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SCIENTIFIC AMERICAN SUPPLEMENT

No. 1033.

For the Week Ending October 19, 1895.

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THE PARIS EXHIBITION OF 1900.

The magnitude of the labor involved in the preparation for a first-class international exhibition may be judged from the fact that already the French people are actively engaged in the preliminary work of organization, although the opening day of their great enterprise is nearly five years distant. It is estimated that the preparation of the grounds, erection of buildings and general maintenance of this exhibition will absorb a round sum of $20,000,000.

How to raise this vast sum is a serious problem, and this is how the directors propose to do it: The Ville de Paris has granted a subvention of $4,000,000. A like sum will probably be obtained in the form of a state subvention, which two sums together will amount to two-fifths of the required amount.

For the remaining $12,000,000 an appeal will be made to the public, and bonds will be offered on some such conditions as attached to the issue of bonds in connection with the Exposition of 1889. In the present instance the exhibition bonds will have a face value of $5, and to each bond will be attached twenty admission coupons.

Each bond, moreover, will entitle the holder to certain lottery privileges, and it will guarantee him a reduction in railroad fare between his place of residence and the Exhibition grounds. This privilege will be graduated according to the distance at which the bond holder may reside from Paris.

From a distance of 200 kilometers from Paris he will be entitled to three special trips; from 200 to 400 kilometers he can claim two such trips; and if he reside more than 400 kilometers away, he will be entitled to one special trip.

To meet the case of those who live in Paris, the bond holder will be given a reduced rate on the admission fee to what are known as the "side shows" and to the theaters and concerts.

It does not seem at first glance as though these incidental and rather questionable benefits would have a very laxative effect on the congested savings of the thrifty Gaul. The response may be slow at first; though it is certain that when it is seen that the success of the Exhibition and the prestige of France is at stake, the French people will respond with that patriotic generosity for which, among the nations of the earth, they stand pre-eminent.

THE ECONOMY OF HYDRAULIC POWER SUPPLY.

In the course of a paper read at the recent summer meeting of the Institution of Mechanical Engineers, at Glasgow, the author, Mr. E. B. Ellington, gave some very significant figures regarding the cost of running the London Hydraulic Power Supply. This is by far the largest municipal supply in the country. It includes 75 miles of mains, carrying a pressure of 750 pounds to the square inch, which deliver 9,500,000 gallons of water at this pressure per week. This serves to operate 2,300 machines. This plant has now been in operation for twelve years, and it yields an annual revenue of $250,000.

In active competition with this scheme is the Westminster Electric Supply Corporation, and a comparative table, drawn up from the records of the running expenses of these two systems, shows a remarkable economy in favor of the hydraulic plant. It appears that the cost of the hydraulic power was 10·34 cents per 1,000 gallons at 750 pounds to the square inch; whereas the cost of an equal amount of electric power measured by the same standard was 18·03 cents per 1,000 gallons.

This economy of the hydraulic system was indorsed by Mr. R. C. Parsons, the engineer who had planned the hydraulic power supply for the drainage of the city of Buenos Ayres; a scheme that cost altogether $30,000,000. The use of electric and of pneumatic power was carefully considered in the preliminary estimates. The electric system was rejected, on the ground that they would have to reduce the speed in order to work the pumps; and, as compact machinery was a necessity, it was seen that in this respect the hydraulic system was greatly superior. It was proved that the compressed air system gave a very low efficiency; and furthermore, owing to the fact that the various lifts, in pumping the drainage, were not of the same height, it was necessary for efficiency that they should have varying pressures. This was not obtainable under the compressed air system. The hydraulic plant, as put in, consists of several small automatic pumping stations supplied from a central station.

As in part explaining the large difference in cost between these two systems of supply, it was suggested that a part of it might be due to the fact that the electric supply station was situated at a distance from the river, and the expense of cartage increased the cost of coal some ten per cent. Another loss of possibly 10 per cent was due to the fact that a large part of the engine power at the electric station was non-condensing. Another source of loss lay in the fact that though they frequently were running with only 55 to 70 per cent of their full load, the speed of the engines was not reduced. At the hydraulic station the speed could be regulated according to the work to be done.

A large part of the difference was due to the difference in "wages and salaries." In the hydraulic installation this item amounted to $43,135 and in the electric to $74,465. This wide difference is probably due to the fact that the electric machinery requires a more skilled class of mechanics than the hydraulic for its operation and maintenance.

After making the above allowances, there yet remains a large amount of leakage that is unexplained.

It should be mentioned that in the table of comparison of these two systems the boiler installations showed a remarkable efficiency, burning only 2 pounds of coal per horse power per hour.

The facts brought out in Mr. Ellington's paper make out an excellent case for hydraulic power supply at high pressures. The installation recently opened in Glasgow, to which we referred in a recent issue, has not been long enough in operation for any accurate estimate of its revenue earning capacity to be made; but the London hydraulic company last year paid the handsome dividend of 6½ per cent.

THE CHICAGO TIMES-HERALD MOTOCYCLE CONTEST.

Less than four months ago the enterprising proprietors of the Chicago Times-Herald newspaper announced that a contest of automobile conveyances, or motocycles, would take place on November 2, and that they would give $5,000 in prizes to the winners of the race.

The only thing which now menaces the success of the contest is the large number of contestants, for though it is expected that a considerable number of those who have entered will fail to put in an appearance on November 2, still the number of contestants will probably be quite large.

The course to be traveled is from Chicago to Waukegan and return. The official route has been announced and comprises almost exactly 100 miles of the best roadway in the West. There are some stretches of ordinary country road, but any practical motocycle will have no trouble in making good time for the entire distance. Signboards will be placed at the intersection of the various roads for the guidance of those who wish to familiarize themselves with the route in advance of the day of the contest. An officer of the contest will be placed at all points where a turn is made, to direct the carriages.

The official list of the contestants who have made entries for the race is as follows:

Arnold, B. J., 1541 Marquette Building, Chicago.
Andrews, A. B., Center Point, Iowa.
Ames, D. J., Owatonna, Minn.
Ames, A. C., 8630 Essex Avenue, South Chicago.
Bradley, Wheeler & Co., Kansas City, Mo.
Bowman, E. Wirt, Evanston, Ill. Mr. Bowman intends to enter four types of vehicles.
Barrows, C. H., Willimantic, Connecticut. Mr. Barrows enters two vehicles.
Barcus, N., 550 East Tawes Street, Columbus, Ohio.
Brown, W. H., Postoffice Box 108, Cleveland, Ohio.
Beck, C. W., 2572 Lakewood Avenue, Chicago.
Chicago Fireproof Covering Co. H. C. Todd, 48 Franklin Street, Chicago.
Chicago Carriage Motor Company. C. O. Hansen, 342 Center Street, Chicago.
Cook & Gowdey, 6324 Madison Avenue, Chicago.
Conklin, Oliver F., Dayton, Ohio.
Carpenter, H. H., 1037 Monadnock Building, Chicago.
Cross, E. D., M.D., 8149 Indiana Avenue, Chicago.
Cronholm & Stenwall. 319 Le Moyne Street, Chicago.
Clapp, Henry W., Sheridan Avenue, Springfield, Mass.
Davis Gasoline Engine Company, Waterloo, Iowa.
Daley, M. H., Charles City, Iowa.
De Freet, Thomas M., Adjutant-General's office, Indianapolis.
Duryea, Charles E., Springfield, Mass., or Peoria, Ill. Mr. Duryea will enter two and possibly three vehicles.
De la Vergne Refrigerating Machine Company, George Richmond. Foot of East 138th Street, New York. This firm enters four machines.
Elrick, George, 904 Irving Street, Joliet.
Elston, R. W., Charlevoix, Mich.
Feerrar, J. C. W., Lock Haven, Pa.
Gawley, T. R., Aurora, Neb.
Guilford, R. W., Auburn, Ind.
Hildebrand, J. A., 308 State Street, Chicago.
Hartley Power Supply Company, 21 Monadnock Building, Chicago.
Hertel, Max, 454 Lincoln Avenue, Chicago.
Hill & Cummings, 232 South Clinton Street, Chicago.
Hall, John W. & Sons, per Harry Lee, Jacksonville, Ill.
Haynes & Apperson—Indiana Natural Gas Company, 23 Buckeye Street, Kokomo, Ind.
Hagaman, J. D., 52 Riverside Avenue, Adrian, Mich.
Holmes, Lyman S., Gloversville, N. Y.
Haviland, Frank W., 210 West 123d Street, N. Y.
Holton, Milton E., 375 Drayton Street, Chicago.
Kappe, W. J. H., Quincy, Ill.
Lewis, George W., 32 Willis Court, Chicago.

Lasher, R. E., 2732 South Third Street, St. Louis, Mo.
Leppo Brothers, Belleville, Ohio.
Laporte Carriage Company, Laporte, Ind.
Lowery, V. L. D., Eaton, Ill.
M'Donald, P. E., and Brennan, W. F., Kedzie Avenue and Thirty-fifth Street, Chicago.
Macleod, Walter, 137 East Seventy-third Street, New York.
Moelin, J. U., 1810 Fond du Lac Avenue, Milwaukee.
Meredith, Edwin, Batavia, Ill.
Mills, M. B., 125 LaSalle Street, Chicago.
Morris & Salvin, 926 Drexel Building, Philadelphia. This firm enters two electric motocycles.
M'Arthur, A. W., Rockford, Ill.
Mueller, H., Decatur, Ill.
Mills & Searls, Chicago.
Maguire Power Generating Co., the, 709 Masonic Temple, Chicago.
Norton, Fred G., 436 Julian Street, Waukegan, Ill.
Praul, John E., 262 North Broad Street, Philadelphia.
Pierce Engine Company, Racine, Wis.
Parks, W. J. (Ellingen & Parks), La Salle, Ill.
Paterson, William, 302 South Morgan Street, Chicago.
Pierce-Crouch Engine Company, New Brighton, Pa.
Pierce, W. A., Sistersville, W. Va.
Roberts, S. W., 80 Dearborn Street, Chicago.
Riel Import Co. (Benz Motor), 51 Dearborn Street, Chicago. This firm enters two motocycles.
Reid, C. G. (Columbia Perambulator Co.), 98 Market Street, Chicago.
Robertson, G. W., Mount Vernon, Ind.
Radford, W. J., 50 Union Street, Oshkosh, Wis.
Strong & Gibbons, 181 West Madison Street, Chicago.
Smith, Ira D., 6004 Ellsworth Avenue, Pittsburg, Pa.
Stone & Maynard. Avonia, Pa.
Smith, Otis E., Hartford, Conn., box 38.
Shaver, Joseph, Walnut and Nineteenth Streets, Milwaukee.
Sturges Electric Motocycle, 1137 Marquette Building, Chicago.
Schoening, C. J., Oak Park, Ill.
Sintz Gas Engine Co., Grand Rapids, Mich.
Schindler, A. J., 441 West Twenty-first Street, Chicago.
Teepleton, John, 1616 Masonic Temple, Chicago.
Thomas Kane Co., 137 Wabash Avenue, Chicago. This firm enters six motocycles.
Taylor, Elwood E., Fitchburg, Mass.
Vanall, Frank, 1631 Gurney Street, Vincennes, Ind.
Verret, U. J., 313 Cherry Street, Pine Bluff, Ark.
Woolverton, G. C., 327 Washington Street, Buffalo, N. Y.
Wayne Sulkeyette and Road Cart Co., Decatur, Ill.
Wilkins, Vernon H., 2249 Ridge Avenue, Evanston, Ill.

For the benefit of those who have entered in the race and those who have not closely followed the details of this great contest, the original offer made by the Times-Herald is reprinted, with the rules as they will stand until announced more in detail by the judges, who will be named in a short time.

With a desire to promote, encourage, and stimulate the invention, development, perfection and general adoption of motor vehicles or motocycles, the Times-Herald offers the following prizes, amounting to $5,000, divided as stated:

First prize—$2,000 and a gold medal, the same being open to competition to the world.

Second prize—$1,500, with a stipulation that in the event the first prize is awarded to a vehicle of foreign invention or manufacture, this prize shall go to the most successful American competitor.

Third prize—$1,000.

Fourth prize—$500.

The third and fourth prizes are open to all competitors, foreign and American.

It must not be supposed that in this contest the question of speed is the only requisite to be considered. It would be possible for an ingenious mechanic to construct a machine with which he could easily outstrip all others in this contest, and yet that device would be of no utility and the outcome of no value to the world from a practical point of view.

It is the earnest desire of this paper that this contest shall add to the sum of our mechanical knowledge in this, the new branch of the science of transportation. In this spirit the following rules are laid down for the guidance of all who may desire to enter into the competition.

1. The date of the contest will be on Saturday, November 2, 1895. The judges may postpone the contest if in their judgment the state of the weather or the condition of the roads will not permit a fair trial.

COURSE OF THE CONTEST.

2. The contestants will start at the junction of Midway Plaisance and Jackson Park, and at the signal from the judges will take up the following course: West on Midway Plaisance to Washington Park; northwest through Washington Park past the refectory to Garfield boulevard or Fifty-fifth street; west on Garfield boulevard to Western avenue, which is also a boulevard; north on Western avenue boulevard to Thirty-fourth street, at which point the boulevard is left and a short turn is made to the west, and the route continues north on Western avenue proper to Twenty-sixth street, thence west to the boulevard; north and west on the boulevard to California avenue; north on California avenue to Ogden avenue and Douglas Park; northwest through Douglas Park to the Fourteenth street boulevard, which turns and leads north to Garfield Park; through Garfield and Humboldt Parks by the connecting boulevards to the intersection of Humboldt boulevard and Milwaukee avenue; northwest on Milwaukee avenue to Jefferson Park, and thence north west and north on the Chicago and Milwaukee gravel road, which is a continuation of Milwaukee avenue, through Niles, Wheeling, Half Day and Libertyville to Gurnee, where the route turns directly east on Grand avenue to Waukegan. From Waukegan the route proceeds south on an easily followed road through South Waukegan, Lake Bluff, Lake Forest, Fort Sheridan, Highland Park, Ravinia, Glencoe, Winnetka and Wilmette to Evanston. From Evanston south on Chicago avenue to Grand avenue; east on Grand avenue to Kenmore avenue; south on Kenmore avenue to Lawrence avenue; east on Lawrence avenue to the Sheridan road; south on the Sheridan road to Grace street; east on Grace street to Pine Grove avenue; south on Pine Grove avenue to Cornelia street; east on Cornelia to the Lake Shore boulevard, and thence south to Lincoln Park, and along the Lake Shore drive to the Grant monument, where the finish will be made.

STYLE OF VEHICLES ALLOWED TO ENTER.

3. The contest is limited to motocycles, or, as they are more commonly known, "horseless carriages." There will be eligible to competition any and all vehicles having three or more running wheels, and which derive all their motive power from within themselves. No vehicle shall be admitted to competition which depends in any way upon muscular exertion, except for purposes of guidance. Competing vehicles which derive their power from petroleum, gasolene, electricity or steam, and which are provided with receptacles for storing or holding the same, will be permitted to replenish their motive power at Jefferson Park, Half Day, Waukegan and Winnetka, and at no other points. Each contestant must make his own arrangements for taking advantage of these relay points.

4. No vehicle shall be admitted to competition unless it shall comfortably carry not less than two persons for the entire distance, one of whom may have charge of the vehicle and the manipulation of the same.

5. No vehicle shall be admitted to competition except that it be free from danger, not only to its occupants but to spectators and the public users of the highway. The judges at their discretion may debar any vehicle which from its construction gives evidence of defects which would render the adoption of its type an evident impossibility.

6. For the purpose of limiting the contest to vehicles of practical utility a preliminary test of all vehicles entered for competition shall be held by the judges on October 29, 30 and 31, under such rules as the judges may determine on, and for such a distance as they may decide. At this test the judges may debar such constructions as in their opinion do not possess features entitling them to further consideration. It is stipulated, however, that all motor vehicles which won prizes or honorable mention in the Paris-Rouen contest in 1894, or in the recent race between Paris and Bordeaux, shall not be compelled to compete in the preliminary test, but shall be admitted upon proper application to the final competition on November 2.

7. In making awards the judges will carefully consider the various points of excellence as displayed by the respective vehicles, and so far as possible select as prize winners those constructions which combine in the highest degree the following features and requisites, rating them of value in the order named:

A. General utility, ease of control and adaptability to the various forms of work which may be demanded of a vehicle motor. In other words, the construction which is in every way the most practical.

B. Speed.

C. Cost, which includes the original expense of the motor and its connecting mechanism and the probable annual item of repairs.

D. Economy of operation, in which shall be taken into consideration the average cost per mile of the power required at the various speeds which may be developed.

E. General appearance and excellence of design. While it is desired that competing vehicles present as neat and elegant an appearance as possible, it should be assumed that any skilled carriage maker can surround a practical motor with a beautiful and even luxurious frame.

The date of the contest will not be changed from Saturday, November 2, except for extremely bad weather or condition of the roads. In answer to many inquiries as to how the carriages will be started, it may be assumed that the judges will start them one or two at a time, keeping accurate record of the exact time each carriage passes the starting point, the same as is the rule in a yacht race. The various vehicles will be designated by numbers, conspicuously displayed, and a record will be kept of the time at which they pass various points along the road.

Some Medico-Legal Points in Regard to Malpractice.

The following points with regard to a physician's liability in suits for malpractice are given in the General Practitioner:

1. A physician is guilty of criminal malpractice when serious injury results on account of his gross ignorance or gross neglect.

2. A physician is guilty of criminal malpractice when he administers drugs, or employs any surgical procedure, in the attempt to commit any crime forbidden by statute.

3. A physician is guilty of criminal malpractice when he willfully or intentionally employs any medical or surgical procedure calculated to endanger the life or health of his patient, or when he willfully or intentionally neglects to adopt such medical or surgical means as may be necessary to insure the safety of his patient.

4. A physician is civilly responsible for any injury that may result to a patient under his care, directly traceable to his ignorance or his negligence.

5. A physician is expected by the law to exhibit in the treatment of all his cases an average amount of skill and care for the locality in which he resides and practices, further than this he is not responsible for results, in the absence of an express contract to cure.

6. A physician is not relieved of his responsibility to render skillful and proper treatment or reasonable care and attention by the fact that his services are gratuitous.

7. A physician is not obliged to undertake the treatment of any case against his will, but having once taken charge, he cannot withdraw without sufficient notice to allow his patient to procure other medical assistance.

8. A physician having brought suit and obtained judgment for services rendered, no action for malpractice can be thereafter brought against him on account of said services.

9. A physician is relieved of all responsibility for bad results in connection with the treatment of a case when there can be proved contributory negligence on the part of the patient.

199 Miles in 175 Minutes.

The record-breaking train on the Lackawanna road, which left East Buffalo at 8:47 A. M., arrived in Corning, 130 miles distant, at 10:49, October 5. From Corning to Big Flats, a distance of 6½ miles, the run was in exactly 4 minutes, or at the rate of 99½ miles per hour. The distance from Corning to Elmira, 16 miles, was made in 11 minutes. The 199 miles from Buffalo to Binghamton were covered in 175 minutes. This train, which consisted only of the engine, a hotel car and a common coach, arrived in Hoboken at 4:19 o'clock, October 5, making the run of 407 miles from East Buffalo in 452 minutes, including all stops and slow-ups.

The only passengers were Joseph Walker, the Wall Street broker, who is a son-in-law of Sam Sloan, president of the D., L. & W., and the members of Mr. Walker's family. The distance between Elmira and Binghamton, 57 miles, was made in 54 minutes. The run of 67 miles between Washington, N. J., and Hoboken was made in 66 minutes.

This is considered remarkable speed, on account of the bad grades, the numerous drawbridges, and the many railroads which the Lackawanna road crosses. The train stopped at Elmira, Binghamton, Scranton and Washington, N. J. At each of these places the engine was changed.

Calculated Power of Lightning.

It is no doubt interesting to express the force of a stroke of lightning in horse power. During a recent storm which passed over Klausthal, Germany, a bolt struck a wooden column in a dwelling and in the top of this column were two wire nails $\frac{5}{32}$ inch diameter. The electric fluid melted the two nails instantly. To melt iron in this short time would be impossible in the largest furnace now in existence and it could only be accomplished with the aid of electricity, but a current of 200 amperes and a potential of 20,000 volts would be necessary. This electric force for one second represents 5,000 horse power, but as the lightning accomplished the melting in considerably less time, say $\frac{1}{10}$ of a second, it follows that the bolt was of 50,000 horse power.—Dr. C. Grottewitz, Barmer Zeitung.