countries, while the second contains samples of all the articles which are manufactured in Belgium. A library and an information bureau are attached to this museum.

LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

Twenty copies of the number containing his communication will be furnishea free to any correspondent on request.

The Robinson Anemometer.

SO long as the anemometer law is purely empirical, it is doubtless largely a matter of individual taste that one should prefer to use a series of ratios whose values, even within the limits of ordinary usage, range between infinity on one hand, and 2.89 on the other, — a value which corresponds, according to *Science* of March 22 (p. 227), to a wind-movement of 25 miles per hour. Nevertheless occasion may be taken at some future time to point out a possible error into which one is easily led by use of this variable factor.

It seems, my "explanation of the effect of a uniform wind blowing across a whirler upon which an anemometer is being tested is very surprising;" indeed, I have wondered myself that so simple an explanation had not been suggested long ago. That it is "entirely untenable" cannot be admitted, since it is only made to appear so by my critic, who unfortunately omits from the very heart of the statement whose accuracy he questions, three very important words. Nothing more than this need be said. I am well aware, also, that "it has generally been considered that while these cups [of the anemometer] never respond instantly to the wind, and continually lag behind while the wind is rising, yet their momentum keeps them up, and about counterbalances this lagging while the wind dies down;" but that these effects about balance is exactly what does not occur, and therein is the novelty of the explanation I have suggested.

The substitute offered in *Science* of April 5 (p. 268) is based partly on an incorrect statement; namely, that a wind blowing directly at right angles to the path along which an anemometer is being carried will add its effect to that due to the motion of the anemometer. If the writer means that the sum of the two separate effects are to be taken, he is entirely wrong. It is a simple question of the resultant of two forces at right angles to each other, which is not the sum of the two separate forces. With this as a partial basis, the explanation is developed, and the astonishing conclusion reached that "the anemometer will be accelerated during more than three-fourths of the rotation [presumably of the whirler], and retarded during less than one-fourth of it." Had the author, in accordance with the principle of the parallelogram of forces, found the resultant of the two wind effects that act simultaneously upon the anemometer at each point of its path, and integrated or summed these up for a complete revolution of the whirler, he would doubtless have arrived at a much more accurate conclusion, — a conclusion that the ultimate resultant effect for a whole revolution "is only small in most cases, and is not very serious," as given in my original letter in *Science* of March 29; a view, moreover, that is entertained by Professors Dines, Stokes, and others who happen to have written on the question.

Even admitting that the explanation under discussion is correct, it does not account for the uniformity of the results obtained in England with the helicoid anemometer, which, being provided with a vane or tail, always presented its front directly to the resultant wind. The Robinson anemometer, from its construction, has no need of a tail, and the two instruments are circumstanced exactly alike so far as being equally subject to the resultant wind. It is presumed throughout this and previous papers that the axis of the Robinson anemometer is vertical or nearly at right angles to the plane of rotation of the whirler. The analysis of the problem is a little different when the axis is inclined more or less to the vertical, but the final result is practically the same.

Having several weeks ago submitted a paper containing in detail the various experiments and results that led to the development of the explanation given in *Science* of March 29, I do not desire to cite here any experimental confirmation of the theory, nor do I consider that the results given by Professor Hazen in any way disprove the theory. Why one should expect to be able to use the same formula for cone-shaped paper cups as had been found applicable to hemispherical metal cups, or should be surprised at a difference of twenty per cent less wind-velocity, does not appear.

Following the example of Professor Hazen, I intend to try some experiments with hemispherical paper cups, and have thus far completed a set; but the pressure of other duties has not afforded me opportunity to do more as yet.

C. F. MARVIN.

Washington, D.C., April 8.

The Metric System and Professional Teaching.

THE committee appointed at the Cleveland meeting to consider the relations of chemistry to public instruction, naturally have their attention called to the metric system of measures. No doubt the familiarity of the public with this system has much increased since 1866, when the Act of Congress was passed making it legal; but recent conversations with parties who might be supposed well posted on the subject show some views that appear to the writer incorrect, and adapted to retard the adoption of a much-needed reform.

A very prominent teacher of chemistry said he was not an advocate of its general use, and that no time would be saved in the instruction of children by such adoption. The Metric Bureau, in their leaflet, stated that "a year of the school-life of every child would be saved by the adoption of this system." This statement was made by teachers. I do not know its basis; but there are, in the English system of tables we use, about fifty factors to be memorized. As there is but one factor in the metric system, and that the same as our system of numeration, necessarily fifty times as much time is required to learn English measures as metric. If the Society for Psychical Research can tell us the average time required to memorize an idea, we should then know the saving of time in instruction, that would follow the adoption of the metric system.

An apothecary assured me that the adoption of parts by weight in the new pharmacopœia, with which he connected in some way the metric system, had, in his judgment, done great harm to the drug business: for, he said, the wholesale manufacturers put on the outside of their bottles that one part of this extract, etc., with nine parts distilled water (or required proportions), would make ten volumes of the officinal strength. The extreme simplicity of this process, my friend argued, reduced the drug business, so far as intellectual qualifications are concerned, below the grocer, and the metric system was somehow held responsible.

The metric system is in universal use by chemists. The arts of medicine and pharmacy are dependent on chemistry for their materials and their processes. As matters now stand, every student in the colleges of these arts is obliged to learn two new tables of measures, — apothecary and metric; for I assume that all professors of chemistry teach the metric, and some professors of materia medica also. In other schools the chair of chemistry teaches one, and the chair of materia medica the other system.

Is it not time to inquire if this is a rational condition of things? It will not do to say the apothecary weight is learned in the primary school. The metric is taught also, at the present time. Both are usually forgotten before the student matriculates. Neither can it be said that we break away from the system of our English cousins, for our fluid measures are not the same as theirs, now that they use the imperial gallon. There remains the single argument against the metric system in our professional schools, that it is not in general use by physicians. Those who do use it find the gram a most convenient unit. The difficulty of inducing a large body of men to change some of their basic elements of thought seems to be the greatest obstacle to a beneficial improvement.

Now, why not let the old doctors use the old system, but teach the graduates only the new; then add to the pharmacy laws a clause requiring every druggist to provide himself with a set of metric weights, making this condition as indispensable as a diploma? At present, when a prescription is presented in the met-