

PAINTING THE FLAGSTAFFS OF TALL BUILDINGS.

The flagstaffs which seem to be an indispensable part of the modern office building often extend to an extraordinary height above the street level. The tallest in the city are those which have been erected above the domes, at the top of the two towers on the Broadway façade of the Park Row building, a description of which appeared in the *SCIENTIFIC AMERICAN* of December 24, 1898. The top of the dome is 390 feet above the sidewalk, and the trucks of the flagstaffs, which are 57 feet in length, are therefore about 450 feet above the street level.

A few days ago the foot passengers down Broadway, and across the City Hall Park, were watching with great interest the figure of a man who was engaged in painting these lofty poles, and the question naturally arose as to how this perilous work was done. The answer will be found in the accompanying engraving, which shows one of these aerial artists at work. His climbing apparatus is one of the very simplest kind, and consists of two short lengths of rope, each of which is provided with a slip noose which encircles the flagstaff. The upper rope carries an ordinary "bo'sun's chair"—a plain piece of board which forms a seat astride of which the painter sits—and the lower rope ends in a simple foot-stirrup. In climbing the pole, the weight is first thrown on the foot-stirrup, thereby releasing the noose of the upper rope, which is then slid up the pole. The weight is now thrown on the seat, and the stirrup noose being released of weight is drawn a few inches up the pole. By thus throwing the weight alternately on either rope and slacking the other, the painter is enabled to climb to the top of the pole. The painting is done from the top downward; the order of slipping the ropes being, of course, now reversed. Underneath one end of the seat is hung the paint pot, and a dab of putty for filling up cracks and knot holes is stuck conveniently upon the same end of the seat.

A NEW METHOD OF INSTRUCTING AND EXAMINING TRAINMEN.

The executives of the most progressive railroads throughout the country are continually devising means to impress upon the employes of the roads the exact meaning of train rules as applied to the various pieces of apparatus that form an important part in the successful operation of the modern railroad.

No scheme has perhaps proved so successful on the Cincinnati Southern road as the method recently devised by Superintendent W. J. Murphy.

The magic lantern has been used with much success by lecturers for bringing before the public that which word painting cannot convey. It has been used for years in our best educational institutions for representing scientific truths, and there is no particular reason why the use of the stereopticon should not prove highly efficient in the instruction and examination of railway employes. While the plan of using models of signals as heretofore employed by the Cincinnati Southern was very satisfactory, it was open to improvement. But one great objection can be offered to their use. A signal is always used on a road to serve a particular

purpose at a special place, and therefore there are many applications that can be represented only by taking the trainmen to those particular locations and allowing them to see the exact purpose of the signal. It follows that in order to know whether trainmen are perfectly conversant with the meaning of all signals along the road, they should be called upon to explain the purposes of each signal in its direct relation to all its surroundings. This cannot conveniently be done by taking the men to the exact location of every signal, but the same thing may be accomplished by making



Weight carried by stirrup.

Weight carried on chair.

HOW FLAGSTAFFS ARE PAINTED.

lantern slides of all kinds of apparatus, signals, tracks, etc., and presenting these with their actual local surroundings to the trainmen who are to be instructed or examined.

The examining room at Lexington, Kentucky, has been equipped, not only with models and such appliances as are placed in the hands of the trainmen for the moving of trains safely, but an electrical stereopticon has been provided, together with a large number of slides representing equipment on the road. The trainmen are required, not only to familiarize themselves with the rules in the abstract, but they must know the purpose and meaning of every signal and piece of apparatus along the line of the road in question. The men are practically carried over the road by a series of lantern slides projected on canvas, and the

examiner is able to determine very satisfactorily as to the fitness of men for the positions which they hold, or to which they aspire.

The use of the magic lantern has demonstrated that it is possible for trainmen to know the meaning of the various positions of all kinds of signals, and to recite glibly what should be done under certain conditions, and yet to be absolutely deficient in the knowledge of what the signal means when it appears in combination with some other. The applications of the lantern are so varied that there is scarcely a phase of railroad work that could not be handled effectively. It is an appliance by which you can bring to the examining room all the apparatus, equipment, and, in fact, the road itself, and all the merits and defects can be discussed accurately and exhaustively.

Our illustration No. 3 represents what is called an electric disk block signal. The color indicated in the small central disk is white. A white signal in connection with the operation of a railroad always means that the train may proceed, but in this case, the rules make it necessary for the train, when running onto a white signal, as indicated by the signal 100%, to stop, unless the signal changes from white to red in the presence of the engineer. In other words, a stationary white signal means just as much danger to the engineer in this case as a stationary red signal.

Red is the danger position of the same signal, which means stop, except, as previously stated, when it changes from white to red upon a train entering the block limit.

Illustration No. 1 represents what is called a semaphore signal. It is used in connection with interlocking apparatus and worked from the tower shown on the photograph. The upper arm always governs the main or most important track. When this arm is in a horizontal position, trains on the main track would have to come to a stop and not proceed until the arm assumes the oblique position, as indicated by the lower arm. The lower arm governs a track of less importance than the main track and is operated in the same way, so that with the signals as here represented a train on the main track would have to stop, and a train on the siding could proceed.

The second illustration represents a scheduled train; that is, a train shown on the time table. The red signals on the pilot of the engine indicate to the railroad fraternity that the engine is backing up at night. The green lights also indicate that the engine is moving at night and that it is to be followed by another train on the same schedule having equally the same rights. The green flags indicate in the day time what the green lights do at night. If the engine or train were going forward, instead of backward, as indicated in this photograph, there would be no lights where the red lights are shown here, but those red lights would be transferred to the rear of the train, so that these symbols, or signals, indicate quickly to the railroad man just what kind of a train it is—whether it is backing up or going forward, whether it is being followed by another section or not.

A regular scheduled passenger train carries by day green or classification flags on the front of the engine, which indicates that

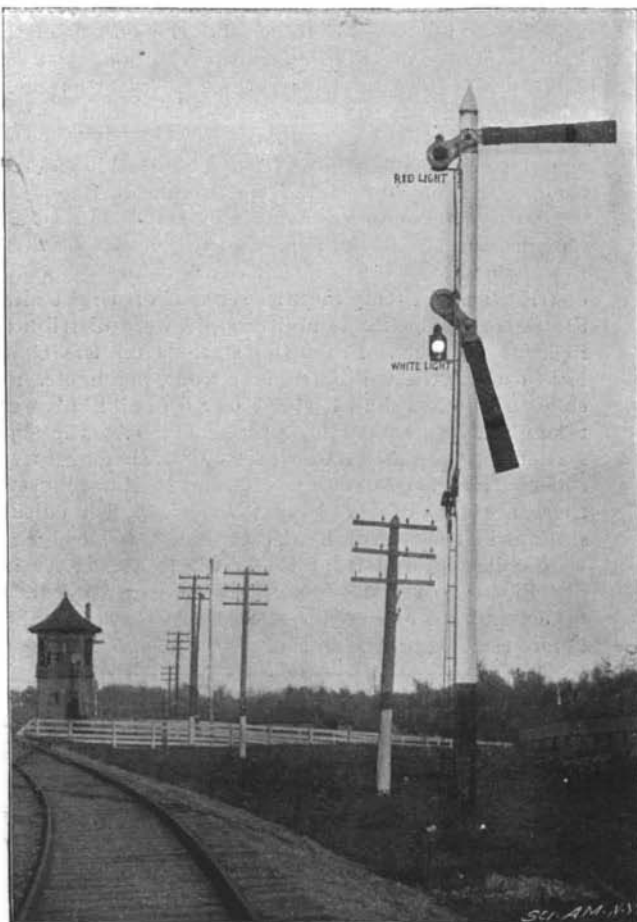


Fig. 1.—SEMAPHORE SIGNAL.

Main line closed, local open.

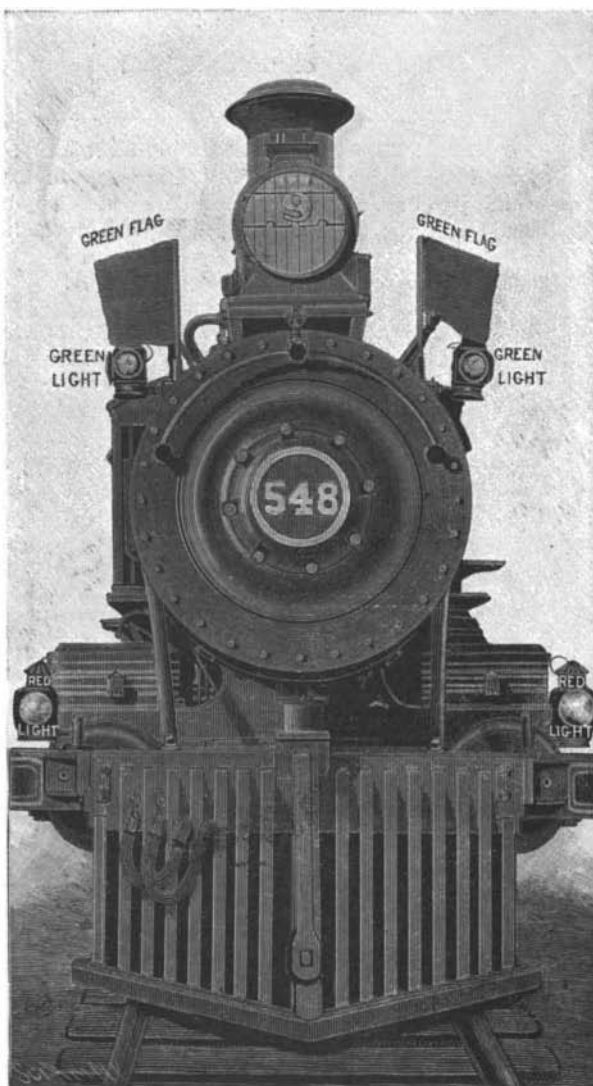


Fig. 2.—TRAIN SIGNALS ON ENGINE.

Schedule train backing up at night.

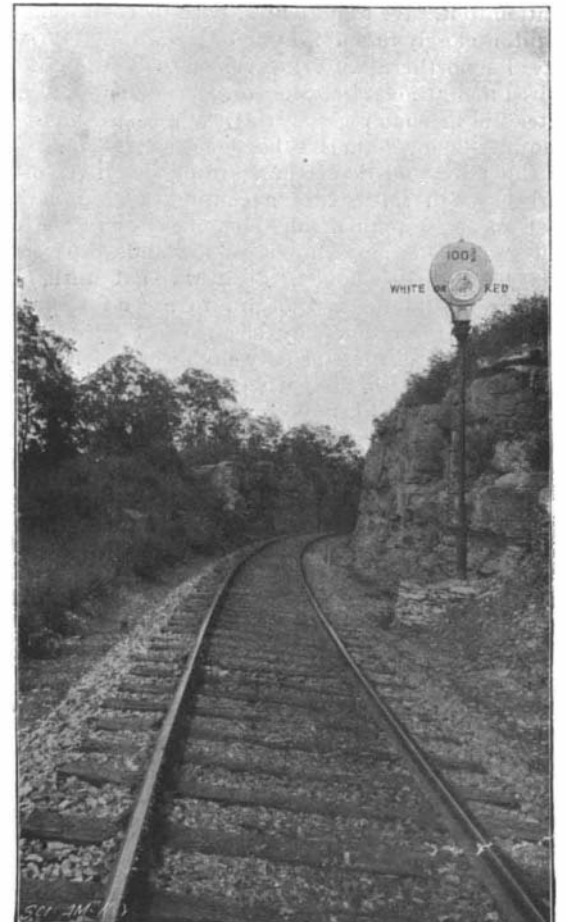


Fig. 3.—ELECTRIC DISK BLOCK SIGNAL.

Train may proceed.

the train is to be followed by another train on the same schedule with exactly the same rights. Two green flags are carried on the rear or last car to indicate that that is the last car in the train; in other words, that the train is complete. Should the green flags be not shown on the rear car of the train, it would indicate to the railroad man that the train had parted, and that there was only a part of the train together in the front portion, a car or two probably having been lost, which often happens by reason of the coupling breaking or the automatic coupling unlocking. This seldom occurs with a passenger train, but it is a daily occurrence with a freight train.

MODELS OF SOME OF THE EXTINCT LIZARDS OF WESTERN NORTH AMERICA.

BY E. O. HOVEY.

Among the new specimens on exhibition in the American Museum of Natural History in this city, in



Fig. 1.—FOSSIL BONES IN MATRIX.

the department of Vertebrate Palæontology, are recently discovered fossils, as well as models and water color paintings to illustrate the supposed appearance of the great lizards which lived in Western North America in Permian, Jurassic and Cretaceous time. Through the kindness of Prof. H. F. Osborn, the curator of the department, we are enabled to present our readers with photographs of some of these models and of one of the great skeletons as it lay in the rock from which it was excavated and the facts concerning them.

This department of the museum was established in the spring of 1891 for the purpose of procuring a representative collection of the fossil vertebrates from the successive geological horizons of the western part of this country for exhibition, research and publication. Every year since then expeditions have been sent out, mainly to the great Tertiary lake basins of the Rocky Mountain region, and an immense amount of material has been gotten together, much of which is now on exhibition in the museum. In the summer of 1897 the expeditions had extraordinary success, one of the parties making one of the most important discoveries ever made in vertebrate palæontology. This party, under the leadership of Dr. J. L. Wortman, was opening a quarry in southern Wyoming for obtaining specimens of the oldest form of mammals when it made the discovery, first of one and afterward of another reptile skeleton of enormous size, and in a remarkably good state of preservation. Fig. 1 is made from a photograph of the bones as they lay in their matrix before they were removed for transportation, giving some



Fig. 2.—AGATHAUMUS SPHENOCERUS.

idea of the manner of working this form of excavation. The greatest care must be exercised not to injure the surface of the bones with rough implements. After the fossils have been excavated they are carefully wrapped in burlaps and plaster of Paris, to prevent, as far as possible, their crumbling to pieces on drying and to enable them to bear in safety the long journey to the museum. These bones are wonderfully well

preserved, and show that the animals to which they belong must have been between fifty and seventy feet in length. The parts represented were the tail vertebrae and the limb bones.

Many attempts have been made to clothe the skeletons of extinct vertebrates with flesh and blood, but the most life-like of all thus far have been the water-color paintings which Mr. Charles Knight has prepared under supervision of Prof. Osborn and Dr. Wortman. Lately, Mr. Knight has turned his attention, under the same supervision, with many suggestions from the late Prof. Cope, to the preparation of a series of models on a reduced scale of some of these animals. The results of some of this work are shown in Figs. 2 to 5, which are from photographs of the models. These models are based upon published restorations of the skeletons and upon the study of the best material to be found in the collections of the American Museum, Princeton University and the late Prof. Cope. This

material gives definite knowledge or inference upon the form and proportions of body and limbs, the shape and character of the head and the position of the sense-organs. The character of the skin is in some cases known to some extent, but in others it has been based upon that of the nearest related living species.

Agathaumas (Fig. 2) was a large, heavily armored dinosaur, or giant lizard, from the Upper Cretaceous beds of Western America, having one large and two comparatively small horns for weapons of attack. The animal was about twenty-five feet long, its feet were provided with hoofs, and the limbs were more symmetrically developed than they were in some other dinosaurs. It lived upon herbaceous food.

Hadrosaurus (Fig. 3) was a great lizard, thirty-eight feet long and provided with a long neck, flattened bill like that of a duck, weak teeth, small fore legs and heavy hind legs and tail. It probably was at home both on the land and in the water and fed upon soft waterplants or small mud-loving animals. The animal



Fig. 3.—HADROSAURUS MIRABILIS.

was covered with a thick hide like that of a rhinoceros, as is known from specimens in the Cope collection in the museum. Its skeleton is found in the Laramie Cretaceous beds of the West.

Fig. 4 represents two individuals of the genus Megalosaurus, Prof. Cope thinking that these animals were great jumpers and fighters. This was the first dinosaur described by Prof. Cope and was from the Cretaceous beds of New Jersey. It was a carnivorous animal, and, although it did not attain the enormous size of some of the herbivorous dinosaurs, it was a formidable creature, being light and active and well armed for attack. Some of the bones were hollow like those of birds. The animal was about fifteen feet long, with about eight feet of this length in the tail. The long hind legs and the strong tail remind one of the kangaroo, and it may even have resembled that animal in getting over the ground by means of leaps, instead of by walking or running, and in using its powerful hind feet, which were armed with heavy claws, in attacking its enemies or its prey.

Naosaurus (Fig. 5) was one of the more primitive reptiles, and its remains are found in the Permian rocks of Texas. It was evidently a highly specialized side branch of the order of reptiles, but the precise use of the enormously rigid fin along its back is not known. Prof. Cope humorously suggested that this fin might have been useful as a sail. It was, perhaps, chiefly ornamental. Different species of this lizard were from three to ten feet in length, and some of them had even longer dorsal fins than the one shown in the model.

Practical Lectures on the Treatment of Animals.

Perhaps never in the history of illustrated lectures was one given amid such queer surroundings as the one which was delivered on June 22, by Mrs. Myles Standish, president of "Our Animal Protective League," an association which was founded a short time ago, and which has for its object the teaching of those who have to deal with animals, and especially with horses, that kindness to our dumb dependents is not only a duty, but it also pays. Some of the New York east side drivers were informed of the organization of the society

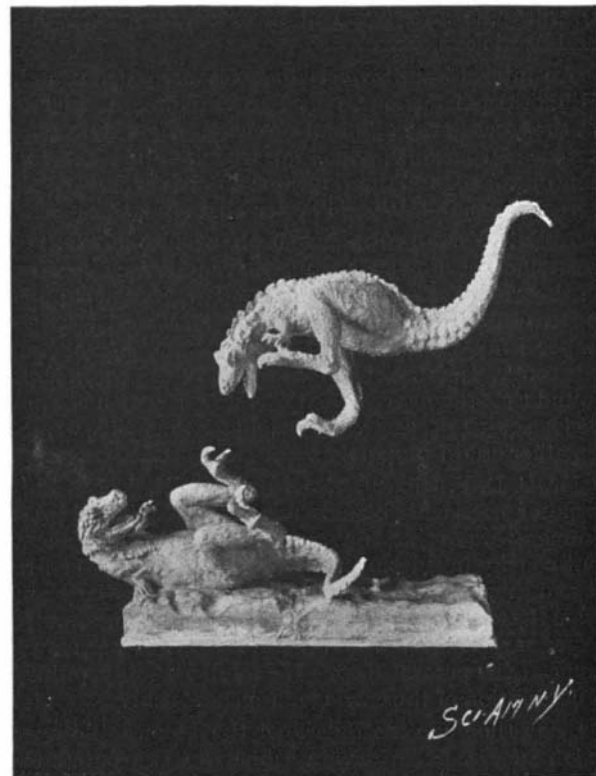


Fig. 4.—MEGALOSAURUS AQUILUNGUS.

and its object, and they invited members of the society to visit them, and the drivers offered to furnish the expense of the stereopticon and also to provide accommodation for the lecturers. A large stable and stable-yard were secured and were thoroughly cleaned in honor of the occasion. An audience which numbered about 700 made its way between two rows of trucks and carts to the yard in the rear. Here the vehicles were stood on end with the exception of a truck which rested on its wheels, which served as a lecture platform. A sheet was nailed on the wall of a building and 150 views were projected, the talk being given by Mrs. Standish and other members of the society. They told them the proper way of harnessing and treating horses and showed that cruelty was very often caused by ignorance. Views of the horses of the fire, police, and street cleaning departments were shown. The remarks of the lecturers were listened to with great attention by the drivers, and it is thought that the meeting will be productive of great good. Work of this kind is of the most practical nature and deserves the warm support of all who love animals.

A CLASS for the instruction of hospital-corps men in preparing food for the sick has been organized at the Washington Arsenal, according to The Boston Cooking School Magazine. The work is to be carried on under military regulations, and the aim is to provide a corps of men who can provide for the sick such food as is

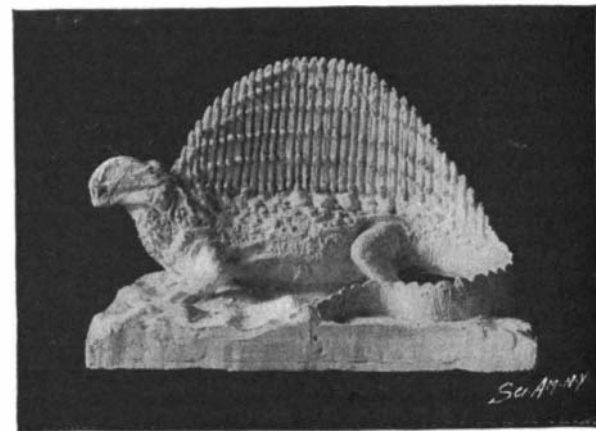


Fig. 5.—NAOSAURUS CLAVIGER.

available. The plan involves also the establishment of a school or schools for army cooks to be conducted by regular officers at some convenient recruiting station.

TELEGRAPHIC communication will be established between the Scottish islands of Muck, Egg, Canna and Rum. They are all to be connected with the mainland and with the Isle of Skye.