Antiaircraft JOURNAL

NOVEMBER-DECEMBER, 1951

Silver Star

1st Lt. John Popovics, Battery B, 21st AAA AW Bn. On the morning of 4 April 1951, while reconnoitering ahead of friendly lines, Lieutenant Popovics and party of two were subjected to heavy fire from concealed hostile positions. After assuring himself of the safety of his comrades, he ran and crawled across open terrain to obtain reenforcements. Returning with a half track, he directed the destruction of the enemy emplacements. As the infantry began to cross the Yongpyong-chan River, he repeatedly exposed himself to a deadly small arms and mortar barrage to guide two half track platoons into position and to ensure a continuous stream of effective support fire. Lieutenant Popovics' valorous leadership, military ability and selfless devotion to duty are in keeping with the high traditions of the United States Army. x x x Vermont.

Silver Star

Pvt. 1st Cl. James D. Moore, Battery B, 21st AAA AW Bn. On the morning of 2 April 1951, while traversing a narrow valley north of Sanjong-ni, Korea, Private First Class Moore's half track platoon was suddenly attacked by a well-concealed hostile element entrenched on the commanding slope. After his comrades had placed a machine gun in firing position, he voluntarily advanced to force the enemy to disclose their positions by drawing their fire to himself. Maneuvering stealthily to the flank, he suddenly attacked, taking the enemy by complete surprise. Thinking that they had been ambushed, the enemy fired a hasty volley, abandoned their emplacements, and fled in disorder over the hill. Privte First Class Moore's valorous action reflects the highest credit on himself, his unit and the United States Army. x x x Virginia.

BRONZE STAR MEDAL AWARDS

3rd AAA AW BN.

Major Herman D. McCallum
1st Lt. Norman N. Semon (V)
1st Lt. Lawrence D. Shields
1st Lt. A. M. Wilson, III (V)
M-Sgt. Hubert L. Lindsey
M-Sgt. Wm. J. Southerland (V)
Sfc. Manual Triana

21st AAA AW BN.

Major David C. Miss
Sfc. David A. Basham (V)
Sfc. Douglas L. Dever (V)
Sgt. John B. Cox
Sgt. Wm. H. Tildsley (V)
Cpl. Melvin D. Straw (V)
Pvt. Ralph R. Perkins (V)

50th AAA AW BN (SP)

Cpl. Jack R. McConnell

82nd AAA AW BN (SP)

Major Robert L. Tataczak (1OLC)
Capt. Perry E. Foust (1OLC)
Capt. James H. Hiscock
Capt. Thomas E. Kelley
Capt. Louis A. Sexton
1st Lt. Kenneth J. Barott
M-Sgt. Clarence V. Dye
M-Sgt. Robt. W. Sweeney (2OLC)
M-Sgt. Robt. L. Wood
Sfc. Melvin J. Guillory
Sfc. Louis T. Manko
Sgt. Frank Dotson
Cpl. Harold D. Henson
Cpl. Chas. E. Stockford
Pfc. John W. Bishop (1OLC)
Pfc. F. X. McCarthy (1OLC)

PURPLE HEART AWARDS

3rd AAA AW BN.

1st Lt. Bruce H. Cumming

21st AAA AW BN.

1st Lt. Melvin S. Gross
1st Lt. R. Y. Park (1OLC)
M-Sgt. Donald L. Treat
Sfc. Clyde H. Beaver
Sfc. Richard Roth
Sfc. Wm. E. Shepherd
Sfc. Buster W. Strasser
Sgt. Emil H. Fink
Sgt. Francis Hamilton
Cpl. Tony J. Anthony
Cpl. James Coleman
Cpl. James W. Karnes
Cpl. Thomas W. Snyder
Cpl. Wm. H. Vondell
Cpl. Bobby D. Yeager
Pfc. Richard L. Cain
Pfc. Tolly Canterberry
Pfc. Eugene Cochran
Pfc. Gregory Guinon
Pfc. Roger L. Hyer
Pfc. Denver B. Onellion
Pfc. Joseph H. Porter
Pfc. Raymond S. Sato
Pfc. James W. Vaden
Pfc. John K. Werme
Pvt. William Brown
Pvt. Bobbie Jamison
Pvt. Donald T. Kirk
Pvt. Bill A. Rochet

50th AAA AW BN (SP)

Cpl. Frank G. Manley
Cpl. Norman J. Ruest
Pfc. Raymond L. Rico
Pvt. Wm. J. Shelow

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The JOURNAL does not carry paid advertising. The JOURNAL pays for original articles upon publication. Manuscript should be addressed to the Editor. The JOURNAL is not responsible for manuscripts unaccompanied by return postage.

PUBLICATION DATE: December 1, 1951

Antiaircraft JOURNAL

Founded in 1892
Published from 1892 until 1922 as
THE JOURNAL OF THE UNITED STATES ARTILLERY
Published from 1922 until 1948 as the
COAST ARTILLERY JOURNAL

VOL. LXXXXIV NOVEMBER-DECEMBER, 1951 No. 6

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Published bimonthly by the United States Antiaircraft Association. Editorial and executive offices, 631 Pennsylvania Avenue, N.W., Washington 4, D. C. Terms: $3.00 per year. Foreign subscriptions, $4.00 per year. Single copies, 75c. Entered as second-class matter at Washington, D. C.; additional entry at Richmond, Va., under the Act of March 3, 1879. Copyright, 1951, by the United States Antiaircraft Association.

ANTIAIRCRAFT AR

By Major Genera

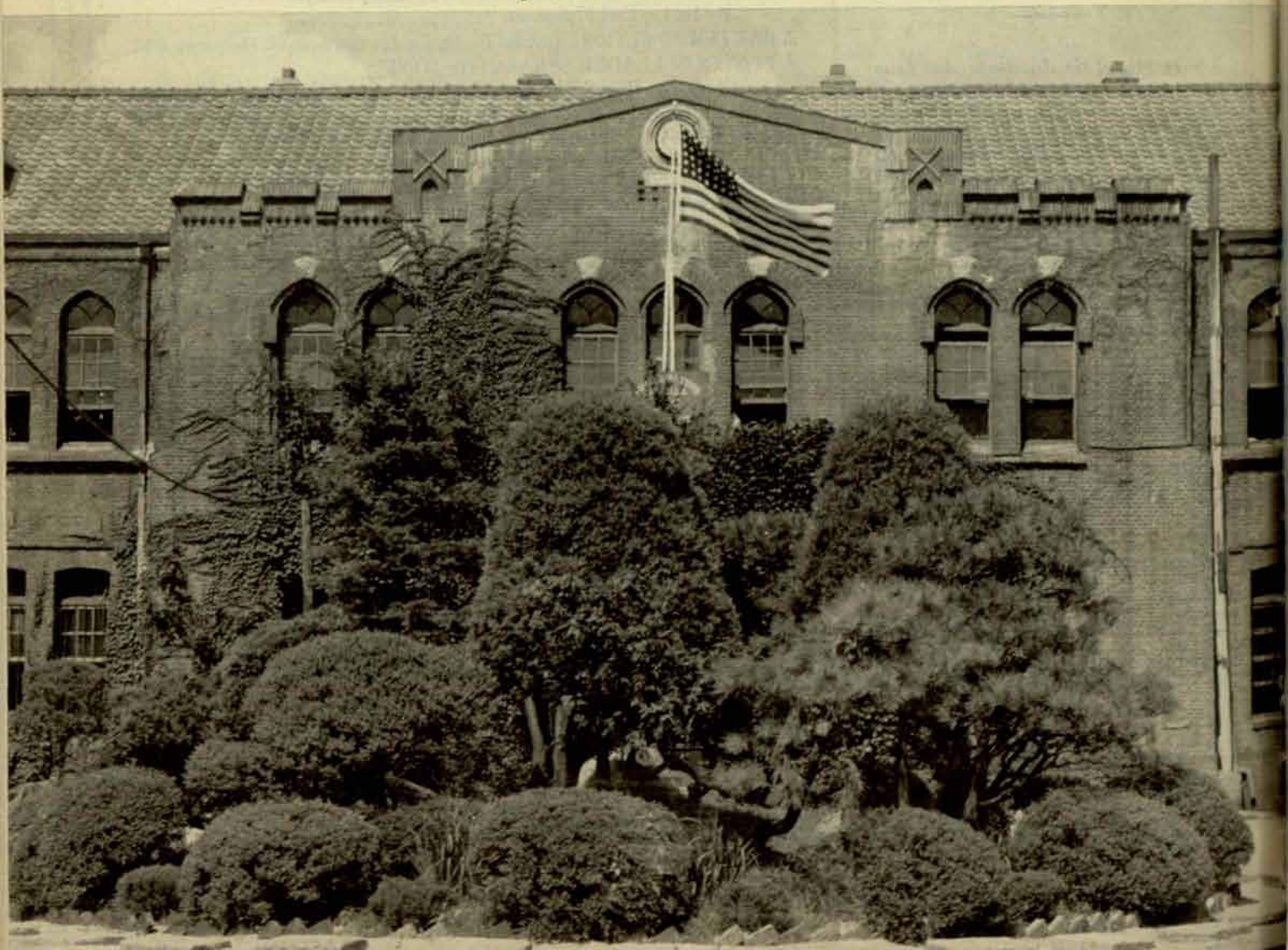
SEVENTH

ANOTHER climatic cycle approaches in Korea as this seventh report is submitted. There are definite indications that the hot, dusty terrain—churned into a morass during periods of torrential rains—once more is about to be transformed into a bleak frozen surface later to be covered with snow and ice with accompanying hazards of winter. The latter period has not yet arrived but the days are getting shorter and the nights give warning that winter is on the way.

Those who have been "near missed" by rotation have vivid memories of the last winter—the advance to the Yalu River; Chosin Reservoir; Hamhung and Hungnam and even the tough conditions in the rear area services bases—and they are not enthused. With usual alertness the Quartermaster has provided new and more efficient types of wearing apparel for the coming winter and the troops are hoping that supplies will be sufficient to meet the full demand.

And with the antiaircraft artillery units, the prevailing atmosphere is one of "business as usual." The long advances and retreats of the early days, replete with exploits of valor on every hand, have been replaced by the shorter but more vicious limited objective offensives against tougher resistance from dug-in defensive positions. The action

Somewhere in Korea: Headquarters of Colonel William H. Hennig's 10th AAA Group.



TILLERY IN KOREA

William F. Marquat

EPORT

Dug-in M19 of Battery B, 15th AAA AW Bn. (SP) on East Central Front.

has been characterized by the divisional units as "plenty sweat" types and the citations keep on arriving. The hostile bogies are appearing from time to time, bringing with them the usual problems of radar detection at low altitudes, difficulty of identification, firing at tree-top targets without illumination or radar tracking and difficulty in actually accounting for "kills." However, there is plenty of evidence that the antiaircraft crews are registering hits—perhaps the best of which is the fact that the hostile bombing has been utterly ineffective.

The 68th Gun Battalion, still under command of the veteran Lieut. Col. Raymond C. Cheal, experienced some difficulty with Typhoon "Margie" but managed to complete its target practice schedule and accomplish a shift of tactical positions in outstanding fashion. So complete was the work of the advance party for the tactical move that there was scarcely any interruption in the defense capabilities of the battalion as a whole. The advance party, under Major Harry Landsman, Capt. Boyd McGinn, Capt. John B. White, M/Sgt. Salem F. Jones and M/Sgt. Jack Rudy, was highly commended for its work. The battalion is proud of its proficiency at installing wartested communications nets with economy of materials, speed and efficiency of operation and ease in construction being emphasized. The battalion reports many night alerts in its new positions which makes life interesting for the antiaircraft artilleryman.

The 21st AW Battalion, commanded by Lt. Col. Charles E. Henry, with the 25th "Tropic Lightning" Division, after complete renovation of equipment and development of a communications system of which the battalion is justly proud, returned to patrol and task force action against the enemy with the usual excellent results.

A platoon of Battery B, commanded by 1st Lieut. R. Y. Park, engaged in some concentrated action against a well dug-in enemy while in support of the 27th Infantry "Wolfhound" Task Force. Lieut. Park's platoon engaged the enemy at 400 yards and accounted for 25 enemy killed in action. Park and five members of the platoon were wounded. These dug-in hostile troops manage to inflict casualties before being dislodged but the antiaircraft rapid fire weapons continue to perform magnificently in driving them out of position. Lieut. Park has since returned to duty after recovering from his wounds. One of the half track units of this platoon hit a ground mine, wounding three men.

Upon another occasion a platoon of Battery B commanded by 1st Lieut. M. G. Gross participated in a division attack, directly supporting the 27th Infantry. This platoon killed 26 enemy and wounded 30. Gross suffered the same fate as Lieut. Park in being hit along with six members of his platoon but he, also, has returned to duty.

1st Lieut. W. O. Keeling, Jr. led his platoon in support of the 24th Infantry in an attack against an enemy entrenched along a river line. Well coordinated fire support permitted the doughboys to rout out the enemy in quick order and the antiaircraft found many enemy dead in a bunker which the antiaircraft artillery fire had reduced. Upon another occasion Keeling's platoon engaged in a terrific battle with Chinese Communist defenders of a hill position. This time the platoon was attached to Task Force Hamilton along with tanks, infantry and friendly artillery. A day long battle ensued and afterwards hundreds of the enemy were found dead. The enemy did considerable damage with its antitank weapons but no disabled vehicles were permitted to fall into hostile hands.

1st Lieut. Paul S. Vanture took his platoon of Battery D on a similar engagement as part of Task Force Lynx in an action to overrun, capture and destroy enemy personnel and matériel.

The 1st and 2nd Platoons of Battery B have been awarded the U.S. Presidential Distinguished Unit Citation for heroic combat action. The "Quad Lightning" Battalion has been given 18 Silver

A Turkish gun crew mans U.S. quad .50s.

Stars, 39 Bronze Stars for valor, 28 Bronze Stars for meritorious service, two Commendation Ribbons and 132 Purple Heart medals. Most of the awards for valor were initiated by Infantry Commanders.

AMONG the most widely publicized recent actions of the Korean War is that at "Bloody Ridge" on the East-Central front. The hostile troops were firmly entrenched on this hill which was the scene of back-and-forth infantry assaults for some time. Some of the hottest action of the war occurred in this area and the enemy finally was permanently driven out of position by determined efforts of the Eighth Army ground forces.

Lieut. Col. Robert H. Johnston's 82nd AW Battalion participated prominently in this action. Officers and men of Battery B distinguished themselves during one assault against a fanatical enemy defense force on this ridge. The antiaircraft weapons were skillfully employed in covering the U. S. infantry advances up the hazardous approaches of the ridge which was protected by three key defensive positions. The M16 weapons time and again used their devastating fire to defeat suicide counterattacks of the hostile forces seeking to halt our infantry's successes.

Capt. James H. Tyree, commanding the battery, and 1st Lieut. Henry S. Dunbar III, SFC Cyril B. Moxham, Sgt. Andrew Wimberly, Sgt. Martin M. Margetich, Cpl. Leonard Marcinowski, Cpl. James B. Sayre, Cpl. Kenneth O. Hauk, and PFC James B. Ketchum were cited for outstanding performances during this famous engagement.

An interesting sidelight on Army life in Korea is recorded in the records of Battery B, 82nd AW Battalion, with the discharge for minority of SFC Donald J. Eskew. Although a veteran of two years and nine months of Korean service, holder of the Bronze Star Medal for meritorious achievement and promoted to the rank of First Sergeant of the battery, Eskew is only 16 years old. His remarkable record of achievement is characteristic of the type of U. S. Army soldier found in our Korean antiaircraft artillery forces.

The 3rd AW Battalion, commanded by Lieut. Col. John B. Goettl, assigned to the 3rd U. S. Infantry Division, also participated in some of the famous action of the recent past in Korea. This unit was engaged in close support of U. S. and Puerto Rican Infantry in the Iron Triangle operations. Battery B, commanded by Capt. James H. Furr, supported the Puerto Ricans in their determined attacks against entrenched enemy on two rugged peaks. 1st Lieut. William Hill's First Platoon rendered close fire support to the attacking infantry for three days of outstanding action. At the end of the period the enemy dead counted amounted to over 400.

When the objective finally was taken there were more than 800 bodies of defending Chinese Reds found in the battered defensive works attributable to all types of U. S. Forces fire. During this action Capt. Furr and Sgts. First Class Henry Fox and Martin Kittelson distinguished themselves in the face of the enemy.

Battery A, Capt. Richard DeWitt, supporting the 7th U. S. Infantry, performed outstanding service in another action within the Iron Triangle sector. On one occasion four days of intensive attack gained the objective for friendly forces in which Battery A performed with distinction. The platoons of 1st Lieut. A. M. Wilson and 1st Lieut. P. H. Felder accounted for 97 enemy killed and the destruction of eight enemy machine gun nests. Master Sergeant Joseph Farrel, SFC John Downing and SFC Warren George were outstanding.

Upon another occasion Battery C, Capt. Jack W. Morse commanding, supported the 7th U. S. Infantry in an attack. From defiladed positions on two flanks of the advancing Infantry elements, the platoons of SFC Roy Rabenstine and SFC F. Tristini covered the movement with fire of such effect that the infantry troops suffered only minor losses from well entrenched enemy fire. Corporals Leonard Mays and Henry Wiersema performed in outstanding manner in furnishing protective fire and in taking out targets of opportunity which opened up on our forces.

One of 1st Lieut. John Kinan's half tracks was hit by enemy fire during a period of heavy engagement but the platoon refused to abandon the weapon. Mechanics repaired a damaged track under enemy fire and the vehicle retired under its own power.

The M39 personnel carrier vehicles of

Brig. Gen. J. S. Bradley, CG, 25th Infantry Division, with Brig. Gen. George B. Barth, Divarty commander, decorate members of the 21st AAA AW Bn. *Left to right:* Lieut. Col. Charles E. Henry, Bronze Star Medal; 1st Lt. John Gronsky, 1st Cluster to The Silver Star; 1st Lt. Richard Y. Park, BSM; 1st Lt. Stuart Lassetter, BSM; Sgt. Floyd T. Barton, Silver Star; PFC George A. Bernasconi, BSM; Cpl. Lynwood E. Collins, Silver Star; SFC Paul L. McRoberts, BSM; SFC Charles H. Moudy, BSM; Cpl. Frederick B. Duke, Silver Star; Sgt. George Gillis, BSM; PFC Richard D. Brown, BSM; Sgt. Raymond R. Arcand, BSM; Sgt. Corey L. Clayton, BSM.

this battalion have been doing heavy duty evacuating the ground force wounded during heavy action. Corporals Billie B. Brock, Howard T. Miller and Frank Grooms, Jr. were cited by the 70th Tank Battalion, 1st Cavalry Division for outstanding performance in evacuating wounded under fire.

THE 50th AW Battalion, under command of Lt. Col. Lawrence J. Lesperance, has had difficulties with high water in its air defense tactical locations. While enemy action could not budge the 50th AW Battalion defenses, nature forced an evacuation. After the high water receded the batteries moved back into their old positions bearing the title of "Driftwood Boys" conferred by the Air Force elements in the area.

The 50th was awarded a Korean Presidential citation by Syngman Rhee, President of the Republic of Korea, along with units of the X Corps to which the 50th Battalion was attached during the period covered by the citation.

This battalion reports a strange but interesting incident illustrating the indirect value of antiaircraft defenses. It had been reported that an enemy bogie had been making frequent nightly visits to one of our air installations causing considerable concern and some damage. It was arranged to shift some of the 50th AW Battalion equipment to this area for a surprise defense against the hostile night raider. Utmost secrecy was observed in the movement and the displacement took place swiftly under cover of darkness. After arrival of the antiaircraft equipment and personnel, no hostile air action in that vicinity was experienced for six nights. When the antiaircraft equipment was returned to its permanent positions, however, the night prowler returned.

It is apparent that the enemy had information of the AAA installations in this area. The fact was established, however, that when friendly antiaircraft installations are present, the enemy planes are reluctant to come to grips with them. It would indicate a deep respect for the potency of U. S. antiaircraft artillery weapons by the enemy. It further reveals one reason why the antiaircraft is not more frequently engaging the Communist night raiders—the raiding planes do not come around areas where

82nd AAA Bn. covers hostile hills.

an antiaircraft defense has been installed.

The 15th AW Battalion, commanded by Lt. Col. Franklin A. Werner, furnishing antiaircraft defense for the U. S. 7th Division, has been busily engaged in the Death Valley sector of operations on the Central Front. The twin 40mm equipment has been found especially effective in attacking hostile hill or ridge top positions of the enemy in support of our friendly infantry advances. Many counterattacks have been repulsed effectively and the multiple mount weapons have been found to be especially suited to this purpose because of the tremendous fire power that can be shifted rapidly to the point of threat.

On one occasion a unit of Battery B led by 1st Lieut. Ernest Honaker of Otway, Ohio was cut off behind the enemy lines during an engagement, fought off a vicious night attack by the Chinese Communists and withdrew the following day while closely engaged with the opposing forces.

A platoon of Battery D, under Lt. Paul J. Tate, supported the infantry during the capture of Old Baldy area objectives. The enemy made a determined counterattack against our successful infantry, but the antiaircraft multiple weapons soon broke up the enemy foray and caused the hostile troops to flee in complete disorder.

Battery C supported an Ethiopian unit during one of its attacks and immediately became a favorite with the UN infantry contingent. This is believed to be the first instance of the use of U.S. AAA troops in support of Ethiopian combat organizations.

Lieut. Don Brown has organized a unit of M3-A1 personnel carriers to shuttle infantry troops to and from extreme forward area positions. The unit is called "Battery X." The armored vehicles transfer the combat infantry troops swiftly and with minimum losses and are most popular with the troops. This combat taxi service is operating under a "You call—We haul" motto.

Sgt. Billy C. Lewey, Tuscumbia, Ala. and PFC Gerald L. Hurhs, Vallejo, Calif. volunteered to enter enemy rear areas during Operation Cleaver to recover wounded infantrymen. Both returned across a fire swept open space with badly wounded doughboys and have been recommended for Silver Star awards.

New arrivals in the Battalion include Majors W. P. Mathers and L. Millar; Captains H. W. Reidburg, H. Postol, A. J. Baer, C. W. Bland and D. Bruce; 1st Lieutenants M. A. Limbert, C. Farrar, J. N. Peck and E. D. Bayne.

THE 78th Gun Battalion, commanded by Lieut. Col. John B. Parrott, has had some contact with night bogies but the enemy has been flying at tree-top height and quickly disappears as soon as fired upon. Capt. Arthur Brooks' Battery D claims one shot down.

The 933rd AW Battalion, commanded by Lieut. Col. Charles E. Roden, has been engaging in target practices at a EUSAK firing point in Korea. It is well equipped for night defense and is prepared to make a showing if the enemy night fliers show up within range. The unit commanders in this battalion are: 1st Lieut. Clyde F. Childs, Headquarters Battery; Capt. Ray R. Hayden, Battery A; Capt. Iverson O. Mitchell, Battery B; 1st Lieut. George C. Hampton, Battery C and Capt. John C. Tucker, Battery D. Capt. Dennis J. Ahern has the 51st SMRUE. attached.

Colonel William H. Hennig's 10th AA Group Headquarters, controlling the antiaircraft troop units in the Korean Air Defense, has been most active in conducting training and target practice operations for all antiaircraft organizations in the Korean area. Lieut. Col. T. W. Ackert, group executive, is on TDY with EUSAK Headquarters, acting as Colonel Hennig's deputy and antiaircraft adviser to General James A. Van Fleet's headquarters.

With winter approaching, the 10th Group Headquarters, having experienced one cold season in Korea, is busily engaged in winterizing its housing and equipment. Several new developments

in sealing construction against cold have been devised and are being installed.

The Group Headquarters has organized a Korean orphans' charity committee to provide for a group of 300 war orphans during the coming cold season. It is estimated that thousands of homeless orphans will undergo extreme suffering during the winter of 1951-52 unless steps are taken at once to provide for them. The committee consists of chaplains and special service officers. They are: Chaplain Johnson and Capt. Turck; Chaplain Ford and Capt. Harris; Chaplain Brooks and Capt. Willard; Chaplain Calter and Capt. Owens; Chaplain Woosley and Capt. Owens; Chaplain Hopson and Capt. Jaffa; and the group executive, Lt. Col. Young, group special services officer, Capt. William F. Rawcliffe and group member 1st Lieut. Paige.

Funds in the amount of more than $5,000 already have been raised. With these finances it is planned to import clothing and food badly needed by these children through cooperation with the United Nations Civil Affairs Command. The 10th Group supports the Chang Choen Garden orphanage. If sufficient funds are later raised, each battalion of the group will take over a separate orphanage.

U. S. Navy aviation F-4Us brought down several of the night raider enemy planes during the period of this report. They were identified as the PO-2 type, slow moving planes with limited range. Several of these PO-2 planes disintegrated when hit but one landed behind UN lines. The plane was wrecked and the pilot killed.

So another phase of antiaircraft artillery history in the Korean War passes. After all there are only so many things you can do in combat and these units have done about all of them by this time. The narratives may appear repetitious to some readers but the actions are in different sectors, by different organizations and involve different men. To those who are participating in antiaircraft artillery support of attacking ground forces there is nothing monotonous about the situations. They are slugging it out with a cunning and vicious enemy but are demonstrating superiority in every type of operation. They are learning lessons that will insure future victories at a smaller cost of human life. They are preparing themselves to be the nucleus of the antiaircraft troop component of the expanded U. S. Military Force and to carry on with the same determination and loyalty as that now being demonstrated in Korea.

The value of antiaircraft in ground support is fully appreciated in Korea. The Eighth Army has assigned M16 quad caliber .50 weapons to each division in order to have this devastating fire effect always with them. This is mute recognition of how the antiaircraft troops have sold their weapons and themselves during the Korean War.

BOOKS RECEIVED

CROSS CHANNEL ATTACK. By Gordon A. Harrison, Govt. Printing Office, Official Historical Publication, Department of the Army. 519 pages, including photos, maps and appendices $5.25

LEGEND INTO HISTORY. By Charles Kuhlman, Stackpole. A new approach to the historians' quest for light on the mystery of Custer's tragedy. 250 pages $5.00

LIFE'S PICTURE HISTORY OF WESTERN MAN. By the Editors of *Life*. 306 pages with colorful reproductions of the world's finest magazine, art and photography $10.00

INVASION 1944. By Lt. Gen. Hans Speidel, Rommel's Chief of Staff on the Normandy invasion, Henry Regnery Co. $2.75

GEORGE WASHINGTON (Volumes I to IV). By Douglas Southall Freeman, Scribners $30.00

MASTER PLAN U.S.A. By John Fischer $3.00

A KING'S STORY. The Memoirs of The Duke of Windsor. Putnam $4.50

THE MACHINE GUN Volume I (II and III are classified). By Lt. Col. George M. Chinn, U.S.M.C., Dept. of the Navy. 688 pages $5.00

COMMAND VOICE. By Captain Richard W. Sherretts, Military Service, 110 pages (paper bound) $1.50

THE MILITARY INSTRUCTOR. By Lt. Col. Edward E. Pickard, CE, USAR, Military Service. 369 pages (paper bound) $2.75

A FOREIGN POLICY FOR AMERICANS. By Robert A. Taft, Doubleday. 127 pages $2.00

THE WOLFHOUND'S FANGS

By 1st Lt. Robert C. Morrison

THE 21st AAA AW Bn. (SP), under the command of Lt. Col. Charles E. Henry, arrived at Pusan on a cold, bitter day in early January, and before we grew fond of that port we headed north on a 300 mile march to join the 25th "Tropic Lightning" Division.

Baker Battery, under the command of Capt. Michael B. Kaminski, a dynamic ex-tanker, was promptly placed in support of the 27th Infantry "Wolfhound" Regiment.

My platoon, the First, immediately joined Task Force Dolvin which drove north through Anyang, Yongdongpo, Kimpo, and on to the sea. The Second Platoon, under the command of 1st. Lt. John Popovics, a few days later joined Task Force Bartlett which leapfrogged up the seacoast and cleared the western sector to Kimpo. At the breakup of the task forces, by the appreciation shown and the praise received, we knew Baker Battery was an accepted part of the Wolfhounds—a fact which raised our morale higher than it had ever been.

When we first joined the Wolfhounds, we were organized according to the TO&E. However, after the initial task forces, the battery was reorganized into three firing platoons, a practical and highly effective solution to the problems involved in a marriage with the infantry. The infantry regiment normally operates with two battalions on the line, using the reserve battalion to rotate and rest one battalion.

Having only two platoons with which to support the infantry made it necessary for our platoons to remain on the line all the time with no chance for reserve within the regiment. The pace of constant attack under this condition was an unnecessary hardship on the men and equipment, hence the reorganization.

The fact that 95% of our tracks were in action at all times during this period of stress merits the highest praise of our drivers and the maintenance crew. Many times mechanics and drivers worked most of the long winter nights so that platoons would be up to full strength for the next day's attack. When the Third Platoon was organized 1st Lt. John Gronsky became its pilot. The platoon was composed of four M16's and one M15 and was attached to the Second Battalion. Lt. Popovics' platoon, the Second, was attached to the Third Battalion, while my platoon, the First, remained with its foster parent, the First Battalion.

As a further part of the reorganization each platoon received one mechanic permanently attached. This attachment was a terrific boon, since the high caliber mechanics we had were able to perform near miracles on the line, thus saving much valuable time which normally would have been wasted waiting on the maintenance crew to arrive. These greasy geniuses have perfected the art of replacing a thrown track to a point that the aid of a winch from another track is the only tool needed in addition to the usual socket set. Soon after our arrival our farsighted battalion commander, Lt. Col. Charles E. Henry, had given each battery two extra 2½-ton trucks to be used for ammunition. This addition to the battery was one of our biggest assets.

The ammo trucks were kept constantly with whichever two platoons were on the line at the time, thus assuring a constant, rapid resupply of ammunition. Due to the fact that we spent as much time ahead of the Wolfhounds, in flanking attacks, as we do abreast of them, there have been many instances when the instantaneous availability of ammunition saved not only the infantry from an ambush but also prevented us from being surrounded without enough ammunition to fight our way back. Our ammo drivers were shelled and machine-gunned more than they liked, yet their front line service to the platoons was always superior and at times even heroic.

IN the drive to the Han we constantly perfected the teamwork between the infantry, tanks and ack-ack. Because of the unshakeable tenacity of the Wolfhounds we could place our tracks in night defensive positions which might be considered tactically unsound if we had been with a less formidable outfit. Our constant goal was to support the infantry no matter where the support was needed. We built bridges, corduroyed mudholes, and winched half buried half tracks in an effort to place our tracks anywhere the infantry wanted us, until we began calling ourselves the Ack Ack Engineers. Using a tank to break the rice-paddy dikes, to tow a track thru a mudhole, or to tow a track up a steep cross-country slope was standard procedure. In such static positions as the Lincoln Line we even used a D7 bulldozer to push our tracks into positions along a 600 meter ridgeline.

Because the infantry prefers enfilade fire to overhead fire, we always button up for the night, foxhole to foxhole with the "doughs." It is a familiar sight to look at the MLR from an OP and see half-tracks squatting among the rice paddies, perched on small ridges, or tucked away in narrow draws, wherever there is a potential hotspot that night.

At night the situation largely determines the method of fire control. Our platoon CP's are always on a direct wire to the infantry battalion switchboard as well as the SCR 300 radio, thus assuring positive communications with the infantry under all conditions. When the sections are split up among the companies, firing is usually under control of the company commander. This is easily accomplished one of two ways. First, thru the infantry chain of command, using a sound power phone to the infantry squad leader nearest the tracks, or second, from the company commander

Lieut. Morrison entered the military service from Tennessee, graduated USMA in 1950, and joined the 21st AAA AW BN at Fort Bliss, Texas.

He has been awarded the Silver Star, OLC, and the Bronze Star for gallantry for action in Korea.

thru the AA platoon CP to the tracks via SCR 508. When, as in some cases, the platoon is itself covering one sector of the front the firing is controlled by the infantry S-3 or company commander, thru the AA Platoon CP to the tracks, via SCR 508.

During the day, in the attack, the system of fire and tactical control is slightly different. Communication is entirely by SCR 300 and SCR 508 until the objective is taken and wire laid by the infantry battalion wire team. Initially in the attack the platoon is placed in direct support of the assaulting company or companies. The company commander together with the S3 determines whether our mission will be to advance with the infantry, to support with flanking fire from a forward position, or to force our way to the rear of the objective for an ambush. This latter mission, usually assigned in the later stages of the attack, is the one which more than any other strengthens our bond with the Wolfhounds, for its success depends upon mutual aggressiveness. When sent around to the rear of a hill we know the Wolfhounds will always somehow get to the top with support if we need it, while they likewise know that when they finally do make the top our tracks will be waiting on the other side to chew up any enemy "bugging out," and more important to mop up any enemy reorganization for an immediate counterattack.

As the tactical situation changes the platoons often get a call to leave one company and support another which is harder pressed at the time. Sometimes this means a mere shift in position of several hundred yards, but at other times due to impassable mountains and a weird road network it means miles of travel. One instance in particular brings this out. After crossing the Han River the approach to the main E-W MSR was blocked by a 700 meter ridge parallel to the MSR. As we neared the head of the valley in support of Baker Company, I received orders to join Able and support them in their advance. In order to do this it was necessary to follow a route approximating a 350 degree arc covering slightly over 15 miles. Before that 2½-day operation was completed we had made the same trip six times finally reaching the MSR late one afternoon. From then on the trip to each of the flank companies was only one mile!

As we worked our way further and further north our tactics had to be altered to meet the increased mortar and artillery fire with which the Chinese defended the central sector. As soon as the day's attack was completed and the objective secured the platoon would wait in nearby defilade until nightfall. In the meantime, the squad leaders and section chiefs would accompany the platoon leader on a detailed reconnaissance of their positions for the night. The tracks would then move into position after dark and move out in the attack at dawn. Moving into position after dark not only had the advantage of protection from artillery observation, it also concealed the actual position of the tracks in the MLR until the last possible moment. This became increasingly important as the Chinese learned the effectiveness of the quads and made their attacks on sectors not covered by our fire. More than once our tracks caught the Chinamen with their bugles down and covered the ground with surprised yellow bodies.

With the confidence acquired by savage, relentless attacking and aggressiveness fired by the high moral of a tough, grizzled fighting team our versatility soon approached the boundless limit expected by the Wolfhounds.

In one instance the second platoon was probing far out ahead of the infantry, toward the battalion objective, when they discovered the terrain would permit complete encirclement of the village and hill. Moving in underneath the enemy mortar fire the tracks took up positions which completely isolated the hill. They then eradicated the remaining Chinese and radioed the amazed battalion commander the objective was secure.

ONE night during the late April Chinese offensive serves as another good example of this versatility. The enemy had overrun a hill on the right flank and was pressing toward a battalion CP in the rear. Both my platoon and the Third were covering the sector of a wide valley allotted to our respective battalions. Leaving the First Platoon to cover the entire front the Third Platoon streaked down the MSR and up into the valley where the CP was beginning its fight for life. When the Third Platoon arrived at dawn, the Chinese were already streaming down the hillsides but as the quads barked the tide immediately began to crumble before the withering fire. As it got lighter the increased visibility aided the tracks in completely disrupting the breakthrough, as the Third Platoon stacked up more than 400 dead, stopping the lead elements some 25 yards from the CP.

A final example of the versatility the Wolfhounds appreciated so much, and one with which I am more familiar, occurred in early June. In two days we led and supported the attack, blocked a night probing attack, completed a rescue mission, and aided a mop up operation. Due to the peculiar nature of the terrain the first two days of the operation were spent in aggressive patrolling. The battalion sector was the size normally covered by a regiment, narrowing down to a battalion size sector after the next series of objectives, Sugarloaf on the right, and Tom on the left.

The MLR followed a cliff-like ridgeline to the east, skirted the edge of a small lake, then climbed up the face of a razor-sharp, 800 meter, N-S ridge. My platoon held the left flank of the line by bending back slightly in order to cover a 1500 yard gap between us and the friendly unit to our left. The day of the attack we were to drive up an E-W valley 1800 yards long leading to the base of Tom. Accompanied by two tanks we were to clear out what resistance we could, set up a base of fire for the infantry, and wait for them to move through us. It was the perfect setup for a tight situation and a tough fight; Hollywood could have done no better. The smooth, calculated killing method in which the crews handled this hellhole, is a tribute not only to them but to the cool courage and fighting spirit of the entire battery. The platoon advanced by sections using the leapfrog method of fire and maneuver, while the section chiefs themselves used the same procedure, track by track, within their section.

As we rounded each wooded finger projecting into the 200 yard-wide valley the ground reverberated from the roar of seven tracks as they chopped up snipers' nests and cut the burp gun artists to ribbons. At the dead end of the valley we made the final turn and walked into a hornets' nest. Green and white tracers turned our shields black with their white

heat at such close range. The tankers were unable to use their big guns due to the thick foliage, but at such close range, 50 to 75 yards, our armor piercing ammunition did a highly creditable job on the bunkers.

By constantly shifting tracks as they needed ammunition we matched enemy fire, returned from three directions, for 2½ hours. When the infantry finally moved through us we had expended 84,000 rounds, knocking out two of the three machine guns and fifty to sixty dug-in enemies. That night the Chinese followed a friendly patrol into the line; so one section was saddled up and sent to join the fireworks display. We caught them in a rocky pass and shattered quite a few links in the Chinese chain of command before their withdrawal. The next day, as the infantry attacked, the enemy slipped around their flanks in small groups, finally regrouping in the valley leading to Tom.

There they cut off several litter jeeps, some walking wounded, and the company wire crews. Answering the battalion commander's call we again entered the valley, advancing almost to the men who were pinned down before drawing fire not only from our front but also from our left rear. By maneuvering the rearmost track so the crew was shielded by another track the fire to our left rear was neutralized, and after a thirty minute battle we managed to pin down the bulk of the enemy to our front, thus allowing the wounded and litter jeeps to clear out of the valley.

No sooner had we covered our own exits than two platoons of infantry joined us for a mop-up of that same pocket of infiltrators. Entering the valley for the third time we covered the infantry's advance as they closed in on the bunkers. We learned afterward, from the dead counted by the infantry, that we had chewed up the equivalent of two enemy companies, knocking out one machine gun nest, while the infantry took two more. By this time casualties had cut our strength to five tracks of four men each but the objective was taken and our missions had all been completed.

CLOSE support of the infantry naturally involved casualties. Of our average operating strength of 120 to 130 men 68 have received purple hearts. Because of this, manpower is always a critical item, but there are always those who rise to meet any need. This is well proven by the seven Silver Stars and the eleven Bronze Stars for Valor which have been awarded by our own battalion and the infantry battalions. True, the AW men in Korea have not received the recognition which the Combat Infantry Badge signifies; however Baker Battery has been well recognized by the recent award of the Presidential Unit Citation for our part in the Han River crossing of 7 Mar 51, when the entire battery supported the assaulting Third Battalion.

Our greatest pride, however, is our name, given by the Wolfhounds themselves—The Wolfhound's Fangs.

The A-B-C's Of Ground Support

By 1st Lt. William O. Keeling

UPON his arrival in Korea a lieutenant bearing the MOS of 1174 may find himself in rather a peculiar quandry. Primarily his training and experience have emphasized the rules and techniques of engaging aerial targets. However, in this theater the targets of many AW units are terrestial and different rules and techniques are employed. It is the purpose of this article to attempt an explanation of the job of an AW platoon leader in a ground support role.

Lt. William O. Keeling entered the military service from Pittsburgh, Pennsylvania in 1943. Integrated into the Regular Army 17 December 1948. Joined Battery "D," 21st AAA AW BN (SP), in Korea 1 February 1951 to command the First Platoon. Awarded the Silver Star and Bronze Star.

Under the leadership of Lt. Col. Charles E. Henry, the 21st AAA AW Battalion (SP) has acted in the ground support role for the 25th Division since the battalion's arrival in Korea. Operating on the theory that a job worth doing is worth doing to the best of your ability, the 21st has performed its mission in an exemplary manner and is now a respected and valued member of the ground support team.

Coordination

Full cooperation and understanding between the AW platoon leader and the infantry unit are prime requirements of ground support. The infantry must be fully aware of your capabilities and limitations and vice versa. Before the 21st was ever committed, Col. Henry supplied the infantry units with a mimeographed form wherein were listed the capabilities and limitations of the M16. These details are often of major value.

Personal contact with battalion commanders, S3's, company commanders, and platoon leaders is a must. Normal contacts may suffice, but I heartily recommend that you make it a point to pay at least a daily visit to the infantry battalion hearquarters. In this way you become a familiar figure and the discussion of your weapons is invaluable in giving the supported unit a clear, concise picture of what you can do for them. These visits also give you an idea of what is scheduled for the next day and allow you to plan and make the necessary contacts.

Get to know the battalion S3! Here you find the scheduled operations and what they require of you. Here also the S2 can give you an idea of what the enemy is doing. If you are well acquainted with the battalion commander and his S3, you are in a position to learn those details which in the final analysis determine how effective your support will be.

You must also learn the fine art of saying no. Sometimes you will be asked to do a job that is beyond your capabilities; a negative answer and the reasons therefore will usually result in either an alteration of the mission to permit your participation or in finding another mission for you. However, be sure you have adequate grounds for a negative reply! Look things over very carefully and if an affirmative possibility exists, give it a whirl.

To sum up. Get familiar with the unit you are supporting. Learn their problems and requirements. Let them learn your side of the story, your problems and requirements. In a very short while you will find yourself working in an atmosphere of mutual trust, respect and confidence.

Types of Employment

Generally, you will find this topic can be broken down into four general types: direct support of the attack, task forces, blocking positions, defensive positions.

In direct support of the attack the main requirement is locating positions well within your most effective ranges so that you can deliver accurate and effective fire throughout the entire attack. Considerations affecting your choice of positions are: accessibility, time required to move into position from your present location, size of the area, proximity to the enemy, and alternate positions.

In the attack it is best to pay close attention to the size of the area you are to occupy. Quite often you will share this spot with tanks and overcrowding is not advised! You may also find it expedient to utilize part of your platoon as a reserve force. This affords more ample room for maneuvering, and also provides you with replacements if one of the striking force vehicles becomes disabled.

The infantry welcomes AW support in an attack due to the tremendous volume of fire that can be delivered in a short time. At 800 yards a platoon of M16's can literally blanket a hillside. In firing a support mission you must give the problem of range serious thought. Positions at ranges of 1000 yards or more restrict your support to preparation fires alone. Dispersion at long ranges makes overhead fire a very risky proposition. If positions can be found within 500 to 700 yards of the objective, overhead fire becomes an extremely effective method of support. Good communications and a proper display of panels can ensure effective fires to the very last minute before the final assault. These ranges can also make life miserable for any hostile counterattacks that may develop.

Area size and alternate positions are worthy of serious consideration. The enemy often reacts to M16's like a dog to fleas. If you have room to maneuver these unwelcome attentions can be reduced in effectiveness. If enemy reaction is vigorous, alternate positions are a must. You are courting extreme discomfort to stay put in a place too long.

Defilade, if available, is most welcome. However, it must be a secondary consideration unless you can utilize it and still accomplish your mission.

Task forces presuppose close coordination with tanks. In this type of operations armor and AW can do quite a bit for each other. The tank is better able to withstand flat trajectory weapons, automatic weapons fire from the front, and mines. On the other hand the M16 can sweep the flanks with devasting effectiveness, protect the armor against rocket launcher teams, and quickly discourage any mass attacks.

To best utilize each weapon's capabilities it is usual practice to employ one or two tanks as the lead vehicles and then scatter the M16's throughout the column with the last vehicle again a tank. In this manner maximum security and fire power are afforded throughout the column.

TASK forces cover a variety of missions, but I am using the term to describe any operation wherein armor and AW are required to operate in advance of friendly lines. Here again close coordination is of the utmost importance. Engineers, armor, infantry and AW are assembled in varying proportions and sent forth on their mission, and each unit must carefully dovetail its efforts into the smooth close cooperation of the entire team.

Mines are an even greater hazard in such operations. Time permitting, the engineers can remove or detonate them as they sweep a clear lane in advance of the vehicles. A tight schedule or heavy enemy fire may reduce the time allotted to mine clearance to the point where only obvious evidence of these weapons can be checked. Then vehicles must proceed cautiously and a sharp lookout must be maintained for likely locations of mines. Mines are one of the prime reasons for making a tank the lead vehicle. Tanks can absorb the detonation of mines with comparatively little damage unless a multiple installation is encountered. Even a single mine can deliver a harrassing jolt to an M16, and at best the front of the vehicle is damaged very heavily. At worst, the gas tanks are struck and a raging inferno results. Either way the crew suffers a severe shaking-up as a minimum of injury.

The range and power of AW fire is an extremely useful aid to the advance of the force. It renders close-in attacks, something approaching suicide. Road blocks are difficult to man in the face of the murderous fire an M16 can bring to bear. In addition, long range fire can be used to rake hill masses suspected of harboring enemy positions. If the mission of the force is to seize an objective, AW provides assault fires as in support of the infantry. It may be utilized as a support force to provide security and covering fires for the withdrawal of the unit. If the job is that of clearing the enemy from villages the tracer and incendiary projectiles in the torrent of AW fire is an unsurpassed medium of arson, and burning buildings are soon empty of hostile occupants. Teamed with the powerful flat trajectory weapons of the tanks and the fighting potential of the infantry, AW is a potent addition to the groups that go out to seek the enemy in his own bailiwick.

BLOCKING positions are an important factor in the withdrawal of friendly forces. The AW platoon leader in conjunction with the supported in-

fantry picks out positions along the route of withdrawal from which he can cover the retrograde movement. Ideal spots are river banks, the mouths of valleys, and main routes of hostile advance. This type of operation also finds AW again employed with armor.

As prearranged, the blocking positions are occupied, friendly troops pass through them and proceed to new defensive positions. As the rear guard moves by, the blocking force pulls out and follows providing coverage of the unit's rear. Often the blocking force awaits the enemy's lead elements and delivers fire designed to inflict maximum casualties, disorganize the hostiles, and disrupt the pursuit thus gaining additional time for friendly units to organize their new position. The mobility of the armor-AW team plus its heavy fire power make it an ideal combination for such rear-guard actions.

Defensive positions utilize the M16 fire power to the maximum, especially where mass attacks are common. The infantry line with its bunkers, barbed wire, mine fields, and concentrations of mortar and artillery constitutes a formidable obstacle in its own right. Coupled with the power of AW, such a position assumes the proportions of a very tough nut. M16 positions should be dug at least out of hand grenade range from the barbed wire. Quite often a protective horseshoe of wire is placed about each vehicle. A recommended distance in rear of the MLR is about sixty yards. High ground overlooking the MLR should be utilized if available. If concealment is available, it is advisable to occupy the firing position after sunset and move out just as daylight is breaking. In this way the very conspicuous silhouette of the M16 is kept out of sight as much as possible.

AW fire power neatly complements the final protective lines of the infantry. The FPL is a calculated system of fire designed to integrate the fires of all weapons into a series of interlocking bands with as little dead space as possible. However, the M45 turret by the nature of its design can easily and quickly bring heavy, accurate fire to bear in any direction. This makes it an ideal addition to the FPL. Given a position overlooking the infantry wire, the M16 can systematically sweep the area and along with the patterned fires of the FPL lay down a heavy blanket of fire along the entire position. A massed enemy, silhouetted as he struggles through defensive wire, will suffer murderously at the hands of heavy, close-range AW fire!

Reconnaissance

The importance of a complete reconnaissance cannot be too heavily emphasized. A map reconnaissance, while useful, is not sufficient. Where possible the AW platoon leader must cover the ground thoroughly before his first vehicle enters an area. Terrain such as that encountered in Korea makes actual coverage of the ground a must. Cross-country movements quickly become nightmares of bogged and struggling vehicles if a route has not previously been fully reconnoitered. The rice paddy is a perfect case in point. From a distance all look about the same. A closer inspection will reveal that some are firm enough to sustain the weight of an M16. However, other paddies will have a thin crust covering a deep sticky gumbo that will stop an M16 as surely as a mine. Reconnaissance can make all the difference in the world.

The inaccuracy of Korean maps is another factor in favor of ground reconnaissance. The map may show an adequate road running right through the positions you wish to occupy. Check that road if you can. Too often you will find a trail that would insult even a mule! An M16 hung up on a cowpath or paddy dike is not calculated to reduce a man's proclivity towards profanity! Check the map and then go check the ground.

Communications

Communications can be one of the most persistent headaches encountered by the AW platoon leader.

Get every type of communication available to you. We use the SCR-300 regularly with the infantry, but sometimes that may fail you. Wire is a must when available. If able, the infantry will gladly run you a wire from their switchboard. The fact that armor and AW both employ the SCR 508 and 528 radios opens another means of communication. A channel can be quickly turned to that of the tanks. This hook-up is essential for working with tanks. It also is a useful alternate to your own system in emergencies.

Lastly the SCR 694 in your personnel carrier will link up with your battery CP when FM contact fails.

To sum up, utilize every available means of communication. Good communications is a mighty handy item to have at your disposal.

If I Had My Way

I would like to see the advent of a replacement for the M16. The half track has labored mightily and valiantly at the task required of it. It has far exceeded the expectations of all concerned. However, it has some critical drawbacks. The vehicle's cross-country mobility is not good, nor is its flotation. The lack of crew protection is a serious deficiency. Even with the appearance of armor shields, the lot of the AW cannoneer is far from enviable. He remains unduly exposed to enemy fire. Lastly, the maneuverability of the M16 leaves much to be desired.

The M16 should be replaced by a full track chassis similar to that of the M19. I prefer the light tank chassis to that of the M39 because it does not have a radial engine as a power plant and so avoids the problem of hydrostatic lock.

Thus mounted the M45 turret should be provided with armor shielding with rounded surfaces that are large enough to give full protection to the cannoneer, with side and overhead cover.

The utilization of a full track chassis would, of course, answer the question of maneuverability. The AW close support vehicle would then emerge as one capable of movement in all but the roughest or soggiest terrain and better equipped to protect its crew during action.

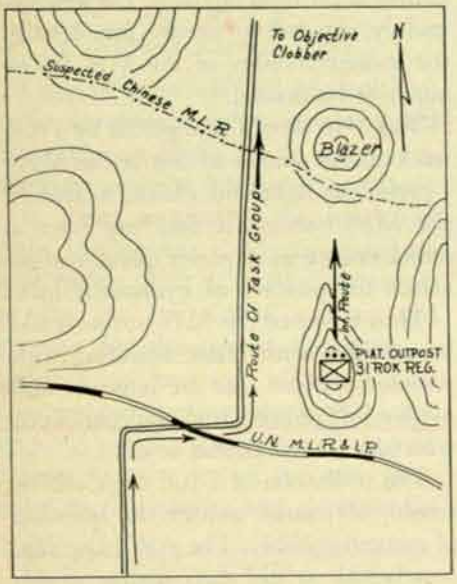
Of course, reasons of economy may be used to rebut my argument, but where is the economy in attempting a job with inadequate equipment?

A Report On Task Force Hamilton

By 1st Lt. William O. Keeling

THREE A.M. the 20th of September was the hour when the men of Task Force Hamilton awoke to begin that foray against the Chinese Forces in the vicinity af Hagujong. The previous day's briefing by Maj. Raymond W. Riggsby, S3 of the 89th Medium Tank Battalion had indicated a strong, well-dug-in enemy would be waiting for us. In addition there was a strong possibility that flat trajectory weapons had been added to an already heavily manned position. Now we were to test that position.

The mission of the task group was to launch an infantry company towards objective "Blazer" and then press a harassing tank attack on objective Clobber. The sketch shows the proposed operation:



The infantry was to move along the outposted hill and launch the attack on Blazer. Meanwhile the tanks and half tracks would give them supporting fires. Once the infantry was pressing up Blazer, all but one platoon of tanks and the half tracks would move on to rough up Clobber, while the remaining vehicles would continue supporting the infantry. Once launched, the entire group would remain in contact until ordered to withdraw by division.

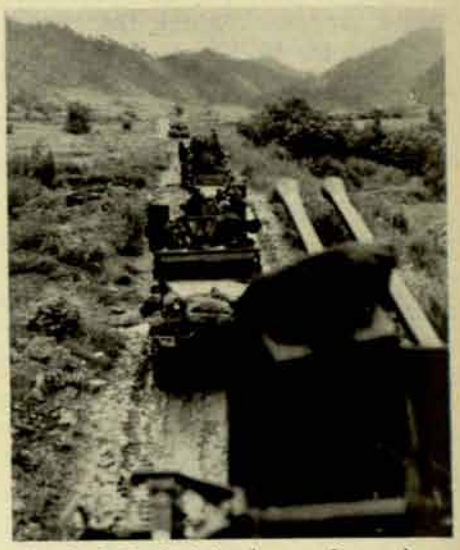
Assembled for its mission, Task Force Hamilton included: Able Company of the 89th Tank Battalion; King Company, 35th RCT; 1st Platoon, Dog Battery, 21st AAA AW Battalion (SP); a platoon of engineers from the 65th Combat Engineer Battalion; and an additional tank platoon.

Thus it was that the task force named for Lt. Col. William T. Hamilton, Jr., commander of the 89th, awoke in the inky hours of the morning of the 20th to the task confronting it. Soon there was the bustle of men rolling and stowing their bedrolls and the coughing of vehicle motors springing to stuttering life. As engines warmed to operating levels, conversation became a matter of shouted exchanges. At the same time, radio voices of the group began the ritual of the communications check and of final instructions. At the appointed time Task Force Hamilton moved out with the bullish roar of tanks filling the air.

Like a long metal snake, the group twisted along the road moving ever closer to the IP until at last as the chilly darkness began to fade into the hazy light of early morning, a halt was made until 0530, our zero hour. The infantry dismounted and began its march to the IP.

Under the cover of friendly artillery, the task force resumed the march until they reached the MLR. Here the various groups deployed to their assigned locations. As ordered, the half tracks took up positions at the barb wire and made ready to cover the next phase of the advance. So far, the operation was going without difficulty.

The tanks now began their movement ahead of the MLR towards Blazer with friendly artillery fire rolling ahead of them. At this point, the infantry began moving up the hill it was to utilize to approach the objective. This movement touched off the first link in the chain of Chinese resistance. Very quickly, a brisk fire fight sprang up as the enemy attempted to halt the infantry before they could assemble for the attack. Soon afterwards the lash of Chinese fire was to strike the tanks. About 2000 yards ahead of the IP, the lead tank was hit twice by antitank fire of killing power. Soon the vehicle was an inferno, shooting up long sheets of flame and billowing clouds of black smoke. In prompt retaliation the tankers leveled murderous fire on the hostile weapon and destroyed it. The ensuing battle was a bitterly contested duel between grimly determined tankers and fanatical Chinese who fired from the hills and swarmed in the tall grass of the valley. At times the enemy was close enough to toss grenades at tank commanders while he was met with fire from carbines and .45's. All the while the enemy was seeking the next target for his deadly antitank guns, and soon another tank fell victim to their screaming projectiles. Once again, the enemy gun went down under the answering fire of the tanks and so the struggle continued.



Typical Tank-AA advance formation. 15th AAA AW Bn.

First Lieutenant W. O. Keeling, Jr. entered the military service from Pittsburgh, Pa.

Joined the 21st AAA AW BN (SP) in Korea in early January 1951.

He has been awarded the Bronze Star and Silver Star.

Meanwhile at the MLR, the half tracks were raking hills to silence snipers and mortars harassing the tank's left rear. Permission was asked of the task force to move to more advance positions. The request was denied due to the flat trajectory fire being encountered and the veritable rain of shells our artillery was hurling at the enemy. The infantry had been restrained from attacking Blazer due to the fierce resistance and so buttoned up in place to await further orders.

Shortly thereafter, the tankers succeeded in evacuating some of their knocked out vehicles and brought them back to the MLR. However, this also blocked the fire of the AW platoon. Before this situation could be remedied, enemy artillery and high velocity guns began ranging in on the half tracks and permission was granted to move to new positions. This move was barely completed when flat trajectory fire landed on what had been the right flank of the platoon. As efforts were made to complete the organization of the new position, the enemy brought observed artillery fire to bear on the area and several casualties resulted. Throughout the day this fire continued to fall and was augmented by what was believed to be a medium tank.

In this manner, the struggle wore on into the afternoon. Several air strikes were called in and added their deadly efforts to the vicious pounding being given the Chinese. In the course of the fight the tanks lost a vehicle to mines and the enemy antitank guns claimed new victims. Their efforts cost them five tanks before contact was broken.

At approximately 1800, the withdrawal order was given and slowly Task Force Hamilton began to withdraw. By various routes, the group pulled back behind sheltering ground and reformed. Finally, the task force began the march to the assembly area where weary men would sleep that night, before returning to parent organizations.

The task force's job was done. It had run head on into a savage struggle with a determined enemy. In those tanks that fell to antitank fire lay dead men. More than a score had been wounded. The enemy had landed some heavy punches, but, had taken a terrible mauling in return. Every available ounce of firepower had been turned on him with deadly results. More important was the character of the men who had faced the enemy that day. In the face of heavy resistance, they had stuck grimly to their positions and giving better than they received proved themselves the equal of anything the enemy could send against them. As final testimony, not one vehicle was left to be pillaged by the Chinese. The tankers evacuated every knocked out tank.

With The 21st Battalion On A Task Force

By 1st Lt. Karl F. Bennett

TOMORROW is the day! After two weeks of relative inactivity coupled with two last minute cancellations of movement orders, it appeared that Task Force Winston was finally to get under way. All day of 19 May 1951, my entire platoon appeared just a bit on edge. The strain of waiting for final movement orders was wearing on the nerves, and when I was called to the 3rd Battalion, 24th Infantry CP at 1800 hours, 19 May 1951, I proceeded with a feeling of relief.

The situation that I encountered at the Battalion CP was somewhat different than that in other regiments in the division. Here I expected to be thoroughly briefed on enemy intelligence, their capabilities in the area where we were to attack and the objectives that we were to fight for. Only part of this information was forthcoming. However, I was told that the force would consist of B Company, 89 Medium Tank Battalion, Btry A, 21st AAA AW BN (SP) and the 24th Infantry. Much of the other information that I desired was obtained by talking to various staff officers. On my way back to the platoon I decided to stop by B Company and see if the tankers had any more information that I could use. At the CP I was met by Capt. John Belcher, and 1st Lt. George Maynard, platoon commander. Since B Company had been attached to the 24th Infantry for quite some time, these officers were able to give me many valuable tips on the methods that the 24th employed. This was the beginning of one of the best examples of teamwork that I have ever seen.

At dawn on 20 May 1951, Task Force Winston departed for the MLR. Our positions were approximately five miles east of Seoul and the task force proceeded due north. All was routine and no contact with the enemy was made until 1630 hours. At that time I Company was advancing across rice paddies toward the village of Chin-gwan-ni. The quads of the First Platoon, A Battery, were in the vanguard. When the infantry reached a point approximately two hundred yards south of the village, they were confronted with stiff small arms opposition. Immediately the infantry took what cover they could and the half tracks went into action.

All six tracks of my platoon deployed and commenced firing; within five minutes the entire village was ablaze. I Company again attempted to advance

Lieut. Karl F. Bennett entered the service from Pennsylvania in 1942. He was commissioned in Sept. 1949 and attended the AB course at Fort Bliss. He has been with the 21st Bn. since 11 Jan. 1950 and recently received the Bronze Star W/"V" device for action performed in Task Force Winston.

Pvt. Jesse Ramierez, 21st AAA Bn, on watch over the 24th RCT Line in Korea.

and again was forced to take cover. We continued to deliver fire on targets of opportunity and suspected targets. About that time, enemy mortar rounds started coming in on us. 1st Lt. Stuart H. Lassetter, my assistant platoon commander, took three half tracks and continued north approximately two hundred yards. From his position Lieutenant Lassetter could bring fire to bear on the reverse slope of a bit of high ground just to the East of the village. This proved to be the hot spot and squad leaders Shillinger, Cooper and May proceeded to eliminate it without further ado. This job accomplished, I Company moved forward and secured the town and surrounding high ground. Results for the day showed four thousand yards advance, approximately 25,000 rounds of Cal. .50 ammunition expended, no casualties and spirits as high as the sky. As we moved back to the assembly area for chow, ammo and gasoline, everybody was, of course, tired and dirty, but the esprit was quite obvious.

DAWN of 21 May 1951 found my platoon and the Second Platoon of the tank company commanded by 1st Lt. George Maynard, streaming north toward the village of Chich-arjon. Our mission was to take up positions in the village while the 3rd Battalion, 24th Infantry, was to begin the attack from the same point that they had stopped on the evening of 20 May. The strategy was for the infantry to force the enemy to withdraw so we could get them from the rear. Everything went along quite well for the better part of the morning.

All squad leaders calmly and coolly scanned the terrain and picked out targets, either small groups or single enemy, and brought effective fire to bear on them. Like all good things, this had to come to an end. The enemy got wise to our tactics and changed their direction of withdrawal to northeast into the village of Yongjong-ni. The village is located in a small valley just 2000 yards east of our position. At 1300 hours Lieutenant Maynard had five tanks and I had three half tracks commanded by SFC Frank A. Simnowski, Sgt. Clifford P. Cooper and Sgt. Thomas Shillinger.

We proceeded up the valley cautiously and as we approached the village, I saw three enemy run behind a building. Apparently, everybody saw them at the same time because every weapon opened fire into the village. The half tracks quickly selected and occupied firing positions and continued to fire into the village. By this time we were getting unusually heavy small arms fire from the surrounding hillsides. SFC Simnowski laid fire on the hills and an open field directly to our front while Cooper and Shillinger were having a real turkey shoot in the village. About this time Lieutenant Maynard decided we had stirred them up enough and gave the order to move out and take up our original positions. However, this last order was not as easily carried out as you might think because as we approached our original positions we found them to be under heavy mortar attack. During this action Cpl. James Luke, my platoon radio operator, was hit by shrapnel and wounded seriously. This ended the action for the day and showed that the first platoon had expended 31,000 rounds of caliber .50 ammo, had one casualty and was credited with 200 enemy KIA's and 600 wounded estimated.

The following three days showed little contact with the enemy and the task force continued at a rapid pace. By 1200 hours, 25 May the force had advanced 18,000 yards since the evening of 21 May. At the village of Sop-a C Company was stopped cold by an estimated enemy battalion. I kept my half tracks about a quarter of a mile south of the village until I could go forward and pick out a few positions. We were receiving quite a bit of mortar fire by this time, but it proved ineffective insofar as casualities were concerned. The ridge on which C Company consolidated was fairly well wooded and did not afford any good positions for the half tracks. The only position that I could find was on the road where it cut through the ridge. Lieutenant Lassetter brought Cpl. Macias' track forward, put it in this position and sprayed the ground directly to the front with caliber .50 fire. Enemy machine-gun fire made this position untenable for periods of any length; so Lieutenant Lassetter adopted the strategy of firing and pulling out of position then after a short while moving back into position for a brief time. Cpl. Richard Lewis, gunner on this half track, placed especially effective fire on the enemy during this engagement due to his keen observation of surrounding terrain and ability to pick out enemy targets.

About this time we received word that A Company on our right flank wanted some support on the hill they were about to attack. Lieutenant Dewey was ordered to take his tank platoon and I was ordered to take five half tracks and proceed approximately 500 yards east to support A Company. After the tanks got into position the half tracks interspersed among them and a preparation fire of five minutes duration was given the attacking force. All of our firing was done with only two guns.

As the preparation fire ended, A Com-

pany started up the hill and the tanks and half tracks continued to give overhead support and to pick out and fire on targets of opportunity. The commander sent one platoon up the east slope, one platoon up the west slope, and one platoon up the center of the hill. The infantry fought hard and valiantly and, at about 1930 hours, succeeded in taking the hill. It was the same nasty business of getting into the holes and down behind the rocks and digging the enemy out, but the infantry did a fine piece of work.

Upon my return to the village where Lieutenant Lassetter was with the remainder of the platoon, I discovered that things had quieted down and everybody was getting settled down for the night. 25 May 1951 showed no casualties, 28,000 caliber .50 ammunition expended and 183 enemy KIA. Apparently the enemy decided that was enough; that was the end of the action for us until after the entire division had moved up the line.

For the period 20-25 May the first platoon A Battery was credited with 483 enemy KIA and 600 enemy estimated WIA. We suffered one casualty and expended approximately 84,000 rounds of caliber .50 ammunition.

The fine spirit of cooperation between the tankers and the ack-ack in this operation is something we shall never forget.

Another outstanding lesson we have learned with the infantry is the necessity for aggressive action. If the mission is close support of an infantry company, then the platoon leader must get his weapons up where they will be of good use to the infantry. If the commanders are modest in the use of their supporting weapons, then we must use our own initiative and put the weapons in a position to aid the supported unit. The platoon leader must also be aggressive in his quest for information, any kind of information, that will enable him to better fulfill his mission. Having gotten it, pass it down the line to the men. It is the privates, the corporals and sergeants who do the job and it is our job to keep them prepared and alerted for it.

A Battery's Flying Tackle

By 1st Lt. Norman G. Halpern

Hq 3d AAA AW BN (SP)

As Captain Richard P. DeWitt was returning from a reconnaissance of the front lines, he suddenly found himself in the midst of a North Korean-U.N. fire fight. A quick glance told him that the 2d Battalion, 7th Infantry Regiment CP was under attack. The rifle companies up forward could in no way assist the small but battling headquarters group. Immediately radioing his 2d Platoon, Captain DeWitt did not have long to wait before the first M19 came hurtling into view. 1st Lieutenant P. H. Felder, in charge of the platoon, being informed of the situation while on the road, gave the order to fire as soon as the first vehicle was in position. Caliber .50 and 40mm rounds sprayed the attacking North Koreans unmercifully. Only a miracle could possibly save anyone confronted by the Ack Ack's tremendous fire. Soon all the enemy fire ceased; one lone, cautious communist staggered out of the brush. Quickly taken into custody, it was learned through an interpreter, that he was the only one left out of what was once two platoons.

This was only the start of A Battery's escapade in the 3rd Division's "flying tackle" maneuver. The division had hardly arrived in the X Corps area to help stem the oncoming communist drive, when A Battery was placed in direct support of the 7th Infantry Regiment and 10th FA Battalion. The 2d Platoon in their initial engagement, supporting the 7th Infantry, had already accounted for 49 enemy dead, 3 AW destroyed and one PW.

U.S. Army Photo

A Battery smoking them out.

With the command post secured, the infantry continued their advance. This time aided by 2 sections of A Battery's 2d Platoon. By the use of careful, deliberate 40mm firing coupled with the volumes of the M16s chattering .50s, the Ack Ack once again kept the enemy pinned down. As the sun set, the 2d Battalion was on its objective.

While the Second Platoon was busy supporting the 2d Battalion, the First Platoon, commanded by Lieutenant Norman Semon, had their hands full warding off potential infiltrators of the 10th FA position about 1000 yards in the rear of the 2d Battalion CP. Their continuous alertness and sporadic fire missions enabled the 10th to continue its supporting fire for the attacking elements of the same 2d Battalion.

The next day there was a definite lull in the activity. The U.N. forces were deciding on a new plan of attack. That night the startling plan was announced: the 7th Infantry Regiment was going to attempt to encircle the enemy.

A Battery, 3d AAA AW Battalion (SP), still in direct support was included in the regiment's operation order. At 0500 hours 27 May 1951 the task force started out, three sections of A Battery in the lead elements, the remainder dispersed throughout the column. All was going well until the column's foremost vehicle hit a mine. Enemy fire came in from all sides. The U.N. Forces returned the fire instantly, covering the advancing foot troops. The AA guns along with the organic infantry automatic weapons, supported the doughboys for five hours —firing incessantly throughout the en-

gagement. However, the open turret Ack Ack vehicles were not capable of protecting the crew members from the hail of enemy bullets. Six casualties were sustained but were evacuated quickly and efficiently by the platoon's M39, whose driver maneuvered the tracked vehicle over practically inaccessible terrain through the unceasing enemy fire.

THAT night the objective was held, but the following day orders were received—directing the 3d Infantry Division to proceed to the I Corps Sector. At 0550 hours 29 May 1951, A Battery departed with the 7th Infantry Regiment and the 10th FA Battalion. The M19s and M16s were dispersed throughout the column to furnish air and ground protection for the move. For the next 24 hours, A Battery remained in column over the tortuous, winding mountain roads until the RCT closed in the I Corps Sector 175 miles away. Hardly a stop was made, that the drivers were not forced to make some emergency repair, but in spite of their temporary difficulties, not a vehicle dropped out of column or lost its place in line.

One day after arriving in I Corps, A Battery was in the thick of it again. The 3d Infantry Division objective was the Chorwon, Kumhwa, Pyonggang Iron Triangle. The 7th Infantry Regiment on the left moved out towards Chorwon on the morning of the 31st, A Battery's 2d Platoon in direct support. The next ten days were continuously active. Each day the infantry would push the communists back, and each day the AA would account for its share of dead Chinese.

But the enemy did not sacrifice an inch of ground, without a life or death stand. Everything they had—mortars, small arms and automatic weapons, were fired upon the steadily advancing U.N. Forces. At times it seemed as if the 7th RCT would be forced to halt.

But everything they had wasn't enough. For each whine of any enemy rifle came the answering thundering staccato of an M16. For each chatter of a Chinese machine gun, the steady pounding of an M19 was heard in return. The increased infantry and AA fire in addition to the volumes of accurate artillery fire convinced the communists—their positions south of Chorwon were untenable.

Reluctantly the enemy withdrew from one strong point to another. On one occasion, two Chinese refused to leave their positions. They stayed in their holes, invulnerable to the flat trajectory AA fire, sniping at the advancing U.N. Forces. Master Sergeant Joseph Farrel, realizing this situation, unobtrusively went around the hill, secured a position above the snipers and succeeded in eliminating the harassing communists with two well directed hand grenades.

At dawn of the tenth of June, the advance U.N. elements entered battered Chorwon. What was once a highly industrialized Korean City was now reduced to a few building skeletons and piles of debris. As the crews arrived Battery A pitched in, side by side with the doughboys, to dig in their weapons and organize a defensive position that the communists were to find too tough to crack.

A Platoon Leader Speaks His Mind

By 1st Lt. Paul S. Vanture, Arty.

THIS article was originally entitled "A trip to Pyonggang" but it had to be changed.

We never got there!

The rest of Task Force X got up there and they had a grand time shooting up the countryside and generally giving the Chinese Forces a hard time.

My platoon—from Dog Battery of the 21st AAA AW Battalion, would like to have gone to that party. The tactics of the enemy and the capability of our weapon, the famous quad fifty, would definitely have made us the Belle of the Ball up near Pyonggang that day.

First Lieutenant Paul S. Vanture is a graduate of USMA, Class of 1950. Entered military service from Cambridge, Maryland.

Serving in Korea with 21st AAA AW Bn (SP) since early January 1951.

He has been awarded the Silver Star for gallantry in action.

As a matter of fact, we *were* invited by the task force commander to attend, but now we know how a wallflower with acne feels at a cotillion abounding with sleek debutantes. Like her, we didn't have the equipment to keep up with such a racy crowd.

Miss Dorothy Dix might have advised the unfortunate damsel to take heart, encouraging her to develop her best qualities in order to offset her shortcomings in other departments Maybe we can learn from Miss Dix something to fit the case of "Miss Quad Fifty" in the role of close support.

The commander of Task Force X is typical of all unit commanders of infantry, large and small, in the 25th Division. Like most, he has been schooled in the concepts of the famous Fort Benning Mad Minute which espouses fire power, and yet *more* fire power, for his doughboys. The M45 turret is the answer to his wildest prayer and he grows positively ecstatic whenever he hears the quads begin to bark in the attack. It does have fire power. The men who operate the turret refer to it affectionately and bestow pet names. As a platoon leader, I have cussed and cajoled M16's around the front lines off and on for nine months in Korea, but I can think of no weapon I'd rather have between me and the Chinamen than the quad.

What, then, is our personality problem? Simply this:

Somewhere in the development of the M45 turret it was "adapted" (I use the term loosely) to a half-track and dubbed an "M16." I can only liken the combination to a jewel in a setting of base metal.

It is not my intent to belittle the half-track. I have up to this point sprung no surprises by stating that the M45 and the track are mismated. Lieut. Col. Charles E. Henry, the discerning commander of the 21st, has frequently ad-

Half-track of the 15th Bn bogs down.

Second Platoon, Battery A, fires from midstream.

vised in his command reports that the turret be adapted to a full-tracked armored vehicle. Doubtless every other commander employing antiaircraft weapons similarly in Korea has urged the same thing. Remarks in the pages of the JOURNAL have hinted directly at the same course to be followed. My intent here is to put a powerful spotlight on the sore spot.

The technicians who developed the M16 were undoubtedly guided by the sincerest motives in seeking to evolve an all-purpose antiair and close support weapon. In a sense, they were highly successful. As an antiaircraftman of of some experience, I have yet to fire at an enemy piloting an aircraft. Paradoxically, I have expended a good half million rounds of caliber .50 at the enemy on the ground. I can testify, therefore, that the M45 is highly effective in the latter usage and then easily surmise its effectiveness in the former, no matter what the turret is mounted on!

THE primary shortcoming of the half track is its mobility. It frequently will not go where it can be placed to make the quad deadly and effective. At this point, my seniors will admonish, "You must realize your limitations as well as the capabilities of your weapon, young man! Simply do not take them where they will not go!"

I shall turn salesman for a while!

I deliberately chose my branch for the wide latitude of interests and missions it afforded. One of the most satisfying of these is the close support mission. Here in Korea the satisfaction has been doubled and redoubled. We have no cheap mass of American lives with which to match the enormous sacrifices of our enemy. We rely instead on superior fire power and technology. Too, perhaps here the pattern has been set for future combat against the communists and we shall still be pitted against mass, brazenly committed by enemy leaders with negligible talent to fall back on otherwise. In the over-all picture it may not matter whether the quad is allowed to flourish or not. But if our branch is to continue to fill a close support mission when called on, let's not be niggardly! I feel it is worthy of all the attention we can spare—and it need not detract from our other missions. Mounted on the flush deck of a full tracked vehicle the turret would obviously fill its dual role even better.

I have stated generally that the half track has narrow limitations of mobility in close support of infantry. Let me be more specific.

I remember a few months ago a hill that was being successfully carried in a fierce assault. We had successfully followed tanks down a boulder-strewn stream bed to a frontal firing position. The fact that we negotiated this tortuous route is no indication that tracks are even fair cross-country vehicles. Practically all our SCR 528 radios, our primary means of communications between tracks and absolutely essential to successful combat operations, were jarred off frequency, rendering them useless. Our nerves and physical beings were likewise unnecessarily jarred, but that is relatively unimportant. In addition, the vehicles sustained an excessive amount of wear and tear that was to show later in maintenance worries. We gained our positions and did some commendable and effective firing.

As the infantry cleared the crest in their successful attack, they radioed their battalion OP that hordes of Chinese were retreating openly down the reverse slope. The S3 realized this as an excellent target for armored exploitation and directed tanks and tracks to circle the hill and take the retreating enemy under fire.

At full throttle the tanks lit out to do their job—but across terrain impossible for a vehicle with only half a track to follow. Our only recourse was a road, and at the urgent request of the infantry commanders we risked it. Result: one half track blown to smithereens by a Chinese box mine.

There have been a score of successive frustrations since. The trip to Pyonggang was essentially the same obstacle. We could have followed the tanks along the route that full tracked vehicles found a breeze—but not with half tracks. Instead of firing at the enemy we spent the day extricating vehicles from such embarrassing predicaments as bogs, broken track assemblies, and even flat tires!

LACK of crew protection is certainly a paramount failure of the M16. "Exposing himself to enemy fire" is a standard phrase in citations of the valor of other troops. Such valor is the requisite of any crewman operating the M16. It is simply a matter of routine in a fire fight. Otherwise we would do no firing! For the record two cannoneers still stand bolt upright on the hind end of this vehicle in order to service the guns—while other crewmen mill around opening ammo boxes and pass them up.

The track is also notably unable to sustain mine damage. A mine detonated under the front wheel will only blow off that wheel and probably carry the

armored hood and half the engine with it. Crew members normally escape with little more than a scratch. Put the same mine under a bogey where directly above you have two gas tanks and a basic load of ammunition and it is a different story! Your track disintegrates! Under either condition the track is rarely salvageable.

Again, a heavier full track vehicle is indicated!

Theoretically the mount on the M16 can be traversed and fired 360 degrees. We have tried assault fire on the move and the results are eminently unsatisfactory. The turret is capable of being fired over the cab, true, but occupants such as the driver and the indispensable radio operator will find their jobs impossible after a matter of seconds. It is the best way to artificially induce shell shock I know of. As a result of this, the track must be painfully and ceremoniously backed into position before the turret can be fired off the rear end.

Some who read my article in the July-August JOURNAL may think that I am furiously back-tracking on impressive claims made in behalf of the 21st Battalion during our close support mission in Korea. Such an idea would be in error. The record remains, but the credit is now directed to where it belongs: the magnificent performance of the men of the battalion who, in spite of the seemingly insurmountable obstacles, successfully fought the problem through.

These observations have been penned with the sole idea of adding constructive thought to the problem of AA in close support with a particular weapon—a valuable one we think.

Some day I hope to return to the fascinating Ordnance Museum at Aberdeen Proving Grounds. There I hope I shall see displayed, in honorable retirement, a half track, perhaps even next to Pershing's famous World War I staff car. By then, perhaps an even better turret will have been mounted on a full tracked vehicle. Both happenings seem way overdue!

Any way, I shall envy that lucky platoon leader who commands those dream weapons!

Target Planes Over The Panama Canal

By SFC Don Hatt

RADIO completely tested, landing parachute checked, everything in readiness—then the final signal rings out:

"Switch On!"

The momentary grind of an electric starter, a hesitant sputter and suddenly the 22 horsepower motor of the new OQ 19 roars into life. The face of the man directly behind the whirling propeller blades becomes distorted and misshapen by the tremendous blast of air as he makes a last minute adjustment of the carburetor.

The crew members attach the firing wires to the jet assisted take-off (JATO) unit. The men scurry to positions of safety and finally the crew chief plunges the magneto handle down.

A sharp explosion heralds the ignition of the JATO and the OQ 19 screams from the catapult trailing a train of fire.

The ground pilot begins the complex positioning of his radio control stick and the newest RCAT is airborne. The glistening wings flash sunlight as it sweeps gracefully through the air—an elusive target for eager gunners.

From its breathtaking jump-off at 88 mph until it flutters like a wounded bird into the sea, the OQ 19 is a grim poem in the sky as it trains artillerymen in death-dealing accuracy.

The new OQ 19 is designed, as are all radio-controlled target planes, to be landed either on the land or in the sea by means of a parachute released by the ground pilot or by automatic action in the event of malfunction of the plane or loss of radio contact.

The little airship carries sufficient fuel for one hour of flying at a cruising speed of 228 mph. Radio control is effective for approximately five miles, therefore the operator can lose radio contact in

(Continued on page 31)

U.S. Army Photo

Spectators watch the new target plane OQ 19. Lt. Holst operates the radio control.

U.S. Army Photo

The OQ 19 launched at 88 mph under the 2,500 foot pound thrust of the JATO unit.

Air Defense Training Exercise—Stateside Style

By Lt. Col. George E. Myers

". . . THIS IS A WARNING ORDER FOR MOVEMENT TO TRAINING POSITIONS FOR THIRTY DAY TRAINING EXERCISE COMMENCING 28 AUG 51 PD . . . POSITIONS WILL BE OCCUPIED ON A FIELD TRAINING BASIS . . . WHERE LOCAL SANITARY REGULATIONS CAN BE MET PD . . . ALL EQUIPMENT . . . WILL BE TAKEN PD AAOC'S WILL BE OPERATED ON A TWENTY FOUR HOUR BASIS . . ."

THAT WAS THE message the teletypes clattered out to major subordinate commanders of the Eastern Army Antiaircraft Command in the Eastern Air Defense Region on August 20. It sent thousands of antiaircraft troops into the field for the largest antiaircraft air defense exercise since the days of World War II.

Designed as a realistic test of training and operational efficiency, the thirty day exercise was directed by Major General Willard W. Irvine's Army Antiaircraft Command, Ent Air Force Base, Colorado Springs, Colorado. There was little warning—little time to make countless administrative arrangements—little time to work out the innumerable operational details involved. For this was to be as realistic a test of AA air defense capabilities in the United States as could be devised, and very little warning was a part of that realism.

In the Eastern Army Antiaircraft Command, the exercise was primarily for training in the defense of metropolitan areas. It posed scores of major problems for the troops of Major General Paul W. Rutledge's command for in the Eastern Air Defense Region were the great metropolitan population centers—the compact manufacturing areas of America's industrial heart. It was to be a test of ability to move units of battalion size into the traffic-choked cities; of securing and occupying training positions from which to defend those areas; of facing and solving sanitation and living problems for hundreds of troops in the field right in the midst of teeming population centers; of mastering difficult communications matters—both radio and wire; of solving scores of other perplexing questions of logistics, operations and training.

For conducting a training exercise in a metropolitan area such as New York City, or Chicago, or Washington, D. C., is a far cry from a field exercise conducted in the vast desert spaces of Fort Bliss, Texas; this was no training camp problem—nor was it an ordinary TFX in the ample maneuver areas available at Camp Stewart, Georgia. It was to be the actual thing insofar as possible, an air defense training exercise—stateside style, with emphasis on the realistic problems of a defense of metropolitan areas.

And the emphasis came immediately!

It came first in the movement from home stations to the training sites, chosen for their close relationship to tactically desirable positions. The real bugaboo was movement through congested areas and crowded traffic—with the necessity for careful route selection, police escorts, highway and bridge clearances. Here was a test of the adequacy of prior planning, of close coordination with civilian authorities, and of logical consideration of time and space factors. Every area presented its peculiar difficulties—even to pea-soup fog to slow convoy schedules in certain seacoast areas. But despite traffic (night movement at off-peak traffic hours satisfactorily solved this problem) and comparatively unfamiliar routes and streets, all but a few units reached their positions right on schedule.

ONCE on training sites, a second major problem in defense of metropolitan areas presented itself: sanitation and living conditions. Every position had a different problem. One battery was in a public park with adequate latrines and showers readily available and a swimming pool nearby for recreation; another battery found itself in a weed-infested field and had to resort to ordinary field latrines; another found itself stationed on the grounds of the U. S. Merchant Marine Academy in New York with the facilities of the Academy available to them—far superior to those at its home station!

And so the picture went through scores of batteries—no two alike. Each one called for its own particular solution; perhaps an appeal to local authorities for use of nearby public facilities; perhaps a conference with local health and sanitation authorities on emergency expedients; perhaps just a resort to good old Army ingenuity. But above all, plain initiative and imagination provided the payoff. There was no single "school" solution—no one "approved" plan.

The problem in operations were the same old ones—yet with many new and oftentimes puzzling quirks. The old headache—communications—was on hand with a vengeance. Some radios wouldn't work in metropolitan areas, were blanketed or blacked out; others which normally were not expected to perform under such conditions came through beautifully. Commercial com-

Lt. Col. Myers is a graduate of C&GSC. He is head of the G3 Training Division of Eastern Army Antiaircraft Command—with additional duty as PIO.

munications were effected without a hitch in some areas; in others, real problems developed, with resultant delays and confusion. But here again the training exercise was performing its all-important function—that of emphasizing the problems of a metropolitan area defense.

Right here it is appropriate to state that the administrative and logistical support given the AA troops by the Continental Armies and the Military District of Washington was excellent. Special efforts were exerted by every supporting agency—and these efforts contributed greatly to the success of the exercise. In fact, the exercise would have been impossible without the wholehearted support given.

Then came the matter of 24-hour-a-day operations—and with it the necessity of providing personnel two deep in key positions. The exercise pointed up this requirement in many units in this vital matter. It also emphasized the constant attention required on maintenance problems—the scheduling, supervision and perpetual hard work required to keep equipment in operation, ready for action in any eventuality.

When occupation and improvement of positions had been accomplished, the matter of continuation of regular training presented itself. Mere occupation of positions would result in loss of training time of inestimable value. With idle time, too, morale and discipline would suffer. Adaptation of the training program to field conditions, the scheduling of tracking missions in the training site areas, on-the-job training in maintenance, and the never-ending refresher training rounded out the programs to occupy fully the eight-hour training day which was specified for the exercise.

The very nature of the exercise—on training sites located in cities—brought other problems to the forefront: public relations and morale. Although details of the training exercise were released to public information media before units began movement to sites, the troops ran into all kinds of public reaction when civilians suddenly found guns set up in the vacant lot across from their apartment building or on their favorite baseball diamond in a public park. Some areas welcomed the troops enthusiastically; others were casually curious, and a few were indifferent. Some communities made public buildings available for various needs; others objected that field latrines violated sanitary codes and demanded strict compliance with the laws. In Washington, D. C., the city provided mobile latrines on truck trailers which were operated by attaching a hose to the nearest fire hydrant with a refuse hose leading to the nearest sewer manhole.

One battery found so much public interest that it became necessary to con-

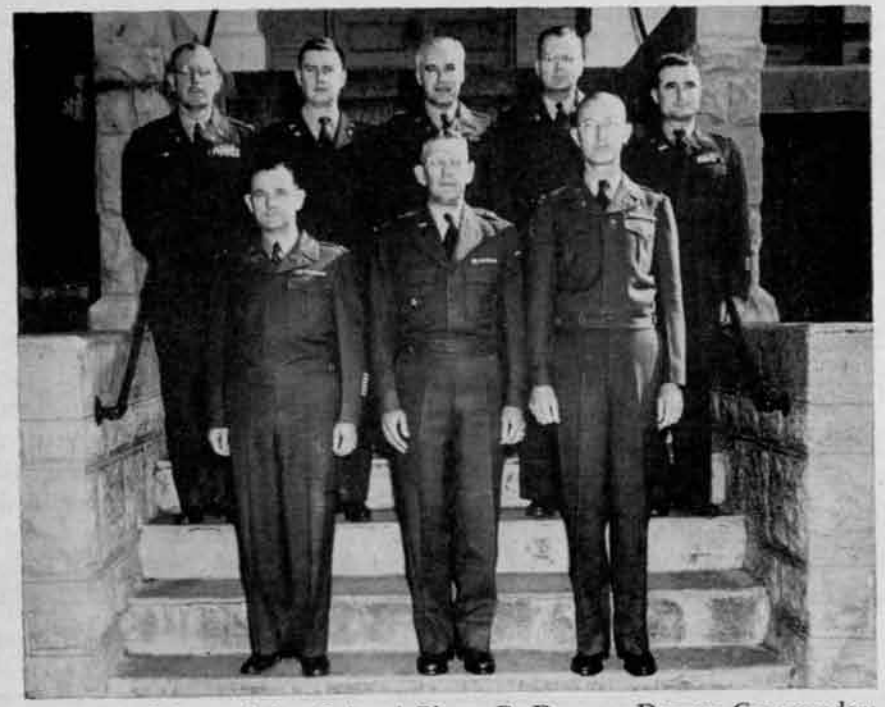
Western Army Antiaircraft Command

Fort Baker, California, a recluse among Army installations for many years, now hums with the urgent business of antiaircraft protection for the vital areas in the West.

The main element of the Western Army Antiaircraft Command is now located in the headquarters at this historic post, in the shadows of the Golden Gate Bridge.

Headquarters of the command, as initially organized, was directed to serve as the antiaircraft element on the staff of Major General Herbert B. Thatcher, Commanding General, Western Air Defense Force, Hamilton Air Force Base. The command includes all Army antiaircraft units allocated for the air defense of the Western Air Defense Region. Ceremonies were held at Fort Baker on September 15, the date officially announced as Organization Day by Brigadier General Robert W. Berry, Commanding General.

WESTARAACOM, as the headquarters is identified by short title, looks back on a successful first year and looks ahead to the second, confident that the command will continue successfully in the Air Defense of the United States.



First row, left to right—Colonel Pierre B. Denson, Deputy Commander; Brigadier General Robert W. Berry, Commanding General; Colonel Walter H. Murray, Chief of Staff. *Second row, left to right*—Lt. Colonel James F. Schnur, AC of S, G1; Major James E. Hurley, Jr., AC of S, G2; Colonel Robert W. Hain, AC of S, G3; Lt. Colonel George H. Pierre, Jr., AC of S, G4; Lt. Colonel William A. Hussey, Chief of Plans and Operations.

Cpl. George Ellis of Baker Battery, 526th AAA Gun Bn (120mm), gets a taste of life in the rough.

duct tours through the battery position; another battery posted signs reading "Government Reservation" to keep out the curious. One community sprayed an area with DDT to eliminate the insects which apparently had their own radar to locate and attack military personnel; another arranged amateur shows for the soldiers. In one area, citizens who hadn't read their newspapers, became excited when the troops moved in. But all in all, the normal reaction was just plain friendly American curiosity and interest.

The thirty day exercise created no morale problem—but it did serve to point up the problem that permanent on-site occupation might produce. The novelty—the change from garrison life—barely wore off during the thirty days. But the attractions of a nearby city, the pleasures it could afford, emphasized the situation which could easily become a morale and disciplinary problem in long occupation of positions under restrictive personnel controls created by a real military danger.

These, then, are but a few of the peculiar problems emphasized in the air defense of a metropolitan area—stateside. They are by no means all the problems—and for reasons of military security—some problems have been lightly brushed over or excluded entirely in this article.

Did the exercise serve its purpose? Commanders and staff officers up and down the chain of command answer enthusiastically: "Yes!"

Everyone learned a lot—not from theoretical classroom lectures, but from the down-to-earth realism of the exercise. In the air defense of a metropolitan area, some of those lessons, as summarized by Major General Rutledge in a staff critique, were these:

▶ Such a defense presents a myriad of special problems—problems with no one "approved" solution—problems which normally never occur in a training center, and which are not covered in a FM or TM.

▶ Successful around-the-clock operations require trained personnel at least two-deep in key technical positions.

▶ The old problems of maintenance, communications, logistic and administrative support are with us always—on a post, on the Chicago lakefront, or along the quiet banks of the Potomac. And they require more initiative and common sense for solution in the field than anywhere else, for there they are multiplied.

▶ Metropolitan area movements require more coordination, more planning, more ingenuity than normal field movements. And a real emergency would see these same problems multiplied many times.

▶ Public relations and public information become a necessity of everyday life at every level of command—and the proper effort in those activities is a must. Tact, common sense and courtesy are essential. Occupation area relationships have no place with Americans and won't be tolerated.

▶ Above all, remember that tactical principles always remain the same—but the conditions of an air defense mission in a metropolitan area constantly change. They are never the same in any two areas or at any two times.

A battery commander whose training position was alongside one of Chicago's best beaches will agree that the problems are different. "Who ever would have thought," he remarked, "that bathing beauties would have to compete with 'battle stations' for attention—and come off second best?"

Members are urged to make use of the Antiaircraft Association Ballot on page 50 for election of a vice-president and four new members of the Executive Council.

Baker Battery, 70th AAA Gun Bn (90mm), in Washington, D. C., during recent Army AA Command defense exercise.

Reactivation Of Fort Hancock

By Brig. Gen. William M. Hamilton

102d AAA Brigade

ON May 7, 1951, without ceremony, the 41st AAA Gun Battalion under the command of Lt. Colonel Carl F. Chirico moved into Fort Hancock, N. J., the first troops in more than a year to be stationed at this once important, beautiful, and much desired post.

But this is getting ahead of the story. Let's go back and glimpse at the early history of this old fort. Fort Hancock is located on Sandy Hook, a beach five miles long and one-half to one mile broad. Sandy Hook was discovered by Henry Hudson on September 4, 1609 when the "Half Moon" anchored in Sandy Hook Bay. Title to the lands of which Sandy Hook is a part was derived from Charles II, King of England, who, in March 1664, granted the region extending from the western bank of the Connecticut to the eastern bank of the Delaware to his brother James, Duke of York, and Richard Nicholls.

The New Jersey Legislature ceded all jurisdiction over the lands to the US in 1790 and in 1806 the US purchased for $37.50 all of the land north of east-west line through the lighthouse. Sandy Hook was fortified in the War of 1812. Title to the four original acres passed from the Hartshorne family to the US in 1817. Also in this year the US purchased additional property south of Youngs Creek for $20,000. This property was ceded by New Jersey to the US in 1846. In 1858 all of the land which comprised Sandy Hook passed to military rule. In 1874 Fort Hancock was designated as the Proving Ground for Ordnance armament. This project was discontinued in 1917-18, but for many years during and after this time including both World Wars, the seacoast batteries at Sandy Hook were well known as important factors in the Harbor defenses of New York.

Fort Hancock, New Jersey, Lieut. General Willis Dale Crittenberger, Commanding First Army; Brig. General William L. Barriger, Chief of Staff, 1st Army, Col. Fred J. Woods, Commanding Fort Hancock; Maj. Gen. Paul W. Rutledge, Commanding Eastern AAA Command.

Between the end of the first world war and 1939, Fort Hancock was used for many purposes including a station for the 7th CA and 52nd RY Arty, ROTC training and for a special radar project. During the period of the last war and up to 1949, it was used as a training camp, a garrison, and the location for a disciplinary barracks.

After World War II, when it was felt peace would be our hard-won reward for some time to come, the Department of the Army prepared to close Fort Hancock. At the time it seemed quite logical and in keeping with the desire to keep military needs and expenses to a minimum. Thus, Fort Hancock which since 1892 had served as a part of the harbor defenses of New York was closed and declared surplus. To many a former coast artilleryman this brought a pang of regret. Fort Hancock not only had served well tactically, but for many thousands of seacoast personnel, officer and enlisted, it had been a most pleasant station and one which was associated with many happy memories. This is particularly noted as many of these officers, now generals and colonels, visit Fort Hancock. They speak with nostalgia of their old quarters, the Officers' Club and their work at the fort. The present Post Commander, Colonel Fred J. Woods, Commanding Officer of the 16th AAA Group, served as a battery and a battalion commander in the old 52nd RY Arty while stationed there between the years of 1938 and 1940.

In early 1951 many of the illusions of peace had vanished and the necessity of preparing for the defense of our country once more was here. Steps were then taken to remove Fort Hancock from the surplus category and reestablish it as an active army facility to be used as an interim station for AA troops.

The Army's need for reactivating Fort Hancock proved a severe setback to the plans of the State of New Jersey which had hoped to turn it into a state park. Once, however, the urgency of the situation was made known, the New Jersey State Park Commission withdrew its opposition and has willingly cooperated with the Army.

Since May, 1951 a limited rehabilitation program has been in progress under the direction of the First Army. In addition to the 41st AAA Gun Battalion, the 703d AAA Gun Battalion have been stationed at Fort Hancock.

Justification for the reactivation of the fort has been clearly established. It is hoped as years go by that those troops now stationed there will look back upon it with as pleasant memories as the old timers do today.

Trailer Camp at Hancock.

INTERSERVICE PROBLEM—JOINT SOLUTION

By Major J. R. Woods and Capt. J. J. Dieringer, USAF

IT started last February in an air defense exercise.

A subsequent air defense exercise in April served to emphasize the problem and to demand action if antiaircraft artillery in air defense of the Zone of Interior was to be effective and efficient.

The problem was simply this: The AAA liaison officers did not appreciate Air Force problems or capabilities and Air Force controllers were not fully cognizant of AAA requirements. Naturally, the problem was most acute at the point of actual working contact between the two services—and that was at the AC&W station.

There the necessary early warning information, the identification and location of aircraft, was assembled, evaluated and disseminated. It was there that operational control of interceptor aircraft and AAA was exercised—orders issued to scramble and vector fighters and to prepare AAA for action. Here was the brain of the Air Force defense structure and here was the source of information necessary to set the AA guns in action.

The GCI controllers knew their stations, their equipment, their jobs—but AA was new to them. AA liaison officers knew their AAOC, their guns and radars and the necessity for early and accurate target information—but GCI functions and capabilities were totally foreign to them.

Obviously the gap between Air Force information and AAA intelligence was not being bridged effectively. The AAOC was being handicapped in securing vital target intelligence to pass on to the gun batteries.

The solution was immediately recognized by Major General Frederic H. Smith, Jr., commanding the Eastern Air Defense Force and Major General Paul W. Rutledge, commanding the Eastern Army Antiaircraft Command. After one of their frequent informal conferences, they directed their respective staffs to get together and set up a joint school or demonstration center. Out of the subsequent staff meetings quickly came the physical plant, program of instruction, troops, instructors and administrative details. The plan was simple—set up an AAOC and a gun battery in close proximity to a GCI station and provide a short course of instruction for selected GCI controllers and AAA liaison officers; show them the machinery, let them see it, operate it and operate it themselves and let them get together and hash out respective problems. And that's exactly what was done.

GENERAL Smith's EADF furnished the physical plant—a GCI station in Massachusetts, student billeting and messing, classroom facilities, and top-flight Air Force instructors. General Rutledge's EAAAC furnished an AAOD, a complete 90mm gun battery equipped with both the T-33 and SCR 584-M9 combination, and AAA instructors. Major Gen. W. W. Irvine's Army Antiaircraft Command and Office, Chief of Army Field Forces were prompt in approving the antiaircraft participation in this school.

The course was short, concise and complete. A morning for a round robin of the three elements and introduction to the Air Defense Team, an afternoon in the AAOC, a morning in the GCI station, and an afternoon in the gun battery. The remaining half-day was reserved for a critique and presentation of questions, observations, ideas and suggestions by instructors and students alike. During the demonstrations and operations in the three elements, the class was correspondingly divided into three sections of five or six officers each, thereby providing the maximum in personalized instruction and practical work. The breakdown by subjects was:

FIRST DAY

School mission and GCI—AAOC gun battery tour
The Air Defense Team
AF role in air defense
AAA role in air defense
AAA communications
Introduction to AF EW radar
Rules of engagement
Function of AAOC
Conditions of alert and readiness
Demonstration of AAOC operations
Student participation in AAOC

SECOND DAY

Battery command post
SCR 584 familiarization
M9 Computer familiarization
Characteristics of AA guns
T-33 familiarization
Gun battery demonstration
Student participation in battery operation
GCI operational procedure
GCI demonstration
Student participation in GCI operations

Major J. R. Woods is a member of the G3 Training Division, Eastern Army Antiaircraft Command.

Capt. J. J. Dieringer, a rated pilot, is currently a GCI Controller in the Eastern Air Defense Force.

THIRD DAY

Review, Questions, Critique.

Lively student participation in the face of a nearby and interesting summer colony, gave mute testimony to the interest in the subjects presented.

In the AAOC, some new equipment and new techniques were presented and these new items are now being standardized in the Eastern Army AA Command. The use of the Vu-graph for immediate and accurate portrayal of plot information enables the teller to read the plot simultaneously with receipt, and eliminates cumulative error in plotting and reading from the operations board (a system devised by Colonel Arthur H. Bender, Deputy Commander of the Eastern Army Antiaircraft Command); the tilted metal operations board with the magnetized arrows and the sled-type raid stands (no more cumbersome "christmas trees"); the AAOO console with toggle switches to flash conditions of alert, conditions of readiness, equipment failure in each battery; the commercial communication terminal equipment. All were designed to provide the best means of receipt and relay of information and orders and to present the picture of the air raid threat in such a manner that the AAOO can act decisively and quickly.

AT the conclusion of each 2½-day course, the student attitude reflected time well spent. When an Air Force officer can discuss, with complete and evident familiarity, the needs of AAA for accurate early warning and identification, and the AAA officer can discuss the critical features of each means by which the Air Force identifies planes, the mission of the school has obviously been accomplished. New ideas and techniques were thoroughly tested and the results indicated the likelihood that new procedures might be developed.

To give credit where credit is due: Principal staff planning credit belongs to Lt. Col. Richard Seaman and Capt. R. A. Smith of EADF and Lt. Col. Harry V. Heim and Major Nicholas Bruno, EAAAC. On the ground, the spade work rested with Capt. J. J. Dieringer, EADF, and Major Harry Eaton, EAAAC (later Major Howard W. Tuttle, EAAAC), the project officers from each command. Since there are always inter-service differences of opinion, Major Lee J. Hodde, EADF, was appointed School Commandant and "arbitrator." At the conclusion of the last class, he was still eagerly awaiting the first dispute.

Men may come and go but the international situation today makes it look like air defense will go on for a long time.

The courses will be conducted again in 1952.

Major General Smith put the matter in a nutshell in his remark to General Rutledge:

"I have just returned from our school and I feel that our joint operation up there is really productive."

I'll Be Comin' Round The Mountain

By Lt. Col. J. W. Huttig, USAR

PERSONALLY, I have nothing against antiaircraft people. But my viewpoint is apt to be a bit prejudiced because I'm one of those people who spent a lot of time looking down AAA gun barrels the wrong way. As a pilot during the late war, my particular job was concerned with both active and passive air defense and I did scare the H-- out of a lot of Japanese balloons cruising over the Aleutian Islands. But all this is getting away from the thing that is bothering me.

According to the newspapers and magazines, we're really making progress in this air defense business. One day I read that the Air Force has a new super bomber that will fly umpty thousand feet high. Then right away comes another article saying that a new AAA gun will shoot umpty thousand plus fifty feet high. The altitude claims are a real tribute to the skill of the publicity boys and look something like my bosses income tax figures. Both the AAA and the flying people are improving their accuracy too. Where the Air Force previously did pickle barrel bombing they now use a thimble. And the AAA boys are releasing mosquitos from high flying balloons and shooting with skeet range rules.

But these new AAA gimmicks are the things that make my ulcers churn—the new guided missiles. In fact I think that the AAA people are almost on the "unfair" side which brings me to the point of this whole seemingly inane discussion.

It stands to reason that if a pilot can, with his physical limitations, take a ride to ultra high altitudes—then a guided missile can do the same thing. Don't get me wrong. I'm still saying that a human pilot has the edge and can figure a way to dodge now and then. These new missiles are not going to do away with aircraft. But they will take away the protection that was once afforded by altitude.

With altitude gone as a protective element, the pilot of tomorrow will have to turn to two other protective factors if he wants to get in all his missions for rotation. He will necessarily look to speed and surprise. But a guided missile can be made to go just as fast as the man carrying type if not faster. So the poor Kelly Field graduate has only one thing left —surprise.

I seriously doubt that this old re-tread will ever be called back to a cockpit. But if he were recalled you can bet your bottom dollar that he won't be flying at umpty thousand feet where enemy radar can plot him into a collision with a guided missile. No siree. He'll be right down on the ground where mother nature's curves can keep him off the plotting board for a longer period of time.

So when you polish up that nice shiny guided missile or oil the bore of that super AAA gun don't bother to write my name on it. I'll be comin' round the mountain.

The Low-Down On The T16 Shield

By Lt. Col. Charles E. Henry

21st AAA AW Battalion (SP)

WE noted with much interest the July-August JOURNAL articles on the T16 Gunner's Shield for the M16 half-track and the discussion pro and con. Having had a part in that, I wish to add a few facts about why and how it was developed.

On February 15, 1951, a platoon of the 21st AAA AW BN (SP) fired 117,000 rounds while supporting the assault of the 24th Infantry at Pabalmak, Korea. During this action, our first of any magnitude, we received many casualties from mortar and small arms fire. This fire was coming at us from fairly close range and was directed at the M16 crewmen. The reason for this is simple. The infantry was able to take cover in foxholes and ditches, the tankers buttoned up, but our men, in order to fight back, had to stand up in the half-track without protection above the knees. In addition to providing admirable targets for the enemy, they were manning a weapon which was causing so many enemy casualties that it became the primary target for hostile fire.

We decided then and there that additional protection was necessary for the crewmen, and more important, that something should be done about it. Accordingly, I went to see the 25th Division Ordnance Officer the next day. He agreed to construct a pilot model shield for us of our own design. Major David C. Miss, our S3, was placed on SD with ordnance until the completion of the shield. He reported next day the completion of the template. It was good, but we were able to make a few changes and improvements. The pilot model was then mounted to the turret on 20 February.

At first I had visualized construction of the shields by our division ordnance, but found that it would take months to equip our 64 M16s with the new shield. The next step then was to get backing from higher authority. After talking this

"A Solution—Not the Solution"

over with General George Barth, divarty commander, it was decided to solicit the interest and support of General Ridgway. We were given an audience.

General Ridgway's TAC CP was located relatively close to the front lines, so we took our M16 with the pilot-model shield, 10,000 rounds of ammunition on the floor of the vehicle, and a seasoned crew to his CP. After some very pointed questions, examining the vehicle carefully and observing further demonstrations by the crew, he called over his G4 and instructed him to investigate the feasibility of constructing shields in Japan and having them air-lifted to Korea.

Throughout this entire interview General Ridgway went right to the bottom of the subject, which was highly technical. His ability to analyze and brush off non-essential facts was only a part of the forceful personality which completely dominated the entire scene.

I told the G4 that I was planning rigorous tests for the M16 with the shield and he asked that they be commenced immediately.

A few days later with Lt. Col. Metzger, Chief of Armament Section, 8th Army Ordnance, we decided on some changes and improvements and came up with the Gunners' Shield, T16, to be mounted directly on the M45 turret with no off turret support, and as now issued to all 8th Army AAA SP battalions.

Due to our casualties, which were continuing, I asked that work be expedited on installation of the shields. Col. Metzger then told me that General Ridgway had decided to equip the M-16s of the entire 8th Army with these shields. They were to be issued to the division ordnance battalions for installation on arrival from Japan where they were to be made up in kits. The 21st Battalion received the first lot to arrive and succeeding lots in greater quantities than the other battalions because we had more M16's employed with the infantry.

Production actually started before the tests were completed. The tests and actual experience in nine months service have developed the necessity for slight changes to strengthen the mounting and improve operability.

It should be noted that the shield is constructed of ¼ inch armor and weighs 308 pounds. Our experience has also proved that the additional weight does not affect the operational efficiency of the mount or the rate of traverse or elevation. There were some discrepancies on these points in your earlier JOURNAL reports.

True the T16 shield is "a solution" and not "the solution." The same also applies to the M16 mount. So long as the M16 is used in close support the T16 shield will probably suffice. However, don't let me mislead you on this point. There are no idle M16's in Korea; we man more than our quota and in some divisions the infantry are manning any they can get.

The paramount factor is that the shield has prevented a big number of casualties among the AAA gunners in Korea, saved the lives of many who did become casualties, and increased the fighting effectiveness of these crews in close support.

Notify the Journal of Your Address Change

BETTER WIND DATA

By Colonel Charles S. Harris

IN the Antiaircraft Artillery we can make and should make definite improvement in our determination of meteorological data. Among battery officers and gunnery students there is a marked lack of confidence in the meteorological message, and unfortunately they have a basis for that feeling. It should not be so. With equipment now available, timely and accurate data on local metorological conditions is entirely practicable.

Fortunately we note signs of increasing interest. The subject is now included in the officers' courses at the AA & GM School and enlisted graduates are reporting to the battalions from the met courses in the Artillery School. Crews are in training.

The main weakness now is that few of the crews in training have adequate officer guidance and supervision. The standard procedures now prescribed involve extensive computations and graphical solutions. Each step involves chance of error. It is too complex to leave entirely in the hands of young men with limited experience. We need more officers who know this problem and each AAA gun battalion or higher AAA command needs at least one officer who understands the problem well; who can spot the characteristic errors and eliminate them; who can train the crews to perform with judgment, accuracy, and speed.

This article will deal solely with the problem in wind determination leaving for a later article the use of the radiosonde equipment and the measurement of temperatures, pressures, and humidity aloft.

The operations involved in ballistic wind determination are treated in detail in TM 20-240, November 1950. By reference to that manual, the equipment, and the work of the met section the AAA officer can master the problem.

THIS ARTICLE PRESENTS THE PERSONAL VIEWS OF THE AUTHOR.

The author is indebted to 1st Lt. John W. Trumbo and SFC Wilson C. Urruttia, Battery A, 710th AAA Gun Battalion, for valuable assistance in the design and construction of the wind speed computer.

Practical Questions

How often the message? That should be determined locally at the station from actual records. At Corregidor in the Monsoon season the wind came out of the east at about 30 MPH at the surface and with little variation up at 12-inch mortar altitudes. It blew that way morning, noon and night. We could predict tomorrow's wind. Not so, necessarily, in the typhoon season. In summer Southern California weather the wind was also predictable, but the lower altitude wind varied considerably during the day. In the afternoon our balloon took off briskly with the sea breezes toward the desert, but just as regularly it soon turned its course and came back over us under the influence of the northeast winds aloft.

On the Atlantic seaboard it is hard to find the pattern, but it is worth a try. Any study should be tied in with a study of weather maps and forecasts. Assistance can be obtained from U.S.A.F. weather stations. Forecasts for winds, densities, and temperatures aloft have been used to forecast artillery met data.

Meanwhile, when the batteries are in target practice or trial fire give them a met observation and message at least every two hours—before and after the shoot for good measure. Battery officers are learning that trial fire corrections have little value except when based on sound met data.

To get the answer for battle conditions around the clock, start with a schedule about like this:

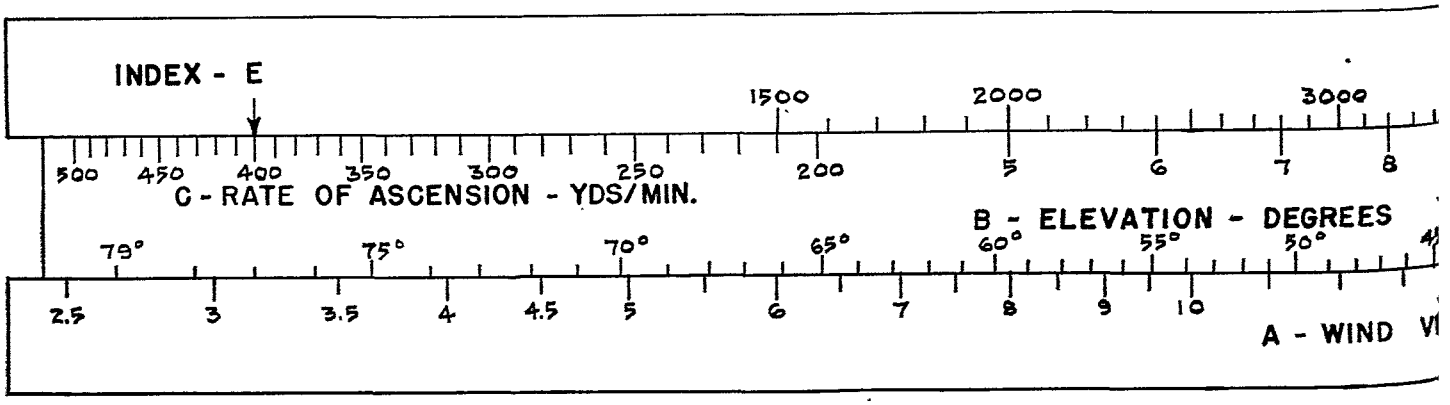
Sunrise,	*Sunset,*
3 hours later,	*2 hours later.*
1300,	

Any big change between successive observations will suggest need for greater frequency. Keep a record of ballistic winds and for ready comparison plot them graphically for some critical altitudes, say 1,000, 5,000, and 8,000 yards.

Remember that the met data will probably be more important by night than by day, though also probably less changeable.

How far is the message good? The 25-mile answer is good enough normally. Each separate AAA gun defense requires

Figure 3, Wi



a meteorological station, and that is enough unless there be a mountain range also in the setup.

Ballistic Wind Determination

THE ballistic wind direction and speed are computed from observations made on a pilot balloon in free flight as it ascends to the desired altitude. With equipment now available we can use either of two standard methods referred to as 1) the Theodolite Method (Visual) and 2) the Radar Method. There are other methods involving the use of radiosonde equipment, but they are omitted here.

The Theodolite Method (Visual) can be used by day or night (by use of lantern attached to balloon), but is limited to conditions of visibility. In this method all computations are based on an assumed rate of ascension, and if that rate be in error, then the computed wind speeds will be in error by an equal percentage error. There will also be an error in zone indication. By careful and accurate balloon inflation such error can be minimized. Otherwise, the method is simple and reliable, giving it definite practical advantage.

Reference is made to pars. 68-84 and 102-105, TM 20-240.

For artillery ballistic winds the atmosphere is divided into 16 zones as illustrated in part in Figure 1. Above that altitude shown in Figure 1, zones 11 to 16, each 2,000 yards deep, extend up to an altitude of 20,000 yards.

Ballistic winds are computed for each standard altitude up to the desired altitude. The standard altitudes may be indicated by the altitude in yards or feet, or they may be indicated by the numbers 0 to 16. For example, line eight in the met message gives the ballistic data

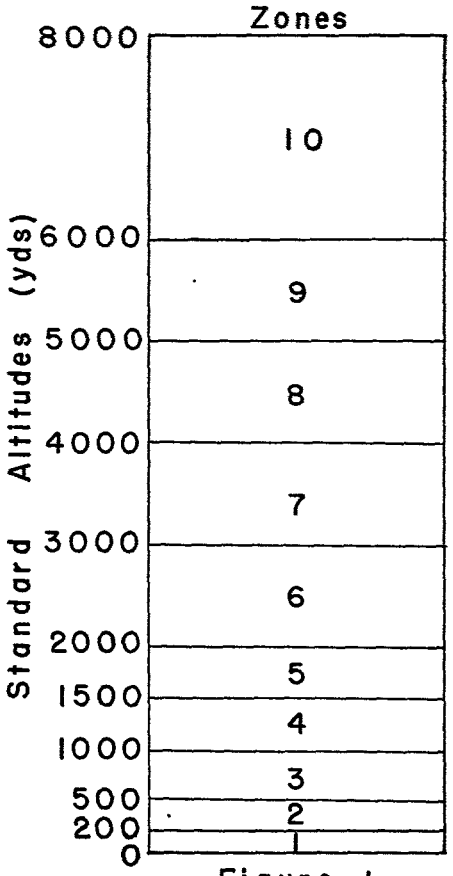


Figure 1

for standard altitude eight, 5,000 yards. There are three types of artillery met messages. We are primarily interested in type two for antiaircraft firing. Reference, pars. 133, 134, TM 20-240.

The balloon is released and tracked by the theodolite and readings are taken in azimuth and elevation. Readings are taken at ¼ minute, one minute, and thereafter when the balloon reaches the top of zone two, three, four, and so on up to the desired altitude. The time for each reading is predetermined from the assumed rate of ascension.

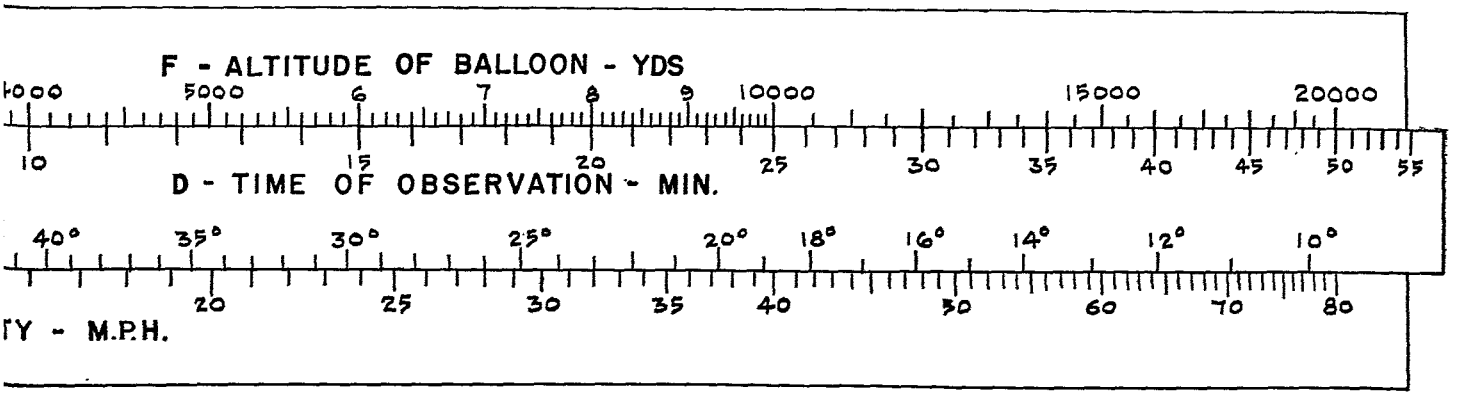
From the assumed altitude and the elevation reading at the top of each zone the horizontal range is determined from Table Ii, TM 20-241. With the horizontal range and azimuth the horizontal projection of the balloon's position is plotted on the plotting board and each point identified. From these plotted points and from the known time spent in each zone the true wind direction and speed in each zone are measured by protractors and scales designed for the purpose. Particular care is taken to measure and record the wind direction, from which the wind is coming and not that toward which the balloon is going.

For use in determining ballistic winds each zone wind is given a specific weighing factor for each standard altitude in which the zone is included. To get the ballistic wind for a given standard altitude the weighted wind for each included zone is determined and plotted graphically as a vector. The sum of these vectors representing the ballistic wind is also determined graphically. The process is explained and illustrated in pars. 102-105, TM 20-240. The basic wind weighting factors are shown in Table IId, TM 20-241.

THERE are some special provisions. The zone winds at surface (¼ min.) and in zone 1 (1 min.) are determined directly from Table Ig, TM 20-241, and are reported as ballistic winds. They are not used in determining ballistic winds for higher altitudes. The zone two wind is measured from the surface to the top of zone two. It is reported as the ballistic wind for zone two and is also used with weighting factors in determining the ballistic winds for all higher standard altitudes.

In training the meteorological crews it is essential to get meticulous care and accuracy in all operations: balloon inflation and weighting, level and orientation of theodolite, timing and readings, computations, and records. Particular care is required in all plotting operations, to get accurate results with the

d Computer.



protractor and pencil. In preparing a met message up to standard altitude 10 there are over 80 key operations which affect the over-all accuracy.

Wind directions are measured and plotted only to the nearest hundred mils; so ultra accuracy is not expected. However, it is still pertinent to avoid careless and gross errors. In order to get the back azimuth for zone winds the manual prescribes that the protractor mil scales be read backwards. Good enough! But somehow it fails to clarify that in reading ballistic winds the mil scales must then be read in the same manner as they are for plotting the zone weighted winds. Hence the typical 3200 mil error.

Likewise zone wind speed errors are likely with the different plotting board scales and the different zone time intervals.

Check the observation readings and also the developed data. They do not progress with equal intervals, but the pattern should be consistent. Jumpy readings suggest error.

In training have the data from each balloon observation developed independently by two different crews. The comparison of results may be revealing. At any rate it will give some indication as to the accuracy of results. If only one crew is available, try to obtain an independent check by shifting key personnel.

Radar Method

A heavier balloon is used with a radar target attached to it. The SCR 584 can be used for tracking. The theodolite is also used to track the balloon and take readings at the ¼, ½, and one minute interval, and thereafter each minute until the radar picks up the target. The radar should be on target within two minutes. Thereafter readings are taken from the radar each minute in slant range, azimuth and elevation. Reference, pars. 96-101, TM 20-240.

In general the principles and methods of determining the ballistic winds are the same as used in the theodolite method. However, there are some essential differences in the determination of the zone winds.

The radar angles are read in mils and converted to degrees and tenths. The altitude of the balloon is computed from the slant range and elevation readings. (Or it may be read from the the altitude converter.) In order then to plot the balloon's position at the top of each zone it is necessary to determine the rate of ascension in altitude and interpolate to determine the time at which the balloon reached the top of each zone. This is accomplished graphically by the time altitude curve illustrated in Figure 51, TM 20-240. Having determined the time, the corresponding elevation and azimuth are also determined by interpolation between the minute readings before and after the occurrence. Then the horizontal range is determined, as in the theodolite method and the balloon's position plotted. This is done for each zone.

The direction and horizontal travel of the balloon in each zone can be measured easily, but to determine the zone wind speed it is necessary to compute and use the time spent by the balloon in that zone.

These additional steps make the procedure more complex and time consuming—and more subject to error—than the theodolite method. It does offer a capability of greater accuracy in that the altitude and ascension rate are actually measured. And it will produce wind data under adverse conditions of visibility.

The comments on training previously made also apply here. In addition the radar officer should check well the basic accuracy of the observation readings. The theodolite can be used to check the elevation and azimuth readings, but a check on range accuracy is also pertinent, as well as a careful analysis of the limits in slant range to which accuracy can be expected.

There is also a particular matter of timing. The radar data scales are not halted for readings as is practicable with the theodolite. While the elevation may not change rapidly, the slant range does and the azimuth may. The readings should be taken on the dot.

Comment

THE methods of wind determination discussed above are sound in theory. However, they do require highly trained personnel and meticulous accuracy in the extensive operations. They were not very practicable or suitable for the battle conditions that applied at Attu, Leyte, Okinawa, or Omaha Beach. In many cases we had either to resort to a simpler procedure or to do without.

Possibly next time we can do better. Meanwhile it also appears to be pertinent to go back, revive, and perfect a simpler procedure. This brings us to the main part of our story.

Simplified Wind Determination

WHEN we were learning our antiaircraft from the French in World War I, and for some time thereafter, we had no antiaircraft ballistic wind weighting factors. We used what we called a straight line weighting factor, or in other words, we determined the average wind to the height desired and accepted it as the ballistic wind. The scheme had real practical advantages.

With the balloon rate of ascension known, the average wind speed for any altitude can be determined instantly from the angular height reading at that altitude.

In Figure 2, P represents the location of the balloon at the end of t minutes. R represents the horizontal range in yards; H, the altitude in yards; and A, the rate of ascension in yards per minute. E is the angle of elevation from the point of release.

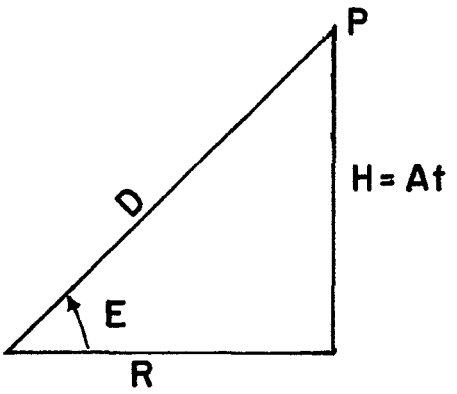


Figure 2

$$Cot.\ E = \frac{R}{H} = \frac{R}{At}$$

$$\frac{R}{t} = A\ Cot.\ E = \textit{wind speed in yards per minute.}$$

To get the wind speed in M.P.H., we multiply by 60 and divide by 1760.

$$W = \frac{60}{1760}\ X\ A\ Cot.\ E$$

The average rate of ascension of the 30 gram balloon to an altitude of 4000 yards is 205 yards per minute. Substituting for A above we have

$$W = \frac{60\ X\ 205}{1760}\ X\ Cot.\ E = 7\ X\ Cot.\ E$$

We constructed and used a simple scale wherein the wind speed could be read instantly opposite the elevation reading. Until the last revision in November 1950, TM 20-241 also included tables to give the same solution readily.

The average wind direction to any given altitude is indicated directly by the balloon azimuth reading at that altitude. If the theodolite is used, it is necessary to convert degrees to mils. And it is also necessary to get the back azimuth in order that the met message give the azimuth from which the wind is blowing. If the tracking instrument is oriented with zero north, add or subtract 3200 mils from the reading on the balloon. We used a simple strip scale with degree graduations showing on one side of the line and the corresponding back azimuth in mils showing on the other side. 1600 mils was opposite 270 degrees.

The meteorological crew, using the theodolite, tracked the balloon and recorded the readings each minute in the regular manner. Their record form indicated clearly the time to take the reading for each standard altitude. With this form, the wind speed computer, and the wind direction converter, as indicated above, the crew computed the meteorological message as the balloon ascended and had it ready for dispatch within a minute after the balloon reached the desired altitude. No plotting board or extensive computations were involved.

Since the ballistic wind for a given altitude zone was used for any firing altitude in that zone we took the reading when the balloon altitude was at the midpoint of the zone.

NOW with the development of radar balloon tracking the range, azimuth, and elevation of the balloon are read each minute; the altitude and rate of ascension can be computed. Since the rate of ascension varies with each run and also to some extent on each run as the balloon ascends, a logarithmic slide rule is required to compute the wind speed. Such a wind speed computer is shown in Figure 3. Scales B, C, and D are inscribed on the movable slide.

It can be used with the flight data from either the radar or the theodolite. The slide is moved first to set the ascension rate on scale C opposite index *E*. Then the average wind speed for the given altiture is read on scale *A* opposite the balloon elevation reading for that altitude.

The wind speed computer can be constructed readily by a master gunner. The wind speed scale is a standard logarithmic scale. Figure 3 shows one copied from a ten-inch slide rule. Likewise, the ascension rate scale is logarithmic at the same scale. The index *E* is plotted conveniently on the left about opposite the wind speed of three M.P.H.

A table of natural cotangents is used in the computations to determine the elevation scale graduations. Assuming an ascension rate of 400 yards per minute and substituting in the formula above, we have

$$W = A \times \frac{60}{1760} \text{ Cot. E;}$$
$$= \frac{400 \times 60}{1760} \text{ Cot. E;}$$
$$= 13.636 \text{ Cot. E.}$$

Beginning at 10 degrees record the natural cotangents for each degree up to 30 degrees and thereafter each five degrees up to 80. (Ref. TM 5-236, page 85.) Multiply each natural cotangent by 13.636 to get the wind speed for that angular reading.

Set the rate of ascension at 400 opposite the index *E* accurately. Then mark the elevation graduations opposite the corresponding computed wind speeds. The degree graduations between 30 and 80 degrees can be interpolated between the five degree markings.

Scales *D* and *F* are added in order to solve the ascension rate automatically from the known time and balloon altitude. Scale *F* is a standard logarithmic scale at same scale as *A* and *C*. The graduation for 20,000 yards is arbitrarily placed opposite 80 M.P.H. Then with the ascension rate set at 400 yards per minute the time of observation scale—*D*—is inscribed to show each minute opposite the proper altitude. This is determined by simple division; e.g.,

4,000 divided by 400 = 10.

The elevation scale can be graduated just as easily to read in mils. That would offer advantage with radar tracking where the elevation is read in mils. However no practical advantage will be accrued unless a slide rule is also prepared to solve the altitude from the slant range and the elevation in mils.

The scales in Figure 3 can be used for an experimental wind speed computer. Cut carefully along the two horizontal lines and remove the middle section with scales B, C, and D and mount it on the movable slide. Mount the upper and lower sections with the same relationship on the fixed part of the computer as shown with 20,000 on scale *F* opposite 80 M.P.H. on scale A. However, for regular use, all of the scales should be inscribed on paper or other matériel less subject to expansion or shrinkage.

Analysis

THOSE who care to do so can analyze the theoretical accuracy of the wind speed computer by reference to the ballistic wind weighting factors in Table IId (page 97), TM 20-241. In studying note that the higher zones have greater depth than the lower zones. For each standard altitude it will be noted that the top zone has half or less weight than its proportional part. The zone next to the top also has a weight less than its proportional part. The lower zones are weighted about equally in proportion with a tendency toward reduction at the higher altitudes.

Table 1 shows such an analysis for the 10th standard altitude, 8,000 yards.

Line A shows the standard wind weighting factors for antiaircraft. Line B shows the factors applied by the wind speed computer when the balloon reading is taken at the zone midpoint, altitude 7,000 yards. Likewise, line C shows the factors applied by the wind speed computer when the balloon reading is made one-third the way up the zone, or at altitude 6,667 yards. Line D shows

TABLE 1

ZONE NO.		1&2	3	4	5	6	7	8	9	10
Standard altitude (yds)		0 to 500	500 1000	1000 1500	1500 2000	2000 3000	3000 4000	4000 5000	5000 6000	6000 8000
8,000	A	.07	.08	.08	.08	.16	.15	.14	.13	.11
	B	.071	.071	.071	.071	.143	.143	.143	.143	.143
	C	.075	.075	.075	.075	.15	.15	.15	.15	.10
	D	.083	.083	.083	.083	.167	.167	.167	.167	.00

the factors applied when the balloon reading is made at the bottom of the zone, altitude 6,000 yards.

Such an analysis indicates that the wind speed computer will give best results from zones 7 to 10 when the balloon reading is made about one-third the way up in the respective zone.

Above zone 10 it appears that greater accuracy can be obtained by taking the balloon reading at the bottom of the zone.

In any case it is hardly necessary or desirable to interpolate between minute readings. Use the minute reading next to the desired altitude. That will give accuracy comparable to the precision in the system and it will avoid chance of interpolation error.

Procedure

Theodolite Method. Inflate the balloon carefully insuring that the prescribed free lift is accurately weighted. Conduct the balloon observation in the normal manner, except that the significant readings in azimuth and elevation are taken at the times indicated in Table 2 below.

When it is desired to check this method against the standard method significant readings should be taken for both. The 2¼ minute reading can be used in both methods for line 2 of the message.

Table 2 shows the time in minutes after release and the average ascension rate for significant readings to be used in computing the met message ballistic wind data with the 30 gram balloon.

TABLE 2

St Alt (yds)	Met Msg Line No	Use Min Rdg	Ascn Rate yds/min
Surface	0	¼	240
200	1	1	240
500	2	2	230
1,000	3	4	220
1,500	4	6	220
2,000	5	8	210
3,000	6	12	210
4,000	7	16	205
5,000	8	21	205
6,000	9	26	205
8,000	10	33	205
10,000	11	40	205

Prior to the release of the balloon the met section should complete the surface readings as to temperature, barometric pressure and humidity and determine the ballistic density data. The meteorological message form should be completed except for the ballistic wind data.

The computer replaces the plotter as a key operator. He sets the initial ascension rate on the wind speed computer. After the ¼ minute reading he uses the wind speed computer to determine the surface wind speed from the elevation reading. From the azimuth reading, and using a degree—mil conversion scale, he determines the wind direction in hundred mils, making sure to determine and record the azimuth from which the wind blows. He then records this data on the zero line of the met message form.

Thereafter, referring to Table 2 he changes the ascension rate setting as indicated. As each significant reading is made he determines the wind azimuth and speed and records that data on the appropriate line of the met message form. When the last reading is completed the message is ready for dispatch.

For anticipated wind speeds above 25 M.P.H. it is better to use the 100 gram balloon. A table similar to Table 2 can be prepared to show the time for significant readings and the average ascension rate assumed for each reading.

Radar Method. Usually the balloon will be inflated to ascend at a rate of about 400 yards per minute. The balloon is inflated, released, and tracked in the normal manner. The recorder starts the timer and obtains and records readings in azimuth and elevation from the theodolite at ¼, ½, 1, and each succeeding minute until the radar trackers report on target. Thereafter he obtains and records readings in slant range, azimuth, and elevation from the radar each minute. The record is made on DA AGO Form 11-215.

The recorder also converts the elevation from mils to degrees and records it on the form. In this method there is no need to convert azimuth to degrees. However, until the radar azimuth readings begin the theodolite azimuth readings are converted to mils and recorded.

The computer replaces the plotter as a key operator. When the first slant range is obtained he uses the slide rule ML-59 to compute the altitude from the slant range and corresponding elevation reading. (Or if the altitude is read from the radar, he notes that reading.)

Dividing the altitude thus determined by the number of minutes he determines the rate of ascension and sets this value on the wind speed computer. He then determines the surface wind azimuth (line O) by adding or subtracting 3200 mils to the ¼ minute azimuth reading. Using the wind speed computer he determines the surface wind speed from the theodolite elevation reading.

Referring to Table 3 for the reading* to be used, without changing the ascension rate he determines the ballistic wind direction and speed for the message lines 1, 2, and 3 and records that data.

TABLE 3

St Alt (yds)	Met Msg Line No	Use Min Rdg with Alt (yds) Nearest
0	0	* ¼ min.
200	1	* ½ min.
500	2	* 1 min.
1,000	3	* 2 min.
1,500	4	1,300
2,000	5	1,700
3,000	6	2,400
4,000	7	3,300
5,000	8	4,300
6,000	9	5,300
8,000	10	6,700
10,000	11	8,000
12,000	12	10,000

The computer then computes or notes the altitude for the 5th minute reading. He moves the slide of the wind speed computer to set the time of observation on scale D opposite the altitude on scale F. This automatically solves and sets the ascension rate. He is now ready to select the minute readings for lines 4 and 5 of the message (see Table 3), or the readings with altitudes nearest 1300 and 1700 yards respectively. He can do this by arithmetic until the graduations on scales D and F are usable. From the readings selected he determines the ballistic wind direction and speed for lines 4 and 5 and records that data.

Refer to Table 4. It shows a sample observation on the Radar Flight Data Sheet. Significant readings are marked with an X. The DA AGO form 11-215 is modified to show opposite each significant reading the corresponding message ballistic wind data.

The computer next computes or notes the altitude for the 10th minute reading and sets the time of observation opposite that altitude. Referring to Tables 3 and 4 he can now select the minute readings for lines 6, 7, and 8 of the message by using scales D and F of the wind speed computer. The wind data are determined and recorded.

TABLE 4

	MIN. FROM RELEASE	ELEV. (Mils)	ELEV. (Degrees)	AZ. (Mils)	AZ. (Degrees)	S. RN. (Yards)	ALT. (Yards)	Met. Msg. Line	BALLISTIC WIND Mils	BALLISTIC WIND Speed MPH
X	¼		46	6260	352			0	31	14
X	½		53	6330	356			1	31	11
X	1		47	6330	356			2	31	14
X	2		34.1	430	24.2			3	36	21
X	3	526	29.5	600	33.8	2600	1280	4	38	25
X	4	494	27.8	630	35.4	3780		5	38	27
	5	465	26.2	655	36.8	4800	2120			
X	6	470	26.4	705	39.7	5950		6	39	29
	7	490	27.6	740	41.6	6650				
X	8	505	28.4	755	42.5	7400		7	40	27
	9	510	28.7	790	44.4	8120				
X	10	520	29.2	815	45.8	8950	4360	8	40	26
	11	525	29.5	845	47.5	9900				
X	12	520	29.2	865	48.7	10650		9	41	26
	13	515	29.0	880	49.5	11850				
	14	515	29.0	890	50.1	12700				
X	15	515	29.0	890	50.1	13800	6700	10	41	27
	16	510	28.7	895	50.3	15000				
X	17	510	28.7	895	50.3	16200		11	41	29
	18	510	28.7	905	50.9	17300				
	19	510	28.7	935	52.6	19400				
	20	505	28.4	950	54.0	19900	9500			

This process continues as the balloon ascends. The altitude computations for every fifth minute should be kept ahead of the ballistic wind determinations.

When the balloon has reached a slant range of 20,000 yards, or when the range approaches the range accuracy limit, the appropriate time of observation is set opposite the last determined altitude and that setting is left fixed for the remainder of the observation. Referring to Table 3, scales D and F are used to select the minute readings to be used in determining the ballistic wind data for the remainder of the message.

When the ballistic densities and other data are determined from surface readings, those operations should be accomplished prior to the balloon release and the met message completed except for wind data. After the last reading on the balloon the completed message can be dispatched in short order.

This method of procedure sacrifices some theoretical accuracy in the matter of wind weighting factors. However its advantages over the standard procedures are that it:

- Gains in practical accuracy by a tremendous reduction in the number of operations involved—each subject to error.
- Facilities prompt dispatch of the message.
- Saves manpower.
- Is more suitable in rugged field conditions.
- Is simpler in operation and more reliable.

It can easily be tested in connection with the standard procedure and results compared. Such comparison should serve to sharpen up the procedures in both methods. Comments pro or con on your findings are solicited.

Target Planes

(Continued from page 18)

79 seconds if he fails to turn the plane before maximum radio range is reached.

The mighty midgets, valued at $2,861, are used to train antiaircraft artillerymen by simulating bombing and strafing runs, their smaller size counterbalanced by closer approach to the area being defended.

But all is not the drama of the take-off and flight. The target planes must be constantly checked and rechecked. The crashed and bullet-riddled ships must be salvaged and repaired. They must be constantly protected against the ravages of climate, accurate gunnery and salt water.

The crewmen, known appropriately as ack-ack fly boys, are indeed an integral part of the defense of this main artery of the western hemisphere—the Panama Canal.

These planes are flown and serviced in the Canal Zone by the 38th Radio Controlled Airplane Target Detachment, a unit of the 65th AAA Group.

CAPTAIN WISE RECEIVES ALA. GUARD AWARD

Captain William M. Wise, commanding officer of Headquarters Battery, 226th AAA Group, was recently awarded the Certificate of Achievement by the Governor of Alabama "for exceptionally meritorious and outstanding performance of duty from 1 October 1949 to 3 September 1950," in his assignment in the Alabama National Guard. The 226th Group, commanded by Colonel John B. Sides, is presently in Federal Service at Fort Bliss, Texas.

AW SIGHT TRAINING

By Lt. Col. Arthur L. Meyer

Gun crews require intelligent and intensive training just like athletic teams.

I. SPEED RING SIGHT

THE speed ring sight is the simplest of the light AAA fire control devices and as a result, it solves the gunnery problem in a relatively crude manner. The expected percentage of hits is least in comparison with all other sights. Considering this minimum performance, plus the recognized insufficiency of the Mk IX sight on our caliber .50 MG turrets, plus the usual carelessness which accompanies the use of any inherently crude device, far too many units exhibit a disdain for the sight and fail to train the crews properly. We must never lose sight of the fact that 50 per cent of all AAA armament, both heavy and light, uses the speed ring sight as a primary fire control device. The sight also appears as an auxiliary sight on all light AAA equipment other than the MG turret. When we realize fully its prevalence and its adaptability to the hurly-burly conditions of battle, we must agree it is essential that our troops use it to maximum efficiency. In an effort to have all units attain this efficiency I recommend earnestly the following training plan.

Col. Meyer has been an instructor at the AAA & GM School for the past three years. He is presently chief of the fire control section at the School.

As in any military subject, the training must begin with a conference establishing the principles and rules for the use of the sight. This certainly isn't news to us, but what is news is the undeviating firmness in enforcing certain rules. For example, the student must be taught to use the sight continuously, keeping the center of mass of the target on the speed ring representing ¾ target speed. He must never abandon his speed ring sight in favor of tracer control. Only when adjustments for line are indicated should the gunner act upon tracer. Almost never will he adjust for lead, because the ¾ speed ring rule gives him the greatest assurance of hits in combat. If the gunner fails to see any tracers but does see the target, however hazy, he should comply rigidly with the simple dependence upon his speed ring sight. In the long run, the sight will produce many more hits than would be obtained from tracer control. By using countless questions directed to individuals by name, by explanations, sight picture illustrations, and more questions, be certain that every student leaving the conference understands how to orient his sight and how to apply the two simple rules for engagement; *i.e.*, point the nose of the target toward the hub of the sight, and track the center of mass of the target on the speed ring representing ¾ speed.

After the student knows what he should do and why, he is ready for the application phase. To prepare for this phase, paint various views of aircraft in flight at different aspects and apparent angles of climb and dive on 24″ x 24″ boards, and at the bottom of each picture paint an arbitrary speed which differs for each picture, figure 1. When this is completed, all you need

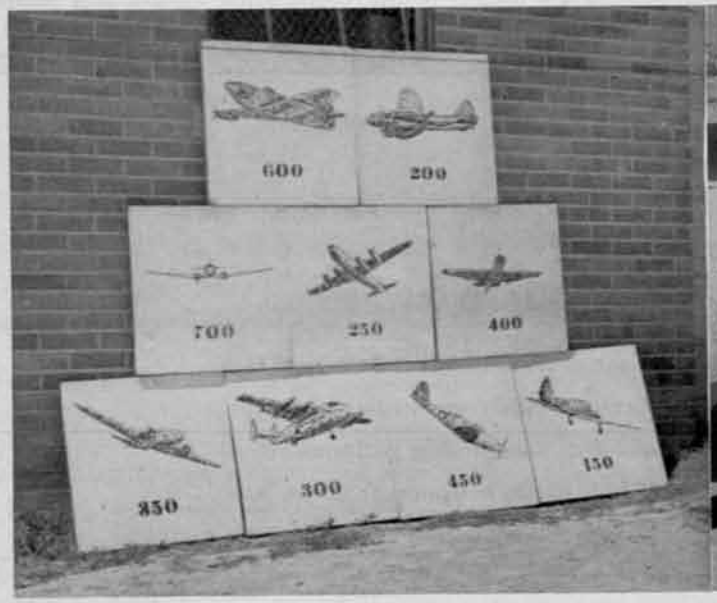


Figure 1—Realistic target views.

Figure 2—Dry fire.

for the first application phase are your organic weapons and these pictures. Place the pictures about twenty yards away from and facing the weapons. Now have the gunners traverse and elevate the weapons until they gain the correct sight picture, assuming the target to be travelling at the indicated speed, figure 2. When the gunner is satisfied he has the target on the speed ring representing ¾ of the printed speed, and with nose pointed toward the hub, he should shout "Cut!" to a second crew member who will then turn off the turret drive switch. The gunner maintains the correct sight picture while the motor comes to a stop. The speed ring instructor should then have the gunner tip his head to one side while the instructor looks into the sight checking the sight picture. After the corrections have been applied, the student should proceed to the next picture. This dry fire training should continue until the student requires no corrections on any picture. In the case of 40mm guns where two trackers may be required to produce one finished, correct picture, always orient both sights on a point which is at the same range as the pictured targets. This convergence can be done at ranges of fifty feet or more, figure 3. By always placing the pictures at this near orienting point, the converged two sights will present the same picture to each tracker; hence, the trackers get a realistic presentation of the effect of one tracker's contribution to the sight picture of both trackers.

The purpose of this motionless sighting practice is to guarantee that your trackers know what the correct sight picture should be and are able to produce it without the added problem of the motion of the target. It is to the AAA gunner what the sighting bar is to the rifleman. If the gunner started his training by actually tracking targets, the instructor could only critique his performance as to what was in the past, not what it is now. The gunner would have to remember how his sight picture had been at various points along the course and never would the instructor be sure the student and he were talking about the same picture. With this dry fire practice, the instructor can discuss the instantaneous errors in detail because the picture will not change until someone traverses or elevates the weapon. The instructor can also demonstrate, to the student, the correct sight picture. After the student masters the still sight picture, he is ready to learn to dominate the tracking problems of his weapon in maintaining the correct sight pictures during actual engagements. In other words, he is now ready for tracking practice.

Figure 3—Dry fire with open metal sights.

TO prepare your caliber .50 MG turrets for tracking practice be sure to provide each tracking mount with a check sight. This is done by removing the sight from 50 per cent of your turrets and mounting those sights in an upside down position on the remaining turrets, figure 4. Although you now have only one-half of your turrets in operation, the important point is you can provide a check on the performance of every tracker at all times. Do not mount an open metal sight as a check sight because the checker must move with the turret as it tracks and by this movement he destroys his sight picture in an open sight. A reflex type sight, such as the Mk IX, does not have this disadvantage in that the observer's eye does not have to be on a specific line of sight.

Using the check sight properly oriented with the turret's normal sight, a checker should ride the turret platform during tracking and constantly correct the tracker along every course. The checker must be a speed ring expert, and must be relentless in his search for errors on the part of the tracker. A check system is the heart of good shooting. Don't ever send your men out to track without a checker on the mount, because the tracker will waste his time and yours by his inevitable carelessness. Finally, the instructor must personally

Figure 4—Using the check sight.

approve every tracker before that person may fire actual target courses. Be merciless; it will pay in hits!

As to the target to be used during the tracking phase, any aircraft will do, slow or fast. Start the training with slow tracking rates and gradually increase them. If your target is high speed, merely increase the slant range to midpoint until the tracking rate is the desired amount. If your aircraft is a slow type and you desire high tracking rates, you can usually get what you want by decreasing the slant range to midpoint. Always start the training with a low slant plane angular height. This will mean very little image spin. Later increase the slant plane angular height to almost 90° so as to cause maximum image spin. And finally, disregard the aircraft's actual speed. You assign arbitrary values to the aircraft. For example, against a liaison plane you could announce the speed to be assumed as 500 MPH. The tracker will handle the target just as he would a legitimate 500 MPH aircraft.

After you are certain your gunners know what a proper sight picture is, and that they are able to dominate the tracking mechanism of the mount to maintain that picture smoothly, your gunners should fire at airborne targets. Again it must be emphasized; use check sights! The only difference between actual firing and the tracking practice procedure is that as the gunner presses the trigger switches, the guns acually fire. In other words everything else remains the same. The checker constantly critiques the performance, and never should a course be fired without a checker on the job. After every fired course, see that the checker or yourself critiques the gunner on his performance. Don't waste a round! And finally, make the gunner fire continuous fire, not interrupted bursts. The only time a gun-

ner should cease fire is when he can no longer see the target. Tracer has nothing to do with ceasing fire. If the gunner maintains the correct sight picture with a properly oriented sight he will get hits whether he sees tracers or not.

By using the ¾ speed rule a flythrough will occur at an angle of approach somewhere between 40° and 50° and again somewhere between 130° and 140°. Some firing ranges have restricted fields of fire; for example, firing—to be permitted only between angles of approach of 45° to 135°. It is conceivable in these cases that, because of limits of fire, flythroughs might not occur. Therefore on such restricted ranges, you can have the gunners track the target on the speed ring representing 8/10 or 9/10 actual speed rather than ¾. However, in combat ¾ speed gives the greatest assurance of a flythrough.

Follow the training system outlined and you will get plenty of hits. But the secret of success is your system of checking. Never take a step without using checkers. Try the system!

II. COMPUTING SIGHT

THE computing sight is a good sight! As the most accurate of the on-carriage type sights, it is found in all light AAA battalions (40-mm) as either a primary or secondary system of fire control. Therefore, because the computing sight will play a vital part in the protection of combat areas against low altitude attacks, we must squeeze every ounce of accuracy available out of it. In an effort to have our antiaircraft artillery provide this maximum effectiveness, I recommend heartily the following training plan.

Using the actual sight and a blackboard, first pound home the principles of construction, the academic principles of solution, and the two simple rules for adjusting fire; *i.e.*, for corrections for line, adjust the arrow; for corrections for lead, adjust the speed. After this, teach the entire chain of gears, shafts, and slides until every man knows how the simple turning of the handwheels finally provides the solution. Finally, have the men perform the adjustments to the sight, including leveling the computing box. When the crews leave this instruction, they should be unshakable in their knowledge of the how's and why's of the computing sight; however, they now need physical practice to finally produce bread in the basket.

Throughout the application phase, the crews should, of course, practice the orientation procedure; however the feature of this initial practical phase is the dry fire training for the lead setter. To prepare for this instruction, construct the tracer training aid shown in figure 1. The pictured aid contains a pair of arms on which are mounted small light bulbs. The shaft from which the arms extend

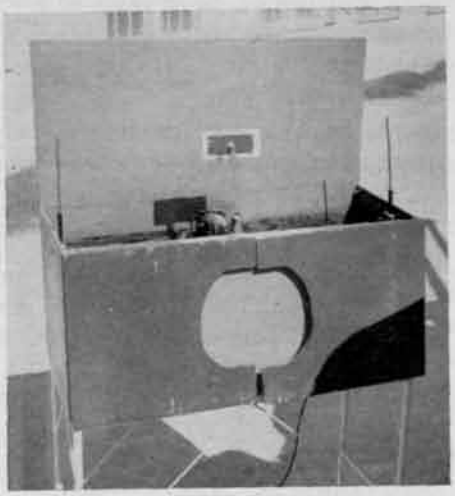


Figure 1—Tracer aid.

has several contact rings, which are connected electrically both to the light bulbs and also to switches (one switch per contact ring) mounted to the rear of the stationary base. When the shaft turns, the arms revolve in windmill fashion. This causes the light bulb to twirl past a stationary white panel type target suspended by a wire to two side supports. One of the arms (with three light bulbs —one higher than target, one on line with the target, and one below the target) is mounted so as to pass to the rear of the target. The other arm (with one bulb on line with the target) passes in front of the panel target. To produce a realistic tracer picture, turn on one of the switches connected to a light bulb. The bulb will light and, if painted except for one small spot facing the observer, will produce a pinpoint of bright light as would a distant tracer. By selecting various switches, you can produce authentic tracer pictures of *HIGH, LOW, AHEAD, ASTERN,* and even if desired, a *HIT*. The pictured tracer aid uses a small electric motor to rotate the shaft; however this is not necessary. Merely put a hand crank at the rear end of the shaft and have one of the men turn the shaft by hand. Flashlight batteries will supply the electrical energy for the light bulbs. And one last thing. In order to force the crews to observe the tracers in the immediate vicinity of the target, make a hinged flap with a small observation circle (about twice the target length in diameter) cut into the wood. When using the aid, tip this flap to an upright position, thus restricting the observer's view, figure 2 (note the tracer aid in distance).

With the tracer aid providing assorted and realistic tracer pictures, now organize the crews for the dry fire practice. Each weapon will have a three man team. The lead setter stations himself at the computing sight with left hand on the arrow positioning handwheel, right hand on the speed handwheel, and eyes directed toward the tracer aid, figure 2 (man on extreme left). The second man stations himself so that he can see the lead setter's adjustments on the speed

Figure 2—Dry fire practice.

dial and arrow positioning mechanism, figure 2 (man inside radio compartment of the turret). The third man positions himself so that he can see the tracer aid, figure 2 (man outside the turret, back toward camera).

As the lead setter sees the assorted tracer pictures, he corrects for each tracer as if it were an actual tracer fired by his mount; hence, for a *LOW*, he moves the head of the arrow toward him; for an *AHEAD*, he decreases speed, etc. The lead setter should learn to make all corrections without dropping his eyesight from the tracer; i.e., don't look at the computing box at any time. The second man reports, to the third man, the corrections he observes on the computing box, such as *INCREASE, DECREASE* for speed changes, and *AWAY* and *TOWARD* for arrow direction changes. The third man hears these callings from number two and compares them with what should be done according to his observation of the tracer pictures. If number three detects an error he calls out what should be done. The lead setter then notes the correction and tries the operation again. The man operating the tracer light bulbs should let one light burn for several rotations before changing to a different bulb. The instructor should rotate the three men in each crew after the lead setter masters the corrections without glancing down at the computing box. Repeat the above rotation until all crewmen are experts at the dry fire corrections for both left to right and right to left courses.

AT this time your lead setters have learned to act quickly and correctly in inserting corrections into the sight, but you have not trained the trackers. Therefore, order tracking missions and begin. To prepare for the tracking practice, arrange the crew for appropriate checking. To check the tracker, station one man outside the turret so that as he walks around the ammunition boxes, he can look down on the reflector of the tracker's M24 Reflex Sight and see the same sight picture as the tracker, figure 3 (man on extreme left).

To check the lead setter, station one man inside the radio compartment of the turret (man on extreme right). This man must be able to observe the computing box for changes in arrow direction and speed settings. During each tracking course the man checking the tracker will call out errors as they occur; such as LOW, meaning the tracker's crosshairs are below the target, AHEAD, etc. The man checking the lead setter will call out assorted arbitrary tracer sensings throughout the tracking course and will observe the corresponding corrective action taken by the lead setter. He will correct errors as they occur. During the tracking course, the lead setter will keep his eyesight on the target and will not permit his eyesight to drop to the computing box.

All of this training, with its incessant check systems, will cause the tracker to be meticulously unerring in accuracy, and the lead setter will apply adjustments with undeviating perfection instantaneously. When you attain this peak of performance, you are ready to fire at airborne targets. And as ever, prepare for your firing with a thorough check system. In addition to a man checking the gun pointer as in tracking practice, plus one man observing the lead setter's corrections during firing, you need two tracer observers. One tracer observer stands behind the firing gun observing whether or not the tracers are on line with the target. He calls sensings of *HIGH, LOW*, or *ON* to a recorder. The second tracer observer stands the proper number of yards downcourse from the firing gun (distance equals $\frac{SDm}{500}$). He observes whether or not the tracers are correct for lead by scrutinizing the tracer hump. Using sensings of *AHEAD, ASTERN*, or *ON*, he announces his observations to a recorder. At the end of each firing course, the recorders report their line and lead information to a qualified critique officer behind the firing gun. The critique officer records these observations on a blackboard at his position, figure 4. With this information, the critique officer begins his critique. His objective is to determine the cause and remedial action to correct for imperfect line performance and lead performance. He must localize his attention to one performance (line or lead) at a time, handle its remedial action, and then cover the other performance for every course.

Figure 3—Constant checking.

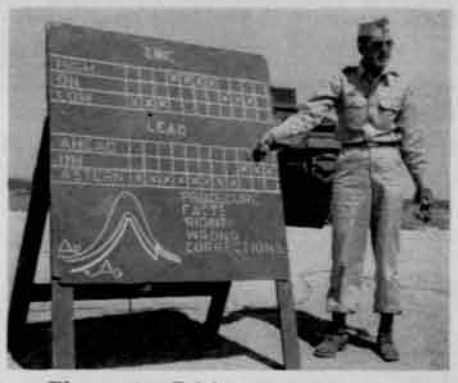


Figure 4—Critique every course.

Having instructed the tracker, lead setter, and their two checkers to station themselves so that they are unable to see the recorded information on the blackboard, figure 4, the critique officer first diagnoses the line performance.

Generally, the line performance is affected by erroneous tracking and adjustments of the arrow direction. Therefore, the critique officer asks both the tracker and the lead setter regarding their performance with respect to these two items. He checks their accounts by separate testimonies from their two checkers. By comparing these reports with the facts recorded on the blackboard from the line observer, he determines the facts as to what actually happened; then determines what was correct and what was in error, announces his findings, and prescribes the necessary remedial action.

NOW the critique officer turns to the problem of lead performance. Generally, the lead performance is affected by erroneous tracking and adjustments of the speed setting. Therefore the critique officer asks both the tracker and the lead setter regarding their performance with respect to these two items. He again checks their accounts by separate testimonies from their two checkers. In this case the tracking checker reports only on tracking with respect to the vertical crosshair (crossing course). By comparing

these reports with the facts recorded on the blackboard from the down course observer, he determines and announces the lead results with appropriate corrective action.

Using the above check system on every course, your results will be outstanding. Incidentally don't worry about how fast your weapons fire with regard to difficulty in recording tracer sensings. Let the weapons fire as rapidly as possible, automatic fire in the last stages of training, and the tracer observer will call sensings only as rapidly as his recorder can receive the information. This means he will not report all the tracers but he will provide more than an accurate sample of the performance.

The secret of success is constant checking. Never perform this training without systematic, untiring checking, your results will be counted in hits. Try it!

★★★★★★★★★★★★★★★

Overcome the natural tendency to shoot astern. Lead the target!

★★★★★★★★★★★★★★★

32nd AAA BRIGADE

By Capt. James R. Lewis, Inf. (PIO)

HAVING served in Europe in World War I and in the Pacific in World War II, the 32nd AAA Brigade has recently moved its command post to the comparatively quiet countryside of friendly England. The address is RAF Station Mildenhall, in the historical County of Suffolk. The brigade commander is Colonel Metticus W. May, Jr. The brigade and its battalions are training with the Royal Artillery, Royal Air Force and U. S. Air Force, as guests of the British Government, as authorized by the Visiting Forces Act. Getting their heads together, the Yanks and Tommies have discovered each other to be pretty regular fellows.

The brigade is directly under the Commander-in-Chief, European Command for administration, training and other activities. Officer and enlisted personnel are continually attending service schools in the European Command to make them better qualified in their jobs.

The brigade has had a host of distinguished visitors. Among them General Thomas T. Handy, Commander-in-Chief, European Command, visited various units of the brigade, stopping to speak with all ranks of officers and enlisted men as they worked at their jobs. "The units of the 32nd Brigade," said General Handy, "have certainly accomplished much in a short time and the officers and men are to be commended."

Mr. John Strachey, British Secretary of State for War, visited the American and British practice firing at Stiffkey, Norfolk, where he observed the best in Anglo-American relations as the guns of both forces, placed side-by-side, fired at the same plane-towed targets with a healthy competitive spirit.

As part of the training program, brigade units recently participated in Exercise Pinnacle, Britain's biggest air defense exercise since the war. Designed primarily to give practice to the control and reporting systems, it was a true test of the effectiveness of the training and tactical coordination between the American and British Air and Ground Forces. To observe this exercise, came General Willard W. Irvine, Commanding General, U. S. Army Antiaircraft Artillery Command in the United States. General Irvine also visited the installations of the 4th AW Battalion at Wyton, under the command of Lt. Col. R. J. Conelly; 39th AW Battalion at Sculthorpe, Lt. Col. Peter J. Lacey, Jr.; and the 60th AW Battalion at Lakenheath, Lt. Col. R. T. Cassidy.

U.S. Army Photo

Major General Willard W. Irvine *(center)* chats with his British counterpart, Lt. General Sir Charles F. Lowren *(right)*, and Col. Metticus W. May, Jr. *(left)*.

Ammunition For 90mm Gun

A Wide Variety of 90MM Ammunition Is Now Available Both As To Shell And Fuze, With Combinations Designed To Meet Specific Purposes.

By 1st Lt. Ralph J. Swann

Gunnery Department, AA and GM School

AMMUNITION for the 90mm gun is known as fixed ammunition. That is, the shell case is crimped to the projectile and the charge cannot be varied. The fuze may or may not be staked to the projectile. The most common types of ammunition for the 90mm gun are armor-piercing, high-explosive, anti-tank, smoke, high-explosive, target marker, target practice, blank and drill rounds.

Ammunition for the 90mm gun may be broken down into three groups: (1) field artillery; (2) antiaircraft; (3) anti-tank. This article will deal with the most common types of shells, projectiles and fuzes presently available and the most effective combinations of fuzes and projectiles to engage a specific type of target.

IDENTIFICATION. Ammunition and ammunition components are identified by the painting and markings (including an ammunition lot number) which appear on all original packing containers and, when practicable, on the items themselves (Figure 1). To identify a particular design, a model designation is assigned, which becomes an essential part of the standard nomenclature and is used in the marking of the item.

An ammunition lot number is assigned all ammunition at the time of manufacture. It is stamped on every loaded complete round and on all packing containers. It is required for the various records. The lot number is also used in separating ammunition for firing, as there is a difference in muzzle velocity between lots.

Projectiles are grouped into weight zones and appropriate ballistic corrections are given in the firing tables for the variations in weight. For 90mm ammunition, the weight zone of the projectile is indicated thereon by squares of the same color as the markings. One, two, three, or more squares are marked on the projectile depending upon its weight as loaded. Two squares indicate "standard" or "normal" weight for which no weight corrections are necessary. Armor-piercing projectiles do not have weight-zone markings.

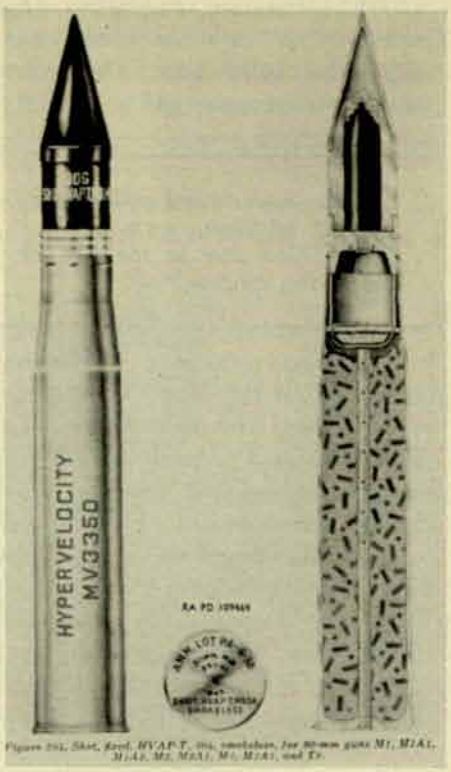


Figure 1.

ARMOR-PIERCING. Nomenclature: Shot, Fixed, AP-T M77 Flashless (Smokeless) for 90mm gun M1, M2, M3 and T8.

This round has a propelling charge and a projectile with no fuze. The projectile is a solid steel slug with the base drilled to receive a tracer which burns for approximately three seconds. (Figure 2.) This round has a muzzle velocity of 2700 fps and a penetration of 4.5 inches at 0° obliquity of face hardened plate at 1000 yards (5.5 inches of homogeneous plate). This round is used most effectively against light and medium armored vehicles.

ARMOR-PIERCING CAPPED. Nomenclature: Projectile, Fixed, APC-T M82, MV 2800, Flashless (Smokeless) w/fuze BD, M68, for 90mm gun M1, M2, M3, and T8.

This round is provided for 90mm guns for use against ground targets, particularly armor matériel. The body proper is made of hard steel with the nose shaped to a relatively short ogive. A steel armor-piercing cap is fixed to the steel nose. A lightweight windshield is screwed or crimped on the armor-piercing cap. The rear portion of the projectile has a small cavity loaded with explosive D. The base hole is threaded to receive the base-detonating fuze M68. The rear portion of the fuze contains a tracer element

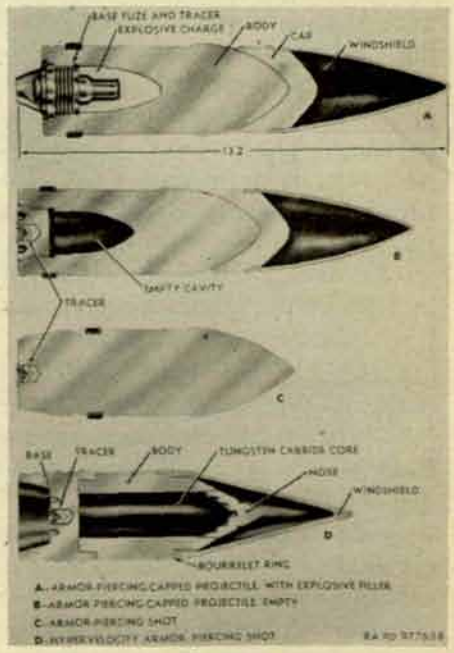


Figure 2.

which burns for three seconds (Fig. 2). This round has a muzzle velocity of 2800 fps and a penetration of 5.9 inches of face hardened plate at 0° obliquity at 1000 yards, or 6.0 inches of homogeneous plate.

HYPERVELOCITY ARMOR-PIERCING. Nomenclature: Shot, Fixed, HVAP-T, M304, Smokeless, for 90mm gun, M1, M2, M3, and T8.

This round is provided for 90mm gun for use against heavily armored targets. The shot is a lightweight hypervelocity projectile having a very hard armor piercing case of tungsten carbide. The projectile has a tracer loaded base with an integral steel rotating band, an aluminum body with a pressed-on steel boarrelet and an aluminum windshield (Fig. 2). This round has a muzzle velocity of 3350 fps and a penetration of 7.9 inches at 30° obliquity of homogeneous plate at 1000 yards.

SHELL HIGH EXPLOSIVE ANTI-TANK. Nomenclature: Cartridge, HE, AT–FS T108 E11 w/fuze, PI T209 for 90mm gun M1, M2, M3, and T8.

Shell, High Explosive, Anti-tank, Fin stabilized T108 E11 is an armor piercing round used against heavily armored vehicles. The round has a reduced muzzle velocity of 2400 fps and employs the Monroe principle of the shaped charge for penetration. (Figure 3 shows an example of a shaped charge.) When using this principle for penetration, fin stabilized projectiles are more effective than rotation-stabilized projectiles. The round has a rotating band and also expanding fins. After the round leaves the bore of the gun the fins expand, reducing the rotation of the projectile. This type of projectile is equally effective throughout its range. The projectile is equipped with fuze, Point-Initiated T209. This fuze has a combination point-initiating and base-detonating action which is activated on impact, giving a super-sensitive, base-detonating action which permits maximum effect from a shaped charge.

SHELL WHITE PHOSPHORUS. Nomenclature: Shell, Fixed, Smoke, WPM313 Flashless-Smokeless, w/fuze, P. D. M48A3 .05 Sec. delay, for 90mm gun M1, M2, M3 and T8.

Shell white phosphorus is a thin wall chemical filled shell resembling the high explosive shell in outward appearance. Through the center of the shell is a burster charge used to burst the shell and disperse the filler (Figure 4). This shell has the same ballistic characteristics as high explosive shells; as a result no separate firing tables were published. When firing this shell firing tables applicable to shell HE M71 will be used.

White phosphorus is a smoke producing chemical with incendiary effect. This shell may be used for smoke screen, target identification, and incendiary effects. White phosphorus may be used against vehicles, personnel in open or foxholes, and for incendiary effects on targets such as supply points, wooded or grassy areas, and buildings.

SHELL HIGH EXPLOSIVE. High explosive shell is a hollowed steel casing with a boat-tailed base. The nose is formed to a long ogive and is threaded to hold a standard point fuze. The bursting charge is 2.04 lbs. of T. N. T. Some stock is loaded with 50-50 Amatol. The shell is designed to break up into fragments at a given time depending upon the fuze action desired. The initial velocity of the fragments is 2,900 fps. High explosive shells for 90mm guns are shipped as "normal cavity" and "deep cavity." The terms, normal and deep cavity refer to the type fuze-well in the shell. Normal cavity shells are only large enough for a booster and standard point fuze. Deep cavity shells are identical to the normal cavity shells except for the deep fuze cavity which makes the shell adaptable for use with VT fuzes or standard fuzes with supplementary charge and boosters. The cavity is lined with a thin cardboard liner which serves as a partial support for the HE filler. If deep cavity shell is to be fixed with a standard point fuze, a supplementary charge must be inserted in the deep cavity (Fig. 6).

Battle reports indicate unsuccessful missions and wasted ammunition due to the use of the wrong ammunition.

Shell HE M71 is shipped with many combinations of propellant and fuzes. The types can be broken down into three groups, normal cavity, deep cavity, and unfuzed rounds.

Normal cavity rounds are assembled with various components as flashless, flashless-smokeless, smokeless propellants, and the different type of fuzes as M43, M48, M51, M54, M85, M500, all staked to the projectile. These rounds are shipped either in metal containers or in wooden boxes. The metal container holds only one round, the boxes may contain two or four rounds. These rounds are ready for firing when received.

Deep cavity rounds are shipped with the same components as normal cavity rounds; except the fuze well with a supplementary charge.

Unfuzed rounds are issued with fuze holes protected by closing plugs. There are three types of unfuzed rounds: (1) Shell, Fixed, HE, M71, Flashless, w/o fuze. This round may be used for VT

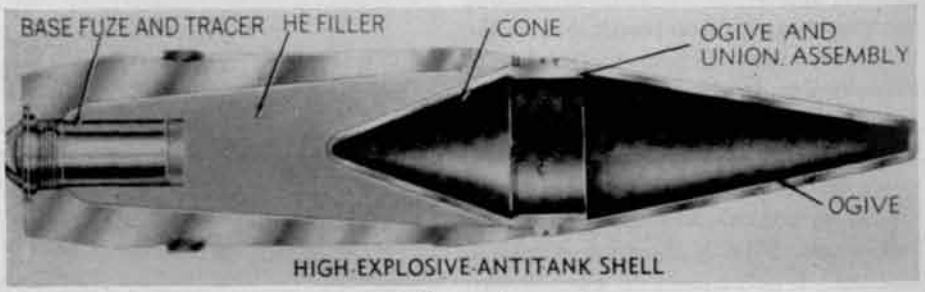


Figure 3.

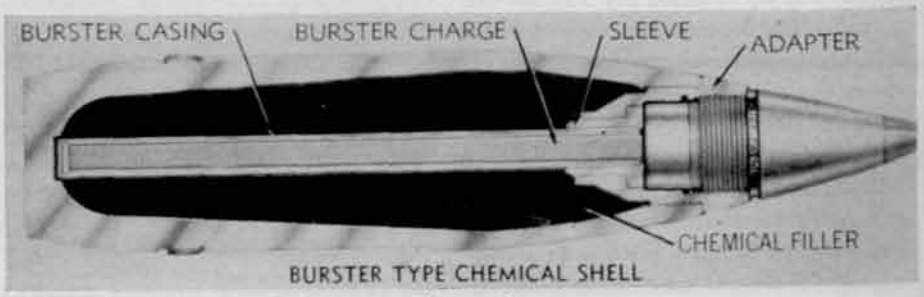


Figure 4.

fuzes of both FA and AA types, however it may be fuzed with any of various standard point fuzes if supplementary charges are available for the fuze well; (2) Shell, Fixed, HE, M71, Flashless, w/suppl chg, w/o fuze. This round is the same as the above round except a supplementary charge is placed in the fuze well before shipping, making the round usable for all types of fuzes. If VT fuzes are to be used, the supplementary charge must be removed; (3) Shell, Fixed, HE M71, Flashless-Smokeless w/suppl chg, w/o fuze. This round is the same as the one above except it is both flashless and smokeless.

There are several advantages in using unfuzed rounds with separate fuzes. In AA or ground firing the fuze may be changed without changing the ballistic characteristics of the round. In the surface mission only one impact adjustment is necessary. As a result, fewer rounds of ammunition are required to obtain corrections. The fuze may also be changed during the adjustment phase or fire for effect phase without loss of adjustment, or any additional rounds being expended.

CAUTION. The deep cavity shell is not to be fired without the supplementary charge with standard point fuzes. That would leave no support for the walls of the filler.

When and why are supplementary charges used with M71 ammunition?

FUZE ACTION. A fuze is a device used with an explosive projectile to cause it to explode at a given time under circumstances desired. Artillery fuzes are classified according to their location, as base detonating (used primarily with AP shell) and point fuzes for all other purposes. (Figure 5.)

FUZE TIME MECHANICAL M43 (all modifications). Fuze M43 is a mechanical time fuze of 30 fuze members with graduations at 0.2 intervals. This fuze is used for both AA and FA firing. The fuze is set at a predetermined setting before firing and when the round is fired the rotation of the projectile starts the functioning of the fuze. At the desired time, the fuze will detonate the projectile.

This fuze is used with shell HE to obtain fragmentation effect against aerial targets. It is also used against such ground targets as personnel in foxholes and trenches. The fuze has a high performance of accuracy when used for time fire. The fuze may be set at "safe" for impact burst. However, the fuze has no impact element and this results in a very

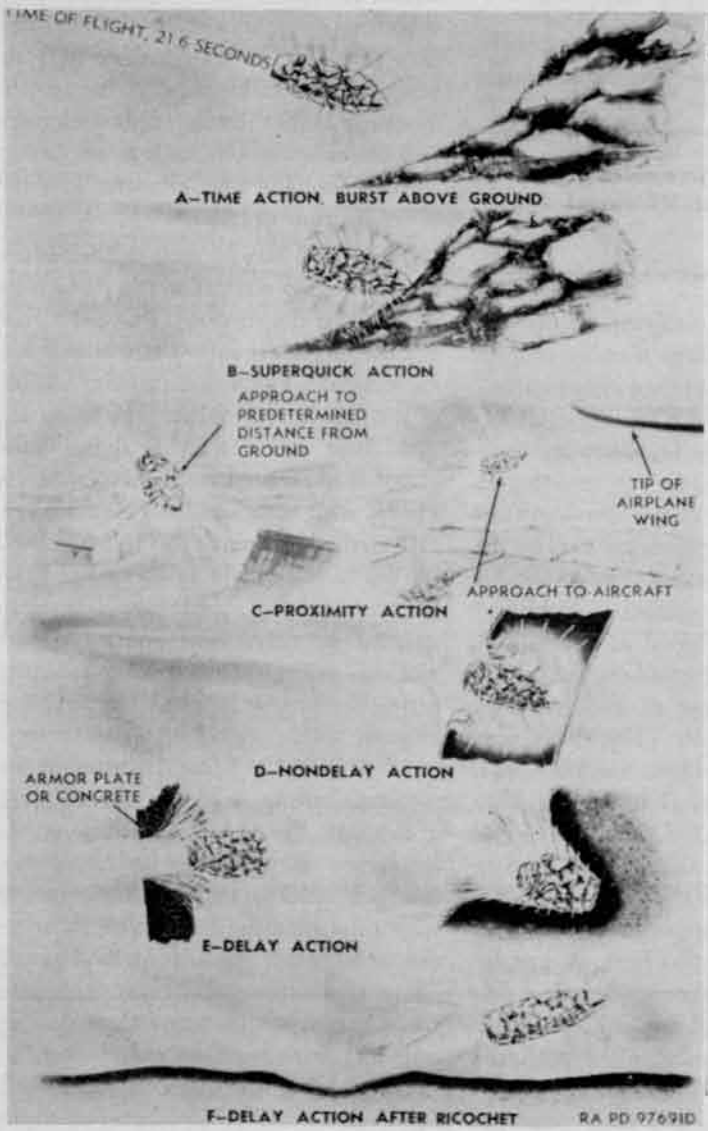


Figure 5.

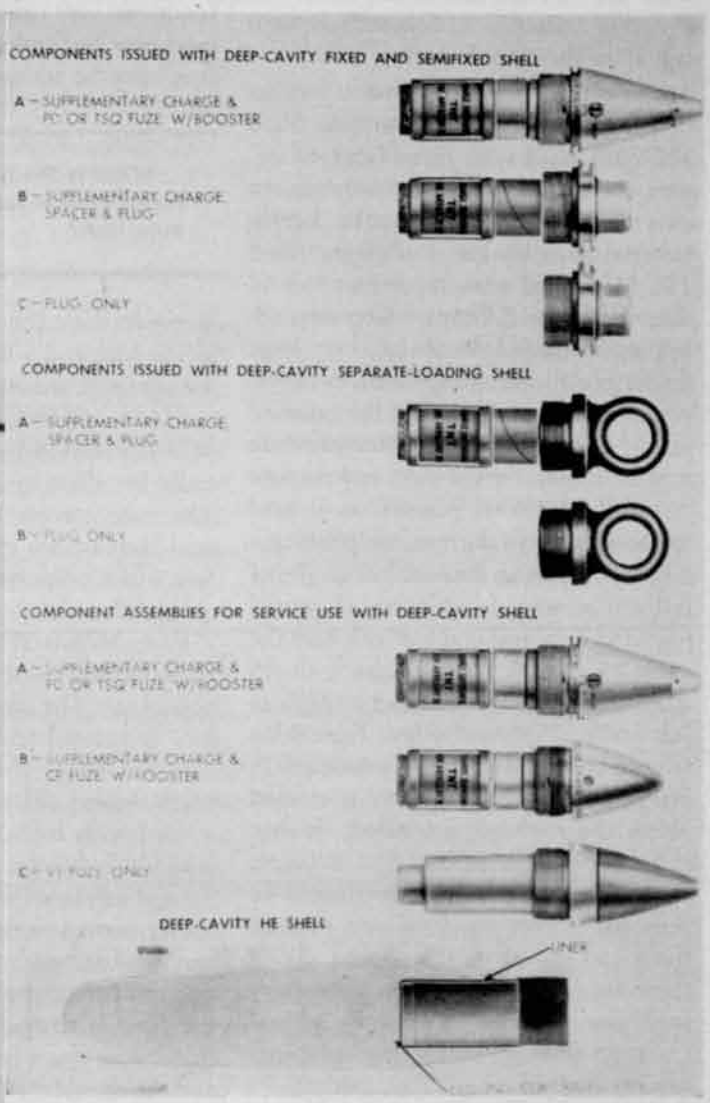


Figure 6.

large number of duds at low firing elevations.

Shell cavitized M71 fuzed with M43A4 fuze has approximately the same ballistic characteristics as the same shell fixed with fuze VT. As a result, we use shell cavitized M71 fixed with fuze M43A4 for the trial shot problem for obtaining corrections for VT fuzed ammunition. When obtaining corrections for VT fuzed ammunition for ground targets, fuze M43A4 set "safe" may be used if fuze 51 is not available.

FUZE POINT DETONATING M48 and M51 (all modifications). Fuze M48 and M51 are point detonating fuzes of the same characteristics. The M51 is the later model and will replace the M48 when present stocks are expended. They are selective types of superquick or delay; either action may be obtained by turning a setting sleeve in the side of the fuze. There are two variations of the delay action, one having a delay of 0.05 seconds, the other a delay of 0.15 seconds depending upon the manufacture.

These fuzes set at superquick give an instantaneous burst upon impact. Shell HE M71 fixed with these fuzes set superquick may be used effectively against personnel in the open, trucks, lightly armored vehicles and buildings. Shell HE M71 fixed with these fuzes set at delay will give different effects depending upon the angle of fall. At large angles of fall, or against vertical slopes, penetration is obtained. If the point of impact is concrete, rock or steel the fuze may be broken off the shell and no fuze action obtained (for penetration of hard surfaces use fuze concrete-piercing). These fuzes set at delay at low angles of fall will burrow along the top of ground for a few feet and bounce back into the air to give an air burst. Fuzes with .05 second delay do not ricochet as high as fuzes with .15 second delay. Fuze delay is used effectively against personnel in building where penetration is desired before the round is detonated. It may also be desirable to use fuze delay in woody areas where the fuze would be activated at tree top level and explode the round just above the ground, giving the same effect as time fire. Fuze delay may also be used effectively against troops in foxholes when ricochet bursts can be obtained.

FUZE TIME AND SUPERQUICK M54 and M55 (all modifications). These fuzes are identical except the M55 series are shipped with a booster. They are a powder train time fuze graduated to 25 fuze numbers. There is also an impact element in the nose. As a result either air burst or superquick action may be obtained.

These fuzes are accurate up to about 15 fuze numbers for air bursts, and are used effectively against troops in foxholes and in defilade positions. If the time element fails to function, the fuze will activate on impact, giving a superquick burst. Superquick bursts are effective against troops in the open, lightly armored vehicles and building of light materials.

FUZE TIME MECHANICAL M67A3 is a mechanical time fuze of 75 fuze numbers graduated each 0.5 interval and used with 90mm gun to obtain air bursts at long range. The M67A3 fuze without booster is the same size, weight, and shape as the M43A4 and functions very similarly. This fuze is used also for high burst ranging. The fuze may be set safe for impact burst; however, there is no superquick element in the fuze and a large number of duds are obtained at low firing elevations.

What is the fuze arrangement for trial fire for VT fuzed ammunition?

FUZE CONCRETE-PIERCING M78 AND M78A1. Is constructed especially for effect against concrete targets. The fuze consists of a solid hardened steel body with a cylindrical well in the base which holds an inertia firing mechanism with a delay plunger assembly.

Fuze M78 is shipped as delay only. Fuze M78A1 is shipped as delay and nondelay. The nose of the nondelay fuze is painted white. The delay fuze uses the delay plunger assembly M1, 0.025 second delay. The booster M25 is used with both M78 and 78A1 and is the only booster that can be used in fitting C. P. fuzes to shell cavitized M71. Either normal or deep cavity HE shells may be fitted with this fuze. When fitting this fuze to the projectile insure that the fuze is screwed up tight and that there is no space between the projectile and the shoulder of the fuze.

HE shells fuzed with C. P. fuze are effective against concrete emplacements, heavy masonry-constructed type of buildings and log emplacements.

FUZE MECHANICAL TIME AND SUPERQUICK M500 AND M501. These fuzes have both mechanical time and superquick elements. They are exactly alike except the M500 has a booster, the M501 has no booster. These fuzes are described as "Mechanical Time, Superquick." They are, in effect, a combination of the mechanical time feature of the M67 series and the superquick feature of the M48 series.

These fuzes are used against targets where air bursts are most effective such as troops in foxholes and in defilade; they are also used for high burst ranging. The fuzes are graduated to closest .5 fuze number up to 75 fuze numbers. As a result a mechanical fuze setter must be used for accurate fuze setting.

FUZE MECHANICAL TIME AND SUPERQUICK M502. Has been designed to replace the 43 series of fuzes. It consists essentially of the 30 fuze numbers fuze M43A4 combined with a superquick impact element. This fuze is designed so that the superquick element will detonate the projectile upon impact in the event the time element does not function prior to impact.

The M502 may be used as a time fuze against smaller aircraft or as a point detonating, self-destruction (PD SD) fuze against larger aircraft where direct hits are desired. The self-destroying feature of the fuze is accomplished by using the time fuze element even though the round is to be fired for detonation upon impact with the aircraft. There are several methods presently being considered for use of the M502 as a PD SD fuze, but no standard procedure has been adopted to date. The most common methods being considered are synchronizing the fuze setter + .1 fuze number in error. This would allow the superquick action of the fuze to detonate the projectile on impact or the time element to detonate the projectile after it passes the target. It must be remembered that if targets are to be engaged subsequently with time fuze the fuze setter must be re-synchronized. Another method would be to synchronize the fuze setter correctly and to set the fuze before loading at + .1 fuze number rather than at "safe." This would allow the fuze + .1 fuze number additional time of flight before the time fuze element would

detonate the projectile, allowing the projectile time to detonate upon impact with the target.

Fuze M502 may also be used against ground targets, as troops in foxholes and in defilade positions where air bursts are most effective. If the fuze is set at "safe" before firing, the projectile will detonate on impact giving a fuze quick burst, which is effective against troops in the open, light armored vehicles and trucks.

NOTE. Setting the fuze M43 or M502 at "safe" is not an indication that the timing disk is set at "0." The fuze should be set with the "Wrench Pre-Fuze Setter." This will insure correct alignment of the timing disk which is necessary for accurate fuze setting when using the Fuze Setter Rammer M20.

FUZES VT are automatic time fuzes, that is, without setting or adjustment they detonate the shell on approach to the target at the most effective point along their trajectories. The artillery VT fuze is essentially a combined self-powered radio transmitting and receiving unit. In flight, the armed fuze transmits radio waves. Unlike radar devices, the waves are sent continuously and are non-directional. The radio wave fronts which are reflected back from an airplane, the ground or water, to the fuze interact with the transmitted wave. When this interaction of transmitted and reflected waves, resulting in riffles or beats, reaches a predetermined intensity, an electronic switch is tripped which then permits an electric charge in the firing capacitor (condenser) to flow through an electric firing squib detonating the projectile.

VT fuzes for 90mm guns are of several different types depending upon the result desired. The major differences are in the minimum arming delay and in the self-destruction feature of the fuze.

Arming is delayed by a series of safety devices for at least 2 seconds after firing in the M97 (T80 E8) models; for at least .5 second for the M92 and M93 fuzes, and for at least 5 seconds for all other models of the M96 (T76) and M97 (T80) fuzes. The exact time of arming depends upon the weapon used and may also vary from lot to lot. The VT fuzes are completely bore safe and muzzle safe.

Height of burst above the terrain of terrestrial VT fuzes varies with large changes in angle of fall, becoming lower as the angle of fall becomes steeper. These fuzes are designed to give optimum burst over average soil; however, the height of burst will vary from round to round and over different types of soil, becoming 50 per cent higher over wet terrain, and 100% higher over water. The average height of burst based upon tests is 14 yards for (FA types) VT when firing 90mm gun. Light tree foliage and vegetation do not affect the height of burst materially, but dense tree foliage and thick vegetation will increase the height of burst above the ground. This effect is decreased at steep angles of fall in which case most shells will burst below tree top level. The dispersion in height of burst decreases as the angle of fall increases.

At the present state of development, approximately 70 per cent (AA types) to 75 per cent (FA types) of VT fuzes are expected to function correctly. When firing VT fuzed projectiles through a worn gun tube, a higher per cent of malfunctions may be expected.

What shell and fuze would you use against enemy troops in village buildings? In a mountain pass?

FUZE VT M92 (T74 E-) is used for AA targets. It will detonate the shell when it passes within 60 feet of aircraft, earth or water. About 90 per cent of this type fuze becomes armed at 1,000 yards from gun. If the fuze malfunctions and does not arm, the shell becomes a dud. VT fuzed duds may detonate upon impact with any hard surface such as rock, concrete, or metal. This fuze contains a self-destruction switch which causes an armed fuze to detonate when the spin of the projectile drops to a predetermined value. This switch is adjusted to close after approximately 25 seconds time of flight at 22.5° gun elevation, approximately 55 seconds at 60° elevation, and from 60 to 80 seconds at 80° elevation. The self-destruction feature in the fuze is intended to detonate the round sufficiently high on the descending branch of the trajectory when fired at quadrant elevation greater than 300 mils (170°), to prevent injury and damage to friendly troops, but in addition a safety factor of 100 mils must be considered. Therefore, projectiles fuzed with the M92 (T74 E-) fuze will not be fired over friendly troops and installations at quadrant elevation of less than 400 mils (22.5°).

FUZE VT M93 (T1 52). Is intended for AA use only. It is used for engagement of low flying aircraft. It is a modification of the M92 (T74 E-) and provides for self-destruction after 14 seconds time of flight at 22.5° elevation. At 18° the switch is adjusted for 10 seconds time of flight. The minimum quadrant elevation in firing over friendly troops and installations is 200 mils.

FUZE VT M97 (T 80 series). Is intended for terrestrial fire. A centrifugal safety switch is used in place of the self-destruction switch. The T80 series through T80E11 have no impact element, models T80E12 and later have an impact element. Close approach to any terrain feature will cause an armed fuze to function. Passing within 10 yards of aircraft will cause the armed fuze to detonate the projectile. FA types of VT fuzes are not as sensitive as AA types and must "see the target for a longer period of time." A clearance of 50 yards is considered safe when firing over crests, clearances should be at least 100 yards to prevent fuzes from functioning over water. Approximately 75% of the fuzes will operate correctly, the remaining 25% may be either duds or may function at random at any point beyond the minimum arming range. Approximately 75% of the rounds will function correctly when fired from a 90mm gun tube with less than 1200 rounds; over 1200 rounds, a high per cent of malfunctions may be expected. Fuze VT M97 is used with several different calibre weapons and the above information is true only for 90mm guns.

Fuze VT M97 is used very effectively against troops, in the open, in foxholes, in light foliage and in small buildings of light materials. The use of VT fuze as compared to other type of fuzes is highly advantageous. The height of burst is no problem, no time setting is necessary and there is no time limitation to the fuze.

CARE, HANDLING, AND PRESERVATION. The fuzes function properly at temperatures between 0°F and 120°F and should not be used outside these temperature limits. Temporary exposure outside of the prescribed temperature limits will not permanently injure the fuzes. If the fuzed projectile is loaded into the chamber of a hot gun but

not fired before thirty seconds have elapsed, the fuze may cause either a random burst after arming or a dud, but safety characteristics will not be impaired. VT fuzes should not be unpacked until rounds are to be fired. If VT fuzes are unpacked and not fired they are still usable for period of one to six months, depending on the location. The number of malfunctions increases with the age of the fuzes.

Summary

THE types of shells and fuzes are constantly changing; therefore, the good artilleryman has to keep up to date on development. Current information may be obtained from latest edition T. M., F. M., Supply Bulletins, S. N. L., and firing tables. T. M. 9-1901 deals with marking, handling and storage of ammunition. T. M. 9-1900 deals with operation of shells and fuzes for all types of ammunition. Ord. 3 S. N. L. P-5 contains code and description of all types of 90mm ammunition and should be used in requisitioning ammunition. Firing table 90AA-B-3 and Graphical Firing Tables M42 may be used to obtain firing data for shell HE, M71 and shell WP M313. Firing tables 90-F-2 (ABR) contain firing data and sight picture for antitank ammunition.

TRAINING LITERATURE

By Major B. G. Oberlin

AAFCS T33, Skysweeper, Duster, and guided missile developments are receiving much attention at AA & GM Br, TAS. Much of this material carries a high classification.

FIELD MANUALS

FM 44-19, Examination for AA Artilleryman, and FM 44-57, Multiple Machine-Gun Mounts, have been approved and are being printed. Both will be ready for distribution in January 1952.

FM 44-1, Antiaircraft Artillery Employment, and FM 44-60, Service of the 40mm Gun and Associated Fire Control Equipment, are at OCAFF for review. Distribution is expected by spring or early summer.

FM 44-28, Service of AA Directors M9, M9A1, M9A2, and M10, is being rewritten at AA & GM Br, TAS. This manual will not be ready for distribution before late summer 1952.

SPECIAL TEXTS

ST 44-153, Service of the Fire Control System T33, Restricted, has been printed at AA & GM Br, TAS, and is being distributed. It has 220 pages with 97 illustrations of this new matériel. ST 44-152, Defense of AAA against Enemy Ground Attack, is in preparation. Distribution is planned for January 1952.

TECHNICAL MANUALS

TM 44-225, Orientation for Artillery, is at OCAFF for review and will be in distribution by April 1952. TM 20-300, Use of Radio Controlled Airplane Targets, and TM 44-234, AAA Service Practice, are being completed at AA & GM Br, TAS. Printing and distribution are expected by summer 1952.

TRAINING CIRCULARS

Training circulars on AAOC-AAAIS and Basic Tactical Principles for the Employment of Light Antiaircraft Artillery in Air Defense are at the Department of the Army printers. Both will be distributed by the first of the year.

Service of the Fire Control System T33 and Service of the 75mm Gun Mount T69 (Skysweeper) are both at OCAFF for review. Printing and distribution are expected early in 1952.

A training circular, Tactical Control and Employment of Skysweeper, is in preparation stages at AA & GM Br, TAS. Circulars on service of the AN/TPS-1D, the replacement AN/TTQ-1(AAOC), the Duster, the Stinger, and the improved 40mm gun have been started. All should be in distribution by summer 1952.

TRAINING FILMS

Two training films, Light AAA with the Infantry and Armored Division and Light AAA in close support of the Infantry, are being filmed at Fort Hood.

Scenarios for training films on AAOC, Skysweeper, and AAFCS T33 are in preparation.

BOOK DEPARTMENT CATALOG

A new catalog for the Book Department has been printed at AA & GM Br, TAS, and is in distribution. It lists manuscripts and lesson plans used in resident instruction for sale as individual items and in packets. Special texts, training aids, and supplies such as slide rules, protractors, stationery, and office needs are also listed.

HONOR ROLL

Original Honor Roll

88th AAA Airborne Bn
Lt. Col. R. B. Barry, Jr.
228th AAA Group
Col. D. W. Bethea, Jr., S. C.
107th AAA AW Bn (M)
Lt. Col. T. H. Pope, Jr., S. C.
305th AAA Group
Col. John S. Mayer, N. Y.

Separate Commands

Army AAA Command
Maj. Gen. W. W. Irvine
Third Army Training Center
Brig. Gen. C. H. Armstrong
East AAA Command
Maj. Gen. P. W. Rutledge
Central AAA Command
Col. D. J. Bailey
West AAA Command
Brig. Gen. R. W. Berry

Guided Missile Dept.

AA & GM School
Col. F. M. McGoldrick

Brigades

32nd AAA Brigade
Col. M. W. May, Jr.
35th AAA Brigade
Brig. Gen. Homer Case
40th AAA Brigade
Brig. Gen. James G. Devine
47th AAA Brigade
Col. G. C. Gibbs
103rd AAA Brigade
Brig. Gen. R. Y. Moore, Conn.
104th AAA Brigade
Brig. Gen. V. P. Cayne, Mass.
105th AAA Brigade
Brig. Gen. A. H. Doud, N. Y.
107th AAA Brigade
Brig. Gen. J. W. Squire, Va.
111th AAA Brigade
Brig. Gen. Chas. G. Sage, N. Mex.
112th AAA Brigade
Brig. Gen. J. W. Cook, Calif.

Groups

1st AAA Training Group
Col. E. W. Heathcote
2nd AAA Group
Col. C. G. Patterson
10th AAA Group
Col. W. H. Hennig
11th AAA Group
Col. W. B. Logan
16th AAA Group
Col. F. J. Woods
19th AAA Group
Col. H. P. Gard
97th AAA Group
Col. J. T. Wrean
200th AAA Group
Col. C. M. Woodbury, N. Mex.
204th AAA Group
Col. F. C. Grevemberg, La.
205th AAA Group
Maj. N. Cook, Adj., Wash.
207th AAA Group
Col. G. T. Stillman, N. Y.
208th AAA Group
Col. H. S. Ives, Conn.
209th AAA Group
Col. E. J. Welte, N. Y.
211th AAA Group
Col. G. F. Lineham, Jr., Mass.
214th AAA Group
Col. J. G. Johnson, Ga.
216th AAA Group
Col. W. E. Johnson, Minn.
218th AAA Group
Col. V. P. Lupinacci, Pa.
220th AAA Group
Col. R. H. Hopkins, Mass.
224th AAA Group
Col. E. W. Thompson, Va.
226th AAA Group
Col. John D. Sides, Ala.
227th AAA Group
Col. P. L. Wall, Fla.
251st AAA Group
Col. A. Long, Calif.
302nd AAA Group
Col. John M. Welch, Ohio
313th AAA Group
Col. A. F. Hoehle, Pa.
326th AAA Group
Col. M. D. Meyers, Pa.
374th AAA Group
Col. T. F. Mullaney, Jr., Illinois
515th AAA Group
Col. F. G. Rowell, N. Mex.

Battalions

3rd AAA AW Bn
Lt. Col. J. B. Goettl
3rd AAA Tng. Bn.
Lt. Col. E. E. Twining
4th AAA AW Bn (M)
Lt. Col. R. J. Connelly
9th AAA Gun Bn
Lt. Col. H. D. Johnson
15th AAA AW Bn (SP)
Lt. Col. F. A. Werner
21st AAA AW Bn (SP)
Lt. Col. Chas. E. Henry
22nd AAA AW Bn
Lt. Col. R. J. Jones
35th AAA Gun Bn.
Lt. Col. J. E. Burrows
39th AAA AW Bn (M)
Col. N. W. Baltzer
41st AAA Gun Bn
Lt. Col. W. A. Keyson
46th AAA AW Bn (SP)
Lt. Col. Wm. M. Vann
48th AAA AW Bn.
Lt. Col. O. K. Marshall
50th AAA AW Bn (SP)
Lt. Col. L. J. Lesperance
59th AAA AW Bn (SP)
Lt. Col. H. Von Kolnitz
60th AAA AW Bn
Lt. Col. R. T. Cassidy
62nd AAA AW Bn (SP)
Lt. Col. R. G. Finkenaur
63rd AAA Gun Bn
Lt. Col. B. I. Greenberg
64th AAA Gun Bn.
Lt. Col. R. A. Lanpher
65th AAA Gun Bn
Lt. Col. R. F. Moore
68th AAA Gun Bn
Lt. Col. R. C. Cheal
69th AAA Gun Bn (M)
Lt. Col. D. C. Sherrets
70th AAA Gun Bn
Lt. Col. K. R. Philbrick
71st AAA Gun Bn
Lt. Col. A. J. Montrone
75th AAA Gun Bn
Lt. Col. A. A. Koscielniak
78th AAA Gun Bn
Lt. Col. J. B. Parrott
79th AAA Gun Bn
Lt. Col. F. E. Pratt
80th AAA Airborne Bn
Lt. Col. L. W. Linderer
82nd AAA AW Bn
Maj. R. H. Johnston
95th AAA Gun Bn
Lt. Col. L. S. Daugherty
101st AAA Gun Bn
Maj. L. D. Collins, Ga.
102nd AAA Gun Bn
Lt. Col. M. H. Roesser, N. Y.
115th AAA Gun Bn.
Lt. Col. W. D. McCain, Miss.
120th AAA Gun Bn
Lt. Col. H. C. Gray, N. Mex.
126th AAA AW Bn
Lt. Col. R. C. Carrera, Mass.
127th AAA AW Bn (SP)
Lt. Col. H. G. White, N. Y.
142nd AAA AW Bn
Lt. Col. C. Beckman, N. Y.
146th AAA AW Bn.
Lt. Col. R. H. Franklin, Mich.
150th AAA Gun Bn
Lt. Col. L. O. Ellis, Jr., N. C.
238th AAA Gun Bn.
Maj. T. P. O'Keefe, Conn.
243rd AAA AW Bn.
Lt. Col. E. E. McMillan, R. I.
245th AAA Gun Bn
Lt. Col. C. M. Brown, N. Y.
250th AAA Gun Bn
Lt. Col. A. J. Twiggs, Ga.
260th AAA Gun Bn
Lt. Col. R. H. Stephens, D. C.
265th AAA Gun Bn
Maj. H. Botts, Fla.
337th AAA Gun Bn.
Lt. Col. J. W. Dry, Pa.
340th AAA Gun Bn
Lt. Col. G. V. Selwyn, D. C.
369th AAA Gun Bn.
Lt. Col. C. S. Heming, N. Y.
385th AAA AW Bn
Maj. D. K. Scott, Illinois
398th AAA AW Bn
Lt. Col. L. B. Dean
420th AAA Gun Bn.
Lt. Col. G. S. Green, Wash.
443rd AAA AW Bn (SP)
Lt. Col. J. F. Reagan
489th AAA AW Bn
Capt. J. E. Cornish, Illinois
502nd AAA Gun Bn
Lt. Col. P. G. Brown
507th AAA AW Bn
Lt. Col. S. J. Paciorek
518th AAA Gun Bn
Lt. Col. O. L. Greening
697th AAA AW Bn
Maj. W. C. Thompson, N. Mex.
698th AAA Gun Bn
Lt. Col. F. Monico, Illinois
705th AAA Gun Bn
Lt. Col. M. P. DiFusco, R. I.
707th AAA Gun Bn.
Lt. Col. F. Fulton, Jr., Pa.
708th AAA Gun Bn
Lt. Col. P. I. Getzinger, Pa.
709th AAA Gun Bn
Lt. Col. L. A. Long, Pa.
710th AAA Gun Bn.
Lt. Col. C. C. Berkeley, Va.
712th AAA Gun Bn
Lt. Col. H. H. Taylor, Jr., Fla.
713th AAA Gun Bn
Lt. Col. B. N. Singleton, S. C.
715th AAA Gun Bn
Maj. J. Y. Woodruff, N. Y.
716th AAA Gun Bn
Lt. Col. Joe R. Stewart, N. Mex.
717th AAA Gun Bn
Lt. Col. E. D. Pelzer, N. Mex.
718th AAA Gun Bn
Maj. M. D. Kert, Adj., Calif.
720th AAA Gun Bn.
Lt. Col. G. A. Duke, Calif.
726th AAA Gun Bn
Lt. Col. John T. Watson, N. Mex.
728th AAA Gun Bn.
Maj. G. C. Moore, Calif.
732nd AAA Gun Bn.
Maj. L. Neeley, Ore.
747th AAA Gun Bn
Lt. Col. J. F. Kane, Mass.
753rd AAA Gun Bn
Lt. Col. W. H. Nicolson
768th AAA Gun Bn
Lt. Col. T. H. Kuyper, Illinois
772nd AAA Gun Bn
Col. F. S. Grant, Mass.
773rd AAA Gun Bn
Lt. Col. G. F. Slavin
804th AAA AW Bn (M)
Maj. S. N. Caudill, N. Mex.
867th AAA AW Bn
Maj. S. M. Arnold

Operations Detachments

102nd AAA Opns. Det.
Capt. G. J. Lahey, N. Y.
105th AAA Opns. Det.
1st Lt. E. A. Sisson, N. Y.
177th AAA Opns. Det.
Maj. W. F. Hale, Va.
179th AAA Opns. Det.
Maj. R. S. Gruhn, Illinois
181st AAA Opns. Det.
Maj. R. H. Moser, N. Mex.
501st AAA Opns. Det.
Maj. E. F. DeLeon
503rd AAA Opns. Det.
Capt. R. R. Berger
507th AAA Opns. Det.
Capt. E. F. Bookter

JOURNAL HONOR ROLL CRITERIA

1. To qualify or to requalify for a listing on the Journal Honor Roll, units must submit the names of subscribers and a roster of officers assigned to the unit on date of application.
2. Battalions with 80% or more subscribers among the officers assigned to the unit are eligible for listing, provided that the unit consists of not less than twenty officers.
3. Brigades and groups with 90% or more subscribers among the officers assigned to the unit are eligible for listing, provided that the unit consists of not less than seven officers.
4. Units will remain on the Honor Roll for one year after qualification or requalification.

Moving Target Indicators

By Lt. Col. L. M. Orman

WOULDN'T it be wonderful if radar sets showed only moving targets? No more would the radar operator have to worry about losing a target in the ground clutter. No more would the enemy be able to take advantage of this weakness of radar and hedge-hop in, confident of the fact that his plane's pip would be lost in ground or sea-clutter.

Such a device is now possible. It will not be revealing any military secrets to say that our future radars will most likely be equipped with moving target indicators. Research in this field had passed the bread-board stage before the shooting had stopped in World War II and these devices were beginning to find their way into the field. Although these primary models were crude and did not completely do the job, an examination of the photographs in figures I and II will show that at least the germ of an excellent aid is present.

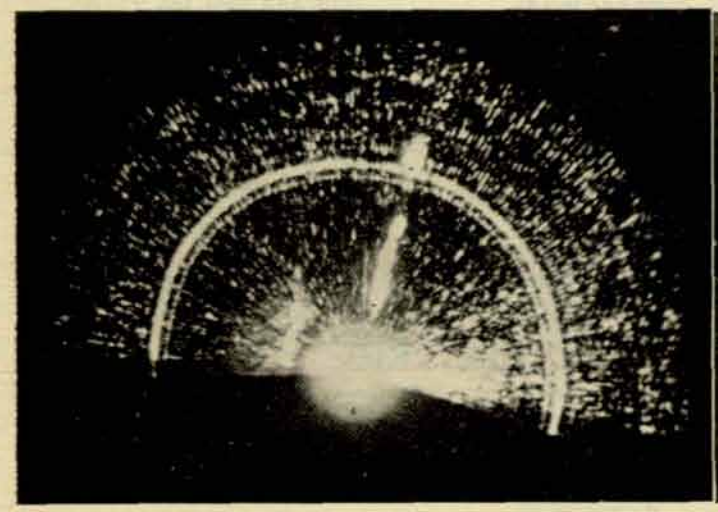
The Germans were early explorers in this field. When we began to jam their radar with strips of tinfoil they discerned that there was a characteristic of "window" which should assist in differentiating it from the real target. This characteristic is speed of movement. The tinfoil falls at the rate of about 8 miles per hour normally. Since a plane is traveling several hundred miles per hour then comparatively speaking the "window" (also called "chaff" among other things) is almost a fixed object when compared to the plane. Hence, a moving target indicator promises to be extremely useful against this sort of jamming.

We have then two extremely important applications of this device—*removal of the clutter from fixed objects* and a *defense against mechanical jamming.*

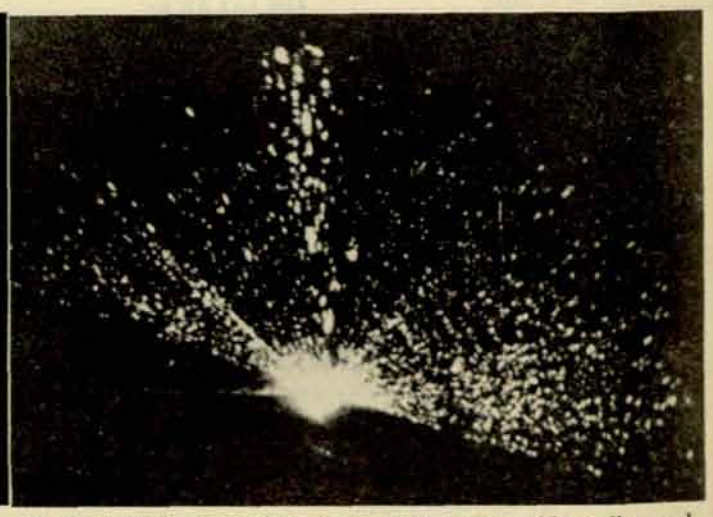
What difference exists between the echo signals from fixed targets and those from moving targets which can be used to favor the moving target return? We have already hinted at this in the discussion of the use of MTI against window. In general, fixed targets tend to give identical amounts of energy from successive pulses. Since a radar beam is not a homogeneous entity, and since the aspect of a moving target changes from pulse to pulse, some small difference in amplitude between two successive echoes can be expected. In addition, with conventional aircraft, modulation of echoes by propeller rotation can contribute to this effect.

However, the most direct way of solving this problem is by use of the *Doppler* principle. The basic difference between a fixed target and a moving target is that the latter moves and the former does not.

For the benefit of the reader whose knowledge of physics is rusty permit me to review the "Doppler Effect." The most readily apparent application of this effect is in the change of pitch of a train whistle as it approaches, then recedes in the distance. Consider the change in pitch as a change in frequency and we are now ready to apply this principle to our radar problem. The frequency of a transmitted pulse from a fixed echo will return unchanged. The frequency of the echo from a moving target will be changed. Provide a means for subtracting the frequency of the transmitted pulse from that of the returned echo. Since the frequency of the echo from the *fixed* target is *equal* to that of the transmitted pulse this *difference will be zero.* Since the frequency of the *moving* target is *different* from that of the transmitted pulse this *difference will be finite.* Feed the resulting difference to a suitable indicator and we have a moving target indicator system. The earliest attempts at such devices were this simple. An aural indicator was used.



Moving train is clearly resolved on scope as mercury delay line cancels out signals from the stationary targets.



Radar picks out moving autos on Worcester Turnpike and approaches to Boston. This is 5 mile sweep at 3,000 feet.

To keep from being too technical we shall treat both of these methods together from this point on. Actually, of course, different circuitry is required in the two systems up to a certain point. Let it suffice to say that whether we are talking about a *difference in amplitude* of the target echo or a *difference in "beats"* or frequency amplitude we can make both appear to be amplitude changes through the addition of certain components to the latter system.

Obviously, such an aural system as we have outlined has many drawbacks. A visual system would be vastly more desirable and easier to interpret. The easier step in this direction would be to display this information on an A-Scope. This can readily be done but is useful only when the antenna is stationary or moving slowly. What is desired then is a method for presenting this information on a PPI scope.

If then, one video pulse is delayed by exactly the interval between pulses and is subtracted from the next pulse, fixed targets can be cancelled while the moving targets leave a residual unbalance. Actually, instead of subtracting the first signal from the second, the second signal is inverted and added to the first. Or, to use the correct electrical term, it is added "out-of-phase" with the first.

At least two methods exist for obtaining the desired amount of delay. These are the *delay line* and the *storage tube*. Little has been published on the storage tube; hence, no further discussion will be made of it here. Attention will be confined to delay lines.

Circuits, such as IAGC,[1] STC, FTC, already exist which are useful in tackling the problem of sea clutter, and although they have some application to this problem their principles are entirely different and will not be discussed here.

To achieve the length of delay needed, it is necessary to convert the electrical energy into sonic energy. The sound waves then travel along the delay line until the appropriate delay has been achieved, whereupon the sound waves are then reconverted into electrical energy. The electrical energy is then compared with the signal through the nondelay portion of the circuit. The uncancelled targets are then applied to the indicator in the normal manner. Since sonic energy travels only about one-millionth as fast as electrical energy an appreciable delay can be achieved with a sonic line of a practical length.

In practice these sonic lines fall into two distinct categories—liquid and solid. Both have been used successfully. The liquid used most frequently is mercury, although there is no theoretical reason why almost any other liquid, even water, might not be used. Even a cursory consideration of the problem will show that water presents some problems not encountered when a substance like mercury is used. The principal ones that readily appear are leakage and expansion with temperature.

In many electrical circuit applications it is necessary to provide a means of delaying a signal. When such a delay is short or when the delay is long and the bandwidth is small, this may be accomplished by means of coil and condenser type networks. In cases where long delays are required, or more precisely, where the product of delay and bandwidth is great, the coil-condenser type of network becomes bulky and in some cases impractical.

These longer delays, accompanied by the wide bandwidth, may be obtained by making use of the relatively slow velocity of transmission of mechanical vibrations through liquids. In particular, it has been found that by operating at ultrasonic frequencies it is possible to convert an electrical pulse signal to a mechanical vibration through the liquid and convert this vibration back to an electrical signal without distortion. The signal will thus be delayed by the time of transmission through the liquid.

The essential parts of such a system are a suitable converter from electrical to mechanical vibrations, a medium which will couple to the converter and transmit the mechanical vibrations, and a receiver to change the mechanical vibrations back to an electrical signal.

Most of the present work on the long delay lines has been with the use of water and water solutions or mercury as the transmitting medium. Quartz crystals have been used as the electro mechanical converter. Other combinations are possible, such as the use of solids (*e.g.*, fused quartz) in the place of a liquid as the transmitting medium, and the use of synthetic crystals as converters. The main drawback to the synthetic is their lack of mechanical stability.

From the amount of delay required the distance necessary to transmit the signal may be determined for a particular medium. In the case of either water or mercury there is no essential difference as both have a velocity of nearly 1500 meters/second at 25°C. Thus, for a delay of 5000 micro-seconds the signal would have to travel a distance of nearly 24 feet. This fixes the length of the delay line.

There are several methods of obtaining the necessary 24 feet of transmitting path. It would be possible to have a large container in which the ultra-sonic beam would be reflected back and forth from the sides of the container or the mercury could be confined to channels or tubes of the required length. This latter method offers considerable advantage in construction as the use of mercury necessitates special care in handling. Stainless steel tubes and fittings provide adequate strength to avoid contamination of the mercury. Because of the weight of the mercury the diameter should be small. If too small a diameter is selected, satisfactory transmission over the required distance will not be possible. This is due largely to the nature of the ultra-sonic radiation from the crystal. It is similar to the radiation of a beam of light from an aperture in which the ratio of the diameter to the length is large and is subject to the same laws of diffraction and interference. At the frequencies ordinarily used the diameter of the crystal is large compared to a wavelength—*i.e.*, at 5 megacycles the wavelength in mercury is .0118 inch. Thus, a one-inch diameter crystal is 85 wavelengths across.

The distance the ultra-sonic radiation will travel as a narrow beam is directly proportional to the ratio of the crystal radiator to the wavelength. To obtain the maximum distance this ratio should be kept large. This may be done either by using a large diameter radiator or using a high frequency. It is not possible to use too high a frequency due to the excessive attenuation. Too large a diameter is not desirable because of the excessive weight. The use of a tube helps in this matter as the effect of the confining walls is to give an effectively greater diameter to the crystal. A tube having an inside diameter of one inch and operating at 6.5 MC has been used satisfactorily.

[1]IAGC—Instantaneous automatic gain control. STC—Sensitivity time constant. FTC—Fast time constant, primarily an anti-jamming filter.

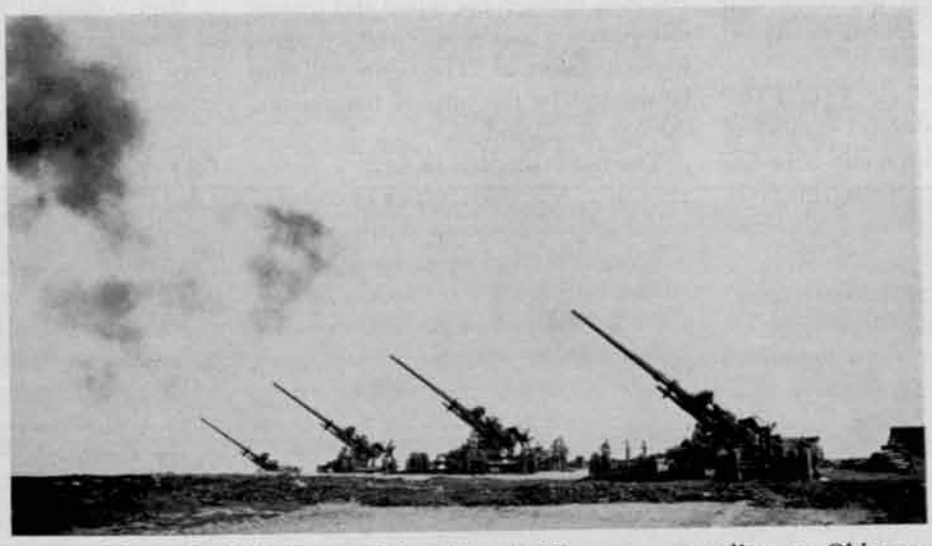
When transmitting from a medium of low velocity to one of higher velocity such as from mercury to steel, the ultrasonic beam will be completely reflected if the angle between the two media exceeds a certain critical angle. By using corner reflectors it is possible to fold the line any number of times without suffering any loss at the reflections. This is true providing the mercury has direct contact with the steel and is possible only if the surface is clean. In actual practice this is a difficult condition to maintain. A moderately rough finish on the steel will create an air film since the surface tension of the mercury will prevent the mercury from wetting the steel. This type of surface has the advantage of being free from trouble due to surface contamination.

The practical mechanical design must be determined. This involves size and shape as well as any other special requirement for operation, such as the accuracy to which the various parts are held. For a 24 foot long, one inch diameter pipe, it is necessary to hold the deviation from straightness to less than ¼ inch. If too few reflectors are used the line would be difficult to handle because of its length A six foot line requires three 90° reflectors to obtain a 24 foot length. The line must be completely air-tight and provided with bellows to allow for the expansion and contraction of the mercury due to temperature changes.

The author collaborated with Capt. L. G. Callahan, Jr., on a thesis for a Master of Science degree at the University of Pennsylvania on the subject, "A Barium Titanate Delay Line." This ceramic seems to offer possibilities and advantages as a delay line. When the material is pre-polarized by being subjected to a strong d-c field it retains this polarization even after the d-c field is removed. This phenomenon is similar to the magnetization of certain metals. This material has the advantages of being easy to work, may be molded into many diffeernt shapes, may be polarized in any desired direction, has a large electromechanical coupling factor, and is quite stable in its properties at ordinary temperature.

The principal advantage of barium titanate as a delay line is the fact that it is not necessary to use quartz crystals to convert the electrical energy to mechanical energy and vice versa, as was the case with the mercury line discussed above. Or to put it in other words, a mechanical wave can be induced to travel down a piece of barium titanate upon application of an electric field across the specimen providing the sample has been polarized under the electrodes. A line made from this material would be much smaller and weigh only a fraction of a mercury line giving the same time delay.

Now that we have taken care of fixed echoes and clutter, let's hope the scientists and engineers can find a way to blank out echoes from all friendly planes. Then the only pips appearing on our scopes will be enemy targets. Oh well, we can dream, can't we?



Guns of the 97th AAA Group, Colonel Joy T. Wrean, commanding, on Okinawa.

The Wild Ride Of John H. Wisdom

By Jerome Kearful

WHO has not heard of the midnight ride of Paul Revere? Yet few today know that some three-quarters of a century after Revere an Alabama rural mail carrier rode seventy wild miles to carry a warning that "The Yankees Are Coming!"

Postman John H. Wisdom was not on the winning side in the Civil War. Nor did he have the poet Longfellow to celebrate his exploit. The record of his wild midnight ride has long remained between the covers of dusty local histories. This is what happened.

On May 2, 1863, Wisdom returned from his rural mail routes to find that Federal soldiers had taken over his home town of Gadsden, Alabama, while he was delivering letters. Not only that, the Yankees had sunk his own private ferryboat that he used to transport himself, horse and buggy across the river into town.

The Federals did not tarry long in Gadsden, since the fabulous Nathan Bedford Forrest and his Confederate cavalry were on their trail. Calling across the river, a neighbor told Wisdom that they were headed for Rome, Georgia, to burn and destroy Confederate stores and property.

Quickly making up his mind, the intrepid letter carrier called back, asking his neighbor to tell his family that he was off to Rome. John H. Wisdom now became a man consumed by one aim: to cover the sixty-eight miles to Rome as quickly as possible and deliver his message, "The Yankees Are Coming!"

Wheeling his horse and buggy, Wisdom started off on his wild ride. Although the animal had been driven all day on the mail routes, the Confederate Paul Revere reached the town of Gnatville, twenty-two miles from Gadsden, in record time. The widow Nancy Hanks lived at this crossroads village. To replace Wisdom's exhausted horse, she gave her only pony, lame though it was.

The lame pony carried Wisdom five miles to the town of Goshen. Here he sought out farmer Simpson Johnson and begged a horse. Johnson hastily saddled two animals, one for Wisdom and one for Johnson's son, so that both horses could be brought back to the farm after Wisdom's next change of mounts. The forty-three-year-old postman and the farmer boy galloped off into the night!

Riding headlong through the darkness, Wisdom and young Johnson soon covered the eleven miles to Spring Valley. Here the Alabama mail carrier applied to parson Joel Weems for a new mount. Parson Weems supplied him with the animal that carried him across the state line into Georgia. John H. Wisdom was nearing his objective, and he spared neither himself nor his horses to hasten his arrival in Rome with the warning, "The Yankees Are Coming!"

He again changed horses at the home of John Baker, near Cave Spring, Georgia. Now he was only fifteen miles from Rome. The Confederate messenger was making such good time that he felt sure he would arrive well ahead of the Federal raiders.

Wisdom was still astride the horse that he had obtained from Baker when misfortune nearly ended his wild ride. Galloping full tilt down a long hill, the animal stumbled. Horse and rider came tumbling to earth. But Wisdom rolled clear, and his mount regained its feet uninjured. Wisdom climbed back into the saddle and was off again with scarcely a pause.

Six miles from Rome, the Southern Revere changed to his last mount. Riding hard, he entered the outskirts of the Georgia town at four minutes before midnight.

Wisdom rode at once to the Etowah House, Rome's principal hotel. Here, he and G. S. Black, the owner, hastily laid plans for rousing the people. Soon their warning was echoing through the streets.

"The Yankees Are Coming! The Yankees Are Coming!"

The excitement was tremendous. Old men and boys began toting bales of cotton to the bridge to form a barricade. Convalescent Confederate soldiers from the Rome Hospital hastily formed a rudimentary military organization to offer what resistance they could. Town authorities passed out squirrel rifles and old shotguns to those able to bear arms. Two ancient cannon were brought up and pressed into duty. In the homes of Rome, women and children comforted one another against the fear of the Yankees. Come what might, Rome was prepared!

Soon after sunrise on the morning of May 3, advanced detachments of Federal troops came into view of Rome. Colonel Abel D. Streight, commander of the raiders, had sent them ahead to seize the bridge leading into the town. Their mission was to hold the bridge until the main body of 1,500 Federal cavalry and mounted infantry should arrive and use it as a passage into Rome.

When Streight's advanced detachments found that Rome had not been surprised as they had hoped, they withheld their attack against the bridge in order to discover, if they could, the strength of the defenses. Questioned, an old Negro woman declared that the town was "full of sojers!" After reconnoitering, a courier was sent to Colonel Streight with the report that the defenses of Rome were "indeed quite formidable."

In the meanwhile, Streight's command had been pursued so unrelentingly by the redoubtable Forrest that men and animals were dropping from utter exhaustion. Men were even falling asleep under fire. Colonel Streight had expressed the opinion that their only hope lay in crossing the bridge into Rome and burning it behind them. Now, because a rural mail carrier had beaten them to Rome by six hours, that course of action was prevented.

In this situation, General Forrest and four hundred Confederates overtook the Union force. Under a flag of truce, the Confederate commander demanded the surrender of the Federals. Streight and Forrest met to parley. By deception, Forrest convinced Streight that he had a much larger force than was so. Confederate troops and guns passed in and out

of clumps of trees, over and around hills. Officers appeared asking Forrest for orders for the disposition of nonexistent units.

Streight surrendered.

When the Federal commander later found that his own men had outnumbered Forrest's by at least three to one, he tried to kill himself. After the war, he said that one man was responsible for his surrender to Forrest at Rome.

That man was John H. Wisdom, rural letter carrier! By warning the people of Rome, he made possible the barricading of the bridge and thus laid the trap that was sprung a few hours later when Nathan Bedford Forrest caught up with Streight's raiders.

The Federal prisoners were brought into Rome between three and four o'clock in the afternoon of May 3. In high spirits, the local newspaper reported that "The Yankees have finally arrived in Rome!"

The grateful Georgia town presented Wisdom with a set of silver and $400 in Confederate money. To the Widow Hanks, in recognition of her lending her lame pony, $400 was also sent.

John H. Wisdom died in Gadsden, July 28, 1909, at the age of eighty-nine. A substantial and respected member of the community, he had still carefully preserved the set of silver that was the reminder of his wild ride that night of May 2, 1863!

ARTILLERY ORDERS

DA Special Orders Covering September 1, 1951 through October 31, 1951. Promotions and Demotions not included.

MAJOR GENERAL

Frederick, Robert T., to Med. Holding Det., Walter Reed AH., Wash, DC.

COLONELS

Connor, William M., to Office Sec of Def 8475th AAU, Wash, DC.
Dunn, Charles G., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Grinder, Richard H., to AFF Bd No 2, Ft Knox, Ky.
Hamilton, John M., to ARWAF Det 8658th AAU, Air Univ, Maxwell AFB, Ala.
Liwski, Francis A., to 35th AAA Brig, Ft Meade, Md.
McDaniel, Otto L., to Hq Fourth Army, Ft Sam Houston, Tex.
Pape, Robin B., to 80th AAA Gp, Ft Totten, NY.
Skidmore, Wilbur M., to AAFES 8655th AAU w/sta New York
Staub, Leslie J., to Hq Army AA Comd 8577th AAU, Ent AFB, Colo.
Wilkins, Frank F., to AFF Bd No 1, Ft Bragg, NC.

LIEUTENANT COLONELS

Behnken, Benjamin T., to Office Chief AFF, Ft Monroe, Va.
Harwood, Dewey S., to 459th AAA AW Bn, Cp Edwards, Mass.
Hirsch, Allan S., to Hq Army AA Comd 8577th AAU Ent AFB, Colo.
Kopcsak, Arpad A., to AFF Bd No 4, Ft Bliss, Tex.
Miller, Charles A., to US Army Pacific, Ft Shafter, TH.
Raleigh, Robert C., to Army Sec Joint Air Def Bd, 8681 st AAU Ent AFB, Colo.
Reddington, C., to Office Chief AFF, Ft Monroe, Va.
Starnes, James V., to Office Chief AFF 8575th AAU, Lawson AFB, Ga.
Stewart, Charles W., to Hq Western Army AA Cmd 8577th AAU, 34th Air Div, Albuquerque, N Mex.

MAJORS

Baker, James W., to Third Army ASU, Cp Stewart, Ga.
Barrett, Sidney., to 707th AAA Gun Bn, Ft Dix, NJ.
Hiles, John C., to Sixth A 6516th ASU Wash NG Instr Gp, Cp Murray, Tacoma, Wash.
McCallum, Herman D., to 709th AAA Gun Bn, Ft Sheridan, Ill.
Petersky, John J., to Hq East Army AA Cmd 8577th AAU, Cp Stewart, Ga.
Selby, Thomas E., to Stu Det AA and GM Br Arty Sch, Ft Bliss, Tex.
Sukiennik, Stazy J., to 35th AAA Brig, Ft Meade, Md.

CAPTAINS

Adams, Louis E., to 5th AAA Gp, North Richland, Wash.
Altman, Joseph C., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Boone, Daniel L., to 31st AAA Brig Hq and Hq Btry, Ft Lewis, Wash.
Carpenter, Charles W., to 47th AAA Brig, Cp Stewart, Ga.
Clarkson, Richard L., to OAC of S G4 8535th AAU, Wash, DC.
Clayton, William V., Jr., to 16th AAA Gp, Ft Hancock, NJ.
Daboy, Antony., to 350th AAA Gp, Ft Lewis, Wash.
Eickhoff, David L., to 746th AAA Gun Bn, Ft Baker, Calif.
Fanning, Leonard B., to 2053d ASU RC, Ft Meade, Md.
Johnson, Raymond G., to 250th AAA Gp, Ft Baker, Calif.
Jones, Clyde S., to 715th AAA Gun Bn, Ft Totten, NJ.
Kee, Pat M., to 209th AAA Gp, Indiantown Gap, Pa.
Kennaman, Jack R., to 501st AAA Gun Bn, North Richland, Wash.
Sarmiento, Ignacio M., to 466th AAA AW Bn, San Francisco, Calif.
Toomaw, Dellie W., to 709th AAA Gun Bn, Ft Sheridan, Ill.
Waddey, Charles M., to Stu Det AA and GM Cen, Ft Bliss, Tex.
Wieringa, John S., Jr., to 3d AAA Gp, Cp Stewart, Ga.

FIRST LIEUTENANTS

Blocker, Stanton, Jr., to 369th AAA Gun Bn, Cp Edwards, Mass.
Buck, Ralph W., to 745th AAA Gun Bn, Ft Devens, Mass.
Higgs, Arden J., to 47th AAA Brig, Cp Stewart, Ga.
McDonald, William C., to 745th AAA Gun Bn, Ft Devens, Mass.
McGaughey, Kenneth E., to 101st AAA Gun Bn, Cp McCoy, Wisc.
Miller, Richard F., to 80th AAA Gp, Ft Totten, NY.
Myers, Ralph L., to 519th AAA Gun Bn, North Richland, Wash.
Nagata, George M., to Stu Det AA and GM Cen, Ft Bliss, Tex.
Nevling, Clayton T., to Hq Western AA Comd 8577th AAU, Hamilton AFB, Calif.
Parker, Raymond R., to 47th AAA Brig, Cp Stewart, Ga.
Rovis, Del P., to 16th AAA Gp, Ft Hancock, NJ.
Simmons, Joseph F., to 186th AAA Opns Det, San Francisco, Calif.
Smith, James P., to 8th AAA Bn, Cp Lucas, Mich.
Smith, Robert W., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Tittle, James I., to Stu Det AA and GM Br Arty Sch, Ft Bliss, Tex.
Tussing, Roy L., to 36th Gun Bn, Ft Bragg, NC.

SECOND LIEUTENANTS

Bowers, Emmett W., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Compston, James R., to 398th AAA Gun Bn, Cp Edwards, Mass.
Frawley, James R., Jr., to 709th AAA Gun Bn, Ft Sheridan, Ill.
Jackson, Clarence A., Jr., to 35th AAA Gun Bn, Cp Stewart, Ga.
McIntee, Francis P., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Mead, David., to 746th AAA Gun Bn, Ft Lewis, Wash.
Merrill, William K., to 519th AAA Gun Bn, North Richland, Wash.
Metzker, Jeff J., to 519th AAA Gun Bn, North Richland, Wash.
Pratt, Sanders., to 770th AAA Gun Bn, Ft Lewis, Wash.
Salona, William E., to 459th AAA AW Bn, Cp Edwards, Mass.
Seiber, Woodford S., to 28th AAA Gun Bn, Ft Lewis, Wash.
Solda, Arthur W., to 245th AAA Gun Bn, Ft Hancock, NJ.
Tanzola, Vincent J., Jr., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Von Gemmingen Felix., to 16th AAA Gp, Ft Hancock, NJ.
Wise, Robert M., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.

News and Comment

To Our Subscribers

As we come to the close of a successful year it is fitting to express our appreciation of the magnificent support given to the JOURNAL by the officers and men of the Antiaircraft Artillery.

Foremost we refer to the contributions by Major General Marquat, Colonels Hennig, Hain, and O'Malley, Lt. Colonels Killilae, Ackert, Stewart, Cheal and Henry, and the many other writers who have given us the story of the superb action of the AAA troops in Korea. With their stirring stories they have promoted the *esprit* of those troops and placed in clear focus the purpose of AAA training everywhere. They have given tone to the pages of this JOURNAL.

We mention, too, our contributors throughout the service. In our effort to promote interest, thought, discussion, and progressive action we rely almost completely upon our members for the articles to publish, and prod them about it, too. They have delivered.

And certainly we shall refer to our enthusiastic members who support us loyally year after year, and who have also gone out to bring us some three thousand of their friends as new members. They give us a base for operations, pay the freight, and make the JOURNAL possible.

We can look forward with bright prospects.

Let us extend to you a Merry Christmas and a Happy New Year.

Retirements

Colonel Kenyon P. Flagg, 30 September after 34 years' service. Colonel and Mrs. Flagg are making their home at 255 Matanzas Blvd., St. Augustine, Florida.

Colonel Harold A. Brusher, 30 September for physical disability. His home address is 391 Balfour Ave., Oakland, California.

AAA Units Cited

The following AAA units have been cited for extraordinary heroism or outstanding performance of duty in combat in Korea and awarded the Distinguished Unit Citation for the periods indicated.

Battery B, 82nd AAA AW Bn (SP) 13-15 February 1951.

1st Platoon, Battery A, 25th AAA AW Bn (SP) 1-4 September 1950.

3rd Platoon, Battery A, 25th AAA AW Bn (SP) 25-27 January 1951.

Battery B, 21st AAA AW Bn, March 1951.

Sixth Army ROTC Poll

Congratulations to Colonel William C. McFadden, PMS&T, Utah State Agricultural College and the AAA instructors at that institution.

In a recent informal poll of ROTC students in the Sixth Army an evaluation was made of the effectiveness of Military instruction as compared with other college instruction. We note that the AAA unit at Utah State took first position among all of the ROTC units.

AAA OCS At Bliss

The Officer Candidate School for the Antiaircraft Artillery opened on 15 November at the AA and GM Branch, TAS, Fort Bliss, Texas. Most of the candidates will be selected from the warrant officers and enlisted men of the Antiaircraft Artillery.

Col. Robert H. Krueger, formerly coordinator of instruction in the School, will head the OCS, which will have a yearly quota of 2500 students.

Korea Citation For 50th AAA

The 50th AAA AW Battalion (SP), Lt. Col. L. J. Lesperance commanding, was awarded the Republic of Korea Presidential Unit Citation in August for its operations with the X Corps in the Inchon Landings in September, 1950 and the Hungnam operations and evacuation, October to December, 1950.

Colonel Charles S. O'Malley, now Chief of Staff of the 24th Division, commanded the battalion during the Inchon and Hungnam operations.

TO THE EDITOR:

It gives me a great deal of pleasure to be able to report that the 4th AAA Battalion is again one hundred per cent

BOOKS TO GET AHEAD ON

These military books are best sellers today. Thousands of officers and men—old-timers and those returning to active duty—are building their military libraries with these up-to-date editions. Some buy a book a month; others a book every quarter.

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subscribed to the AAA JOURNAL.

In the opinion of the officers of the battalion, the AAA JOURNAL has greatly improved during the past year. We have particularly enjoyed, from a point of view of educational value, as well as interest, the fine articles from the Korean battlefront. I feel the antiaircraft has done a magnificent job in Korea.

I noted with particular interest the story in reference to the award of the Distinguished Service Cross to Sgt. Jack R. Hiday, Battery D, 15th AAA AW Battalion (SP). As a result, we have developed, and are now testing, a new type of ammunition chest for the M55 machine gun, a counterpart of the gun mounted in the M16 half track. This new type chest can be reloaded and replaced on the mount in seven to eight seconds where the present dome type chest cannot be reloaded and replaced in less than sixty seconds even by an experienced crew. But more of this later through Army Field Forces Board No. 4.

Here, too, are some complaints that some have not received their copies. Get that straightened out. * * * *

Regardless of small gripes we feel that you're doing a grand job.

RAYMOND J. CONELLY
Lt Colonel 4th AAA AW Battalion
APO 179, N. Y. C.

That was indeed a charitable complaint. We get some much more pointed, and we appreciate all of them as they usually serve to get the address correct and the service improved.—ED.

TO THE EDITOR:

This letter is my request that you send the editors of *Reader's Digest* magazine permission to reprint the article on Military Justice appearing on page 7 of your September-October issue. Or perhaps you have already done so. I am mailing my copy of the AA JOURNAL to them for this purpose.

The *Reader's Digest* article so incensed me that I wrote them a long letter refuting Mr. Keeffe, but did not send it as a manuscript because it was too vehement to print anyway. I appreciate Col. Hatch's article and applaud your prompt publication of it.

JOHN R. SEWARD
Col., G.S.C. (Arty).

APO 958
San Francisco, Calif.

BALLOT

UNITED STATES ANTIAIRCRAFT ASSOCIATION

The Vice-President and four members of the Executive Council are to be elected on this ballot, to replace officers whose terms of office expire December 31, 1951.

Please record your vote by making an "X" in the appropriate square or indicate your choice by writing the name of your candidate. Ballots received with signatures, but with no individual votes recorded, will be considered proxies for the President of the Association.

Each candidate was considered in connection with the geographic location of his residence. The Constitution of the Association requires that at least five members of the Council reside in the Washington area, and that at least three of them be on active duty, in order to facilitate the transaction of business.

Ballots received after December 31, 1951, cannot be counted.

Use the ballot below or prepare one to indicate clearly your vote. Mail to the ANTIAIRCRAFT JOURNAL, 631 Pennsylvania Avenue, N.W., Washington 4, D. C.

FOR VICE-PRESIDENT

☐ Major General Willard W. Irvine, Commanding General, Army Antiaircraft Command.

☐ _____

FOR MEMBERS OF THE EXECUTIVE COUNCIL (Vote for four)

☐ Brigadier General Robert W. Crichlow, Jr., Army Secretary, Research and Development Board, Department of Defense.

☐ Colonel Norman E. Hartman, Chief, AA Section, Artillery Branch, Career Management Division, AGO, Department of the Army.

☐ Lt. Colonel Francis X. Bradley, Assistant Secretary of the General Staff, Office of the Chief of Staff, Department of the Army.

☐ Major James E. Calkins, Assistant G1, 8600 ASU, Department of the Army.

☐ _____

☐ _____

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Rank & Organization_____

Address_____

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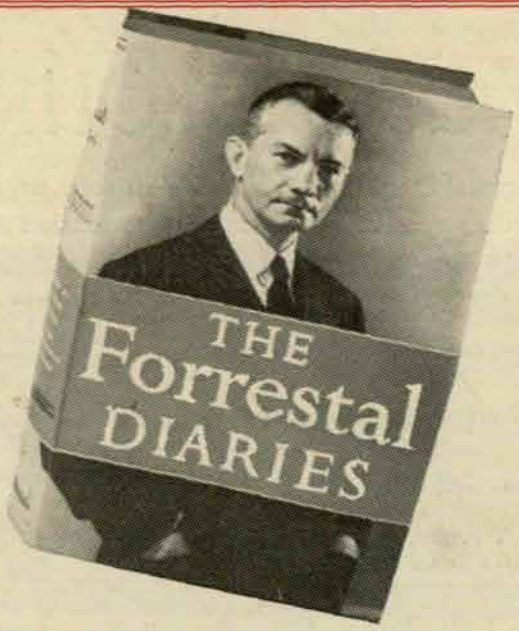

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