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ELECTRICITY

BY

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Being a LECTURE arranged by

The Women's Electrical Association

on behalf of the

WOMEN'S CO-OPERATIVE GUILD

at the Annual Meeting of the Central Committees
and Eight Sectional Councils.

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MISS PARTRIDGE:—

There is something rather exciting about having "Electricity" as the title of a paper. It is such a gigantic subject. It is like taking, say, "The World," or "The Human Race," or some such all-embracing subject to speak about. It is a bit difficult to select the aspects which are of special importance to women; but I'll do my best. In order to get things as clear and concise as possible I have put together the main points I want to bring before you in the form of a sort of catechism.

(1) *What is electricity?*

Electrical energy is just one form of energy. Other forms are light, heat, sound, movement and chemical energy which is stored up in every molecule of matter. Energy is released when we set a light to any matter in the form of light or heat—released when we eat it in the form of yet more life. Released when we ignite a charge of gunpowder in the form of noise and lots of movement. You see energy is just all the manifestation of vitality in the universe. It is difficult to conceive of a world without light or warmth or movement. It wouldn't be a world at all—it would be sheer nothingness. Now electricity is just one form of energy, and it has two special peculiarities which gives it great importance:

(1) It is remarkably easy to bring to any point required. It runs about on wires—and consequently wherever a wire will go electricity will go. (2) Of all forms of energy it is the most easy to convert to other forms.

(2) *What uses can electricity be put to?*

These are light, heat, movement, chemical energy and sound. To society in general with crowded cities and ever rising standards of living, the most important aspects of electricity are: (a) Press button control; (b) Heat without smoke and dirt; (c) Factories without smoke; (d) Wonderful remedial work.

(3) *What are the special uses of electricity in the home?*

It can do anything. I believe I am right when I say that the time will come when the world is provided with electrical equipment for every job a woman has to do. Just to show what can be done, I will instance the electric chambermaid, which calls one in the morning, makes the tea and hot water and turns on the light when the hands of a clock have reached a pre-arranged point. I don't say we all require complicated contrivances of that sort. All I'm pointing out is that if we do require them we've only got to be emphatic enough in demanding them and we shall get them. The things that are made now and can be procured by anyone with money enough are: Light—smokeless—any intensity you want from $\frac{1}{2}$ c.p. to hundreds of c.p.; vacuum cleaners, or electric carpet sweepers; floor polishers, cake mixers, electric sewing machines, fans, washing machines, electric irons, ironing machines, immersion heaters, toasters, grillers, cookers, and full-sized ovens, teapots, coffee pots, electric fires and so on. All these things can, and most of them do, do the work more quickly and thoroughly than any housewife.

A Chance for Inventors.

For some inscrutable reason there is not yet made a satisfactory machine for washing up crockery, drying it or scrubbing. There is a machine used in hotels and places where hundreds of plates are washed at a time, and there is another which will take a few plates and saucers at a time and won't wash baking tins, saucepans, or vegetable dishes.

Then scrubbing; there is a very efficient floor polisher, with two very stiff brushes which revolve rapidly in opposite directions while being pressed down on the floor by a heavy weight. This would only need slight alteration to make it usable with soap and water, and we would get a long-needed electric scrubbing brush—but someone must take the matter in hand. I should like to see an ad-

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visory committee of housewives, with power and knowledge, press for the introduction of apparatus which would most effectively alleviate domestic drudgery. I'm not for a moment suggesting that women should be relieved of all work. I believe in work for everybody and plenty of it; and if it doesn't come readily to hand one must make it; but I don't believe in monotony or lack of purpose in anyone's work. It seems to me a terrible thing to spend hours scrubbing a floor with the certain knowledge that in twenty-four hours' time it will all have to be done again—and in another twenty-four hours the same thing will happen again; and so on throughout one's life.

(4) *Why isn't electricity more used in English homes?*

I believe there are a number of reasons—some natural and unalterable—some peculiar or artificial, and in need of treatment I put the reasons in this order: (a) The comparative newness—the oldest electric supply company is little over thirty years old—and most are of far more recent date; (b) the innate conservatism of most English people; (c) the fact that England is a great coal producer, and consequently her gas supplies are among the first in the world. These are three reasons which we cannot alter if we would—and probably wouldn't if we could. (d) For some inscrutable reason women have never been much admitted into any of the branches of electrical engineering. The science of electricity is very little taught in girls' schools and colleges, and the business side—even the domestic branches that concern women—have remarkably few women in their ranks. (e) The electrical industry has been in the past—and to a lesser degree is in the present—badly hampered by restrictive legislation. (f) General public ignorance of all technical details of electricity. I consider this a really serious national calamity.

When it comes to turning electricity to heat in any quantity the case is not so encouraging. It is generally inadvisable to attempt it unless the power rates are low. When they are 1½d. a unit the costs are as follows.

A little radiator costs 1½d. an hour to run, and a big one, suitable for a room of any size, 3d. or 4d. an hour.

Cooking by electricity is an almost ideal way of cooking but it is not particularly cheap. It will cost about 5½d. on an ordinary electric stove to cook a dinner for five or six persons. On some stoves a clever cook can cook such a dinner for 2½d. or 3d., but it cannot be cut below that. You will appreciate the fact that the larger the oven (it is the oven which runs away with most heat) the greater the cost in proportion, but most especially I would warn you against ovens which are not properly constructed. There are some stoves which are just built of thin sheet metal which lose the heat quicker than it is put in, and consequently they are absolutely useless for cooking except with a preposterous consumption of electric current. It is a great pity that such stoves should be allowed on the market at all. A properly constructed oven should have double sides and slag wool packing or asbestos in between the walls.

The Need of More Knowledge.

Electricity is one of our most valuable public services, yet we know less of its working than we do about a marine engine. Take other public services—water, drainage and gas. We all know the general principles which govern these. We know what happens if a water pipe leaks—we understand the meaning of "water finds its own level," or the difference between good and bad water pressure. If we turn on a tap and the water doesn't come we say, quite placidly, either the water has been turned off at the main, or, "Mrs. Jones in the flat below seems to be using a lot of water to-day." When we press the button of a switch, on the other hand, we don't know what takes place. If the light fails to come we say something has gone wrong, we must send for an electrician. I have been sent for innumerable times for the most trivial reasons. Fuses blown, a switch a little stiff in action, and on one occasion because

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the main switch was turned off and it had not occurred to the owner to look at it; and, worst of all, the first question always asked on these occasions is "Is it dangerous?" I am not saying anything against the caution of the people who ask that question. Granting their state of ignorance of electricity, it is, perhaps, a natural question to ask; but it is symptomatic of a very unfortunate state of affairs when "danger" is the first thought that jumps to mind. As long as housewives do not know anything about electric currents, voltage, kilowatt hours or electric units, or the construction of switches, fuses and lampholders, there can never be any marked progress in domestic electrification, and they will continue to be at the mercy of so-called electricians who work on their fear of fire or danger and manage to make a job out of the replacement of a fuse. (g) the last and most important hindrance to rapid domestic electrification is cost. First, the public costs of electrifying the district, town, street or village; second of wiring the house; third of current consumed; fourth of electrical appliances used.

Cheaper Apparatus Required.

With the exception of lamps and lighting appliances, electrical apparatus is made rather for the wealthy purchaser than for the working man's wife. I believe that this state of affairs is already showing signs of improvement, but more can be done. I am not accusing manufacturers of profiteering, but rather of catering for the rich rather than for the poor. Too much is spent on finish, plating and general appearance. To take an instance. There is a small domestic motor on the market with all the necessary attachments for working a sewing machine, polishing brass and silver, working a fan, sharpening knives and scissors, or mixing cakes. This costs eighteen guineas, and I should say the work, finish and polish and detail put into it is well worth the money. On the other hand one can get an industrial motor of the same size, with attachments for sharpening tools, polishing metal, working a small lathe, a fan and drilling attachments—practically the same thing industrialised for £7 or £8. Electric irons cost 14s. to £1. All the range of small electric heating appliances—immersion heaters, electric kettles, toasters, hotplates, etc., cost between 20s. and 30s. Electric fires cost from 19s. upward to £50 or £60. Vacuum cleaners, the most useful of all electric appliances, cost £9 to £21, or more for large ones. Electric clothes washing machines, also real housewife joys, are far more expensive than we would wish, or than there is any reason they should be if there was a ready market for them. They now cost anything round about £30 to £40. Electric cooking stoves cost from five guineas to £18 or £20, or more for large ones.

I believe the real reason that most electrical apparatus is so expensive is that, on the whole, the only houses which are wired with wall plugs and plugs for heating points are the large and wealthy ones, and from them the demand is for polished electroplate, etc. Moreover the demand is not yet sufficient to justify manufacturers in laying down plant for quantity production, which means cheap production. All these things change slowly, but change they do, and must, in time, and by pressing for cheap apparatus, pressing for wall plugs and heating points in our houses, and generally demanding electric facilities at reasonable prices women can hurry along the change very materially. In the editorial of a technical journal of this month I read, "It is not too much to say that if progress continues as at present, the high cost of electrical domestic equipment and the sluggishness of wiring contractors will soon be a thing of the past." I hope so, but I don't feel content with progress "as at present." I feel convinced that women can hurry along the present rate of progress to their very material advantage if they will only decide what they want, and ask for it.

Cost of Current.

Next about the price of current consumed. Prices of current up and down the country vary from, say, 4d. a unit for lighting, up to 10d. or 1s., and from ½d. for heating, cooking and power, up to 3d. a unit. The rates general in the more forward districts, of which there are many to-day, being about 6d. a unit for lighting and 1d. to 1½d. for heating and cooking. Of course, you will all understand why it is possible for a big power station to run more cheaply than a little. It isn't the cost of the actual fuel, coal or oil or whatever is used, which forms the main item in the cost of electricity. It is the wages of the men running it, the rent, the cost of plant, repairs, etc. It takes a man just as long to look after a little engine as it does a big one. It has to pay very nearly as much for floor space. It is more extravagant in its demand for fuel, and so on; so you will see in the matter of economy of electric current the big towns have a great advantage over small ones. Other factors which affect price of the electric current are the kind of plant installed and the district the service cables have to run through; but I will deal with those when we consider the cost of bringing current to any specific district. There is one very important factor which affects the price of current, and that is the time the consumer uses it.

Consider a man who buys a large and expensive machinery to do a certain job. This machinery will be capable of turning out a regular quantity of work, hour by hour, for twenty-four hours a day. Then suppose some special circumstance, say some freak legislation or some special whim on the part of his customers force him to turn out the same quantity of work in four hours instead of twenty-four. Immediately he will have to increase all his machinery and buildings six-fold, and he will have to increase the price of the commodity sold in very nearly the same proportion. That is exactly what happens to electric supply companies when they only cater for lighting. That is the reason why electricity is usually sold for heating and cooking at a much lower price than it is for lighting. That is why industrial districts which sell current for driving factory machinery can make and sell it for 1d. per unit, because the electric generating plant is in commission the whole time instead of only for a few hours a day in the evening only. Any extensions then, which call for a supply of electricity during the day must make the whole supply to everyone relatively cheaper.

Facts and Figures.

Now for a few figures. Let us assume that we pay 3d. a unit for our electricity. The cost of boiling a pint of water, either with an electric kettle or with an immersion heater will be about 1/5d. The cost of running a 4 lb. electric iron will be 1d. per hour if the iron is on all the time. In practice, however, it is only a very quick ironer with a lot of wet things to iron who will require to keep the current on all the time she is ironing. Generally speaking, for one hour's work it is found that the current need only be on half an hour. A bed warmer which will replace a hot water bottle costs ¼d. a night. Fans cost between 1-10th and 1-5th of a penny an hour to run. Ordinary electric lamps cost the same, according to size, i.e., between 1-10th and 1-3rd of a penny an hour. Sewing machines under ¼d. an hour, sewing all the time. I once worked out how much it would cost in electric current to make a frock with eight yards of sewing. I haven't the exact figures before me, but I believe between twenty and thirty such frocks could be made for 1d. Vacuum cleaners cost between ½d. and ¾d. an hour to run according to size, but I can assure you a very great deal of dust can be absorbed in an hour's continuous running. A washing machine costs 1d. to 1½d. an hour, and the whole of the washing for five or six people can be done in under 1½ hours. The fact is that the

cost of changing electric energy to the energy of movement is very little. No one need be afraid of the cost of running electric motor-driven accessories, even when they are paying high prices for the current consumed. You will, of course, appreciate the fact that these prices are worked out on a 3d. a unit basis. If you pay 6d. or 1s. a unit you must double or quadruple my figures; if you pay 1½d. or 1d. you must take half or one-third of the costs I have given.

Wiring of Houses.

Our next cost item is the cost of wiring the house. The wiring of a built house can usually be done for about £1 per point for lighting and, say, 30s. to £2 a point for heating. These are approximate prices, as the actual structure and size of the house plays a very important part in the cost. It is cheaper to wire a house when it is going up than it is when it is already built, and the most difficult and tiresome and expensive house to wire is the one which is full of furniture. There are a number of different ways of wiring a house, and they, of course, vary in price to a certain extent, but not as much as one would imagine. A finished house usually has to be wired on the surface of the walls, a carcass wired house has concealed wiring. Good wiring ought to last from thirty to forty years. Electricity has not been in general use long enough to know if it will wear longer than that, but it has been going quite long enough for us to know that inferior wiring will not last anything like that time.

Cost of Service.

In most towns arrangements are made to give a service of electricity to practically anyone who asks for it, and this service is given free. Certain roads, however, have not the main cables laid down them, and people who live in these roads usually find that an application for electric supply is met with the reply that the supply will be brought either if the householder asking for current will pay a considerable part of the cost of cable or if a number of people in the road will all agree to take electric light. When you consider that the cost of cable and trenching is about £1 a yard you will see why it is that these stipulations are made, and why it is that people in sparsely populated districts especially find it hard to get electric light. A way out of the difficulty which is applicable in the country and some not too congested urban districts is by use of overhead service lines—like ordinary telegraph wires only rather heavier. These cost, on an average, about 2s. 6d. to 3s. a yard. For young undertakings these prices seem high, and are nearly enough to account for the sluggishness of authorities in bringing electric current, first to the poorer districts of the towns, and second to our rural districts.

However, examples are not wanting of districts where engineers have been bold enough to risk a loss on cable laying, and have been rewarded by the appreciative way people have used the facilities they have been given. Take Hackney, for instance. There the greater proportion of working-class houses have electricity, and a very large number use it for cooking, and get it for 1d. per unit. What can be done in Hackney can certainly be done in other places. Then in South Wales very interesting developments are taking place in the way of electrification of villages and hamlets. Poles or masts and overhead wires stalk about all over the country, and I hear that it is surprising how very much the facilities given are appreciated.

Woman's Opportunity.

(5) *What steps can women take to secure the advantages which electricity has put at the disposal of mankind?*


In the first place we must realise that electricity has come to stay as one of the ordinary public servants of man, and consequently we must press for a reasonable measure of electrical education in our schools. Children, as a matter of course, learn about the language they use,

the money they work with. They learn about hygiene, geography, and history, all very useful subjects, but about a power which, within a few years, everyone will come in contact with every day of his life we learn just nothing whatever. Secondly, we must press for a service of electricity in every district. In towns this is merely a matter of a sufficient number of people asking for it, and no supply company will refuse. In the country more is required. To take a concrete instance, there is a village of some 700 people, remote from all the big distributing companies. This village, like many others, would very much like the advantages and conveniences that electric light would bring, but could not see how it was to be obtained. We have drawn up an estimate for the whole of the lighting of the village, and find that £2,000 will provide everything necessary. To raise this we have started a little co-operative society in which nearly all the consumers take shares, and a number of outside people as well. To do this needs a certain amount of energy and hard work, but there are now, I believe, several village lighting undertakings which are run in this way, and what one village can do another may. We find that the undertaking will pay quite well if we charge an average of 4½d. per lamp per week.

The third thing—and a very important one—which we must press for is a regular system of free or assisted wiring for smaller houses. The system of every man wiring his own house is all very well as long as the owner is also occupier—but when the occupier is a tenant difficulties immediately arise. In the village I just mentioned we got over the difficulty by setting aside a certain sum for wiring the smaller houses, and for that service we charge ½d. per week per light to whoever is in the house. A number of towns have started some such system of wiring—and find it much appreciated—but it is not by any means generally realised that, as long as there are such a large number of houses built before electricity was a common public service, it is only by some such system of wiring that a number of houses can ever hope to get electricity. At present all such improvements are entirely dependent on the enterprise or public spiritedness of a few of the leading men, instead of being common practice in all districts.

Co-Partnership Ownership.

The fourth thing required is some system which will bring the various electrical apparatus within reach of everyone. Again we can only look round to see what has been done in the most progressive districts. Electric supply companies can and do hire out electric cooking stoves in a number of places—but in a very small number. Where they do institute a hiring system for electric cookers people always eagerly avail themselves of the opportunity, but they might well press for a hiring system in every town in England. At the same time as they ask for a hiring system for cookers it should be remembered that using electricity for cooking in the day is the best means of cheapening the general supply of electricity. Vacuum cleaners and clothes washers can only become available to the poorer consumer either by persuading the manufacturers that there is a demand for a cheaper article—a difficult task—or by some kind of co-partnership ownership. There really seems to be no reason why a few such machines should not be jointly owned by a small community as long as they live near enough to each other to secure the advantages of the piece of apparatus whenever they want it. A vacuum cleaner, for instance, will clean a room in an hour more effectively than the most thorough turning out the mind of woman can design. One morning a week will keep a large house thoroughly clean. It seems a pity, then, to pay a large sum for an article which is standing idle 98 per cent. of its time. The same applies to washing machines. I must leave you to work out the details of the scheme. There are certain difficulties in the way of a short time hiring system for these two most useful labour savers, but I feel sure there must be a way of getting over them.



**THE WOMEN'S
ELECTRICAL
ASSOCIATION**

has been founded by women to
promote the wider use of Elec-
tricity in the Service of Women



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