the disorder arises when some atoms fill the unoccupied sites of this underlying body-centred structure. Such 'wrong' atoms would be able to jump from one possible site to the next. This model, admittedly naïve, contains an interesting feature, namely, that as the flow of disorder is weakened by collisions with the walls of the containing tube, momentum in the direction of flow is lost. This should be contrasted with conduction by vibrational waves which do not carry momentum. The reaction due to loss of momentum gives rise to a pressure in the opposite direction to the heat flow.

This process of conduction by flow of disorder has been considered in rather more detail by one of us (H. J., to appear elsewhere), and a second process by which a flow of disorder can be dissipated, namely, by interactions with vibrational waves, has been discussed. This latter process will not, of course, result in a 'back pressure'. This pressure will therefore be greater the greater the part played by the walls in the heat resistance. Lessening the bore of the tube in which heat flows, or filling with powder, increases, therefore, for a given heat flow, the magnitude of the back pressure.

J. F. ALLEN.
Royal Society Mond Laboratory, H. JONES.
Cambridge.

[1] Allen, Peierls, and Uddin, NATURE, **140**, 62 (1937).
[2] Fröhlich, H., *Physica*, **4**, 639 (1937).
[3] London, F., *Proc. Roy. Soc.*, A, **153**, 576 (1936).

Memories of Rutherford in Manchester

WHEN I look back on the five years which I spent with Rutherford as a young physicist in Manchester, many delightful impressions spring to my mind. I see his quiet research room at the top of the physics building, under the roof, where his radium was kept, and in which so much well-known work on the emanation was carried out. But I also see the gloomy cellar in which he had fitted up his delicate apparatus for the study of the α-rays. Rutherford loved this room. One went down two steps and then heard from the darkness Rutherford's voice, reminding one that a hot-pipe crossed the room at head-level, and that one had to step over two water-pipes. Then, finally, in the feeble light, one saw the great man himself seated at his apparatus, and straightway he would recount in his own inimitable way the progress of his experiments, and point out the difficulties that had to be overcome.

There was also a cheerful room upstairs, in which we all met for a cup of tea in the late afternoon. It was perhaps Rutherford's greatest gift to his young pupils and collaborators that he attended with such regularity this pleasant break in the daily routine. Here he would discuss in his lively manner old and new problems in physics, or help us in our experimental difficulties and give us renewed confidence, and here, to the delight of all present, he would so often relate details of his latest successes and discoveries. He might even take us along to his research laboratory and demonstrate to us something that he had himself seen for the first time that very day.

Rutherford always gave most willingly from his rich treasure-house of knowledge, at the same time never thinking of himself. I will mention one instance of this, which is still fresh in my memory. A young physicist who had just arrived in the laboratory commenced work on his research, and before long he was confronted by difficulties. Rutherford suggested to him a new line of attack, which would lead him in a simple and certain manner to a successful termination of his work. But the young man had not quite rightly grasped the significance of Rutherford's suggestions. From that moment, however, what he had heard continued to work on his subconscious self, and he understood gradually the trend of the proposals Rutherford had laid before him. When he saw quite clearly his new plan of action he was delighted, and immediately told Rutherford about these ideas, which he was convinced were his own. But Rutherford only smiled, and congratulated him in words of friendly encouragement on his new plan of work.

I always like to recall another little episode, which occurred at the time when much work was being done in the laboratory with sources of radiation consisting of extremely thin glass tubes filled with emanation. It was necessary to exercise great care lest any of this emanation should escape, for it spread rapidly throughout the building, and by virtue of its activity made experimental work an impossibility for periods of many hours. In his typically drastic manner, Rutherford had threatened the severest penalties for offenders in this matter. One day I noticed that it had become impossible to use an electroscope in my room, where I had fitted up the first counting experiments for Rutherford, and before long other research workers emerged from the neighbouring rooms with the same sad story. We were not long in discovering that the emanation had come from Rutherford's own laboratory, where at that moment he was actively engaged with his experiments. As luck would have it, he came into my room shortly afterwards, and inquired how my work was proceeding. He would have been glad to hear of new developments, but I was brief and to the point. I told him that once again it was futile to attempt to do any work, for the whole building was full of emanation, all of which came from his room. Rutherford looked surprised, and replied: "Well, there you have further proof of the power inherent in this emanation." With this remark he left me; but he soon returned, suggesting that I must be somewhat upset, and that I needed a little fresh air. He took me forthwith in his car for a ride beyond the turmoil of the city, and he was soon discoursing on his own experiments and on all the problems that were yet to be solved. Nothing was so refreshing nor so inspiring as to spend an hour in this way, alone with Rutherford. In spite of the minor provocation, I would be loth to part with the memory of such a day, spent in fellowship with a master-mind.

H. GEIGER.
Physikalisches Institut,
Techn. Hochschule,
Berlin.
Dec. 21.

Relativistic Stark Effect of Ionized Helium

THE problem of the relativistic Stark effect of hydrogen has been investigated mainly theoretically, the experimental investigation being hampered by great difficulties. These being less pronounced for the lines of ionized helium than for the hydrogen lines, I attacked the problem in question using the He^+ line λ 4686 A. This needed a stigmatic spectral apparatus of high resolving power coupled with great