GRADED ARITHMETIC.

1. Two weights, or forces, acting in the same direction on opposite sides of the point of support of the beam to which they are applied will balance each other, when the product of the number of units of force by the number of units of distance of the force from the point of support is the same on both sides. A boy who weighs 80 lb. plays see-saw with another who weighs 100 lb. If the first sits five feet from the point of support, how far away from the point of support must the other sit?

2. A kilogram equals very nearly 2.2 lb. With a kilogram weight at one end of a yard-stick and a pound weight at the other end, where must the stick be supported to balance, disregarding the weight of the stick ?

3. The principle given above applies when there are several weights used instead of one on each side. A yard-stick is supported at its middle point. A weight of 2 lb. is hung on one end, a weight of 5 lb. on the other, a weight of 3 lb. half-way between the 2 lb. weight and the middle point. Where shall 4 lb. be hung that the stick may be horizontal?

4. A long stick is balanced on a support. A weight of 100^s is placed 31^{em} from the point of support, and the support moved until the stick is again balanced. The point of support is now 24^{em} from where it was at first. Assuming that the stick acts as it would if all its weight were at the first point of support, how much does the stick weigh?

5. When a beam carrying a weight rests upon two points of support, the weight on each point of support is inversely proportional to the distance of the weight from that point. A yard-stick hangs by the ends from two spring balances; a weight of 12 lb. is hung 1 ft. from one end. What is the reading of each balance?

6. A weight of 9 lb. is hung 1 ft. from the other end. With both weights on, what is the reading of each balance?

7. A man and a boy are poling hay on poles 10 ft. long. If one pile of hay weighs 60 lb. and another 40 lb., how far from each end of the poles shall each pile be that the man may carry 60% of the load? Is more than one answer possible? If so, find another.