

The Swan United Electric Light Co., Limited.



GOLD MEDALS—PARIS, 1881. CRYSTAL PALACE, 1882.

HIGHEST AWARD FOR INCANDESCENT LAMPS

AT THE

PARIS ELECTRICAL EXHIBITION, 1881.

CONTENTS.

| | PAGE |
|--|------|
| Description of the Swan Incandescent Lamp - - - - - | 2 |
| Price List of Lamps, Dynamos, Fittings, &c. - - - - - | 4 |
| Description, by Sir William G. Armstrong, of the Swan Electric Light as used by him at his residence, Craigside - - - - - | 8 |
| Steamship Lighting - - - - - | 15 |
| List of some of the Places where the Swan Lamp is used - - - - - | 18 |

Offices.

Head Office—

9, ST. MILDRED'S COURT, POULTRY,
LONDON, E.C.

Paris Agency—

89, Rue Charlot.

Factories.

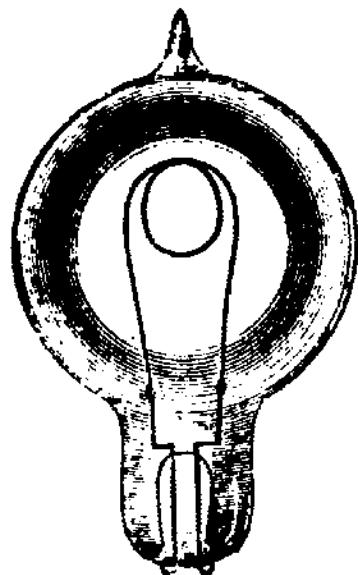
South Benwell,
NEWCASTLE-ON-TYNE ;

Low Fell,
GATEHEAD-ON-TYNE ;

and
32, Avenue Daumesnil,
PARIS.

2 *SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,*

DESCRIPTION OF THE SWAN INCANDESCENT LAMP



THE difficulty of subdividing the electric current for the economical production of incandescent light, which, till recently, has completely prevented the general introduction of electricity for lighting purposes, has been satisfactorily solved by the invention of the SWAN INCANDESCENT LAMP. By its means separate lights of various powers, applicable to all the uses of ordinary gas burners, and to all the purposes for which artificial light is required, can be produced.

SWAN LAMP (FIG. 1).

The SWAN INCANDESCENT LAMP (Fig. 1) is extremely simple in its construction, and may be described as follows:—A small glass globe from which all the air has been exhausted, and in which is fixed a thin filament of carbon connected with two platinum conducting wires, which pass through and are fused into the glass.

On passing the electric current through the carbon it becomes intensely white hot and emits a beautifully soft, clear, and steady light. As the carbon is not in contact with the air there is no combustion, and, therefore, no deterioration of the atmosphere of the room in which it is used, and exceedingly little heat is given off.

This lamp, unlike most other electric lamps, has no mechanism about it, and when it fails, from use or accidental breakage, it is as easily replaced by a new one as a candle is placed in a candlestick.

The light given out by the ordinary SWAN INCANDESCENT LAMP is 20 candle-power, but lamps are now in use varying from $2\frac{1}{2}$ to 100 candle-power each, for list shewing candle-power, and approximate current and electro motive force required, see page 4.

4, 57, NIDDER'S COURT LONDON, E.C.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED, 3

GENERATION OF THE CURRENT.

The electric current for working the lamps is produced most economically by using a dynamo-electric generator. The dynamo-electric machines are driven by suitable motive power—gas, water, or steam—whichever may be found the most convenient and economical under the circumstances.

MOTIVE POWER.

The **GAS ENGINE** is generally used where the number of lamps is not very large. It is also used with large numbers of lamps in special cases, when a steam engine would be inadmissible on account of extra insurance, smoke, &c. One or more engines can then be used. Gas engines are very convenient, as they require little attention when once started, and are economical in their working.

WATER POWER is the cheapest and best power when there is a stream of sufficient volume and fall to work a turbine or water-wheel within a short distance of the place where the light is wanted. See letter from Sir Wm. G. Armstrong to the Editor of *The Engineer*, page 8.

The **STEAM ENGINE** is used where steam is already in use on the premises, and where there is power to spare, as in factories, collieries, &c. Steam power is also used in cases where there are a large number of lamps to be lighted.

The amount of motive power required for driving the electric generator working the Swan Lamps, varies according to the number of lamps in use. It may be calculated that, on an average, one horse-power is required for every ten lamps of 20 candle-power each.

ELECTROLIERS AND FITTINGS.

The Swan Lamps can be adapted to existing gas fittings, and also to oil lamp fittings, where it is desired to retain these; but fittings specially designed for the lamps will be found much more satisfactory. Special fixtures and electroliers can be made exactly suited to the lamps; and, from the fact of so little heat being generated, the smallness of the lamps, and their capability of being used in any position, these may be of unusually elegant design.

9, ST. MILDRED'S COURT, LONDON, E.C.

4 SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,

The light may be turned off or on by means of a key or button, and each lamp is entirely independent of the others, or they may be arranged in groups if desired. Electroliers, arranged for any number of lights, and from special designs if required, are furnished by the Swan Company.

The entire absence of noxious vapours, heat, &c., which are so injurious in lighting by gas or oil lamps, renders this form of illumination peculiarly suitable for the lighting of Gentlemen's Mansions, Clubs, Libraries, Picture Galleries, Conservatories, Theatres, Shops, Factories, Ships, &c., &c.

The Company is now in a position to execute contracts for Electric Lighting on any scale, and is prepared to receive applications from Local Boards, Vestries and Lighting Committees, for the supply of the complete plant requisite for Installations from 10 lights of 16 candle-power each up to 10,000 lights from 16 to 100 candle-power each.

PRICE LIST OF LAMPS, DYNAMOS, FITTINGS, &c.

L A M P S.

| CLASS | ELECTRO-MOTIVE FORCE. | CURRENT. AMPÈRES. | CANDLE-POWER. | PRICE. |
|-------|-----------------------|-------------------|---------------|--------|
| ... | 6 volts. | 1.3 | 2½ | 5 0 |
| ... | 12 " | 1.3 | 5 | 5 0 |
| ... | 24 " | 1.3 | 10 | 5 0 |
| ... | 50 to 60 volts. | 0.6 | 10 | 5 0 |
| A 3 | 37 volts. | 1.6 | 16 | 5 0 |
| A 2 | 39 " | 1.51 | 16 | 5 0 |
| A 1 | 41 " | 1.46 | 18 | 5 0 |
| A | 43 " | 1.36 | 18 | 5 0 |
| B 1 | 46 " | 1.32 | 20 | 5 0 |
| B | 48 " | 1.3 | 20 | 5 0 |
| C | 50 " | 1.27 | 20 | 5 0 |
| D | 52 " | 1.26 | 20 | 5 0 |
| E | 54 " | 1.24 | 20 | 5 0 |
| F | 56 " | 1.23 | 20 | 5 0 |
| G | 59 " | 1.22 | 20 | 5 0 |
| H | 61 " | 1.18 | 20 | 5 0 |
| I | 65 " | 1.17 | 20 | 5 0 |
| ... | 100 to 120 volts. | 0.6 | 20 | 5 0 |
| ... | 100 volts. | 1.2 | 40 | 6 0 |
| ... | 50 " | 2.9 | 50 | 6 0 |
| ... | 100 " | 3 | 100 | 7 6 |

9, ST. MILDRED'S COURT, LONDON, E.C.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED, 5

DYNAMOS.

LIST OF SIEMENS BROS.' & CO., LIMITED, DYNAMO MACHINES SUPPLIED BY THE SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED, FOR INCANDESCENT LIGHTING.

| TYPE OF MACHINE | Number of Lamps. | Diameter of Pulley in inches. | Width of Machine Strap in inches. | Revolutions of Machine per Minute about— | Horse-power required, about— | Price Delivered in London, exclusive of Packing. | Loose Pulleys with Striking Gear, extra. | Fly-Wheel for use with Gas Engine, extra. |
|--------------------|------------------|-------------------------------|-----------------------------------|--|------------------------------|--|--|---|
| S·D ₅ | 12 | 5 | 2½ | 1,600 | 1½ | £ 50 0 0 | £ 3 0 0 | £ 3 5 0 |
| S·D ₇ | 35 | 6½ | 3 | 1,300 | 3½ | 75 0 0 | 3 5 0 | 3 10 0 |
| S·D ₈ | 50 | 8½ | 4 | 900 | 6 | 105 0 0 | 3 10 0 | 4 0 0 |
| S·D ₁ | 150 | 11½ | 5 | 1,100 | 20 | 240 0 0 | | |
| S·D ₂ | 240 | 12 | 8 | | 30 | 320 0 0 | | |
| S·D ₃₀₀ | 300 | 15 | 9 | 650 | 38 | 400 0 0 | | |
| W ₃ | 60 | 8 | 4½ | 750 | 8 | 170 0 0 | 9 0 0 | |
| D ₃ | | 4½ | 2 | 1,100 | | | 3 0 0 | 3 5 0 |
| W ₄ | 80 | 8 | 5½ | 650 | 11 | 205 0 0 | 9 10 0 | |
| D ₄ | | 4½ | 2½ | 1,000 | | | 3 5 0 | 3 10 0 |
| W ₂ | 120 | 10 | 6½ | 650 | 16 | 255 0 0 | 10 0 0 | |
| D ₆ | | 4½ | 2½ | 1,200 | | | 3 5 0 | 3 10 0 |
| W ₂ | 200 | 12 | 8 | 650 | 25 | 300 0 0 | 11 10 0 | |
| D ₇ | | 6½ | 3 | 1,200 | | | 3 5 0 | 3 10 0 |
| W ₆ | 500 | 20 | 10 | 600 | 62 | 535 0 0 | | |
| D ₈ | | 8½ | 3½ | 700 | | | 3 10 0 | 4 0 0 |

With each machine two spare sets of commutator-combs are supplied.

The loose pulleys supplied with the alternate-current machines have SCREW striking gear, rendering the shifting of the belts an easy operation.

9, ST. MILDRED'S COURT, LONDON, E.C.

6 SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,

LIST OF "CROMPTON-BÜRGIN" DYNAMO MACHINES SUPPLIED BY THE SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED.

The following Tables show Prices, Size, &c., of some of these machines for working from 12 Lamps up to 200 Lamps.

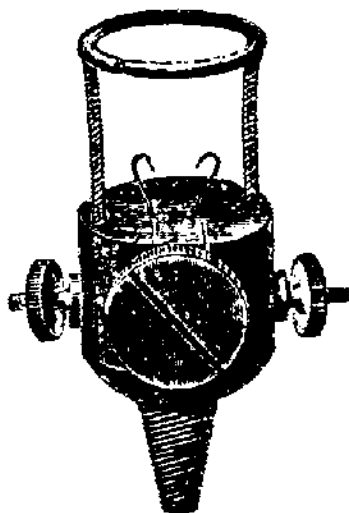
FOR ARC LIGHTING. FOR INCANDESCENT LIGHTING.

| Mark of Machine. | No. of large Arc Crompton Lamps burned in circuit. | Candle power (nominal) of each Lamp. | No. of small Arc Lamps (Wetor) burned in circuit. | Candle power (nominal) of each small Arc Lamp. | Approximate Horse- power required. | No. of Swan Lamps, 20 candles cap., as shown for. | How arranged. | Approximate Horse- power required. | Price. | Remarks. | |
|------------------|--|--|---|--|---------------------------------------|---|---------------|---------------------------------------|----------|---|--|
| A | 2 | 3,000 | 5 | 500 | 4½ | 48 | 3 parallels | 6 | £ 90 0 0 | Generally used for arc lighting. Most generally used for incandescent lighting. *Search Lights for Naval and Military purposes. | |
| B | 3 | 5,000 | | | 5 | 40 | 2 parallels | 5½ | 90 0 0 | | |
| B¹ | 1 | 6,000 | | | 3½ | 30 | 1 parallel | 4½ | 90 0 0 | | |
| B² | 4 | 3,000 | 7 | 500 | 5½ | 80 | 5 parallels | 9½ | 110 0 0 | | |
| C | 3 | 5,000 | | | 6 | 72 | 3 parallels | 9 | 110 0 0 | | |
| C¹ | 2 | 6,000 | | | 6 | 56 | 2 parallels | 8 | 110 0 0 | | |
| C² | 1 | 12,000* | | | 6½ | 40 | 1 parallel | 7½ | 110 0 0 | | |
| C³ | | | | | | 60 | 1 parallel | 7 | 130 0 0 | | |
| S | | | | | | | | | | | |
| S¹ | | | | | | | | | | | |

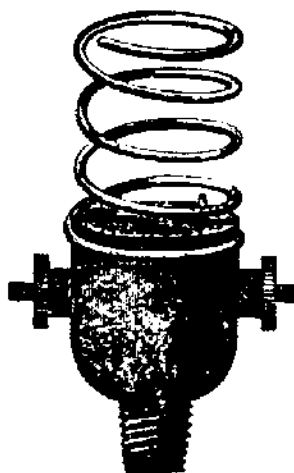
Unless specially mentioned, the machines all run at 1,600 revolutions per minute to give the results above.
7-inch pulleys are supplied with all machines unless specially ordered.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED, 7

FITTINGS SUITABLE FOR THE SWAN
INCANDESCENT LAMP.



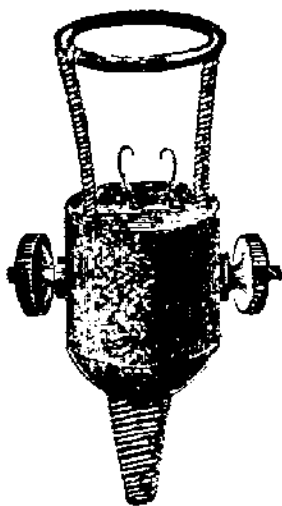
Holder with Switch, price 2/3.



Side Holder,
1/-.



Central Contact
Holder, 1/3.

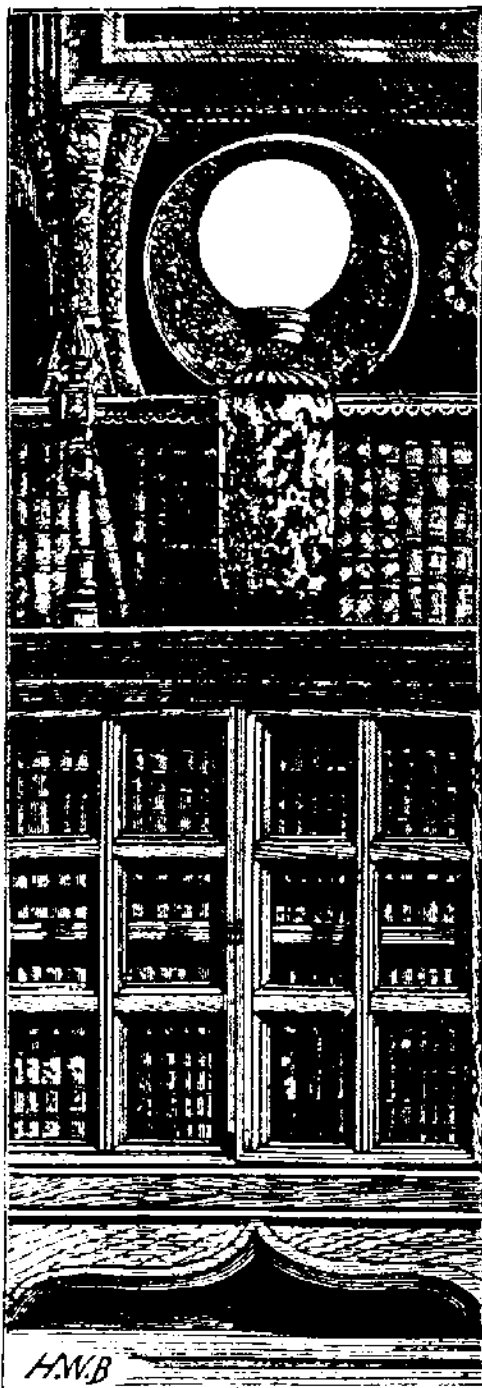


L Pattern Holder, 1/6.



9, ST. MILDRED'S COURT, LONDON, E.C.

8 SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,



DESCRIPTION OF THE SWAN
INCANDESCENT LAMP,

AS USED IN COUNTRY MANSIONS, &C.

LETTER

FROM

SIR W. G. ARMSTRONG,

TO THE

Editor of THE ENGINEER,

Dated January 17th, 1881.

SIR,

The following particulars of a successful application of SWAN'S ELECTRIC LAMPS to the lighting of a country residence will probably be interesting to many of your readers. The case possesses novelty, not only in the application of this mode of lighting to domestic use, but also in the derivation of the producing-power from a natural source—a neighbouring brook being turned to account for that purpose. The brook, in fact, lights the house, and there is no consumption of any material in the process.

The generator used is one of Siemens' dynamo-electric machines, and the motor is a turbine which gives off 6 horse-power, the distance of the turbine and generator from the house is 1,500 yards. The conducting wire is of copper, and its section is that of No. 1 Birmingham wire gauge. A return wire of the same material and section is used, so that the current has to pass through 3,000 yards of this wire to complete the circuit. The number of lamps in the house is 45, but as I can switch off the current from room to room, I never require to have more than 37 in light at once. For this number of lamps, 6 horse-power proves to be amply sufficient, notwithstanding the great length of the conducting wire.

The library, see figs. 2-3, which is a room of 33 feet by 20 feet, with a large recess on one side, is well lighted by eight lamps. Four of these are clustered in one globe of ground glass, suspended from the ceiling in the recess, and the remainder are

(Fig. 2.) The Library.

9 ST MILDRED'S COURT, LONDON, E.C.

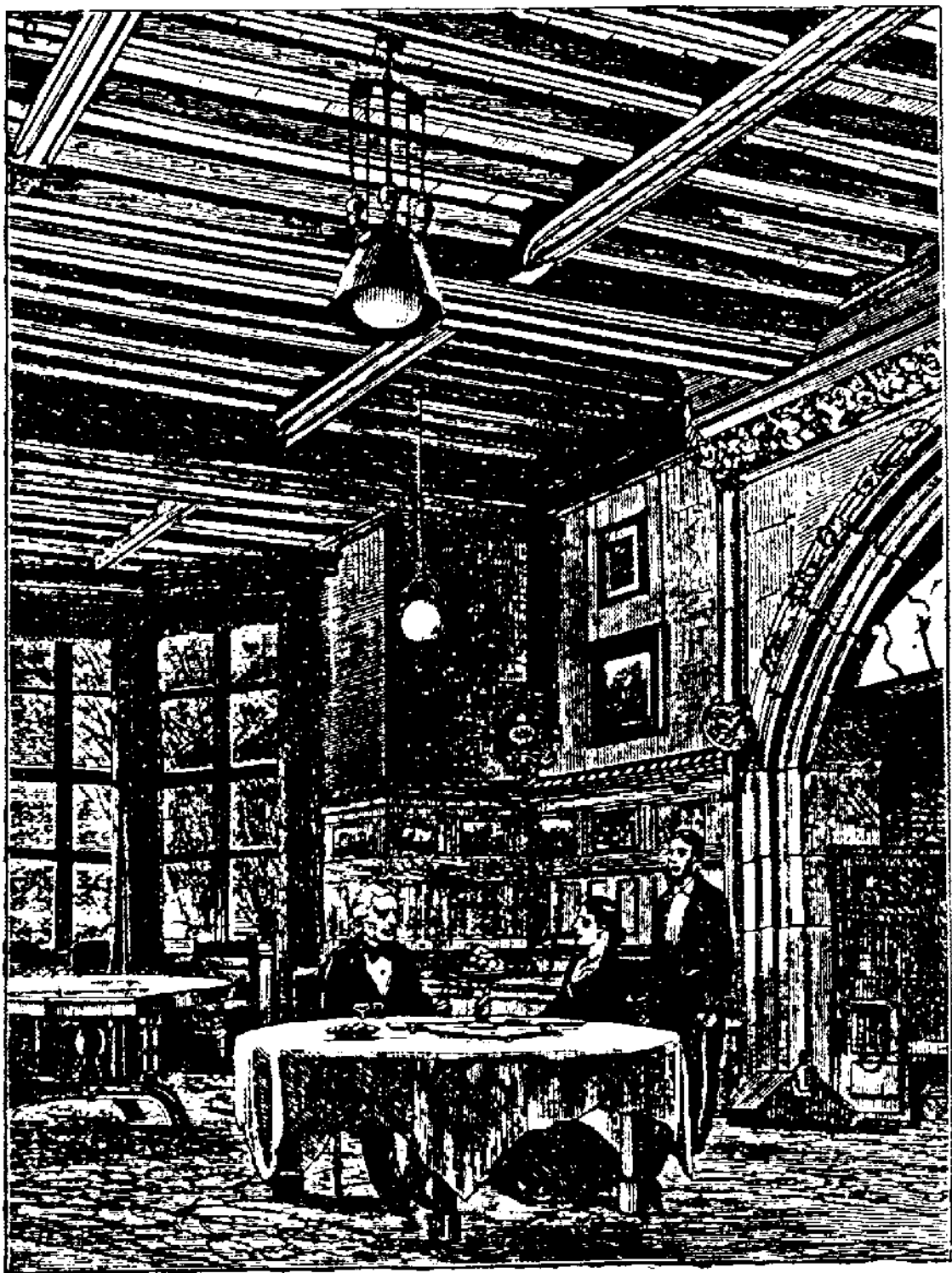
SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED.



Fig. 5. The Bay Window in the Library

4, 57, MILDREDA COURT, LONDON, E.C.

10 *SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,*



(Fig. 4.)

The Dining Room.

9, ST. MILDRED'S COURT, LONDON, E.C.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED.

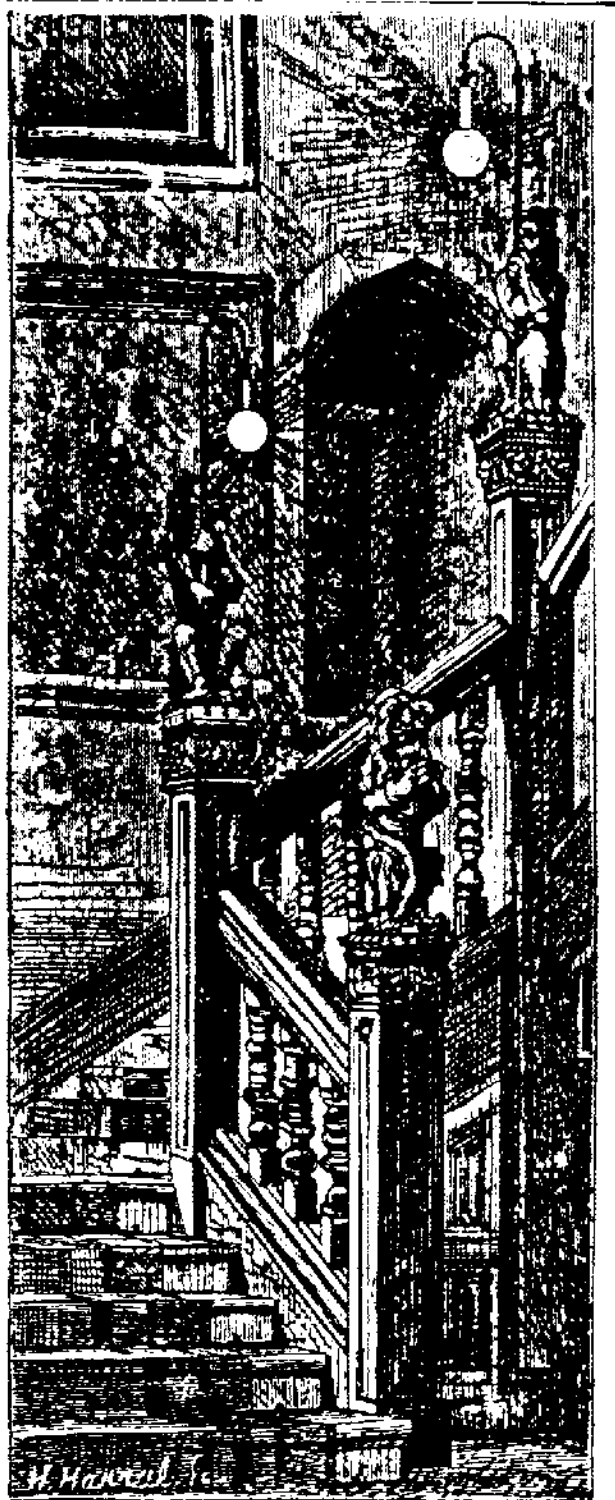
11

placed singly and in globes, in various parts of the room, upon vases which were previously used as stands for duplex kerosene lamps. These vases, being enamel on copper, are themselves conductors, and serve for carrying the return current from the incandescent carbon to a metallic base in connection with the main return wire. The entering current is brought by a branch wire to a small insulated mercury cup in the centre of the base, and is carried forward to the lamp by a piece of insulated wire which passes through a hole in the bottom of the vase, and thence through the interior to the lamp on the top. The protruding end of this wire is naked, and dips into the mercury cup when the vase is set down. Thus the lamp may be extinguished and re-lighted at pleasure merely by removing the vase from its seat or setting it down again.

“The dining-room, fig. 4, is also lighted by eight lamps, six of which are grouped together in one glass shade suspended over the centre of the table, and the other two are used singly as bracket lamps, one at each side of the room.

“A picture gallery, which is also used as a drawing-room, is lighted by twelve overhead lamps; but when the eight lamps in the dining room are no longer wanted, the current supplying them is shunted to the gallery for lighting eight additional lamps, making 20 in all. The gallery is agreeably lighted even with the twelve lamps, and with the full illumination the pictures are seen as distinctly as in daylight.

“In the passages and stairs the lamps are for the most part used without glass shades, and present a very beautiful star-like appearance, not so bright as to pain the eye in passing, and very efficient for lighting the way.



The Staircase. (Fig. 5.)

9, ST. MILDRED'S COURT, LONDON, E.C.

12 *SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,*

"Each single lamp is about equal to a duplex kerosene lamp well turned up, and this, I believe, is equivalent to 25 candles, so that my 6 horse-power, in supporting 37 lamps, gives me an illuminating effect equal to 925 candles. The same power applied to the production of light by the 'Electric Arc,' instead of by incandescence, would give vastly more light, but the arc light, being only divisible to a small extent, could not be made nearly so serviceable for the distributed lighting of a house. Besides, the light produced by incandescence is free from all the disagreeable attributes of the arc light. It is perfectly steady and noiseless. It is free from harsh glare and dark shadows. It casts no ghastly hue on the countenance, and shows everything in true colours. Being unattended with combustion, and out of contact with the atmosphere, it differs from all other lights in having no vitiating effect on the air of a room. In short, nothing can be better than this light for domestic use.

"I have not yet had sufficient experience of Mr. Swan's lamps to judge of their durability, but with the exception of a few that failed by over-heating in my first trials, I have lost none since I began to use them about a month ago. They have not, however, been in constant use during that time, and the test of their duration remains incomplete. But whatever their durability may be at present, it is almost certain to be increased by progressive improvement in manufacture, and when they are systematically made in large numbers, the cost of renewing them will probably be small.

"The lamps are connected with the main leading wire by branch wires, in what is called 'multiple arc,' so that if one fails the others are unaffected. To connect them in 'series' would have some advantages, but would require a much greater electro-motive force to drive the current through, and this would probably involve some difficulty.

"It is important to the preservation of the lamps that the amount of motive power applied should always be proportioned to the number of lamps in light at one time. In my case, I escape the necessity of varying the motive power by using a resistance coil to represent the resistance of each section of lamps which it is desirable to have the option of throwing out of use. By means of these coils the number of lamps in light at one time may be greatly varied without affecting the work of the generator, because the resistance to the current is the same, whether it passes through the coils or the lamps. This method is wasteful of power, but I can afford to waste that which costs me nothing, and is always sufficient in quantity. If steam or gas engines were employed the case would be different, and there might be difficulty in effecting such momentary adjustments of power as would save the lamps from disturbance, where the number in use was liable to great and sudden variation.

"In the daytime the turbine and generator are occasionally used for the transmission of motive power to a second dynamo-machine acting as a motor to drive a sawing machine. This it does with good effect; but I am not prepared to say how much of the original power is realised, or what should be the proportion between the generator and the motor to give the best effect.

W. G. ARMSTRONG.

"CRAGSIDE, ROTHRURY,
"17th January, 1881."

Since the above letter was written, Sir Wm. G. Armstrong has extended the installation and now uses 92 lamps of 20 c.p.

9, ST. MILDRED'S COURT, LONDON, E.C.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED. 13

EXTRACT FROM "THE TIMES" of 16th JANUARY, 1883.

"ELECTRICITY *versus* GAS.

"TO THE EDITOR OF 'THE TIMES.'

"SIR.—In the present state of uncertainty existing in the minds of many of the public as to whether the time has yet arrived for it to be prudent to incur the expense of substituting the electric light for gas in private houses, I send for your information some particulars of the lighting by electricity of a house I have just erected, and also the way I set about it.

"Berechurch Hall is about three miles from Colchester, and in the latter end of last spring I determined to go into the whole question of the best and cheapest method of illuminating it. I had, in the first instance, an estimate drawn up of the cost of laying down gas plant, which was simple enough; but when I came to that of the electric light, many difficulties presented themselves. Not only was there the widest divergence as to cost in the tenders sent in, but I found that it would be necessary for me to be acquainted with the various kinds of lights, the relative merits of the dynamo machines, the best kind of engine to drive them, whether accumulators should be employed, the manner in which the wires should be insulated, how they should be laid in the house, the precautions necessary to prevent risk of fire, &c.; for upon all these the permanent well-being of the installation appears to depend. I saw at once that it would be prudent as well as economical to employ professional assistance. I therefore engaged the services of Mr. Heaphy, C.E., of the Phoenix Fire Office, to advise me upon the matter and superintend the installation on my behalf. We examined together every different system of lighting, the result being that I determined to adopt the *Swan Incandescent Light* and the Burgin machine, and accepted the tender of Messrs. Crompton and Co. to supply the same, after I had instructed Mr. Heaphy to draw up a regular specification and contract, going into every detail, and giving me the power of rejecting any work or materials he was not perfectly satisfied with. We arranged to have 200 lights of 18 candle-power each, and four dynamo machines; the engine to be a 12 horse-power, with very sensitive governor, and with tubular boiler; all leads and wires to be heavily insulated in the best possible manner, and the insulation to be rendered non-inflammable inside the rooms. They were to be embedded in the walls and kept at least four inches apart from each other, and four inches from every kind of metallic substance. Every floor, every room, and, in many cases, each light to have switches to turn the current on and off, as well as a lead 'cut out,' to guard against overheating of the wires.

"The whole has been carried out as specified, and the result has been a success that has exceeded my expectations. The light is quite as easy to manage as gas, while the softness, the purity, and the agreeableness are such that a return to any other method of illumination would be now quite out of the question. The pictures, books and decorations have no chance of injury; the ceilings and walls remain unsoiled, while the difference in health felt after sitting for an evening in a room electrically illuminated, and another lighted by gas, must be experienced before it can be appreciated.

"I will now give details as to cost:—Estimate for gas plant, buildings and erection, £740; gas main to house, £75; laying pipes in house, £200; cutting and making good again, £50; chandeliers and brackets, &c., £268. 18s.—total, £1,333. 18s. Cost of electric light: Four dynamo machines, £405; 220 Swan lamps, £55; 200 sockets for same, £10; cable, wires, switches and cut outs, £66. 4s.; cutting and making good walls and floors and incidental work, £60; engine and boiler, extra flywheel and belting, £300. 6s.; counter-shafting, £25; foundations to engine and flooring, £40;

9, ST. MILDRED'S COURT, LONDON, E.C.

14 SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,

erection, laying wires, &c., and carriage, £90; buildings, £150; chandeliers and brackets, &c., £268. 18s.—total, £1,470. 8s.

"The cost of the first outlay for electricity is, as will be seen, somewhat in excess of the same for gas; but then I have no nuisance of lime, or of tar, or other refuse products; no leakage of gas into the house, no smell in the manufacture, or damage to my garden; and, in the place of an unsightly gasometer, I have a compact little engine, placed out of view, and which, when not driving the dynamo, is utilized for pumping water to the top of the house, and can also be employed for sawing wood, or any other purpose of a like nature I may require.

"I will now estimate the annual working expenses, and, in making a comparison, I will assume that it would cost the same to manufacture 1,000 cubic feet of gas at Berechurch as it does here.

"Electric light—200 18-candle lamps, each working 1,150 hours per annum.—Cost, at 20s. per ton, £38. 18s. 1d.; engine driver, at 30s. per week, £78; renewal of lamps, 153 at 5s. each, £38. 5s.; depreciation, 10 per cent. on cost of machinery, £74; depreciation, 5 per cent. on conductors, £4—total, £232. 15s. 1d.

"Now, for less than half this amount of light it costs me £200 a-year here, and, therefore, I am, if anything, understating the expense when I say that, had I used gas at Berechurch giving an equivalent illuminating power, it would have cost me at least £400 per annum to produce.

"This would show an annual saving of £167. 4s. 11d. to me by using electricity. Having had twenty years' experience of lighting this house by gas—which I consider a great improvement upon any previously-known method—I am only too sensible of its drawbacks, and, although I am not doing away with it here yet, I am well satisfied that I have adopted electricity at Berechurch.

"Faithfully yours,

"OCTAVIUS E. COOPE.

"ROCHETT, BRENTWOOD,

"January 11."

APPLICATION OF THE ELECTRIC LIGHT TO SHOPS, STORES, &c.

Extract from THE DAILY EXPRESS (Newcastle-on-Tyne) of 30th November, 1882.

"Our enterprising townsmen, Messrs. JAMES COXON & Co., general warehousemen, Market Street and Grey Street, who have been the first firm to introduce the Electric Light of our talented townsmen, Mr. J. W. SWAN, for the illumination of their shop windows and show-rooms, have, after some experiments, made a new application of the Electric Light, by the introduction of the Swan Lamps into air-tight show cases. Hitherto show cases have been lighted from the outside, but the small but brilliant lights of the Swan Lamp in their air-exhausted globes can be introduced with safety and with great effect into show cases, whether on the counter or placed against the wall. Some of the choicest articles are kept in cases, which are often almost necessarily imperfectly lighted, because in the use of gas the light is outside; but by the use of Swan's Lamps in the method now adopted by Messrs. COXON & Co., probably for the first time, the most valuable articles may be seen at night with, in many cases, more than the brilliancy of daylight. Messrs. COXON intend next week to have an exhibition of ball dresses, and other articles for the coming festive season; and two of their show-rooms, and the cases in them, will be lighted during the day with the Electric Light, so that the ball-room

9, ST. MILDRED'S COURT, LONDON, E.C.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED, 15

costumes may be seen under the soft but brilliant light of the Swan Lamp. Messrs. COXON & Co. not only have led the way in the experiment with regard to the lighting places of business with electricity, but they are giving nightly a practical illustration of the mode of lighting the streets by electricity, which is being adopted in some of the principal cities in Europe and America, by the suspension of a Siemens' Electric Lamp, of 3,000 candles power, from the top storey of their premises at the corner of Market and Grey Streets, so that those two streets are brilliantly lighted at night while the shop remains open. The electricity is produced on the premises by three of Siemens' Machines, one of which lights the large lamp outside and the other two light upwards of 200 Swan's lamps, of 20 candles, in the shops and show-rooms of the establishment. Magneto-dynamic machines are worked by steam power, which produces a steadier light than the Gas Engines, which Messrs. J. COXON & Co. first tried, in that experiment showing great enterprise, and a desire to go with the age and take advantage of its improvements."

LIGHTING OF STEAM SHIPS BY ELECTRICITY.

The suitability of the Swan Lamp for the purpose of lighting large Steam Ships has proved itself by the great success it has attained, and although little more than 18 months have elapsed since its introduction, twenty-five of the largest ocean-going steamers have for some time past been fitted with the lamps and use it as a means of illumination, in fact no steamer can be considered complete which is not lighted in this manner.

The following is a list of some of the steamers fitted with the Swan Lamp:—

| | | |
|--------------------------|--------|--------------------|
| H.M.S. "Himalaya" | | |
| S.S. "City of Richmond" | .. | Inman Line. |
| S.S. "Servia" | | } Cunard Line. |
| S.S. "Cephalonia" | | |
| S.S. "Pavonia" | | |
| S.S. "Arabic" | | } White Star Line. |
| S.S. "Coptic" | | |
| S.S. "Chimborazo" | | } Orient Line. |
| S.S. "Orient" | | |
| S.S. "Cotopaxi" | | |
| S.S. "Austral" | | |

9, ST. MILDRED'S COURT, LONDON, E.C.

16 *SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,*

| | |
|-------------------------------|---|
| S.S. "City of Rome" | Anchor Line. |
| S.S. "Alaska" | } Guion Line. |
| S.S. "Arizona" | |
| S.S. "Hawarden Castle" | Donald Currie Line. |
| S.S. "India" | } British India Steam Navigation Company. |
| S.S. "Goorkha" | |
| S.S. "Rewa" | |
| S.S. "Nerbudda" | } Union Steamship Company of New Zealand. |
| S.S. "Manapouri" | |
| S.S. "Wairarapa" | |
| S.S. "Antonio Lopez" | Compania Transatlantica. |
| S.S. "Invicta" | L. C. and D. Railway Company |
| S.S. "Lonsdale" | Capt. James Deane. |
| S.S. "Faraday" | Messrs. Siemens Bros. |

A special Descriptive Catalogue of Swan's Electric Light, as used in Steam Ships, can be had on application, and an Engineer specially trained for this description of work will, if desired, attend to give further information and estimates.

**APPROXIMATE ESTIMATE OF THE COST FOR
SUPPLYING AND FITTING THE SWAN
INCANDESCENT LAMPS.**

| 50 LAMPS. | | £ | s. | d. |
|--|---|----------|----|----|
| 1 Dynamo-electric Machine | - | 105 | 0 | 0 |
| 50 20 Candle-power Swan Lamps, at 5/0 each | - | 12 | 10 | 0 |
| 50 Holders, at 1/0 each | - | 2 | 10 | 0 |
| Cable-connecting Wire, Switches, &c. | - | 12 | 5 | 0 |
| Superintendence, Labour and Carnage | - | 25 | 0 | 0 |
| Sundries, Hooks, &c. | - | 2 | 0 | 0 |
| | | £159 5 0 | | |

D. ST. MILDRED'S COURT, LONDON, E.C.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,

17

| 100 LAMPS. | | £ | s. | d. |
|------------|--|------------------|----|----|
| 2 | Dynamo-electric Machines - | 210 | 0 | 0 |
| 100 | 20 Candle-power Swan Lamps, at 5/0 each | 25 | 0 | 0 |
| 100 | HOLDERS, at 1/0 each - | 5 | 0 | 0 |
| | Cable-connecting Wire, Switches, &c. - | 24 | 0 | 0 |
| | Labour and Carriage - | 40 | 0 | 0 |
| | Sundries, Hooks, &c. - | 2 | 10 | 0 |
| | | <u>£306 10 0</u> | | |
| 150 LAMPS. | | £ | s. | d. |
| 1 | Dynamo-electric Machine - | 240 | 0 | 0 |
| 150 | 20 Candle-power Swan Lamps, at 5/0 each | 37 | 10 | 0 |
| 150 | HOLDERS, at 1/0 each - | 7 | 10 | 0 |
| | Cable-connecting Wire, Switches, &c. - | 30 | 0 | 0 |
| | Labour and Carriage - | 60 | 0 | 0 |
| | Sundries, Hooks, &c. - | 4 | 0 | 0 |
| | | <u>£379 0 0</u> | | |

Estimates for larger installations on application.

It is assumed in the above estimate that motive power is supplied by the purchaser.

Applications for estimates should be addressed to the Company's Offices in London, and should state

1. The area to be lighted.
2. Size and height of rooms.
3. Number and position of gas burners used in each room, and whether ordinary or Argand.
4. Steam power available, if any, and distance from area to be lighted.
5. A sketch of the place or plan of the rooms to be lighted is very desirable.

Further particulars can be obtained at the Company's Office, or if desired, an Official of the Company will call upon persons desiring information.

9, ST. MILDRED'S COURT, LONDON, E.C.

18 *SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,*

BUILDINGS, &c., Lighted with SWAN LAMPS, and fitted up by THE SWAN UNITED ELECTRIC LIGHT COMPANY, Limited.

THE "TIMES" OFFICE, London.
Lord ZETLAND, Olliver, Richmond, Yorks.
WEBB BROS., Linen Weavers, Randalstown, Ireland.
C. DAVIDSON & JONES, Mugie Moss and Buxburn Mills, Aberdeen.
COXON & CO., Drapers, &c., Market Street, Newcastle-on-Tyne.
J. H. GARTSIDE & CO., Buckton Vale Dye Works, near Manchester.
W. F. MOORE & SON, Tromode Sail Cloth Works, Isle of Man.
DUNCAN'S Sugar Refinery, Clyde Wharf, Victoria Docks.
C. M. PALMER, M.P., Loftus, Cleveland.
T. RICHARDSON, M.P., Yarm, Yorks.
Sir M. W. RIDLEY, Bart., M.P., Blagdon Hall, Northumberland.
Captain F. MARKHAM, Moreland, Penrith.
Messrs. ROWNTREE & SONS, Drapers, Scarboro'.
Messrs. EDMUNDSON & CO., Great George Street, London.
GREAT EASTERN RAILWAY HOTEL, Parkeston.
GENERAL POST OFFICE, Glasgow.
ROYAL COURTS OF JUSTICE.
FRENCH MILLS.

The following have been lighted by THE SWAN UNITED ELECTRIC LIGHT COMPANY, Limited, TEMPORARILY.

OPERA HOUSE, Paris.
PARIS EXHIBITION.
CRYSTAL PALACE EXHIBITION, Sydenham.
BIRMINGHAM AND MIDLAND INSTITUTE, Birmingham.
CENTRAL EXCHANGE ART GALLERY, Newcastle-on-Tyne.
FREE LIBRARY EXHIBITION, Liverpool.
STOCKTON EXHIBITION, Stockton.
LITERARY AND PHILOSOPHICAL INSTITUTE, Newcastle-on-Tyne.
CHESTER BAZAAR, Chester.
PICTURE GALLERIES, BRITISH ASSOCIATION MEETING, York.
Messrs. FOOTMAN, PRETTY & CO., Ipswich.
GAS EXHIBITION, Marischal College, Aberdeen.
SMOKE ABATEMENT EXHIBITION, South Kensington.
"FREEMAN'S JOURNAL," Dublin.
MIDLAND HOSIERY COMPANY, Sutton-in-Ashfield, Notts.
FALMOUTH POLYTECHNIC EXHIBITION, Falmouth.
Messrs. DUFF AND ROUNTREE, Bishop Auckland.
NORTH EAST COAST EXHIBITION, Tynemouth.
Messrs. GILKES & Co., Kendal.
LORD BUTE'S CASTLE, Cardiff.

By Messrs. CROMPTON, WINFIELD & Co.

TOWN HALL, Birmingham, for Musical Festival.
WAKEFIELD FINE ART EXHIBITION.

9, ST. MILDRED'S COURT, LONDON, E.C.

SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED, 19

*SWAN LAMPS have been fitted by Messrs. SIEMENS BROS.
and Co., Limited, at*

| | |
|--|--------------------------------------|
| GT. SOUTHERN & WESTERN RAILWAY. | Messrs. DAVIES & SON. |
| Mr. CHEW, Blackpool. | Mr. E. WIZZELL. |
| Messrs. SIEMENS & HALSKE. | Messrs. ELKINGTON & CO. |
| Messrs. SCHWARTZ. | TURNER GAS ENGINE CO. |
| Messrs. J. & J. CASH. | Messrs. OPPENHEIMER & CO. |
| SEVERN TUNNEL WORKS. | CRYSTAL PALACE PANORAMA. |
| TOWN OF GODALMING. | CHANNEL TUNNEL WORKS. |
| TOWN HALL, Hull. | Dr. C. W. SIEMENS. |
| Messrs. ROLLO & SONS | SAVOY THEATRE. |
| THE "KIOSK." | Mr. CAMPBELL MUIR. |
| Messrs. FLEURY & CO. | Messrs. HEYERDAHL. |
| Messrs. LAUGHLAND & MACKAY. | Mr. SAWTELL. |
| Messrs. MCINTOSH & SONS. | Dr. LEMON. |
| Messrs. PEACOCK. | Mr. TANNER. |
| Messrs. PICKENPACK. | Mr. BALLARD. |
| Mr. G. HOVEY, Sheffield. | Mr. BURGESS. |
| Mr. EMERSON DAWSON. | Mr. ANGEL. |
| BEACONSFIELD HOTEL. | Mr. COLLIER. |
| ROYAL ALBERT DOCK HOTEL. | Mr. BARNES. |
| DEVONSHIRE PARK, Eastbourne. | Mr. MAGGS. |

*Fitted by Messrs. R. E. CROMPTON & Co., and Messrs. CROMPTON,
WINFIELD & Co.*

THE MANSION HOUSE, London.
THE RISCA COLLIERY, near Newport, Mon.
THE QUEEN STREET STATION, Glasgow.
O. E. COOPE, Esq., Berechurch Hall, Colchester.
J. G. FINLING, Tons Lapps Quay Mills, Cork.
Messrs. HALL & Co., St. Dominick Steam Mills, Cork.
Messrs. WALKER'S, Newry.
Messrs. GUINNESS, Dublin.
Mr. PETER JONES, Draper, King's Road, Chelsea.
THE OFFICES, BRICKLAYERS' ARMS STATION, South Eastern Railway.
J. W. SWAN, Esq., Lauriston, Bromley, Kent.

8, ST. MILDRED'S COURT, LONDON. E.C.

20 **SWAN UNITED ELECTRIC LIGHT COMPANY, LIMITED,**

Fitted by Messrs. EDMUNDSON.

DIDLINGTON HALL, Brandon, Norfolk.
AVENUE HOUSE, Finchley, Mr. H. C. STEPHENSON.
Mr. BOWRON, 279 and 281, Edgware Road.

Independently Fitted.

HATFIELD HOUSE, the seat of the Marquess of SALISBURY.
CRAGSIDE, ROTHBURY, the residence of Sir WILLIAM G. ARMSTRONG.
COMBE BANK, the residence of W. SPOTTISWOODE, Esq., President of the
Royal Society.
CASTLE HUNTLY, the residence of J. M. WHITE, Esq.
THE RESIDENCE OF SIR WILLIAM THOMSON.
THE EARNOCK COLLIERY, Glasgow.
Messrs. SMITH & CHAMBERLAIN, Works, Birmingham.
Messrs. MAWSON & SWAN, Newcastle-on-Tyne.
ROYAL EXCHANGE RESTAURANT, Manchester.
Messrs. FURLONG & SONS' FLOUR MILL, Cork.
Messrs. HALL & CO.'S FLOUR MILL, Cork.
SEVERN TUNNEL.

↵ **ST. MILDRED'S COURT, LONDON, E.C.**

The Swan United Electric Light Company,
LIMITED.

Incorporated under the Companies' Acts, 1862 to 1880.

**Capital £1,000,000, divided in 200,000
Shares of £5 each.**

**First issue, 100,000 Shares, of which 19,750 are fully paid, and
80,150 £2. 10s. per Share.**

Directors.

JAMES STAATS FORBES, Esq., Chairman, 14, Ashley Place, S.W.

E. W. BATT, Esq., 20, Great Winchester Street, E.C.

J. C. STEVENSON, Esq., M.P., South Shields.

**MAJOR-GEN. J. S. TREVOR, C.S.I., R.E., late Director-General of
Railways in India.**

ERNEST VILLIERS, Esq., Director General Steam Navigation Company.

J. W. SWAN, Esq.,

R. E. B. CROMPTON, Esq., } **Technical Directors and Consulting Electricians.**

Bankers.

NATIONAL PROVINCIAL BANK OF ENGLAND, LIMITED, London.

MESSRS. HODGKIN, BARNETT, PEASE & CO., Newcastle-on-Tyne.

Solicitors.

MESSRS. ASHURST, MORRIS, CRISP & CO., 6, Old Jewry, E.C.

Secretary.

JAMES H. IVORY, Esq.

