At a time of constant technological advancement, one must look back through history to fully understand the scope of human achievement. In Pennypacker Mills’ newest exhibit, Stereographing America: A 3-D History Using Stereoscopes, we take a step back from today’s mainstream 3-D technology to determine the exciting evolution of 3-D entertainment.

The heart of 3-D technology lies in the study of vision. The distinction between monocular vision and binocular vision were debated by the likes of Aristotle (384 B.C. – 322 B.C) who described how one object could be seen in double when one eye was moved by the finger. More than two thousand years ago, Euclid (ca. 323 – 283) provided a geometric analysis on how binocular vision works. His findings were determined by examining three different sized spheres with respect to interocular distance, or the distance between the eyes. Leonardo da Vinci (1452 – 1519) further expanded on Euclid’s observations; compared binocular...
vision of a scene with a painting of it, and noted that the painting did not result in seeing the relief or depth of the scene. He made many drawings of projections to one or two eyes of a small sphere, indicating how all the background could be seen with two eyes but not with one eye. Leonardo da Vinci continued use of a sphere, as done by Euclid, created an issue that Sir Charles Wheatstone would go on to discuss in 1838.

While he first conceptualized stereoscopy in 1832, Sir Charles Wheatstone officially published a paper in the Philosophical Transactions of the Royal Society, of which he was a member. His paper, entitled ‘Contributions to the Physiology of Vision. – Part the First. On some Remarkable and hitherto unobserved Phenomena of Binocular Vision,’ examined Wheatstone’s reasoning for designing such a device. Wheatstone sought to allow viewers to study vision and the way eyes are able to perceive a sense of depth through two dissimilar images. It was also noted by Wheatstone, that had Leonardo da Vinci used any object other than a sphere during his observations, da Vinci might have been able to understand the importance of binocular disparities. Wheatstone reflected on da Vinci’s choice of a sphere, suggesting that his expertise in perspective would have led him to realize projective disparity if a cube had been used; da Vinci might also have appreciated the significance of disparate images. Wheatstone’s genius was not to describe disparity but to demonstrate the uses to which it could be put – depth or distance perception.

Wheatstone made mirror and prism stereoscopes as early as 1832, but he only described the mirror stereoscope at a meeting of the Royal Society of London in June, 1838, and he demonstrated the device to a meeting of the British Association for the Advancement of Science held at Newcastle in August, 1838. Stereoscopes were made for him by the London optical firm of Murray and Heath in 1832, and these involved combinations both by reflection and refraction.

Wheatstone’s paper was published about a year before Frenchman, Louis-Jacques-Mandé Daguerre and Henry Fox Talbot, of Lacock Abbey, Wiltshire, England, published their work on the discovery of photographic processes in 1839. Fox Talbot invented the first reliable photographic fixing of an image on to paper, known as the calotype process. Talbot’s findings were also published in the Philosophical Transactions of the Royal Society, lending a connection between Talbot and Wheatstone.

In fact, Sir Charles Wheatstone asked Henry Fox Talbot to take the first pair of stereoscopic images. Fox Talbot made Calotype stereoscopic pairs of photographs and sent them to Wheatstone in the same year. The images that Fox Talbot made are...
“All pictures in which perspective and light and shade are properly managed, have more or less the effect of solidity; but by this instrument that effect is so heightened as to produce an appearance of reality which cheats the senses with its seeming truth.” – Oliver Wendell Holmes, 1859 Atlantic essay

the first photographic 3D images ever made. Among the stereoscopic pairs of photographs Fox Talbot made, were images of his family residence, Lacock Abbey.

The French Daguerreotype, invented by Louis Daguerre, created a far superior reproduction of detail on the polished copper plates used, compared with Fox Talbot’s Calotype process. However, the former suffered from the disadvantage that the images could not easily be reproduced, a considerable disadvantage for publication in books.

Stereoscopy’s popularity increased when Queen Victoria and Prince Albert became interested in examples at The Great Exhibition in 1851 at the Crystal Palace. Sir David Brewster invented the first lens based stereoscope, known as the lenticular stereoscope. This version resembled a pair of opera glasses, more compact and more portable than the Wheatstone device. This device is a closed box that has one or two openings for light; two lenses are located on the top and enable the viewer to see a 3-D image on the floor of the box. Brewster demonstrated his stereoscope at the Great Exhibition of 1851 in Chrysal Palace and presented one to Queen Victoria. The ease of which someone could use Brewster’s stereoscope made it more popular than Wheatstone’s original as well. The publicity the stereoscope had at the Great Exhibition caused a need to increase production of the device. This decade saw the commercialization and mass production of the stereoscope. The London Stereoscopic Company sold half a million devices between 1854 and 1856.

Several years following the Great Exhibition and subsequent increase in interest from the public, the stereoscope device underwent another change. In 1859, Oliver Wendell Holmes invented a hand held stereoscopic viewer. Not only was it easier to use, but the Holmes version of the stereoscope was significantly less expensive, allowing more people the chance to enjoy this form of entertainment. Holmes chose not to patent his invention and instead published the design for anyone to use. By 1860 both amateur photographers and publishing firms were making stereographs and almost every Victorian middle-class family owned their own stereoscope viewer and an accompanying collection of images.
Between the 1840s and the 1920s, stereographs served as an important method of entertainment, education, and virtual travel. The introduction of Holmes’ simple wooden stereoscope also led to a stronger educational technology market, beyond that of exclusively textbooks and chalkboards. Stereoscopes were used to teach millions of American children about geography, natural history, and a range of other subjects. Underwood & Underwood, a successful stereographing company, created a teacher’s manual for using stereoscopes in the classroom, “The stereograph is a superior kind of text, and a good teacher will not have so much trust in mere print.”

Another stereographic company, Keystone, believed that every American city boasting a population of 50,000 people or more should use the “Keystone System” in its schools.

Visual culture was on the rise. On top of stereoscopes, Victorians were excitedly trading photographic calling cards, watching short films, and spinning kinetoscopes of looping animations. By the 1920s, movies and printed half-tone images replaced stereographs as the leading photographic medium. However, 3-D imaging experienced a resurgence in the 1950s when 3-D anaglyph films and the ViewMaster, patented in 1939, were popularized. Initially the ViewMaster was sold as a tourist souvenir, but eventually it became more of a children’s toy. In fact, it was named one of the top 50 toys of the twentieth century.

Virtual reality products, such as goggles and gloves, were first invented in the mid-1980s when Jaron Lanier, founder of VPL Research, began to develop the gear.

Today’s technology, such as Google Glass, Facebook’s 3-D filter, green screen for film and TV and even cell phones, further builds up the ideas of ancient philosophers and the advancements of 19th century inventors. In video games, the virtual...
worlds created use intricate 3-D graphics so real that it is becoming more difficult to tell real from virtual visually. The only question that remains – what will the next advancements of the technology be?

Join Pennypacker Mills in discovering the evolution of 3-D devices – from the original Wheatstone stereoscope, fly past the Brewster stereoscopic design, and move on to the popular Holmes hand-held model. The exhibit will feature stereoscopes and numerous stereocards from the collection of Pennypacker Mills. All visitors will be able to experience the 3-D effects first-hand when viewing the stereocards by using a lorgnette provided upon entering the galleries. We invite visitors to experience the ‘magical illusion’ in person!

The exhibit is located in the second floor galleries and is included on all guided tours.

All ages are welcome to visit the free exhibition. Masks are required.

Call 610-287-9349 to pre-register for a guided tour & the exhibit. Pennypacker Mills is open year-round. Closed Mondays and major holidays. Hours: Tuesday through Saturday: 10 am to 4 pm; Sunday: 1 to 4 pm. Tours take approximately 1 hour; last tour at 3 pm.

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**Are YOU Our Next Volunteer?**

Pennypacker Mills, one of the historic house museums operated by the County of Montgomery, is seeking volunteers to help with guided tours. This historic site is open year-round for tours of the Pennypacker mansion. Tour guides take visitors through the mansion for informative tours. A volunteer manual is provided as well as shadowing of staff members to learn specific information about the site, Pennypacker family and the time period. Call us today and be a part of a dynamic historic site with outstanding volunteers.

If you are interested in history and would like to share your time and talents with visitors, please contact Pennypacker Mills at 610-287-9349 or email us at PennypackerMills@montcopa.org. Office hours: Tuesday through Friday, 10 am to 4 pm. Volunteers are required to obtain criminal check and child abuse clearances, as per the County of Montgomery.
Governor Pennypacker, accompanied by Senators Knox and Penrose and a distinguished gathering of Pennsylvania statesmen from Harrisburg, went to the White House today and invited the President to attend the dedication of the new state capitol next October.

Governor Pennypacker was presented to the President by Senator Knox, who also introduced the other members of the party. They were ex-Governor W. A. Stone, chairman of the Capitol commission; State Senator Sproul, president pro tem of the Pennsylvania Senate; Speaker Walton, State Auditor Snyder, State Treasurer Mathues, Bromley Wharton and Representative Olmstead.

The governor told the President that the entire state would be pleased if he would attend the dedication of the new capitol building, and in urging him to accept the invitation called his attention to the fact that for ten years Pennsylvania furnished the nation with a seat of government. The debt contracted then had never been paid by the nation, but he added, warmly: “The state of Pennsylvania will regard it as paid and paid liberally if the President of the United States will become the guest of the state upon this occasion.”

The President said that if it were a case of settling a debt owed by the government he could best escape personal consequences by referring the matter to Secretary Shaw and letting him deal with it from his point of vantage in the treasury department. Instead of doing this, however, he would give the invitation his most careful consideration and see if he can so arrange matters as to be able to accept it.

Then the President shook hands with the governor once more and with all the other gentlemen present and they separated with the expressions of good will and esteem. The governor and his party went almost directly from the White House to the depot and took a train for Harrisburg.

Note to Reader: President Roosevelt gave a rousing speech at the dedication of the State Capitol Building on October 4, 1906.

“At the dedication ceremony Governor Pennypacker received warm applause following his speech. Just as he finished and turned to present President Roosevelt, the vast audience gave him absolute silence. ‘Of all the rulers in the universe,’ said the Governor, ‘the greatest and best beloved is the President of the United States. We have him with us today and I now present him to you.’

President Roosevelt arose, bowed right and left, and raised his hand for silence. Then, in ringing voice, he plunged into his speech, following closely the printed notes that he held in his hands. Aside from the president’s commendation of prominent Pennsylvanians and praise of the record of the legislature in extraordinary session, the leading features of the President Roosevelt’s address at the dedication of the new Capitol were his advocacy of increased power of the Federal government and a recital of what the Federal government had accomplished in the past few years. He refrained from saying anything that could have been distorted into approval or even acknowledgment of the corrupt state political machine at the turn of the twentieth century.”

Source: Pennsylvania Capitol Preservation Commission
Spring Workshop for Kids!
Sat., April 2
10 am to 12 pm
Fee: $5/child

Join us for a morning celebrating all things Spring! We’ll be making four crafts that kids ages 5-10 years old will enjoy making. Bring along your creativity as we cut, glue & color to make fabulous springtime crafts!

How To Register
Call 610-287-9349 to pre-register for this special program or email us at Pennypacker-Mills@montcopa.org. This workshop is located in the Classroom Building where we will provide social distancing for each group. This workshop is for 1 to 2 children accompanied by 1 adult. Masks are required.

Gallery Talk
Stereographing America:
A 3 – D History Using Stereocards

Sunday, April 24
1 pm  FREE

Plan to attend the Gallery Talk about 3-D optical illusion devices in the second floor galleries. This informative presentation will explore how these devices became the longest running types of photography, spanning daguerreotypes to modern day. Using special viewing devices, participants will have the ability to view many stereographs in 3-D.

How To Register
Call 610-287-9349 or email PennypackerMills@montcopa.org to pre-register for this special program. Space is limited so call today. The Galleries are located on the second floor of the Pennypacker mansion. Masks are required.
A Visit to the General Store
Sat., May 14   10 am to 3 pm
Free

Spend a fun day at the Mills visiting the General Store, located in the 1900’s History Center (red barn). Kids will learn why General Stores were such an important place for local families to visit regularly. Become a person living in the early 1900’s in Schwenksville and buy enough food for your family. Food, tools, medicines for family and farm animals, candies, toys, fresh fruit and vegetables, meat and more are all on display for you to choose. Bring along a camera to take pictures of your kids trying their hand at grinding grain or weighing beans. All ages welcome.