but *less* resistant, exhibiting such a marked sensitivity that they were killed or made severely ill by doses even smaller than those tolerated without harm by normal, untreated animals. In these circumstances the earlier injections seemed to have had, Richet said, an *anaphylactic* effect, that is, an effect contrary to or the inverse of the *prophylactic* (protective) effect he had anticipated. In several of Richet's publications he defined his new word "anaphylaxis" as "the contrary of protection" (*contraire de la phylaxie*).[1,2,3] Unfortunately, Richet did not explain the exact shade of meaning he attributed to the Greek prefix *ana,* but it seems evident that he was using one of its common meanings, *back* or *backward,* in a somewhat uncommon way, in the sense of *in back, in reverse* or *inverse.* Thus, the term was compounded of Greek *ana,* the inverse or contrary of, plus Greek *phylaxis,* protection. Ramon has more recently used the prefix *ana* with exactly this meaning in another important immunological term, "anatoxin."[4]

Richet's literal definition of anaphylaxis appears in the French work "Larousse du XXe Siècle," 1928, but elsewhere it seems to be largely forgotten. In one standard English dictionary[5] we are told that one of the meanings of *ana* is greatly or excessively, "as in anaphylaxis." This would make the term signify literally "excessive protection"—an obvious absurdity. If we turn to three leading American medical dictionaries we find that each has its own interpretation of the word, and none agrees with Richet's. In one (Gould's Medical Dictionary, 4th edition, 1935), the term is said to be made up of Greek *an,* a privative, plus *phylaxis,* thus having the sense "without protection." This is an attractive interpretation, for it is not inconsistent with the situation the word is used to designate, and this definition has been given by others.[6] However, the prefix to be defined is clearly *ana,* not *an.* Another dictionary (Stedman's Medical Dictionary, 13th edition, 1936) gives the following unique construction: "Greek *an,* before a vowel *an,* again, + *a,* privative, + *phylaxis,* protection." Doubtless this may be defended, but it is far-fetched, to say the least, and there is nothing to indicate that the inventor of the word had any such notions.

Finally, in a third dictionary (American Illustrated Medical Dictionary, 17th edition, 1937) we discover still another form of literal definition, and the one now most commonly given in authoritative American textbooks[7] and reviews.[8] According to this definition, the Greek prefix *ana* means "against," and thus anaphylaxis comes to have quite different implications. The original idea of the mere lack of (expected) defense—the contrary of protection—is changed to a concept of active antagonism—"against protection." The difference is important, especially when, as in a recent monograph,[9] this definition is taken as the starting point for theoretical discussion.

Tracing the matter back we find that the interpretation "against protection" apparently originated in no less significant a place than in the classical papers of the pioneer American workers in this field.[10] With all due respect to them, it seems clear that they were in error. The Greek prefix *ana* does indeed have several meanings,[11] but "against" is not one of them. It is true that if we look up the prefix *an,* the first definition given is "against," as in *an*swer, but this is Anglo-Saxon, not Greek.[11]

The writer would be among the first to insist that the *phenomenon* of anaphylaxis is best defined in terms of experimental facts, but the word itself is still with us, and its literal definition should be agreed upon. We see no reason to depart from the original meaning given the term by Richet himself, namely, the contrary of, or the inverse of, protection.

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PROTOZOAN ECOLOGY[1]

A YEAR'S study of protozoan distribution and the sequence of species at several stations in a small artificial lake in Central Oklahoma was made in relation to several environmental factors which have been shown to be of significance to aquatic life. These are temperature, dissolved oxygen, carbon dioxide, and bound and half-bound carbonates, acidity of the water as measured by the *p*H scale, and the major fluctuations of the water level. Approximately two hundred species were collected at least once and forty-five species were taken eight or more times.

Volvox perglobator, several species of *Difflugia* (notably *D. lobostoma*), several species of *Euglena,* two species of *Tintannus, Halteria grandinella* and a few others seemed to be favored by temperatures which were not low. Some species seemed to be

[2] Ch. Richet, *Ann. de l'Inst. Pasteur,* 21: 497, 1907.
[3] Ch. Richet, "L'anaphylaxie," Paris, 1912.
[4] G. Ramon, *Ann. de l'Inst. Pasteur,* 38: 1, 1924.
[5] Webster's New International Dictionary, 2nd edition, 1935.
[6] *E.g.,* W. Guttman, "Medizinische Terminologie," tenth and eleventh edition, Urban and Schwerzenberg, Berlin, 1919.
[7] *E.g.,* Chapter 6 in Gay, *Agents of Disease and Host Resistance,* Thomas, 1935.
[8] *E.g.,* Chapter 73 in "Newer Knowledge of Bacteriology and Immunology," ed. by Jordan and Falk, University of Chicago Press, 1928.
[9] R. L. Kahn, "Tissue Immunity," Thomas, 1936, pp. 9–11.
[10] M. J. Rosenau and J. F. Anderson, *Jour. Infect. Dis.,* 5: 85, 1908.
[11] Funk and Wagnall's New Standard Dictionary, 1935.
[1] Contributions from the Zoological Laboratories of the University of Oklahoma, No. 182. Preliminary note.

favored by conditions associated with intermediate temperatures. No species was found which preferred cold water, but several forms became active in water which had been ice not more than one hour previously. Most species observed showed a wide range of tolerance to changes in temperature as well as in all the other environmental factors which were studied.

Two fundamentally different sequences of protozoan forms were observed at the ends of piers extending into the lake. Here, the planktonic fauna was markedly different from the fauna on the piles of the piers, although no measurable differences in environmental factors could be found.

It is concluded that: (1) most free-living Protozoa show wide ranges of tolerance to individual environmental factors, a fact also shown by the data of Noland[2] and of Wang;[3] (2) most free-living Protozoa are affected by very slight changes in the physical and biotic conditions of the environment, in spite of the wide ranges of tolerances shown; (3) the sequence of protozoan species at any one place passes very quickly under natural conditions; (4) an abundance of food is very important for the distribution of most species of ciliates, as Noland[2] also found; it is also the major factor in the distribution of the saprozoic flagellates, but is not so necessary to other flagellated types, and it has not been shown to be important in the distribution of the amoeboid forms; (5) flagellates tend to react more directly to individual factors in the environment than do ciliates; amoeboid forms seem to be intermediate in this regard; (6) seasonal maxima in number of species occur approximately one month earlier in the spring and later in the fall in Oklahoma than is common farther north (see Wang[3]). This apparently shows that such maxima are controlled by climatic factors associated with the seasons.

A full report of this study will be published elsewhere.

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LEMNACEAE IN FLOWER

ON June 5, 1937, in a small pond north of St. Paul, Minnesota, *Lemna minor* L. was found in flower. About one thallus in ten had flowers. This colony continued to bloom for six weeks, the seed of the first flowers maturing about the time the last flowers appeared. Because of this find and the abundant rains in this area other *Lemnaceae* were watched and were found in flower as follows:

Spirodela polyrhiza (L.) Schleid. in three ponds near Lake Minnetonka, the earliest flowers appearing on July 2, 1937.

Lemna trisulca L. in a pond at Glenwood Park, Minneapolis, Minnesota, on July 10, 1937.

Lemna sp. in a small pool in a woodlands near Lake Minnetonka. The flowers were few, but germinating seeds and seedlings were found on July 27, 1937.

Wolffia punctata Griseb. with young flowers in a lake along the Minnesota river bottom on July 26, 1937.

Wolffia columbiana Karst. was found associated with *Wolffia punctata* and about as abundant; however, very few of the plants of this species were in flower on July 26. A few days later both species of *Wolffia* were found in flower in the Lake Minnetonka region.

This is the first report of *Wolffia* in flower in the state of Minnesota and may be the first report of this matter for the United States. Material of all these *Lemnaceae* is being collected with the intention of making morphological and cytological studies.

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GROWTH IN THE ADULT

SINCE the publication of my study on "Growth During Adult Life,"[1] a number of unexpected letters have reached me with reports of individual experiences in this line. Some of these reports are so interesting and bring to light such curious and novel conditions that I should be thankful for more records of similar nature, particularly by scientific men who are used to precise observation. I therefore appeal to all who in themselves or among their relatives or friends have observed or come to know of accretive normal growth changes in the body or any of its parts during the adult life, to inform me of same. What is desired are as far as possible rigidly accurate data and details, which could reliably be used for further elucidation of the process of normal growth during the adult stage of life.

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THE STATEMENT OF THE RUSSIAN PROFESSORS

THE statement recently reprinted in SCIENCE and said to have been signed by many professors of the Russian Academy, may, I think, do injustice to these men. A friend of mine, who not very long ago held a temporary academic position in another European country, was confronted by a document strongly endorsing the policies of that country, intended to be sent to the American press, and requiring only his signature. This he refused to supply, and for a time the resulting situation was annoying and even alarming. Being a distinguished American, he was able to

[2] L. E. Noland, *Ecology*, 6: 437, 1925.
[3] Chia Chi Wang, *Jour. Morph.*, 46: 431, 1928.

[1] Proc. Amer. Philos. Soc., 1936, LXXVI, 847–897.