LETTERS TO THE EDITORS

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Terminology in the Geological Sciences

DR. R. H. RASTALL[1] probably does not intend us to take too seriously his criticisms of geological and palæontological terminology, but his statement that "popular geology is being killed by pedantry" cannot be allowed to pass unchallenged. It is not very clear from his article whether he refers to the increasing refinement of modern geological studies or to the attempts to incorporate such details in elementary courses for students. He comments on the "enormous number of zones and sub-zones now recognized in several systems", but as he does not appear to question the validity of the subdivisions it is not clear what procedure he would suggest. That many such tables of zones are unsuitable for presentation to elementary students is accepted by most teachers of the subject, but these tables reflect an extension of knowledge, and Dr. Rastall agrees that against this "nothing can be said". Geology would indeed be a strange science if all its more recent advances could be incorporated directly into elementary courses.

Problems of terminology are particularly acute in geology, as in biology, but they also arise in any attempt at a simple or popular presentation of other sciences. In geology much can still be done with a minimum of unfamiliar terms, but in my experience, when a beginner's interest has once been aroused, the terminology is not a deterrent to more serious study. In fact, amateur geologists have themselves provided a good share of the zones and sub-zones and of other names which Dr. Rastall thinks are a deterrent to the popularization of geology. The readiness with which the necessary terminology of any subject is acquired by an interested amateur is seen among gardeners.

Many will join with Dr. Rastall in regretting that few field geologists are now able to name the fossils they collect. Although many field workers do in fact learn to recognize the most significant species occurring in their areas, it is not surprising that others find it simpler to leave most of this work to specialists, in view of the increase in our knowledge of fossil faunas and the degree of precision in identification which field workers now find essential for the elucidation of many structures of importance (for example, in the search for oil and coal).

The species problem as it affects the palæontologist has been much discussed recently, and those concerned with systematic work on fossils are alive to the difficulties which arise in the application of the Linnean system and of the International Rules of Nomenclature. But much as we may hope to see a revised system of nomenclature with an evolutionary basis, our knowledge is far too incomplete for this to be attempted in more than a few groups. Even so, whether we note our fossils under new names or by formulæ, original papers recording them will continue to be difficult to understand by those who have not made some effort to master the new terminology. The loss of familiar generic names such as Pecten, Terebratula and Rhynchonella from many lists is noted by Dr. Rastall, but I do not think that this need affect the elementary student. Glasgow students in their first year use the genera with their original wide significance, but if they continue to study the subject they seem to find no difficulty in replacing them by such terms as Terebratulid and Rhynchonellid, and in realizing that there is nothing inappropriate in the rather loose nomenclature of the elementary course.

So far as my experience is concerned, as a teacher in three universities and an examiner in four or five others, when elementary classes are considered, I do not believe that palæontological and stratigraphical terminology has in any way diminished the attraction of the subject. That any decline in numbers of geology students is largely to be attributed to changes in entrance requirements and in regulations for degrees and to the introduction of the Higher School Certificate in England is shown by the fact that at Glasgow (where these changes have not operated) there are even now almost two hundred students of geology. When students, in school or university, have the opportunity to learn geology, its attraction is felt as keenly as ever.

Finally, I would repeat the words which the distinguished American palæontologist Hyatt felt it necessary to use so early as 1867, "there is nothing to be dreaded in new names except by those who strive to get the animal kingdom by heart".

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WHILE one sympathizes with Dr. Rastall in his attempt to keep up to date in all branches of geological science[1], it should be pointed out that he has neglected three points in his survey of the problem.

(1) It is open to the field worker, now as ever, to name his own fossils. It is as easy to use the names of yesteryear as it ever was. The field worker, an essentially practical person, sends his fossils to the expert because precise determinations are useful to him, not from any superstitious respect for nomenclatorial 'mumbo-jumbo'. That a more refined nomenclature affords increased stratigraphical precision can scarcely be urged as an argument against such refinement.

(2) There is a fallacy in the contrast of petrological and palæontological nomenclature. Terms such as 'granite' and 'basalt' correspond to such terms as 'brachiopod' and 'graptolite'. The description of a particular granite would include a long chemical analysis, careful description of the mineral assemblage present and of its interrelation, and would then, and only then, correspond to the species of the palæontologist. If granites identical in all these respects occurred at many widespread points on the earth's surface, and had been described at different times, in different languages, by workers of all degrees of competence, then Dr. Rastall would find that definite laws, or rules of nomenclature, would be necessary in petrology, and the resulting names would appear strange and formidable to the outsider.

(3) No student need learn all the complicated nomenclature of palæontology. Using again the petrological analogy, a student could well be expected to learn and recognize a granite, and various types of this rock, but no one in his senses would hand him a specimen from, say, South America, and expect him to learn its chemical formula and most minute characteristics. Emphasis must be on characters common to all granites or to great groups among them. Similarly, in the teaching of palæontology, emphasis should be and is placed on the make-up and structure of classes, orders and families within