

The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY
At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Three Dollars per annum—One Dollar in advance, for four months.
Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
See Prospectus on last page. No traveling agents employed.

VOL. VII. NO. 21. . . . [NEW SERIES.] . . . Eighteenth Year.

NEW YORK, SATURDAY, NOVEMBER 22, 1862.

AN IMPORTANT CRISIS IN THE HISTORY OF NEWSPAPER PUBLISHING.

This is a time of severe trial to all newspaper and book publishers; and the prosperity—yea, the very business existence—of many of them is suspended upon a slender thread. That hitherto great national blessing, cheap literature, is likely for the present to receive a severe shock, and possibly its death-blow. We will take the case of the SCIENTIFIC AMERICAN as an illustration of what we have to say on this important topic. For nearly eighteen years this journal has not failed of a single weekly issue; and during that long period we have devoted our best energies and a large amount of active capital to make it the best as it certainly is the cheapest journal in the world devoted to popular science. At the commencement of the "new series"—July 1859—we enlarged the size of the SCIENTIFIC AMERICAN at least one-third, without increasing its rate of subscription. This was done at a greatly-increased cost to us; but notwithstanding this, and in spite of the great "rebellion" and the consequent stoppage of its circulation in all the seceded States, the SCIENTIFIC AMERICAN has gone on, steadily and prosperously, holding its own with the most favored journals of the land. We have regularly, and at a vastly-increased expense to us, given to its patrons, each week, a sheet of 16 pages, printed on the best quality of paper, manufactured expressly for us; and we have profusely illustrated each number with the finest specimens of engravings, prepared expressly by our own artists. In short, we have spared neither time, talents nor money in furnishing a paper which, considering its low price of subscription, is justly regarded as a marvel among the enterprises of cheap literature.

At length a crisis has reached us when we must earnestly consider how far we can continue to maintain this standard of excellence at the present subscription price of the SCIENTIFIC AMERICAN; and, in order that our thousands of readers may fully understand the difficulties that now beset the entire publishing interests of the country, we will explain the matter fully. It is safe to say that the newspaper press of the United States is unrivaled for combined cheapness and enterprise; but, with very few exceptions, no journal has flourished without a large share of advertising patronage. To rely upon the mere circulation of a paper, at the current subscription rates, would soon exhaust the pecuniary means of most publishers. Take, for example, the three leading two-cent "dailies" now published in this city, namely, the *Herald*, *Times* and *Tribune*, if without a large advertising patronage—the greater the circulation the greater the loss to their proprietors. The public, while enjoying the blessings of a cheap press, does not often take this fact into account; yet it is nevertheless true. We have never sought for the SCIENTIFIC AMERICAN a large advertising patronage, but have always desired to give our readers the fullest

possible benefit of our columns for illustrations and reading matter; had we not, however, enjoyed a large professional business, we could not have sustained the paper without a large advertising patronage or an increase in the price of subscription. The war now being waged for our priceless national heritage is working sad mischief to the newspaper interest. A heavy tax is laid upon white paper, also upon advertisements; but these two items we should cheerfully pay as a moiety of our proportion of the war expenses; these, however, are not the worst difficulties that we have to encounter. Owing to the great scarcity of the raw material from which paper is made, the price of the manufactured article has advanced to very nearly fifty per cent, with a prospect of a still greater advance before the first day of January; and it is even intimated that the supply of paper cannot meet the wants of the publishers. Paper-makers will not and cannot, prudently, enter into contracts to supply publishers. They will only sell from week to week at their own prices; and, as usual, speculators are busy in getting hold of every article that goes into the manufacture of paper, with a view still further to enhance the price of the manufactured article.

With this preliminary explanation we come to the vital question at issue, namely: "How shall we adequately meet these contingencies, keeping our own interests and the interests of our generous patrons equally in view?" At the present price of paper our terms of subscription do not pay for the unprinted sheet, to say nothing of the great outlay of type, composition and presswork; hence we are reduced to the alternative of either reducing the size of the SCIENTIFIC AMERICAN or of advancing its subscription price. On the first day of January, 1863, we shall enter upon a new volume. We wish to not only keep our journal fully up to its present standard, but to make its acknowledged excellence to advance as much as it is possible for us to do. We have, therefore, decided to raise the price of single subscriptions to \$3 per annum, with a corresponding reduction to clubs, as heretofore. We think this course will best satisfy our patrons; and we assure them that as soon as the time arrives when we can do so, we shall gladly reduce the rates to the old figures. The matter is now with our hitherto-generous patrons; and, if they still regard the SCIENTIFIC AMERICAN as being valuable to them, we trust they will continue to take it. We shall do our best to furnish them with a liberal equivalent for their continued subscriptions.

SLACKNESS AT THE PATENT OFFICE.

Nothing is more true than that the lack of constant employment begets indolence. When the Patent Office was crowded with business we seldom had occasion to complain at any delay in the examination of cases or lack of promptness in disposing of business in this bureau. But during the last year, and especially the past six months, there has been a noticeable slackness in several departments of the office, for which there is no apparent reason, except upon the principle that "the less one has to do, the less inclined and apt is he to perform well what he has to do."

In 1860 more than twice as many applications were made for patents as are likely to be made this year (1862); and but little, if any, more "help" was then employed in the Patent Office than there is now; still cases are not as promptly acted upon, in some of the examiners' rooms, as they were in that year of great prosperity. The delay in examining and giving decisions upon cases discourages inventors and creates dissatisfaction, which the Commissioner should try to avoid. Some of the examiners, we are happy to say, keep their work well done up, and give a decision in a case within a few days after the application is filed; but there are others who are several months behind in their examinations.

Now, if some of the examiners have so much to do that they cannot get through with their work promptly, why are they not relieved and part of their cases sent to less crowded rooms? There is certainly a sufficiently large examining force in the Patent Office to keep all the work done up snug; and we trust the Commissioner will see to it that the labors of the office are so distributed that no examiner may

excuse himself from not acting upon cases which have been before him for several months, on the ground that he has not yet had time to take the matter up for examination. Will the Commissioner infuse a little more vigor in some of the departments of the Patent Office?

THE CONTINENTAL TELEGRAPH.

The Atlantic has been united to the Pacific by an electric cord 3,500 miles in length, and through this, the largest electric circuit in the world, messages were flashed on the 6th inst. New York and San Francisco now hold daily converse. This is one of the grandest commercial and scientific achievements of the age. The history of the electric telegraph is as wonderful as the story of "Aladdin's Wonderful Lamp." It is but eighteen years since the first line of telegraph was laid on our continent, between Washington and Baltimore, and now more than 50,000 miles of wire throb daily with messages of love, hope, fear and business, conveyed between every city and almost every hamlet in our land. When our first line was laid California was almost an unknown land, and was in the entire possession of the wandering Indian and the degenerate Spaniard; now a splendid Pacific empire, belonging to the Union, exists on the Pacific, and its numerous prosperous cities and villages give proof of the intense energy and enterprise of our people. In 1861 the continental line of telegraph was commenced by parties starting from Fort Kearney for the West, and from Sacramento for the East, and both pushed toward Salt Lake City at the rate of from eight to ten miles per day. This overland telegraph has been working for about a year, in conjunction with the "Pony Express," and now the entire line, from ocean to ocean, is completed, and the voice of the Atlantic is echoed by the Pacific in a few seconds of time. Let us cherish the hope that a railroad across the continent will soon follow the telegraph.

GENERAL MITCHELL.

Among the many distinguished persons who have fallen victims to our unhappy war, none seem to be more generally regretted than Ormsby McKnight Mitchell, the astronomer General. His death resulted from malaria fever, and occurred at Beaufort, S. C., on the 30th of last month. When news of the event reached this city the public heart seemed deeply moved with a sorrowful impulse. General Mitchell was born in Union county, Kentucky, August 28, 1810, but he removed when a youth from that State to Lebanon, Ohio, where he received a cadet's commission to obtain a military education at West Point. From Ohio to the Hudson he traveled a great part of the way on foot, and when he arrived at his destination all the material wealth which he possessed in the world consisted of fifty cents in his pocket and the clothing bound on his back. In 1829, he graduated with a high reputation in mathematics, and for a few years subsequently he acted as one of the assistant professors in our national military academy. After this he returned to Ohio, and in 1834 became Professor of Mathematics and Astronomy in Cincinnati College. In this situation he acquired deserved celebrity as a teacher of his favorite science and as a popular lecturer. In many of our cities he has delivered courses of lectures, and most lovers of science in this country have been both instructed and delighted with his eloquent descriptions of "the starry heavens." He was of medium height, possessed of a wiry frame and was endowed with a clear intellect and great energy of character. The Observatory at Cincinnati was erected through his suggestions and instrumentality, and he devoted an immense amount of thought and labor to have it furnished with superior philosophical instruments. In conjunction with the late Dr. John Locke he was very successful in designing and obtaining valuable and ingenious mechanism for recording astronomical observations. It is stated that he discovered the exact period of the rotation of the planet Mars, and by two published works on astronomy his fame as a scientific author was widely extended.

In 1859, General Mitchell became chief director of the Dudley Observatory at Albany, N. Y., maintaining at the same time his connection with the Observatory at Cincinnati. While thus engaged he was

roused from his contemplations of the heavenly bodies to go forth as the leader of armed squadrons on the battle-field. His military education and known energy led to his selection as an eminently qualified commander in the West where he was so well acquainted. For successful dash and daring he acquired great distinction in several expeditions which he commanded in Tennessee and Alabama. It has been stated that owing to some misunderstanding with General Buel he was removed from his position in the western army, but it was only to be appointed chief military commander of the Department of South Carolina as successor to General Hunter at Hilton Head. He had been only a few weeks in this new situation when his decease took place, but in that brief period he had endeared himself to all those placed under his authority. As a man he was much beloved by his personal acquaintances for his kindness, courtesy and social qualities; and on his tomb might not inappropriately be inscribed the motto—

"Astra castra, Numen lumen."

("The stars my camp, the Lord my light.") We enjoyed the personal acquaintance of General Mitchell for several years, and always esteemed him as an upright, able man. His death entails a loss to the country—a loss to the world.

IMPROVED TOOLS.

The progress of any particular trade is strikingly exemplified in the machinery by which it is carried on. It is not a great many years since hand labor was the rule and machinery the exception in our manufactories, but within a comparatively short period, the most wonderful changes have taken place. Slow, laborious and costly operations have been supplanted by quick, facile and economical ones, to the great advancement of the arts, sciences and improvement of the world in general. It is not visionary to say that the civilization of any quarter of the globe is mainly due to the proportion and extent of its factories, in a direct ratio with the number of labor-saving machines in use; we could show this to be the case by the mere mention of the principal nations of the earth, and by enumerating the productions of their looms, workshops or laboratories. It is not, however, our intention to go to any such length to illustrate the advantages and benefits resulting to mankind through the employment of machinery. The victories of Peace are greater than those of War, for the reason that the former builds up the world, while the latter overturns and destroys it; but the triumphs of the arts and sciences follow in the wake of the warrior and repair the mischief which his fury has caused. We are led to these remarks by reflecting upon the vast number of inventions that come under our notice. Look at an iron or wood turning lathe for example. Time was, at a period not remote, when any apparatus that would swing a piece of iron between two centers, and revolve the same against a steel tool with sufficient power to take off a thin, corrugated, insignificant chip, was thought to be a miracle of mechanical skill and ingenuity. Yet this machine itself was an invention, and, at the time it was introduced, one of great importance, for it supplanted the hand lathe; substituting the slide rest for the hand tool. Those who are familiar with the use of the latter implement will readily appreciate the introduction of the fixed rest. We can remember when large shafts, seven and eight inches in diameter, rough from the foundry pit or the trip hammer, were turned by hand, and sore work it was too, as aching limbs and chest could testify when the job was finished. Now all these things are among the by-gones. The iron turning lathe, as made to-day, seems one of the most complete tools conceivable; the compound slide rest, the universal chuck, the screw gearing for feed and cutting threads, the adjustable collars in the tool post, for regulating the height of the cutter, in short, the innumerable attachments which belong to it, characterize it as one of the first and most invaluable aids to mechanics. The uses to which it can be adapted are very many, and will suggest themselves to all persons familiar with a lathe.

We have said that it seemed almost perfect, yet every day some addition is made, or some modification carried out, which renders it still more complete and useful. In the lathe for turning wood, the general features for common work remain the same as in

the one first constructed, but the adaptations of the machine for special purposes are something extraordinary. Automatic lathes, that execute forms of almost any kind, have been invented, and work with a certainty and precision that seems almost marvelous, did we not know that the inventor had conferred upon wood and iron mechanism some portion of his own vital genius.

The tools thus specified are but a few out of that vast number of willing slaves that crowd our factories and workshops; unto them is delegated the heat and burthen of the labor, while the human brain sits by and quietly directs the untiring energy of the machine upon whatever portion it wishes. Planing machines, whether for iron or wood, boring mills that turn the inside of our immense steam cylinders to a true circle, the multifarious combinations of inventions that are in daily use, have each and all of them lent their aid, in no small degree, to the civilization of mankind. From them comes increased comfort and luxury, and through their aid sufficient leisure is obtained by the great populations of all countries to improve their minds and to attain to still greater proficiency in the various trades. Nations circumscribed in their boundaries, and in geographical positions which are not favorable, have, through greater mental activity and by increased inventive talent, succeeded in not only maintaining their footing as Powers, but set an example of enterprise which it behooves all emulous of national distinction to follow.

SHARPSHOOTERS.

Captain Drew, of Vermont, well known to the people of that State, has issued a circular upon the subject of sharpshooters, in which he urges the importance of forming corps of those soldiers without delay. He says in brief:—

"I need not tell you of the almost incalculable advantage of this arm of the service, for it is written on every page that tells of battles lost or won. The rebels have made many thousands of sharpshooters—some of them are allowed to go to the field with their 'old familiar rifle,' and shoot when and where they please. The large proportion of officers killed on our side testifies to the great service these rebel marksmen do.

"Our Government is anxious to throw into the field more of this class of men. I have authority to raise, under the governor, five companies of one hundred men each. The governor does not think best that they should be called into camp until another call for troops shall have been made, but that we should find in each town a 'noble few' who will pledge their honor to go as soon as more troops shall be called for. In this way we shall have a battalion ready, so that we have only to call for them, and at once from plow, workshop, store and school will come the noble defenders of our land. Your duties will be simple—"watch and kill." You will have no digging, no working; no "camp duty," no standing guard, but will be kept to the front on picket duty or sent forward as scouts and skirmishers. Come, then, sons of the North! your country needs your clear, keen eyes and steady hands; she needs your unflinching hearts and intelligent brains.

"All over the South, they have long been raising bands of sharpshooters and training them long before they are called for. In every town there are two or three young men who might pledge themselves to this, and then strive to see who is the best marksman. Without leaving your business you can become excellent sharpshooters by spending a few moments each day with your rifle or shot gun.

"Do not neglect to give this your attention and influence, for soon there will be another call for troops, and now is your time to prepare to avoid a draft and choose your situation yourself."

The text is pertinent to the occasion; not only in time of war but also in peace. It is singular that so few bodies of sharpshooters have been recruited during the war, considering the excellence of our people as marksmen. In most of the foreign countries, the use of the rifle is encouraged in all possible ways. Germany permits large bodies of her population to gather at certain periods of the year for target practice; these occasions are regular holidays in the nation's history, and are the scene of great festivity. In England there are national schools for the same pur-

pose: the principal one is at Hythe, but in addition to this, there are numerous organizations of volunteer riflemen who are encouraged to put forth all their skill, and whatever talents they may possess in the use of this formidable weapon. Beyond a few turkey shootings or some unimportant meetings of a like nature, nothing is done to foster or develop the traditional skill of our woodsmen and settlers, which has been handed down from the earliest period of our history by all writers familiar with our early struggles. It would have been greatly to our advantage, if the reverse of this neglect had been observed. Cruel as it may seem, the fate of a battle depends in a great measure upon the life of its officers; not solely because it deprives the soldiers of moral support when they are killed, but on account of the confusion and loss of plans which their death necessarily entails. As the circular at the head of this article remarks, our loss of officers in late battles has been awfully disproportioned, and indeed entirely unprecedented; and it may be attributed wholly to the presence of sharpshooters, who, by the brilliant uniforms which our generals wore, were enabled to pick them off like so many partridges. It is, therefore, with the object in view of promoting efficiency in the use of the rifle, that we advocate the formation of such bodies of men without delay. Mechanics especially make excellent marksmen, on account of their superior education of their eyes and facility of estimating distances, and we can point with a pardonable pride to the feats and prowess performed during the war by the bone and sinew of the country. Let us then have more rifle practice; and if the fortunes of war compel us to shoot individuals, we can command as much success as our enemies in this respect.

Pennsylvania Cotton.

We have received a sample of cotton that was cultivated this season at Springhill Furnace, Fayette county, Pa., by Mr. John Oliphant. He states that he did not receive the seed for planting so early, by one month, as he desired; still he is satisfied from his experience that cotton can be cultivated successfully in Pennsylvania, and he is going to engage in its cultivation on a more extensive scale next year. The quality is short staple, and is of good strong fiber. The great drawback to the successful cultivation of cotton in any of the Northern States will be our late and early frosts; still there are many situations, especially on plains, protected by hills from north winds, where it may be successfully grown in the southern parts of Pennsylvania and New Jersey. We have also been informed that there is a species of cotton in China and Japan, cultivated in latitudes as high as that of New York city, and that it is used extensively in making both cloth and paper. The seed of such cotton should be imported and tried. Carolina cotton is an acclimated plant, not a native one.

Street Railroads in England.

Experience has demonstrated the benefits of street railroads in some of the provincial towns in England. The line at Birkenhead—the pioneer—has so grown into favor that its recent temporary stoppage was felt to be a public inconvenience, and a memorial was presented to the commissioners of the township, praying them to take steps to prevent the recurrence of such a misfortune. At the monthly meeting of the board, on the 10th of October, it was announced that this would be sought to be effected by obtaining a bill from Parliament to legalize the original permission given to lay down the rails, and to confer powers of controlling the working of the line upon the commissioners. At present it is open to any ill-natured person to stop the street railway by indicting it in the Court of Chancery as a nuisance.

FOREIGN HONORS TO AN AMERICAN.—Mr. John E. Gowan, who raised the Russian ships sunk at Sebastopol, has been decorated by the Emperor of Russia with the cross of the order of Saint Vladimir. Victor Emmanuel, King of Italy, has decorated him with the Cross of the Order of Saints Maurice and Lazzaro, and the Sultan of Turkey has conferred upon him the Imperial Decoration of the Medijash. The last two were bestowed in recognition of Mr. Gowan's services in repairing and protecting the cemeteries of the allied forces in the Crimea.