while the symbols S_n are determined by the harmonic elements of the initial distribution of velocity and condensation.*

9. *Free vibrations between two concentric spherical surfaces.* Since the radial velocity at the surface $r = r_1$ is zero, then

$$F_m(kr_1)\Big[S_n \sin kat + S'_n \cos kat\Big]$$
$$+ F_{-m}(kr_1)\Big[S''_n \sin kat + S'''_n \cos kat\Big] = 0;$$

and there is a similar equation involving r_2.

These must be satisfied for all values of θ, φ, t,

$$\therefore S_n F_m(kr_1) = -S''_n F_{-m}(kr_1);\ S'_n F_m(kr_1) = -S'''_n F_{-m}(kr_1),$$

with two similar equations in r_2,

$$\therefore \frac{S''_n}{S_n} = \frac{S'''_n}{S'_n} = -\frac{F_{-m}(kr_1)}{F_m(kr_1)} = -\frac{F_{-m}(kr_2)}{F_m(kr_2)} = \rho, \text{ say.} \quad (17)$$

The possible values of k, and of the wave length $2\pi/k$, are to be found from the third of these equalities;† and then S''_n, S'''_n are known multiples of S_n, S'_n. Thus (3) takes the form

$$r^{1/2}\psi_n = [J_m(kr) + \rho J_{-m}(kr)]\ (S_n \sin kat + S'_n \cos kat), \quad (18)$$

an equation which, extended to the whole of space, gives a series of nodal spherical surfaces, of which $r = r_1$, and $r = r_2$ are a pair. At such surfaces the superposed divergent and convergent waves interfere.

ADDITIONAL NOTE ON DIVERGENT SERIES.

BY PROFESSOR A. S. CHESSIN.

In a previous note (pp. 72–75) it has been shown that every divergent series oscillating between finite limits can by a proper arrangement of its terms be made convergent. We will now extend those results to the case when one or both limits between which the series oscillates are infinite. To this end it suffices to consider, together with *regular* se-

* The work is exemplified for the case $n = 1$, *Theory of Sound*, pp. 236, 237.

† *Annals of Mathematics*, vol. 9, No. 1, pp. 29, 30.