Automobile News.

A service of steam motor wagons is now running between London and Tunbridge Wells.

It is said that the cartage bill of Boston in the course of a year is not less than ten million dollars. This shows there is an enormous field for automobiles.

Motor carriages in France are to be taxed according to their power. They put a tax of $1 per horse power in addition to the ordinary tax of four-wheeled carriages.

Arrangements are now being perfected for the automobile road test between New York and Buffalo, which will commence on September 9. The average stages will be from 88 to 90 miles in length. The total distance to Buffalo is 500 miles. Great care is being taken so that the route will include all conditions of roads likely to be met with in a general tour of the State. The regulations are now being framed.

The following prizes were bestowed on the occasion of the Paris-Berlin race: M. Fournier received the prizes given by the German Emperor, the King of the Belgians, the Grand Duke of Luxemburg, and the city of Hanover. Herr Werner received a prize given by President Loubet; M. Giraud the prize given by the Grand Duke of Mecklenburg, and M. Renault the prize given by M. Millerand, the French Minister of Commerce.

In future races the Automobile Club of France will require that cars, when fully equipped, shall weigh only about two thousand pounds. Modern racing cars weigh a ton and a half and over. The policy of builders of racing cars has been encouraged by the absence of any weight limit in races. If the new regulations are enforced, it may result in a revolution in automobile-building, but a worthy revolution, as the latest types of racing cars have been fully developed enough for all practical purposes.

Mr. S. F. Edge, who was the only English competitor in the Paris-Berlin motor race, experienced a curious accident which rendered him *hors de combat*. He was driving a 70 horse power Napier car. The vehicle traveled splendidly, and prior to his first puncture he drew up from twenty-fifth position, at which he started, to ninth in the first 50 miles. His tires then punctured no less than seven times. The final accident that caused his retirement was while passing another competitor. He could not see his way, owing to an enormous cloud of dust, and while traveling at about 70 miles an hour he struck the arched curve of the road over a small bridge. The car leapt into the air and bounced down upon the ground again like an India rubber ball with terrific force. The back carriage spring broke under the impact, and as its replacement would have occupied two days, Mr. Edge withdrew from the race.

New Element: Europium.

BY OUR PARIS CORRESPONDENT.

M. Demarçay, in the course of his spectrum analysis work, claims to have discovered a new element, to which he proposes to give the name of *europium*. In the account which he has lately presented to the Académie des Sciences, M. Demarçay brings out the following points. Sir Wm. Crookes, while pursuing his vacuum tube researches, observed in 1885 a band which he attributed to samarium and which on account of its disappearance in the presence of lime, and other peculiarities, he called the *anomalous ray*. Later on he distinguished it, together with a great number of other bands, each of which appeared to characterize a special meta-element. He called S δ the hypothetical meta-element which corresponded to the *anomalous ray*. In 1892 De Boisbaudran described a series of three brilliant blue lines, which he discovered in the spectrum of the samarium spark. These lines could be brought out more strongly by a fractional treatment of the material and he concluded that they were due to a special element, which he called Z ζ. In 1896 M. Demarçay announced the presence of an element intermediate between gadolinium and samarium, which was characterized by several strong violet and ultra-violet rays. He also showed that the new element was identical with that of De Boisbaudran, and no doubt accounted for the anomalous band of Crookes, as well as other rays not yet described. At that period M. Demarçay could not obtain enough of the material to make further experiments, but at present he has accumulated a larger quantity of it by a fractional treatment of nitrate of magnesium, and finds that its characteristics, namely, line and absorption spectra, electric fluorescence of the sulphate in vacuo, etc., accompany it constantly and are proportional, thus evidently belonging to one and the same element. The purity of the few grammes of the new oxide obtained was sufficiently great to exclude all the samarium rays, and only the stronger gadolinium rays were visible in the electric spectrum. If the product was added in traces to sulphate of calcium, it gave a brilliant spectrum of fluorescence in which the *anomalous ray* predominated. This spectrum includes three principal bands, $\lambda = 609$, very strong; $\lambda = 576$, considerable and wide; $\lambda = 593$, strong and very wide (the figures are approximate). The degree of calcination of the sulphate caused variations in the bands; the strongest seems to change to a double ray when the calcination is strong. The author proposes the name *europium* for the new element, with the symbol eu = 151 (about). He then gives a list of forty of the principal rays of its spectrum comprised between $\lambda = 500$ and $\lambda = 350$; the strongest of these are as follows: $\lambda = 4{,}662.6$; 4,627.8; 4,594.5; 4,435.8; 4,205.4; 4,130.0; 3,972.0; 3,930.7; 3,819.5, etc.

In this spectrum the samarium rays were entirely absent and the strongest gadolinium rays were scarcely visible. Besides the rays given, which no doubt belong to *europium*, a great number of feeble rays are seen, which may belong to this element or perhaps to an unknown element even more rare; this the author proposes to study later.

A NEW KIND OF WATER-TANK.

To provide a construction which will prevent leakage and bruising and warping of the wood of water-tanks and which will keep the water in the tank cool and clean is the purpose of an invention patented by Dr. Edwin F. Evans, of Fredericksburg, Tex.

The tank has an outer wall and an inner wall spaced apart to form an annular chamber, into which a water-inlet extends. Apertured segmental rings serve to space the outer wall from the inner wall and are received in grooves in the opposing faces of the walls. As shown in our illustration the tank is provided with four such segmental rings at different levels.

At the bottom of the chamber a series of vertical segmental blocks are located, which are chamfered at their lower periphery. Vertical perforations in these

A WATER-JACKETED TANK.

blocks place the bottom chamber thus formed in communication with the chamber formed by the side walls. Bolts provided with washers hold the blocks in place. An outlet cock allows water to be drawn from the chamber between the side walls.

Water flowing into the chamber between the side walls rises in the chamber and finally flows over the inner wall and into the tank. The inner and outer walls will, therefore, always be kept moist, so that leakage, shrinkage, and moving of the hoops is avoided. The main body of water is protected and kept cool by the outer jacket of water. The water in the chamfered blocks on the bottom of the tank keeps the bottom joint in good condition.

Owing to the widespread popularity with which the Central London Electric Railway is regarded, and in order to cope with the exigencies of the passenger traffic, the railroad authorities propose to carry out several improvements which will enable them to run their trains at faster intervals than is possible at present. The service now is a train every 2¾ minutes. The service, under existing conditions, cannot be accelerated, owing to the time that is lost in shunting the trains at either end of the railroad. The latest proposition to overcome this difficulty is to construct a large loop at each terminus, so that the trains will simply run round from the up platform to the down platform. At the city end the loop will be a large one, so that a station may be provided at Liverpool Street, one of the busiest trunk railroad termini in the city. By this means the service will be accelerated to a train every minute and a half. It is also proposed to try some geared motors with a view to overcoming the vibration, over which such an outcry has been raised. It is thus anticipated that the locomotives, being fitted with springs, will break the force of the impact upon the rails and the earth, and also insure comparative silence in running.

Engineering Notes.

Gas is about to be made in Canada from peat fuel.

In some trials of steam pumps in England recently the efficiency is asserted to have been from 95 to 99.8 per cent, the pump cylinder being taken as full in the estimate.

At the Germania yards at Kiel, one of the establishments of the Krupps, hereafter all ships will be constructed in large covered slips. The idea of building ships under cover is not new, having been practised in England for a long time.

A Chicago boy recently went around the world in competition with a boy from New York and one from San Francisco to see which one could make the journey around the world in record time. As was almost to be expected, the wideawake young man from the Middle West, whose name is Charles Cecil Fitzmorris, was the winner. He made the globe-encircling journey in sixty days, thirteen hours, twenty-nine minutes and forty-two and four-fifths seconds, thus beating the best previous record by many days.

A set of triple expansion engines of 1,400 horse power recently erected in an English electric lighting station have shown remarkable results as regards economy, the weight of steam used per horse power per hour being but little over 10 pounds. Steam at 200 pounds per square inch is used and superheated 100 degrees Fahr.; the valve gear is of the Corliss type, and no variation in speed over two per cent is allowed; from full load to no load speed must not exceed five per cent variation. This last is not very difficult of attainment, many American engines running much closer than these limits.

The influence of improved appliances in marine engineering has been very marked in the past fifty years, for where in 1854 it required 7.69 men per 100 tons of shipping, in 1900 it required less than 3½ men. The economy resulting from inventions follows in all lines of operation, particularly in fuel, which has fallen from 5 pounds of coal per horse power per hour to under 1½ pounds, with a corresponding increase in the speed, so that, with the reduction in space required for coal, much more cargo can be carried. Where it cost nearly four cents to carry a ton of grain one mile on sea, it can now be delivered for about one-fiftieth part of that sum.

Owing to the remarkable increase in the importation of petroleum into Europe, via Antwerp, extensive alterations are contemplated at that port in order to cope with the exigencies of the augmented traffic. It is intended to construct a series of new docks equivalent in length to 2,000 yards, together with necessary wharves and buildings. This increased accommodation is to be situated to the south of the city, and as sufficient dwellings are to be erected there to house the employes working at the new docks, the nucleus of another town will thus be formed. It is anticipated that Antwerp will then become the general depot for petroleum for the whole of Europe. The fulfilment of the scheme will involve the expenditure of several million dollars, and this is to be voted annually in installments by the Municipal Council.

The water-tube versus fire-tube boiler for vessels of war still occupies a great deal of attention abroad, and two vessels in the English navy, the "Hyacinth" and the "Minerva," have been, and are being, tested to settle certain moot points; the experiments can, at the best, prove conclusive only as to the particular voyage undertaken, the action of the two types for long periods and under all conditions being the only verdict of practical value. It is undeniable that both types have special features of merit, and it remains to be shown what can be dispensed with and what is essential. Economy in the use of fuel is perhaps the least consideration as compared with immediate availability in steaming at full power, and reliability as concerns continuous action; no one type possesses all of these features, and long experience of all the service required is needed in selection of boilers for certain classes of vessels.

During the progress of the construction of the reservoirs for the enlargement of the London water supply, a splendid specimen of an ancient ship has been discovered in the bed of the old River Lea, the course of which has been diverted in order to permit the excavations. The vessel was found at a depth of seven feet below the surface. It is about 50 feet long and is constructed of oak throughout, with the exception of the keel, which is of elm. The ribs of the boat are secured to the sides by trenails, while the timbers are secured with crude and primitive, though well-made iron nails. The floorboards are also fastened together with nails and the calking is done with felt. Many antiquarians, who have examined the relic, think that it constituted a part of the fleet with which King Alfred the Great fought against the Danes. Another curious dugout boat, estimated to be about 2,500 years old, was also unearthed and is to be deposited in the British Museum.