

oxylic acid as 11.72 per cent, in good agreement with the respective results noted above. The solution showed a pH of 6.8 at point B, indicating that its isoelectric point is about 6.8.

An osmotic pressure determination<sup>7</sup> with the dialysed solution of the hydroiodide (conc. 0.558 gm./l.;  $d_{30.8} = 1.001$ ;  $\pi = 2.448 \times 10^{-3}$  atm.) indicated a molecular weight of 5,700.

A detailed account of this work will be published in the *Journal of High Polymers, Japan*.

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<sup>1</sup> Alfrey, T., Morawetz, jun., H., Fitzgerald, Z. B., and Fuoss, R. H., *J. Amer. Chem. Soc.*, **72**, 1864 (1950).

<sup>2</sup> Tani, H., and Noguchi, J. (unpublished).

<sup>3</sup> Bergamann, M., Zervas, L., and Ross, W. E., *J. Biol. Chem.*, **111**, 245 (1935).

<sup>4</sup> Hanby, W. H., Weley, S. G., and Watson, S., *Nature*, **161**, 132 (1948).

<sup>5</sup> Katchalski, E., Grossfeld, I., and Frankel, M., *J. Amer. Chem. Soc.*, **70**, 2094 (1948).

<sup>6</sup> Noma, K., and Tsuchida, T., *J. High Polymers, Japan*, **6**, 282 (1949) have shown that ethyl phenylacetate is a good solvent in the polymerization of the compound (I).

<sup>7</sup> The osmotic pressure was determined by the simplified dynamic method. (cf. Mesituka, G., *J. High Polymers, Japan*, **6**, 305 (1949).)

### Definitions in Biology

MAY I support Prof. Alan Boyden's plea<sup>1</sup> that parthenogenesis should not be classified as asexual reproduction? The habit of doing so presumably arose because the text-book definition of sexual reproduction excludes anything which does not involve fusion of gametes; but such a reliance on a definition instead of on the facts implies a degree of philosophical realism which has no proper place in science.

Biology, unlike logic and mathematics, has to take the world as it finds it. Definitions are descriptions of concepts or phenomena, sometimes of arbitrary stages in a series, and when they are made short they inevitably become inaccurate. Prof. Boyden himself falls into difficulty in proposing to re-define (or, as he puts it, characterize) sexual reproduction as "reproduction which involves gamete formation", for a gamete is usually defined as a cell which fuses with another cell. And can the hologametes of *Polytoma* be said in any sense to be "formed"? It is much better to recognize frankly that, while definitions of biological terms may be convenient as mnemonics and in teaching, they must never be used as the basis for argument. It is well known that no formal definition of 'gamete' is possible, since sometimes, as in *Amoeba diploidea* and many eggs, the cells which begin fusing are not the same individuals as those which finish the process, nuclear division having intervened, and Pirie<sup>2</sup> has argued that 'life' cannot be defined. No satisfactory definition of 'species' has ever been made. One of the latest, that of Mayr<sup>3</sup>, is quite inadequate; apart from being formally incorrect in stating that a species is a group of populations, which it certainly is not, his definition would, since it contains the term 'interbreeding', exclude *Amoeba proteus* and all creatures without cross-fertilization. Similar difficulties arise with the

words cell, reproduction, tissue, skeleton, parasite and many others. The advice "Define your terms" is bad counsel to give to biologists, for where the observations to be described have no sharp limits, if definition makes the argument simpler it does so at the expense of truth.

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<sup>1</sup> Boyden, A., *Nature*, **166**, 820 (1950).

<sup>2</sup> Pirie, M. W., "The Meaninglessness of the Terms Life and Living" in "Perspectives in Biochemistry", Ed. J. Needham and D. E. Green (Cambridge, 1937).

<sup>3</sup> Mayr, E., "Systematics and the Origin of Species" (London, 1942).

### Orthography of the Scientific Names in Zoology

PRELIMINARY consideration was given to the orthography of the scientific names of animals in 1948 in Paris both by the International Commission on Zoological Nomenclature and by the International Congress of Zoology. It was recognized that the provisions relating to this (Article 19) in the "Règles Internationales de la Nomenclature Zoologique" are quite inadequate, for the three conditions in which, under that Article, the original spelling of a scientific name must be emended all involve subjective judgments on the part of the reader; thus it provides that a name is to be emended where it is "evident" that the original spelling of a name is defective by reason of (1) a "faute d'orthographe", (2) a "faute de transcription", or (3) a "faute d'impression". Clearly what is "evident" to one zoologist may be the reverse to others, and in consequence provisions of this kind can never secure the principal object sought by zoologists, namely, stability in zoological nomenclature.

The Paris Congress took the view that it was impossible on that occasion to deal with this subject, owing partly to the intrinsic complexity of the issues involved and partly to the considerable divergence of opinion and practice in this matter in zoological literature. The Congress recognized, however, that this was a matter on which it is desirable that a clear decision should be taken with as little further delay as possible, and accordingly decided to request the Secretary to the International Commission on Zoological Nomenclature, in consultation with interested specialists, to prepare a comprehensive report, with recommendations for consideration by the next Congress at Copenhagen in 1953.

I am most anxious that the report which the Congress has asked me to prepare shall be as broadly based as possible, and for this purpose it will be of great assistance if zoologists and palaeontologists interested in this question will be so good as to let me have statements setting out the general objects which they consider the revised provisions should seek to achieve and, in particular, details of the questions which, in their opinion, should be covered by those provisions.

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