

THE MANUFACTURE OF "GREENBACKS."

The following description of the mode of manufacturing Government money appears in the Washington correspondence of the Cincinnati *Gazette*:—

To obtain access to the note-printing bureau requires a pass from the Secretary of the Treasury himself. For obvious reasons, it is a privilege rarely granted, and never except under the most thorough surveillance. No lady not employed upon the work is ever permitted, under any circumstances, to enter that part of the department. If for no other reason, the crowded machinery would make it dangerous.

THE MACHINE-SHOP

is the first room we enter. It is supplied with forges, lathes, planes and drills, capable of doing all the repairing necessary to be done to the machinery of the building, and to the setting-up and working of such new machines as are demanded by our extensive paper circulation.

THE PAPER MILL,

though not as extensive as one for general manufacturing, is sufficient for all the labor required in making the note-printing paper.

The manufacture of a paper combining the qualities of wear, and being splittless and unphotographic, was a much desired desideratum. Accordingly, it was resolved to make some experiments, which were entrusted to Doctor Gwynn. He has produced a paper as firm as parchment, smooth as satin, and of a combination of materials known only to himself, and secured to the exclusive use of the Government. He has introduced into it a fiber which cannot be photographed without discoloring the paper to which impressions may be transferred, giving it the appearance of a coarse, black spider-web. Being molded into the body of the paper, it is impossible to erase it, and it must be a great preventive of counterfeiting by the photographic process, which has lately been the most successful.

THE INK MILLS

are six in number, for making as many different colors. Each one is called a four-horse-power mill, though the whole six are driven at the same time by an engine which one could pick up with one hand. It not only turns these mills, but at the same time runs three Hoe-cylinder presses. It was made in the machine shop of the department, and derives its force from its great boiler capacity.

THE ENGRAVING ROOM

is of more interest than any we have yet been in. Here science and art are both displayed to perfection. There is, perhaps, no engraving so fine and requiring so much time to execute as that on the plate now being prepared for national note-printing. One, the size of a bill, on which the workman has been employed almost a year, is a copy of one of the paintings in the rotunda of the Capitol. The figures were of exquisite proportions, and the water-lines, though plain, extremely delicate in their tracery.

With the single plate, as it comes from the hands of the engraver, it would be impossible to do the printing required, and, as it is equally impossible to have a number of plates engraved, it becomes necessary to repeat them in another way. This is done in the following manner:—The engraving is done on a plate of soft steel just the size of the bill or bond, and the cuttings are indentations. When finished, the plate is hardened and taken to a "transfer press," where a roller of soft steel, just of a circumference to take in the size of the plate, is rolled over it, under heavy pressure, leaving the impression on the roller in a raised form. This roller is in turn hardened, and then any number of flat plates similar to the original are prepared, and receive in like manner the impression from this roller, and become *fac-similes* of the plate engraved; and we have produced in a few minutes what it has taken months with chisel and eye-glass to make!

THE PRINTING

is now done on the old-fashioned engraver's press, being nothing more than a simple iron roller, covered with cloth and paper, to press the printing paper into the indentures, placed in a strong frame, and turned back and forth by hand, by spokes placed in the end of the roller. Two persons work at each press, a man and woman, the former attending the plate, the latter the paper. The plate is kept warm while working, by a gas heater. The sheets,

when printed, are each laid between other sheets of thin brown paper, to keep them from blurring, and sent in hundreds to the drying-room. The first process of bond-printing is numbering the coupons and the denomination with a yellow mordant, and as they fly from the press they are bronzed, as they appear when issued.

Yellow is used because it cannot be photographed without showing too plainly to be mistaken, as was remarked about the fiber in the paper. This discovery was made in the following manner:—When Mr. Clark was at the head of the Bureau of Construction, he had a map made for military purposes, which it was necessary to repeat. It was photographed, and an obscure road marked with a faint yellow line was discovered to be black in the copies. He then photographed a specimen sheet of inks or paints, and, of all the colors, except black, yellow was the only one which might not have been altered with ease with a touch of the brush. It was black as the black ink itself. Hence any attempt to photograph this color will only lead to the discovery—and, as it is the ground-work of bonds and other securities, and covered by the printing, it seems another security against fraud.

THE SERIES-NUMBERING

is the last process before trimming. The work is done by women, the machines being worked by a treadle. The figures are placed in the edges of six disks, placed side by side, and fastened to an arm worked by the treadle, something after the style of a Wheeler & Wilson sewing machine. The disks are turned by a ratchet, and will number from 1 to 999, 999. For consecutive numbering, a little hook is attached to the ratchet, and the machine shifts itself. Otherwise, the disks are turned by the number.

THE TRIMMING AND CUTTING

was formerly done by hand, and of course very imperfectly and laborously. There were two things to be overcome in cutting by machinery—the inequality of the registry and the shrinkage. It was desirable that the edges should be trimmed, so they would wear well. If cut with a straight knife they would be beveled one way. As they are now cut, with circular knives, they have an edge beveled both ways.

The greenbacks are printed four on a sheet. One machine trims the margins, and another separates them. This latter is an ingenious contrivance. It slits them very fast, and lays them regularly in a box, each series of numbers separately. The notes are lettered A, B, C and D, and the numbers on each are the same: therefore it is essential they should be kept carefully apart. Each of the boxes that receives them has a movable bottom.

When the cutting for the day first commences, this bottom is near the top of the box, but as the cutting progresses and the number of the bills increases, a ratchet lets the bottom drop the thickness of a bill, so the box is kept just so full all the time, to make the bills slide in without doubling. It is intended that the cutting should be a criterion by which to judge of the genuineness of the bills, for every one must be the same width and length. If the end of a bill be placed on the center of another, there will be found no difference in the width—an exactness which cannot be given by the hand.

The currency-cutting machine is more complicated, as it cuts both ways, and files them in bundles of five dollars each, and I am not sure but it binds and seals them.

WET PRINTING

is the process now used in this establishment. The wetting is done by cloths instead of by dipping or sprinkling, as in newspaper printing. A room is prepared especially for this, with iron weights for pressing. Each man has his particular place assigned him; and all work in harmony, and with precision and celerity. Ordinary bills are wet and dried three times during the printing; but this process will soon be done away with, for preparations are being made to substitute.

DRY-PRINTING

in its stead, in which there will be at least two advantages—speed and better work. To do this some eighty heavy hydraulic printing presses are being set up, when what is called dry-printing, or printing on dry paper, will for the first time be successfully performed. There is a very perceptible dif-

ference between the present way and the one to be substituted. Specimen sheets show a clearer impression and a remarkable distinctness with which the faintest water-line is made to stand boldly out. This process, which is entirely new, has only been introduced after the most vehement and virulent opposition.

All sorts of stories were circulated of the building being crushed down, of there being an impossibility to take with a machine more than seventy-five impressions per day, and a hundred others of a similar character; but inviting men of judgment and skill in machinery to test the feasibility of the plan, Mr. Chase went on and instructed Mr. Clark to continue the experiments and perfect the system. The first tests were made with hand-pumps. Machine-pumps are now being rigged, and the whole will soon be in motion. There has been added to the pressure of the pumps a regulator in the shape of a weight, which is intended to take up their lost power as their force is exhausted, thus keeping up nearly the same pressure all the time.

THE CHECKS AND SAFEGUARDS

upon every one employed in this department, from the chief down to the lowest laborer, operate at every turn. Not even a blank sheet, much less a printed paper, is passed from one hand to another without being counted and receipted for, and unless there is collusion from one to another through every process through which the paper has to pass before it is money, through the entire range, there cannot be an over-issue. The paper is issued from one room, and is re-issued from that room sixteen or eighteen times before it is put into circulation; being counted, charged, and re-receipted for each time, and re-counted, re-charged, and receipted for through each process that it passes after leaving this room.

Five hundred persons are employed in note, bond and currency-making. It would seem as if this number ought, in a month's time, to turn out money enough to carry on half a dozen such wars as we have on hand. But a million of dollars in notes of the required denominations to do the current business of individuals, is an immense pile of paper, and when it comes to hundreds of millions, they grow into small haystacks as to size. By the present process of printing each pressman takes about five hundred impressions per day. By the hydraulic presses, it is expected that from three to five hundred impressions per hour will be taken.

RULES FOR FIRING CANNON.

We find a few things that may interest some of our readers in the volume of "Ordnance Instructions," adopted and issued for the guidance of officers in the United States Navy:—

RIFLE GUNS.

It is essential—

1st. That the base of every rifle projectile, especially the Parrott, shall be thickly greased before entering the gun. For this purpose common pork slush, prepared by several washings in hot water, may be used.

2d. That the bores of all guns shall be frequently washed, the grooves of rifled guns cleaned of all residuum and dirt, and a moist sponge invariably used. After firing the bore should be oiled with a sponge.

The attention of commanding officers is especially called to this requirement; and the bureau desires that the action of Parrott's and other rifle projectiles fired under the above conditions, may be carefully observed and reported; for it is believed that nearly all the failures in actual service result from the grooves being filled after a few rounds with a hardened residuum of powder.

It is also necessary that the shell shall be close "home" on the powder, otherwise the necessary expansion will not take place, and the shell will tumble immediately after leaving the gun, utterly destroying its range and accuracy.

If, however, a considerable interval should be left between the charge and the projectile, the strain upon the gun would be greatly increased and it possibly burst. For these reasons the rammer handle should be marked to verify this important fact in case of any accident to the gun.

It is very important that dirt, sand, or other