## Scientific American.

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NEW YORK, SATURDAY, MAY 15, 1880. 

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III. ELECTRICITY, HEAT. LIGHT, ETC.—Physical Society, Lon-don.—"Flashing" in cupellation.—Frictional electricity and the Edison telephone.—A curious anomaly in frictional electricity .... The Transmission of Heat. Decharme's observations ...... Variation of the Compass in the United States.\_Table of direc-transmission of direct.

were conducted at the works of the Keystone Bridge Com. the works in pretty bars of 2,000 ounces each. pany, Pittsburg, at J. M. & J. B. Cornell's works, New York, and at the United States testing machine at Watertown, N. Y. Following are the salient points in Mr. Hill's paper:

of them breaking under loads utterly inadequate to produce | twelfth, and thirteenth claims of the Page patent. rupture, others breaking in some instances without any apthe material is to be used in a structure."

mended for general practice." The tensile strength of these of Morse against O'Reilly. cent and 102,000 lb. in the 0.50 per cent steel.

and an ultimate strength of 100,400 lb. In tempering twelfth, and thirteenth claims of the Page reissued patent. only a permanent set of half an inch.

tests are a fair indication of the wide range of application : carries. steel is capable of in construction, and they also show very have to undergo modification; that our present safety fac- again to April 30. tors, based as they are entirely upon an assumed ultimate strength, become almost meaningless when we have to proportion in steel; and last but not least, that our mechanics

THE USE OF STEEL FOR STRUCTURAL PURPOSES. | lion" is the product of the ore smellers of the mining re-At the last meeting, in Pittsburg, of the Engineers' Society gions, and bears about the same relation to refined silver as of Western Pennsylvania, the subject which most interested pig metal to refined steel. At the Pittsburg refining estabthe iron and steel men of Pittsburg was the topic ably lishment this base bullion is converted into lead, silver, and handled by Mr. A. F. Hill, C.E., of New York, in his gold. The precious metals find their way to New York, paper entitled "Steel in Construction." The points pre- while the lead is consumed by the makers of white lead. sented embodied a series of interesting tests conducted by The Utah ores are the richest in gold, sometimes reaching the gentleman named, with open hearth Pittsburg steel 40 ounces per ton. Of silver, the Pennsylvania Lead Comfrom the establishment now supplying the steel for the wire pany ships 50,000 ounces per week, or two tons, representused in the East River Bridge cables. These experiments ing in value, at \$1.14 per ounce, \$57,000. This metal leaves

#### THE TELEGRAPH SET SCREW.

The decision of Judge Blatchford sustaining the Page Electrical Patent was noted in our issue of March 6.

"Within the past few years there has been developed in April 4 Judge Blatchford heard motions by the American this country a tendency toward steel construction, which to- Union Telegraph Company, the Wabash, St. Louis and Paday is so pronounced as to command the most thoughtful cific Railway Company, and the Union Pacific Railway Comconsideration alike of constructors and manufacturers. The pany, praying to have the decision referred to so modified adaptability of steel to purposes of construction is probably as to exempt them from the payment of royalty to the West no longer questioned, yet there is still a certain distrust of ern Union Telegraph Company, on the grounds that they the material in minds of many thoughtful men, who believe have always used the machine and devices invented and pasteel to be endowed, more than any other material, with that tented by Prof. Morse, and that it could be proved that the exasperating quality which might fitly be called the 'innate original Morse instrument on exhibition in the office of the cussedness' of inanimate objects. This arises undoubtedly Western Union Telegraph Company was made by Prof. from some of the remarkable and seemingly inexplicable Morse as early as 1835, and contained all the essential parts failures which have occurred in finished parts of steel, some of the apparatus and devices set forth in the eleventh,

The petitioners allege further that the defense in the preparent cause at all. I use the expression 'seemingly inex- vious suit could have proved (though they did not) that the plicable' advisedly, for I believe that every such extraordi- testimony of Page in the suit of French against Rogers renary failure is susceptible of rational explanation, and can lated to these essential parts of the Morse apparatus and almost invariably be traced, not to the inherent defect in the devices; they could have proved by Thomas Hall of Boston material itself, but to the wrong treatment of the steel dur- that in 1847 he manufactured a machine under the Morse ing the process of manufacture into parts of the structure. patent, which contained a device and combination adjusting I propose to lay before you the results of some steel tests or regulating the length of the vibration at the armature of made under such conditions as would naturally arise when an electro-magnet by means of a set screw as described in the 13th claim of the Page patent; they could have produced The samples tested ranged from 0.30 per cent to 0.50 per an affidavit of Mr. Page himself, taken in 1848, in the suit cent carbon, and were in the form of eye bars, plates, and of Morse against O'Reilly; also, the defendants could have girders. In the first named, the eye bars were from the proved by the Rev. S. Irenæus Prime that Mr. Page wrote Kloman machine, which rolls the bar complete from end to to the Hon. Amos Kendall in 1848 that he had never claimed end; the Keystone "upset" bar, and bars made by welding the invention of the receiving magnet used in the Morse and die forging. The tests showed that the first two classes telegraph; and the defendants could have made use of the gave best results, and the last named second best, and the depositions of Professor Morse, taken in 1850, in the suit of process of welding and die forging "could not be recom- French against Rogers, and of Leonard D. Gale in the suit

bars ranged from 93,000 lb. per square inch in the 0.30 per The petitioners further asserted that they were ready to produce before the court one of the machines now and for The tests made on plate steel were crucial. A 3/4 steel many years past used by them in telegraphing, and the maplate was tested in the direction of rolling, and across the chines used by Mr. Hall, and if aided by the process of the same; also as to the relative strength of sheared and court they will cause to be produced by the Western Union punched plates, and the effects of annealing and tempering. Company the machine used by Prof. Morse and presented to To ascertain just what such a plate, would stand, Mr. Hill the company after his death; upon a comparison of which punched out the edges of such a plate and then reduced its it would be seen that the machines now used by the petitiongauge by cold hammering to  $\frac{1}{88}$  of an inch. The sample ers and that made by Mr. Hall and that used by Prof. was then heated to a bright cherry, and annealed forty-eight Morse are alike in their essential parts, and that all of them hours in lime. A test showed an elastic limit of 55,000 lb., have the designs and appliances mentioned in the eleventh,

sheared and punched plates from a low heat in oil, the Two weeks were allowed by Judge Blatchford for the effect was contrary to what might be expected; instead of plaintiffs to make answer. When the case was called the rendering the material hard and brittle, it restored its duc- counsel for the Western Union Telegraph Company denied tility and increased its ultimate strength. The last test was that due diligence had not been used in obtaining evidence with a steel girder of  $\frac{1}{16}$  web plate, 12 inches high, with  $\frac{1}{16}$  in the previous trial, and produced the original model of the top and bottom plate, and 15 21/2 x 21/2 steel angle. For Morse telegraph instrument, to show that the disputed set such a girder (6 feet long) in iron the test load would have screw governing the play of the armature was not there and been not quite 22 tons distributed load. The steel girder never had been. It was held by the opposite side that the was tested up to 65 tons distributed safe load; and under a original screw had been removed and another substituted, continued application of 103 tons distributed load, acquired whereat an excited colloquy ensued between the opposing counsel; but no evidence would appear to have been brought Mr. Hill concluded his paper as follows: "The foregoing to show the real function of the screw which the model now

The arguments of the counsel being unfinished for lack conclusively that our present methods of dimensioning will of time, the case was carried over to Monday April 26, and

### STEAM INJECTORS.

Among the most reliable and effective devices in this must learn to test steel as steel, and not as iron. Steel con-class the Rue's Little Giant Injector occupies a prominent struction is undoubtedly the construction of the near future. place. It is made by the Rue Manufacturing Company, The conservative element in our profession which to-day Philadelphia, Pa. The lawsuit for infringement, recently opposes it will still oppose it twenty years hence, just as it mentioned in our paper, has, we learn, been fully settled, took them twenty years to learn that iron was better than and the company is now increasing its facilities and extending its sales. The Rue Company's advertisement will be

Variation of the compass in the United States Fabre of the control and amount of annual change. Improvement in Microscopic Eye Pleces. By J. H. WYTEE, M.D. Vibratory Motion in Fluids.	9627 3636
IV. MEDICINE AND HYGIENE.—Unrecognized Bright's Disease. By B. A. SEGGR, M. D. Albuminuria in Persons Apparently Healthy. By JOHN MUNN, M. D.	3630 3631
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V. ASTRONOMY, GEOLOGY, ETC.—Diameter of Mars. American Jurassic Dinosaurs The Age of the Green Mountains A Large Lake Dried Up. Petroleum in the Old World. The Narcotic of the Australians Geodesic and Astronomic Connection of Algeria with Spain. 4 figures. Perspective and plan of station at M'Sabiha. near Oran. Algeria.—Map of the quadrilateral adopted.—Details of an electric light projection.	363) 363) 3634 3634 3634 3634
VI. NATURAL HISTORY, ETC Does the Cocoon Preserve the Chrysalis from Cold?- Experimental observations by Dr. JOUSSET DE BELLESSME. 2 fgures. Bird Architecture. 11llustration-The Rhipidura and its Nest Forest Fires of North America. By Prof. CHARLES S. SARGENT. (Continued from SUPPLEMENT, No. 227.) Cultivation of the Olive, Carob, and Mulberry Trees in Cyprus Poultry in France	563 368

wood. This conservative element is not without its use by any means; nor are the sand bags to the aerial navigator; found in another column.

they help to steady the flight of his air ship at the lower levels. To make the comparison complete, let me add, that to reach a higher altitude, they must both be thrown overboard."

#### TWO TONS OF SILVER PER WEEK.

There are five establishments in the United States where stitute for H. R. 2573, and H. Res. 125. the smelting and refining of silver-bearing lead ores is carried on. One of the most extensive, if not the most extensive, of these works is that of the Pennsylvania Lead Company, of Pittsburg, Pa. Here the "base bullion" of Leadville and of Utah is brought to meet the cheap coke and coal of Pennsylvania, and though the freight per car ave-Before its passage the House struck out all the penal and rages \$300, the business has grown to great proportions. search-warrant clauses (sections 14 to 21 inclusive); so that President Schwartz, of the above company, gives figures showing that 60 per cent of the "base bullion" output of Leadville is shipped to the Pittsburg refining works, besides Revised Statutes.

THE REGISTRATION OF TRADE MARKS.

A bill to provide for the registration and protection of trade marks was passed by the House of Representatives, April 27. It included the first thirteen sections of Bill No. 5088, submitted by the Committee of the Judiciary as a sub-

The committee sought to re-enact substantially the trade mark legislation of 1870 (Rev. Stat., sections 4937-4947 inclusive) with the act of 1876, save that the operations of the proposed law were confined to trade marks used in com merce with the Indian tribes and foreign nations.

the proposed law re-enacts only so much of the old trade mark laws as are embraced in sections 4937-4942 of the

75 per cent of the output of Utah lead mines. "Base bul-The bill as passed also provides that applicants for regis-