AWESOME stories

STUNNING D-DAY FACTS

Many photographers took pictures of Allied forces landing on the beaches of Normandy during D-Day. This image was taken by Charles Turner. It is online via the BBC. Click on the image for a greatly enhanced view.

It isn't just stories like the capture of Pegasus Bridge which boggle the mind. Consider the following D-Day facts:

- Until the very last minute, the place of invasion - Normandy - was the most heavily guarded secret on the planet.

- Even the units conducting the initial assaults did not know the locations of their landings.

- Surprise was crucial since Germany had 55 divisions in France - the Allies could transport no more than 8 divisions on D-Day morning.

- It is estimated that nearly 2 million soldiers, sailors and airmen were involved in Operation Overlord, including U.S., British, and Canadians who were scheduled to fight after men on the ground secured a Normandy bridgehead.

- 195,000 naval personnel manned 6,939 naval vessels (including 1,200 warships and 15 hospital ships).

- About 17 million maps supported the mission.

- Training maps used fake names.

- The United States shipped 7 million tons of supplies (that translates into 14 billion pounds of material).

- Of those supplies, ammunition accounted for 448,000 tons.

- Air-support operations - often overlooked in the success of D-Day - sustained significant losses: Between the 1st of April and the 5th of June, 1944, the Allies flew 14,000 missions losing 12,000 airmen and 2,000 aircraft.
- 127 more planes were lost on D-Day.
- By the end of the Normandy campaign, 28,000 airmen were dead.
- Instead of two days, it took Germany's 2nd Waffen SS Division two weeks to reach the front. Allied air power, Eisenhower's spies and French Resistance contacts all contributed to that result.
- There are 9,386 graves in the American cemetery at Colleville-sur-Mer. Each grave faces west, toward America.
- 307 of those graves contain the remains of "unknown" soldiers.
- 1,557 names are listed in The Garden of the Missing for those who were never found.
- 4,868 British dead are buried in the Bayeux Cemetery.
- 1,837 British names are listed at Bayeux for those who were never found.
- There were 946 Canadian casualties in the Normandy campaign.
- 21,500 German dead are buried at LaCambe.

Had it not been for the discovery of penicillin by Alexander Fleming (in 1928) and further research and testing by Howard Florey and Ernst Chain (in the late 30s and early 40s) - proving that penicillin could successfully treat infections - the death tolls would have been far greater.

Five years before he died, General Eisenhower (who was a conquering hero at war's end and later served two terms as America's president) came back to Colleville-sur-Mer. It was the first, and only, time he made that journey after the war. Looking over Omaha Beach, he spoke from his heart:

> *. . . these men came here - British and our allies, and Americans - to storm these beaches for one purpose only, not to gain anything for ourselves, not to fulfill any ambitions that America had for conquest, but just to preserve freedom. . . . Many thousands of men have died for such ideals as these. . . but these young boys. . . were cut off in their prime. . . I devoutly hope that we will never again have to see such scenes as these. I think and hope, and pray, that humanity will have learned. . . we must find some way . . . to gain an eternal peace for this world.* ("*Eisenhower: A Soldier's Life*," by Carlo D'Este, p. 705.)

Decades after D-Day, even though humanity seems farther than ever from finding "some way to gain an eternal peace for this world," everyone can agree on at least one point. Those who fought, and died, to free Europe on that day altered the course of history.

See Alignments to State and Common Core standards for this story online at:
http://www.awesomestories.com/asset/AcademicAlignment/STUNNING-D-DAY-FACTS-Normandy-Invasion

See Learning Tasks for this story online at:
http://www.awesomestories.com/asset/AcademicActivities/STUNNING-D-DAY-FACTS-Normandy-Invasion

Questions 2 Ponder

How Is It Possible to Coordinate a 2-Million Person Event?

Historians estimate that nearly 2 million people participated in the Normandy Invasion, begging the question how coordination was remotely possible.

What is the largest event in which you have personally participated?

Was that event well-coordinated? Explain your answer.

How was it possible to coordinate the Normandy Invasion, when nearly 2 million people were involved?

Do you think it is easier to coordinate an unusually large group of people if everyone has the same objective? Why, or why not?

Why do you think the Normandy Invasion succeeded?

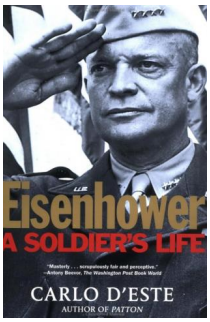
Media Stream

Normandy - Map
Map depicting Normandy location, online courtesy "A Place in France."
PD
View this asset at: http://www.awesomestories.com/asset/view/Normandy-Map

9,387 Graves - American Cemetery at Colleville-sur-Mer
Image online, courtesy American Battle Monuments Commission.
PD
View this asset at: http://www.awesomestories.com/asset/view/9-387-Graves-American-Cemetery-at-Colleville-sur-Mer

Grave Marker - Unknown Soldier
Image online, courtesy American Battle Monuments Commission.
PD
View this asset at: http://www.awesomestories.com/asset/view/Grave-Marker-Unknown-Soldier

LaCambe - German Cemetery in Normandy
Image online, courtesy Wikimedia Commons.
PD
View this asset at: http://www.awesomestories.com/asset/view/LaCambe-German-Cemetery-in-Normandy



Eisenhower: A Soldier's Life - by Carlo D'Este
Image online, courtesy publisher (above) and Google Books.
View this asset at: http://www.awesomestories.com/asset/view/Eisenhower-A-Soldier-s-Life-by-Carlo-D-Este

General Eisenhower Returns to Normandy in 1964
Dwight D. Eisenhower at the American military cemetery in Colleville-sur-Mer, Normandy, 1964. Online, courtesy the Eisenhower Presidential Library and Museum (in Abilene, Kansas).
View this asset at: http://www.awesomestories.com/asset/view/General-Eisenhower-Returns-to-Normandy-in-1964

STUNNING D-DAY FACTS
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Landing on D-day - Survivors Recall the Battle
Clip from *A Distant Shore: African Americans of D-day*. Online, courtesy the History Channel. Copyright, History Channel, all rights reserved. Clip provided here as fair use for educational purposes.
View this asset at: http://www.awesomestories.com/asset/view/Landing-on-D-day-Survivors-Recall-the-Battle

Normandy Beaches - On D-Day and Now
Video online, courtesy DeKa61's Channel at YouTube.
View this asset at: http://www.awesomestories.com/asset/view/Normandy-Beaches-On-D-Day-and-Now

General Eisenhower - A Conquering Hero

Video clip, from Universal News, now part of America's National Archives.

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View this asset at: http://www.awesomestories.com/asset/view/General-Eisenhower-A-Conquering-Hero

Dwight Eisenhower - First Inaugural Address

First Inaugural Address of President Dwight D. Eisenhower, delivered at the Capitol on January 20, 1953. Video online, courtesy C-Span.

PD

View this asset at: http://www.awesomestories.com/asset/view/Dwight-Eisenhower-First-Inaugural-Address

Alexander Fleming and Penicillin - "The Wonder Drug"

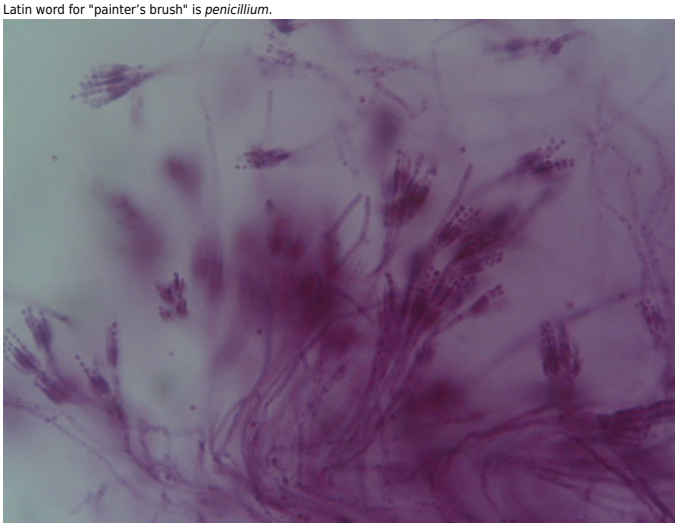
One day, in September of 1928, Dr. Alexander Fleming was cleaning-up his lab at St Mary's Hospital Medical School in London, England. Among the usual clutter in his work space, Professor Fleming saw something unusual in a culture plate.

He'd been investigating *Staphylococcus*, a type of bacteria. In a petri dish, containing that bacteria, some mold (also spelled "mould") was growing in the form of a ring.
Mold in a petri dish was nothing unusual, in and of itself. What caught Professor Fleming's eye, however, was something quite different.
The area around the mold ring seemed to be free of bacteria. Fleming wondered: Is there something about this particular mold which is killing off the bacteria? If so, what substance is coming from the mold?

Fleming investigated the mold a bit further. He put it in a dish so he could watch it grow. As it grew, he was able to extract some liquid from it. His additional research showed that whatever was active in the liquid, which he extracted from the mold, could also kill other types of bacteria.

Taking his research a step further, this curious bacteriologist found that he could give some of the liquid extract to small animals with no side effects. His discovery seemed to have amazing antibiotic properties.

As he continued to study the mold, Fleming realized that it was from the genus "Penicillium," which had first been described in 1809 by Johann Heinrich Friedrich Link (in *Observationes in ordines plantarum naturales*). That name - *penicillium* - was selected because the fungus, under a microscope, resembles a painter's brush. The Latin word for "painter's brush" is *penicillium*.



Busy with other things, Professor Fleming moved on to other investigations. He just couldn't squeeze-out enough of the "mould juice" to make it a major focus of his work. He did give his discovery a name, however. He called it "penicillin," and published a paper about his findings in 1929.

Then ... nine years passed. About the time Great Britain declared war on Germany, in 1939, an Oxford University Professor of Pathology - Dr Howard Florey - was examining substances capable of combating bacteria. He and his colleague, Dr. Ernst Chain, believed that penicillin was the best choice.

They faced the same difficult issue as Professor Fleming, however. What method could they use to efficiently extract the penicillin from the mold cultures? And ... how would they test the effectiveness of their samples?

Oxford University's story about penicillin tells us more:
With Norman Heatley, a biochemist who became Florey's research associate in 1940, the team solved both these problems. Heatley devised a new technique to measure the activity of a sample of penicillin and came up with a method called back-extraction to isolate the penicillin. He managed to automate this procedure using a set up consisting of bottles, milk churns, yards of glass and rubber tubing.
Once Florey and his team had enough penicillin to use for testing, they worked with mice to determine whether it could effectively fight bacteria:
By 25 May 1940, the team had reached a point where they could carry out a new experiment that would test whether penicillin could be an important antibacterial drug. Eight mice were given lethal doses of streptococci. Four of the mice were then given injections of penicillin. By the next morning all the untreated mice were dead while those that had received penicillin survived for days to weeks.
With the war still raging, Florey and his team believed that penicillin could be a major help for all the men who were injured in the fighting. They worked hard to produce enough penicillin for human testing:
He [Florey] turned the Dunn School [at Oxford] into something of a penicillin factory. Six "penicillin girls" were taken on to maintain production in 700 newly designed vessels which were continuously in use. By February 1941 Florey felt he had enough penicillin to begin trials in humans.
The first human-subject was a police officer who was near death because of an infection. Perhaps penicillin would be able to save him:
With the help of Charles Fletcher, a young doctor at the Radcliffe Infirmary, on 12 February 1941, Albert Alexander, a 43-year-old policeman, became the first patient to be treated with penicillin. He had scratched his face on a rose bush, the wound had become infected and the infection had spread. Fletcher injected him with penicillin regularly over four days, and within 24 hours he was greatly improved. But supplies of the new drug ran out before his cure was complete. He relapsed at the beginning of March, and died two weeks later.
Additional human trials, on five patients, also produced good results. To really make a difference in the war effort, however, the new drug would have to be produced in far greater amounts than the professors and their teams could concoct in a lab.
Florey did not file for a patent. He'd been asked not to do so for ethical reasons. It was thought, in Britain, that the processing of penicillin would be so significant that it should benefit all mankind.
Meanwhile, doctors at Columbia University (in New York City) wrote to Dr. Florey. Gladys Hobby and her colleagues (Karl Meyer and Martin Henry Dawson) requested a sample of the mold. They wanted to see whether they could help to produce more of the active ingredient.
As she writes in her book, Penicillin: Meeting the Challenge, Hobby and her team members ran out of room to store their flasks:
Soon hundreds of two-liter flasks ... lined every classroom laboratory bench at the Columbia University Medical School. (Eric Lax, quoting from Dr. Hobby's book in The Mold in Dr. Florey's Coat: The Story of the Penicillin Miracle, at page 145.)
Even that wasn't enough room. Before long, the team members were storing their flasks underneath the seats at the University's two-story amphitheater. It turned-out to be a great incubator.
After Dr. Hobby and her colleagues published their findings, reporting that penicillin could be a very significant germ-killer, drug companies in both the UK and the US were keen to make penicillin on a large scale.
Dr. Andrew J. Moyer - an American researcher working at a U.S. Department of Agriculture lab in Peoria, Illinois - figured-out how to manufacture penicillin on an industrial scale. He applied for, and received, a patent (US 2,443,989).

By June of 1944 - when the Normandy invasion took place - there were enough penicillin supplies to make a monumental difference for the Allied forces:
In 1943, it was possible to treat 1500 military personnel, and only one year later, countless wounded in the D-day landings were saved by penicillin. The yield had been increased from 1% in 1 liter flasks to 80-90% in 10,000 gallon tanks..
Fleming, who died on the 11th of March, 1955, lived long-enough to understand the widespread value of his work. He, Florey and Chain jointly won the Nobel Prize for physiology or medicine in 1945.
Norman Heatley - the "quiet, pragmatic hero in the penicillin success story" who made penicillin extraction possible - was not included in the award of 1945. In 1990, however, he received an honor even more rare than a Nobel Prize. He was given the first honorary doctorate in Oxford's 800-year history.
At the time, people called penicillin "the wonder drug." To this day, penicillin is benefitting millions of individuals throughout the world.
And ... what of the patent which was not sought by the Oxford team?
... Until this day the British regret that, for ethical reasons, they had asked Florey not to file for a patent on penicillin.

The University of Oxford never got its share from the fabulous profits made from penicillin in the US, and, to add insult to injury, the UK had to pay licensing fees to US companies. (See Biotechnology for Beginners, by Reinhard Renneberg, at page 121.)
Video online, courtesy Wellcome Library's channel at YouTube. The film is described as:
A government produced film about the discovery of Penicillin by Sir Alexander Fleming, and the continuing development of its use as an antibiotic by Howard Florey and Ernst Boris Chain. The film uses many modernist animations to depict the scientific research. British Industrial Film Association National Award, 1964; a First Prize, Fifth International Industrial Film Festival, London, 1964; a Diploma of Merit, Melbourne International Film Festival, 1964. 2 segments.

A Central Office of Information film. Produced by T.V.C. London Limited, written by Donald Holms, animated by Dave Rich, Gordon Harrison and Dennis Hunt, camera by John Williams, edited by Alex Rayment, music by Peter Snade and directed by Denis Rich.