of the theatre showing the way to their particular seat, while those who were accustomed to scramble for pit and gallery places found themselves marshalled into an orderly queue. All received, free of charge, a handsomely printed four page programme.

Hated first nights

There was something of a carnival air in the auditorium that night. The Prince of Wales was there to give *éclat* to the occasion. So was John Hollingshead, manager of the breakaway section of the Comedy Opera Company who had taken the lease of the Opera Comique, and was therefore Carte's rival. Gilbert was not there. He hated attending first nights, and in any case he was busy, as it happened, directing the rehearsals of 'Princess Toto' at that very rival theatre! Sullivan was present, conducting the orchestra, as he always did in the presence of His Royal Highness. There were those, in pit and gallery, who, seeing the gas bravely shining, were prepared to believe that Carte was pulling a fast one. They were soon to be disabused of this notion, however, when, after Sullivan had led the chorus and orchestra in a lively rendering of the National Anthem, D'Oyly Carte stepped forward to address the audience. After a few introductory welcoming noises, he announced that in the nature of an experiment, that although the stage lighting system was not ready, the auditorium would be lit by electricity. He went on to warn that the system may fail due to the extremely experimental nature of the installation, in which event, the gas system, a small part of which would remain alight at all times, would instantly be brought into full use. Then, at his signal the gas was turned down and

> 'There was a hum of expectation and anxiety throughout the house. The effect was instantaneous. A start, a pause, a tremor, and suddenly the auditorium was literally brilliant with the novel light.'

wrote the 'Telegraph'. Not all the light was sweetness however:

> 'The light is far too strong, the lamps too numerous, the glare too powerful, and I found my eyeballs aching, and my head throbbing, and I soon discovered that it was as imprudent to stare at an electric lamp as at the sun. I should say that the Savoy should be as well lighted with half the quantity of lamps'.

The system behaved itself admirably throughout the performance of 'Patience' that evening, despite the odd flicker and slight change of intensity as the steam engines varied their speed from time to time. (A problem which had to await a solution until the perfecting of the storage battery). At the end of the performance, the public expressed an (almost) unanimous verdict of success not only of the lighting, but also of the production, it's new scenery, the theatre itself and all it's arrangements (a bar with whisky that *was* whisky and coffee that was something more than just acrid chicory!). Even the ticket takers and other attendants received their share of approbation, not only for the smartness of their appearance and solicitude for the public, but also for the fact that they expected no tip, indeed they were expressly forbidden to accept gratuities on pain of instant dismissal.

It was to be another eleven weeks of hard work before it was considered ready to announce the lighting of the stage by electricity. During that time performances continued under gas.

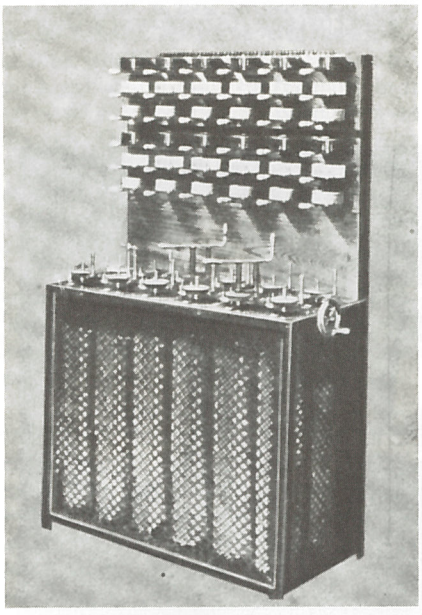

Fig. 5 Siemens' Regulator (permission Siemens AG)

The eventual solution of the problem was quite elegant in it's simplicity. The iron resistors were removed and replaced by a much smaller six-way 'regulator' (fig 5). This consisted of half a dozen six-position switches connected to tappings on coils of German silver wire. These were mounted in a wooden frame positioned on the fly floor and were electrically connected, not to the output of the alternators, but between the dynamos and the field coils of the alternators. The operation of these resistances reduced the magnetic flux in the alternator and therefore the output voltage. it had the added bonus that it also reduced the magnetic 'drag' in the system, thereby effecting a saving in prime-mover power.

Convincing demonstration of safety

By the afternoon of the 28th December 1881, the installation was judged to be completed, and the public and press gathered to see the latest wonder of the age. There must still have been some fluttering in the public dovecotes about the safety of the new medium, for Carte found it necessary to give a graphic demonstration. He (or rather Siemens' engineer, Herr Köppler) produced a bulb which was connected to the power, wrapped it in a piece of muslin of a highly inflammable nature, and at a signal from Carte smashed it with a hammer. The vacuum was broken and the bulb immediately extinguished without so much as singeing the gauze. Whether or not D'Oyly Carte's innate sense of showmanship tempted him into cheating slightly, by having an offstage assistant to 'pull the plug' at the psychological moment to avoid the alarming bang as the fuses blew is not recorded. His triumph, however, was complete. The beauty of the new light was universally acknowledged. 'Engineering' reported that

> in the artistic and scenic point of view nothing could be more successful than the present lighting of the Savoy Theatre: The illumination is brilliant without being dazzling, and while being slightly whiter than gas, the accusation of 'ghastliness' so often