Eggs

A COURSE we are running on " Science in the Home " has given me the opportunity of carrying out a set of experiments that I had wished to do for years.

The New South Wales Egg Marketing Board sells eggs, from the common (or pedigreed) fowl, graded as hen eggs ($1\frac{3}{4}$ ounces or more), medium eggs ($1\frac{1}{2}$ to $1\frac{3}{4}$ ounces), and pullet's eggs (which may be any size, but naturally would be put into a higher grading if over $1\frac{1}{2}$ ounces).

The prices yesterday when we bought our dozen of each size of eggs at the Board's Headquarters, 28 Mountain Street, Ultimo, were 1s. 9d. a dozen for hen, 1s. 4d. a dozen for medium, and 1s. 1d. a dozen for pullet's eggs. We want egg content ; how much do we pay per gramme, and how much do we pay per cubic centimetre, for egg content ? Which is cheaper ?

The eggs were divided up amongst the eight groups in the practical class, three groups each having four hen eggs (A), two groups each having four medium eggs (B), and three groups each having four pullet eggs (C). They were weighed on physical balances, then broken into beakers, stodged up, and the contents poured into measuring cylinders (care being taken to extract all the egg content, and to leave a negligible amount in the beaker. There should not have been a 1 c.c. error for each four eggs, including errors in reading.) The shells were then weighed by the groups concerned, so that the following information about mean values for sets of four eggs, and for several sets in mean values from group readings, was available. This table sets it out :

HEN EGGS. (A).

	1	2	3	Mean.
Total mass	64·1	59·6	63·3	62·3 grms.
Shell mass	6·6	6·3	7·0	6·6 grms.
Content mass	57·5	53·3	56·3	55·7 grms.
Content volume	57·0	52·0	54·5	54·5 c.c.
Content density	1·01	1·02	1·03	1·02 grm./c.c.

MEDIUM EGGS. (B.)

	1	2	3	Mean.
Total mass	45·9	46·9	—	46·4 grms.
Shell mass	5·1	5·4	—	5·3 grms.
Content mass	40·8	41·5	—	41·1 grms.
Content volume	40·0	39·3	—	39·6 c.c.
Content density	1·02	1·05	—	1·04 grm./c.c.

PULLETS' EGGS. (C.)

	1	2	3	Mean.
Total mass	42·3	39·4	42·1	41·3 grms.
Shell mass	5·3	4·5	5·4	5·1 grms.
Content mass	37·0	34·9	36·7	36·2 grms.
Content volume	33·1	33·7	35·8	34·2 c.c.
Content density	1·12	1·03	1·03	1·06 grm./c.c.

With hen eggs (A) at 1s. 9d. a dozen, 1d. buys 30·4 grms. of contents ; medium eggs (B) at 1s. 4d. a dozen, 1d. buys 30·8 grms. of contents ; pullet eggs at 1s. 1d. a dozen, 1d. buys 33·4 grms. of contents. Nothing much to choose between (A) and (B), but (C) would, so far as " weight for money " is concerned with this particular lot, be cheaper.

The mean density of contents appears to increase as we go on to smaller eggs, but this class might have made a mistake of half a cubic centimetre in measuring their volumes, which becomes progressively more important in measuring smaller volumes, and the percentage of " wastage " in extracting the content and in transfering it to the measuring cylinder also becomes increasingly relatively important. Further, I suspect the volume " 33·1 c.c." for No. 1 group on pullet (C) eggs ; it is this that brings up the mean density, as measured, of the contents of pullet eggs. We would, I think, be entitled to reject the readings of this group. We would then, for pullet eggs, groups 2 and 3, have a content mass of 35·9 grms. (giving the amount for 1d. as 33·1 grms.), and a volume of 34·8 c.c. and a density of 1·03 grms./c.c. We would not, on these experiments, care to distinguish between the density of different groups of eggs ; it would be safer to say that the density of egg content is approximately 1·03 grms./c.c. (Note the variations in different groups for the same grade egg.)

This makes an interesting experiment in the use of the balance and measuring cylinder, and in calculations, including density. It also affords an opportunity of discussing the distinction between the millilitre (in which the volumes would actually be measured) and the cubic centimetre. The three dozen eggs, costing 4s. 2d., would provide four eggs each for nine groups. Working two to a group, eighteen people contributing 3d. each, cover the petty cash expenditure, allowing for the inevitable rise in the cost of eggs before you try your class with them.