

Meanwhile, in America, Thomas Edison had also been working on the problem of developing cheap electric lighting since the autumn of 1878. Aided by a team of technicians, Edison tested more than 1,600 different materials to find a substance for the filament. Eventually, he decided that carbonised bamboo showed the most promising results and sent his assistants out into the jungles of the Orient and South America in order to find a species of bamboo which was, in Edison's words, 'almost geometrically parallel and with practically no pith from which we can make the kind of filaments the world needs.' After spending forty thousand dollars and countless hours of experiment Edison achieved success on 21st October, 1879 when a lamp with a filament of a carbonised piece of cotton sewing thread bent in the shape of a horseshoe glowed for over forty hours. Immediately, Edison set out to exploit the commercial potential of cheap electric lighting which attracted much publicity in the press of the day. Swan's surprise upon finding Edison breathing down his neck is expressed in the rough draft of a letter found amongst Swan's personal papers. Whether the letter was ever sent to Edison is not known. Fortunately, the legal tangle between Swan and Edison was settled peaceably. Both companies realised that it would be sensible to amalgamate and thereby strengthen their position against other lamp manufacturers. The Edison and Swan United Electric Light Company was formed and it held the monopoly of the British market until the expiry of their patents in 1893 and the development of tungsten as a filament.

## 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 Eodily Pain  
and Gold "Tailings."

HISTORY OF ELECTRIC LIGHTING.

Newcastle

Sep<sup>r</sup> 24/80

T. A. Edison Esq  
Oriskany

For some  
years I have been  
working at the  
problem of electric  
lighting by the incandescence  
of Carbon; while



T. A. Edison Esq.

Dear Sir,

Newcastle  
Sept 24/80

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.

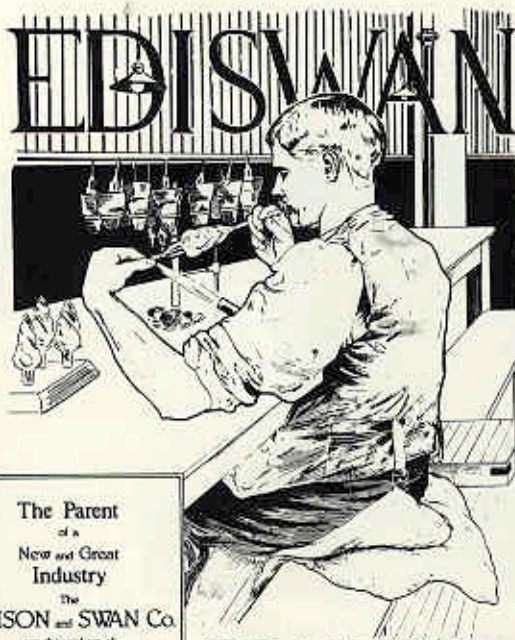
I have made very great progress in some essential points in the construction of lamps. So much so that now I feel quite certain the time has come for undertaking work on scale in competition with gas lighting for towns. I think I am in advance of you in several points especially in the making of the 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.

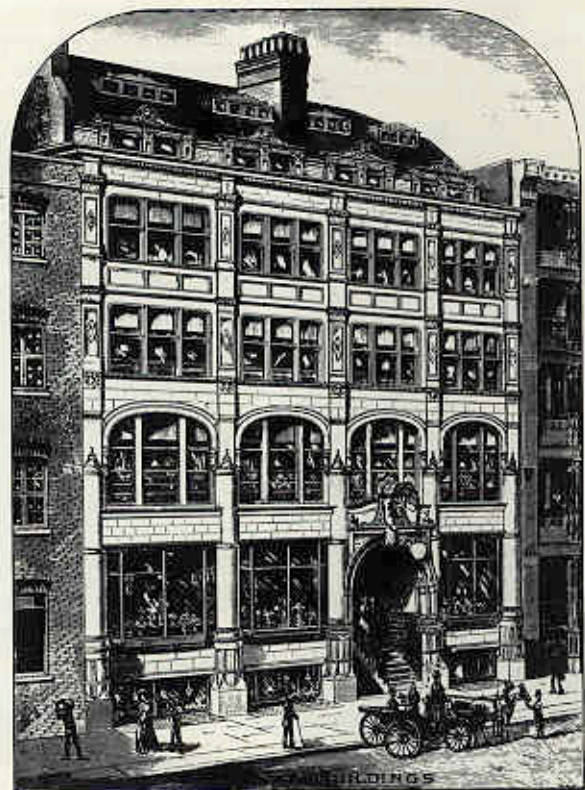
Your obedient servant,

J. W. Swan.



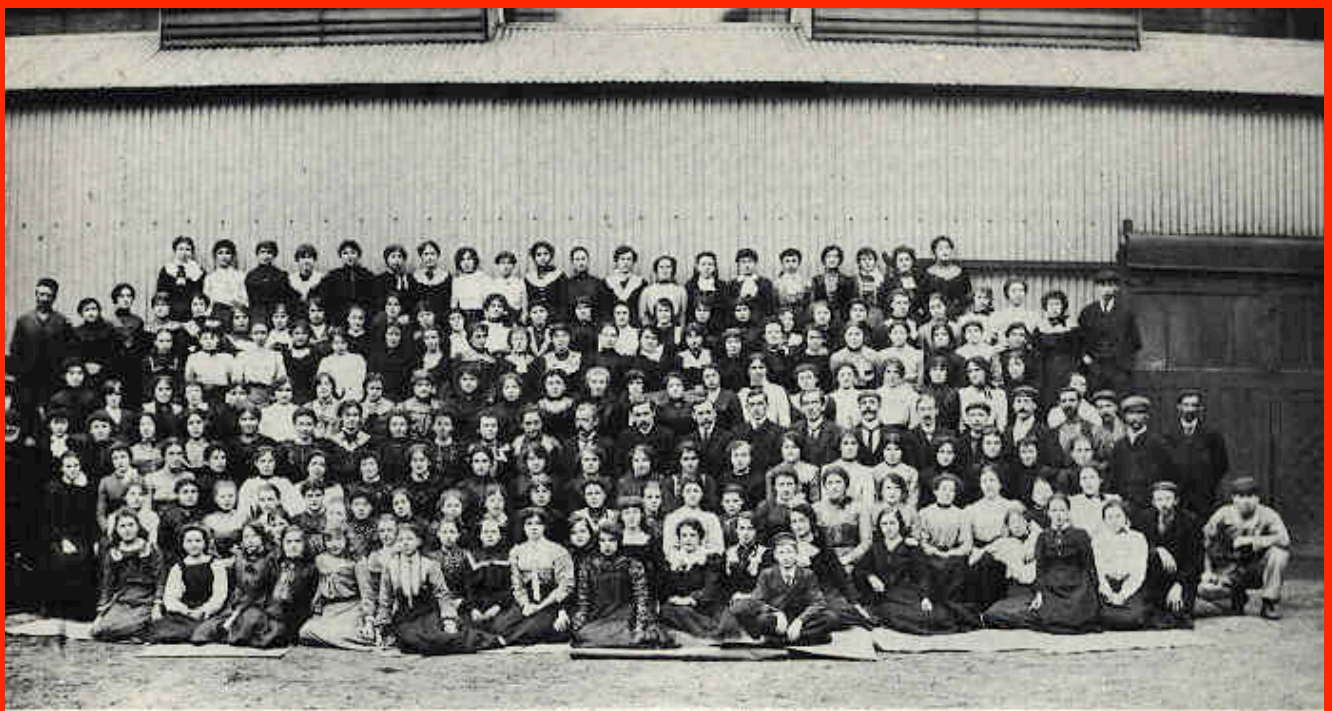
The Parent  
of a  
New and Great  
Industry  
The  
EDISON and SWAN Co.  
are the makers of  
The Original  
The Most Economical  
The Most Reliable  
The Best  
of all  
Incandescent  
ELECTRIC LAMPS

PRACTICE  
MAKES  
PERFECT.

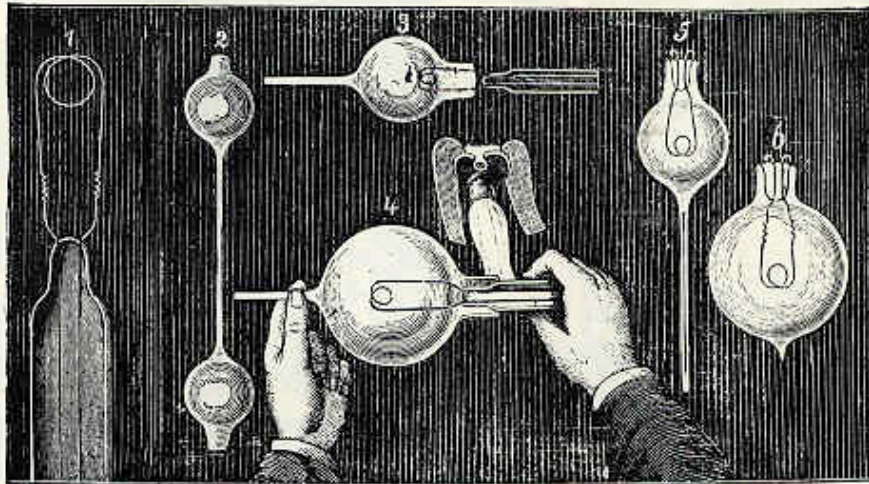


EDISWAN BUILDINGS, 36 & 37, QUEEN STREET, LONDON, E.C.





In 1881 an old tannery in South Benwell was converted into a lamp factory and it was considered something of a distinction to be employed in this new and exciting industry. The photograph above was taken outside the factory at Benwell, some three miles to the west of Newcastle, and it shows the large number of girls employed at the works. Victorian etiquette was rigidly maintained even on the factory floor: employees were strictly supervised and elaborate precautions were taken to prevent fraternization taking place between the men and the girls. No male was allowed to enter any of the workrooms without first seeking permission. These 'security' measures were further enforced by the arrangement which ensured that the male and the female workers arrived and left the factory at different hours! The illustrations below show the various stages in the making of a Swan lamp.



- 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.



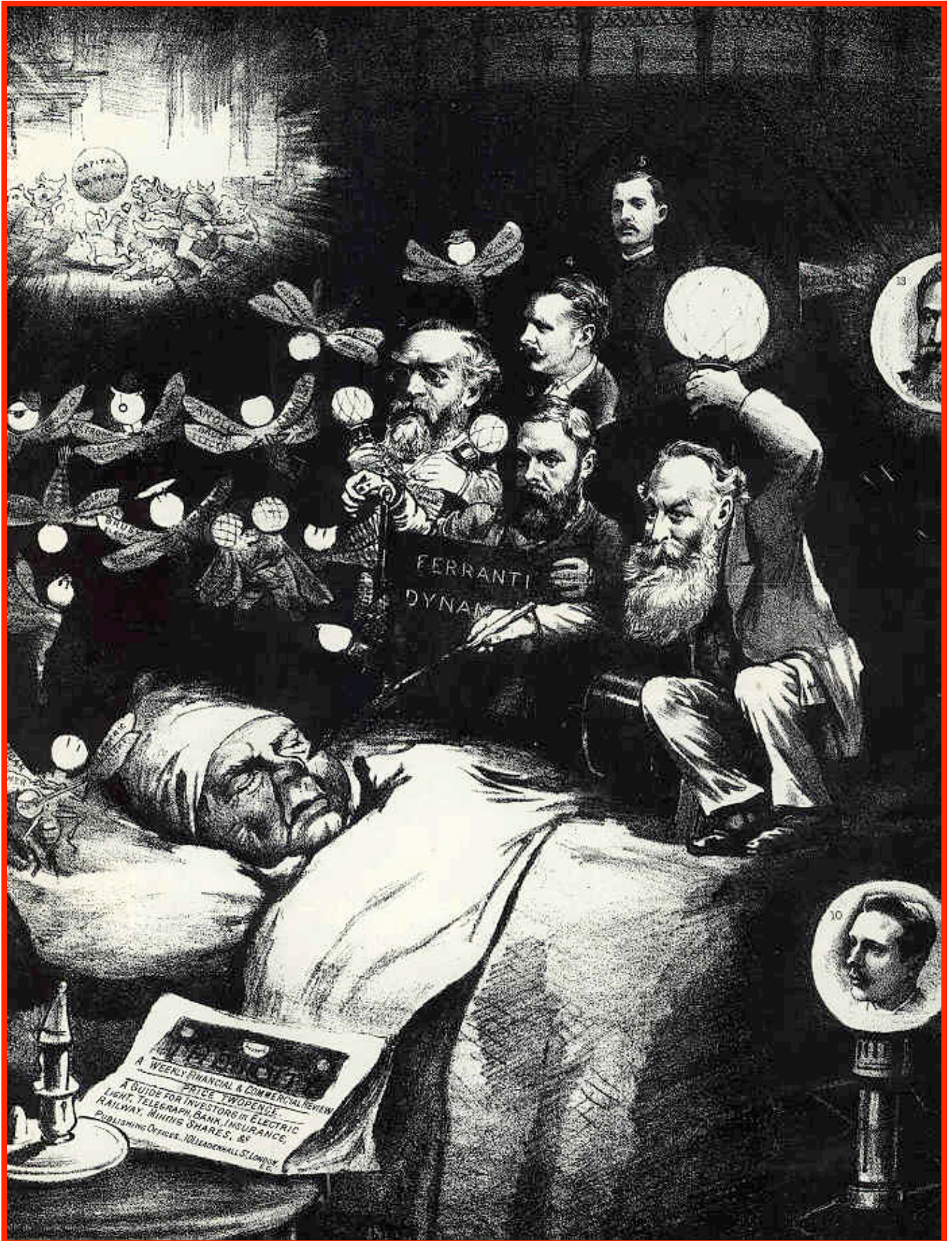


The illustrations on this page are from Robertson's lamp factory in Newcastle where the work was similar to that carried out at Swan's factory in Benwell. The first illustration (top left) shows the process of exhausting the bulbs by Sprengel pumps. These were tested (top right) for various defects. The photograph (bottom left) shows the lamps undergoing a preliminary running test in actual holders and the final picture shows the lamps being stamped prior to delivery.

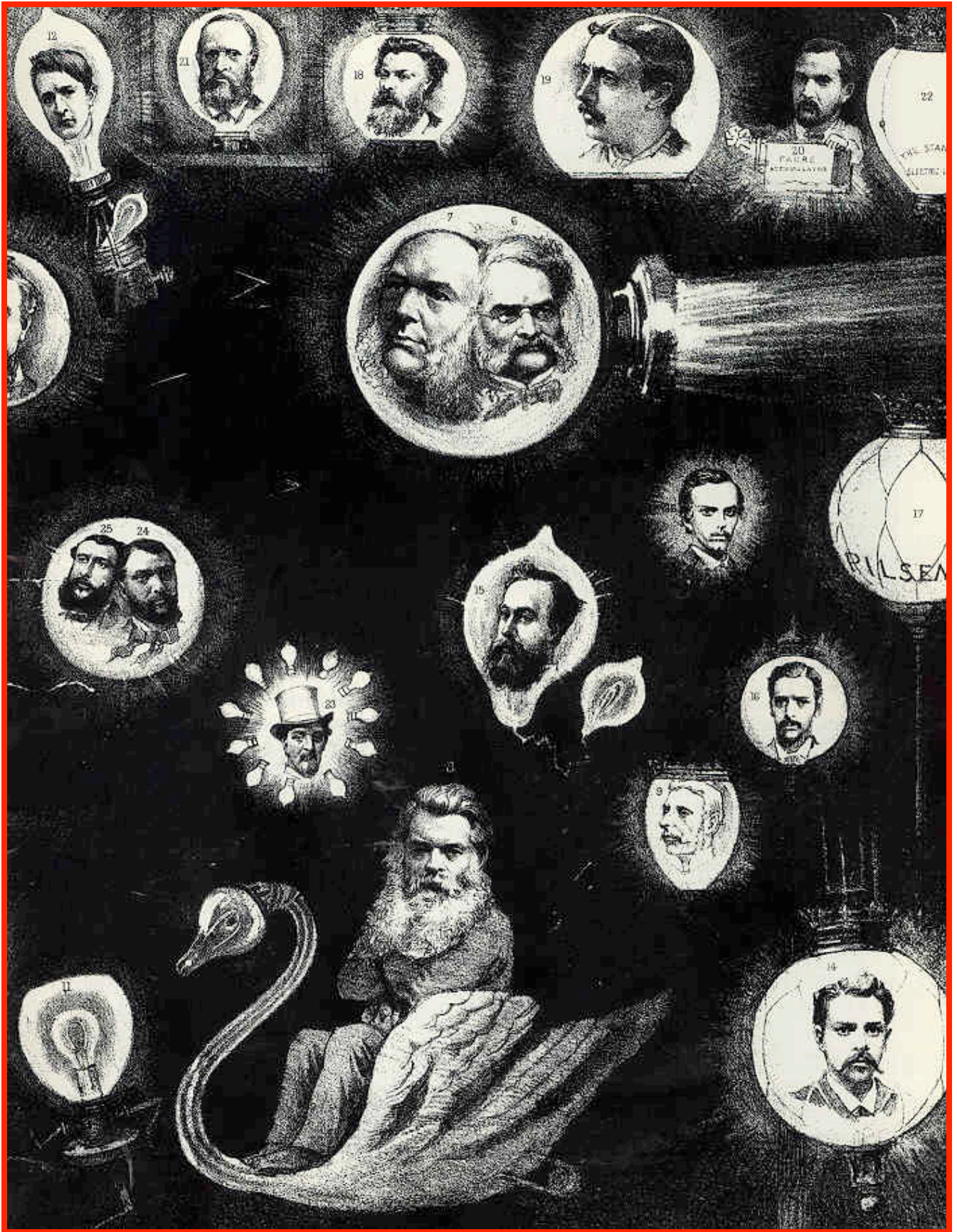
On the next two pages is reproduced a cartoon from a supplement to the financial newspaper 'The City' on November 4th, 1882 which depicts the nightmares of a gas director haunted by the thoughts of the electric light and its inventors and manufacturers. Gas shares plummeted upon the announcement of Edison's invention. Although the arrival of the gas mantle reinstated the position of gas lighting on the market, eventually the electric filament lamp supplanted gas lighting in the home.









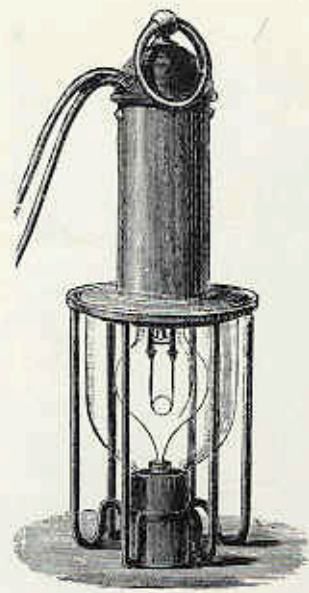






Increased business interests forced Swan to move from Tyneside nearer to London and the headquarters of the new Edison and Swan Electric Light Company. In 1883 Swan purchased Lauriston (above), a family house at Bromley in Kent. Once settled in his new home Swan began experiments to improve the quality of his filament lamps. He was convinced that a non-fibrous thread could prove a more efficient filament. Towards the end of 1883 Swan had succeeded in producing a new 'squirted filament' process. By this new process a continuous, uniform thread was formed which after washing could be cut to any desired length. In addition to providing a better filament there was something about the silky threads that caught Swan's eye. Their quality suggested the possibilities of a textile. Swan produced further threads of a special fineness which were crocheted into doyleys by his wife. This was the first artificial silk.





Swan developed an electric safety lamp for use in the mines and toured the country lecturing on the advantages of the new lamp. By 1892 he had turned his attentions to electrolysis and in 1894 he was elected a Fellow of the Royal Society for his research into the electrolytic deposition of copper. Eventually, the strain of travelling became too great and once again the family moved house, this time to 58 Holland Park, London. In the succeeding years Swan received many awards for his scientific work including the Albert medal presented by the Prince of Wales for 'his inventions in connection with the electric lamp and with photography'. In November 1904 Joseph Swan received a knighthood. However, the constant strain of work and public appearances proved too much for Sir Joseph's health. The heart trouble from which he had suffered for many years was growing progressively worse and on the advice of the doctor the family moved to a quiet village on the North Downs.

The picture below shows the interior of Swan's home in Holland Park.





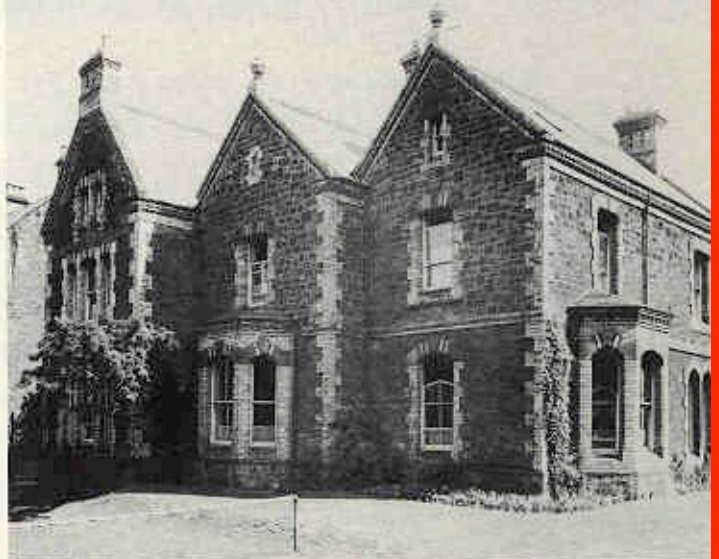




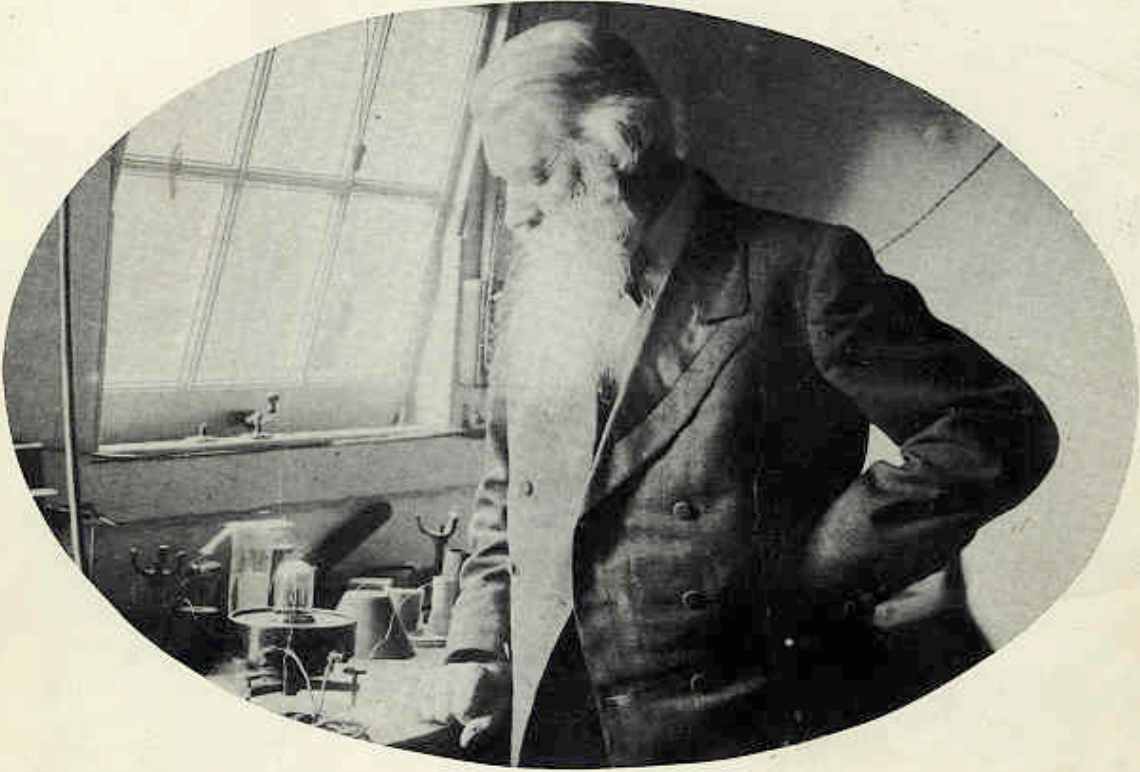


Sir Joseph's enjoyment of family life can be seen in the photograph opposite. Rested and refreshed his inquisitive mind spurred him on to devote his leisure hours to further experiments. Two pages from the laboratory notebook kept by one of his assistants is reproduced opposite. The outcome was the production of an imperishable gas battery which produced electricity electro-chemically working on a similar basis to the fuel cells used in the Apollo spacecraft. However, despite many experiments, Sir Joseph and his assistant were unable to perfect this idea. In the spring of 1914 Newcastle Corporation belatedly decided to bestow the freedom of the city upon Sir Joseph and his friend Sir Charles Parsons. Sir Joseph looked forward to visiting Newcastle but asked if the ceremony could be postponed until warmer weather. As fate would have it Sir Joseph's health failed him - he died on May 27th, 1914.

There are still places associated with Sir Joseph Swan to be seen on Tyneside such as the family home at Underhill, Kells Lane, Gateshead or the business premises of Mawson, Swan and Morgan in Grey Street, Newcastle. But perhaps his finest monument is the electric bulb itself which is still produced in Gateshead at the Osram works on the Team Valley Trading Estate.







Joseph W. Swan

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