the electron during its motion. Curves are shown in figure 19 for the arrival of the influence for every 15^{o} projection all around the electron. The outside limiting curve is a circle with center at the small circle on the x-axis to the right of the origin, and this large circle is the locus of the arrival of all influences after one complete cycle of the harmonic motion of the electron.

In this problem two chief assumptions have been made so that diagrams may be drawn to scale. The first is that the frequency is equal to

$$n = 10^{18} \qquad (52)$$

which is in the range of X-ray frequencies. The second concerns the maximum velocity of the electron at the middle point of its range. It is assumed to be one fifth the velocity of light, that is

$$v(max.) = 0{\cdot}6\ 10^{10} \qquad (53)$$

The assumption of the frequency in (52) makes the angular velocity

$$\omega = 2\pi n = 6{\cdot}28\ 10^{18} \qquad (54)$$

By differentiating (50) the velocity of the electron is

$$v = a\omega \cos \omega t \qquad (55)$$

whence the maximum velocity at the origin becomes

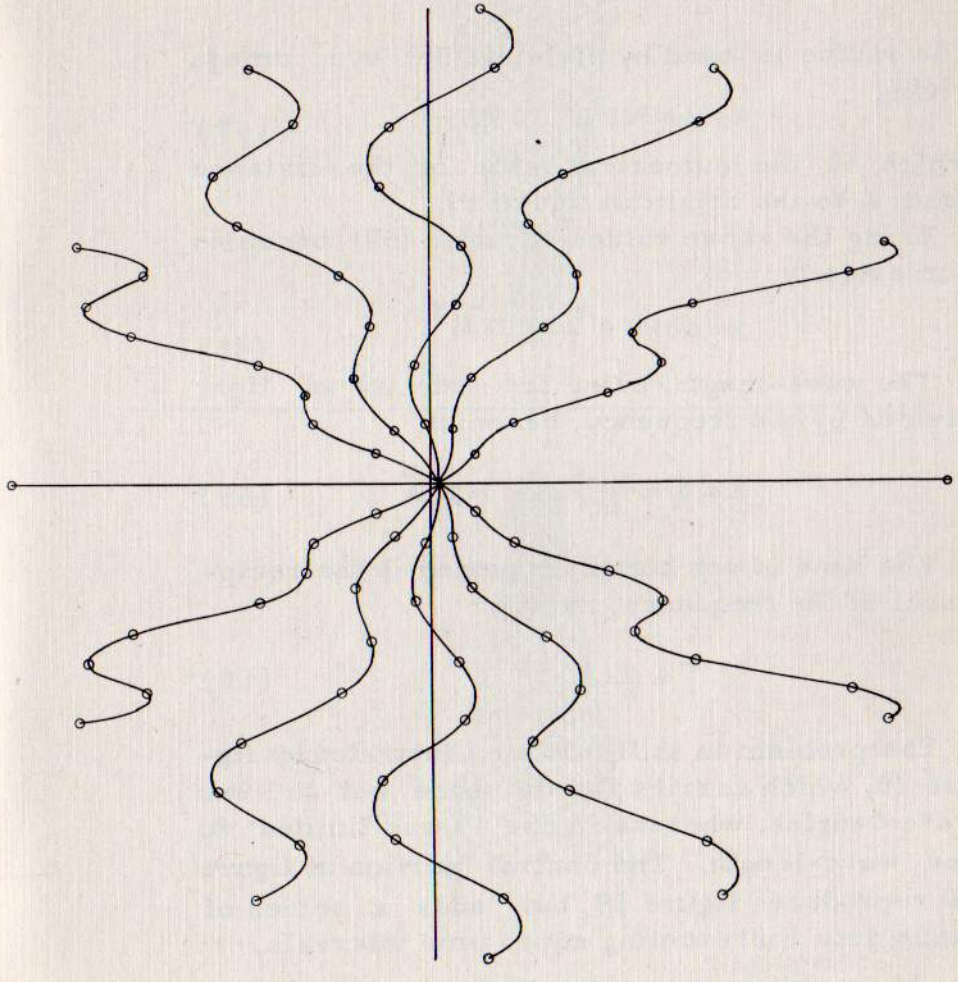

Fig. 22.

The same as figure 20 except that it is for the angle psi 60^{o} instead of 0^{o} as in that figure.

$$V(max.) = a\omega = 0{\cdot}6\ 10^{10} \qquad (56)$$

The radius is found by dividing (56) by omega giving

$$a = (0{\cdot}6/6{\cdot}28)\ 10^{-8} = 0{\cdot}0955 \qquad (57)$$

which is the numerical value of the distance from A to the origin in figure 19.

Using the above values equation (50) becomes numerically

$$\chi = 0{\cdot}0955\ 10^{-8} \sin 6{\cdot}28\ 10^{18} t \qquad (58)$$

The wave-length, being the velocity of light divided by the frequency, becomes

$$\lambda = \frac{c}{n} = \frac{3\ 10^{10}}{10^{18}} = 3\ 10^{-8} = 3\ \text{Å} \qquad (59)$$

The time of one complete period is the reciprocal of the frequency, namely

$$T = \frac{1}{n} = 10^{-18} \qquad (60)$$

The problem is still further illustrated by figure 20, which carries the influence out to two wave-lengths, whereas figure 19 was limited to one wave-length. The central portion of figure 20 reproduces figure 19, but adds a series of black dots representing equal time intervals.

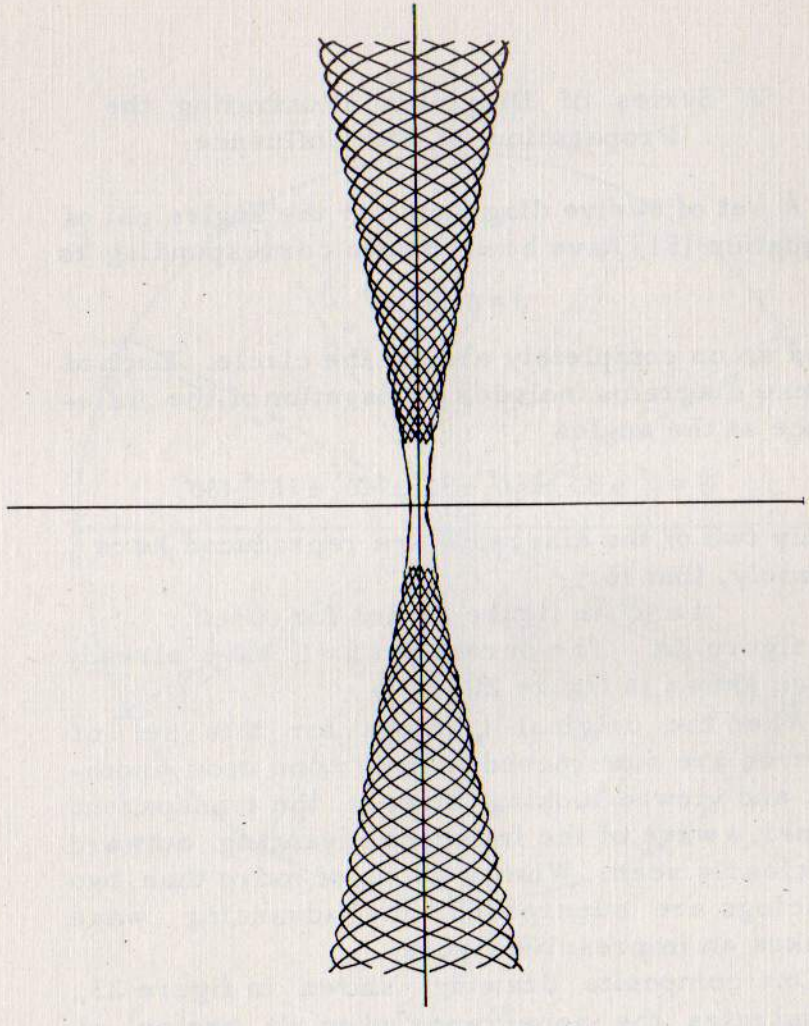

Fig. 23.

A composite drawing on the new theory obtained by superposing 12 curves of arrival corresponding to angles psi at intervals of 30° all around the circle.