The AMEDD Historian

Army Medical Department Center of History and Heritage, Fort Sam Houston, Texas Number 41 Spring 2023

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This year will mark 125 years of the Army, and the AMEDD, operating in the Pacific. The island geography of the Pacific and adjoining countries would change how the military operated, challenging an Army organized for continental operations.

Connections

The AMEDD has operated across the spectrum of competition, crisis, and conflict in the Pacific. The terms have changed over time, but the efforts connected to global health engagement, medical diplomacy, and disaster relief endure. Early on, during initial military involvement, the AMEDD conducted focused R&D on diseases endemic in the Pacific and possible vaccines. Identifying these maladies, their causes, as well as prevention efforts, has led to both long-term engagement within the area and building partnering countries' medical capacity. U.S. Army Civil Affair and Military Government groups relied on Army medical support to rebuild in some countries, assisting citizens and training medical personnel.

Conflict

Conducting wartime operations are difficult, but for the Pacific area logistical and environmental considerations cannot be overstated. Problems related to hospitalization, evacuation, and resupply, were challenged not just by the enemy, but also an unfamiliar environment and great distances. (continued on p27)

Humanitarian Assistance—Disaster Relief

The AMEDD has been involved in disaster relief in the Pacific. Those are humane, but also can help generate international goodwill and influence opinion. Two examples show some of the possibilities and limits in influencing opinion.

On September 1, 1923 a massive earthquake hit the area around Tokyo around noon; wooden buildings caught fire and a 40-foot tsunami hit. Over 100,000 people would die as a result, and foreign governments sent aid. The U.S. sent relatively large amounts of aid (partly returning the favor from Japanese assistance after the San Francisco Earthquake in 1906), with two ships heading from the Philippines and one from San Francisco with medical equipment, supplies, and personnel on board. Diplomatic relations between Japan and the U.S. were tense, and there was uncertainty about what the Americans would be allowed to do. It took two weeks for the ships to arrive, which allowed time for negotiations. The American role was agreed as setting up the hospitals they brought and showing the Japanese how to use the equipment, then turning over all excess supplies to the Japanese. The Americans would only treat non-Japanese patients. The AMEDD elements (10 doctors, 6 nurses, and 41 enlisted men) operated within those constraints, and had no trouble with the Japanese. There was more trouble with the logistics, since the ships had been loaded poorly, for instance the tents loaded underneath the other equipment on one ship and forgotten in the rush to load another. Some Japanese civilians were grateful, and others were wary. The Americans had delivered $5 million of relief supplies, and had erected three hospitals the Japanese used.

Part of Yokohama after the 1923 earthquake and fire. Courtesy National Museum of Health and Medicine.

On March 11, 2011 a massive earthquake just off the northeast coast of Japan caused major damage ashore and a 27-foot tsunami, leading to further damage, including at a nuclear power plant. U.S. Forces Japan had several thousand personnel stationed in Japan, plus civilian employees, and both groups had dependent families. The earthquake was not near American bases, and the initial response largely focused on public health issues on those bases: sediment had been shaken up in water systems, some food storage buildings lost refrigeration. As news spread of the damaged nuclear reactor, some American dependents wanted to leave, and the AMEDD had to handle medical processing for the modified noncombatant evacuation operation that resulted. There was understandable concern about radiological escape, and AMEDD personnel (supplemented by other soldiers) conducted wide-spread monitoring, especially in areas where servicemembers were supporting Japanese troops who were conducting relief and rescue operations. Results were shared with the Japanese, providing them a more detailed picture of conditions and allowing them to focus on other areas. American personnel also supported a Japanese Self-Defense Force base used as a staging area for Japanese personnel going forward into devastated areas.

In both cases the U.S. helped when it did not have to, and probably created goodwill towards America and Americans. Quantifying that is nearly impossible, and quantifying the effect of the goodwill on international relations is similarly difficult. That is not to say the work should not be done – not helping could also influence opinion – but the benefits can be limited.

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In 1956 MG Leonard Heaton had led the surgical team that operated on President Dwight Eisenhower for abdominal trouble. He also operated on the Prime Minister of Thailand, Field Marshall Sarit Thanarat (above), who came to Walter Reed General Hospital for surgery in 1958, and Heaton went to Bangkok in 1959 for further surgery on Thanarat. In December 1963 Heaton (now Surgeon General) was sent to Bangkok with an AMEDD team, but Prime Minister Thanarat was too sick, and died the following week. Heaton, Walter Reed, and the AMEDD were deliberately used as implements for American diplomacy as the Eisenhower and Kennedy Administrations tried to maintain U.S. influence in Thailand. Only a few years later Thailand allowed U.S. aircraft based there to operate in Vietnam and also sent air and ground forces into combat in Vietnam. Heaton also went to Nicaragua and cared for the president there, and other foreign dignitaries received treatment at Walter Reed Army Medical Center.

Image courtesy Wikimedia Commons.

Research

Through the 1800s many Army doctors did research. This would be approved by higher command, but was not their main duty, and thus it was impossible to focus efforts on any topic. In 1898 Surgeon General Sternberg appointed a group to investigate typhoid. Composed of MAJ Walter Reed, MAJ Edward Shakespeare, and MAJ Victor Vaughan, they were focused on the one research question and discovered the causative agent and how the disease was spread – and thus how it could be prevented. Tropical diseases would be a major focus for the Army for decades because the Army was deploying to tropical areas, and especially the Pacific.

In 1900 two research boards were started. Reed (with associates) worked in Cuba on yellow fever. Simultaneously a tropical diseases board was started in Manila, Philippine Islands. By happenstance both boards lasted until 1902, the yellow fever board because it had completed its work, the board in Manila because of administrative changes. From 1898 until 1902 the Philippines were military government, but in 1902 civilian government was established and responsibility, equipment, and some personnel were transferred from the Army to the Insular Government. Among other topics, they worked on animal parasites, dysentery, fevers, bubonic plague, and other tropical diseases.

The board was revived in 1906 without a formal title, simply "a board of medical officers … in Manila, P.I." and lasted until 1914. With more time, and somewhat more personnel, they worked on more topics, although officially only those that existed in the Philippines. Work included confirmation of the mosquito theory of dengue transmission, discovery of a new species of filaria, studies in amoebiasis, leprosy, cholera and yaws; extensive observations regarding the influence of tropical climates, investigations as to the causation of beriberi, investigations regarding surra in horses, studies as to the prevalence of typhoid fever and diphtheria in the Philippine Islands, and experiments on the effect of ultraviolet light upon amoebae. There was consideration of moving the board to Panama, but instead it was closed.

In 1921 Surgeon General Ireland was invited by Governor-General Leonard Wood (a doctor and former Chief of Staff of the Army) to restart medical research. With that impetus, it should not be surprising that a "U.S. Army Medical Department Research Board" was started in 1922. This did move to Panama in 1934, but in the Philippines worked on hookworm, leprosy, tuberculosis, dengue, veterinary bacteriology, beriberi, cancer, surra, and rinderpest.

During WWII the AMEDD mainly focused civilian researchers on topics of military interest through non-military government research agencies. After WWII AMEDD research restarted, and Medical Research and Development Command was established in 1958. At same time, but separately, a South-East Asia Treaty Organization (SEATO) Medical Laboratory was organized in Thailand in 1961 as an outgrowth of a SEATO Cholera Research Laboratory started in 1959. When SEATO dissolved in 1977, the laboratory became the U.S.-Thai Armed Forces Research Institute of Medical Sciences (AFRIMS). This continues, with research sites in various Asian countries.

King Bhumibol Adulyadej shaking hands with Dr. Joseph Smadel as part of negotiations to establish AFRIMS.
Image courtesy U.S. Embassy Thailand.

Research was also pursued in wartime. Separate medical and surgical research teams were sent to Korea, starting in 1950. They produced many articles and six books of clinical material. A medical research team was sent to Vietnam in 1963 which worked with the Institute Pasteur in Saigon. However, the Saigon-based research was not getting 'ground truth' for a counterinsurgency war in rural areas. Thus a U.S. Army Special Forces–Walter Reed Army Institute of Research Field Epidemiology Survey Team (Airborne) was created which did get muddy boots in the field, including identifying North Vietnamese Army units based on particular strains of malaria. Research in the U.S. continued; malaria was a problem, and AMEDD researchers screened tens of thousands of compounds as anti-malaria drugs, tak-

ing 23 into human trials. They also developed permethrin to treat uniforms.

Research protects American servicemembers, contributes to relationships with foreign countries, and ultimately protects humans. The AMEDD will be conducting research in the INDOPACOM for the foreseeable future.

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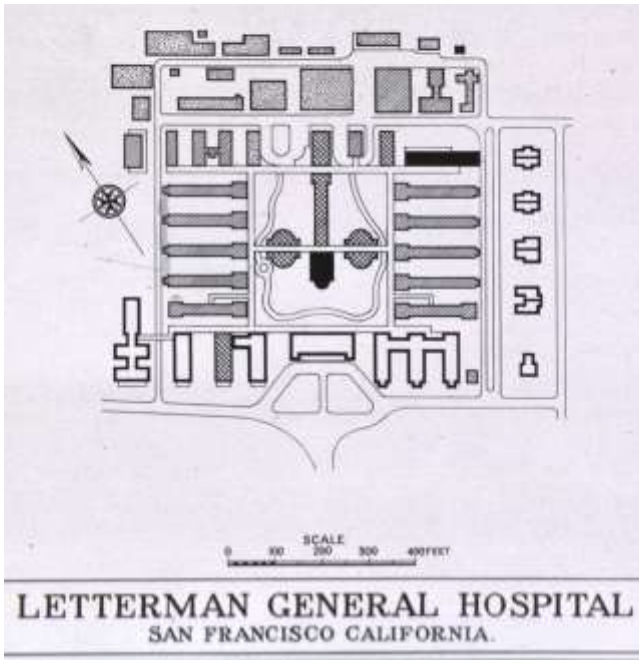
Facilities

Geography affected the development of AMEDD infrastructure in the INDOPACOM.

The large operations in the Philippines led to establishing a medical supply depot in San Francisco, and also a general hospital there for patients returning. Because of the lengthy steamship transit times to the U.S., another general hospital was established in the Philippines so that patients were stable before evacuation, and naturally a supply depot there. When the U.S. annexed Hawaii, AMEDD facilities were also established there.



Sketch of L.G.H. facilities circa 1910. Courtesy National Library of Medicine.

Plans for WWII included hospital expansion, in Hawaii and the Philippines. These included identifying civilian buildings that could be adapted, but also squeezing more beds into wards and using other buildings around hospitals as wards. When Pearl Harbor was attacked the hospitals were not hit; hospitals in the Philippines were apparently not directly targeted. Hospital equipment had been prepositioned on the Bataan peninsula, but many supplies were lost during repeated Japanese air attacks on Manila.

To retake the Philippines bases had to be built up elsewhere, and there were no contingency plans. The buildup started in friendly areas (New Zealand and Australia), and most infrastructure was put in rear areas, safe from an enemy with no long-range attack capability. As Allied forces 'island hopped' forward, Base Sections were established with large hospital capacity and substantial supply levels. Just-in-time logistics was impossible, medical capabilities of the time meant that most patients needed hospitalization rather than outpatient treatment, so there was no avoiding large medical infrastructure.

Both the Korean War and the Vietnam War used existing medical infrastructure. For Korea, it made sense to use the medical facilities in Japan that were so close. Doing so was cheaper, easier, reduced the number of troops that were needed in Korea, and provided better patient care than would be provided in temporary

Letterman General Hospital in September 1945. Courtesy National Library of Medicine.

buildings in Korea. There were surgical hospitals positioned forward in Korea, but (aside from POW hospitals) few rear-area hospitals there because the facilities in Japan were so close.

While Vietnam was further from friendly bases, and thus had more hospitals deployed, offshore facilities were also used. The Navy hospital on Okinawa and Air Force hospital in the Philippines were used, as were Army hospitals in Japan. Medical supplies were largely moved through the major depot on Okinawa. Rather than provide more hospitals in Vietnam, the Army deployed around 3,000 beds in multiple hospitals

Moving a bed into a converted warehouse at Camp Drake to outfit the 249th General Hospital, 1966 or 1967. ACHH photo.

to Japan, and the hospitals there received about 100 patients every day – over half the patients evacuated from Vietnam. This kept patients and staff safer than being in Vietnam, and in a more pleasant climate.

Since the Cold War, facilities have been reduced. The military is smaller, and medical care has shifted towards outpatient care; just-in-time delivery has changed logistics and supply depots. Those reductions have made sense, but given the INDOPACOM geography and possible casualty numbers, the AMEDD will likely have to adjust and find more facilities.

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Building Partner Capacity

The AMEDD has been a part of building partner military capacity in the INDOPACOM since 1935.

The AMEDD started medical training then, when the U.S. declared the Philippines would become independent. That led to creation of the Philippine Armed Forces, and the Philippines Army Medical Services. These modeled the AMEDD in structure, with Medical Corps, Dental Corps, and so forth. The PAMS was slow to form because of shortages in training facilities, money, and having relatively few civilian medical professionals to train into military medical personnel. To help the process, the U.S. transferred NCOs from Philippine Scout units. Medic training was decentralized, with a small school to train medical detachments at each regimental training base. Supplies were often tight, and the U.S. tried to source items locally (to save costs) but shipped some items from America.

Combat arms troops were the first priority when the U.S. started training troops in the Republic of Korea. Training for medical troops was added in May 1946, first focusing on medical detachments for the tactical units, then expanding to hospitals. The Korean Military Assistance Group (U.S. Army trainers in Korea) recommended opening a number of schools in April 1949, and in August that year a Korean Army Medical Field Service School opened. Some Korean personnel had done on-the-job training at U.S. medical units and hospitals in Korea, but the school had more capacity and capability. It was modeled on the U.S. Medical Field Service School, and the American instructors were selected from among former instructors at Fort Sam Houston. The Korean instructors were selected from among those who had trained with Americans. The KAMFSS opened with officer and nurse orientation courses, a medical administrative officer course, and a basic medical course for enlisted men. A few ROKA personnel were brought over to U.S. Army schools, but as there were only 27 to all Army schools, there were few medical personnel. Small teams of Korean officers also went to Japan to observe how the U.S. Army trained, and each of the four teams had a medical officer. The KAMFSS

Physical therapy (left) and laboratory (right) students receiving practical instruction at the Medical Field Service School, Masan, Korea. Circa 1953.

From *Medical Bulletin of the U.S. Army Far East* .

had to displace when the North Koreans invaded, but it reopened and during the Korean War expanded to offer about twenty courses, mostly parallels to U.S. MFSS courses, but also providing nurse training since no trained civilian nurses to draw from. They had classroom training, field exercises, and practical training at hospitals when appropriate.

As the Republic of Korea Army (ROKA) expanded to divisions, the KMAG recommended following the U.S. division model, and the ROKA added divisional medical battalions, and in due course organized Mobile Army Surgical Hospitals, hospital trains, and other units. When the fighting ended, the problems changed. The ROKA asked for help with approximately 14,000 patients, about 6,000 surgical, 6,000 medical, and 2,000 with tuberculosis. The AMEDD pushed teams to selected Korean hospitals, who helped treat patients, and helped train Koreans to continue the work. AMEDD teams also helped set up a blood bank and to provide supplies.

In Vietnam the story was similar, but also different. In 1951 a small military medical school opened in Hanoi, but moved to Saigon in 1954 when the French lost their Indo-China War. It operated alongside a Medical Training Center (for medics) and the two institutions were combined into a Military Medical School in 1961. The U.S. provided some medical (and more logistical) training through a Temporary Equipment Recovery Mission from 1956, and had recommended organizing the military medical school. A new facility was built and conducting 35 courses by spring 1964. It did not provide clinical education, and stayed relatively small; by 1970 it had only trained 3,517 students, or roughly 600 per year. Student capacity was rated at 1,000, so qualified students seem to have been in short supply. Training was mostly by lecture, and the U.S. advisers recommended not just training aids and group discussion, but having a training hospital nearby for practical application, although that never happened and typically "graduates lacked practical experience."

However, it is likely that more Vietnamese personnel received on-the-job training at U.S. military facilities during the conflict. This was always encouraged to help build Vietnamese capacity, but received more emphasis from 1969 as American policy increasingly emphasized training Vietnamese personnel so the U.S. could withdraw. The school finally expanded (and received equipment such as more desks) and apparently started graduating about 3,000 students annually in 1971 and 1972. Vietnamese clinicians were sent on training courses outside Vietnam so they could train other Vietnamese when they returned. Through 1970 some Vietnamese military personnel trained in the U.S., but that was judged minimally effective, and was stopped. The centralization of training in Saigon was also seen as a problem since troops from local-defense forces would not travel to Saigon, and medic training was regionalized.

As the U.S. withdrew, medical facilities and supplies were turned over to the Vietnamese, and other capabilities were started. For instance, eyeglass fabrication training and equipment was provided, and the Vietnamese began producing some 100 pairs per week. The U.S. continued to provide medical supplies for some time. However, the dwindling U.S. support overall had its effect on the military health system: in 1974 the medical school was operating at only 1/3 capacity.

Building partner capacity has proven hard, but indefinitely maintaining U.S. military presence is equally hard.

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Preventive Medicine in the Burma Campaign: Failure and Success
By Nolan A. (Andy) Watson

The 5307th Composite Unit (Provisional), code named Galahad, but better known as Merrill's Marauders, has a firm reputation in Army history, including a 1962 movie. Despite fame and successes, disease casualties made the unit non-effective. Fortunately, the follow-on units were able to make immediate improvements.

The unit operated in the China-Burma-India (CBI) Theater, tasked to disrupt Japanese military operations in Burma. The 5307th began operations on 24 February 1944 with 2,705 field troops proceeding into Burma and 247 remaining in India. Deployed as a light infantry unit, the 5307th would often serve in mountainous jungle areas with little support from larger forces. Due to the rough terrain, long marches, and lack of roads, 600-700 horses and mules were part of the unit to haul supplies and gear.

The 5307th's three battalions had a medical detachment with 30-40 personnel each, including one Veterinary Corps officer. Despite providing medical personnel, there were some very big problems that were not resolved at the unit's formation. Mosquito netting was not available or not used properly. Also, the use of anti-malaria drugs, (especially atabrine) for the 5307th was not strictly enforced, and water purification efforts became lax during operations. Medical evacuation was largely restricted to wounded and injured. While airplane evacuation of wounded personnel was attempted at clearings, without helicopters or effective ground ambulance networks, moving them was challenging.

Quickly moving ahead, the 5307th was able to prevent Japanese advances through raids, ambushes, and other actions, culminating in a victory at the town of Myitkyina. Despite successes the unit ceased operations in August 1944 at the conclusion of the Myitkyina battle. Inadequate methods to prevent insect-borne illness, careless water purification standards, physical exhaustion, and an unwillingness by the leadership to break contact with the enemy and evacuate casualties led to appalling numbers of casualties. Fig.1

BATTLE CASUALTIES:	
Battle deaths	93
Nonbattle deaths	30
Wounded in action	293 [19]
Missing in action	8
SUBTOTAL	424
DISEASE CASUALTIES:	
Amoebic dysentery	503
Typhus fever	149
Malaria	296
Psychoneurosis	72
Miscellaneous fevers (approx.)	950
SUBTOTAL	1970
TOTAL	2394

Table of casualties for the 5307th Composite Unit (Provisional). *Merrill's Marauders*,

One soldier described his condition at the close of operations: "By now my dysentery was so violent I was draining blood. Every one of the men was sick from one cause or another…I didn't worry any more about letting the colonel down. All I wanted was unconsciousness." -CPT Fred O. Lyons

LTG Joseph "Vinegar Joe" Stilwell presents medals to the remnants of the 5307th after the Battle of Myitkyina. The disheveled appearance of the Soldiers receiving medals from a Lieutenant General illustrates their condition.

A second effort

Although the 5307th was not able to continue operations, there was still a need for the force in Burma. As personnel were evacuated, transferred, and tried to recover, new plans were being made for a follow-on unit. Daring and swift attacks were still needed, but so was a conservation of the force. Remaining personnel who were healthy enough to serve were consolidated to form the 475th Infantry Regiment. The 475th would form the nucleus of the new unit, the 5332nd Brigade (Provisional), known as the MARS Task Force.

U.S. troops rest on a mountain trail in Burma. US Army photo.

Medical problems were reviewed with the formation of a new unit. Preventive medicine measures were to be strongly enforced, and better medical care in the field would be provided by three portable surgical hospitals, really just 25-man surgical teams. Similar to its precursor unit, there were medical detachments (to include veterinary and dental officers) for each of the four battalions and three cavalry squadrons.

The larger force had more materiel, so there was not only an increase in the number of pack animals, but also a focus on animal, as well as human health. The 18th Veterinary Evacuation Hospital was attached to the MARS Force to care for its numerous horses and mules. All heavy supplies, to include artillery and the hospitals, were carried by the equines. As with the precursor unit, operations would be conducted with Chinese forces when possible. The more robust MARS Task Force had peak numbers of 7,300 personnel (but averaged 5,700) with 2,900 horses and mules. Equine power would also aid in evacuation of the wounded if local litter bearers were unavailable.

Commanders also put their time into an active program for preventative medicine. Around campsites ground cover was cleared and burned off to limit mite and tick numbers, since they were vectors for scrub typhus. Insect repellent was utilized on uniforms and all facility areas and tents were sprayed with DDT. Every soldier was instructed to boil their water in all circumstances. Water purification tablets were furnished as well. A water purification unit filtered and chlorinated water, and all water for human consumption was additionally boiled for 20 minutes, cooled, and then re-chlorinated.

> All troops leaving the forward area for whatever reason were ordered to continue their atabrine suppressive therapy. Malaria rates are checked and excessive rates are investigated through command channels. Malaria discipline, when properly applied, is very effective in the combat area.

Excerpt from "Medical History of the 5332nd Brigade (Prov)".

The anti-malaria drug atabrine would have the greatest effect. A daily atabrine tablet was given under officer supervision, and random checks were made of the urine of hospitalized soldiers to determine if atabrine was present. Malaria discipline continued to be an issue with incoming troops or those leaving forward areas. Malaria rates per thousand troops were significant in the first month of the MARS Task Force. The rate for September 1944 was 154, but by March 1945 were only 43 per thousand troops. Scrub typhus numbers had peaked in October 1944 with 64, but similarly decreased to 10 per thousand troops by March 1945. Evacuation policies were also credited with allowing soldiers to recover from illness. Despite improvements in sanitary conditions, decreased morale and increased fatigue affected the willingness to follow through with preventative medicine measures. As with malaria deterrence, the importance of command oversight cannot be

overstated. One problem that was not resolved was the continuing issue of skin infection due to infrequent changes of clothing and the humid environment. Diarrheal disease causes were also not completely solved, despite the water purification efforts.

Results

The MARS Task Force was in the field for roughly seven months. At first the mission was to disrupt the Japanese forces, but that changed into recapturing Burma. Advancing to capture Japanese forces in the eastern and southern parts of Burma, the task force marched on. The apex of fighting would occur in the months of January and February 1945, with the unit suffering 954 combat casualties (105 deaths). Operations for the unit would wind down after the capture of the city of Mandalay. The MARS Task Force concluded missions in March of 1945 after roughly seven months of existence. Preventive medicine allowed it to continue operations; in six months Merrill's Marauders had become combat-ineffective due to disease. When the MARS Task Force was inactivated, it was because of the theater commander's choice instead of the unit having too few personnel.

Adapted from Mr. Watson's article in *AMEDD Historian* No.31.

Malaria
Charles Franson, AMEDD Museum

One of the diseases that has yet to be eradicated in the INDOPACOM is malaria. Malaria is an ancient parasitic disease caused by the presence of various Plasmodium species in the blood. The common vector is the female Anopheles mosquito. The disease is very debilitating, often resulting in death. A common early treatment (dating to the 17th Century) consisted of preparations made from the bark of the Cinchona tree. Further refinement during 1800s produced quinine, which could be given in standardized doses by mouth for the prevention and control of the disease or in an injectable form for treatment of severe cases beginning in the 1890s.

Malaria was endemic in the U.S., especially the South, even into the 20th Century. It affected military strength during the Civil War, and again became a major issue during the Spanish-American War in 1898. At the end of this brief conflict America became a global power, acquiring several new overseas territories, including the Philippine Islands and the Marianas. The importance in controlling and treating this illness continued for America during the 20th century due to World War II and the Vietnam War. Given America's extended presence in the area, the AMEDD Museum has a variety of objects in its collection relating to the ongoing battle with malaria.

The AMEDD's strategy for combatting malaria in the 20th Century not only included pharmaceutical interventions, but also preventive health measures. Among the preventative protocols were the use of mosquito netting (especially over beds and over hats); wire screens on windows; and drainage or spraying of stagnant water with oil. Quinine continued to be the preferred drug, including intravenous administration (in severe cases) for the prevention and control of malaria leading up to WWII. To inject quinine was a complex process as the tablets were first dissolved in sterile water, the mixture drawn into a syringe and then injected into the patient. AMEDD medical officers stationed in the Philippines during and after WWI wore an officer's medical belt that contained an assortment of pharmaceuticals, including a vial of quinine sulfate tablets for malaria, 20mg.

The main source of quinine by the end of the 19th Century was the Dutch East Indies (now Indonesia), and the world supply of quinine was largely under control of a consortium of growers which had banded together to form the Kina Bureau, a cartel based in Amsterdam, which held an effective monopoly on this valuable medicinal. With the German invasion and occupation of the Netherlands in May 1940, they gained access to the warehouses and manufacturing capabilities of the Kina Bureau, putting most of the processed drug under Axis control. When Japanese forces overran the Dutch East Indies, in 1942, the raw supply of cinchona was lost to the Allies as well.

While preventive measures, including spraying and the use of nets, continued, along with a campaign of informational printed material, a replacement had to be found for quinine. The drug initially selected to re-

place quinine was Atabrine (or Mepacrine), a drug first developed by Bayer in 1931. Atabrine was effective for malaria prevention and was issued to troops in endemic areas. One issue with atabrine was its profoundly bitter taste, even with the minimal contact involved with swallowing it.

This caused non-compliance among the troops so that administration was often done at mealtime, with a medical officer observing to assure each dose was swallowed. Atabrine's effect on the liver produced jaundice in patients taking it. Artist Franklin Boggs captured this unpleasant fact of daily life in the Army in a painting entitled "Pill Call." Pacific veterans also believed that taking atabrine rendered one sterile, and the Japanese used that in propaganda to dissuade troops from taking atabrine.

Captured Japanese medical supplies indicate that our adversary used both "Bagnon," which was an intravenous treatment combining quinine, caffeine, and urethane as well as atabrine. A great breakthrough in eradication efforts came in 1943 when the Army began using the chemical DDT to kill mosquitoes. Aerosol application of pyrethrins was also used to eradicate the mosquito.

Right: Japanese 'Bagnon' anti-malaria medication.

Left: Pill Call, Franklin Boggs, oil on canvas, c.1944.

Malaria remained an important threat after WWII and efforts to control it continued. The search for a substitute for atabrine resulted in reviewing a drug developed during WWII. In 1934, Bayer developed Chloroquine, a synthetic quinine analog. Although at first deemed too toxic, further development produced a variant that was widely issued to German troops and other troops in the Mediterranean area. U.S. Army medical intelligence troops acquired some among captured enemy supplies, and further refinements resulted in chloroquine phosphate becoming available for use in 1947. Another drug, Primaquine, was developed as part of a coordinated effort led by the Office of Scientific Research and Development in World War II to develop anti-malarial drugs. Primaquine is effective in the prevention of relapsing malaria, later determined to be caused by a dormant phase in the liver.

The threat of malaria to combat effectiveness once again became a major priority with America's involvement in Vietnam. Despite best efforts to control transmission, including netting, screened windows, chemical spraying, the use of both chloroquine and primaquine, the discovery that Dapsone would also help, and liberal issue and use of insect repellent over the course of the Vietnam War there were 24,606 cases of malaria, and 46 deaths due to malaria. Most cases were treated in-country, rather than rotating soldiers out.

Unofficial patch for the 6th Convalescent Center.

The 6th Convalescent Center was set up as a means of rehabilitating sick and injured soldiers for return to their units. The caseload of malaria was between one-third and one-half of all patients. Patients were held in a ward under treatment with antimalarials until they showed negative on a malaria test. They were then subjected to a course of physical reconditioning and returned to their unit. Thousands of soldiers were treated and returned to duty in only a few weeks.

From 1947 through the 1980s chloroquine, sometimes given in tandem with primaquine, remained the standard therapy. Material gathered by medical intelligence units during the Vietnam War indicated that our opponents also followed this regimen. In numerous North Vietnamese Army/Viet Cong captured medical kits are bottles of chloroquine oral tablets and/or glass vials of quinine dihydrochloride to give the drug intravenously. The North Vietnam-

ese asked their Chinese supporters for help against malaria, and that led to rediscovery of artemisinin, which had been used in Chinese folk medicine.

By the end of the 1980s, chloroquine-resistant strains of malaria were becoming common, leading to the development of newer interventions, including the administration of doxycycline for prophylaxis. Artemisinin was also turned into intravenous artemisunate. Many of the newer therapies, however, carry increased risk of long-term neuro-psychological disturbances, often mistaken for PTSD.

Injectable quinine dihydrochloride (above) and chloroquine tablets (right) captured from Communist forces in the Vietnam war.

Based on research going back to the 1980s, the Walter Reed Army Institute for Research developed and tested a malaria vaccine which interferes with the parasite before it can infect the liver. The World Health Organization has recommended its use, coupled with properly administered malaria prophylactic and treatment regimens. WRAIR is also working on a newer vaccine, which it is hoped will broaden the immune response, and enhance protection.

All images from the AMEDD Museum collections.

Amphibious Medical Support
Lewis Barger, ACHH

Amphibious landings and vast distances are two military characteristics of the Pacific. In WWII the 264th Medical Battalion dealt with both. They were organized to support Engineer Special Brigades in landings. They did that, but also found themselves establishing hospitals, operating air evacuation holding centers, and providing area medical support. Their ability to adapt to the theater requirements in combat shows the flexibility of their personnel and serves as a reminder that in combat operations units may be required to perform unfamiliar missions while continuing to ensure the best possible medical care for the forces they support.

The U.S. Army had limited amphibious doctrine and experience prior to the United States' entry into World War II. They had viewed it as the Navy's responsibility to transport and deposit them on land, at which point the Army would be responsible for defeating the enemy there. In the Spring of 1942, though, the Navy's attention was held by losses to German submarines in the Atlantic, defending against the Japanese fleet in the Pacific, and replacing its losses from Pearl Harbor. This led the Chief of Staff of Army Ground Forces to conclude that "only the Army had the means and the grasp of the problem to plan, prepare, and train the necessary ground and air forces for joint amphibious operations." Engineers would turn landings into beachheads so follow on forces could push forward and logistics units could support the combat forces. The Army created six Engineer Special Brigades. Three brigades, the 1st, 5th, and 6th were designated to support the European Theater while the 2d, 3d, and 4th ESBs were assigned to the Southwest Pacific Area. The Army would find there were few times whole brigades were needed in one place, and subordinate units were often separated to

Shoulder sleeve insignia for all engineer special brigades.

provide capabilities for smaller landings.

The 4th activated on 1 February 1943 at Fort Devens, Massachusetts. Its organic medical unit, the 264th Medical Battalion activated with it. In June 1943 the brigade reorganized and the 264th reorganized as well, assuming its permanent structure of three clearing companies (A, B, and C) and a Headquarters and Headquarters Detachment (HHD). Clearing companies had 200 cots for sick, injured, and lightly wounded; they had capability for minor surgery. The unit trained at Camp Edwards on Cape Cod and later at Camp Gordon Johnston in Florida until April 1944. The 4th ESB and 264th Medical Battalion embarked in San Francisco and landed at Oro Bay, New Guinea in July 1944. This would be the last time the companies of the 264th Medical Battalion would all operate under their battalion headquarters for six months. In August Company A departed for the invasion of Morotai, landing on 16 September while Company C embarked for Cape Gloucester, New Britain in November to stage for the invasion of Luzon spreading the battalion over 1,500 miles of the South Pacific. HHD and Company B remained in Oro Bay supporting the force on New Guinea.

Medics from the 264th on New Guinea, 1944.
Courtesy Eric P. Montgomery, www.soldiersandsailors.us

At Morotai, Company A set up operations in a coconut grove about 100 yards from the beach operating out of tents and supporting the 544th Engineer Boat and Shore Regiment. Fighting on the island was minimal; the Japanese had only about 500 defenders compared to the nearly 28,000 combat troops in the invasion force. Still, Company A handled dozens of medical patients and some combat stress patients. Operations ceased at the end of October as the unit prepared for further movement to Bougainville in preparation for the invasion of Luzon. Both Companies A and C were attached to XIV Corps for that operation.

On 12 December both companies A and C departed Bougainville and Cape Gloucester on attack transports, landing on Lingayen Beach, Luzon on 9 January 1945. A Company landed on Green Beach and supported the 37th Infantry Division, setting up a clearing and surgical station one and a half miles south of Binmaley. By the 15th of January they treated 218 patients, including 170 civilians, many wounded during the three days of naval and air bombardment before the landings. Company C landed on Orange Beach in support of the 40th Infantry Division, setting up several hundred yards from the beach and in its first week treated 206 military sick and wounded, 3 enemy prisoners, and 72 civilians. From the 9th until the 17th of January evacuation was accomplished by ferrying the sick and wounded over the beach and out to medically equipped Navy Landing Ships, Tank (LST). Beginning on the 17th, though, casualties were evacuated by air. Three squadrons of L-5 Stinson Sentinels equipped with radios and capable of carrying one litter patient were dedicated to the air evacuation mission on Luzon. Beginning on the 10th of January both companies, A and C started receiving additional civilian casualties as division clearing stations emptied their wards in preparation for movement further inland. The Army's policy was to admit civilians "only to save life or prevent undue suffering" because of the unavailability of civilian treatment. As a result, most of the civilians reaching Companies A and C had significant injuries. The following day, though, other units received that mission.

As the divisions advanced through the lowlands leading towards Manila the mission of Companies A and C changed. In mid-January both were attached to the 263d Medical Battalion under the 135th Medical Group. While Company A moved several times along the beach at the southern end of Lingayen gulf, from Binmaley to Dagupan, and finally the town of Lingayen, Company C began operating as an aerial evacuation staging facility, holding patients long enough to ensure they were stable enough to be evacuated by air. In their first 13 days in this role they moved 518 casualties. On the 28th of January Company A relocated again,

this time to Mangaldan, where they set up a 300-bed clearing station and received patients from seven hospitals. Company C also relocated to Mangaldan and established a 300-bed convalescent hospital.

By this time HHD, 264th Medical Battalion and Company B had departed Oro Bay. Enroute the battalion XO performed an emergency appendectomy on a wardroom table using a borrowed surgical kit. The convoy debarked on Lingayen beach on 9 February. HHD and Company B collocated with Company A, and HHD resumed control of its three companies. During February, A Company coordinated air evacuation of 836 medical cases, 1521 surgical cases, and 148 combat stress casualties. Company C admitted 1152 patients to their convalescent hospital, as well as moving twice and changing mission to being another airfield holding unit. At the airstrip they also handled outpatient care on an area-support basis.

On the 16th, Company B closed their recently occupied facility and prepared for their own move from Mangaldan 60 miles south to East Mabalacat Air Strip near Clark Field. There they set up a 200-bed holding facility in ten ward tents, taking patients from four hospitals and a clearing station to prepare them for air evacuation. Many of their patients had severe injuries. Patients with head and neck injuries were given tube feedings, as were combat stress casualties described as psychotics. Plasma, sulfonamides, penicillin, and oxygen were administered as needed. Wounds were dressed and patients with colostomies were given intravenous fluids to replace lost salts and protein. Patients were held until they were stable enough for air evacuation and those whose condition contraindicated movement by air – asthmatics, sucking chest wounds, abdominal wounds, and head injuries – were instead transferred to the 98th Evacuation Hospital for water evacuation. 1,819 patients were evacuated by air from this facility before they received new orders to move to Manila on 18 March. There they established a 280-bed holding facility for patients awaiting water evacuation, but 10 days later had to expand to 480 beds working with a staff of only 114 enlisted men, 2 Medical Administrative Corps officers, 1 dentist, and 3 doctors. While only 8% were litter patients, more than 2,000 patients passed through their facility in two weeks. Company C's workload was similar, processing 1,598 casualties for evacuation from the Quezon airstrip by the end of March. Company A, still operating at Mangaldan, moved 1,338 medical cases, 1,280 surgical cases, and 329 combat stress casualties by air during the month of March.

Locations where the 264th operated in the Philippines. Created by the author.

During April the situation stabilized, with only short moves and no mission changes. Together, the 264th Medical Battalion's three companies evacuated 18,785 casualties from April to June. Casualty numbers declined in the following months. In July the battalion headquarters moved to Manila and set up tents in Rizal Stadium. As combat operations wrapped up, units began training for the invasion of Japan. The 264th's mission was beach clearing stations in support of the XIV Corps where they would collect, treat and evacuate casualties. Sections from Companies A and C would detach as on-board medical support on freight and troop carriers that would be employed for emergency evacuation of casualties. Casualty projections for the invasion were high, exceeding the dedicated medical evacuation capabilities of the invasion force.

That all changed in August with Japan's surrender. HHD, 264th Medical Battalion was reassigned from XI Corps to I Corps and on 28 August moved back to Lingayen, preparing to embark for Japan and occupation duty. Companies B and C were detached from the 264th and placed under the V Amphibious Corps. For the movement to Japan, Headquarters, 264th Medical Battalion was given the mission of a medical group, commanding two malaria detachments, an ambulance company, a medical supply platoon, a field hospital, and

an evacuation hospital. It was their job to oversee the orderly loading and transport of all those units for the convoy to Wayakama, Honshu, Japan. On 1 September Company A was detached and attached to the 25th Infantry Division but continued to operate their air evacuation holding facility until the 24th of September when they relocated to Tarlac to stage for movement to Japan and operate a dispensary for 25th Infantry Division troops. The three companies wouldn't depart Luzon until mid-October.

The HHD, 264th Medical Battalion and its collection of units embarked from the 13th to 15th of September and departed Lingayen Gulf on 20 September, arriving at Wayakama five days later. The seas were calm as Landing Craft, Vehicle, Personnel carried them to wading distance of the shore. From the beach they loaded trucks and traveled to Wakayama Military Hospital where they established a guard and set up camp. The attached units, with the exception of the two malaria detachments, were detached and dispersed to locations the Corps Surgeon had already selected. On 1 October the battalion headquarters was ordered to proceed to Osaka, along with the two malaria detachments, where they established headquarters on 6 October in a two -story building infested with fleas, roaches, flies, and mosquitoes. Over the next ten days while they worked to clean up the building they had eight assorted medical companies attached.

Occupation duty was largely uneventful. The units attached to the 264th Medical Battalion operated dispensaries while soldiers began redeploying to the United States for demobilization. The drain of personnel was so rapid that units were constantly consolidating, inactivating, and transferring remaining personnel to other units where the process continued. The three companies never came back under control of their battalion headquarters. In early November the battalion headquarters was directed to institute a training program so there would be someone to take over functions when key personnel departed. On the 30th of November LTC Wilbur R. Southward, Jr., who had commanded the 264th since its activation, was transferred out for return to the United States. On the 21st of December the battalion was notified that they had been awarded the Meritorious Service Unit Plaque (now the Meritorious Unit Award) and on 31 January 1946 the battalion inactivated.

From July 1944 to January 1946 the 264th Medical Battalion and its companies demonstrated their flexibility as an organization providing support not only to the 4th Engineer Special Brigade, but to the Army and Marine Corps units they supported during the invasion of Luzon and the occupation of Japan. The units were called to perform duties for which they had not been organized, equipped, or trained. Through the perseverance of their soldiers and leaders they not only performed the missions but excelled, treating and evacuating tens of thousands of casualties. This is perhaps best illustrated by a statement from Company C's report covering the first three months of 1945 during the invasion of Luzon: "*The unit functioned for eight days as a clearing station, 21 days as a convalescent hospital, 47 days as an air evacuation station, and spent six days making three changes in location."* The battalion headquarters was frequently separated from its units by great distances and for a brief period of time performed the functions of a group headquarters with only its small detachment of personnel. The 264th Medical Battalion's record of achievement through adversity deserves to be remembered.

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Food Supply in the Pacific
Nolan A. (Andy) Watson, ACHH

During WWII the American military supply system had to rapidly expand to support the often remote and isolated force in the Pacific. Supply chains were continually stretched and tested as U.S. troops advanced. Although the United States had considerable resources and logistical expertise, the procurement of food and ensuring its safety in harsh environments and over great distances was a constant challenge.

Isolation Part I: Fall of the Philippines

Originally the U.S. Army had operated in a garrison setting on the Philippine Islands but as the Japanese invaded in December 1941, American forces were pushed into rural areas. Food items from Philippine and other sources were blocked by the Japanese. Food that made it through Japanese naval blockades or land battle lines, were in quantities too small to sustain the defenders, or the material was in various states of deterioration.

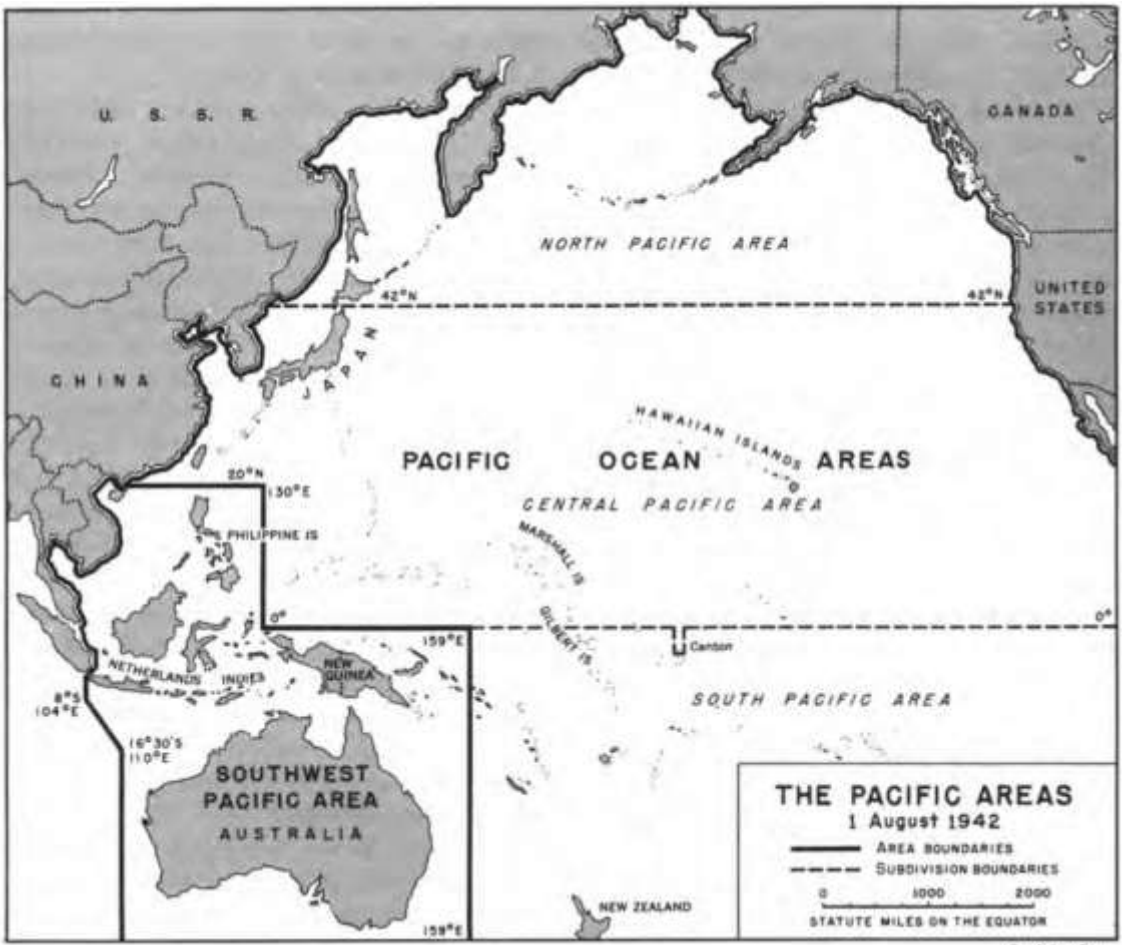
Surrounded American forces consumed available rations, then half-rations, quarter-rations, and finally tried to forage from the local area. By May 1942 sources dwindled. Military horses and wild animals, such as monkeys and bats, were butchered and consumed, but these sources did not provide adequate amounts of nourishment. Disease soon followed malnutrition, and surrounded American forces capitulated.

Building Support and Supplies

As America fully mobilized for war, plans to create and feed a very large military were enacted. Food oversight committees were created and government food inspection agencies such as the Bureau of Animal Inspection of the USDA, and military veterinarians were tasked with inspecting billions of pounds of food for military consumption.

The huge Pacific area was divided into sections for operations, and resupply. In addition to items from CONUS that had a longer shelf life, Hawaii was an early choice to provide food items for operations within the Central Pacific Area. There were limitations in the amount and type of food provided from Hawaii. Pineapple and sugar production dominated its economy and imported food from CONUS was needed to support the civilian population; however, it was a necessary staging area for naval and aviation operations, and it provided much needed refrigerated warehouses.

As troops advanced into the Southwest Pacific Area, the U.S. needed additional sources of food and greater quantities. America sought the aid of allies Australia and New Zealand. These countries had large marshalling areas, but at the



Pacific sectors. U.S. Army

time, their food industries were not mobilized to feed additional armies. Australia could provide meats, grains, fruits and vegetables, but farming was not concentrated near port areas. Similarly, crop production was not yet at industrial-sized capacities. New Zealand had similar issues.

Both countries had smaller populations of farmers and the increased production of food was at first a shock to their farming and food industries. American veterinary personnel guided food inspection at production sites. This was especially necessary in New Zealand where veterinarians were in short supply. Both countries had issues with milk production, since many dairy herds were infected with tuberculosis. Labor shortages also plagued the countries, as they supported their own armies too. Despite the challenges, it worked. For more than two years Australia furnished over half the food consumed in the Southwest Pacific Area. New Zealand provided relatively more food products than Australia.

Even with massively increased food production, moving supplies to front lines was a problem. CONUS, Hawaii, Australia, and New Zealand produced millions of tons of food, but how would it get to service members? Obviously, ships were a necessary part of the supply chain, but they are slow and could be blocked. Aircraft could move material quickly and over great distances, but aircraft can only handle smaller portions. Both modes of transport relied on island depots to increase their effectiveness, with refrigeration on ships and some islands lengthening the usability of perishable food.

Problems Enroute and Local Procurement

In the Pacific, food and other supplies could be readily supplied where opposition was overmatched; ships could readily move and unload. When the enemy could contest operations, logistics was more of a problem. Moving inland also stressed supply lines because there was little infrastructure.

It should also be noted that long-term "living-off-of-the-land" or foraging is not a viable option for a larger group. "Coast watchers" that provided invaluable reconnaissance serving behind enemy lines often foraged while being virtually stranded on isolated or occupied islands. Working alone or in very small groups, they had very meager supplies and often relied on friendly locals to provide food sources. In addition to the precarious friendship, it added stress to a local population that might already have limited food resources.

The Battle of Guadalcanal offers insight for food issues. The invasion begins with problems. The Marines sent to secure Guadalcanal in August 1942 lost their supply chain as naval escorts moved away from the island to maneuver against Japanese forces. There were additional complications. The hurried nature of deployment cut the amount of rations brought forward, and hasty departure of the transport ships reduced the amount unloaded. While preparing for the invasion, supplies packed in cardboard were thoroughly drenched by tropical rains and fell apart. Other containers lost structural integrity and were crushed. Finally, a portion of Marines of the invading force were recovering from quickly losing weight (some estimates are 16-23 lbs. for the afflicted) during the journey from CONUS since 1) meals aboard the U.S.A.T. *Ericsson* (troop capacity 5,400) were limited to two per day, with one being a soup meal and 2) the onboard bakery ran out of shortening for bread and used oil substitutes, which probably caused the diarrhea that affected 40% of the Marines.

Isolation Part II: Guadalcanal

Once on the island, the Marines pushed forward successfully, but rations were still limited. Marines eagerly sought and consumed available stores of rice, fruit, and other food when they captured Japanese positions. Weeks into the invasion an airfield was captured, improved, and named Henderson Field. When it was captured the Marines also found 100 pound bags of rice as well as tea, hardtack, dried kelp, noodles, canned goods, and large quantities of beer and sake, which were necessary and welcome supplements. The airfield was primarily used for fighter aircraft and was frequently under attack, but it could receive supplies as well.

Even so, American units were still operating in remote portions of the island and stretching rations. Airdrops were tried. Parachutes were not available, so items were wrapped in burlap or canvas and thrown from bombers. "On 13 January [1943] a B-17 dropped 7,000 pounds in four flights, and two days later another dropped four tons. Rations stood the rough treatment fairly well; 85 percent of the food was usable, but only 15 percent of the ammunition could be used, and nearly all the 5-gallon water cans were ruined."

A primitive road system was created, but only for use in rear areas and it was very susceptible to recurrent tropical storms. As U.S. naval forces secured water and air routes, the resupply system improved. Through continuing battles and attacks the invasion succeeded.

Rations and Clothing

The rations usually served to troops in combat were the C and K rations. These were nutritious but somewhat greasy for use in the tropics. The C ration consisted of prepared meals—meat and beans, stew, or meat and vegetable hash in the dinner ration, and biscuits, candy, and a concentrated beverage powder for breakfast—packed in tin cans. One day's ration weighed over five pounds, and was bulky and heavy in a man's pack. The concentrated nonperishable K ration included a small can of cheese or meat paste, biscuits, candy, beverage powder, chewing gum, and two cigarettes. It was packed in waterproof paper packages, was lighter than the C and easier to pack. But most men found the cold K rations tiresome, and agreed that the C ration, whether hot or cold, was wearisome.

Men did not carry complete mess kits into action with them. A canteen cup and spoon sufficed each man. Both C and K rations could be eaten out of the containers with either hands or spoon. Means of washing mess kits thoroughly were not to be found at the front, and to eat from an improperly washed kit led to violent diarrhea.

In the rear areas, when kitchens and messes were established, hot meals were served. But they were little better than those at the front, for they were prepared from canned and dehydrated meats and vegetables. There were virtually no fresh foods—eggs, milk, butter, or meat—then available on Guadalcanal, and shipping and refrigerator space was too scarce to ship such commodities for anyone but hospital patients. The only fresh food most men tasted during the campaign came from a shipment of turkey, fresh potatoes, oranges, and celery brought in for their Christmas dinner.

A description of American rations and food on Guadalcanal.

The tables had turned on the defending force. The Japanese Navy had similarly maneuvered away from the island in order to take on the U.S. Navy, leaving Japanese troops without a strong supply chain. Working on the food problem, Japanese forces at Rabaul (1,000 km to the northwest) packed rice in empty gasoline drums, roped fifty together, and loaded four of the 50-drum bundles onto the deck of a destroyer. The destroyers would then travel to Guadalcanal. Arriving at night, the drums were sent overboard to float in with the morning tide. Destroyers transported over 20,000 drums, but it is thought that Japanese troops on shore recovered less than 30 percent. Some were destroyed on the coral reefs, and the ropes often broke. Also, Allied fliers strafed them whenever possible. Submarines and airdrops were also used for resupply as the air over the island stayed contested.

Despite these novel methods of resupply, the quantities fell short of providing enough food or supplies for Japanese troops. In some cases Japanese soldiers conserved their ammunition and lubricating oil for their guns in order to be able to hunt wildlife in the jungle terrain. Just as with American forces on different long-term island campaigns, gardening efforts were encouraged to provide fresh vegetables. Ultimately, Japanese forces could not hold the island.

In conclusion, these are just a few examples from many operations that took place in the Pacific during World War II. The challenges were immense and worthy of consideration. For brevity, and to maintain focus on food supply, the essential issues of clean water, combating malaria, and field sanitation were not covered. It should be noted that even with an adequate supply of food there were additional problems. From a soldier interview during operations in Papua, New Guinea:

> The men had been poorly fed. They were, for the most part, on the Australian ration: hardtack, bully beef, and tea, supplemented by a little rice. Because the unceasing wet had made it virtually impossible for them either to heat the ration or to boil water for tea, most ate the food cold and threw away the tea. The bully beef (corned, preserved beef of Australian manufacture) came in large, four- or five-pound tins. It was not only unappetizing, it often had a revolting fish-oil taste that caused some of the

troops to retch when they tried eating it.

Many of the tins had become contaminated: some had been contused or sprung when they were dropped from the air; others had been left out in the open without cover and had rusted. This contamination, together with the impossibility of sterilizing the few eating utensils the troops had with them, and the tendency of the oversize cans of beef to spoil before they were completely consumed, had its effect. Acute diarrhea and dysentery gripped most of the battalion, and many of the men had to cut holes in the seats of their trousers, so completely had they lost control of their bowel movements.

Chow line along a muddy trail. 128th Infantrymen, 32d Division en route to Oro Bay from Pongani. New Guinea.. U.S. Army image.

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Medical Support Behind Enemy Lines
Dr. John W. Downs

On 26 January 1945 the 6th Ranger Battalion was ordered to raid the Cabanatuan prison camp, 30 miles behind Japanese lines. There were around 500 Allied prisoners there, and U.S. 6th Army commander LTG Walter Krueger was worried they would be killed if U.S. forces moved slowly. The mission needed to be on the 29th, and the Rangers had little time to plan. 120 men went forward, marching with Filipino guerrilla guides; other guerrillas went into villages along the route and had dogs muzzled and chickens cooped so their noise would not warn Japanese troops. The attack had to be delayed a day (Filipinos warned of major Japanese troop movements) and the Rangers made final arrangements. CPT James Fisher, MC, the battalion surgeon, used the time to coordinate with Dr Carlos Layug, who provided medical support to the nearby guerrillas. Layug and his assistants would operate a main aid station about 2.5 miles away with their limited equipment, while Fisher went forward with the attacking troops. He knew how little equipment Layug had, and sought to mitigate that by going forward himself. Unarmed Filipinos would also go forward as litter bearers. Carts were simultaneously gathered to carry prisoners who were too weak to march out. Fisher had coordinated with the 92d Evacuation Hospital in hopes that light aircraft would be available for evacuation, to warn them of incoming patients, and urge them to stockpile food and clothing.

During the night of 30-31 January the Rangers and Filipino guerrillas attacked the camp, blocked Japanese relief efforts, and rescued all the prisoners. Fisher went forward, but was hardly needed: there was only one other seriously wounded man. Fisher, however, was mortally wounded. The evacuation worked smoothly, although the prisoners were weak and more and more carts were needed to carry them out. The Filipino support was part of the many pieces that came together to make the mission successful.

Adapted from Dr. Downs' article in *AMEDD Historian* No.13.

Ranger CPT James Fisher, MD (left) with Ranger CPT Bob Prince a few hours before the raid on Cabanatuan. Photo used with permission from the Alamo Scouts Historical Foundation.

New ACHH Archival Donations:

Ten black and white photographs. Regina E. Bacon served as an Army Nurse with the 21st Station Hospital during World War II.

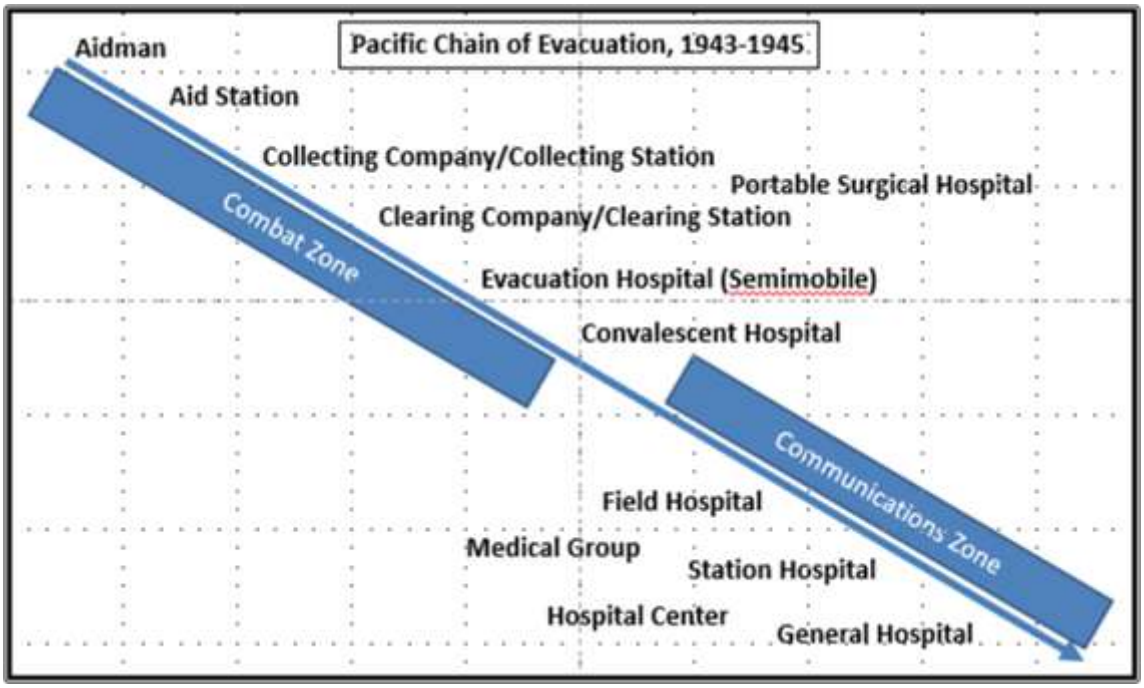
One 1880s tintype. Various images from WWI and WWII: eight panoramic photographs, three black and white photographs, and one postcard. Donated by COL (Ret) Keith Sharples.

Hospitalization and Evacuation in the Pacific: WWII through Vietnam

WWII

Before WWII, AMEDD force structure was intended for operations on a continent. Hospitalization (whether for surgical or medical reasons) would start in the Combat Zone (CZ, basically in division and corps areas) and once a patient was stable they would be evacuated by ground ambulance or ambulance train to Communication Zone (COMMZ) hospitals. In the COMMZ they could receive longer-term care. They might be able to return to duty from the definitive-care General Hospital, from a Convalescent Hospital, or from lower-acuity Station Hospitals that supported personnel stationed in an area. If their condition was too serious, they would be evacuated by water to CONUS, although air evacuation began in 1943 and increased as clinical experience with air evacuation showed it was safe for more patients.

That structure would falter amid the islands and small beachheads so typical of the Pacific. It would also fail in the China-Burma-India theater because it envisioned far better transportation infrastructure than existed. Evacuation had to change, but hospitalization started changing first. Portable Surgical Hospitals (PSH) were created to go with small task forces, and provide forward care when evacuation would be delayed. Field Hospitals were created during WWII, able to operate either a 400-bed facility or three 100-bed platoons. Platoons were often attached to infantry divisions, or complete hospitals could operate in rear areas. Evacuation hospitals were used when there were enough troops ashore (typically more than two divisions), which also meant a large beachhead so they were safely to the rear given the enemy's lack of long-range fires.

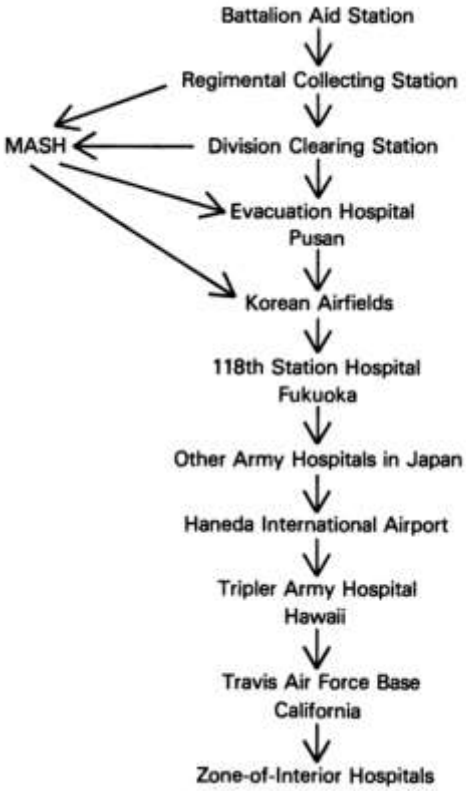


Evacuation by air had to be improvised until Medical Air Evacuation Squadrons (which had no dedicated aircraft, but flight surgeons were assigned to select patients to evacuate and flight nurses and medics to accompany them) arrived in the Pacific. Alternatives to hospital ships were improvised, including using Landing Ships, Tank as hospitals when small medical teams were attached. Given the geography ground evacuation was only for tactical purposes.

The COMMZ concept was certainly used, and with the hospitals structured for European operations. But they were further in the rear, perhaps hundreds of miles. Since U.S. forces were widely dispersed (few bases were closed until late in the war, even if the front had moved several time zones away) many station hospitals were needed. Their size would vary based on the number of troops in an area, and hospitals could be down-sized by moving personnel where they were needed. General Hospitals were never put near the fighting, but numerous GH were deployed because of the large patient population and limited pharmacopeia: definitive care for disease often meant prolonged hospitalization, just as much as definitive care for wounds did. With tropical diseases endemic, and malaria treatment taking roughly a month, many hospitals were needed. When these were grouped together, a Hospital Center was established to manage their combined resources and facilitate receiving large numbers of patients.

Over the years of WWII, most patients returned to duty. Theater policy varied, but usually if a patient was likely to recover within 120 days they were kept; only those with longer recovery times would be evacu-

ated to CONUS. That was part of why a large hospital system was needed, but that system meant hundreds of thousands of patients returned to duty forward, with no need to evacuate them to CONUS, identify a replacement, and ship that soldier forward.



Korea

In Korea, the CZ/COMMZ split still existed. Mobile Army Surgical Hospitals (MASHs) had been established for forward surgical care (60 beds per division) but early in the fighting they were expanded to 200 beds and essentially replaced other forward hospitals. Given the proximity to Japan, the fixed-facility Army hospitals there were expanded rather than deploying many more hospitals to Korea. Rail evacuation was common in Korea, from forward hospitals to rear ones, and air evacuation became more common than water evacuation back to Japan. Again, Pacific geography drove decisions on what units to deploy and how they would operate. Even early in the operation, when casualties were straining the medical system, about half of patients were able to return to duty without leaving Korea. Once the hospital system in Japan was fully staffed, around 80% of patients were able to return to duty with 30 days.

Vietnam

The guerrilla war in Vietnam meant the Combat Zone/Communications Zone concept made little sense. Instead, combat zone types of hospitals were deployed but operated in an area-support role. Hospital moves were very rare. Instead, hospital facilities were over-built so that medical personnel could be moved to support more intense combat operations. (Thus the designation of a hospital became almost irrelevant, and a "60-bed MASH" could be operating more beds than a "400-bed evacuation hospital".)

There was a COMMZ, but it was offshore. U.S. ground troops were sent in 1965, and the AMEDD buildup included 3,500 hospital beds in Japan since that was an easy flight away. Japan had a better climate for patients, and obviously patients (and hospital staff) there were not at risk of enemy attack. Patients would stay in Vietnam if they were likely to return to duty within 30 days, and were evacuated to Japan if they would recover within 60 days. Other hospitals in the Philippines and Okinawa were also used, and patients who would need lengthy recover periods were returned to the US.

One COMMZ unit that was deployed to Vietnam was the 6th Convalescent Center. Early in the war it handled sick (largely malaria patients) as well as wounded, and returned 96% of patients to duty, the equivalent of 1-2 battalions of soldiers each month.

Conclusion

The current Roles of Medical Care have replaced previous experience of utilizing the COMMZ for theater-level hospitals to return soldiers to duty. There are no Army medical units to serve as evacuation, convalescent, station, field, or general hospitals in the COMMZ. Relying upon fixed facilities currently in Japan to support the INDOPACOM will bring about similar problems faced in the past. In the Korean War, few patients evacuated to Japan returned to combat. During Vietnam, the hospital center in Japan was effective, but logistics were uncontested. In a future conflict there will be challenges: we have no deployable units intended to return wounded to duty, and both evacuation out of theater and returning to theater would be subject to contested logistics.

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Medical Civil Affairs in the Philippines, 1945

By David Smollar

In the steamy dawn of Friday, May 4, 1945, hundreds of Filipino residents in the western Leyte port of Palompon lined the shore along the Visayan Sea. The special U.S. Army team known as Philippine Civil Affairs Unit (PCAU) 17, after four months of helping to heal and jump-start their war-torn community, was sailing to another island needing aid. For more than two hours under an already baking sun, they watched the LST slowly leave the pier, serenading the departing soldiers and wishing them Godspeed.

"The local citizens sought us out to wring our hands, thank us, and bless us, and thank us again in their own version of Bon Voyage," the medical officer with PCAU-17 wrote home.

> Lots of emotion was expressed. A real poverty stricken mother of a skeletal child I saw during the first days after fighting stopped, reckoned now as long ago in 'war time,' handed me a dozen fresh eggs. Another former patient gave me fried chicken. The hospital men and women, they financed a pair of house slippers and tea cloth as a 'thank you' for me. You know, I'm pretty gruff, and I was often damn tough in getting these people to understand how to fight illness and disease, but all this made me, well, downright sentimental. It feels good to know that for them a hospital is no longer a place to shun, not a place to go to die, but rather a place to go to get well.

The medical officer was my father, Leo Smollar. The team of 10 officers and 39 enlisted men had assisted tens of thousands of Filipinos to recover medically, educationally and economically from three years of Japanese military occupation. It was one of 30 special units that, between October 1944 and July 1945, followed the combat troops retaking the Philippines island by island. Each provided immediate food relief, reopened schools, helped local government re-emerge, assisted fishermen and farmers to resume work, and set up hospitals and clinics to treat war wounds and endemic disease.

MAJ Smollar at his dispensary.

The PCAUs were the brainchild of US General Douglas MacArthur and his civil affairs staff. In May 1942, MacArthur escaped by submarine from the Philippines as the Japanese army closed in on U.S. forces isolated on the island of Corregidor in Manila Bay. MacArthur had held military and government posts in the colony on-and-off since the early 1900s and felt a close attachment to its people. In planning to retake the islands, he felt deeply that his prestige was linked to successful post-combat civil recovery.

MacArthur's top civil affairs planner used as his template for the strategy the 1944 story *A Bell For Adano* by novelist and war correspondent John Hersey. The book fictionalized the bungled effort by Allied forces in 1943 to restore civil society in Sicily after German withdrawal, where combat officers micromanaged beleaguered civil affairs personnel. In an oral history, Lt. Col. Joseph Rauh recalled, "I've always said that I helped write the plan based on the novel. I read it, and reread it, and read it again; a marvelous book, it taught you how to do civil affairs."

The final plans called for the 30 teams to revitalize combat-damaged areas with as little meddling as possible from regular military units. The idea was that self-contained teams would allow for a shorter period of military government and prepare the islands for independence, promised by the U.S. before the 1941 Japanese invasion. The officers had specialties in medicine, policing, agriculture, labor relations and administration; enlisted men came from Filipino-Americans in California who had volunteered for all-Filipino regiments to fight in the Pacific.

My father knew nothing of this background. In October 1944, he was taking advanced coursework in tropical medicine in Hollandia, British New Guinea—he was in the Pacific because of that expertise—when word came in early November designating him as medical officer for a civil affairs unit. For the next several weeks, PCAU units 9-20 crammed information on Filipino language, politics, economics, and related topics. (The first eight units had gone ashore in the initial invasion of eastern Leyte on October 20.)

The units sailed on December 21 from Oro Bay in Dutch New Guinea as part of a 48-ship troop convoy zigzagging its way to Leyte. Ashore at Dulag city on December 28, his team waited for equipment to be

offloaded amid stifling heat, humidity, monsoon rains and nightly air raids. On January 3, PCAU-17 moved west over tortuous mountain roads and set up in Palompon, the scene of heavy fighting through Christmas Day and at the base of mountains where an estimated 25,000 Japanese troops remained scattered but potent. American air and artillery bombardment had pummeled the town, with only two buildings left undamaged; it swarmed with refugees the retreating Japanese forced to the coastal plain.

The first of many medical reports that my father, along with other PCAU doctors, filed weekly to MacArthur's headquarters in Australia provide only a staccato-like glimpse into Palompon's initial medical situation. One tent hospital with 27 beds, all filled, 17 civilian war casualties; two dispensaries (clinics) with 1,122 patients, a third of them with tropical ulcers (skin lesions known as jungle rot) or yaws (a bacterial infection where skin and bones swell), 396 serious cases. His letters personalize the human suffering in the statistics.

> The population has been underfed, under-clothed and overworked by the Japs. Many, many cases of worms and parasitic infestations. Child mortality is high. Vitamin deficiencies and beri-beri are widespread. Tuberculosis is high. Sanitation is very poor. Most common diseases are intestinal and spread by bowel movements done everywhere. Must alter the custom of defecating whenever and wherever urge comes. No hospital but only a half-destroyed two-room structure used as a clinic. The sick are numerous and there's a continuous stream of civilian infected and wounded, some deliberately bayoneted by Japs. It's more than enough to make your heart bleed.

In the first week, PCAU-employed laborers cleared rubble along the shoreline for a permanent 50-bed hospital in addition to the tent facility. In a single day, January 6, my father treated 200 starving refugees in rags, vaccinated for smallpox 35 children, and lectured a large group on how to dispose of human waste and avoid gastro-intestinal diseases. But death was everywhere, including for American soldiers in what MacArthur had called mopping up. Wrote my father: "Watching wounded come in is not the prettiest pastime. You can tell the dead at first sight by the undisturbed flies on the yellowing white skin or face or whatever anatomical surface you can see. The real job of mankind should be war prevention, just like disease prevention." Equally wrenching were the ulcerated children, "so many emaciated, undernourished, with even two- three- and four-year olds suckling at their mothers' breast, so deficient has been the diet under the Japs."

There was danger even behind the lines. The PCAU's commanding officer and four enlisted men were killed 16 January on the same mountain road when Japanese ambushed a supply convoy. In late January, he rushed north to Villaba town, where nasty fighting raged with many casualties, military and civilian—and where a few rounds of friendly fire were directed by mistake toward his boat. From January to March there were nightly Japanese air raids, when he would climb out from his slit trench to hear civilians calling, "Doctor Smollar, come quickly, there are wounded" and throw clothes over pajamas and rush to the hospital.

A PCAU assistant vaccinating a child.

My father was never able to procure laboratory and related equipment for PCAU-17, so he worked without a microscope, x-ray equipment, or specialty devices. "It's heart-wrenching to have to send someone home with aspirin knowing that the patient could die" for lack of surgical equipment. Though trained as an internist, he began to perform operations out of necessity. In February, he did his first major surgery, amputating a hand above the wrist on a patient whose fingers and thumb had been blown off by vengeful Japanese. The following week he performed an emergency amputation of an arm to save a fisherman, and did an appendectomy for an elderly woman. He undertook a knee surgery five days later. "I finally chiseled a surgery book from a combat medical unit and that's helped a lot. The only thing I dread now would be a case of demanding bowel surgery."

His first encounter with Japanese prisoners came in late January, brought to his hospital by Filipino guerillas who had captured them in the hills—one with a bullet wound to the chest.

> The MPs from the PCAU had to protect them because they would have lasted about two minutes if the local civvies got

their hands on them. Giving them medical help seemed strange at first. It's the first contact I've had with the Laws of International Medicine and it brings home the emotional contradiction between war and law. They were so underfed and pathetic, and although I realized they were enemies, and dangerous ones if they had weapons in the hills, I could feel no personal animosity. All of this intrudes on the glamorization of war from armchair philosophers.

By early March, the Palompon region was slowly on the mend. The PCAU had established a system of food distribution, price controls, and retail stores. A few farmers had returned to fields and daytime fishing resumed as a Navy embargo loosened. Schools were functioning and some local government functions had been handed over to Commonwealth officials. The town received a working short-wave radio.

The weekly statistical reports throughout March showed a decrease in hospital admissions to an average of 16 a week. Four clinics now operated in the region; almost 2,000 residents were being seen weekly for non-combat injuries or illnesses, with dysenteries, vitamin deficiencies, tropical ulcers and tuberculosis cases still predominating, though many less severe. "People have filled out. No longer do I see that look of hunger, the signs of under- and malnutrition," though "fat and chubby persons are still unusual. I can now leave the community with a functioning medical system where there was none when I arrived." A handful of Filipino doctors had come back to the area and were working alongside my father. "They will gain in competence and sooner or later they have to take over and sink or swim, so I am starting to do more supervising now." On March 26, the hospital got electric lights. This made refrigeration possible for long-term medicine storage.

There were still bad days. On March 26 a year-old child came to the hospital with severe amoebic dysentery, too late to save. "It's depressing that the baby would have lived easily had the mother brought it here earlier but many still never come in time." He took pride in the large number of smallpox and typhoid vaccinations for children. Sanitation continued to vex him. "It's just hard work because squatters [those accustomed to squatting to defecate, not sit on a toilet] don't like box latrines. We have seen some improvement because the CO has had 14 people arrested for indiscriminate defecation. Usage is now up but we have to hope the local officials will keep on it after we are gone."

Top: Filipinos providing medical care under PCAU auspices as the Philippine government rebuilt.
Bottom: Infants recovering from malnutrition through PCAU efforts.

The PCAU's May 4 departure was to northern Mindanao, the latest island invaded in the Army's methodical advance. With the island more developed than western Leyte, my father spent much of his time there on administration, plying dusty roads in a jeep checking on clinics and supplies, or making two-day boat trips to the farthest reaches of PCAU 17's responsibility. In one clinical encounter, 12 Filipino women with venereal disease were brought to the main hospital after being freed from an inland town. Japanese soldiers had forced them to work as prostitutes. "They make us work just like carabao (buffalo)," they recounted painfully to my father.

By July, his team was one of only five PCAU still functioning as the Commonwealth government assumed most civil functions. My father learned that his singular labor of love in the Philippines, the Palompon hospital, had been closed, along with other PCAU facilities, because Leyte health officials could afford only one regional hospital. One clinic remained to continue the sanitation effort. He wrote bitterly, "There's no use discussing the reasons because these things always boil down to money and politics, and of course there is nothing I can do. My efforts count for about as much as a cockroach in a restaurant." But similar closings and consolidations took place on every island, as the American propensity to "save the world" ran up against real world barriers of time, money and culture.

In his August 1945 final report on Philippine Civil Affairs, Mac-

Arthur stressed that the units prevented widespread starvation, epidemics and public disorder, all real fears at the time of his island-by-island invasions. A top civil affairs aide, Lt. Col. Edgar Crossman, wrote that the "nearer that Army units got to the fighting, the more the Army appreciated civil affairs" because PCAUs relieved combat units of responsibility for civilians. A PCAU public relations officer, Capt. Ted Sendak, noted that the "we know best" attitude among Americans sometimes grated on Filipinos, who nevertheless remained grateful.

And my father came around again to a more positive view of his time in the Philippines, despite his deep disappointment that much of the work now seemed ephemeral. In a letter shortly before sailing home, he wrote, "We kept the civilians out of the Army's hair and did a lot of health and welfare assistance. I realize that it feels good to know you've done something, that in the midst of war we made even a start toward future progress."

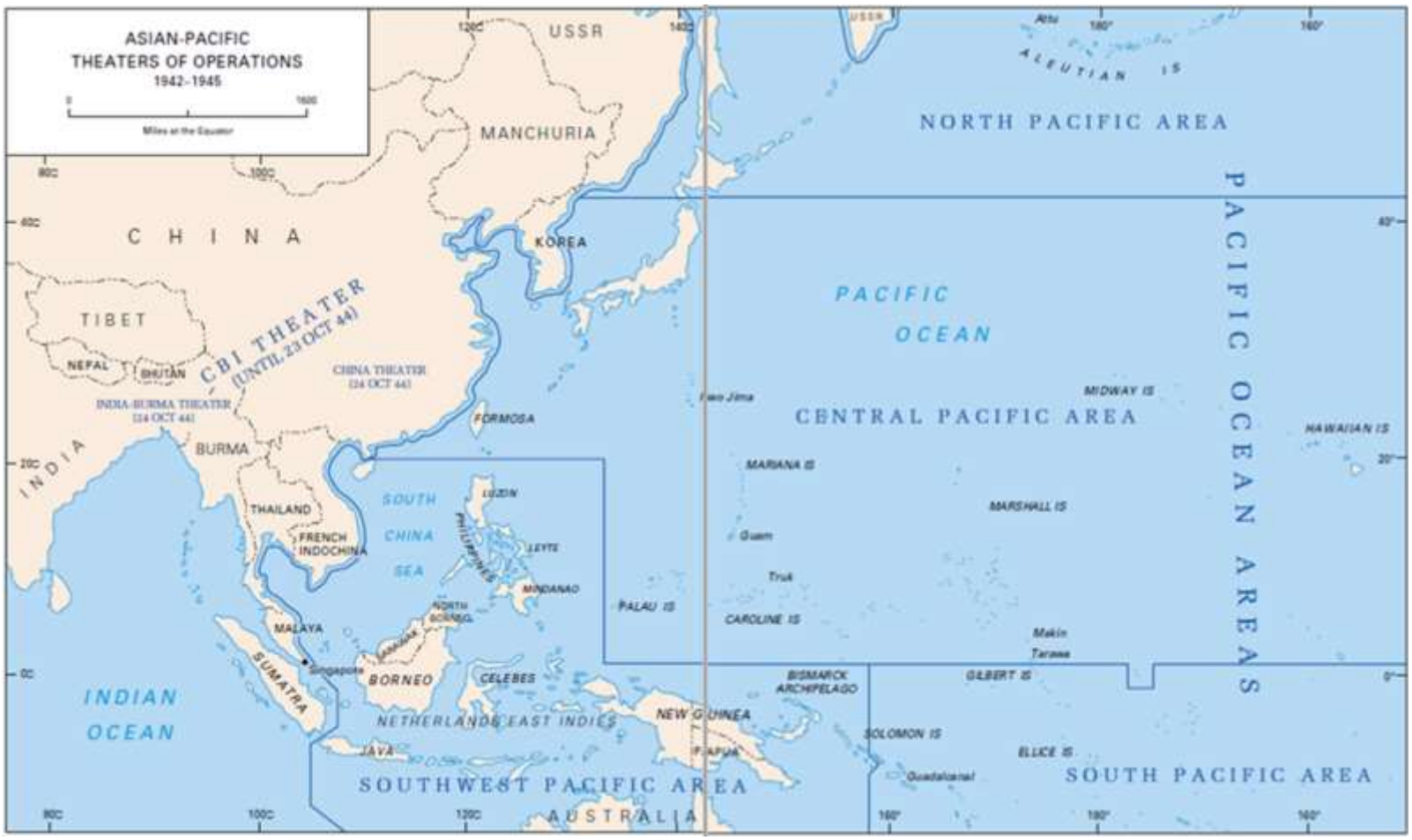
This is abridged from Mr. Smollar's article in *AMEDD Historian* No.14.
All images courtesy of Mr. Smollar.

(continued from front page)
Adjustments were also needed for the varied climates that were often tropical. Moving medical supplies for treating combat wounded and prevention of diseases are serious concerns, as are the availability of food and clean water.

Faced with these challenges the Army and its medical personnel persevered, searching for solutions. Whether on "island hopping" or mainland campaigns, combat and medical support in the Pacific is worthy of consideration.

Loading patients in ambulance plane. Evacuation of casualties by plane. At Maingkwan, Burma - 151st Medical Battalion. Patients brought by ambulance from 42nd and 46th Portable Surgical Hospital below Walabum, Burma. Patients flown to Ledo for 73rd Evacuation and 20th General Hospitals. Patients wounded less than 24 hours previous.

Image courtesy National Museum of Health and Medicine



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