

**ANTIQUE BRONZE CANNON AT ANNAPOLIS AND WASHINGTON.**

BY DAY ALLEN WILLEY.

The cannon collections at Annapolis and Washington embrace marine as well as land artillery pieces used on deck and in fortification, manufactured at some of the most noted gun factories of the Old World. They include parts of batteries on the ill-fated Spanish fleet and guns from land defenses in Cuba; and the war with Mexico, that of 1812, and even the Revolutionary war are brought to mind by the carronade, the mortar, and field guns of antique type. Indeed, so rare and so really artistic are some of the creations of the old-time gunmakers, that it would seem as if these should be more carefully preserved, and at least sheltered from the elements, instead of being exposed in the open as they are, where rain and sun can injure if not obliterate their delicate tracery.

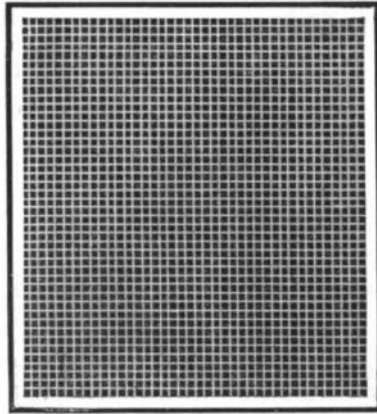
Studying these weapons of the past, one is struck with the care displayed in fashioning and finishing them. The work upon breech and barrel plainly shows that even religion entered into their manufacture; and some of them bear inscriptions showing that they were sent away to the wars with the blessing of the Church.

The contrast between the smooth black tube of today without sign or letter and these elaborately chased and scrolled trophies of the past is indeed remarkable. The modern disappearing rifle or turret gun looks peaceful beside one of the older pieces; though the latter is as a child's toy in contrast with the modern weapon, that can hurl its half-ton projectiles some 20 to 25 miles. Perhaps the old Chinese idea of having an instrument of war appear threatening was favored by the European designers, for in the collection we see ships' guns in which the breech was molded to represent the head of a griffin—an uncanny sight to say the least. One of the largest carronades on the Naval Academy grounds has this design. Another has the breech partly finished to represent a human face with great staring eyes, the face standing out of a framework of leaves so distinctly that its appearance is startling. Another piece has the head of an ogre on the breech.

The French and Spanish guns of the seventeenth century were often elaborately named, and bore mottoes in Latin text indicating that they were "cast for the king" or for a "holy war." Several in the American collection bear dates showing that they came from the Seville and other foundries prior to 1650. Each has a name, such as Chevalier or Marquis de —, its title evidently obtained from some notable family in the country from which it came. The title is usually in raised letters across the barrel near the breech, which leaves ample room for other ornamentation. So nearly all of the brass and bronze pieces are elaborately decorated on the upper parts of the barrels. One favorite design is what appears to be the face of a cherub or angel surrounded by a halo, such as is often seen in religious paintings. Probably the designers took their idea from this, but on most of the guns the work is so beautifully done, that even after the long interval of time which has elapsed, the lines are clear and distinct. The *fleur de lis* is a common ornament, especially on the guns of French workmanship, while exquisitely-chased "collars" encircle

the barrel where it enlarges into the muzzle. Even the metal sockets, in which was fastened the rope or chain for controlling the movements of the piece when in action, are molded into artistic designs.

As already stated, some of this ancient artillery dates back to the seventeenth century. In the opinion of ordnance experts, one of the oldest, if not the oldest, is a huge mortar in the Annapolis collection. This is almost as wide as it is long, and has an opening or bore that actually measures 16 inches at its greatest diameter. It is believed to be fully three hundred years old, as judged by its design and the few characters to be traced upon it. Some of the large carronades, mounted at the entrance of the War and Navy Departments and at Annapolis, are 12 feet from breech to muzzle; but their greatest caliber is only about 6 inches, and some of the smaller have but 4-inch caliber. They are made principally of bronze. They are smooth-bore, and though formidable in ap-



**AN OPTICAL ILLUSION.**

If viewed through a vertical slit, only the horizontal lines show; but if the figure be held close to the eye only the vertical lines appear.

pearance, they are pygmies in destructive force compared with even the 4-inch rifle of to-day.

Possibly the most historic guns in the collections are two insignificant-looking iron tubes, that stand on guard near the north end of the State, War, and Navy Building in Washington facing Pennsylvania Avenue. Mounted on the stone wall just above the basement, they might be overlooked on account of their small size. They are alike in design and dimensions, being about four feet long, and unlike their fellows, destitute of ornament. On one is the inscription "San Mateo," and on the other "San Marco." These were two of several pieces of artillery captured from the Mexicans by the American fleet operating in the Gulf of Mexico. They were mounted in a battery defending a Mexican port. After the place had fallen into the hands of the Americans, an officer who had noted the quaint appearance of the weapons asked about them, and was told they had been brought to Mexico several centuries before. It is an interesting fact, recorded in the history of La Salle, the explorer, that in his expedition to the New World in 1684, he had as a part of his armament two small guns which the records say were named "San Marco" and "San

Mateo." The appearance of the cannon at Washington proves that they are of very ancient workmanship.

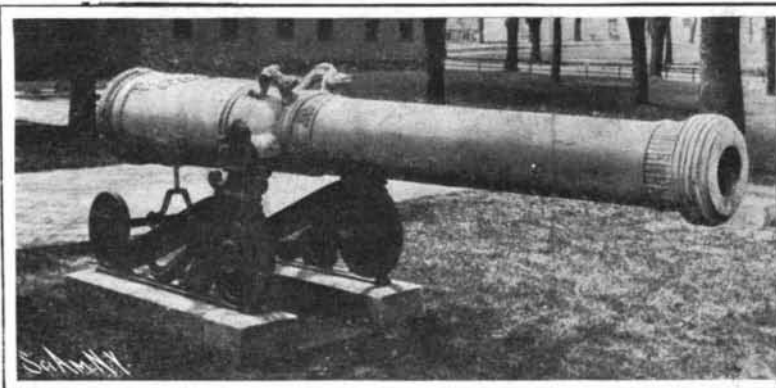
**THREE OPTICAL ILLUSIONS.**

BY PROF. GUSTAVE MICHAUD, COSTA RICA STATE COLLEGE.

Vision at extremely short distances is of course indistinct, unless a small diaphragm (pinhole or slit) is used to decrease the size of the luminous pencils. If, however, the object observed is sharply divided into luminous and dark masses, its shape may be recognized even when the eye almost touches it. A curious transformation in such cases sometimes takes place. The accompanying drawing apparently shows a dark field crossed by white lines. Yet if, instead of being examined at the ordinary distance, it be placed at about one inch from one eye, this being kept at rest as if looking at some distant object, the figure will be reversed, i. e., dark lines will appear on a white field. Owing to the very small distance between the eye and the figure, the rays emitted by the white lines come to a focus far behind the retina. The convergent beams which have crossed the crystalline lens strike the retina as wide luminous stripes, leaving but very narrow dark boundaries between them. These appear as black lines on a white field.

The other transformations, by far more curious, take place when the same figure is seen through a narrow slit made with a single stroke of a penknife into a piece of dark-colored pasteboard. The slit is kept all the time vertical, close to one eye, the other eye being shut. The figure, thus examined at a distance of about one inch, will appear to be made up entirely of vertical lines, the horizontal lines having apparently vanished. Vision in that case is distinct. The vertical lines are seen nearly as sharply as in the case of vision at ordinary distances. This is not extraordinary if it be borne in mind that the slit decreases the width of the luminous pencils, and prevents the formation of diffusion circles in a horizontal direction only. It acts as a diaphragm for the vertical lines, and renders no such service to the horizontal lines. But if the figure be now withdrawn to the distance of one or two feet, the slit remaining in the same vertical position and all the other features of the experiment remaining unchanged, it will be found that the horizontal lines, which had vanished, have reappeared, while the dark, sharply-cut, vertical lines have entirely disappeared. At a distance of one inch the figure was exclusively made of vertical lines; at a distance of one foot it contains horizontal lines only.

Diffraction is the agent of the queer transformation. The rays which have passed through the narrow slit interfere, and the result of their interference is a general blurring and blending of the vertical lines. When these were at but a small distance from the eye, their image was large enough to remain quite distinct in spite of a slight blurring of the edges. But as the distance increased, the image became smaller and the blurring relatively more and more important until it caused the image to disappear. As to the horizontal lines, the extension of the slit in the vertical direction is such as to prevent diffraction from blurring their horizontal edges. Moreover, they are now at the distance of distinct vision, and their image is clearly formed right on the retina without any diaphragm.



**Old Highly-Decorated Spanish Gun.**



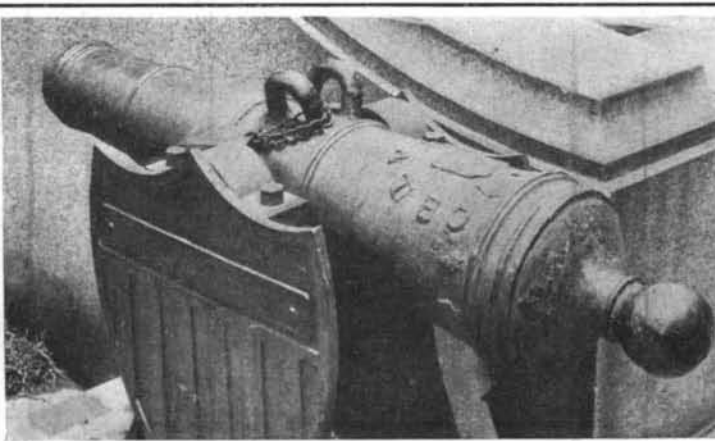
**An Odd Breech.**



**Cannon With Griffin's Head Breech.**



**Mortar Three Centuries Old.**



**These Two Guns Are Believed to Have Been Brought to America by La Salle, the Explorer, in 1684 and Named After Two of the Evangelists.**

