

Microscopes

5 September 1989



Four stamps featuring subjects as seen through a microscope will be issued on 5 September to mark the 150th anniversary of the Royal Microscopical Society, founded in 1839 as the Microscopical Society of London.

The **19p** stamp (inland first class and EEC basic rate) features a 10-times enlargement of a Snowflake; the **27p** stamp (airmail postcards) features a 5-times enlargement of a Blue Fly; the **32p** value (airmail Zone B) shows blood cells at an enlargement of 500 times and the **35p** denomination (airmail Zone C) a microchip, shown at 600-times enlargement.

The use of the microscope took hold of the public imagination in 1665 when Robert Hooke (1635-1703) published his *Micrographia* which illustrated tiny creatures (whose existence no one had suspected) at enlarged size. Hooke's superb drawings revealed a complex world –

mained somewhat sceptical of the instrument. In 1830 Joseph Jackson Lister (1786-1869, father of the surgeon Lord Lister) perfected the achromatic objective, a lens without the defects that bedevilled earlier lenses. As a result the microscope became accepted in scientific circles. The



32p stamp shows blood cells as revealed through a microscope of 1839 when Lister and others formed the Microscopical Society of London. The Society set about standardising the size of the glass slide on which specimens are fixed for observation and determined some of the dimensions of the instrument. In 1866 the Society was granted the prefix Royal and adopted as its emblem the Snowflake as shown on the 19p stamp.



people were amazed at the illustrations of the flea and louse and of the blue fly as shown on the 27p stamp. The microscope revealed that cork contains patterns of tiny holes which Hooke called cells – the term now used to describe the basic units of life of which all living things consist; Hooke's "cells" were the empty spaces where living cells had been.

Microscopy made relatively little advance for a century after Hooke's *Micrographia*, mostly as a consequence of the poor quality of lenses available. Whilst microscopes became popular with amateurs who wanted to see for themselves the "little animals", the more serious scientists re-

By the end of the Victorian age the development of photography had aided microscopists, instruments could be produced which allowed

for magnification of about 1,000 times. In 1931 the electron microscope was invented in Germany, this permitted magnification of 1 million times. The scanning electron microscope, developed in Britain in 1951, provides for views of whole objects or surfaces rather than the slices that had previously been used. The 35p stamp shows such a view of a microchip.



Microscopes are today vital in industry; metals, plastics and ceramics may fail if faults are contained in their internal structures – such faults can be detected by microscopes. Lasers are being applied to microscopes to extend their capabilities. The Scanning tunnelling microscope uses a new principle to achieve magnifications of 100 million times and picture individual atoms.



Microscope by J.J. Lister, 1826 (Science Museum)

Technical Details

Designed by Keith Bassford, the four stamps have been printed by lithography by The House of Questa Limited. They are of “nearly square” format, 35 x 37mm, printed in sheets of 100 on phosphor-coated paper with PVA Dextrin gum. Perforation is 14 x 14¼.

Royal Mail Stamp Cards

Royal Mail Stamp Cards (formerly referred to as PHQ cards) featuring each of the four stamps will be available from 21 August, price 16p each. They are numbered 120A-D.

Presentation Pack

The presentation pack (No 201) will cost £1.35 and was designed by Keith Bassford with text by Neil Ardley. It was printed by Litho-Tech colour printers. The illustrations include early and modern microscopes.

First Day Cover

The first day cover will be available from 21 August, price 17p, from the British Philatelic Bureau, philatelic counters, the National Postal Museum and main post offices. Two pictorial postmarks will be used for the first day cover service, one for the Bureau (microscope eyepiece), the other for Oxford (microscope slide).

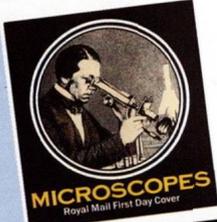
A first day cover service will be provided by the Bureau with the official Royal Mail cover addressed to the destination required with the four stamps cancelled with either postmark – charges £1.62 UK (including VAT), £1.41 overseas (no VAT). Application forms, available from the Bureau and main post offices, should be returned not later than 5 September.

Customers requiring only the special pictorial postmarks may obtain them under the reposting facility by sending on the day of issue a stamped addressed envelope under an outer cover endorsed “Special First Day of Issue Handstamp” to:

British Philatelic Bureau 20 Brandon Street
EDINBURGH EH3 5TT

Oxford Special Postmark Duty
Customer Services Mails Branch
Oxford LDO
Becket Street
OXFORD OX1 1PR

First Day Posting Boxes will be provided at most main post offices for those collectors who wish to post covers to receive the standard, non-pictorial “First Day of Issue” handstamps. In addition pictorial First Day handstamps are available at the London Chief Office (arms of the City of London) and Durham (Cathedral). Covers for reposting should be sent to: Special



MICROSCOPES
Royal Mail First Day Cover

Mrs J Robinson
200 Manorbie Road
ILKESTON
Derbyshire
DE7 4AB

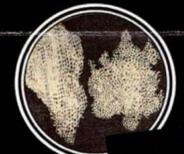
... existence was that the creatures were tiny. The views were those seen through a microscope.



The fly from Hooke's *Micrographia*.

Hooke's *Micrographia* was the first great work devoted to microscopical observations, and it revealed an unknown and fascinating world – the world in miniature. Hooke's superb drawings portrayed a world as complex and detailed as the one we see around us. People gasped at his fearsome portraits of the flea and house, as well as the blue fly shown on the second stamp in this issue.

Micrographia contained one vital discovery, although Hooke was not aware of its significance. The microscope revealed that cork contains patterns of tiny holes, which Hooke called cells. We now use the term to describe the basic units of life, of which all living things consist. Hooke's 'cells' were the empty spaces where living cells had been.



Cork cells from Hooke

Although Hooke's *Micrographia* had such a powerful impact, it hardly advanced for two centuries afterwards. The poor quality of lenses meant that the little world – how they appeared. But more investigators were highly interested in the instrument. To them, it was little more than a toy. Its images were capable of much more than a toy. Its images were capable of much more than a toy. Its images were capable of much more than a toy.

JJ Lister with his achromatic microscope made by Bully from Lister's design in 1839.

In 1830, JJ Lister (father of the famous surgeon) perfected the achromatic objective, a lens without the defects that hindered a clearer view of the miniature world. Using this lens, the microscope rapidly became a thoroughgoing scientific instrument. The third stamp with its illustration of blood cells shows what was revealed by microscopy in 1839, when Lister and others formed the Microscopical Society of London to promote the development and use of the microscope in science. One of its first acts was to standardise the size of the glass slide on which specimens are fixed for observation. The Society, which became the Royal Microscopical Society in 1866, also determined such important factors as the dimensions of screw threads and eyepieces in microscopes. Its endeavours truly led the way to the instruments we use today.

Below: A standard 3 inch x 1 inch (7.6 cm x 2.5 cm) Victorian glass slide



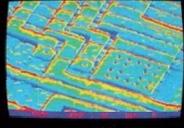
Above: The Society's emblem from their first logo

... emblem of our age, the microchip.



Above: A scientist operating a scanning transmission electron microscope.

Below: Computer-enhanced false-colour scanning electron micrograph of part of the same microchip on the fourth stamp.



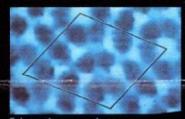
Everything that exists is made up of smaller parts. By knowing the parts, we better understand the whole. In revealing the parts within ourselves, as well as in animals and plants, the microscope enables us to understand life and how during illness it may fail.

Modern medicine makes great use of microscopes. Chromosomes in cells can be examined for genetic counselling, and 'test-tube babies' actually begin life under a microscope as fertilisation is carried out. The use of microscopes in the examination of tissues helps to identify and prevent disease, while their use in surgery enables tiny parts far too delicate for normal repair work to be mended.

Light micrograph showing serious weakening in a brazed T-joint in an aircraft component.

In another vital way, we are becoming increasingly dependent on the miniature world. The computers that control machines and help us in so many ways are able to perform their amazing tasks because they contain many thousands of miniature components packed together in their microchips. Microscopes enable engineers to inspect and check these devices, while machines developed from electron microscopes use electron beams to manufacture chips of ever greater complexity and power.

The members of the Royal Microscopical Society have not been slow to take advantage of new developments elsewhere in science. Computers now aid microscopists in their work by analysing and improving images: to detect chromosomal abnormalities, for example. Lasers are being applied to microscopes, extending the capabilities of light microscopy. For, by allowing parts at different levels inside a live specimen to be seen selectively, the structures in living cells are revealed.



False-colour scanning electron micrograph

MICROSCOPES
Royal Mail Mint Stamps



Postmark Duty, City of London LDO, King Edward Street, LONDON EC1A 1AA and Pictorial First Day of Issue Postmark Duty, 33 Silver Street, DURHAM DH1 3RE.

A number of special handstamps, sponsored by stamp dealers and others, will be used on 5 September – full details of these will be found in the *British Postmark Bulletin*.



Thury's five-body microscope (Science Museum)

Souvenir Cover

A souvenir cover, of similar design to the first day cover, will be available from philatelic counters from 6 September, price 17p. This can be used to obtain relevant Microscope postmarks after the first day of issue and will be on sale for one year.

1990 Special Issues

The subjects for the 1990 programme were announced in the February *Bulletin*. The proposed dates of issue are as follows:

23 January	RSPCA
6 March	Europa (Buildings)
10 April	Queen's Awards
3 May	Penny Black Miniature Sheet
5 June	Trees
10 July	Gallantry
11 September	Thomas Hardy
16 October	Astronomy
13 November	Christmas

Collectors should note that these dates are provisional, any changes will be notified in the *Bulletin*. The "special definitives" for the 150th anniversary of Penny Post will be issued on 9 January.

Posting Boxes

No.102. Shown here is a George VI lamp box at Glenfinnan in Scotland, near to the famous monument erected to commemorate the rising of the clans in support of Prince Charles Edward Stuart (Bonnie Prince Charlie) for the 1745 Rebellion. The monument featured on the 14p stamp in the National Trusts set of June 1981



(SG 1155) and the Prince was shown on the Scottish aerogramme marking the centenary of the National Portrait Gallery of Scotland issued on 4 April 1989 (see April *Bulletin*, page 207).



The illustration was sent in by Angus Mathieson of Bedfordshire who commented "I think it is interesting because The Post Office has left a G.R. post box at the very spot where it was hoped to displace a previous George from the throne ...".

This particular type of lamp box was introduced in 1935 and continued to be manufactured until 1949 when a revised design was introduced. Many are to be found today in rural areas.

Cylinder News

The 14p definitive has recently been printed from cylinder 11 (phosphor 41), the 19p from cylinder 3, the 28p from cylinder 4 and the 1p sideways roll (code SC) from cylinder R39. The £1 Castle stamp has been printed from plate 1E.