been definitely excluded from this result by previous assumption that $x < n$.

For other values of $d$ the expressions in (5) do not simplify, and we have to determine $x$ from the general conditions

$$n = ax + c, \; c < x, \; (a \neq 0, \; a - c > (d-1)(x+1) \text{ and } \leqq d(x+1)).$$

It may be verified by actual trial that the solutions of (1) and (2) may in this way be effected with a degree of readiness which will make the method serviceable in a large number of cases.

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# THE INNER FORCE OF A MOVING ELECTRON.

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1. *Introduction.* — Sommerfeld * has given a general method of determining the force which an electron exerts on itself when its motion is known. Schott † has applied the retarded potential to the same problem. In the present paper the known vector expression ‡ for the force with which a moving point charge acts on another point charge is used to determine the action between any two elements of the electron. A double integration over the volume of the electron gives the inner force of the electron. The Abraham-Sommerfeld expressions for the longitudinal mass and Abraham's value for the transverse mass are thus very simply determined and the limitations on the solutions are made manifest.

2. *The Force Between Two Moving Point Charges.* — The electron is assumed to be a uniformly charged solid sphere which is moving in a straight line without rotation. Take the $x$-axis in the direction of motion. Measure the time from the instant at which the force is to be determined and choose the velocity of light as the unit of velocity. Let $(x_0, y, z)$ be the coordinates of the point charge $de_2$ relative to the point charge $de_1$. The distance moved by the electron in time $t$ is

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* *Göttinger Nachrichten*, 1904.

† *Ann. der. Physik*, 1908, No. 1.

‡ Abraham : Theorie der Elektrizität, vol. II, p. 98.