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The Trend in the Use of Electricity on the Farm

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The bulletin "The Red Wing Project on the Utilization of Electricity in Agriculture" was a report on the experimental work done by the Division of Agricultural Engineering during the years 1923 to 1928. More than ten years have now elapsed since this project was started and it might be of some interest to see what the trend in energy consumption has been and what the general reaction of the farmers toward electric service is at this time. The experimental data given in the bulletin was obtained from carefully supervised operations and the question naturally arose whether the same results would be obtained when and where the farmers themselves were to assume the responsibility for the care and operation of the equipment. To make a fair comparison a re-check of the equipment and farm operations have been made during the past year.

The type of electric service on the experimental line is single phase 110-220 volts alternating current. The high line is an all copper line with a primary voltage of 6900. When the line was constructed in 1923 nine customers were served and seven co-operated in the experiment. Another co-operator was added shortly after the line was completed. Of the eight who were served during the first summer of 1924, one has retired from farming and another has moved away but their successors are both continuing the use of electric service.

Household Uses of Electricity

The Electric Range. Seven of the eight original co-operators were equipped with electric ranges for cooking purposes. Most of the farms in this section have woodlots from which they can obtain very cheap fuel during the winter months when the farm activities are rather slack. As a result four of the ranges have been replaced by wood burning ranges. When electricity was used exclusively the consumption for cooking varied from 100 to 200 kilowatt hours per month. The ranges now remaining are used mainly during hot weather and for preparing light meals.

Electric Refrigeration. The electric refrigerator has proved to be one of the most satisfactory pieces of electrical equipment. Four machines were installed when the project was started and several have been added since. One of the refrigerators has given uninterrupted service during the ten-year period. Servicing of the other machines has consisted of recharging with sulphur dioxide once and replacing one thermostat control.

Water Heating. Automatic water heaters were tried out but were discontinued before the experimental work was completed. The energy cost for electricity was found to be far in excess of the cost of other available fuels.

Other Household Appliances. The use of common appliances such as washing machines, electric irons, fans, toasters, radios, and vacuum cleaners is being continued in all the homes. Most of these appliances are now considered essentials rather than luxuries.

Power Equipment

The use of 15 and 10 h.p. motors for threshing and ensilage cutting was tried out for several years. Although it was found that the fuel cost for the electric motors and for gasoline or kerosene tractors was about the same the use of electric motors for this purpose was discontinued because much of the threshing was done too far from the line to use electricity. This necessitated tractor power in addition to the electrical equipment. The large motors required the use of separate portable transformers which were connected directly to the power line. This introduced an additional cost as well as a serious hazard, especially among inexperienced operators. It was found that a 5 to 7½ h.p. motor was the most economical size power to use

for ensilage cutting. Motors not to exceed 7½ h.p. can usually be connected directly to the secondary of the farm wiring system. Most of the farms were equipped with 5 h.p. motors in 1924 which have been used for all the large power jobs such as ensilage cutting, wood sawing, feed grinding, elevating, etc. On inspection the motors were found to be in good condition with no perceptible wear. With the exception of renewal of brushes no servicing had been required on any machine.

Water Pumping. All the farms were equipped with water systems of either the gravity or hydropneumatic type or both. Some difficulty had been experienced with the automatic switches on the hydropneumatic plants and in one case the automatic switch has been replaced by a hand operated one.

Incubators and Brooders. Several of the farmers used electric incubators and brooders for several years but discontinued their use after the keen competition between commercial hatcheries made it more economical to buy chicks than to operate small scale incubators.

Cream Separator. Operating the cream separator ½ or ¼ h.p. motor is being done on practically all the farms in the group. The cost of energy amounts to only a fraction of a dollar per month and eliminates one of the most tedious jobs on the farm.

Following is a table of the average kilowatt hour consumption on six farms during four years of the experiment and also during the last five years. Two farms have been omitted because of change of tenants and equipment. The sharp drop in consumption between 1927 and 1930 can partially be accounted for because of the elimination of electric ranges on most of the farms.

Farm	1924	1925	1926	1927	1930	1931	1932	1933	1934
A	53	178	243	251	191	164	144	143	122
B	224	239	225	316	131	101	130	109	82
C	240	308	310	379	143	108	102	110	126
D	84	327	309	201	165	172	136	139	141
E	42	161	206	223	199	114	88	85	90
F	86	219	249	309	194	151	114	94	106

Conclusion

All the original co-operators or their successors on the Red Wing experimental line were continuing the use of electricity and expressed general satisfaction with this type of power. Electrically driven water systems, washing machines, refrigerators, and cream separators continued to be the most popular pieces of small power equipment.

Electric ranges are now used only to

supplement wood burning ranges because of the abundance of fire wood in this locality.

Five and seven and one-half horse power motors have proved to be the most economical size for general power purposes. Feed grinding, wood sawing, ensilage cutting, and all operations except threshing can be done economically and efficiently with motors of such capacities.