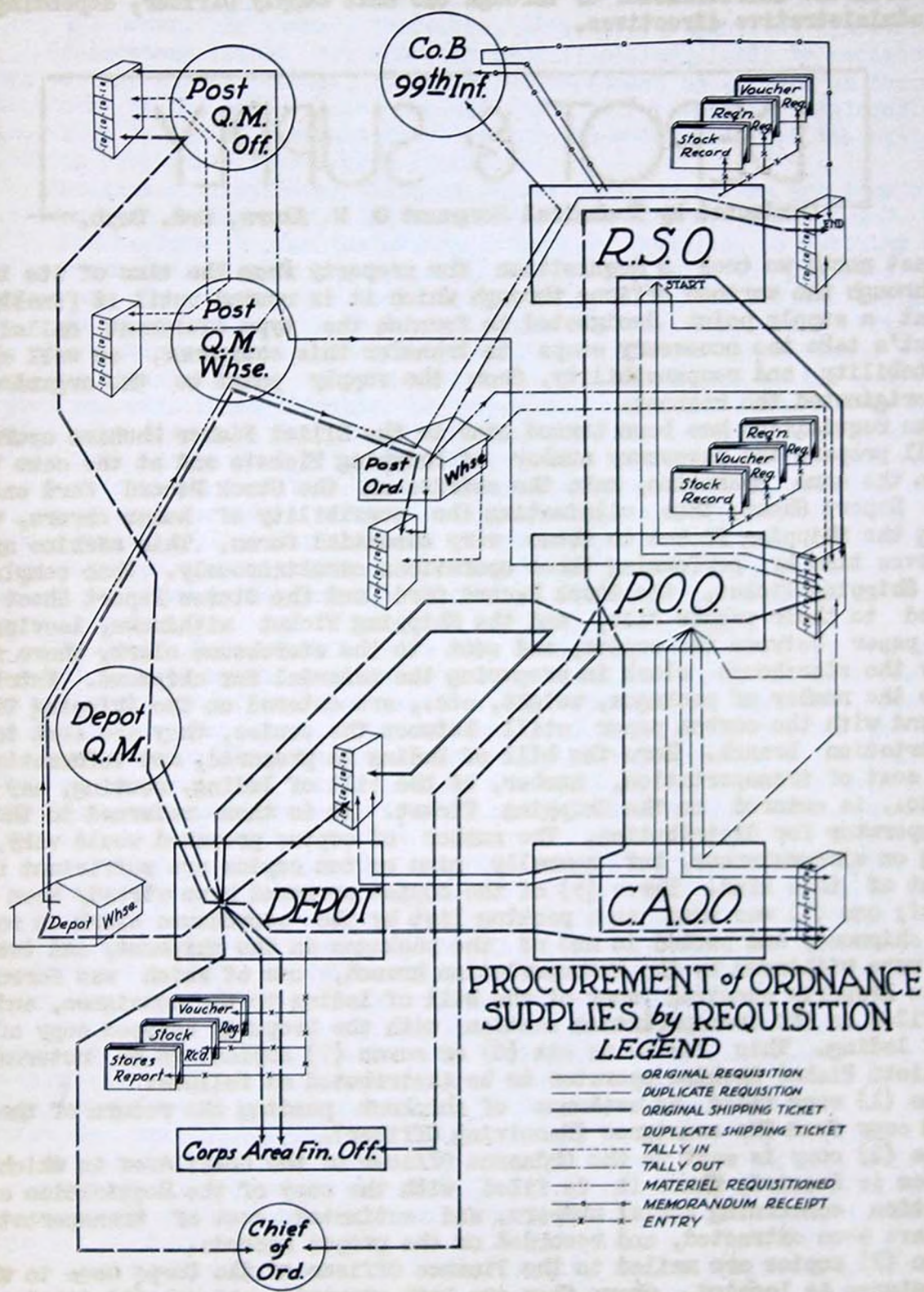
Last month we took a Requisition for property from the time of its inception through the various offices through which it is routed until it finally arrives at a supply point designated to furnish the type equipment called for. Now, let's take the necessary steps to transfer this equipment, as well as the accountability and responsibility, from the supply point to the organization which originated the request.

The requisition has been turned over to the Elliot Fisher Machine operator, who will prepare the necessary number of Shipping Tickets and at the same time, and, in the same operation, make the entries on the Stock Record Card and the Stores Report Sheet; thus eliminating the possibility of human errors, while posting the Shipping Ticket to these very essential forms. This machine system also saves time by performing three operations simultaneously. Upon completion of the Shipping Ticket, the Stock Record Card and the Stores Report Sheet are returned to their proper file, and the Shipping Ticket withdrawn, leaving the carbon paper between the copies, and sent to the storehouse clerk, where it is used by the storehouse clerk in preparing the material for shipment. Entries - such as the number of packages, weight, etc., are entered on the Shipping Ticket here, and with the carbon paper still between the copies, they are sent to the transportation branch. Here the bill of lading is prepared, and information as to the cost of transportation, number, of the bill of lading, routing, car number, etc., is entered on the Shipping Ticket. It is then returned to the machine operator for distribution. The number of copies prepared would vary, depending on circumstances, but normally nine or ten copies are sufficient for a shipment of this kind. Three (3) of the copies prepared have already been disposed of; one (1) was used as a packing list by the storehouse clerk in making up the shipment, and packed in one of the packages in the shipment, and two (2) copies were withdrawn by the transportation branch, one of which was forwarded with the Property received copy of the bill of lading to the consignee, and the other filed in the transportation section with the Property Shipped copy of the bill of lading. This leaves us six (6) or seven (7) copies to be returned to the Elliott Fisher Machine operator to be distributed as follows:

One (1) copy filed as evidence of shipment pending the return of the receipted copy from the consignee (Receiving Officer).

One (1) copy is sent to the Ordnance Officer of the Corps Area in which the consignee is located, where it is filed with the copy of the Requisition after information concerning serial numbers, and estimated cost of transportation, etc., have been extracted, and recorded on the proper records.

Two (2) copies are mailed to the Finance Officer of the Corps Area in which the consignee is located, where they are both stamped, and one (1) filed as a debit voucher, to the account of the consignee in the auditor's file, and the other copy mailed to the Corps Area Finance Officer of the Corps Area in which



the Consignor (Shipping Officer) is located, where it will be filed as a credit voucher to the Shipping Officer's account in the auditor's file.

Two (2) copies will be mailed to the Consignee, one (1) of which (the original) will be receipted by the Consignee and returned to the Consignor, thus becoming a valid voucher to his account. The other copy will be signed and filed as a debit voucher to the consignee's account.

One (1) copy will be mailed to the Office of the Chief of Ordnance if it bears serial numbers which are required to be recorded in that office, or if the shipment has been made as a result of orders from that office.

The shipment itself has been on its way to Fort Blank, while we have been following the copies of the Shipping Ticket through the various offices of record, and now it has arrived where it will be turned over to the Quartermaster by the Common Carrier (Railroad), who will check it against the bill of lading and the Shipping Ticket which was received along with the "property received: copy of the bill of lading. If all is in order, he will accomplish the original copy of the bill of lading, which was received under separate cover from the consignor, and turn this copy over to the agent of the carrier. The Quartermaster might wait for the ultimate consignee, who would be the Ordnance Officer in this case, to check the shipment before accomplishing the bill of lading and turning it over to the carrier. The shipment will be tallied in the Quartermaster-storehouse and then tallied out to the Ordnance Officer, who will tally it in, recording all data to identify the shipment with the Shipping Ticket. The shipment will be checked thoroughly against the Shipping Ticket, and if found in order the Shipping Ticket (original) will be receipted and returned to the consignor. The other copy of the Shipping Ticket received will be given a voucher number and posted to the Stock Record Account, and serial number record cards will be prepared for all serial numbered items listed. It will then be filed with the other vouchers to the Stock Record Account. If this equipment was requested and came in for a particular organization, it would not be necessary to post it to the stock record account, but in lieu of posting it, make a notation on the Shipping Ticket cross-referring it with the Shipping Ticket which will transfer the accountability to the organization.

The equipment is now in the hands of the Post Ordnance Officer and on his Stock Record Account, and in order to transfer it to the 99th Infantry it will be necessary to prepare another Shipping Ticket in quadruplicate, consigning it to the 99th Infantry Supply Officer. In this case the copies will be distributed as follows:

Two (2) copies (original and one copy) sent to the R.S.O. 99th Infantry, who will receipt the original and return it to the Ordnance Officer.

One (1) copy will be sent to the Corps Area Finance Officer, where it will be used by the auditor in auditing both accounts at Fort Blank.

One (1) copy mailed to the Corps Area Ordnance Officer, for use in posting to his serial number record cards.

The Regimental Supply Officer, or his authorized representative, will call for the shipment, and sign for it on a Tally-out sheet prepared in the storehouse. This equipment will be posted to the Stock Record Account of the Supply Officer, 99th Infantry, and he will maintain accountability for these items while the articles themselves will be in the hands of the Company Commanders within the Regiment. The Supply Officer will prepare nine (9) Memorandum Receipts, one for each Rifle Company within the Regiment; these will be prepared in duplicate, the original of which will be signed and returned to the Supply Officer, and the duplicate held by the Company Commander for his file. Thus we have transferred responsibility for these items to the Company Commanders who originally made the informal request. The Regimental Supply Officer is not yet finished with this, for he has another record to keep; record of property on

Memorandum Receipt, QMC Form 488. This record actually amounts to an abstract of the property so issued, and shows where every item is, for the benefit of the Supply Officer, as well as the auditor.

The 99th Infantry has now all of the equipment authorized it by Tables of Basic Allowances, with the changes thereto. The Requisition submitted last month has served its purpose and placed the desired equipment in the hands of the Company Commanders who originated it informally. All offices interested, have the necessary records of this equipment, and during these transfers accountability and responsibility has never ceased for a moment. It sounds like a long process, and it would be were one individual to follow it through to completion. But it is divided into numerous operations, and actually does not take the time this article might lead one to believe. Attention is invited to the diagram on page 144 showing the routine of the various forms prepared and mentioned throughout this article.

DO YOU KNOW?

There are seven different circumstances under which a separate requisition is required. Can you name them?

The correct answer will appear in the May issue of THE ORDNANCE SERGEANT.

DO YOU OWN A PROFESSIONAL LIBRARY?

Every Ordnance Sergeant should own at least a part of a professional library, and should add to it at every opportunity. It is insurance for a more efficient future, and therefore for a more satisfactory future. Read about the list of references recommended by the Chief of Ordnance in the May issue of THE ORDNANCE SERGEANT.

THE ORDNANCE SHOP

Conducted by Technical Sergeant G. A. Orsino, Ord. Dept.

"THE COST RECORD JOURNAL"

(This is another of a series of articles explaining the organization and operation of a Cost Accounting System for the Post Ordnance Shop.)

Upon completion of the Shop Work Order (discussed in the February and March, issues of THE ORDNANCE SERGEANT) it is filed in its proper serial position and must remain on file for at least one year. During this time reports may be required on any of the information to be found on the completed work order. After the Work Order is no longer required to be kept on file, some information should remain in abstracted form, for future planning purposes.

These requirements may best be met by complementing the Work Order with a Cost Record Journal. The purpose of the Journal is to have available, in abstracted form, cost statistics found on the Work Order so that reports involving these data may be readily compiled, and to have this information available when the completed Work Orders are no longer on file.

There are a number of ways in which this Journal could be set up, the meth-

COST RECORD SHEET

MATERIEL Pistols, Cal. .45, M1911

Date	Quantity	W.O. No.	MOD. W.O.	Time		Labor Cost			Cost of Parts	Total Cost
				Enl.	Civ.	Enl.	Civ.	Total		
1/6/41	5	14-41	----	2	3	1.70	3.75	5.45	2.40	7.85

EXAMPLE 1

COST RECORD SHEET

REGIMENT 121st Field Artillery

Date	Quantity	Organization	W.O. No.	MOD. W.O.	Time		Labor Cost			Cost of Parts	Total Cost
					Enl.	Civ.	Enl.	Civ.	Total		
1/6/41	5	Battery B	14-41	-----	2	3	1.70	3.75	5.45	2.40	7.85

EXAMPLE 2

od chosen of course depending upon what is required locally.

For example, suppose that it is desired to keep abstracted cost records pertaining to each type and model of 75-mm guns that was serviced in the shop of a Division, or other unit. A Journal sheet would be started under the heading: "Gun, 75-mm, M1897A4." Each Work Order involving this particular model of 75-mm gun would have its cost data entered on the sheet. At any time subsequent to the initiation of the sheet, any statistics required and covered by the form could very readily be obtained.

On the other hand, it may be desired to keep abstracted records pertaining to each regiment or other similar unit serviced without regard to types or models of equipment. In this instance the Cost Record Journal sheets may be modified to conform with this idea and the information entered accordingly.

These two examples point out how flexible the system is, since there are any number of ways that this form may be changed to give any required information for any given conditions.

On the preceding page, the sheet is divided to show how the form would look for each of the examples cited, and how the entries are made. It should be understood that the actual sheet used is the full width of the paper, and not as shown. Also, that this sheet would be one of many that go to make up the complete Cost Record Journal.

The first example shows the sheet made up to provide maintenance costs for materiel while the second example shows a modification of the form to show maintenance costs for regiments.

Using as an example the completed Work Order published in the March issue of THE ORDNANCE SERGEANT, the form would be filled in as explained below.

EXAMPLE 1

Materiel. -- In this space enter the type and model of materiel covered. This sheet is for cal. .45, M1911 pistols only, and as a Work Order on pistols is completed the information required is transcribed to this sheet.

Date. -- Enter the date of the Work Order.

Quantity. -- Enter quantity shown on the Work Order.

W. O. No. -- Enter the Work Order No. as shown on the face of the Work Order.

Mod. W. O. -- This is an abbreviation for Field Service Modification Work Orders and an entry here is required only when the Shop Work Order covers an authorized Field Service Modification to materiel. (An Article on Field Service Modification Work Orders is contemplated for the near future.)

Time. -- Enter the time data as shown on the Work Order.

Labor Costs. -- Enlisted and civilian labor costs are also entered separately.

The third column under "Labor Costs" is for the total labor cost shown on the Work Order.

Cost of Parts. -- Enter as shown on the Work Order.

Total Cost. -- The total cost is entered as shown on the Work Order.

This particular set of entries is now completed. The next Work Order involving pistols would be entered immediately below.

EXAMPLE 2

The second example on the sheet is made up to show how the form would be changed if cost statistics by regiments or similar organizations were desired without regard to materiel. Since the greater part of the entries have been mentioned above, and the remainder are self-evident, no further discussion is to be necessary.

AMMUNITION

Conducted by Technical Sergeant L. I. Dance, Ord. Dept.

DESTRUCTION OF DUDS

In these times of large scale training, it is necessary that our Ordnance Sergeants be trained in the police of target ranges. With the rapid expansion of the Ordnance Department, there are naturally many untrained men incorporated in our ranks. The necessity arises, more than ever, for cool-headed, straight-thinking, rule-abiding, trained Ordnance Sergeants to conduct this afore-mentioned police of target ranges. There is set forth below, the essential safety rules to be followed by those charged with the "Destruction of Duds".

1. Assemble the detail assigned to this work and instruct each individual in his particular job.

2. Unexploded projectiles and other components of ammunition which have been fired, are extremely dangerous to handle. They should not be moved, but should be destroyed wherever found, if practicable. Should it be necessary to move a projectile, it should be handled with the utmost care and always in a horizontal position. To place an unexploded fired projectile on its base or nose is to invite disaster, as such an operation might cause movement of the internal fuze parts and may cause immediate explosion of the projectile.

3. Duds on a target range, such as unexploded projectiles, fuzes, grenades, etc., usually can be destroyed in place with TNT blocks placed in intimate contact with the body of the dud and covered with a few feet of earth. The firing is accomplished in the usual manner with either an electric blasting cap and hand exploder or with a blasting cap and miners safety fuze. Preparation of the charge is given below.

a.

<u>Caliber of Shell</u>	<u>Number of TNT Blocks</u>
37-mm., 2.24-inch - - - - -	1
2.95, 75-mm., 3-inch - - - - -	2
4.7-inch, 155-mm., 6-inch - - - - -	3
8-inch, 9.2-inch, 240-mm. - - - - -	4
10-inch, 12-inch - - - - -	5
14-inch, 16-inch - - - - -	6

Note: For Chemical shell, the charge of TNT blocks should be double the number specified above for equal caliber.

b. The necessary number of TNT blocks will be placed in intimate contact with the side wall of the projectile and held in place by packing earth around them. One explosive block will be placed on its side; and, if two are used, one will be placed on top of the other. If three or four are used, two will be placed close together on the shell, and the others placed on top of these two. If five or six are needed, there will be two layers of two blocks each, with the fifth and sixth on top in a third layer.

(1) By Electricity. Use one (1) cap, blasting, tetryl, electric hand exploder, and wires of sufficient length to take cover at a safe distance. The blasting cap is placed in the hole in the top of the TNT block, and held in place, if necessary, by a small amount of mud. Cover the dud with at least

two (2) feet of earth to limit flying fragments. Check to see that the wires are NOT connected to the post on the exploder. Lay the wires from the dud to a safe distance and behind cover. Connect the two wires to the two wires on the blasting cap and separate these two connections to prevent a shortage, with a possible misfire.

(2) With Safety Fuse. Use one (1) cap, blasting, tetryl, non-electric and sufficient length of miners safety fuse. A piece of this fuse will first be burned and timed to determine the length required to give the operator time to take cover, also to prevent usage of the wrong type of fuse, such as instantaneous fuse. Safety fuse burns at the rate of 32 to 40 seconds per foot, instantaneous fuse burns at the rate of 120 feet per second. One end of the required length of fuse will be cut squarely across with a sharp knife and this end inserted in the cap until it just touches the charge. The cap will then be crimped to the fuse with a fuse crimper, care being taken not to press the fuse too tightly against the cap charge. Insert the fused blasting cap into the topmost TNT block, secure with mud and cover over with at least two (2) feet of earth.

4. The signal for detonation should be given by the person in charge, after first being sure that all persons in the immediate vicinity are under cover. Personnel should not be within 100 yards of a projectile when it explodes, even if suitable cover may be at hand. The wires (if using electricity) will then be connected to the exploder and the charge detonated. If using safety fuse, light the fuse and take cover.

5. If a misfire occurs, personnel will not approach the point of demolition until a period of thirty (30) minutes has elapsed,

6. After a blast, the nearby ground will be searched for unexploded material and if any is found, it will be included with the next charge.

In an early issue of THE ORDNANCE SERGEANT, the destruction of unserviceable ammunition at posts, camps and stations will be dealt with. The conductor of this column will gladly welcome accounts of unusual experiences, suggestions, criticisms, questions and ideas which will be to the benefit of any or all Ordnance Sergeants.

Be liberal with your letters, and with your questions. Your letter may become the basis of a feature article, or of a department page; or it may appear "as is" in "Letters from the Field." Your questions will be given careful and authoritative answers. Address: THE ORDNANCE SERGEANT, The Ordnance School, Aberdeen Proving Ground, Maryland.

WHY DOES "UNCLE SAM" GIVE YOU AN EXTRA SHIPPING ALLOWANCE FOR PROFESSIONAL BOOKS

Answer: Because he knows that professional books are just as important to you as your tools or the knowledge you have acquired. They are an essential part of every efficient and ambitious Ordnance Sergeant. And he even tells you what professional literature will be most beneficial to you. The list will appear in the May issue of THE ORDNANCE SERGEANT.

ORDNANCE AVIATION ACTIVITIES

Conducted by H. M. Randel, 2d Lt., Ord. Dept.

ASSIGNMENTS OF ORDNANCE UNITS SERVING WITH THE AIR CORPS

This month the Aviation Ordnance Section of THE ORDNANCE SERGEANT is going to forego its usual discussion on some particular phase of Aviation Ordnance and list, for the benefit of its readers, the current available information on the Ordnance Units serving with the Air Corps.

STATION	STATION CHANGE (If any)	UNITS
Anchorage, Alaska	----- -----	699th Ord. Co. Avn. (Comp) 748th Ord. Co. Avn. A. B.
Barksdale Field, Louisiana	To New Orleans, La. To Oklahoma City, Okla. ----- To Baton Rouge, La. To Baton Rouge, La. To New Orleans, La. To New Orleans, La. To New School	450th Ord. Co. Avn. (Bomb) 451st Ord. Co. Avn. (Bomb) 459th Ord. Co. Avn. (Bomb) (Less 1 Platoon) 676th Ord. Co. Avn. (Pur) 704th Ord. Co. Avn. A. B. 720th Ord. Co. Avn. A. B. 721st Ord. Co. Avn. A. B. Station Complement
Bolling Field, Washington, D. C.	-----	Ord. Sec. Hq. & Hq. Sec., GHQ Air Force
Brooks Field, Texas	-----	Station Complement
Chanute Field, Illinois	To Fort Wayne, Ind. To Fort Wayne, Ind. -----	679th Ord. Co. Avn. (Pur) 709th Ord. Co. Avn. A. B. Station Complement
Eglin Field, Florida	----- -----	688th Ord. Co. Avn. (Pur) (Less 1 Platoon) 700th Ord. Co. Avn. (Comp)
Ellington Field, Texas	-----	460th Ord. Co. Avn. (Bomb) (Less 1 platoon)
Godman Field, Kentucky	To Bowman Field, Ky. To Bowman Field, Ky.	443rd Ord. Co. Avn. (Bomb) 706th Ord. Co. Avn. A. B.
Hamilton Field, California	To Boise, Idaho To Fresno, Calif. ----- ----- To Boise, Idaho	442nd Ord. Co. Avn. (Bomb) 444th Ord. Co. Avn. (Bomb) 680th Ord. Co. Avn. (Pur) 692nd Ord. Co. Avn. (Pur) 705th Ord. Co. Avn. A. N.

	To Fresno, Calif.	710th Ord. Co. Avn. A. B.
	-----	711th Ord. Co. Avn. A. B.
Kelly Field, Texas	-----	Station Complement
Langley Field, Virginia	-----	446th Ord. Co. Avn. (Bomb)
	-----	462nd Ord. Co. Avn. (Bomb)
	To Charlotte, N. C.	677th Ord. Co. Avn. (Pur)
	To Charlotte, N. C.	707th Ord. Co. Avn. A. B.
	-----	714th Ord. Co. Avn. A. B.
Lowry Field, Colorado	-----	461st Ord. Co. Avn. (Bomb)
	-----	(Less 2 Platoons)
	-----	689th Ord. Co. Avn. (Pur)
		(2 Platoons only)
MacDill Field, Florida	-----	447th Ord. Co. Avn. (Bomb)
	-----	463rd Ord. Co. Avn. (Bomb)
	To Tallahassee, Fla.	675th Ord. Co. Avn. (Pur)
	To West Palm Beach, Fla.	686th Ord. Co. Avn. (Pur)
	To New School	691st Ord. Co. Avn. (Pur)
		(Less 1 Platoon)
	To Tallahassee, Fla.	702nd Ord. Co. Avn. A. B.
	-----	715th Ord. Co. Avn. A. B.
	To West Palm Beach, Fla.	729th Ord. Co. Avn. A. B.
	To Drew Field, Fla.	Hq. & Hq. Sec. SEAD
March Field, California	To Albuquerque, N. M.	440th Ord. Co. Avn. (Bomb)
	To Tucson, Ariz.	456th Ord. Co. Avn. (Bomb)
	-----	682nd Ord. Co. Avn. (Pur)
	-----	693rd Ord. Co. Avn. (Pur)
	To Albuquerque, N. M.	701st Ord. Co. Avn. A. B.
	-----	718th Ord. Co. Avn. A. B.
	To Tucson, Ariz.	728th Ord. Co. Avn. A. B.
	-----	Ord. Sec. Hq. & Hq. Sec. SWAD
Maxwell Field, Alabama	To Jackson, Miss.	445th Ord. Co. Avn. (Bomb)
	To Meridian, Miss.	687th Ord. Co. Avn. (Pur)
	To Jackson, Miss.	713th Ord. Co. Avn. A. B.
	To Meridian, Miss.	732nd Ord. Co. Avn. A. B.
	To New School	Station Complement
	-----	Ord. Sec. Hq. & Hq. Sec. SE AC
McChord Field, Washington	-----	448th Ord. Co. Avn. (Bomb)
	To Pendleton, Ore.	458th Ord. Co. Avn. (Bomb)
	To Everett, Wash.	678th Ord. Co. Avn. (Pur)
	To Portland, Ore.	684th Ord. Co. Avn. (Pur)
	To Everett, Wash.	708th Ord. Co. Avn. A. B.
	-----	716th Ord. Co. Avn. A. B.
	To Portland, Ore.	723rd Ord. Co. Avn. A. B.
	To Pendleton, Ore.	731st Ord. Co. Avn. A. B.
Middletown, Pennsylvania	-----	Ord. Det. Middletown Air Depot
	-----	Ord. Det. North East Air Depot

Mitchell Field,	-----	683rd Ord. Co. Avn. (Pur)
New York	-----	694th Ord. Co. Avn. (Pur)
	-----	719th Ord. Co. Avn. A. B.
Mobile,	-----	Ord. Det. Mobile Air Depot
Alabama		
Moffett Field,	To New School	690th Ord. Co. Avn. (Pur)
California		(Less 1 Platoon)
	To New School	Station Complement
	-----	Ord. Sec. Hq. West Coast ACTC
Montgomery,	-----	Station Complement
Alabama		
Ogden,	-----	Ord. Det. Ogden Air Depot
Utah		
Orlando,	-----	452nd Ord. Co. Avn. (Bomb)
Florida	-----	722nd Ord. Co. Avn. A. B.
Patterson Field,	-----	Ord. Det. Fairfield Air Depot
Ohio.		
Randolph Field,	To New School	Station Complement
Texas	-----	Ord. Sec. Hq. Gulf ACTC
San Angelo,	To New School	Station Complement
Texas	-----	Station Complement
Sacramento,	-----	Ord. Det. Air Depot
California		
Salt Lake City,	-----	453rd Ord. Co. Avn. (Bomb)
Utah	-----	724th Ord. Co. Avn. A. B.
Savannah,	-----	454th Ord. Co. Avn. (Bomb)
Georgia	-----	464th Ord. Co. Avn. (Bomb)
	-----	725th Ord. Co. Avn. A. B.
Scott Field,	To New School	Station Complement
Illinois	-----	Station Complement
Selfridge Field,	-----	685th Ord. Co. Avn. (Pur)
Michigan	-----	695th Ord. Co. Avn. (Pur)
	-----	726th Ord. Co. Avn. A. B.
Selma,	To New School	Station Complement
Alabama	-----	Station Complement
Spokane,	-----	455th Ord. Co. Avn. (Bomb)
Washington	-----	727th Ord. Co. Avn. A. B.
	-----	Ord. Sec. Hq. & Hq. Sec. NWAD

Stockton, California	To New School -----	Station Complement Station Complement
Westover Field, Massachusetts	To Bangor, Me. To Manchester, N. H. ----- ----- To Bangor, Me. To Hartford, Conn. To Manchester, N.H. ----- To Hartford, Conn.	441st Ord. Co. Avn. (Bomb) 449th Ord. Co. Avn. (Bomb) 457th Ord. Co. Avn. (Bomb) 681st Ord. Co. Avn. (Pur) 703rd Ord. Co. Avn. A. B. 712th Ord. Co. Avn. A. B. 717th Ord. Co. Avn. A. B. 730th Ord. Co. Avn. A. B. Ord. Sec. Hq. & Hq. Sec. NEAD
-----	-----	Ord. Det. Mid-Continent Air Depot
Hickam Field, Hawaii		481st Ord. Co. Avn. (Bomb) 482nd Ord. Co. Avn. (Bomb) 740th Ord. Co. Avn. A. B. Ord. Sec. Hq. Air Force
Wheeler Field, Hawaii		674th Ord. Co. Avn. (Pur) 696th Ord. Co. Avn. (Pur) 741st Ord. Co. Avn. A. B.
Albrook Field, Panama		697th Ord. Co. Avn. (Pur) 742nd Ord. Co. Avn. A. B. Ord. Sec. Hq. Air Force
France Field, Panama		743rd Ord. Co. Avn. A. B.
Howard Field, Panama		483rd Ord. Co. Avn. (Bomb) 744th Ord. Co. Avn. (Bomb)
Nichols Field, Philippine Islands		698th Ord. Co. Avn. (Comp) 745th Ord. Co. Avn. A. B.
Borinquen Field, Puerto Rico		484th Ord. Co. Avn. (Bomb) 485th Ord. Co. Avn. (Bomb) 746th Ord. Co. Avn. A. B.
Ponce Field, Puerto Rico		673rd Ord. Co. Avn. (Pur) 747th Ord. Co. Avn. A. B.

ARE YOU A PHOTOGRAPHER?

THE ORDNANCE SERGEANT can use good photos on subjects related to Ordnance activities. Do your bit to help this publication represent the entire Ordnance Department. Submit glossy prints, or better than that, loan us your negative. All negatives will be returned. Address: THE ORDNANCE SERGEANT, The Ordnance School, Aberdeen Proving Ground, Maryland.

ORDNANCE TRAINING ACTIVITIES

Prepared by Major John D. Billingsley
Assistant Commandant, The Ordnance School

The Ordnance School courses, as of April 7, 1941, with the total number of students in each, is as follows:

OFFICERS' COURSES:

General Refresher	- 24
Aviation Ordnance	- 36
Special Course "A" (Automotive - Ammunition)	- 18
Special Course "B" (Artillery - Depot and Supply)	- 19
Special Course "C" (Fire Control)	- 14
Special Course "D" (Depot and Supply - Small Arms)	- 19
TOTAL OFFICER STUDENTS	130

N. C. O. COURSES:

Maintenance	- 27
Depot and Supply	- 43
Fire Control (A A. Instruments)	- 2
TOTAL N.C.O. STUDENTS	72

SPECIALISTS' COURSES:

Artillery	Regular	- 12
	Marine Corps	- 6
	Ordnance Replacement Center Cadre	- 11
Automotive	Ordnance Replacement Center Cadre	- 37
	Carpenters	Regular
Cooks	Regular	- 34
	Ordnance Replacement Center Cadre	- 20 (White) - 15 (Colored)
	Clerks	Regular
Ordnance Replacement Center Cadre		- 35 (White) - 47 (Colored)
Small Arms		Regular
	Marine Corps	- 6
	Ordnance Replacement Center Cadre	- 45

(Continued on page 162)

ORDNANCE NEWS ITEMS

Prepared by First Lieutenant W. L. Boland
Assistant Secretary, The Ordnance School.

The Ordnance Training Center, Aberdeen Proving Ground, Maryland, has activated the following companies and battalions:

Companies A and B of the 3rd Ordnance Training Battalion, activated March 10, 1941.

Companies C and D of the 3rd Ordnance Training Battalion, activated April 4, 1941.

Headquarters, 4th Ordnance Training Battalion and Companies A, B and C of the 4th Ordnance Training Battalion, activated April 4, 1941.

Cadres have been received from the following places and have been transferred to the Ordnance Replacement Center, Aberdeen Proving Ground, Maryland.

March Field, California

Langley Field, Virginia

MacDill Field, Tampa, Florida

Mitchell Field, New York

Fort Douglas, Utah

Savanna Ordnance Depot, Proving Ground, Illinois.

Hamilton Field, California

McChord Field, Washington

Savanna Air Base, Savannah, Georgia

The 2nd Provisional Ordnance Training Company of the Ordnance School was activated on April 1, 1941, and is made up of student personnel only. No members of this organization are assigned, but are attached, including the cadre. Personnel of this organization is composed of members of the National Guard, Selective Service, Army of the United States, Regular Army Reserve, Regular Army and for the first time since the Ordnance Field Service School was consolidated with the Ordnance School, members of the United States Marine Corps are undergoing a course of instruction at The Ordnance School.

To protect your personal honor and that of your organization, read the very special announcement on page 160. Do your "bit" to help this deserving cause. You will receive worth while dividends through the page of THE ORDNANCE SERGEANT.

A total of 500,000 Chinese dogs gave up their lives when Quartermaster purchasing agents bought their pelts. The furs (?) were used to line the clothing worn by our high altitude fliers in France. Rumor has it that the canine population of Nuchwang Province, China, has never fully recovered.

There was not a single casualty among American troops in the last war due to defective gas masks.

LIBRARY

Conducted by Technical Sergeant E. R. Manfrin, Ord. Dept.

Automotive mechanics interested in spark timing and tune-ups will find a very interesting article in the "Auto-Digest" for March, dealing with 1941 spark timing. Although this article was written especially for those engaged in the repair and upkeep of automobiles, that is, garage and automobile mechanics, the automotive mechanic can find that copies of magazines dealing with their suited trades will serve as good reference guides and advice catalogues.

Fundamentals of the .50 caliber machine guns (AA) and the operation of them can be viewed by referring to the March issue of Popular Science. The author relates with a series of pictures the actions of the guns in operation.

Firing and loading of the ammunition, as well as operations of the guns are clearly shown. This of course would not be used for a course of instruction but could illustrate the operations to those who have anything to do with, or will be assigned to, such an outfit. As these guns are of vast importance in the defense of posts, forts, and camps, a little advance information will not berate anyone's learnings.

While on the subject of antiaircraft guns we can jump from the .50 caliber to the 3-inch AA gun materiel, M2A2, M1A2, M1A1, M2A1, T1A2 and T1A1, and we find that Technical Manual 9-1360, dated July 25, 1940, furnishes suitable instructions for the maintenance and shop repair of this materiel. The Ordnance Maintenance Companies can use this book to good advantage. The tools and instructions for inspections of the gun and mount are covered in several sections as well as tools for maintenance and repair. Instructions for maintenance and repair cover a few more pages and are more complete in their listing. The list of references at the end of the manual lists the SNL's, TM's, OFSB's and drawings that are used with this materiel.

Another technical manual which does not pertain to the Ordnance Department at large, but might cover a few phases of it, is the manual published by the Chief of Field Artillery, TM 6-225, Field Artillery Trainer.

Reverting to manuals published by the War Department and prepared under the direction of the Chief of Ordnance, we run into TM 9-315, dated 11/1/40. This manual deals with the 75-mm gun and carriage, M1917 and modifications. It contains all the essential information of a technical character required by the using arms and services for the identification, use, and care of the particular equipment described, as well as the use and care of ammunition, spare parts and accessories, and sighting and fire control equipment.

Under the chapter dealing with the gun and carriage, we find the data, description and operation, disassembly and assembly, inspection, functioning and care and preservation. Sighting and fire control equipment are covered in another section, while the chapter on ammunition deals with the general description of ammunition as well as nomenclature, classification, firing tables, identification, mark or model and quite a few descriptive charts on fuzes. There is also an article on sub-caliber equipment, as well as material affected by gas.

A tentative technical manual, 9-200, Organization and Functions of the Ordnance Department, might be an "eye opener" to those just entering the Ordnance Department, as well as the few who are still bewildered. This TM 9-200, which is divided into six sections, discusses the following subjects:

Statutory Provisions, History of the Ordnance Department, Organization of the Office of the Chief of Ordnance, Ordnance Activity within the Corps Area or

Department, Organization of the Ordnance Training Center, and Ordnance activity at a Camp, Post or Station.

A schematic drawing clearly portrays the organization of the Ordnance Training Center. The various services within the Ordnance Department such as Administration, Property, Ammunition, Artillery, Small Arms, Instruments, and Automotive Sections are listed at the end of this manual with reference texts, calling to attention all the subjects that should be familiar to a Post Ordnance Sergeant.

FM 21-100, (12/11/40), titled the "Soldiers Handbook," is now available. There are still a few Ordnance men who will find new subjects in this manual that were changed since the conception of the streamlined division. "The Old Army" is no longer a subject of discussion, for it just isn't being done that way anymore.

An article explaining modern thought concerning caster, camber, toe-in and other steering factors is found in the March issue of "MoToR" magazine, written by Harold F. Blanchard, Technical Editor of "MoToR." He states that since the introduction of knee-action in 1934 there has been a steady trend toward reduction in caster, camber and toe-in to the point that caster and camber are now negative on numerous cars while toe-in is frequently zero and never more than 1/8 inch. (Automotive experts may file their complaints on the "Letters from the Field" page of THE ORDNANCE SERGEANT, As I am sure this may create some pretty good discussion.)

How many of you Ordnance Sergeants can tell the number of parts that make up a tank? Well, even if I am wrong, I can safely say that 17,000 parts equal one tank. A small article on tanks was written by Hal Borland at Berwick, Pa., Berwick being America's No. 1 Tank Town. His article was written in the New York Times magazine, issue of March 2, 1941. It consists mostly of general knowledge about the tank plants.

The March-April issue of "Army Ordnance" publishes an article written by F. A. Stevenson, Vice-President, American Car and Foundry Corp., depicting a case history of industrial preparedness at work, and titled "Mass Production of Combat Tanks."

In the same issue there is a double page outline map of the United States showing the Ordnance establishments for Military Armament Production and Supply. Explanatory Data with reference to each establishment are also included with this outline map.

Brig. Gen. James I. Crain, Chief of Field Service, Ordnance Department-- shows the balanced force for field maintenance and supply in his article "Ordnance Service in our New Army." The functions of the Field Service are storage, distribution, inspection and maintenance of Ordnance equipment and ammunition. The two issue categories, "controlled" and "credit", are also explained by Gen. Crain. A schematic diagram showing the Field Service organization of the Ordnance department is included in the article.

With the conclusion of this chapter comes the ending of this column by Technical Sergeant Manfrin, and the introduction of Staff Sergeant Kelleher, who will begin the writing of the "Library" page. Sergeant Kelleher is now the Librarian of the Ordnance School Library, and will try to keep Ordnance Sergeants in the Field informed regarding new works and publications of interest.

ORDNANCE TRAINING CENTER PERSONNEL

(Continued from page 115)

Colonel G. W. Outland.

In the picture below Colonel Outland is shown in conference with his efficient subordinate, Major J. D. Billingsley, Assistant Commandant of THE ORDNANCE SCHOOL.



INDEX TO VOLUME I

In accordance with earlier announcements, an Index to Volume I of THE ORDNANCE SERGEANT will be published. In order to prevent waste there will be no general distribution of this index. If it's worth having, it's worth writing for a copy. A card of a letter will be sufficient. Don't forget to tell us your name and CORRECT address. All requests for copies must be received on or before July 15, 1941.

NOTICE

THE ORDNANCE SERGEANT is published by Ordnance personnel, for Ordnance personnel, and it is hoped that we can justly say about Ordnance personnel. In other words, those individuals at THE ORDNANCE SCHOOL who devote a portion of their time to the preparation of this publication hope that many Ordnance men will volunteer to add their ability to assist in making this a better publication for the mutual benefit of all concerned.

This magazine is your publication. Show that you are taking an active part in helping to improve it by having your name appear frequently on the "Honor Roll" which will be published monthly. Also, since this publication is distributed to all companies and organizations of the Ordnance Department, it is the duty of each man to see that his company or organization is represented in this, publication.

OBSERVE THESE RULES

1. Your contribution may be submitted in any form; a letter for publication, constructive criticism on any Ordnance subject, a set of photographs pertaining to Ordnance, a set of drawings (rough copy if you are not an artist), a feature article, a set of questions and answers, shop hints for any department of Ordnance activity, an Ordnance news item, or simply good ideas or suggestions which will tend to make a definite improvement. Your contribution must tend to improve THE ORDNANCE SERGEANT. Merit will be determined upon that basis alone.

2. All voluntary contributions will be acknowledged by publication of an "Honor Roll" each month.

3. No anonymous contributions will be considered. However, if you wish, your name will not be published. But you must submit your name, rank, and organization.

4. Excellent writing is not necessary. Typewritten manuscripts are preferred, but not required. The excellence of your idea is far more important, than literary ability. Your contribution may be of any length, but the Editor, reserves the right to condense or revise any article.

5. If you submit a set of photographs, an explanation must accompany each photo.

6. No contributions will be returned except photograph negatives.

Get your mind in gear. Get your contributions in the mail. Who will be the first to crash the Honor Roll?

Address all contributions and correspondence to: THE ORDNANCE SERGEANT, The Ordnance School, Aberdeen Proving Ground, Maryland.

When the submarine warfare of the World War began to limit our import of sulphur, pyrites and sodium nitrate; our output of nitric acid began to decline. Nitric acid is a necessity in the manufacture of explosives of all kinds. Two distinct American achievements can be directly traced to this wartime situation. In the search for methods of producing the acid, a modified version of the Haber process for the fixation of atmospheric nitrogen was developed; and the new Cyanamide method for accomplishing the same result.

1941 RAPID CONSTRUCTION PROGRESS OF THE UNIT TRAINING CENTER FACILITIES



WEEK OF FEBRUARY 17, 1941



WEEK OF FEBRUARY 26, 1941



WEEK OF MARCH 4, 1941



WEEK OF MARCH 13, 1941

"ORDNANCE TRAINING ACTIVITIES"

(Continued from page 155)

Instrument Repair	Regular	- 20
	Marine Corps	- 5
Munitions Workers	Regular	- 13
	Marine Corps	- 6
	Ordnance Replacement	
	Center Cadre	- 52 (White) - 28 (Colored)
Machinists	Regular	- 50
	TOTAL SPECIALIST STUDENTS	<u>493</u>

DO YOUR BIT TO MAKE OUR BIT JUST A BIT BETTER! Just turn this page back, read the notice on page 160, then do your stuff. You may contribute something useful for some other Ordnance man, and he in turn may contribute something which will be very helpful to you. Wouldn't that be a good swap?

ORDNANCE DEPT. FACTS

GENERAL HISTORY

REVOLUTIONARY WAR PERIOD. The work of the present Ordnance Department was first performed by "Committees" of the Continental Congress, and was so continued until 1775, when the same order which appointed General Washington to the command of the colonial forces authorized an officer to be known as the "Commissary of Artillery Stores." This officer, although appointed by the Commanding General, was a civilian. He was mainly a storekeeper, and did not obtain the Army supplies, which were still procured by the Continental Congress through a "Secret Committee." The next year, 1776, the Congress created a "Board of War and Ordnance" to procure, care for, and distribute the Ordnance materiel required by the Army.

POST REVOLUTIONARY PERIOD. In 1789 a "Surveyor of Ordnance" was authorized to be appointed from among the colonels of Artillery. This man is the first in our Ordnance history to be chosen from the military service. Later, ---various bills of Congress gave authority to the President and the Secretary of War to perform some of the functions of the present Ordnance Department, such as the renting, purchase, or construction of arsenals and armories; the purchase of arms, ammunition and other military stores.

WAR OF 1812. The Ordnance Department, as such, was created by Congress in 1812. It was to assist the Commissary General of Ordnance, together with his deputies and assistants, of whom there were to be not more than 13. This department was to procure, care for, inspect and issue Ordnance materiel. By 1815 it was ordered that as many artificers, together with tools and carriages, be attached to line troops as were necessary to maintain their equipment properly.

PERIOD FOLLOWING THE WAR OF 1812. When, in 1821, the Army was reduced to a small, peace-time organization, the Ordnance Department, was merged with the Artillery, where it remained for eleven years. It was then reestablished and organized with 13 officers and not over 250 enlisted men, under the command of a colonel.

The Ordnance Department has been in continuous existence since that time. At the beginning of the World War, the Department consisted of four Staff Divisions (the Chief Clerk, Administrative Division, Accounting Division, Mail and Record Division, and three Technical Operating Divisions; Small Arms and Equipment Division, Gun Division and Gun Carriage Division. This was a small and compact organization which served until shortly after our entry into the World War. Its authorized strength was then increased from 97 officers and 1241 men to 4527 officers and 25,054 men. There was a correspondingly large increase in the number of civilians employed and in the amount of work to be performed. To care for some of this new work, the Automotive Division, the Nitrate Division and the Trench Warfare Division were formed.

REORGANIZATION OF 1918. A reorganization along functional lines was made early in 1918; the Staff Divisions being replaced by the General Administration Bureau, the Engineering Bureau, and the Control Bureau; and the Operating Divisions by the Procurement Division, the Production Division, the Inspection Division and the Supply Division. This organization did not function satisfactorily and shortly after the War the Department was reorganized along the lines existing before the War. Two main operating Divisions corresponding to the functions of Manufacture and Supply were established. These two Divisions were divided along commodity lines and vary little from the organization of the Ordnance Department of today. The present Ordnance Department is divided into three groups of services, General Office, Industrial Service and Military Service.

GROWTH OF THE PROBLEM OF ORDNANCE SUPPLY. With each succeeding war the task of supplying the Army with Ordnance materiel has grown by leaps and bounds. With the invention of rapid-fire guns, the consumption of ammunition has increased enormously. Some conception of the actual quantities involved can be obtained by noting that during the battle of St. Mihiel, which lasted four days, the American Troops expended over 1,000,000 rounds of Artillery ammunition alone.

MANUFACTURING ARSENALS AND OTHER ORDNANCE ESTABLISHMENTS

Part I

SPRINGFIELD ARMORY

Springfield Armory is located in the city of Springfield, Massachusetts. It was established as a National Institution in 1794, and has been in continual operation in the manufacture of muskets, carbines, rifles, etc., ever since. Present peace time activities at Springfield Armory are those connected with the manufacture of U. S. Rifles, cal..30, M1, cal..22, Model, 1922 M1 and M2, together with the spare parts and appendages, the repair and maintenance of rifles and pistols, automatic rifles, machine guns, tripods, etc., and the manufacture of spare parts for all small and automatic arms. In addition there is carried on a large amount of experimental work in connection with the improvement in the design of small arms and machine guns of all kinds and the development of new types, and in connection with the improvement of methods of manufacture.

It is contemplated that in the event of an emergency Springfield Armory could maintain a daily output of 2000 U. S. Rifles with spare parts and appendages. It also has an issuing depot for items manufactured there.

"GONE WITH THE WIND"

Several days ago a particular man was assigned to one of the Maintenance Sections in connection with shop work. He reported to the Captain in charge and asked him what his various duties would be. The Captain detailed him on a special job in the Welding Shop.

The next day as the Captain was walking through the hall of The Ordnance School he noticed someone leaning flush against the wall, feet propped on the desk, and face buried in a rather thick volume of reading material. As he approached closer he saw that this was the same man assigned to him only the day before.

CAPTAIN: "I thought I told you to report to the Welding Shop for some special work. What is the meaning of this?"

PRIVATE: "Yes sir, I'm sorry sir --- but they don't have my welding supplies yet, and I thought I'd just stick around until they came. But when they do come I'll be sure to go right down and do it."

CAPTAIN: "I'll say you will. In fact, you're going right down now and do any kind of work that they have down there. If nothing else you can sweep the floors for eight hours. Why, what would some of the officers think if they saw you out here loafing your time away under my supervision. By the way, let's see what simple literature you are reading."

The Private handed over the book, whose title read "GONE WITH THE WIND".

CAPTAIN: "Take this darned book and keep it in your barracks. I don't ever want to see it, or any other book, around here again while you are on duty. Do you understand?"

PRIVATE: "Yes sir."

Two days later the Captain was walking through the Museum end at a quick glance saw a similar scene that he had seen in the hallway. Only this time the Private saw the Captain in time and began stuffing the book under his shirt. The Captain walked over with much disgust and --

CAPTAIN: "I told you Tuesday that I didn't want to catch you at this, again. You have disobeyed me, and I am going to hold this against you. Let me see what it is this time."

The Private peeled back his shirt a bit, pulled it out, and handed it over.

CAPTAIN: "GONE WITH THE WIND." I'll burn it the next time."

During the following week the Private made application for a pass for the week end. The application was submitted to the Captain for approval. As soon as he received it his temper flamed, and consequently the application was returned with a big "Not approved" on it.

Friday morning the Private worked his way to the Captain's desk to see what had caused this rejection.

PRIVATE: "Captain, er -- ah, I don't quite exactly understand your....."

CAPTAIN: "Straighten up and address me properly. Now what is it?"

PRIVATE: "Sir, I just don't understand why I didn't get the pass that I asked for this week end. I feel that I deserve one."

CAPTAIN: "Do you remember those two instances when I caught you loafing and reading books while on duty?"

PRIVATE: "Yes, Sir."

CAPTAIN: "Well, your pass is just like the book ---- 'GONE WITH THE WIND! I don't believe that I have to say any more."

I N D E X

to

T H E O R D N A N C E S E R G E A N T

VOLUME I

January - June, 1941

18 & 8, welding of	171	Ammonia bronze (Blue), formula	26
Aberdeen Ordnance Depot	217	Ammunition, chemical	116
Aberdeen Proving Ground	216	destruction of	199
Aberration, chromatic	25, 188	Ammunition defined	11
spherical	188	destruction of	198
Aberrations, defined	139	Field Artillery	42
of single lenses	188	and safety	102
Accelerator, M1 rifle, repair of	186	Ammunition Companies, responsibil-	
Accountability, property	143	ities of	258
Accounting, cost, Ordnance Shop	10, 40, 82	Ammunition Company vehicles	196
property	38	Ammunition depots	258
Accounts, clothing	141	AMMUNITION PAGE:	
Acetylene gas	170	General discussion	11
Acetylene welding	168	Modern Fuzes for Field Artillery	
Activities, class	202	Ammunition	42
ACTIVITIES, ORDNANCE TRAINING		Projectiles	96
13, 44, 85, 155, 202,	262	Destruction of Duds	149
Adamsite	117	Destruction of Unserviceable	
Adapter, high-speed, inspection	132	Ammunition at Posts, Camps	
Addere Flamman, Ordnance School		and Stations	198
Motto	204	Responsibilities of Army Ordnance	
Administration Center, functions	37	Ammunition Companies (Part 1)	258
ADMINISTRATION PAGE:		Ammunition References	209
Reorganization of the Army Per-		Angle, critical	36
sonnel System (Part 1)	8	Angle of incidence	36
(Part 2)	37	Anti-tank gun, M4, 37-mm.	93
Sources of Information	77	Aperature, M1 rifle	241, 242
Sources of Information and		Arc welding, electric	170, 174
Clothing Issues and Accounts	141	Hydrogen atomic	168
The Service Record	190	Arm, follower, M1 Rifle, repair of	181
Pay of Enlisted Men	250	Armament, precision aircraft	238
Administration References	179	Armory Section, MM Company	255
Aerial Transport of Troops	32	Army Ammunition Depots	258
Aiming Circle, French	249	Army Ordnance Ammunition Companies	258
Aircraft armament, precision	238	Army Personnel System, reorganiza-	
Aircraft bombs, destruction	198	tion of (Part 1)	8
development of	260	(Part 2)	37
Airplane design, development in	223	Arsenals, manufacturing	163, 194
Alcohol on compound lenses	25	Artillery, siege, 16th century	185
Algeo Flamman, Ordnance School		Artillery ammunition	42
Motto	1	Artillery in action (photos)	176
Changed to "Addere Flamman"	204	ARTILLERY PAGE:	
"All Americans Now" - Editorial	219	Breech Mechanisms	5
Alloy, nickel	270	Manufacture of gun barrels	34
Alloy steels	257	History of the Development of	
Alloys, aluminum	257	the French 75-mm. Field	
copper	269	Artillery Materiel	75
welding of	171, 172	Inspection Procedure for 75-mm.	
Aluminum, cast-wrought, welding of	174	Materiel	131
Aluminum alloy, welding of	172	History of the Development of	
Aluminum and aluminum alloys	257	Field Artillery Materiel	
Aluminum bronze	269	(Part 1)	182
"Americanization" - Editorial	219	(Part 2)	243
		Artillery Projectiles	96
		Destruction of	198

Bushing, threaded, (A49975)	60	Coma	188
Butt weld	172	Commercial brass	269
Canada Balsam	264	Compasses	212
Cannon, repeating (1409)	183	Components of light	188
Carbon steel, high	257	Compound lenses and alcohol	25
low	257	Concave, double, lens	59
plain	257	Concave, plano, lens	59
Carburetor, The	76	Concave weld contour	173
Care of batteries	35	Cone, forcing, measurement of	131
Cast iron, grey, welding of	174	Contours, fillet weld	173
Cast steel, welding of	174	Control box, Eclipse	133
Cast-wrought aluminum, welding of	174	Converging lenses	59, 78
Catalogue of F5 screws	107	Convex, double, lens	59
Catapult, description of	182	Convex, plano, lens	59
Catch, operating rod, M1 rifle,		Convex weld contour	173
repair of	181	Copper	269
Cement, red plugging, application of	25	Copper alloys	269
Center, administration, functions		Correction of service record	191
of	37	Cost accounting, Shop	10, 40, 82
Chain tracks, repair of	186	Cost Record Journal	146
Change in motto of Ordnance School	204	Coupler, inspection	132
Changes in MM Companies	195	Coupler key, inspection	132
Characteristics of flames	169	Courtesy, Military, background of	124
Charges, separate loading propell-		Cover, rear sight, M1 rifle	241
ing, destruction of	199	Covers, muzzle roller	132
Charging circuits, characteristics		Cracks in welds	208
of	246	Craters in welds	208
Charleston Ordnance Depot	217	Critical angle	36
Chaser, thread	107, 207	Cross piece, jacket, inspection	131
Chemical ammunition, general	116	Current limiter	134
destruction	199	Curtis Bay Ordnance Depot	217
marking of	117	Curvature of field	188
problem	119	Cushion, piston rod, inspection	131
projection of	117	Cylinder, gas, M1 rifle	74
responsibility for supply	117		
Chemical warfare, history and		Dart projectile, 14th century	183
development of	116	DeBange obturator	5
Chisel, for removing metal	255	Delaware Ordnance Depot	217
Chromatic aberration	25, 188	Demolition, destruction of	
Chromium steels	257	ammunition	198
Circle, French aiming	249	DEPOT AND SUPPLY PAGE:	
Circuits, charging, characteristics		Other sources of Information	9
of	246	Property Accounting	38
Classes of lenses	58	The Requisition	86
Classification of steels	256	Transfer of Property and	
Cleaning of brass	60	Responsibility	143
Cleaning of lenses, with "Batiste"	60	Procurement of Ordnance Prop-	
Cleaning of lenses and prisms	249	erty by Local Purchase	192
Cleaning of optical elements	60	Storage and Safekeeping of	
Clip latch, M1 rifle, repair of	185	Property	252
Closed butt weld	172	Depot Company Vehicles	197
Closed corner weld	172	Depots, ammunition	258
Clothing issues and accounts	141	Ordnance	194, 216
Coated electrodes	171	Design, development in airplane	223
Collimation of M15 Telescope	207	Design of welds	172
		Destruction of ammunition	198

Destruction of duds	149	Elevating knob, rear sight, M1	
Destructive power of TNT	200	Rifle	245
Detection of parallax	139	Elevating mechanism, inspection	132
Detonators, destruction	199	Elevating Pinion, rear sight,	
Development, in airplane design	223	M1 rifle	242
of aircraft bombs	260	Engines, Diesel	6
of Aviation Ordnance	221	Enlisted men, pay of	250
of Chemical Warfare	116	Entries on service record	191
of Field Artillery materiel	243	Equipment, of Railway Artillery	
of Railway Artillery Ordnance		Ordnance Maintenance Company	31
Company	30	on-carriage sighting, inspection	132
Devices, safety, artillery	19, 99	of welding repair truck	175
Die, for cutting threads	254	sighting, references	210
Diesels in Defense	6	Erie Ordnance Depot	217
Diffusion of light	23	Error in Service Record	191
Dispersion of light	188	Establishments, Ordnance	194, 216
Distortion	188	Explosive shell, origin of	184
in lenses	211	Extractor, M1 rifle, repair of	180
Diverging lenses	59, 79	Extractor spindle, M1 rifle,	
Double concave lenses	59	repair of	180
Double convex lenses	59	Extractor spring, M1 rifle,	
Double flange weld	172	repair of	180
Double vee weld	172	Eye, characteristics of	247
Douglas B-18A planes	224		
Drain valve, inspection	132	F5 screws, catalogue of	107
Duds, destruction of	149	Ferrous metals, welding of	174
Dumping at sea of ammunition	199	Field, curvature of	188
Duraluminum	269	Field artillery materiel,	
		history of	75, 243
Eccentric screw breech mechanism	5	Field glasses, inter-pupillary	
Eclipse control box	133	scales	25
Eclipse generator	133	Field maintenance, welding in	173
Economy of Diesels	6	Field of view, defined	248
EDITORIALS:		Field repair operations	174
Algeo Flamman	1	Field use of welding repair truck	175
Lives of Great Men	29	Fillet weld	172
The Moving Finger Writes	69	Fillet weld contours	173
Rough Stuff Ahead	113	Filling valve, inspection	132
Memorial	165	Fire control instruments,	
All Americans Now	219	painting of	212
Efficiency of Diesels	6	Fire control lubricants	107
Eglin Field	234	FIRE CONTROL NOTES IN BRIEF:	
Electric arc welding	170, 174	No. 1	25
Electricity, automotive	133	No. 2	60
in destruction of duds	149	No. 3	107
Electrodes, welding	170	No. 4	139
Elementary Optical Principles:		No. 5	212
Part 1	7	No. 6	249
Part 2	36	FIRE CONTROL PAGE:	
Part 3	78	Elementary Optical Principles:	
Part 4	137	Part 1	7
Part 5	188	Part 2	36
Part 6	247	Part 3	78
Elements, optical, cleaning of	60	Part 4	137
Elevating knob, rear sight, M1		Part 5	188
rifle	242	Part 6	247

Fire control references	210	Gasoline, use of	73
Fire control safety	72	Gauging, star	131
Firing mechanisms, artillery	19	Gauges, for inspection of M1 Rifle	4
Firing pin, M1 rifle, repair of	181	Generator, Eclipse	133
Flames, characteristics of	169	on machine shop truck	3
Flange weld	172	Generators, characteristics of	246
Flat weld contour	173	German bombs	260
Flush weld contour	173	Grenades, destruction of	199
"Flying Fortresses"	221	Grey cast iron, welding of	174
Focus, principal, of lens	59	Gribeauval 12-pounder gun	245
Fogging of lenses	25	Grinder, bench	3
Follower, M1 rifle, repair of	181	tool post	2
Follower arm, M1, repair of	181	Ground rules	9
Follower assembly, M1 rifle,		Guide, bullet, M1 rifle, repair of	186
repair of	181	sweeper plate, inspection	132
Follower slide, M1 rifle, repair		Gun, 16-inch, in action	176
of	181	breechloading	184
Forcing cone, measurement of	131	Gun barrels, artillery, manufacture	
Foreign bombs	39	of	34
Foreword to Volume I Preceding page 1		Gun book, in inspection	132
Forge welding	168	Gunners, aerial, training of	239
Forms for property accounting	38	Gunners' quadrant level rest	93
Formula:			
Ammonia Bronze (Blue)	26	Hammer and chisel, for removing	
Tan plugging wax	26	metal	255
For cleaning brass	60	Handguards, front and rear, M1	
Fragmentation bomb, MKII	261	Rifle, repairs of	127
Frames, truck, reinforcement of	172	Handling, bomb	128
France Field	226	Handy track jack	186
French 75-mm. artillery materiel,		Hatcher, Col. J. S.	70
history of	75	Hawaii, Ordnance Aviation in	227
French aiming circle	249	Headquarters and Supply Section	
Front handguard, M1 rifle, repairs	127	of MM Company	254
Functions, of Administration		Headspace, M1 Rifle	4
Center	37	Heavy coated electrodes	171
of organization headquarters	20	Heavy Maintenance Company Vehicles	197
of Railway Artillery Ordnance		Heavy Maintenance Company (Tank)	
Company	30	vehicles	197
of welding repair truck	175	High carbon steel	257
Fuse, safety, use of	150	High speed adapter, inspection of	132
Fuzes:		History, of Chemical warfare	116
M46	42	of the Development of Field	
M47	42	Artillery Materiel (Part 1)	182
M48	42	(Part 2)	243
M51	43	of the Ordnance Department	162
M54	52	of Railway Artillery	30
M55	52	Hoops, artillery	34
destruction of	199	Howitzer, 16-inch, in action	176
for artillery ammunition	42	Human eye, characteristics of	247
Rheinmetall electric bomb	39	Hydrogen arc welding, atomic	168
		Hypermetropic eyesight	248
Gas, acetylene	170		
mustard	117	I & I of pistol barrels	17
tear	117	"If You Want to Know About Welding"	168
Gas cylinder, M1 rifle	74	Image, real	103

Image, virtual	104	Lenses, converging	78
Imperfections of the human eye	248	distortion in	211
Incendiaries, defined	117	diverging	79
Incendiary bomb MKI	270	fogging of	25
Incidence, angle of	36	LETTERS FROM THE FIELD:	
Inclined planes, inspection of	132	15, 51, 206, 265	
Index, oil, inspection of	132	Level rest, bore	93
Information, sources of	9, 77, 141	gunners' quadrant	93
Insert to service record	191	Leveling plates, inspection of	131
Inspection, M1 rifle	4	Lewisite	117
of 75-mm. materiel	131	Liaison planes	223
Instrument references	210	Library, Ordnance Sergeants'	179
Instrument section, MM Company	256	LIBRARY PAGE:	
safety in	72	16, 46, 90, 157, 205, 264	
Instruments, painting of	212	Light, components of	188
sectionalized	140	diffusion of	23
Inter-pupillary distance scales	25	dispersion of	188
Interrupted screw breech mechanism	5	nature of	7
Iron, grey cast, welding of	174	reflection of	36
Irritant smokes, defined	117	refraction of	23, 36
Irritants, lung, defined	117	Limitator, current	134
Issue of chemical ammunition	119	Liner, removable	54
Issues, clothing	141	"Liver of Great Men" - Editorial	29
"It's Better to be Safe than Sorry"	72	Loading, bomb	129
Jack, handy track	186	Local purchase of property	192
Jacket cross piece, inspection of	131	Lockridge Gun	239
Jacket rollers, inspection of	131	Longitudinal cracks in welds	208
Joggled weld	172	Longitudinal stress, defined	34
Joints, welded, design of	172	Losey Field	228
Journal, cost record	146	Low carbon steel	257
Key, coupler, inspection of	132	Lowry Field	267
Knob, rear sight elevating, M1		Lubricants, for instruments	107
Rifle	242	Lubrication, of M1 Rifle	33
windage, M1 Rifle	242	Lucite, use of	141
"Know Your Army"		Lung irritants, defined	117
New Army Set-Up	120	M1 Rifle:	
U. S. Air Defense in Panama	120	Inspection	4
Knurling, defined	2	Lubrication	33
Lachrymators, defined	117	Old and New GasCylinder	74
Langley Field	228	Repairs	127, 180, 241
Lanolin	264	M1 Telescope sight	139
Lap weld	172	M4 Sight (Mortar)	140, 207, 212
Latch, clip, M1 Rifle, repair of	185	M5 Telescope	107
Lathe, bench, in machine shop truck	2	M5A1 Telescope	107, 139
for boring	256	M15 Telescope, collimation of	207
for cutting threads	254	M38A2 Practice bomb storage	232
for turning	256	M46 Fuze	42
operations defined	2	M47 Fuze	42
Lens, defined	58	M48 Fuze	42
principal focus of	59	M48 Shell	97
Lenses, cleaning of	249	M51 Fuze	43
compound, and alcohol	25	M54 Fuze	52
		M55 Fuze	52
		M103 Shell	97

M1915 BC Telescope	207	MKI incendiary bomb	270
M1915A1 BC Telescope	207	MKII Fragmentation bomb	261
M1916 Range Finder	249	Modifications, inspection	132
M1918 French Aiming Circle	249	Moffett Field	234
MacDill Field	230	Molybdenum	257
Machine shop truck	1	Monel metal	270
Machine shop equipment, in MM Co	2	Monocular instruments, defined	249
Machine tools in the Maintenance Company	2	Mortar shell, trench, destruction	199
Machinist, the Ordnance	256	Mortar Sight, M4	60, 140, 207, 212
Magazine area picture	232	Motto of Ordnance School	1
Magnesium alloys, welding of	171	changed	204
Magnetic needles	212	Mushroom head	5
Magnification	138	Mustard gas	117
Maintenance, field, welding in	173	Muzzle roller covers, inspection	132
Maintenance Company, machine tools in	2	Muzzle rollers, inspection	132
Maintenance of Diesels	6	Nansemond Ordnance Depot	217
Manganese bronze	270	Naval brass	269
Manufacture of gun barrels, artillery	34	Needles, magnetic	212
Manufacturing Arsenal	163, 194	NEWS ITEMS, ORDNANCE:	14, 45, 89, 156, 204
March Field	229	New Type Welding Truck	215
Marking of chemical ammunition	117	Nickel and nickel alloy	270
Maxwell Field	232	Nickel steels	257
Measurement of forcing cone	131	Nickel-chromium steels	257
Mechanism, breech, inspection	131	Nitrostarch, use of	199
Mechanism, breech	5	Non-ferrous metals, welding of	174
Mechanism, elevating, inspection	132	Normal weld contour	173
Mechanism, recoil, inspection	132	North American BC-1 planes	226
Mechanism, traversing, inspection	132	North American XP-51 planes	224
Medium carbon steel	257	NOTES IN BRIEF (Fire Control):	25, 60, 107, 139, 212
Medium Maintenance Company:		Nut, rear sight, M1 Rifle	241
Organization and Mission	254	Nut lock, rear sight spring, M1 Rifle	242
Changes in	195	Observation planes	223
Vehicles	196	Obturator device	5
"Memorial" - Editorial	165	Off-set weld	172
Men, enlisted, pay of	250	Ogden Ordnance Depot	218
Meniscus converging lens	59	Oil index, inspection of	132
Meniscus diverging lens	59	On-carriage sighting equipment, inspection of	132
Metal, monel	270	Open butt weld	172
removing	255	Operating mechanisms, artillery	19
Metallic electrodes	271	Operating rod, M1 Rifle, repairs	130
Metals, facts about	171	Operating rod catch, M1 Rifle, repair of	131
repair processes for	174	Operation, of Railway Artillery Maintenance Company	48
Methods, welding	168	of welding repair truck	175
Military band, first Ordnance	204	Operations, field repair	174
Military courtesy, background of	124	Optical Principles, elementary	
Milling attachment	2	Part 1	7
vs. shaper	3	Part 2	36
operations defined	2		
Miscellaneous Ordnance establishments	218		
Mission of MM Company	254		
Mitchel Field	233		
MKIAI Shell	97		

Optical Principles (Continued)

Part 3	78
Part 4	137
Part 5	188
Part 6	247
Optical texts	107

Optics (See Optical Principles)

Ordnance Ammunition Companies, responsibilities of	258
Ordnance Aviation, development of in Hawaii	221 227

ORDNANCE AVIATION PAGE:

New Regulations for Bomb Handling Drill	12
Servicing the War Birds of Mars	12
Foreign Bombs	39
Rhenimetal Electric Bomb Fuze	39
An Introduction to Aviation Ordnance	88
Assignment of Units	151
The Destructive Power of TNT	200
The Development of Aircraft Bombs	260

Ordnance Company, Maintenance, Railway Artillery	30
Ordnance Department Facts	162, 194
Ordnance Establishments	194, 216
Ordnance Machinists	256
Ordnance Military Band, first	204

ORDNANCE NEWS ITEMS:

14, 45, 89, 156, 204,	263
Ordnance School Motto changed	1 204
Ordnance Sergeant, defined	178
Ordnance Sergeant's Library	179

ORDNANCE SHOP PAGE:

Cost Accounting in the Post Ordnance Shop (Part 1) (Part 2) (Part 3)	10 40 82
Cost Record Journal	146
Changes in MM Company	195
The MM Company -- Its Mission and Organization	254

ORDNANCE TRAINING ACTIVITIES:

13, 44, 85, 155, 202,	262
Ordnance Training Center Personnel:	
Col. J. S. Hatcher	70
Lt. Col. G. W. Outland	114
Col. D. W. Simpson	166
Lt. Col. H. U. Wagner	220
Ordnance vehicles	196

ORDNANCE VIEWPOINT:

Transport of Troops by Air	32
British Bases	80
Panama Bases	80
Ski Patrols	123
Are You an Ordnance Sergeant?	178
Maneuvers	240
Organization Headquarters, responsibilities of	20
Organization of MM Company of MM Company	254 195
of Railway Artillery Maintenance Company	30
Outland, Lt. Col. G. W.	114
Oxy-acetylene welding	168
Oxygen	170
Painting of fire control instruments	212
Panama, Republic of	122
Parallax, detection of	139
Parallel lap weld	172
Parts of the bolt group and follower assembly, M1 Rifle	181
Paths, roller, inspection of	132
Patrols, ski	123
Pay of enlisted men	250
Personnel assigned to welding truck	175
Personnel system, reorganization of (Part 1) (Part 2)	8 37
Phosgene	117
Phosphor bronze	270
Phosphorous, white	117
Picatinny Arsenal	194
Pictograms of vehicles of Ordnance Companies	196
Pin, firing, M1 rifle, repair of	181
Pinion, rear sight elevating, M1 Rifle	242
Pistol barrel, I & I of	17
Piston rod cushion, inspection of	131
Piston rod stop washer, in- spection of	132
Plain carbon steel	257
Planes, inclined	132
Plano concave lens	59
Plano convex lens	59
Plate guide, sweeper, inspection	132
Plates, leveling, inspection	131
Plugging cement, red, formula	25

Plugging wax, tan, formula	26	Rear sight elevating knob, M1	
Plunger, M1 Rifle, repair of	180	M1 Rifle	245
Post Ordinance Sergeant	178	Rear sight elevating pinion, M1	
Power of TNT, destructive	200	Rifle	242
Practice bomb storage	232	Rear sight group, M1 Rifle	241
Precision aircraft armament	238	Rear sight nut, M1 Rifle	241
Press, bench drill	3	Rear sight nut lock, Spring, M1,	
Primers, destruction	199	Rifle	242
Prisms, cleaning of	249	Rear sight windage knob, M1 Rifle	242
Prisms, in optics	79	Receiving Report	193
Problem, chemical ammunition	119	Recoil mechanism, inspection of	132
Procedure, welding	171	Recoiling parts, M1 Rifle, repairs	130
Processes, welding	168	Record, service	190
Procurement of property	192	Red plugging cement	25
Procurement of supplies and		References, administration	179
property	144	References, ammunition	209
Projectile, dart, early	183	artillery	209
Projectiles, artillery, destruc-		Automotive	210
tion	198	Instruments, fire control and	
Projectiles, for field artillery	96	sighting equipment	210
Projection of chemical ammunition	117	Property	179
Projectors, Levins	117	Small arms	210
Propelling charges, separate		Reflection of light	36
loading, destruction	199	Reflector, barrel	4
Property, local purchase of	192	Refraction of light	23, 36
procurement of	192	Regulator, voltage	134
storage and safekeeping of	252	Reinforced flush weld contour	173
accountability	143	Reinforcement of truck frames	172
accounting	38	Removable liner	54
procurement	144	Removing metal	255
references	179	Reorganization of the Army Personnel	
responsibility	143	system (Part 1)	8
transfer of	143	(Part 2)	37
Protrusion of firing pin, M1		Repair truck, welding	175
Rifle	181	Repair operations, field	174
PT-13A Stearman Planes	222	Repairs of M1 Rifle	127, 180, 241
Purchase, local, of property	192	Repeating cannon (1409)	183
Pursuit planes	223	Report, receiving	193
		Requisition, preparation and use	86
Quadrant level rest, gunners'	93	seven circumstances for separate	194
Questions and answers	17, 207, 266	use of	143
		Resistance welding	168
Racks, wing	261	Respirator, inspection of	132
Radial cracks in welds	208	Responsibilities of Army Ordnance	
Radial stress, defined	34	Ammunition Companies	258
Railway Maintenance Company	30	Responsibility, property	143
vehicles	196	Rest, bore level	93
Randolph Field	235	Rest, gunners' quadrant level	93
Range Finder, M1916	249	Rheinmetall electric bomb fuze	39
Raritan Ordnance Depot	217	Ribaulds, description of	184
Real image	103	Rifle, M1, inspection of	4
Rear handguard, M1 Rifle, repairs	127	Rifle, M1, lubrication of	33
Rear sight cover, M1 Rifle	241	Rifle, M1, Old and new gas	
Rear sight elevating knob, M1		cylinder	74
Rifle	242	Rifle, M1, repairs	127, 180
			241

Rings, split	5
Rock Island Arsenal	194
Rod, operating, M1 Rifle, repairs	130
Roller path, lower, inspection	131
Roller paths, inspection	132
Rollers, jacket, inspection	131
Rollers, muzzle, inspection	132
"Rough Stuff Ahead" - Editorial	113
Royco, 6A	107
Rules, ground	9
Safekeeping of property	252
Safety, small arms	101
Safety as applied to artillery	99
Safety devices, artillery	19, 99
Safety fuse, use of	150
Safety in Ordnance activities	72
Safety in the automotive section	100
Safety in the instrument section	72
Safety in Diesels	6
Safety planning for the shop executive	101
Safety with ammunition	102
San Antonio Ordnance Depot	218
Savanna Ordnance Depot	218
Savannah Air Base	236
Scales, inter-pupillary distance	25
Scott Field	237
Screening smokes, defined	117
Screw threads, cutting of	254
Sea, dumping of ammunition at	199
Sectionalized instruments	140
Selfridge Field	237
Semi-coated electrodes	171
Separate loading propelling charges, destruction of	199
Separate requisitions, seven circumstances	194
Service Record	190
Service Section, MM Company	2
Service Section, MM Company	255
Shaper, universal, for removing metal	255
Shaper operations defined	3
Shaper vs. milling attachment	3
Shell, explosive, origin of trench mortar, destruction of	184
Shop, cost record journal	146
Ordnance, cost accounting	10, 40
Shop executive, safety planning for	101
Shop work order	82, 40
SHOP PAGE: (See Ordnance Shop Page)	
Sight, M4 (Mortar)	60, 140, 207, 212

Sight, rear, elevating knob, M1 Rifle	242, 245
Sight, rear, windage knob, M1 Rifle	242
Sight, telescopic, M1	139
Sight base, M1 Rifle	242
Sight cover, rear, M1 Rifle	241
Sight group, rear, M1 Rifle	241
Sight nut, rear, M1 Rifle	241
Sight testing tools, 37-mm. anti-tank gun, M4	93
Sighting equipment, on-carriage, inspection of	132
references	210
Silico, manganese steel	257
Simpson, Col. B. W.	166
Single vee weld	172
Ski patrols	123
Slide, follower, M1 Rifle, repair of	181
Sliding wedge breech mechanism	5
Small arms ammunition, destruction	199
SMALL ARMS PAGE:	
Inspection of M1 Rifle	4
Lubrication of M1 Rifle	33
The Old and New Gas Cylinder for the M1 Rifle	74
Repairs of the M1 Rifle (Part 1)	127
(Part 2)	180
(Part 3)	241
Small arms references	210
Small arms safety	101
Smokes, irritant, defined	117
Smokes, screening, defined	117
Solvents, use of, unauthorized	73
Sound waves	7
Sources of Information	9, 77, 141
Special purpose planes	223
Special tool steels	257
Spherical aberration	188
Spindle, extractor, M1 Rifle, repair of	180
Split rings	5
Spring, extractor, M1 Rifle, repair of	180
Spring, rear sight nut lock, M1 Rifle	242
Spring, torsion	249
Springfield Armory	163
Stainless steel, welding of	171, 174
Star gauging	131
Stearman PT-13A planes	222
Steel, cast, welding of	174
high carbon	257
low carbon	257

Steel (Continued)		TNT in destruction of duds	149
medium carbon	257	substitute for	199
plain carbon	257	Tool steels, special	257
silico-manganese	257	Torsion spring	249
stainless, welding of	171, 174	Track repairs	186
structural, welding of	174	Track jack, Handy	186
tungsten	257	TRAINING ACTIVITIES, ORDNANCE:	
Steels, alloy	257	13, 44, 85, 155, 202, 262	
chromium	257	Training of aerial gunners	239
classification of	256	Training of Railway Artillery	
molybdenum	257	Maintenance Company	48
nickel	257	Training planes	224, 223
nickel-chromium	257	Transfer of property	143
special tool	257	Transport of troops by air	32
Stereoscopic vision	249	Transport planes	223
Stereovision	249	Traversing mechanism, inspection	132
Stock, M1 Rifle, repairs	127	Trebuchet, picture of	182
Stock and die, for cutting threads	254	Trench mortar shell, destruction	199
Stop washer, piston, inspection	132	Triton (See TNT)	
Storage and safekeeping of		Truck, bomb lift	12, 94
property	252	Truck, machine shop	1
Storage battery, care of	35	Truck, welding repair	175, 215
Storage of chemical ammunition	119	Truck frames, reinforcement of	172
Straight tee weld	172	Trunnions, inspection of	132
Strapped weld	172	Tube, artillery, defined	34
Stresses, in artillery, defined	34	Tungsten steel	257
Structural steel, welding of	174	Turning in a lathe	256
Structures, design of welded	172	Twist, artillery, rifling	17
Supplies, procurement of	144	Types of welded joints	172
Supply (See Depot and Supply Page)		Unit personnel sections	20
Supply of chemical ammunition	117	Unserviceable ammunition,	
Supply Section, MM Company	254	destruction of	198
Sweeper plate guide, inspection	132	Upkeep of M1 Rifle	33
Tan plugging wax, formula	26	Vacuum, use in cleaning	249
Tangential stress, defined	34	Valve, drain, inspection of	132
Tear gas	117	Valve, filling, inspection of	132
Tee weld	172	Vehicles of Ammunition Company	196
Telescope, M5	107	of depot company	197
Telescope M5A1	107, 139	of Heavy Maintenance Company	197
Telescope, M15, collimation of	207	of Heavy Maintenance	
Telescopic sight, M1	139	Company (Tank)	197
Texts, optical	107	of Medium Maintenance Company	196
welding	172	of Railway Artillery Maintenance	
"The Dew of Death"	117	Company	196
The handy track jack	186	Vessicants, defined	117
"The Moving Finger Writes" -		View, field of, defined	248
Editorial	69	Virtual image	104
The Service Recors	190	Voltage regulator	134
Thermit	117	Vultee BC-3 plane	222
Thermit welding	168	Wagner, Lt. Col. H. U.	220
Thread chaser	107, 207	Washed electrodes	171
Threads, screw, cutting of	254	Washer, piston rod stop, inspection	132
TNT, destructive power of	200		

Watertown Arsenal	194	White phosphorous	117
Watervliet Arsenal	194	"Widespread Development of	
Waves, sound	7	Aviation Ordnance	221
Wax, tan plugging, formula	26	Windage knob, M1 Rifle	242
Weights, trigger	4	Wing racks	261
Welding as applied to Ordnance		Wingate Ordnance Depot	218
Field Maintenance	173	Wire-wrapped gun barrel	54
Welding, cast iron	174	Work Order, shop	40, 82
Welding electrodes	170	Wrought-cast aluminum, welding of	174
Welding methods and processes	168		
Welding repair truck	175, 215	XP-24 Bomber	221
Welding texts	172	XP-51 North American planes	221
Welding truck	175, 215		
Welds, craters in	208	YFM-1A Bell planes	224

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