RAYS OF LIGHT
A comprehensive history of the incandescent light bulb
Ray Tye
Rays of Light outlines the development of the incandescent electric lamp from its beginning in the late 1870s through to its demise facing competition from the compact fluorescent lamp, and the rapid development of the LED lamp.

Many books have been written on the subject detailing the technical developments and relating to a particular company’s development but this is an attempt to describe the early production methods, the effect of restrictive Acts of Parliament and patent restrictions.

The photographs of lamps, some from small and little-known early makers show many lit only possible as they form part of the author’s collection which he donated to the National Trust for permanent display at Cragside, Rothbury, Northumberland, the former home of Lord Armstrong, and the site of the first major installation of Joseph Swan’s incandescent electric lamps in December 1880. It is hoped the photographs will assist collectors to identify some of the lamps in their collections that bear little or no markings.
Ray Tye, a retired business archivist, was born in Kew, Richmond, Surrey, lived all his life in the London area spending most of his working life in the City of London. An avid collector from childhood, he started with pre-war cigarette cards and London Transport bus and tram tickets and later British coins. He became fascinated as the war ended with the reintroduction of street lighting, and as councils replaced their gas lighting with electric lamps he scoured the council scrapyards for redundant gas lanterns.

From 1971 he obtained several important collections of early electric lamps resulting in an extensive collection from 1879 to modern times.

He has appeared in several TV programmes illustrating the development of artificial gas and electric lighting using examples from his collection. He gives illustrated talks to various organisations including the National Trust, Historic England and other conservation bodies.

All the photographs of bulbs in the book sections are from his collection which he donated to the National Trust for permanent display at Cragside, Rothbury, Northumberland the former home of Lord Armstrong, and the site of the first major installation of Joseph Swan’s incandescent electric lamps in December 1880.
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United Electric Engineering Company advert for Arc Lamps from The Electrician, December 1888.

ZURICH Incandescence Lamp Co.
47, Victoria Street, London, S.W.

“Stearn”
High Voltage Lamps.

200 to 230 VOLTS.
6, 8, 16, 25, 32, 50 and 100 candles. Efficiency, 3 5 to 4 watts per candle.

Write for Prices, &c.
Ediswan Buildings, 36 & 37, Queen Street, London, E.C.
Made in England

THE ROBERTSON INCANDESCENT ELECTRIC LAMP

Long Life Saves Current

THE GENERAL ELECTRIC COMPANY, LIMITED
69 & 71, Queen Victoria Street, LONDON, E.C.

THE LARGEST MANUFACTURERS OF ALL ELECTRICAL SUPPLIES
WRITE FOR CATALOGUE, 500 pages.
Royal Ediswan "Pointolite" Lamp

Fig. 1.
30 c.p., 45 amp.
Galvanometer Type, for use with Reflecting Galvanometers.

Fig. 2.
100 c.p., 1.35 amp.
Standard Type, 3in. Bulb, for Optical Projection Lanterns.

Fig. 3.—100 c.p., 1.35 amp.
Fixed Focus Type, 2½in.-2½in. Bulb, for use with Parabolic Reflectors.

Fig. 4.—Standard Resistance Box for 100 c.p. Lamp, adaptable for all circuits from 100 v. to 240 v.

Another improvement introduced is the standardising of the position occupied in the bulb by the light-giving electrode.
This position is fixed by the use of a device in the manufacture of the lamps, thus, by ordering lamps with "fixed" electrodes, the user may replace a lamp without altering the external focussing apparatus (see Fig. 3).
ELECTRIC BATTERY READING LAMP
For use by travellers on the 'Cut & Cover' (sub surface) sections of line on
the Metropolitan & District Railway in London. One penny in the slot provided
30 minutes of additional lighting.
Electric trains were introduced in 1903
along with a new electro pneumatic
signalling and points system designed
by George Westinghouse which is now
being replaced in 2019 by the latest
electronic system.
ZURICH INCANDESCENCE LAMP CO.

VICTORIA ST., WESTMINSTER, S.W.

Director:
C. H. STEARN,
Joint Inventor
with
Mr. J. W. SWAN,

of the modern
IncanDESCENCE
Lamp.

Lamps delivered by
postal packets to all
parts of the
United Kingdom.

Lamps of Long
Duration with
larger consumption
of power, or of
greater economy
and Shorter
Duration, delivered
as required.

Terminals affixed
as ordered,
to suit any
holders of the
current types.

The Lamps are
manufactured under
Mr. STEARN's
Personal Direction
by an English Staff.

ALL LAMPS ACCURATELY CLASSIFIED IN VOLTAGE & CANDLE-POWER

STEARNS NEW CENTRAL STATION LAMPS

at 27 watts per candle. "for use where Economy of Current is the first consideration." These Lamps effect a saving of 10s. 2d. per 1,000 hours on a 16-c.p. Lamp as compared with the ordinary 4-watt Lamps, price of current being 7d. per Board of Trade Unit.

ORDERS FOR LARGE QUANTITIES OF LAMPS PROMPTLY EXECUTED.
Light for Production

Do you realise the situation this country faces?
Do you realise the imperative demand for LIGHT—for
LIGHT in thousands of Works
and Factories where light has
never played an important part
before?
TO-NIGHT thousands of great
manufacturing plants must push
production at top speed—and they
must have BETTER LIGHT
to do it by.
Give the Workers GOOD LIGHT.
Give them the light of

MAZDA

HALF-WATT TYPE
Electric Lamps

The British Thomson-Houston Co. Ltd.
MAZDA HOUSE, 77 UPPER THAMES STREET, LONDON, E.C.4
MAKING THE "WOTAN" (ONEWATT) LAMP

(From a humorous point of view)

Drawing the filament.

Exhausting the bulb.

Blowing the bulb.

A delicate piece of work.

Marking the C.P.

(Did not notice what she was actually doing)

N.B. Switched immediately after visit.

The Photometric Test. (conducted in camera)

The Life Test.

The Vibration Test. What one but a "one watt" would pass this?

1911 SIEMENS BROTHERS DYNAMO WORKS, Dalston, London. Advertisement for the new WOTAN drawn wire lamp. (Page 388)
Carbon Filament Lamps

100v 16cp 2 1/4" x 3 1/4" (Pages 33 & 205)

110v 16cp 2 1/4" x 4 1/4" (Pages 33 & 205)

40v 8cp 2 1/4" x 3 1/4" (Pages 33 & 205)

50v 16cp 2 1/2" x 4" (Pages 33 & 205)

2 1/4" x 4" (Pages 33 & 205)

Rating N/A 2 1/4" x 4" (Pages 33 & 205)
Carbon Filament Lamps

1905-1910 ROBERTSON, G.E.C., London. Two loop filament, tip evacuation. BC base, Standard Vitrite insulation and contact plates. 100v 8cp 2¼" x 3¾" (Page 56)

1905-1910 ROBERTSON, G.E.C., London. Two loop filament, tip evacuation. BC base, Modern Vitrite insulation and contact plates. 100v 8cp 2¼" x 4" (Page 56)

1910s ROBERTSON, G.E.C., London. Five loop filament, tip evacuation. BC base, Modern Vitrite insulation and contact plates. 210v 5cp 2½" x 4½" (Page 56)

1920s ROBERTSON, G.E.C., London. Four loop filament, tip exhaust. BC base, Standard Vitrite insulation. 230v 16cp 2½" x 4½" (Page 56)

1920s ROBERTSON, G.E.C., London. Four loop filament, stem tube exhaust and seal. Modern BC base. 230v 16cp 2½" x 4½" (Page 56)

1930s UNKNOWN EUROPEAN MAKER. Four loop filament, stem tube evacuation and seal. Modern ES base. 240v 25w 2½" x 4½"
Tungsten Filament Lamps

1925-1939 PHILIPS, Holland. Drawn wire squirrel cage filament, ES. Modern stem tube exhaust. 240v 25w 2¼” x 4¼”

1925-1939 OSRAM G.E.C., London. Drawn wire type used for Ultra Violet health lamps. Drawn wire, stem tube exhaust. BC 240v 60w 2¾” x 5½”

1925-1939 ROYAL EDISWAN, London. Made for Victoria Railways. Drawn wire. Stem tube exhaust, BC. 240v 60w 2½” x 4½”

1930s PHILIPS, Holland. Squirrel cage or Navigation type drawn tungsten wire lamp. Stem tube exhaust. ES. 240v 60w 2¼” x 4¼”

1920s GENERAL ELECTRIC, NATIONAL MAZDA, U.S.A. Drawn wire squirrel cage filament. Tip exhaust, ES cap. No rating label. 2¾” x 5½”

1930s JAPANESE decoration ‘figural’ lamp. One of a huge range of designs. MES From series working decoration set. 14v 1½” x 4”
Neon discharge lamps

1922-1926 G.E.C. OSGLIM. ‘Beehive’ neon lamp. Tip exhaust, domet in pinch. Used as nursery or hospital night light. BC 240v 5w 2⅛" x 4⅜"

1922-1925 OSGLIM, G.E.C., London. Neon indicator. Used in cinemas and theatres to indicate seat locations, room numbers etc. BC 240v 5w 2⅛" x 4⅜"

1930s UNIDENTIFIED EUROPEAN MAKER. Neon rose in tubular lamp. Stem tube seal. ES 1⅛" x 5⅜"

1930s UNKNOWN MAKER. Neon decoration lamp of rose in blossom on branch. Stem tube exhaust with domet in pinch. ES High voltage 1⅛" x 5⅜"

1950s UNKNOWN MAKER. Decoration neon lamp outlining a rabbit. Stem tube exhaust, domet in pinch. BC High voltage 2⅛" x 5⅜"

1950s ATLAS. Neon decoration lamp, flowers. Stem tube exhaust, domet in pinch seal. BC 200-250v 2⅛" x 4⅜"
Lamp cartons 1905-1930s

1912-20 Mc CANDLESS USA
Carton contains five bulbs
9v 18cp 3" x 11"

1912-15 FALK STADELMANN 'EFESCA', import from Europe. Tungsten drawn wire
BC 2 3/4" x 6 1/2"

1915-20 ROBIN ELECTRIC LAMP Co.
Double Filament
210v 50cp BC 2 1/2" x 6"

1920s OSGLIM G.E.C., LONDON
Neon night light. Price 3/1d.
230/240v 5w BC 2 1/2" x 5"

1930s MAZDA ENGLAND
Coiled coil tungsten
BC 3 1/2" x 6"

1905-15 ECONOMIC 'HYLO', NEW YORK, USA
Bright, dim & off positions
ES 2 1/2" x 6"

1920s OSRAM G.E.C., LONDON
Automobile headlamp. BCP MES 2 1/4" x 3"

1920s PANSY, EUROPEAN MAKE
230v 60w BC 2 1/4" x 5"
Lamp cartons 1930s –1940s

1930s MULTIPLEX BRITISH
Double filament lamp, adjustable cap
BC 150V 60/60w 3” x 5”

1930s DUOFIE BRITISH ELECTRIDE CORPN.
Double filament, adjustable cap

1930s GEC BABY SASHALI
Photoflash bulb 2½” x 5”

1930s OSRAM ‘VACUBLITZ’
German flash bulb 2¼” x 4”

1930s MAZDA BTH
Dual purpose lamp with pull cords
2¾” x 4½”

1930s ‘HYGRADFE’ BRITISH
Price 6d. (2½p)

1930s B.E.L.L. MAXTRIP 2 LONDON
Picture light end contacts 12” x 1¼”

1930s B.E.L.L. MAXTRIP, London
Linear lamp end caps 11” x 2½”
Lamp cartons 1930s – 1940s

1930s SILVER FOX (JAPAN)
Dundas Fox import
3½” x 5½”

1930s FENBO, J. ISMAY & SON LONDON
Chrystal Glass bulb
Price 1/11d. 3½” x 7”

1950s CRYSELCO, ENGLAND
Gas filled tungsten lamp
BC 3” x 5¼”

1930s CROMPTON PARKINSON, ENGLAND
240v 60w 2½” x 4”

1930s COSMOS, METROPOLITAN VICKERS
Brimsdon 240v 60w 3½” x 7”

1930s ROYAL EDISWAN, ENGLAND
Gas filled tungsten 3¾” x 7”

1920 MAZDA BTH, ENGLAND
Well packaged tungsten twisted candle lamp
77v 17w SBC 3” x 6”

1930s KYE, B.E.T. HAYES
Drawn wire vacuum tungsten
240v 60w BC 2½” x 5”

1930s PHILIPS, HOLLAND
Coiled Coil Tungsten
BC 3” x 7”
Decoration Lamp Set boxes

1930s PIFCO "ELECTRIC FLORALITES NO. 1268", 'Foreign' make. Photograph of Joan Crawford, M.G.M film star. Set of 12 plain lamps set in metal flowers of several colours. Retail price 5/11d reduced to 4/11d. V.I.R. flex. 20v bulbs, series wiring. (open circuit) 240v set 10" x 7" x 2"

1950s McELROY ADAMS MANUFACTURING Co., U.S.A. Bubble lights, 'Foreign' make. Set of 9 glass tubes containing chemicals which bubble when heated by being seated on flat top bulbs. the plastic surrounds distort with the heat when alight. Bakelite BC adaptor. V.I.R. flex. Series wiring. (open circuit) 240v set 12" x 8" x 3"


1930s INSIDE SILVERED LAMP SET NO. 3701", 'Foreign' make. 16 lamps and 2 spares. Moulded in clear glass. Internal silver coating, externally hand painted. Notoriously unreliable due to internal overheating in use. V.I.R. flex. Series wiring to Bakelite BC adaptor. 16v bulbs. 240v circuit (open circuit) 14" x 6" x 2"

1970s BON VOYAGE. Unnamed maker. Hong Kong. Set of 20 miniature screw contact tubular lamps set in coloured plastic flowers. Modern plastic flex fitted to a pink plastic BC adaptor. 12v series lamps 240v circuit 12" x 5" x 1½"

1951 EVER READY, ENGLAND Battery operated set Price 10/- + 2/2d Purchase Tax
Playing card advertisements

1910-1913 Brimsdown
  Colloid tungsten lamp

1912-1920 Metropolitan Vickers
  ‘COSMOS’ drawn wire lamp.

1913-1917 Brimsdown
  WRUM drawn wire lamp

1913-1920 ROYAL EDISWAN
  drawn wire tungsten lamp

1920 Edison General Electric
  MAZDA tungsten lamp.

Letter Labels

1910-1923 OSRAM
  G.E.C. Drawn wire lamp

1911-1923 WOTAN
  Drawn wire lamp

1911-1923 OMEGA
  Drahtlampe

1911-1923 PHILIPS
  G.E.C. Drawn wire lamp

1920s OSRAM
  The favourite lamp

1925-1930 PHILIPS
  WXPOSITION, Lynn, USA

1925-1930 PHILIPS
  Holland, GLS lamp

1920s PHILIPS
  Holland
1912 SIEMENS BROTHERS DYNAMO WORKS, Dalston, London. One of many amusing advertisements to popularise the Tantalum lamp. (Page 256)