

closing new wonders in its mysterious constitution, and revealing changes that are taking place at the origin of this subtle agent, and along the line of its propagation. For ages it has been bringing its hieroglyphic messages to the world, but only just now has man become able to interpret them. Dispersed by the prism of the spectroscope it displays its recently deciphered characters. Wollaston saw these in 1802, but could not read them. In 1814 Fraunhofer examined them more carefully and mapped them, having doubtless a strong suspicion of their scientific importance. Later came several able physicists, who made many painstaking researches to clear up the mystery; but all remained in obscurity till 1859, when Kirchhoff gathered together many isolated facts relating to absorption, and, generalizing the fact that a gas absorbs precisely those rays which it emits when made self-luminous, enunciated the law that "The relation between the power of emission and the power of absorption of one and the same class of rays is the same for *all bodies* at the same temperature." Since, the physicists have not only analyzed terrestrial substances, but they have also determined in part the physical constitution of the sun, the planets, stars, comets and nebulae. By spectrum analysis it has been ascertained that the sun contains many substances in common with the earth; that Uranus is probably in part self-luminous; that Venus, Mars, Jupiter and Saturn have an atmosphere containing aqueous vapour, while the moon has none; that comets appear to consist of an aggregate of minute solid particles, rendered luminous on approaching the sun; and that many of the unresolved nebulae, floating on the outskirts of the universe, are still in their original condition of glowing gas. The credit of these wonderful discoveries belongs principally to European investigators. Secchi of Rome, Angstrom of Upsala, Kirchhoff of Germany, Janssen of Paris, and Lockyer, Roscoe and Huggins of England, have been indefatigable workers. America has, however, one representative who compares favourably with these noted names of the old world. To Prof. Young, of Dartmouth College, belongs the considerable credit of being the only American who is recognized abroad as an original investigator with the spectroscope. In the latest and best work on "Spectrum Analysis," by Dr. Shellen, frequent reference is made to the investigations of Prof. Young. He is admitted to be the best authority in this country on the physical constitution of the sun.