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SCIENTIFIC AMERICAN SUPPLEMENT

No. 676.

For the Week Ending December 15, 1888.

Price 10 cents. For sale by all newsdealers.

EXPERIMENTS ON DEATH BY ELECTRICITY.

At Mr. Thomas A. Edison's laboratory in Orange, N. J., the effects of electricity were tried upon larger animals than have hitherto been experimented with, under the charge of Mr. Harold P. Brown. The experiments were witnessed by Mr. Elbridge T. Gerry and others. A calf weighing 124½ pounds was first selected. Its resistance was determined, and was 3,200 ohms. An alternating current of 700 volts E.M.F. was applied and continued for 30 seconds. This was needless, as death was instantaneous. On dissection, its flesh and principal organs were found to be unaffected. The circuit wire was connected to a prepared bare spot on the forehead and to a second spot, also denuded of hair, upon the spine. Sponge-covered electrodes, moistened with sulphate of zinc solution, were employed.

A second calf, weighing 148 pounds, resistance 1,300 ohms, was killed instantly by the same current. The current was only applied for five seconds. Finally, a horse, weighing 1,230 pounds, resistance 11,000 ohms, was killed, the current passing from one fore leg to the other through the body. The demonstration was addressed to the members of the committee who recommended for capital offenses the substitution of death by electricity for the statutory death by hanging. It is also interpreted as illustrating the deadly nature of the alternating current. Proof of this after the number of deaths which have occurred from the direct current in this city seems quite timely. The distinguished inventor in whose laboratory the experiments took place is the principal advocate of the direct system of electric lighting.

THE WEBSTER-HIGGINS PATENT SUIT.

The accounting in a great patent suit has been brought to a close by Commissioner Shields, before whom the proceedings for accounting had been brought. The patent in suit, granted to Wm. Webster in 1872, referred to the placing and withdrawing of the wires used in raising or forming the pile in the manufacture of Brussels carpet. Originally the work was done by hand; then, under the Bigelow patent, a monopoly was held, until 1871, for executing it by machinery. When this expired, many concerns began to use mechanical appliances which seemed to infringe the Webster rights. Shortly after its granting, a company with $200,000 capital was formed, to sue infringers under this patent. The great case now decided was brought against the Messrs. Higgins, and four years, from 1874 to 1878, were consumed in bringing it to the final hearing in the U. S. Circuit Court. The complainants were originally represented by Messrs. Clarence A. Seward and E. N. Dickerson; the defense retained George Gifford, Esq., Judge Hoar, and Senator Evarts. Judge Wheeler, before whom the case finally came, decided in favor of the defendants, and held the patent invalid. This decision after four years had passed was reversed by the U. S. Supreme Court, and an accounting was ordered. It was here that the remarkable features of the case began to appear. Two years were devoted to it. The documents finally produced weighed two tons.

Mr. George Gifford died, and his son Mr. Livingstone Gifford succeeded him in the management of the case, and Roscoe Conkling was also retained by the prosecution. A claim was presented by the representatives of the Webster patent right for over $28,750,000. One witness, the expert bookkeeper and president of the Webster Iron Company, was subjected to a cross examination extending over two years. Nearly 6,300 interrogatories were embraced in his testimony, the record of which covered between two and three thousand printed pages. The great claim was by this examination reduced to $1,500,000, an average of over $4,000 per question asked. The Messrs. Higgins' proofs on the accounting filled 1,200 pages. Eleven days were consumed in the argument, and over a thousand pages of brief were handed the Master. His final decision practically throws out the patent in suit as an element for damages, and the Webster Loom Company are awarded nothing.

The cross examination of Mr. Smith, the president of the prosecuting company alluded to above, is the most remarkable on record. The eminence of the counsel and the visitations of death among them and the other parties also signalize the case. Messrs. George Gifford, Roscoe Conkling, Judge Hoar among the counsel, and the patentee and one of the original defendants, Mr. Nathaniel Higgins, are dead.

Lectures for Workingmen and Women.

The school commissioners of the city of New York authorized at their meeting on Wednesday, December 5, lectures for workingmen and workingwomen, to be delivered twice a week, at night, in schools in the Tenth, Twelfth, Thirteenth, Nineteenth, and Twenty-second Wards. These lecturers have been selected: Prof. L. J. B. Lincoln, Prof. Henry A. Mott, Dr. T. O'Conor Sloane, Charles S. Allen, M.D., Henry G. Hanchett, M.D., Edward H. Boyer, Stephen Helm, Francis G. Caldwell, Nathan S. Roberts, M.D., H. M. Leipziger, Prof. J. C. Zachos, Geo. A. Clement, Prof. Bickmore, and J. Oscroft Tansley, M.D. This is an innovation in the line of public education from which much is to be hoped and whose results will be watched with much interest.

Bursting of the New Steel Gun.

The hopes which were entertained of producing cast steel guns of sufficient strength to stand the requirements of actual service have met with a serious check if not final disappointment.

The new steel gun which was carefully cast by the Pittsburg Cast Steel Co., after being finished and rifled, was taken to the government proving grounds at Annapolis, Md., and subjected to trial on December 5. The gun was 193 inches in length, and was to be tested with 38 pounds of powder on the first charge, and 48 pounds for ten consecutive shots following. It carried a 100 pound conical shot, which was to be fired into the earth bank 200 yards away. All the visitors were supplied with bomb-proof stations, some with glasses and others with peep holes, giving a view of the gun at the discharge.

The first discharge was made with 36 pounds of powder, at the request of the makers, "to warm up the gun," they said. The gun stood this test, a pressure of 11 tons to the square inch. The second load contained 48 pounds of powder, the regulation charge. With a tremendous roar the second discharge came, startling the auditors and spectators. It had done its work. The great gun lay dismantled under the huge timbers of the platform that had been utterly demolished, heavy timbers of 12 by 12 inches having been splintered into fragments. The government lost $5,000 by the destruction of property in the explosion. Ensign Robert R. Dashiell said that the experiment proves that the Bessemer cast steel will not do for great guns. The gun exploded under a pressure of 14·1 tons to the inch. It was broken from the trunnions to the butt in over twenty pieces. From the trunnions to the muzzle it remained in one piece. The ball deflected about 20 feet above where it was aimed. The gun showed weakness in the breech, where it ought to have had strength. The fragments of the gun all flew backward.

An investigation is to be made, with a view to discover, if possible, the exact causes of the disaster.

A Volatile Alkaloid in Pepper.

BY WILLIAM JOHNSTONE, PH.D., F.I.C., ETC.

The subject of this short note is to announce the existence or discovery of a volatile alkaloid in pepper possessing strong alkaline properties. The analysis of its platinum salt gave the following results:

		Found.	Calculated.
C	120·0	20·02	20·60
H	24·0	4·32	4·15
N	28·0	5·01	4·80
Pt	197·4	33·93	33·89
Cl	213·0	36·62	36·56
$2(C_5H_{11}N.HCl)PtCl_4$	582·4	99·90	100·00

These results so closely agree with the formula of piperidine that I think I am justified in announcing the existence of piperidine in pepper.

I have made several estimations of this volatile alkaloid in various peppers, and find that nine samples of black pepper gave an average of 0·56 per cent, with a minimum of 0·39 per cent and maximum of 0·77 per cent calculated as piperidine.

Long pepper contains 0·34 per cent, and pepper refuse, composed principally of the husks, 0·74 per cent.

Three samples of white pepper gave respectively 0·34, 0·21, and 0·42 per cent, showing that the alkaloid is contained principally in the husk, and which naturally accounts for the greater pungency of black pepper over that of white pepper.

The same samples of black pepper were examined for piperine and the amount estimated, giving a maximum of 13·03 per cent, a minimum of 5·21 per cent, and a mean of 8·25 per cent.—*Chemical News.*

The Proposed Quaker Dam.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. A. Marichal discussed the plans of the Quaker Bridge Dam, as proposed by the board of experts appointed by the New York Aqueduct Commission, and made comparisons between them and the plans presented by himself to the commission at the beginning of this year.

Mr. Marichal says that the report of the board of experts contains certain errors of such a natureas to make it almost worthless; that this report represents his plans as to be built on a straight line, while four pages out of seven of the pamphlet accompanying his plan are devoted to demonstrating that the dam should be built on a curve. He, moreover, says that he was one of the first to criticise the straight line in plan (see *Proceedings*, January 14 last).

The author of the paper went into a mathematical demonstration, having for its object to prove that the calculations made by the board of experts to ascertain the leverage, the frictional and the granular stability of the profile were based on wrong theory; and that his profile, built on a curve of 900 feet radius, would make a much stronger dam than the one proposed by the board of experts, and that the cost would be less by half a million dollars.