

it touches the sources of public health. It touches the question of either the progress of our people in mental and physical vigor, or, on the other hand, degeneracy of mind and body. I cannot follow it into these relations, but the importance derived therefrom has, I trust, been rendered somewhat apparent by the views which I have presented in this discourse.

CHANGE IN THE NUMERATION OF SPECTACLE LENSES; ADOPTION OF THE METRICAL SYSTEM.

BY HASKET DERBY, M. D.

WITHIN the past year the inch has been discarded and the metre adopted as the unit in the numeration of glasses and the expression of degrees of refraction and breadth of accommodation. I desire briefly to state the reasons that have led to this change, and to explain the new method.

A one-inch lens, the unit of the system so long in use, was a lens that brought parallel rays to a focus one inch behind itself. Held one inch from the wall of a room it would form thereon the perfect picture of a window at the opposite end of the same chamber. The radius of its curvature was substantially its focal distance — one inch.

This lens had, however, no real existence for the surgeon. Too strong for practical purposes, it was found in no spectacle case. The most powerful convex glass, used for the near in cases where the crystalline had been removed, was one that had a focal distance of two inches and was consequently half as strong as the unit, having to be expressed by the fraction $\frac{1}{2}$. The next in order was $\frac{1}{3}$, and so on through the series. Moreover, to obtain for cataract patients intermediate lenses, these fractions themselves were subdivided, and we thus had $\frac{1}{2\frac{1}{2}}$, $\frac{1}{2\frac{1}{4}}$, $\frac{1}{2\frac{1}{8}}$, etc. The series ran up to $\frac{1}{72}$, giving thirty-two glasses, all expressed in vulgar fractions, the differences between which necessitated constant calculation. These very intervals were, moreover, unequal, varying as they did from $\frac{1}{360}$ to $\frac{1}{18}$.

But a not less serious objection to this method lay in the fact that the standard itself was variable, and that to ascertain the strength of a given number, especially a high one, it was necessary to find out in what country it was ground. The Paris inch differed from the English, 36.94 of the former, 39.37 of the latter going to a metre. Between these came the Rhenish and the Austrian inches, all differing from each other. A patient asking for No. 2 in London, Paris, Berlin, or Vienna might receive a different glass in each place.

At the meeting of the Heidelberg Society in the autumn of 1875, and shortly afterwards at the Medical Congress in Brussels, Professor

Donders proposed the metre as the unit of numeration. The metrical system had already been adopted for other purposes in many countries, and was likely to be used for the expression of the focal distances of optical instruments in all, excepting perhaps England.

The new No. 1, therefore, is a lens ground on a curve whose radius is one metre, and having a focal distance of one metre, corresponding very nearly to $\frac{1}{38}$ of the former (French) series. This glass is called a "dioptric." No. 2 is equivalent to two dioptrics, is consequently twice as strong as one dioptric, has its focal distance in half a metre, and corresponds nearly to $\frac{1}{19}$. No. 3 has its focal distance in one third, No. 10 in one tenth, No. 20 in one twentieth of a metre, and consist respectively of three, ten, and twenty dioptrics, being precisely that number of times stronger than No. 1.

Such is the simplicity of the whole system. To obtain glasses feebler than No. 1 we divide the dioptric expressing its divisions by decimals, 0.25, 0.50, and 0.75. These fractions may moreover be used between the weak numbers of the series, up to 6. But there are no vulgar fractions, and pencil and paper are never necessary for our calculations. Two No. 2's make one No. 4; 1.50 and 3.50 make 5; the difference between 2.50 and 2.25 is 0.25, or quarter of a dioptric. The new trial cases of lenses contain thirty numbers, the difference between each of which may be calculated instantly. In using the new system we speak of a myopia or hypermetropia of so many dioptrics (expressed by the letter D). Presbyopia is estimated by the number of dioptrics necessary to bring back the near-point to 22 centimetres (about 8 inches), and the width of accommodation is the number of dioptrics embraced in the lens equivalent to the increased convexity of the crystalline, when changed in adaptation from its far to its near point. Thus, to cite the example given by Donders, let the near point be in one fifth of a metre, and the far point in a metre, the accommodation (A) = 5 — 1, equals 4 dioptrics.

But one or two points remain to be considered. The numbers of the new glasses do not express their focal distances. These may, however, readily be found by dividing a metre by the number of the glass. No. 4 has a focal distance of $\frac{1}{4}$ m. or 25 cm; No. 10 of $\frac{1}{10}$ m. or 10 cm.

The reduction of these glasses to the old system, and the change from the old to these, is equally simple. Our previous glasses are numbered in Paris inches, 36 of which may for convenience in calculating be taken to represent a metre. Divide the new number by 36 and we practically obtain the old: 2 D equals $\frac{36}{18} = \frac{1}{18}$; 3 D = $\frac{36}{12} = \frac{1}{12}$; 9 D = $\frac{36}{4} = \frac{1}{4}$. To change the old to the new, multiply by 36: $\frac{1}{4}$ becomes $\frac{36}{4} = 9$ D; $\frac{1}{6}$ becomes $\frac{36}{6} = 6$ D or 4 D; $\frac{1}{18}$ becomes $\frac{36}{18} = 2$ D or 2.50 D.

At my suggestion Nachet has added to his new cases of metrical test lenses a printed table giving their respective values in terms of the

previous system. This will facilitate the change for those of us long used to the old numbers.

This system of Professor Donders has been adopted by the most eminent ophthalmologists. Snellen, Giraud-Teulon, Nagel, Javal, Wecker, and Carter at once gave in their adhesion to it, and its use is daily spreading. And in our own country the surgeons of the Boston Eye Infirmary voted, at a recent meeting, "that all future measures of length and refraction be recorded in, and all glasses ordered on the metrical system."¹

A CASE OF POISONING BY BROMIDE OF CADMIUM.

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As this is the first case, so far as I am aware, of poisoning by the use of the bromide of cadmium, I am induced to make it public. The history of the case is as follows.

A patient of mine, Mrs. N., residing in this town, has been in the habit of taking, by my direction, occasional doses of bromide of ammonium. On Friday, September 8th, feeling some premonitory symptoms of neuralgia, and having none of her usual medicine by her, she sent to the druggist in this town for one ounce of the bromide of ammonium. The druggist sent her an ounce bottle labeled bromure d'ammonium. It resembled, as seen in the bottle, the veritable salt which it purported to be. Upon receiving it she took out upon the handle of a teaspoon the same quantity, as nearly as she could judge, that I had been in the habit of giving her, poured it into a tumbler two thirds full of water, gave her mother, Mrs. R., half of it, on account of a headache, and swallowed the rest herself. She at once perceived the difference in the taste of it, and without waiting to perceive any further effects sent her servant to me with the bottle, with a request that I should tell her what it was and whether she should take any more. Upon looking at the bottle and reading the label I supposed that it was all correct, and that she had sent to me as a matter of caution on her part. To make sure of it, however, I wet my finger and took out of the bottle what would adhere to it and put my finger in my mouth. I noticed at once the extremely pungent taste, and felt sure that it was a corrosive poison of some kind. I immediately made my preparations to go to the patient's house and see in what condition she might be. Before I left my own premises, however, I was met by a messenger who told me that Mrs. N. and her mother were very ill, and thought they were poisoned. On arriving at the house I found both ladies vomiting severely, and complaining of extreme pain and a burning sensation in the stomach. Mrs.

¹ Thaxter and Brother, 291 Washington Street, and J. H. Ailman, 14 Bromfield Street, are prepared to fill metrical orders, and to furnish suitable prescription blanks.