

STRIKING SNOW STATUARY.

BY DAY ALLEN WILLEY.

In some of the towns of Germany, as well as other portions of northern Europe, snow sculpture has reached a fairly high standard. In the city of Brussels an exhibition is given every winter by the art students, who transform one of the public parks into a natural gallery, and display specimens of their work which are really remarkable. In the little town of Andreasberg, Germany, however, a snow festival, as it is termed, is held yearly, when the villagers vie with each other in the uniqueness and excellence of their work. One of the most remarkable groups which has ever been "done" in Andreasberg is the battle scene which is herewith reproduced. The artilleryman stands in the rear of his piece in the act of discharging it, while just behind it lies the dead body of his brother soldier. A study of the poses of the figures shows they are remarkably realistic, although the proportions and modeling of the gun, including wheels and tube, are a most artistic bit of execution.

At the winter exhibition given in Brussels, the royal park where it is held sometimes has over a hundred individual and group designs, some of them of heroic size. Entering the park the visitor may pass between rows of snow lions which guard the way on either side. While human figures are common, there are such groups as the training of elephants, showing one huge beast standing on its hind legs or its fore feet on the back of the other, the trainer standing whip in hand. Tigers and horses are frequently represented, while some of the prize-winners have been allegorical designs, such as Charity, depicted by a young woman with children in her arms; Prayer, by an angel kneeling, etc. The well-known painting entitled "Three Jolly Companions" has been faithfully imitated in this material.

The snow sculptors of Europe pride themselves on their ability to fashion their images out of the

snow itself, using no other substance except charcoal or some coloring matter to form the eyes and dark shading required. Even the hair and beard are imitated by the clever designers. At Andreasberg the fall of snow in winter is so great that modeling can be done from solid blocks. Such a quantity of "raw material" is required for the Brussels display, however, that the blocks must be made of snow balls. For three or four days visitors are excluded from the park prior to

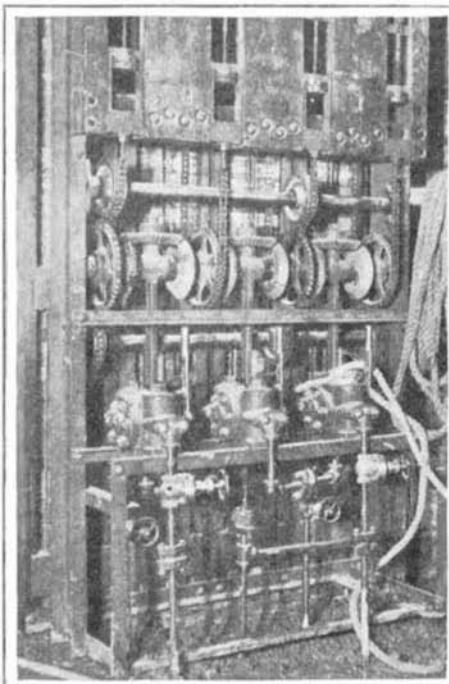
Two or three motions of the wooden shaver finish the mouth and so the work proceeds. The eye of the workman is generally so true, that he proportions his single statue or group by it alone. To give the figure more of the appearance of sculpture, when the finishing touches have been put on, water is poured over it at night, when the temperature is low enough to freeze it rapidly. If just enough of the liquid is applied, it will give a coating of ice and not injure the work, so that when placed on exhibition it glistens like the bronzes of the ordinary gallery.

If the snowfall is two or three feet in depth, the artists of Andreasberg cut it into cakes of convenient size, and by fitting them together thus form blocks. They utilize the same crude tools, but get a fairly accurate idea of the proper proportions by marking off the surface into squares by means of a string and a pointed stick. Then they trace the outline of the figure or features, thus getting a pattern which guides them as

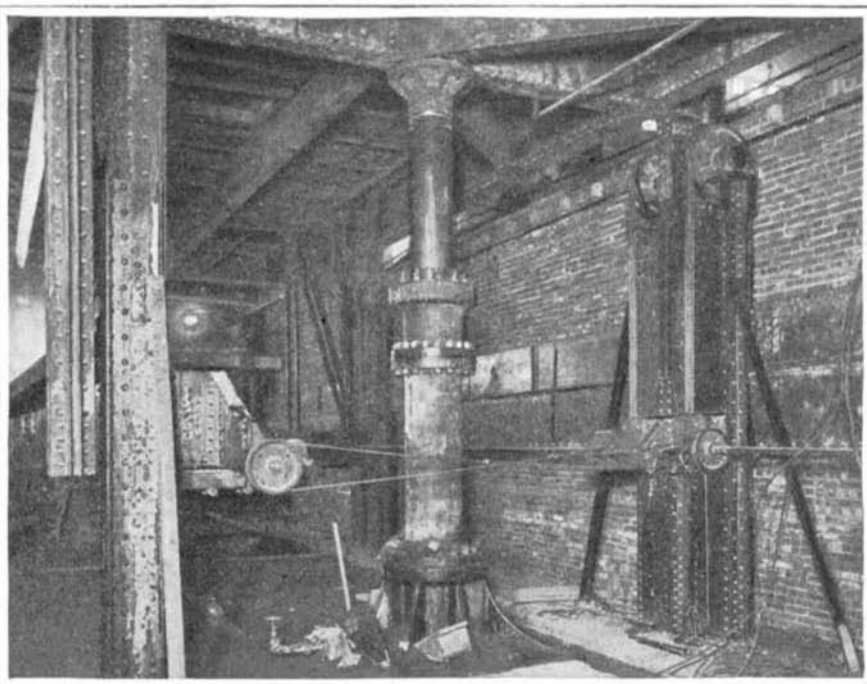
they work. When it is stated that the battle scene illustrated was fashioned almost entirely out of a solid mass of snow, an idea of the amount of labor required can be gained. The pattern is of great value, especially in making small figures, since some of the work is extremely delicate, and a mistake of a few inches would entirely alter the proportion. Sometimes it is necessary to fashion a group from several blocks, but most of the designs are modeled entirely from one mass.

THE NEW YORK HIPPODROME.

The demand for spectacular productions planned on a scale much larger than can be accommodated on the stage of an ordinary theater, was long ago proved by the great popularity of the huge open-air spectacular shows, which for many years have attracted crowds of summer visitors at a certain famous seaside resort within the limits of New York city. In these open-air



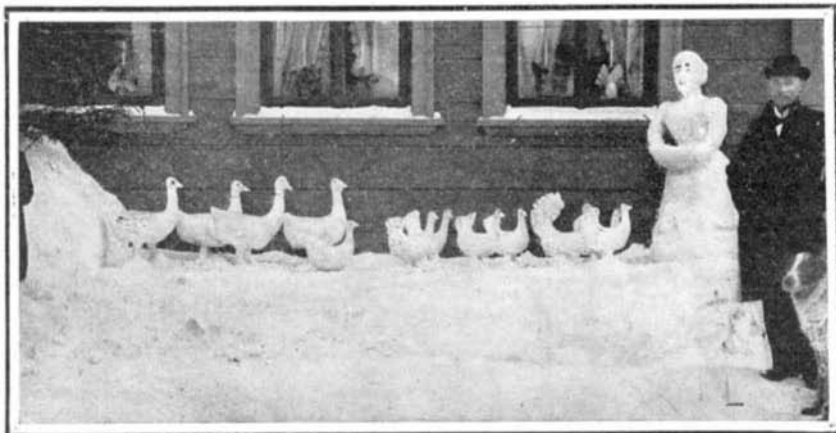
Equalizing Valves for Controlling the Pressure of the Plungers.



View Beneath Movable Stage, Showing the Counterweights, Guides, Locking Gear, and One of the Four 12-inch Plungers.

STAGE APPLIANCES OF THE NEW HIPPODROME.

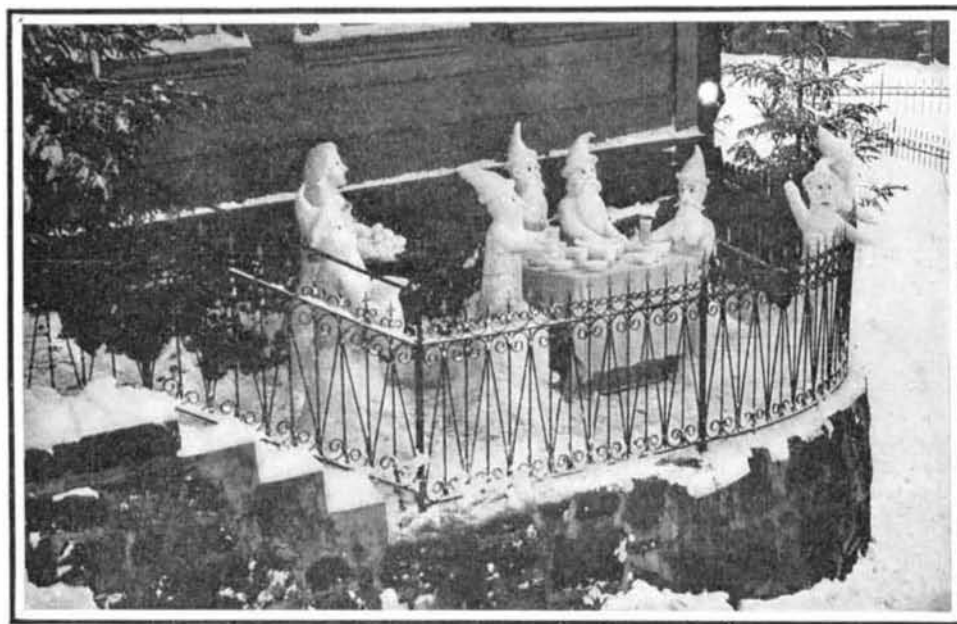
the exhibition, allowing the students to work without interruption. Rolling balls of suitable size they pile them into masses of the proper proportions, packing the cracks and crevices until the surface is entirely smooth. Their tools are exceedingly simple—the thumb and finger-tips, some pointed sticks, and a piece of shingle, or thin board sharpened to an edge. With these they begin work after cutting out a piece here and sharpening off a corner there. If it is a human face, the eyes and nostrils are easily made by gouging the surface at the proper places with the thumb or finger or sharp-pointed stick, then putting a bit of coloring in and above the hole for eyeballs and brows.



Mealtime in the Poultry Yard.



Little Red Riding Hood.



A Banquet in Snow.



The Cannoneer.

SOME STRIKING STATUES IN SNOW.

productions, much of the excellent effect produced is due to the large sheet of water that fronts and forms part of the stage, and the aquatic and marine effects thereby rendered possible. It would seem, at first thought, that the introduction of a large body of water as part of the "setting" of an indoor stage was, in the nature of things, quite impossible, for the reason that, to secure any adequate effects, the stretch of water would have to be of a size incompatible with the internal dimensions of a theatre or other inclosed place of amusement. Thanks, however, to the enterprise of Messrs. Thompson and Dundy, to whom we are indebted for the plans and data upon which the accompanying illustrations are based, there has been built, in the heart of New York city, a vast amusement house, which will be known by the generic name of Hippodrome, whose dimensions are such as to admit of a stage and a lake of water, large enough for the accommodation of spectacular performances that will rival the outdoor exhibitions to which reference has been made above.

The Hippodrome is a popular and recognized form of public amusement in large cities abroad; but this is the first of the kind to be constructed in the United States, and it also has the distinction of being by far the largest building of its kind in the world. The New York Hippodrome occupies the westerly half of the block bounded by 43d and 44th Streets and Sixth Avenue. There is no playhouse, either here or abroad, that rivals it in size, construction, or equipment. The main façade, which is of impressive and characteristic treatment, has a length of 200 feet, and the building extends for 240 feet on 43d and 44th Streets. It is built of brick, marble, and steel, and it extends to a height of 72 feet on Sixth Avenue and 110 feet at the rear. In its construction every possible precaution was taken to render it perfectly fireproof, and it has more than usual capacity for rapid exits.

To a technical journal, of course, the chief interest of this building centers in the stage, and the entirely novel mechanical arrangements for operating the movable platforms, filling and emptying the tank, raising and lowering the stage, and handling the scenery. But before passing to these features of the building, it will be interesting to mention some of the statistics that tell, better than words, the story of its vast size and capacity. In the first place, the total seating capacity of the Hippodrome is 5,300, which may be compared with the Metropolitan Opera House, 3,400; the Academy of Music, 3,000; and the Broadway Theatre, 1,800. The building is lighted by 25,000 electric lights, and the sunburst in the center of the ceiling alone contains 5,000 electric lights. On the main floor will be fourteen rows of orchestra seats, with accommodations for about 1,100, behind which will be the stalls, which are a common feature of European theatres. Then comes a line of boxes encircling the promenade. Above this is the balcony, seating about 1,600, and over that is the gallery, seating no less than 2,600 persons, or more than most large theatres. The building has thirty-five regular and emergency exits. The roof is carried on four main steel trusses, which are the largest ever placed in a building of this type in the United States. These trusses weigh 50 tons each, and are 115 feet in length by 25 feet at the point of greatest depth. There are also four subordinate trusses, weighing 32½ tons apiece, which are each 110 feet long.

It is in the stage and its accessories, however, that the greatest interest centers. It may be divided for purposes of description into two portions: that which is behind, and that which is in front of the Proscenium Arch. This arch, by the way, is the largest in the world, having a total width of 96 feet and a clear height of 40 feet, and its fire curtain is the biggest piece of asbestos ever woven. The depth of the stage from the extreme front to the back wall is 110 feet, or 50 feet from the back wall to the Proscenium Arch, and 60 feet from the Arch to the extreme front of the stage. The main stage at the rear of the arch measures 50 feet in depth, by 200 feet in width between the side walls. Of this area, the central portion immediately back of the arch, measuring 50 feet in depth by 100 feet in width, is carried on four 12-inch hydraulic rams, and is capable of a vertical movement of 8 feet. The weight of this platform, which is virtually nothing more nor less than a huge elevator, is carried upon four deep plate girders, with the plungers placed at the four intersecting points. This rear stage and the movable apron with their fittings weigh about 230 tons, and the rear stage can be raised from the normal level to a height of 8 feet.

The movable stage is provided with massive counterweights, one line of which will be noticed in the accompanying photograph, showing the under side of the stage and one of the hydraulic plungers. The stage is guided in its vertical movement by steel columns, at the top of which are carried the sheaves for the counterweight cables. Attached to the under side of the stage are vertical guides, which slide within the steel columns. These guides are provided with slots, which are engaged by massive dogs that slide horizontally in the

steel columns, and serve to lock the stage at any desired elevation. The dogs are operated in unison by means of lines of countershafting, which are driven by a single electric motor. At each column the countershafting carries a small pinion, which engages a rack on the upper side of the dogs, and when the motor is started, the dogs are thus simultaneously moved into the locking position. The plungers which lift the stage are made to travel at one and the same speed by means of the automatic equalizing valves shown in the accompanying illustration. In the movable stage itself there are seven "traps" provided, each capable of independent operation.

That portion of the stage, 60 feet in depth, which lies forward of the proscenium arch, is known as the apron. It is generally elliptical in form, and measures 48 feet in depth and 92 feet in width. Like the main stage, it is carried on 12-inch hydraulic plungers, with, in this case, a vertical travel of 14 feet. Normally, the movable apron will be at the same level as the main stage. It is large enough to contain two circus rings, each 42 feet in diameter. Beneath the apron is built a huge steel and concrete tank, over 14 feet in depth, and large enough for the whole apron to sink within it. When aquatic performances or naval pageants are to be given, the tank is filled with water, and the movable apron is submerged below the water to the bottom of the tank. Two circular inclined runways lead on each side of the main stage, down to the basement to the animal stalls, and adjacent to the main runway is a narrow runway for the wild beasts. As the runways communicate on a common level, it is possible for processions to make the circuit through the basement and across the stage.

The use of such large quantities of water necessitates an extensive hydraulic plant. The main tank is served by three centrifugal pumps of a combined capacity of 8,000 gallons per minute. Around the back of the stage, at a height of 14 feet, a 12-inch pipe extends for a distance of 180 feet. From this pipe, by means of flexible connections leading to a cataract and fountains, a fine cascade with a fall of 14 feet is formed, with the full capacity of the three centrifugal pumps to maintain it in constant flow. There is also an 8-inch pipe, placed just inside the runway, by means of which a considerable flow of water is produced across the surface of the tank, giving the effect of a river. Flowing water in large volume is also used in the Andersonville battle scene, where a considerable mountain torrent is shown rushing under a bridge of 30-foot span, and flowing with a slower current across the whole length of the tank in the foreground.

The total height from the stage to the gridiron is 80 feet, and this great height well matches the other proportions of the stage. It is here, in connection with the handling of the scenery, that this stage presents some of its most original and striking features. The scenery, in place of being dropped and lifted, is carried, by means of traveling electric hoists, on four separate lines of overhead tracks, which are attached to the gridiron, and curve in concentric semicircles above the stage, and extend into deep side wings known as scene pockets, each of which is of sufficient depth to enable the whole of the one-half of the scenery to be moved within it, clear of the stage. The tracks consist of 12-inch I-beams, upon the lower flange of which run the traveling trolley hoists for handling the set pieces and scenery. There are four double electric hoists and two single hoists. Each hoist is provided with its own electric motor, and has a capacity of from two to three tons. There is a man to each hoist, which he controls by wires reaching to the floor, and by this means the whole of a complicated and heavy scene may be picked up from the stage and carried into the scene pockets, with great rapidity. In each of the side wings of the stage is a series of winding drums designed specially for lifting set pieces. There are in all sixty separate drums, with a lifting capacity of 800 pounds each. The drums are operated from a constantly-rotating shaft by means of friction clutches, and each drum is provided with an automatic catch, which throws the clutch out of gear at the proper moment, when the piece of scenery has been raised to the desired height, or lowered into position. As showing its great capacity, it may be mentioned, in closing, that in one of the scenes as many as six hundred performers will be massed on the stage at one time.

THE NEW BRITISH BATTLESHIP "KING EDWARD VII." (Continued from page 240.)

broadside 6-inch battery, as against the separate armored casemate positions favored by the English and some other powers. In the "King Edward" class, which was the last battleship design brought out by Sir William White, the former chief constructor of the British navy, a new 9.2-inch gun has been introduced, four of these being carried in four single turrets placed at the corners of the central battery. The casemate system of protection is discarded, and the ten 6-inch guns are carried within a central box battery with a continuous wall of armor to protect them. The 9.2-inch guns

fire a 380-pound shell, as against a 250-pound shell fired by our 8-inch gun; but we have eight 8-inch as against the "King Edward's" four 9.2-inch guns in the intermediate battery.

The "King Edward" and class—there are eight of these ships altogether—are 425 feet in length, 78 feet in beam, and on a draft of 26¾ feet they displace 16,350 tons. The complement of officers and men is 800. The armament consists of four 40-caliber, 12-inch wire-wound guns, four 9.2-inch 45-caliber, wire-wound guns, and ten 6-inch 50-caliber guns, besides fourteen 3-inch and fourteen 3-pounders. There are also four submerged torpedo tubes in the "King Edward" and three other ships, and an additional, or fifth, torpedo tube is built in the stern in the submerged position.

The armor protection consists of a 9-inch belt tapering to 3 inches forward and to 2 inches aft, with which is associated a 2-inch protective deck with an additional 1-inch deck at the gun deck. The side armor is 8 inches thick amidships between the berth and gun decks, and 7 inches thick up to the main deck. The 12-inch guns are protected by 8-inch hoods and 12-inch barbettes, and the 9.2-inch have 7 inches of protection.

The "King Edward" is driven by twin-screw engines of designed horse-power of 18,000. On trial, however, the engines indicated much higher than this, and drove the ship at a speed of 19.04 knots. The maximum amount of coal carried is 2,000 tons, and the total cost of each of these fine vessels is \$7,500,000.

The Current Supplement.

The current SUPPLEMENT, No. 1525, is largely devoted to an exhaustive review of the engineering work on the Simplon Tunnel. The article is written by Charles R. King, a civil engineer, who has made a personal inspection of the work and who writes with an intimate knowledge of its scope. Naturally, considerable care has been taken to illustrate the text fully. Mr. King's treatise will be considered one of the most painstaking that has thus far been written on one of the finest engineering undertakings in the world. Prof. Charles Baskerville's paper on the "Elements, Verified and Unified," is concluded. Emile Guarini contributes an interesting study on various automobile trucks, and presents some striking illustrations of leading types. Prof. Vivian B. Lewes concludes his thorough examination of the theory of the incandescent mantle. Useful formulas for waterproofing fabrics are published. With the ninth installation of Prof. Hopkins's articles on Electrochemistry the series is concluded. Considered as a whole, the articles supply a much-needed want in scientific literature, for there is no book to which the student can turn which will give him such valuable help in experimental work in electrochemistry. For the benefit of those readers who have not read every installment, it may not be amiss to state that the articles have appeared in SUPPLEMENTS 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525.

The Charcot Expedition Safe.

News comes from Buenos Ayres, that the Charcot Antarctic expedition has arrived at Puerto Madrin, Argentina. A telegram received from Dr. Charcot is as follows:

"We wintered at Wandel Island and carried out all our scientific work under favorable conditions. The question of Bismarck Strait was solved, our party passing through it. We reached Alexander the First Land, though ice prevented our landing.

"We explored several unknown points on Graham Land. Notwithstanding the fact that our vessel grounded, sustaining a serious leak, we were able to continue the voyage and determine the contour of the external coast line of the Palmer Archipelago."

A plant for burning household waste is now operating very successfully at Zurich, Switzerland. It contains twelve furnace grates which consume 130 tons per day of garbage such as is collected by the city wagons, without adding any combustible. The garbage wagons are unloaded by an electric crane. A powerful air-fan draws air through the furnace and sends it into conduits on each side of the latter. The air is thus heated, and after passing the combustion grate it is sent into the main conduit. This is kept incandescent by the gases themselves, after which the gas is led to the boiler house where it goes into two boilers of 200 square yards heating surface. The steam from the boilers is superheated and then taken by piping into the machine hall. The latter contains a Brown-Boveri-Parsons steam turbine which is direct-coupled to a 200-horse-power alternator furnishing current at 220 volts. The speed is 3,000 revolutions per minute. The plant was first erected with the object of burning the waste only, but it was found that a considerable amount of power could be obtained. Part of the current is used to operate electric motors in the plant and for lighting, and the rest is delivered to the city mains. The cinders, which represent 30 or 40 per cent of the garbage, can be used in the manufacture of a special kind of brick.

SCIENTIFIC AMERICAN

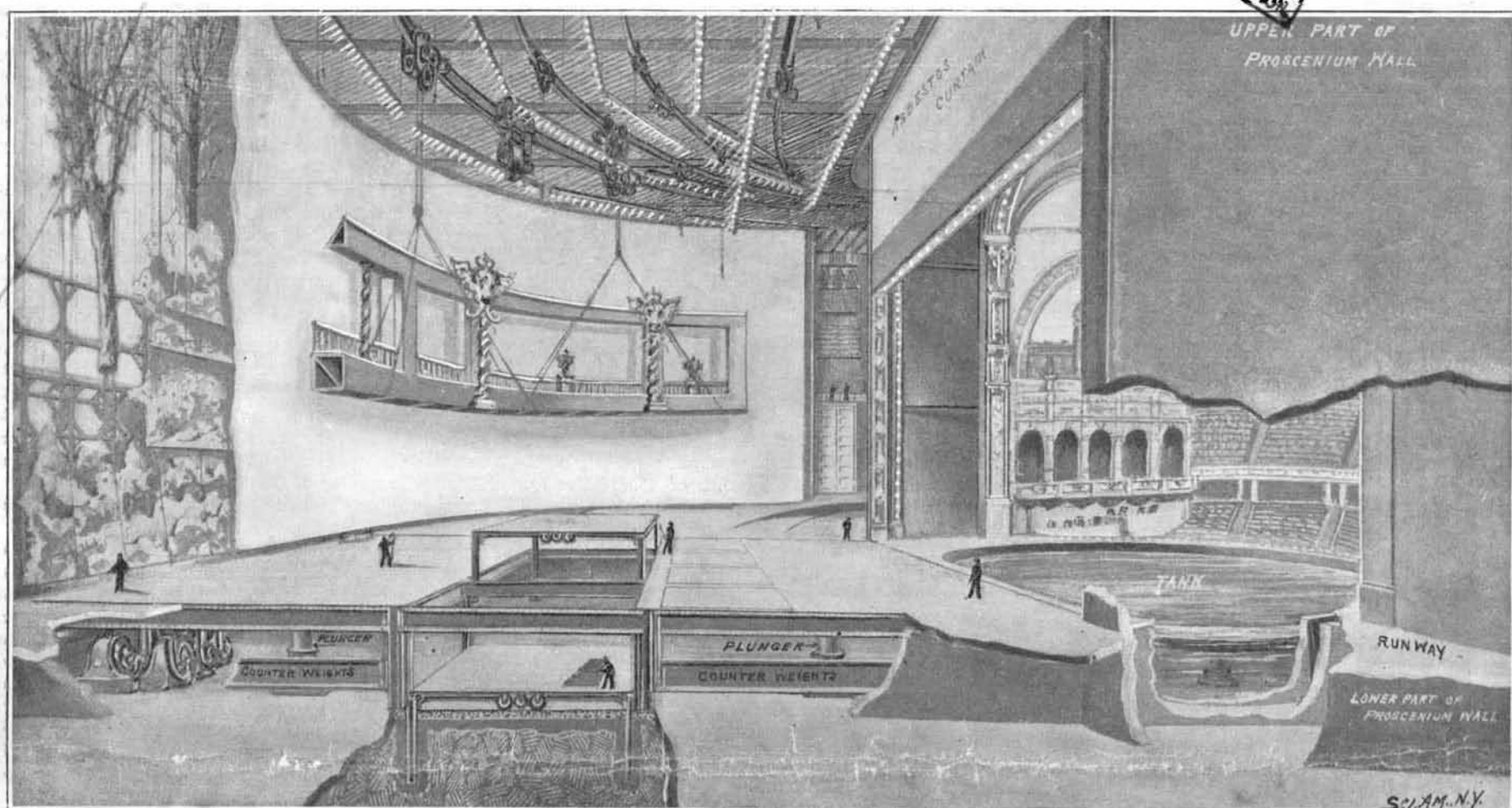
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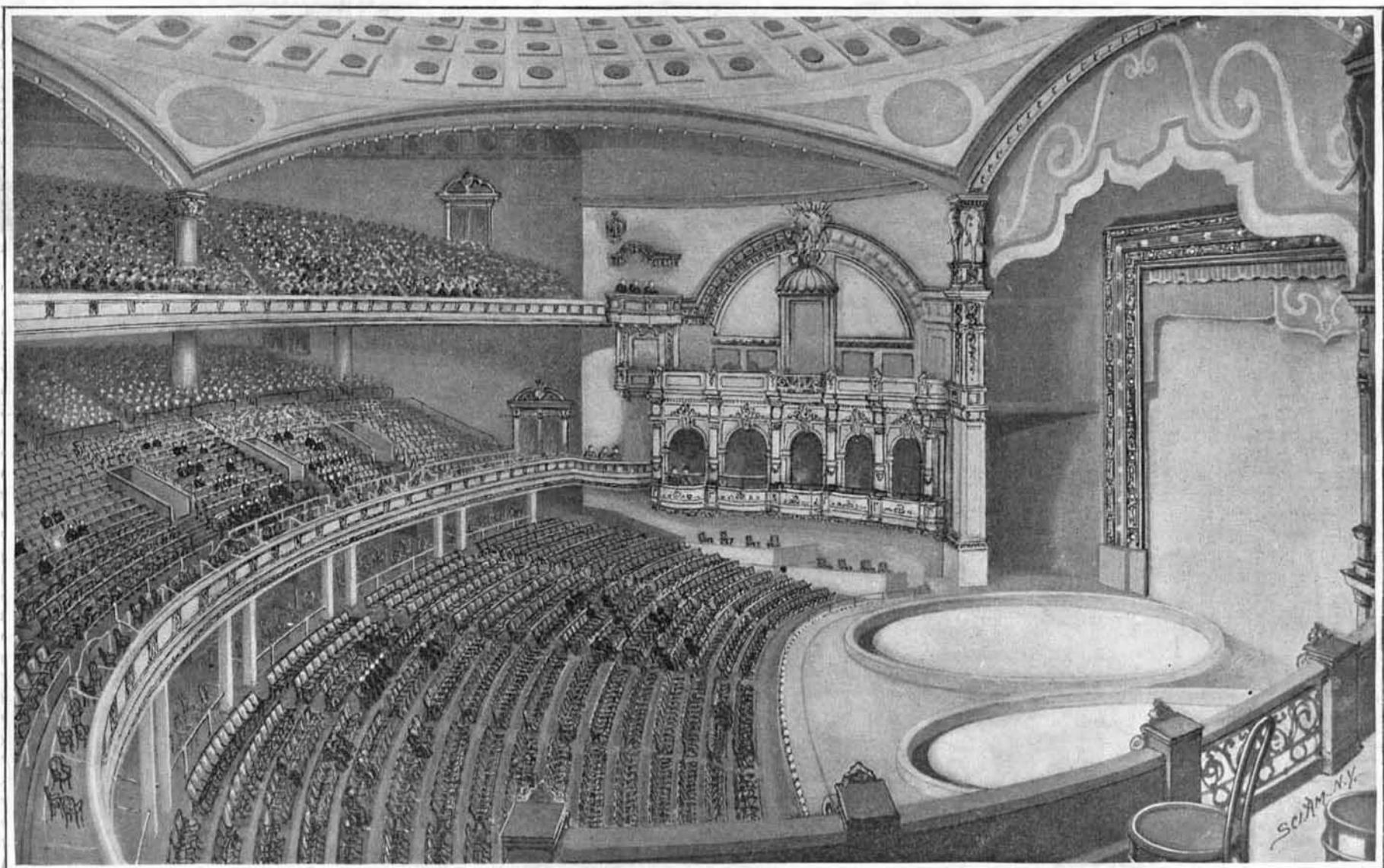
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Showing the front movable "apron" over the tank and the main stage, with the hydraulic rams by which they are raised and lowered; the traps in the main stage, and runways by which processions, etc., enter and leave the stage.
Sectional View of the Stage.



General view, showing the auditorium, the front "apron" (stage) forward of the curtain, and the proscenium arch. The apron, which is here shown with two 42-foot circus rings in position, is carried on hydraulic plungers. Below it is a tank of water measuring 60 by 100 feet. When aquatic performances are to be given, the apron is lowered bodily to the bottom of the tank. Behind the curtain is a movable stage measuring 60 by 100 feet.

MECHANICAL FEATURES OF THE NEW YORK HIPPODROME.—[See page 241.]