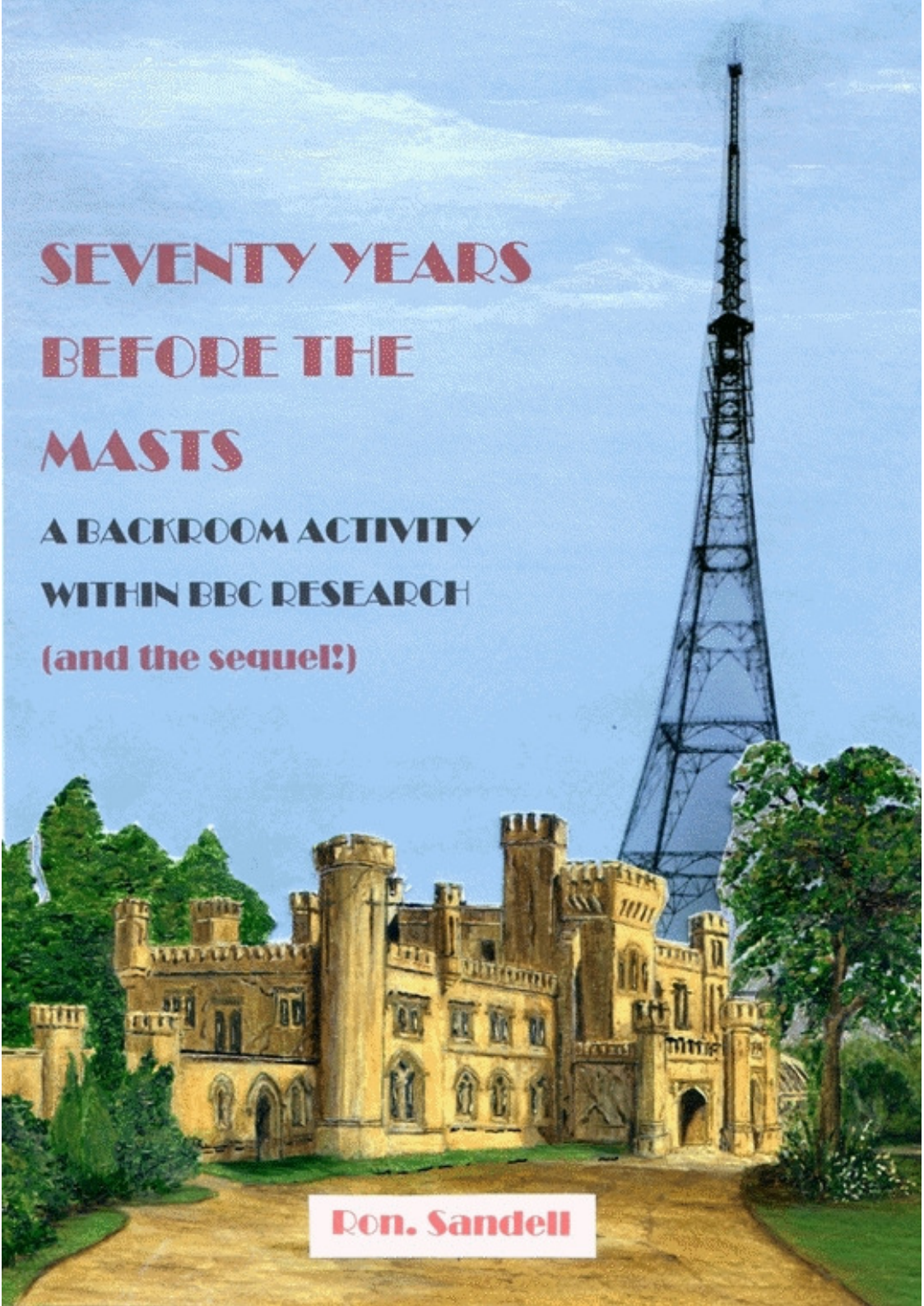
SEVENTY YEARS BEFORE THE MASTS

A BACKROOM ACTIVITY WITHIN BBC RESEARCH

(and the sequel!)



Ron. Sandell

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By
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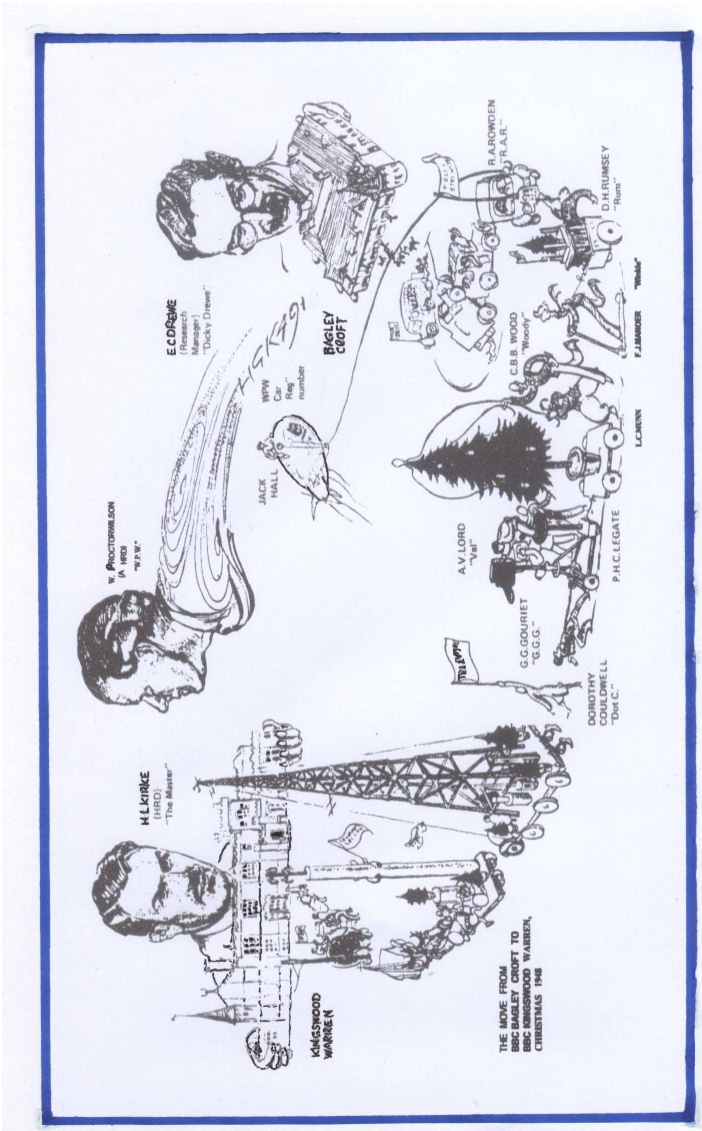

1948 – The pilgrimage of Research from Bagley Croft to Kingswood Warren (by Margaret Gallant)

ACKNOWLEDGEMENTS

The origins of this book date back to 1985, when the previous Head of what was originally known as Field Strength Section in BBC Research Department, Robert Arthur Rowden (RAR), gave me a large tea chest full of documents. It contained records of work going back to the earliest days of the British Broadcasting Company, including his own diaries, recording daily events using the worst handwriting I have ever seen. In effect, the contents presented a history of the broadcast coverage planning work, an obscure but crucial feature of the engineering activities that eventually claimed the attention of a large number of people, inside and outside the BBC. In due course, this single tea chest was joined by several more, because I, too, squirrelled away paperwork when I joined the Section in 1954. In 1985, by then retired, RAR suggested that the overall story of the work should be recorded, because "he believed the Section had made a unique contribution to the development of broadcasting." On the verge of retirement myself, and without realizing the consequences, I agreed to prepare a draft..

I must acknowledge a considerable debt of gratitude to the members of the Section and the Department with whom I worked from 1954 to 1991. It was a privilege to be present amongst a unique collection of enthusiasts (for work and for living). It was an era and an environment that positively encouraged dedication. I must certainly mention the enormous fund of anecdotes, some true, that I received from them. A selection of those suitable for publication have been included in what follows.

I am also grateful to the many engineering and scientific contacts I made outside the Corporation, in this country and abroad. Enthusiasm for the work that we shared was contagious, and enduring friendships were formed. Of course, there was occasional competition, which often clarified a situation and led to a better result. Arguments, when they rarely occurred, were usually stimulating. One regret must be that some of the bumbling Administrations of the World, who decided future policies, did not have more engineers amongst their ranks.

Now to more precise acknowledgements. Firstly to the Royal Television Society, which gave support to the closing stages of this project, to their Clare Colvin who co-ordinated my contributions, and to Norman Green, whose extensive knowledge of broadcasting at a senior level within independent television helped him to struggle through my meandering first draft. Then to the two referees whose close knowledge of the work allowed them to plunge more deeply into the detail. Peter Rainger was Head of BBC Research Department before going on to become the Corporation's Deputy Director of Engineering, and Bob. Mears was the Research Executive for many of the Kingswood Warren years. I am grateful for their penetrating and helpful comments.

Ken. Hunt has been well known in the worldwide broadcast engineering arena for decades, and I asked him to comment on parts of the text, particularly those dealing with international co-ordination. I did this with some apprehension, being well aware of his forthright candour, and of his experiences within the European Broadcasting Union, the Independent Broadcasting Authority, and the BBC. He lived up to my expectations.

I have included references to various books, official reports, publications, etc., in the text, but at this point I must make specific mention of four works that I found particularly helpful. The first is the iconic and detailed description prepared by Edward Pawley, "BBC Engineering 1922 – 1972". It was an ambitious project, and contains a wealth of information describing the work of the BBC Engineering Division during those years. Meticulously, the author and his colleagues concentrated on the facts of the operations, without venturing too far into the jungle of external events that so often influenced the action. A broader picture was presented by Asa Briggs, whose "History of Broadcasting in the United Kingdom" explains the reasons for some of our engineering activities. Then there are two books - "Prospero's Wireless", a revealing biography of the BBC's first Chief Engineer, Peter Eckersley, written by his son Myles, and "The Emergence of Broadcasting in Britain", prepared by Brian and John Hennessy. These provided enormous detail of the early years when many of a previous generation were to leave Guglielmo Marconi's factory at Chelmsford and other pioneering wireless companies to establish the British Broadcasting Company.

Despite the naming of knowledgeable contributors, the text of this book contains much detail and there will be mistakes. Responsibility for these will be mine. The old broadcast engineer's motto – "its all right leaving me" - cannot be used here. I also claim responsibility for my personal opinions, which are littered through the text. I hope none of these will offend an individual, or their descendants, although I have not been quite so sensitive when it comes to organizations.

Finally, it is 25 years since I left the full time service of the BBC, and throughout that period my wife Barbara has definitely had more than her share of the downside of the old adage about retirement – "for better, for worse, but not for lunch". She has somehow tolerated a husband besotted with research, often apparently more interested in computers, books, and piles of old papers than gardening and house maintenance. It must have been much worse than being married to a golfer. In fact, for many years, she gave invaluable assistance with data processing, a subject completely alien to her normal activities. I owe her a very, very considerable debt of gratitude. Perhaps at long last I will now have time to learn how to operate the washing machine.

Ron. Sandell

February 2012.

PREFACE

Early in the Twentieth Century a world-wide revolution began. The ability to communicate over great distances using a wireless system meant that within a few years one man or woman could speak to millions. Broadcasting was to open ears, eyes and minds, but it had a slow start. It emerged from the work of many scientists and engineers, some of whom had devoted their lives to transform ideas into reality. It worked, although a few of the pioneers quietly admitted that they were not sure how, because some of the scientific support relied on debatable theories. It involved the use of radio frequencies, and the transmission of energy through space. Assumptions had to be made about physical conditions in the void between the transmitter and receiver, apparently empty but in fact full of features that could distort or destroy the broadcast signal. It was soon recognized as the weakest link in the communication chain, and its mysteries were to impede the progress of this great new invention. Unfortunately for those promoting these new services, there was also serious opposition from the outset. There were the politicians, most of them unable to understand the technology, and fearful of the implications of public broadcasting. Knowledge was power, by allowing these developments, was Samson about to lose his hair? Other users of radio frequencies, together with the newspapers, the infant film and gramophone industries, were also highly suspicious. But public interest had been aroused, and many entrepreneurs were enthusiastic to explore the enormous potential of the new medium. It had to succeed.

Marconi had arrived in Britain in 1896 to stimulate the growth of wireless systems, but it was not until 1922 that arrangements for a national broadcasting service were agreed. The British Broadcasting Company was formed, and within two years twenty transmitting stations were providing a service to 70% of the population. The Company, soon to be a Corporation, was employing just over 100 engineers, of whom fewer than half a dozen or so were concerned with planning the coverage – the areas served by the transmitters. They could not be described as scientists, but all were pragmatists, and they entered what was to be a very long conflict with the weakest link. Apart from the scientific aspects, they soon discovered other serious problems. Decisions on their recommendations would come from their managers, but these front-office broadcasters constantly needed a lot of reliable technical information to form and defend their proposals. So as well as probing the science, the new planning engineers needed to know the objectives of the broadcasters, and the requirements of the audiences. They had to understand the political constraints, and recognize the commercial objectives and limitations of a rapidly developing industry. Then, because radio waves do not recognize national boundaries, they had to negotiate their plans internationally, because of the risks of interference between the signals of a growing number of transmitters.

The work of these “service planners” became a challenging and fascinating occupation. It was unusual, because from the epicentre they witnessed the conflicts and evolution of broadcasting. Yet they were few in number. Eventually a section within BBC Research Department, there were at any one time between four and fifty of them, the total

dependent upon the work load. Over a period of 70 years, about 100 people were to spend some part of their BBC career within this team. I joined them in 1954, and found the work so compulsive and varied that I remained for the next 37 years. Then, although I left the unique ambience of the Department, the occupation remained so compelling that I went on with attempts to solve some of the outstanding puzzles of the previous years. It is also important to mention that from the Fifties, parts of the work were shared with planners in the independent broadcasting sector in the UK. Initially suspicious of each other's motives, we became mutually attracted to the solution of common problems.

The text of this book is based upon the personal archives, diaries etc. garnered by two previous leaders of the Section, Robert Arthur Rowden and myself. Occasionally, the story dips into the scientific and engineering aspects, because some explanation is needed to follow the plot. In the first two chapters it deals with the early scientific discoveries, revealing fundamental uncertainties that were to persist, and moves on to the events in the twenty years or so that led to the formation of the BBC. The developments over the next 70 years are then described, from the days of the early experimental transmissions to the achievement of what we were told were amongst the best broadcasting services in the World. Then came the digital sequel, and a brief description of this has been included because it transformed the whole concept of public communications, although not without some hiccups along the way. The final chapter contains the author's personal conclusions, and includes a flagrant albeit brief outburst from an engineer in which I trespass upon the vital domain of those who design the programme material. The engineers in the backroom may be clever, but it is the

programme makers that decide the real contribution of broadcasting to our society. My defence for this incursion is that with my engineering colleagues I have watched the introduction of one of the wonders of the Twentieth Century, but despite outstanding technical achievements, we are now witnessing the start of what might well be the decline in the true value of the overall system, that of providing a dedicated public service.

TABLE OF CONTENTS

introduced his concept of public service broadcasting, and his Chief Engineer, Peter Eckersley, set up a "research department". The primary objective was a nationwide network of 10 to 20 low and medium frequency transmitters, but minimal resources were available for the one backroom. For many years it was a part-time occupation.

4. The Introduction of Television (1930 – 1939):

During this period a few BBC engineers were assigned to deal specifically with radio propagation – within the Research Department they were to become the "Field Strength Section". The need had been endorsed following the early television experiments, which demanded intensive use of the radio frequency spectrum. Tests using Baird's mechanical system had started in the Twenties, and an electronic system soon followed. In 1934 the Selsdon Committee recommended a field trial, and the eventual success of the electronic method required the broadcast transmissions in the very high frequency (VHF) bands. The BBC started propagation tests, because it was obvious there was going to be a substantial increase in the number of transmitting stations.

5 The War Years (1939 – 1945):

The primary BBC objective was to keep radio services going, whilst preventing enemy aircraft from using these domestic transmissions for navigational purposes. The television service was closed. The few remaining BBC research engineers took on a very mixed work load, although relatively little in the way of real research was possible. Nevertheless, apart from their routine activities, they were

heavily involved in a variety of separate secret operations. In September 1944, the Hankey Committee produced important, far-reaching recommendations concerning the future of television.

6. The VHF Networks (1945 – 1960):

This was the start of the explosive expansion of very high frequency terrestrial broadcasting services in Europe. There was an instant demand for research into all matters relating to the planning of the radio frequency spectrum. BBC Research began a programme of propagation experiments and site tests for new transmitters that was to continue for 40 years. However, the prospect of building more than 100 transmitters, many of which would need high masts, was daunting, and the UK television service did not expand beyond the London area until 1949. There was also much discussion about the relative priorities of television and VHF frequency-modulated sound broadcasting. In the early Fifties, the introduction of independent television raised new service planning problems, and there was a period of adjustment. The ever-increasing demand for more programmes and higher technical quality soon required expansion into the ultra-high frequency (UHF) bands.

7. The UHF Developments (1961 – 1985):

The use of UHF meant the number of UK transmitting sites would increase yet again by a factor of ten - to well over 1,000. An important European VHF/UHF broadcasting conference was held in 1961, and plans for 8,000 high-power stations were agreed by representatives from 45 countries. UK broadcasting policy was defined by the Pilkington Committee report, presented in 1963. The UK continued its

propagation research, but it became increasingly difficult to obtain international consensus on planning methods. This had long-term implications for later developments. An almost continuous series of official enquiries set up by the government into the state of broadcasting also increased the need for in-depth research reports on the expanding subject of planning strategy.

8. Cable and Satellite Delivery – the Alternatives to Terrestrial:

Up to 1984, less than 10% of the population used the few cable systems in the UK, but serious attention to the contribution of cable and satellite distribution began with the Cable and Broadcasting Act in that year. By 1988, 18 satellite channels were serving Europe, and the Government published a White Paper proposing a further UHF terrestrial channel and the introduction of digital satellite services. However, the arrival of commercial analogue satellite programmes confused the situation. The plans for broadcasting legislation, also included in the White Paper, contained proposals for a major reform of the transmission arrangements – "giving scope for greater private sector involvement". The Nineties witnessed an explosion of technological developments, and the synergy of the personal computer and television became evident. This decade was a watershed for broadcasting.

9. The Introduction of Digital Broadcasting:

This chapter moves beyond the end of the 70 years of service planning, and the events leading up to the analogue/digital conversion of the UK broadcasting networks are described. One reason for this extension was concern about some of the

planning methods, and further research is reported. However, interest in the problems of the terrestrial component diminished as concentration shifted to the cable and satellite delivery platforms. The main attraction of terrestrial was that because it was in widespread use, it provided an immediate albeit interim channel whereby digital distribution could be introduced, and a complex plan to carry out the analogue/digital conversion of terrestrial television services within Europe was internationally approved by 2006. Increasingly the situation was driven by market forces.

10. My Conclusions:

It took most of the 20th. century to build up the broadcasting system that has been described here, networks that were appreciated by millions. The technological revolution that then took place introduced radical changes, and engineers in the Nineties were confronted by new demands and increasing commercial pressures. Apart from the conclusions that are recorded in this chapter about the sequence of technical events, it was a matter of observation that the number of broadcasters has grown, and the objectives of the original professionals had to be adjusted. It is suggested that the concept of public service broadcasting has been lost, and the final chapter presents the personal views of the author. They include an observation that despite astonishing technological progress, and eyewatering levels of investment by all concerned (not least the public), new problems have emerged. The chapter ends with a precocious suggestion for an engineer; that regardless of the commercial pressures, we should rediscover and promote the advantages of a

distinctive type of public service broadcasting, using its original medium – the terrestrial link.

Index of Contents

1. A LITTLE SCIENCE AND TECHNOLOGY

This chapter is not a mandatory overture to the rest of the work; readers who may be worried by an excursion into a branch of science that is still not fully understood by experts can go immediately to Chapter 2. The only risk is that later there may be some gobbledygook that will defy understanding, so the recommendation is to stick with it, this overture will be gentle.

Science and engineering are disciplines that have sent many students scurrying for cover in the dense undergrowth of more subjective professions. Perhaps scared off by early emphasis upon starchy mathematics and physics, they sought a superficially attractive career path where the challenges and awards were more tangible. Shame, because technology can be exciting, fascinating, and rewarding. Many of the facilities that we enjoy today have been developed as a result of the work of dedicated technologists pursuing elusive targets, and this book describes a typical example. It deals with the triumphs and disasters during the Twentieth Century of a small group of engineers who were at the cutting edge of the development of the broadcasting services of the United Kingdom. This enormous project was one result of the discovery of wireless transmission, itself explained by the impressive electromagnetic theory proposed by James Clerk Maxwell in 1865. He had postulated the ways in which electrical energy could be transmitted through space, and the most important challenge confronting these new engineers was to apply these theories, and bridge this weakest link between the broadcaster and the audience.