comparative abundance or rarity of certain species of birds in a given locality, at a given time. There are two methods of meeting this difficulty, neither of which will probably meet the approval of every one. The former of these, which will be outlined later, has grown into general use and with a reasonable exercise of common sense in judging the relative occurrences of the species, with due regard to season, meets most requirements.

The latter method will dispense with the sometimes indiscriminate and loose use of adjectives and adverbs such as "very rare," "rather common," etc., and the substitution of a system suggested, I believe some decades ago, by the late Joshua Billings. This system under proper use and a full study of any given locality will express, with mathematical accuracy, all gradations of the occurrence of any species, not only of birds but of the entire range of the vegetable and animal kingdoms.

In this system, the absolute zero and maximum occurrence of any species would be represented by exact expressions indicating accurately the abundance or rarity of a given species. The scales of abundance and rarity would cross or intersect at the gradation now vaguely expressed by the word "common," and their use would entirely dispense with any doubt as to its meaning, and also with such expressions as "very common," "not uncommon," "rather rare" and the like. Mr. Billings's system would express the superlative of abundance, like blackbirds in a tree in spring or the hairs on a dog's back, by *abundance 100;* grading down numerically to *abundance 0,* which would cover the case of no blackbirds at all or the degree of hairiness presented by a billiard ball. *Rarity 0* would express the entire absence of a given species, while *rarity 100* would express an approach to abundance which need not necessarily be noted in the terms of the rarity scale at all.

It will be noted at once that abundance 50 = rarity 50, and that any degree of accuracy can be secured by the decimal system thus:

Myiarchus Crinetus, abundance 67.3; or *Virco Philadelphicus,* rarity 2.7. An obvious advantage of this system is that it will cultivate close and systematic study coupled with accuracy in the expression of results, but they are both subject to serious interruptions by the habits of migration and breeding which vary the occurrence of all species to such an extent as to necessitate commencing the work over again before it could be satisfactorily completed. This, however, is not without its advantages, particularly if those who undertake to alter or direct the use and development of our language by juggling with its synonymous terms could be set at putting the system in use. But for the great mass of English-speaking scientists in search of the clearest mode of describing the things they see and of setting forth the thoughts they have, good Anglo-Saxon well understood and properly used is a strong and flexible medium.

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"QUITE A FEW"

To the Editor of Science: I have just read with much interest the illuminating paper by Professor H. L. Bolley, of the North Dakota Agricultural College, in Science of July 11, with the caption "The Complexity of the Microorganic Population of the Soil."

The writer is however somewhat puzzled to know just what is meant by an expression used by Professor Bolley, in its relation to the commonly accepted standard of what is called "good English." The expression referred to is "quite a few," introduced in the following sentence: "So now, there seems to be quite a few who think they can tell a productive soil," etc.

The puzzle is, to apprehend just what Professor Bolley means by "quite a few." We can well understand that the expression "a few" means a very small number of units; and in the formula "quite a few" there would seem to be an emphasis placed on the "few" by the qualifying adverb "quite." So that in an analysis of the formula the conclusion must be that "quite a few" means a less number of units than "a few."

Is that the idea that Professor Bolley intended to convey, that the number of persons referred to by him in this connection is less than "a few"? Or does he mean more than "a few"; or exactly as many as "a few"?

This array of logical discussion is of course mere quibbling, and is designed to bring out the writer's surprise, that a learned teacher, in a scientific disquisition in a scientific journal, should have introduced this slangy and meaningless expression, that has appeared of late years as a malevolent fungus growth on our "mother tongue," and become a sort of fad much affected by the "light weights" of our present social and literary world.

With apologies to all concerned.

T. G. DABNEY

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SCIENTIFIC BOOKS

The Fitness of the Environment. An Inquiry into the Biological Significance of the Properties of Matter. By LAWRENCE J. HENDERSON, Assistant Professor of Biological Chemistry in Harvard University. New York, The Macmillan Company. 1913.

This book is essentially a discussion of the nature and implications of organic adaptation, *i. e.*, of the relations between the living organism and the environment, but is written from an unusual point of view.

> Darwinian fitness is compounded of a mutual relationship between the organism and the environment. Of this, fitness of environment is quite as essential a component as the fitness which arises in the process of organic evolution; and in fundamental characteristics the actual environment is the fittest possible abode of life. Such is the thesis which the present volume seeks to establish.

This quotation from the preface defines clearly the author's general purpose and indicates broadly the general nature of his treatment. In his discussion he inverts the order of procedure customary with biologists. Adaptation, he points out, is a reciprocal relation, depending quite as much on the existence of special conditions in the environment as in the organism. This environment—nature, or the physical cosmos—exhibits in its ultimate constitution certain characteristics which are of such a kind as to favor the production and continued or stable existence of living systems or organisms. The world, in other words, is, and was from the beginning, fitted for the abode of life. This was the contention of Paley and the other natural theologians. It implies a biocentric conception of nature—a conception once familiar and, indeed, historically the first to be formed, but which has fallen into disrepute since the rise of the theory of evolution. Dr. Henderson aims at rehabilitating this view and supporting it by an appeal to the results of modern physical science. His conception of nature has thus some of the characteristics of Paleyism in a modernized form, but is essentially uncolored by theological and philosophical prepossessions. The greater part of the book is devoted to an account of the chief physico-chemical peculiarities of the environment. This is largely a description of the general properties of matter, with especial regard to their biological fitness. Attention is called to many conditions favorable to the production and continued existence of living beings. Carbon, hydrogen and oxygen, the most abundant and widely distributed of the elements, and their chief compounds, particularly water and carbon dioxide, possess a variety of properties and modes of behavior which render them ideally adapted to the formation of systems having the characteristics that we call vital. What is insisted on as remarkable is not merely the existence—in such a substance as water—of single properties that are biologically favorable; it is the possession of a unique *combination* of characteristics shown by no other substance, and which so far as we can see could not possibly be possessed by any other substance, that gives water its unique fitness as a component of living matter. Similarly, with carbon dioxide and the other chief compounds of carbon with hydrogen and oxygen: they are uniquely favorable as constituents of protoplasm and no substitutes are conceivable.

In support of these contentions, the author proceeds as follows: He first reviews