

## THE BANK OF ENGLAND.

Considering the world-wide reputation of the Bank of England, it is remarkable how little is generally known as to its internal working. Standing in the very heart of the largest city in the world—a central landmark of the great metropolis, even the busy Londoners around it, have, as a rule, only the vaguest possible knowledge of what goes on within its walls. In truth, its functions are so many, its staff so enormous, and their duties so varied, that many even of those who have spent their lives in its service will tell you that, beyond their own immediate departments, they know but little of its inner life. Its mere history, as recorded by Mr. Francis, fills two octavo volumes. It will be readily understood, therefore, that it would be idle to attempt anything like a complete description of it within the compass of a magazine article. There are, however, many points about the Bank and its working which are extremely curious and interesting, and some of which we propose briefly to describe.

The Bank of England originated in the brain of William Patterson, a Scotchman—better known, perhaps, as the organizer and leader of the ill-fated Darien expedition. It commenced business in 1694, its charter—which was in the first instance granted for eleven years only—bearing date the 27th July of that year. This charter has been from time to time renewed, the last renewal having taken place in 1844. The original capital of the Bank was but one million two hundred thousand pounds, and it carried on its business in a single room in Mercer's Hall, with a staff of fifty-four clerks. From so small a beginning has grown the present gigantic establishment, which covers nearly three acres, and employs in town and country nearly nine hundred officials. Upon the latest renewal of its charter, the Bank was divided into two distinct departments, the Issue and the Banking. In addition to these, the Bank has the management of the national debt. The books of the various government funds are here kept; here all transfers are made, and here all dividends are paid.

### IN THE BANKING DEPARTMENT

is transacted the ordinary business of bankers. Here other banks keep their "reserve," and hence draw their supplies as they require them. The Issue department is intrusted with the circulation of the notes of the bank, which is regulated as follows. The Bank in 1844 was a creditor of the government to the extent of rather over eleven million pounds and to this amount and four million pounds beyond, for which there is in other ways sufficient security, the Bank is allowed to issue notes without having gold in reserve to meet them. Beyond these fifteen million pounds, every note issued represents gold actually in the coffers of the Bank. The total value of the notes in the hands of the public at one time averages about twenty-five million pounds. To these must be added other notes to a very large amount in the hands of the Banking department, which deposits the bulk of its reserve of gold in the Issue department; accepting notes in exchange.

All Bank of England notes are printed in the Bank itself. Six printing-presses are in constant operation, the same machine printing first the particulars of value, signature, &c., and then the number of the note in consecutive order. The paper used is of very peculiar texture, being at once thin, tough and crisp; and the combination of these qualities, together with the peculiarities of the watermark, which is distributed over the whole surface of the paper, forms one of the principal guarantees against imitation. The paper which is manufactured exclusively at one particular mill, is made in oblong slips, allowing just enough space for the printing of two notes side by side. The edges of the paper are left untrimmed, but, after printing, the two notes are divided by a straight cut between them. This accounts for the fact, which many of our readers will doubtless have noticed, that only one edge of a Bank-note is smooth, the other three being comparatively ragged. The printing-presses are so constructed as to register each note printed, so that the machine itself indicates automatically how many notes have passed through it. The average production of notes is fifty thousand a day, and about the same number are presented in the same time for payment.

No note is ever issued a second time. When once it finds its way back to the Bank to be exchanged for coin, it is immediately cancelled; and the reader will probably be surprised to hear that the average life of a Bank-note, or the time during which it is in actual circulation, is not more than five or six days. The returned notes, averaging, as we have stated, about fifty thousand a day, and representing one day with another, about one million pounds in value, are brought into what is known as the

### ACCOUNTANT'S SORTING OFFICE.

Here they are examined by inspectors, who reject any which may be found to be counterfeit. In such a case the paying-in bank is debited with the amount. The notes come in from various banks in parcels, each parcel accompanied by a memorandum stating the number and amount of the notes contained. This memorandum is marked with a certain number, and then each note in the parcel is stamped to correspond, the stamping-machine automatically registering how many are stamped, and consequently drawing immediate attention to any deficiency in the number of notes as compared with that stated in the memorandum. This done, the notes are sorted according to number and date, and after being defaced by punching out the letters indicating value, and tearing off the corner bearing the signature, are passed on to the "Bank-note Library," where they are packed in boxes and preserved for possible future reference during a period of five years. There

are one hundred and twenty clerks employed in this one department; and so perfect is the system of registration, that if the number of a returned note be known the head of this department, by referring to his books, can ascertain in a few minutes the date when and the banker through whom it was presented; and if within the period of five years, can produce the note itself for inspection. As to the "number" of a Bank-note, by the way, there is sometimes a little misconception, many people imagining that by quoting the bare figures on the face of a note they have done all that is requisite for its identification. This is not the case. Bank-notes are not numbered consecutively *ad infinitum*, but in series of one to one hundred thousand, the different series being distinguished as between themselves by the date, which appears in full in the body of the note, and is further indicated to the initiated, by the letter and numerals prefixed to the actual number. Thus 25 0 90758 on the face of a note indicates the number in question is No. 90758 of the series printed on May 21, 1883, which date appears in full in the body of the note. In like manner indicates that the note forms part of a series printed on February 19, 1883. In "taking the number" of a note, therefore, either this prefix or the full date, as stated in the body of the note, should always be included.

The "Library" of cancelled notes—not to be confounded with the Bank Library proper—is situated in the Bank vaults, and we are indebted to the Bank-note Librarian for the following curious and interesting statistics respecting his stock. The stock of paid notes for five years—the period during which, as before stated, the notes are preserved for reference—is about

SEVENTY-SEVEN MILLION SEVEN HUNDRED AND FORTY-FIVE THOUSAND

in number. They fill thirteen thousand four hundred boxes, about eighteen inches long ten wide, and nine deep. If the notes could be placed in a pile one upon another, they would reach to a height of five and two-third miles. Joined end to end they would form a ribbon twelve thousand four hundred and fifty miles long, or half way round the globe; if laid so as to form a carpet, they would very nearly cover Hyde Park. The original value is somewhat over seventeen hundred and fifty millions, and their weight about ninety-one tons. The immense extent of space necessary to accommodate such a mass in the bank vaults may be imagined. The place, with its piles on piles of boxes reaching far away into dim distance, looks like some gigantic wine-cellar or bonded warehouse.

As each day adds, as we have seen, about fifty thousand notes to the number, it is necessary to find some means of destroying those which have passed their allotted term of preservation. This is done by fire, about four hundred thousand notes being burnt at one time in a furnace specially constructed for that purpose. Formerly, from some peculiarity in the ink with which the notes were printed, the cremated notes burnt into a solid blue clinker; but the composition of the ink has been altered, and the paper now burns to a fine gray ash. The fumes of the burning paper are extremely dense and pungent; and to prevent any nuisance arising from this cause, the process of cremation is carried out at dead of night, when the city is comparatively deserted. Further, in order to mitigate the density of the fumes, they are made to ascend through a shower of falling water, the chimney shaft being fitted with a special shower bath arrangement for this purpose.

Passing away from the necropolis of dead and buried notes, we visit the Treasury, whence they originally issued. This is a quiet-looking room, scarcely more imposing in appearance than the butler's pantry in a West-end mansion, but the modest looking cupboards with which its walls are lined are gorged with hidden treasure. The possible value of the contents of this room may be imagined from the fact that a million of money, in notes of one thousand pounds, forms a packet only three inches thick. The writer has had the privilege of holding such a parcel in his hand, and for a quarter of a minute imagining himself a millionaire—with an income of over

THIRTY THOUSAND PER ANNUM FOR LIFE! The same amount might occupy even less space than the above, for Mr. Francis tells a story of a lost note for thirty thousand pounds, which, turning up after a lapse of many years, was paid by the Bank *twice over!* We are informed that notes of even a higher value than this have been printed, but the highest denomination now issued is one thousand pounds.

In this department is kept a portion of the Bank's stock of golden coin, in bags of one thousand pounds each. This amount does not require a very large bag for its accommodation, but its weight is considerable, amounting to two hundred and fifty-eight ounces twenty pennyweights, so that a million in gold would weigh some tons. In another room of this department—the Weighing Office—are seen the machines for detecting light coin. These machines are marvels of ingenious mechanism. Three or four hundred sovereigns are laid in a long brass scoop or semi-tube, of such a diameter as to admit them comfortably, and self-regulating to such an extent that the coins gradually slide down by their own weight on to one plate of a little balance placed at its lower extremity. Across the face of this plate two little bolts make alternate thrusts, one to the right, one to the left, but at slightly different levels. If the coin be of full weight, the balance is held at equipoise, and the right-hand bolt making its thrust, pushes it off the plate and down an adjacent tube into the receptacle for full-weight coin. If, on the

other hand, the coin is ever so little "light," the balance naturally rises with it. The right-hand bolt makes its thrust as before, but this time passes harmlessly beneath the coin. Then come the thrusts of the left-hand bolt, which, as we have said, is fixed at a fractionally higher level, and pushes the coin down a tube on the opposite side, through which it fall into the light coin receptacle. The coins thus condemned are afterwards dropped into another machine, which defaces them by a cut half way across their diameter at a rate of

### TWO HUNDRED A MINUTE.

The weighing machines, of which there are sixteen, are actuated by a small atmospheric engine in one corner of the room, the only manual assistance required being to keep them supplied with coin. It is said that sixty thousand sovereigns and half-sovereigns can be weighed here in a single day. The weighing machine in question is the invention of Mr. Cotton, a former governor of the Bank, and among scientific men is regarded as one of the most striking achievements of practical mechanics.

In the Bullion department we find another weighing-machine of a different character, but in its way equally remarkable. It is the first of its kind, having been designed specially for the Bank by Mr. James Murdoch Napier, by whom it has been patented. It is used for the purpose of weighing bullion, which is purchased in this department. Gold is brought in bars of about eight inches long, three wide, and one inch thick. A bar of gold of these dimensions will weigh about two hundred ounces, and is worth, if pure, about eight hundred pounds. Each bar when brought in is accompanied by a memorandum of its weight. The question of quality is determined by the process of assaying; the weight is checked by means of the weighing-machine we have referred to. This takes the form of an extremely massive pair of scales, working on a beam of immense strength and solidity, and is based, so as to be absolutely rigid, on a solid bed of concrete. The whole stands about six feet high by three wide, and is inclosed in an air-tight plate-glass case a sash in which is raised when it is desired to use the machine. The two sides of the scale are each kept permanently loaded, the one with a single weight of three hundred and sixty ounces, the other with a number of weights of various sizes to the same amount. When it is desired to test the weight of a bar of gold, weights to the amount stated in the corresponding memorandum, *less half an ounce*, are removed from the latter scale, and the bar of gold substituted in their place. Up to this point the beam of the scale is kept perfectly horizontal, being maintained in that position by a mechanical break; but now a stud is pressed, and by means of delicate machinery, actuated by water-power, the beam is released. If the weight of the bar has been correctly stated in the memorandum, the scales which holds it should be exactly half an ounce in excess. This or any less excess of weight over the three hundred and sixty ounces in the opposite scale is instantly registered by the machine, a pointer travelling round a dial until it indicates the proper amount; the function of the machine, however, is limited to weighing half an ounce only. If the discrepancy between the two scales as loaded is greater than this, or if on the other hand the bar of gold is more than half an ounce less than the amount stated in the memorandum, an electric bell rings by way of warning, the pointer travels right round the dial, and returns to zero. So delicate is the adjustment, that the weight of half a penny postage stamp—somewhat less than half a grain—will set the hand in motion and be recorded on the dial.

The stock of gold in the bullion vault varies from one to

### THREE MILLION POUNDS STERLING.

The bars are laid side by side on small flat trucks or barrows carrying one hundred bars each. In a glass case in this vault is seen a portion of the war indemnity paid by King Coffee of Ashantee, consisting of gold ornaments, a little short of standard fineness.

One of the first reflections that strike an outsider permitted to inspect the repository of so much treasure is, "Can all this wealth be safe?" These heaps of precious metal, these piles of still more precious notes, are handled by the officials in such an easy-going, matter-of-course way, that one would almost fancy a few thousands would scarcely be missed; and that a dishonest person had only to walk in and help himself to as many sovereigns or hundred pound notes as his pockets could accommodate. Such, however, is very far from being the case. The safeguards against robbery, either by force or fraud, are many and elaborate. At night the Bank is guarded at all accessible points by an ample military force, which would no doubt give a good account of any intruder rash enough to attempt to gain an entrance. In the event of attack from without, there are stiding galleries which can be thrust out from the roof, and which would enable a body of sharpshooters to rake the streets in all directions.

Few people are aware that the Bank of England contains within its walls a graveyard, but such is nevertheless the fact. The Gordon riots in 1780, during which the Bank was attacked by a mob, called attention to the necessity for strengthening its defences. Competent authorities advised that an adjoining church, rejoicing in the appropriate name of St. Christopher-le-Stocks, was in a military sense a source of danger, and accordingly an Act of Parliament was passed to enable the directors to purchase the church and its appurtenances. The old Churchyard, tastefully laid out, now forms what is known as the Bank "garden," the handsome "Court Room" or "Bank Parlor" abutting on one of its sides. There is a magnificent lime-tree, one of the largest in London, in the centre of the garden,

and tradition states that under this tree a former clerk at the Bank, *eight feet high*, lies buried. With this last, though not least of the curiosities of the Bank, we must bring the present article to a close. We had intended briefly to have referred to sundry eventful pages of its history; but these we are compelled, by considerations of space, to reserve for a future paper.

## FOR THE FARMER.

### Cooking Food For Swine.

The cost of pork is greatly lessened by cooking the food for the hogs. Wormy apples, small potatoes, etc., will pay handsomely for the trouble of cooking. It is the greatest fault of our pork production, that we feed corn almost exclusively. This monotonous diet, rich in oil, must jeopardize health. It is as if a man ate nothing but fat meat and corn-bread. The value of cooked food does not depend altogether upon its nutritious contents. In cold weather much good is done by feeding hogs heated food. It warms up the body, and stimulates the digestive organs to vigorous action. It pays always to warm slops in cold weather. The main reason farmers do not feed more cooked food to their swine, is the fancied labor and trouble of preparing it. A good utensil is a large iron kettle, swung upon two poles of sufficiently strong wood. The bail is removed, and a piece of chain, forming a loop a foot long, is passed through each eye of the kettle, and over the respective poles. The poles are placed on forked sticks, set in the ground. The poles should be parallel, and as far apart as are the eyes of the kettle. Place near the kettle a large, light trough, made of two-inch pine boards, which may be situated in a small lot separated from the hog lot by a fence with a small gate. Old broken fence rails make excellent, cheap fuel; they ignite readily, give a quick, hot fire, and soon die down. When the cooking is done, rake the fire to one side, and bring the trough partially under the kettle on that side from which the fire has been removed. Raise the pole from that side out of the croches, and let it down. This will tilt the kettle on the edge of the trough, and most of the food will be deposited in it; the balance is easily scooped out with a board or pan. When only one pole is used, it is difficult to get the cooked food into the trough. After the food has been cooked sufficiently, open the gate in the fence, and let the hogs into the feast. Managed in this way the labor of cooking a kettle of food can be done in five minutes, and the only expense of making the ration is a few pieces of old rails.

Boiled small potatoes, mixed with meal, will cause pigs to grow and fatten. Give horses cut feed in the winter. Cut the hay and oat-straw together, and sprinkle on the meal; it saves the hay, utilizes the straw, and the meal itself does better service. Corn stalks should be cut for cattle. If you own an old horse, that has barely lived through the summer, it would be an act of mercy to put him out of the way now. He would otherwise eat a ton or more of hay before spring opens, and then be worthless. Keep salt before the cattle, or at least so convenient to them, that regular "saltings" will not be forgotten. Farmers should make a careful study of the feeding of store cattle. They make a mistake who feed simply to keep the animal alive through the winter. It requires two-thirds of a full ration to sustain life without growth, whereas the other third will produce growth, and yield a profit on all the feed. The animal, which comes out in good condition in the spring, has a long way the start of one that, from insufficient food must take a month on grass to get thrifty again.

Do not delay filling the ice-house, for a single day, after the ice is six inches thick and of good quality. Get out the year's supply of fire wood, and any logs needed for timber, lumber, etc.

### Orchard and Fruit Garden.

Gather up all stakes, labels, boxes, and store whatever may be of future use, and make kindling wood of the rest. Surface drainage should be provided to carry off water from rains and thaws. Young trees planted last fall or spring, need a mound of earth at the base of the trunk to steady them against the heavy blows, and also help to keep off mice. Cut cions in mild weather, always taking vigorous last season's shoots. Pack with sawdust or moss, first carefully labelling them. Strawberry beds, if not yet protected, should be covered with straw, bog hay, or leaves. Prune in mild spells, currants, gooseberries, grapevines, etc. If trees or small fruits are to be planted next spring, decide upon kinds, where they are to be bought, and order early. Fruit, if stored in the house cellar in large quantities, may give off so much carbonic acid as to contaminate the air of the rooms above. Provide ventilation, connecting with a chimney if possible. Keep a thermometer in the fruit cellar to aid in maintaining a low temperature—just above freezing. Manure should be drawn to the orchard while the ground is frozen, ready for spreading in early spring. Gates and fences should be in condition to keep out animals. Rabbits are most readily kept from young trees, by sprinkling the trunks with blood. Set traps. The eggs of the tent caterpillar, which are glued to the twigs in a band near their ends, should be cut off and destroyed.

### The Kitchen and Market Garden.

In most localities the weather has been favorable for doing spring work in the fall. Continue in mild spells, to do whatever will save time in the busy time of next spring. Cold frames, in a mild winter, require close watching. If the temper-

ature is but slightly below freezing, air must be given every day. If the plants are not frozen when snow falls, the glass should be cleared of snow soon afterwards. Spinach, kale, and onions, that are now in the ground, should have a moderate covering of straw, bog hay, or leaves. Roots in pitta, and celery in trenches, will need more covering up as the winter grows colder. Parsnips and salisfy, if sowed before spring, may be dug during the thaw that usually occurs this month, as also may horseradish. It is poor economy to sow seeds of uncertain quality. Overhaul the stock on hand, and reject all that are doubtful. Determine what seeds are to be bought, and order them. While parsnips, onions, and a few other seeds are uncertain if not of the growth of the previous year, cucumbers, squashes, and all of that family, will remain good for many years. Every source of manure supply should be watched, and nothing allowed to go to waste that will increase the value of the compost pile. The market gardener should be acquainted with all the manufactories in the vicinity, and ascertain the character of their refuse, with a view to securing it if of value. Have all the implements in good working order. If any are beyond repair procure new ones. Make all home-made appliances, such as markers, dibbles, etc. Secure labels, tying materials for bunching vegetables, baskets, boxes for raising seedings, etc., etc.

### Flower Garden and Lawn.

But little can be done here save to prevent injury to trees, etc. Have the snow plow in motion soon after a storm, as the labor of opening paths is much less when the snow lies lightly. Evergreen trees and hedges are often injured by snow, which collects in and breaks them. Shake or beat out accumulations of snow, before they harden. All proposed improvements in the grounds may be leisurely considered at this season, and if a plan of the grounds is made on paper, drawn to a scale, it will greatly facilitate doing the work next spring.

## SCIENCE.

In a recent number of the *Journal of Inebriety*, Dr. Napier shows that farinaceous foods are preferable to all others in the treatment of alcoholism. Macaroni, beans, dried peas, and lentils, in his opinion antagonize in a marked degree the appetite for alcohol.

An inventive genius, after a long series of experiments, says the natural gas contains the chemical elements of whiskey, and he claims to have discovered a process by which it may be converted into first-class whiskey. Another man is making bogus butter out of the gas wells.

Professor Osborne Reynolds says that steel ropes as transmitters of power have a great advantage over shafts, because the stress on the surface will be uniform, and may be at least ten to fifteen times as great as with the shafts, say 100 feet per second, the rope is carried on friction pulleys, which may be at distances of 500 or 600 feet, so that the coefficient of friction will not be more than 0.015, instead of 0.04.

In the Northeastern island of Terra del Fuego the Ua people, who intermarry frequently with the more Southern Yahgans (as they are called by the English missionaries), are the tallest race on the globe, according to the French Mission to Cape Horn report, presented to the Academy of Science, Paris, by Dr. Hahn. In stock and speech this tall people appear closely related to the Patagonians of the Continent.

Professor Fitzgerald, of the University Experimental Science Association, Dublin, has published a paper on the magnetophone, a new form of which instrument has been devised by Mr. W. V. Dixon. In this a diaphragm removed from a telephone is placed in proximity to one end of a bar magnet, while at the other extremity of the magnet small masses of iron fixed radially are rotated. A note is produced at the diaphragm.

The height and velocity of clouds has been determined in England by means of photography. Two cameras, placed about 600 feet apart, are provided with instantaneous shutters simultaneously released by electricity. The observer measures the angle of inclination of the cameras and the position of the clouds as photographed on the two plates, and from these data a trigonometric calculation gives the distance and height of a cloud with great accuracy.

A great Swiss marine and pocket chronometer competition is now going on at Geneva, to last eighty-three days. A special stove, in which an invariable temperature can be maintained for several consecutive days, was built. For five days the chronometers placed therein will be kept at one temperature, which will afterwards be raised by degrees at a time from 5 deg. to 35 deg. Centigrade, and then reduced in like manner from 35 to 50 per cent.

A famous aeronaut says that no balloon has ever gone over a second sunset. The moment the sun goes down the gas condenses, and you get through the night better than the day. But the next day, in the presence of the sun, the gas expands and you mount to great elevations, but every mount the balloon makes scriples its power, and it is only a question of hours, if not minutes, how long you can keep up. If an aeronaut could have forty-eight hours of night he could travel a great distance. The highest rate of speed he had ever attained, even with a strong wind blowing, was eighty miles an hour.

"I have read every book in my husband's library. I really don't know what to do for something to read," said a newly married woman to a friend. "Why don't you get another husband?" was the reply of the other party, who had some experience. The above is said to have occurred in Boston.