

Meet The Covert Geologists That Helped The Allies Win The Second World War



EDITOR'S PICK
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Scientists are often recruited during times of conflict to serve the national cause. Generally, when we think of scientists in warfare, we think of physicists, chemists, engineers and mathematicians – the type that can either build better weapons or crack the enemies’ codes. That’s fair enough: they certainly made up a disproportionate number of academics recruited by the military in the 20th Century.

wars too. The US, UK, Germany and the Soviet Union had their very own secret geological intelligence units that played key roles in the bloodiest conflict in human history. For this particular article, we'll focus on the role that American geologists played during the Second World War, and in the Cold War, but believe you me – the story of geology and conflict is richer and more bizarre than you could possibly imagine.



Troops and equipment land on the shores of Sicily during the first day of the Allied invasion on July 10, 1943. IMPERIAL WAR MUSEUMS

If, entirely reasonably, you're wondering why in the world geologists would be a key part of the war effort, just head back to [15th Century Britain](#).

Research on multiple significant battle sites revealed that conflicts took place far more frequently on Permian, Triassic and Upper Carboniferous Period outcrops than others younger or older. It's not entirely clear why, but one researcher speculates that military seniors took into account how fertile the land was, the richness of mineral resources in the soil, and – of course – how difficult the terrain was the traverse. These all affected engagements, lines of communication, and how sustainable encampments were.

During the First World War, geologists were regularly consulted by military forces of all kinds, but were arguably pioneered by the British and French more than anyone else. [Trenches](#), as you may imagine, can't just be dug anywhere; they required specific types of soil, and they also needed to hold up after they were dug out. What soil and rock types could stand up to explosives more than others?

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In the closing years of the war, the US Army Corps of Engineers were attached to the American Expeditionary Force as it arrived in France in

water supply operations on the Western Front. They were also vital in the development of new roads and railroads to and from the fighting.

Fast-forward to the Second World War, and the [United States Geological Survey](#) (USGS) itself was recruited in the fight against Axis powers during the Second World War. In 1942, a few months after the surprise attack by the Japanese forces on Pearl Harbour at the end of 1941, the USGS formed a Military Geology Unit in Washington DC. Jumping off the experience of geologists in the First World War, the MGU ended up becoming the most expansive geological intelligence unit in human history. Unlike the UK (and German) geologist groups, which were incorporated and often [served](#) in the military itself, the MGU remained a civilian entity – with a few notable exceptions.

They certainly had their work cut out for them. Germany had re-established its own military geological group, and eventually featured 400 German geologists spread across the military, navy and air force. The Soviets, too, had their own geologists working around the clock.

On the other hand – as elucidated by this fascinating, exhaustive [2012 paper](#) by Nelson and Rose – the US and the UK had more or less failed to capitalize on its advances in this regard made between 1914 and 1918.

It transpired that, early on at least, the port of call were often geographers, not geologists. It's safe to say that the Allies began the war on the back foot, but everything changed just before Christmas in 1941.



Pearl Harbor, seen here from above in October 1941. US NATIONAL ARCHIVES

convened and decided to throw their weight behind the war effort, with a USGS delegation in attendance. Things quickly escalated: starting from a minerals-focused point, an outline for the use of geologists during the war looked at plenty of possibilities, including the use of uniformed geologists serving in the theatre of war.

Ultimately, recruited geologists were asked to perform cloak-and-dagger terrain assessment from afar, houses in buildings near the USGS Library in the US capital. Their first assigned was to determine the availability of construction materials, soil, water and fuel supplies of parts of northwest Africa in February 1942, whose control was violently fluctuating between the Allied and Axis forces. This was soon expanded to include an assessment of all of Africa's mineral resources, which was quickly cut down to just Sierra Leone, at the time a British protectorate.

Their secretive research quickly involved all kinds of sly shenanigans. German military geology texts were quickly translated; complex German maps based on the First World War that showed lithological, hydrological and mining layers were used as a template for all future US geological cartography, after two test cases using maps of Arizona and Morocco were enthusiastically approved by the upper echelons at the time.

US Army's Corps of Engineers, with their first masterpiece manifesting in the form of an intricate pair of geological maps on Madagascar, which in 1942 was under Vichy French control. These maps aided the successful invasion of British forces in May of that year, who were then – along with the Free French forces – made immediately aware of the island's geological riches, particularly those relating to water and mineral caches.

This unleashed the scientific beast. The top brass in the US Army Corps of Engineers realized the militaristic potential of these studies being conducted back in Washington DC by their geologists, and 75 more were ordered. From Denmark and New Caledonia to various sites on the African continent, dozens of strategic sites earmarked for invasion were composed, all under a veil of utmost secrecy. After the Allied invasion of Morocco and Algeria led to huge territorial gains, the US Army forces' chief engineer commended the USGS' work, and a formal geological alliance with the British – who were doing their own work on Western Europe and the Middle East – was forged.

Then, on the 24th of June, 1942, the USGS Military Geology Unit (MGU) was born. Its staff and funding grew rapidly, and scientific specialists were eventually required to read two foreign languages – especially Chinese,

understanding of enemy geological literature.

The MGU's maps covered a vast swath of the world, including, but not limited to, Alaska, Afghanistan, the Caucasus, Crete, Egypt, Iran, Iraq, the Kamchatka Peninsula, Palestine, Sardinia, Sicily, parts of Siberia, Yugoslavia and more. They comprised them all in what was affectionately referred to as the "Dungeon", part of the basement of an old Department of the Interior building.

The review of Sicily, in particular, proved to be instrumental in the success of the Allied invasion of Italy in 1943. During the massive amphibious operation involving Canadian, British and US forces fighting side by side, several USGS hydrologists actually took part in the attack, and landed on the largest island in the Mediterranean in order to provide life-saving water-sourcing advice to the troops gradually making their way towards the Italian mainland. The same advice, and more – including that on the climate, vegetation, landslide likelihood and even the presence of malaria – continued as Allied forces reached Italy's toe, and as they marched on Rome.



Supplies land on the beaches of Normandy during the first days of Operation Overlord. MICKSTEPHENSON/WIKIMEDIA COMMONS

The MGU also provided support to the British military geology units, who by 1944 had a solid command of the geological highlights of Normandy. After the invasion proved to be successful, and German forces began to

to Berlin were also geologically mapped to some degree.

Aerial photographs played a major role in helping to identify the types of sediment hiding beneath the soil, revealed by sizeable bomb craters. If a bridge over the Rhine was destroyed, they wanted to know if the geology there made it more or less likely to collapse. If German forces were bunkered down behind a hill, they wanted to know how likely it would be to stand up to sustained mortar fire.

The MGU played a far larger role in 1944-1945 in surveillance activities in the Pacific Theatre, supplying invading forces with information on the terrain they were about to fight on – and perhaps derive resources from – in the archipelagoes tracing lines to the Japanese mainland. A new MGU unit based in Hawaii was also set up, and several hydrologists even followed armed units onto Iwo Jima and Okinawa, the location of two of the deadliest battles in the entire conflict, for which they were awarded Bronze Stars for their efforts under fire.

There's a lot more to the story than that, and if possible, I'd advise you to read through Nelson and Rose's paper in full to get the entire, extraordinary picture. It's safe to say, though, that the MGU was a groundbreaking unit, right up until its disbandment in 1972. Its spirit

Department of Defense.

As you'd imagine, geologists were consulted all throughout the Cold War, as proxy wars and the clear and present danger of thermonuclear exchanges flared up in hotspots all over the world.

Perhaps the strangest example of all this involved a bit of overzealous mining: Back when there were far fewer restrictions on the use of nuclear weapons, the Soviet Union and the US wondered whether or not that it would be viable to use these weapons of mass destruction to **dig holes** in the ground. The former had “Nuclear Explosions for the National Economy”, and the latter had “Operation Plowshare”. Geologists not only provided plenty of advice, but got plenty of data from the blasts too – some of which I ended up using for my very own doctoral thesis more than half a century later.



The Sedan crater. NATIONAL NUCLEAR SECURITY ADMINISTRATION

The largest crater produced through this frankly insane game of subterranean tit-for-tat appeared in Nevada, on July 6, 1962. The 104-kiloton blast, generated by a nuclear bomb buried in the desert, created a huge crater, but one that was just **100 meters deep**, nowhere near as large

craters weren't the best idea when it came to mining precious resources from Earth's crust.

Although they probably aren't asked to give advice on projects quite as over-the-top as Operation Plowshare these days, it's certain that geologists are still consulted today by American intelligence agencies and military brass. Much of what they engage in, however, will likely remain a complete mystery long into the future.

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