

hole through which they were thrown is shown at the left of the picture. Near by stood a furniture warehouse, having front and side walls of brick, while the floors were supported by heavy wooden beams. The warehouse was practically demolished, and most of its contents, including beds, mattresses, bureaus, and other furniture, ruined. In one of the apartments was stored five hundred chairs. Apparently the force of the storm was spent in this portion of the warehouse, for every chair was actually blown out of it, some of them being found several hundred feet away. Nearly all of the chairs were more or less broken.

The elevator was located near the track of the railroad, adjacent to the depot. It was substantially built, having a framework of dovetailed timbers covered on the outside with heavy planking. It was nearly filled with grain awaiting shipment, and at the time of the disaster, several cars were being loaded. In spite of its heavy contents, which acted as so much ballast, the sides of the elevator formed such resistance to the force of the wind that it was moved about twenty feet from its foundation and the top blown off. The downward suction of the air current apparently produced a centrifugal motion inside, which removed most of the grain, some of it being found afterward a mile away. A train of about twenty box and flat cars stood on a siding near the station. One of the box cars, which was loaded with flour, was lifted from the rails, crushed like an eggshell, and the flour spread over an area of several hundred feet, the ground appearing as if covered with snow. Near the carload of flour was coupled a flat car loaded with lumber, every piece of which was blown off. The depot was reduced to a mere mass of wreckage, which can be seen in the illustration in front of the elevator.

Next to the schoolhouse, the flour-mill referred to was the largest structure in the town. It was built of wood, with gable roof surmounted by a cupola, and formed a target for the missiles of various kinds blown through the air. Pieces of wood varying from planks a foot in width and an inch in thickness to mere splinters, stuck in the sides and roof. Strange to say, the mill itself was but little damaged, although it is almost a total loss, for the reason that it was lifted up and carried nearly fifty feet from its foundation, and could not be replaced. In a number of instances two-story dwellings were lifted and thrown on their sides, and in one case a house was literally forced to turn a half somersault, as an athlete would say, being found lying on the roof timbers, the roof itself having been crushed in.

Considering the damage done by the storm, the loss of life was remarkably small. Nine persons were killed, while four were fatally injured, but a number of people escaped death and injury almost miraculously. Mrs. L. Sheridan resided on the second floor of a building on the main street. The lower part was used as a store. She was sitting in the front room when the cyclone came up. The front wall was torn away from the building from foundation to roof, leaving the roof and floors without any support on the side damaged. Mrs. Sheridan had the presence of mind to rush down stairs and out of the building just in time to escape being caught in its ruins, for the rest of the structure fell a moment afterward. A Mrs. Drew and two children were in their home—a frame dwelling two and a half stories high. The house was carried a distance of seventy-five feet, as verified by measurements made after the disaster, but none of the inmates was injured, although they were thrown to the floor of the room in which they were sitting. The roof of the house was torn off and lodged in a grove several hundred feet distant. The direction of the cyclone was such that a remarkably large number of stores and residences were damaged by the front walls being torn off, most of them collapsing as a result of the injury. One of the larger dwellings, owned by Christopher Lorensen, was left unharmed by the cyclone itself. About five hundred feet from it, however, stood a small shed built of heavy planks surrounding a well. This was thrown against the side of the Lorensen house with such force that it passed through the outer wall of boards and the lath and plaster which lined the interior, not stopping until it had struck the opposite wall, and partly breaking through it.

This was one of the numerous freaks of the cyclone. In another instance a case containing about twenty bottles of mineral water was blown out of a saloon

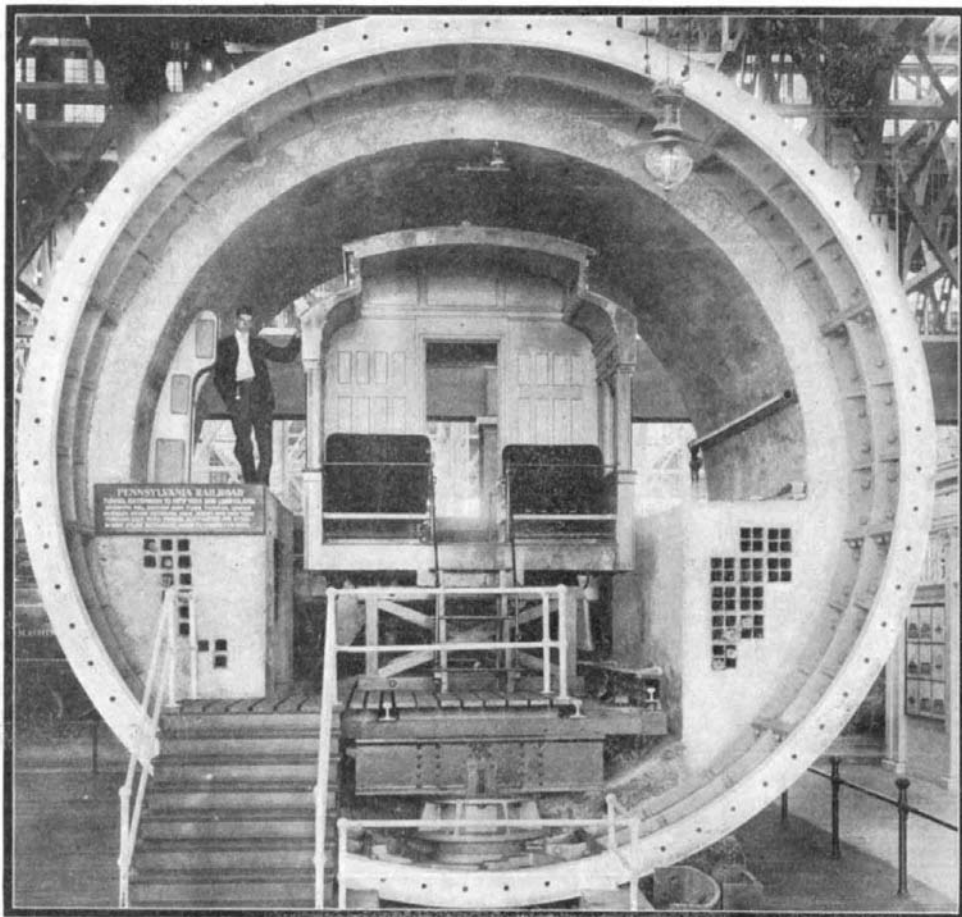
into the basement of a building across the street, and when picked up but two bottles were found broken. When the work of rescuing the victims began, the people who hurried to the ruins were attracted to one spot by the howling of a dog, which they found alive although buried under a pile of brick and timbers, the timbers lying in such a way as to keep the weight from the animal. It was clasped tightly in the arms of its owner, who had evidently met instant death, being crushed by the timber which had saved the dog's life.

Probably the enormous force of the air current was more strikingly displayed by its effect on the opera house than even in the wreckage of the town. This was also built of wood, the sides being inclosed with thin clapboards nailed upon scantling. Although it was directly in the path of the cyclone, the principal damage done to the building was by pieces of wood in various forms, which were hurled through the air. A score of such missiles as strips of planking two inches in thickness, boards, and limbs of trees were found sticking out the side exposed to the storm, like arrows driven into a target.

#### A SECTION OF THE HUDSON RIVER TUNNEL AT THE WORLD'S FAIR.

BY THE ST. LOUIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The exhibit of the Pennsylvania Railroad Company at St. Louis includes an actual section of the Pennsylvania Tunnel that is being built beneath the Hudson River. When the Fair is over, this section will be



A Section of the Pennsylvania Hudson River Tunnel at the World's Fair, With Section of Day Coach Inside.

taken down, and ultimately it will be built into place in the river mud. The section is made up of eight complete rings, each 2 feet, 6 inches long, making a total length of 20 feet. Through the bottom of the shell project two of the cylindrical cast-iron piles, and upon them is supported a section of the track floor-beams and stringers, with the ties and rails and third rail in position. The piles are to pass through the floor with a sliding fit. They will be carried, everywhere, down to rock, and consequently the load of the moving trains will be carried directly by the stringers as a bridge and by the piles as bridge piers, none of the shock or vibrations of the trains coming upon the tunnel tube, which will act merely as a protecting envelope for the trains.

The interior of the shell is lined with concrete, and a mass of the same material is formed at the sides of the tunnel up to the level of the car windows, thus providing two footpaths, along which passengers may walk in case of a breakdown of the train. The man in the photograph shows that there is ample room for this promenade.

Within the concrete mass are embedded the electric conduits. One of the block signals is shown adjacent to the man above referred to.

The interior of the tunnel is filled by a full-sized section of a first-class day coach of the Pennsylvania standard size, and in fact the whole exhibit is complete in every respect to the smallest detail.

In passing below the North River, it will be necessary, in order to avoid going to a depth which would involve heavy grades that would be expensive to oper-

ate, to carry the tunnel through a river mud and silt that are of such consistency that the question of the stability and perfect alignment of the tunnel calls for special study. Although the silt is sufficiently firm to preserve the tunnel itself in perfect alignment, it was considered by Mr. Jacobs that provision should be made for carrying the moving train loads independently of the tunnel shell. It was considered that if the heavy Pullman trains, weighing with their locomotives as much as 600 to 700 tons, were allowed to bear directly upon the shell of the tunnel, their weight and impact might produce a settlement and set up bending stresses that would result in fracture and leakage. The problem will be solved by driving a line of very massive cast-iron screw piles through the floor of the tubes, at 15-foot intervals, with their heads projecting within the tubes, and capping the piles with a system of heavy transverse girders and longitudinal stringers, upon which the track rails will be laid. The heavy load and severe impacts of the trains will thus be received by the piles, and should there be any slight settlement of the piles under load, the movement would not affect the tubes, which would serve their proper purpose as an envelope for the protection of the trains. The piles will be driven either to rock or to a bearing capable of sustaining a predetermined load. Of the 24,049 feet of cast-iron single-track tunnel, 12,174 feet will be reinforced with screw piles.

#### Does Body Make Brain?

In a recent number of the Contemporary Review appears a forcible and suggestive paper on "Play as an Education," by Woods Hutchinson. His chief contention is that the progress of investigation in the field of psychophysics continues more and more decidedly to indicate that the organization of the brain is bound up so closely with muscular activities that no educational scheme can be rightly based on a plan which does not take full cognizance of this fact. In the hydra the nervous organization consists simply of fibers which assist in securing food; there is no brain. In the starfish, the brain, if brain it can be called, is only a double ring of nerves about the mouth. As we ascend the scale of animal life we find similar rings about the nose and eye. The locus of these rings determines the capital of the body-state, and all the rest of the territory included in the area of the animal hastens to get a representation there. Such is the genesis of the brain. If these observations be sound, it may be inferred that the more complex and delicate the muscular life, the more complex and delicate will be the structure of the brain and the greater its intellectual power. This conclusion is supported by a study of the play of animals. The simplest organisms have no period of play. The frog has no play time. Birds have little. In this respect dogs and cats are their superiors in

a degree commensurate with their superior intelligence. While the child plays he is organizing his brain; it is growing; he is gaining the power which in after years will enable him successfully to cope with situations demanding a well-trained mind. The lesson which lurks in this conclusion for teachers and school authorities may be condensed into a phrase: Shorter hours of study, and public school playgrounds everywhere. The latter should be under school supervision and should be recognized as an integral factor in education, not merely tolerated as a necessary evil or regarded as a side-issue. Athletics should likewise be cordially recognized as an essential part and force in the curriculum.

#### Ancient Fluorspar Mine.

The Blue John mine, at Castleton, Derbyshire, is famous for its beautiful fluorspar. Antiquaries have established the fact that the occurrence of this spar was known to the Romans, who found it probably while working the hills for lead. Anything that did not contain lead, the Romans threw to one side as worthless; and thus it was that quite recently, in a tunnel communicating with a shaft made by the ancient adventurers, the proprietors of the mine found one of the biggest and finest specimens of the rare mineral ever seen—a mass that had been placed there by the Romans nearly 2,000 years ago. The largest vase ever made from fluorspar is in the Chatsworth sculpture gallery, but it is said the lump just found might be worked into one to rival even that of the Duke of Devonshire.—Eng. and Mining Journal.