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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 FORLORN HOPE OF THE BALTIC FLEET.

In view of the utter wreck of Russia's naval strength in the Far East, and the probability of the early capture of Port Arthur and blockade of Vladivostock, there was something almost pitiful in the elaborate ceremonies attending the recent departure of the Baltic fleet for the Orient. There can be no doubt about the official character of the dispatch of the fleet, for it was witnessed and sanctioned by the Emperor, attended by the High Admiral and other noted officers of the Russian navy. The Admiral commanding the fleet, with due ceremony, boarded the imperial yacht and bade his farewell to the Emperor. Then, with destroyers ahead and abeam, the "Kniatz Suvaroff," one of the brand-new battleships, led the way down the Gulf of Finland to the tune of booming guns, the shouts of the populace upon the water fronts and piers, and the fluttering of many signal flags wishing good luck to the fleet on its long voyage.

In the press dispatches speaking of the event it was announced that the fleet would merely touch at Libau, where it would be joined by twelve transports, colliers, and supply ships, and that it would then proceed direct to the Orient. The fleet reached Libau. It is there at the present writing; and the latest dispatches have conveyed the inevitable tidings that for the present, it will remain there, its departure being dependent upon the development of events at the seat of war.

As for the fleet itself, it is certainly formidable, if only for the reason that it contains four new battleships, just completed, which are practically sister ships to the "Czarevitch," and, therefore, are to be reckoned as among the finest battleships afloat to-day. It is these ships, with the "Osliabya," and they alone, that could have any serious effect upon the issues of the naval campaign in the Far East; for the situation out there is such that the two out-of-date second-class battleships "Navarin," launched in 1891, and "Sissoi Veliky," of the same speed, launched in 1894, would be more of a hindrance than a help to the newer ships in any engagement against the seasoned, powerful, and victorious battleships of Japan. The same may be said of the odd assortment of cruisers that make up the balance of the fleet. There is the old "Admiral Nakhimoff," nineteen years old and good only for 17½ knots at her best, and the "Dmitri Donskoi," launched twenty-one years ago, and steaming well if she can make 15 knots an hour. These are armored cruisers; but the armor is of the old compound type, soft as butter to the high-velocity guns mounted by the modern Japanese armored cruisers. It is true there are three fast, unprotected cruisers, the "Oleg" and "Aurora," sisters respectively to the "Bogatyr" and "Pallada," and the "Almaz," sister to the "Novik;" but in the present stage of Russia's fortunes in the Far East, which can be retrieved only by the most desperate kind of fighting in line of battle, unprotected cruisers are merely "food for powder."

Let us suppose, however, that the Russians should have the fatuity to send this hastily-gotten-together and heterogeneous collection of ships out to the Far East, and that it should arrive there. Where would it rendezvous? Port Arthur would in all probability be in the hands of the enemy; while, if the siege were still in progress, the Russian fleet would have to fight its way through Admiral Togo's line of battle before it could gain the harbor—a line of battle composed of five of the most powerful battleships and eight of the best armored cruisers afloat; a fleet trained to the hour, manned by crews that are seasoned and expert, thoroughly familiar with their ships, knowing exactly what they can do. What the Russian fleet at Port Arthur, more powerful and fresh from its base, failed utterly to accomplish, will never be accomplished by a less powerful fleet that makes the same attempt at the end of a long and exceedingly trying voyage of several months' duration.

If the Baltic fleet should leave Libau and actually start for the Far East, it will mean, in the judgment of the naval experts of the world, that Russia, after losing the flower of her navy in the first campaign of the war, is merely sending the remnants to a similar and very certain fate. The damage already wrought by the prowess of Japanese arms has moved Russia down from third position among the navies of the world to fifth position. If the Baltic fleet should ever reach the Far East, the venture would in all probability end in Russia's losing what claims she now has to be reckoned a first-class naval power.

A GRAVE RESPONSIBILITY.

During the last administration the Municipal Art Commission of this city was called upon to pass upon a set of plans for a city bridge, to be known as the Manhattan Bridge, for which an appropriation of $7,600,000 was asked by the Bridge Commissioner.

Realizing the great importance of the bridge, and the necessity of securing a structure that was perfectly fitted for its work, Mayor Low appointed a commission of disinterested bridge engineers to pass upon the merits of the structure. This was done; and the commission of engineers, all being of international reputation, indorsed the plans. The appropriation of $7,600,000 was passed by the Board of Estimate and Apportionment; but when it came before the Board of Aldermen, that body refused the appropriation, without giving any logical reasons for their reprehensible action in delaying such an urgently-needed work. The expert testimony (if such it can be called) before the aldermen was given by an employee of the Bridge Commissioner, who left his desk to go to this meeting and condemn the plans of his superior, who, by the way, is recognized among engineers both in America and Europe as the leading authority on the design of long-span suspension bridges.

For this gross act of insubordination the employee was promptly and very properly discharged.

At the change of administration, the Commissioner was succeeded by a gentleman, who has not and does not profess to have any knowledge of bridge engineering, and he promptly installed the discharged employee in the responsible position of Chief Engineer of Bridges, a post which under the former administration was filled by the Commissioner himself.

The first act of the Commissioner and his new chief was to discard the plans, which, designed by the leading expert on such structures and indorsed by a disinterested commission of experts, had been passed by the Art Commission.

The next step was to draw up a preliminary sketch of a bridge costing $2,500,000 more than the discarded bridge, and taking one and a half years longer to build, and submit this raw proposal to the Art Commission for their approval.

It was at once pointed out to the Art Commission by the engineering and technical press that, before they passed upon these plans, they should, following the precedent set by Mayor Low, request the present mayor to appoint a commission to inspect the new plans, and decide whether they were preferable to the accepted plans.

The latest protest against the action of the Bridge Commissioner was made by the Merchants' Association of New York, during a hearing granted by the Art Commission to that body, in the course of which it said:

"There has been and still is very serious difference of opinion between the present Bridge Commissioner, unsupported by outside engineering ability, and the former Bridge Commissioner, supported by the findings of the expert commission to which his plans were submitted, as to the relative effectiveness, cost, and speed of construction under the respective plans.

"In view of these facts, the Merchants' Association, which does not pretend to any engineering knowledge and does not, therefore, favor one set of plans as against the other, most strongly urges upon your Commission that the approval by you of the plans prepared by the present Commissioner of Bridges be withheld until both sets of plans shall be submitted in detail, with specifications and strain sheets, to disinterested engineering experts of at least as high standing as those who passed upon Commissioner Lindenthal's plans. In this way the controversy as to the strength, cost, durability, and speed of construction of both plans would be decided by technical men of standing and reputation, whose decision would command the confidence of the whole community.

"Should your honorable Commission decide to approve Commissioner Best's plans without submitting them to expert engineers, the whole responsibility, both for the successful completion and operation of the bridge, and for any disaster which might occur thereon as a result of inherent engineering weakness, will rest upon your shoulders, because the approval of your Commission is necessary under the law before construction can commence. Your Commission, therefore, is the only body which can compel the submission of the plans to expert engineers for decision as to their relative merits."

In spite of the obvious contradiction involved in the repudiation by the Art Commission of properly-authenticated plans that they had already indorsed, in favor of imperfect plans lacking any engineering indorsement, the Art Commission has seen fit to accept the new plans.

We certainly agree with the Merchants' Association in the opinion that the Commission has assumed a grave responsibility in authorizing this important public work under circumstances that must be very discouraging to the friends of good government in the administration of city affairs.

For what good reason does the Art Commission, after accepting the findings of an expert investigation of a bridge designed by a competent engineer, now refuse to ask for a similar investigation of the undigested plans of a man who was a comparatively unknown subordinate in that engineer's office when those first plans were made?

PROPOSED AMENDMENT PERMITTING THE EXTENSION OF THE TERMS OF PATENTS.

At frequent times, we see many incidents which furnish the best evidences of the high esteem in which the inventors of our country are held, and the duty which the public recognizes of assisting in the perfection of our patent system, to enable inventors to secure the protection which, from the earliest days, our statesmen believed to be their due. It is deemed to be only just that an inventor who has added to the technical knowledge of the public, and has enabled the wants of the many to be better or more economically satisfied, should be suitably rewarded. In giving the inventor, for a time, a monopoly of the device, a knowledge of which he has furnished to the public, the reward is commensurate with the value of the knowledge furnished by the inventor, provided the term of the monopoly is reasonable.

In the several patent laws which have been enacted, the terms for which patents were granted have varied, and it has been evident that there is a difference of opinion on the question of the time during which the inventor should have the exclusive right to the patented invention; but on closer investigation, it will be found that this, in a measure, is because of the facts in particular cases. While, usually, the term of seventeen years, which is the period of the grant of a patent under our present law, is sufficient to recompense an inventor, and the difference in the returns will be in proportion to the value of the knowledge furnished to the public in the Letters Patent, it is found that, in particular cases, because of lack of capital, the necessity of using the invention in connection with another patented device the patentee of which will not make reasonable terms, the difficulty in procuring raw material, or other causes, inventors have been unable to receive the expected return, and that in those cases, to do justice it is necessary to extend the otherwise definite term in which they may reap their reward.

Earlier enacted patent laws of the United States permitted patentees who, through no failure on their part, had been unsuccessful, during the term of the patent, in obtaining a reasonable reward, to have the term extended. The last law permitting such extensions was repealed in 1861, since which time it has been impossible to have the monopoly extended, except by a special act of Congress. The injustice arising under the present law has led to an agitation to create a sentiment in favor of an amendment which will reenact provisions of the law enabling inventors in special cases to have the life of their patents prolonged. The members of the American Bar Association have been communicated with concerning the proposed amendment, and they appear to be unanimously in favor of the change in the law. The question is now being submitted to the patent solicitors and specialists of the United States, and at the meeting of the American Bar Association, to be held shortly at St. Louis, a resolution in favor of the change in the law will be submitted for the vote of the members present. Considering the replies which were received to the letters previously addressed to them, the vote of the members of the American Bar Association will undoubtedly be favorable to the proposed amendment.

As the members of Congress, who have been interviewed concerning the proposed change in the law, seem to be decidedly in favor of extending the privileges granted to inventors, it is likely that the amendment will, at the next session of Congress, be enacted.

TRUNK LINES AND TROLLEYS IN THE EAST.

The announcement that the New Haven road will spend $8,000,000 for the improvement of its suburban service near New York is of special interest to electricians, for of the six tracks entering the city limits four will be of the third-rail electric type, two for local trains, and two for express trains to run under a fifteen-minute headway. The land for the new tracks has been secured, but plans are not completed either for the installation of the electric lines or for the equipment of the road with electric cars and locomotives. However, the general plan will be to connect local electric trains with the underground electric road of the

new city subway, and to give commuters thereby a convenient method of traveling from the business section of the city to their suburban homes.

This completely revolutionizing scheme of one of the oldest roads in the East, taken in connection with the installation of the Fourth Avenue tunnel with electricity by the New York Central, indicates pretty clearly that the trunk lines in the East are entering the electrical railroad field in order to save their traffic from complete demoralization by the trolleys. The struggle between the two systems of transportation, steam and electricity, is thus likely to terminate in the general adoption of the latter for nearly all work except possibly the long-distance through express service. Eventually this may also be changed to follow in the line of progress; but at present it is impossible to predict its future.

In New England the trolleys have intersected the country so that passengers can go from one town to another without once riding on the steam roads, and in most cases the two lines run parallel. The trolleys in nearly all such instances have robbed the steam roads of their local, short-distance traffic. The latter tried the expedient at first of reducing fares to compete with the trolleys, but this proved of little avail, for the trolleys were more convenient and satisfactory for a ride of five or ten miles than the steam cars. The time table of the latter would have to be revised so that trains would have to run every five or ten minutes to hold this local, short-distance traffic.

The changed attitude of the steam roads indicates now that they will enter extensively into the work of building trolley roads as feeders to their main lines. Towns and cities a few miles back from the steam roads are being connected rapidly by short trolley roads built and operated by the steam roads. These trolleys run to meet all trains, and passengers thus find it convenient for them to connect with trains at the least possible expense and trouble. Formerly only stages connected these towns with the steam roads, and their isolated positions inland retarded their growth tremendously.

The effect of this enlightened system has already been noticeable. Towns and villages that possessed unusual natural surroundings, but owing to their location inland were out of touch with the rest of the world, have suddenly increased in population and business enterprise. Some of them have actually doubled in population within three years owing to their direct connection with the steam roads by trolley feeders. Summer visitors have flocked there, so that their former stagnant life has been completely revolutionized.

It is apparent that most of the eastern roads have within the current year reached the conclusion that they must wake up and adopt new policies. They cannot run counter to public demands much longer when the latter have the electric roads to use as a final weapon to force them to compliance. The New York Central and the New Haven roads have both entered extensively in the electrical field all along their extensive routes. In some instances they have bought up the different trolley systems, or secured control of them so they would no longer compete with the steam roads, but act as feeders to them.

Several of the eastern railroads have gone far in the past few months in building feeders to their lines, and incidentally forestalling private trolley companies in constructing new systems in localities where the traffic is now small. The question of establishing motor cars as feeders has been tried in England by the Great Western Company, and the same subject has been brought up here for consideration. In parts of the country where no trolley roads are to-day built, the motor cars might connect small hamlets with large towns on the line of the railroad, and thus promote better traffic. The English motor cars used for this service between the Lizard and Helston station, in Cornwall, accommodate 32 passengers, and since they have been in operation they have proved profitable. A similar service was tried this summer at several of the beaches by the New Haven road. The beaches had natural advantages that should make them popular, but no company had yet built trolleys running to them. It is doubtful if the summer traffic would be sufficient to make a trolley line profitable for the whole year, for the travel is confined chiefly to the three or four summer months.

The New Haven road started a line of motor cars from the nearest station to the beaches, connecting with the principal trains running to the cities. The result has been that the traffic to the beaches more than doubled this year, and at the present rate of increase the summer population should almost warrant the building of a trolley line within another year or two. The success of such summer motor cars as feeders to the main railroad lines has the further advantage of opening up new territory and laying the foundations for future trolleys. It is possible to ascertain the relative value and possibilities of a new route by installing such a motor car line. If the natural advantages of the place are sufficient to attract summer visitors when a good service is provided, the projection of a trolley line is merely a matter of a year or two. Next summer the New Haven road promises to develop many new beaches and isolated routes by this method, and if the traffic increases, trolley lines under the steam road's control will follow.

Even the question of the trackless trolley has received consideration in the past. Awakened from their long sleep, the railroads are looking around for every possible improvement and development that will place them abreast of the times. Having adopted electricity as an auxiliary motive power, it is only natural that they should seek to utilize it whenever possible.

The trackless trolley has been tried in Germany, but whether the greater cost of operating the cars over dirt or macadamized roads instead of on rails will not more than offset the expense of building tracks is a question that cannot be answered. There are, however, companies who believe otherwise. Within the past month two or three independent companies have been organized for experimenting with the trackless trolley. The application for a charter to use the turnpike for such a trackless trolley was denied the past month in New Jersey because there was no existing law which could control the operation of the cars. It was the legal opinion that the trackless trolley was neither a railroad, nor yet a vehicle in the ordinary sense of the word. Consequently until some new law was passed to control the trackless trolley, it would be wise to refuse to issue a charter for using the right of way of a public road. However, this short-sighted legal view of the matter will not be final if the trackless trolley can be proved to be of value in the development of the country.

Unquestionably the trackless trolley should prove an effectual feeder to the railroads in many parts of the country where small towns and villages are located off from the main lines of traffic, provided the cost of operation is low enough to justify this method of propulsion. The roads must be firm and smooth the greater part of the year to make the service of any value, and as a result they must be macadamized or securely built so that the drainage is perfect. Muddy winter roads would put the trackless trolley out of service about as quickly as anything. The snow problem would have to be considered also, for while it might be easy to clean the tracks of snow, sleet, and ice, it is quite another proposition to keep the whole side of a turnpike free of obstacles. There would also arise many problems regarding the right of way. Not every teamster or driver of an automobile would yield to the trackless trolley car the best part of the road, and trouble and confusion, with resultant litigation of a costly nature, might follow to involve the company.

However much these side issues of the general movement of the steam roads to adopt electricity may seem exaggerated and uncertain in their ultimate good, it cannot be denied that the old struggle between the trolley and steam railroad in the East is entering upon its final stage, which is nothing less than the capitulation of steam and electricity. The latter has proved too formidable for the former, and it is rapidly being adopted by the most conservative of steam railroad corporations, not simply for city tunnels and bridges, but for suburban traffic, country short-haul feeders, and even for express service in certain sections.

THE NEW YORK SESSIONS OF THE EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS.

The Eighth International Geographic Congress began its first convention in the United States at Washington, September 8, and continued it at Philadelphia, New York, Niagara Falls, Chicago, and St. Louis during the succeeding fortnight, under the presidency of Commander Robert E. Peary, U. S. N. The honorary presidency of the congress was held by President Theodore Roosevelt.

In New York the congress was the guest of the American Geographical Society, and the sessions were held at the house of the society in West 81st Street and in the halls of the American Museum of Natural History on Tuesday and Wednesday, September 13 and 14, while Thursday, the 15th, was devoted to an excursion up the Hudson to Mount Beacon and to West Point, closing the sessions in this city.

The days were devoted to the scientific programme, in which many papers of interest and value were presented, and of which an extended report will soon appear in the SCIENTIFIC AMERICAN SUPPLEMENT. The convention here began with a general session Tuesday morning in the lecture hall of the American Geographical Society, at which Commander Peary gave the visiting geographers, who numbered some 300, a cordial welcome to the city, and then introduced the general programme, which for the morning consisted of addresses on Deep Sea Deposits, by Sir John Murray; on the Volcanoes of Martinique, Guadeloupe, and Saba, by Dr. E. O. Hovey; and on the Rise and Development of the German Colonial Possessions, by Graf Joachim von Pfeil.

The sectional meetings began in the afternoon, and at these the numerous papers of the convention were read in full or by title. The sections meeting here and their officers were: Oceanography, William Libbey chairman, R. A. Harris secretary; Exploration, H. G. Bryant chairman, H. L. Bridgman secretary; Economic Geography, E. R. Johnson chairman, C. W. Hall secretary; Educational Geography, Charles R. Dryer chairman, E. C. Jones secretary; Volcanoes and Earthquakes, Charles H. Hitchcock chairman, E. O. Hovey secretary.

Tuesday evening a public lecture complimentary to the congress and the society was given in the auditorium of the museum by Dr. and Mrs. W. H. Workman on their recent high ascents among the Himalayas and the glaciers of those mountains. Dr. Workman has established the record for high altitude on land, attaining an elevation of 23,397 feet, and Mrs. Workman's record is only two thousand feet less. A brilliant reception at the house of the society followed the lecture.

The dinner of the congress was held Wednesday evening at the Endicott Hotel. This was complimentary to the foreign delegates, and was largely attended. In the course of the dinner Commander Peary announced that his plans for another attempt at the North Pole had gone so far that the keel of his new ship had been laid, and that she would be ready for use next summer. She is to be a vessel of the strongest construction, adapted particularly to the work in view, and provided with engines capable of exerting 1,500 horse-power. A feature of the evening was the presentation to Commander Peary of the gold medal awarded to him by the Paris Geographical Society for his Arctic researches.

Among the celebrities present may be mentioned Sir John Murray, of the Scottish Geographical Society; Prof. A. Penck, of Vienna; Dr. H. R. Mill, of London; Graf Joachim von Pfeil, of Berlin; Major A. St. H. Gibbon, of London; Profs. H. Cordier and G. Grandidier, of Paris; M. de Claparède, of Geneva; Dr. Bela Erödi, of Buda-Pest; Prof. A. Marcure, of Berlin; Prof. Oberhummer, of Vienna; and Prof. J. Thoulet, of Nancy. About 120 foreign delegates were in attendance, and the total registration was about 800. The next convention of the congress, five years hence, will be held in Geneva, Switzerland.

SCIENCE NOTES.

Prof. Constantine Gregory, of Naples, has invented a new chemical process for the preservation of flowers and foliage. When the professor submitted the results of his first experiments to the Neapolitan Institute for the Advancement of Science, a few weeks ago, the association, after carefully examining them, requested the preservation of some plants which they described, and which in their opinion presented the greatest difficulties owing to their peculiar nature. The professor completed the trial set before him, and he has presented some splendid examples of begonia and orchid leaves which have a remarkable natural appearance. In recognition of this work he has been awarded the silver medal of the institute. The professor is now engaged upon the extension of his invention to fungi, and in the event of his achieving success he will be presented with the society's gold medal.

In a recent number of La Energía Eléctrica, A. Sandaran describes a new method of testing the molecular state of locomotive axles and other iron and steel pieces, this method being based on the magnetical properties of iron and steel, and intended to reveal any injury these pieces possibly have undergone in operation. From the principles of magnetism, it is inferred that when testing an iron or steel piece before commencing work, the graphical representation of a magnetizing cycle will afford an illustration of the magnetical properties of the piece concerned. Now the axles of locomotive and railway carriages, as well as other machine pieces, are exposed in operation to such vibrations and shocks as to become brittle, when the fracture will show a crystalline structure. At the same time the magnetical residual phenomena are diminished, the iron piece assuming the normal average state as corresponding with the magnetic force, its hysteresis being diminished and the ascending and descending branches of the induction curve differing from each other to no material degree. Between the magnetizing curves of an axle or another iron piece as recorded at different periods of operation there may thus be noted important differences, a magnetical investigation of the piece in question allowing of conclusions being made as to its present safety, and of stating whether any abnormal alteration such as an internal fracture has occurred.

The last 100-foot crib, which forms the foundation of the new government breakwater at South Chicago, was recently put in place and sunk by the contractors. The pier when completed will extend 6,900 feet from the shore of the north side of the Calumet River, and form a complete protection from north and northeast storms.