

Commercial Egg-Farming: From Practical Experiences gained over a Period of Years. By S. G. Hanson. Pp. 62. (London: Constable and Co., Ltd.) Price 1s. net.

"I AM not a poultry-farmer because I like hens, but simply because I do not know how to earn an equal income so easily in any other way." So says the author on p. 10. This fact alone should secure for the work the serious consideration of all poultry-keepers. It is a good book containing much information and no padding. We should, however, have liked more detail on several points, and are far from convinced as to the economic side of the large brooder-house.

We note there is no balance-sheet. The cost of rearing pullets, even Leghorns, appears almost too modest at 2s. 6d. per head; and colony houses at about 2l. each (p. 39) also seems scarcely sufficient.

We like the author's capital charge of 1l. per bird, and this agrees with our own estimates and experience. No figures are given covering labour, rent, rates, and depreciation, considerable items on large plants.

The book is well worth reading, being full of hints, and the figures on the income side do not appear to be exaggerated; but it must be remembered that there are many drones in a large flock, and it is on the elimination of these that ultimate success depends. Although we are far from convinced as to the desirability of dry-mash feeding, there is much to be said in its favour on the score of economy of labour.

LETTERS TO THE EDITOR.

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Observations on the Excitation of Helium Spectra.

In the course of an examination of the properties of the electron discharge in an atmosphere of helium we have made some observations of the conditions affecting the excitation of the lines of the helium spectra which seem to be of considerable interest. The source of electrons was an incandescent tungsten filament, and the discharge passed to a parallel nickel wire about 8 mm. distant. The electrodes were mounted in a quartz tube filled with helium at about 2 mm. pressure. The helium was free from all contaminants except a small amount of mercury vapour, the partial pressure of which was about 0.001 mm. in the observations immediately following.

In a particular experiment the current across the gap increased slowly from zero to 10 microamperes as the potential difference between the anode and the negative end of the filament was raised from 0 to 20 volts. The current then increased more rapidly to 100 microamperes at 23 volts, when the arc spectrum of mercury flashed out and the current jumped to 220 microamperes, the potential necessary to maintain the discharge dropping at the same time to 21 volts. On raising the potential further the current increased rapidly to 690 microamperes at 23.5 volts, when the

helium spectrum flashed out. With higher potentials most of the lines in the helium spectrum increased in intensity and the current increased, but at a gradually diminishing rate, to 1450 microamperes at 40 volts.

In other experiments the helium spectrum has been found to be excited by 22.5 volts potential difference. If allowance is made for the initial kinetic energy of the electrons and for the drop of potential down the filament due to the heating current, this quantity is not increased by so much as one volt, and there are indications that it tends to approach a lower limit close to the ionisation potential value for helium found by Franck and Hertz and by Pawlow. In any event, the observations made would seem to destroy the special significance of the value (approximately 30 volts) of the minimum potential difference necessary to excite the line spectra of helium given by Rau. There is no doubt that these spectra can be excited by the impact of electrons having energies much less than the value of the ionisation energy of helium calculated by Bohr. We are unable to reconcile these results with Bohr's theory except on the hypothesis that the impact ionisation of helium is a more complex phenomenon than has been supposed. Possibilities which suggest themselves are that the ionisation is the result of successive impacts or results from impacts on atoms in an abnormal condition caused by the absorption of radiation generated in other atoms in consequence of electron impact. Experiments to test these possibilities are in preparation.

In contrast to the lines of the mercury arc spectrum the different helium lines behave differently *inter se* when the exciting voltage is changed. Thus the blue line 4472 requires about half a volt, and the blue line 4713 about a quarter volt more potential difference for excitation than the yellow line. The green line 4922 of the first subsidiary series of parhelium seems to appear and disappear along with the blue line 4472 of the first subsidiary series of helium. The order of excitation with voltage for the different lines is not simply a question of frequency, but depends partly on the series to which the lines belong. Most of the lines increase steadily in intensity with increasing voltage and current density, but the line 4713 of the second subsidiary series of helium increases rapidly in intensity to a maximum soon after excitation, then becomes very faint as the potential difference is increased to about 40 volts, reappears with higher voltages, and then increases steadily in intensity with rising potential difference. Several of these effects have been noted by Rau at higher voltages.

We have examined the radiation from the helium spectrum in the extreme ultra-violet when excited by 40 to 70 volts potential difference, using a photo-electric method, and have obtained definite indications of the presence of radiations having wave-lengths close to 600 and to 400 Ångstrom units respectively.

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The late Prof. James Geikie.

A BIOGRAPHY of the late Prof. James Geikie is now in course of preparation, and the work would be greatly facilitated if those who have letters or communications of general interest from him would kindly forward these to me at the Royal Scottish Geographical Society's Rooms, Synod Hall, Castle Terrace, Edinburgh. They will be carefully preserved and returned after being copied. MARION I. NEWBIGIN.

Edinburgh, September 4.