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OBSTACLES TO THE PROPOSED ERIE CANAL IMPROVEMENT.

The recent course of events at Albany suggests that the proposed scheme for enlarging and improving the Erie Canal will have to travel a rough road before it arrives at the point of actual construction. The indications are that this greatly needed work will have to lie in abeyance for at least another year. That strong opposition should have been developed against the canal was not unexpected. It is well known that there is a number of apparently unrelated interests that would be, or at least think they would be, adversely affected by the enlargement of the existing canal to accommodate boats of a thousand tons or over.

Leaving out of consideration the railroads which, in the nature of things, cannot be expected to look with much favor upon a rival system of transportation whose successful operation would divert an enormous yearly tonnage from their systems, there are other hostile elements, whose opposing influence, tending in one direction, may well prove fatal to the canal. There is first to be considered the farming population of the interior of New York State, who long ago found that wheat growing was unprofitable, mainly because of the cheap rates at which the product could be brought from the great wheat fields of the West, and, who therefore, failed to see how any further cheapening of transportation could better their condition. In many cases they have come to look upon the canal as a toll-road which exists for the benefit of two great terminal toll-gates, New York and Buffalo; and they seem to have lost sight entirely of the fact that of late years the receipts from local traffic on the canal have exceeded those from the through freight.

Another adverse influence, indirect, but undoubtedly powerful, is to be found in the proposal to build a full-sized ship canal from the lakes to the ocean, a scheme that finds its strongest supporters in the wheat producing communities of the West, who see in the creation of a ship canal and the possibility of wheat's being shipped from lake ports direct to its destination in Europe, the prospect of an immediate lowering of freight charges and a consequent increase in the producers' profits.

There are indications of opposition, also, from the vested interests of the transportation companies of the Great Lakes, whose operations under existing conditions are known to be extremely profitable. The opening of waterways, such as the proposed Erie Canal, and the recently opened Canadian Canal, with depths of water of 12 and 14 feet, will, it is feared, disturb the existing condition of things in more ways than one. In the first place, it is certain that it will develop a new type of vessel capable of carrying wheat without intermediate handling direct from Duluth to New York, and again it is feared that the canals will open up the lake carrying trade to the competition of a vast fleet of deep sea steamers of the smaller class. That the existing conditions will be somewhat modified by the canals is not to be disputed, but the fear that they will be prejudicial to the present transportation companies on the lakes is unfounded, for experience has shown that any modifications in methods of transportation which reduce the amount of handling and increase the facilities for the moving of freight invariably benefit the transportation companies themselves as much as they do the general public.

We are of the opinion that most of these objections are based upon a too local view of the economic effects of the canal. The prosperity of the interior of the State is closely related to the prosperity of New York as its great shipping point for the Old World, and the diversion of trade from New York to other ports which has been taking place of late years, unless it be checked, cannot fail very materially to affect the prosperity of interior towns and districts along the route of the canal. As to the shipping interests of the lakes it has yet to be shown in what particular they will be injuriously affected; and as we have said, the increase of traffic resulting from improved facilities must ultimately more than offset any temporary derangement of an ex-

isting and profitable business. As to the deep water ship canal, the report of the government engineers indicates that the interest on the first cost of construction would more than outweigh any possible subsequent benefit to be derived. Furthermore, the conditions of navigation in the comparative calm of the lakes and amid the heavy storms of the Atlantic are so different as to call for an entirely different class of vessel; a ship built for the Atlantic being of a type of construction too strong and unnecessarily costly for the lakes, while the comparatively cheap and lighter-built lake-vessel is unfitted, if not positively unsafe, as the experience of the "Whalebacks" has shown, for deep water navigation.

AUTOMOBILISM IN THE GERMAN POSTAL SERVICE.

The results obtained in the trial of automobiles for the government postal service in Germany do not seem to be as satisfactory as prevailing reports would have led us to expect. At the same time it is to be borne in mind that the conditions imposed for the service were somewhat severe, and that only two types of automobile were given a trial. Furthermore, the failures seem to have occurred chiefly during the snowstorms of the winter, when the efficiency of any type of vehicle, whether horse-drawn or otherwise, is greatly reduced.

The government has decided that the results obtained with the postal cars driven by hydrocarbon motors indicate that the type is not satisfactory for such service, and that considerable improvements will have to be made in the motors before they reach the absolute reliability demanded by the postal authorities. The two electromobiles which were used seemed to have given better results, although they broke down more or less during the snowstorms, the trouble being the same as that which was experienced last winter on the underground trolley roads of this city. The electromobiles had sufficient power but insufficient adhesion. The larger of the two was therefore provided with heavier rubber tires, while the smaller had its iron tires roughened, both changes being made with a view to improve the adhesion. These results do not agree with those obtained in this city, where the electric cabs, under similar conditions, continued to run long after the other means of transportation of the city had been paralyzed.

The Postal authorities also raised the objection that the accumulators are extremely heavy in proportion to the power given out, and they suggest that builders should provide a suitable device to prevent malicious starting of the motors when the driver is not in attendance.

In view of the fact that steam-driven automobiles for heavy work have proved so successful in England and that steam-driven automobiles of a lighter type have given excellent results in this country, it is surprising that the German postal authorities should not have included a steam automobile in these trials. They are light for their power, have excellent hill-climbing ability, and when properly designed and constructed seem to be thoroughly reliable. This adverse report will necessarily be disappointing to the friends of automobilism, but we think that for the reasons given it is not entitled to the weight which a Government report of this kind should naturally carry.

THE WORK OF THE DIVISION OF ENTOMOLOGY.

The work of the Division of Entomology of the Department of Agriculture has been most gratifying during the last fiscal year. As in former years the work of the division may be classified under investigations upon specific injurious insects or groups of insects, experimental work with regard to the determination of specimens sent in, the general investigation of life histories of the injurious insects, work on the geographical distribution of injurious insects of the United States, bibliographic work, investigations in apiculture, preparation of circulars, correspondence, etc., and in addition, this year, work has been carried on upon the exhibit of insects for the Paris Exposition.

The investigations on the insects from abroad is most important. In 1894, a skilled entomologist was sent to Mexico to study the injurious insects liable to be introduced from that country into the United States; this investigation has been carried on continuously until the present time. The results which have been obtained bid fair to become of great importance to certain sections of the United States. The introduction and apparent establishment of the insect which in Mediterranean countries fertilizes the Smyrna fig has heretofore been mentioned. In 1899, an assistant was sent to Porto Rico to collect and study the injurious insects of that island. Large collections were made and a report of the trip will be published in one of the bulletins of the division. The importance of the investigations on foreign insects is shown by an instance which occurred in the spring of 1899, when an insect boring into the stems of orange trees received in California from Japan, was at once recognized by comparison with specimens received some time ago from that country, and the habits of which were reported at that time by a temporary agent of the division. It was at once determined to be a

very dangerous species, and the trees having the insects were destroyed.

Work upon insects damaging forests in the Northwestern States have been carried on and the result of the investigations was that many species new to science were found, and which were undoubtedly engaged in destructive work in the timber of that region. Dr. A. D. Hopkins, the expert, made many observations upon which may be based practical suggestions which will prove of value to lumbermen. Investigations regarding scale insects have been carried on both by the officials of the department and by State officials. Investigations were also started in the autumn of 1899 on insects as carriers of disease, and the results of the investigation will soon be published. Work on garden and greenhouse insects, injurious grasshoppers, and insects affecting the tobacco crop have been carried on during the last fiscal year. Dr. L. O. Howard, the entomologist of the department, gives an outline in his report of the proposed work for the fiscal year of 1900, which includes investigations on the outbreaks of local species of grasshoppers, partial exploration of some of the suspected permanent breeding grounds of the Rocky Mountain locusts, or Western grasshopper, and to carry on the work concerning the establishment of the blastophaga in California to fertilize the figs. Dr. Howard also mentions the need of investigations in the West Indies and the Philippines, and also experimental investigations in apiculture.

CHANGES IN THE ASSISTANT COMMISSIONERSHIP.

By the resignation of Mr. Arthur P. Greeley, Assistant-Commissioner of Patents (who is to engage in private business), the Patent Office has lost one of its strongest men. His breadth of mind and fairness of spirit has done much to advance the interests of the inventors of this country. Born at Methuen, Mass., of old New England stock, he graduated from Dartmouth College in 1883. He was admitted to the bar of the District of Columbia in 1887.

Mr. Greeley's connection with the Patent Office began in 1884, when he was appointed assistant-examiner; in 1891 he became principal examiner, and in 1895 he became examiner-in-chief—strictly upon merit. Commissioner Butterworth requested Mr. Greeley to become Assistant-Commissioner of Patents, which he did on May 27, 1897.

One of the first matters which engaged Mr. Greeley's attention after his entrance upon his new duties as assistant-commissioner, was the restoration of the rules of practice in force prior to 1895, and they were restored on June 18, 1897.

At the time of Mr. Greeley's appointment, the proceedings in the notorious Wedderburn case had already been begun, and the conduct of the matter was very largely in his hands, and his report of his findings and recommendations in the case, which resulted in the Wedderburn disbarment, is generally recognized as of great importance.

During Commissioner Butterworth's long illness, Mr. Greeley had entire charge of the Patent Office, and administered its affairs to the general satisfaction of patent attorneys and their clients.

A matter of considerable importance which came before him during this period was the question of the registration of prints and labels. The registration of prints and labels had practically ceased since 1891, through the construction placed by the office upon a decision of the Supreme Court. Mr. Greeley believing that the construction placed on this decision was erroneous, and recognizing the importance to commercial interests of protection of the prints and labels, reopened the registration in decisions rendered in January, 1898. The fact that in 1898, 235, and in 1899, 611 prints and labels, many of them lithographs of unquestionable artistic merit, were registered, indicates the importance to the business interests of the country of Mr. Greeley's policy in this matter.

Mr. Greeley has, both in his work as Assistant Commissioner and in his work as a member of the commission to revise the patent and trademark laws, to which he was appointed by the President in 1898, taken great interest in trademarks and their protection in this country and abroad. In 1899, he published a volume on foreign patent and trademark laws, in which for the first time the systems of protection of trademarks in foreign countries are presented to the American public in comparison with the trademark law of this country.

Perhaps the most important cases which come before the Commissioner or Assistant Commissioner for decision are the interference cases. Mr. Greeley's decisions in these cases have seldom been appealed from, and in but one case out of eleven which have been decided by the Court of Appeals on appeal from his decision, has his decision been reversed.

We wish Mr. Greeley success in his new undertakings.

The new Assistant Commissioner of Patents is Mr. Walter H. Chamberlain, of Chicago, who was promptly nominated by President McKinley. The selection is an admirable one, as since his admission to the bar in 1890 he has made a specialty of patent law. He was

born in Detroit in 1866, and entered the office of Wells W. Leggett, a son of the former Commissioner of Patents. He soon became a well-known patent lawyer.

We understand that Mr. Chamberlain was appointed through the recommendation to the President of the Commissioner of Patents.

SOME CHINESE VEGETABLES.

A thorough investigation of the food and vegetables offered for sale in Chinatown, San Francisco, is being made by Prof. Walter Blasdale of the chemistry department of the University of California, and undoubtedly many of the vegetables can also be obtained in the Chinese quarters at New York. They form a remarkable collection, entirely different from that of Caucasians. In fact, the Chinese do not care at all for our vegetables with the exception, perhaps, of celery. Many of their common vegetables would form an agreeable addition to our own tables as they possess qualities of flavor and nutrition which, in many cases, are equal to any of the vegetables so common with us. "Po kua" which is used for cooking, is grown both for its fibrous pulp and as a food. It is a long gourd-like vegetable measuring when mature about 24 inches and is yellowish green in color and contains quantities of sugar and starch and is highly nutritious, but is inferior in flavor to the delicate qualities which make the squash a desirable vegetable. The young green and hairy fruit of the "zit kwa" is a kind of melon growing on a vine and is boiled and seasoned like a squash. The interior is made up of a white, solid flesh, set with rows of white seeds. When mature, says The San Francisco Chronicle from which we derive our information, these vegetables weigh thirty pounds, and are covered with an exudate which hardens to a white wax. The hairs disappear, and the surface is perfectly smooth. This product is used by the Chinese for making a confection, and in this form has a taste and flavor as agreeable as many of the glazed fruits. The "chu ko" is something like an ordinary potato in starchy content and nutritive value, but in appearance resembles the beet. It is the most common and valuable of cultivated root crops among the Chinese, as it holds among them about the same place as does the potato with us. Analysis shows it to be a dietary article far superior to the potato. It has a flavor characteristically Chinese and would probably not be esteemed by us. The root yields excellent starch, and is largely employed by the Chinese in making that commodity. It is grown on swampy land. The "taro" somewhat resembles the last named vegetable. It is also grown in the Hawaiian Islands. It resembles an ordinary red beet whose consistency is that of a sweet potato. It has found favor with many American families, and their purchase of the bulb comprises no inconsiderable part of its sale. It can also be used as an ornamental aquatic plant, the roots being easily started. An extraordinary thing, which has been noticed, is that nearly all of the vegetables of Chinese origin have a considerable proportion of manganese. Prof. Blasdale has found that the green color characteristic of manganese was always present in a greater or less degree upon igniting the ash of the Chinese vegetables. The water chestnut or "ma hai" shows the largest quantity. This is a well-known food in Chinese quarters. It has a sweet chestnut flavor and is juicy and watery in consistency. It has a thick, tough brown outer skin. Within it is white, and when grated yields quantities of starch. It is eaten either raw or boiled. It does not resemble the chestnut in any sense, being a little bulb, and growing at the bottom of a collection of long, marsh grass stems. A considerable proportion of Chinese vegetables are produced from swamps.

The lily bulb called by the Chinese "pak hop" finds a large sale, the price ranging from 10 to 20 cents. They are sold green and dry and are regarded as a delicacy. The seeds of the lotus which grow largely in China are roasted and ground. They are then made into bread and are used largely in soup. They are eaten raw, boiled or roasted and are sold in great quantities in Chinatown, two varieties of them being obtainable. The Chinese also eat varieties of sweet potatoes which are almost like those grown in this country. The "fan ko" or yam bean grow upon a fibrous vine which runs along beneath the surface of the ground. They are covered with a thick yellow stringy bark which peels off and leaves a white fleshy interior, firm and sweet to the taste. Above the ground the vine bears rounded leaves and white flowers, bulbs or beans containing large quantities of starch and cane sugar, and have a sweet insipid flavor, but are nutritious. The most poisonous vegetable which the Chinese eat is "ginseng" which contains hydrocyanic acid. It is rich in starch and nearly all the proteins is true albuminoid, and it contains large quantities of both cane and reducing sugar. The roots are about 20 inches long, 4 inches thick, and weight about 1½ pounds. They taper at both ends and are curved with gray bark. The flesh is white and sweet and is traversed by bundles. It is very starchy and is used largely by the Chinese as a source of starch which they make into a kind of tapioca.

Beans are the great standby of the Chinese and the "soy bean" is the most important. There are a vast variety of other beans and they are boiled, baked, made into soup, and are even made into a bean cheese. In preparing this cheese the beans are soaked in water for thirty-six hours. They are then reduced to a paste and the mass cooked. This is strained through a coarse cloth, thereby making a white fluid much resembling milk and having some of its characteristics. A crude salt is added which coagulates and precipitates the protein material in this fluid, and the mass resulting is kneaded into small square cakes so common on the Chinese grocers. Sauce is also made of the beans, and a kind of macaroni, looking very much like old-time yellow taffy. Most of the beans are sprouted or germinated and are eaten as green vegetables and in nearly all Chinese groceries may be seen bucketsful of sprouted beans, the young plants curling around the kernel. They have been soaked in water until the hulls were softened and the growth started. Watermelon seeds are also commonly eaten, and for the variety chiefly used they are boiled for thirty-six hours before they are fit to eat. Purslane is extensively used as a pot herb and ginger, both the roots and stalks are eaten in great quantities as are also several varieties of bamboo shoots. Many of the products are imported from China, but most of them are now grown along the banks of the Sacramento and are brought every morning to the groceries in the Chinese quarters of San Francisco.

THE PATENT OFFICE EXHIBIT AT THE PARIS EXPOSITION.

The Patent Office holds such a unique place in the life and activities of America, that it is only fitting that in the closing exposition of the century we should be represented by an adequate exhibit of what the patent office really means, and the important part that it has played in aiding us to surmount the ladder of industrial supremacy. The patent office exhibit will be in the charge of Principal Examiner Edward Bruce Moore, Esq., who sailed on March 29. The exhibition, which will not be large, will be of unusual interest, embracing some 208 models, which will reflect the inventive genius of America. Heretofore it has been the custom at expositions to show the time-honored models of the early inventors; this year, however, a new plan has been adopted which bids fair to be an immense success. This is to confine the exhibit of this year to models representing the basic principles of electricity, as applied to the arts, and to commerce. A special act of Congress was necessary to allow the models to be removed from the country. Delay in legislation resulted in the necessary curtailment of some of the exhibits. The early models of Edison, Brush, Thompson-Houston, Maxim, etc., will be most interesting. The first electric motor of Joseph Henry will also be a most important exhibit, dating as it does from 1834. The electrical propelling machinery of Davenport (1837) is also noteworthy. The first printing telegraph invented by Edison in 1873 will be displayed. The early telephone and phonograph models will also probably be much sought after. The selection of Mr. Moore is an admirable one, and is a compliment to and recognition of his ability.

M. TRILLOT ON COLOR PHOTOGRAPHY.

M. Trillot has recently presented to the French Académie des Sciences an account of some experiments which he has made in the direction of color photography. Starting from the well-known fact that in a photographic plate the image is formed of a precipitate of silver in the amorphous state, whose granules are dispersed throughout the thickness of the supporting film, the experimenter wished to find out whether this amorphous silver could be transformed into a series of superposed films or laminae, and in this case color effects would probably be produced by interference. To solve the problem it was necessary to find a process for dissolving the precipitated silver contained in the film, and then to find a reagent which would precipitate it again in the laminated form. It was found impossible to treat the image in a liquid bath, as the solvent in this case attacks the image and carries away a part of the silver. The desired result is obtained by exposing the image to certain vapors which act upon the silver without altering the gelatine. Nitric acid vapor was found to be the best suited for the purpose, and the plate, after going through a process of cleaning, polishing and hardening, is placed in a vessel containing commercial nitric acid. After a few seconds' exposure to the vapor, the image is seen to diminish, and it finally disappears entirely, the plate becoming transparent and the precipitated silver being dissolved to a seemingly colloidal state in the interior of the film. In order to make the image reappear in the laminated state, it is exposed to hydrogen sulphide containing water vapor, upon which the image is seen to reappear, presenting a metallic appearance. By continuing the treatment the outline of the object is distinguished, and finally a strong coloration, having a metallic luster, appears on various parts of the image. If the treatment is prolonged, these colors fade out and be-

come diffused. The process being stopped at the proper moment, the plate is dried, and upon examination of the glass or gelatine side by reflected light, a polychrome image of strong color is perceived. The colors on the two faces of the plate are often complimentary, seeming to show a dissymmetrical arrangement the reflecting structure. These colors are quite stable, but change momentarily when exposed to moisture.

Generally speaking, there is no definite relation between the natural colors of the object and those produced upon the plate by this process, but on the other hand, it is possible to cause a localization of certain colors desired, especially where the different parts of the image present considerable variations in thickness, and these colors may be made to approach more or less to the natural colors of the object.

To show what may be done by the process, M. Trillot presented several positive plates of the same subject, in which the colors green, red, and white are localized upon the corresponding parts of the image, which in this case represent foliage, red tiled roof and white walls. It will be seen that it is of importance to use orthochromatic plates in applying this process. M. Trillot is making further experiments, and expects to be still more successful in producing a polychrome image.

OUR EXPORTS OF IRON AND STEEL.

No feature of the marvelous growth of our commerce is more striking than that relating to exports of iron and steel. The total foreign commerce of the United States in the year just ended has for the first time crossed the \$2,000,000,000 line, and the total exports of the manufacturers of iron and steel have for the first time crossed the \$100,000,000 line. In the calendar year, 1890, the total exports of iron and steel amounted to only \$27,000,000, but in 1899 they were \$105,689,645. In the same period the importations of manufactures of iron and steel have decreased with nearly equal rapidity, the importations of 1890 being \$44,544,140, while those of 1899 were \$15,799,206. The striking feature of this rapid growth in our importation of manufactures of iron and steel is the fact that European countries are taking largely from us in these lines.

In builders' hardware, for instance, the United Kingdom took nearly \$2,000,000 worth in the year just ended, and Germany more than \$1,000,000 worth; and the exports to the United Kingdom of sewing machines were \$1,285,609 in 1899, against \$806,401 in the preceding year, and the trade in the same line with other countries was also gratifying. For new and ingenious machinery the world seems now to be looking to the United States. Exports of electrical machinery increased from \$917,453, in 1897, to \$2,523,644 in 1898, and \$3,143,336 in 1899, and metal working machinery from about \$4,000,000 in 1897 to nearly \$7,000,000 in 1899. Railway engines increased from \$3,000,000 in 1897 to nearly \$5,000,000 in 1899; typewriting machines from \$1,566,916 in 1897 to \$2,776,363 in 1899. Such lines of machinery as cash registers, laundry machinery, printing presses, shoe manufacturing machinery, fire and stationary engines show a marked growth.

In 1880, the production of pig iron in tons in the United States was 3,835,191 tons. The value of iron and steel manufactures exports was \$15,422,874, while the imports amounted to \$63,956,853 in manufactures of the same line. Nineteen years later, in the calendar year 1899, the pig iron production amounted to 13,620,703 tons, while the exports of iron and steel manufacture amounted to \$105,689,645, while the imports in the same line shrunk to \$15,799,206.

DEATH OF PROF. PEPPER.

Prof. John Henry Pepper, an author and analytical chemist of some distinction and inventor of the so-called Pepper's Ghost, is dead. He was born in 1821, and became famous through the illusion known as "Pepper's Ghost," which was perfected by him from a rough model devised by Henry Dirck. By it the reflection of the figures of the actors behind the scenes were thrown upon the stage by a system of mirrors. These reflected images had all the semblance, and repeated all the actions of the living originals, but were, of course veritable apparitions. The illusion was a great success when first produced and realized \$60,000 in six months. The ghosts were exhibited for a long time in the London Polytechnic and curious effects were wrought with them in various ghostly dramas. An attempt was made to utilize the system for the ghostly manifestations in "Hamlet," "Macbeth," and "The Corsican Brothers," but the plan did not seem to succeed very well on account of the fact that the specters though plainly to be seen by the audience were invisible, for optical reasons, to the actors upon the stage so that it was almost impossible to secure perfect harmony of action between the shadow and the substance.

It is proposed to build a suspended bridge at Duluth, over the ship canal, similar to that over the Seine at Rouen. The city power house is to supply the current,