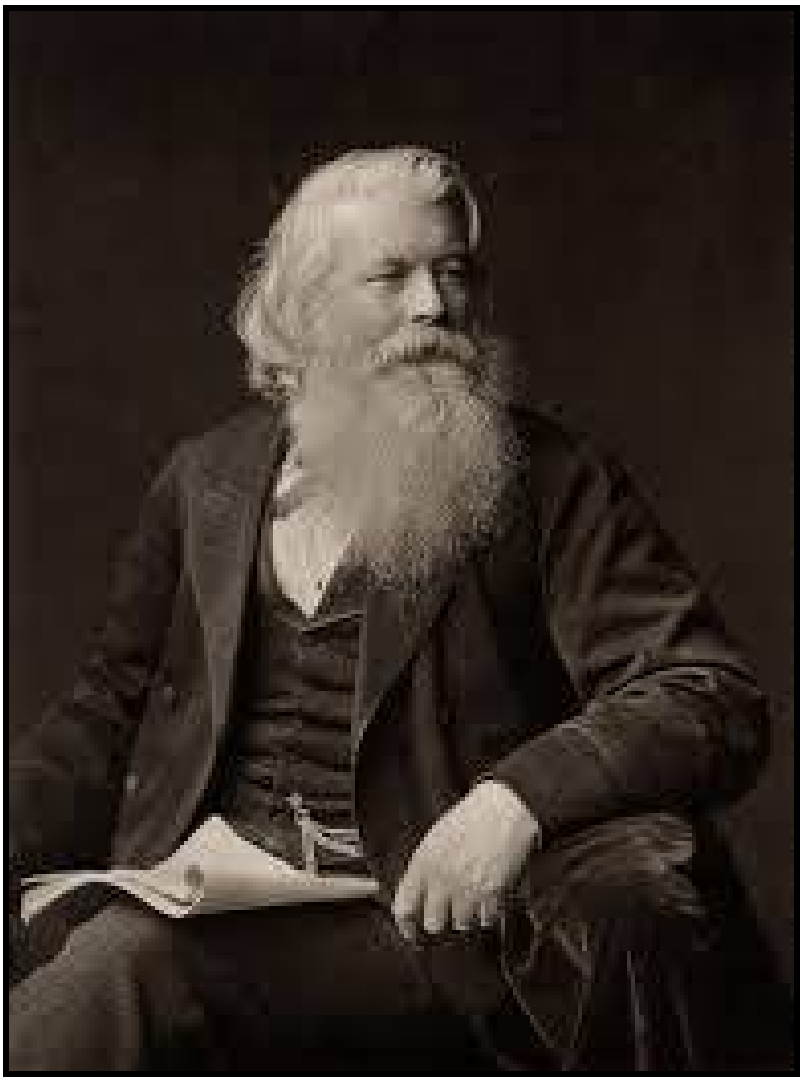
JOSEPH WILSON SWAN
ELECTRIC LAMP PIONEER

by Brian Roberts, CIBSE Heritage Group

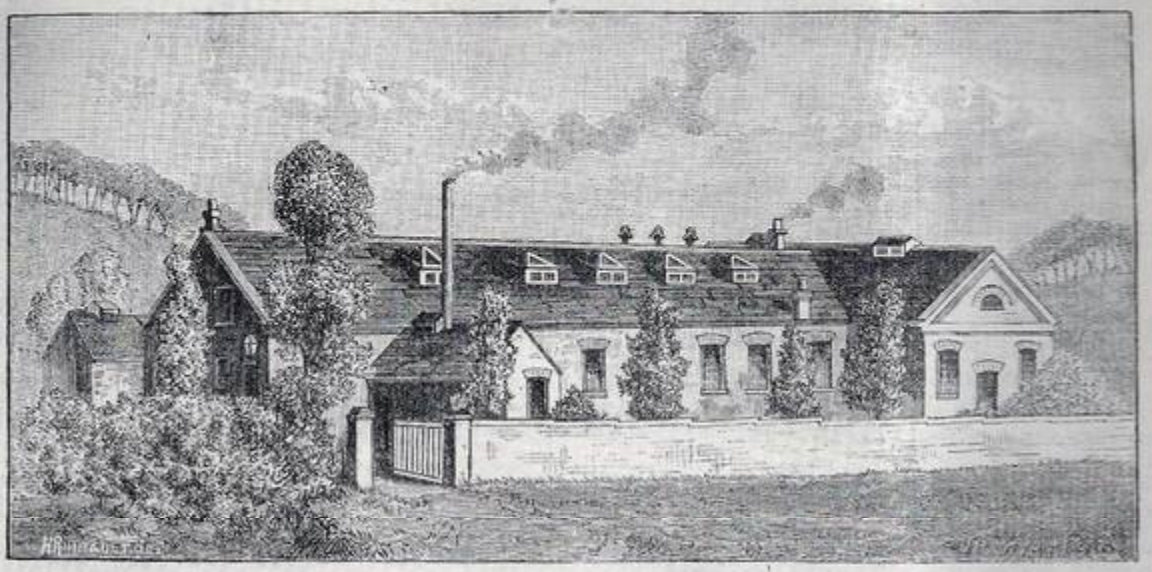


Sir Joseph Wilson Swan, 1828-1914

Joseph Swan, born on the 31st October, 1828, at Pallion Hall in Sunderland, was a British physicist and chemist most famous for the invention of an incandescent light bulb for which he was to receive his first patent in 1878. (This was a year before Thomas Edison). He is perhaps less known as a pioneer in the field of photography.

Soon after leaving school, Swan was apprenticed to a firm of chemists. About 1844, he entered the firm of John Mawson. In 1860 the firm of Mawson & Swan was established. For the next ten years Swan was busy experimenting and inventing methods of producing permanent photographs. This work enabled him in 1877 to begin manufacturing dry plates of superior sensitivity and led to George Eastman, the founder of Kodak, acquiring Swan's formula.

March 1886



MAWSON & SWAN'S
DRY PLATE FACTORY.

The Factory.

Emulsion Making.

Being convinced by long experience that full justice cannot be done to a process so sensitive and delicate as emulsion making in any building not originally adapted for the purpose, we have erected these extensive works, under the supervision of Mr. Swan, specially for the manufacture of our Dry Plates, on the most improved plan, and have equipped them with every appliance necessary to secure the utmost perfection in the manufacture, more especially in respect of cleanliness and regularity in coating.

The Laboratory is under the care of Dr. Smith, an experienced chemist, possessing the highest qualifications, who works under Mr. Swan's directions.

Testing.

In addition to the ordinary laboratory tests, Mr. John Green, a skilled professional Photographer, who has operated in London and Provincial Studios, and was for some time Operator in Mr. Swan's Private Studio, devotes his whole attention to the practical Testing of the Plates.

Glass.

Every Sheet of Glass is carefully examined in the Cutting Room, and only the best quality is allowed to go into the Factory.

Coating. Cleaning.

It is well known that Plates coated by hand are unevenly coated. To avoid this fault, and to ensure a uniform film, the Plates in Mawson & Swan's Factory are coated by means of the most improved Automatic Coating Machine, worked by a gas engine; and for more effectually cleaning the glass, Glass Cleaning Machines, worked by steam power, have been adopted.

Examination.

Every Plate is carefully Examined by an Expert previous to packing, and no Plate unless free from faults and of the exact size is allowed to pass.

Packing.

The Packing of the Plates has been materially altered and improved.

Employees.

None but Experienced Hands are employed, and every possible means is adopted to make

THE MAWSON PLATE

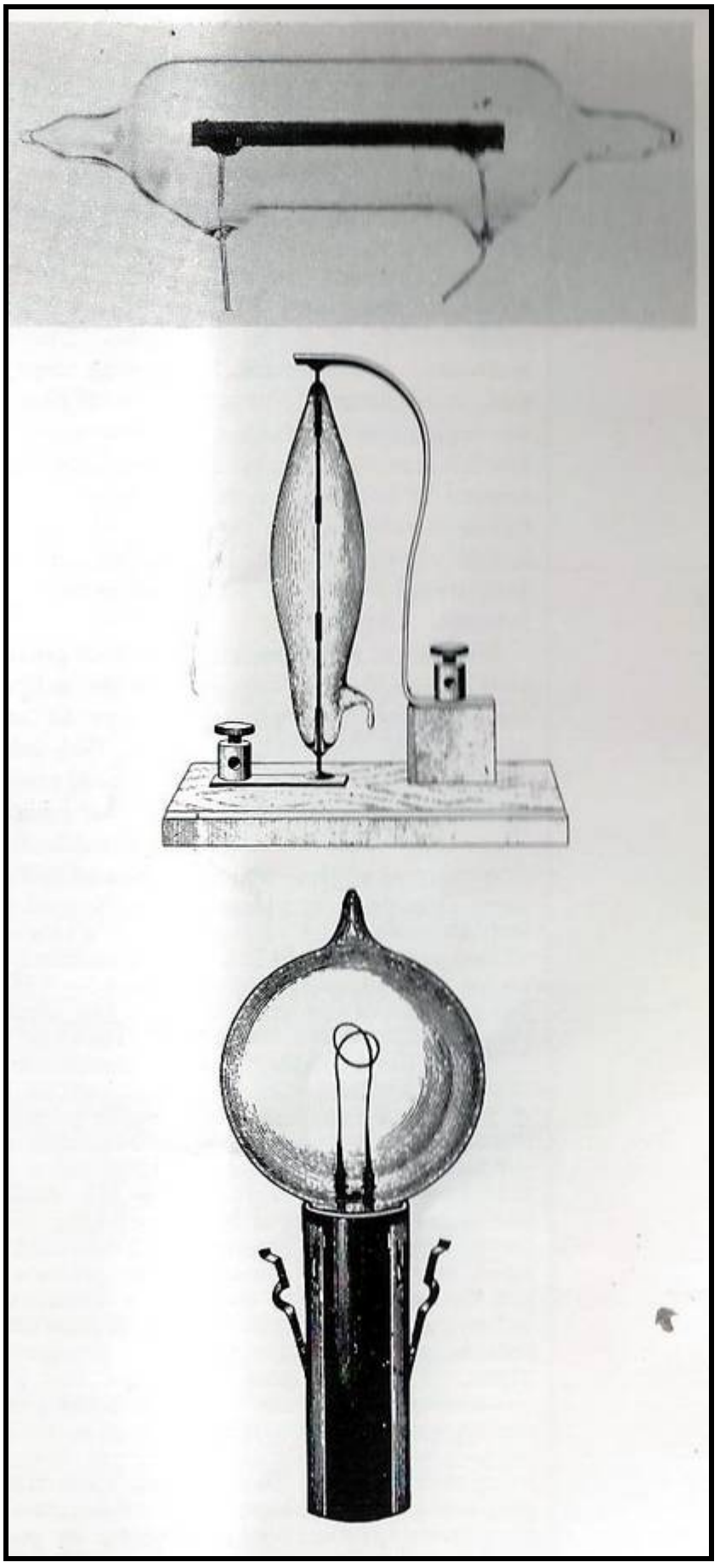
The Best and Cheapest Plate in the Market.

Swan, since very early in his career, had carried out electrical experiments after being inspired at a lecture given by W E Staite in 1845.

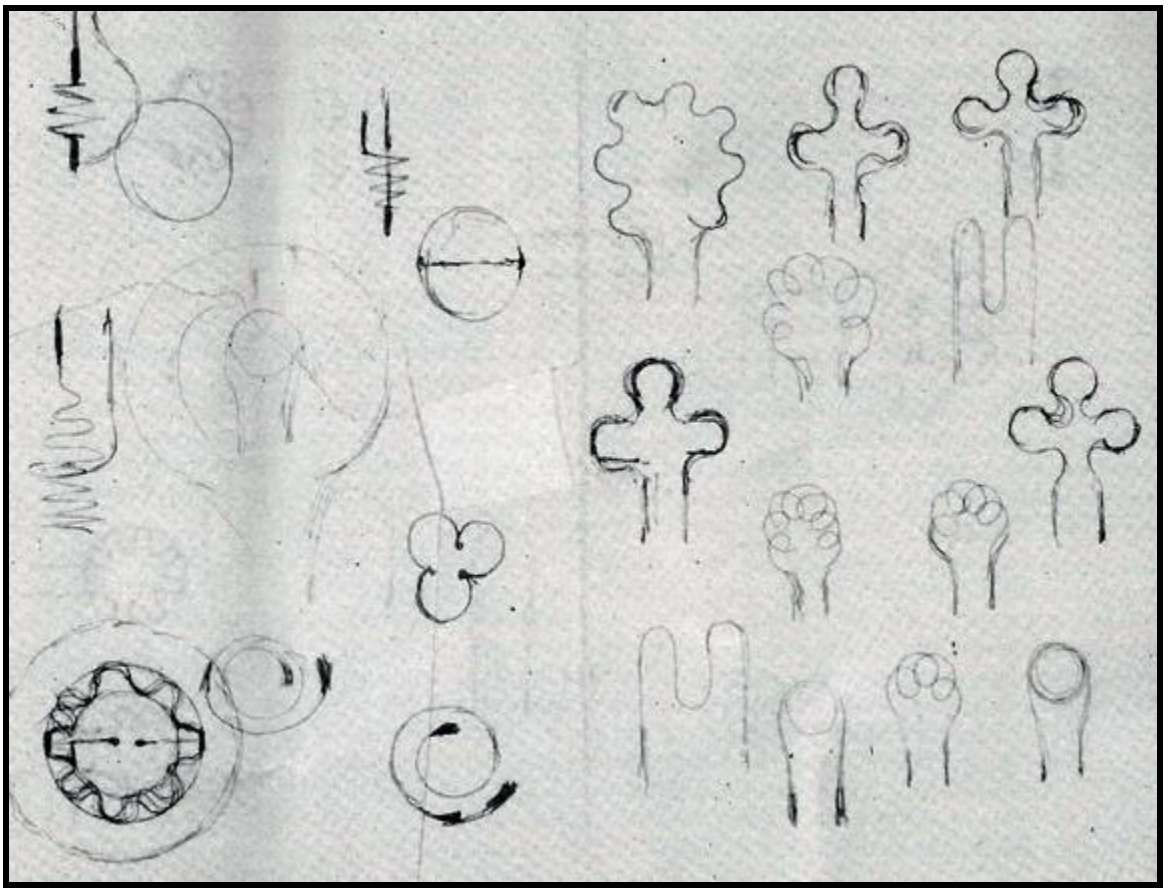
In 1841, before Edison was born, and when Swan was still a youth, the Englishman, Frederick De Moleyns secured a British Patent for an incandescent lamp. In 1848, Wilson Edwards Staite of Bristol developed an incandescent lamp. Both Staite and De Moleyns used platinum for the filament, but this was too expensive for commercial use and only electricity from batteries was then available.

However, it was in Gateshead that Joseph Wilson Swan first experimented with filament lamps from 1848 to 1860, and then being partially successful in 1878 and 1880. Though his lamps lit up, the filaments rapidly burnt out.

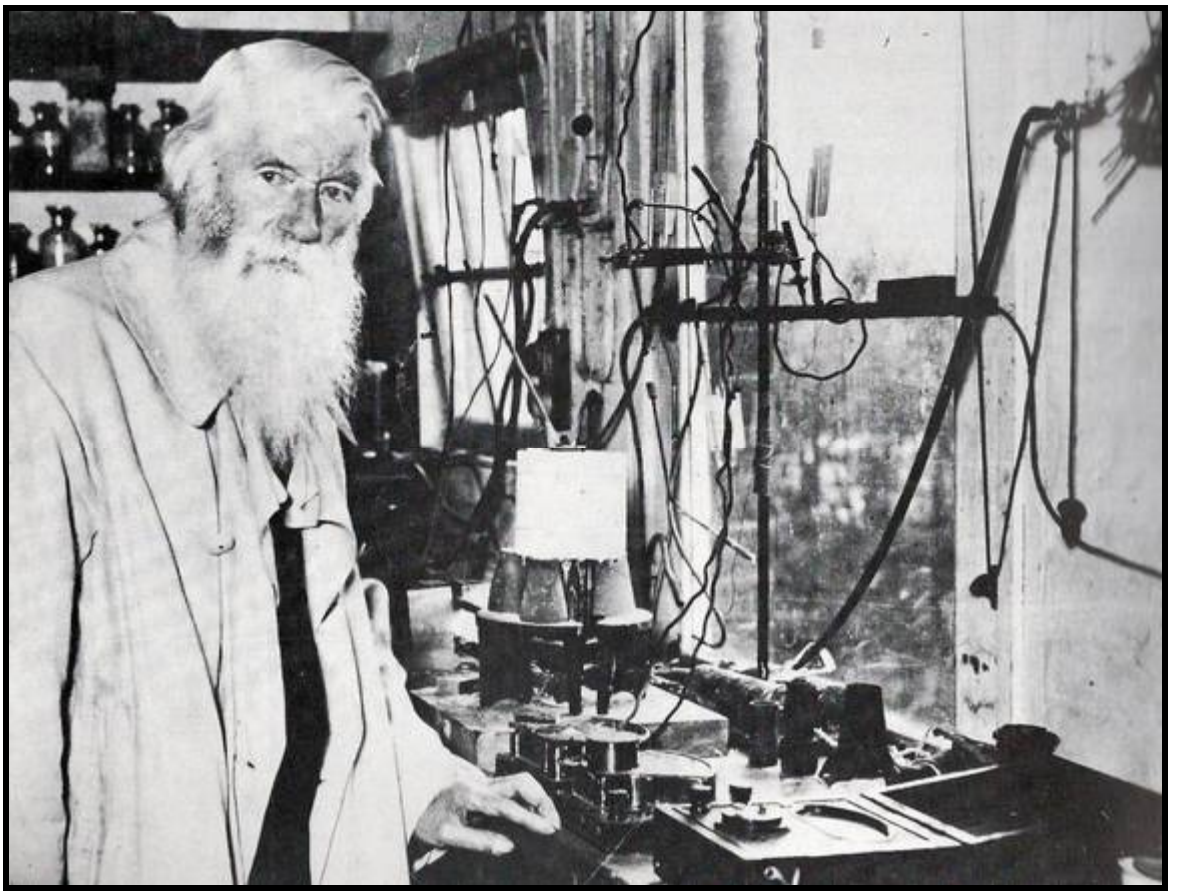
Early Swan incandescent filament lamps



Swan lamps



Swan's notebook with sketches of possible shapes for his carbon filaments



Swan in his laboratory

THE NEWCASTLE DAILY CHRONICLE, TUESDAY,

THE ELECTRIC LIGHT.

Last night our townsman. Mr. J. W. Swan, lectured at the Literary and Philosophical Institute, Newcastle, on the subject of the electric light. There was a crowded audience. Sir William Armstrong occupied the chair, and, in introducing the lecturer, said that the subject was one which had excited a great amount of public interest. He felt sure they would be exceedingly glad to hear it treated by so able an investigator as Mr. Swan. Being a fellow-townsman, Mr. Swan needed no introduction at his hands; he had only to assure him on their behalf that they would listen to what he had to say with the greatest interest. (Applause.)

Mr. SWAN, who was received with great applause, said that during the last few months no subject, scientific or even popular, had occupied so large an amount of public attention as the electric light. Not only had men of science been discussing it, but almost everybody had been talking about it from one end of the country to the other. The subject had, for some considerable time before, been gradually acquiring importance, and gaining more and more attention both from scientific and practical men; but the crisis, if he might so call it, was reached in October of last year, when the following telegram from Mr. Edison to his London agent was fulminated:—"I have just solved the problem of the subdivision of the electric light indefinitely." This was immediately followed by the telegram:—"When the brilliancy and cheapness of the lights are made known to the public—which will be in a few weeks, or just as soon as I can thoroughly protect the process—illuminating by carburretted hydrogen gas will be discarded. With fifteen or twenty of these dynamo-electric machines, recently perfected by Mr. Wallace, I can light the entire lower part of New York City, using a 500 horse-power engine. I propose to establish one of these light centres in Nassau Street, whence wires can be run up town as far as the Cooper Institute down to the battery and across both rivers. These wires must be insulated and laid in the ground in the same manner as gas pipes. I also propose to utilise the gas-burners and chandeliers now in use. In each house I can place a light meter whence these wires will pass through the house tapping small metallic contrivances that may be placed over each burner. Then housekeepers may turn off their gas, and send the meters back to the companies whence they came. (Laughter.) Whenever it is desired to light a jet it will only be necessary to touch a little spring near it. No matches are required." The effect of the publication of these telegrams was electrical. For some time before these sensational telegrams were issued certain things of a very startling character had happened in connection with electrical science. Within a period of forty years this obscure branch of physics, previously unknown to practical people, or if known despised by them as useless, had in its results in several ways assumed an importance of the very highest degree. It was known that Mr. Edison was a man of extremely inventive genius, that he had invented an electric pen, a talking machine, a telephone, and no end of other wonderful things. Hence it happened that when these telegrams were published the whole world was struck with unquestioning amazement. Gas shares were immediately greatly depreciated in value, and those who possessed them were in the greatest state of alarm and even panic. He described various forms of electric light which the old-fashioned electrical machine produced, and gave an experiment to illustrate the kind of light producible by the ancient electrical machine. The discovery of the Voltaic battery, commonly but erroneously termed the galvanic battery, constituted the real startling point of the history of his subject. Up to the time of Volta, no means of producing a large quantity of electricity continuously were known. Hitherto it had been produced by friction, and in very small quantity. Volta discovered the means of producing electricity by chemical action, and in very large quantity. The lecturer explained the voltaic arc apparatus, by means of which he gave several wonderful experiments. The voltaic battery, efficient as it was, so far as concerned the production of electrical effects, was yet quite a hopeless means of obtaining these effects at a moderate cost, and so long as the production of electricity was expensive, so long would it be impracticable to apply electric lighting to common purposes. All the available forms of voltaic battery, so far devised, had in common this inherent vice, that the production of a certain quantity of electricity involved as a matter of necessity the oxydisation, in effect the burning of, a corresponding quantity of zinc. Zinc in the voltaic battery played the same part in the production of electricity that coal in a gas works did in the production of light and heat. Zinc, however, with us, was about fifty times the price of coal, and yet its possible effectiveness, weight for weight, was much less than that of coal; therefore, to use zinc as a fuel either for the production of light or heat; and whether by direct combustion, or indirectly by first producing electricity by its means, was to use a fuel at least fifty times more costly than coal. Cheap electricity—the one thing needful for the practical utilisation of electric light—had been obtained as the result of a discovery made by Faraday forty years ago; and he here gave an example of how a current of electricity was developed by motive power. The merit of first producing a machine that, by the action of motive power, would produce a perfectly continuous current, in all respects like that of the voltaic battery, belonged to M. Gramme, whose machine, and also that of Mr. Siemens, he described. They could now produce electricity by means of coal instead of zinc, and although they did not get really the full equivalent in electricity of the potential energy resident in coal and evolved as heat (because they only got it second-hand, the heat being first applied to produce motive power and the motive power to produce electricity), yet the advantages in point of cost, as compared with zinc-produced electricity, was so great as to completely change the position. Electro-lighting now rested on a new foundation. They had at last got a cheap source of electricity. He next referred to the various contrivances for applying the current most effectively to the production of light. There were two broadly distinct modes of producing electric light, one by means of the voltaic arc, and the other by means of the incandescence of an imperfect and infusible conductor such as platinum or carbon, both of which methods he minutely described. Next to the discovery of the principle of the Dynamo electric machine, nothing had given such a strong impulse to the industrial application of the electric light as the invention of the Joblochkoff candle, of which he had a few specimens for inspection. The light produced by the voltaic arc was so splendid that it was no wonder that great efforts had been made to utilise it and to overcome its chief defect, unsteadiness. It was wonderful how near an approach to perfect success in overcoming this defect had been achieved. Quite a sufficient degree of steadiness had been realised to render it serviceable for a number of purposes where a pure and very powerful light was required. So far, the most that had yet been done in the way of divided lights had been done by the Jablochkoff candle. What did electric light cost? This was a question difficult to answer, except in the most general terms, for the cost varied exceedingly with variation of circumstances. For example, what electric light would cost depended primarily upon what motive power cost, and that depended upon whether it was produced by the steam-engine, and in that case upon the cost of coal, or whether some other motive power was used, as, for example, a gas engine or a waterfall. In the one case it might be rather expensive, and in the other very economical. Then it greatly depended upon whether the power was expended in producing a very few powerful lights, or a great number less powerful. There was great loss in dividing electric light. If in one case they had one light equal to 10,000 candles, and in another 10,000 candle light

*Swan's Electric Light: **The Newcastle Daily Chronicle**, 4th February, 1879 (continued next page)*

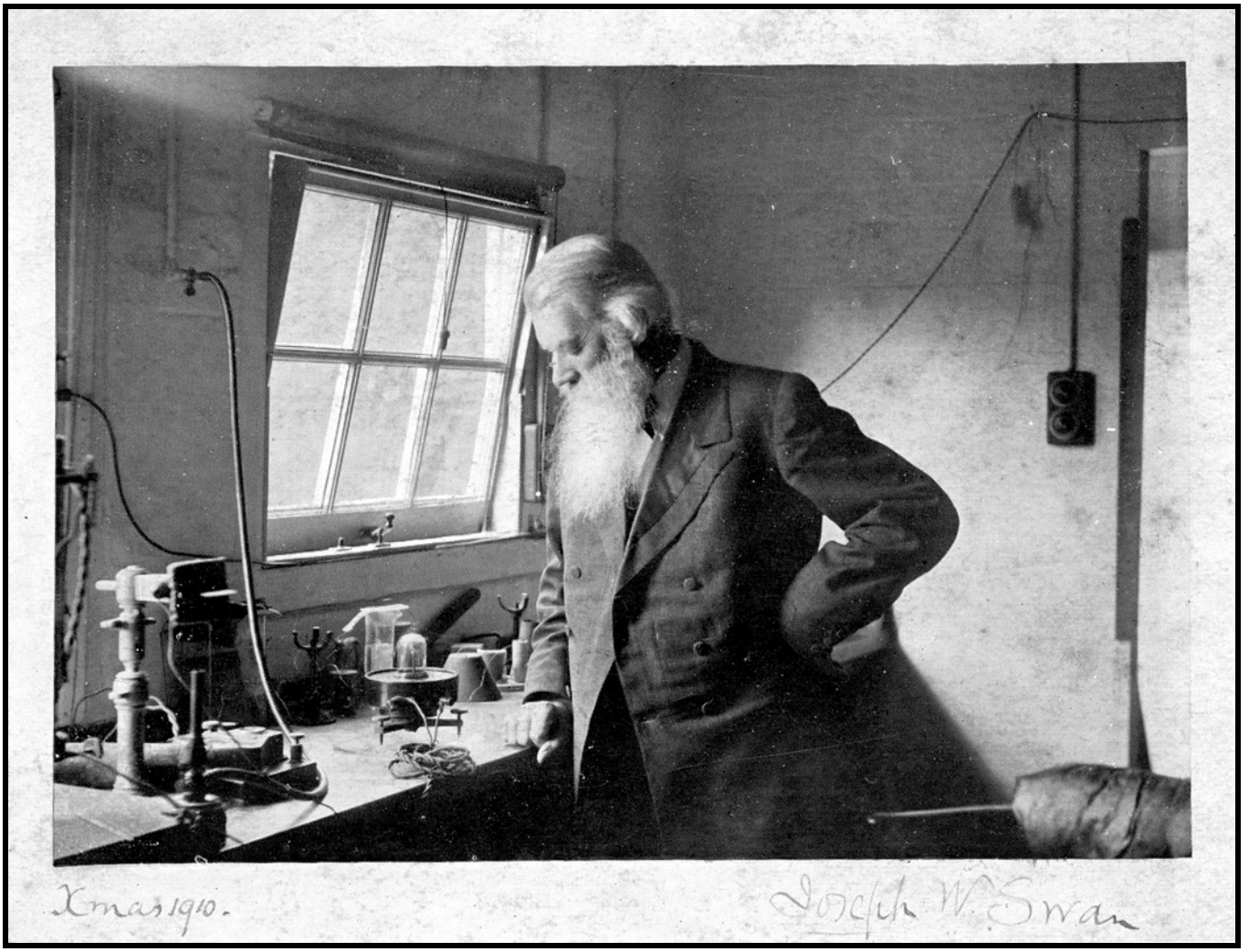
divided over 100 lamps, much more power would be expended to produce the same total quantity in the case of the divided light. If they took as the datum of cost of motive power that of the most economical working steam engine, consuming say 3lbs. of coal per horse-power per hour, and if they put one horse-power, at that rate of cost, into one light, they could get a light equal to at least 1,250 candles. The cost of maintaining this powerful light was therefore exceedingly small, looking at the matter in the abstract. The fuel consumed might be roughly estimated as about the same as that consumed in the same time in a good house fire, such as they were accustomed to in the North; and the money cost per hour would be sufficiently covered by that now obsolete coin, a farthing. This estimate took no account of the cost of the engine and apparatus, nor of attendance. These were very considerable additions to cost in working electric light on a small scale, but were much less serious in large operations. Neither did it include any charge for waste of carbons going on at the lamps; that waste might be looked upon as avoidable. If the current generated by the one-horse power were divided over ten lights, probably only one-tenth of the light would be obtained; but that would be 125 candles, or equal to eight large gas burners, an ample light for a large room, and which could be obtained for the small cost he had named. Was electric lighting going to supersede gas? He thought there was little probability of that, as there were many advantages in favour of gas. Gas could be stored in a reservoir, while electricity could not. Gas could be used for heat as well as light, whereas it was doubtful whether electric heat could be used instead of gas heat. It was evident that both gas light and electric light had their special uses. Gas would continue to be largely used, perhaps as largely as ever, and electric light would also come into extensive use in its own special field. Among the many uses to which the electric light was put, he mentioned the lighting of Sir William Armstrong's picture gallery at Cragside, Rothbury. In an abstract of a report by two engineers on the cost of working for a month on a small scale the Jablochkoff candle system at Westgate-on-the-Sea, the relative cost of electric light and gas light was put at four to one. The Jablochkoff candle system was costing not so much on account of the power expended in producing the light as on account of the candles themselves, which cost 7½d. each, and lasted nominally an hour and a half. What was required to make electric street lighting, and shop and house lighting, successful was an electric lamp in which there was no waste of carbon and no machinery. Mr. Edison said he had invented such a lamp. Mr. Sawyer said he also had. If this were true, and if, along with these advantages, those lamps gave a satisfactory return in light for the electricity spent, then the chief problem was solved, and they would not have to wait long for a very extended development of electric lighting. But in any event, even if it should happen that those inventors had not accomplished quite so much as we had been led to expect, the problem of a simple and an economical lamp would, he did not doubt, be ultimately solved, and with its solution electricity would become a common means of illumination. (Applause.)

Sir WM. ARMSTRONG moved a cordial vote of thanks to Mr. Swan for his highly interesting lecture, which was carried by acclamation.

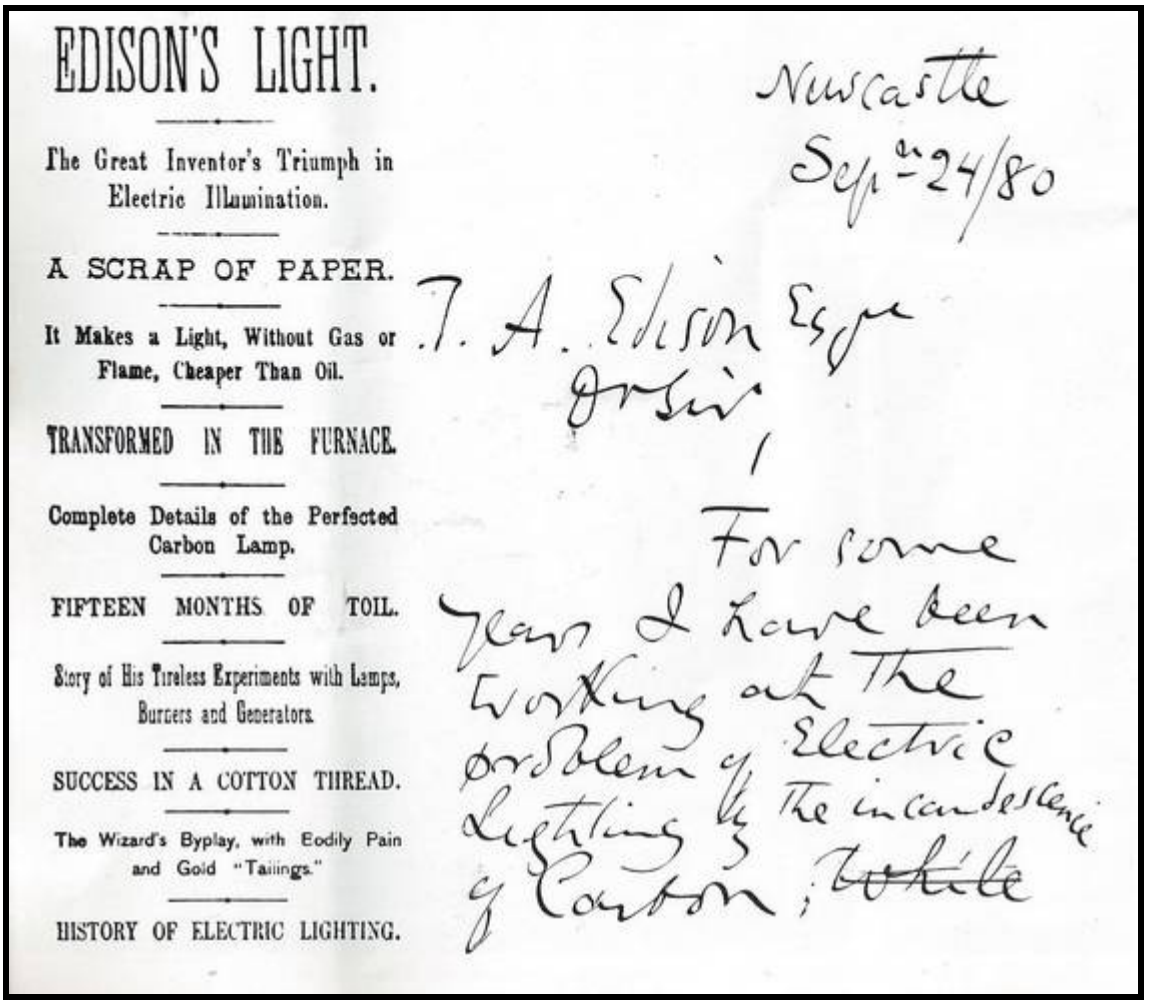
The lecture throughout was rendered additionally attractive by the introduction of various experiments with the electric light, all of which passed off with an unusual degree of success.

1900 Portrait

A Newcastle Street lit by Swan lamps



Swan in his laboratory



EDISON'S LIGHT.

The Great Inventor's Triumph in Electric Illumination.

A SCRAP OF PAPER.

It Makes a Light, Without Gas or Flame, Cheaper Than Oil.

TRANSFORMED IN THE FURNACE.

Complete Details of the Perfected Carbon Lamp.

FIFTEEN MONTHS OF TOIL.

Story of His Tireless Experiments with Lamps, Burners and Generators.

SUCCESS IN A COTTON THREAD.

The Wizard's Byplay, with Bodily Pain and Gold "Tailings."

HISTORY OF ELECTRIC LIGHTING.

Newcastle
Sept 24/80

T. A. Edison Esq

Dear Sir,

For some years I have been working at the problem of Electric Lighting by the incandescence of Carbon;

T. A. Edison Esq.

Newcastle
Sept 24/80

Dear Sir,

For some years I have been working at the problem of Electric Lighting by incandescence of carbon. I have watched with much interest your experiments in the same direction and the thought has occurred to me that we might with mutual advantage exchange ideas on the subject and to a certain extent share interests; that is to say you might have the benefit of what I have done for America and I have the benefit of what you have done for England and share interests for other countries.

I have made very great progress in some essential points in the construction of lamps. So much so that now I feel quite certain the time has come for undertaking work on scale in competition with gas lighting for towns. I think I am in advance of you in several points especially in the making of the carbons – this I have carried to a very great degree of perfection. I have also ideas with regard to the distribution and measuring of the light such as town lighting would call into operation which I think could be usefully joined with your own.

I can easily convince you if necessary that I have been working long on this subject and that carbonised cardboard was a material that I have for years been experimenting with and was actually working at the very time you announced your use of it. I was also at the time referred to using the simplest possible form of lamp, like your own composed entirely of glass, platinum and carbon, the platinum being fused into the glass and exhausted to a very high degree by a most expert manipulation with the Sprengel pump namely Mr. Stearn of Birkenhead.

I therefore had the mortification one fine morning of finding you on my track and in several particulars ahead of me – but now I think I have shot ahead of you and yet I feel that there is almost an infinity of detail to be wrought out in the large application now awaiting development and that your inventive genius as well as my own will find very ample room for exercise in carving out this gigantic work that awaits execution.

Your obedient servant,

J. W. Swan.

In 1880, Swan wrote to Thomas Edison

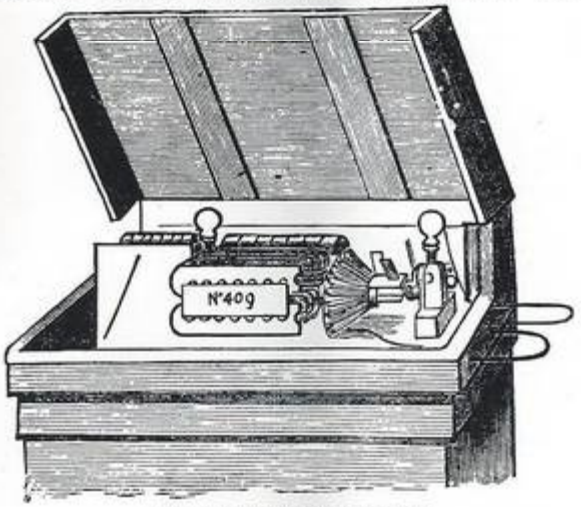
Edison and Swan did eventually meet and after initial legal arguments over patents, a possible court battle in Britain between the Edison and Swan companies was avoided when they agreed in 1883 to form the Edison & Swan United Electric Light Company Limited.

From *The Graphic* april 2nd 1881

SWAN'S ELECTRIC LIGHT AT CRAGSIDE

Two years ago Mr. Swan, of Newcastle, exhibited before the Literary and Philosophical Society, under the presidency of Sir William Armstrong, a new form of electric lamp, in which the light was produced by the white heat of a continuous carbon conductor enclosed in a small hermetically-sealed glass bulb. Many previous attempts had been made to utilise the incandescence of carbon, but never before had the difficulty of preventing the wasting of the carbon been so effectually surmounted. The distinguishing features of Mr. Swan's lamp were: its extreme simplicity, the durability of the carbon filament, and the economy with which light was produced.

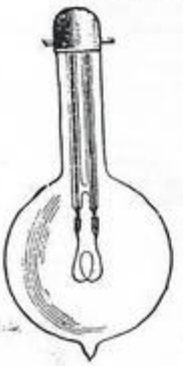
Since then Mr. Swan has devoted himself assiduously to improving his lamp, and he now has succeeded in bringing it into actual use for house and shop-lighting. Mr. Stearn, of Birkenhead, who aided Mr. Swan in the elaboration of his lamp, has lighted his house in this manner for several months past, and the business establishment of Mawson and Swan at Newcastle has been thus lighted uninterruptedly since October. But the largest and most complete application of the system has been the lighting of Sir William G. Armstrong's mansion at Cragside, which is depicted in our illustrations. At Cragside the electric current is generated by one of Siemens' dynamo-electric machines shown below,



THE DYNAMO-ELECTRIC MACHINE.

to which the motive power is supplied by a turbine of six-horse power worked by the overflow of a lake three-quarters of a mile distant from the house. The dynamo machine is placed close to the turbine, and the electricity is conducted to the house by a double line of copper wires.

Mr. Swan's lamp is exceedingly simple. It consists merely of a bulb of glass about three inches in diameter, containing a thin carbon conductor supported by two platinum wires, which, where they pass out of the bulb, are hermetically sealed into its wall by fusion of the glass around the wires. The air contained in the bulb is thoroughly exhausted.



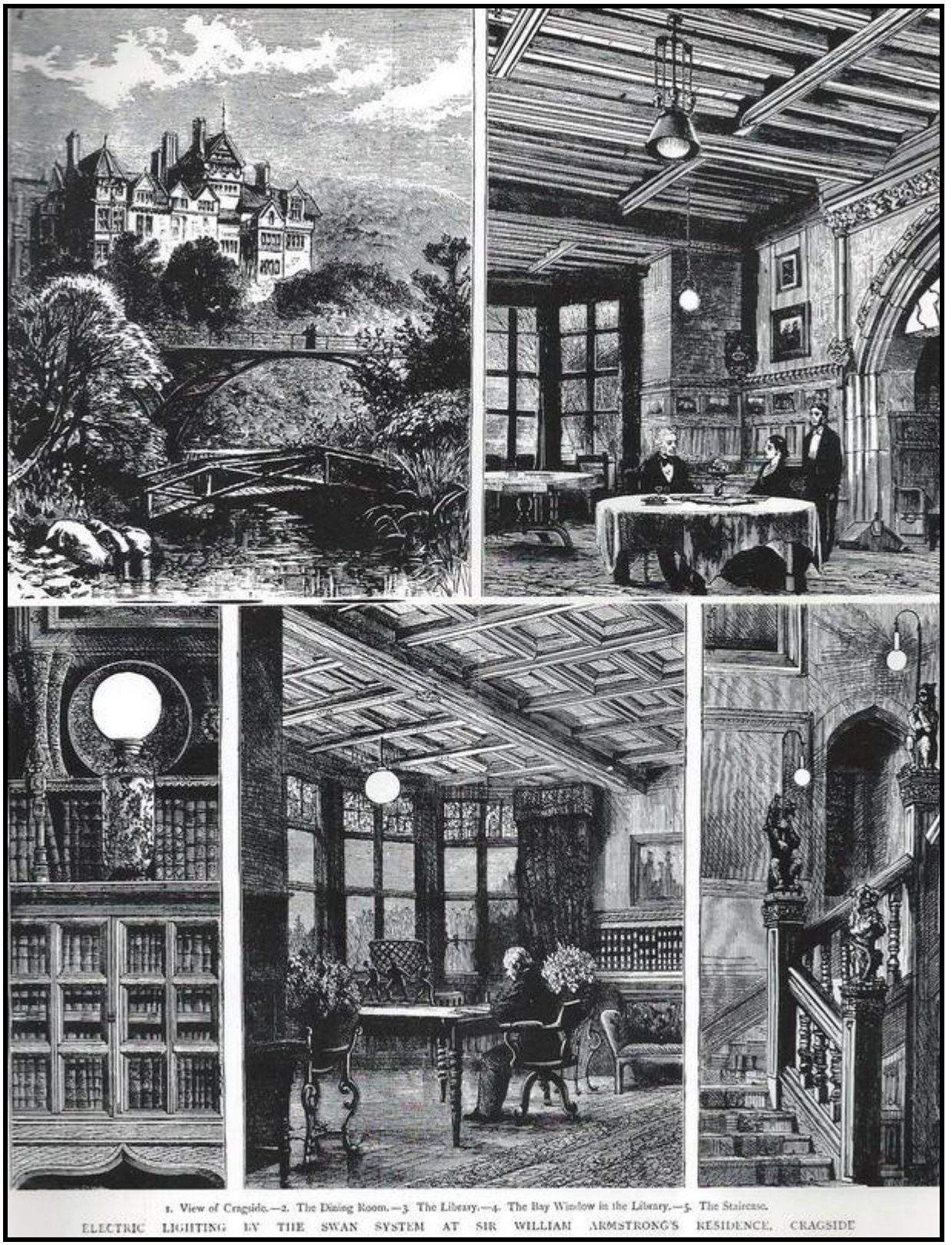
THE LAMP

The chief peculiarity of this lamp is the wonderfully thin and elastic filament of carbon, as thin as a hair, and almost as hard and springy as a steel wire. When the electric current traverses this filament it becomes white hot, and emits a soft and perfectly steady light. As the bulb contains no air or other gas capable of combining with carbon the filament does not burn away, but lasts without change for many months,—indeed, it becomes harder by continued use. The power of the light depends on the size of the carbon filament—the "wick" so to speak—and on the quantity of electric current flowing through it. The light emitted is totally devoid of that dazzling brilliancy which has generally characterised electric light of the old style, and therefore does not necessitate the screening of the light by opal or ground glass, though slightly frosted globes are mostly used at Cragside. Unlike the ordinary form of electric light, the Swan system can be divided absolutely to any extent without sacrifice of economy. Each lamp at Cragside has the power of two or three large gas lights. But it is just as easy, and no less economical, to make the lamps either much smaller or much more powerful. There are forty-five lamps in position. The current is turned on or off the lamps by small switches attached to the wall. It suffices to give one of these a slight turn, and the lamps immediately light up, and to reverse the movement and they all as quickly die out.

Sir William Armstrong has taken a warm interest in the installation of the light, and has himself directed all the details, and brought his wonted ingenuity to bear in adapting the new lamp to previously existing fittings; for example, the centre pendant in the dining-room was formerly used for an oil-lamp, this has been utilised to hold six Swan lamps; when these are lighted the effect on the table beneath is most beautiful. The pendant in the bay of the dining-room holds two other lamps.

A similar and equally happy adaptation of old lamp-fittings is shown in the vase lamp, Fig. 3, one of four (in addition to the pendant in the bay, which contains four lamps) employed for lighting the library. Each of the vase lamps has its proper place around the room, but is removable; they are so arranged by Sir William as to be lighted and extinguished by an exceedingly simple mechanical action. The picture gallery is lighted by twenty lamps contained in five frosted glass globes hanging from the arched roof. The peculiar suitability of a Swan lamp to the lighting of pictures is here demonstrated under the best possible conditions, for the pictures contained in the Cragside gallery are all of them masterpieces, the "Chill October" of Millais and a lurid sunset by Vicat Cole appear to equal advantage seen by the pure and steady light emitted by these lamps. There is a total absence of the prevailing violet light which characterises the ordinary electric light.

Report of Swan's Electric Light at Cragside: ***The Graphic****, 2nd April, 1881*



1. View of Cragside.—2. The Dining Room.—3. The Library.—4. The Bay Window in the Library.—5. The Staircase.
ELECTRIC LIGHTING BY THE SWAN SYSTEM AT SIR WILLIAM ARMSTRONG'S RESIDENCE, CRAGSIDE

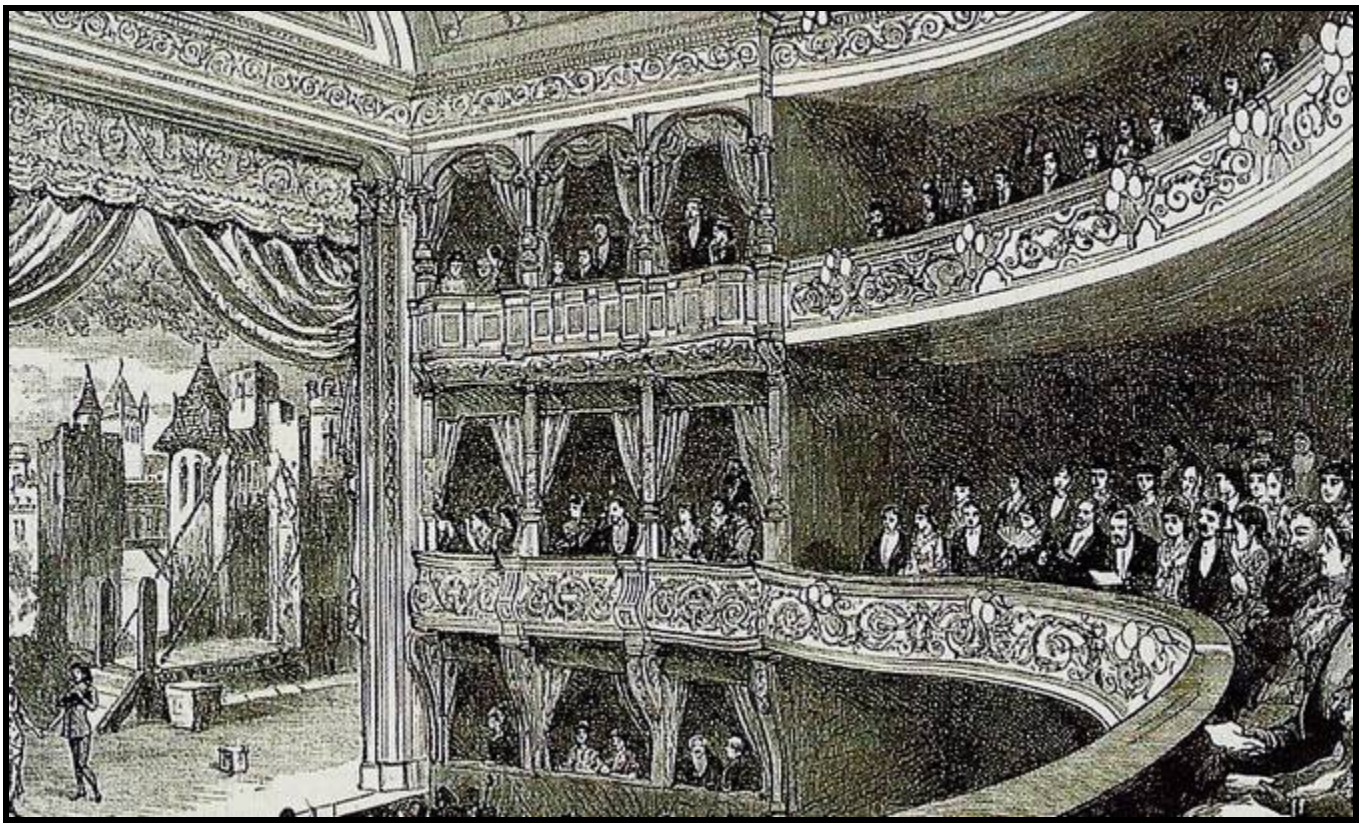
The Light at Cragside

Cragside Library, said to be the first room in the world to be lit by electricity produced from water-power (with Swan Lamps)

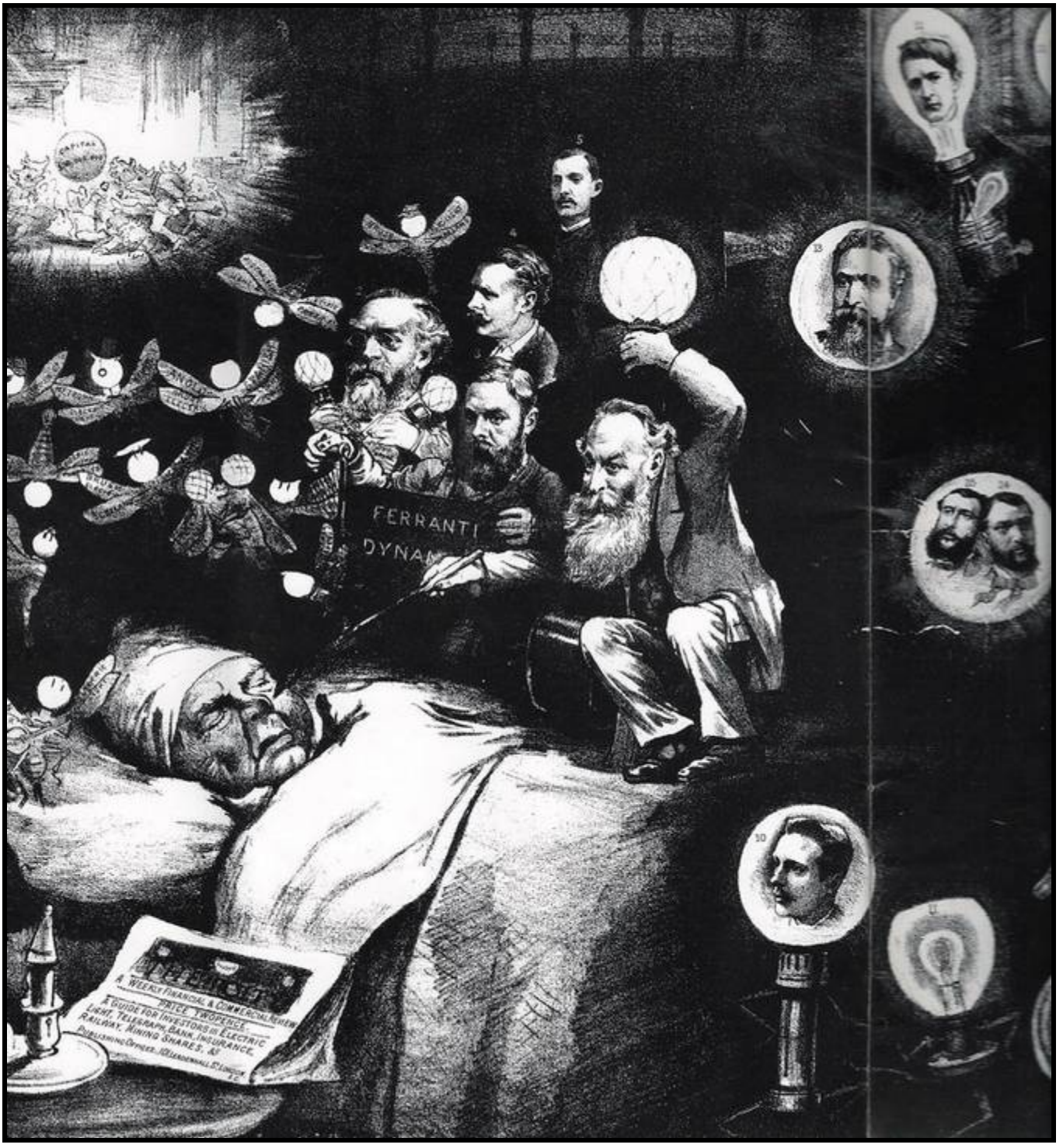
The old staircase at Cragside, lit by electricity in 1880

In 1880, Richard D'Oyly Carte commissioned a new theatre to be built on London's Somerset Street facing the Thames Embankment. This was to be the Savoy Theatre, which opened in 1881. All parts of the building were lit by electricity (though an emergency system of gas lighting was provided, just in case). The lighting installation was carried out by Siemens & Company using Swan incandescent lamps. The power was generated by steam engines on an adjoining site and it was claimed that "the Savoy Theatre was the first public building in the world to be permanently lit in all areas by electric light and the first theatre to plunge the auditorium into darkness during the performance."

The Savoy Theatre, London



The Savoy Theatre, 1881



Cartoon from: ***The City*** *(a financial newspaper), 4th November, 1882*

The drawing depicts the nightmares of a gas director haunted by the thoughts of the electric light and its inventors and manufacturers. Swan is the bearded gentleman in the centre holding aloft an electric lamp.

The Edison & Swan United Electric Light Co.

LIMITED.

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West End Showrooms: 53 PARLIAMENT STREET, S.W.

Branches throughout Great Britain. Agencies in every part of the World.

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INCANDESCENT ELECTRIC LAMP.

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STANDARD LAMP.
HALF-SIZE.

SEE THAT EVERY LAMP BEARS THE TRADE MARK, 'EDISWAN.'

Lamps of every description, Voltage, and Candle Power, of British Manufacture.

ADVANTAGES

- ECONOMY IN CONSUMPTION OF CURRENT.
- LONG LIFE IF USED AT THE MARKED VOLTAGES.
- EQUALITY OF LIGHT DURING THE ENTIRE LIFE OF THE LAMP.
- COMPLETE RELIABILITY, EVERY LAMP BEING CAREFULLY TESTED BEFORE DESPATCH.

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Branches and Agencies throughout the United Kingdom and in every part of the World.

MANUFACTURERS OF

DYNAMOS,

MOTORS,

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SWITCHBOARDS,

AMMETERS,

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SWITCHES,

DETECTORS,

TESTING SETS,

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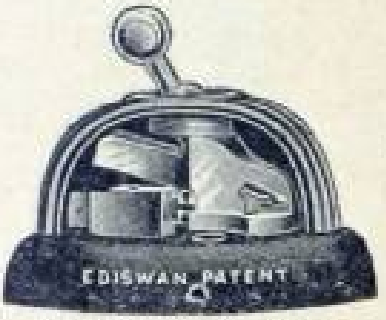
SWITCHES OF EVERY DESCRIPTION,
Either with Metal or Porcelain Covers.



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Trade Mark:

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LAMPS,

FANCY SHADES,

BRACKETS,

PENDANTS,

ELECTROLIERS,

SHOP FITTINGS,

STANDARDS,

SHIP FITTINGS,

BRONZES,

&c. &c.

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1899

Index to Advertisements will be found on pages 81, 82, and 84.

1899

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Section I.

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UNITED ELECTRIC LIGHT COMPANY, LIMITED.

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100, VICTORIA STREET, LONDON, S.W.

City Office and Show Rooms:

110, CANNON STREET, E.C.

West End Order Office:

50, PARLIAMENT STREET, S.W.

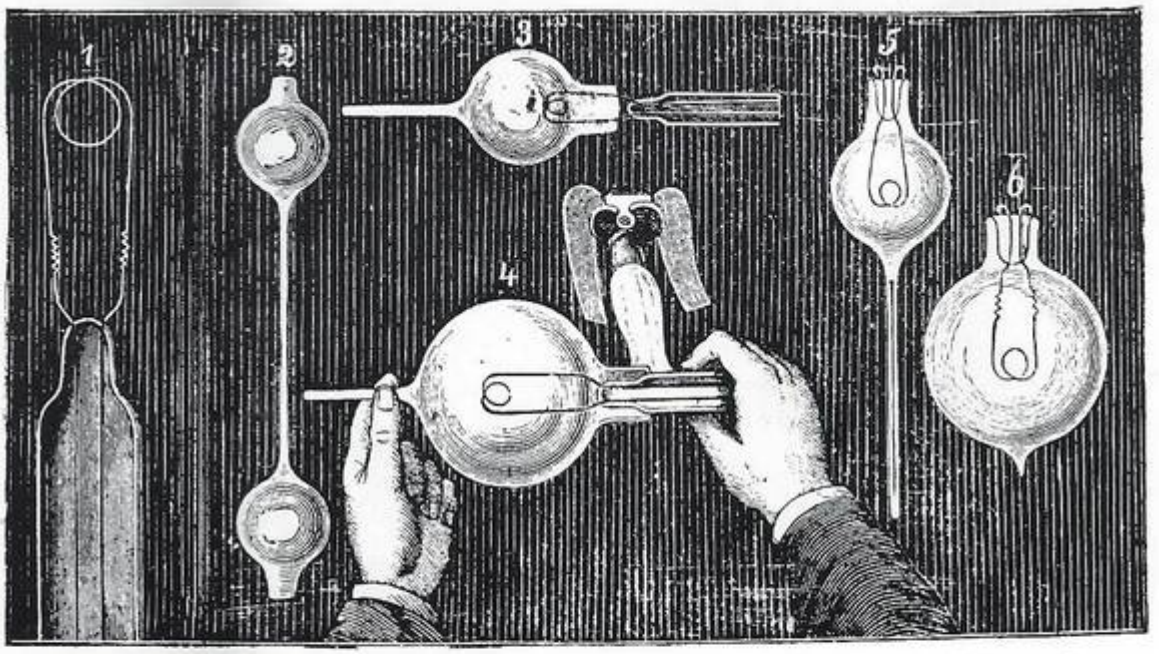
Works:

PONDER'S END, MIDDLESEX,

AND

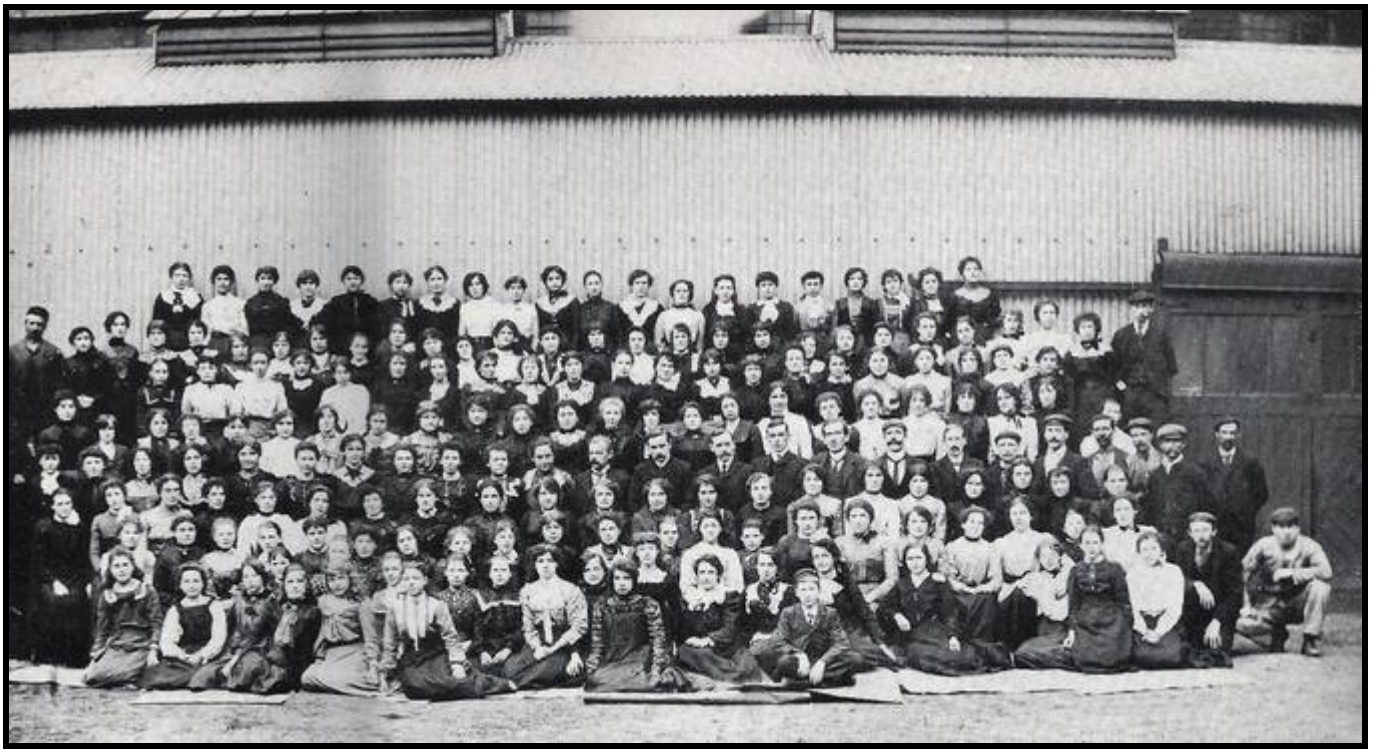
SOUTH BENWELL, NEWCASTLE-ON-TYNE.

1893

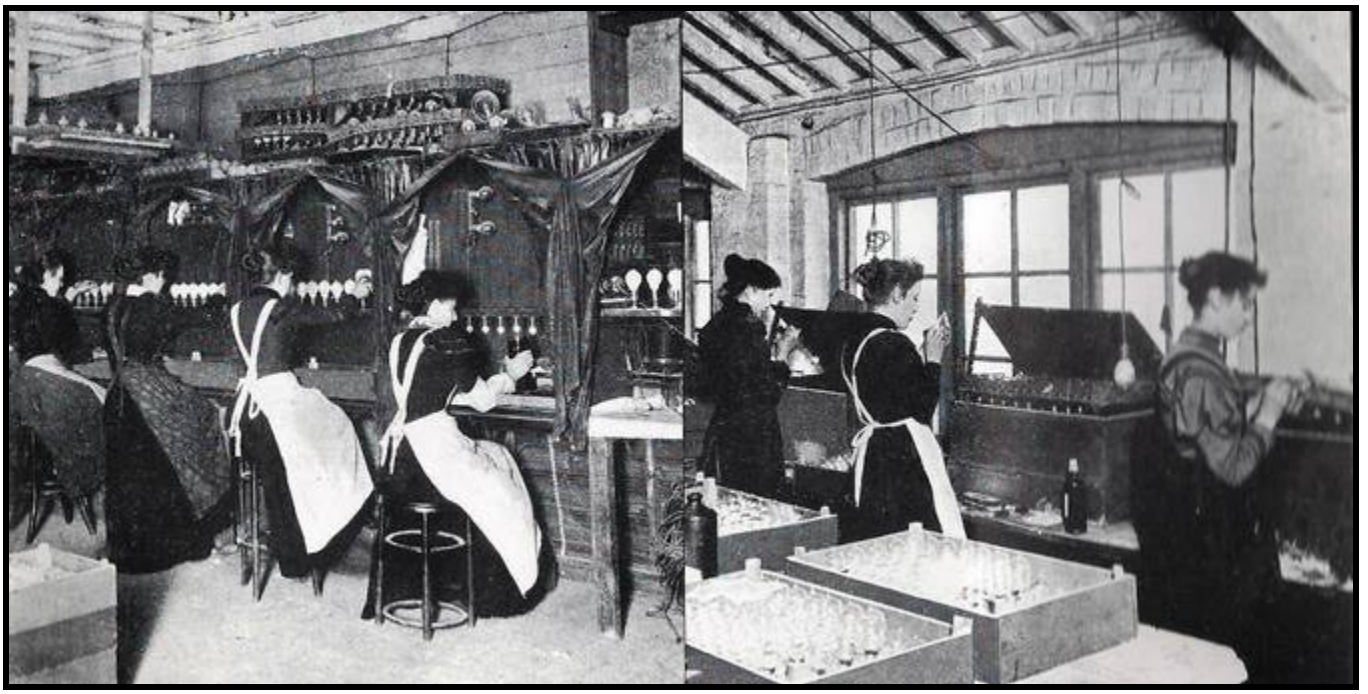


1) The platinum wires to which the carbon filament is attached are fused into a glass stopper.
2) A glass tube is drawn out and blown into bulbs leaving a stem attached for exhausting.
3) The glass stopper with platinum wires and filament attached is placed into the bulb.
4) The stopper is heated and the filament sealed in.
5) The lamp is exhausted of air by means of the stem.
6) The completed lamp.

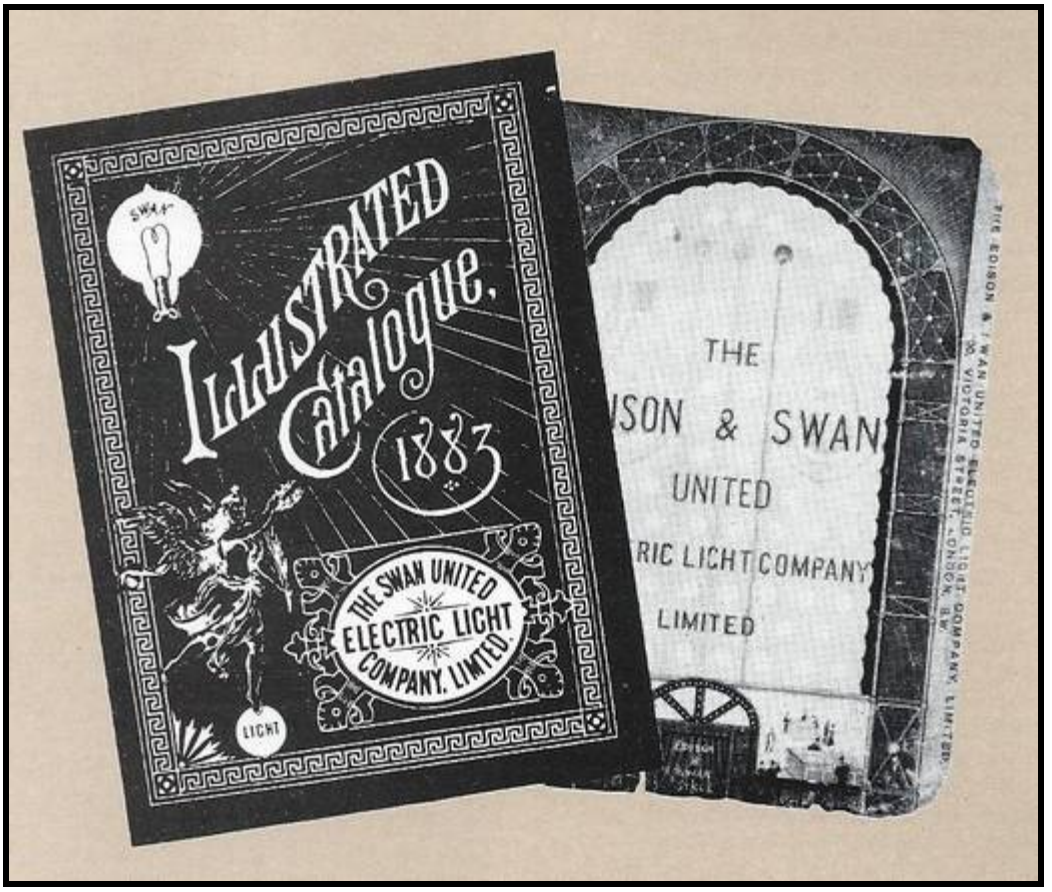
Stages in the making of a Swan lamp

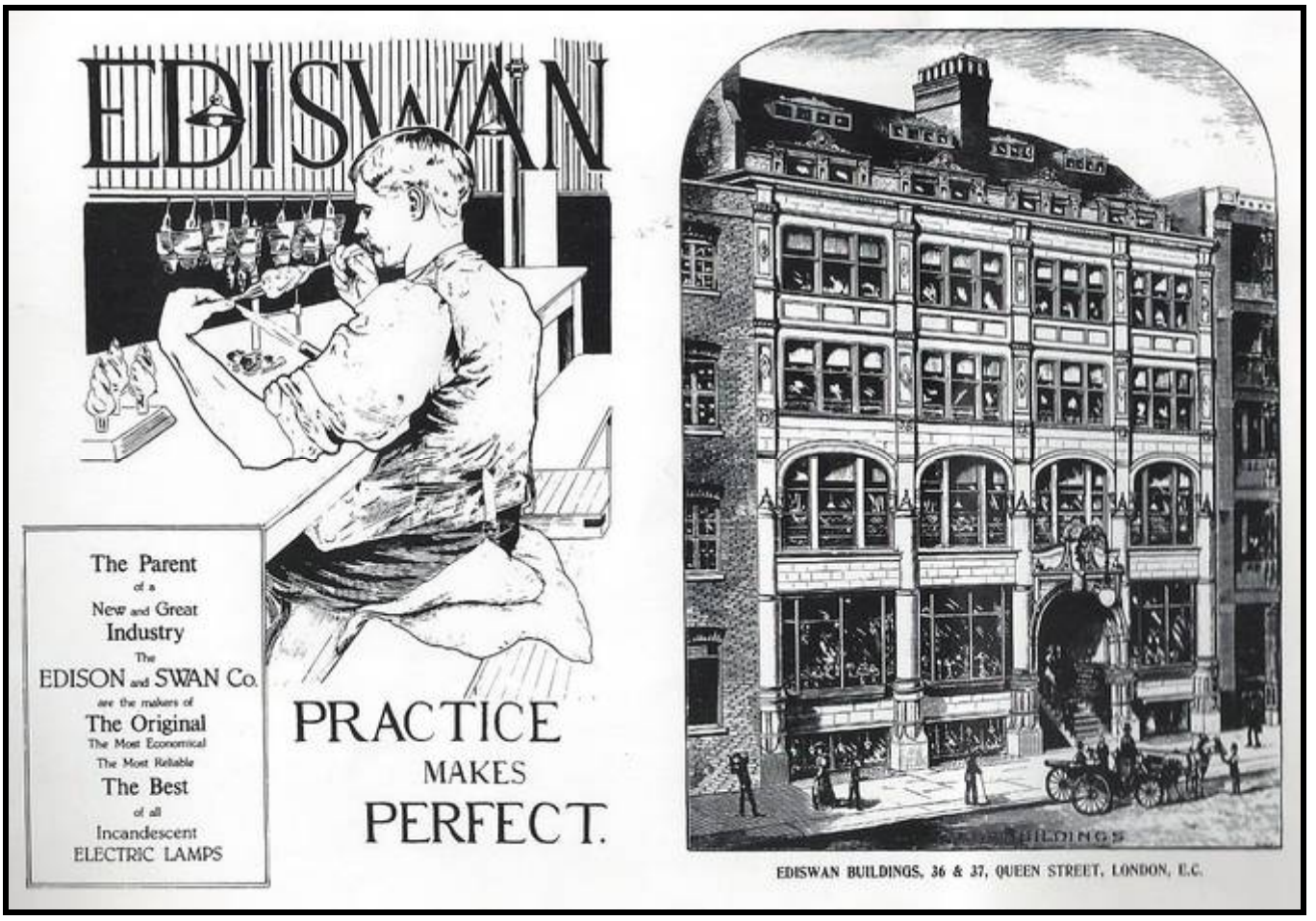


Workers at the Swan lamp factory in South Benwell, near Newcastle, in 1881

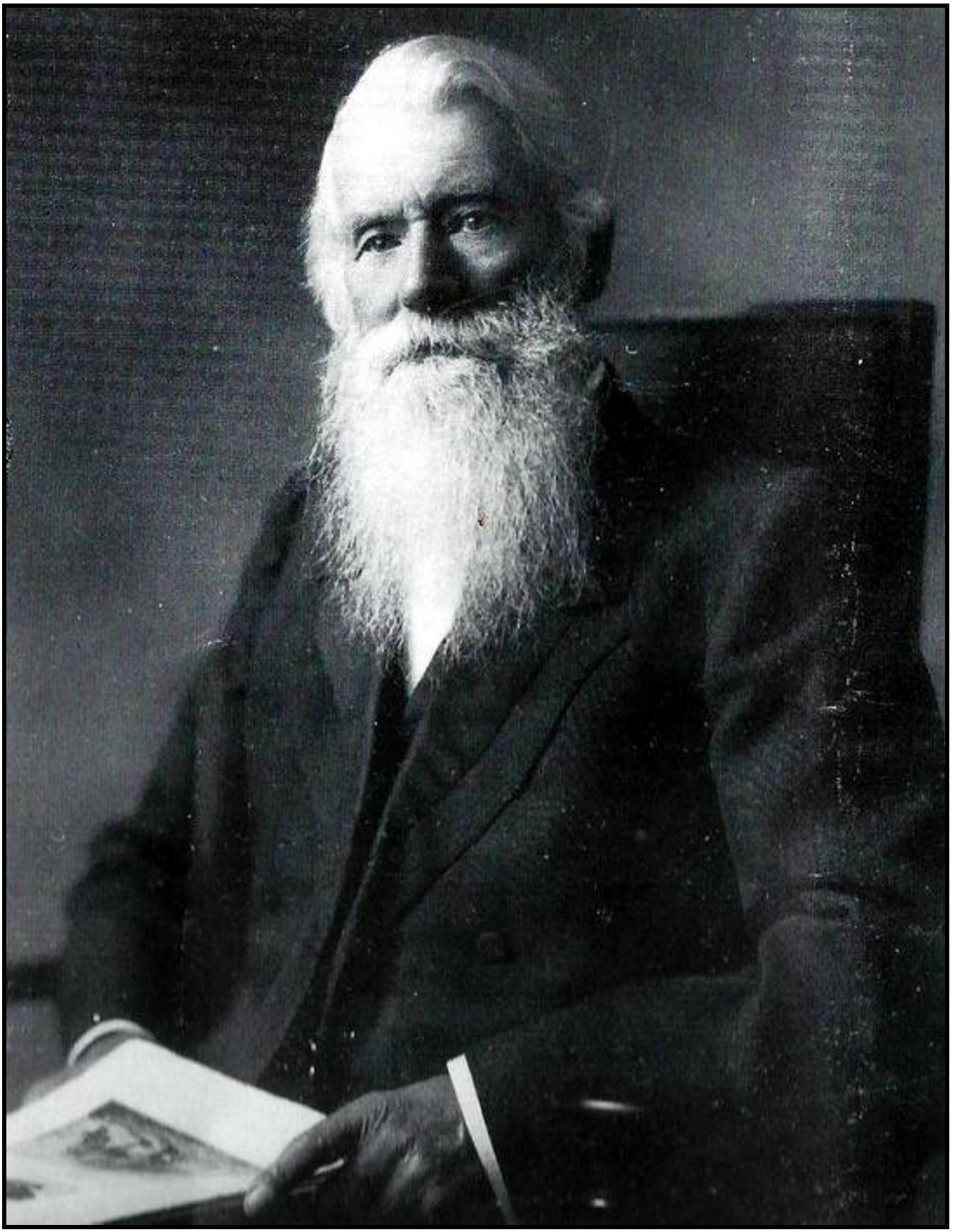


1901 photographs from Robertson's lamp factory in Newcastle, where the work carried out was similar to that in Swan's Benwell factory

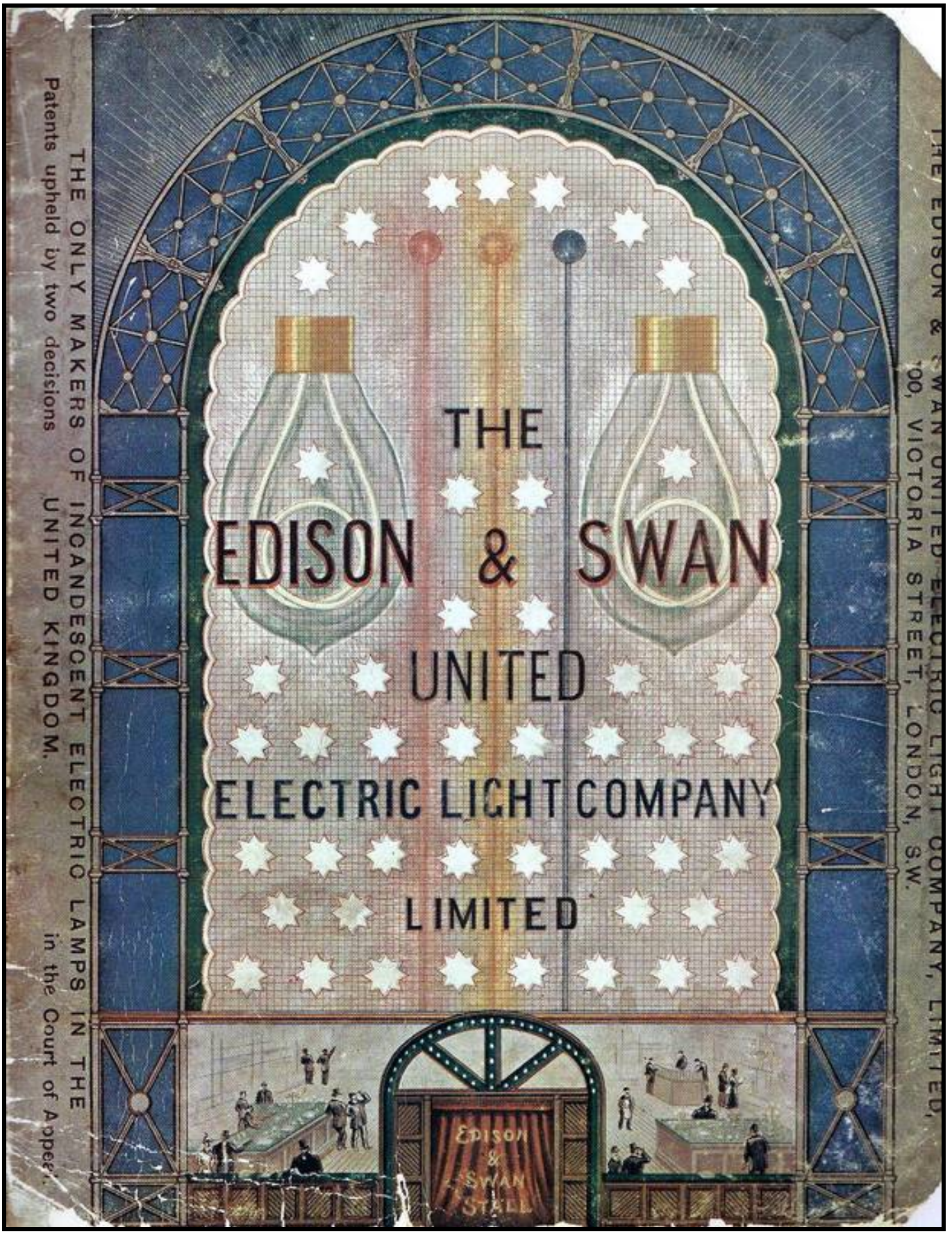


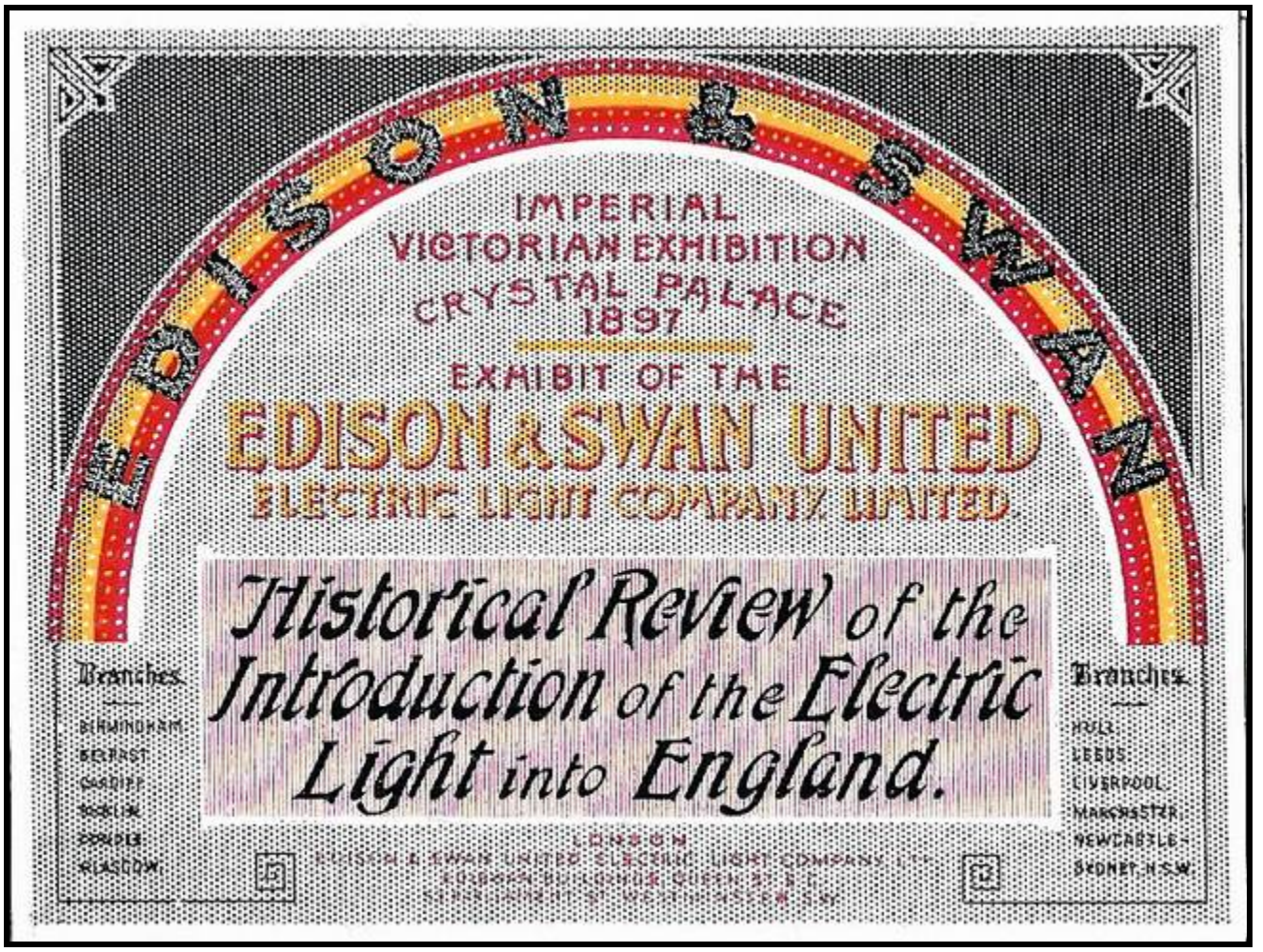


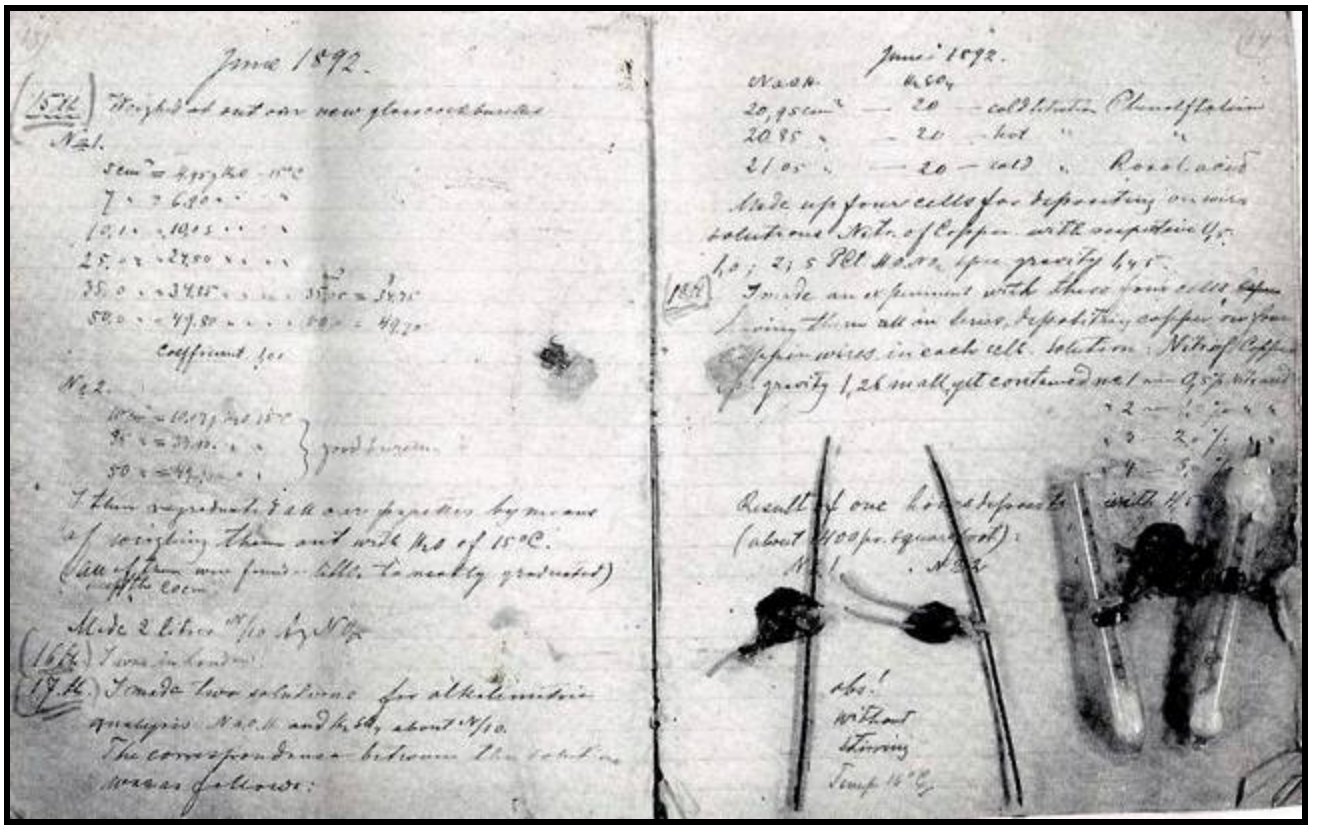
An Ediswan advert and their London office



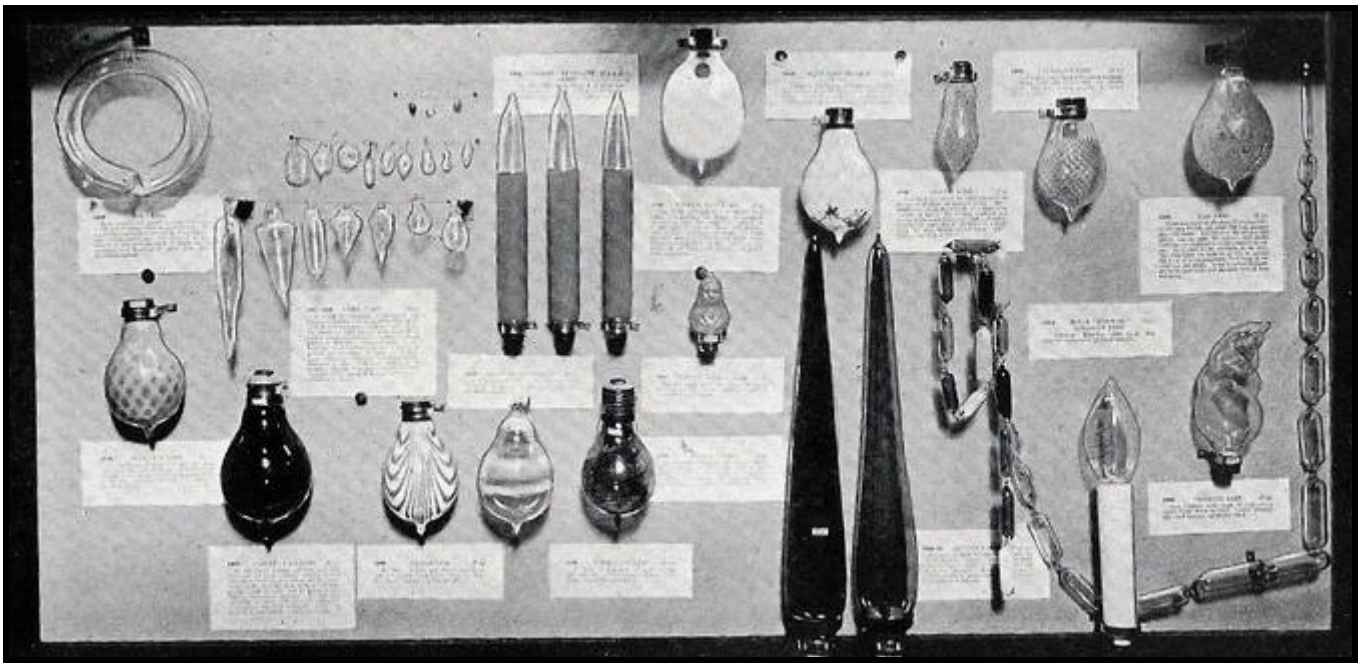
Sir Joseph Wilson Swan


THE
EDISON & SWAN
UNITED
ELECTRIC LIGHT COMPANY
LIMITED
THE ONLY MAKERS OF INCANDESCENT ELECTRIC LAMPS IN THE UNITED KINGDOM.
Patents upheld by two decisions in the Court of Appeal.
THE EDISON & SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,
00, VICTORIA STREET, LONDON, S.W.
EDISON & SWAN STILL

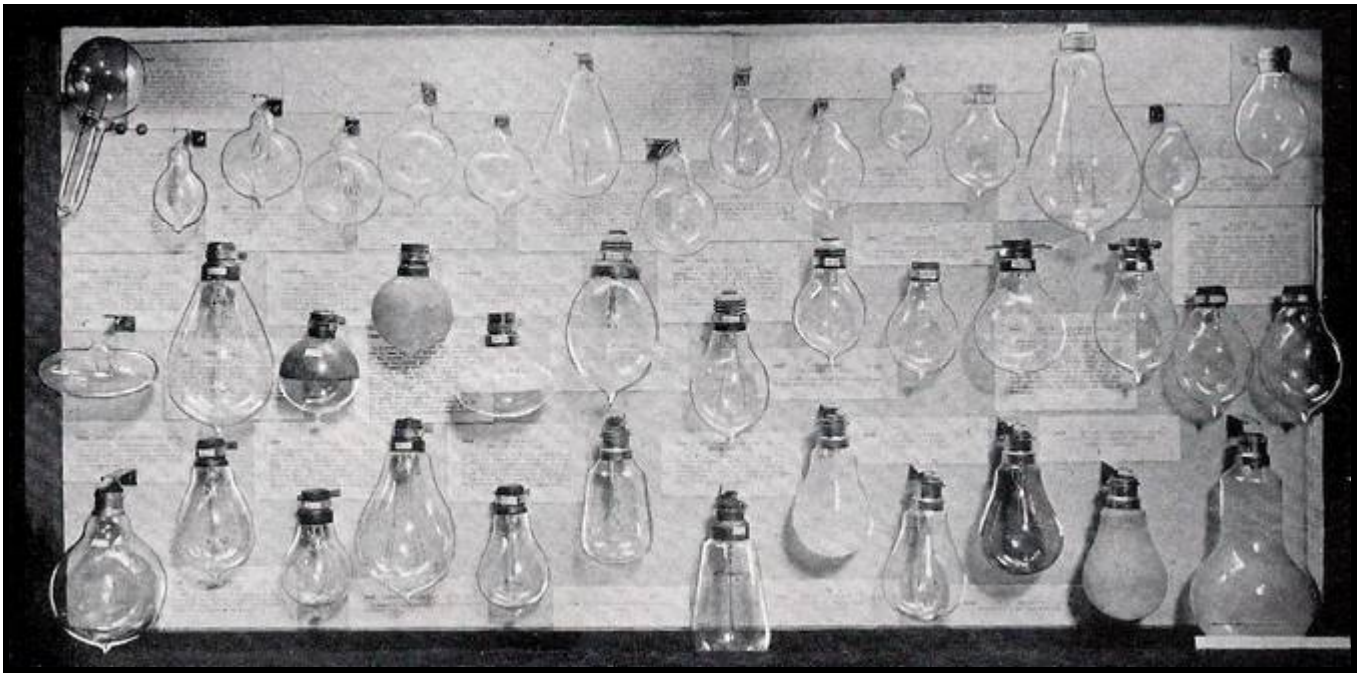




Page from Swan's Notebook, June, 1892



Early decorative lamps (Ediswan Collection of Historic Lamps)

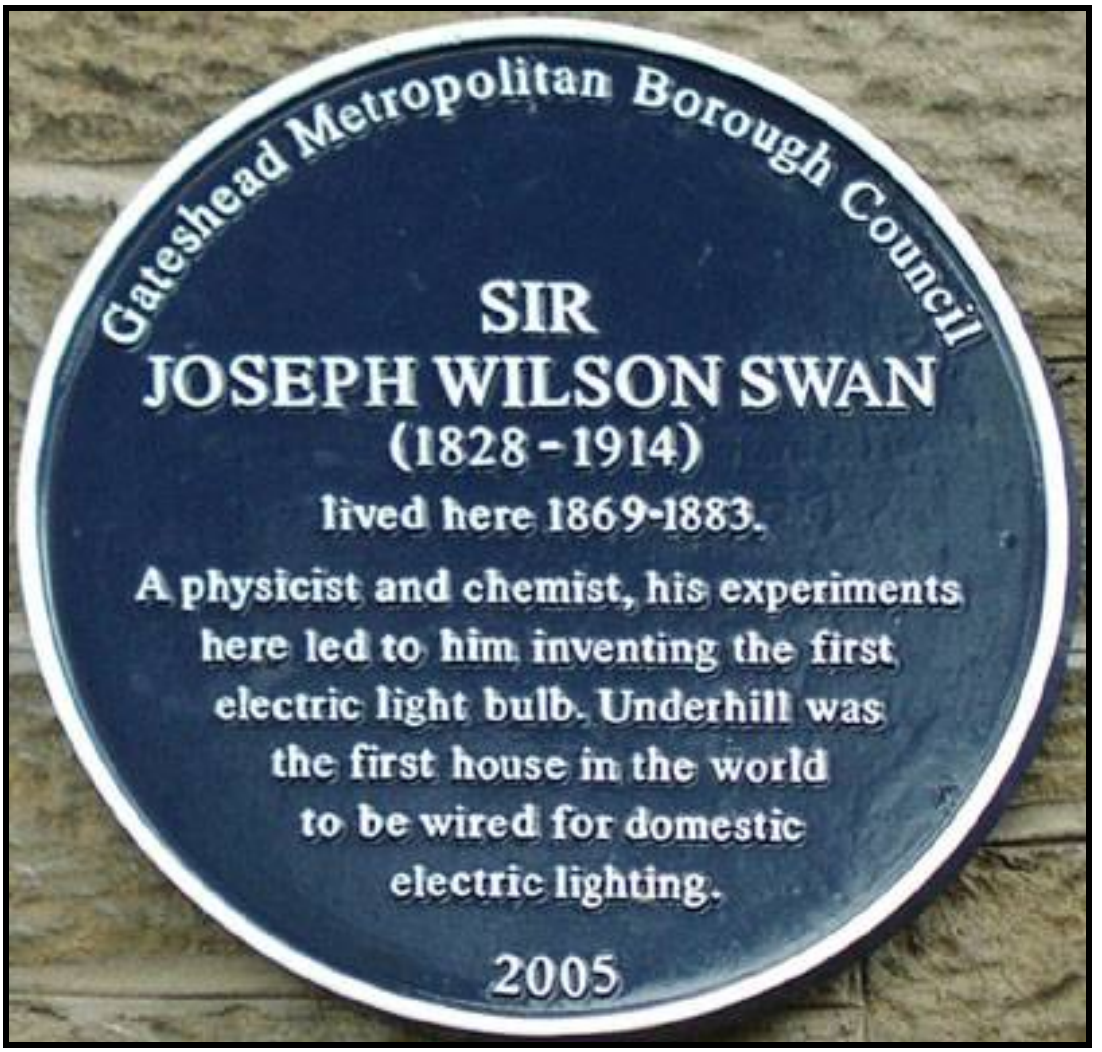


Some modern filament lamps (c.1950 or before) and their ancestors
(From a case in the Ediswan Collection of Historic Lamps)

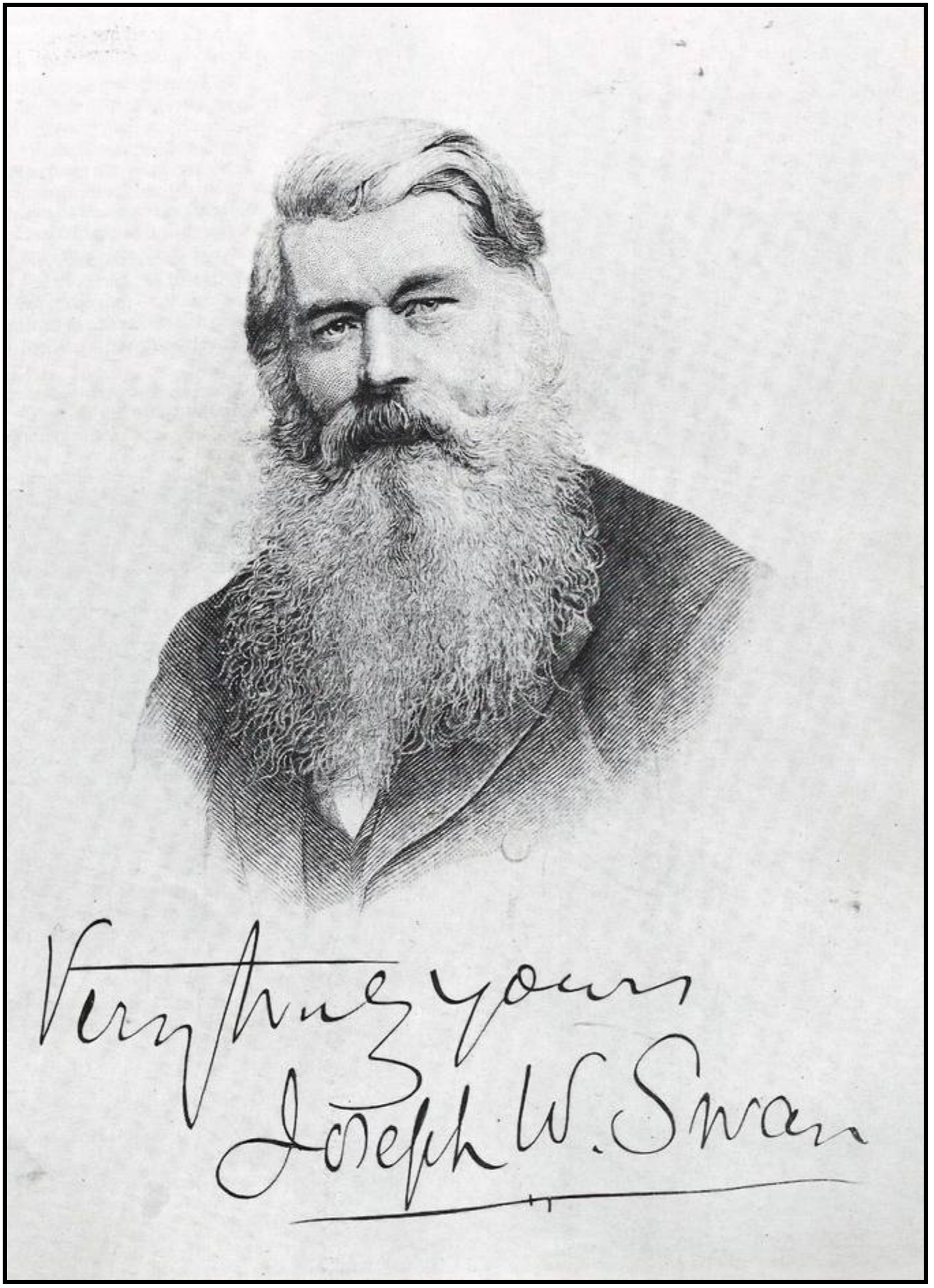
The Swan Family home in Bromley in Kent after he moved from Tyneside in 1883

The Swan Family at home

About 1894, Swan moved to 58 Holland Park, London



Gateshead Blue Plaque


Very truly yours
Joseph W. Swan

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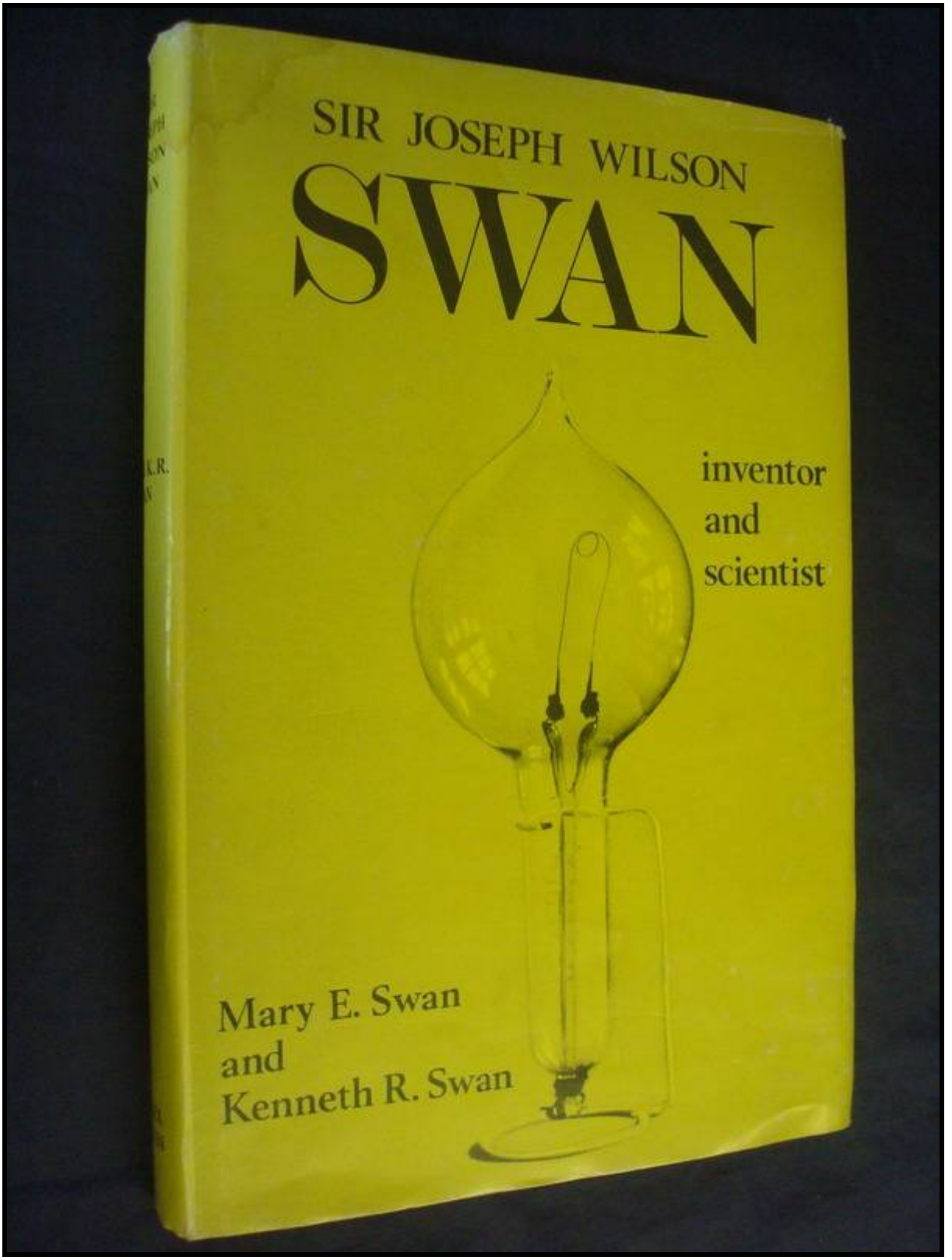
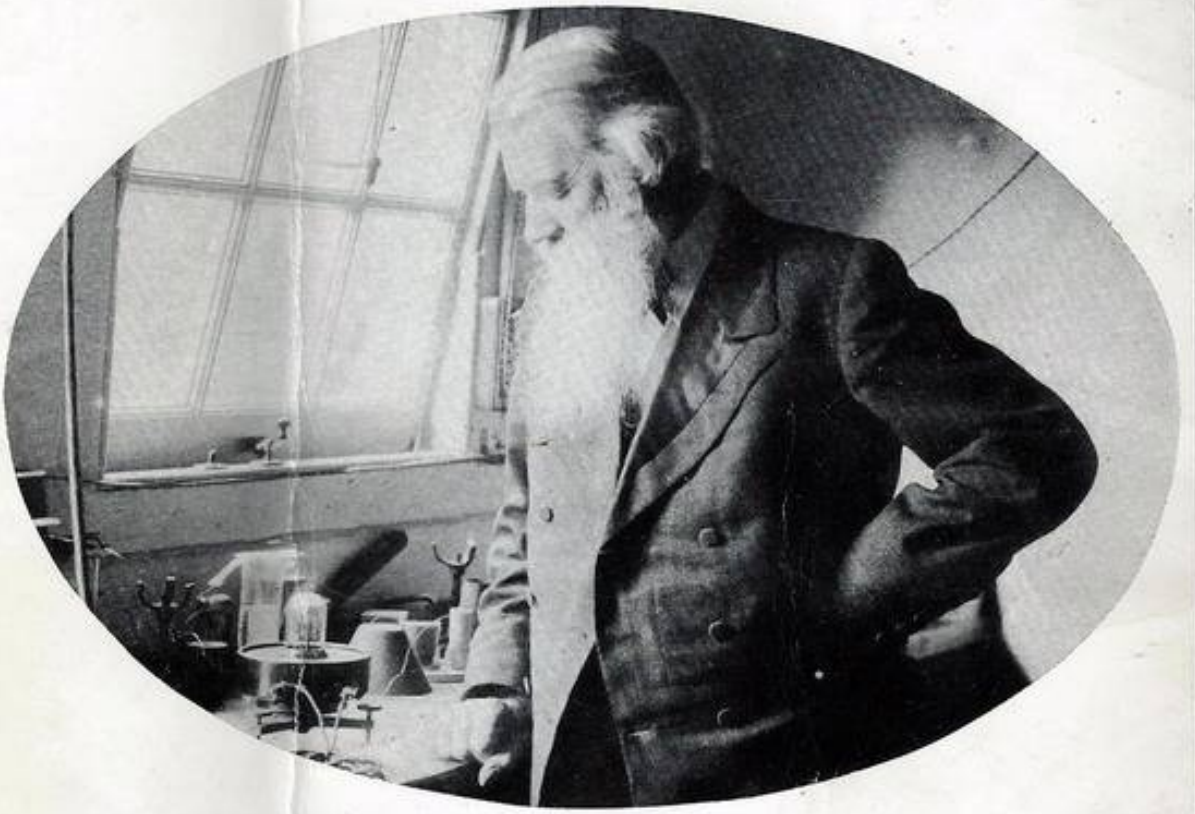
POSTSCRIPT: FURTHER READING



1968



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Undated

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C N Brown BSc

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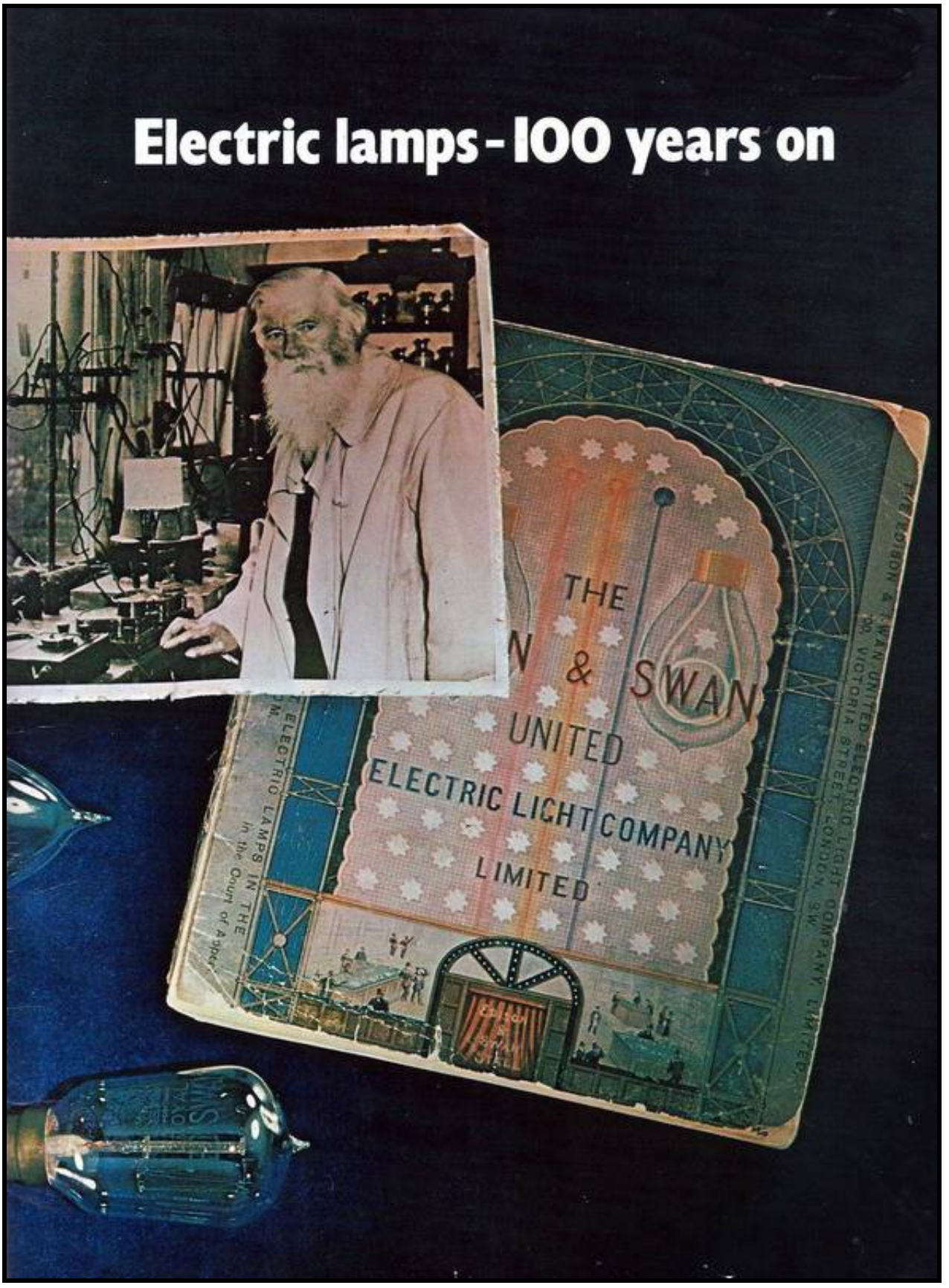
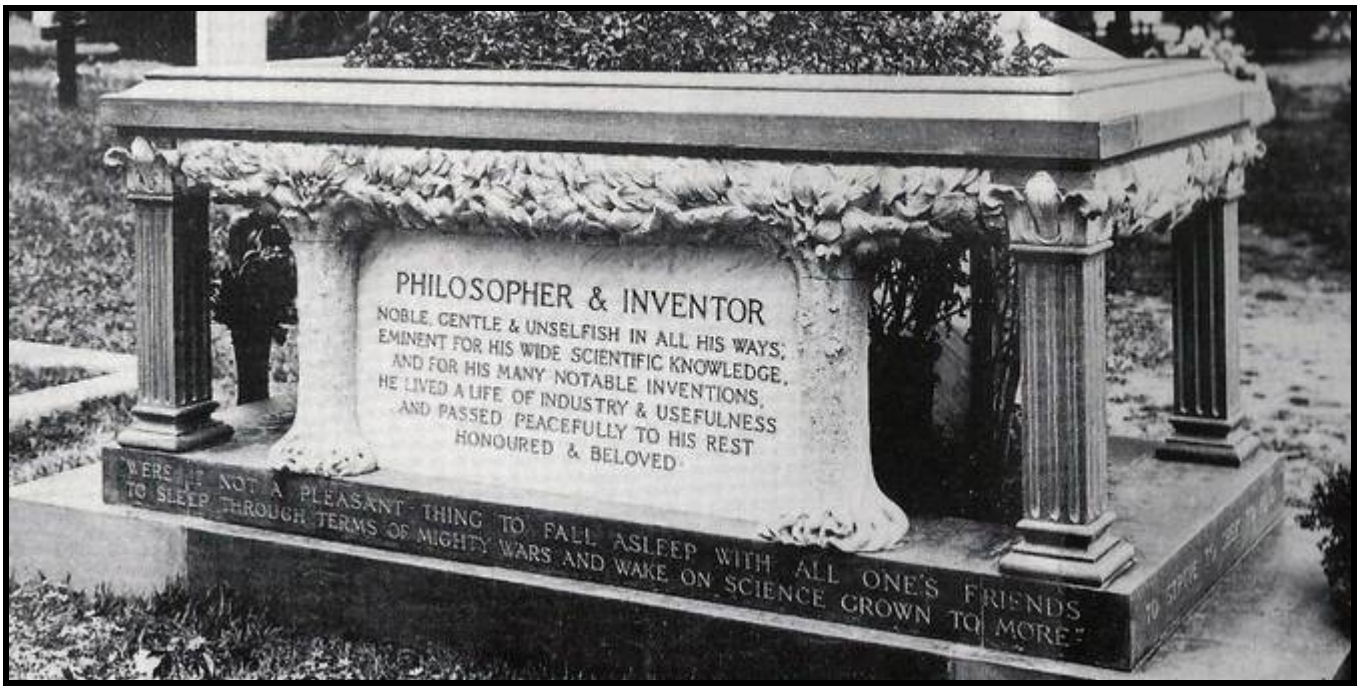
1978


Electric lamps - 100 years on
THE
N & SWAN
UNITED
ELECTRIC LIGHT COMPANY
LIMITED

1979

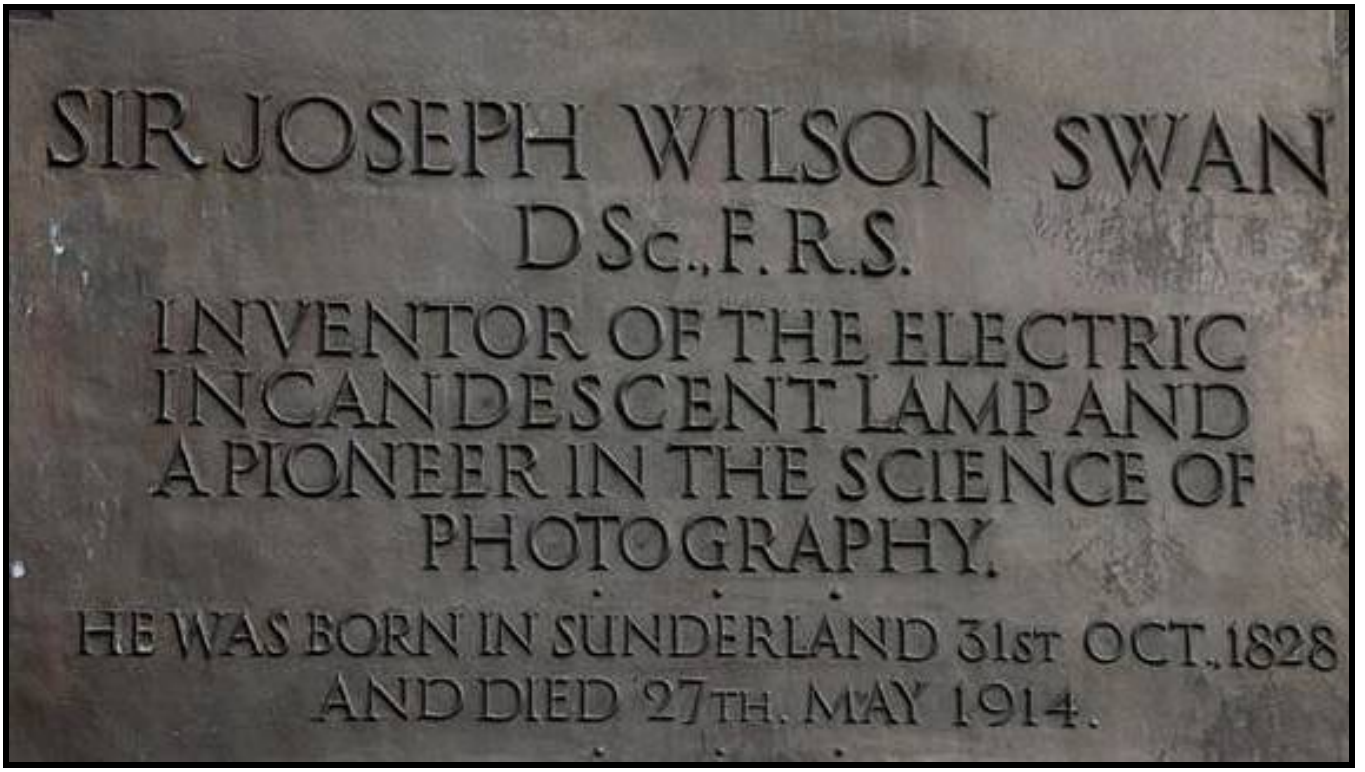
EPILOGUE

Joseph Swan was awarded a Fellowship of the Royal Society in 1894 and was knighted in 1904. In the spring of 1914, Newcastle Corporation decided (belatedly) to bestow the Freedom of the City upon Sir Joseph, who looked forward to visiting Newcastle. Unfortunately, his health failed him before the intended ceremony and he died on the 27th May, 1914.



Sir Joseph Wilson Swan's final resting place at All Saints Church, Warlingham in Surrey

Sir Joseph Wilson Swan's grave as it is today, over 100 years later



Sunderland memorial