has been reported from one of the western states. All the other west American crayfishes are members of the genus Astacus, while all the crayfishes of the United States east of the Rocky Mountains belong to the genus Cambarus, with the exception of *Astacus gambelii,* which ranges across the divide from Utah and Idaho into Montana and Wyoming, where it is found in the upper tributaries of the Missouri River.

Cambarus clarkii has been previously reported from Texas and several other southern states, and it is an interesting fact that this is one of the species of Cambarus whose previously known range approaches most closely the southern part of California. Nevertheless, the Californian and the Texan representatives of this species are separated by a long, arid stretch of over 800 miles. This is a quite unusual discontinuity in the distribution of a species, but it is possible that other specimens may be found in some of the small streams of the intervening territory in Arizona and New Mexico. It is also possible that the forms may be artificially introduced, although crayfishes are not commonly distributed in this manner. A species of crayfish would encounter many difficulties in extending its range across the deserts which lie between southern California and Texas, unless it migrated in a period when the rainfall was much more plentiful than it is at the present time.

S. J. HOLMES

UNIVERSITY OF CALIFORNIA,
BERKELEY, CALIFORNIA

ON BOTANY ON THE CAMPUS

PROFESSOR TRELEASE, in his article in SCIENCE for August 1, calls attention among many other interesting things to the need of introducing the embryo agriculturist to plants as they grow, and to the European botanical gardens which serve the purpose. Isn't it conceivable that something of the sort might be done under American conditions? I think any aggressive botanical department would be glad to do the work if it had any reasonable hope that the plantings would be permanent.

Here there have been a number of fine groups of native and introduced plants that have been used for such instruction. But they have no protection from the administrative authorities in charge of the campus; and even in the few years I have been here a large proportion have been either dug out with a steam shovel or buried under twenty feet of earth, sometimes to make way for something equally or more useful, but frequently merely to straighten a drive or level a piece of ground. This spring one of the two small areas of natural shrubbery on the main campus was slashed off, and most of the trees also cut down, without even the excuse of any construction on the site, but apparently merely because it was in the neighborhood of a new building that was going up. (A *dead* hickory was left standing alone.)

I wonder if there is hope of sufficient reform in grounds administration to make the building up of a collection of the necessary types of plants a possibility. I imagine conditions are no worse here than on most rural campuses. The problem on a crowded city campus will be largely of a different sort.

WM. T. M. FORBES

CORNELL UNIVERSITY

OSMOSIS DEMONSTRATION FOR BIOLOGY CLASSES

DR. CLAYBERG'S observation regarding the demonstration of osmosis set up by biology teachers (SCIENCE, LX, 100, August, 1924) that "sometimes the thing does not work," applies unfortunately over a large part of these United States. I have found teachers of all degrees of intelligence and training shy at the demonstration as usually described in the textbooks, and resort finally to the classic egg and sealing wax, which is confusing to the student rather than illuminating. The chief practical difficulty is apparently that of attaching a membrane to the funnel or thistle tube so as to leave no leaks.

The use of celloidin bags I find eminently satisfactory. Although this has been repeatedly described in technical literature, teachers seem to be afraid to try it because they were not themselves taught it in school or college. But it is easy enough after one or two trials.

This method consists of: (1) preparing the celloidin bag before the class: Pour some "newskin," celloidin dissolved in ether-alcohol, free from acetone, into a four-ounce wide-mouth bottle, dry; pour out again all you can, back into the container, rotating the bottle constantly, slowly, so as to spread a very thin layer of the celloidin over the entire inside surface; remove ether and alcohol by ventilating inside of bottle—that is, blow into it several times; after the odor of ether is gone, rinse out with water, which removes most of the alcohol; gently work out the membrane, beginning at the neck of the bottle, pouring a little water between membrane and glass—the whole skin can be removed without breaking it. (2) setting up the "artificial cell" or "root hair": Insert a No. 4 or No. 5 rubber stopper, two holes, in the neck part of the bottle-shaped celloidin capsule; insert thistle tube into one hole of stopper; pour in sirup or whatever solution you intend to use until bag is quite full and overflowing; plug second hole; suspend in water—use clamp on ringstand, holding at level of rubber stopper.

To fasten bag to stopper, I find either several windings of rubber band or cementing with fresh celloidin solution satisfactory. The thistle tube may be re-