The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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

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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.
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VOL. VIII. NO. 1....[NEW SERIES.]....*Nineteenth Year.*

NEW YORK, SATURDAY, JANUARY 3, 1863.

TO OUR FRIENDS.

NOW IS THE TIME TO FORM CLUBS.

With the present number a new volume of this journal commences. We appeal to its friends in all sections of the country where mail facilities exist to endeavor to form clubs for the present year. We feel justified in asserting that no other journal in this country furnishes the same amount of useful reading, and especially at the extraordinarily low price at which it is furnished. The present high price of paper has rendered it necessary that we should somewhat increase the subscription price of the SCIENTIFIC AMERICAN, but by availing themselves of our clubbing rates persons may obtain the journal on very reasonable terms even now. We are obliged to pay more than double the price we did one year ago for the same quality of white paper that the SCIENTIFIC AMERICAN is printed on, while the subscription price to clubs is only a fraction more than formerly.

The long winter evening must be relieved of its dullness, and we must keep reading and thinking, and thus be prepared to overcome temporary difficulties and open new channels of wealth and prosperity. Friends, send in your clubs; at least renew your own subscriptions promptly.

PROGRESSIVE SCIENCE AND ART.

Every new discovery in science is like an increase of power in the telescope, by which a more extended view into space is obtained. New inventions do not circumscribe, but expand the range of discovery. A new abstract truth is almost apparently valueless to art when first discovered. It is like the seed of a tree or flower, that requires planting and careful cultivation It was observed several centuries ago that light turned certain white metallic salts black, but this abstract truth was like a field of grain long covered by an avalanche in an Alpine valley. The sunshine of genius at last thawed it out, and it has now developed into the wonderful and beautiful art of photography. In 1790, Dr. Galvina noticed that a dissected frog executed a hornpipe when it was attached to a copper wire suspended over an iron ballustrade. This was the germ of chemical electricity, from which have emanated electro-magnetism, electro-telegraphy, and electro-metallurgy. These two cases we have cited out of many as examples of progressive science and art. The pursuit of truth in every form is one of the chief distinctions of the human mind. Every new fact, therefore, in science, however abstract and valueless it may appear at first, should be welcomed as a treasure, for it may become the foundation-stone of a splendid temple of art.

During the past year we cannot point to any remarkable new discovery in science, but there has been a steady progress made in nearly all the arts. Two years ago, by the improved instruments of Professors Kirchoff and Bunsen, it was discovered that the flames of different substances possessed specific properties of color, with bright and dark bands. Already this invention has been applied to analytical chemistry, several new metals have been discovered, and it has opened up a boundless prospect for scientific investigation.

Chemistry and mechanics are intimate companions. The one furnishes the materials, the other the instruments of the arts. Metallurgy may be called both a science and an art. There is such a dependance of one art upon another that any improvement in one benefits all the others. From foreign periodicals we learn that some improvements have been made in Europe during the past year in the manufacture of steel. To these, and to the production of the finer qualities of steel, the attention of our metal manufacturers should be intensely devoted. Coarse steel is now made in considerable quantities at Pittsburg, Pa., but the finest qualities, that are used for making our saws, cutting instruments and wire, are imported from England. All that is wanted for the manufacture of fine steel in America is trained skill. In England, the best steel is made from Russian and Swedish iron. Every variety of iron known is native to America. We have the best materials in profusion for the manufacture of fine steel, and encouraging inducements are now presented, by the increased import duty, for our metallurgists to experiment, and thus acquire that skill which must end in success.

The scarcity of cotton has instituted a demand for new substitutes that may be employed in the manufacture of cloth and paper. Improvements in processes and machinery for treating flax may render this beautiful fibrous substance a cheap substitute. There are thousands of vegetable substances from which fibre can be obtained for spinning and weaving, but the trouble and expense of treating them to remove their gluten and bitumen and obtain the fiber are obstacles to their cheap production. The fibre of some substances is more easily obtained than others, hence attention should be directed to the cultivation, or discovery of those which are the most easily treated. Paper can be made from an endless variety of vegetable substances. The semi-civilized inhabitants of Japan, in several respects, are in advance of the skilled nations of Christendom in the art of paper-making.

Had we space we could allude to quite a number of other subjects connected with science and the arts to which the attention of inventors, manufacturers, scientists and others should be directed in commencing a New Year. Let not small things be overlooked; observation should be minute and penetrating. There is not a single science or art that can yet be called perfect. By patient thought and industry great improvements may be made in them all. Who knows but that some neglected or obscure truth in science may be developed into a splendid art during the incoming year? The past is fraught with encouragement, the future is full of hope.

STEAM WAGONS UPON COMMON ROADS.

THE introduction of steam carriages on common roads has been a pet project of inventors for many years. The advantages arising from their use are many, but the objections to them must also have due weight when their employment is proposed. The progress of the street locomotive, practically considered, has been very slow in this country, few comparatively having been built which can be noticed at all. Of those lately in operation, the Lee & Larned steam fire-engine is, perhaps, the most successful one, viewed either in point of speed or capacity for carrying moderately heavy loads—both of these features are comprised in this engine. The British Society of Engineers have discussed the subject of steam carriages at great length in one of their recent meetings, and we cull from their report some accounts of what previous inventors have achieved, so that if our own people should take the matter in hand, they may not be ignorant of what has been heretofore attempted.

In 1824, W. H. James, of England, took out a patent for improvements in steam carriages, and several were constructed on his plan. He employed four cylinders, each pair coupled on to one driving wheel, the axle of which was divided in the middle; the object of this was to render each wheel independent of the other, and to avoid the necessity of throwing the inner one out of gear when turning curves, at the same time to allow both engines to be in motion. The motion of the springs was allowed for, by making the engines, and the frame in connection with them, vibrate upon hollow axles provided with stuffing-boxes, constituting the steam and exhaust passages. A few experiments were tried with these engines, during which, it is said, they attained a speed of twenty miles an hour. They were complicated, however, and were soon abandoned.

In 1826, Mr. F. Andrew patented a carriage, the steering apparatus of which is worthy of special mention; this consisted of a simple wheel placed in front of the carriage, revolving between two lateral bars of a framing; by guiding this wheel with a lever, the direction of the two fore wheels could be altered, thus turning the wagon in every direction. This carriage had oscillating engines, acting directly on the main axle, but the invention was a failure through a defective boiler.

The next candidate for fortune and renown was a Mr. Gurney, who, after repeated trials and failures, at last succeeded in establishing a line between Cheltenham and Gloucester, England. Mr. Gurney, like many others, commenced his experiments with a machine having a series of legs, which struck out behind in order to obtain the necessary adhesion; this plan was abandoned in favor of direct-acting engines, coupled on to the cranked axle of the after-drivers. There was also an upper and under framing, the engines being attached to the under one, while the boiler, passengers, &c., were carried by the upper one, the object of this arrangement being to keep the body of the carriage well suspended, while the engines always maintained their relative position with the axle. The proprietors ran these steam coaches for four months, four times a-day, between Cheltenham and Gloucester, during which time they carried 3,000 persons, and ran 3,500 miles at the rate of a little over nine miles per hour. They were, however, driven off by opposition, and the project was finally abandoned by Mr. Gurney.

We now come to Mr. Walter Hancock, of Stratford, who commenced his career in 1827. His carriages were much superior to any others hitherto constructed, both in point of workmanship and plan. The cause of failure in most of his predecessors lay with the boiler, and the one he adopted is said to have been remarkably ingenious, considering the state of the mechanic arts at that period. One of his coaches, called the *Infant*, had a boiler with six square feet of grate surface, and one hundred feet of upright surface. This supplied vapor to engines of 9-inch cylinder, and 12-inch stroke. The weight of the whole carriage was about six tons. He used an artificial draft, and, it is said, raised steam from cold water in twenty minutes. The following is a description of his invention:—In order to avoid twisting the main shaft, which was always breaking in other inventions, an endless chain was adopted in preference to direct action, and a vibrating link was placed between the engine shaft and the axle, to take the strain caused by the transmission of power, as also to preserve a uniform distance between the two parts. The driving-wheels were outside of the frame, ran loose on the axle, and connected with clutches, so that the stoker could throw them out of gear when desirable. The piston worked downwards, and the driving-axle and crank shaft were geared to the same speed. Hancock constructed nine engines of this pattern, which ran several months in public service, but he also was obliged to discontinue them through popular prejudice.

Coming down to later years (1859) we find that a Mr. Rickett, of Stony Stratford, England, has been quite successful, in a mechanical point of view, with his inventions. The main features of his carriage are the framing and the boiler; the former is hollow, and contains the supply of water for the boiler in addition to supporting the working parts; the boiler is very short, is made of steel, is nineteen inches in diameter, and affords an area of thirty-one square feet of heating surface. The cylinders are three inches diameter and nine inches stroke, and work at an average pressure of one hundred pounds. This carriage has run upwards of twelve miles an hour on common roads.

With these extracts we conclude. The meeting