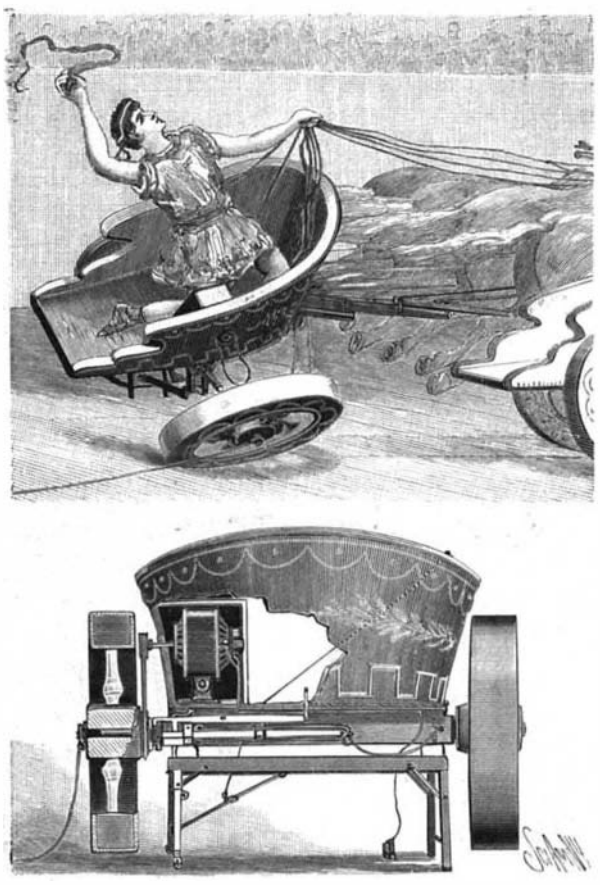
SOME STAGE EFFECTS IN "BEN HUR."

For years the public has been demanding more and more realism in plays. Managers have found great difficulty in satisfying this demand, owing to the time required to set elaborate scenery. The public dislikes long waits, and more than once a play or opera has proved a failure on this account; but after one has seen the production of an elaborate play from behind the scenes, he will never again be impatient at the length of the *entr'acte*. The only wonder is that the elaborate setting can be gotten ready in the five to fifteen minutes between the falling of the curtain at the close of one act and the raising of the curtain at the beginning of the next act. An excellent piece of work of this kind is shown in "Ben Hur," in which the scenery is shifted, in the dark, in from five to thirty seconds.

"Ben Hur: A Tale of Christ," by Gen. Lew Wallace, was first published in 1880, and has attained a wider sale than probably any other American work of fiction, with the exception of "Uncle Tom's Cabin." Notwithstanding this fact, twenty years elapsed before it was dramatized. We present some illustrations of scenes from "Ben Hur," as played at the Broadway Theater, New York. They represent some of the latest phases of good stage mechanism, and the chariot-race scene is probably unrivaled. Our readers are doubtless familiar with the story. It will be remembered that Ben Hur, the hero of the play, by accident dislodges a tile from the roof of the palace of Hur, in Jerusalem. The tile falls upon Valerius Gratus, the new Procurator of Judea, injuring him. The young prince is betrayed by Messala, his one-time friend, and he is hurried away to the galleys, while his family are thrown into prison and their possessions confiscated. The second act opens with the interior of the cabin of a Roman galley, or, rather, trireme. In the center sits the tribune, Arrius, on a raised dais, while in front of him sits the sailor whose office it is to strike a sounding-board with gavels, keeping time for the rowers. Along the sides of the cabin are rows of benches, which are really a succession of rising banks, and here are the galley slaves, who are each pulling at an immense oar. The tribune is impressed with the appearance of young Ben Hur, who is now a galley slave, and he gives orders that when they go into battle Ben Hur shall not, like the other galley slaves, be chained; for in case of the boat sinking, the slaves would all be drowned. Then comes an action with the pirates, in which the galley is sunk. The crash and grinding of the timbers are admirably rendered by what is known in stage parlance as a "crash" machine. The lights are then turned out and in an instant they are lighted again, showing the wreck scene, which is reproduced in our upper engraving. The side scenes fold up instantly when the change is made and drop to the floor. The rowers' benches are pushed out of the way and the borders and back-drop are raised from view. The galley slaves with their oars drop to the floor, and the men from the rear draw forward a painted cloth which represents the sea; it is secured to a batten and is laid down just back of the footlights. Men now step forward carrying the cloth which covers the raft, which rests upon the tribune's seat. The back-drop scene was in place before the back drop of the galley was raised. It will be remembered that the galley slaves are lying upon the floor and they now throw up and down the canvas cloth, producing a most realistic imitation of waves. They are assisted by a number of men in the wings, who pull the cloth in unison. The raft itself consists of two cradles, which are each so hinged that a rocking motion is given in two directions. This is done by Ben Hur and Arrius themselves. The raft is in position in the previous scene, but is not allowed to move, being held by pins, which are removed by those behind. With an electrical sun and proper electrical effects, the scene is very realistic, and is interesting as showing how simply a good stage effect can be produced.

It will not be necessary to rehearse the subsequent adventures of Ben Hur, but in his wanderings he comes across his enemy, Messala, and decides to humble him and ruin him by a chariot race in the circus at Antioch, and this scene is one of the most realistic ever produced. It is a combination of several effects, some of them old and many of them entirely new. The new effects were invented by Mr. Claude L. Hagen, of the firm of McDonald & Hagen, New York city, who is also the master machinist of this splendid production of "Ben Hur." When first introduced upon the stage, the horse race was a decided novelty, and it is doubtful if any stage illusion is more ingenious. The two principal plays in which the horse race has been used are Neil Burgess' production of the popular play "The Country Fair" and the French play presented in Paris called "Paris Port de Mer." In both of these plays three horses, each ridden by a jockey, race upon the stage without going out of sight of the spectators. We have in these plays an illusion true to nature; the horses, appearing to be free from all restraint, are really galloping, the ground disappearing under their feet and the landscape as well as the fences fly past in the direction contrary to the forward motion of the horse. This is accomplished by means of a treadmill, which the horses themselves actuate. In "Ben Hur," many radical improvements have been introduced, even in this part of the performance. Reference to our engravings will give an idea of the mechanism.

A large part of the illusion depends upon the background, which gives the idea of positive motion, and the one shown in our engraving, invented by Mr. Hagen, is very novel. It embodies means for mounting and driving traveling aprons at the rear and sides of the stage, so as to prevent any break in the scene, and this, of course, gives the audience the impression of change of scenery, as in the illusion the spectator follows the racing horses. At the rear of the stage is an endless apron, flanked on each side by smaller end less aprons, each of which is complete in itself, but are operated in unison. When not in use the side aprons may be folded back against the rear apron; but while the scene is being "set" for the chariot race they are extended to the position indicated in our engraving. Upon these aprons are painted representations of the background of the scene; in this case representing the antique circus at Antioch filled with spectators. The mechanism will be understood by reference to our engraving. Directly below the chariots will be seen the electric motor which actuates all three aprons of the panorama. It is a five-horse power Lundell motor, and is operated at the proper time by the assistant, who stands at the switchboard and who receives the signal of the stage manager by a flash of a colored electric lamp. The motor is started manually. A twisted belt imparts motion to a vertical shaft upon which are three pulleys, one to receive the power from



TRICK CHARIOT IN "BEN HUR."

the countershaft and the others to transmit the power to the two ends to vertical shafts, which each carry a cylindrical drum, around which the aprons are passed. Their rotation causes the apron to travel continuously, and gear-wheels are provided, as shown in our upper left-hand engraving, which impart motion to the side aprons, so that they are all driven in the same direction, and to the spectator the three aprons appear to be a continuous, unbroken scene. Notwithstanding the fact that the panorama is 96 feet wide and 25 feet high, the three panoramas are all rotated at a speed of 2,000 feet per minute by a two-horse power motor. The ease with which this enormous extent of canvas is driven is largely owing to the method of suspension, which is also shown by a small inset in our upper left-hand engraving. There is an endless track mounted rigidly on and extending between the outrigger-structures at the two ends, and upon this wheels or rollers are mounted to run on the tracks. The wheels or rollers are secured to hangers which are attached to a belt which runs around the upper portions of the drum to which the panorama apron is fastened. By these means the apron is suspended in the proper position, and it is caused to turn true around the drums without crinkling or being subjected to other distortion. The lower edges of the aprons are provided with a belt mechanism, similar to that at the top, which serves to keep the bottom edge of the apron in a proper position. These belts also serve to receive the power transmitted by the drums, which arrangement avoids straining the apron, as would be the case were the apron engaged directly with the drums. These hangers are shaped as frustums of a cone and are mounted by ball bearings on the spindles which carry them.

To make the illusion complete, Mr. Hagen has provided an exceedingly ingenious means for representing the ground, causing the chariots to appear to be actually moving over it. This illusion is effected by a number of narrow, endless canvas belts, painted in low tones to represent the ground and placed edgewise on the stage between and in front of the chariots and extending across the stage. On being driven toward the rear of the chariot it appears to the spectator that the chariots are moving over the ground. To give proper perspective to this effect the speed at which the belts are driven is gradually decreased toward the rear of the stage. Suitable gearing is provided for driving these belts, which are actuated by an independent motor shown at the right of the picture. The belts themselves are carried on pulleys which are mounted on housings which may be readily placed in position when the scene is set. For connecting the pulleys which carry the belts with the gear for driving them, couplings are provided which pass through the floor of the stage and which may be readily taken up when the chariots are removed, leaving a clear and uninterrupted stage. We now come to the chariots themselves.

The treadmills are placed immediately beneath the stage and are covered by sections of planking which are removed and carried out to the wings when the race is to take place. There are eight treadmills, one for each horse, and the horses are brought up from the stables, a few blocks away, a short time before they are needed, and they take their places with the artists and supernumeraries awaiting their cue to go upon the stage. They seem to take huge delight in the performance, and seem to know to the minute the time when they are to run. The chariots are two in number and each is supposed to be drawn by four horses, and each chariot is provided with a pole. The chariot of Ben Hur is not a trick chariot, but that of Messala is arranged to go to pieces when Ben Hur is supposed to strike his chariot, throwing him and causing him to lose the race. The chariot wheels do not rest upon the floor of the stage, but are supported upon metal yokes which are not noticed by the audience. The wheels are actuated by a small electric motor inside the body, and can be switched on by the drivers. Both chariots have these motors, and current is obtained by the aid of plugs which are inserted in the floor. The chariot of Messala is arranged so that at the critical moment when Ben Hur strikes Messala's chariot by dropping a catch, powerful springs on the axle throw the wheels off and the body of the chariot drops upon a yoke which is provided with springs. Of course, it is necessary to make one of the chariots appear to go ahead of the other. This could, of course, be managed by allowing the horses to really advance, but with four horses this might prove dangerous. The same means is accomplished by having the four treadmills and the place upon which Messala's chariot rests on an independent section of the flooring, which can be moved back a distance of 15 feet. Underneath the stage joists support this movable section and it slides directly on top of these joists. Curtains simulating the color of the stage close the aperture at both ends, so that it is not visible to the audience. At the extreme right of our engraving, behind the side of the panorama, will be seen men working at a winch. This winch winds up a wire rope which is carried over a pulley at the extreme left underneath the stage, and is connected with the entire movable section carrying Messala's chariot and horses, and three men move the whole affair back with ease and give the appearance of Ben Hur winning the race. A stop is provided so that the treadmill cannot be operated by the horses until the panorama has begun to move and the curtain is ready for operation. The horses are very securely fastened, so that there is little danger of an accident. To simulate the dust raised by the chariot wheels, a combination of powders is forced out underneath the horses' feet and behind the chariot wheels. This is accomplished by a blower in the cellar, driven by the same electric motor which actuates the belts. The dust is fed into a hopper and is blown through fourteen ducts arranged at proper intervals to produce the desired result. The "dust" is a combination of vegetable products arranged so as to imitate the dust of a road having the buoyancy of natural dust without its grit.

It requires about eight minutes to set this scene, and in that time the side panoramas are folded out into position, the sections of floors are removed, and the chariots are rolled into position and adjusted. The horses are hitched to the chariots, connections are made with the belts for giving the effect of moving ground, and the dust arrangements are put in place.

THE telegraph was first established in Japan in 1869, when a line was built between Yokohama and Tokio by English engineers. In 1873 the Government Telegraph Department was organized. In 1879 the Empire joined the International Telegraph Union. There are now 1,267 offices in Japan proper and 112 in Formosa, and there are 144,570 miles of line in service. In 1899 these lines transmitted 224,000 foreign and 15,275,623 domestic messages.