

By fusion with alkalis, manganates and permanganates are formed that find considerable use in the arts, both in dyeing, as a disinfectant, or for other purposes.

The salts of manganese are distinguished for their beautiful colors, usually some shade of pink. Manganates, however, are green, permanganates deep purple, but change easily.

**AN INDUSTRIAL CITY.—PULLMAN, ILL.**

It is not quite four years since that, on the 25th of May, 1880, ground was first broken for the building of the Pullman Palace Car Works and the city of Pullman, Ill. At that time the land was an open and not very promising prairie; the appearance it presents to-day will be, perhaps, better appreciated from a glance at the accompanying illustration than from any description we can give. Yet the building of the city of Pullman, and the success which has marked the scope of the enterprise, represents much more than the making of a great industrial city in a wilderness in a short period of time. It was, pre-eminently, the design of its founder to build a city in which, as far as possible, all that would promote the health, comfort, and convenience

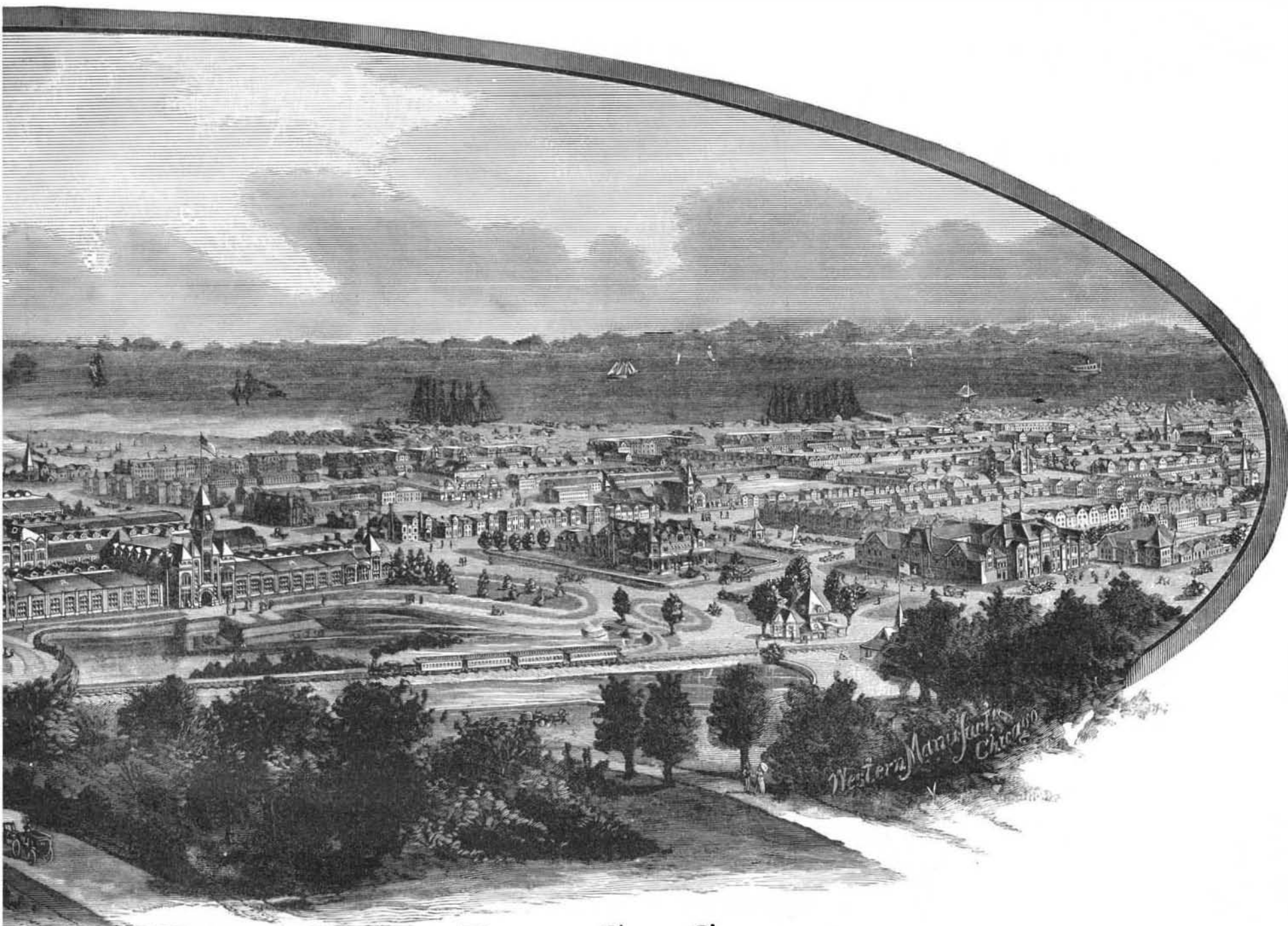
In the selection of a site the first great object was to obtain the ownership of a sufficiently large body of land, that the builders of the new city might have room enough in which to develop their plans and protect themselves from objectionable surroundings, while still being in the vicinity of a leading city, and a location thus near the great railway center of the continent presented obvious advantages. The situation is near enough to Chicago to be easily reached in even less time than it takes to travel to any of New York's suburbs from the business portion of the city; but here, with every facility which capital can control of prosecuting their great industrial enterprise, the Pullman Company have the added advantage of a permanent population of skilled labor, bound to the interests of the company by the knowledge that the latter has, with great wisdom and foresight, to leave out the idea of beneficence, shown a practical consideration for their comfort and happiness, of which there is not another similar example in the world to-day.

The industries carried on here, and for which the city has been built, include the Pullman palace car and freight car shops, the Allen paper car wheel works, the Union foundry

and flats. The frontage of buildings extends along five miles of well paved streets, and there are fourteen miles of railroad track laid for the use of the city and shops. The buildings are all of brick or stone, and built in the most substantial manner. The homes of the workmen are upon wide, well paved, and shaded streets, and have all the conveniences of the best modern city houses.

Every house has gas and water, while the larger houses are heated by steam, have hot and cold water, and bath rooms, and the drainage and sewerage is perhaps the most perfect of that of any city similarly located in the world. The æsthetics of architecture and landscaping are also made prominent features, and the grouping of buildings and trees, to produce a pleasing effect, has been studied as diligently as the arrangement of machines in the shops.

At the left in our illustration, and at the north end of the city, are the new freight shops before referred to, and in their immediate vicinity are shown the residences prepared for the workmen in these shops, while a little further in the background may be seen the shops of the Chicago Steel Works, now in full operation. At the extreme left is shown a small portion of the south end of the shops of the Union



BELONGING TO PULLMAN'S PALACE CAR COMPANY.

of a large working population would be conserved, and many of the evils to which they are ordinarily exposed made impossible, while at the same time conducting the enterprise on thoroughly sound business principles, looking for a moderate and sure return on the capital invested. And it is not yet too early to say that the execution of this comprehensive plan has been attended with a success as great as it has been well deserved.

This young city, which has now almost reached its fourth birthday with a population of over 7,500, is situated on the west shore of Lake Calumet, five or six miles west of Lake Michigan and fourteen miles south of Chicago, on the line of the Illinois Central Railroad. The ground is almost a dead level, as it is, in fact, through most of the State of Illinois, the lake being of a soft bottom ranging from 1 to 8 feet in depth, while it is only 1½ miles wide by 3 miles long. It drains a small area, not much of the land in Pullman being more than 7 or 8 feet above its surface, and it is connected with Lake Michigan by the Calumet River. The latter, however, does not run through the lake, but is connected therewith by a small channel, through which the water flows from the lake to the river, or from the river to the lake, according to the conditions of winds and floods.

and Pullman car wheel works, the Dunning steel horseshoe works, the Spanish-American curled hair factory, and other minor manufactures collateral to the principal business and incident to the maintenance of such a large and rapidly growing population. Not the least among the latter should be mentioned the large brick yards of the Pullman Company, as there have been used, besides 25,000 cords of rubble stone, 45,000,000 of brick in the building of the city.

One of the last completed of the large factories is the freight car manufactory, which has an area of 800 feet in length by an average of 200 feet in width, and has a capacity for manufacturing forty freight cars per day, or one for every fifteen minutes in working hours. The total number of workmen employed is about 4,000 in all the departments, the car shops alone keeping 2,500 busy. The power for driving the machinery for the principal shops, as well as the freight car shops, is furnished by the great Centennial Corliss engine, being conveyed to the freight car shops by underground shafting.

The length of the city from the north to the south end is about two miles, while the width from Calumet Lake back is about one mile, of which the dwellings at present cover over 150 acres, the city having 1,400 brick tenements, houses,

Foundry and Pullman Car Wheel Works, an immense establishment, covering several acres of ground, and still north of which are the brick dwellings of the employees of the works, very much in the style of the residence portion of Pullman itself. The works employ 1,000 hands, and have a capacity for melting 200 tons of iron per day, with facilities for turning out castings 50,000 pounds in weight. In addition to car wheels, the great specialty of these works is architectural castings, of which they make large quantities.

In extending the view to the north, it has been necessary to omit some important structures of the residence portion, at the south end of the city. Notable among these is the elegant and commodious school building, which has been erected at a cost of \$60,000, and is one of the best in the State. It has fourteen commodious school rooms for the various grades, and will seat 850 pupils. Another large building in that vicinity is called the Casino, the first floor of which is devoted to stores, while the second floor contains the rooms of the Episcopal Church, and a large photograph gallery. The other buildings left out are dwellings.

In the center foreground are the principal erecting shops of the Pullman Palace Car Company, the water tower, and the building adjacent containing the great Corliss engine,

which furnishes the motive power for driving the multitudinous machinery of this busy manufacturing city. One of the most attractive views of the city is the Boulevard, looking east from the Illinois Central depot to Calumet Lake, about one mile in length and 100 feet wide, finely paved, and lined on either side by 200 elm trees. In the foreground, and to the right of the Boulevard, is the Hotel Florence, a beautifully situated and well appointed structure, with accommodations for 100 guests, and a dining room capable of seating 125 persons. A prominent structure in the same vicinity is the Arcade, a building of fine architectural design, 250 feet long by 164 feet in width and 90 feet high. On the first floor are 28 stores, while on the second floor is the Pullman Public Library, with 5,500 volumes, the generous gift of Geo. M. Pullman to the city. The book cases are all of cherry, of beautiful design. The library rooms, with offices, are 60 x 65 feet. On the same floor is the Arcade Theater, capable of seating an audience of 1,000 persons; also a bank, and the architect's office. The third story is devoted to lodge rooms, offices, etc.

As a beginning toward beautifying and ruralizing the city, some 30,000 trees and shrubs have been planted along the streets and in the parks. Prominent near the lake shore at the foot of the Boulevard are the Pullman Gas Works, which supply the city with light. The city has eight miles of gas mains and 250 street lamps, and 1,400 gas meters have been set. Across the Boulevard from the gas works is the Pullman depot, and east of this, between it and the lake, are the grounds for athletic sports—base ball grounds and race course, with its grand stands capable of accommodating 7,000 spectators. Finally, the Presbyterians, Methodists, Episcopalians, Baptists, Catholics, and Lutherans have flourishing societies in the city. There are no court houses, no saloons, no jails, and only one policeman. The people govern themselves, and have no Councils or Boards, with the single exception of a Board of Education.

Perhaps one of the most difficult of the problems which presented itself to the projectors of the city of Pullman was that of providing a system of perfect drainage and sewerage, and the way in which that problem was solved has proved so complete a success that it has been noted and commented on by those who have given attention to such matters throughout the world. It is but an example of following out what has long been acknowledged as the correct theory, resulting in a thorough accomplishment of the work, at what is now only a nominal cost, and which may in future be changed to an actual profit. There was no way of getting rid of the sewage by gravity, for it was as much as could be looked for that the surplus rainfall would thus be carried off on so flat a surface as that where the new city was laid out. Lake Michigan could have been reached by a pipe six or seven miles long, and by pumping the sewage could readily have been discharged therein, according to the plan recently inaugurated of disposing of the sewage in Boston. But the Pullman Land Association found a better way than that of further contaminating the waters of Lake Michigan so near Chicago and their own borders. They purchased land three miles away, and prepared a farm of sufficient size to dispose of the sewage of 10,000 persons, also erecting suitable farm buildings thereon, for a less outlay than would be incurred in laying a pipe to Lake Michigan, and this farm has since been successfully operated by the sewage from the city of Pullman. All the water from roofs and streets is carried by one system of pipes and sewers into Calumet Lake, while the sewage from houses, factories, etc., goes through a separate system of pipes to a large cistern under the water tower, whence it is constantly pumped to the farm. In all cases outside of houses, in mains, laterals, and house drains, salt glazed vitrified clay pipe is used; within the houses soil pipes are of iron, vertical ones being wrought iron, coated with coal tar varnish, put together with screw joints, the horizontal ones being of cast iron with lead joints. The sewage is conveyed to the farm by a 20 inch cast iron main, the farm end of which connects with a closed screening tank, excluding material that will not pass through a screen of a half inch mesh. From the tank the sewage passes through a pressure regulating valve, limiting the pressure on the pipes leading to the fields to about ten pounds, and the tank and valve act to regularly and evenly distribute the sewage, in the pipes provided therefor, over the farm.

The system of sewerage thus adopted has, from October, 1881, proved entirely adequate and simple in its operation, and the ratio of deaths in the city of Pullman has been less than seven per annum for every 1,000 people.

The Pullman Company also have for years kept up a large headquarters for their business in the city of Chicago, for which they have just erected and are now completing an imposing structure, nine stories high, on the corner of Michigan Avenue and Adams Street, of which our illustration gives two elevations. The main object of the building is to obtain permanent general offices, but it will afford much

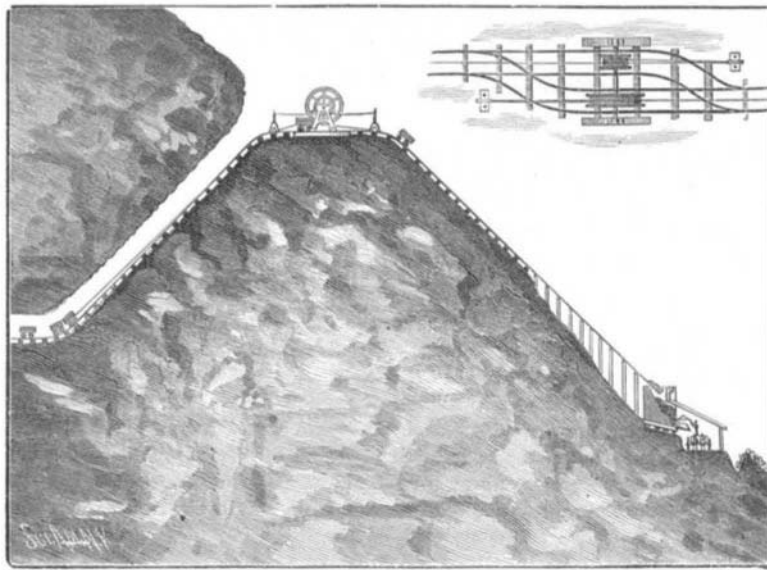
more than this, the first three floors being devoted to the uses of the Pullman Company, the next three to general business, while the three top floors will be occupied as apartments. The edifice has a frontage of 120 feet on Michigan Avenue and 171 feet on Adams Street, and is nine stories high, perfectly fireproof from cellar to garret—fireproof tile and iron beams being used throughout. The style of architecture is a modification of the Norman round arched Gothic, modernized and adapted to the peculiar purposes for which



PULLMAN & CO.'S BUILDING AND GENERAL OFFICES,  
MICHIGAN AVE. AND ADAMS ST., CHICAGO.

the building is intended, the main object being to give it an expression of dignified elegance in its simple massiveness. The entrance to the apartment house is on Michigan Avenue, which has been made as inviting and pleasing as possible, while the entrance to the office portion, on Adams Street, is through a more business-like portal.

The first story is built of rock-faced granite, of a reddish hue, laid up in large blocks in a heavy buttressed manner at the base, giving it an expression of great strength, while the color harmonizes pleasantly with the red, pressed brick used in the rest of the structure. A series of arcades on the Adams street facade, support the superstructure, the heavy elliptic arches being on massive columns with carved capitals and moulded octagon bases and highly polished red



HARTT'S NEW ORE ELEVATOR.

granite shafts. A marked feature of this elevation is the large central arch that spans the entrance to the court approaching the offices. This granite arch is 22 feet in diameter, supported on large rectangular columns, with carved caps and moulded bases and polished red granite shafts. The arch is enriched in its spandrels with bold terra cotta carvings, and provided with beautiful wrought iron gates. The court referred to extends open from the grade upward, running back at right angles to a depth of 80 feet from Adams street, and entirely open to the street, making a recess, as shown in the engraving, that in effect divides this elevation

into two buildings, connected by the massive archway shown, and lending a very unique and picturesque effect to the building. In the court is located the grand stair-case and elevator system for the offices. Surmounting the granite and encircling the street front of the building, is a heavy moulded belt course, or impost moulding, from which starts the brick-work of the superstructure. The brick work is disposed in liberal masses, with broad windows. Terra-cotta is used for the string courses and projections, but to a limited degree. No stone is used above the granite story. The street corner of the building is accentuated by a circular bay, carrying with it the effect of a tower and conservatory up through the entire height from its massive granite base, and surmounted by an observatory.

Many of the more recent details and the illustrations herewith are from the columns of the *Western Manufacturer*.

#### The Mobility of the Brain.

It has long been known that the brain in normal conditions undergoes certain rhythmical movements. The powerful vessels at its base cause the cerebral mass to rise and fall with each systole and diastole of the heart. The brain also rises slightly with each expiration and sinks with inspiration. These phenomena are dependent, it is presumed, upon the presence of the cerebro-spinal fluid, since when that is withdrawn the movements cease.

M. Luys, in a paper recently read before the Academie de Medecine, states that the brain is subject to still other changes in position, dependent upon the attitude of the body. If a man is in the dorsal decubitus, or lies upon his side, or stands upon his head, the brain undergoes certain corresponding changes in position in obedience to the laws of gravity. The movements take place slowly, and the brain is five or six minutes in returning to its first position.

From these anatomical data M. Luys deduces some striking conclusions of practical interest. He explains, upon the theory of these gravitating movements, the symptoms of vertigo and faintness which feeble persons experience when suddenly rising from a horizontal position. He asks if the pains of meningitis are not due to an interference with these normal movements. In cases of insanity he calls attention to the excitability and agitation which often come on when the patient lies down at night. As a practical point in mental hygiene, M. Luys advised against prolonged travel during most of the day, and urged the value of giving the brain the change produced by a horizontal position at night.—*The Medical Record*.

#### NEW ORE ELEVATOR.

The device shown in the engraving can be used to raise ore and waste from a mine whenever the outside grade is longer than the mine grade. On the level at the top of the grades are two rail tracks, placed side by side for a short distance, one of which extends down the mine shaft and the other down the side of the mountain to the dumping place. These tracks are connected by switches, as shown in the plan view, in order that the loaded and empty cars may pass each other and be transferred from one track to the other. Over the middle of the double track section is a shaft—placed at an elevation sufficient to allow cars to pass beneath it—carrying two drums, around the larger of which is a rope leading down the mountain, and around the other a rope leading into the mine. These drums are so proportioned that the time necessary for the two sets of cars to make the journey will be the same.

In operating the device three or more ore cars and one dead-weight car are used. A loaded car passing down the mountain side will be able to raise both a loaded car and the dead-weight car from the mine, because of the greater leverage of the large drum around which its rope winds. After the car has discharged its load it is drawn to the top by the weighted car and an empty car descending to the mine, the combined weight of these two being sufficient to overcome the leverage. The large drum is provided with a groove, to receive a friction strap by which the speed of the cars can be regulated. It will be seen that this method utilizes the gravity of the material on a descending grade of greater length than the one up which the material has to be raised. By this plan all the work of raising the material from the mine and

returning the empty cars is done by gravity; the expense is reduced to a minimum, the work is rapidly done and completely controlled.

This invention has been patented by Mr. W. A. Hartt, 99 Lake Avenue, Rochester, N. Y.

THE album of the Bank of England in which specimens of counterfeits are preserved has three notes which passed through the Chicago fire. Though they are burnt to a crisp, black ash, the paper is scarcely broken, and the engraving is as clear as new.