

DAVISON'S "IMPERIAL FIBER" LETTER COPYING BOOK.

A non-blurring copying book, used for press copying of type-written and pen-written matter alike, and affording beautifully clear and distinct copies, is manufactured by Messrs. H. C. Davison & Co., of No. 41 John Street, New York City, from a special character of copying paper, known as "Imperial Fiber."

These books are used in exactly the same manner as the ordinary copying books; the peculiarity and great advantage being in the fact that the copies will not spread or blur on this special paper, even though the leaves may be extra wet.

An apparatus for properly moistening the leaves of copybooks, to insure uniformly good copies, is made by the same firm, and is shown in the illustration. It consists of a japanned tray with cover, two heavy felt sheets for moistening, and a dozen patent copying sheets, the latter being each composed of two layers of stuff, between which is another of absorbent vegetable parchment drawing moisture from the felts and keeping the sheets evenly moistened and always ready for use. These sheets are sufficiently thin to enable users to copy a large number of letters at one time.

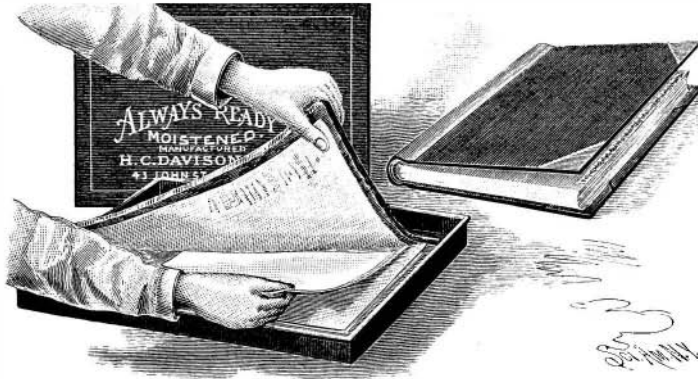
THE CASTLE OF BONNETABLE.

In Sarthe, at some distance from Mamers, and upon the railway that connects the latter with Saint Calais, stands, in the small city of Bonnetable, the castle built in 1742 by the architect Mathurin de Landelles upon the site of a former castle erected in the twelfth century by the lords of Montfort l'Amaury. An edifice often loses all unity and all charm in the successive alterations of which it is the object. It is with it, as it is with those coins which, having been passed from hand to hand for several generations, become smooth to the touch; the relief has disappeared.

Bonnetable has fortunately been preserved from so lamentable a fate. From the d'Harcourt family, which, in the thirteenth century, entered into possession of the fief, and one of the members of which, Jean d'Harcourt, had undertaken the construction of it, it passed into the hands of the Bourbon family and then into those of the de Luynes family. In 1788 it came into the possession of Duke Mathieu de Montmorency. At present it belongs to Duke de la Rochefoucauld-Doudeauville, who, in recent years, has had it restored by two Parisian architects, Messrs. Henri and Louis Parent.

The first castle, the one at least that Mathurin de Landelles constructed, includes two facades of analogous dimensions. The principal facade, flanked at its extremities by huge cylindrical towers, crowned by a projecting *chemin de ronde* which is prolonged

upon the entire facade, and covered with a conical slate roof, has the aspect of the entrance of a fortified castle. It is pierced in its center by a great ogival dome contrived in the base of a square donjon of quite feeble height, above which rises a pyramidal roof, surmounted by a light woodwork belfry. To the right and left of the entrance, protected by a drawbridge and closed by a portecullis, there are two towers smaller than the corner ones, and also cylindrical and covered by the same pepper-box-like roof. The rest of the facade is composed of a high ground floor, lighted by large, square bay windowed windows, the upper part of which is ornamented with the traditional curved lines. Above the ground floor is the first story, the windows



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of which, starting from the base of the *chemin de ronde*, and surmounted by high gable ends, rise to the ridge of the roof.

These windows, identical as to form with the windows of the ground floor, are the only ornamented part of the edifice. Their ornamentation, entirely Gothic, is, moreover, of the simplest nature. It is, nevertheless, in most exquisite taste. Their triangular tympan has a grand appearance under their framing of crocketed gables, surmounted by a flower at the point and bordered with symbolical animals at the base.

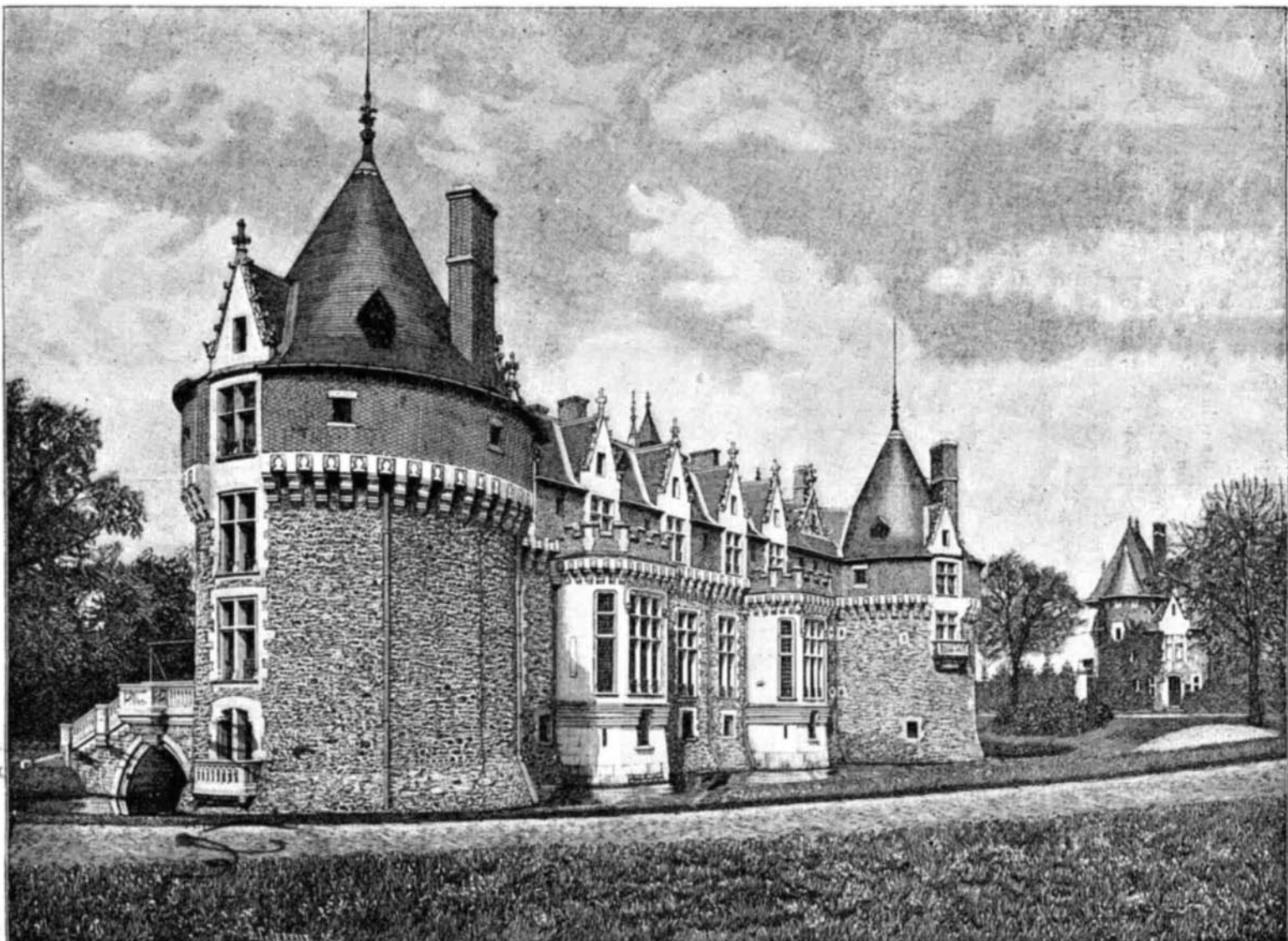
The decoration is the same for the lateral facade, which, like the principal one, is flanked by a huge corner tower, and, like it, bathed in a wide basin. But while the principal facade has, without any modification, preserved its severe aspect of former times, the lateral facade has, during the course of the last work of restoration, undergone a few modifications designed to render it more habitable. The windows of the corner towers have been provided at the base with elegant little balconies, supported by sculptured brackets and provided with openwork balustrades. In the space comprised between the towers the rigidity of the straight line is broken by two bay windows with six sides—a sort of projecting turrets containing large win-

dows, but which do not exceed the height of the ground floor, and the upper part of which forms an embattled terrace, upon which, in guise of balcony, open the windows of the first story. This is the facade that is represented in our engraving.

So much for the primitive part. As the castle in this form was not sufficient for a large family and for a *personnel* still more numerous, some enlargements became necessary. It became a question of constructing a new wing in complete harmony with the old edifice, without changing anything in the primordial plan. The architects have acquitted themselves of this task with rare skill. At the other extremity of the principal facade they have constructed a new main building, parallel with the ancient wing, but of more limited dimensions. This building, which has the form of a long quadrilateral, and which rises from the foundations of the destroyed wings of the castle constructed by the lords of Montfort l'Amaury, presents the aspect of a donjon, which is connected wonderfully well with the rest of the edifice. At the point of connection of the corner tower and the new donjon the architects have constructed a chapel, whose apsis projects over the basin.

Such is the castle in its present state. But the description would be forcedly incomplete did we not speak of the inclosing wall, which extends in front of the principal facade of the castle, upon the street (for the property is situated in mid-city), and the construction of which, very ingeniously combined, does the greatest honor to the Messrs. Parent. It is an embattled wall in which, opposite the postern of the castle, opens a lattice-work gate flanked by high masonry pillars. Let us add that although the castle has preserved none of its ancient furniture, the internal arrangement has not been sensibly modified. One feels that the present arrangements have been made by the Duke of La Rochefoucauld and his architects with a religious respect for the past. They cannot be too highly felicitated.—*Magasin Pittoresque.*

In a paper on the Laval steam turbine, read before the French Society for the Encouragement of National Industries, it was stated that, though invented only in 1891, some 200 of the motors are now at work, ranging in size from 5 to 100 horse power. The speed of rotation ranges from 15,000 to 30,000 per minute, the steam issuing from the guides at the full speed due to its pressure. Owing to this it is not necessary that the wheel should fit closely into the guide chamber, as there is no tendency to leakage, and, as a matter of fact, a clearance of about $\frac{1}{8}$ inch is allowed between the two. There being this clearance, the wheel cannot jam as it might otherwise do mounted as it is on a very flexible shaft.



THE CASTLE OF BONNETABLE.

The Atmosphere of the London Underground Railway.

In the House of Commons, recently, Mr. Weir asked the president of the Board of Trade whether his attention had been drawn to certain articles and correspondence in the *Pull Mall Gazette* as to the state of the atmosphere in the underground railway and the means of purifying it; and whether he would take steps to deal with the matter effectually.

Mr. Bryce: I have myself had such frequent and painful experience of the state of the atmosphere in certain parts of the underground railway that no newspaper articles could make me feel more strongly than I do the inconvenience from which the public now suffers. But Parliament has not intrusted the Board of Trade with any powers which would enable them to deal effectually with the mischief of which my honorable friend complains.

THE ACCIDENT TO THE STEAMER PLYMOUTH.

Last June the splendid steamer Plymouth, of the Fall River line, plying on Long Island Sound, between New York and Fall River, went ashore on the rocks off Rose Island, R. I., in a dense fog. For six days she remained there, resisting all attempts to remove her, but was finally floated off and made the trip to New York under her own steam. Here she was placed in the dry dock for repairs. Our engraving is from a photograph specially taken for the *SCIENTIFIC AMERICAN* while the boat was on the dock. It shows the appearance of the hull after the damaged outer plates had been removed. It illustrates what a remarkable provision for safety the double hull used on the iron boats of this company is, and also the fine quality in the material used. The damage in brief amounted to this. For a considerable distance on each side of the keel about amidships the plates were bulged, cracked and broken, and thirteen of her twenty-two compartments in the double bottom were open, so that it was calculated that 450 tons of water entered. The inner hull was intact.

It was found that little water entered it, and that the leakage was confined to the outer hull. One very interesting point brought out in the illustration is the fact that the plates connecting the two hulls were only injured in their lower portions. In executing the repairs the lower portions were cut off and replaced by new pieces, but the upper portions of these connecting plates are as good as ever. The accident was a striking tribute to the excellence of the material and the great safety afforded by the double hull.

The Plymouth is a magnificent specimen of marine architecture. She is 351 feet 8 inches long and of 50 feet beam. Over the guards her width is 86 feet. She

is driven by triple expansion inclined engines, and throughout is replete with the latest improvements. Her engine is of 5,000 horse power. A more detailed description of the boat, with illustrations, will be found in our issue of October 4, 1890.

A CHINESE GAME.

What is called the "Game of the Devil" dates back in China, where it is called *Kouen-gen*, to a very remote antiquity, and has been much played in France at



THE GAME OF THE DEVIL.

different epochs of modern times, especially at the beginning of the present century. One of our readers, Mr. W. Taylor, sends us an interesting photograph relating to the operation of the apparatus used, and which we reproduce herewith.

It represents the "devil" thrown into the air by means of a string that the player keeps taut by means of two sticks and upon which he is to catch it. "I remember having often seen this game in the hands of one of my friends," says Mr. Taylor. "According to him, the game was in great favor in Belgium in his boyhood, about fifteen years ago, especially at colleges, where the young men often got up genuine matches between two and even three players. I send a photograph taken with a kodak and which represents a

player at the moment in which the 'devil' is returning to fall back upon the string. The form of the devil varies a little from that of the 'Kouen-gen.' It is made of two tin cones, connected by their apices and provided with apertures for the production of a humming sound when the devil revolves very fast. A good strong player can easily throw it to a height of more than forty feet."

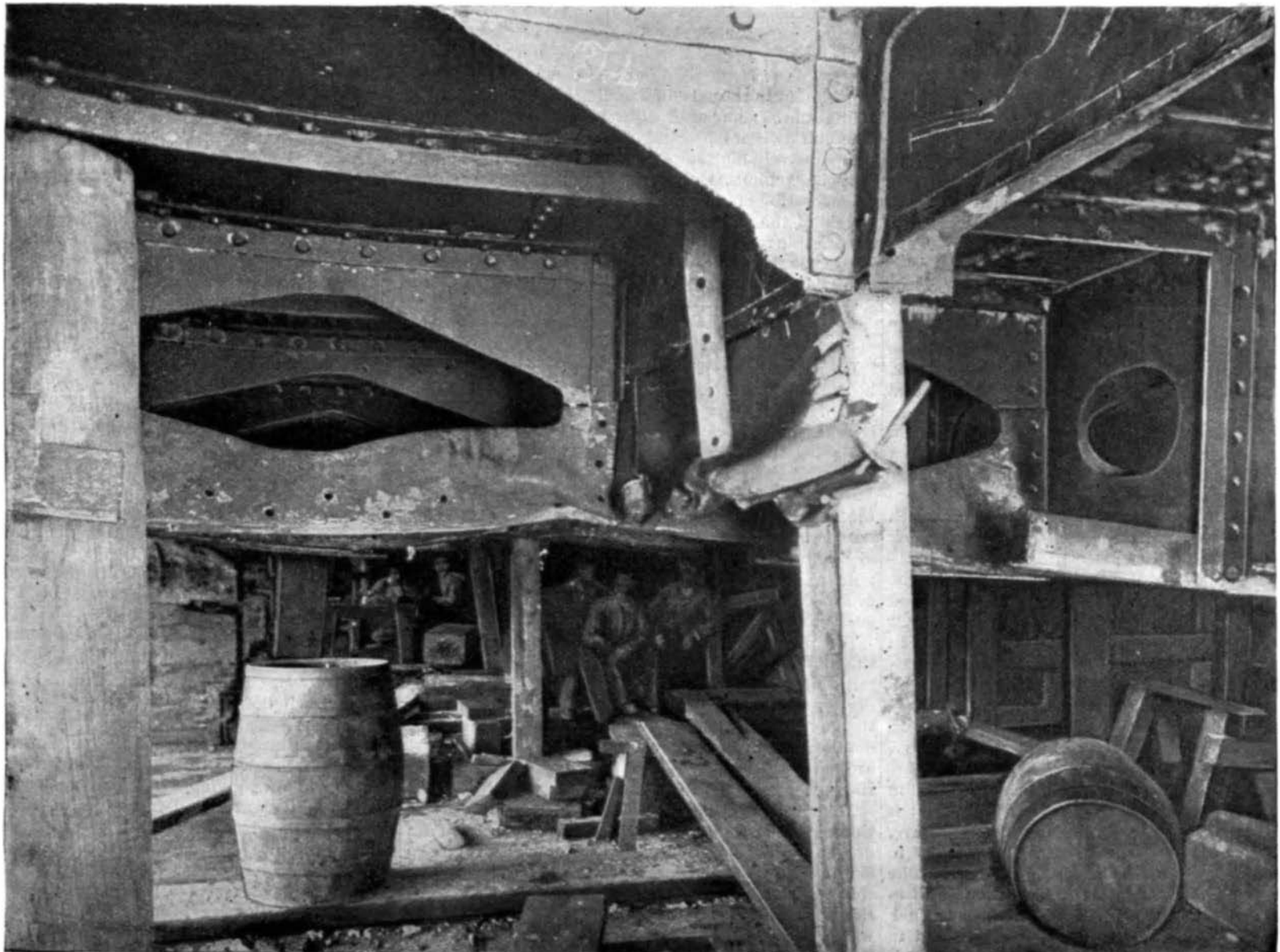
In our childhood (along about 1853), this game was much played at Paris. The devil was made of two hollow boxwood balls. This game, which is very amusing, and which tries one's skill, is now almost forgotten. It would be interesting to bring it into vogue again.—*La Nature*.

A New Electric Locomotive.

An electric locomotive of 1,000 horse power is (says the *Engineer and Iron Trades Advertiser*) under construction in London, from the plans of Sprague, Duncan & Hutchinson, to the order of the North American Company. It is intended for slow speed and heavy traction in switching service. The machine is carried upon four pairs of driving wheels, all coupled. The frame is of steel, with deep pedestals. The 56 inch wheels are close coupled; the first and last pairs only are flanged. There is a motor in each axle, the weight of the armature coming directly on the wheels, and that of the field magnets is on the journals through the pedestals; no spring supports are used. The four motors all form parts of a complete system on a rigid wheel base of 15 feet. The motors are of the alternating type, are wound for 860 volts, at 225 revolutions, which will be the equivalent of 35 miles an hour when in multiple.

The Telescope of the Future.

At the Royal Institution Sir Howard Grubb in a lecture recently discussed the great telescopes of the future. The main point of his new proposal is to mount a colossal instrument so that it practically floats on a liquid support. In this way even the greatest reflectors and refractors could be properly sustained. They would, it is believed, move with a smoothness and steadiness not attainable with supports ordinarily employed. By this method Sir H. Grubb proposes to render the large telescopes more suitably adapted for photographing the heavens. In the ordinary visual use of the telescope slight irregularities in the movement of the instrument are merely inconvenient, but for the accurate demands of photography absolute precision in movement is required. When this is wanting the result of the photograph is to represent each star as a streak instead of a round sharp dot, which the properly exposed plate should produce.



DOUBLE HULL OF THE STEAMER PLYMOUTH.