the account, a spring check block is placed on the desk ledge and a small pivot blade is turned down, engaging between the cards adjacent to the one removed, and accurately marking its place and indicating its absence. The check block has inscribed on it the name of the clerk that places it, each clerk being provided with such a device. The boxes are placed in consecutive order along the desk, and are designed to be removed to the vault at night. As the card accounts become closed or dead, they can be transferred to receptacles provided for the purpose. When a card is taken away from its receptacle it is secured on a clip board, which protects it from injury and distinguishes it from other papers until it is replaced.—*The World's Progress.*

DETECTING FORGERIES ON PAPER.

Recently before the Belgian Academy of Medicine, Prof. G. Bruylants gave an account of the researches which, in co-operation with Prof. Leon Gody, he had instituted with the view of illustrating how frauds and alterations practiced on business papers can be detected. He said:

Although my experiments were not carried on under the most favorable circumstances, their results were satisfactory. A piece of paper was handed to me for the purpose of determining if part of it had been unequally and greatly wet, and if another part of it had been manipulated for the purpose of erasing marks upon it; in other words, whether this part had been rubbed. The sample I had to work upon had already gone through several experiments. I had remarked that the tint of paper exposed to the vapor of iodine differs from that which this same paper assumes when it has been wet first and dried afterward. In addition to this I realized that when sized and calendered paper, first partially wet and then dried, is subjected to the action of the iodine vapor, the parts which had been wet take on a violet tint, while those which had not been moistened became either discolored or brown. The intensity of the coloration naturally varied according to the length of time for which the paper was exposed to the iodine.

There is a very striking difference also when water is sprinkled over the paper, and the drops are left to dry off by themselves in order not to alter the surface of the paper, complete desiccation being produced at a temperature of 212°.

Thorough wetting of the paper will cause the sprinkled parts to turn a heavy violet blue color when exposed to the vapor, while the parts which were untouched by the water will become blue.

If, after sprinkling upon a piece of paper and evaporating the drops thereon, this piece of paper is first thoroughly wet, then dried and subjected to the action of iodine, the traces of the first drops will remain distinguishable whether the paper is dry or wet. In the latter case the traces of the first sprinkling will hardly be distinguishable so long as the moisture is not entirely got rid of, but as soon as complete dryness is effected their outlines, although very faint, will show plainly on the darker ground surrounding the space covered by the first drops.

In this reaction water plays virtually the part of a sympathetic fluid, and tracing the characters with water on sized and calendered paper, the writing will show perfectly plain when the paper is dried and exposed to the action of iodine vapor. The brownish violet shade on a yellowish ground will evolve to a dark blue on a light blue ground after wetting. These characters disappear immediately under the action of sulphurous acid, but will reappear after the first decoloration, provided the paper has not been wet and the decoloration has been effected by the action of sulphurous acid gas.

This process, therefore, affords means for tracing characters which become legible and can be caused to disappear, but at will to reappear again, or which can be used for one time only and be canceled forever afterward.

The usual method of verifying whether paper has been rubbed is to examine it as to its transparency. If the erasure has been so great as to remove a considerable portion of the paper, the erased surface is of greater translucency; but if the erasure has been effected with care, examination close to a light will disclose it, the erased part being duller than the surrounding surface, because of the partial upheaval of the fibers.

If an erasure is effected by means of bread crumbs instead of India rubber, and care is taken to erase in one direction, the change escapes notice, and it is generally impossible to detect it, should the paper thus handled be written upon again.

Iodine vapors, however, show all traces of these manipulations very plainly, giving their location with perfect certainty. The erased surfaces assume a yellow brown or brownish tint. If, after being subjected to the action of the iodine, the paper on which an erasure has been made is wet, it becomes of a blue color, the intensity of which is commensurate with the length of time to which it has been under the action of the iodine, and when the paper is again dried the erased portions are more or less darker than the remainder of the sheet. On the other hand, when the erasure has been so rough as to take off an important part of the material, exposure to iodine, wetting and drying result in less intensity of coloration on the parts erased, because the erasing, in its mechanical action of carrying off parts of the paper removes also parts of the substances—fecula, sizing—which, in combination with iodine, give birth to the blue tint. Consequently the action of the iodine differs according to the extent of the erasure.

When paper is partially erased and wet, as when letters are copied, the same result, although not so striking, follows upon exposing it to the iodine vapor after letting it dry thoroughly.

Iodine affords in certain cases the means of detecting the nature of the substances used for erasing. Bread crumbs or India rubber leave yellow or brownish yellow tints after iodination, and these are distinguished by striæ or more intense coloration, erasure by means of bread crumbs causing the paper to take a violet shade of great uniformity. These peculiarities are due to the upheaval of the fibers, caused by rubbing. In fact, this upheaval creates a larger absorbing surface, and consequently a larger proportion of iodine can cover the rubbed parts than it would if there had been no friction. When paper upon