SCIENTIFIC AMERICAN

ESTABLISHED 1845

MUNN & CO., - - Editors and Proprietors

Published Weekly at

No. 361 Broadway, New York

TERMS TO SUBSCRIBERS

One copy, one year for the United States, Canada, or Mexico $3.00
One copy, one year, to any foreign country, postage prepaid. £0 16s. 5d. 4.00

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845) .....$3.00 a year
Scientific American Supplement (Established 1876) ..... 5.00 "
Scientific American Building Monthly (Established 1885) ..... 2.50 "
Scientific American Export Edition (Established 1878) ..... 3.00 "
The combined subscription rates and rates to foreign countries will be furnished upon application.

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MUNN & CO., 361 Broadway, New York.

NEW YORK, SATURDAY, MAY 21, 1904.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

REAR COLLISIONS ON CITY RAPID TRANSIT SYSTEMS.

The recent rear collisions on the elevated railroads of New York and Brooklyn are a forcible illustration of the increased risks, which are inseparable from the higher speed of travel and the greater frequency of trains resulting from the introduction of electric traction. Most of the collisions of the past twelve months have occurred on the Brooklyn lines, where the operation is notoriously careless. On the Manhattan elevated lines, considering their far heavier traffic, there has been a remarkable and most commendable freedom from accident—remarkable, because we doubt if there is any railroad system in the world, where trains, with a running speed between stations that rises at times to 30 miles an hour, are run under a headway so close, that in the rush hours there will be sometimes not over a car's length between two trains at the stations. The trains are not merely faster, but heavier; and were it not for the wonderful efficiency of the Westinghouse air brake, which was installed at the same time that the elevated railroads were electrically equipped, rear collisions would be a frequent occurrence. Tribute also is due to the motormen, most of whom are engineers carried over from the days of steam service; for it is evident that under a service so swift and crowded, a few moments' hesitation or neglect would precipitate a disaster.

The recent accident at Fifty-ninth Street, on the Third Avenue line, resulted in the telescoping of two cars, and the death of the motorman. That a score of people were not killed and wounded is due to the fortunate circumstance that the collision occurred at an hour when traffic was light. The immediate cause of the collision is a mystery; for it seems that after the accident the controller and the air brakes were found to be in good order. An eyewitness claims that just before the collision occurred, he saw the engineer of the second train gesticulating wildly, as if to warn people in the train ahead; but why he did not apply his brakes or turn off his controller is a question that is puzzling the authorities. In spite of the remarkable immunity from accident of the electrically-operated elevated lines, we are of the opinion that the trains should be operated by some system of block signals of an automatic character, which, while it would allow two trains to be between the same two stations at the same time, would still automatically serve to shut off the current and apply the brakes should the trains approach within less than say three train lengths of each other. To introduce a block signal system in which the blocks occupy the full length between stations, would be to cripple the capacity of the line, and indeed blocks of this length would not be necessary. At the speed at which the local trains are operated, it would be sufficient to divide the space between the nearer stations into two blocks, and that between the more distant stations into three blocks. To render the system fully effective, there should be a trip provided at the danger signal, to automatically apply the Westinghouse brake, should a train run past the signal. It is gratifying to know that the Subway trains are to be operated strictly on the block signal system; and the experience obtained by the company after a few months' operation of the Subway should render it a simple matter for them to install an automatic block signal adapted to the conditions that obtain on the elevated roads.

ECONOMY OF NARROW-GAGE RAILROADS.

We have recently received from a correspondent in the West Indies a letter asking for advice regarding the proposed construction of a branch railway to extend through a somewhat hilly country into a region of plantations, the particular point upon which information was sought being the old question of the broad versus the narrow gage railroad. It seems that our correspondent was desirous of having a narrow-gage road constructed, being under the impression that a great economy would be realized thereby over a road of the standard gage of four feet eight and a half inches. The engineers, who had reported in favor of a standard gage road, stated that the cost would be but little greater, and that with a road of standard gage, it would be possible to have an interchange of cars with the main line, and freight could be shipped through from the plantations to the docks without any intermediate handling. This and other advantages were supposed to more than outweigh the very slight reduction in cost obtained by building the road of narrow gage. Our correspondent could not understand that the narrow gage could cost so little less per mile than standard gage, as to render the saving entirely wiped out by the many limitations and disadvantages of the system.

Now, the railroad engineers of the United States have had considerable experience, especially in Colorado, with narrow-gage roads, which have been tested for both freight and passenger, slow and high speed service, with the result that after a certain number of years of operation, it has been established that the cost of construction and the cost of operation are so slightly increased for a standard gage road, as to render it good policy, where there is any prospect of a reasonable amount of traffic, to build on the standard gage system. As regards construction, the mere saving of eighteen inches of width throughout the whole length of the line cannot be taken by a rough-and-ready method of calculation as insuring that the road can be built for one-third less cost. As compared with the standard-gage road, the cost of location will be the same; the amount of contractor's plant which must be transported to the scene of the work will be about the same; there will be the same number of rails to the mile; the same number of rail joints, bolts, and spikes; and the same number of ties, although the latter, it is true, will be some eighteen inches shorter; there will be the same amount of equipment in the way of switches, signals, telegraph lines, etc., and the section gangs for the maintenance of the line must be approximately of the same strength. It may be taken for granted that, except under very special conditions, it will be found advisable to build to standard gage.

On the other hand, there is undoubtedly a great field open for the construction of light railways that are not intended to handle traffic of the amount, or at the speed, aimed at in the narrow-gage railroad; and we believe that as soon as some well-thought-out system of single-rail track and equipment is placed upon the market, and given practical demonstration under normal working conditions, we shall see a great development of this form of railway.

RESULTS OF THE GERMAN ANTARCTIC EXPEDITION.

An interesting lecture was recently delivered before the Royal Geographical Society of Great Britain by Dr. von Drygalski, of the German Antarctic Exploration, narrating some of the most important results achieved by that expedition.

The German South Polar Expedition was absent altogether twenty-eight months, of which fourteen months were passed in the South Polar ice, ten months with operations in the South Atlantic and South Indian oceans, and four months with work and residence in the islands of the Indian and Atlantic oceans and at the Cape. The vessel "Gauss," although not a fast sailer, had proved a remarkably strong and seaworthy ship, her lines being well suited to the conditions of polar work.

Dr. von Drygalski explained the researches of the expedition in the vicinity of Kerguelen and Heard, on both of which the glacier development was discovered to be considerable. In the former region they stayed a month. A branch station was here established, for the purpose of carrying out terrestrial, magnetic, and meteorological observations while they remained in the Antarctic waters. After leaving these places, the great unknown lay before them, and they had to seek out the right course, which, in the almost complete lack of previous experiences, was practically a question of pure luck. He chose the Kerguelen route, for south of that part, between 60 deg. and 100 deg. east of Greenwich, there lay before them an Antarctic region, where hitherto no serious advance had been attempted, and where were consequently concealed many debatable problems. They found a seaboard trending east and west just a little south of the Antarctic Circle, and consequently forming a bar to further progress southward. For a portion of the unknown space between Knox Land and Kemp's Land —a stretch of over six hundred miles—a land connection was definitely established.

Pushing southward, they came in view of land never before beheld, never before set foot on. All was ice-clad. The coast itself was a high vertical wall of ice, too steep to be approached, in whatever direction they turned their eyes. A landing on this icy barrier was out of the question, and the explorers accordingly resumed such operations as, in the absence of ice-free tracts, might lead to some conclusions regarding the substratum of the ice-cap—that was, the character of the land itself.

The expedition now followed the coast westward in the direction of Kemp's Land, in order to see in what way was filled in the unknown gap between Knox and Kemp's lands. The ship soon became icebound, and remained fast for the rest of the twelvemonth. On the hummocks surrounding them, however, the expedition was able to carry out even the most delicate observations without disturbances of the level. Frequent storms and gales raged, the ship feeling the shocks, and constantly heaving over under the fearful strain. Numerous expeditions on sleighs were made from this central point, which occupied altogether five months. Records were taken of the phenomena of motion presented by the inland ice; stones were collected, lichens and mosses were also found; the nesting places discovered of one of the two species of stormy petrel in the Austral glacial sea. Many interesting facts were brought to light, amply rewarding the great expenditure of five months' time and efforts.

Suddenly, in January, 1903, the icebergs which had closely encompassed the "Gauss" began to drift northward, and on February 8 the ship was liberated by the ice suddenly breaking.

The results of the expedition, Dr. Drygalski pointed out, could not be comprehensively surveyed until the whole material and copious collections, all of which had been brought in good condition, were classified and made accessible. It might, however, be already affirmed that the "Gauss" expedition achieved everything in the region assigned to it that it was possible to accomplish in the time available. It had discovered a new land, and thereby cleared up an old contested question regarding the nature and extent of the Antarctic continent for over ten degrees of longitude, certainly for about half of the debated region between Knox and Kemp's Lands, and perhaps for the whole. At least for the actual determination of the westerly tract, observations were now at hand by which light might be shed on the specified question. An important factor was the steep fall of the land down to a deep sea discovered by the explorers; important also was the structure of the land, which consists of old crystalline rocks; lastly, it was important to find that this margin of the continent was occupied by a volcanic formation, whose lavas contain molten gneisses, which had been forced up with them from the bedrock. The inland ice covering the continent presented a picture of our former Ice Age, and was undoubtedly the vastest glacial area now existing.

THE CATALPA TREE.

How a forest of extremely valuable timber may be grown in a score of years, and made a source of profit within six to eight years, will be demonstrated in an interesting exhibit at the World's Fair.

This exhibit will be made under the auspices of the International Society of Arboriculture. John P. Brown, secretary and treasurer of the association, has consulted with the chiefs of departments at the World's Fair and has made all arrangements.

That particular variety of the catalpa tree known as Speciosa will be the basis for this exhibit, and the great value and adaptability of this wood will be shown in all forms. The catalpa is indigenous to the Wabash bottom lands in Illinois and Indiana, but may be grown in any section of the United States. The tree is known nearly everywhere, but its great value is just beginning to be understood. Nearly every boy knows the tree because of the long and slender seed pod, which when dried burns much like tobacco, and is often known as the "lady cigars."

It is the worth of the timber, and its marvelously quick growth, that is destined to solve the problem of future railroad building, and furnish a supply of lumber for all purposes.

In the World's Fair exhibit a section of railroad will be built showing the adaptability of catalpa timber for ties. Old ties, that have been in use for thirty-two years, and not yet showing any signs of decay, will be shown. When it is shown that the average life of an oak tie is seven years, the catalpa's value on this line is demonstrated. There will be telegraph and telephone poles that have been in use as long, and fence posts will be exhibited that can be proven to have been in use for one hundred years.

Not alone for these purposes is the wood of the catalpa valuable. A prominent Dayton, O., car-building plant will exhibit a section of a palace car, all of the timbers of which, inside and out, are of catalpa wood. The timber possesses all of the requirements for such work, being strong and susceptible to a fine finish. After it has been placed in the finish of a palace car, it is often mistaken for oak, chestnut, or cherry. Furniture factories will also exhibit fine chairs, desks, and other furniture made from this wood.

The Arboriculture Society's exhibit will not stop with showing the varied uses to which the lumber from the catalpa tree may be put, but it will show how the catalpa forests may be grown anywhere within a very

few years. The seed are planted in good, rich garden soil, and in a short while they spring up. The young shoots should be transplanted within a year, for the roots reach out in every direction, and the best results are obtained from early transplanting. The trees should be set out in spaces of eight feet in either direction. The growth is exceedingly rapid, being uniformly one inch in diameter for each year. At the end of the sixth year the trees have attained a diameter of six inches. Then it is best for the trees to thin them out, cutting down each alternate row, and then each alternate tree in the rows that remain. This leaves the trees standing sixteen feet apart.

The trees that are cut may be used for posts and ties, and then the forest yields a fair return during the thinning process. "Pole ties" from oak trees are practically valueless, because of the sap in the latter years' growth of the tree. The wood that contains the sap soon decays, and this contaminates the rest of the timber. There is practically no sap in the catalpa, and "pole ties" from this wood last an indefinite number of years.

After the thinning-out process, the growth of the tree continues at the uniform rate of one inch in diameter each year, and catalpa trees at eighteen years old often reach as high as one hundred feet, thus yielding a large return of splendid lumber.

Among the large railroad systems to recognize the importance of tree planting in order to guarantee a supply of ties for the future is the Illinois Central. At a point near Du Quoin, Ill., two hundred thousand catalpa trees were planted three years ago, when President Stuyvesant Fish became interested in the work of the Arboriculture Society. These trees are thriving now, and in a few years, when the thinning-out process begins, many of the ties in the Illinois Central Railroad will be cut from this forest created in the heart of the vast Illinois prairie. The same road is planting similar forests in Mississippi, and contemplates the establishment of others.

ILLUMINATION OF THE WORLD'S FAIR.

BY ROBERTUS LOVE.

It was a rare occasion when first the bud of electric illumination at the World's Fair burst into blossom; and since that first night of informal rehearsal, every time that the lights have been turned on has been a rare occasion to those privileged to be present. Now that the public may enjoy this illumination each evening, the long-anticipated delight of the spectacle is being realized.

It is best to see the illumination at first from a considerable distance. One should get his first glimpse of this magnified fairyland from the outside of the grounds, or at any rate from a point a mile or so away from the "main picture," which is the center of illuminative features. The night should be dark, with neither moon nor stars visible, but free from clouds, so that the lights be not dimmed by the misty haze.

Riding around a curve on a trolley car, or topping the brow of a hill, one suddenly becomes aware of something wonderful in the distance, a mighty bouquet of light blossoming out of the darkness. For half a mile the flowers of light sparkle in the murk—clear, clean-cut, golden. The distance not only lends enchantment to the view, but mellows the lights to a soft glow soothing to the eyes. One beholds, glowing through the darkness, long lines of little lights, broken here and there into fantastic designs. Now a huge star breaks out, made of many lights. Yonder is circle after circle of gleaming brilliancies, far up in the sky. Still higher up is outlined a skeleton framework of lights, and you know that it is the illumination of a tower, though you see nothing whatever of the tower itself.

Lower down are parallel rows of lamps, in parallelogram form, leading hundreds of yards horizontally and sixty or seventy feet perpendicularly, the perpendiculars crossing the other lines at frequent intervals, and ending in circles and diamonds and squares and crosses. You know that this is the outline of one of the mighty exhibition palaces, but you see nothing of the building itself. A glorious archway in electric lights marks a main entrance, and overhead a curious arrangement of lamps suggests a gigantic statue or a mighty pediment of reclining figures, though there is nothing visible of the statuary staff.

If you are familiar with the shapes of the buildings, you can distinguish one from another by these lights. The classic pillars on the colonnades of the Palace of Varied Industries flash themselves into fiery outline. The massive plyons at each end of the Palace of Transportation are heralded in the living language of the lamps. The Palace of Electricity is a gleaming telltale ghost of its own glories of architecture.

Yonder, high up on Art Hill, rises in lines of lights converging to a common center, the illumination that marks Festival Hall and its wonderful dome, and just below are the great fountains and the Cascades, leading down to the Grand Basin and the lagoons, which are spanned by bridges outlined in electric glow. At each side on the hilltop lights lead the vision along the Colonnade of States to the towering twin pavilions with their lesser domes flanking Festival Hall.

Away down in the center of the bouquet of brilliance you behold a single flower rising above the rest, and you know that the name of this slender stalk is the Louisiana Purchase Monument. It is time now that you come nearer to the picture. As you approach, the darkness gradually melts from the vicinity of the little lamps, and you perceive the ivory-tinted exteriors of the huge buildings, glowing in the light of thousands of lamps. Stepping into the edges of the main picture, you are entranced by the scene. Lagoons and plazas and broad thoroughfares for promenade are made as bright as day. Thousands of people pass along the promenades, stand upon the bridges, or float in the many gondolas.

DEATH OF HENRY M. STANLEY.

Word has been received from England of the death on May 10 of that great African explorer and colonizer, Henry Morton Stanley. Following the lead of Livingstone, in relieving whom he first started to explore the "dark continent" in 1871, Stanley spent the best years of his life traveling through tropical jungles and tracing out lakes and rivers in the very heart of Africa, and to him is due the credit for solving her most puzzling geographical problems.

Stanley's life history reads like a romance. Born of Welsh parentage in 1841, his father, John Rowlands, dying when he was but two years old, the lad took to the sea at the age of sixteen, and worked his passage on a sailing vessel to New Orleans. Here he obtained employment from a merchant named Stanley,

THE LATE SIR HENRY MORTON STANLEY.

who befriended him, and whose name young Rowlands assumed in recognition of many benefactions. When the civil war occurred, he enlisted in the Confederate army, and he was taken prisoner at the battle of Shiloh. He escaped, however, and returned to his Welsh home. The next year (1863) he returned to America, and joined the Federal navy. He served on the flagship "Ticonderoga," soon attaining the position of secretary to the admiral, and afterward, on account of great gallantry in swimming 500 yards under fire and fixing a line to a Confederate steamer, he was made an officer. After the war he left the navy, and engaged in work as a newspaper correspondent. In 1868 he accompanied the British expedition to Abyssinia under Sir Robert Napier, acting as correspondent of the New York Herald. The following year the same newspaper sent Stanley on a trip through various countries of the East, and in February, 1871, he left Zanzibar with two hundred men in search of Livingstone. On November 10 of that same year, he found Livingstone at Ujiji, on Lake Tanganyika, in an almost helpless condition. After nursing him back to health, and making some explorations with him around the northern end of the lake, Stanley returned to Europe the following year. In 1873 he went to West Africa, to report the campaign against the Ashantis.

The death of Livingstone in Africa on May 1, 1873, and the interment of his remains in Westminster Abbey in April of the following year, made Stanley once more eager to attack the problems of the "dark continent." He was again sent out by the New York Herald and the London Daily Telegraph, and he left Bagamoyo, near Zanzibar, with 356 men (including three white men) on November 12, 1874. The first great work he accomplished was a boat survey of the shores of the Victoria Nyanza. Following this he discovered Lake Albert Edward, and found it to be one of the head reservoirs of the Nile. He also found the Kagera, or Alexandra Nile, to be the main source of supply of Victoria Nyanza. In 1876 he sought in vain the outlet of Lake Tanganyika, as the level of this lake was then too low for water to flow through its outlet, the Lukuga, into the Congo. Although the expedition was greatly depleted by fever and smallpox, the intrepid Stanley traveled westward to Nyangwe on the Lualaba, which Livingstone and Cameron had visited before, and then he determined to follow the river to its mouth. Fighting his way westward through tribes of ferocious cannibals, he succeeded in making the 1,500-mile trip on the river which, upon his arrival at Boma, August 9, 1877, he found to be the Congo. This was Stanley's greatest discovery, for he proved that the Lualaba and the Congo were one. The journey cost him his three white companions and 170 porters, and he was exactly 999 days from the time he left Bagamoyo until he reached Boma.

Early in 1879 Stanley again went to Africa, this time for the purpose of founding the Congo Free State, making treaties with the natives, and planting stations on the Congo from Vivi to Stanley Falls, about 1,300 miles up the river.

Stanley remained five years in Africa this time, in order to accomplish his mission. He made treaties with 450 native chiefs, and in order to reach the upper part of the river, his native porters had to carry all his supplies and steamboats in sections for 235 miles around the rapids.

The great explorer made his final crossing of Africa during the two years from 1887 to 1889. This time he conducted an expedition in aid of Emin Pasha, the Governor of the Egyptian Soudan, who had been cut off by uprisings of the natives from communication with the civilized world. Ascending the Congo as far as its tributary, the Aruwimi, Stanley followed this river to its source, and then cut his way for months through well-nigh interminable tropical forests to the Albert Nyanza, which he finally reached December 13, nine months from the time he started. So hard had been the journey, that 215 out of 389 natives that began it with Stanley, perished on the way, while the 174 that were left were mere skeletons. In April, 1898, Emin Pasha appeared at Stanley's camp on the shore of Albert Nyanza. The explorer then retraced his steps through the great forest, in order to bring back from the head of navigation of the Aruwimi, a detachment of men which he had left there. Taking with him the few he found alive, he fought his way through the 250 miles of jungles for the third time, and again joined Emin Pasha in January, 1889, and conducted him to Zanzibar. In this expedition Stanley made his second journey across the continent, and, besides discovering the extent of the great forest, the water connection between Lake Albert Edward and Albert Nyanza, and the snow-capped Ruwenzori mountain chain that separates them, he accomplished the main purpose of his expedition—the finding of Emin Pasha.

Stanley's success with the natives in Africa was largely due to his patience, kindness, and tact. On account of these qualities, he was able to inspire confidence and win friendships readily. His planting of colonies on the Congo, and opening of this great highway to trade, was one of his greatest achievements, while the previous tracing of this great river from its scurces to its mouth—which is graphically described in "Through the Dark Continent"—was undoubtedly his greatest. The finding of Emin Pasha terminated his life of exploration. After returning to England, of which country he became a naturalized citizen in 1892, he was made a Knight, and he devoted his time to writing of his travels. "In Darkest Africa," "My Dark Companions," and "Through South Africa" are the titles of some of his best-known later works. Sir Henry married Miss Dorothy Tennant, the artist, in 1890.

A movement is on foot to inter the body of the great explorer beside that of Livingstone in Westminster Abbey, and it seems to us that no more fitting place could be found than one beside that first great African missionary and explorer, whose work Stanley so largely completed.

The industrial development of Brazil is likely to be greatly enhanced by the recent discovery of coal measures in that country. The monthly bulletin of the International Bureau of the American Republics for last September reports that there has been discovered in Brazil, at a place called Cedro, in the township of Imbituba, State of Parana, a great deposit of coal. The coal-bearing area extends over 3,000 hectares (7,000 acres), and the samples taken from the upper strata were classified as "fat pit coal." These coal fields run through the center of Parana due north and south, and seem to be the continuation of the veins that traverse the States of Rio Grande do Sul and Santa Catharina.