THE TARSIERS AND LORISES OF THE MALAY ARCHIPELAGO.

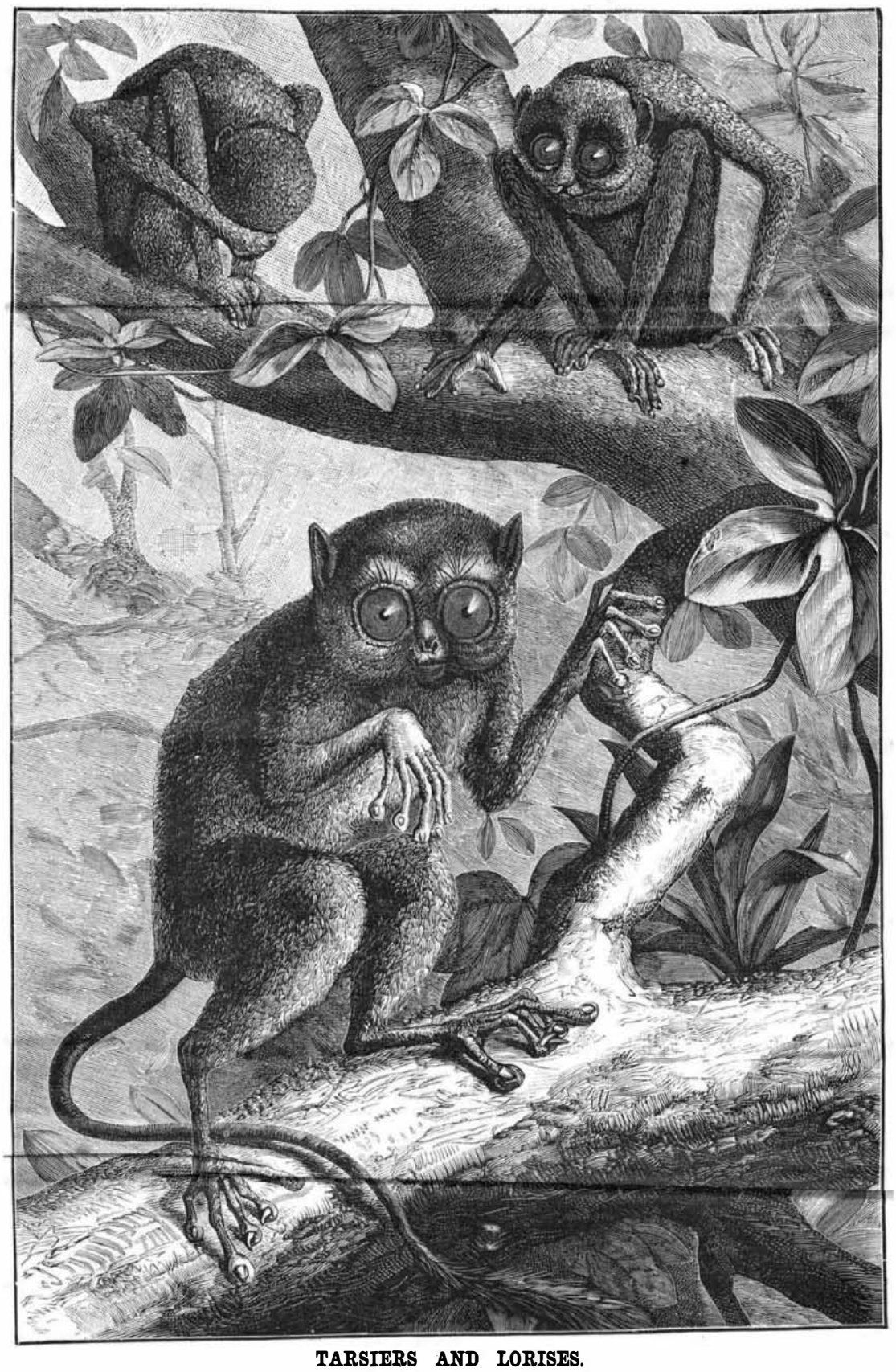
The forests of the East Indies are populated by strange animal forms, among which the curious Lemuridæ that are figured herewith, from a drawing by Mr. Clement, are deserving of occupying the front rank. These odd creatures, the analogues of the galagos of Africa and of the indris and cheirogales of Madagascar, are, with the *Galeopitheci*, or flying lemurs, the representatives, in the Indo-Malaisian region, of the order Lemuridæ, which are inhabitants of the tropical regions of the Old World, and the fossil remains of which confirm their existence at the Tertiary epoch in France and North America.

These animals represent transitory forms between the monkeys and cheiroptera, but are more widely separated from the former than from the marsupials, with which they have very great affinity, and from which they appear to have originated. Taking as a basis the present geographical distribution of these creatures, certain English and German naturalists have tried to find the possible ancestors of the monkeys in the Lemuridæ; and, starting from man, have assigned as the home of these ancestral forms an immense and now submerged continent of which Madagascar and the Malaisian islands are the last vestiges. These views are hazardous at the best, and, while there is nothing to demonstrate the truth of them, a large number of facts can be adduced against them. It can be proved that the various types of Lemuridæ were, at the time of their appearance, distributed throughout distinctly defined regions. The Tertiary epoch shows us forms of them in the temperate parts of the Old and New World. In the phosphorites of Quercy Mr. Fithol has collected the remains of *Nacrolemur antiquus*, a lemur closely allied to the present pottos of West Africa. "Their burial in the phosphatic fissures," says Mr. De Lapparent, "appears to have been immediate, and doubtless under the influence of noxious vapors that asphyxiated such animals as had come to slake their thirst at the springs; for there are many entire skeletons, and the bones of neither the ruminants nor rodents show any trace of incisions made by the teeth of the carnivora with which they are associated."

Other geologists have exhumed from the lower Eocene of Wyoming Territory the remains of ~~Limnotherium and~~ *Lemuraoides* of whose natural affinities with the makis there is no question. At the beginning of the Eocene period there existed other animals, whose bones, collected in the Montmartre gypsums, leave scientists in uncertainty as to the exact place to which they ought to assign the owners of these remains in the mammalogical series. Some regard the *Adapides* as ungulate mammals, while others would place them among the Prosimians, to which a large number of their characters tends to ally them.

If we take the proofs that unite to give us the geological and geographical distribution of the Lemuridæ, our mind is made certain. Far from looking for the probable origin of the primates in these creatures, we must, on the contrary, consider them as a special type that has been clearly characterized from the most ancient time, and that is due to modifications introduced into certain marsupials. The thumbs opposite the other fingers is not a character that can be called upon to approximate these animals to the monkeys, for this peculiarity is observed in a large number of marsupials, and, properly speaking, cannot be considered as a mark of superiority. It is even remarked that certain monkeys are destitute of it, such as the catarrhinians, of the African genus *Colobus*, which lack the thumb on the hands. The hand must not be considered as a modification of the foot, but rather as an organ of special and primitive plan. Certain naturalists have considered, and do still consider, the thumb as a continuation of the axis of the arm represented by the radius. It seems more reasonable, along with Carl Vogt, to look at it "rather as a secondary radius independent of the other fingers, and which, for this reason, is generally the first to disappear when the number of the fingers is reduced."

The tarsier, shown at the lower part of the engraving, seems, through its fantastic appearance, to well merit the name *spectrum* given it by Geoffroy Saint-Hilaire. To consider but its stature and proportions, its long hind limbs, and its still larger tail, ending in a tuft, this tarsier might be taken for a jerboa, were it not for the inordinately large round eyes with which its head is provided. These eyes, which are of a yellow brown, are luminous in the dark, and, according to one observer, give the head the appearance of a dark lantern with two bull's eyes that revolve upon a pivot.



TARSIERS AND LORISES.

The accompanying figure shows the tarsier reduced to about one-third of its natural size. The length of the adult's body is about 6 inches, and that of its tail 9 inches. The body is covered with a woolly fur of a grayish brown, lighter upon the belly. The trunk is slim, and the long tail that terminates it is cylindrical, and is provided at the tip with a tuft of hairs. In the abdominal limbs, the first two divisions are nearly of equal length. The thigh is stouter than the leg, and the latter terminates in a very slender tarsus, and a foot whose toes are still more elongated than the fingers, and which is provided with a strong toe that can be placed opposite the others. Of the toes, the second and median end in a claw, while the very long fourth one and the fifth one, like the fingers, are provided with flat nails. It must be remarked, however, that the nails of the hand are more convex than those of the foot. The toes end in a disk, and their lower surface is provided with round callouses, by means of which the animal fixes itself firmly in position.

The thoracic limbs, which are much shorter, terminate in a hand composed of long, slender fingers, provided with disks. The thumb, which is short, cannot be moved opposite the other fingers.

The head is large and round, the muzzle is short pointed, and the ears are of medium length, naked, and provided with a sort of fold by which they can be closed. The eyes take up more than half the face; and the mouth, which is capable of opening very widely, does not contribute to increase the animal's beauty, and seems to contract into a diabolical grin.

The dental formula ($\frac{2}{1}\ \frac{1}{1}\ \frac{3}{3}\ \frac{3}{3}$) is that of an insectivore, and is nearly identical with that of the bats of the genus *Plecotus*, and likewise recalls that of the indris of Madagascar. "In the upper jaw," says Vogt, "the incisors, canines, and premolars have nearly the same form of sharp fangs, the median incision is more prominent, the second is smaller, the canine is stronger, the first premolar is very small, the second is larger, and the third has two points. The molars are wider than long, and are provided with sharp external tubercles. In the lower jaw, the strongest teeth are the canine; the incisors are small and straight; and the premolars increase from in front backward."

The spectral tarsier inhabits the Sunda, Celebes, and Philippine Islands and, according to Brehm, the Moluccas, and principally the island of Amboyna.

It has never been permitted me to see this Prosimian in a living state, and the specimens that I was enabled to see or procure during the course of various voyages among the islands of Malaisia were either preserved in alcohol or stuffed. It is, moreover, an always rare animal, that lives in couples in thickly wooded and the least accessible places in the virgin forests. During the day it remains in deep slumber. At the approach of night it is seen running nimbly, making long leaps from branch to branch, and pursuing and greedily devouring insects. It feeds on fruit also, but its most usual diet consists of articulates and simple reptiles.

The female gives birth to one offspring, which fastens itself to her thighs, or which she sometimes carries with of cats.

The Malays seem to have a singular dread of this animal. Owing to its strange physiognomy, they appear to regard it as some supernatural and malevolent creature that takes pleasure in casting a spell over men and their possessions. They even carry their simplicity so far as to abandon the fields where the animal shows itself by chance, thinking that it is better to bear the fatigue of clearing other land than to expose themselves to the witchcraft of the little devil. Yet there are few creatures so inoffensive as these little Lemuridæ, and those that have been observed in confinement have never displayed any ill nature—the most that they have done being to make some impatient movement when awakened in the middle of the day. In a wild state they pass the day coiled up asleep in the hollows of trees or in the forks of the branches.

The slender loris (*Loris gracilis*, Van der Hoeven) has the same habits as the tarsier, and, like it, inhabits the large Sunda Islands. But its geographical range is much wider at the north, and although it is frequent in the forests of India and Indo-China, it does not appear to inhabit the Celebes and the Moluccas. It is rare in Malaisia and is replaced by an allied form, the *Nycticebus*, of which two species are known, *N. java-*

nicus, Geof., and *N. tardigradus*, L. Like the tarsiers, the lorises have large eyes which shine in the dark; but they have merely a short rudiment of a tail. At the top of the engraving are represented two of these animals. One of them is preparing for a frolic, while his companion is still in deep slumber. I have observed this animal while it was asleep, and the engraving well shows its usual attitude.

The slender loris is 10 inches in length. Its dental formula ($\frac{2}{3}\ \frac{1}{1}\ \frac{3}{3}\ \frac{3}{3}$) slightly approximates it to the carnivora, whose diet it shares. Its greatest treat is birds, which it seizes in the dark and devours the brain of. It is looked upon with an evil eye by the aborigines of the countries that it inhabits. The Ceylonese catch the poor animal, and torture it most cruelly. "The beautiful, large, bright eyes of the loris," says Tennent, "have attracted the attention of the aborigines, and it is for the possession of these that they hunt the animal. These organs enter into the preparation of certain love potions. In order to extract them, the natives hold the poor beast over a fire until the eyes burst." The same author adds that the slender loris is so fond of birds' brains that, according to the natives, it will attack the pea fowl while the latter is asleep, quickly crush its skull with its teeth, and then feast upon the contents. Like the tarsier, the loris does not appear to be able to live in Europe, and those that an endeavor has been made to introduce in menageries have died during the trip.—*M. Maindron, in La Nature.*

THE CYCLORAMA.

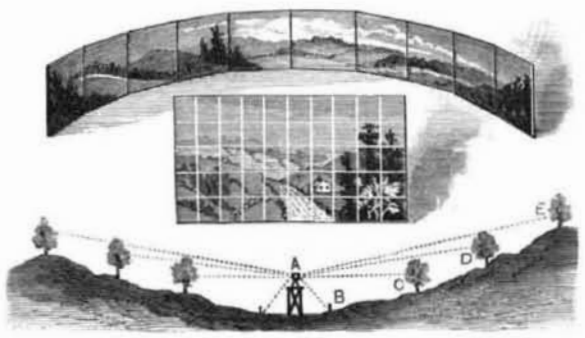
The origin of this form of art is fancifully traced to the use of scenery by the Italians, two or three hundred years ago. They arranged, outside of their windows, scenes painted on canvas, that simulated extensive gardens. The American inventor, Robert Fulton, is said to have exhibited a panorama in Paris in the beginning of the present century. This was probably paintings of a series of scenes on a continuous canvas wound on rollers, and caused to pass across the stage. The circular or cylindrical painting, properly called a cyclorama, whose perspective is a matter of special calculation, and which is celebrated for its illusive effects, is more recent. It probably does not date back over fifty years.

A cyclorama has, within a short period, been placed on exhibition in Brooklyn, illustrating the battle of Gettysburg. Irrespective of its artistic merits, which are very great, the technical details of its construction and the solution in it by means of photography of the problems of cylindrical perspective alluded to above possess much interest. The painting is contained in a large circular building on the City Hall Square.

The work covers a sheet of canvas four hundred feet long and fifty feet high. This is supported from the sides of the building so as to form a cylinder. A rail or beam of iron and wood combined is carried all around the upper part of the building like a cornice, resting on brackets. The upper edge of the canvas is nailed to this. The cloth is first rolled smoothly on an iron roller surfaced with wood, fifty feet long. This roller is about three feet in diameter. It is held vertically in a heavy framework that runs on tracks around the building. From the roller thus carried, the cloth is gradually paid out, eight or ten men being required, some on top and some below. As fast as roller, it is seized and held in pincers by one of the operatives, and its edge is tacked to the cornice beam.

This disposes of the upper edge. The lower edge is fastened to a circle of gas pipe, that runs completely around the building, and that is carried entirely by the cloth. At every third foot a twenty-five pound weight is hung, to stretch the canvas. The effect of the stretching is that the canvas loses the true cylindrical shape; its sides are no longer parallel, but curve slightly inward, about one foot in amount, at the center. Thus at the horizon line, the most distant part of the scene, the painting is about a foot nearer the vertical line, through the observer's position, than in the foreground. In absolute distance from his eyes the difference is still greater. Owing to obliquity of the line of sight, the foreground, that seems so near at hand, is really much further off than the horizon.

The next operation to be described is the painting. This was carried out in this particular cyclorama so as to secure almost absolute accuracy. The landscape is really an artistic transcript of photographic views of the field. The artist went personally to the field of Gettysburg. On it he selected a point of view, and a small stage of the height of the proposed audience stage was there erected. Around the stage a line of pickets was driven in a circle whose radius was forty feet—less than one-half the diameter of the cylindrical picture. The distance was measured from the stage as a center. From the top of the scaffold three identical series of ten photographic views each were taken. In



PHOTOGRAPHING THE FIELD.

taking them, the instrument was newly pointed for every view, so that the entire horizon was covered. Each series shows the whole field of view in all directions. The arrangements were such that the line of pickets came just within the field. One series of photographs was taken for the foreground, focusing and exposure being adjusted for this special portion; two other series, identical in all respects except that by their focusing and exposure they were devoted to middle distance and background respectively, completed the set. The only difference between the three series was in the focusing and exposure. Each view was divided up into squares. The canvas was marked off by corresponding divisions and the photographs were copied square by square. This blending of the ten views and the aerial perspective was a question of artistic achievement. The out lines were determined, to a great extent, mechanically.

The painting was done from scaffolds, of which a number were used of different heights. These travel on the same track that carries the roller frame. The painting is in oil, tinsel being occasionally employed with excellent effect. Bayonets or equipments and bursting bombshells afford instances of its use. The artist personally did practically all of the work, the sketching and artistic details, besides attending to the superintendence of his aids.

The circular wall being thus covered, the foreground has next to be attended to. By platforms and earth this is built up irregularly and to a greater or less extent toward the center. Earth and sod cover the boards. Real trees, evergreens and others, with shrubbery, portions of fences, and the like are set about, and tufts of grass, wheat, and similar things, lend their aid to fill up the scene. The continuation of a road out of the canvas is colored to match the painting with brick-dust and earth mixed. In this way a genuine landscape is produced. Lay figures cut out of board also appear. One curious instance is shown in the illustration. Two men are seen carrying a litter on which a wounded man rests. The more distant soldier is painted on the canvas. The litter is real, two of its handles passing through holes in the canvas. The figure resting on it is made of boards in the most curious segments, that seem to bear no relation to the final effect. The nearer bearer is cut out of a flat board. The illusion is simply perfect. No one could tell how much was painted or how much was real. Other scenes in the foreground are similarily treated.

The result of the arrangement is that it is impossible to tell where the painting begins, it blends so perfectly into the actual foreground.

The spectators occupy an elevated stage, access to which is by a gallery that runs under the scaffolding of the foreground, being completely concealed thereby. By winding stairs the platform is reached, and the result is that the spectator loses all orientation, and cannot tell north from south. While looking at the picture, he must live in its scene. Neither can he form any conception of the size of the building. Although it is known that it is of moderate size, no approach to the true dimensions can be reached by any process of estimation.

Over the spectators' stage a circular screen is suspended that shades it from the light that enters through the skylights. The spectators are kept, to a certain degree, in obscurity, while the daylight pours in upon the painting, especially upon its upper parts. The sky is thus lighted up, and a peculiar luminous effect, favoring the aerial perspective, results. At night a number of electric lamps, suspended around the screen and out of sight of the spectators, illuminate the painting. The arrangement is that of footlights reversed. The lights and the dynamos are of the Ball system.

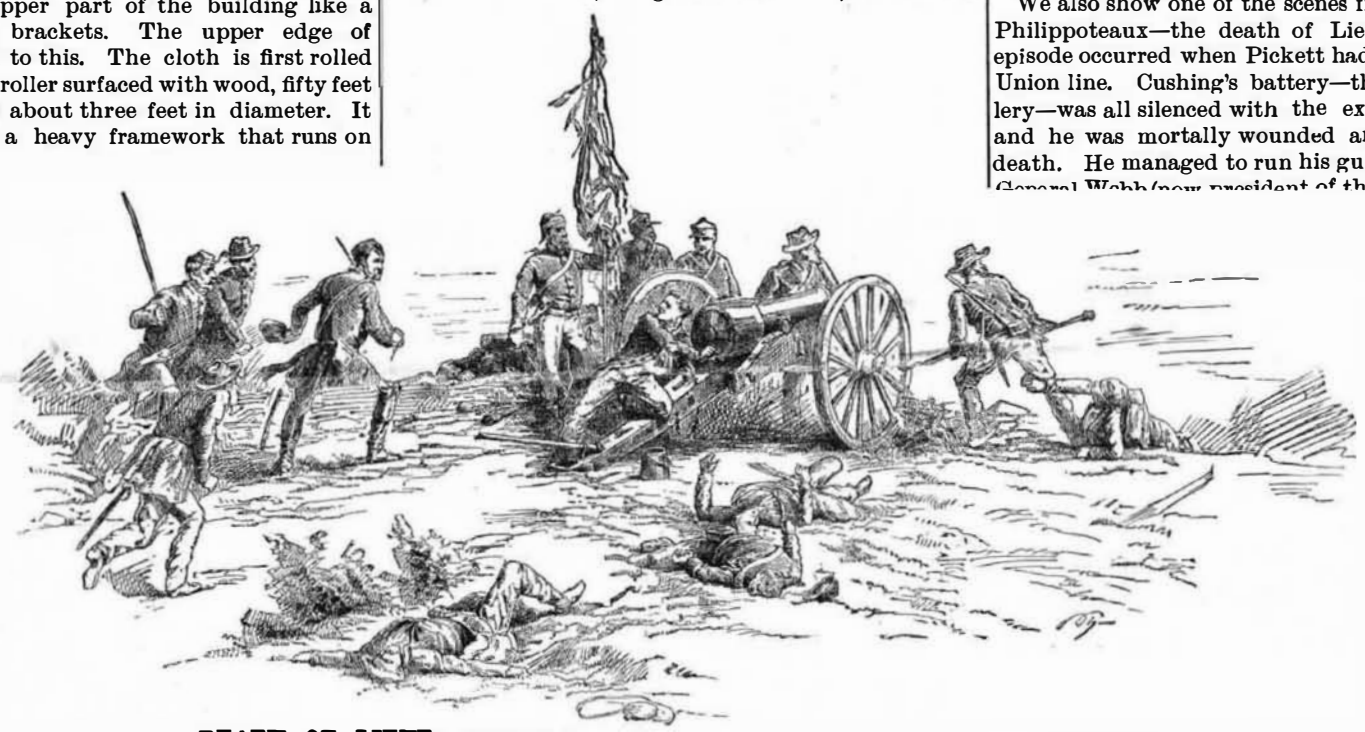
It would have been easy to have executed the painting by the mathematical rules of cylindrical perspective. By the photographic method, the necessity for this was obviated. Had the ten photographs been reproduced without any blending, it is manifest that a ten-sided canvas would be the theoretically perfect surface for their reception. But as it is, the artist has carried out the work so well that the perspective, aerial and linear, is beyond criticism.

The canvas is imported from Belgium, none being manufactured in this country that would answer the purpose. It is nine yards wide, and the seams run up and down.

The artist, Paul Philippoteaux, has been identified for many years with this form of art work. He was born in Paris, in 1846, studied under Cogniet and Cabanel, and won great success as a historical painter. With his father he painted a cyclorama of the defense of the Fort of Issy, which was exhibited for fourteen years in Paris. Some nine cycloramas have since been painted by him, and the one we are describing is his fourth Gettysburg.

Many of the details of the present picture were obtained by him from eye-witnesses. The uniforms, modes of carrying blankets, and the details of harness and of minor parts of the scenery were studied carefully. In the foreground are scattered some real pieces of harness and similar objects, and they compare perfectly with what is seen on the canvas.

We also show one of the scenes from a sketch by M. Philippoteaux—the death of Lieut. Cushing. This episode occurred when Pickett had nearly reached the Union line. Cushing's battery—the 45th U. S. Artillery—was all silenced with the exception of one gun, and he was mortally wounded and on the point of death. He managed to run his gun forward, and told General Webb (now president of the College of the City of New York) that he would give them one more shot. He fired his gun, cried out "Good by!" and fell dead. This incident appears in the foreground, and serves to establish the position of the spectators. The platform stands in the center of the Union line.



DEATH OF LIEUT CUSHING, 45TH U. S. ARTILLERY, AT GETTYSBURG.

Propagation of Flies.

Their particular office appears to be the consumption of those dead and minute animals whose decaying myriads would otherwise poison the air. It was a remark of Linnæus that three flies would consume a dead horse sooner than a lion could. He, doubtless, included the families of the three flies. A single fly, the *Naturalist* tells us, will sometimes produce 20,000 larvæ, each of which, in a few days, may be the parent of another 20,000, and thus the descendants of three flies would soon devour an animal much larger than a horse.

To mix sulphur for making joints under engine beds, melt the sulphur in an iron ladle in the same manner as with lead; only, cover the ladle, while melting, with a piece of iron to prevent fire.