much hesitation, such as most practitioners will feel who guide their treatment too much by the *name* of a disease.

I have long since inculcated on the pupils attending my lectures the great discordance between disease as described in nosological works, and as witnessed at the bed-side. We here see instances not resembling any of those cases which are so systematically arranged and discriminated ; but, perhaps, a mixed form, partaking of two or more of the elements described, and receiving its name from whichever of them it resembles in the greater number of the symptoms.

ART. III.—*A new Method of graduating Glass Beads, for the Purpose of ascertaining the specific Gravities of Fluids.*

By WILLIAM FERGUSON, Operative Chemist to Apothecaries' Hall.

THREE methods are in general use among chemists for ascertaining the specific gravities of fluids ; the bottle, with which they compare the weights of equal volumes, the hydrometer, with which they compare the volumes of equal weights, and the bead, with which they directly compare the specific gravities of the instrument and fluid, the relation the former bears to that of water being known. The bead possesses advantages over both the bottle and hydrometer in the delicacy of its indications, and extent of its application ; in some important experiments it is the only instrument available.

Beads for this purpose are usually graduated by ascertaining the specific gravity of that fluid in which a bead has no tendency to rise or sink, but will remain at rest in any part in which it may be placed ; for this purpose many solutions are required ; as they are liable to change their specific gravities from slight changes in temperature, and from evaporation, a

method of graduating beads with the help of distilled water only, may be found useful.

Having procured a sufficient number, weigh them accurately, noting the weight of each, then weigh them in distilled water at 62°, observing the loss of weight which every bead sustains, their weights divided by the loss of weight in water will give their specific gravities ; and such as require alteration should then be arranged for the specific gravities to which they can be most conveniently reduced, and marked with them, before they are finally adjusted.

If we could reduce the weight of a bead without altering its bulk, its specific gravity would be reduced directly as the weight subtracted ; but we have no method of altering the weight without changing the bulk also, and the loss of bulk is to the loss of weight as unity to the specific gravity of the glass. Having found, therefore, the specific gravity of the glass, the weight of the bead also, and its bulk, we can calculate the number of grains that must be ground off to reduce it to any required specific gravity.

Let W represent the weight of a bead, B its bulk, equal to the loss of weight in water, G the specific gravity of glass, R the required specific gravity, x the weight to be ground off, and y the bulk corresponding to that weight, we have then the following equations :

$$\frac{W-x}{B-y} = R, \text{ and } \frac{x}{y} = G,$$

which gives

$$W-x = BR-yR, \text{ and } y = \frac{x}{G},$$

By substitution

$$W-x = BR - \frac{Rx}{G},$$

By multiplying out the fraction we have

$$GW - Gx = GBR - Rx,$$

By transposing

$$\overline{G-R} \cdot x = G(W-BR),$$

and by division

$$x = G \cdot \frac{W-BR}{G-R}.$$

The rule is therefore as follows; multiply the bulk of the bead by the intended specific gravity, and subtract the product from the weight of the bead, divide the remainder by the difference between the specific gravity of glass and the intended specific gravity, the quotient is the bulk to be ground off, and when multiplied by the specific gravity of glass, is equal to the weight that the bead must lose. Let the quantity thus found be subtracted from the original weight of the bead, the remainder is the diminished weight which should be placed in the pan of the balance, and the bead ground down till it corresponds with it.

The calculation may frequently be considerably shortened by using a table of logarithms, as follows; multiply the bulk of the bead expressed in grains and decimals by the intended specific gravity and deduct the product from its weight, to the logarithm of the remainder add the complement of logarithm of the difference between the specific gravity of glass and the required specific gravity, and the logarithm of the specific gravity of glass itself, the sum will be the logarithm of the weight of glass which it is necessary to grind off.

By this method we can graduate beads with great accuracy, and the calculation may be verified before the bead is altered, for as the quotient obtained by dividing $W-BR$ by $G-R$ is y , the bulk corresponding to the intended reduction in weight, it may be subtracted from B , and the remainder divided into the reduced weight of the bead ($W-X$), if the calculation has been correct, the quotient will be the required specific gravity; should it differ from it only by a low decimal place, it can, of course, make no sensible error in practice; and the actual accuracy of the bead is a matter of strict arithmetical

calculation, as far as the delicacy of the balance employed will permit. From the difference of the specific gravities of glass it may be well to procure a fragment of the tube of which the beads were made, to ascertain it exactly.

Suppose a bead that displaces 20 grains of distilled water at 62°, weighs 25 grains; the loss of what weight will reduce it to the specific gravity of water, that of glass being 3.5?

$$x = G. \frac{W - BR}{G - R}$$

$W=25$ $B=20$ $R=1$ $G=3.5$ to find the value of x ,

$$25 - 20 \times 1 = 5$$

$$5 \div 3.5 - 1 = 2$$

$$2 \times 3.5 = 7 \text{ the required reduction}$$

in weight.

By the use of a table of logarithm

$$25 - 20 \times 1 = 5 \text{ logarithm} = 0.698970$$

$$3.5 - 1 = 2.5 \text{ comp. logarithm} = 9.602060$$

$$3.5 \text{ logarithm} = 0.544068$$

$$\underline{\quad 7 \text{ logarithm} \quad} = \underline{\quad 0.845098 \quad}$$

It is evident that $25(W) - 7(x) = 20(B) - 2(y)$.

ART. IV.—*Observations on the Treatment of Various Diseases.* By ROBERT J. GRAVES, M.D., M.R.I.A., King's Professor of the Institutes of Medicine.

(Continued from vol. i. p. 304.)

CONVULSIONS IN CASES OF CHRONIC DROPSY.

CONVULSIONS in hydrocephalus have long attracted the attention of the profession. Those I am about to describe appear to possess features of a very different character. I have now witnessed three cases where they have suddenly and unex-