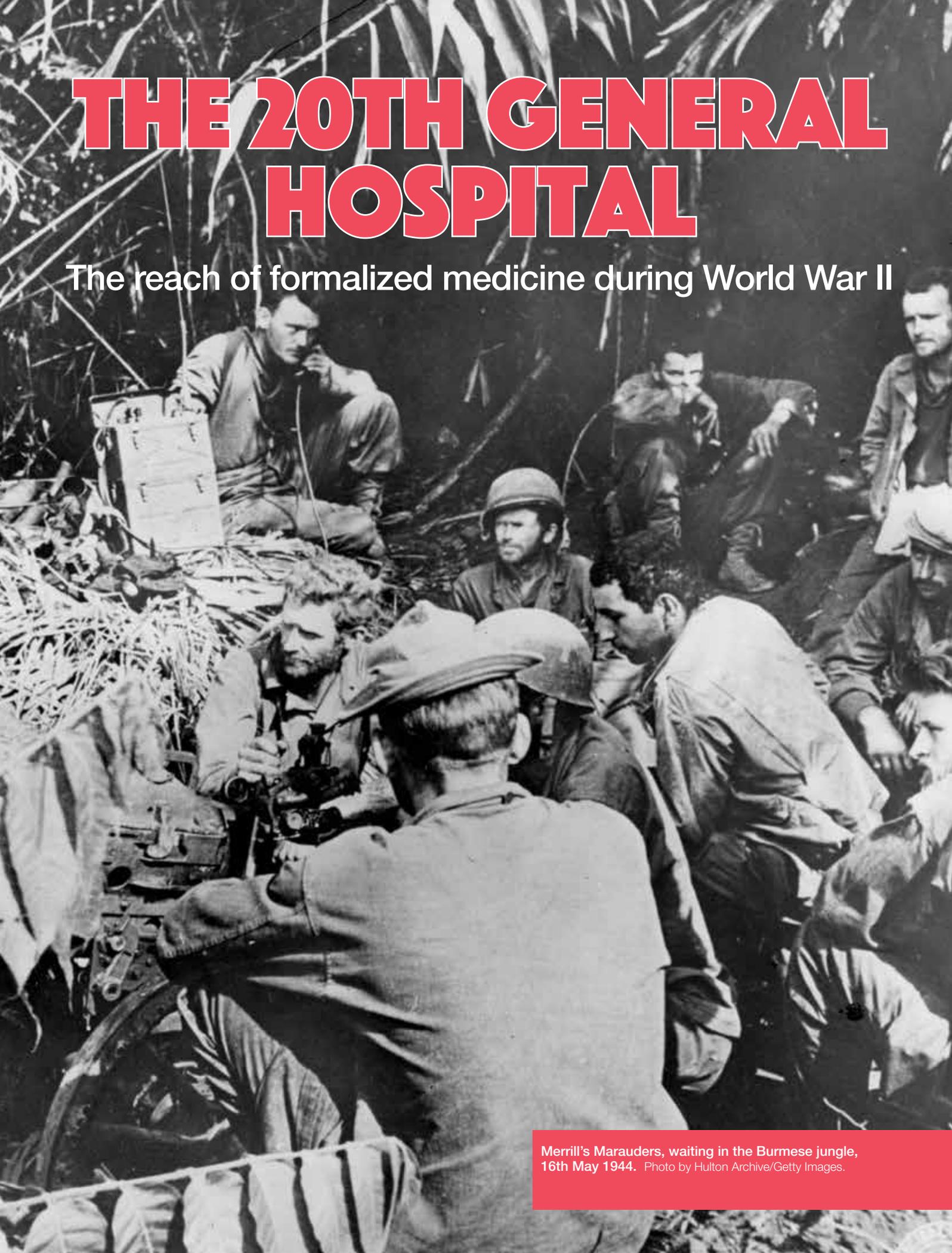


THE 20TH GENERAL HOSPITAL

The reach of formalized medicine during World War II



Merrill's Marauders, waiting in the Burmese jungle, 16th May 1944. Photo by Hulton Archive/Getty Images.



Entrance of the 20th General Hospital, circa 1944. From the Collections of the University of Pennsylvania Archives.

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It was a glorious night and turned the distress of India into a mirage of heavenly softness and romance.

—Rev. Louis Meyer, 20th General Hospital¹

In the aftermath of World War II, a traveler to the town of Ledo, in the far northeast of India, would have found a curious site. As the rest of the country was ablaze with the India-Pakistan partition, Ledo was newly quiet. The steady drone of machines no longer penetrated the dense jungle. Instead, the sound of monsoons and wild birds reigned.

If a traveler could avoid the groups of Chinese bandits flourishing within the post-war power vacuum, a narrow road snaking through the mountainous jungle, now pot-holed and covered by landslides could be seen. At the western terminus of this road, near Ledo, stood a single structure in a clearing. It had been a chapel, property of the United States Army, but post-war belonged to a well-armed Indian contractor who used the structure to stockpile surplus war products purchased from the former tenants.²

By 1947, no other structures surrounded the chapel-turned-depot, but to those who were there two years before, the setting was unmistakable. For them, the area around the chapel was the nucleus of their wartime lives from 1943-1945.

It was a medical beehive, home to 289 buildings and 162 tents that treated more than 73,000 patients.

It was where they carried out the activities of daily

The 20th General Hospital



Bulldozer clearing away a landslide that covered Ledo Road, 1943. Credit: Bernard Hoffman / Contributor.



Fighting nurses of the jungle on the India-Burma border, 1943. Credit: Betmann / Contributor.

life, both familiar—eating, washing, and working—and unfamiliar—hunting snakes, mending mosquito nets, and battling dysentery.

For them, that clearing was the 20th General Hospital of the United States Army.³

For those who were not there during WWII, it could be tempting to see that clearing in the jungle as little more than a shadow of a vestige, a hidden reminder of a terrible conflict. However, the 20th General Hospital is an example of the arc of military medicine in WWII.

When the doctors and nurses arrived in Ledo, the hospital was little more than a mud pit. By the time they left, the Army had poured enough precious assets—doctors, nurses, food, logistics—to turn a jungle into a fully-equipped modern hospital.

Hospitals such as these were built across U.S. military zones, but the 20th General Hospital reached a far corner of the war in a distant jungle, a demonstration of the ubiquity of modern medicine in the U.S. Armed Forces. The creation of this hospital is a story of the U.S. Army's commitment to formalized military medicine during WWII.

Despite requiring tremendous resources, this medicalization of warfare yielded a strategic advantage for the Allies. In the words of General Raymond Kesler, “The 20th General Hospital would be outstanding anywhere in the world, and is the equal of university hospitals.”⁴

The 20th General Hospital delivered state-of-the-art health care in the middle of a malarious jungle at the end

of the longest supply line in the war. Its story represents a drastic departure from a time when disease killed more soldiers than the enemy.

From ancient times to the Burma jungle

“War is the only proper school for a surgeon”

—Hippocrates

Since the ancient world, advances in medicine have been motivated by war. In ancient times, soldiers received care from physicians, while civilians were under the care of priests, and the priest's medical advice was typically valued over the physician's. This hierarchy often broke down during military campaigns. Separated from priests, wartime military physicians were free to develop treatments by empirical means.

World War I was the first major international conflict where modern medicine entered the battlefield. As a result, many historians focus on this conflict, leaving a relative paucity of scholarship on WWII medical history.⁵ Still, many who study the history of medicine in WWII conclude that the most revolutionary feature of the conflict was the inseparability of the military and medical establishments.

During WWII, medicine was, for the first time, seen as a vital military resource, cementing both the “medicalization of the military,” and “militarization of medicine.”^{6,7}



General Stilwell and Dr. Ravdin, right, visit wounded soldier.
Credit: cbi-theater.com.

During the conflict, modern medicine followed modern warfare to all theaters of war, even into the remote jungle of the India-Burma border region.

The concept of the general hospital was built on the formal staging system established in WWI, and was designed to be a fully-functional, modern hospital built near the front lines, with a capability to house at least six percent of the military force in the field. In addition to standard medical care, general hospitals were to provide specialized procedures such as plastic surgery, neurosurgery, and orthopedic reconstructions. They were designed to be the end-of-the-line for patient flow. Patients at a general hospital were either sent home, convalesced to return to duty, or died.^{6,8}

Also modeled after a WWI system, doctors and nurses from a single stateside institution staffed a particular general hospital. The 20th General Hospital, with its 60 physicians, 120 nurses, and 600 enlisted men, drew from the University of Pennsylvania with Dr. Isidor S. Ravdin (AΩA, Raymond and Ruth Perelman School of Medicine at the University of Pennsylvania, 1931, Alumnus), professor of surgery, as its executive officer.³

The hospital was a part of the China-Burma-India Theater, a campaign which saw relatively little American involvement. Though the 20th General Hospital did not arrive until 1943, the fighting in Burma began in 1942, when the Allied British, Indian, and Chinese forces were driven out by the Japanese.

The military retreat yielded untold suffering as thousands of locals also fled the advancing Japanese army.

Strategically, the Japanese advance was problematic to the Allies because it prevented the transportation of supplies via the Burma Road to the Chinese forces fighting the Japanese in the interior of China. As a result, the Allies had to airlift supplies over the Himalayas, a dangerous and costly endeavor which became known as “flying the Hump.”

To alleviate the need for this airlift, the Allies began constructing a road from north-west India through northern Burma and into western China, bypassing the Japanese forces which had settled in southern Burma.

Named the Ledo Road for its western terminus, it was where the 20th General Hospital was stationed.⁹

The mission of the 20th General Hospital was to care for those constructing the road—predominantly Indian, Chinese, and African-American U.S. soldiers—as well as the Chinese and U.S. soldiers fighting the Japanese throughout the region. This melting pot of patients led Dr. Ravdin to declare the 20th a “League of Nations” hospital. Nevertheless, the wards were mostly segregated.¹⁰

The medicalization of this far-flung military outpost required massive mobilization of personnel and equipment, demonstrating the military’s strategic commitment to extend state-of-the-art medical care throughout the theaters of war.

Beginning with a few shacks in a muddy field, the 20th General Hospital grew to become a fully equipped medical complex. Myriad bamboo structures and tents held full laboratory services, blood storage facilities, X-rays, surgical theaters, and medical wards. Though officially rated as a 2,000-bed facility, it sheltered as many as 2,560 patients at one time.

Of the 73,000 patients admitted to the hospital, 300 died, resulting in a mortality rate comparable to top U.S. hospitals at the time.⁴

A rough beginning

In 1940, U.S. Surgeon General Thomas Parran Jr. called on the University of Pennsylvania to organize a medical unit, in case of sudden need. Volunteers from the medical and dental schools filled the initial request for 73 officers.⁴

For more than two years, preparations were made from



Dr. Isador S. Ravdin, left, receives the Legion of Merit from Brigadier General Lewis A. Pick. Photo from the I.S. Ravdin Collection. From the Collections of the University of Pennsylvania Archives.

Philadelphia. On May 15, 1942, 64 doctors and 120 nurses from the Hospital of the University of Pennsylvania gathered at 30th Street Station, and boarded trains to a training camp in Louisiana. The president of the University of Pennsylvania told a reporter, “We hate to see such good men go, but the sooner they go, the sooner we’ll get this over with.”¹² Presumably he was sad to see the nurses go as well.

Life in Camp Claiborne, Louisiana, was similar to many non-combat units preparing for deployment—boring and filled with anticipation. The diary of neurosurgeon R.A. Groff tells of day after day of military foot drills under the hot sun. However, his June 24, 1942 entry conveys

unusual excitement: “At 1:15 prepared for movies and we saw a skit on sex and personal hygiene and another film on the results of letting out information which is secret.”¹³

Unfortunately the heat and boredom did not relent when the doctors and nurses boarded ships in Long Beach, California, January 19, 1943, for “Destination Unknown.” On the high seas, their accommodations became more uncomfortable as Dr. Groff recorded in his diary, “We have allotted ourselves one shower every 5 days. Water is like platinum. We are really beginning to smell like a sweat box.” In addition, deck space was limited, and a rotation was set for time on deck in the fresh air.¹³

The group landed off the coast of Wellington, New Zealand, where they paraded through the streets to boost the morale of the allied island.¹¹ They were greeted with an outpouring of support—United States flags, cheers, and invitations to tea.

Upon departing Wellington, only the ship’s crew knew their final destination. The group passed the time playing cards, writing letters, and sharing the few books they brought on board.¹³

In March 1943, the 20th General Hospital team reached Bombay, India. There they were entertained by British high society who chatted nervously about the Japanese army looming to the east. On March 6, still unsure of their

final destination and mission, they loaded onto train cars. Dr. Phil Hodes, a radiologist, played *Auld Lang Syne* on his violin. The passengers sang along with the tune while tears streamed down their faces as they headed to war.¹

The next three weeks were spent traveling by rail from Bombay to Ledo. The new environment was one of mystery, wonder, dread and disease. Local Indians carried baskets on their heads, and there were two water spigots—one for Hindus and one for Muslims.

Now, 10 months removed from Philadelphia, one member wrote, “Violence was being done to a lifetime of habits and tastes; everything about this land was a

reminder of home and loved ones, not in the customary suggestions of civilized communities, but in contrasts of opposites.”¹² One officer wrote, “I ate, because I was hungry, like an animal; not in the manner of a man.”¹²

Dysentery was spreading throughout the ranks. “The sole topic of conversation was diarrhea.”¹² Latrines became known as “thunder houses.” The 20th’s priest, Reverend Louis Meyer, appreciated the desperation of the situation as he wrote in his diary about a local Indian boy who was hired to clean the latrine, declaring, “Pagan or no pagan, that lad will get to heaven.”¹

Upon arriving at Ledo, Dr. Ravdin, who had spent time in military hospitals in the Pacific, recalled, “The first view of the hospital was something never to be forgotten. We splashed out of the trucks into nearly six inches of soft slippery mud. [The hospital] consisted of a large polo field, on which were no buildings because it was said to be covered with water during the monsoon.”¹⁰

A new home away from home

Bashas were 2,000-square-foot bamboo structures that served as home, kitchen, and workplace, for the team. The window and door covers were made of bamboo, the roofs were leaves, and the floors were dirt. Each member of the 20th had a bed, but no mattress, just wire springs, and a mosquito net. Each night, they checked their clothes for bugs, lizards, and snakes.

The basha that had been declared the mess hall did not have chairs or tables, but it did have bacon, eggs, and coffee.

Because the Japanese occupied the ports to the south, Ledo’s supply line crossed the entire span of India—the longest in the war. Any item that could not be secured locally required weeks of planning. This included hypodermic needles and penicillin, as well as coffee and bacon.

As supplies trickled in, dysentery continued to run rampant, and improved hygiene became a top priority. As a result, one of the first contraptions erected in the mess hall was an empty oil drum over a brick oven for boiling water to sanitize mess kits.¹ From grand to small, innovations such as these slowly came to Ledo, which was an ecosystem of continuous improvements.

Boots were purchased at the local bazaar, laboratories were erected, and blue nurses’ uniforms were replaced with brown ones to better accommodate the mud.

Gradually, a hospital was born, fed by train loads of equipment from more than 2,000 miles away.



About Christopher Magoon

I began reading history books while growing up in Canton, Ohio, followed by a degree in history from Yale University. After I graduated, I was fortunate to receive a scholarship to move to the far southwest of China. After learning the language, and chatting with many the people, I became fascinated with the story of the China-Burma-India theater. I can be contacted at: Christopher.magoon@gmail.com, or [@cpdmagoon](https://twitter.com/cpdmagoon).

Merrill’s Marauders

The American fighting unit cared for by the 20th was the 5307 Composite Unit (Provisional), or more commonly known as Merrill’s Marauders, after their commander Frank Dow Merrill. This unit worked in coordination with the Chinese to slip behind enemy lines and attack the Japanese from the rear flank. As a result, the Marauders hiked through leech-infested swamps, and across steep precipices, which made it difficult to execute the step-wise organization of medical aid. Regimental surgeons, cut off from supplies, often had to borrow simple tools from locals. If a Marauder was wounded, he often rode a pack animal back to a clearing where he was evacuated by a small medical plane that landed wherever it could. Often times, when the plane arrived at the 20th General Hospital, the soldier had been wounded days before.⁹

Sergeant Michael Pelot of Hazleton, Pennsylvania, had his hand torn open by an explosion while operating behind enemy lines. According to his own report, maggots infiltrated the wound within two hours. He was evacuated by ox cart to the 20th General Hospital on a journey that lasted eight days, during which time he developed gangrene. Once he arrived at the 20th, he underwent a series of surgeries, followed by postoperative care, which resulted in a full recovery.¹⁴

A research hospital

Tropical disease plagued both the 20th and the armed forces in the region. Scrub typhus and malaria were the most common. In the monsoon season of July through October 1943, the 20th admitted 12,000 malaria patients.¹⁵

Though malaria could be effectively controlled by



Brigadier General Frank D. Merrill speaking about Merrill's Marauders, 1944.

Credit: Hulton Archive / Stringer



Major Thomas Machella.
Standard Sentinel back, 1944.

quinine, the Japanese army held most of the world's Cinchona trees, the natural reservoir for the drug. The Americans were left to control malaria with a relatively new drug, Atabrine. Atabrine tasted bitter and often turned skin yellow, which made adherence difficult.⁸ As Elise Sours, a nurse with the 20th, recalled, "Some people came down with malaria, though everyone was supposed to take Atabrine. We used to wonder why one girl didn't turn yellow like the rest of us. When she became sick, we found out she wasn't taking it. We used it to dye curtains and anything else. Everything was shades of yellow."¹¹

The 20th was also a research center. Dr. Thomas Machella began conducting research on prevention and treatment of tropical ailments. Though Atabrine was the prophylactic treatment for malaria, it was unclear if intravenous (IV) Atabrine would be as effective as other treatment options for those already infected.

Machella designed an experiment where soldiers who were diagnosed with malaria were either given IV Atabrine, oral Atabrine, or a single infusion of quinine. His data showed that IV Atabrine was effective, but the patient needed to be watched closely due to a high likelihood of adverse reactions.

His results were distributed widely, affecting treatment

throughout the armed forces. However, he was prohibited from publishing his results in a medical journal, as the military was concerned about the information falling into enemy hands.¹⁶

Machella was also instrumental in assessing the safety and efficacy of the anti-malarial drug Chloroquine. The drug was discovered in the 1930s, but sidelined due to what was believed to be unacceptable toxicity. During WWII, researchers in the United States theorized that the initial toxicity estimates had been

overestimated. Aware of this debate, Machella tested the drug and wrote a report, concluding, "It is believed that SN 7618 [Chloroquine] is effective in the suppressive treatment of malaria. Troops are more willing to take it than Atabrine. The drug is effective in fighting an attack of *P. Falciparum* malaria."¹⁶ Machella's report proved to be the accepted evaluation of Chloroquine, however, due to conflicting results elsewhere, the drug was not approved for general use until 1946.

Machella also conducted research on the intracellular parasite *Orientia tsutsugamushi* which causes scrub typhus. Though relatively unknown by American doctors before the 1940s, scrub typhus caused severe epidemics in Burma throughout the WWII, and affected many of Merrill's Marauders. Treatment options were limited, but Machella provided treatment to 64 cases and published his results in the *American Journal of Medical Science*.¹⁶

Machella was awarded the Bronze Star for conducting studies on a variety of diseases commonly affecting troops in his area; improving methods of treatment resulting in the lowering of morbidity and mortality of diseases such as cerebral malaria; and developing a more complete knowledge of many tropical diseases.¹⁶

The 20th General Hospital began as mud pit in a marginalized theater of war. Located at the end of a 2,000-mile supply line, its patients—primarily of color—were



Merrill's Marauders, 1944. Credit: Keystone / Stringer

the beneficiaries of military planners who prioritized high medical standards, and appreciated and supported medical research.

Amidst the mud, dysentery, and the Japanese army, this outpost of modern medicine achieved successes commensurate with the most modern hospitals of the time.

By establishing an acute care research hospital in the middle of a malarious jungle, the Army advanced the field of preventive medicine, and ensured high quality medical care in a marginalized theater of war.

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