Japanese structure that precludes its general use in our severe climate, although it has a pictorial aspect that is pleasing in its variety. The large building overtopping the Japanese village is the Liberal Arts building, the Chime tower, Art building and New York State building being upon the terraced heights, while the large white edifice presents the Woman's building from one of the many standpoints that reveal its beautiful proportions. The pole and boat in the lake are part of the paraphernalia of the Life Saving Service exhibit, the upright mast representing the supposed mast of a stranded vessel. One of the crew is daily rescued from this mast in a genuine exhibit of the means employed in this service. A line is shot over the yard, the breeches buoy is sent out from the shore, and finally the exhibitor simulating a distressed mariner is brought safely to the shore.

The Government building is the most attractive and complete of all on the grounds, and in it are exhibits from nearly every department of the government—war, navy, interior, treasury, etc. About one-sixth of the floor space is given to army siege and field guns, army rifles, military trappings, wagon trains, models of men and horses fully accoutered for service, etc. In a similar space for the navy are shown models of ancient and modern United States war vessels of large size in glass cases, including a full sized torpedo boat ready for service and the various forms of guns and small arms used in the service. The Smithsonian Institution contributes a varied and educational display. The Lighthouse Board, Fisheries Commission and Signal Service have many beautiful and interesting features, and in the southwestern corner of the building are tanks for living fishes of many species.

The L of the corner is utilized with a broad passageway so arranged that the only light coming into it passes through the water in the tanks, thus giving perfect illumination of the fish. One side of the L is devoted to salt water and the inhabitants thereof, while the fresh water fish are in the tanks on the opposite side. This portion of the building is always crowded with visitors, and great credit is due the commission for the taste displayed in its arrangement. The portion devoted to the Agricultural and Treasury departments is also exceedingly interesting. Every variety of government note, bond, postage stamp, vignettes, portraits, etc., is shown, and a stamp is in operation producing medals and coin.

The Forestry building, with a floor space of 3.000 square feet, is unique in construction, in that the timber on its exterior surface and the interior supporting timbers are not denuded of their bark, thereby giving to this building the appearance of being a colossal rustic summer house. In the exhibits forming its attractive interior are shown all the varieties of Southern wood, both in the rough and finished state. The western half of this building (in the immediate foreground) is devoted to minerals, and here are shown all the useful Southern minerals, as coal, marble, limestones, granite, clays, etc., and many of the more valued stones for jewels and ornamentation. An octagonal turret rising from the center breaks up the straight lines of the side walls. Projecting porches on the ends and sides also materially assist in destroying a monotonous flatness to the elevation.

The Phœnix wheel, whose larger prototype proved so attractive at Chicago, is also a good drawing card for visitors at Atlanta. The wheel is rotated by a huge sprocket chain engaging with the sprockets upon one of the circular rims, the chain being driven by a steam motor. Upon either side of the street where the wheel is located are buildings devoted to amusement exclusively.

In the "Streets of Cairo," the architecture of Egypt is represented both in form and decoration. The locality is devoted to booths, where are sold trinkets and souvenirs, supposed to come from Egypt, the dealers being dressed as Egyptian natives.

Looking toward the Government building from the plaza, the most prominent feature, as represented in one of our views, is the "Chime" tower, as it is called. It is located upon one of the terraces that surround the grounds of the Exposition, and contains a chime of thirteen bells and a tower clock. Back of this tower is shown the Government building, and upon the left is seen a portion of the Art building.

A Scientific Prize Awarded.

Mr. J. R Roosevelt, secretary to the United States Embassy, has presented to Lord Rayleigh and Prof. Ramsay the check of the embassy for $10,000, being the Hodgkin prize awarded by the Smithsonian Institution of Washington for their discovery of new properties in the atmosphere. The recipients of the prize have written a letter of thanks to the Smithsonian Institution.

This, we believe, is the largest prize ever awarded in this country for a scientific discovery. The founder of the Smithsonian Institution was an Englishman, and that his own countrymen should have won the reward is a matter of especial gratification.

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(Illustrated articles are marked with an asterisk.)

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For the Week Ending November 16, 1895.

Price 10 cents. For sale by all newsdealers.

THOMAS C. ROCHE.

Another practical worker in photography has passed away. We refer, with regret, to the death of Thomas C. Roche, on October 22 last, 68 years old, following just a year after the decease of Charles Ehrmann.

Mr. Roche, we are informed, began the practice of photography in 1858 as an amateur photographer, practically when the wet plate process began to be extensively used.

In 1860 he brought into use aniline dyes for photographic purposes, for tinting albumen paper and the coloring of photographic prints. In 1862 he was induced to become a professional photographer and became associated with E. & H. T. Anthony & Company of this city, one of the oldest photographic manufacturers, whom he served for the past thirty-three years as their expert in photographic matters. At the time stereoscopic pictures were the fashion he did an immense amount of work, making stereo negatives of Central Park, and, under the protection of General Meigs, numerous pictures of battle grounds of the civil war.

In 1877 he was awarded a silver medal for the best carbon transparencies, and received a similar award the following year. About this time he suggested an important improvement in collotype printing which is now being used commercially. It is said in 1879 he produced the first specimen of gelatino-bromide paper made in the United States, for which he was afterward in 1881 awarded a patent. He also invented an improvement in gelatine dry plates by which the gelatine was so hardened during the manufacture of the plates that it would not dissolve out afterward in hot or warm water. The plates were specially useful in hot climates and he gave them the name of "tropical plates." He was very successful in the making of collodio-bromide emulsions and in preparing dry plates with the same, while later he learned to manipulate the gelatine dry plate perfectly. He was familiar with many different processes, was fond of experimenting in several directions and always willing to aid and help amateurs and others out of difficulties in photographic manipulation.

He was generally quick and alert in grasping the salient points of photographic problems and was considered a rapid operator. For several years he was an active member of the Operator Photographers' Association. One of his last demonstrations before a photographic society was on the primuline process before the Society of Amateur Photographers of this city. We learn that one of his sons is engaged by the New York Herald as chief of the photographic department in that newspaper office, a fitting continuation of the usefulness of the father. His loss will be greatly felt by many of the old and many of the new photographers and in a greater degree by the firm in whose service he has been so long.

THE PERMANENCE OF MODERN BUILDINGS AND PUBLIC WORKS.

If history is to repeat itself in telling the story of the great civilized nations that dominate the world today, there is an age coming when the Anglo-Saxon race in both hemispheres will be known only by the monuments of its skill and labors that may happen to survive it.

The kingdoms of Assyria, of 4,000 years ago, speak to us from the sculptured walls of Nineveh.

Thebes, the Sphinx and the towering mass of the Pyramids are eloquent witnesses of the skill, resourcefulness, and undoubted wisdom of the ancient Egyptians.

The Parthenon, at Athens, and a thousand sculptured fragments strewn thickly over its classic soil, will preserve for ages to come the record of Grecian art.

The colonizing Roman has left enduring monuments of his taste and skill, both as architect and engineer, and the highways that he constructed are to-day, in many cases, the main thoroughfares of the countries through which he originally built them.

The question of the comparative durability of our Nineteenth Century engineering and architectural works is an interesting one.

We will assume—although we see nothing to indicate the fact—that the tide of Western civilization has reached its high water mark, and that in the splendid achievements in the arts and sciences, which have marked the closing years of the Nineteenth Century, the Western races have reached the zenith of their powers. We will assume for the sake of argument that from this time on a decline shall set in which shall ultimately lead to a decrepitude and decay as complete as that of the races of Assyria and Egypt, Greece and Rome—and at the same time ask the question: How many of our great public works will be left standing upon the earth forty centuries hence, to bear witness to our Nineteenth Century knowledge and skill?

Are there in New York, London or Paris buildings that will stand for forty centuries the buffeting of wind and weather as those stately edifices by the Euphrates and Nile have stood? Probably not; nor

is the fact any reflection upon the work of the modern builder. It is merely a result of the more artistic modern taste, which expresses itself in a style of architecture that is at once more picturesque and less durable than the gloomy temples and palaces of the ancient builders.

This is the age of steel and iron, materials for construction of which the ancient races appear to have known very little. As compared with stone, they are less durable. Left to itself, an iron or steel structure will, in time, corrode and disappear. Unless the skeleton frames of our modern lofty buildings be carefully built in and protected from oxidation, it is certain that their life will be limited; for, should the steel work ever be eaten away by rust, there will be no strength in the lower walls adequate to carrying the great superimposed load of the upper stories. This, of course, is not an immediate contingency; but in reckoning the life of buildings—as we are now doing—by centuries, it is an element of decay that may ultimately be responsible for their collapse.

Of the great steel and iron structures, such as the Brooklyn and the Forth bridges, it may safely be said that their life will be contemporaneous with their careful maintenance and repair. The theory of the crystallization of steel under continued stress is now pretty well exploded; and it is generally conceded that if a steel structure, such as the Brooklyn bridge, which is subject only to static strains, be carefully protected by painting, its life may be indefinitely prolonged. Left to itself, however, as the works of the ancients have been left, the rust eating through the cables would ultimately bring the whole structure into the river, leaving the granite towers as an indestructible monument to mark where the bridge once stood.

The great systems of waterworks, both for municipal supply and for irrigation, will provide many lasting monuments to the energy and skill of the nineteenth century. Nothing constructed in Egypt or Assyria was more durable than is the masonry of the great dam of the Croton waterworks.

In constructing our vast system of railroads we have written our history in monumental lines of rock and earth, that will probably last as long as this globe turns upon its axis. Should some glacial period return and grind these embankments and cuttings out of existence, there would yet remain the great tunnels, to show with what unconquerable energy we pushed our way even through the heart of the hills themselves.

Autumnal Tints.

Now that the shortening days and lengthening nights are gradually inducing that wintry sleep of vegetation prior to which a large percentage of trees and shrubs and lesser growths throw off entirely their leafy garb, we find these unobtrusive green leaves rivaling the brightest blossoms of the summer in the brilliant tints they assume. Curiously enough, too, in most cases the alteration of the sap, as its vital flow is first slowly checked and then stopped altogether, leads to the assumption of a gamut of tints embracing the brightest complementary colors of the normal hue of green. In one and the same leaf we start with the pale green of the opening buds in spring, the ripe, dark viridity of the late summer, and now, at the first keen frost, it first turns pale and sallow, and then blushes vividly, changing into glowing scarlet as it falls fluttering to the ground. Here, in the succeeding stages of decay, the scarlet deepens and sobers down into warm russets and browns prior to merging into the dusky tints of Mother Earth herself. The subtile changes which lead to this wonderful display of color are extremely interesting when considered in relation to the laws of color generally. Every tint, as is well known, has its own particular number of vibrations of the rays of light which produce it, precisely as every tone in sound or music has its special number of aerial vibrations, which cannot be altered without altering the pitch. Hence, in the leaf, during its period of vitality, it is endowed with a capacity for absorbing all the tints but the green, which it rejects and reflects, and by virtue of which we term it of that color. So soon, however, as its vitality declines a change sets in, and as it wanes the light is gradually decomposed in a different degree, and correspondingly divers hues are reflected in the process. If we observe the colors of the rainbow or spectrum, we shall invariably find a certain order maintained; beginning with violet, the tints gradually merge into indigo, and thence into blue and green. Then, starting from this completed half, we find precisely the same successional order as we observe in decaying leaves, viz., the pale greens, yellows, orange, and reds, which render our autumnal landscapes so brilliant as to defy the palette of the painter to reproduce them. This richness of coloring is a feature which merits full recognition in the choice of trees and climbers especially. A wall covered with Ampelopsis Veitchi, for instance, is intensely beautiful for several weeks before the foliage actually drops, the varying degrees of exposure to sun or frost bringing out the colors irregularly, and thus adding the additional charm of contrast, since all the hues from green to scarlet will be presented in a single coup d'œil.—The Gardeners' Magazine.

Electric Road Carriages.

M. Rechniewski contributes to L'Electricien an account of the vehicle built by M. Jeanteaud, which ran the Paris-Bordeaux race without serious accident. He says that electricity propelled carriages are, nevertheless, yet only in their experimental stage. From the driver's point of view the electric carriage has the most convenient and manageable motor and leaves nothing to be desired on this count. Its most inconvenient feature is that it is necessary to seek a charging station after running a certain course for the purpose of being recharged or of a change of cells, an inconvenience less serious for certain services than for others, as, for instance, when a carriage runs between certain fixed points or stations. The first item to be considered is the distance that can be run on one charge; the second item is the possible running speed. Among the many accumulators tried up to date for road vehicles, those of the Fulmen type have given best results, and the arguments of the article are based on the figures obtained therewith. The batteries used on the Paris-Bordeaux route weighed complete 850 kg. (1,875 lb.), and had 38 elements of C 21 type divided into a dozen boxes of 3 or 4 elements each. Each element had 15 kg. of electrodes and a capacity of 300 ampere hours at the ordinary rate of discharge of 10 hours. At a discharge of 70 amperes, nearly 5 per kilogramme of plates, the capacity of the battery would be still 210 ampere hours. Unfortunately, the mean power at the 10 hours' duration of discharge is fixed a trifle low, and the length of the road between charging stations is thus very important. As the electrical carriage bears its own battery, and this is limited in its storing power, the question of weight and efficiency are of special importance, and it is desirable to reduce weight to a minimum.

The vehicle of M. Jeanteaud at present holds the record for speed and distance among its electrical competitors. It is a plain vehicle with no offensive pretense in the shape of a dummy animal in front; it has two parallel seats, each of two places, and a back to back seat at the rear and provided in front with a circular splash guard carrying a triple bullseye lamp. The accumulators are placed beneath the rear seats. The wheels are of hickory, 1 meter diameter in front and 1·40 meter behind, and they carry respectively 1,200 and 2,000 kilos., or a total of 3,200 kilos., or fully 3 tons.

The front end is supported by two bow springs set transversely one above the other and coupled back and back, so giving the effect of a central support to the body of the carriage and halving the effect of a stone or lump under either wheel, as well as giving a very elastic suspension and easy running. The body of the vehicle is entirely of steel. The axles have bearings of 45 and 55 millimeters at the front and rear; on the day of the race an accident bent the rear axle, which ran hot all the time and compelled stoppages continually for cooling and oiling, and when examined at the journey's end, the axle box was proved to have seized badly, and to this common accident the delay of the electrical carriage was entirely due. There is a brake on the wheel tires actuated by a pedal and another brake worked by wheels at each end of the seat for use in case the driving chain broke upon an incline, the two brakes giving absolute security in the working of the machine.

The mechanical arrangement consists of a shaft carrying differential gear driving the wheels by two chains, the gearing permitting speeds of 12 and 24 kilometers per hour at the ordinary speed of the motor—7½ and 15 miles.

The motor built by the Société Postel Vinay has given excellent results, both on a brake test and over the course of 600 kilometers (375 miles), which it ran without a failure, and so takes a position in advance of anything yet tried. Its efficiency was over 90 per cent when working at a voltage of 70, and nearly 7 horse power with 70 amperes. This is necessary for the traction at the rate of 24 kilometers. The weight of the motor is 225 kilos., and it develops 14 or 15 horse power when surmounting hills without heating or sparking, and it acts as a dynamo or brake in descending hills to the extent of 80 amperes. Though too little to be taken into account, it is enough to secure excellent regulation in descending hills. The intended output of 70 amperes has frequently been doubled, and even 200 have been drawn for an appreciable time without lowering of the voltage. In spite of such enormous outputs, of frequent journeys by rail of some of the batteries returned to Paris to recharge, and sent on again to Bordeaux, of hasty transshipment and frequent operations by unaccustomed hands, and of shaking on the road, these batteries have behaved well and kept their charge. Each battery of 850 kilos. served for a run of 40 to 70 kilometers, according to the nature and profile of the route. Ten minutes served to change them at the stations, and the reconnection is automatic by means of springs and metal plates.

It was only in March, three months before the race, that the construction of the carriage with its motor and battery was commenced, and only one trial was made prior to the race of June 6, and except for the heating of the one axle, no part of the vehicle or of its machinery called for the slightest repair during the run of 600 kilometers, as is proved by its return to the exhibition after the journey.

Messrs. Jeanteaud et Brault aimed less at the prize than at demonstrating that electricity has entered the practical stage in road traction, and we can only regret that the unfortunate accident to the axle should have prevented the vehicle from showing what would surely have been even a much better record. At the same time, the weight of over three tons should be kept in mind as something to be, if possible, reduced, as it is a great bar to the success of accumulator propelled carriages for general work.

A Fiberloid Explosion.

The city of Newburyport, Mass., was startled about 10 A. M., October 23, by the explosion of what are known as the Fiberloid Works, by which many were wounded and several lives were lost. The facts are as follows: Last May the Fiberloid Company started operations as successors to the Lithoid Company for the manufacture of collars and cuffs. Fiberloid, which is merely a trade name, is nearly identical with celluloid, being a hard elastic substance made by subjecting gun cotton or pyroxylin with camphor and other substances to a hydraulic pressure of 4,000 pounds to the square inch. This compound is very inflammable and highly explosive, and a former explosion took place in the same place, only with another company, June 14, 1890. Hence the utmost caution has been observed.

There are eleven buildings in all, employing a hundred hands. One object in having so many small buildings is to limit the results of accidents. The dry house is where the recent catastrophe took place. This is a room where the pyroxylin is dried after being washed to free it from acid. The lot on hand had been washed with especial care. The point of ignition is known to be about 385 deg. Fahr., and a man who was in the dry house four minutes before the explosion noted the temperature as being only 100 deg. Fahr. The man in charge was accustomed to use wooden scoops for shoveling the cotton; and he also wore tennis shoes with rubber soles so as to prevent friction from shoe nails. In short, every known precaution was taken; and yet there was this explosion that killed McManus, the man in charge of the dry room.

William Giles, foreman, had just left the dry room before the explosion occurred, and thus escaped uninjured. He testifies that the temperature had been noticed by him as being only 100 deg. Fahr., whereas the cotton does not ignite below 385 deg.

William H. Poor was in the mixing room; was badly burned, but is expected to recover. His statement is that the explosion in the dry room burst a hole through the wall into the mixing room, where it ignited the nitrated cotton and the alcohol. He thinks McManus was dragging a paper barrel of cotton across the floor and that the friction ignited the cotton dust scattered on the floor. The shock from the explosion was felt all over the city of Newburyport, breaking many windows, throwing down objects from shelves and doing other damage.

Gambier.

The following paragraph is a part of a speech delivered by the Marquis of Ripon, K.G., late secretary of state for the colonies of Great Britain, at the anniversary dinner of the Linnean Society. It is a good thing to be honest enough to acknowledge ignorance, but how a secretary of state for the colonies could have escaped hearing something of gambier is a mystery.

"I had a curious proof the other day of the way in which plants of great value may be but little known to those who do not cultivate science, or are not engaged in those industries in which these plants are employed. I received a deputation from Leeds. Though most of you probably think only of Leeds as an important place for the production of cloth, yet there is a great leather trade in Leeds besides, and this deputation of leading men came to me to do what I could to help to increase the production of gambier. They told me they could not get on without it; that it was absolutely essential to their industry, and that it came shipped to them from Singapore. I believe the largest quantity is not grown in Singapore, but comes from the native states beyond. I am bound to say that until I had received this deputation, I had never heard of gambier. I knew nothing about it."

The interest of this paragraph lies not in the ignorance of the official, but in the information it gives of the growing scarcity of gambier. If that deputation of citizens of Leeds should turn to the United States, they would learn that we have a substance here called canaigre, prepared from the roots of Rumex hymenosepalus, that will sooner or later displace gambier, which is of uncertain origin, uncertain quality and uncertain effect.