

**SOME PHENOMENA OF THE ST. LOUIS HURRICANE.**

A very spirited description of the formation and course of the late St. Louis storm was recently contributed by Mr. H. A. Kirchner, F.A.I.A., to the American Architect and Building News. The barometric readings for the day show a steady fall from 29.30 at 7 in the morning to 28.75 at 5:15 in the evening, when the storm was at its height. They were as follows:

7 A. M.	29.30	3	P. M.	29.10
8 "	29.28	4	"	29.05
9 "	29.27	5	"	29.00
10 "	29.26	5:15	"	28.75
11 "	29.25	6	"	29.10
12 M.	29.25	7	"	29.14
1 P. M.	29.23	9	"	29.16
2 "	29.16	10	"	29.13

The first evidence of the coming trouble occurred at noon, when there were signs of a storm gathering in the west. At 3 P. M. the northwestern sky was overcast; at 4:30 there was "a flying scud underlying light gray cumulus clouds," the wind was increasing and was from the east.

"At 4:35 the flying scud was traveling very rapidly from southeast to northwest, the sky in the south and southeast still remaining clear. The wind increased, still from the east, attaining a velocity of thirty-seven miles per hour. Every indication pointed to a catastrophe in the elements. The western sky became black, the scud piling up in high banks. Suddenly, at 5 P. M. a line formed on the northern sky, showing an attack by the elements from that direction. The line was moving rapidly to the south, forming a straight line from east to west, and mounting high into the sky, all underneath the rapidly advancing line of the storm being of a transparent green color. At the same time the moisture in the air over the city condensed into an inky blackness, from which issued magnificent bolts of lightning in bands of heroic size, setting fire to several buildings and destroying telephone boxes, power houses and light plants. The wind, blowing from east-northeast, suddenly increased to 120 miles per hour, tearing, ripping, demolishing everything in its path. Joists, scaffolding, tin roofs, trees, cornices, signs, glass, brick, every material, large and small, found in the country or city, seemed in grand conglomeration to move westward with a speed indescribable, amid the roaring, crashing, booming artillery of the onslaught of wind and water, the lightning lighting up the scene to only a few feet from the observer, as the elements were so thick as to obscure light. The effect was the same as sunshine when seen from under the water. This turmoil ceased after ten minutes' duration, when it set in again, more terrific than before, from the west-northwest, with an interval of but a few seconds. The second onslaught lasted about ten minutes. Twenty minutes after, a third storm, but with wind of moderate velocity (about 25 miles), set in, accompanied by severe lightning, hail and flood. Altogether over three inches of rain fell in one hour."

The effect of these storms was distinct, the one from the east wrecking the northeast part of the city and the river front, the second wrecking the southern and southwestern part of the city. The storm, however, was general, for severe damage was done throughout the city, and over an area of 150 square miles.

Mr. Kirchner is of the opinion that the storm was more of the nature of a hurricane than a tornado, although "undoubtedly derived from the same source as a tornado," both resulting from the unbalanced magnetic condition of the atmosphere. The damage, as assessed, amounts to some \$20,000,000, and in the opinion of the writer was caused:

First. By the direct pressure resulting from the velocity—120 miles an hour—of the wind. This is estimated at 79 pounds per square foot of surface, normal to the direction of the storm. Secondly. The pressure of the wind was assisted by the impact of flying debris. These two causes would operate to bend the columns of a building of steel skeleton construction, throwing the wall out of plumb and causing the shell of brick or stonework to fall out of the framed work, as the combined result of shock and gravity. It is estimated that the total pressure upon a skeleton building of 50,000 square feet front, which the writer was constructing, amounted to 4,000,000 pounds. Thirdly. Telegraph poles would snap in two, and the cross trees and wreckage attached to telephone, telegraph, and electric wires swayed from side to side, knocking down buildings on each side of the street. Fourthly. Tin roofing was torn loose, and swept through the air, assisting in the general destruction.

It is suggested that these periodical storms should be made the object of special scientific study. It is certainly humiliating that with all our wonderful advance in science, and our ever increasing knowledge of natural phenomena, we should be so ignorant of the real cause, and so helpless in the presence of, such storms as this. In view of the appalling loss of life and property which attends these Mississippi valley storms, it would be both humane and prudent to make a special appropriation for their investigation. All possible data should be gathered regarding previous storms, and an effort made to find out the laws which govern, or at least the very earliest signs which foretell their approach.

**THE THREE NEW BATTLESHIPS, NOS. 7, 8, 9.**

The Naval Department has lost no time, since the appropriation of the necessary funds by Congress, in the preliminary arrangement for the construction of the authorized battleships, and the circular of the Secretary calling for bids is in the hands of the various builders. The contracts are to be made on or before October 8 of this year. Proposals will be received by the department either under its own plans and specifications or under plans and specifications submitted by the bidder and approved by the Secretary of the Navy. The dimensions of the new ships are to be as follows: Length on water line, 368 feet; breadth, 72 feet; mean draught, 23½ feet; normal displacement, 11,500 tons; and they each carry a total of 1,200 tons of coal.

The armament will consist of four 13 inch guns, mounted in two 17 inch turrets, the barbettes being 15 inches thick. There will be a broadside battery of fourteen 6 inch rapid fire guns protected by a continuous wall of 5½ inch armor, extending in the wake of these guns from turret to turret. Between each 6 inch gun a 1½ inch splinter bulkhead will extend from deck to deck, serving to confine the flying fragments to one particular gun station. Disposed throughout the ship in commanding positions will be some twenty-five smaller rapid fire guns, consisting of sixteen 6 pounders, four 1 pounders, four machine guns and one field gun.

The hull is protected at the water line by a belt of steel 16½ inches in its thickest part and 7 feet 6 inches wide, 4 feet being below and 3 feet 6 inches above the water line. The 16½ inches thickness will be continuous from the aft to the forward barrette, and from the forward barrette to the bow it will gradually diminish to 4 inches. Athwartships, at the barbettes, there will be bulkheads of 12 inches of steel, to resist a raking fire by the enemy. This wall of armor will be roofed in by a protective deck of 2¼ inch steel which will be carried out to the bow and stern, and curved down to below the waterline at the sides, the thickness being increased to 3 inches at the bow and 5 inches at the stern. Below the bottom edge of the side armor the hull will be double, the space between the two shells being subdivided into watertight compartments.

There will be two military masts, each carrying two fighting tops, and the conning tower of 10 inch steel, which will be placed beneath the pilot house, will be supplemented by another armored position aft, from which the ship can be fought in case the first should be destroyed. The stability of these ships will be assisted by a complete belt of corn-pith cellulose—a substance which swells rapidly when wet and will automatically plug up shot holes—which will be worked in from stem to stern in the wake of the 6 inch armor. To reduce the fire risk, as little wood as possible will be used in the construction of the internal fittings of these ships. The speed is to be 16 knots and the cost is not to exceed \$3,750,000.

It will be seen that the completion of Nos. 7, 8 and 9 will add a very formidable trio to our new navy. The designs are full of interest, and show that the naval board have made a compromise between the Iowa and Kearsarge type. They have departed from the Indiana in the matter of armament, by throwing out the 8 inch guns altogether, and substituting an extremely powerful battery of 6 inch rapid fire guns. The new type has the high freeboard of the Iowa; the forward heavy guns being located on the upper deck, which only extends back to the aft barrette, and the after pair being on the main deck. There are the same number of heavy rapid fire guns in the secondary battery as there are in the Kearsarge, but the caliber has been raised from 5 inches to 6 inches, and they are better disposed, ten being on the main deck and four on the upper deck. Though the number of guns in the heavy rapid fire battery is the same as in the Kearsarge, the increase of one inch in the caliber of these guns increases their power to such an extent that the total energy of one rapid fire broadside of the new ships will be about double one discharge of the corresponding battery on the Kearsarge. No doubt many admirers of the noble trio represented by the Indiana will regret the absence of the 8 inch guns, which were their characteristic feature; but the substitution of rapid fire is in the line of modern ideas on battleship building, and the actual weight of metal thrown by the new ships in a given time will be equal to, if not greater than, that of any ship afloat.

**Sir John Pender.**

Sir John Pender, to whom we are largely indebted for the first Atlantic cable, died on July 7, at the age of eighty-one. Had it not been for his generosity and faith in the cable scheme, we should undoubtedly have been deprived of the cable for many years. In 1857 he was one of the original stockholders. When the cable parted in 1865 the case seemed desperate; neither the public nor the government would help. Then Sir John came forward and pledged an enormous sum as a guarantee. It was largely due to him also that Australia and the East were put into telegraphic communication with Europe. His public services were unquestionable and many honors were bestowed on him.

**Nest Building Fishes.**

There are fishes that build nests just as birds do. Not long ago some of them were brought to this country from Japan, and the San Francisco Examiner says one can buy a pair of them for a small price at any fancier's now.

The habits of these creatures are remarkably interesting, and, unlike gold fish, they will breed in an aquarium or even in a glass globe. They produce three or four broods of young annually, so that the owner is likely to be able to make money by disposing of the increase. In the land of the Mikado, to which they are native, they are called paradise fishes.

The nests they make are very odd, indeed, being composed entirely of air bubbles. When the time for mating arrives the male fish undergoes a striking change in its appearance. Ordinarily he is of a dull, silvery color, but now he exhibits stripes of red, blue and green, with streaks of brightest orange on the ventral fins. Such is the costume in which he goes a-wooing.

Later on the female proceeds to construct the family nest at the surface of the water. Swallowing air, she ejects it in the shape of bubbles, which are held and made permanent by glutinous capsules from a secretion in her mouth. Having got together in this way a sufficient mass of bubbles, she proceeds to lay.

At this stage the female paradise fish seems always to be seized with a strange desire to gobble her own eggs. This she would inevitably do but for the watchfulness of the male, who prevents her, taking the eggs in his mouth and ejecting them beneath the mass of bubbles, to which they rise and find a resting place among them. Sometimes he will conduct his mate under the nest, so that the eggs as they are laid may ascend to it. When laying is finished he keeps guard over the nest, attacking the female if she comes near. Meanwhile he busies himself in the making of fresh bubbles to take the place of those which chance to burst.

This performance is kept up for five days, at the end of which the young are hatched out. They cannot swim, but cling like little tadpoles to the bubbles. If one falls to the bottom, as happens now and then, the papa fish takes it in his mouth and disgorges it among the bubbles again. His watchfulness is continued until the little fishes are able to take care of themselves.

They grow fast in a glass globe or aquarium, attaining a length of three or four inches. They thrive best on chopped angle worms, but raw beef cut fine will serve as a substitute. Apparently they are exclusively carnivorous. Care must be taken not to expose them to cold, which quickly kills them.

**Plans for the Sandy Hook Station.**

Plans have been prepared at the War Department for important improvements at the Sandy Hook military station, officially known as Fort Hancock, says the New York Tribune. These have been approved by Secretary Lamont, and the probabilities are that in the near future the work of building quarters and barracks at the station sufficient for the purposes of a fair sized army post will be begun. The plans drawn up contemplate the erection of a number of houses for officers and a barracks to accommodate about 100 men, and the making of suitable parade grounds, walks, roads, etc. These plans were prepared under the direction of the Quartermaster-General. It is proposed to make the buildings of brick, and to place in them all modern conveniences for the health and comfort of officers and men. In his last annual report General Miles said that Sandy Hook was an important military point, which, in time of war, would be a valuable outpost in the defense of New York. He recommended that steps be taken to make the place more formidable. Congress took up the subject, and in the army appropriation bill provision was made for quarters and barracks in connection with a permanent artillery garrison at Fort Hancock.

For this purpose Congress authorized the application of \$100,000 of the total appropriation for the fortification and equipment of the new fort. It is expected that this money will suffice to provide what is known as a two battery post, and that will mean a garrison large enough to man the defensive works already constructed, although not sufficient for all future needs. Therefore the plans have been so projected as to permit of a ready extension of the quarters at any time. They have already been prepared, and the quartermaster's department will at once take steps to procure all further necessary information for beginning construction work. The projected work will not interfere in any manner with the completion of the defensive works of the fort itself, which is to be pressed as rapidly as the resources of the engineer's department and the capacity of the army ordnance works will permit.

Much has already been accomplished at Sandy Hook that is unknown to the public in the matter of placing mortar batteries, and there are also several heavy caliber modern rifles there mounted on disappearing carriages. The ordnance shops are making rapid progress with other heavy guns, and it is expected that considerable additions will be made to the Fort Hancock defenses as soon as the engineers can prepare the emplacements, possibly this summer or fall.