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Price 10 cents. For sale by all newsdealers.

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THE BENEFITS OF THE PATENT LAWS.

In the discussion of the oleomargarine bill in the House of Representatives, effort was made to bring a point against it as being a manufacture based on patents. One member declared that he had a hundred patents before him relating to it. This point was made, it is obvious, to gain the goodwill of the House for the measure, by invoking its dislike of the present patent laws. Extraordinary as such reference appears, it was seriously made. It is most satisfactory to see how it was met. The Hon. Nathaniel J. Hammond, of Georgia, took up the issue, and said in reply, partly to Mr. Holman: "He is hardly driven again to say this bill is against a monopoly patent. He absolutely says that the patent clause of the Constitution is a curse rather than a blessing."

Mr. Holman.—No; not that. Mr. Hammond.—I cannot argue such a proposition in my limited time. But the history and the experience of this Government will show no other clause, except those that protect life, liberty, and property, that has been half as valuable to this country. Let me call attention to some facts which illustrate this. We may put our wives down to knitting stockings for themselves and their children, or we may turn to a machine that will knit seven pairs for one mill. What rest to the wife! What comfort to the babes! With patent pegwood we peg sixty million pair of shoes per annum in the United States at a cost of five pairs to a cent! Millions of feet are shod that but for that invention would be crippled by the hard frosts of winter. Sir, the Patent Office has changed the whole current of modern life. It has given fewer hours of labor, and to more men less consumption of human muscle, a broader sweep of human mind. . . . The foundation of that change is the constitutional clause on which is based the Patent Office. It has increased wages, it has increased mental strength and physical strength, mental comfort and physical comfort. When gentlemen are driven, in support of this bill, to denounce any part, and especially that part, of the Constitution of the United States, they are indeed hardly driven." [Applause.]

This shows that in Congress there is some recognition of the benefits of those statutes, and interference with them is resented by one leading member as an attack to some extent on the Constitution.

Again Mr. Hammond had to return to the charge, in answer to his former opponent. Just as gracefully and eloquently as before, he defended the patent statutes against the unreasonable attack made on them. He holds Mr. Holman closely to the issue he had raised.

"The gentleman from Indiana [Mr. Holman] got away from the issue made between him and myself as to that clause in the Constitution which declares that 'to promote the progress of science and useful arts, patents may be granted for limited times.' He undertook to raise a prejudice by speaking against 'patent monopolies' and the laws as passed. The law is one thing, the Constitution another. If the law is wrong, it ought to be changed. The Constitution was the thing which he attacked, and is the thing which we swear to support."

Mr. Chairman, in the price of every acre of land in this country on the eastern or western shore, you see the value of the patent rights. What would our Western lands be worth but for improved corn-droppers and corn-shellers, and improved plows, thrashers, and binders? What would they be worth but for the improved machinery which has tunneled our mountains, which has bridged our rivers, which carries our produce to the ocean, and from the eastern shore to the great world beyond?

Mr. Chairman, let us look at the philosophy of this thing. It is a fact that every dollar of gold which was ever dug cost three—not to the man who dug it out. It is but one who finds it, and he gets rich. But the others who are hunting, the others who are wearing out their hands and eyes in fruitless search, are spending their dollars. It was not the man who undertook to find oil in Pittsburg, but the man who struck it, that made a fortune. The world profited by the industry of the searchers for gold, and the world reaps a benefit from the find of the finder. That they got rich affects not the question.

That grand impulse of selfishness which God has placed in every man for his protection, as a stimulus for his ambition and energy, which makes anxiety to be rich, is the mainspring which has led to all the inventions of this world which are worth talking about.

Why is it we outdistance any nation of the earth? It is because we have the best patent laws and patent organization on the face of the earth. Why is it that these very systems denounced as monopolies are utilized by every one of us, except that they bring but good? Take this telephone. How many use it, simply to save the expense of servants?

The gentleman from Indiana [Mr. Holman] said when printing was invented, there was no patent office. When the Patent Office was established, the printing press then in existence compared as poorly with the Hoe power press of to-day as a chip on the ocean com-

pares with the most magnificent steam vessel which floats a flag. [Applause.]

When the gentleman from Pennsylvania was a boy his neighbors, perhaps himself, lived in a cabin, with nothing to hang their coats upon but a peg, and nothing to sit upon but a stool. Under the impulse to inventive talent given by the hope of securing for inventors during a limited time the exclusive benefit to the cogitation of their brains, the homes of the poor and the rich have been made comfortable. And the cottage of the workingman to-day outvies in comforts and luxury the dwellings of the kings of a hundred years ago.

Mr. Chairman, look at the item of wages for a moment. Go back fifty years, and compare the wages then paid with the present rates. Take the history of New England recently published, and compare the wages of a shoemaker of to-day with what they were then. These mechanical improvements have been developed in every department. Yet shoemakers' wages are doubled and in some departments trebled in fifty years. One man to-day can make three hundred pairs of boots each day by a Yankee machine; but more boots are wanted, and bought for little money. I do not care where you go or what you see, it is better and cheaper because of inventions. Inventions are made because they are protected by the Constitution. The thousands and thousands of dollars that are wasted in vain endeavor, the sleepless nights, the toilsome days, all at last crystallized in some man's success, bring a glad fruit to the Patent Office, and ask it to make the contract according to constitutional promise. The inventor says, 'Give me this for a limited time, and at the end it shall belong to the world.' And the world makes by the bargain every time." [Applause.]

The fact must be regretted that there was any need for such words. Their bearing should form a part of the creed of every legislator. But it is, on the other hand, a subject of congratulation for all that when the necessity arose there was some one ready to say them, and able to say them so well. The parenthetical "applause" shows how well this direct statement was received, and illustrates the fact that the House of Representatives is not dead to the issue. The menacing attacks on the patent statutes at any moment may come before the House. When this time comes, we trust that the members will not be found wanting, and that such wrong measures, although urged by the Committee on Patents, will receive speedy death at the hands of the whole assembly. If opposed with such spirit and eloquence as disclosed in the quoted remarks, they never will pass by the majority that a similar measure received some years ago.

This defense of the patent statutes comes with added grace and force from a Southerner. He does not represent a section devoted to invention. But he is ready and willing to offer a tribute from the agriculturists of the South to the inventors of the North, who have made their work easy and profitable to them. We spare our comments of Mr. Hammond's remarks, as we feel that we can add nothing to their force.

CAR BUILDERS PERPLEXED ABOUT CAR COUPLERS.

At the annual convention of the Master Car Builders' Association, which opened at Niagara Falls, June 8, there was quite an excited discussion relative to car couplers. It will be remembered that the Executive Committee of the Association conducted, in September last, a series of tests of car couplers at Buffalo, as a result of which twelve special styles of couplers were recommended for further trial in actual service, out of forty-two that were then experimented with. [For particulars of these trials, with illustrations of the couplers experimented with, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 510.] Of the twelve then selected for subsequent service tests, only seven were, by the committee's report at this last meeting, recommended "as most worthy of trial" in a large way hereafter, to "demonstrate their ultimate worth," five styles of coupler formerly recommended being thus inferentially condemned. The committee gave no reasons, when questioned, for their action in this particular, further than that the service trials were as yet very incomplete, an admission which different members of the convention thought should have prevented the committee from making a report discriminating against the five styles of coupler that were dropped; and this impression seemed to be so general that the whole car coupler question is yet concededly an open one.

The trials of couplers are to be further continued by the committee, but new consideration will be given by these examiners only to such couplers as may be indorsed by five members of the Association. The committee express doubt "as to whether there is to-day available any automatic coupler which a railroad company would be justified in applying to its cars," as other companies would still use different couplers, and the danger to train men would thereby be increased rather than diminished. It is rather recommended that "the safest course for railroad companies to pursue is the conservative one of retaining the old general style of coupling," while the energies of the Association should be devoted to adopting and

getting into practice "uniformity in style and construction of drawheads and deadwoods."

The report of the committee caused a most animated debate, from which it was plain that the question of obtaining a satisfactory safety car coupler is still one of the most important that railroad men have to deal with. There is not any particular style of coupling that has yet received more than a sort of negative recommendation, but the lines are pretty clearly laid down that new couplers shall be calculated to couple readily with such other styles as are at present in most general use. The field for further competition is therefore still wide open, and inventors are urgently invited to occupy it until they succeed in working out the difficult problem, and constructing a device which will command approval. The demand for such improvement is now felt to be the more urgent, inasmuch as New York State requires an approved safety coupler on all cars built after July 1, while in Massachusetts and Michigan similar laws are already in operation, and public opinion seems to insist upon such legislation in most of the other States. The master car builders and the railroads would be only too happy to comply with such laws, if they could find a coupler which would adequately answer the practical requirements of the railway business of the country; but until they are satisfied that such a style of coupler has been found, the Association think a waiting policy is the best one for the companies, in the hope that American inventive genius will yet furnish a satisfactory way out of their difficulties.

A TRANSCONTINENTAL BALLOON VOYAGE.

The largest balloon in the world, according to the San Francisco *Chronicle*, has recently been built in that city by Mr. A. P. Van Tassel. It has a capacity of 150,000 cubic feet of gas, and has been constructed for the special purpose of enabling the well known aeronaut to undertake a journey across the continent, from ocean to ocean. The height from the floor of the wicker car to the top of the gas reservoir is 119 feet, and of the dilated reservoir alone 68 feet. The envelope is made of finely woven cloth, manufactured expressly for the purpose, and is varnished, as usual, in order to make it gas tight. The car has accommodation for fifteen persons. It is about twenty-one feet in circumference, and the sides are thirty-four inches high. The supporting ropes are kept in place by the usual "concentrics." Hydrogen gas will be used for inflating the balloon. The cost of the structure, is stated to be \$6,000. Mr. Van Tassel has had considerable experience in aerial traveling, having crossed the Wichita Mountains, 15,000 feet above sea level. His present attempt is more ambitious than any he has yet made. A careful study of the aerial currents leads him to believe that by seeking the proper stratum of air he can be carried eastward at high speed, possibly 100 miles an hour. The greatest difficulty will probably be due to the Rocky Mountains, which modify the movements of the air currents over a large area of the continent. It is expected that the voyage will be begun some time about the 1st of July. Should it survive the trip, the giant balloon will be taken back to San Francisco, where it will be placed on exhibition.

ELECTRIC LIGHTING AS AN INVESTMENT.

With a view to put at rest the question whether local electric lighting companies are profitable investments, we have recently addressed a circular letter to the general managers of a number of such companies, both East and West, asking for their experience in the matter. We have directed our inquiry in this instance particularly to those operating the Thomson-Houston system.

We have received answers from all parts of the country, and the general tenor of the replies is that many of their local companies are earning better dividends than are yielded by the majority of other new enterprises. The question of profit rests first with the locality, and then, if this be judiciously chosen, with the system employed and the ability displayed in the management.

Of those who have stated the exact profits of their investment, we believe the highest returns came from Omaha, Nebraska, where a company, operating four 30 light dynamos, had earned at the end of the first three months after incorporation 4½ per cent on the investment, or at the rate of 18 per cent per annum. Two more dynamos of the same capacity have since been added to their plant. The gentlemen connected with this company are so well pleased with these results that they procured a franchise for operating in Des Moines, Iowa. They began by running 65 arc lamps, but have since increased their plant.

Replies have also been received from Washington, St. Louis, Worcester, Terre Haute, Auburn, Me., Salem, Mass., Quincy, Ill., Kansas City, etc., which confirm these results, and state emphatically the belief of the writers in the desirability of electric lighting as an investment.

These conclusions, although derived from the working of the particular lighting system we have named, may be equally valid and reliable for other systems

now before the public, although we are advised that a greater number of local companies are operating their system than any other, and we find these companies uniformly successful so far as our inquiries have extended. There is room for great extensions of these local lighting companies in all parts of this and foreign countries.

PHOTOGRAPHIC NOTES.

Chlorophyl and Eosin Orthochromatic Plates.

In a communication to the Franklin Institute, which we take from the *Brit. Jour. of Photography*, Mr. Fred. E. Ives, of Philadelphia, Pa., relates some interesting experiments recently made on the combination of chlorophyl and eosin, as follows:

The subject of color sensitive photographic processes has received a great deal of attention during the past year or two, but there has been, and is still, a great diversity of opinion in regard to the capabilities of the various color sensitizers. In illustration of this fact I will mention that Becquerel, who first tried chlorophyl, stated that with it he made plates from one-fifth to one-tenth as sensitive to the red of the spectrum as to the blue or violet. Dr. Vogel estimated that eosin-stained plates were eight times more sensitive to the yellow-green of the spectrum than to the blue. I myself stated that plates stained with myrtle-chlorophyl, according to my published method, required even less exposure through a yellow glass than eosin plates. Captain Abney stated that, according to his experience, stained plates were always many times more sensitive to blue and violet than to any other color; and many persons have believed that the color sensitizers acted more by reducing the blue and violet sensitiveness than by actually increasing the sensitiveness to other colors.

For the purpose of proving the capabilities of chlorophyl and eosin, I have made four photographs of the lime light spectrum, one on a plain emulsion plate, one on a chlorophyl-stained plate, one on an eosin-stained plate, and one on a plate stained with both chlorophyl and eosin. The spectrum was projected by means of an optical lantern and a flint glass prism, with a slit measuring one-fiftieth of an inch. It will be understood that the different colors have not exactly the same relative intensity in this spectrum that they have in the solar spectrum, but the difference is insignificant. Short wires were placed so as to cast shadows on the sensitive plate, to aid in the comparison of results. Some of these wires, which I have marked, occupy the position of Fraunhofer lines in the solar spectrum. All plates were prepared with the same collodio-bromide emulsion, and received the same exposure and development.

The plain emulsion plate shows very little action, except in the blue, violet, and ultra-violet; the maximum of sensitiveness is in the middle of the violet. (It should be noted here that with gelatino-bromide dry plates the maximum of sensitiveness is in the indigo blue, about G, and they are also relatively more sensitive to green and yellow.)

The chlorophyl plate shows a very strong action all through the visible spectrum—strongest in the red, orange, and dark green; weaker in the blue and violet; and weakest in the yellow-green. In the red, below C, the plate shows about five times as much sensitiveness as in any part of the violet; in the orange red, twice as much; in the yellow-green, one-half as much; and in the dark green, one and a half times as much. The violet sensitiveness appears to be slightly reduced near H. This experiment proves that my chlorophyl plates are remarkably sensitive to all colors, as I have many times asserted that they were, and that they are twenty-five to fifty times more color sensitive than those which Becquerel employed in his experiments. They are probably 400 or 500 times more sensitive to red than unstained plates.

The eosin plate shows no action in the red and orange, very little in the yellow, a great deal in the yellow-green, and considerable in the dark green. The action of eosin is strongest exactly where the action of chlorophyl is weakest; it gives about the same degree of sensitiveness to yellow-green that chlorophyl gives to red, but in a broader band. The violet sensitiveness appears to be exactly the same as in an unstained plate.

The chlorophyl-eosin plate shows by far the most remarkable result of all. Neither sensitizer appears to have retarded the action of the other, but rather to have aided it, so that the *weakest portion of this photograph below F is stronger than the strongest portion in the blue and violet!* Nearly a year ago I recommended that chlorophyl and eosin be used together in practical isochromatic photography, and this experiment proves that the combination possesses the advantages which I claimed for it.

I have found that, in order to secure the best results with the chlorophyl-eosin process, fresh, strong, blue-myrtle chlorophyl solution must be used, and the amount of eosin must be strictly limited, otherwise, the plate will not be so sensitive to yellow and to blue-green. I now prefer to apply the eosin by simply tinting it with water in which the plate is to be washed, after applying a plain solution of chlorophyl. I have an

over-exposed negative of a bright chrome card, which I made on one of these chlorophyl-eosin plates, with an exposure of one minute in the light of a coal oil lamp having a single small Argand burner and nickel reflector. No color screen was used, but, owing to the yellowness of the coal oil flame, all the colors have photographed correctly. An unstained plate, with same exposure and development, showed only the high lights of the picture very faintly.

The Law as to Party Walls.

A party wall in law is the wall dividing lands of different proprietors, used in common for the support of structures on both sides. At common law an owner who erects a wall for his own buildings which is capable of being used by an adjoining proprietor, cannot compel such proprietor, when he shall build next to it, to pay for any portion of the cost of such wall. On the other hand, the adjoining proprietor has no right to make any use of such wall without consent of the owner, and the consequence may be the erection of two walls side by side, when one would answer all purposes. This convenience is often secured by an agreement to erect a wall for common use, one-half on each other's land, the parties to divide the expense; if only one is to build at the time, he gets a return from the other party of half what it costs him. Under such an agreement, each has an easement in the land of the other while the wall stands, and this accompanies the title in sales and descent. But if the wall is destroyed by decay or accident, the easement is gone, unless by a deed such contingency is provided for. Repairs to party walls are to be borne equally; but if one has occasion to strengthen or improve them for a more extensive building than was at first contemplated, he cannot compel the other to divide the expense with him. In some States there are statutes regulating the rights in party walls, and one may undoubtedly acquire rights by prescription on a wall built by another, which he has long been allowed to use for the support of his own structure.—*Building.*

Mineral Ultramarine.

J. R. Jackson, F.R.S.—The preparation of ultramarine is as follows: The pieces of lazulite the most rich in color are picked out, they are washed, and then plunged into vinegar, and if the color does not change, the quality is esteemed good. The stones are then again repeatedly heated, and plunged each time into vinegar. By this means they are easily reduced to an impalpable powder. This is then well worked up into a paste with resin, white wax, and linseed oil, to which some add Burgundy pitch. The paste is then put into a linen bag and kneaded under water, which at first assumes a grayish color, resulting from the impurities that are first separated from the mass. This water is thrown away and replaced by fresh, and the kneading recommenced, when the water becomes of a fine blue. This is poured off and allowed to settle, the precipitate being ultramarine of the finest quality. The repetition of the process furnishes color of inferior quality in succession, and finally the residuum, being melted with oil and kneaded in water containing a little soda or potash, yields what is termed ultramarine ashes. The inalterability of ultramarine is a most valuable quality; but this very property is injurious to the effect of old paintings, for while the other colors have changed, this, preserving its original brilliancy, all harmony is destroyed, as may be observed in many old paintings and frescoes.

Convention of Civil Engineers.

The Annual Convention of the American Society of Civil Engineers will be held at Denver, Colorado, on July 2, 3, and 5. Sessions for professional discussion, and one for the transaction of business, will occupy the three days. At the close of the Convention, several railway excursions will be made to a number of points of engineering interest in Colorado. These excursions have not yet been fully arranged, but will probably include Greeley and the extensive irrigation works in its vicinity, Georgetown, Leadville, Gunnison, and Pueblo. It is proposed that they shall terminate at Colorado Springs, where the engineers will separate for their respective homes. A large attendance is anticipated, and in consequence very favorable transportation rates have been secured. Mr. Henry Flad, the President of the Society, will deliver the annual address during one of the sessions of the Convention.

DAVID VAN NOSTRAND, a well known New York publisher and importer of scientific books, died June 14, in the 75th year of his age. He was first employed in a city bookstore when 15 years old, and subsequently became acquainted with many military and scientific men, who gave him orders for books, relying upon his good judgment for their selection. He thus, as well as from the natural bent of his tastes, developed a business especially in the line of military and scientific books, his military publications during the war of 1860-65 having been numerous.