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PUBLISHERS' CARD TO ADVERTISERS.

About the 10th of November we shall publish a SPECIAL edition of 50,000 copies of the SCIENTIFIC AMERICAN, which will be mailed in separate wrappers and the postage prepaid to every post office in the United States, Canada and adjoining provinces.

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MUNN & CO., PUBLISHERS.

A MILLION DOLLAR TELESCOPE.

The *Manufacturer and Builder*, in noticing the fact that Congress has appropriated \$50,000 to pay for a 27 inch refractor for an Astronomical Telescope, calls attention to the want of liberality usually shown by our public men, in respect to expenditures for scientific instruments. It thinks there is no difficulty in obtaining money to build engines intended for destruction, such as monitors, but, when it comes to devices that are solely capable of adding to human knowledge and augmenting human happiness, then the purse strings are drawn tight, and money grudgingly given. Our cotemporary thinks that an appropriation of a million dollars to build a large telescope ought to be passed, and that science ought to be aided and encouraged in the same liberal style on all suitable occasions. The editor further believes that if such a telescope were to be capable of killing people at the rate of a thousand souls a minute, the million dollars would have been paid out and the machine constructed long ago.

It may be interesting, in regard to this matter, to give an account of the largest telescope constructed, and a few hints about what we may expect of a million dollar telescope.

The large telescope, commenced by William Herschel in 1785, was finished in 1789; its objective was a reflecting metallic mirror of 4 feet diameter and of nearly 2,000 pounds weight; the focal length was 36 feet. It magnified objects 6,000 times in their linear dimensions, or 36,000,000 times their superficial area. Herschel found, however, that the penetrating power depended on the size of the objective. A small objective of long focus causes the rays to be diffused so much that little light is left; and by using the telescope with different sized diaphragms, he found that, while with a small opening he could only see to a certain distance in the heavens beyond the stars visible by the naked eye, he saw much farther by using the full opening of his telescope. By the latter, he saw nebulae so distant as to totally escape vision when using diaphragm with smaller opening, which was equiva-

lent to a smaller objective. He further found that some nebulae could be resolved into stars, and others could not; and it was supposed that this was a confirmation of La Place's nebular theory, these nebulae being assumed to be future planetary systems in their incipient condition.

The next large telescope was constructed by the late Lord Rosse. It had a reflecting objective of 6 feet diameter, and a focal length of 53 feet, and magnified objects over 10,000 times in linear dimensions, or 100,000,000 times in their superficial area. With this telescope, many of the nebulae not resolvable into stars by Herschel's telescope were resolved, and it was a question whether all nebulae could not thus be resolved, if only a still larger telescope than that of Lord Rosse was used.

This problem, however, has since been solved without building such a large telescope, as the spectroscope has proved that most of these unresolvable nebulae consist of glowing hot hydrogen gas.

The magnifying power of a telescope is found by dividing the focal length of the eye piece into the focal length of the objective. It follows from this that the magnifying power increases with the focal length of the objective, which regulates the length of the tube, and is in an inverse ratio to the focal length of the eye piece. Some very long telescopes have been made, of over 100 feet length, mounted on a stick in place of a tube; but as the objectives were very small, the great magnifying power was counterbalanced by the small amount of light they received; and they had a total lack of penetrating power, and could be of use only for observations of such highly luminous celestial objects as the sun. For a successful instrument, the size of the objective must, therefore, be proportional to the length of the focus; and an objective of say 12 feet diameter, with a focal length of 120 feet, would be the thing to be desired, unless, indeed, these dimensions could be exceeded. If such an objective is ground to a very true parabolic curve, it can stand a very strongly magnifying eye piece, that is, one of very short focus. Suppose that the objective is so truly ground and polished that it could stand an eye piece of one twentieth of an inch focus, with which to magnify the image of the distant object formed in the focus of the objective; the magnifying power would then be equal to 120 feet divided by one twentieth of an inch, or 1,440 multiplied by 20—28,800 times the linear dimensions, or over 800,000,000 times the surface.

Such a degree of magnifying power would make the moon an interesting object for the geologist, showing the results of ancient volcanic action undisturbed by the effects of air and water. As the moon is at a distance of nearly 240,000 miles, a magnifying power of 28,800 would bring it to a distance of about 8 miles, and then the theory that the moon cannot be inhabited would be practically verified.

In regard to the planets, Mars would be brought to within 4,000 miles, and thus would be apparently 60 times nearer than the moon; and it would have a visual diameter of 50°, or 100 times that of the moon. As this is the only planet which, according to the latest scientific revelations, has conditions so similar to those of our earth as to make it highly probable that it is inhabited, the observations of the same would perhaps be the most interesting of all, as the works of men, such as cities and roads, could certainly be distinguished.

It is impossible to speculate on what such a telescope would discover in regard to the other planets or the vast regions of the firmament; let us hope that some day the amount of capital necessary will be forthcoming, on the most liberal scale, for the progress of the most sublime of all the sciences.

DOWNFALL OF THE PAPER COLLAR RING.

For several years past the members of a Clique, organized for the purpose of attempting the control of the Paper Collar business, and known as the Union Paper Collar Company, have set up and operated on the pretence that they were in possession of certain Patents which covered the exclusive right to manufacture paper collars. Anybody who made paper collars of any sort was, so they claimed, an infringer of their patents, notwithstanding the well known fact that such collars were known and used for many years before their patents were thought of.

By dint of threats of prosecution, and by actual resort to legal persecutions in some instances, this unscrupulous Clique has for a long time held sway over the smaller dealers, compelling them to take licenses and pay unjust tribute money or submit to the meanest annoyances. Indeed, some dealers have been compelled to abandon the business.

In view of these circumstances, it is with considerable satisfaction that we observe that the Collar Clique have at last been brought into Court, where their pretensions have been curtailed to reasonable proportions. We publish an abstract of the case in another column, from which it will be seen that their principal patent claims are declared invalid.

DISCOURAGING PROSPECTS IN ENGLAND.

The late English journals are filled with gloomy forebodings as to the prospects of the poorer classes and the working people for the coming winter. In the cities, and especially London, the repeated building strikes have brought poverty to hundreds; while in the rural districts, where the agricultural laborers have been carrying on a war for higher wages, acres of productive land have lain uncultivated during the best months of the year.

The potato crop, which forms a staple industry among a large number of farmers, has utterly failed. The *London Times* states that growing potatoes are offered at one shilling a rood, without customers. The produce should be worth ten shillings. The face of the country where the po-

tatoes are lying is blackened, and in the most cases the stench plainly indicates the presence of the disease before it is detected by the eye. The retail price is one penny per pound, and the wholesale, seven pounds per tun instead of less than half that sum. An agricultural weekly estimates the loss, if the disease continues its spread as it bids fair to do, at 1,630,000 acres at 4½ tuns per acre, in all 7,735,000 tuns, which, at £4, comes to £39,340,000, or the value of say 10,000,000 quarters of wheat.

Various methods have been tried to prevent this fearful scourge, with but little success. Dr. Hooker, curator of the Kew Gardens, publishes, at the request of Premier Gladstone, the information that parts of the diseased vegetable may at least be saved, by grating and washing, thus extracting the starch. He also suggests that efforts should be made to spread among the poor the use, as food, of the beet root, and the foliage of the turnip and other vegetables, which are now given to cattle.

Another calamity is threatened in the shape of the foot and mouth disease among the domestic animals, which will result in the material increase in the price of meat. The *London Daily News* quotes from a Parliamentary speech, in which it is asserted that, in the five weeks previous, 10,000 cases of cattle and 50,000 cases of sheep had been returned as affected with this contagious disorder.

The outlook is further darkened by the probability of the price of bread being raised. A general strike of the bakers is threatened in London, which, it is feared, if carried into effect, will give rise to extensive and formidable bread riots.

In addition to these other evils, coal is selling at rates largely in advance of previous years. This may be accounted for, both by the troubles among the miners, large numbers of whom have struck for eight hours work, forcing many colliers into idleness, and also by the unusual demand for coal by the iron and metal working trades, the rate of whose yearly consumption has largely increased. Whether the advantage gained by the activity of these industries will compensate for the hardships entailed upon the poorer classes by the enhanced cost of fuel, is, as in all cases where one portion of a population is benefited at the expense of another, at best questionable.

With coal doubled in price, meat advanced and perhaps unhealthy from disease, potatoes, the great substitute for bread, scarce, and bread itself dearer, the prospect for the English working people is not very encouraging.

AN IMPORTANT PATENT EXTENSION DENIED.

The application of Perry G. Gardner, for an extension of his patent of Sept. 28th, 1858, for Improvements in Car Springs, has been rejected by the Commissioner of Patents on the ground that his statement of receipts and expenditures under the patent is vague and insufficient. The patentee granted licenses to use his invention to certain Companies, taking stock in compensation, and alleges that he has received no dividends therefrom; although nothing appears to show that his stock is not of great value, and no pretence is set up that the companies are not doing a profitable business. The Patent Office infers that the patentee has received a large remuneration for his invention, respecting which he withholds, in his statement, all information. Nothing is more common, says the Acting Commissioner, among manufacturing companies than to withhold all dividends, even while making enormous profits, devoting the latter to the enlargement and improvement of their works.

PROFESSOR J. H. PEPPER.

We are pleased to observe the arrival, in this city, of Professor J. H. Pepper, Director of the Royal Polytechnic Institution of London. He comes to this country on a tour of observation.

During his stay, we are to be favored with a few of those striking and marvelous scientific lectures for which he is celebrated, and which have attracted so much attention in London. The first lecture is announced for October 30th, at Steinway Hall in this city. Some of Professor Pepper's experiments with light and electricity are said to be quite astonishing, his appliances for direct illustration being very effective and original.

UNDERGROUND RAILROADS.

The *London Telegraph* gives a vivid picture of the horrors of the underground railroads of that city. It speaks of "the incessant hurry at the subterranean stations, the nerve shaking slamming of every carriage door, the hideous yells of the engines, the difficulty of distinguishing one train from another, or of getting a coherent answer to a question from the fevered and inarticulate officials," and says that "all these peculiarities, with the oppressive atmosphere and the spine convulsing way of putting on the brakes, render the underground lines as terrible as they are useful."

Is the underground railroad which Mr. Vanderbilt is supposed to be building in this city, or to be making preparations to build, to be of this sort? Already we have troubles of our own in the way of travelling about the city. These are due in a degree to what some one has happily called the "natural depravity of inanimate objects," it is true; but they are none the less a grievance on that account, while the torments already inflicted on us by some of the horse car conductors, the stage drivers, and the hackmen, are worthy of the Spanish Inquisition in its worst days. But if the *Telegraph's* portrayal of the characteristics of the underground railroads of London be not wholly imaginative, what a pandemonium are we preparing for ourselves!—*Evening Post*.

The London Underground Railway is a model of its kind, pandemonium though it is, and the steam road proposed to be built in New York by Mr. Vanderbilt, will not be substantially different from that of London. The presence of the