From the GEC Archives...

The History of the General Electric Company up to 1900 – Part 1

by H. HIRST, M.I.E.E.
Chairman of the GEC 1910-1943

During 1920, Hugo Hirst gave a series of lectures to the GEC Debating Society, of which he was Chairman at that time. During these talks he described the events that took place during the five years leading up to the formation of the General Electric Company in 1886, through to the year 1900. These lectures were recorded in shorthand and subsequently transcribed into typescript. The final version, with annotation by Hirst himself, now resides in the GEC Archive collection. In this paper, which is divided between successive issues of GEC Review, we present selected extracts from these lectures, some 100 years after the events which he described took place. We have reproduced the original text without amendment, except in the instance of obvious typographical errors, and have illustrated the extracts with photographs and drawings from other publications contained in the GEC Archives.

I have often been asked to write the history of the G.E.C., but I am still too busy to grant myself the time that such work would require. I have, however, fallen a victim to many entreaties to try some evening to give you that history.

I have been thinking over how such a task could be fulfilled without wearying you and yet be useful. I do not know exactly at this moment how to treat the subject, but one thing I am certain is it cannot be done adequately in so short a time as is allowed and is usual and desirable at a meeting of a Debating Society. I also wish to make it quite clear that I am not here to give a story of my life. My life must necessarily play an important part in the development of the General Electric Company because the two things have been so interwoven; therefore if I speak much of myself I do not want it to be misunderstood.

The G.E.C. is not the work of one man; the G.E.C. is the work of many people from its earliest days onwards, and I can only describe it as I saw it at any time, I can only give you the impressions such as I have experienced from time to time, and if

H. Hirst, first Baron Hirst of Witton, was born in Munich in 1863 and came to England when he was 16 to build up a career which made him a leader in the electrical industry. It was at the age of 19 that he entered the electrical industry, but it was not until 1886 when he joined Mr. G. Byng in a little electrical shop in Queen Victoria Street London EC4 that his life's work can really be said to have begun, for this business was the seed from which sprang the G.E.C. He became Managing Director of the Company in 1900 and Chairman in 1910. Lord Hirst was one of the first to realise the importance of research in industry, and the Company's research laboratories are among the leading industrial laboratories in the world. A recognised authority on international trading, he served as Economic Adviser to the Cabinet Research Committee and on many committees, such as the Cabinet Trade and Employment Panel, Advisory Committee of the Board of Trade 1922–25, 1929–32, 1936–39, as well as the Committee on Unemployment Insurance 1925–26, and the Committee on Co-operative Selling in the Coal Industry 1926. In addition he was a member of the Melchett-Turner Conference and also served on the Committee of Industrial Research. He was also a member of a number of industrial and research institutions connected with the electrical and its allied industries. For the two years 1936–38 Lord Hirst was President of the Federation of British Industries, having formerly acted for some years as chairman of the Empire Committee of that body. He was President of the Radio Manufacturers' Association from 1938, hon. member of the Institute of Electrical Engineers, past president of the Association of Technical Institutions, and a past president and one of the founders of the Institute of Fuel. Further, he was a past president of the British Export Society and the British Electrical Development Association, as well as the Incorporated Society of British Advertisers and the Decimal Association. He was Master of the Glaziers Company for two years from 1928–1930. A baronetcy was conferred upon him in 1925 and he was raised to the peerage in 1934. He died, after a short illness, at his home, Fox Hill, Earley, Reading, on January 22 1943 at the age of 79.

(From the Financial Times, January 24th 1943)

therefore I omit the names of some who have collaborated it is not from any selfish motive, or trying to take glory where it is not deserved, it is simply because in reviewing a long period of 35 years without having prepared any notes it is impossible to do justice to everybody.

I intend to give you this history of the G.E.C. with an object. It is my intention as I wander through the many years to endeavour to describe the condition of the time so that you will better understand the risks which one ran and the reasons why one did certain things or did not do certain other things; and if I succeed in that I hope that this address or lecture, or I might even venture to foreshadow a series of lectures, will be instructive as well as interesting.

The Early Days

In order to give the history of the G.E.C., I must introduce my humble self through the few years preceding the actual starting of the G.E.C. I think my experiences during the years from 1881 to 1883 and from 1883 to 1886, the actual starting of the G.E.C., were very largely contributory to the character which the G.E.C. in due course assumed; it was a creation entirely different from any other electrical concern when we started it, largely on my suggestion, in 1886. There were no central [generating] stations; there was no general electric supply; there were makers of dynamos and makers of submarine cables who first started to make some rubber coils to suit the dynamo makers. Many a time a dynamo was run for months before lamps could be supplied or shades put on the lamps; and the idea of the G.E.C. when it was started was to make it a supply business for the benefit of contractors and installers. Our speciality was to study what all these different people used so as to be able to tell them:

'We have it in stock; you need not delay your installation; we keep everything in stock'.

We were laughed at at the time as being an electrical business which did not do any installing, but in course of time the usefulness of the idea was appreciated and supported, and we had imitators in this and every other country.

These few words should tell you that the G.E.C., when it was started was originally looked upon as a quaint effort of some outsiders who did not know what electrical engineering was.

With these introductory remarks I would like to refer to the few years preceding my own experience in connection with it when I met people who collaborated and were instrumental in the starting of the G.E.C.

In 1881 I was appointed as private secretary to the Managing Director of the then new Electrical Power Storage Company. It had been only quite recently incorporated, I think with Pritchetts and Gould, which Company, with the exception of the vicissitude I will refer to presently, led an honourable life for 20 years. That Company had the patents for accumulators. That was during the period when all electrical invention seemed to be made. Mr. Edison had just invented his carbon lamp, and Mr. Swan had simultaneously invented the Swan lamp; the Jablakoff candle was shown off on the Thames Embankment, and other arc lamp makers appeared in the world with new inventions. Arc lamps were in those days driven by clockwork; they allowed the positive and negative carbon to move at a fairly equal speed, and the makers tried to calculate out the speed equivalent to the burning capacity of the carbon; with the unreliability of the carbon you can imagine how these lamps burnt and what flickering and what other effects took place to make arc lighting an impossibility.

Dynamos were in those days very unreliable things. The so-called Siemens dynamo which shewed in the incandescent lamp supplied by it a flicker every time the belt passed a certain position was at that time the best machine. The invention, therefore, of accumulators seemed in those days the ideal thing for the electric light: you could charge accumulators during the day, took your current from the accumulators during the night, and you would have a steady light. Well, I know a little of what I stepped into. I used to write articles for newspapers which may inform Mr. Palmer that my connection with the Press (and you know what the Press is capable of) dates back to 1882. We used to boom the possibilities of accumulators. We sold patents to Russia for £184000 (sums of which I did not appreciate in those days), and we sold patents to every other Country, but I never saw money, I only saw stocks and shares. We carried on installations for which we were never paid. We fitted up the Grand Hotel, but it was not my managing. I stood aghast and looked at the proceedings. We fitted up the 'Gaiety' [theatre] for no payment but simply to have the advertisement of what the accumulators could do; and the usual phrase in those days was 'Electricity will be carted around to the houses every morning with the milk'. That was the common idea. It may seem strange to you, but the public knew nothing about electricity. I have seen letters which customers sent me which said:

'We have bought your lamps and we have used a whole box of matches and cannot get the blooming thing to light'.

When wires were supplied, which was in later years (I only mention this to show the absolute ignorance of the public) we sent a quantity of wire to a ship and wrote mentioning the quantity and insulation resistance, and the ship sent it back saying:

'insulation resistance not contained in case'.

These are facts which I mention not merely for amusement but to give you a sort of idea what the mind of the public was. They believed in those days that accumulators were going to be sent round with the milk, and paid the consequences for it.

I had not very much to do. The most important event of the week occurred on Tuesday, when the Directors attended the Board Meeting. There was champagne, port, and sandwiches of every kind; they never touched them, but I had a cheap meal that day.

I had a very strategic office chair. My seat was at the end of the office, so when the manager came out of his office he always saw me. That was an indirect advantage; every man who came in saw me first, and, as I had nothing to do, I tried to answer questions; it was in those days I made the acquaintance of Professor Sylvanus Thompson, of Lord Kelvin, of Sir William Preece [the Engineer-in-Chief of the British Post Office], Mr. Houghton of the Brighton Railway, and others. In other words, as there was no organisation for selling and nobody cared exactly what happened in business so long as these jobs were carried on, the callers applied to me, and as I was willing to oblige I became so to speak, their instrument in communicating to the powers that be everything they wanted. I did my best. They appreciated my efforts and it was certainly useful in my later schemes to have made the personal acquaintance of these men when I started in actual business; and it was of tremendous use that humility, that desire to oblige, that desire to help the customer, though it was not my duty; and I emphasise it as an example to some of the younger men in our firm today who might be induced to think that anything that is not their own job is not worth while looking after if it comes in their way.

The Manchester Gas Lighting Company

After about two years of a variety of very hard, busy work I had nothing to do; the inevitable fate reached the Power Storage Company, and it had to go into liquidation to reduce its capital. Well I got

1 ***Mr Gustav Byng (circa 1900)***

the sack. I had to do like so many other people, look out for a job, and I heard that a Company from which Mr. [Gustav] Byng (fig. 1) was purchasing certain goods was looking out for a man to go out to Australia; it was the Manchester Gas Lighting Company, who invented the gas lighter, the first actual speciality of the G.E.C. That Company wanted somebody to go to Australia. They were making gas lighters, electric bells, and medical coils, and I applied for the job and with Mr. Byng's help, I got it.

While I was with the Electrical Power Storage Company I lived privately with Mr. Max Byng who was very ill for a good many months. I used to go round every luncheon hour between 12 and 2 – I stretched it – because I had very little to do in those days; and also after my office hours, which meant five minutes or five and a half minutes after the Managing Director left, I did all the business of Mr. Max Byng – entered his books, made out the invoices, and whatever was necessary, sometimes 'til 10 or 11, and out of gratitude he helped me to find a job. I accepted the situation; I was very keen on going to Australia, I thought I would make my fortune. I went home to say goodbye to my people, and came back equipped with revolvers and boots, and all kinds of things that relations give you, and on the way back I met one of the best, Mr. Falk, who is now dead. He asked me: "what are you doing here?" I told him, in high glee, what I was about to do; he said: "I thought you were a clever fellow; you are a 'd' fool". I said: "Why?" He said: "Either electricity is going to be something

or it is going to be nothing; if it is going to be something there will be more electricity within four miles of Charing Cross than in the whole of Australia; therefore, if you stick to electricity stick to it near Charing Cross".

He was about nine years older than myself and was in the gas business and looked upon electricity with a sort of sneering sentiment. I was not of age yet and was really sent over to my father to get a guarantee. I never had any money from my father in my struggles – I refused to take it, but the Manchester Company wanted a guarantee that I should not do a bolt with the stuff they entrusted me with. Those words of Mr. Falk sank in. I went home, and before I had shaved that evening I had made up my mind, "I am not going to Australia". The Directors did not like it, they even threatened a bit; and then a stroke of luck came my way – it was in 1884 – and in the Press notices appeared of a Bank smash, and things were bad in Australia. There was a great crisis in 1884; the firm thought it would be foolish to send me out there, and decided to use the stock by opening retail businesses; they opened a place at No. 58 Queen Victoria Street and one at 4 Charing Cross. Mr. Max Byng managed the Charing Cross branch and I managed the Queen Victoria Street one.

That is where the second chapter started. It is essential I should go through that before I come to 1886, the real beginning. In that shop we tried to sell the produce of the Manchester Company, which, as I said before, was gas lighters. There were two kinds of gas lighters. First there was a battery with chloride of silver, and there was a stem in which the conductor went up, and there was a little hole in the top in which the spark shewed itself; you turned on the gas and the electric spark ignited it. That seemed a little thing, but it meant a lot of business received through the assistance of the Insurance Companies because, in the cotton factories where they used gas, so many fires originated through the throwing away of matches that if the mills shewed they used only electric gas lighters, they received a rebate on the insurance. That was the only business that Company had, the rest was medical coils and accumulators and scarf pins; and in order to show them off we had to have a gas engine in the basement.

It may sound funny, but it was simply awful in those days to be a shopkeeper. I lived in St. John's Blackheath; I enjoyed a great local position in the Swimming Club and Tennis Club, and amateur theatricals, and was invited to dances; but if anybody had known I was a shop-keeper I am afraid I would have been ostracised from St. John's. I wanted to look as respectable as possible, and the cleaning of the shop, and the cleaning of the engine, the starting of the engine, and the arranging of the shop window, was a very serious thing which I did before office hours, before the ladies and gentlemen of St. John's came into London. Many a time I caught the train at 6 o'clock in the morning in order to look a gentleman by 9.15. It did not do me any harm; I only mention it to shew how one had to work in those days and how useful the work was. One obtained experience which enabled one later on in organising this Company to know what to expect from each man. My salary was £2 a week and a bonus on the profits, if any. Well here again it was the only electrical shop in the City, and every man who took an interest in electrical affairs strolled in, if only after lunch in order to have a chat. A number of people invaluable to me in after life such as engineers, and medical men, even, came in.

Partnership with Messrs Byng: the General Electric Apparatus Company

Mr. [G.] Byng did not get on with the Directors of the Company and he parted from them and he wanted me to join him. I accepted Mr. Byng's invitation and went to a new place he had taken, No. 5 Gt. St. Thomas Apostle (fig. 2). He had his brother [Max] with him (fig. 3), and there was another man who was his manager, named Lawrence.

I then joined with Mr. Byng in a separate department, and all the help I got was an office with absolutely nothing in it. I did nothing for the first week or two but go round to all the engineering firms telling them I wanted to start a depot supply department,and what were the things they wanted.

The Catalogue: a Commercial Innovation

Then I sat down and realised that if you wanted to develop, a catalogue was essential; and I very much recommend to your inspection a catalogue which was published in 1887. I joined on the 16th September, 1886, and there you have a catalogue that must have taken 12 months to prepare, though it was my first. If you look through it today you see that I unconsciously had the idea of the G.E.C. in mind. It was my department, called 'H' Department. I start with a switch board; then come a series of small switches; then some ceiling roses, cut-outs, etc. I made a trip to Germany before that catalogue was finished, and you find glass ware.

2 ***5, Gt. St. Thomas Apostle, London – the first premises of The General Electric Company – shown, as it is today, in the centre of the photograph***

We wanted everything electric, and I got an agency for carbons, and then I had dynamos and finished up with engines. That was published in 1889, and except that each article may be today a Department, and we manufacture the things, that

3 ***The founders of the General Electric Apparatus Company in 1892 (left to right): Hugo Hirst, Gustav Byng and Max Byng***

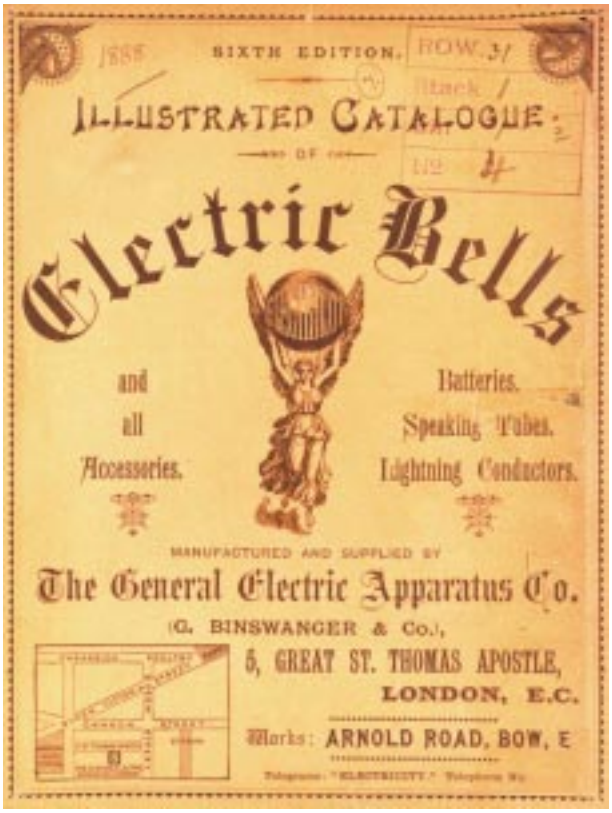
is the idea of our catalogue. That is the first catalogue of its kind, in this or any other country, which was ever attempted, and that is why I make this the introduction of the years that preceded 1886 in order to show how I arrived at the idea. Of course, it might not have worked, and then I would have had to switch over to something else, but the idea proved the right one and we went on.

The Origin of the G.E.C.

As I could not make the agreement with Mr. Byng which satisfied me, and I did not like to act as his clerk, and began to feel my powers, I insisted that we ought to trade under a neutral name, and we took the name: 'General Electric Apparatus Company' (fig. 4), and I have still got the catalogue with 'General Electric Apparatus' but with 'Apparatus' struck out. When we took up these articles which were not apparatus, we thought it was inaccurate, and we dropped 'Apparatus' and that is where 'G.E.C.' comes from. It was still a private business, Mr. [G.] Byng was the proprietor, and it was only made a limited liability company in 1889.

Switches

The years 1886 to 1889 proved a success. We did so much business and we made so much profit, but I thought you would be more interested to know that the idea of the switch board in those days was something very original. The switches were made



4 ***An early (1888) catalogue produced by the General Electric Apparatus Company***

for us by two people; at the beginning only one. There was a firm in Bow: Coates Macdonald & Co.

The Manchester Company went smash and Coates and Macdonald were in that Manchester Company and they started for themselves down in Bow. We gave them all the orders, and Mr. Coates is still with us. In those days we made switches which were wooden blocks, and we thought we had made a wonderful discovery when we found when we put a spring on a lever instead of making any contact the current was still going through the moving parts. Of course, 50 ampères was something very big. Then we devised the idea of double contacts and then studied the question of springs.

Then I had an idea I took up. I actually took out a patent for putting switches on china; it seemed so simple; but we had never thought of it. A patent was granted, but the china people could not work the china; they could not screw china in those days and we had to devise means. If you wanted to fix anything you just had to drop a bolt through and fasten a screw on the back. What it meant was, that with the possibility of water running down the back, short circuits occurred, and the fires that were caused you can imagine. Then I thought of putting plaster of Paris in, but I visited in those days, and so did Mr. Byng, the china works, to make ourselves familiar with the way china was being made, and we devised certain things that we thought could hold on the cover, and eventually succeeded. That was a process which took over three or four years, but it proved very interesting because it made us experts.

We were the first who thought of china, and it gave us an outstanding position in the electric supply business (figs. 5 and 6); in four or five years afterwards the bulk of our business was derived from our speciality, of which we both had patents. It started with these difficulties on the part of makers in meeting the conditions. We had no personal experience but we met the engineers and met the users, took note of their complaints, and tried to improve.

The switchboard was something tremendous and we thought no one would ever be such a fool as to buy one. I will not go through the details, but our efforts at switches were not successful in the minds of some people, and Sir William Preece and some other Post Office people devised one for which we took a licence, and the idea was to put a new phrase in our catalogue to give us a lift up. That gave us the opportunity to know Post Office people, and we made a lot of money, not out of the switch, but out of the Post Office.

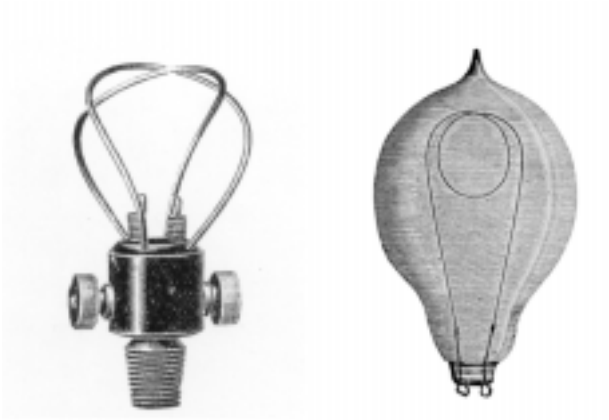
5 ***Main switches (from the 1889–90 'General List')***

6 Domestic branch switches (from the 1889–90 'General List')

Lamps

Then the next thing on that catalogue is lamps. Lamps were a monopoly. We could only buy lamps at Southampton and ship them for export, but we could not import lamps. The business was in the Edison and Swan Company and I called on the manager, hat in hand, saying I represented the G.E.C. and we should like to take up the electric lamps. His agents had 30%, and the list price for carbon lamps was 5/– each. I do not know the exact words he used, but it was to the effect they were quite well provided with agents and they did not want to have anything to do with a man like me, but they had a man named Dawson who was free to trade. We made an arrangement and our lamps were bought at fixed prices and we did quite a business with them.

Now, most of the lamps were made with little hooks; there was no socket on them, the lamp holder was a piece of wood with two 'U'-shaped springs, and the lamp rested on those springs which pushed it up (fig. 7). It was all very well on the first day, but here again, if you did not have German Silver wire, or even if you had, those springs got tired and the inevitable happened – the lamps burst or the holder burnt. Then the Vitrite people made brass sockets. We were for a time agents for the brass socket/holders with Vitrite, but



7 Wooden spring holder (left, from the 9th Edition of 'Electrical Supplies, 1898) and 'bottom loop' lamp (right, from the 1889–90 'General List')

there was no profit in it and nobody made money on it.

I then discovered that the Edison & Swan Company which, by that time, had come under different management (I am forging ahead a year or so) had a patent. I went to Mr. Page and said: "You have a patent and if you will uphold that patent I will be one of your licencees, but it means regulation of prices". We did a big business; our business from Edison & Swan Company amounted to something like £3,000 a year and the only trouble was we had always to have the auditors in the house and Mr. Byng fainted every time he saw the auditor.

Cables, Glassware and Carbons

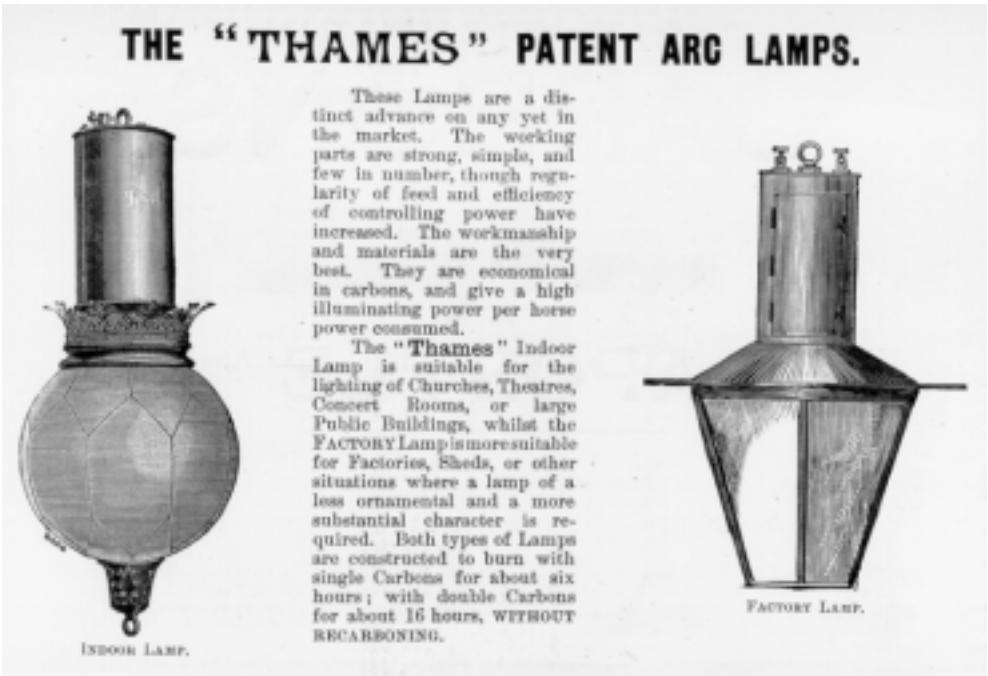
Now, electric wires and cables we put in the list, with the idea that we ought to supply everything. Then I found there was a business to be done in glassware. Nobody had started glassware and every electric lamp wanted a shade. I visited the different glassworks and saw vases of all kinds of designs, and we broke them haphazard to see whether a shape would remain. All those shades that you see, the opal and the tulip or whatever they may be called, were the outcome of those visits to the glassworks. In order to sell them I conceived the idea of giving each shape a name and standardising the opening which I fixed at $1\frac{1}{8}$ [inches, or 28.6mm] for the lamp holder, $2\frac{3}{4}$ [70mm] for the small gallery, $3\frac{1}{4}$ [82.5mm] for the big gallery, and whatever was fixed is still ruling today, because others copied them, even the names. Then, once having a shape given a name, the customer could order it in any kind of glass, opal or frosted, or blue or yellow, or any colour he wished.

8 ***Cut glass shades (from the 1889–90 'General List')***

This led very quickly to a development of the glass business which played an important part in our concern, and we made ourselves very useful (fig. 8).

That in turn led to the supply of arc lamp/globes (fig. 9). At that time arc lighting was the general thing rather than the exception. Every arc lamp had a different shaped globe, and some of them were 18 inches [45cm] in diameter. The English glass blowers objected to blowing such big glass, and I was forced to make trips to the Continent to see whether I could buy them there. I did open up a source of supply, and for many years that led to a regular and profitable business in our stores in Thames Street, where later on Mr. Railing entered as his first job in the G.E.C. which was principally given up to glass ware.

The difficulty of selling carbons [for arc lamps] was firstly their expense. I remember getting every month one order from the South Kensington Museum from Major General Festings. 2000 pair invariably came on the last Saturday of the month and invariably meant £52 and something. How many thousand pairs would you supply at that price today? In going round I found that the average lamp trimmer did not know what they cost: he could not understand the invoices; he could not calculate the complicated prices of feet and millimetres and pence , and so on, and it was then that the idea occurred to me to give an all round price of 1/4d per millimetre per foot, or £1 per millimetre per 1000 feet, and that made it very simple to buy.



9 ***Arc lamps (from the 1889–90 'General List')***

(Part 2 of this account will appear in a subsequent issue of GEC Review and will include topics such as the European scene, the beginning of the electrical installation trade, the Crystal Palace Exhibition of 1891, the arrival of Max Railing, and the development of the business.)