



**Fig 13.20** *Rate of respiration and uptake of potassium chloride by carrot discs. (Based on data by Robertson & Turner (1945).)*

To summarise so far, the uptake of ions by roots is a combination of:

- passive uptake**, where ions move by mass flow and diffusion through the apoplast;
- active uptake**, or **active transport**, in which ions can be taken up into cells against a concentration gradient using energy from respiration.

13.19 Fig 13.20 shows that the rate of