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THE LARGEST YET.

We print this week two editions of the SCIENTIFIC AMERICAN, the combined issue of which reaches the large number of One Hundred and Ninety Thousand copies. The quantity of paper required for the two editions is Five Hundred and Thirty Reams, and the weight, Thirty-Nine Thousand Seven Hundred and Fifty Pounds---little less than Twenty Tuns. We believe this to be the largest circulation of any paper of its class ever issued in a single week.

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With this issue, the time for which a large number of our subscribers have prepaid, expires. In order that our readers may experience no stoppage in the receipt of the journal, and that we may not miscalculate the quantity of the paper to print at the commencement of a new volume, we hope our friends will signify their intention to continue the paper by early remittances.

The plan of discontinuing the paper when the time expires for which it is prepaid, we think preferable to the course, adopted by many publishers, of continuing their paper indefinitely and collecting afterwards. The latter course is too much like having a bill presented for a suit of clothes after it is worn out. We shall be gratified to have every old subscriber renew, and doubly grateful if each will send one or more new names with his own.

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ANOTHER NEEDED AMENDMENT OF THE PATENT LAW.

By the present law, the grantee of any interest in a patent has ninety days within which to file his conveyance for record. If he complies with that rule, his rights are determined by the date of his deed. This furnishes abundant and unnecessary opportunity for fraud, and often imposes great hardships on innocent and careful purchasers.

He who after full examination finds the title of a patent complete and unencumbered often feels safe in paying his money therefor, and in making extensive arrangements for engaging in the manufacture thereof. Ninety days thereafter he may learn that an assignment one day older than his has just been filed in the Office, and has rendered his title worthless. This ought not so to be.

In some of the States of the Union, the registry laws relative to the conveyance of real estate have had a like provision, but experience has shown the inexpediency of such a rule. Priority of right is now generally given to the purchaser who first files his deed for record. This is a wise regulation; for if some one must suffer wrong, good policy as well as justice dictates that it should be the negligent rather than the vigilant. Is not this an equally sound maxim as applied to the sale of a patent?

At all events, the ninety days now allowed to the purchaser of a patent is much too great. No great mischief would result from allowing such a purchaser hardly time enough to send his deed to the Patent Office. If he failed to do this, his rights should be postponed to those of any other *bona fide* purchaser whose deed was first on record. A rule of vigilance similar to that which is observed in order to charge the indorser of a protested promissory note might best protect the just rights of both purchasers, and would furnish little room for injury of the kind above referred to.

But there is a still more crying evil of a similar character. A license under our present law need not be recorded at all. A *bona fide* purchaser, who has waited ninety days before paying the purchase money or doing any other irrevocable act, may afterwards find, to his dismay, that there are licenses in existence, running the entire lifetime of his patent and covering the whole scope of his conveyance, which is thus rendered wholly valueless. Opportunities for successful wrong are here presented, for which there is no excuse. They are unworthy of the intelligence of the age and country. The hand of reform should be applied here without delay.

GOVERNMENT MONOPOLY OF THE TELEGRAPH LINES.

The argument of Mr. G. P. Lowery, before the Congressional Committee, in opposition to the Hubbard Postal Telegraph bill, contains much forcible reasoning. Whether or not Congress has the right to make telegraphic intercommunication a government monopoly is clearly a constitutional question, based upon the interpretation of the sections which confer upon the national legislature the power to establish post offices and post roads, and to regulate commerce. The advocates of the scheme hold that, under these provisions, Congress has the necessary power, and urge that the telegraph must be regarded in similar light as the mails; if the government has the right to monopolize the dissemination of information through the carriage of missives in the latter case, it has the same right through the transmission of signals in the former. The opponents of the bill, including all the present private telegraphic corporations, deny the above premises, and draw a wide margin of difference between the establishment of the post offices and roads and that of the telegraph. They maintain that the post office is simply the medium through which the government tenders itself to carry parcels of a limited weight for a limited price, and this entirely regardless as to the contents of the parcels, whether the same be a means of transferring ideas from one person to another, or a mere mass of material substance. The telegraph, on the other hand, is *per se* a medium for transmitting information, and nothing else.

Mr. Lowery elaborates these views with much ingenuity and cogency in his argument. He points out that the post office is an agency, the original design or motive of which was, doubtless, to favor the transmission of intelligence, public or private, between the people: its function is the carrying of packages which *may* contain information. Because this possibility exists, and Congress controls the means of conveyance, therefore it is urged by the advocates of the plan that Congress should control another medium which conveys nothing, but merely transmits information as such—a clearly illogical sequence.

To borrow Mr. Lowery's illustration: Suppose A and B are talking together a couple of feet apart. A crosses the street, and the conversation is still maintained by raising the voices; or one person may go to the garret and the other to the cellar of a house, and yet converse through a speaking tube. They may separate by a wider interval and talk by pre-arranged signals made with their arms; or lastly, they may place an interval of a thousand miles between them, and still continue their remarks by the aid of the telegraphic wire. A's mind meets that of B just as instantly through the telegraphic signals as through the medium of oral words. In the one case a conducting wire, through which a current passes, is the means; in the other, sound-conducting air, through which certain vibrations are transmitted, serves the same purpose. The extension of the telegraph, then, from between A and B to between every individual in the United States and everywhere else, virtually places all the people within the sound of each other's voices. If such were literally possible, then—if the government has the right to control batteries and wires in the one case—it has equally power to control the vocal cords and air in the other: in other words, to prevent people talking to each other save on the payment of tax—a *reductio ad absurdum* too palpable to need further demonstration. Of course the power once in the hands of any government to control interchange of information between the people converts that government into a despotism very different from that contemplated by the Constitution. That instrument, however, is a rigid one; and as it distinctly says "establish post offices and post roads" and "regulate commerce," and does not say anything about controlling information (however transmitted), it may be taken as reasonably certain that no judicial interpretation would discover in the plain provisions above quoted the degree of elasticity necessary to extend them to an authorization to Congress to assume the ownership of the telegraph lines.

There are many, however, who would be willing to yield a point of right, if the expediency of the change were great. That is, if, by suppressing the private corporations and placing the telegraph under government control, the whole country would be manifestly benefited, not many would be found to oppose any legal means, if such could be reached, for accomplishing the object. But here again we are met by an array of considerations and facts which demonstrate the project to be plainly inexpedient. The latest reports of European government telegraphs show clearly that, instead of being a source of revenue to the countries where the system has been adopted, they are a source of expense. Statistics for 1873 show for the German Empire a deficit of $661,727. France has a very slight surplus; but taking the aggregate receipts of seven countries—Germany, Hungary, Belgium, Denmark, France, Holland, and Switzerland—the expenditures are found to have exceeded them by $1,075,510. As for England, the London *Railway News*, of late date, admits a deficiency of $5,000 a week, and this increasing.

In adverting to this subject before, we pointed out that a comparison of the British tariff with our own, taking into consideration the enormous distances between points in this country, shows in the end that our rates could gain little in cheapness supposing our government to run the telegraph at once as efficiently as that of England now does. Again, the English post office carries letters for a penny, and makes five million dollars a year; ours charges three cents, and, according to Postmaster Jewell's report, there is a deficit of eight million dollars. The Postmaster General may well assert his intention to try and make the receipts and expenditures of the Department bear some proper relation to each other; and we may justly doubt even the accomplishment of this task for some time to come. It is absurd, however, to suppose that, beside this, a postal telegraph could be made into a paying enterprise, and not an additional burden on the taxpayers. There are other objections to the postal telegraph which we have not space here to detail. A government censorship of news is not to be desired in these days of high party feeling; nor is the saddling of the country with an immense host of new officials an inviting prospect—particularly when appointments will probably, as is the case now in other political positions, be governed by every other consideration save that of fitness for the work. The imposition of another tax is also objectionable. The telegraph is not employed by a great mass of the population. As it is now, it costs this class nothing; as it would be, they would be obliged to contribute to its support.

Postmaster Jewell's report, to all appearances, gives the postal telegraph scheme its practical quietus for this session; but as the project is nevertheless likely to be brought up and discussed, it is, perhaps, well that the public should understand wherein it fails both in law and in expediency. If the government chooses to erect or acquire telegraph lines for its own use and benefit, it certainly has the right to do so; but that it should compel the people to employ only those lines, by legislating the great telegraphic corporations out of existence and securing to itself the monopoly, we decidedly disbelieve.

THE TRANSIT OF VENUS.

Cable despatches from three of the American expeditions for the observation of the transit of Venus, respectively stationed in Japan, Siberia, and Tasmania, and from the British parties in India, China, and Egypt, announce the results thus far obtained. Professor E. Hall, telegraphing from Vladivostock, reports that, as the planet advanced and touched the sun's limb, the moment was signaled with accuracy; but owing to the drifting of haze and clouds between, it was impossible to obtain good photographs of the contacts. After Venus had crept half way across the sun's disk, however, thirteen good negatives were secured, so that it will be possible to map the planet's track on the photographic image of the sun after the observers return home. Professor Davidson, at Nagasaki, was also troubled with cloudy weather. The first contact could not be recorded, but the time of the second one was obtained excellently. A large number of accurate measurements were secured, however, and sixty clear photographs. The astronomers of this party were remarkably fortunate, as almost immediately after the occurrence of the phenomenon the sky became thickly clouded.

Messages from the British parties to the Astronomer Royal state that at Thebes, Egypt, numerous fine photographs were taken; and at Cairo and Suez, the closing stages of the transit were viewed under favorable auspices. The reports from Shanghai, China, are discouraging, and announce complete failure of all attempts, owing to the cloudy weather. The Indian observations seem to have been the most successful, upwards of one hundred negatives of the planet's position on the sun's disk being secured. The details of the micrometric measurements and of the instants of contact, it is also stated, were obtained with precision.

Professor Harkness, from Hobart Town, Tasmania, announces bad weather, but good results, in the shape of one hundred and thirteen photographs.

Altogether the reports are encouraging, and point to generally fair success. The despatches of Professors Harkness and Hall are the most important, owing to their stations being far north and far south of the Equator, and hence giving the most trustworthy data.

In this connection we notice a letter, from Mr. Lewis M. Rutherford, to the *Times*, in which he recommends the use of a short telescope and enlargement of the image by the intervention of an enlarging lens between the objective and the plate on which the photograph of the sun is taken, in lieu of

a long telescope, some forty feet in length. Mr. Rutherford's great success in solar photography, as well as in the photographical record of the positions and aspect of other heavenly bodies, entitle his opinions to the highest consideration; and since his suggestion to the above effect has not been adopted by our observers, the details of the results obtained by using long telescopes will be looked for with interest. If there be any error or difficulties due to the latter cause, it would be a matter of grave public regret that Mr. Rutherford's advice had not been heeded.

Professor C. S. Lyman, of the Sheffield Scientific School, has published an interesting communication detailing telescopic observations of Venus, made from the observatory of the above institution just before the period of transit. When the planet arrived at a distance of only half the sun's diameter from the sun's limb, its appearance became no longer that of a crescent but of an entire ring of light, beautifully delicate, and brightest on the side toward the sun. It is only when the conjunction occurs very near the node that the planet can approach near enough to the sun to have the horizontal refraction of the planet's atmosphere, on the side opposite to the sun as seen from the earth, deflect the solar rays so as to bring them to the observer.

It is to be hoped that other astronomers have watched this interesting phenomenon: for beside its beauty and novelty, it affords, with proper measurements, the means of determining the refractive power of Venus' atmosphere, which would appear to be about one sixth greater than that of the earth.

THE PATENT OFFICE CLERKS.

We are informed by a Washington newspaper that the Commissioner of Patents is proposing to have the force in his office increased without increasing its expenses, by diminishing the pay of some of the old employees sufficiently to provide salaries for the new ones. We hope this statement is untrue. That the present rate of compensation in the Patent Office is not too great is proved by the fact that it is insufficient to secure the desired permanency in official station therein. When a clerk has acquired the experien e and skill that qualify him for the effectual discharge of his duties, he soon finds some more lucrative employment elsewhere. These situations are thus often regarded as stepping stones to the real business of life, and are vacated as soon as the incumbents have fitted themselves for usefulness therein. This state of things will grow worse the more the rate of compensation is diminished. As the higher grades of these clerkships require the highest order of talent and skill, they should be made the object of ultimate ambition and desire to those holding subordinate positions. These should not, therefore, be induced to seek more inviting situations elsewhere, in consequence of inadequacy of compensation here.

If, therefore, a larger number of employees is needed, let them be employed and fully paid; if they are not needed, they ought not to be employed at any price. It is a false economy to fix the s ale of official salaries so low that they will not command proper qualifications in their incumbents, and it is almost an equal mistake to cumber the rooms and halls of the Patent Office with those whose services are not needed. Let all be diligently employed and fully paid.

If we are not misinformed, there are already nearly or quite five hundred persons now on duty in the Patent Office. With proper regulations, and under a well arranged system of labor, we believe that this number is fully sufficient for all the business that will be brought before the Office for many years to come. The funds of the Patent Office have been contributed by the inventors of the world, and should be devoted to their benefit. It is due to them that this fund should not be wasted or needlessly expended. If it is now more than sufficient to meet the annual expenses of the Office, a diminution of the office fees would be a proper corrective; but it ought never to be squandered on a multitude of officials who are willing to serve on half pay.

EZRA CORNELL.

Just as the reports of the astronomers scattered over the remotest portions of the globe, telling of the observations of a great natural phenomenon, are flashing over the wires, the sad intelligence reaches us of the death of the man to whom, next to Morse, the world is indebted for the introduction of that grandest of modern inventions, the electric telegraph. The immediate associate and co-worker with the inventor, his firm adherent through all the dark hours preceding the triumphant success of the derided project, the name of Ezra Cornell will pass to posterity as indissolubly linked to the telegraph as to the noble university which remains a monument to his benevolence and philanthropy.

Mr. Cornell was born at Westchester Landing, New York, on January 11, 1807. His youth was spent working at the potter's trade with his father, but little opportunity being afforded him to acquire more than the rudiments of a common school education. On attaining his majority and for fifteen years thereafter, he was at times a workman in machine shops and at times engaged in agriculture, earning but a slender income. In 1843, he became acquainted with Morse, and at once deeply interested himself in the plans of that inventor. At that period Morse was seeking a practicable way of laying his wires through underground pipes, and called in Cornell's aid to assist him. Cornell soon invented a machine for accomplishing the work, which was successfully used until it was de ided to abandon the underground system in favor of the poles. It is related that this decision was not arrived at until two thirds of the Congressional appropriation, for constructing the experimental line between Baltimore and Washington, had been expended, and it was evident that the balance could not complete the undertaking. Morse then called Cornell aside, and told him that operations must be stopped, but in such a manner that the public would not suppose that they had failed. Cornell at once grasped the handles of his machine and started the eight mules by which it was drawn ahead at a lively pace. By an adroit turn of the wrist when unobserved, he ran his plow point against a rock, wrecking the apparatus, thus demolishing the only means by which the pipe laying could be continued. Subsequent experimenting resulted in the success of the wire elevated on poles, as is well known, but the labors of the inventor and of his faithful friend to raise funds to extend their projects were none the less unremitting. So hard-pushed were they at one time that they opened a show of their instruments in a store on Broadway, asking a small admission fee; but the public failed to appreciate the chimeri al scheme, and the revenue of the partners was very small. Cornell was almost penniless, entirely so at one period, as he afterwards stated that the lucky finding of a shilling in the street prevented his going dinnerless.

With the general recognition of the magnitude and importance of the invention, Mr. Cornell began to reap the returns for his zeal in its behalf. He was employed in the construction of many telegraph lines, through which means, together with the increase in value of the shares of stock which he owned in the Western Union line, he speedily amassed a large fortune.

The early part of his life is a lesson of frugality and perserverance; his closing days furnish a shining example of liberality and benevolence. He struggled until he attained wealth; but riches once gained, he abnegated self, and devoted them to the welfare of mankind. His first public act of philanthropy was the endowment of a public library in Ithaca, New York, on which he expended some fifty thousand dollars. Then followed the magnificent gift, first of $500,000, then of two hundred acres of land with the necessary buildings, and finally smaller donations amounting to $11,000, to found Cornell University, one of the few great educational institutions which aim to teach men to keep themselves, to send out skilled mechanics, graduates capable of earning their bread at once by their own work, not mere book-worms, as ignorant of the world as of how to make it support them.

Mr. Cornell for many years took an active part in politics, filling with honor several State legislative offices. He was also President of the State Agricultural Society, and was largely interested in many railroad, banking, and manufacturing companies. His fatal illness, which terminated on the 9th of December, was induced by overwork in business affairs.

WILL DO IT AFTER A FUNERAL.

It is now considered settled by the most eminent medical authorities that a large percentage of the sickness which prevails in cities, like New York, is due to the backing up of foul gases through sewer pipes into the apartments of dwellings. Against these dreadful odors, the pipe traps commonly used offer but little protection.

There is a very sure and simple remedy, which at a slight cost might be applied in every house in New York; but which, we are sorry to say, is rarely put into use until after there has been a funeral in the family. In the case of the Deaf and Dumb Asylum, in this city, it required several funerals before the parties could be induced to look to the sewers connected with the establishment.

The remedy we allude to is the connection of the house sewer pipes with the kitchen chimney, so that all gases that back up from the sewers will be carried up chimney and not into the house.

We have repeatedly called attention to the excellence of this remedy, have given engravings illustrative of the method of application, have cited instances of its application in other countries, have urged our architects to take special care in drawing up the specifications of new buildings to provide for these escape pipes. We now renew these reminders. Furthermore, we would respectfully ask the eminent and accomplished scientific gentleman who presides over the Board of Health in this city, whether, in his opinion, the introduction of escape pipes as suggested is not a desirable thing to accomplish, regarded from a sanitary point of view? If it is, are there any weighty reasons why the Board should not issue an order forthwith, requiring all landlords to put the pipes in? The Board, we believe, does not lack authority in the matter. It has only to speak the word, and it will be done.

THE LATEST POLAR EXPEDITION.

Dr. Augustus Petermann, the celebrated German geographer, has recently addressed a letter, on the subject of past explorations of the arctic regions, to the British Royal Geographical Society, which is of timely interest in view of the present fitting out of another English expedition to that unknown quarter of the globe. Dr. Petermann believes, from the results already arrived at, that with appropriate steam vessels, making use of the extensive experience gained, the central area will be penetrated as far as the North Pole or at any other points. He also states that the disputed question as to the proper route is clearly settled in favor of passage through Smith's Sound.

Through the individual labors of Dr. Petermann, continued since 1865, seven small expeditions have been sent out. The details of the explorations conducted have not been made public; but generally, from the interior of Greenland, in 30° W. longitude to 59° E, east of Spitzbergen, a width of about ninety degrees of longitude has been surveyed. Besides this, it is now known that the Norwegians, in frail fishing smacks, have circumnavigated Nova Zembla, and have proved that the Kara and Siberian seas are for five months in the year open. The most important information, however, communicated in Dr. Petermann's letter, lies in the extracts from reports by Captain Gray, of Peterhead. From observations made in 1868, this navigator concluded that no difficulty would be found in carrying a vessel to the Pole by taking the ice at about the latitude of 75° (where generally exists a deep bight), sometimes running in a northwest direction upwards of 100 miles toward Shannon Island, thence following the continent of Greenland as long as it is found to sound in the desired direction, and afterward pushing northwards through the loose fields of ice which will be encountered. Captain Gray penetrated northward again during the past summer as far as 79° 45'. At that latitude, in August, the ice was broken up, whereas "down to 77°," he states, "the floes were lying whole in the sea, clearly showing that the ice in 80° must have been broken up, by a swell from the north; beyond the pack to the north (which I could see over), there was a dark water sky, reaching north until lost in the distan e, without a particle of ice to be seen in it."

If two thoroughly equipped steamers be despatched, one up the west coast of Greenland, by way of Smith Sound, and the other up the east coast of the same continent, there is not much question but that one or the other would ultimately reach this open water near the pole, the existence of which so many have credited. It has been the misfortune of late ar tic expeditions that all have been projected on too small a scale; and although they have performed excellent service as pioneers, they lacked the completeness in organization and equipments necessary for the endurance of so long and arduous a voyage.

The preparations for the British expeditions, we understand, are already under way, and the command has been given to Captain George S. Nares, late of the Challenger. We may conclude, therefore, that the long-sought problem of reaching the pole is at length to be met by all the resources of engineering skill and scientific knowledge, in presence of which the solution cannot be far distant.

CHEAP FREIGHTS.

The American Cheap Transportation Association recently met at Richmond, Va., under the presidency of the Hon. Josiah Quincy, of Boston, Mass. Mr. F. B. Thurber read a report on railroads, in which he pointed out various abuses incident to the general management of lines in this country. Among these he mentioned watering stock, fast freight lines run by concerns outside the companies, the present palace, sleeping, and express car systems, and the fact of employees being pecuniarily interested in the use of certain materials and patents. The conclusions were that the most effectual and permanent remedy for the evils is competition, and that the most effective competition will be found in railroads when they are owned by the people. The improvement of water courses and the construction of small canals to connect large bodies of water is also necessary. An exclusive freight road, it is believed, from the grain-growing sections of the West to the seaboard, would demonstrate how cheap freight can be carried by rail; and as soon as this is ascertained, public opinion would soon compel existing roads to abolish the abuses which are absorbing the revenues of the present system.

It strikes us that any candid reader who peruses the columns of the daily journals and endeavors to master the intricacies of the strategic movements of the Pacific roads against the trunk lines, the Baltimore and Ohio against the New York Central, the Pa ific Mail muddle, and the question of the Saratoga agreement, will arrive at no other conclusion but that there is plenty of competition, though the chances of cheaper freights are by no means so generally apparent. The recent completion of the Baltimore and Ohio direct road to Chicago is, it is said, destined to have considerable significance, in that negotiations are pending between its managers and those of the Erie line for a joint use, by the latter, of a portion of the former route, which would render Erie independent of Lake Shore. It appears, however, that, in spite of the pronounced benefits to be gained by the Baltimore and Ohio completion, the published rates of the New York Central are far less already than those of the first mentioned road. Mr. Vanderbilt's table of local freight tariffs, compared with that of the Baltimore road, shows rates averaging in the neighborhood of 40 per cent less for similar distances. For example: From South Branch to Baltimore, 162 miles, is charged 62 cents; from Schenectady to New York, 161 miles, the winter tariff is 50 and the summer 30 cents, all first class. Flour, per barrel, from Parkersburgh to Baltimore is $1.30, 383 miles; from Buffalo to New York, 440 miles, 50 and 70 cents.

The Central besides gives special rates to any one. A like comparison to the above shows that the tariffs on that road are actually less than those asked by the Grangers on the Illinois lines. Finally the comparison of the business done by the New York Central for the past year, as compared with 1873, exhibits an increase of 46,800 tuns in tunnage, and a decrease of $397,972.59 in earnings on freight. This looks more like practical cheap transportation than any project before the public, while it disposes of the charges of illiberality on the part of the Vanderbilt management. Mr. Thurber, in the address to which we refer in our initial paragraph, goes into facts, figures, and an elaborate argument to prove that the New York Central ought to and must charge a much higher rate of freight, because it invests its earnings and issues stock representing the same, instead of using the earnings to improve the road and carrying the balance over as surplus, after the fashion of the Baltimore and Ohio. It is unfortunate for Mr. Thurber that actual figures demonstrate exactly the reverse of his theoretic conclusions.

Eelskins dried and cut in strips make very strong belt lacings.