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## SOME RECENT SPECULATIONS ON THE NATURE OF LIGHT<sup>1</sup>

FOUR weeks, one day and four hours ago I was sitting on a sofa in the Cosmos Club, Washington, chatting with your distinguished director during a brief interval between long committee meetings. That was when, but I know not just how or why, I was caught by that wily hunter for this particular repast. This time he was not after big game—merely angling for a poor fish.

There is no need to import any outsider into the Jefferson Physical Laboratory to talk about light. Here you have Pierce with his wave lengths in hundreds of meters and Duane with them in fractions angstroms, a range of  $10^{14}$ . Here the celebrated Lyman region was found and explored. You have in Saunders one who has followed series spectra from Ritz to Bohr and beyond. Then there is infra-red Kemble and band-spectra Mulliken, and for recent speculations on the nature of light why look further than Slater? The whole range of factual and deductive and speculative optics is here, and nowhere else in greater variety or completeness or perfection. If Count Rumford were alive he would perhaps feel that you were all out for the Marathon that leads to his medal and premium—and all likely to win.

The count spoke of light and heat. To-day light and heat and electricity have come together. Therein lies our difficulty and thence issue our speculations. While light stood alone we had reached a satisfactory theory of its nature as a wave motion in a medium. When it passed to heat and we became interested not in the transparent but in the black body we were in trouble at the short end of the spectrum and that trouble has been confirmed and accentuated by photoelectric phenomena. A score of years ago Ritz<sup>2</sup> in a masterly critique of electromagnetic theory suggested strongly that the time had come when it might be no longer useful and might perhaps even be harmful to consider energy as localized. We have proceeded, in the most contrary way, to emphasize more and more the localization of energy, especially radiant energy, and to endow this energy with momentum, angular momentum, with mass, inertia and weight. The quantum theory and the Bohr orbit have certainly been

<sup>1</sup> An address before the Physical Colloquium, Jefferson Physical Laboratory, May 24, 1926.

<sup>2</sup> W. Ritz, "Gesammelte Werke."

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