
Mask History— *Infantry or General-Purpose Mask*

By Major Robert D. Walk

The perfect infantry mask is nonrestrictive, easy to breathe through, comfortable, and fully compatible with all military equipment, from sophisticated optical-sighting systems to common-soldier equipment such as helmets and canteens. Over the years, millions of dollars have been spent on research in various attempts to find the perfect mask. In the process, the United States has produced a myriad of masks—from the uncomfortable but effective masks of the First World War to the easy-to-wear masks of today. Each mask produced exemplified the technology of its day.

World War I

When the United States entered the First World War, the French M2 mask and the British small-box respirator (SBR) were the only two masks readily available. Not knowing which was better, the American Expeditionary Force (AEF) bought both and issued them to our doughboys.

The SBR had a facepiece with mouthpiece and noseclip, hose, canister, and carrier (with accessories). When the threat level was high, the soldiers wore the mask carrier on the chest for immediate access. To put the mask on, the soldier put the mouthpiece in his mouth, attached a noseclip to his nose, and pulled the facepiece over his head. The noseclip and mouthpiece were required because the facepiece did



British small-box respirator mask

not fully seal around the face. Army regulations of 1918 allowed the soldier 9 seconds to don the mask from the ready position. All masks used since that date have the same donning requirement. If the mask was damaged, the soldier had an accessory kit to repair the mask or could use his French M2.

The French M2 mask used multi-layered, impregnated

cheesecloth to filter out the chemical agents. It had no outlet valve and was difficult to fit properly. It did not provide adequate protection against chloropicrin, so it was not the primary mask for the soldier. It, however, was readily available since the French manufactured more than 50 million during the war. While it was more comfortable to wear, it was not as effective as the SBR. During gas attacks, soldiers would initially wear the SBR but then would change to the M2 for its comfort and get gassed during the changeover. This was not acceptable, so the M2 was removed from service as a secondary mask. Not satisfied with Europe's available masks, MAJ Karl Connell of the AEF Gas Service developed the Connell mask for the infantry in Europe.

The Connell mask was a stamped-brass mask with small eye lenses and a sponge rubber seal for the face. Official histories called this a single-line-of-defense mask; the single line of defense was the face seal. As the soldier inhaled, the air was drawn over the eye lenses to keep them clear. Unlike all other American masks in World War I, the filter canister was suspended behind the head. Up to 1,000 copies of the mask were possibly produced in Great Britain and sent to the United States for evaluation. This mask was not as comfortable as the later American Tissot masks, so in July 1918, production was discontinued. Some of the design features, however, influenced some future mask designs. (Look at the Navy masks of World War II and you can see the lineage!) In addition, the six-point head harness was used on later mask designs.

The U.S. Bureau of Mines initiated work for a good protective mask. Copies of the SBR and the French M2 were examined, but the first mask manufactured was a

sight-unseen imitation of the SBR. This SBR, while a tremendous effort, was not good enough to use in war. Unfortunately, 25,000 were manufactured before the flaw was discovered. These masks were used for training and could be identified by the large black-filter canister. While not bad for a first effort, an actual SBR was brought from Britain for the United States to examine and copy.

After receiving an SBR, the design was examined and improvements added. This resulted in the corrected English (CE) mask. One of the features of this mask was its use of “safety glass.” Improvements to the basic SBR included outlet-valve protection, noseclip redesign (to lessen discomfort), and facepiece-frame redesign. About 2 million masks were produced between June 1917 and March 1918. The CE mask was better, but improvements to the basic SBR could still be made and they were.

The next version was the Richardson, Flory, and Kops (RFK) mask (named after its designers—Ralph Richardson, E.L. Flory, and Waldemar Kops), of which more than 3 million were produced before the war ended. On 11 November 1918, about 40,000 masks were being produced daily. This mask provided a DOUBLE line of defense—mouth tube and noseclip and face seal. It included improvements in the head harness, angle tube (inlet and outlet for the mask), and facepiece construction of the CE. Unfortunately, it still retained the SBR’s weak points—the mouth tube and noseclip, which added the second layer of protection and also added discomfort. This discomfort caused the soldiers to try and adjust or change the mask, causing casualties. Checking around, we found an answer from the French—the Tissot mask.

The Tissot mask used the facepiece to form the seal which prevented chemical agents from getting into the lungs. Incoming air was also deflected over the eye lenses to prevent fogging. The mask system was large and bulky, which prevented it from being issued to the infantry; so creative American designers adapted the Tissot system with the infantry canister. Kops, talented designer of corsets, adapted the Tissot system with a better canister and outlet valve to come up with the Kops-Tissot (KT) mask, of which 197,000 were produced before the armistice. Air flowed into the facepiece at the nose area (and was deflected over the eye lenses before reaching the mouth) and exhausted through a separate outlet valve in the chin area. The KT used the same carrier as the SBR/CE/RFK and was thus usable by the infantry. Without



French M2 mask (left) and the CE mask (right)

the mouthpiece and noseclip, speech transmission was improved, although all communications was difficult. Difficulties in production and limited durability restricted this mask’s effectiveness. The Akron-Tissot (AT) mask was another design built on the Tissot system.

The AT mask, developed in parallel with the KT, integrated the deflector of the Tissot with the angle-tube arrangement—the inlet and outlet for the mask was in one—of the RFK. As with the KT, speech transmission was not impossible but it was difficult. This mask, while good, did not fully protect soldiers with high cheekbones or hollow cheeks. However, it was still an improvement and was produced in quantity (297,000 manufactured before the armistice). Using the best features of



The Kops-Tissot (KT) (left) and the Akron-Tissot (AT) (right) masks



The KTM mask

all masks, the Kops-Tissot-Monroe (KTM) mask was adopted.

The KTM mask was the best American mask of the First World War. This mask (relatively speaking) was comfortable, effective, and durable. The facepiece and hose were made of rubber covered with elastic stockinette and was manufactured using the

fastest hand-working methods. In this mask, the incoming air was deflected over the eye lenses by two separate tubes from the angle-tube assembly; 2,500 were bought before the armistice. An improvement, but the engineers knew that to really improve the mask, a molded mask would have to be made.

A molded mask, developed in parallel to the KTM, was in advanced development as the war ended but was never completed and put into production. This was the "Victory Mask" developed at the Long Island Laboratory of the Gas Defense Service. This mask was designed as a one-piece mold and then assembled, eliminating the vulnerable seams present in the previous masks. Unfortunately, work on the Victory Mask was abandoned after Armistice Day (11 November 1918), and the KTM was adopted as the standard Army mask after the war and soldiered on. The next molded mask did not appear for 20 years.

Between the Wars

Initially called the KTM, it was also known as the Model 1919 and later the MI mask. The mask was produced in five sizes to fit the majority of soldiers' foreheads (masks were marked number 1—the largest, to 5—the smallest). The carrier went from the chest (M1919 carrier) to the side (MI carrier). This mask solved the comfort and breathing problems as best it could, but communications, while better, were not solved.

During this time period, the filters effectiveness continued to improve. With filter changes, carriers changed. Since there was little money to replace all filters and carriers to one standard design, the Chemical Warfare Service (CWS) developed a nomenclature to identify the masks. Each mask was identified by the facepiece model, filter model, and carrier model separated by dashes. Thus, an MI facepiece with an MIV filter canister and an MIII carrier was an MI-IV-III service mask.

In 1934, improvements to the mask were adopted as the MIAI. The mask was now repairable because of the screwed-in eye lenses, and it fitted better. When researchers developed a mask that fitted 90 percent of the soldiers, sizes 2, 3, and 4 were replaced by the universal size (facepieces marked with a U), and the MIA2 was adopted in 1935. The MIAI soldiered on in sizes 1 and 5. Upon mobilization of American industry in 1940, the MIA2-IXA1-IVA1 was the first mask produced in quantity for World War II. In 1944, when sufficient newer masks were on hand, the MI-series mask was declared obsolete.

Continuing the search for the perfect mask, various experiments were tried between the wars. The filter was constantly improved and issued with the masks, resulting in improvements in the carrier design to accommodate the new filters. Officers had to communicate, which was difficult in the MI service mask, and so the diaphragm mask was developed and procured. (The diaphragm mask, not in general infantry use, will be the subject of another article.) Manufacturing technology at the time (1930s) did not allow the procurement of diaphragm masks for all soldiers at a reasonable cost. In an attempt to improve the mask, various attempts were made to make a fully molded mask.

Budgets were constrained in the interwar years. To reduce the cost of chemical training, the chemical branch developed a training mask. This mask was molded rubber and took less effort to manufacture than the service mask. It also was more comfortable. The MI (1940) was produced with an MIV outlet valve, and the MIAI (1941) was produced with an MV outlet valve. It used the MI training filter and was carried in the MI training gas-mask carrier. The original was thus the MI-I-I training gas mask. Because of the obvious improvements over the MI-series service gas mask, the MI training facepiece was assembled with service gas-mask components and adopted as the M2-IXA1-IVA1 service gas mask. The MI training mask, renamed the M2 training mask to reduce confusion (yet causing some), was used by soldiers in combat zones because of its small size and easy storability. This mask was used by the Airborne forces and by the jungle fighters in the Pacific. Because of the harsh conditions of the Pacific, the CWS created a waterproofing system for the mask.

World War II

The M2 service gas mask was more easily manufactured than the MI service mask because the injection-molded facepiece could be produced using modern manufacturing methods unlike the MI-series facepiece. Improvements in plastic technology and outlet-valve design led to the M2A1 (MV outlet valve), the



(Above) A soldier wearing an M1 mask
(Right) A soldier in an M2-IXA1-IV



M2A2 (M8 outlet valve), and the M2A3 (C15 outlet valve). The original M2 facepiece used the MIV outlet valve. The M2 mask was more comfortable to wear than the M1, but it still suffered from the M1 masks' bulkiness and weight (about 5 pounds). Research for the perfect mask continued.

The M3 lightweight-service mask was the next attempt at a perfect mask. This mask resulted from experiments on various filter designs and carry locations. It used a shorter hose (18 inches) and smaller filter canister (M10) than previous masks. The M10-filter canister was smaller and lighter than the M1XA1, provided almost the same protection, and used the M8 outlet valve. The M6 carrier held the mask, three protective covers, and one tube of protective ointment. Adopted in 1942, it was known as the M3-10-6 and weighed about 3 ½ pounds. The M3 was the first American mask to use a nose cup. The M8s, along with other early outlet valves, were fouled easily with mud, so a new outlet valve was designed—the C15. The basic C15 design was so good that it is still used today. The C15 outlet valve used the M3A1 facepiece. No original M3A1s were produced; all were converted from M3s. In World War II, 4,069,556

M3 masks were procured. Improvements to the M10 canister resulted in the M10A1 canister, still in use in the year 2000. In 1949, all masks using the M10 canister were declared obsolete. The M3-10A1-6, using the improved M10A1 canister, was not declared obsolete until 1961. Initially, production of the mask was slow because of tooling difficulties and the learning curve on using neoprene for the facepiece instead of rubber.

When the demand for M3s exceeded its production capabilities, a stopgap solution was found. The M2-service gas masks could be modified and rebuilt to the same standard, creating the M4-series lightweight gas mask. This was adopted in 1942 but not produced in quantity until 1944. The hose for the M2-series mask was 27 inches long, and the hose for the M3-series mask was 18 inches long. By cutting off 9 inches of the M2 hose and vulcanizing it to another 9-inch hose piece, three M3 hoses could be produced for every two M2 hoses. As with the M3, the M4 used an M8 outlet valve and the M4A1 used the C15 outlet valve. In World War II, 3,672,069 M4 masks were procured. As with the M3A1, all M4A1s were produced by retrofitting M4s with the C15 outlet valve. The masks were declared obsolete at the same time as their related M3 masks. The soldiers now

had a lighter mask but still did not have adequate speech transmission and light enough weight. The Army ground forces wanted something better. This led to continuing research in mask design.

During World War II, research on producing the perfect mask continued at a record pace. New concepts were tried and discarded or adopted. With a critical shortage of rubber in the United States because of the loss of the major rubber-producing countries in Asia (Malaysia and the Dutch East Indies [later Indonesia]), a substitute rubber had to be found. Research resulted in the use of neoprene, which was used in mask components during the war. In the search for a better mask design, the British lightweight-mask concept of a filter mounted on the cheek was used on the E6 mask designed by the Massachusetts Institute of Technology.

The E6 assault gas mask had a redesigned M3 facepiece with a filter attachment on the left cheek. This modification still allowed the soldier to fire his rifle but deleted the hose and used a lighter filter—the E3. After field tests, the E6 assault mask was adopted as the M5 combat-service gas mask and the E3 filter as the M11 filter. The mask was carried in the M7 carrier. The nomenclature for the mask was the M5-11-7 assault (later combat-service) gas mask. The M7 carrier was constructed of rubberized-cotton-duck fabric and was waterproofed for fording and assault-landing operations. The soldiers in the Normandy invasion carried this mask. In fact, the M7 carrier is credited with saving

lives during the war; when soldiers carrying the mask on their chest were dunked into deep water, the mask kept them afloat. More than 500,000 were produced. The M5 masks were in great demand and issued as quickly as they were made, but production was unable to keep up with the demand. In fact, production was curtailed in 1944 after the failure rate for masks became too high to be practical. The mask was never completely available, so another assault-type mask was needed to supplement it.

The Massachusetts Institute of Technology engineers looked into quick modifications of existing masks to fill the void. Modifications to the M2A2 service and training

facepiece examined included attaching an M11 filter to the mask horizontally, vertically, and at a 45-degree angle. A shortened M10A1 filter directly attached to the M3 service facepiece (similar to the M2 training gas mask) was also examined. After field tests with troops, which included checking the mask for ease of storage; water leakage in the rain; and comfort in the standing, kneeling, and prone positions, the 45-degree-angled filter attachment was deemed best and adopted as the M8 snout-type gas mask. The standard M2A2 facepiece could be modified quickly with a new head strap and filter-attachment insert and issued. It was carried in the M10 carrier, a modified MI training gas-mask carrier. During the war, 1 million masks were authorized and more than 300,000 modified. The use of the natural rubber M2A2 facepiece (which became the M8 snout-type facepiece with the inclusion of the head strap and filter mount) kept this mask in use for more than 10 years. By mounting the filter under the chin, this mask could use the early steel-cased M11 canisters (later M11s were aluminum). The steel canisters were not usable on most other masks (M5 and M9) because of the weight imbalance caused by the filter. The entire nomenclature of this mask was the M8-11-10 mask. In 1958 it was declared obsolete.

After the initially successful introduction of the M5 mask, work continued on improving the design of the mask for better air distribution. The combat experience in Europe during the winter of 1944 disclosed a major problem (cold set) in the mask with neoprene, which was



Assault gas mask

used in the construction of the M5 facepiece. Cold set caused the mask to get rigid in cold weather, rendering it incapable of forming a good seal on soldiers' faces. The result was the E48. Instead of passing the air under the chin as in the M5 mask (causing most of the air to come in on the left side), the air flowed across and in front of the nose, providing better air distribution (and giving it a big-nosed look). This protrusion led to it being a "mustache-type" mask

in some publications. The E48 also was made of butyl rubber, a rubber that did not get cold set. This mask was deemed fit for use and adopted as the M9 service gas mask in 1947.



The E48 and M9 masks, 1947

Production masks were made of natural rubber. The carrier, C15R1, was similar to the carrier used with the M5-11-7 mask and was rubber-coated duck. At this time, the prewar nomenclature was also discarded for new masks, and the M5 was declared obsolete because of the neoprene used. In 1951, the M9A1 field protective mask was adopted. The only difference was that the M11 carrier replaced the C15R1 carrier. This mask became known as a “protective” mask because the mask protected against dusts and organisms as well as gases.

The 1950s

In the 1950s, with a plethora of masks still standard (M2-series, M3-series, M4-series, M8, and M9), the Chemical Corps initiated research on a replacement mask. The program’s goal was to develop a lightweight, comfortable mask for the soldier that occupied less space and weighed less than its predecessors.

In the search for a better mask, several variants were tried. One was a modified M9 mask, another was an entirely new mask without a conventional filter, another was to be attached to the helmet so that it could be donned rapidly, and another was a hood-type that sealed at the neck. There was even thought of developing an inexpensive, disposable mask to issue to soldiers until the need for the full-sized mask was realized. The unconventional filter mask showed promise and was further developed into two models—the E12 for rapid donning and the E13 with detachable filters. These masks were developed further; the E13 being seen as the most acceptable model. In 1959, with minor changes, the tenth revision (E13R10) was adopted as the M17.

The 1960s

The M17 was made of natural rubber, had twin pork-chop-shaped cheek-mounted filters (M13-series), an integral nose cup, a voicemitter, and twin triangular eye lenses. This was the first time a voicemitter was included on a general-issue U.S. mask. Once the M17 was adopted, other masks were quickly deleted from the inventory (M3, M4 in 1961 and the M9 was removed from frontline service). The M9 was kept as the “Mask, Special-Purpose, M9” until the 1990s because of its use in chemical surety units. After further research, in 1967, the M17 was modified to include drinking and resuscitation capabilities—the M17A1. This allowed the soldier to drink fluids in a chemical environment—a real advantage to those who sweated profusely. Again, a further move along the line towards the perfect mask, but this mask, while giving all soldiers improved voice transmission capabilities, made firing the rifle difficult. Experience in Vietnam showed that the M17-series mask, while effective, provided more protection than necessary and was too heavy in the light-soldier environment there.



The M17A1 design allowed soldiers to drink while wearing the mask.

What to do? Soldiers in the field needed protection against the riot-control agents in use and desired a lightweight, easily carried protective mask (or none at all). This requirement led to the development of the XM27- and the XM28-series masks. Each used a high-efficiency-particulate air filter to remove the riot-control agents but provided no protection at all against military-standard chemical agents. The XM27 mask was effectively a green silicone M17, while the XM28 was a totally new design. Experience in field use in Vietnam showed the XM28 to be superior in design, comfort, and storage; so, after four revisions, the XM28E4 was adopted as the mask, riot-control agent M28 in 1968. Many people refer to this mask as the “grasshopper” mask. The M28 was widely procured (up to a million examples) and surplus to many police departments after the war. In 1976, the M28 was declared obsolete.

The 1970s

The 1970s focused on the logisticians and money concerns. After Vietnam, the Army had four standard masks—M17 (and A1), M25 (and A1), M24, and the M9A1. Two (M25-series and M24) were very similar and only had a few dissimilar parts. The others were unique with few interchangeable parts; therefore, maintaining spares and parts for these masks was expensive. The XM29 program was developed to make a common-mask system, simplify logistics, and save money. This one mask would use a common facepiece for all variations and would be of one-piece, injection-molded, transparent, silicone rubber. Silicone, the wonder material of the aviation industry in the 1970s, doesn’t suffer from cold set, is nonallergenic, and seals to the face in a wide range of temperatures. To improve sealing, the facepiece used an in-turned periphery. The mask used a screw-mounted NATO-standard filter canister that mounted on either cheek (right or left side). The screw mount not used by the filter had an insert that functioned as a voicemitter. In the front, the mask had a front voicemitter and drinking tube. Unlike the M17 mask, filter changes were rapid, and the mask could be used with two filters mounted to reduce breathing resistance. Unfortunately, the XM29 eye lens had a tendency to “frost,” but this could be corrected by scrubbing it with a mild cleanser. However, the silicone required special coatings to provide the necessary protection against CB agents or decontamination chemicals. The technology did not exist yet to coat the silicone and allow it to remain transparent. Lens-coating problems caused the Army to develop the XM30 series, which was effectively an XM29 with a separate glued-on lens.

The 1980s

The XM30-series masks continued the developmental work of the XM29 series. The XM30 was a hybrid approach that retained the silicone face-blank material but used a glued-in, transparent, urethane-material lens. In this program, there were initially some problems with securing the lens face-blank seal. In 1981, after the Army’s investment of more than \$60 million in the program, Senator William Proxmire gave it a “Golden Fleece Award” for a perceived waste of the taxpayers’ money. The Army dropped the XM30 program shortly afterwards. The problem of bonding the urethane lens to the silicone face blank was eventually solved, and the U.S. Air Force and U.S. Navy adopted the XM30, now redesignated the MCU-2/P, as their standard mask.

With M17-series masks generally more than 10 years old and used hard, the Army reopened the M17 production line in 1983. The M17 produced an M17A1 without the resuscitation-tube capability and was designated the M17A2. This mask also was produced in a size XS—the first in a U.S. mask. The XS mask facepiece used the in-turned periphery to improve the fit on hard-to-fit soldiers (and to cause untold grief to these soldiers when they tried to change the filters!). After years of service, the resuscitation tube was deemed useless and discarded. The M17A2 still only had one voicemitter and, in the 1990s, a separate loudspeaker by Audiopack was authorized to improve communications with a large group. While producing the M17A2, the Army initiated a minimum-change, minimum-risk program for the M40 series.

The M40 program was then initiated to modernize the Army mask as quickly as possible. The M40 program was to combine the best elements of the mechanically attached rigid lenses of the M17 and the silicone face blank and replaceable filter canister of the XM30 program into a new



Soldiers wear the XM30 mask.

mask for the military. In 1984, Scott Aviation, ILC Dover, and Avon submitted masks for testing. The Scott Aviation version won the competition, and the mask was adopted in 1987. The M40A1 (1992) had user-requested mask improvements, including a better nose cup and quick-doff hood. This mask did not solve all communications problems, so the M7 voicemitter amplifier was adopted. The M7 amplifier was a screw-in design that mounted on the front voicemitter. Because of the number of laser systems on the battlefield, the M1 laser ballistic outsert was developed to protect soldiers' eyes while wearing the mask. The M40 was produced in small, medium, and large sizes.

The 1990s

In 1996, the M45 aircrew protective mask was adopted. The follow-on mask for infantry use was to be the XM47. While not originally procured as a general-purpose mask, the M45 is currently used in the "Land Warrior" program. Because of this adaptability, the "Aircrew" was dropped from the designation in 1997 and the follow-on XM47 deleted. This mask took lessons learned from the M40 mask and also was designed using modern plastics technology. This mask is virtually an all-injection-molded composite and silicone-rubber assembled using modern production methods and ultrasonic welding. The M45 is designed to use night-vision equipment. Like the M40, the filter can be attached to the mask on either cheek. With front and side voicemitters, the mask can be used for face-to-face and phone communications. To improve communications, Audiopack is in the process of producing a new voicemitter amplifier (smaller and lighter than the original M7). To eliminate lens fogging, the design forces the air from the filter over the eye lenses before entering the mouth area and being inhaled. To ensure a good seal, the mask uses an in-turned periphery. The mask is available in extra small, small, medium, and large sizes with six replaceable nose cups for a better fit. Those few soldiers who cannot be fitted to an M40 are fitted with M45s.

While the M40 and M45 are excellent masks, the Army needed to do better. The perfect mask still did not exist. The RESPO-21 project was begun as a technological leap forward in mask-protection technology and, in 1996, evolved into the Joint-Service General-Purpose Mask (JSGPM) program. The JSGPM is known as the XM50. As initially demonstrated, a technology demonstrator proved to be lightweight and compact. Protection from a variety of chemical agents and toxic-industrial materials is planned. Comfortable to wear with minimal peripheral vision loss and low breathing resistance, this will be a Cadillac (maybe even a Rolls Royce, considering the maker) among masks. As all services have signed on to the program, this mask will replace all M40-series, M42-series, M45 (nonaviation applications) and



Photos courtesy of Audiopack Sound Systems.

M40 (above) and M45 (below) masks with voice amp



MCU-2/P masks. This will drop the cost of masks and spare parts by an economy of scale. This will meet the program's goal of lower total cost through low initial investment and low operating cost.

Sustainment is being considered throughout the design and testing phases of the program. Through the use of new, revolutionary manufacturing methods and techniques, the military hopes to procure a proper mask that meets the requirements but will have a low enough initial unit-issue cost to consider alternative sustainment concepts. When grossly contaminated, or at the end of its service life, the mask would be thrown away properly. The soldier, marine, or airman would then be issued a replacement mask. The idea is to consider and simplify logistics.

The NBC-defense project manager is also working closely with other program managers who are developing

other components of the NBC ensemble (such as overgarment, helmet, and gloves) to ensure that they meet the new joint-service sustainment initiatives like “Vision 2010” to create the best cost-effective, low-logistic-footprint protective mask for the twenty-first century. This would help ease logistics in the future battlefield. (Remember, a good theater commander is always concerned about logistics.) Reduction in overall weight and bulk is also critical, and the JSGPM must occupy less space than a replacement M40 facepiece. The mask will also be usable with a wide range of soldier systems to minimize soldier degradation on the future battlefield.



JSGPM mask

The XM50 is a technological leap forward, but it still has a long way to go. As of September 2000, the first prototypes were received from the government’s prime contractor—Avon—which won the benchmark “cradle-to-grave” developmental, production, and sustainment contract. The XM50 program can only succeed with the continued dedication of an extensive joint-service, integrated-product team. You can contact the system manager for the JSGPM at his Web site (SBCCOMs). He wants to develop the best mask for the soldiers, so he will review all ideas submitted.

Conclusion

The search for the best protection for our soldiers continues. Choosing the mask that performs best while logistically supportable is difficult. During the years, the Army has examined and procured masks to protect soldiers while continuing the search for the best mask. The current standard mask, the M40A1, has an excellent protection factor. Meanwhile, there is an ongoing search for a better mask in the JSGPM program.

References

Brochure, Mask-Compatible Voice Amplifier (NSN 5830-01-364-4595) for MCU-2/P, Audiopack Sound Systems, undated.

Brochure, M7 Audio Frequency Amplifier (NSN 5996-01-381-9012) for M40, Audiopack Sound Systems, undated.

Brophy, Leo; Wyndham D. Miles, and Rexmond C. Cochrane, U.S. Army in World War II – The Technical Services. “The Chemical Warfare Service: From Laboratory to Field.” Office of the Chief of

Military History. Department of the Army: Washington, D.C. 1959.

CCTC Item 1222. Standardization of Mask, Gas, Service, Snout-Type, M8-11-10. Chemical Corps Technical Committee, 11 January 1945.

CCTC Item 1801. Redesignation of the Mask, Gas, Service, Combat, E48R1-M11-E15R1 as Mask, Gas, M9 and Classification as a Standard Type with Reclassification of the M5-11-7 and M8-11-10 Gas Masks. Chemical Corps Technical Committee, 8 November 1947.

CCTC Item 2330. Classification of Carrier, Field Protective Mask, M11 (E18R9) and Mask, Protective, Field, M9A1as Standard Types with Reclassification of Mask, Gas, M9 as a Limited Standard Type. Chemical Corps Technical Committee, 25 May 1951.

CCTC Item 2455. Status of the Steel-Bodied Canister, Combat, M11 (E3). Chemical Corps Technical Committee, 3 April 1952.

CCTC Item 3026. Establishment of Subproject 4-80-02-030-08, Expendable Field Protective Mask. Chemical Corps Technical Committee, 14 March 1955.

CCTC Item 3407. Obsolescence and Elimination of Chemical Corps Items from the Supply System. Chemical Corps Technical Committee, 4 February 1958.

CCTC Item 3665. Report of Project Nr ATB 1359, Check Test of Mask, Protective, Field, E-13 Type (DA Project Nr 4-80-02-031; RDB Tech Obj CW-4b). Chemical Corps Technical Committee, 31 August 1959.

CCTC Item 3890. Obsolescence of Masks, Protective, Field, Lightweight, M3-10A1-6, M3A1-10A1-6, M4-10A1-6 and M4A1-10A1-6. Chemical Corps Technical Committee, 18 August 1961.

“Edgewood Quarterly” Issue No. 6. U.S. Army Edgewood RDE Center. Aberdeen Proving Ground, MD. September 1995.

“Edgewood Quarterly” Issue No. 8. U.S. Army Edgewood RDE Center. Aberdeen Proving Ground, MD. June 1996.

“Edgewood Quarterly” Issue No. 9. U.S. Army Edgewood RDE Center. Aberdeen Proving Ground, MD. October 1996.

“Edgewood Quarterly” Issue No. 10. U.S. Army Edgewood RDE Center. Aberdeen Proving Ground, MD. January 1997.

Final Report of the Gas Defense Division, Chemical Warfare Service, U.S.A. Volume 28 (Technical Section).

Final Report of the Gas Defense Division, Chemical Warfare Service, U.S.A. Volume 35 (Technical Section).

Nomenclature. Progress Report No. 458. Mechanical Division, Protective Department, 24 April 1925.

Technical Regulation Number 1120-35. The Gas Mask. War Department: Washington, 21 October 1930.