above the other, and as soon as the supply of tabs in any color is used up another set of strips may be prepared and pasted on this card.

The strips may be arranged according to the spectrum or by the alphabetical order of topics they are to indicate. I have found the latter more convenient, especially with the subject each color indicates written opposite the strips of that color on the cardboard holder. I have two such holders in use in daily reading, one at the laboratory and one at home. The preparation of additional strips furnishes constructive amusement to children who find kindergarten entertainments to their liking.

I have still to be convinced that a functional index, with almost the completeness of a dictionary, should not be demanded by the readers of scientific journals. In the meantime it is up to the readers to convince the editors of a serious omission in their commonly gratuitous undertaking.

DONALD A. LAIRD

COLGATE UNIVERSITY

A PROPOSED BIOGRAPHICAL ENTOMOLOGICAL DICTIONARY

AMERICAN entomologists and arachnologists should be much interested in the project of Professor Embrik Strand to publish a Biographical Entomological Dictionary containing the autobiographies of all entomologists and arachnologists who have done scientific work as authors or as collectors in all parts of the world.

This project has been explained in *Entomological News,* May, 1924, page 178, also May, 1924, pages 227–9, and in *The Entomologist* for March, 1924, page 68. However, the response from American entomologists has not been very great. The project has several auspicious features that should warrant wholehearted and prompt support: (1) There is no question about the publication of data; (2) the editor appreciates the desirability of individuality in the form of the biographies; (3) it is not necessary to be saving of space, since the editor suggests that all the main points in the life of the individual, even though they may have nothing to do with the professional career, should be included; for example, work in other biological fields than entomology or arachnology.

All persons who have done work with insects or spiders are urged to send an autobiography to Professor Strand at the earliest opportunity. Professor Strand's address is: Professor Embrik Strand, Director of the Systematic Zoological Institute, Universität, Kronvalda bulvars 9, Riga, Latvia.

To facilitate the assembling of the autobiographies of Americans, it is suggested that they may be sent to Dr. H. P. K. Agersborg, Department of Biology, The James Millikin University, Decatur, Illinois, or to Professor C. L. Metcalf, 201 Natural History Building, Urbana, Illinois, who will be glad to forward them by registered mail to Professor Strand.

H. P. K. AGERSBORG

C. L. METCALF

SPECIAL ARTICLES

CAN THE HYDROGEN ION CONCENTRATION OF LIVING PROTOPLASM BE DETERMINED?

THE various determinations that have been made of H-ion concentration in organisms are applicable in the case of plants only to the cell sap, and in the case of animals usually to no more than body fluids bathing the exterior of the cells. To assume that the results correspond to the cH of the protoplasm in contact with these inanimate fluids would be unjustifiable, as the following experiments will demonstrate. The subject of study is *Pelomyxa palustris,* a multinucleate Amoeba which frequently attains the giant size of 3 mm or more in diameter. Its markedly vesicular or foam structure renders this organism peculiarly suitable for colorimetric tests of cH; for, since it is desirable that the indicator should be as uniformly distributed as possible, and since it is impossible, as far as I am aware, to impart a visible coloration to living protoplasm itself, the nearest approach to ideal conditions is afforded by such an intimate foamy admixture of protoplasm and vacuolar fluid as *Pelomyxa* presents. The average diameter of the vacuolar vesicles is one third to one half that of the nuclei, but larger and smaller ones also occur. Neutral red was the indicator used. It is absorbed readily from dilute solution and forms in the vesicles a much more concentrated solution than in the external liquid. Granules in the protoplasm also stain deeply, but their color is little affected by the cH of any medium in which they may be placed and so is of no use as an indicator.

The tint of the neutral red in the great majority of the vesicles is practically uniform and corresponds sometimes to a neutral and sometimes to a very slightly acid medium. It is more acid than the water outside—a relation which seems to hold whenever the cH of cell vacuoles is compared with that of the bathing fluid. Comparing therefore the three media, cell sap, protoplasm and external liquid, we see that the neutral red has a different concentration in all three media and the H-ions in at least two of them. Why, then, should we assume that their concentration in the protoplasm agrees with that of the internal rather than the external liquid or indeed with either?

There is, however, more convincing evidence that the protoplasm is deliminated sharply as regards