

From the GEC Archives...

The History of the General Electric Company up to 1900 – Part 2

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 has been 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.

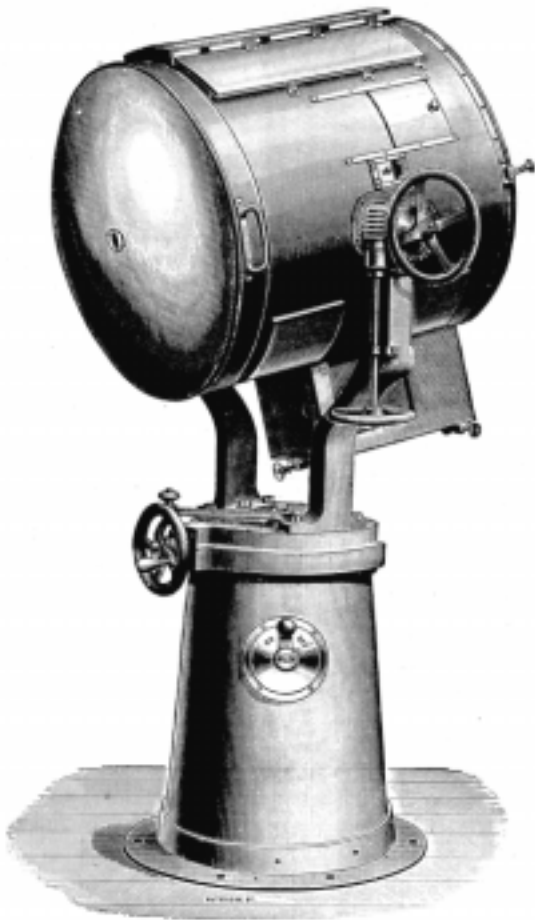
The European Scene

Now, I come to that trip to the Continent. In those days electrical people all the world over sympathized with each other. They gave each other the benefit of each other's experience, and you were free to walk in anywhere and compare goods. I visited every kind of works on the Continent, and discovered a number of most useful things. Going to Schuckert's I got there at the time when a Military Mission was there to inspect the goods, and they were inspecting searchlights (fig. 1). I was invited to be present and I asked: "What has the Army to do with searchlights?". They told me what a wonderful thing they were after a battle, to throw a light on the battlefield to pick up the wounded etc. It appealed to me, and I gave an order there and then for two searchlights. These were the first two searchlights which were introduced into the British Army. They were sent out to Lord Kitchener, who was then fighting the Dervishes, and I have seen a letter of appreciation which he sent back in



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)



1 **Projectors and searchlights (from the G.E.C. General List of 1889-1890)**

connection with those searchlights. I never received another order for searchlights from the War Office because they sent direct to Schuckert's afterwards; but I introduced it.

At Schuckert's I met Professor Aron who was on the Commission. I stayed a few days at Nuremberg in order to get near him. I met him at Berlin. I believe on the occasion of his death I wrote the history of that meeting in the 'Magnet', and anybody interested is welcome to ask for that copy of the 'Magnet', it was very interesting⁽¹⁾. The importance of the meeting is this, that I got his agency. He had been waiting for me. The first meter we had, which in fact afterwards became the G.E.C.'s, was purely an electrical apparatus which electrical engineers had to have, and which nobody else could supply.

The only [generating] station in existence at that time was the Grosvenor Gallery Station, and the only condition under which the light was supplied was at £2 per point per annum; therefore if a man had 75 points in his house he had to pay £150 a year whether he burnt the lamps or not. There was no electricity meter in existence at that time.

The moment I came back I made a song of those meters. I made all the people who had the idea of cheap electric light undertakings acquainted with the thing, and the Aron Meter (fig. 2), the first electricity meter used in England, was the means of bringing us in touch with the real technical side of the industry, which led to further developments on which I will dwell some other day. But the fact that the first man gave me an order for two and the second an order for 50, and that Aron had never made them and did not know what they cost, that the man offered a price of £15 each meter, and it turned out the cost was only £6, will show how profitable it was. By reducing the price other people took it up eagerly. I remember getting Aron's letter in which he asked 'could I sell 1,500 in a year?' I sold that number in one afternoon by riding round to London [generating] Stations!

Electrical Installations: a New Trade is Created

A distinct school of electric light fitters grew up: they were the outcasts of every other trade, but still they started the electrical trade, and they picked it up very quickly, and we had to cultivate them. We had very little money, but thanks to Mr. Byng, who then came on the scene, we found the way of nursing them. Mr. Byng began then to take an active interest. You will remember he was practically the owner of the business; I was only an employee. He suddenly woke up and found that the bulk of his capital was invested in the 'H' Department. He looked into it and found I had blown it. It was there somewhere, and he began to take an interest.

Mr. Byng was a very clear thinker and had a very critical mind, very essential for the building up of the business. He was a hard worker, but he was not very bold; he was not exactly courageous, but I could never have done or attempted what I did attempt unless I had gone through the severe school which his companionship was for me. In those early days he was very helpful: he was one of the finest counting house men I ever met: he overlooked the business entirely from the counting house, and when he found that it was necessary to do business with those impecunious people, the only people who could place orders, he suggested, and it is still carried out very often, that we should give those people credit if they allowed us to inspect their books and see whether they understand how books are kept and how to charge out their contracts. By sending our accountants to some of those people who were doubtful as regards credit, we not only saved our own money,

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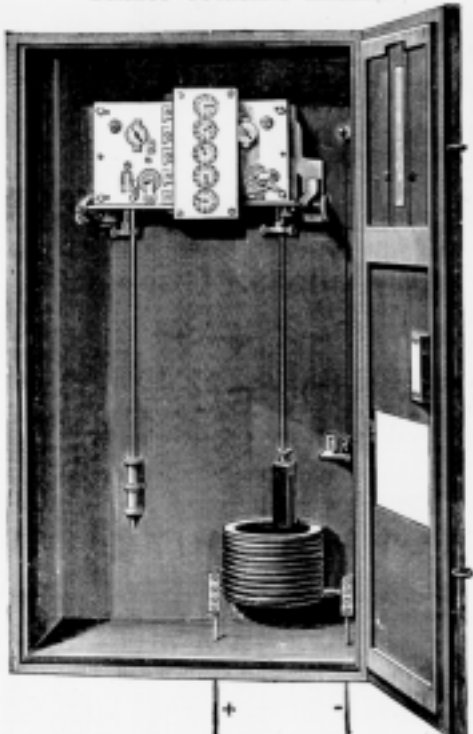
DR. ARON'S NEW ELECTRICITY METERS.

FOR DIRECT AND ALTERNATE CURRENTS.
(UNDER LICENSE OF PROFESSORS AYRTON & PERRY.)

These Instruments are specially designed for Central Lighting Stations as a recorder of the electricity consumed at the various points on the circuit. They are largely used in the various Continental and English Central Lighting Stations, and owing to their accuracy and reliability give general satisfaction.

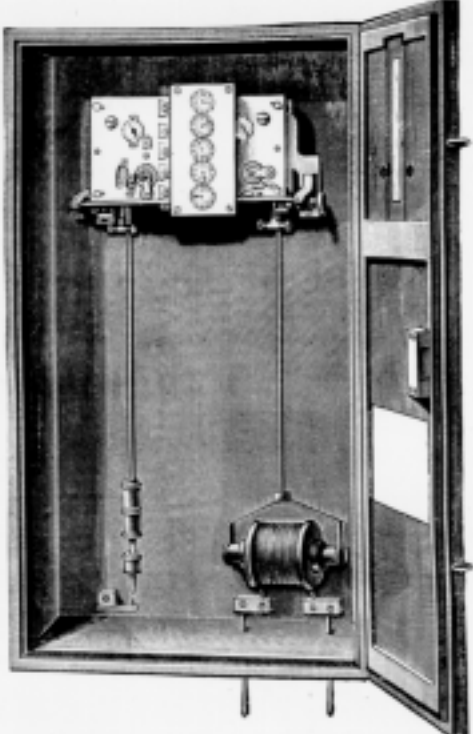
The following description will give an idea of the construction of the instrument:—

DIRECT CURRENT METERS.



Two Pendulums control two distinct clockwork gears. One of these is a standard, revolving at a regular speed. The other one has a permanent magnet instead of a weight, and is variable in speed. The variation is obtained by passing the entire supply of current to be recorded through a solenoid of thick wire placed underneath the magnet. The magnetic influence of this solenoid has an accelerating effect on the pendulum, in direct proportion to the current passed through. The difference of speed between the Standard and Magnetic Pendulum is given in direct ampere hours by differential speed counting gearing, on a similar principle as a gas meter index. The slightest alteration in the current passed through is thus recorded.

ALTERNATE CURRENT METERS.



The principle of this meter is the same. One pendulum carries an ordinary metal weight, whilst the other one is in the shape of a fork, which carries a coil of thin wire. This small coil is connected up in circuit, and carries directly inside a larger coil, wound with thick wire, through which passes the main current. The effect of these 2 coils acting upon each other, causes an alteration of the speed of the measuring pendulum, which is proportionate to the product of the existing E. M. F., and the strength of current.

The clockwork registers the difference of speed. The top dial shows units, the second one, the third hundred, &c. The clocks run for six weeks without winding up. Therefore if started simultaneously a few hours every month is all the attention required to keep going any number of meters, working on one circuit. The clocks work so exactly alike that should no current pass through the meter during a whole month, no difference of speed worth mentioning would be registered.

The loss of E. M. F. at a circuit of say 100 amp., does not exceed 0.05 volt., owing to the small resistance in the measuring coil.

INSTRUCTIONS FOR FIXING ARE SENT OUT WITH EVERY INSTRUMENT.

It will be seen that these meters combine all the important features requisite for an instrument that is to be placed in the hands of those unacquainted with electricity. These features may be summed up as follows:—

1. It will work only when a current is being consumed.
2. It will record a small current as accurately as a large one
3. The reading is direct in simple every-day units.
4. It is self-contained, and can be locked in a dust-proof case to prevent tampering.
5. It requires to be wound up but once per month.
6. It does not require recalibration, nor any skilled attention.

PRICES.

No. 1321 Instrument complete for continuous or alternate currents to carry 12 amp. £11 10 0	No. 1326 Instrument complete for continuous or alternate currents to carry 200 amp. £20 0 0
No. 1322 Ditto Ditto 25 " 12 10 0	No. 1327 Ditto Ditto 300 " 25 0 0
No. 1323 Ditto Ditto 50 " 14 0 0	No. 1328 Ditto Ditto 400 " 30 0 0
No. 1324 Ditto Ditto 100 " 16 0 0	No. 1329 Ditto Ditto 500 " 35 0 0
No. 1325 Ditto Ditto 150 " 18 0 0	

N.B.—When ordering please state the approximate E.M.F. of circuit in which the Instruments are to work. Unless ordered to suit a different E.M.F. they are calibrated for an 80—120 v. circuit.

2 The Aron Electricity Meter (from the G.E.C. General List of 1889-1890)

but very often turned a loss to them into profit, because they did not know how to keep books, how to charge out, and with our help they were able to do it. That brought about a two-fold feeling.

Our cultivating that business made us disliked by the engineers. The natural customers for the electrical industries were the engineers in Victoria Street, and they supported us to a certain extent,

but they did not like our catalogue, which they said brought other people, not justified, into the electrical business and spoil their trade. I think we had the bigger vision; we felt that electric house lighting was not an engineer's job. We supported those men, and I sometimes think that the antipathy which the General Electric [Company] had to endure for many years from certain engineering quarters might be traced back to that policy of ours which we developed to our benefit and their dislike; but I do not think to their harm.

We went so far that we realised it would be better for the electrical industry if the right kind of people did electric lighting (figs. 3 and 4). We found these men, brought together from all trades, these ship carpenters and others who because they knew how to saw wood were considered fit for putting up casting; they were not the ideal men, and it was at that time the idea occurred to me, electric lighting, which meant an awful upset in any household, could be best done by the people who did the spring-cleaning, in other words by the decorators; and I tried to prove that. I thought I would try with Maples [furnishing shop]. I went up to Maples repeatedly to see if I could interest one or other of the managers, but I could not get a hearing.


One day I accidentally knocked against Blundel Maple – he was not Sir John then – and the reason why I mention this incident is this. It has influenced the way electric lighting went in this country in contradistinction to the way it went in other countries. I do not think in any other country that the decorators or the furnishing people do electric lighting. I think it is only in this country, and it is traced back to that attempt of ours. We felt they were the right people to do it, and Maple listened very attentively. First he thought he would turn it down. I went back to the office, and before I had been back ten minutes I got a message Would I come up and see Mr. Blundel Maple again. I went up. He said: "You say you want me to go in for electric lighting; you to supply all the stuff; you to teach us how to do it". I said "Yes". "What would you want for that?" "If you give me a little room in your show rooms", I said, "I will put you up an electrical department, and you will find that people will come in who buy your furniture, your wall paper, and all that sort of thing, and they will want you to put in the electric light". "How soon can you fit up such a showroom?" "How soon do you want it?" I asked. "Could you have it by tomorrow morning?" I said, "Yes".

It was during the period between 1886 and 1892. I went back to Gt. St. Thomas Apostle. We emptied the whole of our show room into three or four cabs. We took everything that we had up to Maples. We worked all the night through: we fitted up that

STANDARD LAMPS.

Standard Lamp-generators all lamps required in the ordinary way of lighting for shops, private houses, hotels, public buildings, &c. They are supplied in the catalogue in the table of prices given below, most of which show the light in candle. Other lamps of similar construction may be supplied, and no limits are put on the number of lamps.


Standard Lamps are also kept in stock here with other Electrical Goods, Electric Bells, Lamp Oil, at General Electric Co., both largest and best. Lamps are supplied at very short notice. If other lamps are required in any large quantity, it is necessary to order in advance.



N.Y. NAYMET CAP

ILLUSTRATION.

FULL SIZE.



E.S. EDISON SOFTEN

PRICES.		
Candle Power.	Voltage Limits.	Price.
5	15—120 volts.	1 0
10	10—120 "	1 6
25	45—120 "	1 6
40	9—300 "	1 9
5	25—300 "	1 9
25	25—320 "	2 1
50	30—320 "	3 1

EXTRA CHARGES.



Lamps smaller than Standard full-		8d. extra.
Lamps other than No. 1 fitted with small fittings		1/-
Platinum supports for Filaments		6d.

3 Standard lamp bulbs (from the G.E.C. Electrical Supplies catalogue, 9th edition, 1898)

ENGLISH 'STANDARD' LAMPHOLDERS.




SWITCH LAMPHOLDERS.

The latest type of Switch with Switch mechanism, is made with silver contacts and arranged for fast insertion. This facilitates the wiring and ensures safety from short circuits. The Switch is double-throw with quick action, and is very reliable.

Catalogue No.	Description.	Price each.
2 2022	All FOR BRASS CAPPED LAMPS	
2 2023	Switch Lampholder 2 1/2" Thread	0 6
2 2024	Do. do. with Switch Carrier	0 9
2 2025	Do. do. with Cord Grip and Switch Carrier	1 -
2 2026	Do. do. 2 1/2" Thread	0 6
2 2027	Do. do. with Switch Carrier	0 9
2 2028	Do. do. 2 1/2" Thread	0 6
2 2029	Do. do. with Switch Carrier	0 9

BACKPLATE HOLDERS.

Catalogue No.	Description.	Price each.
2 2027	Round Back Standard Brass Holder	1 0
2 2028	Do. do. with Switch Carrier	1 3
2 2029	Flat Back do. do. with Switch Carrier	1 3
2 2030	Do. do. with Switch Carrier	1 3
2 2031	Flat Back for use in any direction, suitable for shop windows	0 9
2 2032	Do. do. with Switch Carrier	1 3

All the above holders can be supplied finished without increase in price. Nickel plated at 1/- each extra. Silver plated at 1/6 each extra.

4 Standard lamp holders (from the G.E.C. Electrical Supplies catalogue, 9th edition, 1898)

show room, and about eight o'clock in the morning Mr. Blundel Maple turned up, and he was very pleased. He wanted to have it explained. I showed him the fittings. We had then one or two heating apparatuses, and we had a fan working. He said "Look here, I have somebody Robinson coming from South Africa, and we are building a house for him in Africa. Do you think you could undertake the electric lighting?" I said "Certainly".

Well, Mr. Robinson came at ten o'clock. I was allowed to have breakfast in the meantime and had a wash up. I came back. Mr. Blundel Maple talked to Mr. Robinson as if he had been an electric engineer all the time, not forgetting the words 'Ampère' and 'Volt', which I had given him. He introduced me as his engineer, and I will not go further than to say that Mr. Robinson invited me as one of Maple's engineers to meet him at the Savoy Hotel, and we got an order for £3,000, on which Maples made some hundreds, and we did the work. That shows how a little idea like that leads to success. Maples took up electric lighting, and were very good customers, but afterwards they found our catalogue and policy were against their policy, and they preferred to buy from firms who had not a catalogue. As a result other decorators and that class of people went in for electric lighting, and we have the benefit of it, and they gradually as you know became the principal contractors.

Europe, America and The Crystal Palace Exhibition

During the years 1892–1895 the business was simply a continuation of where we started. Electrical Engineering made certain progress; we developed the use of china in connection with electrical fittings: we were the first people who brought out the design of cut-outs for high voltage; our H.J. installation fittings gave us a particular reputation for the first time for producing something worthy of consideration by engineers. We developed more strongly on the telephone side, but our means did not permit us to extend as much as we should have liked to, so we still resorted to extending our opportunities of middlemen.

In that connection, as a bond of interest and personal activity, I would like to report or record that twice a year I made a continental trip: that trip included the town of Liège, where we were in connection with a firm of Peeper, who made arc lamps; Berlin, where it was essential for me to meet Professor Aron, whose meters we sold; and also to visit A.G. Siemens and other concerns in order to see what progress had been made. I went from there to Nuremberg to visit Shuckert and the

carbon people. I went to Vienna, where there were other carbon people, and other things. I then went to Zurich, where I met Oerlikon, and I think I was the first man who brought into this country a multi-phase motor. I had to make a lecture upon it. I do not know how I did it, but it was much applauded. Nobody knew what multi-phase motors were at the time.

I also visited Milan and Paris, and those trips never took more than ten or twelve days. I travelled all night. It was one day like another. You arrived at five or six in the morning; you had your bath; took a cab to the factory outside the town; spent the day in some factory and saw the machinery; all kinds of foreigners offering you things, and impressing upon you how far ahead they are of the others. In the evening you went back, had something to eat, and next day caught your train. I did it twice a year, but the inspirations which these trips gave me, the opportunity of learning, the meeting of prominent men of the world, had due effect on the formation of one's mind and character, and I have much to be grateful for to those times, because of the effect these trips had on me. Incidentally one always picked up something which was saleable, and which made us known in some new set or another set, which increased and improved the business.

About the same time none of us had visited America, but I went out in 1893; we had come in contact with the firm of Crocker Wheeler, whose meters we had sold. We met the Cutler Hammer people, the first people who went in for electric heating; and in 1891, the year of the Crystal Palace Exhibition – I think it started in December, 1891 and lasted to January 1892 – the great sight of the town was Mr. Bevis, my assistant, making pancakes. Nobody had ever seen up to that time pancakes cooked by electricity. We then showed the American apparatus, and formed the intention to start manufacturing them in this country, improving them, and we have done so ever since. We had not got very far yet, and everybody else did the same; but that Exhibition was a great event. It really made electricity popular. It was the finest exhibition the Industry ever had. There were others later, but 1891/1892 was an epoch-making exhibition. I remember it was the first time we dared to show our head above water. Our exhibit was a copy of Cleopatra's Needle. It was an obelisk, and everything electric which was made, whether it was made by us, sold by us or not, we showed it there, and it was quite the centre of chief attraction of that Exhibition. I even remember people I met there for the first time, who are still friends of mine – Radcliffe, for instance. I mention that Exhibition because it was one of those events which gave us a distinct lift up. We were reported on in the papers

without having to pay for it – I think the first time in our lives – though we got good copy, and I felt personally that one had got up one rung of the ladder.

At that time a short interruption occurred in the progress of the G.E.C., because early in 1892 I got married, but I tried to make good in so far as our wedding trip consisted in visiting our business friends in every part of the world.

Disaster Strikes in Salford

Through my regular visits to Manchester I got very familiar with the staff and the work people. They had a bean-feast. That was in 1893. I went down to be present at the bean-feast. I went down on Friday, and after my arrival a notice was put up that the men should meet next morning at six o'clock. They were going to Blackpool. When the men had left I went home with the manager of the works, who was a Mr. Eckstein, whom many of you remember. We had in his 'digs' a little dinner, and then we went to the nearest pub where they had a billiard table, where we played billiards and so on.

About ten o'clock, or perhaps half past ten, a man came in shouting "Is Mr. Hirst here?" "Yes". "Your place is on fire". Well, we never finished the game. We got a cab somehow. We raced down from Withington to Salford. By the time we got there it was well after a quarter past eleven; the whole factory was in flames.

By some stupid idea which I had I thought I must save the books, and one or two people accompanied me to get at the safe, and we had just opened it when a fireman came in and hustled us out. We were not out a second when the whole building collapsed. The hose was played on us. You cannot quite remember in a moment of such experience what passed through your mind, but the next thing I remember is that I went round to the Victoria Hotel, soaking wet, and asked Mr. McDonald, who managed Spiers & Ponds Hotel, to lend me a suit. It was about twice my size, and I came down disguised as Mr. McDonald.

By that time one had got one's cool head again, and I wanted to communicate with Mr. Byng. There was no chance of a telegram being delivered that night. There was no night telegram in those days, and I had to go to the Post Office. I asked somebody whether he had a friend at Charing Cross Post Office. He said "Yes". I deposited a guinea, and I said: "You telegraph through that he is to send a cab to Mr. Byng at Belsize Park. He is to catch the newspaper train at five o'clock to come down to Manchester; the works are burnt down". That was the only way in which one could communicate in

those days after midnight between London and Manchester. That done we thought we had to be busy.

I do not know how that night passed, but we were sitting with plenty of whiskeys and other refreshment. Then we remembered that at six o'clock the men were coming for the bean-feast. I think that was the first time I addressed work people, and I had to tell them that the factory was no more. There was no bean-feast, but the incident is very illustrative of the spirit which existed in those days. I told them that we should have a factory in a few days. I told them it has taken us three years to build up that organisation; that we did not mind losing the factory, but we did mind losing our men, and I asked them to come back in the afternoon, and perhaps I could hold them out the hope that we should have a chance of getting a factory.

I knew various people, our solicitor and others. By nine o'clock I had telephoned them to ask whether they knew of a factory; I heard there was one going, and that was Peel Works (fig. 5), and we got hold of the owner. By ten o'clock I had a definite offer what he would take. It belonged to Frankenberg, the Rubber people. My Byng arrived at 10.25, and by eleven o'clock some of our engineers left for Birmingham. Mr. Coates, Mr. Franklin, and those people left – some were told [to go] off to look round Manchester [to see] what tools and machinery could be bought. Then I met the workpeople at five o'clock in the evening. I could tell them we had a factory, but it was empty, but it was our intention to employ in the first instance the married people, provided they do any work that may be asked of them. We would give them full wages; we would give all the other people, except those who are definitely employed, the first week quarter wages, the second week half wages; the third week three quarter wages; and the fourth week they should all be employed if they would give all the help possible.

We carried out our bargain, but it is only fair to say that the work-people who had only quarter wages or half wages stood round the works all day long to offer to give a hand, to run a message or do something. It was like a family party, and within four weeks we were inside those works, five times the size of the old works, and the next period began where we could develop in that branch of our business. I do not think such a thing would be possible today, but it was an achievement on the part of the management as well as on the part of the workers, so both sides can be proud.



5 Some of the early GEC factories, featuring The Peel Works, Salford, Manchester (centre) (from 'Electricity', the G.E.C. catalogue, 1902)

Max Railing Arrives

On the 1st January 1893 an event happened, very unimportant then, but very important today. I think Mr. Railing arrived on the scene. I shall never

forget when he landed in my house in Hampstead. I was out, and I am quite sure he had studied in what manner to talk to me, thinking he would meet a serious head of the G.E.C., and I came in in Norfolk tweeds just from skating, and I think all

regard he meant to bring to me I threw to the winds at that moment. Mr. Railing started in very humble beginnings. It might interest you to know he was first put into the Counting House. Then something went wrong in Thames Street, our first extension which we had for three months, because we did not want it for longer, and I think since 1893 the lease has been renewed every three months. I referred to the starting of the Robertson Lamp Works which was an arrangement with a Vienna firm that they should supply us with lamps until we could turn out lamps there, and as these lamps did not come quick enough I think the first important mission for Mr. Railing was to go to Vienna and sit there in the factory and see that we got so many – 100,000 – which we bought at a time and then Mr. Robertson, after Mr. Railing returned, tried to blow himself up with a bicycle pump I think or something of that sort, and we were suddenly without Head or Manager. Mr. Wilson had not arrived on the scene and Mr. Railing went out, and having dispatched lamps for three weeks we thought he ought to know enough to make them, so in a short time – seven weeks – he was making them.

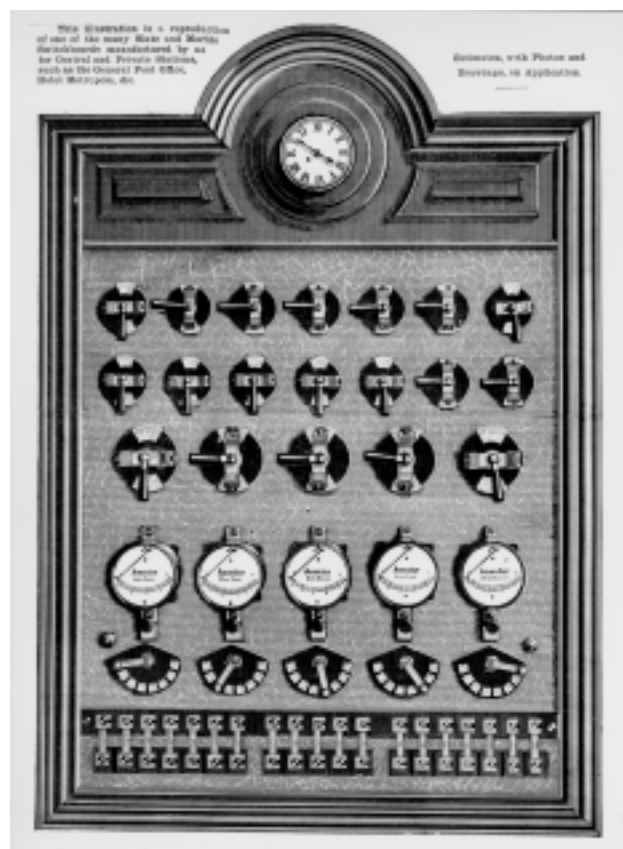
After that Mr. Railing came back to the Head Office, and the first opportunity he had to distinguish himself was when we bought Woodhouse and Rawson. Those of you who remember that very wonderful firm – wonderful considering what they did in their early days of lamp making and other electrical supplies – those of you who were with us then will remember that they were right opposite to us where the Fire Station is now, but through their ‘company-mongering’ and ‘get-rich-quick’ methods and neglecting their business, through which they became important, they fell on evil days and we bought them up from the Receiver – what was still in the building – we took the lease over. Mr. Railing was put in charge and found tons of stuff they did not know existed. We managed to get rid of it at a good price. We took over the lease and started a real Fitting Department under the leadership of Mr. Railing which we developed up to 1901 or 1902 whenever it was – that being the most profitable and biggest Department from the money-earning point of view in the firm.

The Business Develops

The years between 1892 and 1898 were really the working years of it. None of us ever thought of a holiday. We had to work. I believe I told you the influence which the Baring crisis had on our business – how our principal partner got into difficulties and how everyone of us personally was

pledged between 1892 and 1895 to live on nothing and pay back what we owed, and that set the pace, and just to give you an idea as to how this business worked out; in 1890 and 1891 we had a turnover of £80,000 in 1891 and 1892 £106,000. Then we come to 1893 and 1894, £242,000. 1894 and 1895 £285,000, and then 1895 and 1896 £219,000 turnover in London. That was a very quick rise with the very few factories we had at our disposal, and with the very small trade that existed in those days.

Central [generating] stations were only beginning to be put down then. One had not the large market in every town that one has today. Every apparatus we sold had to be sold to some customer who had a private plant, and so you can understand that the market was very limited. This includes the Telephone Department, but in these figures already the Telephone Department had fallen back, first to 50% and then to 33% or so of the combined Department. I should not have said fallen back; I should have said the others increased. The articles which were sold mostly in those days, and which still are the foundation of today's business, are mainly china fittings – switchboards – what people call ‘brown switchboards’ (fig. 6).



6 So-called ‘brown switchboard’ (from the *General Electric Catalogue, 1893*)

We started then with clip fuses already. We have made lamp holders and other instruments. Arc lamps we made in Thames Street, and if anybody who is not everyday with us were to look at this catalogue I am quite certain he might think it is a catalogue of three or four years ago, but he would never realise it is a catalogue of 27 years ago. The whole foundation of the G.E.C. is built up on fittings and lines which were then started. The very style of the catalogue is the same, the print and the same manner of setting up, as we cultivate today, and as everybody else has cultivated and even to me it is really surprising that these fittings when you look at any page of it remind you of what you are selling today and only a very close study tells you that we have altered; but we are still fighting with some of the same problems that we fought then – low [power] interchangeable plugs and fuses and so on. It is well worthwhile looking at that catalogue.

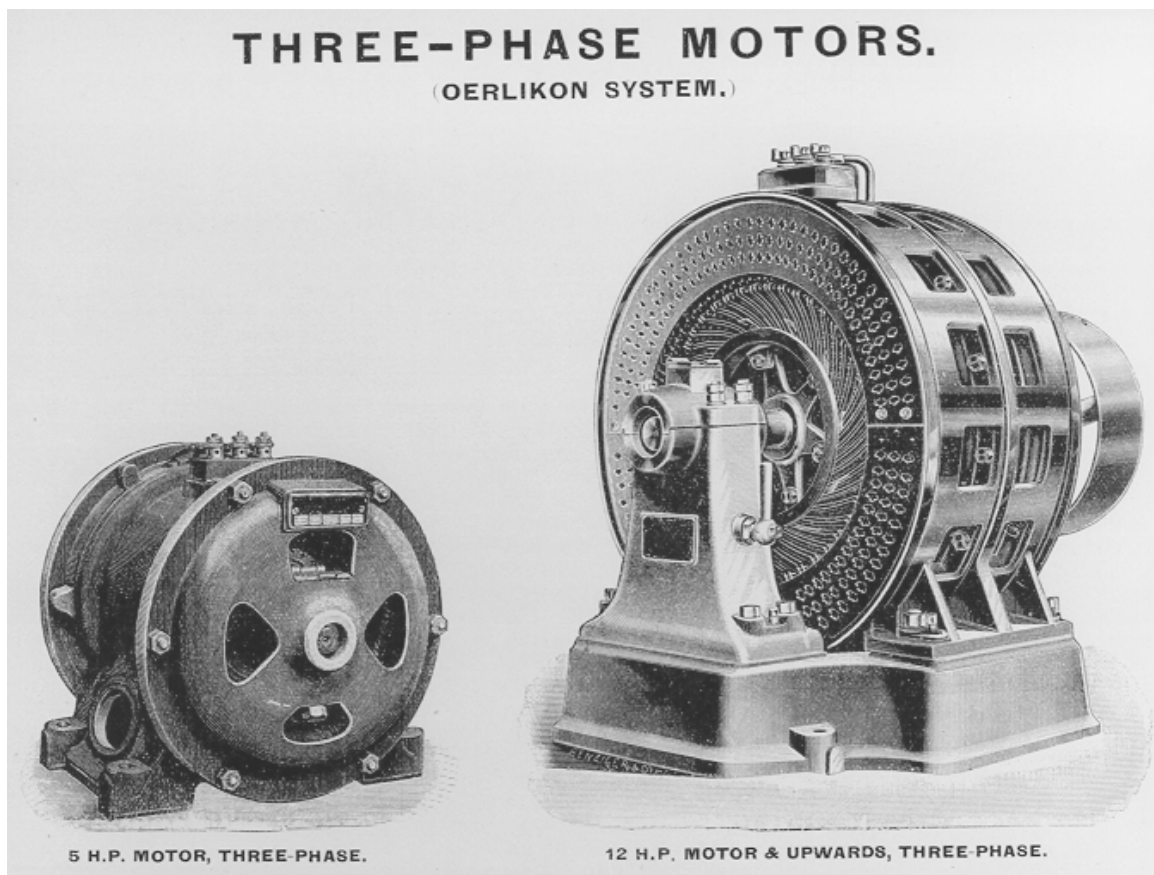
In connection with the development of this turnover we have displayed already the taste and the desire to cease to be agents and to start manufacturing. We had gone into, as you will remember in my last address, the Bell works. Well they were pretty big works, and as far as I remember one floor, the ground floor, was given up to work and various kinds of pushers, telephones and

switchboards. The next floor to electric bells, the next to telephones and the next floor was given up to parts which had to be assembled; and the fourth floor was china fittings and accessories; and in 1895 we even went so far as to start making motors.

GEC Becomes an International Electrical Engineering Company

It was on one of those hurried trips to the Continent that I came across what was then a discovery – a multi-phase motor. I had an ambition to go into heavier engineering. I did not like the idea of being an electrical ironmonger, as we were feeling we were going to be; and there I noticed for the first time a motor which though an electrical apparatus would lend itself to mechanical wear and tear – more like the mechanical machine. I do not suggest I was sufficiently a scientist to quite follow its working, but my intuition and my knowledge of the market, and my appreciation and judgement of what I saw made me very keen on it, and I came back with the agency for Oerlikon who were the only people on the Continent who could make two- and three-phase motors (fig. 7).

I was then already a Member of the Institution of Electrical Engineers, and I remember how with



7 Three-phase 'Oerlikon system' motors (from 'Electricity', the GEC catalogue, 1899)

heart beating I risked getting up and talking to those mighty clever men about what the three-phase motor is going to be, and I proved correct, only when I tried to introduce them I found the Westinghouse Company of America and Patents and they could prevent us from manufacturing. I studied the matter. It was the first time I found out the Board of Trade had the right to insist on something being made here or to grant us a compulsory licence, and they advised me to write to the Westinghouse Company and the Westinghouse Company of America gave us a licence, and we built some works in those days which I thought were tremendous works. It is the little wing alongside the Peel Conner Works. We started making those three-phase models and within a very short time our South African agent brought us a contract of 60,000 or 80,000 for those motors. It is the biggest thing ever done; the dynamos were 260 kilowatts – and the whole country talked about it, and we were considered, with one swoop, an engineering firm. However we executed that order – and executed it with satisfaction – I do not know. In the Great Central Deep, the Witwatersrand, and some other mine, the motors are still working. That was one of the great achievements in those days of stress, hard work and success, sometimes counteracted by failure. Fortunately the failures were never very great.



8 GEC's headquarters in Queen Victoria Street, from 1889–1921

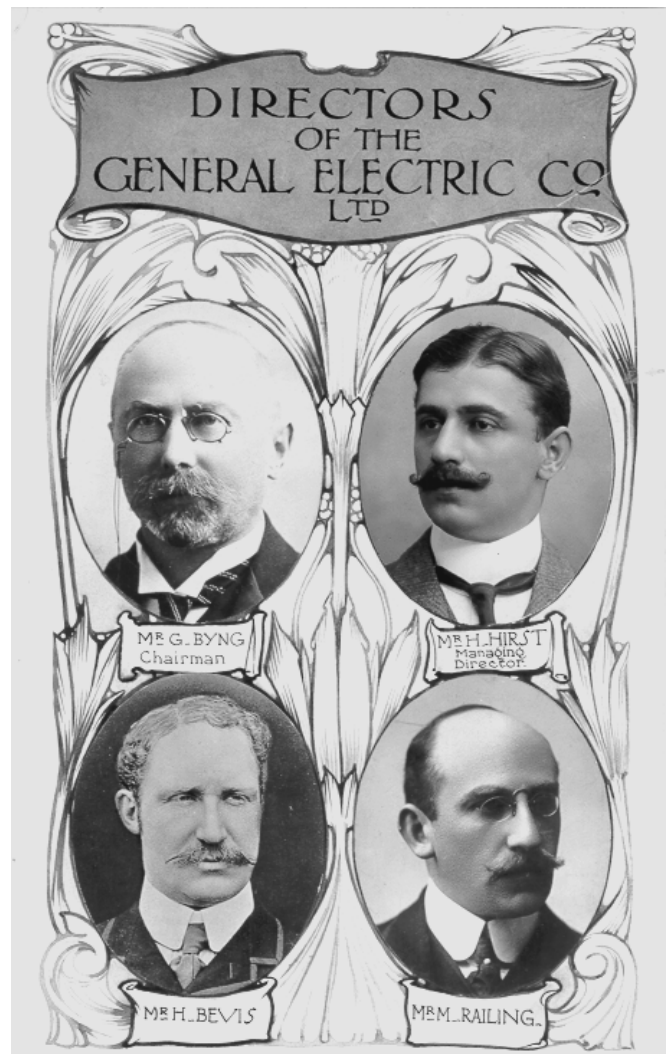
In Conclusion

The history of G.E.C. from 1900 onward is one that had better be given when the present great programme that we have engaged in has proved to be a success, in, let us hope, one or two years' time, and then those early days of our beginning in 1900 (figs. 8 and 9) will look as romantic to the General Electric Company, as I see it three years hence, as the days of 1884 and 1886 looked romantic when I started these lectures.

Reference

- 1 'Professor Aron and the G.E.C.', *Magnet Magazine*, II, 8, p. 216-227, December 1913.

(Part I of this account appeared in *GEC Review*, Vol. 14, No. 1, 1999. A portrait of the author appears in fig. 10)



9 The original Directors of The General Electric Co. Ltd. c. 1900



10 Hugo Hirst, 1863 – 1943
(This portrait was painted by Oswald Birley in 1934 and now hangs in the GEC Archives)