furthermore let

$$|f_i(x, t, y)| \leqq M \qquad (i = 1, 2).$$

Then if ρ *satisfies the conditions*

$$\rho \leqq \alpha, \quad \rho \leqq \frac{\beta}{M}, \quad \rho \leqq \frac{\gamma}{2AM},$$

there exists, in the interval $|x - x_0| \leqq \rho$, *one and only one continuous solution* $y(x)$ *of the integral equation* (1).

The proof is entirely similar to that of Theorem I.

CORNELL UNIVERSITY,
January 10, 1913.

A THEOREM ON ASYMPTOTIC SERIES.

BY MR. VINCENT C. POOR.

THEOREM: *If* $f(z)$ *is not holomorphic at* $z = 0$, *but is formally developable into a Maclaurin series, and if* w *is asymptotic to* $a_1/z + a_2/z^2 + \cdots$ (*written:* $w \backsim a_1/z + a_2/z^2 + \cdots$), *then* $f(w)$ *has an asymptotic representation.**

To prove this theorem take $f(z)$ in the form

$$(1) \qquad f(z) = f(0) + f'(0)z + \frac{f''(0)}{2!}z^2 + \cdots + \frac{f^{(n)}(0)z^n}{n!} + \int_0^z f^{(n+1)}(t) \cdot \frac{(z-t)^n}{n!}\,dt.$$

Since

$$w \backsim \frac{a_1}{z} + \frac{a_2}{z^2} + \cdots$$

w may be written

$$(2) \qquad w = \frac{a_1}{z} + \frac{a_2}{z^2} + \cdots + \frac{a_n + \epsilon_{1nz}}{z^n},$$

where, according to the Poincaré definition† for an asymptotic

* This theorem is the " résultat préalablement obtenu " referred to in Professor Ford's paper in the *Bulletin* of the French Society for 1911. See *Bulletin Société math. de France*, vol. 40 (1912), fascicule 1 under " Erratum du Tome XXXIX."

† Poincaré, *Acta Mathematica*, vol. 8 (1886), p. 296.