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NEW YORK, SATURDAY, MAY 4, 1901.

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.

THE NORTH RIVER BRIDGE BILL.

The storm of opposition, which has been aroused in New York by the passage of the North River bridge bill by the New York Legislature, is directed not against the bridge itself, nor even against the proposed elevated structure from Fifty-ninth Street to the Battery; for the erection of the bridge has come to be regarded as a necessity, and the extension of the bridge tracks along the Hudson River waterfront is admitted to be the necessary concomitant of the bridge itself. The present violent opposition is based upon the fact that, in giving to a private corporation the right to build an elevated structure along five miles of the city's waterfront, on the payment of a merely nominal consideration, the Legislature is practically handing over to private individuals property which, in the estimate of ex-Mayor Hewitt and the present Comptroller of the city, may easily prove to be worth from sixty to a hundred million dollars.

The North River Bridge should be built, and if private capital wishes to undertake such a gigantic scheme, it should be encouraged by all proper legislative assistance. To render the bridge effective, its tracks should certainly extend south from Fifty-ninth Street throughout the full length of the city's waterfront. But that any private corporation should be allowed to secure such a practical monopoly of ocean and river traffic as would result from the carrying out of the present bill, is not to be thought of for a moment. The present city government, the leading commercial bodies of the city, and the most prominent of its present and past officials, are unanimous in condemnation of the extraordinary audacity displayed in the present bill. If a franchise for the construction of the West Street line is to be granted, it should only be done subject to such conditions as are suggested by ex-Mayor Hewitt, namely, a rental equal to the interest, with a contribution to the sinking fund for the repurchase of the property within fifty years, and with the power of resumption by the city at any time during that period by paying the amount actually spent on the work plus a reasonable percentage. We are inclined to think, however, that in view of its enormous and ever-appreciating value, a railway of this kind giving access to all the docks, would develop such a vast earning capacity that the city could not do better than undertake the construction and ownership itself. The company that owned the combined bridge and approach would absolutely control the shipping situation in New York, and there would always be the temptation to operate the system on the vicious principle of charging up to the limit of what the traffic would bear, thereby sacrificing the interests of the city as a shipping point to those of the shareholders of the company.

From an engineering point of view the scheme is entirely feasible. Looked at from the standpoint of operation, moreover, there is everything to be said in its favor. The proposed bridge will have a capacity of six or eight main-line railroad tracks, and it will doubtless be capable of accommodating all the traffic from the West which now finds a terminus in Jersey City. Freight could be carried from any western shipping point, direct across the Hudson River, down the West Street elevated structure, and switched off, if need be, on to the steamer pier at which it was to be unloaded—an ideal traffic arrangement, and one to which New York city is bound ultimately to come, if it is to maintain its position as the chief shipping point on the Atlantic coast.

It is sincerely to be hoped that after Governor Odell has heard the committees from New York which are opposed to the bill and has looked at all the bearings of this momentous question, he will veto the measure and leave it for the bridge company and the city authorities to make an equitable arrangement which will be mutually profitable.

RE-ROLLING OLD STEEL RAILS.

During the past five years, there has been developed a method of utilizing old steel rails which bids fair to become an important factor in the steel industry. When steel rails were first introduced, the question arose as to what disposition could be made of them when they had been so far worn out as to be unfit for further service, and it was not until the introduction of open-hearth furnaces that it became possible to cut up the old rails and remelt them with pig iron and scrap from the stockyard.

About ten years ago Mr. W. E. McKenna, one of the officials of the Chicago, Milwaukee and St. Paul Railroad, turned his attention to the problem of utilizing these worn-down and defaced rails by re-rolling them to a size somewhat smaller than the original section. After considerable experimental work, the first of which was done in 1895, it was determined in 1897 to erect a plant for the special purpose of re-rolling old rails. The first plant was erected at Joliet, Ill., and in 1898 a second plant was built at Kansas City, Mo. At the present time over a thousand miles of track have been relaid with rails that have been passed through the re-rolling mills, a total of nearly one hundred thousand tons having been thus treated by the new system.

The wear upon the rails is, of course, chiefly on the top and inside of the head of the rail. In the process of re-rolling, the rails are very slightly reduced in the webs and flanges, while the contour of the head is restored to a symmetrical, though somewhat smaller section. Briefly stated, the process consists in first passing the rail beneath a set of grinders, which take off the slivers and rough edges from the head, then heating them in a special furnace to a temperature of 1,700 degrees, and rolling them down to the desired section, the rails passing out of the finishing rolls at a temperature of 1,480 degrees. The rails are then sawed to proper length, straightened, and the holes drilled for the angle bars.

The thorough working over of the metal at such a comparatively low temperature serves to improve its quality, not chemically, of course, but by virtue of the density and toughness which result from a thorough working over of steel and iron. The reduction of the section of the rail produces a corresponding elongation, a 30-foot rail being increased by 1 to 2 feet in length for a reduction of cross section of 8 per cent. The value of this system is obvious, particularly in view of the fact that theoretically the oftener a rail is re-rolled the better its quality. Since many of the great railroad systems use as many as three or four different weights of rail, according to the character of the traffic in different localities, it is evident that re-rolling will result in considerable economy, worn rails of a section being simply sent to the mills and rolled down to a section suitable to other divisions of the road.

NITRO-CELLULOSE VS. NITRO-GLYCERINE SMOKELESS POWDERS.

The facts brought out in an article by Lieut. A. T. Dawson, late of the Royal Navy, in a paper read before the English Society of Arts regarding the behavior of the British smokeless powder, cordite, are a decided indorsement of the wisdom of the Naval Ordnance Bureau in directing its attention to the development of pure nitro-cellulose, or all-gun-cotton, smokeless powder. Nitro-glycerine, on account of its great explosive energy, is an attractive ingredient in the manufacture of smokeless powder; but it has the great defect that the temperature of explosion is abnormally high and that the erosion of the interior surface of the gun is proportionately increased. The South African campaign has afforded an excellent opportunity to judge of the amount of this deterioration, and it is a fact that many field pieces in the Transvaal have been returned badly eroded, and that several of the 4.7-inch guns supplied from the navy were in constant need of replacing, the wear and tear of service having completely spoiled the shooting qualities. Variations of 400 yards in the range have been experienced with guns that had been some time in service and were badly eroded.

These results may be compared with those mentioned in the last report of Rear-Admiral O'Neil, in which it is stated that tests carried out by the Bureau of Ordnance with the navy nitro-cellulose powder prove that there is practically no erosion whatever, a 4-inch rapid-fire gun at the Indian Head Proving Ground having been fired 661 times, and a 5-inch gun 636 times, without causing any wear that could be detected by micrometer measurement.

Some of the nitro-cellulose powders used on the Continent have given ballistic results which entirely disprove the oft repeated assertion that, weight for weight, cordite possesses much greater power than any nitro-cellulose compound. In a recent trial of a 45-caliber 6-inch gun, a charge of 28.6 pounds of cordite gave a velocity of 2,873 foot-seconds, while 36 pounds of Rottweil nitro-cellulose powder gave 2,910 foot-seconds. The corresponding energy for 2,910 foot-sec-

onds is 5,872 foot-tons, whereas the velocity developed by the same gun in service, using cordite, is only 2,530 foot-seconds, equivalent to 4,438 foot-tons, or 32 per cent less energy. A further advantage of high velocity is the increased danger space, which in a 6-inch gun with 3,000 foot-seconds is 465 yards as against 226 yards in the case of the service 6-inch guns using cordite.

THE SMITHSONIAN REPORT.

Dr. S. P. Langley's report of the Smithsonian Institution for the year ending December 30, 1900, deals with the Institution proper, the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park and the Astrophysical Observatory. The total permanent fund now amounts to \$912,000, and is deposited in the Treasury of the United States and bears interest at six per cent per annum, the interest alone being used in carrying out the aims of the Institution.

Congress charged the Institution during the fiscal year 1900 with the disbursement of \$397,540, of which the National Museum received the greater part, although the grants of \$75,000 to the National Zoological Park and \$50,000 to the Bureau of American Ethnology may be regarded as a very satisfactory disposal of public funds. Appropriations made by Congress for the fiscal year 1901 were \$428,540. The Institution has continued research work in various fields of science, including experiments in the solution of the problem of mechanical flight, and, through its Astrophysical Observatory, investigation on the solar spectrum. The Institution has made some interesting experiments during the year on "radio-active substances." The different branches of research now progressing under grants from the Hodgkins fund are making satisfactory advances. The income of the Hodgkins fund is devoted to investigations of the properties of atmospheric air. In accordance with the urgent desire of many of the leading biologists of the country a contract for a table in the Naples Zoological Station for a third term was entered into, and the appointments to the seats were at once approved. While it has never been possible for the Institution to devote a large amount of its income to carrying on explorations, it has, nevertheless, been able to promote such work in various ways, particularly in connection with the bureaus of the Institution and in co-operation with the executive departments of the government. These explorations have a very wide range, and are productive of a very great increase in the knowledge of natural history of the region visited, and of the ethnological conditions of the people. During the past year the Institution has thus been more or less directly concerned in explorations in various parts of the world, from the Arctic regions as far south as Patagonia, and in the distant possessions in the Philippines, as well as in South Africa.

Through the publications of the Institution and its bureaus much is done each year in carrying out its fundamental object, which is the "diffusing of knowledge." Works covering practically every branch of the human industries have been distributed throughout the world to librarians and institutions where they may best be available to scholars and to the reading public. The number of volumes, parts of volumes, pamphlets and charts given to the library has aggregated 25,701, and now only completed volumes are entered in the accession book. The secretary notes with regret the failure of Congress to make an appropriation to send a representative to the conference on the International Catalogue of Scientific Literature held in London.

Dr. Langley states that he is fitting up in the southern tower of the Smithsonian building a small room which is to be called the "Children's Room." The little group of specimens which it contains is meant to stimulate interest and imagination rather than to ostensibly instruct. Latin is banished from its labels, and the classification is not that of science but that which is most intelligible to the untrained minds. This room will, without doubt, prove very attractive to children and will probably be taken as a model the same as is the Children's Museum of the Brooklyn Institute, which we have illustrated.

The correspondence of the Institution embraces letters having reference not only to the scope and work of the Institution, but also relating to the bureaus placed by Congress under its direction. A part of \$300,000 appropriated for a government exhibit at the Pan-American Exposition has been apportioned to the Smithsonian Institution and its bureaus. The collection will chiefly consist of specimens illustrative of its scientific functions and more especially of the National Museum and Bureau of Ethnology.

Robert Ridgway, Curator of Ornithology in the National Museum, published, a number of years ago for the use of the naturalist, a handbook on color, and he requested a grant from the Institution for a new edition. It appeared to the secretary that a work upon a more extended scale and a somewhat different plan would be of value, primarily to the naturalist,

but also in every department of science, to artists and in many branches of industry. A committee has been appointed to consider the subject, as the work promises to be of considerable magnitude, and the results will be looked for with interest.

The Secretary calls attention to the necessity for an increase in the National Museum buildings, which are entirely inadequate. The field of the work of the corps of the Bureau of American Ethnology extended into Maine, New York, Minnesota, Wisconsin, Indian Territory, Oklahoma, California, Arizona, New Mexico, Cuba, Ontario and Nova Scotia, while especial work was done in other districts. The explorations and researches continue to yield valuable results in the form of contributions to the science of ethnology, while the collections made in connection with the work form an important tributary to the National Museum. Some practical importance attaches to the recent work of the bureau in connection with aboriginal agriculture and crop plants. The investigation of the wild-rice industry of the north lake region especially brings out a neglected phase of aboriginal industry and at the same time directs attention to a promising natural resource.

The free interchange of government and scientific publications between this country and the learned of other lands has grown to be one of the most important functions of the Smithsonian Institution. Great numbers of books are annually transported abroad and great quantities are received in exchange each year, the quantity handled aggregating 113,563 packages, weighing 409,991 pounds. The exchanges are in no sense of a commercial nature, for no publications for sale are allowed transmission. It is interesting to note that the expenses of the exchange service were for thirty years made entirely from the income of the Smithsonian Institution, but when public documents began to form so large a part of the transmissions as to become an unbearable strain on its resources, Congress began to make appropriations for the work.

The National Zoological Park is being constantly made more interesting by the introduction of new specimens. The extremely limited appropriations allowed by Congress have made it almost impossible to carry out the original programme of procuring a large collection of specimens of our native animals. The Astrophysical Observatory possesses a considerable quantity of apparatus which was employed in the observations on the solar eclipse of May 28, 1900, and we shall take pleasure in publishing in a subsequent number of our SUPPLEMENT full particulars of the work of observing the eclipse.

On the whole the Smithsonian Institution seems to be admirably administered with a view to carrying out the wishes of the original founder.

THE BALDWIN-ZIEGLER EXPEDITION TO FRANZ JOSEF LAND.

During the coming summer an expedition is to be sent to Franz Josef Land. It will be known as the Baldwin-Ziegler Expedition, and will be under the direct command of Mr. Evelyn B. Baldwin, formerly of the United States Weather Bureau. It is understood that the cost of the undertaking will be borne by Mr. William Ziegler, a wealthy and public-spirited resident of New York city. The principal objects of the expedition are to make magnetic, meteorological, gravity, and astronomical observations, in addition to surveying and hydrographic work, for which elaborate preparations are being made. It is also intended to make extensive collections of the flora and fauna of the region, as well as to gather specimens which will adequately represent the geographical formations.

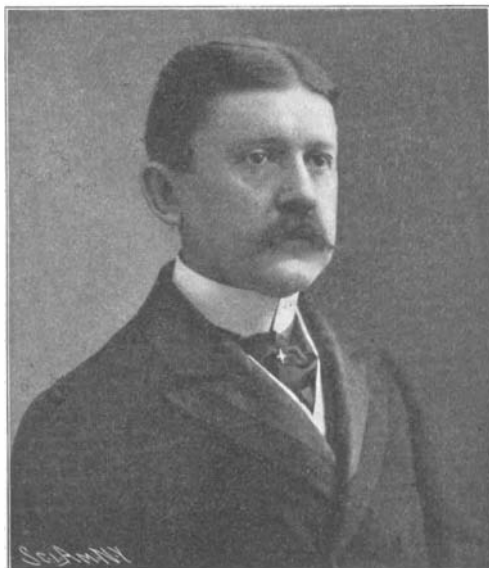
The expedition will take two steam whalers and one or more steam launches, the latter being designed especially for use in shallow waters.

Franz Josef Land, once believed to be a continent and now known to consist of a group of islands, lies in the Arctic Ocean, north of Novaia Zemlia. It is in a higher latitude than any other known land in the eastern portion of the Polar Basin. It was discovered by an Austro-Hungarian expedition in 1873. The region was penetrated by a sledging party for a distance of about 125 miles. Payer, the commander of the land party, advanced up Austria Sound as far as Cape Fligely (82° 5' north lat.) from which point—1,000 feet above the level of the sea—he observed mountains far away to the north, beyond the 83d degree. At this point it may be stated that Jackson, who visited the region later, found that no such land as Petermann Land existed. To the northwest high land rose above the open water. In the vicinity of the cape bears and foxes were plentiful, and seals were observed in large numbers about the edge of the ice. The abundance of animal life was most propitious for the explorers. Several eminent authorities regard this region as a most favorable starting-point for future journeys northward. Admiral Sir George Nares, of the British navy, went so far as to say that its extreme importance as a base for future operations has been proved. Admiral Albert Markham, in his recent work on Sir John Franklin, regards the region as "the

objective from which future Arctic exploration should be carried out." Admiral Sir Erasmus Ommaney declared that "as all other points afford no hopes of penetration to the northward, we must now accept Franz Josef Land as the base for future operations;" and Sir Allen Young in like terms considers that it must be regarded as "the only land extending far to the north by which such journeys can be made."

The now celebrated Jackson-Harmsworth Expedition visited this land in 1894 and remained there for three years. While their object does not seem to have been to actually reach the North Pole, the hope was indulged that a thoroughly scientific exploration of Franz Josef Land might be made and that they might reach a point so far north as to afford facilities for a nearer approach to the North Pole than had hitherto been accomplished.

With the aid of his co-travelers Mr. Jackson found Franz Josef Land to consist of numerous islands instead of a continent, as had been previously believed. The idea of gaining a very high latitude was therefore abandoned, their special efforts being then devoted to a thorough examination of the group. Magnetic, meteorological and other observations were taken constantly and collections made in almost every branch of natural history. Winter quarters were established on Northbrook Island to the southwest of the group. Walruses, bears and seals were found in abundance. During the three years of their stay at the island the "Windward" paid a visit, but being frozen in, was compelled to remain a year. It returned with supplies in July, 1896. A month previous Dr. Nansen and Lieut. F. H. Johansen, who wintered in Franz Josef Land about 100 miles from Jackson, arrived at the island in their kyaks, and a cordial welcome was given them. In the following summer the "Windward" again



MR. EDWARD B. MOORE,
Assistant Commissioner of Patents.

visited Franz Josef Land, and on this occasion Jackson and his party returned home.

The collections which they made included rocks, fossils, silicified wood, plants, including phænogams, cryptogams, and lichens; eggs of snow bunting, eider duck, glaucous gull, kittiwake gull, ivory gull, Richardson's skua, Brünnich's guillemot, black guillemot and little auk; and birds, including the snow bunting, Lapland bunting, shore lark, common swallow, snowy owl, jerfalcon, Brent goose, eider duck, turnstone, Bonaparte's sandpiper, sanderling, Arctic tern, Ross' gull, glaucous gull, ivory gull, kittiwake, Richardson's skua, pomatorhine skua, Mandt's guillemot, little auk, Brünnich's guillemot, red-throated diver, and fulmar petrel. No traces of previous human occupation were found by the explorers.

Shortly before sailing from England in 1894 Mr. Jackson read a very interesting paper before the Royal Geographical Society of London, in which he summed up the advantages of the region for exploring purposes under these four principal heads:

"I. The accessibility of Franz Josef Land late in the summer when approached along the meridian of 45° E., or some meridian between that of 45° and 50° E. This accessibility has been proved, in my opinion, by the voyages of Mr. Leigh Smith and the little Dutch ship 'Wilhem Barents'."

"II. The northward extension of Franz Josef Land to a latitude as high as 82.5° at Cape Fligely, and some twenty or so miles further if we accept Payer's view that Cape Sherard Osborne is continuous with that portion of the country he called Prince Rodolf's Land. The long stretch of *terra firma* forms a safe route for advance or retreat, and provides all we need in the way of sites for our depots and cairns."

"III. The still further extension to the north of what, perhaps, I should call the Franz Josef Land group. Standing on Cape Fligely, Payer saw, sixty or seventy miles to the north, the high outlines of an ice-covered

land of apparently large extent. This he called Petermann Land, and this land lies undoubtedly in a latitude as far north as any yet reached. There is absolutely nothing known of it beyond this, but it is a reasonable hypothesis to maintain that a land of such elevation would probably reach at least to the eighty-fourth degree north latitude, and who knows how much further?"

"It is this land we shall try to reach after we have safely landed, and in the early days of the following spring marched over the ice of Austria Sound, a gulf which penetrates the country to Cape Fligely; or if this be not so favorable to us as it proved to Payer, along the shores that reach down to the Sound."

"IV. The fourth consideration is provided by the observations of Payer, confirmed by the winter experience of Mr. Leigh Smith. And this consideration is a strong one—the great abundance of animal life on the southern shores of Franz Josef Land during the winter as well as in the summer."

Although the results of exploring expeditions have always been hazardous subjects of speculation, it is confidently expected that the enterprise of the present year will be at least as successful as any that have yet been made in that region, while it is natural to hope that our American effort will eclipse all others in brilliancy of exploit and results of practical usefulness, and perhaps even pave a definite pathway to that long sought goal of explorers—the North Pole.

THE NEW ASSISTANT COMMISSIONER OF PATENTS.

The new Assistant Commissioner of Patents, vice Walter H. Chamberlain, resigned, is Mr. Edward B. Moore, late Principal Examiner of the Thirty-fifth Division of the Patent Office. Mr. Moore was born at Grand Rapids, Mich., and he entered the Patent Office some fifteen years ago and at once set himself resolutely to the task of fitting himself for promotion. Eleven years later he was appointed to the position of Principal Examiner and later made a Chief Examiner of the office. Mr. Moore was chosen to represent the Patent Office at the recent Paris Exposition. The Office made no formal exhibit on that occasion, but many interesting models were loaned for exhibition purposes. Mr. Moore has had under his supervision the examination of all cases relating to educational appliances, accouterments, baggage, advertising devices, bundle carriers, fluid pressure regulators, packing and storing vessels, buckles, buttons and clasps, constituting a very wide range of subjects and involving extended technical knowledge upon his part.

Mr. Moore is noted for the justice of his decisions, by which the interests of the inventor and those of the public are equally safeguarded. In his new office Mr. Moore will have an excellent opportunity of again demonstrating his fitness as to the general and technical requirements which are imperatively demanded for the effective performance of the difficult and responsible duties which devolve upon the Assistant Commissioner of Patents.

OPENING OF THE PAN-AMERICAN EXPOSITION.

The gates of the Pan-American Exposition were closed on April 21, and every available man was put to work in order to offset the damaging effects of the severe snowstorm which visited Buffalo. The damage to the buildings is very slight, but the delay in the landscape work and the building of roadways is a great hindrance. It was intended to have this portion of the work so complete that it would be possible to have the Fair practically complete on the opening day. The storm, however, was so severe that the managers decided to postpone the formal opening until Dedication Day on May 20. It is not intended to postpone the actual opening, but there will be no ceremonies until May 20. As the Fair will be very complete at that time and the weather will probably be better, the change seems to be a wise one. The first two weeks of every fair that has ever been held have seen incompleting buildings and empty exhibition spaces.

According to German press reports, the project involving the construction of an electric railway between Rome and Naples, which was agitated some time ago but afterward abandoned, has been revived. Two Neapolitan engineers, it is stated, have prepared new plans for the road, which have been submitted to the ministry of public works. The contemplated railway will run along the shore via Cancelli, Mondragone, Minturno, Formia, Fondi, Terracina, and Cisterna to Rome, with a branch line, by way of Marano and Guigliano, to Capodimonti, the summer residence of the King. It will be double-tracked, with a total length of 135 miles.

A Swiss engineer named Sutter nearly lost his life while conducting some experiments with his airship at Arbon, near Lake Constance. His airship is similar to that of Count Zeppelin. The machine rose to a height of 150 feet, and then became unmanageable and fell.