ered to about 5.4, but tadpoles will survive even at this low pH. The pH is somewhat higher if less sphagnum moss is added. Several of the tadpole cultures containing sphagnum moss in tap water have been tested, and the pH was found to vary from 6.2 to 6.9. Therefore, in using sphagnum moss as food, not only is bacterial growth reduced, but also laboratory tap water can be used without any harmful effect on the tadpoles. This method of rearing tadpoles is economical as well as time-saving.

HAN-PO TING

Department of Zoology and Entomology
The Ohio State University, Columbus

Oaths and Affidavits

Dr. Grundfest omitted from his discussion "On Political Oaths and Affidavits" in SCIENCE for July 21, 1950, the core of the problem, namely, the criminal aspects of the Communist Party. He repeatedly referred to *political* beliefs but said nothing about *criminal* beliefs. The word "Communist" carries a connotation of lawlessness that does not apply to our major political parties. For example, few professional Democrats and Republicans enter this country under false names or by means of untruthful affidavits.

I don't care about the *politics* of my doctor or my lawyer, but I do not wish either one to be a member of, or in sympathy with, a criminal organization. At the same time I see little merit in miscellaneous "oaths and affidavits." It doesn't do much good to ask a man if he is a criminal or if he associates with criminals.

P. W. MERRILL

Mount Wilson and Palomar Observatories
Pasadena, California

Basic Processes of Erosion

We who are interested in the conservation of our soil resources appreciate your article "Soil Erosion by Rainstorms," by W. D. Ellison (*Science*, **111**, 245 [1950]). The article should be quite beneficial in disseminating information on the basic processes causing erosion.

Two faulty statements were made, however, that should be corrected. These statements appear on page 246, column 2, last two paragraphs as follows: "However, these experimenters apparently did not recognize splash erosion as an important independent erosion process. The first known reports on splash erosion were made by the writer (*3*, *4*, *5*)."

Much of Mr. Laws' work on raindrops and erosion has remained unpublished, as he left Soil Conservation Service research for work more closely connected with our war efforts. As one closely associated with Mr. Laws and the work on effects of raindrops, I can definitely state that not only did Mr. Laws recognize the importance of splash erosion, but it was also recognized by the men in charge of this research (Donald A. Parsons and Howard L. Cook).

Mr. Laws not only recognized the significance of splashes but photographed the splashes and splashed soil (*Agr. Eng.* **21**, 432 [1940], Fig. 3, *B* and *C*, left, entitled: *B*. Just after striking. *C*. The air is filled with flying soil particles).

In addition, I would like to quote from the *S.C.S. Research Project Monthly Report* for May, 1941. (Note items 1*a* and 2.)

A few of the phenomena of general interest that have been observed, or that are deducible from the observations, are outlined below.

1. Raindrops impinging upon soil cause:
   (a) *Splashing* which results in large quantities of soil and water being transported from one place to another. It is easy to reason that on sloping land, the distance of travel of these splashes is greater down the slope than up; also, soil splashed into nearby rapidly flowing water becomes highly susceptible to being carried away.
   (b) *Loosening* of the soil particles at the surface, giving the run-off waters an opportunity to act upon them.
   (c) *Turbulence* in the run-off water which aids in the maintenance of the soil particles in suspension.
   (d) *Shattering* or breaking down of the soil aggregates into more easily erodible material.
   (e) *Rearranging* of the particles at the ground surface which serves to reduce the infiltration rate.
   (f) *Puddling and tamping* which tends to alter the soil structure near the surface, resulting in a thin compacted layer which further reduces the infiltration rate and thereby increases the run-off rate and rate of soil erosion. As rearranging, puddling and tamping progress, the erodibility of the surface decreases.
   (g) *Leveling*, or localized erosion and deposition, which reduces depression storage and results in greater amounts of run-off and soil loss. Leveling is a result of several of the primary actions.

2. Because of splashes, a large part of the run-off occurring from each small area of bare soil consists of water and soil transported to that area by means of splashes from the adjacent areas. Consequently, the soil and water losses by run-off from any small area of bare soil are less if the area is bounded by areas from which splashing does not occur. It was observed that a large part of soil and water losses from a 2-foot square plot of soil subjected to an erosive rain took place through the medium of splashes rather than through the medium of run-off. This phenomenon is implicity involved in the balk method of farming.

3. In some of the tests the soil surface was covered for brief periods with a roof that shielded the soil from direct hits by the raindrops, but drained their water gently onto the soil. Under this condition, overland flow was occurring without rainfall impact effects. When the roof was removed, the same magnitude of flow existed but with disturbances caused by the striking raindrops. A run-off rate of 3 inches per hour was observed to produce no erosion when the roof protected the soil surface. When the roof was suddenly removed, the soil concentration jumped to 2 percent by weight of the run-off.

4. Experiments of this type have wide application because they show individual processes, uncomplicated by external factors. Thus, one practical value of the above experiment is to demonstrate the essential function of soil covers. It is evident that any cover, whether it be metal, stone, vegetation or plant residues, that protects the soil surface from rainfall impact, will reduce soil losses materially.

5. Depending upon plot conditions, the results also show that there is a certain rate of overland flow below which erosion will not occur from the action of run-off alone. Although in these experiments the bed material was an agricultural soil and the depths of flow were only a few hundreths of an inch, this result should not be surprising, since many experimenters concerned with the movement of bed load in open channels have determind that for any