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on the poles (not cross armed)? A. Yes. Cross talk is produced by the wires running parallel to each other, and not by their being on the same cross arm. 3. I do not understand how every 'phone attached to the line in multiple system will reduce the resistance of the line. A. One wire has a certain resistance between two points. If we add a second wire like the first we have half the resistance, because there are two paths for the electricity, and hence twice as much can pass. 4. Does the corrosion that gathers on the zincs of a Leclanche cell impair the working of the battery? A. Yes. 5. How is polarization guarded against in those forms of the Leclanche cell having the carbon in the form of a hollow cylinder? A. By the great amount of surface it presents to the liquid. It does not prevent polarization, it only retards it. 6. Can you tell me where I may obtain directions for making a home-made galvanometer, such as would be suitable for rough-testing a 'phone generator and battery? A. In "Experimental Science," price \$4 by mail. 7. Why is it harder to turn a 'phone generator when the line is grounded or when the 'phone is plugged? A. Because no current is generated when the generator is short-circuited. 8. Could you give me instructions for making a home-made blow-pipe furnace? A. Pile up a few bricks around your crucible and work away. See "Experimental Science." 9. Do sharp ends of wire from one-half inch to one inch long, left projecting from any electrical connections, cause a waste of electricity? A. Not unless there is a very high potential, as in the secondary of an induction coil. 10. What is the best method for splicing small copper wires, especially No. 36 magnet wire? I have tried splicing it with an alcohol lamp, but found the flame to be too hot? A. By soldering them, using rosin as a flux. 11. Is there any method of testing the strength of the polarizing magnet of a polarized bell of a telephone? A. By finding what it will lift, or what repulsion it will exert on a magnetic needle. 12. Should oil be placed on any of the bearings of a telephone generator? A. Any part of a machine where there is rapid motion may be oiled. There is no magnetic or electrical advantage or disadvantage one way or the other.

(8473) C. C. H. writes: I was interested in the question of your correspondent, No. 8403, issue of October 26, in regard to the temperature of an iron bar in sunlight. In this instance the sense of temperature is not at fault, the temperature of iron in sunlight being higher than the temperature of the surrounding air, as the following experiment shows: In the edge of a cast-iron disk, about an inch thick by six inches broad, I bored a hole and inserted a thermometer after first filling the hole with water. The disk being stood in the sunlight out of doors, at the end of a half hour the thermometer registered 100.6 deg. The temperature of the surrounding air, also in the sunlight, found by whirling a thermometer at the end of a string, was 59.9 deg. The sky was hazy, or the difference would have been greater. The explanation is as follows: A body radiates heat at a rate nearly proportionate to the excess of its temperature above that of the surroundings, provided the excess be not too great, so that a piece of iron when placed in sunlight will rise in temperature until the loss of heat radiated is equal to that received from the sun. If we make the part of the iron not exposed to the sun a bad radiator by polishing it, and the part exposed a good absorber by smoking it, the temperature difference will become still greater. The reason that the air becomes only slightly heated by the passage of the sun's rays is that the air is a bad absorber of radiation. An interesting experiment is to lay a sheet of blackened sheet metal in the bottom of a shallow wooden box and close the box with a (or better two) cover of glass, making all as tight as possible and inserting a thermometer through a cork. In the sunlight on a hot day the temperature may rise above the boiling point of water in such a box.

(8474) W. F. B. asks: In lighting my house with incandescent lights from an isolated plant consisting of dynamo coupled to gasoline engine what effect will the variation in the number of lights used have upon the dynamo? In a mill, the motor, which receives current from a transmission line, raises the stamps 110 times per minute without any perceptible variation. Jack up all the stamps and the motor will turn the empty camshafts exactly 110 times per minute. The difference between full load and no load does not phase her a particle. An engine would race unless provided with a very sensitive automatic governor; and I suppose the motor takes only as much current as is required to make that number of revolutions. But if a 50-light direct-coupled dynamo is running and the women folks turn out all the lights in order to enjoy the moonlight, what will happen to the dynamo? A. If a miller is drawing water from his pond to run his mill, and he shuts the gate to go to dinner, what happens to his pond? Nothing. Just this will happen to your dynamo, and for the same reason. Water in the pond with the gate shut has pressure but no motion. Only pressure, electromotive force, exists in the dynamo when all the lights are turned off. There is every preparation for an outflow of electricity, but no current. Turn a switch and the current flows and the lights glow. Just as in the mill the wheels turn when the gate is opened.

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