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NEW YORK, SATURDAY, OCTOBER 11, 1902.

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.

TITLES TO THE PANAMA CANAL.

The announcement that the titles to the property of the Panama Canal Company are unquestionably valid marks another important step toward the completion of the great waterway through the Isthmus. It will be remembered that during the final discussion in Congress on the question of the respective merits of the Nicaragua and Panama routes, the point was urgently insisted upon by Senator Morgan and some of his associates that the Panama Company could not possibly give valid title to their properties. To determine this question, Attorney-General Knox, assisted by the American legal adviser of the company, has been making a thorough search in Paris of the titles to the Panama holdings. The latter gentleman has recently returned to this country, and he announces that, during six weeks of consecutive examination, he prepared and delivered to Attorney-General Knox in Paris every conveyance, decree or concession relating to the properties of the canal company, from its inception in 1878 to the present day. The presentment showed a complete chain of title in the new Panama Canal Company, and its unquestionable power to convey the canal, plant, concessions and other property to the United States, free and clear of all liens or claims of any kind.

As the questions involved are governed by the law of France, the American representative of the canal company submitted his opinion to several of the most eminent lawyers of France, among whom was included two former presidents of the Bar Association of France, the French counsel for the new Panama Canal Company, the counsel for the liquidator of the old company, all of whom are among the leaders of the bar of France; and it is gratifying to learn that without exception these lawyers delivered opinions fully sustaining the titles and powers of the company. With a view to securing further indorsement of this opinion, the matter was submitted to such a great authority as M. Waldeck-Rousseau, who has just resigned the Premiership of France to resume the practice of the legal profession. From him a further indorsement was received in the form of a set of elaborate opinions, to which was added his conclusions that the title to the property is perfect and absolute, and that the United States will acquire a complete and valid title thereto, free from any possible complications from creditors or stockholders of the old company.

It is a fortunate circumstance that in February last a bondholder of the old company raised certain questions designed to interfere with the sale to the United States. The canal company boldly met these questions, and forced them to a decision which confirmed the position of the new Panama Canal Company; and an appeal taken by the defeated bondholder to the Court of Appeals resulted in the absolute confirmation of the previous decision, his action merely serving to secure judicial approval of the sale to the United States.

As the matter now stands, all questions involved in the transfer are governed by the law of France, and the courts of France have finally and conclusively adjudicated every question in favor of the new Panama Canal Company. It is now only necessary to conclude a treaty with Colombia in agreement with the Spooner law. The treaty is well under way, only three or four points being still under discussion. With the conclusion of the treaty between this country and Colombia it will be a simple matter for the United States to protect the strip of land over which it will acquire jurisdiction.

THE BRITISH GOVERNMENT AND THE SHIP COMBINE.

The long-awaited details regarding the nature of the great American and British ship combine and its relation to the British government have recently been made public by no less an authority than Gerald W. Balfour, President of the British Board of Trade, and incidentally an important letter has been issued by the directors of the Cunard Steamship Company, which is not in the combine, setting forth the terms of a subsidy which it is to receive from the government. With regard to the Cunard Company, the important announcement is made that the subsidy includes the payment by the government of $750,000 annually on the condition that the company builds two large, fast steamers of from 24 to 25 knots speed for the Atlantic trade. During the continuation of the agreement the Cunard Company is to hold its entire fleet, including any new vessels which it builds, at the disposal of the government; and the company agrees further that under no circumstances shall the management be in the hands of other than British subjects, nor shall the shares of the company or its vessels be so held.

With regard to the shipping combination, Mr. Balfour publicly stated at Sheffield that he believed Mr. Morgan had no intention of injuring British commerce or shipping, and that proof of this was found in his readiness to meet the government on all points upon which Great Britain's interests might seem to be most endangered. The Secretary of the Board of Trade further stated that an agreement had been arrived at with Mr. Morgan under which British vessels in the shipping combination would remain British, not merely nominally but in reality. The majority of the directors of the new combination in Great Britain were to be of British nationality, the vessels were to fly the British flag, while the officers and a reasonable proportion of the crew were to be of the same nationality. Moreover, the combination had agreed that at least half of the tonnage hereafter to be built for it should be built in England and sail under the British flag. The government was empowered to terminate the agreement, which was for twenty years' time, and was to be renewable by five years' notice from each party to it. In concluding, the Secretary of the Board of Trade said that it was his earnest hope that the arrangements thus announced would, while safeguarding British interest, be the surest foundation of lasting friendship between the two nations.

Subsequently it was announced on this side of the water that this great steamship combination is to be carried out under the name of the International Mercantile Marine Company, with a capital of $120,000,000. The president of the company will be Clement A. Griscom, and the directors and committees will be made up of a combination of leading American and British steamship owners of international repute.

The aims and objects of the combination are so well known to the public as to need no reiteration here. It is claimed that the companies included will be able to provide a greatly improved service and to regulate the dates of sailing so that they will be better distributed throughout the days of the week for the convenience of the traveling public, while it is expected that great economies will result from the operation, under a single management, of companies which formerly had no well-adjusted relations with each other. There is no question that the lines interested in the merger will be operated more economically, and the public will naturally hope that it will realize its due share of this economy in the shape of reduced fares and better service.

FURTHER DEVELOPMENT OF NIAGARA FALLS POWER.

With the approaching completion of the second power house of the Niagara Falls Power Company, and the construction of another great power plant on the Canadian side of the river, the development of the energy of the Falls is proceeding at something like the rate which was predicted many years ago at the time of the inauguration of the first Niagara Falls plant. The old station of the Niagara Falls Company contains ten 5,000 horse power turbines, giving an aggregate of 50,000 horse power; the output capacity of the second station will be 55,000 horse power. This will be developed by eleven turbines, operating eleven generators, each unit, as in the old house, being of 5,000 horse power capacity. The new wheel pit is 178½ feet deep, 18½ feet wide, and 464 feet long. It is excavated out of the solid rock and discharges into the great tunnel which was driven to serve as a tailrace for the first power house. The total length of the new power house is 560 feet, and its width is 70 feet. At its completion the plant of the Niagara Falls Power Company will be the largest in existence, having a total of 105,000 horse power, which is more than is actually developed by any of the great power houses in this city, although some of the latter, when completed, will exceed this figure.

The Canadian Niagara Falls Power Company has commenced work on its new plant, which will be located in the Victoria Park, about 1,500 feet above the Horseshoe Falls. Its general features will be similar to those of the American plant, its discharge tunnel opening through the cliff at the foot of the Horseshoe Falls. The power will be transmitted to Toronto and other Canadian cities that are within economic range, and to factories located on the Canadian shore. In view of the large ultimate output of the plant, and to secure economy of space and reduction in cost of development per horse power, it was decided to use units of the great capacity of 10,000 horse power each. The frequency will be 25 cycles, and the generators will be wound for 12,000-volt three-phase current. In addition to the economy of space there will be other advantages in the use of such large units, such as simplicity of operation, owing to the reduction in the number of units and the reduction in the cost of maintenance. For the present three generators have been ordered of the General Electric Company. They are of the internal, revolving-field, vertical-shaft type. The speed of revolution will be 250 per minute, and as a result the generator will be relatively small, its extreme diameter being 19 feet. The weight of the revolving portion of the machine is 141,000 pounds. It will be a considerable step from the 2,300-volt, two-phase of the American plant to the 12,000-volt, three-phase current of the Canadian plant; but this high voltage was selected because of the economy in distributing to power users located near the power house. For long distance transmission to different Canadian cities, the voltage will be raised to 22,000, 40,000 or 60,000 volts.

THE WATER-TUBE BOILER PROBLEM.

The report of the British Commission on the use of water-tube boilers for naval purposes will prove to be a most valuable document to every navy of the world. The high character of the Board of Experts who carried on the investigation, and the exhaustive and elaborate nature of the tests which were undertaken, render these conclusions practically final on this question. The committee admit the undoubted advantages of the water-tube boiler for naval purposes, and at the same time they point out the difficulties and risks attendant upon the use of it. They propose to find a way out of the dilemma by installing a combination boiler plant, to consist partly of cylindrical and partly of water-tube boilers, the cylindrical boilers to be used for cruising at ordinary speeds, and for the supply of the various auxiliary engines, while the water-tube boilers are to be considered as a reserve which is to be called upon only when extra speed is to be attained. The six new British cruisers of 22,000 indicated horse power are to have a fifth of their equipment, or 4,400 horse power, in cylindrical boilers, and the remaining 17,600 horse power, in water-tube boilers. The wisdom of this decision cannot be disputed, for, as a matter of fact, the period or periods during which one of the modern fast cruisers or battleships makes use of all its boiler equipment to secure its maximum speed, are very short and infrequent. It is quite possible that in the case of some vessels they will not for twenty-four hours out of their whole life be driven at their maximum speed. Except for the first high-speed acceptance trial runs, there are no occasions in times of peace, save possibly for a brief spurt during naval maneuvers, when the vessel is pushed to its full speed, and in war time the engines will probably only be called upon for their maximum effort for a few hours at a stretch. An additional advantage arising from this determination to reserve the water-tube boilers for high-speed runs is that, since their periods of service will be briefer, they need not be made so heavy as the present naval water-tube boilers, which have to be designed to fulfill the requirements of durability and capacity for continuous service. In fact, under the new arrangement the water-tube boiler can be designed more on the lines of those installed on the torpedo-boat destroyers, with a consequent saving in weight and space which will be of the greatest value to the naval architect.

POWER FROM OIL IN TEXAS.

Fuel oil has worked many strange improvements in the method of doing things in Texas and Louisiana since the Lucas gusher "came in" nearly two years ago, and it is destined to accomplish more wonderful changes, the latest and most striking of which has just been announced.

One plan has as its object nothing more or less than the turning of a comparatively unimportant section of a Texas county into a thriving center of life and activity through the agency of electricity.

Harris County is that selected, and the industry to be developed is the raising of rice on an immense scale, all the power to be supplied by electricity, even to flooding the fields, harvesting the crop, milling the rough rice, lighting and heating the homes of farmers, supplying heat for their cooking stoves and the power for transportation of product over a network of trolley car lines. In other words, almost every necessity and comfort of the people who will be brought in to settle this country will come to them through the agency of electricity. Fuel oil will produce the steam which will operate the central power plant, and through its use the cost of operation will be just about one-half of what it would be were coal or other fuel used, the oil fields being only a short distance away.

A ten-thousand-acre rice plantation, which cannot be irrigated under the system of surface canals now used, is to be equipped at an expense much less than

that at which water can be supplied through such canals in more favored sections.

Wells are to be bored, an abundance of water being obtainable at a depth of fifty feet or less in any portion of the rice belt, and the water drawn by electrically-operated pumps. Each farmer will have his own well and will be independent of his neighbors and of drouth, thus insuring an uninterrupted cultivation and a constant crop of rice. A centrally located power plant will supply power for the wells, rice mill, harvesting machinery, trolley lines, warehouse trucks and equipment, lights for the plantation roadway, store and dwelling houses, and possibly heat in winter time as well as the means of cooking all the year round.

Prof. Knapp, president of the National Rice Growers' Association, which has just closed its session in New Orleans, has long held that a solution of the costly plan of canal irrigation—receiving water supply from rivers and bayous—would be solved by the pumping process and be followed by an increase of 100 per cent in the rice output in Louisiana and Texas within five years.

THE WORLD'S VOLCANO RECORD FOR 1902.

The New York Times has compiled a most interesting and scientifically valuable list of the world's record of earthquakes and volcanic eruptions from April 10 to September 23. The list shows an almost continuous series of earthquakes, eruptions, tidal waves and lesser strange phenomena throughout the summer. Seismologically, the year has been one of the most remarkable recorded in history. The extraordinary eruptions of Mont Pelée and La Soufrière form only a small portion of the general disturbance to which our earth has been subjected. The list is as follows:

April 10—News received of volcanic activity at Unalaska, Aleutian Islands.

April 18—Earthquake in Guatemala, Mexico, Amatillan, San Juan, San Marcos, Escuintla and Santa Lucia, killing 1,000 persons, injuring 3,000 others, and rendering 50,000 homeless.

May 3—Mount Redoubt, in Alaska, erupts.

May 7—First eruption of St. Vincent.

May 8—First eruption of Mont Pelée, destroying St. Pierre and its 30,000 people.

May 12—Mount Colima, near Guadalajara, Mexico, becomes active.

May 13—Severe earthquake felt at St. Thomas, Danish West Indies.

May 15—Mount Soconusco, State of Mexico, becomes active, causing many casualties and a few fatalities in Aquespala, Laverga and Comitan.

May 18—Earthquakes in the southern part of Portugal.

May 18—Second eruption of St. Vincent.

May 20—Tidal wave destroys a portion of the village of La Carbet, Island of Martinique.

May 20—Basse Pointe, Martinique, inundated by mud.

May 21—Earthquake experienced at St. Augustine, Fla.

May 24—Mont Pelée resumes and continues with great force for several days.

May 28—Earth tremor registered at Bayonne, N. J., and at Chattanooga, Tenn.

May 30—Another eruption of La Soufrière, accompanied by a severe earthquake.

May 31—Sulphurous exhalations from Mount Trabochetto, between Nice and Genoa, Italy.

June 2—Announcement of eruption of Mount Blackburn, in southeastern Alaska.

June 4—The Gusygran, a mud volcano near the village of Kobe, in Caucasia, erupts, killing several persons.

June 4—Landslide, Mount Grigna, near Lake Lecco, Switzerland, kills two noted scientists.

June 6—Another violent eruption of Mont Pelée.

June 8—News received of the eruption of Tacana, in Guatemala, accompanied by violent earthquakes which razed many buildings in several towns. One thousand persons killed.

June 9—Columns of steam rise from Mount Rainier in Alaska.

June 14—Discovery of slight elevation of localities in Pennsylvania.

June 14—Still another violent eruption of Mont Pelée.

June 15—Strong earthquake shocks in Sicily.

June 19—Mass of slime ejected from Pelée, practically destroying the town of Basse Pointe.

June 20—Disastrous earthquake shocks in Tyrol.

June 21—Volcano Pichincha, in the Province of Manabi, in Ecuador, becomes active.

June 22—Violent earthquake shock at Cassano al Jonio, in the Department of Calabria, in Italy.

June 24—News received at San Francisco of the eruption of the volcano of Kilauea, near the city of Hilo, Island of Hawaii.

July 1—Earthquake shocks in Salonica, European Turkey, causing heavy loss of life and great damage to property. On the same day, also, earthquake shocks were felt simultaneously in twenty towns in Asia Minor, causing the collapse of many houses.

July 7—Large bowlders and gases ejected from Tulsa, a small volcano in the Indian Territory.

July 7—Guvesne and Zelisova, in European Turkey, partially destroyed by an earthquake.

July 8—Volcanoes of Miravallis and Ricond de water up the Harvey Canal, killing countless millions of fish.

July 8—Volcanoes of Miravallis and Ricond de Vieja, in Costa Rica, reported to be in active eruption.

July 9—Severe earthquake shock at Bunder Abbas, Persia, doing much damage.

July 9—Three severe earthquake shocks at St. Vincent, Danish West Indies.

July 10, 11, 12—Loud detonations from Soufrière volcano.

July 1—Fresh eruption from Mont Pelée.

July 12—Violent earthquake shock in Caracas, damaging towns of Guarenas, Guatire, Valencia and La Guayra.

July 17—Other severe earthquakings at Kingston, St. Vincent, Danish West Indies.

July 27—Destructive earthquake shocks in California, doing much damage to property in Los Alamos, San Maria, and Santa Barbara. Simultaneously a series of severe shocks was felt in Nebraska, the Dakotas and western Iowa, and did damage to property.

August 13-15, Japan—Eruption in small Island of Torishima; the inhabitants, 150 in number, disappeared, together with houses.

August 25, Italy—Mount Alto in eruption.

August 27, Philippines—Earthquake in the Island of Mindanao; sixty natives killed.

August 30, Venezuela—Earthquake shock at Carupano at 9 A. M.; disturbance accompanied by noise which was heard along the whole shore of the Caribbean Sea.

August 30, Martinique—Mont Pelée in violent eruption; said to have killed 2,000 people.

September 1, Martinique—Mont Pelée again active, the eruption surpassing in force that of May 8.

September 6, Italy—Vesuvius spouts flames.

September 8, France—Earthquake shocks at Pau.

September 8, India—Severe earthquake in Bengal.

September 9, St. Vincent—Contour of island changed by eruption of La Soufrière.

September 9, Greece—Stromboli in full eruption.

September 16, Mexico—Water spouted from a lake frightens Indians and whites.

September 17, Philippines—Macon, Taal and Balusan volcanoes unusually active.

September 22, St. Vincent—Violent eruption of La Soufrière; cable repair ship "Newington" working five miles from shore forced to steam away at full speed, effecting a narrow escape.

September 23, Jamaica—Sharp and violent earthquake shock felt throughout the island.

September 23, Ecuador—Severe earthquake shock felt at Quito, followed by violent storm.

TWO RIVAL AIRSHIP ASCENTS.

On September 29 E. C. Boice, in the airship which Santos-Dumont left behind him, made an ascent from Brighton Beach. The Santos-Dumont ship rose steadily to a height of about 1,000 feet and was headed for Sheepshead Bay. Hardly had Mr. Boice set off on his journey when Leo Stevens started upward from Manhattan Beach. Stevens' ship rose to a height of about 1,000 feet, headed due west, traveled about 1,000 yards, when the motor became disabled. The machine alighted on the top of a telegraph pole.

Boice had not much better luck. The Santos-Dumont was brought to a sudden stop because, as its navigator stated, one of its ropes fouled the propeller. The ship descended after having been in the air for about fifty minutes.

Stevens and Boice seemed to have their airships well under control. Boice sailed a mile and a half and landed in a vacant lot. Stevens succeeded in covering about three-quarters of a mile. During the trials an eight-mile wind was blowing from the northeast. Boice's trip from start to finish was almost directly in the teeth of the wind. Stevens, on the contrary, was compelled to drift along with the wind.

COLLIERS FOR THE BRITISH NAVY

The British Admiralty has introduced another new type of vessel into the navy, which, although not a war vessel in the strictest sense of the word, will nevertheless play an important part in a naval engagement. This new vessel, for which many firms have been invited to submit tenders, is described as a floating "coal depot," with a capacity of no less than 12,000 tons. The design of the ship is very ingenious, the hull being divided into two immense holds by an opening which extends all fore and aft, and from the double bottom to the deck. These holds are in turn divided by a lower deck, which leaves a space of about seven feet in height below it. Shoots are distributed all over the deck, and the coal in the main holds forces itself through them, with very little trimming, into bags fixed below them. When the bags are full they are conveyed by an ingenious device toward hoists in the central passage, and from the deck are loaded into the vessels alongside. It will be possible to coal two ships simultaneously by this method, and the supply will be continuous and speedy. It will thus be seen that the coaler is practically mechanical and will need very little attention. The British Admiralty contemplate equipping all the coaling stations with ships of this type.

SCIENCE NOTES.

In the course of an article on animal sense perceptions, in which special attention is directed to nauseous or offensive odors as a means of protection, the editor of the Zoologist warns his readers against regarding animal etiology too much from the human standpoint. Because animals cannot speak, we must not assume that they have no modes of communication; it is by no means certain that the ordinary explanation of "warning colors" is the true one, while the evil smell of the durian fruit does not render it distasteful either to the orang or to man himself.

There is on exhibition in London a large collection of relics of great archæological value discovered by Prof. Flinders Petrie, the famous Egyptologist, and Drs. Grenfell and Hunt, during the past year among the ruins of ancient Egypt. One of the most interesting relics is a specimen of headgear very similar to the present Panama hat in style, computed to be some 2,000 years old. The last year's exploration into Egypt's past covers every historical period of the country, but the most important scientific result has been the accurate connection of the prehistoric and the historic times. An unbroken stratified series of deposits, ranging over four or five centuries of the earliest kingdoms, has been found in a town which had the ultimate fate to be inclosed as the temenos of Osiris.

The death of Virchow, following the deaths of Pasteur, Helmholtz and Darwin, seems to leave the world without men of science as great as those it has lost. Great Britain, in the establishment of its new order of merit, has selected Lord Kelvin, Lord Lister, Lord Rayleigh and Sir William Huggins as the four students of science to be honored. In addition to Mr. Herbert Spencer, whose claims for recognition are somewhat different, Sir Joseph Hooker and Sir William Stokes may be placed in this group. When, on the occasion of Virchow's eightieth birthday last year, Lord Lister brought greetings from Great Britain, he was the only man whose work could be placed beside Virchow's; but while his method of antiseptic treatment in surgery has been one of the greatest advances in medicine, it is in some respects an isolated discovery, and can scarcely claim equality with the immense work accomplished by Virchow and Pasteur. Lord Kelvin is the only living physicist who might be ranked with Helmholtz. Darwin has no peer.—Popular Science Monthly.

THE CURRENT SUPPLEMENT.

The launch of the new White Star liner "Cedric" has been deemed of sufficient interest to warrant the publication in the current SUPPLEMENT, No. 1397, of a well-illustrated descriptive article on the vessel from the pen of Mr. Harold Shepstone. The first American attempt at introducing the alternating current for electric traction on roads of standard gage is soon to be made on the Washington, Baltimore and Annapolis line. Since the single-phase current is to be used instead of the usual triple-phase, the road marks a radical departure in electrical railway practice. For that reason the paper by Mr. B. G. Lamme on the line may be regarded as of exceptional value. Prof. James Dewar continues his thoughtful history of cold and the absolute zero. Madame Curie in a brief note tells of the atomic weight of radium. Automobilists will doubtless be interested in a most copiously illustrated description of a novel fore-carriage built on the Riegel system. Mr. Otto F. Hunziker concludes his entertaining review of the existing methods of cultivating anaerobic bacteria. Numerous short articles and the usual Consular Notes and Selected Formulæ will also be found in the current SUPPLEMENT.

A SICILIAN CYCLONE.

Dispatches from Rome state that a terrible cyclone swept over Catania, Sicily, and that the town was flooded. Many houses, including the Villa Bellini, have been damaged. The railroad suffered seriously. Mt. Etna showed signs of activity, and Stromboli was still erupting.

The discovery of niter deposits in Death Valley has started a rush to the perilous region. Five hundred men are waiting at Ballarat for information as to which portion of the desert is the best for prospecting. It is said that the deposits are as rich as those of Chile.