Translating Old Units of Measurements

In my experimental physiology laboratory class, in which students use invertebrate model systems to study physiological phenomena, they must read older (preelectronic) literature, where they often encounter methods that are no longer used in the modern biological laboratory. For example, when they look at the results of a 1937 paper describing autorhythmic gastrointestinal tract smooth muscle in the polychaete worm Arenicola marina (2), they ask why the force transducer tracings are white lines on a black background. The answer is that the tracings were made with a smoked drum kymograph, an instrument that many physiologists today have never even seen, much less used (3).

Another problem arises when students are trying to duplicate solutions described in older papers. I have been able to help them when solutions are described in mg% (mg/100 ml of solution), but I was not confident that I knew what M/100,000 or M/40,000 meant. My students found this notation in the classic paper by Forster and Taggart on renal tubule transport (1). After failing to find any of my more senior colleagues at the University of Texas who could translate the notation, I asked for help through the American Physiological Society Teaching Section listserv. The answer to my question came from William H. Waugh, emeritus professor of physiology at East Carolina University. I am submitting his answer, relayed to me through Robert Carroll, here so that we can have a written record of it.

The slash in M/100,000 represents division, so M/100,000 means 1/100,000 or 1 × 10⁻⁵ M. The more puzzling notation M/40,000 means 1/40,000 M or 2.5 × 10⁻⁵ M. Dr. Waugh explained that the calculations in 1950 were done by slide rule and therefore it was easier to work with the real denominator than to work in scientific notation.

Now if I only did not have to explain to my students what a slide rule is and how one would use it...