Chapter 9

Artillery Weapons and Munitions

9001. Introduction

This appendix provides information on artillery weapons and ammunition. For detailed information, see technical manuals.

9002. Selected Characteristics of Artillery Weapons

WEAPON	XM777	M198	M109A3/A4	M109A5/A6	CRUSADER
WEIGHT (lbs)	9000	16000	53940	64000 lded	
TIME TO EMPLACE (min)	3 or less	4	0.5	0	
TRANSPORT CAPABILITY					
Ground	MTVR, 5-ton	5-ton	SP		
Helo	V-22, CH53E, CH53D	CH53E	No		
Fixed-Wing Transport	All	All	C-5A		
MAXIMUM RATE OF FIRE Per tube (rounds per minute)	5-8	4	4		
SUSTAINED RATE OF FIRE Per tube (rounds per minute)	2*	2*	1	4	
HIGH EXPLOSIVE				1	
Effective casualty radius (1 round)	50m	50m	50m	50m	
Weight of proj. (fuzed) (lbs)	95***	95***	95***	95***	
TRAVERSE (mils)	6400**	6400**	6400	6400	
MAXIMUM SPEED (mph)					
Towing - cross country	NLT 24 kph	5	----		
Towing - secondary roads	NLT 56 kph	25-30	----		
Towing - improved roads	NLT 88 kph	45	----		
SP speed	----	----	35	38	
CRUISING RANGE (miles)	----	----	220	185	

* Two rounds per minute or as determined by thermal warning device.

** 6400 traverse using speed shift; 400 left/right without speed shift.

*** 95 lbs for M107 Family; 103 lbs for M483 Family; 138 lbs for Copperhead.

NOTE: Fuze DODAC = 1390 plus DODIC number as shown below.

TYPE	CURRENT	DODIC	REPLACEMENT	DODIC	FUTURE
CP delay	M78A1	N330	None	---	Mk 300 Mod 1
nondelay	M78A1	N331	None	---	DODIC 659
PD SQ/D	M557	N335	M739	N340	MOFA
SQ/D	M572	N331	M739	N340	MOFA
MT	M565	N248	M577[1]	N285	M762
MTSQ	M564	N278	M582[1]	N286	M767, MOFA
VT	M728	N463	M732	N464	MOFA

[1] M577 and M582 can be set for either MT or SQ action. There is not a PD backup on these fuzes.

(M198/M109A5/A6)

		PROPELLING CHARGES (See 155mm Propelling Charges)					
PROJECTILES	DODAC	M3 SERIES	M4 SERIES	M119 SERIES	M203	MAXIMUM RANGE	FUZE ACTIONS
M107 HE	1320-D544	Yes, but not zone 1	Yes	Yes	No	18,100	CP,PD, MTSQ, VT
M549A1 RAP	1320-D579	No	Yes, but zone 7 only	Yes, but not M119	Yes	30,000	PD
M449A1 ICM	1320-D562	Yes, but not zone 1	Yes	Yes	No	18,100	MT
M485 Illum	1320-D505	Yes, but not zone 1	Yes	Yes, but degraded reliability	No	18,100	MT
M483A1 DPICM	1320-D563	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M864 BB DPICM	1320-D864	No	Yes	Yes	Yes	28,180 (M198) 27,740 (M109A5/A6)	MTSQ M577
M692 ADAM-L	1320-D501	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M731 ADAM-S	1320-D502	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M116A1 HC	1320-D506	Yes, but not zone 1	Yes	Yes	No	18,100	MT
M110A1 WP	1320-D550	Yes, but not zone 1	Yes	Yes	No	18,100	PD,MTSQ
M795 HE	1320-D529	Yes, but not zone 1 or 2	Yes	Yes	Yes	22,500	PD,MTSQ (M732 VT only)
M825 smoke[1]	1320-D528	Yes, but not zone 1 or 2	Yes	Yes	No	18,100	MT
M718 RAAMS-L	1320-D503	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M741 RAAMS-S	1320-D509	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M712 Copperhead	1320-D510	Yes, but no requirement for zones 1 through 3	Yes	Yes	No	16,400	BD (comes already installed)
M804 practice	1320-D513	Yes, but not zone 1	Yes	Yes	No	18,100	PD,MTSQ, VT M732 only)

[1] Only M825A1 is authorized to be fired with M203/203A1. The USMC has not procured this munition.

(M109A2/A3/A4)

	PROPELLING CHARGES (See 155mm Propelling Charges)						
PROJECTILES	**DODAC**	**M3 SERIES**	**M4 SERIES**	**M119 SERIES**	**M203**	**MAXIMUM RANGE**	**FUZE ACTIONS**
M107 HE	1320-D544	Yes, but not zone 1	Yes	Yes	No	18,100	CP,PD, MTSQ, VT
M549A1 RAP	1320-D579	No	Yes, but zone 7 only	Yes, but not M119	Yes	23,500	PD
M449A1 ICM	1320-D562	Yes, but not zone 1	Yes	Yes	No	18,100	MT
M485 Illum	1320-D505	Yes, but not zone 1	Yes	Yes, but degraded reliability	No	17,500	MT
M483A1 DPICM	1320-D563	Yes, but not zone 1 or 2	Yes	Yes	No	17,500	MT
M864 BB DPICM	1320-D864	No	Yes	Yes	Yes	22,000	MTSQ M577
M692 ADAM-L	1320-D501	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M731 ADAM-S	1320-D502	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M116A1 HC	1320-D506	Yes, but not zone 1	Yes	Yes	No	18,100	MT
M110A1 WP	1320-D550	Yes, but not zone 1	Yes	Yes	No	18,100	PD,MTSQ
M795 HE	1320-D529	Yes, but not zone 1 or 2	Yes	Yes	Yes	22,500	PD,MTSQ (M732 VT only)
M825 smoke[1]	1320-D528	Yes, but not zone 1 or 2	Yes	Yes	No	17,500	MT
M718 RAAMS-L	1320-D503	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M741 RAAMS-S	1320-D509	Yes, but not zone 1 or 2	Yes	Yes	No	17,740	MT
M712 Copperhead	1320-D510	Yes, but no requirement for zones 1 through 3	Yes	Yes	No	16,400	BD (comes already installed)
M804 practice	1320-D513	Yes, but not zone 1	Yes	Yes	No	18,100	PD,MTSQ, VT M732 only)

[1] Only M825A1 is authorized to be fired with M203/203A1. The USMC has not procured this munition.

9003. Ammunition

a. Separate-Loading. Separate-loading ammunition is issued as four separate components: primer, propellant, projectile, and fuze. The components are unpacked, prepared for firing, and loaded into the weapon in three portions. The first portion consists of the projectile with fuze, the second portion consists of the propellant, and the third portion consists of the primer. Propellants are of three types: green bag, white bag, and red bag.

b. 155mm Shell-Fuze Combinations

(1) High Explosive Shell, Point Detonating Fuze (HE,Q). HE Q is a bursting-type projectile filled with TNT or composition B. It produces fragmentation and blast over a wide area on impact. Optimum effectiveness is gained by using the lowest charge without causing excessive dispersion. M557 fuzes are subject to premature detonation by heavy rain or hail. This shell-fuze combination is effective against standing personnel, personnel prone on ground, unarmored vehicles, and light material. It is particularly effective in high angle fire. Effectiveness is reduced on personnel dug in, on uneven ground, and against buildings or earthworks. Some detonation will occur when fired in trees. *HE Projectile Nomenclature*: M107. *Fuze Q Nomenclature:* M557 and M739.

(2) High Explosive Shell, Delay Fuze (HE Delay). HE delay is a function obtained by rotating a set screw on the point detonating fuze to cause a .05 second delay in detonation after impact. This shell-fuze combination is used for penetration of overhead cover or to obtain airburst by ricochet. Use the highest practicable charge for ricochet effect. HE delay is effective against unarmored vehicles, earth and log fortifications and some masonry and concrete targets, personnel in light frame structures, lightly covered emplacements, and dense woods. It is not effective against heavy masonry or concrete.

(3) **High Explosive Shell, Proximity Fuze (HE, VT)**. HE VT has a radio-activated fuze which functions when it receives the reflection of a self-transmitted radio signal. The fuze has a nonadjustable height of burst of 7 meters above the target. A wet or marshy target area will increase the height of burst. The greater the angle of fall, the closer the burst will be to the ground. When the target is close to friendly troops, the lowest practicable charge should be used to obtain a large angle of fall. HE VT is useful in situations where an airburst is desired without the need to adjust the height of burst. It is particularly useful when engaging long-range targets, at night, and for high angle fire. Light foliage has little effect on the VT fuze, but heavy foliage will cause detonation. *VT Fuze Nomenclature*: M728 and M732.

(4) High Explosive Shell, Mechanical Time Superquick Fuze (HE, MTSQ). HE MT contains a graduated time mechanism set prior to firing to activate at a predetermined time interval. The height of burst is normally set to activate 20 meters above the target, or on impact. However, the height of burst usually requires adjustment. Use the highest practicable charge to minimize the height of burst error. M564 fuzes are subject to premature detonation by heavy rain or hail. HE MT is effective against exposed personnel or personnel in

uncovered trenches or fighting positions. It is unreliable in high angle fire because of a large PE/HOB. *MTSQ Fuze Nomenclature*: M564, M577, and M582.

(5) High Explosive Shell, Concrete Piercing Fuze (CP). The CP fuze is of special, heavy metal construction for use against concrete targets. These fuzes come in two types: nondelay to clear away rubble and shatter effects and a delay type (0.025 seconds) for penetration followed by fragmentation and blast to be used in fire for effect. This shell fuze combination should not be used in area neutralization fire. *CP Fuze Nomenclature*: M78 Series.

(6) White Phosphorus (WP) Shell. This is a burster type projectile filled with WP. On detonation, WP is expelled over a limited area. This projectile is most often fuzed with the point detonating fuze (M557 or M739). However, it can be fuzed with a mechanical time (MT) fuze (M564 or M582) to produce an airburst. WP is used for marking, screening, obscuring, and incendiary effects. It is useful against vehicles, POL storage areas, etc. *WP Projectile Nomenclature*: M110 Series.

(7) Smoke Shells. Shell smoke is an expelling charge type projectile which contains canisters filled with a pyrotechnic smoke mixture (hexachloroethane-zinc) (M116). When a MT fuze (M565, or M577) activates, these canisters are expelled from the rear of the projectile, producing smoke for 60 to 90 seconds. The projectile usually requires adjustment. The smoke has more screening effect than WP but has a longer buildup time. The HC smoke projectile is being replaced with the M825 improved smoke round. The M825 uses felt wedges impregnated with WP to facilitate rapid dissemination and provides five to ten minutes of smoke. A MT fuze activates a charge causing base ejection and ignition of the WP felt-pad wedges in a large area. Unburned WP can cause a hazard to friendly forces; therefore caution must be exercised when operating in these areas. *Smoke Projectile Nomenclature*: M116 Series and M825.

(8) Illuminating Shell (illum). Shell illum is an expelling charge-type projectile which contains an illuminant canister and parachute assembly. On activation of a MT fuze (M565, M577), the canister/parachute assembly is expelled from the base of the projectile, and the illuminant suspends from the parachute providing 1,000,000 candle power of battlefield illumination. *Illuminating Shell Nomenclature*: M485.

(9) Improved Conventional Munitions. This is an expelling charge-type projectile that contains submumitions (grenades). Upon activation of a MT fuze (M565 or M577) or an electronic time (ET) fuze (M762), these grenades are ejected over the target area. There are two types of ICM: antipersonnel (ICM) and antimaterial (DPICM).

(a) ICM. ICM contains 60 grenades. When the grenade strikes the target, it hurls a steel ball filled with explosive 5 or 6 feet into the air, where it detonates and scatters over the target area. ICM has maximum effectiveness against troops in the open. Some effect can be gained on troops in fighting positions.

(b) DPICM. DPICM contains 88 dual-purpose armor defeating and antipersonnel grenades. When the projectile is detonated, a high explosive-shaped charge grenade suspended from a ribbon streamer is expelled. On impact, a shaped-charge jet is expelled downward through the body of the grenade, while the rest of the grenade bursts outward producing fragmentation. The jet is capable of penetrating approximately 2.75 inches of homogenous armor plate. DPICM is effective against vehicles such as armored personnel carriers and trucks. Little effects are produced against hard materiel targets.

The effects pattern of ICM is generally uniform and in a circular shape. The size of the pattern varies with the caliber, characteristics of the target area, and the height of burst. Six 155mm howitzers can deliver an effects pattern of 150 meters in radius. The height of burst may require adjustment. Deep snow (over 6 inches) can reduce the effects by more than fifty percent. All ICM grenades are subject to duds. At the optimum HOB, the dud rate is normally less than two percent. On some types of terrain, it may be as high as fifteen percent. It is more effective than HE on area personnel targets because a greater area is covered uniformly with a greater density of fragmentation. Caution should be exercised when firing DPICM in trees, since the ribbon streamers may become hung in the trees, creating obstacles to friendly troops moving in the area. *ICM Projectile Nomenclature*: M449. *DPICM Projectile Nomenclature*: M483A1.

(10) High Explosive, Rocket-Assisted Projectile (RAP). Rocket-assisted projectiles have high fragmentation steel cases filled with composition B or TNT. An integral rocket motor is positioned on the rear which functions along the trajectory, increasing the range of the projectile. Accuracy of the RAP is reduced at longer ranges due to the uneven burn of the rocket motor. However, the RAP will produce more fragmentation over a larger area than the standard HE projectile. The RAP can be fuzed with point detonating fuze (M557, M739), MT fuze (M582 series) or ET fuze (M767). See TMs for limitations on fuze and propelling charge combinations. *RAP Nomenclature*: M549 Series.

(11) Cannon Launched Guided Projectile (CLGP or Copperhead). The Copperhead projectile is an antitank round that has the capability of homing in on its target after being fired. It is employed in indirect fire to destroy or neutralize moving and stationary hard point targets such as armor, mechanized vehicles, and field fortifications. Targets must be designated during the latter phase of the terminal portion of the trajectory for at least 13 seconds by either a ground or airborne laser which provides reflective laser energy for terminal homing.

(12) Family of Scatterable Mines (FASCAM). FASCAM refers to expelling charge projectiles used to deliver antitank or antipersonnel mines. FASCAM includes **area denial artillery munitions (ADAM)** and **remote antiarmor mine system (RAAMS)**. These projectiles are fuzed with either an MTSQ fuze (M577) or an electronic fuze (M762).

(a) ADAM. ADAM projectiles are antipersonnel projectiles that contain submunitions used to deny the enemy use of certain areas for a short period. This action is accomplished by firing the ADAM so that 36 submunitions per projectile are ejected over the target area. After each submunition comes to rest on the ground, 7 sensor trip lines will

deploy up to 20 feet from each mine. Disturbance of the trip line completes an electronic circuit. A layer of liquid propellant, which by gravity rests under the kill mechanism, is initiated, shattering the plastic munition body and projecting the kill mechanism upward. At approximately 2 to 8 feet above the ground, the kill mechanism detonates, projecting approximately 600 steel fragments in all directions. If the mine has not detonated or functioned within the factory set time, it will automatically self-destruct, thereby clearing the area. The self-destruct times are 48 hours (long) or 4 hours (short). *ADAM Projectile nomenclature*: M731 (S), M692 (L).

(b) RAAMS. RAAMS projectiles are antitank projectiles that contain submunitions used to deny or delay access to a particular area for a specific period. Each projectile contains nine mines that can be expelled into the target area. The mines are scattered over an area and become armed within seconds after landing. Any metallic object, such as tank, self-propelled vehicle, or other type unit, passing over the mines will cause them to activate and damage or destroy the equipment. These mines also have self-destruct mechanisms. Scattered among the mines are some that have an antidisturbance firing mechanism. *RAAMS Projectile nomenclature*: M741 (S), M718 (L).

NOTE: When firing a shell-mix of ADAMS and RAAMS fire the RAAMS first in order to prevent the premature detonation of ADAMS.

c. Propellants

(1) M3 Series Propelling Charge (Green Bag). Green bag propellant is used for firing charges 1 through 5. The propellant increments are loaded in cloth bags which are fastened together by cloth straps. The M3 series contains two types of propellants: M3 and M3A1.

(2) M4 Series Propelling Charge (White Bag). White bag propellant is used for firing charges 3 through 7. The propellant increments are loaded in cloth bags fastened together by cloth straps. The M4 series contains two types of propellant: M4A1 and M4A2.

(3) M119 Series Propelling Charge. The M119 series contains two types of propellants: M119A1 and M119A2. M119A1 is a propelling charge designated as charge 8 and extends the range of the 155mm howitzers using the M795 HE projectile. The propelling charge is a single-increment white bag charge. M119A1 has a donut-shaped flash reducer at the forward end that precludes non-ignition of the rocket motor of the RAP. M119A2 is a charge 7 red bag propellant. The propelling charge is a single increment red bag charge.

(4) M203 Propelling Charge. The M203 is an 8 super charge designed to supplement the standard M3, M4, and M119 series charges and to provide extended range for the M198. The M203 is a single increment red bag charge. The charge is used to fire the RAP, M795, M864 BBDPICM, or M825A1.

d. Interchangeability of Ammunition. NATO forces are to use AOP-6, *Land Forces Ammunition Interchangeability Catalogue in Wartime*, in order to identify ammunition which can be interchanged and fired by each national weapon system in war.

e. Ammunition Field Storage. The four greatest hazards to ammunition in the battery area are weather, enemy fire, improper handling, and careless smokers. Regardless of the method of storage, these hazards must be considered. Some general considerations for storage of ammunition include:

- Stack ammunition by type, lot number, and weight zone.
- If ammunition is being stored on the ground, use at least 6 inches of dunnage under each stack.
- Keep ammunition dry and out of direct sunlight by storing it in a vehicle or covering it with a tarp. Be sure adequate ventilation is provided.
- If offloaded, provide ammunition as much protection from enemy indirect fires as time and available materials allow. If sandbags are used for protection, keep the walls at least 6 inches from the stacks and the roof at least 18 inches from the stacks to ensure proper ventilation.
- Particular attention must be paid to ammunition temperature. A powder thermometer is inserted into the top powder increment in the canister, and care must be taken to ensure the thermometer does not touch metal. FDOs should update propellant temperature at least every hour if not every half-hour, especially in the morning when the temperature rises quickly, and after sunset.
- Only enough ammunition to meet current needs should be prepared for firing.

f. Care and Handling of Ammunition

- Never tumble, drag, throw, or drop individual projectiles or boxes of projectiles.
- Do not allow smoking, open flames, or other fire hazards around ammunition storage areas.
- Never make unauthorized alterations or mix components of one lot with another.
- Do not fire ammunition that has been rammed and then extracted.
- Leave eyebolt lifting plug or closing plug screwed into the fuze well until the round is to be fuzed.
- Store WP ammunition upright on its base at all times, away from combustible materials, and away from other ammunition, if possible.
- Inspect projectiles for leakage, dents, or cuts on the rotating band that go through the round, loose grommets, improper assembly, and cleanliness.
- Fuzes must be protected from shock. When fuzing a round, inspect to ensure the threads are clean and serviceable and the fuze is screwed flush with nose of the projectile without gap.
- Never lift a projectile fuzed with a time fuze with a hand around the fuze. A slip might change the fuze setting.
- Fuzes must not be dropped, rolled, or struck under any circumstances. Caution should be exercised to ensure these fuzes do not strike the breech of a weapon during loading.

- Any MT fuze that is set and not fired must be reset to SAFE, and the safety wires, if applicable, must be replaced before the fuze is repacked in the original carton.
- Never fire a projectile without a fuze or with a fuze that is not authorized for that projectile.
- Keep powder containers closed tight to keep moisture out and keep them dry and cool.
- Propellant bags must be firm, clean, and well laced or tied and the increments inserted in the proper sequence.
- Keep flash reducers dry and in their sealed containers until needed for use. M119A2 charge 7 red bag propellant is manufactured with flash reducers attached and should not be removed.
- Protect primers from shock and moisture.
- Do not fire unused powder increments. Store this powder away from the weapon until they can be burned or otherwise disposed of. The procedures for burning powder are discussed below.

g. Procedures for Burning Powder

- Select a burning site at least 200 meters from grass and loose debris as well as personnel and equipment.
- Arrange a row of increments in a single layer not more that 12-inches wide oriented in the direction of the wind.
- Lay a train of combustible material about 15 feet long, perpendicular to and at the downwind end of the row of charge increments. Light this train at the end farthest from the increments.
- When burning powder in a tactical environment, ensure the burning does not compromise the camouflage and concealment effort.

9004. Ammunition Under Development

There are currently several munitions under development for artillery weapon systems. This paragraph focuses on those which are relevant to the 155mm towed howitzer systems (XM777 and M198) and will be available for Marine Corps procurement in the future.

a. M795, High Explosive Projectile. The M795 is a 155 High Explosive (HE) projectile. It will be employed against the same target array as the M107 HE projectile and achieve a range of 22.5 km. In addition, it will be used to determine registration corrections for expeditious computation of range, deflection, and fuze setting corrections for other members of the M483, ballistically similar, family of projectiles.

b. Extended Range M795. The extended range M795 possesses similar ballistic characteristics as the M864 Base-Burn Dual Purpose Improved Conventional Munition (BBDPICM) projectile and will have a greater lethality at extended ranges than the M549 High Explosive Rocket Assisted (HERA) projectile. When fired with zone 5, Modular Artillery Charge System (MACS) it will be capable of achieving a range of 37 km (threshold) to 40 km

(objective). In addition, this projectile will be used to determine registration corrections for expeditious computation of range, deflection, and fuze setting corrections for use with the M864 BBDPICM projectile.

c. XM982 Extended Range Munitions. The XM982 Extended Range projectile will replace the M864 BBDPICM projectile and will provide 155mm howitzers with an extended range, fratricide reducing, accuracy-enhancing capability to the FMF. The XM982 concept combines both drag reduction from the M864 BBDPICM projectile and glide technology from the M712 Copperhead projectile. Currently there are three variants of the XM982 (DPICM, SADARM, and Unitary Warhead), each of which has a GPS/Inertial Navigation System (INS) self location system, is compatible with the Multi-Option Fuze for Artillery (MOFA), and will be inductively set via the Portable Inductive Artillery Fuze Setter (PIFAS). A significant reduction in the fratricide probability for cannon DPICM firings will be reduced utilizing DPICM submunitions with self-destruct/sterilization features. Hazardous DPICM duds will be reduced from the current M42/46 2-3 percent rate to equal to or less than .2 percent (1 in 500) when DPICM is the lethal cargo for the XM982 projectile.

d. SADARM. SADARM is a base-ejecting projectile carrying two submunitions. When ejected these submunitions detect armored vehicles or equipment and detonate an Explosively Formed Penetrator (EFP) to penetrate the top of the target. It is ballistically similar to the M483A1 and therefore capable of being utilized to determine registration corrections for expeditious computation of range, deflection, and fuze setting corrections for use with the M483A1. SADARM will be capable of a 28 km to 37 km range from a 39 Caliber cannon and maintain an effectiveness equal to or greater than that of the M864 BBDPICM projectile.

e. M782 Multi-Option Fuze for Artillery (MOFA). The MOFA fuze is compatible with all 155mm HE family projectiles and may function as a proximity, time, point detonating, or delay fuze. It consists of an electronic countermeasure hardened design and will be set inductively via the PIAFS.

f. Portable Inductive Artillery Fuze Setter (PIAFS). Initially PIAFS will be a battery powered, hand held device capable of electronically setting the M762, M767, and MOFA fuzes. This will increase accuracy and rates of fire, reduce human errors, and shorten artillery response time. Ultimately the PIAFS is envisioned to become incorporated into the P3I (pre-program product initiative) system of the XM777 howitzer by transferring fuze information directly from the technical solution derived by the P3I mission manager to the fuze.

g. Modular Artillery Charge System (MACS). The MACS consists of two solid propellant charges (M231 and M232) which will be compatible with all 155mm artillery systems. The M232 is designed solely for the US Army's Crusader SP howitzer. Charge errors will be reduced due to each charge being identical (i.e., rather than verifying the correct number of increments and the correct charges, only the correct number of increments has to be verified). The MACS will also reduce logistical requirements as a result of its reduced volume and weight when compared to the M3A1 Green Bag and M4A2 White Bag series of

propellants.

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