

In this way uniform results can undoubtedly be arrived at, but as is now admitted the cubage so obtained gives a higher numerical value to the contents than is the actual capacity of the cranium as tested by the employment of water for the purposes of cubage. This is not to be wondered at when it is remembered that the shot is rammed into the cranial cavity to its utmost capacity, whilst no corresponding pressure is applied to the shot after pouring it into the cubic measure, so that necessarily it occupies a greater space in the measure than in the skull. Dr. E. Schmidt, whilst recognising that Broca's method is not only the most practicable, but also the most precise of all the methods up to that time employed, has yet found it necessary to draw up tables by means of which the measurements taken according to Broca may be reduced to the actual capacity. Thus when shot is employed, whilst Broca's method would give 1000 cubic centimetres, the actual capacity is 931, making a difference of 69, and the difference gradually rises until a capacity of 1500 (Broca) is only 1409 (Schmidt), and one of 2000 (Broca) is 1887 (Schmidt), the difference between the apparent and real capacities in the last example being as much as 113 cc.

What is undoubtedly a desideratum in the determination of the cranial capacity is a method which will bring the two processes of gauging the skull and cubing its contents into precisely uniform conditions, so that the number obtained in the cubage may express the actual capacity. I have performed a number of experiments with this object, and have now elaborated a method which gives results so nearly uniform when tested with a standard skull, that it may, I think, be taken as furnishing in each case a close approximation to the actual capacity. This standard skull was itself prepared by stopping all the foramina, except the foramen magnum, with cement and by coating both the inner and outer tables with sealing wax varnish. The method is based upon two of the most important principles insisted on by Broca, viz., that the size of the particles employed must be uniform, and that they should be poured into the skull through a funnel, the neck of which has a definite diameter.

No. 8 chilled shot has been employed as, from its hardness, it preserves its globular form much more efficiently than ordinary shot.<sup>1</sup> A litre is filled with this shot, which is then poured into the foramen magnum through a funnel 14.5 centimetres wide at the mouth, and 12.5 cm. in depth, the spout of which is 2 cm. long and 2 cm. wide. The skull is then lifted in both hands and a sharp tilt forwards given to it so as to project the shot into the anterior and middle cranial fossæ. Shot is again poured in through the same funnel until it reaches the foramen magnum, care being taken that it shall pass well down into the occipital region. The skull is again lifted and a sharp tilt given, first

<sup>1</sup> I attach importance to the preservation of the globular form of the shot, as it thereby runs much more uniformly than if the particles were flattened or irregularly shaped. An objection to the method of ramming the shot employed by Broca is the constant change of form which the particles are made to undergo, and the alteration therefore in the number of their surfaces of contact.