COCOA.

By JOSEPH HATTON.

Illustrated by W. H. MARGETSON.

"COCOA-LEAF, cocoa-nut, cocoa," remarks a technical authority, "it requires thought before one can rightly attribute the properties and uses of these vegetable products." Many persons think cocoa-nibs are made from a root, others associate them with the cocoa-nut palm. I could hardly realize the existence of so much ignorance or indifference about one of the most familiar of popular beverages and confections until I opened an established dictionary and found an engraving of the cocoa-nut palm illustrating the word "cocoa." The great Encyclopedias do not however leave one in doubt. Cocoa is the product of the seeds of the *Theobroma* (Food of the Gods) *cacao*. The tree flourishes in Mexico, Brazil, the West India Islands, Columbia, Equador. The finest qualities are grown in the island of Trinidad, and in Venezuela. Caracas has given its name to a popular brand. Of late years, Ceylon has also produced a bean of high character. A drawing made in a leafy corner of that sunny island supplies us with our initial illustration. The *Theobroma cacao*, better known as the cocoa tree, rises with a bare stem to the height of six or seven feet, and then dividing into many branches climbs upwards some ten or fifteen feet higher. The branches spread out not unlike an oak, but with a dark green leaf something of the shape and character of a plum tree. The fruit is a large pod that hangs pendulous from the tree by a tough timber stalk. Its surface is grained and hard. At first the pods are green, but as they ripen they become yellow, the side next the sun red. The tree attains its full vigour in seven or eight years, and yields two principal crops in the year. There is not what may be called a harvest time, not in the sense of our cutting of corn or the vintage in France. The pods do not ripen all at the same time. One or two from a tree are cut as they appear to the eye of the expert as ready for stripping. These are gathered together in heaps, and by and by the plantation hands, men and women, burst open the pods, strip away the rind and extract the nuts, each pod containing a hundred or more packed in the closest compass. The nuts are then laid out upon mats to dry, after which they are packed for exportation in bags, each of which holds about 112 lbs.

Recently, in company with a friend, I saw vast quantities of the luscious-looking bean turned out of its Oriental packing in "the cocoa metropolis" of the West of England, and watched its gradual conversion into that particular "food of the gods" which has become universal among men. Bags from Trinidad, Venezuela, Ceylon and other cocoa regions were being swung through the air into the storage and grinding room of Fry's factories at Bristol. Pausing in one of the galleries that unite the different factories to watch the busy scene below us, we find ourselves on a level with the vane of St. Bartholomew's Church steeple. The sacred edifice is literally embedded in the secular buildings that have grown up all around it. The children pouring out of the church-schools might be part of the working-folk of the factory going to dinner. They all

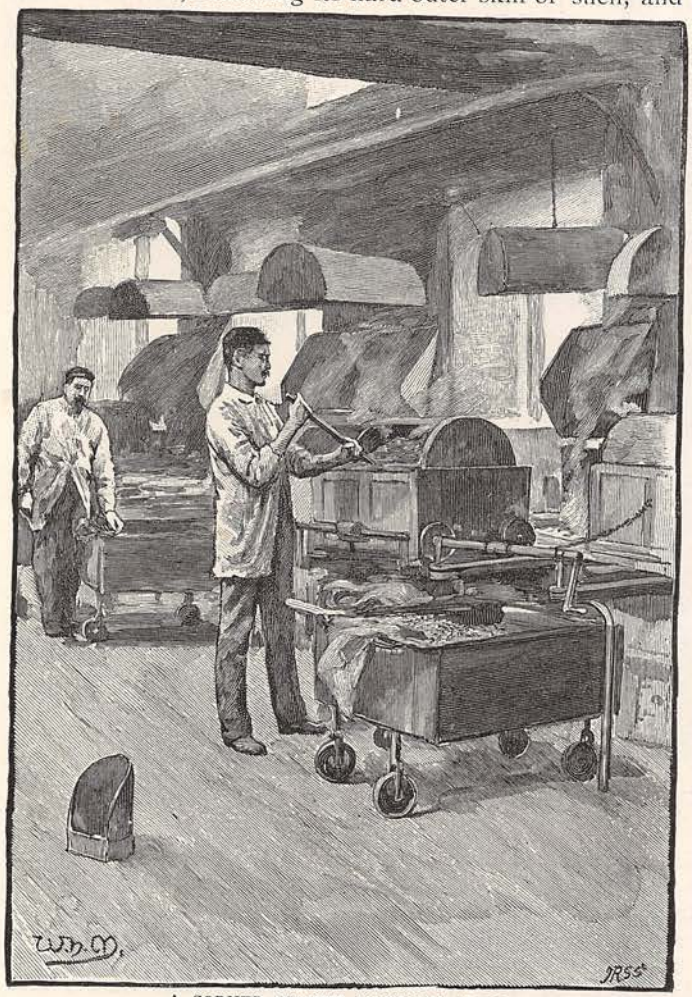
look free and happy and well nurtured, the working children as well as the scholars with their books and slates. St. Bartholomew's is one of those out-of-the-way churches which you often find in old cities lost in the noisy thoroughfares of growing industries, their congregations dispersed among other houses of prayer A new site will evidently have to be found for St. Bartholomew's. From the first it would seem as if trade and commerce had been struggling at Bristol for supremacy with ecclesiasticism. In the fifteenth century it was "a city of towers," eighty monasteries and churches crowning its embrasured walls. Prior to the edicts of Henry VIII., it was indeed more or less an ecclesiastical city, crowded with devotional guilds, hospitals, hermitages, churches, chantries, the population picturesque with the typical costumes of Franciscan, Benedictine, Carmelite and Dominican monks, priests, and friars, the air (says one historian), "thick with clouds of incense." If the possible conversion of the site of

IN A CEYLON PLANTATION.

St. Bartholomew's into business purposes should strike a note of regret in some minds we would hasten to offer the compensating fact of the annexation of the county gaol for the firm's stables and timber stores. Indeed the exigencies of cocoa manufacture seems to have compelled a general making free with the western city. Fry's brass-plate meets the eye in the various business quarters of the city, setting up fresh land-marks for old ones, and filling the air with a perfume at some points hardly less noticeable than was the incense of Bristol's olden days.

We had paused at the open door of the roasting room, not only to witness the unloading of tropical cargoes but to take a glance over the red-tiled roofs and gabled houses of Bristol away to St. Paul's in Portland Square, busy streets right and left and at all points, suggestions of the historic character of the famous old city and its mer-chant venturers, its battles for king and parliament, its royal and civil banquetings, its reform riots, its literary coteries, and its varied enterprises maritime and otherwise. A fine old city Bristol, full of ancient landmarks, rich in architectural treasures, a vein of romance and poetry running right through its history from the days when Cabot sailed out of its picturesque port to discover new worlds to the present time when ships from every sea float upon her lazy tides and moor themselves in the very heart of the city as they do to this day in Amsterdam and Yarmouth. But our courteous guide awaits us and we must postpone for the time being such wayside reflections as do not come within the immediate focus of our work. The bags already mentioned are upon this

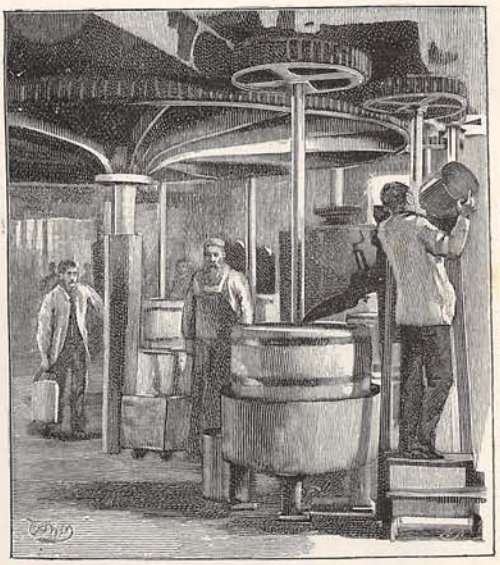
floor, emptied into several roasters, cylindrical pans slowly revolving over open coke fires. The bean is stirred now and then by experienced attendants who can tell by the flavour of the vapour that arises from them when the operation is complete. This first process is the most important of the series of treatments which the cocoa bean undergoes before it is ready for the breakfast or dessert table. A bad roast is fatal. The bean is destroyed. But a bad roast is a very exceptional incident. From the roasters the beans are conveyed to large hoppers connected with the floors beneath by shoots that convey the roasted bean to the winnowing room. Here a machine cracks the nut, removing its hard outer skin or shell, and both are together hauled to a point over the winnower where the blowers separate the husk from the nut, and the latter now being thoroughly cleaned from all *débris* of the shell becomes what we know as cocoa-nibs, which are now ready for grinding.



A CORNER OF THE ROASTING ROOM.

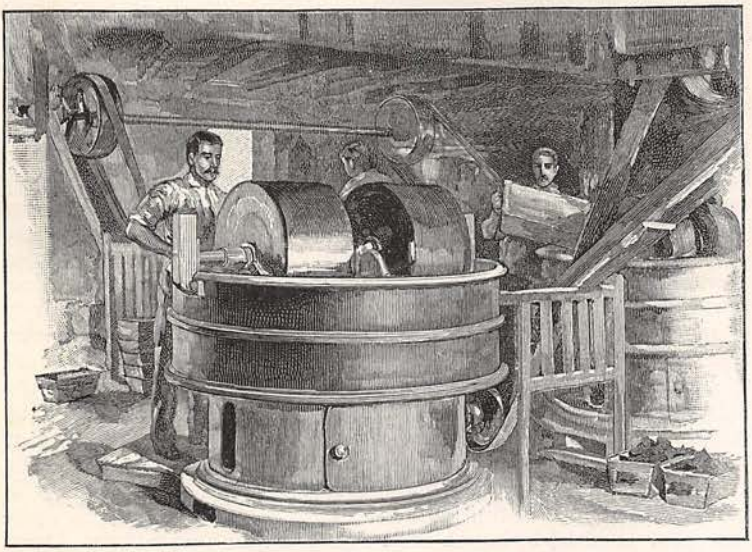
As there are four main factories, each more or less reproductions of the other, the various departments are known in the works by numbers, but for the better understanding of the reader we prefer to give them proper names. Thus from the grinding room we come to the sugar-grinding room, which is incidental as it were to the next operation which belongs both to the manufacture of chocolate and the ordinary drinking cocoa. We might now be in one of the floors of a flour-mill, so white is the atmosphere, so ghost-like the workpeople. Tons of loaf-sugar are here ground and sifted until it is as fine as the finest flour, and as soft and silky to the touch. As the salt-sea waves leave their flavour upon the lips, so does the flying dust of the sugar-room leave behind its sweet if not cloying flavour; and one also leaves the room as to beard a trifle grayer than one entered it. This little world of "sweetness and white" gives upon the pan or pug-mill room, where the cocoa-nibs, in great revolving pans, are mixed with the fine-dressed sugar and pounded between granite rollers into paste. No water is used, but the material is kept warm. There is a large percentage of oil in cocoa-nibs, and encouraged by a gentle heat it is brought forth, and thus the nut or bean becomes liquefied. Sugar is added until the cocoa is of the consistency of dough. The beds of the revolving pans are of granite like the rollers. Iron would set up a chemical condition inimical to the delicate flavour of the product. When the nibs find their way into these heated mills they are hard and brittle, and one might expect to see them ground into powder. Not so; they become paste as we have seen, and in this form are made to perform all kinds of strange evolutions.

It is whirled hither and thither in the great pans, making graceful curves, now ejected in liquid columns like miniature Severn "bores" or enormous snakes, rich brown tortuous never-ending boa constrictors; thence it goes into batteries of rollers where it is conducted over granite cylinders, flattened out and rolled by a series of ingenious machines invented and made in Paris, and comes out chocolate, except that it has to cool. This hardens the oil of the nib, called "cocoa butter," and the chocolate is then ready to be prepared for use.



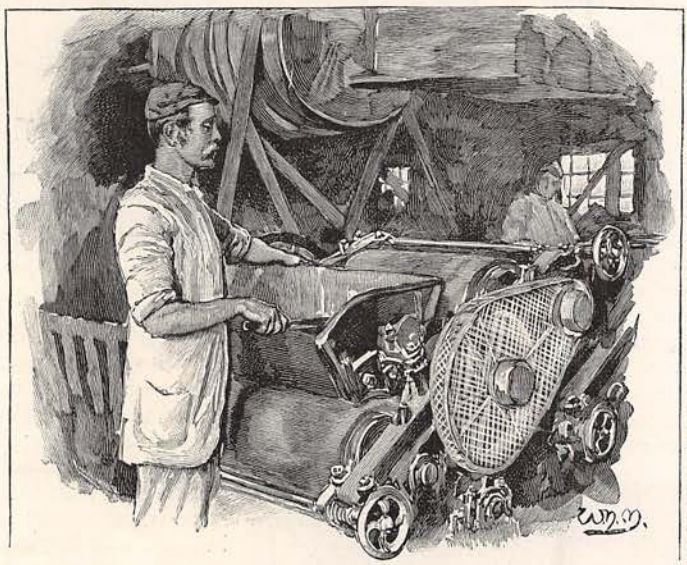
GRINDING PURE CHOCOLATE.

Skipping the floor we have just described a certain proportion of the ground nibs come to the department to which we next descend, falling into hoppers that make the powder finer and finer. For storage purposes there is a curious little machine here, originally made for pressing patent fuel into blocks. Later the inventor applied it to cocoa in this way. The material is placed in an automatic metal box, the lid is closed, then by pressure the bottom is forced upwards until the lid opens to let out the compressed brick of cocoa which is then stored. Passing this little machine we are in one of the most picturesque departments of the factory. There is no more artistic form than that of a wheel, nothing in continual motion that gives a greater idea of power. The avenging Jupiter could think of no punishment so persistent as that of the whirling wheel to which Mercury bound the banished Ixion. In every manufactory the wheel is familiar enough. It is the motor of the place, the guide and controller of miles of straps and bands; it is beginning and never-ending in almost every nook and corner; but we have rarely seen it in such striking evidence as in one particular department of these great cocoa factories. Here on this floor of hoppers into which the ground nibs are deposited to make concentrated cocoa the sense is bewildered, the mind fascinated, by the incessant repetition of wheels. They fill the ceilings in two or three vast circles, that have their revolving satellites like moons each on its own axis, and each governed by the master wheels. The curious part of the scene for a novice is literally a ceiling of moving wheels as well as a continuation of the same right, left, and centre. Watch them for any length of time and you might find yourself presently going round and round with them until you whirled yourself out of existence like the gyrating maiden in the fairy-tale. To the turn of these many wheels the mills perform their



A PUG-MILL, OR MIXING PAN.

eccentric motion until the chocolate is sufficiently ground. It is then collected in batches and placed in canvas bags, which are packed into the receivers of a long array of hydraulic presses that also constitute a very interesting scene. At first blush you might think you had strayed into the counting house of the firm of Gogs and Magog whose letter-copying presses stopped the way; but these double-handled machines are worked by a power greater than that of a thousand Gogs and Magogs with an army of Polyphemuses thrown in. The canvas bags subjected to hydraulic pressure give forth most of the oil which the cocoa contains. It runs off into tin pans and leaves behind the dry pure cocoa of commerce. The oil is of a dark brown colour, but as it cools it gradually becomes white and in solid blocks. Later we come upon it turned out of the tins "cocoa butter" in great solid pats. On this and other floors there are large artificial cooling rooms, for which there is on the ground floor extensive frost generating machinery on the brine and ammonia system. The shafts go up through the various factories, as do also the lifts or elevators. Even in summer days the artificial snow has to be collected and removed from the freezing closets.

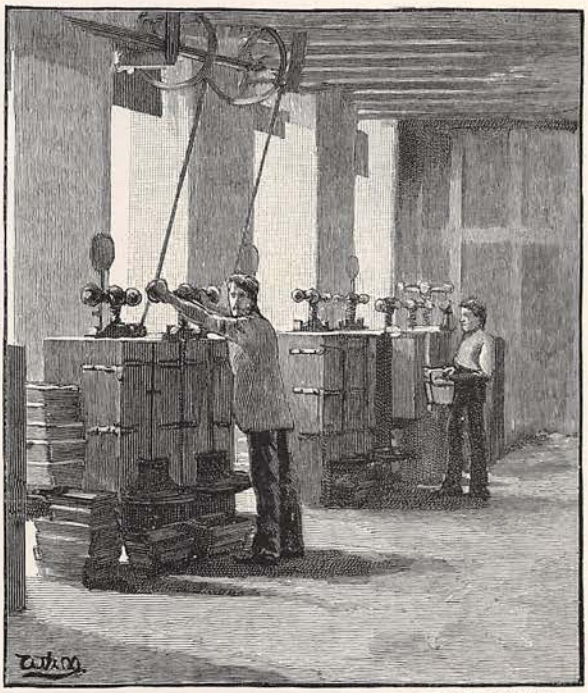


ROLLING SWEET CHOCOLATE.

Passing through the rooms devoted to the mixing of miscellaneous chocolates we now leave what may be called the manufacturing departments. We have not thought it necessary to mention the separate treatment of different varieties of bean, Trinidad, Caracas, Ceylon, and others. The process does not vary. In quitting the grinding, winnowing, milling, pressing and other operations we leave behind us the men's work. Not that the master hands do not appear in the lighter sections of the factories, but girls and women predominate in the later departments which belong to the production of chocolate creams and fancy confections. On our way to the ground floors we come upon one of the rooms set apart for the filling of cocoa tins and packets. Here crowds of girls are weighing and packing the brown powder. They are a healthy, well-dressed company of young women, and of a more than ordinary look of intelligence. The ground floor of the factory is devoted to many varied purposes. First, we come upon the busy scene of sugar boiling, long rows of boilers, long rows of men in white French caps and aprons. From the boilers the sugar is emptied upon great stone slabs where a little army of more white-capped labourers stir and beat up the cream-like compound with white wooden spades. Thus prepared it is transferred to the moulds; and this brings us to another department that repeats the atmosphere of the sugar mill. Moulds for iron castings, as you are aware, are made of sand. The creamy sugar which we have seen boiled and manipulated for the next process is poured into moulds made of starch. We find ourselves in the midst of stacks upon stacks of these square moulds, flanked by bench after bench of men and boy moulders. Wherever labour is divided by machinery or hand, one operation dependent upon another, there is no time for idleness. The machine, human or otherwise, must be kept going. Here moulds are filled and emptied with a steady and effective monotony. On one side the sugar cream is poured into the moulds from handy funnels; on the other, when solidified the resultant creams are collected for ultimate coating with chocolate. Leaving the moulding rooms we seem to drift to and fro into various other departments where thousands of trained dainty fingers are giving the finishing touches

to fancy forms of creams and plain chocolates that gradually develop into all kinds of boxes, from the cheap popular little *bonbon* boxes to the handsome and artistically arrayed and decorated cabinet of mixed sweets fit for the notice of a Princess.

And now once more in the fresh air we make the acquaintance of the engines and boilers all on the most perfect scale, even to the oldest mechanical servant of the firm, a great old beam engine of the melancholy mad-elephant kind described by Dickens. It has been in use over fifty years, and in its present site was erected the first engine that Boulton and Watt introduced to Bristol. The old-fashioned but powerful engine has been supplemented by many others. It takes eight powerful sets to drive the works in these days. They would be a surprise to the writer of a paragraph in the *Bury and Norwich Post*, of June 6, 1798, could he once more visit the glimpses of the moon. "Since the great improvement of the steam engine," he wrote on that particular date, "it is astonishing to what a variety of manufactures this useful machine has been applied; yet it does not a little excite our surprise that one is used for the trifling object of grinding chocolate; it is, however, a fact, or at least we are credibly informed, that Mr. Fry of Bristol, the maker of the famous Churchman's chocolate, has in his new manufactory one of these engines (improved by Mr. Jones, an ingenious millwright of that city) for the *sole purpose* of manufacturing chocolate and cocoa. Either the consumption of this little article must far exceed our ideas, or, which we think much more likely, a very large portion of what is drunk in this kingdom must be made by him." This is the very thought that occurs to us after walking for hours over only one of the four main factories that rise aloft tier upon tier, with their tall smokestack, giving employment to more than *two* thousand people. Fry's had been established some half a century when the *Norwich* paragraphist quipped about the "little article" of cocoa, and yet with four factories *en bloc* and several outsiders there is still room for competition in the supply of the United Kingdom, which in 1891 paid duty on 21,601,825 lbs.

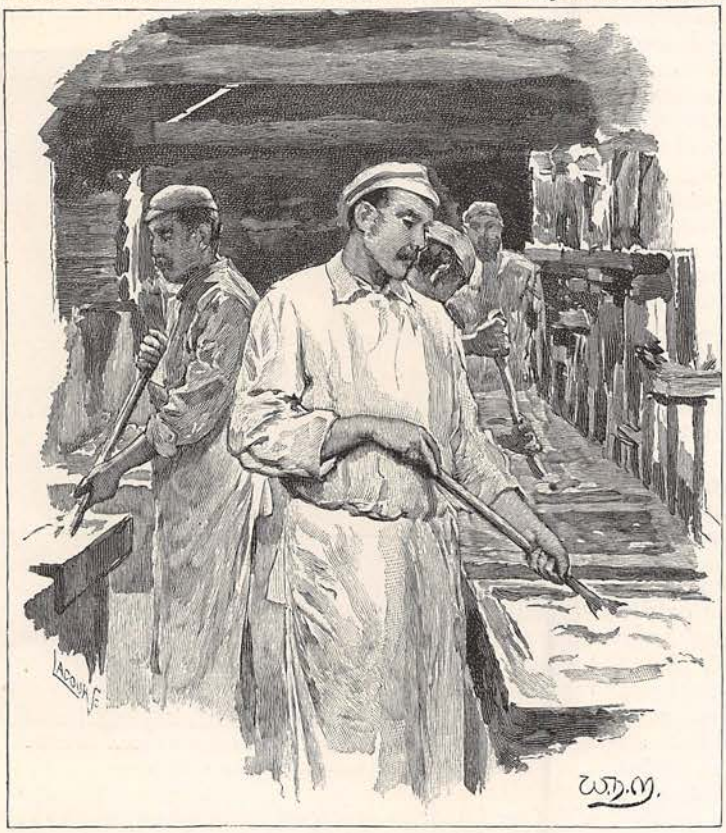


HYDRAULIC PRESSES FOR EXTRACTING COCOA BUTTER FROM CONCENTRATED COCOA.

The water supply for the eight sets of engines is obtained from the river Frome which runs under the factories a prisoner beneath stone arches, the old story of the bright and cheery brook arrested on its way through pleasant meadows for various industrial purposes, dammed up to turn a mill, then released for a brief freedom to be the playmate of village children, to floating tiny boats and murmuring beneath ancient bridges, finally, to be caught and imprisoned under city roads and compelled to feed the boilers of hot and steaming-engine houses. If the Frome were sentient, the strong child of the Avon might be content to know that it was helping to produce the pretty boxes of chocolate creams that come to happy children at Christmas time, not to mention those canisters of cocoa extract that give wholesome drink to thousands of busy people. "We shall want a larger supply than the Frome can give us," remarks our guide, "when the new factory is finished," and he draws our attention *en passant* to a block of buildings in course of erection. Here we have an opportunity of noting the principle upon which all the factories are constructed. Each floor is supported by iron pillars, with girders and cross girders, the spaces between the girders being filled with slate pavements; where stone is used it is Cornish granite. The completion of

the new factory will increase the number of hands employed to between two and three thousand men, women, and girls. It is a surprising story, the multifarious operations that belong to the production of a cup of cocoa or a chocolate cream.

Incidentally we ought to mention that traversing one of these factories and parts of the other four, making excursions over bridges from street to street, we have noted with pleasure evidences of the care both physical and moral which the firm takes of its work-people, more particularly of the younger members of their staff. More than once we have passed through meal-rooms and school-rooms. The firm provides the means of cooking in the factories, and the great majority of the young people only leave the works to buy their daily food or to supplement their tea and dinner baskets with some trifles from the adjacent markets. In one of the main factories we came upon a large and handsome lecture room which is also once a week used as a night school, once for boys and once for girls, the firm providing them with teachers. Every morning at a quarter to nine, one of the seniors of the firm attends in the lecture room and reads a chapter in the Bible; and a hymn is also read. The hall is occasionally lent to them for meetings of their own, and employers and employed are evidently on the best and most friendly terms with each other. There are also sick clubs and other organizations of great usefulness connected with the factories, and indeed the whole concern is conducted as if the persons engaged belonged to a special community outside and apart from the busy city to which it has given the name of "the cocoa metropolis."



STIRRING THE SUGAR-CREAM.

We have already seen how the growth of great industries has compelled manufacturers to extend their businesses in directions never contemplated at the outset. Fry's is a remarkable instance. Besides chocolate makers, they are engineers, boxmakers, carpenters, tinworkers, and are concerned in various other occupations. Beyond the factories we have described, we found ourselves driving in cabs and tramping through the ancient ways, visiting other concerns that belong to them and are an integral part of their main business. Our first visit was to Wapping, where they have a steam saw-mill with all kinds of implements, circular, whip and other saws, planers, nailers, and what not on the newest principles. The nailing-machines are ingenious contrivances; they work automatically, are fed with nails and supplied with boxes in sections which, passed from hand to hand, from machine to machine, are completed with remarkable rapidity. There is a new saw here circular and pliable, which cuts two planks at one operation and does not need to be fed; one man gives it occasional attention. Fenced off in the mill are several printing

machines for labelling the box lids. How many separate packets these boxes are made to hold it would be difficult to say, but the firm in its Wapping carpentry turn out some thousand dozens of them every week. After inspecting the mechanical work of the mill, we entered the store-rooms to find what almost seemed to be acres of boxes ready for use.

From Wapping we drove to the county gaol. It is many years since the present writer visited this once formidable house of detention, the occasion being the arrest of Sir William Don, while that "tall monumental warning" of reckless expenditure (as he called himself in one of his local speeches) was fulfilling an engagement at the Bristol Theatre in King Street. Those were the days before the abolition of arrest for debt, when the bailiff though shorn of much of his power was still a formidable officer. Sir William was a good deal put out when he was not allowed to finish the play in which he was acting; but great sympathy was shown for him, and he found exceptional accommodation at the castle, where the Governor, Mr. Gardener, gave up to him one of his own private rooms and made his brief incarceration as pleasant to him as possible. This included a very agreeable luncheon the next day, at which I was a guest. Sir William related to us some of his numerous adventures. One may be excused after all these years for feeling a curious sensation at finding the little garden, in which one had walked and smoked after that breakfast with Sir William and the Governor, now occupied as stables for the large working team of Messrs. Fry, and part of the castle turned into a store for their box timber. But there are many other remarkable changes in Bristol, and it seems as if our guide had a curious facility for impressing them upon us. He takes us to Quay Street and introduces us to the card box factory of the firm. We had already in the stationery department of the main factory seen the cardboards cut into shape by various curious little machines and prepared for this outer shop. Here the boxes are made and decorated and the tops embellished in gold with the names of the firm. The atmosphere of one of the *ateliers* was full of gold leaf. Stray bits of it here and there looked like golden butterflies, their fanciful motion aided once in a way as to realistic effect by a ray of sunshine that came in through an open window. Throughout this building there were heard the cheerful voices of girls whose division of labour began with a plain bit of cut cardboard and ended in the perfected box.

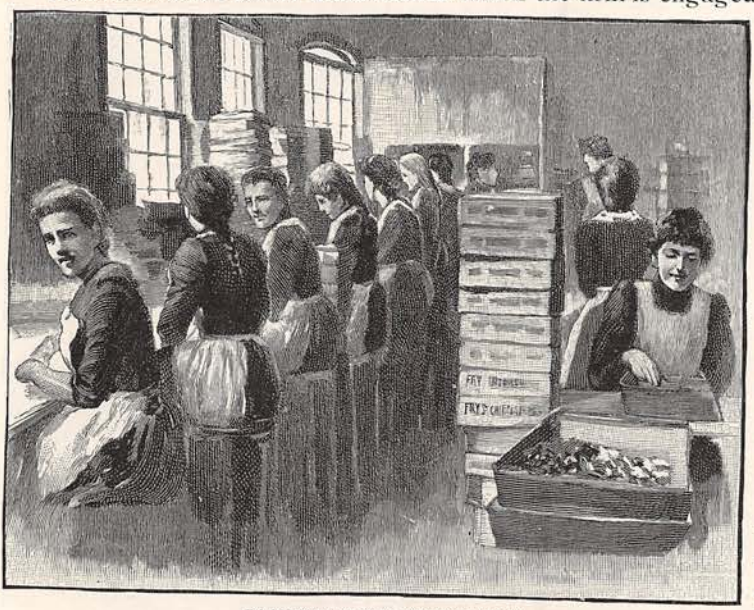
FILLING PACKETS OF COCOA.

Once more threading the traffic of the city, we come to premises where the firm has converted a comparatively new building into a store chiefly used for the Christmas fancy trade; here cases are being filled with chocolate dainties by scores of busy hands, while one floor is dedicated to the making of "orange flavouring," and a very attractive operation it would prove, we fancy, to most young people. Stacks of loaf sugar and baskets full of oranges are being used up. The oranges having been rubbed upon the sugar to extract the flavour of the rind, they are then returned to the baskets which are emptied into presses made on the principle of the cider-press. The juice is squeezed out with the impregnated sugar, and the

whole place is full of the aroma—"orange groves and music from sweet lutes" might be added by the imaginative writer.

From Quay Street we pass on to Nelson Street, and here, like the cuckoo, the firm occupies another nest built for other birds. This time it is the old Trade School that has been annexed for a tin industry. The shops are fitted with remarkable machines that deal with tin as easily as if it were paper, cutting it, twisting it, making it into canisters round and square with the greatest ease, but not without a certain amount of noise and clatter. For instance, there are machines that at one operation make the tops and bottoms of canisters, embossing them at the same time with everlasting labels.

There are other minor industries in which the firm is engaged—they make much of their own machinery with the exception of castings, for instance—but it would need a week's stay at Bristol and an entire magazine to follow the ins and outs of this cocoa and chocolate industry. We have said nothing about its offices, its counting-houses, its carts, its shipping arrangements, little about its history; nor paused to mention the political and judicial honours that belong to the family: these things are part of the history of Bristol; but luxuriously ensconced in a Great Western railway carriage, with a rack full of literary souvenirs of the western country, and one of those bright boxes of sweets made from the beans which the dusky maidens are collecting in our first picture, it would have been impossible not to think of a few parting words about the literature of this "food for the gods" that takes so many people to prepare and provides so many with pleasant refreshment.



PACKING FANCY CHOCOLATES.

White's in St. James's Street is the direct successor of White's Chocolate House, which is represented with St. James's Palace in the fourth plate of Hogarth's *Rake's Progress*. Chocolate was the excuse, gaming the object of White's. Yet the beverage was much drunk and very fashionable in the days of *The Tatler* and *Spectator*. The Cocoa Tree was also in St. James's Street. It was a Tory house. De Foe mentions it to remark that "a Whig would no more go to the Cocoa Tree than a Tory would be seen at the Coffee House of St. James's." Eventually the Cocoa Tree, like many of the taverns and coffee houses of the time, developed into a club. As an instance of the familiar terms which many of the men of fashion permitted between themselves and the menials of these famous *rendezvous*, it is related that a favourite waiter named Samuel Spring, having occasion to write to George IV. when he was Prince of Wales, commenced his letter in these words: "Sam, the waiter at the Cocoa Tree, presents his compliments to the Prince of Wales, &c." Next day the Prince saw Sam, and after a quiet rebuke as to the freedom of the style of his note, remarked: "This may be all very well between you and me, Sam, but you will find it will not do with the Norfolks and the Arundels."

These passing thoughts with a few mental memoranda as to the literature c White's, and the Chocolate House, have scarcely been supplemented by a glance at th evening papers when we run smoothly into Frith's Railway Station, having made th journey of a hundred and eighteen miles in the time that it would have taken the wit of St. James's to get from the Cocoa Tree to Richmond.