where

$$\tan\theta_1 = \frac{P_1\alpha - 2a\alpha P}{P_2 + P(\alpha^2 - a^2) - \alpha P_1} = \tan\left(at_1 - \tan^{-1}\frac{P_0'}{P_0''}\right),$$

and in which $t_1$ is the phase difference in seconds between the motion of the sphere and that of the support.

6. The particular class of numbers which are discussed in Mr. Stager's paper suggested themselves in the construction of a table for use in applying Sylow's theorem. This table — now constructed for the first 10,000 numbers and eventually to be extended to 15,000 or 20,000 — exhibits the value of $k$ for all prime factors of each number which give factors of the form $p(kp + 1)$, where $p$ is any prime except 2 and $k$ is any positive integer. Those numbers, called $P$'s, which contain no factor of the form $p(kp + 1)$ form a very interesting class. The present paper deals with their fundamental properties; shows that the numbers consist of four general types; obtains several formulas for their enumeration; and suggests a connection between the number of ordinary primes and the number of $P$'s within a given limit.

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*Secretary of the Section.*

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## THE CONSTRUCTION OF A SPACE FIELD OF EXTREMALS.

BY DR. E. GORDON BILL.

(Read before the American Mathematical Society, December 30, 1908.)

IT is a well-known theorem of the calculus of variations,* that if all the members of a one parameter family of plane curves pass through a fixed point $O$, then any arc of these extremals which does not contain $O$ nor its conjugate point, may be imbedded in a field.

Moreover, in 1879 Weierstrass stated that a field including $O$ could be constructed and Professor Bliss † has proved this to be true.

* Osgood, *Annals of Math.*, ser. 2, vol. 2, p. 112.
† Bliss, BULLETIN, vol. 13, p. 321.