

## NOTES ON ELECTRICAL THEORY.

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1. *The Production of Light.*—According to an idea that is generally associated with the names of Faraday and J. J. Thomson, energy is radiated from an electric charge in the form of light or electric waves when the lines of electric force issuing from the charge assume a wavy form. This idea has been made more definite by a study of the form of the lines of force in various types of electromagnetic fields. It is known now that waves on the lines of force may be produced either by an oscillation of the electric charge or by the continual emission of either electric or magnetic doublets. The emission of a single electric charge produces a kink in each line of force while the emission of a single magnetic charge produces a rotation of each line of force. When charges of opposite signs are successively emitted in the same direction so as to be equivalent to a doublet, the successive kinks are in opposite directions and are thus equivalent to a solitary wave. When a succession of magnetic poles of one sign are emitted in one direction, the lines of force rotate about this direction but they rotate with different angular velocities. The same is true when magnetic poles of opposite signs are fired out in opposite directions.

If a magnetic pole emitted in one direction is followed by a magnetic pole of the opposite sign so as to give a magnetic doublet, the lines of force rotate first in one direction and then in the other returning finally to their original directions. The result again is that a solitary wave runs along each line of force, but just as in the electrical case one line of force is unaffected.

The question now arises whether two types of light production really occur in nature. This is a question that has been bothering physicists for some time and opinion is divided. An argument in favor of the dual nature of light may be presented as follows:

2. *The Reaction of an Electric Charge upon a Field which Alters its Motion.*—It is usually assumed in electromagnetic theory that when an electric charge  $A$  is accelerated by an