

Our Money Manufactory.



NUMISMATICS is a science in which the vast majority of people probably take but the faintest interest. Yet the history of coinage, its developments, its ramifications, is bound up indissolubly with the history of the human race. It is the history of money; and money, as Carlyle said of his own time, is the one certain nexus as between man and man. Money is the determining factor in four-fifths of our relationships. It has made the world what it is; on the one hand it has brutalised mankind, and on the other it has given man unrivalled opportunities of winning popular esteem. Money has ruined and created individuals, families, States. Equally often it has brought worldly happiness and worldly misery; it has broken hearts, unhinged reasons, undone great enterprises; it has shed light in dark places, secured comfort for the weary and the suffering, and involved all that heart can desire. Noble knees have bent before "Lucre's sordid charms"; the humble and the struggling have exalted themselves to place and power by its means. Pope gives us an idea not only of the use but of the abuse to which riches may be put, from the hiring of the dark assassin to the corruption of a friend, and the bribing of a Senate.

Money in the form of cash has been infinitely more to civilisation than mere barter and exchange ever were to barbarous races content to accept one article in payment for another. It is, in fact, only necessary to let the mind dwell for a period on all that the possession or want of coin means to a people, indi-

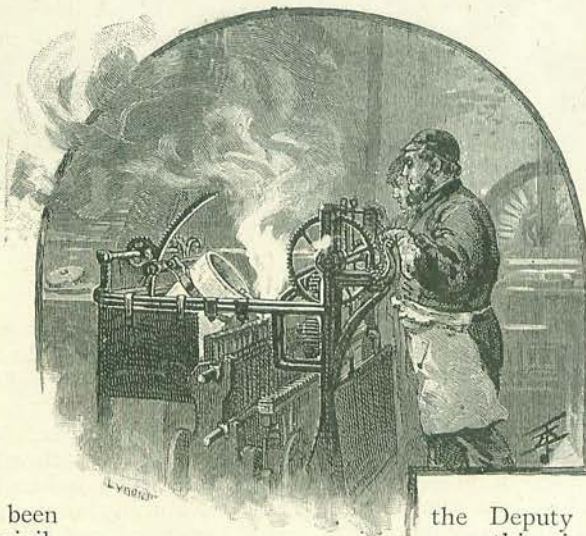
vidually and collectively, to render any inquiry into the working of our money manufactory one of considerable fascination. The attractions of the Mint for the ordinary sightseer have, it would seem, yearly become greater, and in 1889, according to the Report of the Deputy Master, the number of visitors was larger than in any previous year, no less than 7,912 persons—that is, an average of twenty-five a day—having been shown over the establishment on Tower Hill. Vivid an idea of the place as the illustrations which accompany this article will convey to those who have never been to the Mint, it may at once be said, that to thoroughly grasp the actual work done there, a visit is essential. It is an institution round which centres so much human energy and scientific achievement that a picture should certainly make most people anxious to know something more about it.

The Mint, as one approaches it on Tower Hill, suggests that it may be a barrack, and the sentry pacing up and down outside

lends colour to this view, until one finds one's passage through the entrance gate blocked by a sturdy policeman. Unless you happen to be fully armed with credentials, or orders, you will not easily run the gauntlet of the keeper of the peace and the gate, affable gentleman though he is. To be shown over the Mint you must get an order from

the Deputy Master, and then everything is clear.

Once within the precincts of the establishment, your education—if it is a first visit, as this of ours is—begins. You have probably, when pocketing your salary at the end of the week, never given a moment's thought as to the process by which money comes



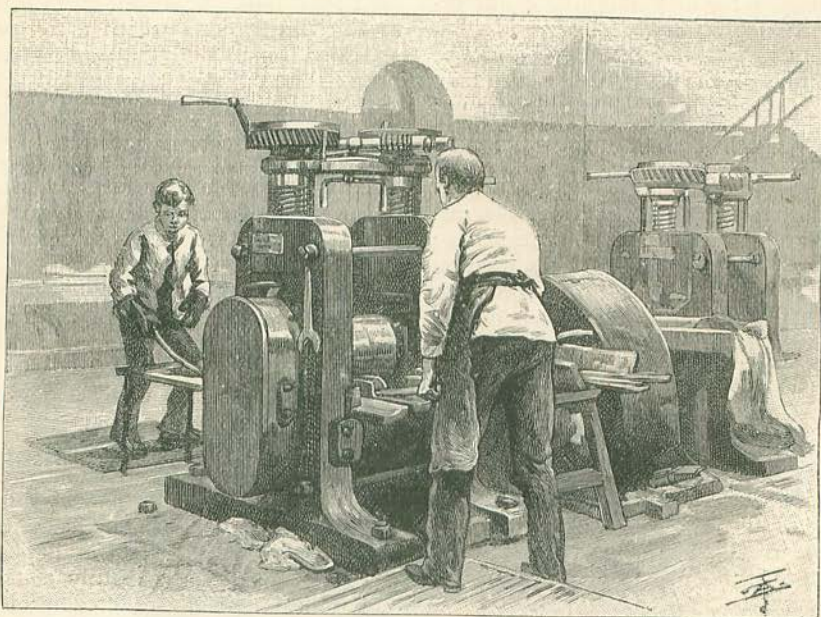
RUNNING SILVER INTO MOULDS.

into the world. The pounds (if you have any), the shillings, and the pence which you carry in your pockets are the result of a combination of experience and skill which you, perhaps, little suspect.

When the bullion—the metal in its pure state—arrives at the Mint, it is assayed—that is, tested. It is then passed on to the Melting-room, and, together with the baser metal which forms the alloy necessary to reduce it to the proper standard, placed in the crucible, or melting-pot. Let us take the coining of silver as an example. The crucible used is made of mixed clay and graphite, each vessel holding about three

inches long and three-eighths of an inch thick. When removed from the moulds their edges are ragged, but a revolving file soon makes them smooth, and the bars are ready to be again assayed. A piece is chipped from one of them, and if the necessary standard of fineness has been secured, the bars pass to the next department.

This is the Rolling-room. The metal, it must be understood, is far from hard, and the reduction of the thickness and consequent increase in the length, due to the rolling of the bars, are not so difficult a matter as to the uninitiated they may



IN THE ROLLING-ROOM.

thousand ounces. On two sides of the Melting-room are coke furnaces, and into one of these the crucible is dropped.

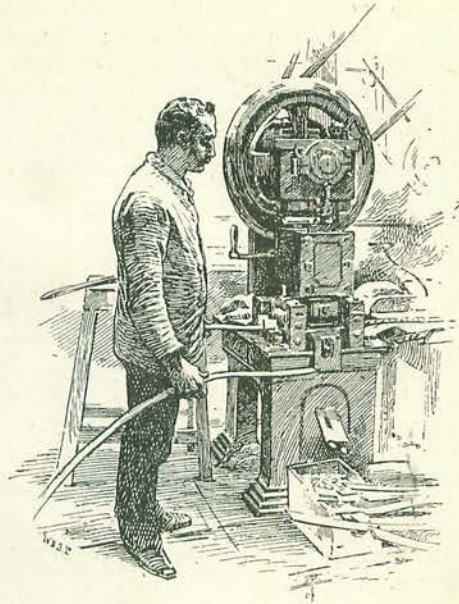
Here it remains until the metal is at a molten heat, when it is lifted by means of a crane on to an apparatus shown in our illustration. This forms a pretty sight. The crucible is red-hot, and the boiling metal, as it is stirred vigorously by one of the men with an iron rod, emits a lovely bluish flame. The apparatus tilts the pot, and the metal runs into a series of moulds which move on a carriage underneath. These moulds being well oiled, the metal has no chance of becoming part of them. The bars formed in this way are twelve

seem. The bars are placed between adjustable cylinders and rolled into strips, or "fillets" as they are called.

They pass several times through the machine, being reduced the one-nineteenth part of an inch in each rolling at first, but, finally, only the one-hundredth part of an inch. Naturally the process makes the metal very hard, and it has to be annealed—that is, heated and softened—constantly until it is the right thickness. We need only state that the strips from which half-sovereigns are made must not vary more than 1-20,000th part of an inch—in other words, they must be within 1-10,000th part of an inch of the nominal thickness—to

give an idea of the minute care with which every stage of the development of the coin has to be watched. Two-tenths of a grain is the divergence allowed in the weight of the sovereign, but even this margin may mean a difference of more than £3,000 on a million sovereigns.

The strips, as they leave the Rolling-room, are about four feet long and double the width of the shilling. They are taken to the Cutting-room, and here for the first time we get something approaching a piece of money. The "fillets" are placed in the cutting-machines, by a man who feeds two at a time. No doubt many persons have formed the idea that the coin is cut, cucumber-fashion, from a metal rod; we have, indeed, heard people suggest as much. Well, the foregoing is sufficient to dispel any such notion. The fillet passes beneath two punches, and over holes the size of the coin. As the former descend with swift, sharp, irresistible force, they punch the "blanks" of the coin out of the strip. The blanks fall through a tube into a tray or pan, and what remains of the strips is sent back to the Melting-room, to be turned again into bars. In the case of shillings, two blanks are forced out at once. In the case of copper, five disappear at a blow, but in the case of large silver coins, only one blank is cut at a time. The blanks of the



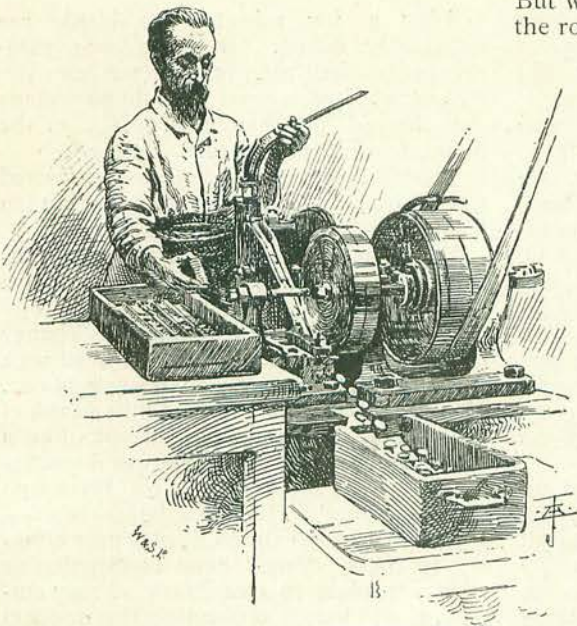
CUTTING MACHINE.

shilling are produced at the rate of some 300 an hour.

Having secured the blank, it might well be imagined that there was nothing more to be done but to impress it with the proper device on its obverse and reverse. But we are not yet more than half-way on the road to the coin which can be sent to the Bank, there to be handed over the counter to the public.

Close by the cutting-machine is what is called a marking-machine. The special function of this is to raise the edge which all coins possess for the protection of their face. The blank is run into a groove in a rapidly revolving disc, and edges are produced at the rate of between six and seven hundred an hour; in fact, almost as quickly as the man can feed the machine.

We cannot help but listen pensively for a moment to the thud, thud, of the cutting machine as the punches strike the fillet, and watch with keen interest the express rate at which the marking is accomplished. To see the blank being turned out at this pace is to make one's mouth literally water, and one's heart and pocket wish that it



MARKING MACHINE.

were so easy and so mechanical a business to "make money" in one's daily doings. And then it strikes us: What do these men, with their usually grimy aprons and often blackened faces, get for their work in turning out so much coin of the realm? They seem to have a very good time of it on the whole, and the conditions of light, warmth, and safety under which they labour are certainly in striking contrast to the trials, the dangers, and the dreariness of the lives of those who unearth the metal.

On an average, each workman in the operative department of the Mint makes his £2 10s. a week. He enters the service of the department as a boy, and remains there through his working life, if he cares to do so and proves trustworthy. No one is accepted for employment after sixteen years of age, and every precaution is taken by the authorities against the weakness of human nature. Each room is under a separate official, without whose assistance in the unlocking of doors no employé can leave.

There is no hardship in this daily imprisonment, every department being fitted up with all conveniences for cooking, eating, &c.; and, judging from what we have seen, we should say the lives of the operatives at the Mint are not unenviable. Of one thing we can speak very positively, and that is as to their natures: their geniality is a characteristic they share in common with their chief superintendent. If one had seriously contemplated becoming an operative, they could not have taken more pains to initiate one into the mysteries of the coinage.

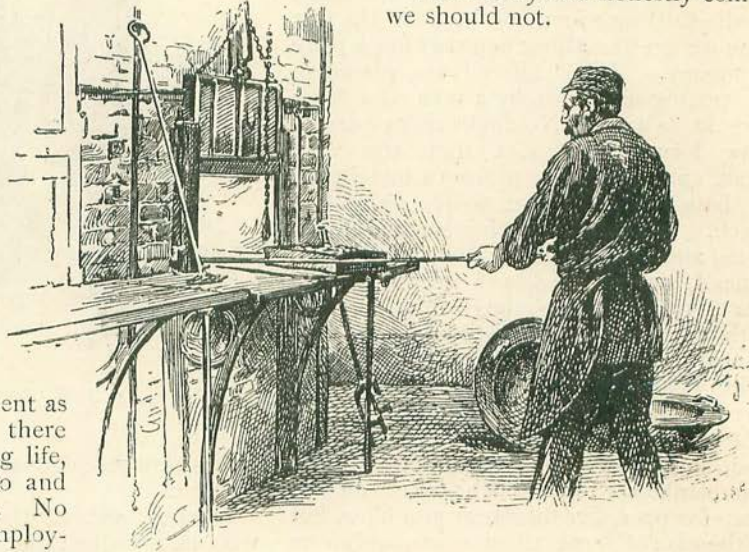
We now make our way to the Annealing-room. Here the scene changes entirely. The buzz, the whirr, and bang of the all powerful machinery give place to several furnaces. The blanks are brought in in bags, are emptied into an iron tray, and shoved along an elongated sort of oven, of which our

illustration gives an excellent impression. It shows the man standing with the iron rod and hook in hand ready to push the tray to the farther end of the oven.

We venture modestly to suggest that the structure would do admirably for the purposes of cremation.

"Quite right, sir, it would! I suppose you wouldn't like to try it?"

We frankly and honestly confess we should not.



ANNEALING FURNACE.

After a few minutes the blanks are sufficiently baked. If one's own valuable carcass had been in that red-hot oven for ever so short a time, it would have come out charred and hardened. Not so the metal, which is considerably softened.

The blanks are now tipped into a perforated sort of basin, which is picked up by a man from another room and carried away.

We have during all this time been standing in a heat which would do credit to a Turkish bath.

But now, again, the conditions change entirely, and we are in a room filled with steam, and cold enough to refrigerate one. Here the blanks are plunged into a tank of cold water, which hisses and spits like a dozen angry snakes as the hot metal touches it. From the cooling bath the blanks go to the acid bath. Into this latter they disappear black with the oxide of copper clinging to them. Pears' Soap or Sapolio, or whatever means to cleanliness we may employ, would hardly accomplish the wonders in an hour's application to the human skin,

which a few seconds of the sulphuric solution accomplishes with the blank of the coin. They emerge from their bath in every sense white as snow.

The blanks are, of course, wet, and before they can assume the full honours of the complete coin they have to be dried. How is this done? By blowing on them with a bellows? By wiping each blank separately with a cloth? By placing them in front of a fire or even in the oven again? No. They are simply emptied into a revolving box containing beechwood sawdust. A turn about in this, and they and the sawdust are emptied into a sieve, from which the sawdust escapes with a little shaking. The sawdust is dried on a hot slab or bench, and is used again; the blanks are ready for the Press or Die room.

In the illustration of this room the man is standing with a handful of blanks feeding a small tube or shoot, from which they drop on to a sliding plate and are conveyed into a collar, as it is called. We see the piece a blank for the last time. Once in the collar, if the machinery is in motion, nothing can save that smooth-faced blank from becoming, in appearance at least, a coin of the realm. The blank rests on a die and beneath a die. The latter descends with precision and force, and the blank finds itself for an instant in a grip more powerful than miser ever gave his hoard. It would, if it could, spread itself out to the thinnest possible substance. But as it seeks to escape under the pressure its edge comes in contact with the sides of the collar. These are milled or lettered, and whatever they contain appears on the coin. It is not generally known that the object of this milling or lettering is to prevent the clipping or debasement of the money. In Queen Elizabeth's time, and on to the reign of William III.—during the sixteenth and seventeenth centuries—the operations of the clippers were very serious. Men made fortunes by paring a small piece from every coin in their possession, and even the death penalty failed to check the evil. A year or two before the beginning of the eighteenth century a mill, worked by horses, was started in the Tower of London to replace the old system of making money by the hand-wielded hammer. The edge of the coin was made to bear an inscription,



DRYING BLANKS.

and the operations of the clipper were rendered practically impossible. Even today offences in connection with the currency are numerous. In 1889 110 persons were convicted out of 194 charged with issuing counterfeit coins, having them in their possession, or actually making them. The more ingenious the device on the coin produced by the Imperial mint, the less likely is a counterfeit to pass muster for long.

The coin leaves the Press-room complete, and has to pass only one other ordeal, that, namely, of the Weighing-room. Here it is placed on a wonderful automatic balance. If it is too light it falls into a drawer on one side, if correct into a drawer in the centre, if too heavy into a drawer on the other side. The average of coins which are either too heavy or too light, and consequently have to be returned to the melting pot, is, owing to the smallness of the "remedy" or margin of weight allowed, as much as 13 per cent.

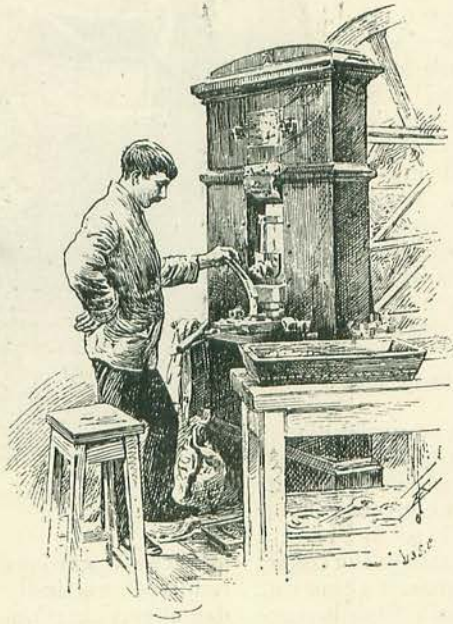
There are thirty of these little machines employed, and their workmanship may be judged by the fact that each one costs £300. Bronze coins are not subjected to this severe test, but are weighed in bulk in a huge scale. Every year there is what is called "The Trial of the Pyx"—the

pyx being the chest containing sample coins. A coin is taken, without preference, from every "journey weight" of gold, a "journey weight" being 15 lb. troy, or 701 sovereigns, or 1,402 half sovereigns. The work of testing is performed by a jury, composed of freemen of the Goldsmiths' Company in the presence of the Queen's Remembrancer, and the report of the jury is laid before the Treasury. The yearly verdict shows how wonderfully and uniformly accurate the standard of fineness has remained, averaging, as it did in 1889, according to the Deputy Master's Report, 916.657, the precise standard being 916.6. As regards silver, the English standard of 925 is, with the exception of certain coins, averaging 945 in the Netherlands, the highest in the world, the average in France being 835, and in Germany and the United States, 900.

The Deputy Master's Report for 1889 was rendered especially interesting from the fact that it was the twentieth issued under the present system of Mint administration. It was only in 1870 that the Mastership of the Mint ceased to be a separate office, and the Chancellor of the Exchequer became *ex officio* Master, with the Deputy Master as principal executive officer. The Mint was removed to its present site from the Tower of London in 1810. With the increase of its labours, the buildings afforded quite insufficient accommodation, and from 1871 to 1881 several Bills were introduced into the House of Commons with a view to acquiring a new site on the Thames Embankment. The governor of the Bank of England, however, having in 1881 declared that no inconvenience would arise if all gold coinage were suspended for a year, it was determined to improve the existing structure. The changes were commenced on February 1, 1882, and ended early in the following December. The result has been to place the department in a position to meet almost

any demands which may be made upon it. The machinery was nearly all renewed, and the arrangements now admit of the simultaneous coinage of two metals. During July, 1889, the producing capabilities of the Mint were put to the test, and one million perfect sovereigns were struck and issued

in a week. The coinage in that year of £9,746,538, to which previous reference has been made, was nearly four times the average of the previous ten years. Even this enormous sum does not represent the whole of the coinage operations of the country in 1889. A considerable portion of the Colonial coins required were turned out by a firm formerly known as Ralph Heaton & Sons, but now called "The Mint, Birmingham, Limited."* Messrs. Heaton were for many years a sort of Imperial Mint Auxiliary. The idea once got abroad that all bronze coins stamped with the



COINING PRESS.

letter "H" were counterfeit, whereas the initial simply denoted that their manufacture had been entrusted to Messrs. Heaton. The Mint, Birmingham, does most of the coinage for small foreign States which look to England to convert their ingots to money.

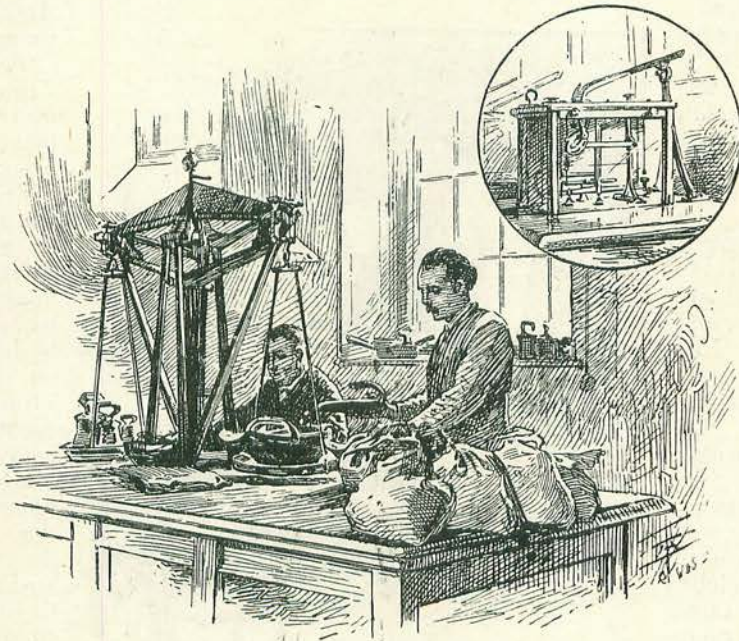
The Imperial Mint, in the words of so many company prospectuses, is a going concern. It levies a seigniorage which brings in a handsome revenue. This seigniorage was abolished by Charles II., but restored by an Act of George III., which required every pound of silver to be coined into 66 shillings instead of 62—the extra four shillings to go to defray the expenses of the establishment. During five out of the 18 years, 1872 to 1889, the Mint was worked at a loss; but, taking the whole 18 years, the average net profit was as much

* The Imperial Mint supplies the whole Empire with coinage, except Australasia, which is supplied largely by mints in Sydney and Melbourne, and India, which has mints in Calcutta and Bombay.

as £83,724. The profit made in 1889 amounted to no less than £780,691 12s. 5d. What the record for 1890 will be it is too early yet to know, but 1889 will, in every respect, take a lot of beating.

The Mint does not confine itself to the production of coins, but strikes thousands of medals every year for the War Office, the Board of Trade, the University of London, the Royal and other Societies. It may be remembered that Pope addressed some admirable lines to Addison *à propos* of one of his dialogues, on the historic virtues of the medal. He pictures all the

glories and triumphs of the Imperial ambition of Rome shrunk into a coin. "A narrow orb each conquest keeps," he says, and he demands when Britain shall "in living medals see her wars enrolled," and "vanquished realms supply recording gold." The historian must always bear grateful testimony to the assistance derivable from the metallic tokens of a country, no matter whether they show "a small Euphrates," or merely an inscription, and the head of the sovereign. They are imperishable witnesses in the cause of accuracy and truth.



WEIGHING ROOM.