Security by Design

A closer look at Bank of England notes

BANK OF ENGLAND | MUSEUM


BANK OF ENGLAND

SECURITY *by* DESIGN

A closer look at Bank of England banknotes

One of the three key functions of the Bank of England is to issue the banknotes that we all use in our daily lives. Since its foundation in 1694 the Bank has provided those pieces of paper crucial to the country's economic development. And today, even after more than three centuries, few would deny that banknotes remain an essential tool of modern life.

A few hours after the Bank legally came into existence on 27 July 1694, its governing body, the Court of Directors, decided in what manner receipts would be given for deposits of cash. Three methods were chosen and one, the running cash note, developed into the modern banknote.

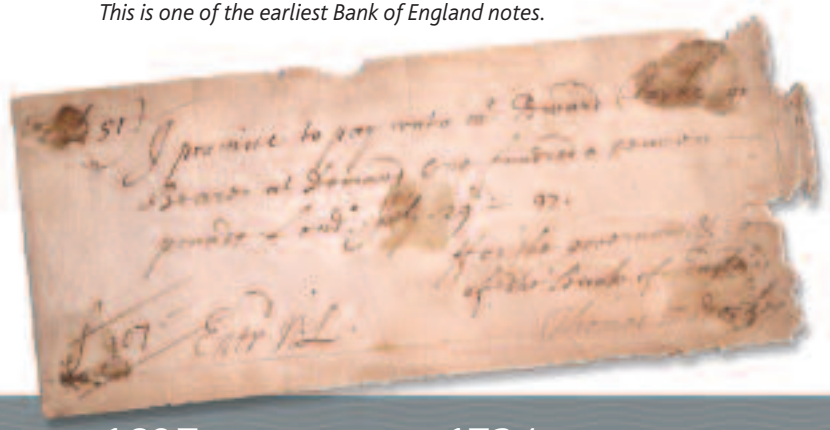
In issuing these notes, the Bank drew on the experience of the goldsmiths, those proto-bankers who had been issuing such promissory notes for more than half a century. Thus the Bank adopted, almost unconsciously, a design of note that was remarkably long-lived. In spite of the refinements and the effects of forgery, legislation, wars, financial crises and advances in printing and paper technology and even fashion, the fundamental design endured, staggeringly until the mid-20th century. But the great change in the Bank's note design policy came in 1928 with the introduction of its first colour-printed notes which paved the way for today's pictorial issues. When that step was taken – from words to pictures – note design could move from a passive, reactive role to one that was rather more pro-active.

I Promise to Pay...

1694 Britannia.

Early Bank of England notes or "Running Cashes" were receipts – promissory notes undertaking to pay, or rather repay, to the depositor the amount of cash deposited. Partly printed, they were stored until needed, and when the deposit (usually of coin) was made, the details were filled in by a cashier. The information added by hand consisted of the date, name of the depositor, amount of the deposit in words and figures, and the unique number of the note. The promissory note was then signed by an authorised cashier "For the Governor and Company of the Bank of England". They were spectacularly successful because they were so easily transferable. This was made possible by the key words "or bearer" which followed the name of the depositor.

Handwritten banknote for £107 dated 29th July 1697. This is one of the earliest Bank of England notes.



'The Custom of giving Notes hath so much prevailed amongst us that the Bank could hardly carry on Business without it'

Sir Theodore Janssen, a Director, 1697

1694 First Britannia

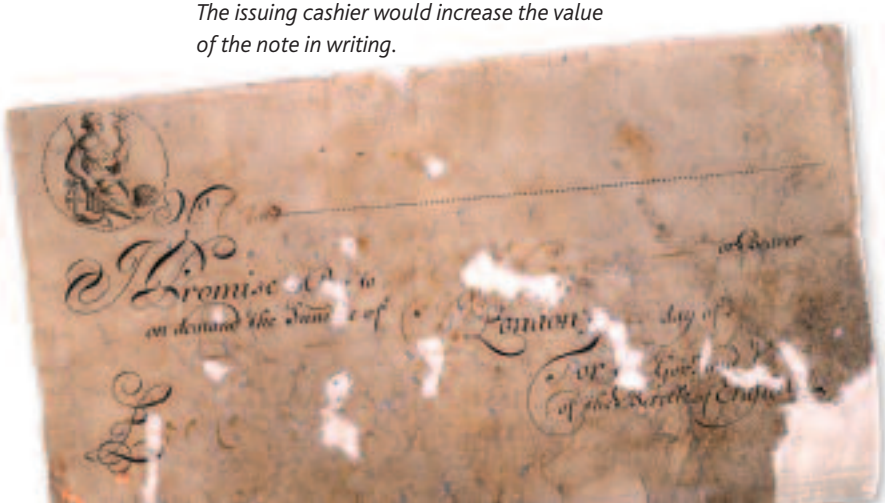
1697 Watermark incorporated into paper made by Rice Watkins at his mill in Berkshire

1724 The Bank signed a contract with Henry Portal to provide specially watermarked paper for notes

On 30th July 1694, three days after the Bank opened for business, the Directors decided that the corporate seal for the new institution should depict 'Britania sitting and looking on a Bank of mony' (sic), and Britannia has appeared on every printed Bank of England note since.

A looped-border watermark was specially-produced in 1697 for the Bank's banknote paper. It is possible, perhaps even likely, that this was the first use of a watermark as a security feature.

The move towards denominated notes began in 1725 with partially-printed notes for £20 and upwards, in increments of £10. The highest denomination was £90. However, each denomination could be increased in value by a maximum of £9 19 shillings 11 pence (£9.99 pence) to reflect the actual amount of the deposit. The issuing cashier would increase the value of the note in writing.



Sum Block for £10.

George Cruikshank's Restriction Note, a parody of a Bank of England note protesting about the severe penalties for forgery. Forgery was a capital (hanging) offence from 1697 until 1832. Published 1819.

1725 First move towards denominations

1743 Sum Block introduced

1759 First true denominations, the £10 and £15, appear

1791 Banknote printing (previously supplied by commercial printers) moved to the basement of the Bank in Threadneedle Street

1793 £5 note

1797-1821 The Restriction Period

1797 £1 and £2 notes issued

1801 Waved line watermark

The Sum Block took the form of an elaborate £ sign followed by the denomination in white Gothic letters on a black ground. Essentially it was a security feature aimed at preventing the amount being altered and was to survive for more than two centuries. During the 18th century it was more common for a forger to attempt to alter the amount of a note eg. £10 to £20, rather than to attempt to replicate the note itself.

The Restriction Period (1797-1821), during which the Bank was not obliged to convert its notes into gold on demand, provided the conditions in which forgery could thrive because low-denomination notes (£1 and £2) were issued for the first time to compensate for the shortage of coin. These notes were handled by people who were unused to paper currency and who were often illiterate. They quickly became the natural dupes of the forgers.

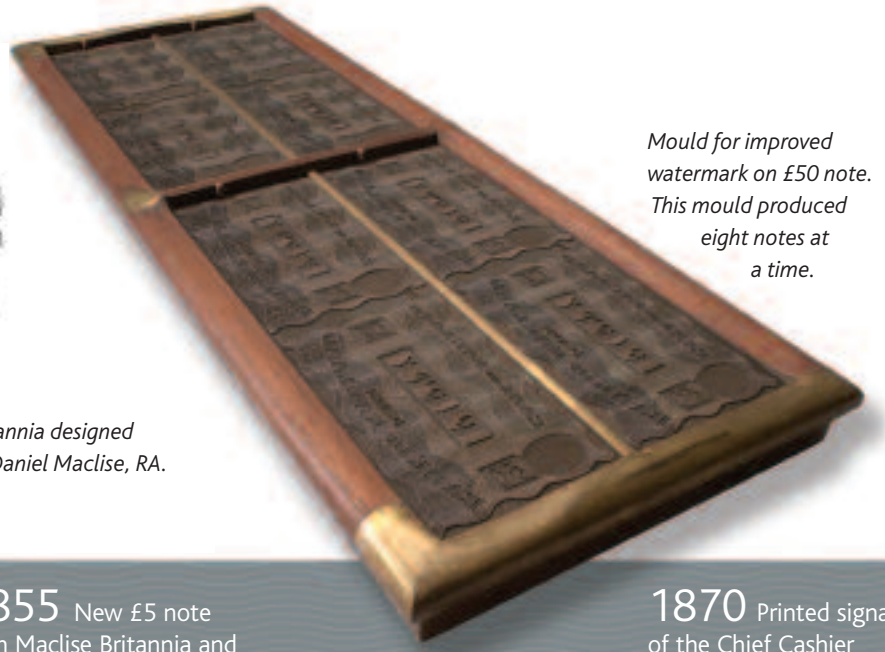
'A peep into the old rag Shop in Threadneedle Street'. Anonymous coloured engraving published September 1818. A man accused of an offence in connection with a forged note is brought before the Bank's Directors who, because of the poor quality of the Bank's notes, are unable to decide whether it is a forgery or not.

The Printed Note

The first fully-printed Bank of England note appeared in 1853 but the facsimile signature it carried was that of a cashier, not the Chief Cashier. The signature of the most junior cashier appeared on the £1 notes whilst the £1,000 denomination was reserved for the senior cashiers.

In January 1855, a new note was launched. It incorporated two new features – a shaded watermark and had been printed by letterpress (surface printing) from stereo-types which were 'grown' by electro-deposition from a master die. 'Identity' or 'sameness' had been achieved at last.

Britannia designed by Daniel Maclise, RA.



Mould for improved watermark on £50 note. This mould produced eight notes at a time.

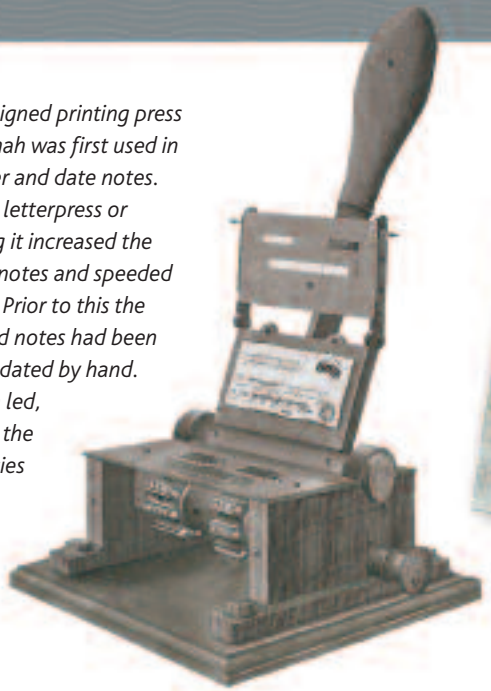
1809 Bramah press – numbering and dating by surface printing

1836 Steam-driven printing presses and a method of creating identical plates were introduced

1853 First wholly printed note

1855 New £5 note with Maclise Britannia and improved watermark

1870 Printed signature of the Chief Cashier



A specially-designed printing press by Joseph Bramah was first used in 1809 to number and date notes. As it printed by letterpress or surface printing it increased the security of the notes and speeded up production. Prior to this the partially printed notes had been numbered and dated by hand. Its introduction led, incidentally, to the first redundancies in the Bank.

£5 notes from 1853 and 1855.

The sea-change in the design of the Bank's notes took place in 1928 with the issue of new ten shilling (50 pence) and £1 notes. Printed in colour on both sides, these issues were radically different from anything which had gone before. They incorporated complex machine-engraving, swirling acanthus leaves and a centrally-placed watermark and were the work of W M Keesey.

1928 £1note.

During World War II forged notes were printed in Sachsenhausen concentration camp outside Berlin. The project was codenamed 'Operation Bernhard'. The design of the Bank's high sum notes (from £5 up to £1,000) had remained unchanged for almost a century. The technology applied in their production had similarly continued unimproved with the result that they were copied extremely successfully by the Germans. Almost 9 million notes with a face value of £134 million were printed, a figure which represented more than 10% of the total notes then in circulation in the UK. A Bank official, an expert in banknotes, described them as '...the most dangerous ever seen'.

1920 the Printing Department moved to a converted hospital just off Old Street

1928 Colour printing and machine engraving

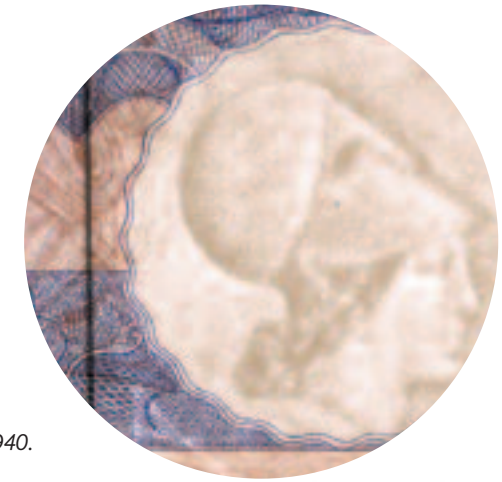
1940s 'Operation Bernhard' forgeries

Genuine 1929 Bank of England £10 note.

Operation Bernhard forgery.

After the war forged notes and printing equipment were discovered in an Austrian Lake where they had been dumped.

Fighting Forgery



Metallic thread introduced in 1940.

Introduced in 1793, the £5 denomination lasted with relatively few changes until 1957 when it was replaced by a startlingly new blue 'fiver'. The old note, known as the Series A, had done sterling work but technology had overtaken it. It was too vulnerable to copying as had been demonstrated all too clearly by Operation Bernhard.

Returning banknotes being marked off in ledgers. Bank Note Office, 1942.

1940 Special blue £1 emergency issue with metallic thread

1943 Bank stopped issuing denominations greater than £5 to tackle the threat of counterfeiting

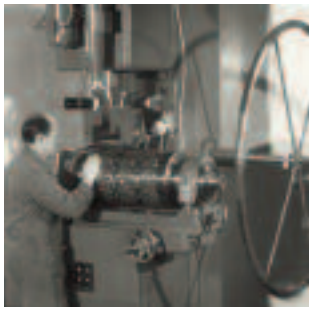
1956 Last issue of the white 'fiver'; banknote printing moved to a purpose-built factory in Essex, where it remains to this day

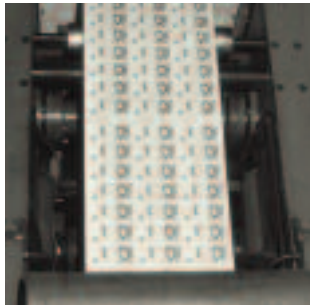
1957 'Fiver' printed in colour

The new £5 note was a stunning, confident design by Stephen Gooden. It featured a helmeted Britannia on the left and a Britannia watermark in profile to the right. St.George grappled with the dragon, bottom centre, whilst on the back a muscular lion held a double-warded key. For security its design relied on subtle colour changes and detailed machine engraving. This was the only design in the 'B' Series of notes to be issued.

A Royal Portrait








This series of photographs from the 1960s shows stages in the engraving and production of banknotes.

1960 Queen's portrait on Robert Austin £1 Series C note

1961 Ten shilling (50 pence) Series C note

1964 £10 Series C featuring watermark portrait of the Queen

A new £1 note designed by Robert Austin was released in 1960. For the first time the monarch was portrayed on a Bank of England note and this added another anti-forgery device. Figurative engraving is much more specialised than any other type and on a portrait a very minor engraving error can be spotted.

1965 £5 Series C

The £5 and £10 Notes (Series C) were the work of Reynolds Stone, the designer renowned for his lettering. These notes featured a new portait of the Queen.

In 1970 a new £20 was released. It marked the beginning of a brand new series of notes (Series D) whose common feature was an historical figure on the back. Portraits and highly detailed machine engraving blended into historical scenes making notes more difficult to copy. The series was the work of H N Eccleston OBE, the Bank's first full time Artist-Designer, and his assistant Roger Withington.

1970 £20 Series D
William Shakespeare and the balcony scene from Romeo and Juliet

1971 £5 Series D
The Duke of Wellington and the battle of Fuentes de Onoro (1811) during the Peninsular War

1975 £10 Series D
Florence Nightingale and a scene in the barracks hospital in Scutari during the Crimean War

1978 £1 Series D
Sir Isaac Newton and apple blossom, reflecting telescope and prism

1981 £50 Series D
Sir Christopher Wren and St Paul's Cathedral. Contoured edge metallic thread introduced

1981 £20 note revised to incorporate windowed metallic thread and watermark of Shakespeare

Series E – Increasing Awareness

This wholly new series of notes, again featuring historical figures, began with the George Stephenson £5 (1990), the Charles Dickens £10 (1992) and the Michael Faraday £20 (1991). A new and controversial portrait of the Queen also featured. All were the work of Roger Withington.

The front of each Series E note featured a different Britannia, and a different shaped denomination identifier.

1990 £5 Series E
George Stephenson and his locomotive 'The Rocket'

'Get a rocket in your pocket and give Wellington the boot'
The media urged the public to accept the new note






£20

£10

1991 £20 Series E
Michael Faraday and some of the scientific discoveries with which he is associated

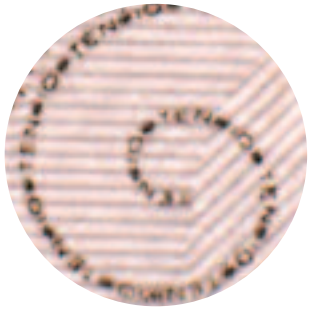
1992 £10 Series E
Charles Dickens and the cricket match from his novel *'The Pickwick Papers'*

Today's Banknotes

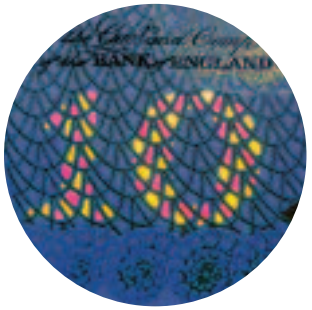
The success of a banknote can be gauged by its acceptability: in short, whether people have confidence in it and trust it. That confidence is inspired by the security features built into the note itself.

FOIL PATCH

RAISED PRINT



MICROLETTERING



ULTRA-VIOLET FEATURE

HOLOGRAPHIC FEATURE

1994 £50 E introduced to mark the Bank's 300th anniversary featuring Sir John Houblon, the Bank's first Governor. A new security device in the form of a reflective foil patch carrying the royal monogram and a Tudor rose

1999 £20 E Revised design. Michael Faraday replaced by the composer Edward Elgar, and Worcester Cathedral is featured. Foil hologram, ultra-violet feature and micro-lettering introduced

2000 £10 E Revised design. Charles Dickens replaced by Charles Darwin

2002 £5 E Revised design. George Stephenson replaced by the prison reformer, Elizabeth Fry, and a scene inside Newgate Gaol

Series E £50 note with centrally-placed red triangular identifier.

Both the holographic and the ultra-violet security features were incorporated into the replacement notes of the Series E i.e. the Faraday £20 in 1999, the Darwin £10 in 2000 and the Fry £5 in 2002.


£50
Bank of England
FIFTY
Pounds
L52 951552
BANK of ENGLAND
£20
TWENTY
POUNDS
£10
Bank of England
TEN
Pounds
DC10 112525
10
England
Pounds
JB66 733952
FIVE
POUNDS
£5

RAISED PRINT

PRINT QUALITY

METALLIC THREAD

ULTRA-VIOLET FEATURE

WATERMARK

HOLOGRAPHIC STRIP

MICROLETTERING

SEE-THROUGH FEATURE

The New £20 Note

The new-style £20 note features the philosopher and economist, Adam Smith (1723-90). Born in Kirkcaldy, Scotland, Smith is known today as one of the fathers of modern economics.

In Adam Smith's second great work, *An Inquiry into the Nature and Causes of the Wealth of Nations*, published in 1789, he explained how trade and co-operation form the basis of industry and commerce. He uses a pin factory to describe the benefits created by the division of labour.

Portrait of Adam Smith by James Tassie and an illustration of the French pin factory which appeared in the article 'Epingle' in the fifth volume of the Encyclopedie Diderot (1755).

Both of these images appear on the back of the new note.

Adam Smith © The National Galleries of Scotland
Pin factory © Trustees of the British Museum

2007 £20 Series F introduced, featuring Adam Smith. New security features include holographic strip, enhanced watermark and ultra-violet features and a see-through feature

'...the greatest bank of circulation in Europe'

Adam Smith on the Bank of England

An Inquiry into the Nature and Causes of the Wealth of Nations, 1789

Banknote Printing and Paper

Today all Bank of England notes are produced by De La Rue Currency, a subsidiary of De La Rue plc, located at Loughton in Essex. One of the aims at every stage is to ensure that the note is as difficult as possible to counterfeit. Some images are engraved by hand into metal plates, whilst others are created using a Computer Aided Design (CAD) system and are drawn onto film by a laser beam. When finished, the images are duplicated many times onto printed plates ready for the presses. Specialised inks used to produce the notes are also manufactured on site; more than 85 are required for the four denominations.

Banknote paper

The paper for Bank of England notes is made by a specialist paper manufacturer. It is manufactured from cotton fibre and linen rag, which makes it tougher and more durable than the more common wood pulp paper. Using copious amounts of water, the cotton is broken down into individual fibres and reformed into reels of paper of the quality required. The watermark design is engraved in wax and, as with the metallic thread, the image is incorporated into the paper at the manufacturing stage.

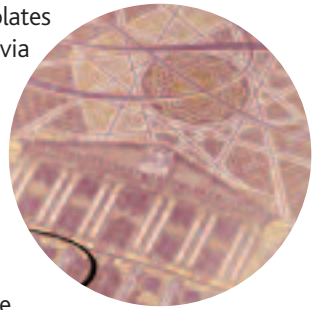
'Banknotes contain a unique combination of advanced security features and intricate printed images, all of which have to be produced on a mass scale to maintain the circulation of over two billion notes'

Andrew Bailey, Chief Cashier, 2007

Printing banknotes

Currently three printing processes are used:

Offset Litho – the printing plates transfer the ink to the paper via an intermediate offset roller. This process is used to print most of the front and back of the note except for the portrait of the Queen, the lettering and the numbering. Offset printing involves a number of separate plates with different colours superimposed in close register to produce high quality clearly defined images.



Intaglio – this process is used to add the portrait of the Queen and the raised print on the front of the note. The ink rests in grooves engraved in the printing plate. When the plate comes into contact with the paper the ink is forcibly 'drawn' from the plate onto the paper under very high pressure. This produces the raised print which is one of the characteristics that gives Bank of England notes their distinctive feel.

Letterpress – this process is used for the cypher (the letters which precede the numbers) and serial numbers. Ink is transferred onto raised letters and digits which are then printed onto the note.

Did You Know...

There are around **2 billion** Bank of England banknotes in circulation.

That's between **£35 billion** and **£40 billion**...

...or between **£750** and **£800** per adult in the UK.

The highest denomination currently in use is the **£100,000,000 note**...

...but you won't ever see one, as they are used only by the Bank of England for accounting purposes.

The £20 is the most common denomination making up **65%** of the total value of notes in circulation...

...if all the £20 notes in circulation were laid end-to-end, they would stretch around the earth's equator between **4 and 5 times**.

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Booklet Text John Keyworth | *Design* TUCH Design | *Printing* Park Lane Communication

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