whether colored or not, reflects white light at its outer surface, it would appear absolutely black when placed in yellow light.

When a colored body, as a red wafer, is looked at steadily for a short time, on turning the eyes to a white substance, a green image of the wafer appears, which is called the accidental color of the red—all tints have corresponding accidental colors: thus the accidental color of orange is blue, that of yellow is indigo; of blue, orange-red; of violet, yellow; and of white, black; and *vice versa*. When the direct and the accidental colors are of the same intensity, the accidental is then called the complementary color, because any two colors are called complementary to one another, which produce white when combined. The varying tints of watered silks and satins afford numberless examples of complementary colors.

When a very slender sunbeam passes through a small pin hole into a dark room, and is received on a white screen or plate of ground glass at the distance of little more than six feet, the spot of light on the screen appears larger than the pin hole, and instead of being surrounded by a shadow, has a series of colored rings, separated by obscure intervals encircling it. These rings are more distinct in proportion to the smallness of the beam. When the light is white, there are seven rings which dilate or contract with the distance of the screen from the whole; as the distance of the screen diminishes, the white central spot contracts to a point and vanishes; and on approaching still nearer the rings, gradually close in upon it, so that the centre assumes successively the most intense and vivid hue. When the light is red, the rings are alternately red and black, and more numerous; their breadth varies with the color, being broadest in the red light and narrowest in the violet.

The shadows of objects are also bordered with fringes of color when held in this slender beam of light. If the edge of a knife or a hair, for example, be held in it, the rays, instead of proceeding in straight lines past its edge, are bent towards it when quite close to it, and proceed from thence to the screen in curved lines, so that the shadow of the object is enlarged, and edged with a colored fringe; these fringes are quite independent of the form or density of the body, being equally produced, whether the object be sharp or pointed, glass or platina. The rays being curved when they reach the screen, they are of different lengths, and in a state of unequal vibration, and thus conspire to form the colored fringes, or to destroy each other in the obscure intervals. These rays, then, are said to interfere with one another, and the phenomena is termed the *interference* of light; when this interference is partial, colored rings are produced; when it is complete, darkness is the result.

Some bodies owe their color to this fact of interference, and not to the reason given before. Such are the iridescent metals, peacock's feathers, and the surface of mother of pearl.

SIR F. C. KNOWLES' IMPROVEMENTS IN THE MANUFACTURE OF IRON.

We are much gratified in being able to announce to our readers that the problem of the successful reduction of the rich primary ores of iron has at length been solved. This has been accomplished with the pea coke of Dartmoor, by Sir Francis Charles Knowles, Bart., and a peculiar process of his own invention, the details of which we are not, for the present, able to give; but its extraordinary power will be appreciated by our readers, when we state that the pressure of the blast used at no time exceeded 6 oz. to the square inch; yet this was found adequate to bring down, with profuse rapidity, a rich gray cast iron. The iron produced (of which we have samples) is uncommonly strong, yet soft and ductile under the hammer, and, in its fracture, presents the valuable peculiarity of a highly