

taken to avert a catastrophe. On the very day that the Campanile fell, the unheeded Vendrasco wrote, "The Campanile has but a few hours to stand." Hardly was the ink dry on his paper when the tower fell, crushing in the north end of the Library, almost miraculously sparing the great church and the neighboring magnificent structures that constitute the glory of Venice.

The causes of the collapse of the Campanile are fully discussed in the Building Monthly's article. The fissure opened by the stroke of lightning in 1745 was but indifferently repaired. Telluric movements and electric discharges continually disturbed the injured section. Still another element of weakness was the complete deterioration of the mortar which held the masonry together. Much of this mortar had so far crumbled away as to appear in the ruins like a fine white powder or dust. It had long lost all power of cohesion. Although the mortar had crumbled and become worthless, the bricks in the main were in good condition and showed astonishing hardness. Many were very old, far antedating the building of the Campanile itself. One bore an imperial stamp of the reign of Antoninus Pius; others showed prints of the feet of domestic animals and fowls that had walked upon them before they were burnt. The bricks ranged in age from the first century B. C. to mediæval times. The older ones had been taken from Roman edifices at Aguleia.

Though doomed largely through early official neglect of warnings received, the immediate causes of the collapse of the giant tower were the bungling repairs of the roof of the Loggetta. Here it was that the deep cut previously referred to was made into the base of the part of modern construction. The old fissure reopened, the crevice spreading with alarming rapidity. Even though this condition of affairs was brought to the notice of the city authorities, several days elapsed before concern was shown; visitors were even permitted to ascend to the belfry before steps were taken to preserve the structure. No adequate protection was given to the public on the Piazza up to within half an hour before the crash. One official ascended the belfry five hours before the downfall, and workmen, scaling a ladder resting against the tower-wall, saw the yawning gap spread over the wall ere they fled. A few moments later all that was left of the Campanile was a mass of ruins where the ladder had stood.

A new Campanile will take the place of the old on the Piazza San Marco. Subscriptions are pouring in from all parts of the world. Commendatore Boni declares that work on the new structure will be commenced in the spring. That the new bell tower will not have the same associations with the historic past of Venice goes almost without saying. No traditions will lend their glamor to the modern structure; nor will the old poetic atmosphere cling to the new Loggetta which is to take the place of the ruined masterpiece of Sansovino. What may be styled the tombstone of the old Campanile will be erected on an artificial mound in the public gardens in Venice. This memorial will be a pyramid thirty feet high, formed of perfect bricks of the old belfry, and is to commemorate the great collapse of July 14, 1902.

#### PROTECTING OUR WILD ANIMALS.

BY GEORGE ETHELBERT WALSH.

One of the problems of the day which all lovers of animals and birds are intensely interested in is the successful adoption of some adequate methods of preserving the native wild animals and birds that are threatened with extinction by thoughtless and ruthless hunters and ignorant people generally. The fauna of the North American continent was the largest and most varied of any in the world in the days of the earliest settlers; but a century of steady destruction of the finest specimens of the animals brings us to-day to a realizing sense that, if we wish to have any of these creatures among us in the wild state, systematic efforts must be made to protect them.

In recent years the general movement to protect our song and plumage birds from ruthless destruction has resulted in educating the public to a higher appreciation of the value of these harmless creatures. Most States have enacted laws now which amply protect the birds. In the interests of sport our game birds and animals have likewise received partial protection during the breeding seasons when the rate of destruction is the greatest. Consequently these innocent creatures are in no immediate danger of extinction. In fact, they are actually on the increase in those States where the bird and game laws are rigidly enforced. All that the small animals and birds needed was such protection from man's destructive tendencies in order to enable them to breed and live in the woods and fields. With a little more general protection, we may hopefully look forward to the time in the near future when our song birds will be as numerous as ever.

But there is a class of animals and birds which cannot be reached by the ordinary methods of State legis-

lation. The larger animals of the forest will not thrive well in captivity, no matter how the parks and zoological gardens may be arranged, and if kept confined they lose their native characteristics and degenerate in spirit and size. Gradually their extinction is inevitable. Legislatures may pass laws annually to protect them, but if they are deprived of their great natural habitats—the wild woods and forests—they will inevitably decline in numbers and die out. Their danger is not only from the hunter's rifle, but from the influences of civilization which are destructive to their existence.

So generally accepted is this fact to-day that efforts have been made in different parts of the country to protect the wild animals on large natural preserves where they can have all the freedom and comfort of a wild existence. In the great Yellowstone Park the national government possesses a vast empire of natural wilderness where all of the American birds and animals thrive in the most satisfactory manner. Although the government officers in the park have not been able to quell poaching and hunting entirely, they have succeeded in giving to the few wild buffaloes, deer and antelope comparatively ample protection. The domain is so large, and the temptation so great for unscrupulous hunters to enter the park for unlawful purposes, that infractions of the law are quite common; but under more stringent enforcement of present laws it may be possible to preserve indefinitely in the Yellowstone Park animals and birds that will be exterminated in almost all other parts of the country.

Recently there has been started a movement by the government to preserve the great forest reservations of the West from the destructive influences of hunters, settlers and woodmen. There are some 47,000,000 acres of these forests in the West which are under the control of the national government. Some of the woods have already been denuded of trees so that they would be of little value for preserving game; but most of them are almost as wild and unexplored as half a century ago.

That they will be preserved in part at least is now quite evident. The Forestry Bureau is making elaborate plans for protecting them from fires and the woodman's ax; but closely associated with their protection is that of the wild animals which roam through them. It is claimed by the experts that, if all game, whether of birds or animals, were protected in these great natural forest preserves of the national government, within another half century our fauna would be once more the finest in the world. These vast tracts of forest lands are the natural haunt of wild animals which refuse to breed and multiply in any small preserve or park. The freedom of the pathless woods seems necessary for their growth and happiness.

In view of the rapid denudation of our forests, and the destruction of nearly all the larger wild animals of the country the national government will soon be called upon to extend this protection to the hunted creatures which have been driven before the hunter's rifle to the most inaccessible recesses of the Northwest and Canada. Indeed the latter country has to-day become an asylum for many of our finest animals, and hunters annually seek them in this far country. There are parts of Canada which have never yet been explored, and in the limitless woods and forests north of us the wild creatures find the protection which nature gives them. Even a large remnant of our wild buffaloes have crossed the Canadian border and now feed somewhere in the loneliest parts of that country.

The protection of the birds and animals on the government forest preserves is one of the steps demanded to-day in the interest of science and humanity. In such places they would perpetuate their species far into the future. As matters stand to-day there are whole families and groups of wild animals which must soon become extinct if no provision is made for their protection in great natural forest preserves.

One of the greatest enemies to the wild animals in any woods or forest is fire. In the great Northwestern forests where fires annually consume thousands of acres of timberland small and wild animals are destroyed in such numbers that their race has become almost extinct. Unless there is water near at hand the animals are caught by the fire and killed. This destruction is peculiarly great in the fall of the year when the young creatures are just beginning to run around and enjoy themselves. They are unable to run a race with the fire, and eventually they are smothered to death or roasted alive. The question of preventing fires in the woods is one that lumbermen have considered carefully for years, but it is a matter that should appeal to the humanitarian as well as the utilitarian. Where there is one lumber mill or home of a settler burnt down by these fires there are ten thousand helpless animals and birds consumed in the fierce flames. Even on the government forest preserves these fires do a great amount of annual damage. Their prevention must be effected before either the forests or the wild animals can be preserved. As most of the fires start through the carelessness of railroads, hunters and set-

ters, it is possible to enforce regulations and punishments that would gradually tend to abate them.

In addition to the present movement to interest the national government in the work of preserving birds and animals on the natural forest reserves of the West there is a pretty general effort on the part of private individuals to establish preserves for breeding and protecting the wild creatures that stand now in danger of extinction. Some of these private preserves have been established simply in the interests of science and humanity. Their owners have created for the animals a natural asylum where they can live and enjoy themselves. They are not thus protected for the sportsman or hunter, but to keep them from extermination so that in the future there will be fine specimens of their race to gladden the hearts of generations yet to come.

#### SCIENCE NOTES.

Prof. A. E. Wright, of the Army Medical School at Netley, has published the results obtained by anti-typoid inoculation. It is demonstrated, so it is said, that fewer cases and fewer deaths occurred among those inoculated than among those untreated.

Prof. Lucien M. Underwood, of Columbia University, and Dr. N. L. Britton, of the New York Botanical Gardens, as well as other scientists, have been investigating the flora of this State, and have discovered a new plant, or rather a new variety of an old plant. Near the salt beds of Syracuse, N. Y., they found specimens of the *Cissa marina*, which by no means conformed to the well-known species. The new form has been named *Cissa marina Syracusana*.

For twenty-five years the indefatigable Catholic priest, Father Delattre, has been engaged in archaeological researches on the site of ancient Carthage, and now reports what he declares the best find made during this period. It is a white marble sarcophagus, 2.09 meters in length, partially covered with designs, that on the lid being a relief portrait of a woman, of rare artistic beauty. The sarcophagus belongs to the Punic period and is the work of a Greek artist. It is now regarded as the pièce de résistance in the well-stocked museum of the Pères Blancs in Carthage. The find was made in the necropolis near Ste. Monique.

The collection of physical apparatus which was left by the late George M. Hopkins has been given by his widow to the Adelphi College, of Brooklyn, New York, with a few exceptions, notably his optical lantern with its various attachments, with which he performed interesting experiments on the rare occasions when he could be induced to give public lectures. This has been given to his friend, Prof. W. LeConte Stevens, Washington and Lee University, Lexington, Va. The collection embraces most of the pieces of apparatus which are illustrated in "Experimental Science." The apparatus for the Adelphi College was selected from the collection by Prof. W. C. Peckham.

Victims of pulmonary complaints have heretofore been compelled to make inconvenient journeys to the higher altitudes in search of the pure rarefied air which is known to be so beneficial to them, but this is no longer necessary. It has been discovered that the air from limestone caves has all the characteristics of that of the mountains. This discovery has just been made use of in the location of a sanitarium near one of these caves, and the air for the institution is supplied from the underground caverns. This establishment is at Luray, Va., and the system of ventilation is arranged so that each room gets its own supply direct from the cave. The air of these caverns is of a very uniform temperature and remarkably pure and free from all germs and dust particles. In the warmest weather the doors and windows of this institution are kept closed, and a comfortable temperature of 75 degrees is maintained in spite of one of 90 or more encountered outside.

The Agricultural Department has begun a series of exhaustive investigations into the matter of cold storage. There are a number of mysterious manifestations which take place in a cold storage warehouse, and the government agents are endeavoring to ascertain the why and wherefore of these. For instance, it has been often noted that one lot of fruit will keep in fine condition for many months, while another immediately near will rot in a comparatively few days. This is particularly true of peaches. It has also been noticed that some peaches lose their delicate flavor very quickly in cold storage, while others are not affected in the least. In order to get at the facts, an agent of the Agricultural Department has been assigned to take a specimen carload at Fort Valley, Ga., and to make careful observation of the manner of picking and packing and to follow the fruit through the various stages through which it must pass on its way to a cold storage plant in Jersey City. Here the fruit will be watched carefully during its prolonged stay by the same agent, who will make a detailed report of his observations. The same programme will be carried out with other shipments of peaches as well as other fruit.