THE WAY BANKS ARE MANAGED IN NEW YORK.

To persons who have nothing to do with banks except to receive and pay away their bills, it naturally seems that furnishing these bills for use as money is the principal function of banks; it is in fact an incidental and comparatively unimportant part of their operations. Banks are companies of money lenders, who associate for the purpose of getting larger revenues from their capital, and with greater safety, than they could if each loaned his funds separately on his own account. The principal advantage of the association is the better credit obtained with the community by the large amount of paid-up capital, and the publicity which is given in relation to the bank's condition. This credit is advantageous in two ways.

First, it enables the bank to get the use of a large amount of capital without paying anything for its use. In every civilized community there are at all times persons having money on hand which they wish to deposit temporarily in some safe place where they may be sure to find it when they want it. Banks offer to receive such funds, and to return them promptly when called for; their whole capital being, of course, a pledge for the safety of the trust. Though each one of these deposits is liable to be called for at any moment, experience shows that others are constantly coming in, and thus a certain average amount, subject to some fluctuation, may be counted on with great confidence. A portion of this amount the bank officers consider it safe to loan to business men on good security, keeping sufficient funds on hand to meet any call of depositors likely to take place. The interest on this property of other people is, of course, a clear profit to the bank.

A second, but less important advantage of a good credit to the bank is the ability to pay out its notes and have them circulated in the community as money. As these notes draw no interest, while they are given in exchange for the notes of business men drawing interest, they are, of course, a source of profit.

Our joint-stock banks are all under the management of Boards of Directors—men selected from among the largest stockholders—those, therefore, who are most interested in managing the bank with profit to the owners. The directors choose a President from among their number, and hire a cashier and the necessary clerks; they then offer to merchants and other business men to open accounts with them, to receive their surplus funds on deposit, and to loan them a limited amount of capital. In paying large sums it is safer and more convenient to make the payment by a check on a bank than to count the bills; every man in active business, therefore, keeps an account in some bank, depositing with it all the money he receives, and making his payments by checks, which are simply orders to the bank to pay the amount stated in the check.

Banks in New York are opened at 10 o'clock, A. M., and closed at 3 P. M. Merchants having accounts with a bank generally make a deposit in the afternoon, as near as may be before the closing hour, of all the funds they may have received during the day. These are partly in bank bills, but mostly in checks, and they are sent to the bank by a trusty clerk. A list of the checks is sent with the funds, together with a little blank book, in which the receiving teller enters the amount of the deposit; this entry being the bank's official receipt for the funds. The receiving teller compares the checks with the list, counts the money, if there is any, and enters the amount in the little book, and also in a large account book in the bank. This work is done with great rapidity, as in the afternoon there is usually a long line of clerks awaiting their turn at his window.

To avoid the inconvenience both to the bank and the merchant of having several deposits made in a day, it is customary for the merchant to draw checks for whatever payment he has to make during the day, even if he has not sufficient funds in the bank at the moment to meet them; and the bank pays these checks, trusting to the honor of the merchant to deposit sufficient funds to make all his checks good before the bank closes. Occasionally a customer fails to make his checks good, and the bank suffers a loss from its misplaced confidence; but a conclusive proof of the general prevalence of mercantile honor is furnished in the fact that losses from this source are of very rare occurrence.

Twice a week the directors meet to loan the funds on hand at the time. Loans are usually made by discounting notes. A commission merchant, for instance, has notes of different jobbers to the amount of $20,000, payable two or three months in the future, and he wants the money for them now. He writes his name on the back of each, and sends them to the bank for discount. The directors examine the notes, and if the names are satisfactory and they have the funds to loan, the paper is discounted; the bookkeeper computes the interest on the several notes to the time they are due, deducts it from the principal, and carries the amount remaining to the credit of the merchant.

When capital in market is not worth more than seven per cent the main question in regard to discounting any paper offered is the certainty of its being paid, but when capital is worth more than the legal rate, a second question has quite as much influence in deciding who among the several applicants for loans shall have the preference—that question is, who keeps the largest deposit with the bank. If two merchants want each $20,000, and, on examining the books, it is found that one has an average deposit of $5,000, and the other of $10,000, loaning the $20,000 to the former is equivalent to loaning $15,000, while to the latter it is equivalent to loaning $10,000, receiving in either case the interest on $20,000. In one case the interest on the capital actually furnished is $9\frac{1}{3}$ per cent; in the other it is 14 per cent. Bank directors, like other men, generally accept the best offer, and the man who keeps the best account gets the discount. In this way bank directors always manage to get the market rate of interest for their capital, in spite of any usury laws, however cunningly devised, that any legislators can enact.

NITRO-GLYCERIN.

The last number of *Le Genie Industriel* has an artical by M. Alf. Nobel, engineer, setting forth, at length, the advantages of nitro-glycerin over gunpowder for blasting rocks. The economy claimed is in the cost of drilling the rocks, as much smaller holes suffice, owing to the greater explosive force of nitro-glycerin. M. Nobel says that this force is in hard rocks from eight to ten times that of ordinary blasting powder, and in soft rocks from twenty to thirty times.

"Four principal causes contribute to its superior explosive force:—1st, its great specific gravity, which permits the introduction into a hole of nearly double the weight of powder which the same hole will receive; 2d, its perfect gasification, leaving no solid residue; 3d, its richness in oxygen, which produces com-plete combustion; 4th, its extraordinary suddenness of explosion.

"According to Regnault, gunpowder, in burning, forms, theoretically, 260 times its volume of gas, taken cold, but in practice, owing to incomplete combustion, it does not exceed 200 volumes. The formula of nitro-glycerin is—

$$C^6H^5O^3+5NO_3$$

which in burning would give—

$$6CO_2+5HO+5N+O$$

So that one volume of nitro-glycerin would produce about—

544 volumes of the vapor of water.
469 volumes of carbonic acid.
39 volumes of oxygen.
236 volumes of nitrogen.

1,288 volumes, taken cold."

[We give M. Nobel's formula but do not understand how he gets his NO_3. The formula of glycerin is $C_6H_7O_5,HO$, and the usual view of nitro-glycerin is that it is a substitution compound in which two atoms of hydrogen are replaced by two atoms of nitrous acid. making the formula of nitro-glycerin—

$$C_6H_62NO_4O_6]$$

"It is evident that gunpowder, the combustion of which is very incomplete, cannot produce an eleva tion of temperature so great as nitro-glycerin, of which all the carbon is transformed into carbonic acid, and all the hydrogen into water. This is proved in practice by the fact that a small addition of nitro-glycerin to powder communicates much more brilliancy to the flame. It is difficult to measure the heat of an explosive substance, but, in view of the above-mentioned circumstance, it wil be admitted that the temperature of the flame ought to be nearly double that of gunpowder. We shall have then for powder 200 volumes, which, with a quadruple expansion, will be 800 volumes, and for nitro-glycerin 1,288—in round numbers 1,300 volumes—which, with an oc tuple expansion, will be 10,400."

Nitro-glycerin is made by dropping glycerin into a mixture of equal parts of strong nitric and sulphuric acids. It is a heavy oily liquid, its specific gravity being 1·6. It is insoluble in water, and the usual plan is to fill the hole above it with water in place of tamping, and then to fire it with a safety fuse, having a heavily charged percussion cap at its lower end. This mode of firing has been patented in France and other countries.

According to M. Nobel, nitro-glycerin does not explode by direct fire, decomposing itself with flame by contact with an ignited body, but being extinguished so soon as the hot body is removed. He also says that it detonates under a violent blow of a hammer, but only the part that is struck explodes: the fire is not propagated to the surrounding portions. A few drops spread on an anvil may, by repeated blows, produce a series of explosions. By the gradual application of heat it explodes at 180° Cent.—356° Fah. It is a very permanent compound, preserving itself indefinitely, and not being decomposed by either phosphorous or potassium.

THE ELECTRIC RAY OF THE ENGLISH CHANNEL AND OTHER ELECTRIC FISH.

[Translated from the French for the Scientific American.]

In a paper communicated recently to the French Academy of Sciences, by Mr. Charles Robin, occur the following statements regarding certain electric fish;—

"The varieties of these fish are but few in number; the *raya*, ray, or skate, the *gymnotus electricus*, or electric eel, and the *silurus electricus*. The *raya* belongs to the skate family, hence they are sometimes termed electric skates, while fishermen call them *tremblers*, or magic fish. This fish has a smooth, flat body and short tail, resembling somewhat an almost circular disk. There are several kinds to be found on the coasts of Provence, and the channel between France and England. If a ray be taken up in the hand a strong shock will at once be felt, so violent as to benumb and even paralyze the entire arm during several minutes. The sensation may be compared to that experienced from a violent blow on the elbow. The force of the shock is estimated as equal to that of a pile of 100 to 150 pairs charged with salt water. The discharges succeed each other with very great rapidity, as many as fifty discharges having been counted in one minute. A shock can be given to twenty persons simultaneously, if they stand touching each other in a circle, with the two persons at each end touching, the one the back and the other the belly of the ray. It has been discovered that the back of the fish emits positive and the belly negative electricity. After a fisherman has emptied the contents of his net into his boat, if he pours a large quantity of salt water upon the fish, should there be an electric ray among them, he is at once apprised of the fact by a shock in the hand he uses to pour out the water.

"Plutarch mentions this peculiarity as having been known to the ancients. The discharge from the ray emits sparks similar to those of an electric machine, produces magnetization and chemical decomposition, and gives marked signs of heat when passed through a thermo-electric pair.

"The electric organs are of three kinds, viz:—

"First, In the lower half of the body and at each side of the head there are several hundred small tubes (Hunter counted as many as 1,182) or membraneous, vertical prisms close together, like honey combs, and subdivided by horizontal partitions into little cells filled with mucus.

"Second, In the hinder part of the brain there is a lobe known as the electric lobe. Every time that this lobe is touched strong discharges are produced, even if the organ be separated from the brain and spinal marrow. All action upon the body of the ray, determining the discharge, is transmitted by the nerves from the irritated spot to the electric lobe of the brain.

"Third, Three very large branches of the fourth pair