diameter, the above ratios show that the wave-mechanical treatment of the problem gives the correct experimental result qualitatively for hydrogen, helium, neon, and argon ; in the case of hydrogen and helium there is even fair quantitative agreement.

We wish to emphasise that our calculation can be regarded only as a first approximation, because we are dealing with slow electrons, which will be considerably influenced by the extra-nuclear electrons beyond the K-shell, whereas in the case of the scattering of α-particles the effect of the electrons outside the nucleus is only of secondary importance. The way in which this fact modifies the results above mentioned will be given in our detailed paper which will be published shortly.

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Nottingham, Aug. 25.

Noise Associated with Lightning.

SOME years ago I directed attention in NATURE to a swishing sound that is sometimes heard when a flash of lightning is very close to the observer. I had at that time never heard the sound myself. I heard it, however, very distinctly on the night of Aug. 29–30. I had been expecting a flash to come close, as a very active storm centre had been moving directly towards this spot, with steadily decreasing intervals between the cloud to earth flashes and the thunder. I did not see the actual flash, only the illumination of the garden through the open window ; it was very brilliant and was followed instantly by a noise as though a shower of large water drops had been thrown on to a hot metal plate ; this was followed almost instantly by the thunder. I think there was a slight interval between the swish and the thunder, but it must have been only a fraction of a second ; I had been counting seconds after previous flashes, but with this one I had not time to begin to count before the thunder came. The flash must have struck a point well within a hundred yards of my room, and I suspect that it struck the lightning conductor on the house. The noise was heard by my daughter and by two other people in the house. It was also heard by two people in a cottage about 50 yards from the house ; one of them likened it to a red-hot poker being plunged into cold water, the other to the sound of the arc when two electric cables are short circuited.

The origin of the noise is obscure. I feel inclined to think that it is caused by some of the branches into which the main discharge often divides before reaching the ground ; it may well happen that a number of these may be nearer to the observer than the main discharge and so be heard first. The noise was not unlike the crackle of a brush discharge on a large scale. The chief argument against this explanation is that a correspondent in NATURE described the sound as occurring not after but before the flash. But it seems possible that on some occasions brush discharges may occur just before a flash. At any rate, this sometimes occurs with a highly charged Wimshurst machine.

Another point that I noticed (not for the first time) in the recent storm was that there seemed to be definite active centres. When I first observed the storm about 9 P.M., summer time, there were two centres where most of the brightest flashes were occurring, one on a line through Chichester, the other on a line just north of Portsmouth, though both centres were probably at a good distance farther than either town ; almost all the flashes at this time were connected with one or other of these centres, though many of the cloud to cloud flashes travelled long distances in the sky. The 'Portsmouth centre' moved nearer, taking a course that brought it within about five to six miles to the north-west of us. Meanwhile, another centre of activity had moved a little south of us ; this produced some very good flashes a mile or two to the south-east and east, and finally moved away in the direction of London. It could be followed for a long time, the flashes appearing, owing to increasing distance, to become shorter and fainter. Finally, I noticed another centre on a line a little to the south of the direction of Portsmouth, and this centre it was that was responsible for the flash described above ; it also produced three other flashes quite close by, and one of these made the peculiar noise, though I did not hear it myself, probably because I was going round the house to see if any damage had been done by the first flash and happened to be in a passage where there was not an open window.

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Sunspots and Pressure Distribution.

THE issue by the Meteorological Office of the daily charts of the weather in the northern hemisphere has enabled me to ascertain the barometric changes which take place from day to day in high latitudes. As a rule, the cyclones and anticyclones are large as compared with the polar uncharted area, and it proved possible to extend the isobars of the surrounding areas over the Arctic Sea. However, east Siberia could not, in the absence of the Japanese daily charts, which reach England about six months late, be dealt with.

From the partially completed charts the mean pressures were calculated for each day along latitudes 30°, 40°, 50°, 60°, 70°, and 80° north. When plotted they showed irregular periodic variations, some of which had a swing of something more than 25 days. As this is about the apparent period of rotation of the sun and pointed to our chief luminary as the cause of the variability of pressure from day to day, I decided to consider the sunspot question carefully.

By the courtesy of the Astronomer Royal, I have been supplied with bromide prints for each day for January, February, March, and April, and been allowed to see some of the later negatives of the solar disc. Also, by the courtesy of the director of the Meteorological Office, I have obtained the pressure charts—issued to the public, since March—for January and February.

The sunspots have been plotted upon a diagram, the abscissæ of which are days and the ordinates degrees on the sun's surface measured from the apparent centre of the disc. They clearly show the movements of each spot or group of spots, as they approach or recede from the centre of the disc, owing to the sun's rotation.

An examination of this diagram demonstrates the fact that the pressure is low over the Arctic regions when there are sunspots near the sun's centre, and that there are high pressures over the Arctic regions when there are no spots near the centre of the disc. Such low pressures due to sunspots occur in the long Arctic winter quite as markedly as they do during the summer. When the sun's disc was clear in the centre on April 24, the mean pressure north of 60° was 1025 millibars. On Mar. 8 the mean pressure was 1001 millibars and there were spots near the sun's centre.

I hope to be in a position to publish full details concerning the matter soon after the receipt of the Japanese weather charts of the North Pacific area for June.

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