

THE BERLIN INDUSTRIAL EXHIBITION.

The Berlin Industrial Exhibition was opened by Emperor William on May 1, and, though the exhibition is a meritorious one, its success has not been remarkable. The exhibition is intended to commemorate the twenty-fifth anniversary of Berlin as the national capital of the German empire. The national authorities co-operated

grounds and buildings, and we now give illustrations of two of the more monumental features of the fair—the industrial building and the main restaurant and water tower.

The main building covers a space of 570,280 square feet, and houses a large part of the exhibits. The dome is covered with aluminum, and, as regards the

Curiosities of the Tooth Brush.

In the Dental Practitioner Dr. Parmele notes that in some old books published during 1600, directions are given for preparing certain roots that are used to clean the teeth, lucerne and licorice roots being specified. These roots are directed to be boiled and cut into pieces six inches long, the ends of each being split with a pen-



BERLIN INDUSTRIAL EXHIBITION—MAIN INDUSTRIAL BUILDING.

with the municipal authorities to make an industrial exhibition which should present a complete picture of the achievements of the industries and arts of Berlin and to show their importance in relation to the national life of Germany. From what has just been said it will be seen that the exhibition is not on an international scale. As the exhibition will remain open until October 15, it is to be hoped that the exhibition will draw a larger crowd of visitors than it has done heretofore. The exhibition grounds in Treptow Park have a greater

architecture, it might be said that it looks very much like some of our Florida hotels. The Berliners are very fond of hotel and cafe life; so it is little wonder that the restaurants came in for a liberal share of attention in laying out the Exhibition.

The second illustration shows the main restaurant, which is situated at the opposite end of the lagoon from the main building. It consists of a large building, masked by the ornamental semicircular loggia and the water tower, which is treated with great felicity. On

knife into the form of a little brush, after which the pieces are slowly dried to prevent splitting. In use, one end is moistened with water, dipped into tooth powder, and rubbed against the teeth until they look white. Brushes similar to these are said to be used at present in some parts of Turkey, but many Turks use ordinary European tooth brushes, though as even the most lax among them look upon the pig and all belonging to it as vile and unclean, they would as soon think of eating a pork chop or a rasher of bacon as of



BERLIN INDUSTRIAL EXHIBITION—MAIN RESTAURANT AND WATER TOWER.

area than those of most international exhibitions, and offer great advantages by their close proximity to the city and their picturesque beauty, which has been enhanced by successful landscape gardening. In our issue for May 9, 1896, we presented a bird's eye view of the

the whole, the group of buildings is admirable, and is peculiarly adapted for use to close in the end of the lagoon. For our engravings we are indebted to the Oesterreichische Monatschrift für den öffentlichen Baudienst.

defiling their mouths with a Russian bristle brush. "The shopkeepers, therefore, swear by their heads and the souls of their fathers and mothers that the hair of which their brushes are made grew on the back of the camel, the cow, or the horse."

The Providence Motorcycle Race.

The most unique feature of the seventy-sixth annual Providence State Fair was undoubtedly the series of horseless carriage races. This is the third contest of motorcycles held in America, the first one taking place in Chicago, in a storm of snow and sleet. The Cosmopolitan race on Decoration Day, from New York to Irvington, can hardly be considered of much value, as only two makes of motorcycles went over the course. Both of these were road races; as a matter of fact, neither of the races was productive of fast or even moderate time. The State Fair management realized the importance of giving inventors an opportunity to show what speed results can be obtained.

Until within a week or so of the date of the first race the entries came in so slowly that it was feared the contest would have to be abandoned, but almost at the last moment six or seven entries were made, which brought the total number up to twelve. Seven machines started in the race on September 7. The race itself consisted of five laps, five miles each, one lap to be raced each afternoon of the fair week.

One of the conditions of the contest was that the carriages should not run at a slower speed than fifteen miles an hour, which the managers deemed a conservative figure, in view of the many statements of the manufacturers that their motorcycles were capable of making from 25 to 40 miles an hour. Of the seven starters, four of them ran within the limit of the conditions, that is, they made the five miles inside of twenty minutes. The winner of the first lap was an electric motor carriage, manufactured by the Riker Electric Motor Company, of Brooklyn. This carriage covered the distance in 15'01 $\frac{3}{4}$, single miles averaging a fraction over three minutes. The crowd which witnessed the race was very enthusiastic, and it was a strange sight to see the so-called "vehicle of the future" taking the place of horses on the race track. The electric carriages made a particularly fine showing. The Duryea carriages have already been described in the columns of the SCIENTIFIC AMERICAN.

Prof. Pickering, of Harvard, officiated as chairman of the judges. He was assisted by Prof. Alonzo Williams, D. M. Thompson, president of the Corliss Steam Engine Company, and ex-Governor D. Russell Brown.

The result of the first lap of five miles and the time made by the several machines follows:

First—Riker Electric Motor Company; driver, A. H. Whiting. Time, 15'01 $\frac{3}{4}$.

Second—Electric Carriage and Wagon Company; driver, H. G. Morris. Time, 15'13 $\frac{1}{2}$.

Third—Duryea Motor Company; driver, William McCall. Time, 18'47 $\frac{1}{2}$.

Fourth—Duryea, owned by G. W. Hewitt, of Springfield; driver, J. J. Rynne. Time, 19'31 $\frac{1}{2}$.

Fifth—Duryea, owned by Fiske Warren, Boston; driver, E. B. Mekins. Time, 20'03 $\frac{1}{2}$.

Sixth—Duryea, owned by J. Frank Duryea; driver, Mr. Duryea. Time, 20'59.

Seventh—Duryea, owned by J. Frank Duryea; driver, Warren Root. Time, 21'23 $\frac{1}{2}$.

The fastest heat was made by Riker's machine; time, 2'47 $\frac{1}{2}$.

The horseless carriage race of September 8 was more closely contested than that of the preceding day, when Riker and the Electric Motor Company had it all to themselves.

The time was as follows:

Riker Electric Motor Company, New York, 13:6; Duryea Motor Wagon Company, Springfield, Mass., 13:14; Electric Motor Wagon and Carriage Company, Philadelphia, 13:33; George Henry Hewitt, Springfield, Mass., 16:12; William M. Ashley & Son, Springfield, Mass., 16:31; J. Frank Duryea, Springfield, Mass., 17:52; George H. Morrill, Boston, Mass., 18:19; Fiske, Warren & Co., Boston, ran only four miles.

Recent Archaeological News.

At Austerfield, near Bowtry, in Yorkshire, one of the two villages from which the Pilgrim fathers come, a row of Norman arches have been discovered in perfect preservation, but built upon the wall of the village church. The church is small, the chancel being but twelve feet wide and the rest of the church eighteen feet. It has a splendid Norman doorway and an ancient font.

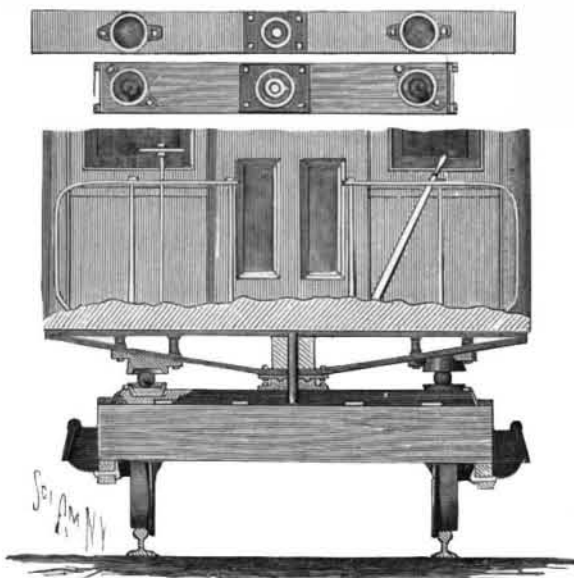
Mr. Sayce tells, in the Academy, of the discovery by him of an inscription coeval with Cheops, the builder of the Pyramid of Gizeh. The locality was the island of Elephantine. The inscription was made on a boulder, and records a visit of "Assuan to Khufu-ankh." In the Cairo Museum there is a granite sarcophagus of this king. There is nothing bearing on the pyramid. What is of moment in this discovery is this, that a monument of the Fourth Dynasty should be found so far south. The date of the inscription must be so ancient that it was made before the wall was built around the city of Elephantine. While working on the island of Philae, Capt. Lyons has found many Roman remains, some as late as the Byzantine period.

Is it known generally that works of art were well paid for in ancient times? A German review furnished recently some particulars about that question. Poly-

gonotus, of Thasos, who lived about 450 B. C., refused, it is true, any payment for his works, and declared that he was sufficiently rewarded with the title of "citizen of Athens," which had been conferred on him. But such disinterestedness was seldom imitated. Thirty years later the painter Zeuxis, of Heracleum, was called to the court of Archelaus I, King of Macedonia. He received for his frescoes in the Palace of Pella 400 "minas," about \$8,000. Mnasoo, of Elatha, paid \$20,000 for a "Battle with the Persians," which he had ordered from Aristides, the leader of the Thebans school. Pamphilus, of Sycione, gave a course of lectures on painting; each pupil paid for attendance one "talent," or \$1,200 a year. Appelles received twenty gold "talents," about \$24,000, for a portrait of Alexander I, ordered by the city of Ephesus.

A NOVEL BALL BEARING FOR CAR TRUCKS.

The illustration represents a durable, practical, and sensitive car truck bearing, designed to relieve the springs of lateral motion, and to a great degree do away with the grinding of the wheels on curves, thereby saving both rails and wheels. The improvement has been patented by William J. O'Byrne, Pontiosuc, Ill. The car has at each end a king bolt or vertical pivot connecting the body bolster to the swing beam of the truck, and, instead of the ordinary side bearings, providing for a slight oscillation of the body bolster, the invention provides the improved bearing shown in position on a car in the large view. The small figures show an underneath view of the body bolster and a plan view of the swing beam of the truck, with the lower bearings applied, the plates being recessed or cup shaped on their adjacent faces to form small oscillating tables with a circular retaining marginal flange, inside which a comparatively large metal ball is free to roll in all directions. A sensitive bearing is thus formed between the body bolster and swing

**O'BYRNE'S CAR TRUCK BEARING.**

beam at each end, allowing the trucks to readily adjust and readjust themselves in all directions. The ball is preferably about three and a half inches in diameter, and is not retained to any special curve, as is the case with the ordinary ball bearing, but moves progressively over the table surfaces as it rotates about its center, doing away with oil and waste, and moving sensitively without any sliding friction.

The Genesee Dam Project.

The Mount Morris storage dam project is about to take a new form. The survey undertaken by State Engineer Adams and George W. Rafter, of Rochester, N. Y., under the appropriation of the last Legislature, has resulted in the discovery of serious obstacles to that project, such as insecure foundations for the dam and the vast superiority of a dam at Portage. While the former would give a fall to Rochester of 50 or 60 feet, the latter would give a fall of 330 feet, thus affording a water power of immense value to the industries of Rochester and intermediate points. The new plan would cost much more than the Mount Morris dam, as it involves the submergence of six villages and a large amount of valuable farming land; but it is pointed out that the opposition on this account would probably be overcome to a large degree by the advocates of the construction of similar State dams on the Hudson, Black, Chemung, and Mohawk Rivers.

The Largest Merchant Steamer.

The Hamburg-American Steamship Company's new twin-screw steamer Pennsylvania was launched at the Harland & Wolff shipyard at Belfast, Ireland, September 10. The new vessel is the largest merchant steamer afloat, being of 20,000 tons carrying capacity. She is 558 feet long, 62 feet beam, and 42 feet deep. The Pennsylvania is designed to make an average speed of 14 knots an hour and will also carry a limited number of passengers, 200 first cabin, 250 second cabin, and 1,000 steerage.

Science Notes.

The poisonous nature of acetylene gas suggested to M. Chuard the possibility of employing calcium carbide as an insecticide. He proposes to try mixing carbide with earth, so that under the influence of moisture acetylene would be given off slowly at the roots of plants, thus preserving them from attack. It is proposed to try this against the phylloxera. At the present price of calcium carbide, however, it would be entirely impossible to use it as an insecticide.

In the course of legal analyses, where it became necessary to examine carefully very small quantities of stearin and other candle material upon pieces of clothing, and where the quantity of material was so small that the use of capillary tubes was impossible, Van Ledden-Hulsebosch (Pharm. Weekblad) devised the following method: He laid small pieces of the cloth on which the fat was detected in a small aluminum capsule, and floated this upon water in a large beaker. He then heated this water bath very carefully, and suspended in it a thermometer so adjusted that only the upper portion of the water affected the thermometer. Slowly raising the temperature, he kept a close watch on the thermometer and upon the grease under examination, and was thus enabled to determine with considerable accuracy both its melting and congealing points.

The French journal Les Sciences Populaires has recently published some interesting researches on the diurnal variation of rain at Paris. M. Angot shows from the record of the Bureau Central Meteorologique that dividing the day into eight parts of three hours each, the summer rain fall of the last five years has been heaviest between three P. M. and six P. M. and the lightest falls occur between nine A. M. and noon. In winter the probability of rain or snow is greatest in the morning hours, and reaches a maximum between six A. M. and nine A. M., but in summer, however, the maximum fall of rain, as regards quantity, occurs in the afternoon between the hours of three and six o'clock. It is usually stated that rainfall is most frequent and heavy in the hours between noon and midnight, but the figures of M. Angot prove that this is true only in summer.

Not infrequently the pursuit of microbe and germ theories leads people to absurd conclusions. In the Annales de Micrographie, M. Miquel gives statistics for ten years of the numbers of bacteria in a cubic meter of air, both in the center of Paris and in the park of Montsouris. In consequence of local improvements, the air in the park has gradually become purer, the number of bacteria having decreased from 480 per cubic meter in 1884 to 275 in 1893; but the air in Paris itself has increased in micro-organisms from 3,480 in 1884 to 6,040 in 1893. This large increase, Nature says, M. Miquel attributes to the greater cleanliness of the inhabitants, who, by dusting out and cleaning their houses and shaking carpets, etc., stir a large quantity of germs into the air. He even goes so far as to condemn this form of cleanliness, on the ground that the germs are simply blown about by the wind, and find their way into the houses again, so that if you do not get your own germs back, those from your neighbors fly in at the window instead.

M. Moissan has found that when acetylene is allowed to impinge upon pyrophoric iron, which has been reduced by hydrogen at the lowest possible temperature, the gas is decomposed with incandescence into its constituents. At the same time condensation takes place, and a liquid hydrocarbon, rich in benzene, is produced. The same result is obtained if pyrophoric nickel, or cobalt, is substituted for the iron. No gaseous compound of either metal is obtained, and he concludes that the decomposition is due to physical causes.

Sir John Lubbock, the naturalist, has been experimenting to find out how long the common ant would live if kept out of harm's way. On August 8, 1888, an ant which had been thus kept and tenderly cared for, died at the age of fifteen years, which is the greatest age any species of insect has yet been known to attain. Another individual of the same species of ant (Formica fusca) lived to the advanced age of thirteen years, and the queen of another kind (Lasius niger) laid fertile eggs after she had passed the age of nine years.

In connection with his geological and cosmological investigations, Prof. Clarence King has constructed a series of temperature gradients, as they are termed; that is, tables with diagrammatic representations of temperature and pressure from the surface to the center of the earth. He finds that, while there is really a very slight change of temperature from the surface to the center below a certain superficial depth, the pressure augments with one downward sweep to the center; thus it passes 1,741 degrees at 175,000 atmospheres, thence steadily augmenting until at the center it reaches over 3,000,000 atmospheres pressure; it appears, therefore, that the empire of heat over pressure is confined only to the superficial layer of the earth, that of pressure over heat being not far below the surface and increasing steadily downward to the center. The temperature of the earth, as a globe, according to Prof. King's investigations, never exceeded 2,000 degrees Cent., and the central portions are made up of very dense substances, such as metals and their compounds.