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For the Week Ending February 13, 1892.

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A VIOLENT ERUPTION OF THE SUN.

A very remarkable eruption of a solar prominence was observed on June 17 of the past year, at the Haynald Observatory, Kalocsa, Hungary, by the eminent astronomer, Julius Fenyi. At about a quarter to six in the evening the first signs of the eruption were seen, and eighteen minutes later the great mass of intensely heated matter was found by spectroscopic observation to be in rapid motion. The enormous displacement of the spectrum toward the blue indicated an apparent shortening of the ether waves due to rapid motion of the glowing matter toward the earth. The prominence was essentially hydrogen. Several observations for velocity were taken, a direct maximum of 890 kilometers per second, equal to 553 statute miles, being obtained. The mass represented a suspended column, subtending 111 seconds, and rose while observed to a height subtending 256·9 seconds of arc. But the velocity was not only in the direction toward the observer, it also moved laterally and also in the meridian. Combining two of the different velocities, a probable resultant velocity of 1,014 kilometers, or 630 miles, per second is obtained, leaving out of account any movement in the meridian. This is sixteen hundred times faster than a cannon ball moves, and is enough to indicate the projection of the hydrogen into space out of the sphere controlled by the sun's attraction.

The cause of the outbreak and its final result are mysteries. M. Fenyi even appeals to electricity as the possible cause. The next query would be, Where did the great mass of hydrogen go? Did it fly through space like a drifting cloud, to be torn to pieces and distributed to different orbs as a constituent of their atmosphere? If it possessed quality enough of gravitation to keep its mass together, it might, when appropriated by some distant orb, gravely modify its atmosphere. It might find oxygen enough in such atmosphere to combine with and produce a conflagration to be revealed to our astronomers years hence, when the ether waves announcing the disturbance would have traveled to the earth.

From the magnetic records at Greenwich Observatory, in England, it appears that there was a marked magnetic disturbance, very short lived but clearly registered, at the time of a similar disturbance observed from Paris on the same day. But this was slight in extent compared to other perturbations.

THE CONGRESSIONAL REPORT OF THE COMMISSIONER OF PATENTS.

Two annual reports are made by the Commissioner of Patents, one in the middle of the year, July, to the Secretary of the Interior, the other in January, to the Senate and House of Representatives. The latter has just been presented by Commissioner of Patents W. E. Simonds, late Member of Congress from Connecticut. It is his first report, and is a most able and interesting document. The value and importance of the services rendered by inventors are eloquently set forth, and the measures necessary to enable the public to reap benefits from these services are described. Among the means to these ends the improvement of the Patent Office is shown to be essential. Its present crowded condition is disastrous to all concerned. The health and efficiency of employes are sacrificed for want of room for air and action. The report concludes with several valuable suggestions for modifications of the existing patent laws in the interest of inventors and the people. We make the following abstracts from the report:

The total number of applications for patents during the year 1891 was 40,452. Total number issued, 23,244. Total receipts, $1,271,285. Expenses, $1,139,713. Balance now in the United States Treasury on account of the patent fund, $4,004,317. The Commissioner says:

"As regards the rooms occupied by the examiners, the need is urgent. The cubic feet of space per occupant is 916 feet. Dr. John S. Billings, in his work entitled 'The Principles of Ventilation and Heating,' gives 4,200 cubic feet as necessary for each person in a room with 'ordinary ventilation' for two consecutive hours of occupancy. These examiners' rooms are occupied seven consecutive hours each day, with the exception of half an hour for luncheon. These rooms hardly attain what might be called 'ordinary ventilation,' for all of them are dependent upon the doors and windows for fresh air, except that one of them has a small ventilating register, which cannot be used, and five of them have grate fires, which to a degree assist the ventilation. The heating is attained in some rooms by the steam pipes, in others by hot air registers, and in still others by stoves. It is the rule rather than the exception in these rooms that the floor space is so occupied by desks and cases for papers that the occupants move about in them through tortuous lanes. Cases of drawings belonging to the patented files are necessarily located in large number along the sides of the corridors, where the public passes to and fro. This is unsafe and unsightly. This state of affairs not only puts unnecessary discomfort upon the examiners, but it also unfavorably affects their health, and, to a degree that is more than noticeable, prevents them from doing work to their full capacity."

The public benefits resulting from the policy of granting patents are sketched by the commissioner as follows: "The vast majority of our great manufacturing industries were originally based upon inventions recorded in the United States Patent Office. The following are a few and only a few of the American inventors whose reputation has become national and whose improvements have formed the foundation of manufacturing industries of great magnitude: John Fitch, Robert Fulton, and James Rumsey as to steamboats; Eli Whitney, as to the cotton gin; Oliver Evans, as to milling machinery; Amos Whittemore, Erastus B. Bigelow, and Barton H. Jenks, as to looms; Eli Terry, Ira Ives, Noble Jerome, and Chauncey Jerome, as to clocks; Peter Lorillard, as to tobacco making; E. I. Dupont de Nemours, as to gun powder; Jesse Reed, as to nail making; William Edwards, as to leather making; Jethro Wood, as to iron plows; Thomas Blanchard, as to lathes for turning irregular forms; Asa Spencer, as to geometrical lathes; Richard M. Hoe, Isaac Adams, Stephen P. Ruggles, Andrew Campbell, Moses S. Beach, and G. P. Gordon, as to printing presses; Samuel W. Collins and Elisha K. Root, as to ax making; Oliver Ames, as to shovels; William Woodworth, as to wood working; Thaddeus Fairbanks, as to scales; John J. Howe and Chauncey O. Crosby, as to pin making; Eliphalet Nott and Jordan L. Mott, as to stoves; Robert L. and Alexander Stuart, as to sugar refining; Matthew W. Baldwin and Ross Winans, as to locomotives; Cyrus H. McCormick and William P. Ketchum, as to mowing and reaping; Samuel Colt, Ethan Allen, Christian Sharps, Edmund Maynard, Rollin White, Christopher M. Spencer, Horace Smith, and Daniel P. Wesson, as to fire arms; Alonzo D. Phillips, as to friction matches; Henry A. Wells, as to hat making; Charles Goodyear, Nathaniel Hayward, and Horace H. Day, as to India rubber; John Ericsson, as to naval construction and hot air engines; Elias Howe, Jr., Allen B. Wilson, Isaac Singer, J. E. A Gibbs, William O. Grover, and William E. Baker, as to sewing machines; S. F. B. Morse, Royal E. House, and David E. Hughes, as to telegraphs; Henry B. Tatham, as to lead pipe; Cullen Whipple, as to wood screws; Jonas Chickering and Henry Steinway, Jr., as to pianos; Henry Burden, as to horseshoe machinery; Linus Yale, as to locks; John A. Roebling, as to cables, chains, and bridges; George H. Corliss, as to steam engines; Asa Whitney and Nathan Washburn, as to car wheels; Gail Borden, Jr., as to condensed milk; William and Coleman Sellers, as to shafting and iron working; Henry Disston, as to saws; James J. Mapes, as to fertilizers; John Stephenson, as to horse cars; R. P. Parrott, as to cannon; Richard J. Gatling, as to Gatling guns.

These men and thousands of others like them enjoyed for a little time the ownership of the property they produced by their own brains and their own hands, out of materials belonging to no one else, and that property of vast and peculiar value has been given to the American people forever. Even during the few years that they enjoyed the ownership of the property, which was theirs by the best and highest of all possible titles—that of creation—they realized but a small fraction of the benefits flowing from their improvements. Even during that limited period the lion's share inured to the public benefit in added comfort and lowered prices.

The patent law does not exist for the benefit of inventors. It exists for the benefit of the public. The enlightened public selfishness which called that act into being was expressed in the organic law—in the Constitution of the United States—when Congress was therein authorized to secure 'for limited times to authors and inventors the exclusive right to their respective writings and discoveries,' in order 'to promote the progress of science and useful arts.' The magnificent degree in which the progress of science and the useful arts has been promoted in America by wise patent laws ought to be clear to the dullest comprehension.

The benefits of the patent system are by no means confined to the manufacturing industries. It may well be doubted whether the larger benefits do not flow to that portion of our people who seem to have the least connection with those industries. It was Whitney's improvement in the cotton gin which made possible the marvelous cotton culture of the South, producing thirty-six hundred and twenty-two million pounds of the staple in 1889, which without the schoolmaster's invention would have required the labor of three millions of men for a year simply to clean it.

The settlement and cultivation of the great West have been made possible only by patented improvements in agriculture and in transportation. Under the old order of things it would have required the labor of all the men and boys in the United States, some twenty-four millions in number, to plant and till and harvest the American corn crop of 1889, it being more than two thousand millions of bushels, raised upon seventy-eight million acres of land, leaving to take care of itself meanwhile four hundred and ninety million bushels of wheat and seven hundred and fifty million bushels of oats produced in that

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same year. And under that old order of things the value of each bushel of this grain would have been consumed in transporting it three hundred miles, while now it is carried across a continent and across an ocean and still sold at a living profit.

There is no class or condition of men in the whole country which has not felt the blessings of American inventive genius, fostered into its fullest flower by wise and kindly patent laws.

That same inventive genius has greatly enlarged the employment of manual labor and enhanced its wage. Every calculation to the contrary, based upon doing a modern volume of business by the number of men who would have done it under the old order of things, has the fatal defect of forgetting the inevitable relation between lessened price and increased consumption. The man who, at the meeting of the American Social Science Association in 1878, calculated that on a single great modern daily newspaper a few men, using modern machinery, had practically displaced more than five thousand printers, using the press of Benjamin Franklin, omitted to note that the wages of this army would have so raised the cost of the journal as to annihilate its circulation and destroy the enterprise. It is an absolute condition of the doing of any modern volume of business that it shall be done in the way it is done.

"No greater labor-saving device than the sewing machine was ever invented, or is ever likely to be; but its introduction into common use greatly enlarged the field of manual labor. In 1838 Walter Hunt had all but perfected a practical sewing machine; but upon the protest of his wife as to its effect upon tailors and sewing women he gave his invention over to darkness and oblivion. Nevertheless, the sewing machine was made a common thing between 1850 and 1870—a period of time in our national life more important and interesting in most particulars than any other similar period. In 1850 there were fifty-two thousand tailors in a population of twenty-three millions, or one tailor to four hundred and forty-two inhabitants. In 1870 there were one hundred and six thousand tailors in a population of thirty-eight millions, or one tailor to three hundred and fifty-eight inhabitants. Population in these two decades increased sixty-five per cent; but the number of tailors increased more than one hundred per cent. Meanwhile the manufacture and sale of sewing machines had given profitable employment to at least forty thousand persons, and millions of sewing machines had gone into use in factories and families, effecting a saving well-nigh measureless in that labor which is performed with the needle.

"The locomotive is another immense labor-saver, which first became common in America in the period between 1850 and 1870, and while in those two decades the population increased sixty-five per cent, the makers of common carriages and wagons increased in number more than two hundred per cent.

"Among the English-speaking peoples, never, since they crept out of the twilight of the Middle Ages, has the beneficial effect of wise patent laws been seriously questioned."

The Whitening of Wool.

We owe to M. Hofmann, of Dresden, an interesting communication on the process employed for producing a pure white on wool. It is well known that it is impossible, even by the aid of the most active bleaching agents, to remove from the wool a faint shade of yellow, which becomes specially noticeable when the material is contrasted with silk or cotton. The neutralization of this yellow by a complementary blue, such as is used for cotton, linen, paper, etc., only gives poor and unsatisfactory results. Attempts have long been made to give wool a better white by means of white topping substances, such as magnesium carbonate. This method has had, however, to be given up on account of the dust formed after a short period of storage. The author proposes to obtain a better result by vegetalizing the wool, that is to say by impregnating it with a solution of cuprous oxide in ammonia, and then passing the fiber into a solution of sugar or dilute acid, which precipitates the cellulose in an insoluble form, and thus fixes it. To render the gelatinous cellulose thus deposited opaque and white, the material is dipped into ether. The same result is obtained by F. V. Hallah, by the use of hyposulphite (the old hydrosulphite) of soda and indigo. The effect produced is of two kinds: The hydrosulphite produces decolorization by its energetic reducing action, and by dissolving the indigo mechanically deposited on the surface of the tissue, causes the coloring matter to penetrate uniformly into the fiber. The blue color is restored to the indigo by a subsequent exposure to the air, and, being complementary to the yellow of the wool, completely destroys it. It is very doubtful whether, even under these conditions, a perfect equilibrium is attained between the yellow shade which is to be removed and the blue of the indigo. We have already observed that the numerous attempts previously made in this direction, with various coloring matters, have resulted in failure. However this may be, the method as given by the *Deutsche Farb. Zeit.* is as follows:

The hyposulphite solution should be prepared immediately before use. For this purpose, 7 parts of zinc dust, or 20 to 30 parts of granulated or sheet zinc, are digested with a concentrated solution of bisulphite of sodium, representing about 100 parts of the dry salt. The operation is carried on in a well closed vessel, which must be shaken up at intervals during an hour. The clear liquid is decanted, and contains hyposulphite of sodium, together with some of the zinc salt. The woolen material, carefully purified, washed, and freed from fat, etc., is thoroughly moistened in a bath of cold water, in which indigo is suspended in a very fine state of division. The best quality for the purpose is that which gives bright blues of a reddish shade in the vat process. The material emerges from the bath covered over with particles of indigo deposited on the surface. It is then passed into the bleaching solution, which is composed of water and hyposulphite solution at 1° to 4° Baume. Just before passing in the material, a quantity of acetic acid, equivalent to the hyposulphite present, is added. It is essential that the stuff be properly manipulated, so that the reduction of the indigo proceeds with perfect regularity.—*Le Mon. de la Teinture.*

Dr. Crerar's Cure for Influenza.

"There can be no question," says the London *Lancet*, "as to the advantage of having prompt recourse to rest in bed and a persevering administration of easily assimilable food, together with such special remedies as may be called for by the type of the disorder. Every practitioner knows that the manifestations of influenza are by no means uniform, that in some the headache, pains, and prostration, in others gastric or pulmonary catarrh, predominate, and he has to regulate his choice of remedies accordingly. Few are prepared to admit that, even with the adoption of all precautions, it is possible to ward off the supervention of severe bronchitis or pneumonia, which carries off so many of the weakly and the aged, or to prevent the protracted convalescence and the nervous sequelæ that characterize a certain number of cases. When, however, we attempt to realize the extent to which influenza prevails, and estimate its gravity in proportion to its morbidity, even the long list of fatalities dwindles to almost insignificant proportions. Still, this is but small consolation, and the demand for some truly specific or antidotal remedy is perhaps natural. Many such have been introduced—some, to be sure, with little reason, and all based more or less upon theoretical considerations. There is, however, one remedy which, from its simplicity and from the very confident opinion expressed by its introducer, may be singled out, in order, if possible, to get some more general opinion as to its merits. We refer to the use of large and repeated doses (thirty grains every two or three hours) of potassium bicarbonate, which Mr. Crerar, of Maryport, introduced to the notice of his fellow practitioners in an address he delivered in 1891, as president of the Border Counties Branch of the British Medical Association.

"We need not concern ourselves with the somewhat strained analogies and arguments adduced by Mr. Crerar in that paper, or dwell on the fact that it is not possible from his address to perceive why he should have come to the conclusion that the influenza poison could be neutralized by increasing the alkalinity of the blood. We may fail to be convinced of his logic, and yet not refuse to accept his facts; and the evident sincerity of his statements, which, in a paper he has just forwarded to us, are supported by the experience of others, and particularly by the personal testimony of a well known teacher in Edinburgh University, together with the results of the treatment in the wards of the Edinburgh Infirmary, seem to warrant some attention being paid to them. It is not necessary to give the text of this paper, which mainly consists in the citation of such testimony, but in justice to its author we may quote his conclusions as to the advantages of the method. They are:

"'1. If used before the attack, it prevents the disease. 2. It destroys the power of the disease within twenty-four hours, generally within four or six hours. 3. The strength is conserved, and the convalescence is short and satisfactory. 4. Sequelæ are conspicuous by their absence. 5. The death rate is reduced to a minimum. I have not had any death in more than one thousand cases. 6. It has more power over influenza than I have ever seen exerted by any method of treatment over any other disease, and I have had an extensive practice for upward of a quarter of a century. 7. If adopted by the whole profession, it would make influenza non-existent in one week. 8. It rests upon a sound scientific foundation.'

"The last two conclusions may be open to question, but the preceding are statements which no medical practitioner of standing would venture to put forward without good cause. Therefore, without in any way desiring to bias opinion, we have, after due consideration, deemed it only right to call attention to these statements in order that they may be put to the test. No doubt one's first impulse is toward incredulity, but *prima facie* it can hardly be asserted that the method is unreasonable, although the administration of such large doses of a salt that has undoubtedly a depressing action on the circulation is surely a step to be taken with circumspection and care, especially in a disease so characterized by depression as influenza."

The Earth an Outer Shell with a Fluid Filling.

Just why the magnetic needle, instead of pointing due northward, inclines to one side to a greater or less degree, and why the region toward which it is directed keeps shifting slowly, is a problem which has for ages baffled the wisest men. But a solution of it which, if it is not accepted by the scientific world as complete and final, at least has much to commend it to instant favor, is now offered by Henry Wilde, F.R.S. It is briefly discussed in the *American Meteorological Journal* for January by that new, though already eminent, authority on terrestrial magnetism, Professor Frank H. Bigelow.

Mr. Wilde has come to the conclusion that the outer shell of the earth and the great mass within rotate somewhat independently of each other. The interior portion, still in a liquid condition, he conceives as continuing to revolve about the axis which our planet had in its infancy; that is, one perpendicular to the plane of the ecliptic. Somehow, in the great cataclysm in which the moon was thrown off from the earth, the crust of our globe was, he thinks, skewed over to one side about twenty-three degrees; and this part of our sphere, therefore, revolves about what we call "the geographical pole." The inner mass, like the other planets and the sun, he regards as electro-dynamic; while the shell is electro-magnetic. Furthermore, two causes are supposed to render those portions of the earth's exterior underlying the oceans more highly magnetic than others: the permanent low temperatures at the bottom of the ocean, and the greater amount of iron here included, the crust being thicker under the seas than elsewhere.

For purposes of demonstration Mr. Wilde constructs a machine, consisting of one sphere within another slightly larger one, both converted into magnets by coils of wire encircling them. Upon those portions of the shell which correspond to the oceans he attaches magnetized sheet iron. And by means of proper gearing he makes the inner and outer spheres rotate on axes 23½ degrees apart. Finally, for test purposes, he provides for temporarily fixing a magnetic needle at any point on the surface of globe. With this ingenious apparatus, he declares he can reproduce every known variation of intensity and direction in terrestrial magnetism of which he can find a record; and, what is the convincing feature of his experiment, the real magnetic history of all parts of the world for the last four centuries, so far as he can learn it, is actually repeated in the minutest details when the inner sphere is made to fall behind the outer one, in their revolution, at the rate of 22½ minutes of an arc annually! That exceedingly well informed and cautious expert, Dr. Charles A. Schott, of the United States Coast and Geodetic Survey, tells Professor Bigelow that he has records of magnetic variations of which Mr. Wilde is evidently ignorant; and that when these are used as tests, in addition to the vast number of verifications Mr. Wilde has presented, the theory still holds good. The period of time here required for one whole "secular" change is 960 years, which agrees with the values of Sir William Thomson, though differing somewhat from tradition.

The only doubt which will remain in any scientific mind regarding the soundness of Mr. Wilde's explanations, after studying this magnificent demonstration, will probably spring from the notion, now widely entertained by physicists, that the earth is solid to its core. Sir William Thomson has expressed the belief that the whole globe is as rigid as glass, if not as firm as steel. Yet Mr. Wilde declares himself thus confidently: "From the various movements of the declination and inclination needles, correlated with each other in direction, time, and amount, on different parts of the earth's surface, the theory of a fluid interior may now be considered to be as firmly established as the doctrine of the diurnal rotation of the earth on its axis."—*N. Y. Tribune.*

Walter A. Wood.

The Hon. Walter Abbot Wood, the inventor, and founder of the manufactory of harvesting machines, well known all over the world, died, aged seventy-six, at his residence at Hoosick Falls, New York, on the 15th ult., from the effects of influenza and pneumonia. He was one of the earliest and largest makers of reaping and mowing machines, beginning in 1852, since which time he and the company of which he was president have made nearly a million machines. They made the first wire and string self-binders ever sold. Mr. Wood had had conferred upon him the Legion of Honor, by the Emperor Napoleon III., at Paris, in 1867, and the Francis Joseph Cross by the Emperor of Austria at Vienna, in 1873. He represented his district in Congress for four years from 1878 to 1882.

THE first theater in the United States was at Williamsburg, Va., in 1752.

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