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THE STORY OF SWEB'S RURAL ELECTRIFICATION

by Graham Warburton

Browsing through a map of West Devon, the names of Morchard Bishop, Woolfordisworthy, Rackenford, Broadwood Kelly, Monkokehampton etc. brought back memories of the 1950s and the rural electrification taking place at that time all over the South West. This was an exciting era and a time when teamwork was paramount with a canvassing sales-force, planning engineers, field survey teams, drawing office staff and finally engineers and construction gangs all playing their part in bringing power to rural areas, which, as we shall see, without Nationalisation, had no chance of ever receiving a supply of mains electricity.

There was also the contracting side of SWEB, which played a big part in wiring many of the properties and the home service advisors and demonstrators who then educated the new consumers in the best use of electricity. Indeed it was the contribution made by the commercial side of SWEB, which kept the Board in profit for the years 1963/4 and 1966/7. It is a tale that needs to be told, which started on Nationalisation in 1948 and continued until 1969, after which date rural development failed to get a mention in the SWEB Annual report.

Organisations such as the Edmundsons Electricity Corporation had achieved much by way of rural electrification in territories supplied by their companies namely the Cornwall Power Company and the Shropshire, Worcestershire and Staffordshire Electric Power Company. Indeed the writer started with the latter Company in 1947 and apart from odd spurs, there was only one major Rural Development scheme in the Bromsgrove District where I was employed. On moving down to the South West in 1957 to start work with the Central Construction Department a very different picture emerged. The Christy Brothers brought electricity to remoter areas, but this could only be done against a background of a reasonable return for capital expended.

In 1927 the Electricity Commissioners called a representative conference on Electricity supply to rural areas - their report read as follows:-

"It is evident that for economic reasons rural electrification cannot be proceeded to the extent of planning a supply of electricity at the service of every inhabitant, farm or other premises throughout rural Britain. There is no doubt that the prospects in the

sparsest and remote areas are of such a low order as to preclude, or at any rate delay for many years to come, the establishment of a public supply on a remunerative basis, even under the most favourable conditions of capital expenditure on rural distribution. It has been variously estimated that up to 50 per cent of the more sparsely populated rural portions of the country is likely to fall within this category".

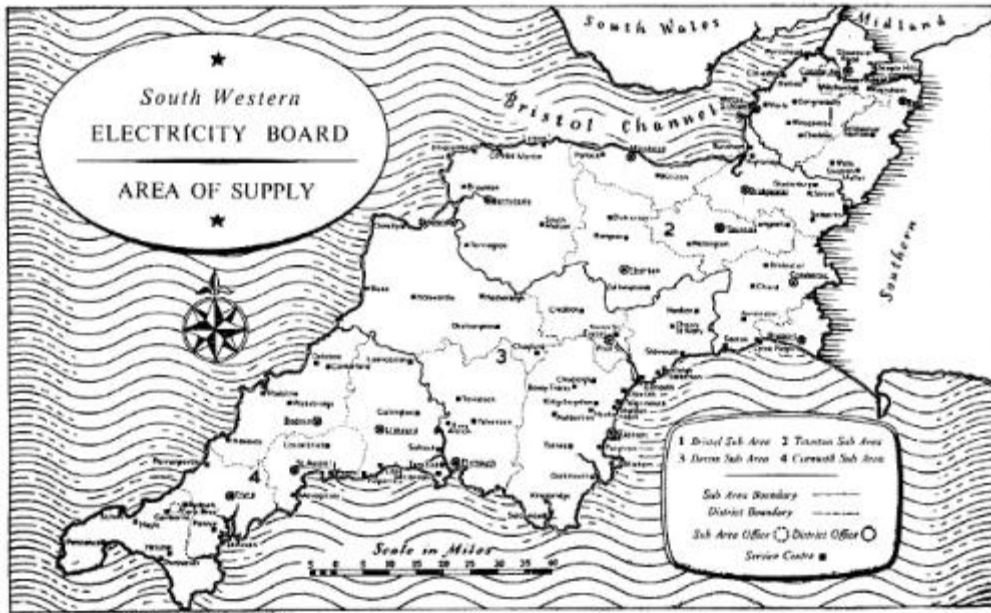
In May 1929 the Ministry of Agriculture set up a "Demonstration Scheme" to demonstrate the advantages of electricity supply to typical rural communities and to test demand. The first such scheme was near Bedford, followed by Norwich in 1930, Dumfries in 1931, Kircudbright in 1932 and Shropshire. The capital costs of these schemes were high and the revenue low with deficits incurred for a number of years by all five schemes.

A further conference was convened in 1934 when it was resolved: "That the development of electricity supply in rural districts is impeded by the small size and large number of undertakings operating in certain areas; and that the Electricity Commissioners be asked to consider what steps could be taken with a view to economic grouping of rural areas into appropriate units for the efficient distribution of electricity by a smaller number of undertakings"

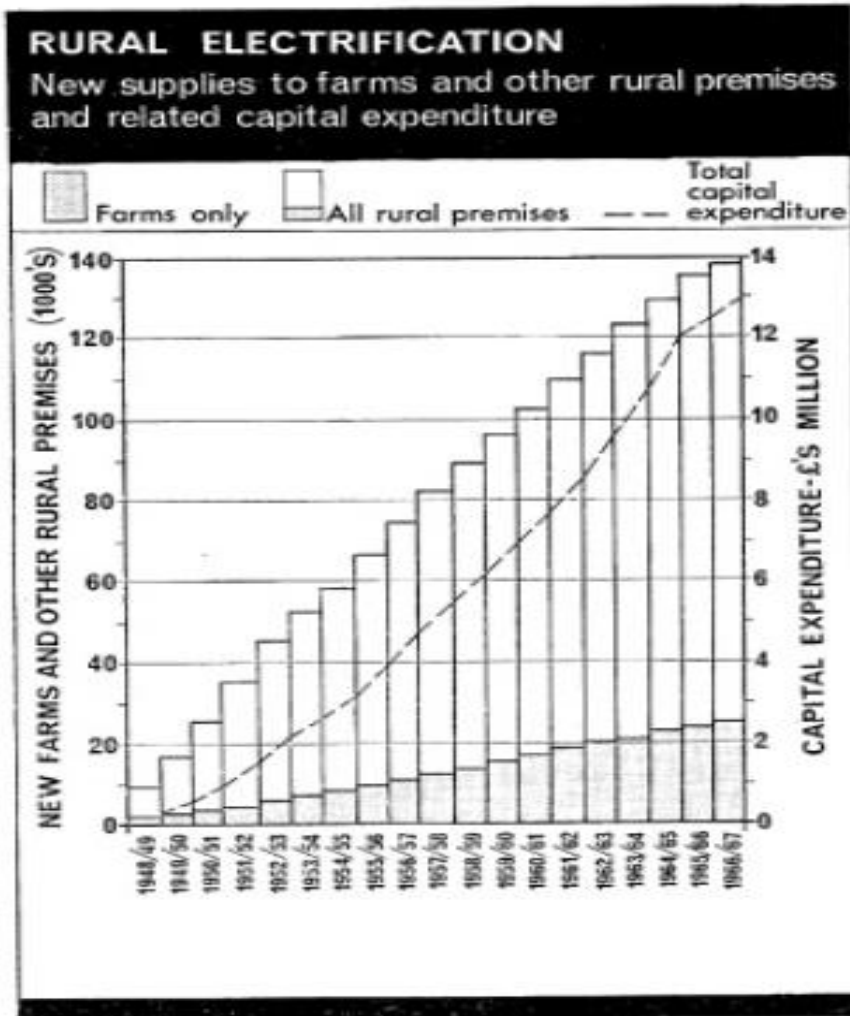
During the war, rural development virtually ceased unless the war effort benefited. A report dated January 1944 had this to say: "A difficulty that tends to retard the development of electricity supply in rural areas is the cost of making connections to isolated premises remote from transmission works. The costs of these works are often substantial and therefore economically unjustifiable. This matter has been considered in the light of financially aided schemes such as those at Bedford, Norwich and Dumfries. It is generally agreed that some financial aid may be needed if the completion of rural electrification throughout the country as a whole is to be expedited".

Nationalisation was therefore the only way forward, as whilst the National Grid was already in place, the problem was getting power to the people.

THE SWEB AREA AS IN 1950 WITH 4 SUB-AREAS AND 23 DISTRICTS
 (Initially at nationalisation there were 5 sub-areas and 21 districts) **FIG. 1**



RURAL ELECTRIFICATION GRAPH FROM 1966/67 SWEB ANNUAL REPORT
FIG. 2



The Electricity Act of 1947 stated in Section 1 (6) that "In exercising and performing their functions, the Electricity Boards shall secure as far as practicable, the development, extension to rural areas and cheapening of supplies of electricity". SWEB was the least developed of all Boards with the lowest population density, unit sales and industrial load, and the largest amount of undeveloped territory. Four out of every five farms were without electricity on vesting date.

The area covered by SWEB was 5,560 sq. miles with a population of 2,089,000, 70% of which lived in urban areas compared with 80% in the rest of England and Wales. Only 45% of the area was provided with an 11kV supply and on vesting day only 6,330 farms were on supply out of an estimated total of 34,200. Population averaged 376 persons per square mile, compared with an average of 704 over all fourteen Electricity Boards and 470 for rural Boards. The 1949/50 Annual report stated that only 33% of the Area received an Electricity Supply, 12% is in reach of a supply and 55% is outside the reach of a District Network.

SWEB instigated a plan for a rural development survey, which was approved by the Board on 4th May 1948 and being a massive operation covering 5,065 sq. miles and 949 rural parishes was not completed until 1951. The survey revealed 65,000 rural premises without a supply which included 25,000 agricultural holdings. It is also identified 19,000 rural properties, which were sufficiently near to existing mains to be supplied economically. It was estimated that 4,500 miles of HV and 4,000 miles of LV mains would be required, plus 10,000 transformers.

SWEB devised a Line Rental Scheme to cater for rural electrification; it provided strong incentives to use electricity requiring a 20% return on capital for the scheme as a whole, instead of from individual premises. (See Appendix 1. Note 1). The scheme worked well; by the end of 1952 more than 5,000 farms and 50,000 other rural premises had been added to the network. A farm was defined as an agricultural holding of five acres or more.

In August 1951, the Government decided that no new rural electrification schemes should be started during the remainder of 1951 or in 1952, thus saving £2 million, however in fixing the level of expenditure for 1952 £1 million of this was re-instated. But - diminishing returns made future progress uneconomic. Connection charges were beyond the means of most potential customers and further rural development would inevitably put SWEB in the red. (See Appendix 2).

With no assistance from the Central Authority, other Boards or the Government, the problem was raised in Parliament and a request made that the matter be studied at National level. It should be pointed out that the 1947 Act "does not require each Board to balance, it requires all the Boards and the Central Board to

balance taking one year with another". The problem was therefore a National one. The Minister of Fuel and Power attended a special conference of the Central Authority and Area Board Chairman on 8th July 1953. The meeting decided to set up a rural electrification committee under the Chairmanship of Sir Henry Self "to examine all aspects of rural electrification and to formulate a statement of policy".

The committee met at the Manor House Hotel, Moretonhampstead in October 1953 devoting a whole weekend to the problem. It was a historic occasion and the recommendations of this committee were adopted by the whole industry and became known as "The Moretonhampstead Agreement" by Parliament and elsewhere. The programme ensured that 85 per cent of all farms and an even higher percentage of other properties would be connected within 10 to 15 years, the cost to be borne by the industry as a whole. All Boards could now proceed with confidence with a quinquennial review, when any Board with financial problems incurred by rural electrification could rely on support from central funds.

As we have seen SWEB anticipated their rural electrification responsibilities and having already complied with the conditions during their first five years received £250,000 from the Central reserve fund to relieve them of the deficit incurred from their advanced rural programme. This grant was refunded in full when a surplus was earned, but its payment in 1954 not only made it possible for the Board to continue its rural programme, but vindicated it fully in the policy it had pursued.

The British Electricity Authorities sixth report 1953/4 stated that the Area Boards planned to take electricity to an additional 60,000 farms and some 260,000 other rural premises during the five years ending March 1958, the cost estimated at £50 million. It also went on to say that in the subsequent 5 years an additional 45,000 farms and a corresponding number of other premises would be connected bringing the total to £100 million, to which a further £30 million had to be added to increase generation and transmission. SWEB's target was that a further 5,000 farms and 24,000 rural premises would be on supply by March 1958. This target was actually exceeded one year early by March 1957. In April 1963 post war capital restrictions were lifted with SWEB setting a target that 85% of all farms and an even higher proportion of other homes and premises would be supplied by 1968.

The line rental scheme was replaced in 1953 by a system of rural development contributions under which charges were standardised according to the type of premises, regardless of the distance to existing mains. (See Appendix I, Note 2). The first major rural development project under the new arrangement was carried out by Bath District at East Pennard. An immediate and dramatic rise in rural connections was made and in the period 1956 to 1966 an average of

1,500 farms per year was maintained, the record being in 1961/2 with 1,733 farms connected.

The National target of 85% was achieved in October 1964, four years ahead of the original plan as set by the "Moretonhampstead Agreement" in 1953. It now remained to connect the even more remote premises, which required supplementary contributions from consumers where the cost was exceptionally high. (See Appendix I, Notes 3 & 4). In spite of substantial extra payments acceptance remained high and by March 1973 98% of all holdings in the South Western area received a mains supply. In twenty-five years the number of connected farms had increased from 6,000 to 32,000 and a supply made available to virtually every home - however remote.

What a truly magnificent achievement. See Appendix II for a tabulated breakdown of yearly progress. It should also be noted that not only did SWEB tackle Rural Electrification from vesting day, it also had the not inconsiderable task of welding together 39 various Electricity supply undertakings of which 11 were originally under Local Authority Control.

THE ROLE OF CCD

We have seen above that the newly formed SWEB was well aware of the massive amount of rural electrification required and had no intention of shirking its responsibilities. The Districts were able to cope with a certain amount of this work such as the 19,000 rural properties sufficiently near to mains to be supplied economically, but post-War housing development, repairs and maintenance would always be their main responsibility. It was quickly realised that much more construction capability would be required than that available at District level, there being 21 of these in the beginning.

MAPS SHOWING THE MAINS DEVELOPMENT IN WEST DEVON DISTRICT BETWEEN 1950 AND 1967

(extracted from the 1966/67 SWEB Annual Report)

Fig.3

Fig.4

Apart from cash problems there was a serious shortage of trained linesmen, as few would have entered the industry during the war years rendering recruitment out of the question. Within a year of Nationalisation, the Chief Engineer, George McLean, had it in mind to set up a Central Construction Department, which would also incorporate a Linesman's Training School.

The 1949/50 Annual Report stated that C.C.D. was established to deal primarily with major 33kV schemes throughout the area enabling use to be made of large

scale standardised methods of construction and mechanical aids which can speed and cheapen the work!

The Role of CCD continued :-

George McLean, Chief Engineer, appointed Don Horn to establish the organisation. In retrospect it is not surprising that both these gentlemen were former Edmundsons Electricity Corporation employees, as the Power Companies they owned were sufficiently large to have experience in rural electrification employing their own construction staff. Indeed when the writer commenced work with the S.W.S.E.P. Company in 1947, nothing changed on Nationalisation as Bromsgrove was already a District in the same way that SWEB districts were eventually organized.

Don Horn's first job was to establish a Lineman's training school, which took the form of a 48' x 16' Nissen hut. It was on the 4th July 1949 that a squad of men recruited from the Labour Exchange turned up on the Bindon Road site in Taunton to erect the new "school", which was done in about four days.

Don then set off to Hawkes, the local ironmongers accompanied by Sam McAlleenan, who was a chargehand linesman from Cornwall (again an ex-Edmundsons employee) to purchase tools required for the school. All this took place during the first week of July 1949, with the first Linesman's course starting the very next week. After eight weeks the first batch of semi-skilled linesmen passed out to initially work in the Bridgwater area, followed by rural development work at Manston, near Bovey Tracey.

The next training course then started and with resources getting stretched, Clarence Maynard from Cornwall was seconded to take over teaching and establish a drawing office. Clarence had been in charge of O/H line design in Cornwall. The first major job undertaken by C.C.D. was an 11kV Supply to Chumleigh and adjacent small hamlets.

On 11th November 1949, Frank Richardson was appointed Distribution Engineer (Construction) to whom Don Horn was responsible. Shortly after his appointment, Richardson was required to produce a Standard Overhead Line Manual based on B.S. 1320 and Edmundson's Standard Construction. This work initially took place in the drawing office within the Bindon Road Nissen hut.

By 1950, it was obvious the Bindon Road premises were totally inadequate for the volume of work, not to mention the training school and during the Spring of 1951, a move was made to new offices at Priorswood Road. A further Nissen hut was obtained and erected for use as a Linesman's training school. The 1950/51 report stated CCD had completed the first year and had five gangs in continuous use. And so C.C.D. was established, but as we have seen further expansion became uneconomic in 1952 and rural development ceased. At this time C.C.-D. employed 300 to 350 men and with no work what was to happen? Fortunately the South Wales Board were able to take over some C.C.D. gangs and field engineers, together with an O/H line surveyor. Work was also done for the M.E.B. on a

contract basis.

As we saw earlier, more capital became available in 1953 and as the 'recession' was shortlived, C.C.D. was re-activated, linesmen were again trained and the labour-force increased to around 450 men. The amount of new construction that Districts could achieve was limited and so it was left to C.C.D to survey, plan and construct most of the remainder, amounting to an estimated 42%.

Large areas of West Devon were without electricity, as were Exmoor, Dartmoor, the Brendons, Quantocks and Mendips etc., etc. In fact, most Districts would require some rural electrification. With several teams of surveyors in the field, serviced by Drawing Office, staff problems arose with design and material errors. It was obviously very costly, if poles were the wrong size or insufficient materials were delivered. It was a long way back to the stores and with construction staff lodgings, work was costed to the bone and overspending required an explanation.

With the appointment in 1955 of Fred Marchant, as Senior Draughtsman, strict drawing office procedures were instigated, which ensured everything was thoroughly checked before construction files left the office. Standard profile sheets were introduced together with line, pole, conductor and material schedules prepared on tracing paper enabling dyeline prints to be made - all very similar to the pre-nationalisation Edmundson's methods. Fred came to S.W.E.B. from the S.E.B. - a Board, which not surprisingly included an Edmundson's Company. Also in 1955, a young man was taken on by C.C.D. by the name of Marcus Palmen (a member of this illustrious Group), who apart from devising a scheme, whereby it was impossible to lose on the three draws fixed odd pools, introduced O/H line design charts.

Previously a nomogram method was used to obtain diameters together with stay sizes on angle poles and straight-line poles diameters were calculated as outlined in BS 1320, Marcus designed charts, which instantly gave the information required, when known factors were applied, such as stay spread, pole height and load span. Marcus also caused much consternation in Cornwall Group, when he proved trussing sets were useless on 'H' poles.

In the late 1950s, C.C.D had thirteen O/H line surveyors in the field, many being permanently outbased or lodging, each having a chainman. Those outbased rarely visited the office, their weeks work in the form of level books and maps being dealt with by post. Those lodging usually called in the office on either Friday evening or Monday morning when their work was deposited/collected. Additional assistance was obtained using a Company called Transmission Line Surveys (TLS). However whilst the survey and resulting profile was reasonably satisfactory, the planting element was not and so the assistance of TLS was not all it might have been. The tachometry method of survey was adopted, as apart from being more accurate than the

'foresight/backsite' method, a chainman was dispensed with.

Each surveyor required a draughtsman at Taunton to process his work. These could be either NIB or NJC staff. On reaching the age, where adult pay was required, chainmen were generally transferred to construction gangs or where appropriate to the Drawing Office as NJC draughtsmen - some taking day release and later becoming NIB staff.

On receipt of the Surveyors level book, the levels were checked and the profile plotted. An important part of the profile was the inclusion of a 'tie' sketch at every angle position, which clearly showed, which side of the hedge the poles and stays were located and more importantly dimensions enabling the angle peg to be located. This allowed any other surveyor to peg the line for construction in the event of sickness or holiday affecting the original surveyor. Whilst the statutory ground clearance is 17' 0", S.W.E.B. standardised on 20' 0" as appropriate for a rural Board.

I well remember Don Horn coming into the Drawing Office, picking up the appropriate sag curve and checking a profile at random. He discovered excess ground clearance equating to some 30' 0" in total on that particular sheet, which was the equivalent of a wasted pole. He ordered a much tighter adherence to standards.

Over the years it was found that each draughtsman averaged one mile per week of line constructed, or about forty-five miles per annum.

To obviate resurvey and to get it right, when wayleaves proved impossible to obtain first time, a system was later devised, whereby a "walkover" survey took place, when pole positions were selected and submitted for wayleave consent. Once the line was wayleaved, an instrument survey took place and the pole positions verified in the normal way. This led to considerable savings in survey costs, particularly when 33kV lines became necessary when 33/11kV Substations were established to back up the 11kV System. Pole positions were irrelevant, when a landowner desperately wanted a supply, but once supplied the 33kV pole was unwanted.

Fig. 5

Power comes to Hunters Inn. near Parracombe, North Devon, with Jean Metcalf accompanied by Cliff Michelmore of BBC. "Family Favourites" fame performing the switching-on ceremony. The scheme, which took power to five farms and seventeen other rural premises was completed in the Summer of 1958.

Linesman's training courses were often set up in the field, one such being at Widecornbe-in-the Moor, which was featured in the publicity film - "Power comes to Widcombe", made in 1962. C.C.D. also ran courses to train District staff in the use of explosives for the excavation of pole and stay pits, as well as the first courses on live line techniques. Regular courses were given on Surveying and O/H Planning by C.C.D Engineers and Draughtsmen.

Fig. 6

In order to avoid free felling in the beautiful Heddon Valley an 11,000 volt Aerial cable was suspended from short poles thus avoiding the necessity for the usual 50' 0" wide clearance. This was the first time in Great Britain that this method of supply was utilized.

Fig. 7

Widcombe-the-Moor R.D. Scheme August 1962. Instructor, Des Gough, with a linesman's school outlining requirements for protecting G.P.O. circuits and supervising students in "the binding-in" of conductors to insulators.

About 1964 S.W.E.B set up its permanent training school at Priorswood, which led to the permanent transfer of C.C.D Engineers Des Gough and Ken Fillery, who was its first Principal. So ended the direct connection between C.C.D. and Training, which for some fourteen years had served the Board well.

At its height C.C.D. employed some 600 men and each year, there was an anxious wait to see if sufficient cash was forthcoming from central funds - no money, no work. With such a large staff, constant pressure was applied to reduce costs by improved methods and mechanisation and to this end one engineer together with an engineering draughtsman were more or less employed full time on research and development. Various plant was improved or redesigned, including three drum conductor trailers, pole bogies, machines for cutting and coiling staywire, conductor running out blocks, pole boring machines etc. In order to pass on such expertise, C.C.D. organised several plant exhibitions at Priorswood for the mutual benefit of Districts, other Boards and manufacturers.

In addition, C.C.D erected the trial one wire system of O/H distribution from Stockland to Steart in West Somerset, as well as 11kV aerial catenary cable at Hunters Inn in North Devon. The latter also notable, as Cliff Michelmore and Jean Metcalf of "Family Favourites" fame performed the ceremony of switching-on, being there on holiday at the time, see fig. 5.

From memory, about twelve engineers were employed in the field on rural development construction and as with surveyors some were permanently outbased. With the National Rural Development target of 85% achieved in 1964, the C.C.D. workforce gradually fell from 287 in 1966/67 to 196 in 1967/68 and to 138 in 1969/70.

C.C.D. remained occupied with Primary Substation construction, deviation of mains, motorways crossing and re-conductoring of 132kV lines, but then, that's another story.

Finally, mention must also be made of the Somerset Group mobile team, which was principally set up to

work in the Barnstaple area, although work was certainly also done in the Crewkerne District. The Team consisted of a surveyor, draughtsman and as their name suggests a caravan. Most of their output was constructed by C.C.D. gangs. However I am advised that neither Devon nor Cornwall Groups adopted the idea.

In conclusion I hope these notes have been of interest and would point out that our archives do hold files on this subject, which would benefit from anything the members would like to add by way of documents or reminiscences.

In preparing these notes, the following documents are acknowledged :-

- I Twenty-five Years of South Western Electricity - Stanley Steward 1973
2. Report on Power 1960 - Electricity Council
3. C.C.D Archives
4. B.E.A. Annual Reports
5. S.W.E.B. Annual Reports
6. S.W.E.B. Staff Magazine