The Real Electric Frankenstein
Experiments of the 1800s

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On November 4, 1818, Scottish chemist Andrew Ure stood next to the lifeless corpse of an executed murderer, the man hanging by his neck at the gallows only minutes before. He was performing an anatomical research demonstration for a theater filled with curious students, anatomists, and doctors at the University of Glasgow. But this was no ordinary cadaver dissection. Ure held two metallic rods charged by a 270-plate voltaic battery to various nerves and watched in delight as the body convulsed, writhed, and shuddered in a grotesque dance of death.

“When the one rod was applied to the slight incision in the tip of the forefinger,” Ure later described to the Glasgow Literary Society, “the fist being previously clenched, that finger extended instantly; and from the convulsive agitation of the arm, he seemed to point to the different spectators, some of whom thought he had come to life.”

Ure is one of many scientists during the late 18th and 19th centuries who conducted crude experiments with galvanism — the stimulation of muscles with pulses of electrical current. The bright sparks and loud explosions made for stunning effects that lured in both scientists and artists, with this era of reanimation serving as inspiration for Mary Shelley’s literary masterpiece, “Frankenstein or The Modern Prometheus.” While most scientists were using galvanism to search for clues about life, Ure wanted to see if it could actually bring someone back from the dead.

“This was a time when people were trying to understand the origin of life, when religion was losing some of its hold,” says Juliet Burba, chief curator of the exhibit “Mary and Her Monster” at the Bakken Museum in Minnesota, which will open October 29. “There was a lot of interest in the question: What is the essence that animates life? Could it be electricity?”

In 1780, Italian anatomy professor Luigi Galvani discovered that he could make the muscles of a dead frog twitch and jerk with sparks of electricity. Others quickly began to experiment by applying electricity to other animals that quickly grew morbid. Galvani’s nephew, physicist Giovanni Aldini, obtained the body of an ox, proceeding to cut off the head and use electricity to twist its tongue. He sent such high levels of voltage through the diaphragm of the ox that it resulted in “a very strong action on the rectum, which even produced an expulsion of the feces,” Aldini wrote.

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It all started with a little frog muscle experiment, one that anatomy students still conduct in labs today. Image by: Wellcome Images

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People outside of science were also fascinated by electricity. They would attend shows where bull heads and pigs were electrified, and watch public dissections at research institutions such as the Company of Surgeons in England, which later became the Royal College of Surgeons.

When scientists tired of testing animals, they turned to corpses, particularly corpses of murderers. In 1751, England passed the Murder Act, which allowed the bodies of executed murderers to be used for experimentation. "The reasons the Murder Act came about were twofold: there weren't enough bodies for anatomists, and it was seen as a further punishment for the murderer," says Burba. "It was considered additional punishment to have your body dissected."

Lying on Ure’s table was the muscular, athletic corpse of 35-year-old coal miner, Matthew Clydesdale. In August 1818, Clydesdale drunkenly murdered an 80-year-old miner with a coal pick and was sentenced to be hung at the gallows. His body remained suspended and limp for nearly an hour, while a thief who had been executed next to Clydesdale at the same time convulsed violently for several moments after death. The blood was drained from the body for half an hour before the experiments began.

Andrew Ure, who had little to no known experience with electricity, was a mere assistant to James Jeffray, an anatomy professor at the University of Glasgow. He had studied medicine at Glasgow University and served briefly as an army surgeon, but was otherwise known for teaching chemistry. "Not much is known about Ure, but he was sort of a minor figure in the history of science," says Alex Boese, author of "Elephants on Acid: And Other Bizarre Experiments." One of Ure’s main accomplishments was this single bizarre galvanic experiment, he says.

Others, such as Aldini, conducted similar experiments, but scholars write that Ure was convinced that electricity could restore life back into the dead. "While Aldini contended himself with the role of spasmodic puppeteer, Ure’s ambitions were well nigh Frankensteinian," wrote Ulf Houe in "Studies in Romanticism."

Ure charged the battery with dilute nitric and sulphuric acids five minutes before the police delivered the body to the University of Glasgow’s anatomical theater. Incisions were made at the neck, hip and heels, exposing different nerves that were jolted with the metallic rods. When Ure sent charges through Clydesdale’s diaphragm and saw his chest heave and fall, he wrote that “the success of it was truly wonderful.”
Ure’s descriptions of the experiment are vivid. He poetically noted how the convulsive movements resembled “a violent shuddering from cold” and how the fingers “moved nimbly, like those of a violin performer.” Other passages, like this one about stimulating muscles in Clydesdale’s forehead and brow, are more macabre:

“Every muscle in his countenance was simultaneously thrown into fearful action; rage, horror, despair, anguish, and ghastly smiles, united their hideous expression in the murderer’s face, surpassing far the wildest representations of a Fuseli or a Kean,” wrote Ure, comparing the result to the visage of tragic actor, Edmund Kean, and the fantastical works of romantic painter Henry Fuseli. He continued: “At this period several of the spectators were forced to leave the apartment from terror or sickness, and one gentleman fainted.”

The whole experiment lasted about an hour. “Both Jeffray and Ure were quite deliberately intent on the restoration of life,” wrote F.L.M. Pattinson in the Scottish Medical Journal. But the reasons for the lack of success were thought to have little to do with the method: Ure concluded that if death was not caused by bodily injury there was a probability that life could have been restored. But, if the experiment succeeded it wouldn’t have been celebrated since he would be reviving a murderer, he wrote.

Mary Shelley was aware of the types of scientific experiments researchers were toying with at the time. “Science was something that the public paid attention to,” says Burba. “There was a lot of crossover, so there were poets who knew a lot about science and scientists who wrote poetry.”

Two years before Ure conducted the experiment, Mary Shelley came up with the story of Frankenstein, and published the novel in 1818, the same year as Ure’s experiment. By sheer coincidence, Victor Frankenstein also brought the monster to life “on a dreary night of
November.” However, unlike Ure, the scene of the creature’s resurrection is brief and vague, with no mention of the word “electricity.” Shelley wrote that Frankenstein “collected the instruments of life around me, that I might infuse a spark of being into the lifeless thing that lay at my feet.”

Some historians have hypothesized that Shelley was inspired by other medical procedures being studied at the time, including blood transfusion and organ transplants. It isn’t until later in her introduction of the 1831 edition of the book that Shelley mentions galvanism: “Perhaps a corpse would be re-animated; galvanism had given token of such things; perhaps the component parts of a creature might be manufactured, brought together, and endued with vital warmth.”

It’s unclear whether Frankenstein further encouraged Ure or others to dabble in galvanic experimentation, or if Shelley was particularly struck by any one experiment. Mary Shelley’s Frankenstein and these galvanic experiments happened in tandem, Burba explains, pointing out that the language in the novel reflects that of scientists of that era. “Both of these things
were happening within a cultural milieu where there was great interest in electricity as well as the effects of electricity on bodies — whether electricity might be the ‘spark of being’ that animates life.”

No actual scientific knowledge or data came from Ure’s experiment, yet he still enthusiastically lectured about his experience. He wrote up the results in a pamphlet, which was seen as “publicity of the crudest kind,” W.V. Farrar wrote in Notes and Records of the Royal Society of London. “This rather ‘Gothic’ experiment, reported in such appropriate literary style, no doubt made Ure’s name better known.”

These animated and horrifying displays eventually went out of style as sectors of the public began to view them as evil and “satanic in nature.” Electricity’s first rudimentary experiments on the body did make way for resuscitation technologies such as defibrillation, but the focus is now on saving lives, not reanimating a long-dead corpse.

“Traditionally, we overlook horrors in the name of science,” says Boese. “We have codes of what’s acceptable behavior in normal everyday life, but people put on a lab coat and there are totally different codes of conduct that seem to apply. These scientists in the early 18th century were gentleman, upstanding members of society, yet they’re doing these things that seem totally sociopathic and bizarre.”

Some of their experiments on non-human animals have stood the test of time, however. Students in biology classes still conduct Galvani’s famous frog muscle experiment today.
Quiz

1. Read the sentence from the article.

   **While most scientists were using galvanism to search for clues about life, Ure wanted to see if it could actually bring someone back from the dead.**

   Which selection from the article BEST supports this idea?
   
   (A) On November 4, 1818, Scottish chemist Andrew Ure stood next to the lifeless corpse of an executed murderer, the man hanging by his neck at the gallows only minutes before.
   
   (B) Andrew Ure, who had little to no known experience with electricity, was a mere assistant to James Jefferson, an anatomy professor at the University of Glasgow.
   
   (C) Ure charged the battery with dilute nitric and sulphuric acids five minutes before the police delivered the body to the University of Glasgow’s anatomical theater. Incisions were made at the neck, hip and heels, exposing different nerves that were jolted with the metallic rods.
   
   (D) Ure concluded that if death was not caused by bodily injury there was a probability that life could have been restored. But, if the experiment succeeded it wouldn’t have been celebrated since he would be reviving a murderer, he wrote.

2. Read the sentence from the article.

   **No actual scientific knowledge or data came from Ure’s experiment, yet he still enthusiastically lectured about his experience.**

   Which of the following conclusions can be drawn from the selection above?
   
   (A) Ure felt he accomplished something worthwhile with his experiment.
   
   (B) Ure believed he was an expert in electricity after the experiment.
   
   (C) Ure wanted to focus his efforts on saving lives, not bringing back the dead.
   
   (D) Ure planned on conducting more experiments with electricity and corpses.

3. Which of the following provides the BEST analysis of the article’s introduction?
   
   (A) The introduction outlines the steps of galvanism to inform the reader of the process.
   
   (B) The introduction highlights the morbidity of galvanism to emphasize its controversial nature.
   
   (C) The introduction provides a dramatic account of an experiment using galvanism to pique the reader’s interest.
   
   (D) The introduction gives background information about galvanism to provide the reader with a historical context of the practice.

4. HOW effective is the last paragraph at concluding the article for readers?
   
   (A) It is very effective; it compares the uses of galvanism today to the uses years ago.
   
   (B) It is very effective; it shows the longevity of galvanism since some practices are still being conducted today.
   
   (C) It is not very effective; it mentions modern-day science when the article is about science practices from long ago.
   
   (D) It is not very effective; it focuses on galvanism using nonhuman animals when most of the article is about Ure using galvanism on a human.