

The industrial schools at Carlisle, Pennsylvania, Hampton, Virginia, and Forest Grove, Oregon, are movements toward recognizing the value of the individual Indian. At these schools he is taught trades, the worth of labor, and personal responsibility, and, thus is prepared to cope with the world and earn his own living. The Indian has always been a kind of artisan, and his hand is skilled by long heredity to steady lines and strokes, more fine than heavy. The trend of his past turns him toward the shop where the work of the eye and hand is coördinated. To the truth of this statement, it is only needful to call to mind the silver work of Northern and Southern Indians, the bows and arrows and other weapons, the wrought bone implements, the pipes, both historic and prehistoric; nor should woman's handicraft be forgotten,—her weaving, quill embroidery, the articles made of skin, bark, and wood; her pottery-making and free-hand ornamentation. Our museums bear ample testimony to the industrial ability of our native races. The Indian, therefore, is not lazy; but he does not labor as we labor; he has not learned the value of persistent work, which begets provision and care for the future, and his environment in the past has been of such a character as to furnish no suggestion as to the need of such care-taking, but rather the contrary. The one thing imperatively needed for the Indian is industrial education. Educate him thus, and he becomes a friendly neighbor and co-worker; keep him in ignorance and isolation, and he becomes dangerous to his own future and to those about him.

The Commission's report states that the number of Indian children who are of school age (exclusive of the five civilized tribes) is 34,662; and this is an underestimate, as several tribes are not reported. The number of reservation schools is given as 73 boarding, 105 day, and 2 night schools. These schools are maintained at a cost to the Government of \$278,733, exclusive of rations and of part of the clothing. Various religious societies contribute \$58,725, and the State of New York \$17,644. The industrial schools at Carlisle, Pennsylvania, Forest Grove, Oregon, and the Indian department at Hampton, Virginia, receive from the Government \$91,394, and religious societies give to these institutions \$49,882. It is not improper to state that, but for generous outside support, the effectiveness of these schools would be seriously curtailed. Those now in operation can accommodate only 10,202 children, leaving a school population of 24,460 without any possible means of education or instruction in the ways of civilized life.

Where is the block in the way of educating these children? It is in Congress, which should appropriate the money. It is but just to say that there are men in Congress who appreciate the need of education for the Indian, who desire to have the money appropriated; but they are surrounded by such a dead-weight of indifference and ignorance that they can make little headway. This year the appropriations are inadequate, considering the needs and just demands. Treaty obligations, the appeal of the Indians through their agents, the urgent request of the Commissioner of Indian Affairs, and the plain setting forth of the Secretary of the Interior, failed to move the Congressmen from their short-sighted policy and false notions of economy. It is cause for congratulation that the

present Secretary of the Interior is seriously and practically in earnest to secure education for the Indian. In his report he offsets war expenses against a plan for educating annually 10,000 Indian children, and adds:

"It is believed that with an annual expenditure of between five and six million dollars, during the next fifteen years, for educational purposes of the character indicated, the danger of Indian outbreaks may be avoided, and the great mass of Indian youth at least made self-supporting."

That such prudent counsel should fall short of practice for the lack of money gives rise to the query whether there remains any other available resource by which industrial education can be provided for the Indian in the near future. Turning to the report, we find that a considerable part of the 115,957,350 acres classed as untillable is adapted to herding. Men with capital and various corporations are coveting these plains, and even now negotiations are pending for the purchase of millions of these acres. Other portions of the untillable land lie in regions of known mineral wealth. Valuable mines have already been discovered, and prospecting parties are secretly pushing their investigations. The day is not far distant when these lands will also fall into the hands of those who can develop their hidden wealth.

The great reservations are sure to be broken up, and it is best that they should be, best for the Indians, best for civilization and for our own race. Isolation is ruin to the Indians, and brings injury to us as well. There is no safety for any people except in education, law, and freedom.

A considerable portion of the land held for the Indians is not secured by treaty, but by executive order; and when land of this tenure is withdrawn, little if any compensation will be given to the Indians. A detailed examination of the treaty lands shows that it is not prudent to delay longer the conserving of the land capital of the Indians. The income which can be secured from the sale of surplus lands will be none too large to meet the needs of industrial schools fitted to prepare the Indian youth to earn their living by intelligent labor, by which alone they can secure their future welfare and advancement. The well known "Civilization Fund" was derived from the sale of Indian lands. To that fund was mainly due the establishment of the industrial schools at Carlisle, Forest Grove, and Hampton, which herald the day of right-doing toward the native inhabitants of our land.

A. C. Fletcher.

On the Galloping Horse in Art.

THE article entitled "The Horse in Motion," which appeared in the *THE CENTURY MAGAZINE*, for July, 1882, describes how, at the instance and the expense of the public-spirited Governor Stanford of California, Dr. J. D. B. Stillman, a physician, and Mr. Eadward Muybridge, a photographer, investigated the sequence of attitudes taken by animals in quick motion, and their causes, and how in the five-thousandth part of a second an attitude was photographed at each foot of the stride of a galloping horse.

The truths discovered by these gentlemen are a most

valuable addition to scientific knowledge, but it is the object of this article to prove that they have arrived at false conclusions with regard to the pictorial representation of the galloping horse. They call the manner in which painters have depicted the gait "the conventional and mythical gallop," and ask "if animal motion is always to be taught to follow such severely false models, wherein is it better teaching than that of the priests of Osiris, with whom all forms were stereotyped for thousands of years, and the last stages of their art were worse than the first";* and in such manner Dr. Stillman in his writings, and Mr. Muybridge in his lectures, contend that with the knowledge they have given them, artists are "false to their mission" if they "willfully persist in perpetuating a falsehood."

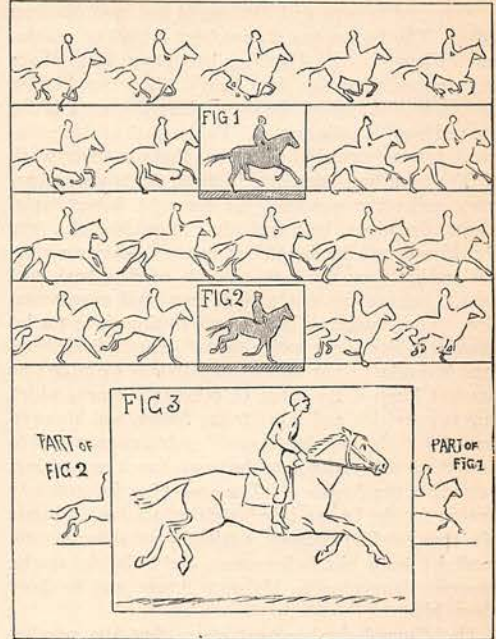
They seem to misunderstand the art of the pictorial artist, which is to reproduce by pigments sensations through our eyes similar to those produced through his eyes when he saw what he depicts, or what, from his previous experience, he knows would be produced had he seen what he depicts; and so, disregarding the important question of the effect produced on our eyes by objects in quick motion, they insist that artists should represent them as if our eyes were photographic cameras.

If the reader of this article will fix his eyes on any object, and then close them and open them as quickly as he can for one or two seconds, he will find that the object has not disappeared, though it has seemed to quiver, and yet each time the eyes were closed the object was shut out from sight; and if he possessed photographic cameras instead of eyes, the representation of what he saw would be a series of dark blanks and unquivering objects. He will also find that if he shuts his eyes for the space of one second and opens them for a second, he will then have alternate representations of blanks and unquivering objects, as the camera would give them. He will find, also, that winking as fast as he can, he does not open and close his eyes oftener than from three to four times in a second; so that the eyes do not give detached sensations of changes, which occur as often as four times in a second, and the impressions produced on them when more strongly affected, or for a longer portion of those short periods of time, eliminate those produced on them when less strongly affected, or for a shorter portion of the time.

The pace of a fast running horse is about a mile in one minute and forty seconds; that is, five thousand two hundred and eighty feet in one hundred seconds, or very nearly fifty-three feet in a second; so that if each stride of the gallop is twenty feet in length, the time taken in making it is twenty fifty-thirds of a second, or less than two-fifths of a second, and the time between each of the twenty positions taken by cameras set a foot apart, while the horse is making the sequence of attitudes given by them, is one fifty-third of a second, and this was the case with Governor Stanford's mare Florence Anderson, whose stride was nineteen feet nine inches long.

A copy of the photographic illustrations of the attitudes during a stride of Florence Anderson is here

given. The imitation of one of these twenty attitudes must be what Dr. Stillman advocates when, after criticising the manner in which painters have represented a horse galloping, he writes: "We are told that



the object is to represent action; would not that object be more readily attained if some position were represented which was known to be true, instead of one that is proved to be impossible?"

The winking experiment has proved that none of those attitudes will be seen detached, since they lasted but a five-thousandth portion of a second, and the sensation produced through the eyes must be a blending of impressions produced by a series of those positions. Let us consider two of those attitudes—Figure 1 and Figure 2; neither of these recalls to us our sensations when we saw a horse galloping. In Figure 1, we recognize the position taken by a horse who endeavors to commence his stride, but is restrained by his rider; he rises with three of his feet in the air, feels the restraint, and quietly settles down again, one foot remaining on the ground during the movement, which requires about a second for its operation. In Figure 2, we recognize the attitude of a horse kicking, except that the position of the near fore leg is not one which would last a second; but the "off" fore leg, rigidly planted on the ground, checks any idea of a change in its position for about a second of time.

Figure 3 is made up of the fore part of Figure 1 and the hind part of Figure 2; but this represents the galloping horse in what Dr. Stillman calls the "conventional and mythical gallop." So that manner does represent the fore legs and the hind legs in positions they actually take during the stride; but they are not in those positions at the same time. Let us make a chronometrical examination of this difference: Figure 1 and Figure 2 represent attitudes at distances apart equal to one-half of the stride, there being nine atti-

* See "The Horse in Motion," page 102. Boston: James R. Osgood & Co.

tudes between each; so that it having been shown that the whole stride is taken in two-fifths of a second, then one-fifth of a second is the time which elapses between the fore legs being in the position shown in Figure 3 and the hind legs being in the position there shown. The winking experiment shows that the eyes do not take note of their closure at intervals of one-fourth of a second; so it has "been proved to be impossible" that they should appreciate the difference of one-fifth of a second in the positions of the fore and hind legs.

On further examination, it will be seen, that for ten feet of the stride both the hind feet are off the ground, and for ten feet both the fore feet are off the ground, in four of the positions both fore and hind feet being off the ground; so that the impression on the eyes for half the time is that of both hind feet off the ground, and for half the time is that of both fore feet off the ground. One hind foot touches the ground for three feet, then both hind feet touch the ground for three feet, and then the other hind foot touches the ground for three feet. One fore foot touches the ground for five feet, and the other for five feet, one hind foot and one fore foot touching the ground at the same time in two of the positions.

If the reader will make another experiment, and move one of his arms backward and forward as if striking a series of blows as quickly as he can, and observe the effect in a mirror, he will find that the resultant effect on the eyes is the well-defined outline of the knuckles when the arm is at full stretch, the rest of its positions being indistinct. This effect may be accounted for partly because, however swiftly the movement may be given, there must be a pause at the reversal of the movement from forward to backward, and partly because the eyes are also excited by the reversal more than by the continuous movement in one direction.

In our winking experiment, the sensations produced while the eyes were closed are eliminated by the more powerful impressions produced during the longer period when the eyes are partly and fully open; and so with regard to the effect of the sequence of attitudes of the galloping horse, the impressions of the quick, involved actions of one foot after another touching the ground for one-tenth of a second are eliminated by those of the more conspicuous actions lasting throughout the whole stride of fore or hind legs, swing-

ing in the air from positions near each other under the belly to the extreme boundary of the attitudes; and, like the knuckles in the experiment of the outstretched and retreating arm, the positions, when the legs are most outstretched, are those which most powerfully affect our eyes, and those positions, when painted, recall our sensations when we see horses galloping, while those shown on a photograph taken in the five thousandth part of a second do not recall those sensations.

George Snell.

"Strangulatus pro Republicâ."

IN THE CENTURY for December, 1881, was published a fac-simile of the late President Garfield's singular death-bed autograph, "*Strangulatus pro Republicâ*," and editorial comment was made to the effect that "the most diligent search and inquiry have failed to discover an earlier use of the Latin phrase."

It has just chanced to me to find in a familiar book a passage which may be held to cast some light on the source and sense of President Garfield's self-composed epitaph. In Bishop Ellicott's "Life of Christ," page 307, note 1, an extract is made from the commentaries of Dr. (now Bishop) Lightfoot ("Horæ Hebraicæ") on the Gospel of Matthew, in discussion of the term ἀπήγγεστο as applied to the suicide of Judas Iscariot. "The explanation of Lightfoot," says Bishop Ellicott, "according to which ἀπήγγεστο is to be translated '*strangulatus est, a Diabolo scilicet,*' is obviously untenable. We may say truly with Chrysostom, that it was the mediate work of Satan, but must refer the immediate perpetration of the deed to Judas himself."

Here we seem to have a chance glimpse into some rabbinical tradition or superstition that those who are killed directly by satanic agency "*strangulati sunt.*" I do not venture to offer this as any adequate elucidation of the tantalizing and obscure ἀπαξ λεγόμενον of the late President's death-bed. But General Garfield was widely read, alike in theological and general letters; and who knows but that the idea—so natural in his then condition—that his assassination was due to direct diabolical agency, may not have knit itself more or less unconsciously in his mind about a dimly remembered phrase which in some sort suggested the source rather than the method of the deed?

Edward S. Gregory.

LYNCHBURG, VA., Feb. 19, 1883.

BRIC-À-BRAC.

Through the Wood.

THROUGH the woodlands when the day
Drives the dusky night away,
And the hill-top's pearly height
Catches first the creeping light,
And above the valley pale,
Slow the night-mists lift their veil—
Then, with whistle clear and low,
Down the woodland path I go:

Dim the dew upon the grass
Prints my footsteps as I pass,

And the cowslip's carpet sweet
Crushes 'neath my springing feet,
And the daisy-blossom's eye
Closes as my step draws nigh,
Lest I bruise her tiny cup,
Ere her lord, the sun, is up!

First I chirrup to the bird,
Ere from rest he scarce hath stirred;
Whistle shrill with laughing lip
Just to see the rabbit slip
Through the fern or budding clover
That his swift form closes over;