Questions and Answers

Miscellaneous.

Heating by Electricity, etc.

1. How many K. W. H's. of electricity would be required to heat and light a twelve roomed house and cook for a family of ten per year?

2. How much current would be generated from a stream flowing about forty cubic feet past a given point in one minute if dammed to a height of ten feet?

3. What would be the most suitable voltage for carrying this current a half mile each way from source, and could it be carried on a telephone pole lead along with telephone circuits, and would No. 12 iron telephone wire do for this purpose? J. E. W.

Ans.—1. To heat a twelve-roomed house for say seven months will require at least 8 tons of coal, and some use as high as 12 to 15 tons for houses this size. It would take 10 H. P. of electricity running full strength every minute for 7 months to give as much heat as 8 tons of coal, and even then the electricity would not take the place of the coal, because at night time and during mild weather the store is run light, but in the daytime and during severe weather it is forced and burns two or three times the average, consequently it would require at least 20 H. P. of electricity to give the same heating capacity as 8 tons of coal, and 25 H. P. would be safer. Eight H. P. for 7 months = 30,365 K. W. H.

The lighting is a small item in comparison with this. Say that on the average there were 12 lamps each of 25 watts, in use for four hours each day, the total power used in the year would be only 448 K. W. H.

The current necessary for cooking is harder to arrive at, but perhaps we can approximate it. The "elements" in some electric cookers take about 1,300 watts each. Assume for each meal, including also the baking, that two elements would be run an average of one hour at morning, noon and night. That would make 2,600 watts 3 hours or 7,800 watt hours per day, or 7,800 x 365 = 2,847,000 watt hours per year = 2,847 K. W. H.

Adding the heating, lighting and cooking together the requirements would be 33,660 K. W. H.

2. A stream flowing 40 cubic feet in one minute and dammed to 10 feet high would generate not more than 20-33 of one horse power, which going steadily all year would give 3,940 K. W. H. which is almost exactly 1-9 of the amount required for heating, lighting and cooking.

3. 110 or 220 volts would be ample, because the current for 20-33 H. P. at these pressures would be only 4 amperes for the 110 volt circuit and 2 amperes for the 220 volt circuit, and the loss at these strengths would be very small. A small amount of power like this would probably not disturb the telephones to any appreciable extent. A No. 12 iron wire one-half mile long and back would have about 110 ohms resistance and 110 volts against this could only drive 1 ampere of current, to say nothing about doing work at the end of the line. Hence the iron wire would not do. A copper wire the same size would do as it only has about one-fourteenth as much resistance as the iron. W. H. D.