than it is at present, in fact the region may have presented more or less the aspect of a desert.

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PLURAL FRACTIONS

FROM time to time correspondents unburden their minds in these columns of sundry loads of worry about the low state of our written and spoken language. Constant Reader has learned to look for old friends among the words mentioned as horrible and convincing examples, and he would be surprised to find that the English courses in high school and college are not blamed for the deplorable condition. My own personal theory is distinctly different, but will not be aired now. The reason for writing is to call attention to a common mistake for which the decimal system must be blamed.

In reading common fractions such as $\frac{4}{100}$ or $\frac{893}{10000}$ gram, one naturally says "four one-hundredths (of a) gram," and similarly for the ten-thousandths. Yet in recent journals these fractions were given as "0.04 grams" and "0.0893 grams." It is not necessary to give references because the mistake is of wide occurrence, and is an argument for the practice of some journals never to use the names of units in the plural. It is easy to see why so many writers use and editors permit the wrong use of the plural. Think of the way decimals are commonly read. "Oh, point, oh, four gram—no, the last figure is four, so it must be grams."

The "oh," it may be remarked in passing, seems to indicate a great public necessity as the cause of the approaching obsolescence of "zero" in reading decimals. As for "naught" it seems to have died when we were young. Do school children still start the two table with "twice naught's naught"?

If the decimals we have given are bad, what can be said of 0.1 or 0.01 grams? Such expressions can be seen if the reader will look for them.

In tabulated data the column headings are often in the plural, though space is at a premium and all the figures in the column are less than unity. In a recent article "Potential, Volts" occurs seventeen times, though the maximum voltage is -0.825. In spite of the minus sign it would not be fair to say that the value is less than nothing, and is that much farther from being plural.

In the same number of the last journal negative powers of 10 play their frequent plural role. For instance, just because it is written 7×10^{-12}, the value 0.000 000 000 007 is ergs! One would like to say that this is a misprint, but the evidence does not in general encourage the charitable thought. On another page can be found "varied from 5–0. 3×10^{-4} g. calories." Seconds, grams and other units in varying negative powers of 10 are common occurrences.

Finally, in the ergs journal a writer says that so and so "occurs at every 2×10^{3} collision." He would not think of writing or saying "at every two collision," but perhaps "at every second collision." Why was he led astray by an exponent?

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WHY PATHOGENE RATHER THAN PATHOGEN?

IN printing this word, quite a good many authors in the states, including the U. S. Department of Agriculture and some universities, use the final "e"; many others do not and many abroad do not. As I recollect, the innovation started with the editorial board of *Phytopathology*. Doubtless the U. S. Department of Agriculture followed the usage of that journal, as did a few universities. I have had my doubts as to the need or even desirability of such usage and have always written the word "pathogen."

I was supported in my view by the opinions I received from several distinguished men of letters, among them Stuart P. Sherman, who said: "Why certainly not, no more use for the 'e' than in oxygen and hydrogen." I wonder if those insistent upon the final "e" use it in naming these two gases. I think the matter is also very well stated by my colleague Professor E. E. Schneider, of the faculty here, who says:

> To me pathogene seems simply absurd. Of course, English is so outrageously inconsistent in spelling that almost no rules can be laid down, but in a case like this, where we have such long-established analogous words as oxygen and hydrogen, I can't see any sense in using a different form. Anyhow, all these forms are from a root *gen* (as in Greek, γενναω; Latin, gens, genus, generare) and *not* from some established nominal or adjectival form having a proper termination of its own, so why not let it go at that? It is true that *gene* has common use, but that is also an arbitrary modern formation, and so does not, to my understanding, constitute a valid precedent for other formations.
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> My usual rule in the choice between two spellings is this: To choose the simpler one always when there is any authority for it at all, provided the simpler spelling is easily understood, does not conflict with any fairly well-established rule or practice and, finally, does not lead to any possible ambiguity.

Now a little matter of history. At about the time "pathogene" was being insisted upon there appeared

in *Phytopathology* quite a eulogy regarding some one who had hit upon the wonderfully useful term inoculum. I forget now who made this wonderful innovation. But I do know that for several years prior to that time I had been using the word inoculum and that many others also had done so.

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SCIENTIFIC BOOKS

Living Africa. A Geologist's Wanderings through the Rift Valleys. By BAILEY WILLIS. New York: Whittlesey House, McGraw-Hill Book Company, Inc., 1930, pp. xv, 320, illustrated.

THE unique geologic feature of eastern Africa is its rifted plateaus with their rift valleys and their rift lakes. On no other continent are the ancient geologic formations so markedly split asunder, so torn apart, and so deeply cracked, and as a result it is one of the greatest regions of the earth for upwellings of molten rock from the heated interior. The rift valleys begin with the Dead Sea trough of Palestine, continue on through the deep Red Sea, and thence somewhat disconnectedly through eastern Africa to Lake Nyasa. In other words, the rift structures continue for 4,000 miles south of the Jordan.

The problem of the cause of this unique fault system has long fascinated geologists. Is it the consequence of tension, due to the deep subsidence of the Indian Ocean, which in late Mesozoic time began to pull down and break apart eastern Africa north to the Jordan? There is no agreement as to the answer, and it is therefore well that an American geologist who is fully conversant with the grand faulting of the Great Basin and California should take a good look at the rifting of eastern Africa and Palestine. This Willis has done under the fostering care of the Carnegie Institution of Washington, examining the rift valleys for a length in excess of 1,500 miles.

Central Africa is not only the land of high plateaus and long narrow lakes, but the place where the Congo and Nile rivers now have their origin; the country of active and recently extinct volcanoes, some with snowy tops; of much earthquake movement; of great mammalian game; of the deadly tsetse fly; and of nightly ice formation within the tropics. Amidst these interesting but frequently difficult conditions, Willis traveled more than 6,000 miles in six months, climbing volcanoes and walking twenty miles a day on safari, and all this in his seventy-second year!

"Living Africa" (living, because Africa is still growing geologically) is Willis' narrative of what he saw of the natural history, physical and organic, with accounts of the natives and the white people who helped him on his way, sprinkled with descriptions of the geological phenomena and what he thought about them from day to day. Later we are to get his technical report of the geologic structures and his final explanation of their causation. The present volume opens with "The Question" (pp. 1–15): How does the crust of the earth move?, continues with twenty-one chapters of narration (19–286), and closes with "The Answer" (287–310). It is a wonderfully interesting book, written in a clear, spirited, optimistic and humorous style, and why not, since the author was accompanied everywhere by his "Solomon"?

The Scottish geologist, J. W. Gregory, also visited the rift valleys of East Africa, first in 1892–1893 and again in 1919, and two years later published his book, "The Rift Valleys and Geology of East Africa." Willis agrees with Gregory that the Eastern or Great rift "is a crack, an effect of tension in the earth's crust," but adds, "We see the cause of tension from different points of view." The Great Rift valley of Africa is 650 miles long and from 20 to 30 miles wide; the superficial rocks are lavas and volcanoes piled upon a Precambrian crystalline basement. The Western rift is far more complex geologically than the eastern one and has a length of 850 miles. In Ruwenzori the old basement, here in the form of a wedge, has been squeezed upward through horizontal compression to 16,794 feet above sea-level, and other similarly shaped blocks have either risen or been depressed by the same forces. "The mountains said it, the rivers roared it, and the lakes acquiesced" (p. 96). It is the physiography of the plateaus, the curiously changed stream pattern, the nature of the crystalline basement on which rest the strings of volcanoes with their lava flows that guide Willis in his interpretation of the rifting and its causation.

"The recent uplift of the African plateaus and the development of the rift valleys constitute the group of facts that we have to throw against the background of the ancient history of Africa as a relatively modern expression of the forces that have created and shaped the continent since the beginning" (p. 291). These movements, in Willis' opinion, began in the late Mesozoic, and the first major upwarping, with differential movement of as much as 3,000 feet, may have taken place in the early Cenozoic. "The great western rift shows evidences of horizontal compression throughout its entire length" (p. 295). The Lake Victoria "disk" is 450 miles across, a high plateau with a saucer-like lake depression, and with margins that are upraised