coming from known radioactive substances in the soil, it follows, therefore, that about $4 \cdot 2$ ions per c.c. per second must be accounted for by the presence of other types of radiation.

From the observations made by a number of investigators, it is clear that one of these types is the secondary radiation produced at the walls of the zinc receiver by the penetrating rays themselves. A second type which it was thought might possibly be present and contribute to the ionization in the receiver was a secondary radiation produced at the surface of the ground by the penetrating rays coming from the soil. Some observations were taken which seem to establish the existence of this type.

The measurements which led to this conclusion were made by taking readings on the ionization of the air in the zinc receiver as it was gradually brought up to a high and extensive brick wall forming part of a brick building which bounded the University lawn on one of its sides. These readings are recorded in Table III. and are represented by a curve in Fig. 1.

TABLE	III.
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	Observation Station.					"q" No. of ions per c.c. per second.
At the	cent	re of	the la	wn		15.1
3.7 n	net res	from	the	all.		15.4
3.7 n	net res	from	the	vall		$15 \cdot 4$ $15 \cdot 45$
$3 \cdot 7$ n $2 \cdot 2$	net res "	from "	" the	vall		$15 \cdot 4$ $15 \cdot 45$ $16 \cdot 4$
3.7 n 2.2 0.7	net res "	from "	u the	vall		15-4 15-45 16-4 16-7
$3 \cdot 7$ n $2 \cdot 2$ $0 \cdot 7$ $7 \cdot 7$ $4 \cdot 6$	net res "	from "	u u u u	u u u u u		15·4 15·45 16·4 16·7 16·7

From the numbers given in the table it will be seen that the ionization began to increase when the receiver was about 14 or 15 metres from the wall. At the centre of the lawn the reading was $15 \cdot 1$ while at 13.7 metres from the wall it was $15 \cdot 4$. At a distance of 10.7 metres the reading was $16 \cdot 4$ ions per c.c. per second, and at $7 \cdot 7$ metres it was 16.7. From there on to the wall the readings remained practically steady. As it had been shewn previously that at any one place readings could be taken with the apparatus which did not shew a variation greater than 3 per cent., it is clear from the numbers given above that the wall emitted a radiation whose range extended out in the air from the wall to a distance of between 14 and 15 metres. The absorbing power of this amount of air is roughly equivalent to between $6 \cdot 5$ and 7 millimetres of aluminium, and this thickness it has been pointed out is practically

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