pupils and teachers were speaking a language which he could scarcely understand. He would also find that it was a common thing for a teacher to demonstrate to his pupils with actual specimens, day after day, things which in his own day it was utterly impossible to demonstrate except by the most laborious and roundabout methods, and which at best gave unsatisfactory results. With this enormous advance in technique or in the processes of research, has arisen a demand for a better class of laboratory instruments, which, while they are compact, simple, and of moderate height and weight, are constructed with a view to durability, and at the same time admit of use for all the ordinary purposes of the investigator or student. Such instruments should possess such qualities as would enable one to use them for the most elementary as well as for the most advanced work requiring the highest grade of manipulative skill. The senseless catering of makers to the lovers of 'brazen elephantiasis' (as I once heard an eminent histologist express himself), with their large and costly instruments, has wrought a kind of mischief which teachers have every now and then to contend against, in the tendency of poorly informed tyros buying at large cost these brazen giants, which they soon find are not what they want.

My own deliberate conviction is, that the ideal microscope for the student and investigator still remains to be devised; that neither Europe nor America has yet produced it; and that any attempt to produce such an instrument, without considering every possible and reasonable demand that can ever be made of it as a table microscope, must end in failure. Looking over the vast amount of rubbish which is constantly being figured in microscopical journals as something new and valuable, one is often tempted to make the comment, "Why could not that person have been more usefully employed than in devising that perfectly useless piece of apparatus?" There are, however, many exceptions; and I do not mean to be understood as scoffing at all new pieces of apparatus, because many of them first devised within the last ten years have been of the greatest value.

How is this ideal microscope to be realized? Who will design it, and who make it after it is designed? I would suggest that every piece be made to a standard gauge, and that thus, if any parts are broken or worn out, they may be replaced with a minimum of trouble. I would advise that the existing rack and pinion be replaced by a better construction, as no rack and pinion yet made is so constructed as to remain firm and steady after prolonged use of the instrument. The fine adjustment can be made a part of the coarse adjustment, provided the cogs of the rack and pinion are accurately cut; and this adjustment can be placed at the back of the instrument, near the fingers of the manipulator. In this way a source of weakness in the construction of both American and foreign instruments may be avoided. The outside tube in which the optical tube slides must be fixed, and form a part of its support. The optical tube must be short; tube length, with draw-tube out, not over 155 millimetres, so as not to make the instrument uncomfortably high when the tube is vertical. The support for the tube must be in a single, solid piece, which may also support the simple, flat, wide stage covered with a thin piece of hard rubber firmly fastened to its upper surface. The stage clips must be so placed that they do not interfere with moving the slide over the whole width of the stage. The base or tripod upon which the whole rests must be cast in a single piece, and the joint at the back, between the base and the supporting piece for the tube, to be made simple and strong, and so that it may be quickly tightened by the manipulator if it should get loose. This joint for tilting I hold to be necessary for certain kinds of work and for photography. The mirror bar must be large and strong, and made as nearly concentric with the surface of the stage as possible. The attachment for the condenser should be made so that it is firm, and so that the condenser is easily swung into and out of position, and rapidly adjusted up or down with as little accessory mechanism as possible. A condenser of the Abbé type is of course the only one to be considered for general work, and it should be as short as possible, so as to make it possible to keep the stage as low down or near the table as is consistent with ready and successful illumination. The concave mirror should be larger than on the most of the laboratory microscopes used here and abroad.

Now a word as to the camera lucida. This absolutely necessary piece of apparatus must be adjustable to every eye-piece, and it should be available for use with the tube upright, inclined, or horizontal, without the addition of any desks or drawing-boards to the outfit of the microscope. If the rack and pinion is properly constructed, and an adjustable or sliding collar with the Royal Society screw fitted into the optical tube or body, with this camera, and a proper combination of eye-pieces and long or short focus objectives, drawings of objects may be made, ranging from 5 to 1,500 diameters, without difficulty, and the use of an embryograph largely if not entirely dispensed with. Searcher eye-pieces might be added to the combination, which would make the outfit still more complete and varied for the use of the investigator who needs to make figures of the subjects which he studies.

It will thus be seen that the prime requisites in the microscope for the investigator are simplicity and mechanically correct construction. No instrument yet made fulfils in the largest possible measure these requirements. Mr. Zentmayer has really added important improvements to the instruments constructed in this country; and for solidity and fewness of pieces, his work (which has always been honest) has been among the very best. American observers of world-wide reputation have used American instruments and objectives with success. Among these may be mentioned men no less famous than Profs. H. James Clark, Alpheus Hyatt, and Joseph Leidy, while Prof. J. F. Rothrock's studies with American lenses upon the strength of wood as illustrated by sections has started a most important line of practical inquiry.

But notwithstanding this, as stated at the beginning, the ideal microscope is still to be placed upon the market. To have the matter assume the importance which it demands, I would suggest that the American Society of Naturalists, at their next meeting, take into consideration the question of securing a satisfactory design for a standard instrument. Let this be done by offering a prize to be competed for, and let us for once have something like uniformity of pattern in this most important instrument of research. The teacher would then have no difficulty in suggesting to his pupils what make of microscope they should buy, and every maker would not be offering instruments departing more or less from a recognized standard.

And finally, as suggested by Dr. W. P. Wilson, now that the surplus from revenue and tariff is stirring the political wiseacres at Washington, where a plethoric treasury is threatening the financial prosperity of the country, let our universities and colleges make an appeal to members of Congress, in co-operation with the American Society of Naturalists, to have the absurd tariff on imported scientific books and apparatus removed. This senseless tax on knowledge, which it seems is to be catalogued among the 'luxuries,' is a glaring and shameful disgrace to American institutions. As it is, neither American publishers nor manufacturers are profiting to any extent from this absurd regulation, nor are they likely to, even after the duties are removed.

JOHN A. RYDER.

University of Pennsylvania, Dec. 15.

Sound-Blindness.

IN *Science* for Nov. 18, p. 244, I observe some remarks on certain phenomena of defective hearing, which, from their supposed analogy to color-blindness, is called 'sound-blindness.' I am very much interested in the facts, but the name I do not at all like. It seems to me very misleading. But neither is the term 'sound-deafness,' which was proposed as a possible substitute, any better. Comparing the eye and the ear, 'sound-deafness' corresponds with 'light-blindness;' but these terms express simply blindness and deafness without qualification. The correspondent of *color*-blindness is not *sound*-deafness, but *pitch*-deafness. But the phenomenon spoken of in the article referred to is neither *sound*-deafness nor *pitch*-deafness; for the characteristic of vowel-sounds is not musical pitch, but *timbre*. In so far as the phenomenon is physiological at all, the defect is therefore *timbre*-deafness. But it seems to me that the defect is probably, largely at least, a defect of perception, and not of sensation, and therefore psychological, not physiological.

JOSEPH LECONTE.

Berkeley, Cal., Dec. 9.