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TABLE OF CONTENTS OF
THE SCIENTIFIC AMERICAN SUPPLEMENT NO. 390,
For the Week ending June 23, 1883 .
Price 10 cents. For sale by all newsdealers.
I. ELECTRICITY AND MAGNETISM.-McEvoy's Torpedo System. -8 figures.
netic Metals. By Professor D. E. HUGHEs, - Molecular Dature magnetism -Causes of molecular polarity.-Experimental evidences. - -Rotation of inherent polarized molecules
Luminosity of Magnets.--By J. T. SPRAGTE Luminosity of Magnets.--By J. T. Sprag
Simulation of Electric Phenomena by Ligui rents. -4 figures...
The Insulite Sealed Battery. - 3 figures.
Improved Electric Underground System. -14 figures.
Resistance of Glass.... ... . ............................ Farcot's Ventilating Air Compressor.-Several figures

## 8 figures........ Turkey Red..

Woodbury Reliefs
 Glycerine; its Manufacture and Uses in the Arts.-By Dr. A.
Bergiaus.-Propertles.-Effect of heat and cold.--Action netals.- Use in dyeing. - Manufacture and purifleation.- Reovery from spaty yes. Lse in medicine and cosmetics. . MEDICINE
Cereal Foods from What - By Dr. STUMPF.............. A. T. CUZNER.-5 fgures.

Are Boracic Acid and the Borates Poisonous?.......................
Life-History of the Liver-Fluke.-Several figures
IV. NATURAL HIS'TORY.-Northern Limits of the Principal Fores Trees of Canada, East of the Rocky M
Pitcher Plants.-By Joseph F. Janmes
V ASTRONOMY. - True Time taken at Kansas City by Regular Stel ASTRONOMY. -True Time taken at Kansas
lar Observations.-By W. W. ALEXANDER.
VI. MISCELLA NEOUS - Im proved Folding Hire Escape .............. Extirpation of Field Mice.
Potash for Barren Fruit Tr
Collection of Shoes at the Museum of Cluny, Paris. Scientiftc Shows.-2 illustrations... Longitude.-By Mr. William Ellis....
Children should study Natural History.

## THE NATIONAL EXPOSITION OF RAILWAY APPLIANCES AT CHICAGO.

The managers of the Railway Exposition have succeed in making an exbibition interesting to the general public, in a field which at tirst glance would seem to attract only specialists. The most attractive popular features are the old locomotives and the electric railway, yet the exposition as a whole is striking, surprisingly so, even to the mere sight-
seer, while attracting the deeper interest of railroad men. As one goes through the vast building and its extensive annex, groups of railway employes are seen gatbered here and there around novelties in brakes, couplings, and other appliances, and the comments heard of these practical men are certainly pertinent though sometimes brusque. No one knows better than a brakeman the fact, which statistics prove, that the safety of the men connected with the movement
of when is the weak spot in the system. Everything tbat ingenuity and care can provide is used to protect the pas sengers; and looking at the various appliances for safety as they are brought together here every possible contingency seems provided for; yet where the employe is solely concerned, especially in the coupling of cars, it is notorious that the companies are sadly indifferent. Possibly there are practical objections to most of the coupling devices intended to insure safety, but certainly the many excellent features shown in the exposition can be drawn upon to produce a perfect device.
The old locomotives, which naturally are the center of attraction, have been so frequently described, I need not dwell on them. As the visitor steps from the shed containing these pioneers, across to the array of modern locomotives, an epoch is bridged from experimental years to the present times which have brought forth these triumphs of the present century. The modern locomotive represents the finest achievement of our civilization in the application of means to attain a result. I confess I cannot pass one of these great engines, wherever met, without a desire to remove my hat, because to me they seem to have taken to themselves some of the brain and brawn spent in their production, and because I know somewhat of the time, the
labor, the genius, and the lives that have been given to perfect them. Study the history of any part of a locomotive, and you shall learn a story of wearied brains and long ex perimenting before success. True, that one being produced, they can readily be duplicated in any number; that is also true of the sculptor's work, yet who begrudges him his meed of praise on that account? To the men from Stephenson down, who by their genius and sķill have made locomotion what it is, is due the homage of bistory.
The exhibition of locomotives embraces all varieties of steam motors from the first class passenger to the drilling engine. The principal works of the country are well represented by their masterpieces. The Baltimore and Ohio Railroad sends from its own shops a magnificent specimen as a contrast to its pioneer locomotive, also on exhibition.
In the car department twenty or more street cars are shown for both horse and cable roads. The handsomest is one made for the North Chicago line by the John Stephenson Company, of New York. In cars forsteam rosis there is one of every type, including all the Pullman palaces, pas-
senger coaches, and freight and stock cars. This array of cars and engines of what is in actual use throughout the country strongly hints of the large amount of capital and labor required for their production and operation. In the lines of car wheels, trucks, switches, and railway sup-
plies the display is large, the latter class, which embraces an endless variety of articles, sbowing a high grade of workmanship, and being one of the most striking portions of the exposition. In the various classes of machinery for railway shops, and for the construction and repair of roads, there is a fine display, and as a novelty which has been perfected in the West a track laying machine is noticeable. It consist mainly of a platform car, having a forward extending frame and endless apron, by which the rails and ties are carried
from the car and deposited on the track. The railway companies centering in Chicago have contri6216 buted to the exhibition both cars and locomotives, and some have sent products of the country through which they pass. trees and palms, while the Pennsylvania roads furnish native ores, typical of the diversified interests of the whole country, held together by bands of railroad iron.
Among the many notable exhibits are the following:
Several novelties in freight car doors, and in that connec tion let me say there is a fine chance for inventors to im. prove on the common form.
The Keystone Bridge Company exbibit forged eye bars and a turntable truss of the largest size.
The Allen Paper Car Wheel Company make a fine exhibit of wheels and trucks, as do also in their own specialties the Westinghouse Air Brake Company; the Union Switch and Signal Company, of Pittsburg; the Keystone Car Spring Company; the Ashcroft Manufacturing Company in steam
gauges; and the Jersey City Iron Company. The Janney gauges; and the Jersey City Iron Company. The Janney
coupling for freight and passenger cars is also deserving of 7 notice.

The Roebling Wire Company, inconnectionwith theirdisplay of wire rope, exbibit sections of the cables of the Niagara, the Covington, and the Brooklyn suspension bridge. Of course these are not actual sections of the cables in place, but similar, and the superior greatness of the ropes that fasten New York and Brooklyn together can be realized by the comparison with the other two cables.

Taken as a whole, the exposition is worthy of its appellation "National," as it fairly exhibits the state of the art in railroading in the United States, and I doubt whether perfection has been so closely sought and nearly attained in any other country. There is little or notiong of catchpenny and claptrap devices. The whole aftair appears earnest d means business.

## RAINFALL ON THE ISTHMUS OF PANAMA.

According to the observations of Mr. John Stiven, director of a gas company in Panama, the quantities of rain that have fallen at the Isthmus of Panama during the last four years have been as follows: $2 \cdot 152$ meters in 1879; 1.683 meters in 1880; 1.792 meters in 1881; and 1.158 meters in 1882. The rainy season in this region lasts six months, from M to November, excepting an interruption of a few Weeks foreld in June and at the beginning of July. Tris abundance of rain in the summer is explained by the movement of the stratum of rising air which accompanies the curve of maximum temperature in its annual oscillating progress from one side to the other of the thermal equator, and back again, which in its turn depends upon the movement of the sun to each side of the geographical equator. As the sun passes the zenith twice a year, on the 18th of April and the 29th of August, the ascending strata of air cover the isthmus from the beginning of May to the end of June, and from the end of July to the first of December. This forms the rainy season, the rest of the year the dry.
During the latter the ascending strata of air are all to the south of the isthmus. To the north of these strata is the trade wind of the northern hemisphere, which generally blows from the northeast over the isthmus. To the south of it is the trade wind of the southern hemisphere. In the zone covered by this ascending current the wind is fluctuating; when it is over the isthmus, then occurs the period of calms or of very variable winds , that are found as frequently pon the main land as on the sea.
It is understood that while the rising air strata are over the isthmus, then the rainy season occurs, since the trade winds, that are low winds scouring the surface of the ocean, gather up in these strata great quantities of aqueous vapors which on rising enter the lofty and colder regions of the atmosphere, are condensed, and produce that vault of perpetual cloud which arches over the earth, forming an obscure circle which the French sailors call Pot-au-Noir and the English and American the Cloud-ring, from which jssue during the rainy season those great deluges that inundate he intertropical regions. Moreover, near to the isthmus passes the equatorial current that after passing Florida is called the Gulf. Stream, and the waters of this current are relatively heated, and consequently the air which crosses them becomes charged with a great amount of aqueous vapor; on reaching the isthmus with the slight velocity that the wind has in the rising strata during the rainy season, it is forced to rise, since it becomes part of the former; it also encounters the slopes of the Cordillera, along which it rises, and in ascending dilates, producing refrigeration, which forms another cause that contributes to the abundance of the rainfall, at least over the Atlantic slope, since in the case of the Pacific coast the general current of the ocean is the reverse of that which obtains on the east shores, as it proceeds from the north, whence its waters are less hot and part with les moisture to the winds that sweep their surface.
Another interesting fact is that the excess of rain on one slope over that on the other is most marked in the second period of the rainy season. This is attributed to the fact that during the first part of the rainy season-May and June -the prevailing winds are southerly, while during the second period of the same they are northerly and are more freighted with moisture; also it is at that time that the contrast beween the rainfalls of the Pacific and Atlantic coasts is the most striking.

## Ancient Lake in California.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. T. M. Cleemann showed a map and profile of the Southern Pacific Railroad in California, showing where it crosses the dried up bed of a lake, being below the surface of the Pacific Ocean for 58 miles, and attaining a depth below said surface of 266 feet. At this point it skirts a deposit of salt from six to twenty-four inches in thickness. He also showed a number of photographs of the Tehachapi Pass on the same railroad near San Fernando. In order to ttain the summit with a sufficiently reduced grade, the line was "developed," advantage being taken of a conical hill to wind about it in the form of a helix, crossing itself, and continuing on its way with several meanderings. The Saint Gothard Intitroadrhes several such helices, but they are cut in the solid rock;

## Long Steel Plates.

Some long steel plates have been rolled by the Otis Iron and Steel Company, of Cleveland, Ohio. The plates were 50 feet 6 inches in length when sheared, 51 inches wide in he center, and three-eighths of an inch thick, and the ingots from which they were rolled weighed 4,400 pounds each. They were made for Messrs. Morgan, Williams \& Co., of Alliance, Ohio, and they will be used in the construction of a large traveling crane, which the above firm are building for the Dickson Manufacturing Company, of Scranton, Pa.

