

## THE LONDON EXHIBITION.

The following are some further extracts from the London *Mechanics' Magazine* :—

## THE AMERICAN DEPARTMENT.

No kind of classification has been made, and we believe at one time it was doubtful whether an American Court would be opened at all. Even now we may say that the arts and manufactures of the United States are unrepresented. The collection we have in the south-eastern angle of the building is not here through the patronage or encouragement of the United States Government, which has other work on hand. It was through the enterprise and creditable ambition of a few private individuals, who were determined to show, at their own risk and on their own responsibility, that there is inventive skill in America, which is not afraid to measure itself against that of Europe in the same direction. Not a single Southern State is represented. This may be on account of the blockade, but it is said that had there been no blockade at all, the South, though she might have shown well in natural productions, could have made no figure in manufactures or mechanical inventions. The State of New York, and the Northern States generally, have been the fertile source of all the inventions which have been patented since the Exhibition of 1851.

The United States Court is represented by Mr. Holmes, and his son-in-law, Mr. Taylor, an eminent engineer. It is due to the energies and sacrifices of these gentlemen that America is represented at all, and the things which their public spirit has brought together indicate the actively practical mind of their countrymen. There are nearly a hundred articles in the various classes exhibited, and most of them have the merit of novelty, as well as utility.

Samples are here of a farinaceous article manufactured by the Glencove Starch Company, of New York, under the name of "Maizena." It is the purest preparation of the finest maize. In a short time, and without any trouble, it can be made into various forms of diet, and is a good substitute for arrowroot.

Near the south-east entrance one is attracted by a cork-cutting machine invented and patented by Mr. Conroy, of Boston, which cuts cork into parallel-pipedons, and then into smaller figures according to the length of bung or cork required. The ease with which this machine does its work is surprising. A clever cork cutter, working by the hand, can turn out, on the average, eight gross of corks a day. By this machine can be made fourteen gross of corks per hour. In a day of ten hours, therefore, two men can produce 20,160 corks or bungs, while two men by the hand in the course of the same time can turn out only 2,304. The corks can be cut in perfect cylinders, or beveled to any angle required by slightly elevating the horizontal disk. The machinery is very simple, and ingenious through its simplicity.

A bolt is shown in one part of the Court, which has all the excellency of the rivet, with this advantage over a rivet, that when required it may be moved from its place without any trouble. It is well adapted for the framework of locomotives and railway carriages. The bolt passes through an iron frame, or through woodwork, and is secured behind by a nut. The nut is kept into its place by having a spring inserted into it, which adapts itself to the ratchet work of a hollow washer. The inventors are Messrs. Lawrence and White, of Melrose, N. Y. Close to the screw-rivet bolt is a contrivance for common land carriages.

There are four exhibitors of pianos, all of New York city or county. These instruments vie in tone, and power, and in cabinet work, with any in the other courts of the building. In power, we suspect that they will carry off the prize against all competitors. We had the opportunity, at least, of listening to a square and a grand exhibited by Steinway & Sons. The internal arrangements of these instruments are novel; the strings are not all in parallels like those in the usual pianos; on the contrary, the bass strings are placed at acute angles above the tenor and treble strings, and obtain the full advantage of the sounding board. The motions of the hammers are not impeded by this arrangement. The grand has seven octaves, and tone loud enough for a large concert room, and yet, through the mechanical arrange-

ments of the instrument, it can be made to play as softly as if it had been intended for a sick chamber.

## FATAL EXPLOSION OF GUN COTTON—DEATH OF A PROMISING YOUNG CHEMIST.

A few months ago the writer of this made the acquaintance of L. M. Dornbach, a young chemist, a graduate of the Lawrence Scientific School, at Cambridge. He was a man of uncommon energy and perseverance, and had so diligently prosecuted his studies, that he was regarded by some of our learned professors, who knew him well, as one of the most thorough chemists in the city. Last winter, when a contract was made with the Government for a large supply of Doremus's cartridges, the manufacturers formed an arrangement with Mr. Dornbach to make the gun cotton with which these cartridges are coated. He hired an isolated three-story brick building above the settled portions of the city, and commenced the manufacture. He had been at work but a short time when, one morning as he was going to his manufactory, he discovered that the house was gone. At that time a small proportion of chlorate of potash was mingled with the gun cotton, and some 250 pounds of this dangerous explosive were stored in the building. By some unknown means fire was communicated to the inflammable materials in the middle of the night, and a terrific explosion ensued, so completely demolishing the structure that not one brick was left upon another. The building was near Columbia College, and we heard Professor Joy say that the peculiar violet-colored light which is produced by the combustion of the chlorate of potassa, illuminated every room in the college.

After this occurrence the chlorate of potash was omitted from the compound, and Mr. Dornbach removed his operations to the outskirts of Williamsburg. He hired a lot, inclosed it with a high board fence, and erected a small wooden building in one corner for his manufactory. It was his practice, after the cotton had been submitted to the action of the acid, to spread it upon the ground to dry, and when dry to pack it in barrels for transportation. The compressing in the barrels was effected by pounding the cotton down with a wooden pestle, and, as it is well known that gun cotton, under certain conditions, will explode by percussion, this mode of compression had been a subject of discussion between Mr. Dornbach and Professor Seely. But Mr. Dornbach said that though he had some apprehension at first, he had made experiments which had satisfied him that the practice was free from danger, and his confidence was confirmed by the opinion of some other good chemists.

On Saturday, the 21st of June, Mr. Dornbach was packing some of the gun cotton with his own hands, and had placed in a barrel about 30 lbs., which he was driving down with a stick of wood, when it exploded, burning his hands and arms and setting his clothes on fire. He ran to the building, where his assistant was at work with an abundance of water, for the purpose of having his blazing garments extinguished, but a fragment of his clothes fell upon the floor, setting fire to about 150 lbs. of gun cotton in the building. A second explosion took place, blowing out one side of the building, still further injuring Mr. Dornbach, and severely burning the hands and face of his assistant. Both of the men walked to the house, about a quarter of a mile distant, neither thinking that he was dangerously hurt. But the next day Mr. Dornbach exhibited symptoms of having been injured internally by inhaling a portion of the hot gases, and at midnight he died.

We are acquainted with no one whose prospects were brighter than those of the young man whose career is thus suddenly and sadly closed. He was from Mechanicsburg, Pa., and was 30 years of age at the time of his death. He was a young man of great promise.

The experiments at Shoeburyness, England, with shot against iron targets, have developed some curious results. The appearance of a conical iron shot after having struck the iron target, is like that of a birch broom hollowed in the center. When the point of the cone strikes the target, it is stopped, but the surrounding portions of the shot move forward, and slide over the center as a core, and thus produce the form described.

## A Line of Battle.

This expression often occurs in referring to the order of troops on the battle field, and it is doubtless the opinion of many that the two armies stand in two lines; but it is not so.

The army is divided into divisions, and there are often great gaps between the divisions. They are posted in positions, or in commanding places—that is, on hills, or in woods, or on the banks of streams, in places where they will be best able to resist or attack the enemy. The divisions are usually so placed that they can support one another. You can understand a line of battle pretty well, by imagining a regiment here on a hill, another down in the valley, a third in a piece of woods, with artillery and cavalry placed in the best positions. If you want to make it more real, when you are out in the fields or pastures, with the hills all around, just imagine that the enemy is over yonder hill, with ten thousand men and twenty pieces of artillery. You are a general, and have an equal number. The enemy will come down that road, spread out into the field, or creep up through the woods and attack you.

You can't exactly tell how many men he will send on the right, or how many on the center, or how many on the left; so you must arrange your forces to support each other. Then, to shift it, you are to attack him. You don't know how his troops are arranged, for he keeps them concealed as well as he can. You don't want many of your men killed, but do want to win a victory. Now there is a chance for you to try your skill in planning a line of battle. You must place your artillery where it will do the most damage, and receive the least from the enemy. You must move your infantry so that they will not be cut off by the enemy before they get near enough to cut them up in return. You see that it is no small thing to be a general. These are great responsibilities.

FIGURES ON DRESS PARADE.—A correspondent in alluding to an extract copied into a late number of the *SCIENTIFIC AMERICAN*, under the above caption, makes the following calculation:—Six hundred thousand men would extend in single ranks  $227\frac{3}{4}$  miles, allowing two feet to a man. In double ranks they would extend  $118\frac{7}{8}$  miles, and if formed in a hollow square, in double ranks, it would measure  $28\frac{6}{7}$  miles on each side, and inclose nearly 807 square miles. They would stand on  $55\frac{35}{63}$  acres, or nearly  $\frac{1}{4}$  of a square mile, each man occupying four square feet.

WOOL EXHIBITION.—There is to be a great wool show under the supervision of the Ohio State Agricultural Society at its annual exhibition to be held at Cleveland, September 15 to 19, 1862. Competition is open to the world. Wool will be divided into four classes. 1st. Fulling wools. 2d. Delane wools. 3d. Cassimere wools. 4th. Combing Wools. Twenty-five fleeces must be exhibited to entitle exhibitor to a premium. Mr. S. N. Goodale, of Cleveland, will have charge of this department.

VARNISH DRAWINGS.—Boil some clear parchment cuttings in water, in a glazed earthen vessel till they produced a very clear size; strain it and keep it till wanted, then give the work two coats of the size, passing the brush quickly over the surface, so as not to disturb the colors. Or, mix one ounce of Canada balsam and two ounces of spirits of turpentine together, then size the print or drawing with a solution of isinglass in water and when dry apply the varnish with a camel's-hair brush.

BLUE COLOR FOR STAMPING.—Take one ounce of Prussian blue, pound it to powder and dissolve it in a little gum water wherein is mixed a little oxalic acid and white sugar. By having a greater or less quantity of water mixed with the blue and thickened with gum, dark and light shades will be produced, as may be desired.

This war has proved that the United States have more military resources, and can put into the field greater armies, than any nation on the earth. It has proved that the United States Government has no friends among the governments of Europe, and furthermore that it needs none. It has proved that the genius and mechanical skill of American inventors is as remarkable in war as in peace.