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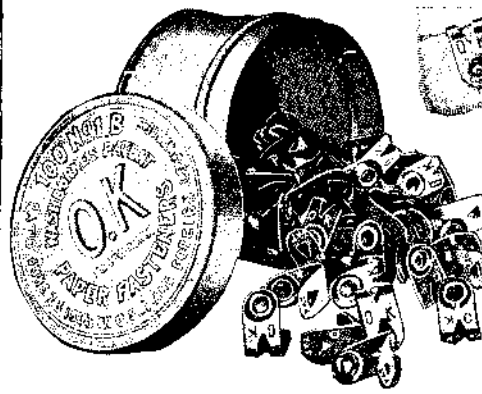
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Notes and Queries.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(9623) J. E. E. asks: Please answer in the question columns which is the more economical light, gas or electricity (incandescent) where the consumption is limited to a city of 10,000 inhabitants. I believe that for a city to own either a gas plant or a system of electric lighting, gas is cheaper, and will give a great deal more light for a given quantity than electricity. In fact, that electricity is a luxury. A. Whether gas or electricity is better for any given city is to be decided wholly by local conditions. If the proper gas coal can be had for a low cost at the place, gas may be cheaper. If water power can be had for generating electricity, or if steam coal is cheap in the place and gas coal is not cheap, then electricity would be better. The lighting by electricity is better than any other form of illumination.

(9624) W. J. McC. asks: What kind of an instrument can I make or buy to test that "a current of heat flows through a rod of metal, if the ends are kept at different temperatures, the flow being always from the high temperature to the lower," as is stated on page 122 of "Lessons in Electricity and Magnetism," by Silvanus Thompson, 1882. I require an instrument to show the above condition. A. A simple way to prove that a current of heat flows from a place of higher to a place of lower temperature along a bar of metal is by placing the fingers on the colder end and moving them along as far as it can be done without burning them. An ordinary thermometer may be used unless the bar gets too hot for it. Sometimes the bar is coated with paraffine when cold, and the melting of the paraffine is observed as it proceeds from the hot end toward the colder end. No special instrument is necessary to show that a bar is heated by the flow of heat along the bar. This flow is a current of heat.

(9625) W. J. W. says: Referring to No. 9584 under notes and queries in your issue of April 1, 1905, you state that no rivers on the earth flow up hill, on account of centrifugal force. If the mouth of the Mississippi River is farther from the center of the earth than the source, which it undoubtedly is on account of the shorter polar diameter, does not the river flow up hill? If not, please state your authority. A. Rivers unquestionably flow from one point to another point which is further from the center of the earth, but that does not mean that they flow "up hill." The definition of a level surface is one parallel at all points to the surface that a liquid, such as the sea, or the surface of any body of water not in motion, would take. This surface is not a part of that of a perfect sphere, but an oblate spheroid. Having thus defined a level surface, "up hill" would be defined as a direction deviating from it, going away from center of the earth faster than the level sur-

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face. If you were to assume that the Mississippi River—or any other river flowing toward the equator—flows up hill, you would have to say that the level of the sea was not level, but was "up hill" toward the equator. This is contrary to ordinary usage, and not in accordance with the accepted definition of the words "level" and "up hill."

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