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ADDRESS TO THE MINERALOGICAL SOCIETY.

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[Delivered at the Anniversary Meeting, Oct. 21st, 1884.]

It does not appear to be at present a matter of fixed precedent whether the Annual Meeting of the Mineralogical Society should or should not be associated with the delivery of a Presidential Address ; and I had hoped, knowing how slight are my claims to the honour which you have conferred upon me, to have escaped until I give place to a worthier successor. But our Honorary Secretary has intimated to me that he would prefer ' a few remarks,' and as I feel so strongly the obligations under which he has placed the Society by the free gift of his valuable time, his will is law to me.

As the report laid before you justly states, the past year has been a marked epoch in the history of this Society, since it has witnessed the fusion with it of the Crystallological Society. For this

most fortunate event (as I deem it) we are greatly indebted, I must be allowed to say, to the tact and zeal of our Honorary Secretary. There were not a few difficulties to be surmounted, some susceptibilities to be consulted, but the task was lighter to one so well known in scientific circles than it would have been to many other men of equal energy and zeal for mineralogy.

I have called the event 'most fortunate,' because the existence of two societies so nearly identical in their ends, in fact only differing by the one being nominally more restricted in its means than the other, has always seemed to me a great misfortune. There may be and there sometimes is a healthful effect produced by rivalry; but in science, as in theology, I am afraid that there is always more danger of loss of energy through friction, and even conflict, than hope of gain through a noble emulation. Permanent good, as it seems to me, is only likely to be obtained when of two such societies, the one is content to accept the humbler position, and act to some extent as the helpmate of the other. Certainly we could not expect that this *rôle* would be assumed by a society among whose leading members were the Professors of Mineralogy of Oxford and Cambridge, and the Keeper of the Department of Mineralogy in the British Museum—while we, as far the larger and hardly the less distinguished body, certainly could not be expected to take the 'lower room.'

I think indeed that in all respects I am fortunate in being President at an epoch when the Council are able to present you with such a report as the present; for it also announces that our finances, which two years since were in so critical a condition, have now been restored to a healthful tone; and I trust that by due economy, without any reduction of the real value of our publications, we may be able at the year's end to announce a balance yet more satisfactory.

I find also in the report yet another subject for congratulation, that is, the success which marked the meeting held in Edinburgh last June. There are many advantages attendant on the occasional 'decentralisation' (if I may so apply the term) of a scientific society; and ours, as the number of students of

mineralogy is not large, is exactly one suited for a life mainly settled, but occasionally migratory. I trust, then, that the Scotch meeting will henceforth be an annual occurrence, and I am sure that we may trust to the zeal for fatherland, which in Scotland manifests itself in the nobler instead of the baser form, to make that meeting always a success.

There is one other event of the year to which, although it has no direct connection with our Society, I should like to refer—I mean the rearrangement of the mineralogical collection in the British Museum, which, although it has been the work of more than one year, may be regarded as completed in this by the publication of the Guide to the Mineral Gallery of the British Museum (Natural History). We can now examine that magnificent collection much more easily than in its old home at Bloomsbury. But the feature of the new order of things to which I wish at the present to direct your attention, is the special provision made for the instruction of learners. It is quite true that a willingness to act as public teachers as well as custodians of the national treasures has long been an honourable characteristic of the members of the various departments of the British Museum; and I shall ever remember gratefully the kindnesses which I have received from the late Keeper, Professor Maskelyne, and Mr. T. Davies, in their cramped quarters at Bloomsbury; but the removal of the collection to its more spacious abode at Kensington has given to Mr. L. Fletcher (the present Keeper), with the same able helper, an opportunity which he has been quick to seize, of arranging a number of additional cases, after a distinctly educational plan, and publishing a guide book to the Museum so arranged as to alleviate that overpowering sense of bewilderment with which the beginner (and I may say not only the beginner) contemplates that vast collection. I think, as a teacher myself, I may venture to assure Mr. Fletcher and Mr. Davies of the gratitude of teachers and students alike. The liberality also of the trustees in distributing among places of education their surplus duplicates, many of them specimens of considerable value, though, like silver in the days of Solomon, of little account in that grand collection, calls for a grateful acknowledgment from students.

You will not look to me, gentlemen, for any profound remarks on the subject of Mineralogy. As I vainly urged, when the honour of becoming your President was proposed to me, I am a Petrologist, not a Mineralogist; I pursue mineralogy, if in this place I may dare to make the confession, not so much for its own sake as for the light which it throws upon the constitution and the genesis of rock. I am more concerned with the identification of a mineral, the circumstances of its formation, and its paragenetic habits, than I am with peculiarities either in its form or its chemical composition. Still, from this point of view, a distant one it must be admitted, some things may possibly strike an observer which might not occur to one more profoundly immersed in the study of the subject; and on this account I am about to offer, or perhaps more correctly speaking to reiterate (for they are not new), two criticisms upon systematic mineralogy as it is set forth by many workers. The points to which I am going to refer are to a certain extent questions of nomenclature; but they are more than this—they involve principles, and these of wider application than our science. A word in science should be the expression of a thought, a name more or less the representation of an idea; hence questions of great importance, principles of the highest moment, may often be involved in what at first sight may seem only a matter of nomenclature.

I wish, then, to call your attention to two tendencies among mineralogists, which, as it seems to me, impede the real progress of the science. These are, an over precision, displayed in the notation by a novel name of some slight observed varietal difference in a mineral; and an over laxity in the application of specific names. These tendencies at first sight would appear the outcome of entirely different habits of mind, yet apparently they coexist in the same individual, and possibly find their origin in the same mental idiosyncrasy.

The first—the fondness for giving new names—is only the verbal expression of a habit of species splitting, known in other branches of science, but nowhere I think so rampant as in mineralogy. Open any large work on descriptive mineralogy, and in addition to species you will find its pages studded with named varieties,

some of them quoted only to be rejected by the author, others obviously only distinguished by characteristics which cannot be of real value. To take as an example a single mineral group, the felspars. To begin with, we have a generally admitted difficulty in deciding as to what number of 'major' species (if I may use the term) we shall accept: some authorities even doubting whether *Labradorite* and *oligoclase* can be called 'species,' though I suppose most would agree that they must be in some way designated; many more dispute the claims of *Andesine*; and then we come to forms like *Perthite* and *Bytownite*, obvious mixtures of more than one species, and a crowd of others, such as *Indianite*, *Huronite*, *Tschermakite*, *Hafnefiordite*, *pericline*, *lozoclase*, *Murchisonite*, *Carnatite*, *hyposclerite*, *erythrite*, &c.

I do not deny that in these and similar cases with regard to several other minerals which it would be easy to quote, the names often express some variation either in aspect or mineral composition or look, of which it may be well to take note—as, for example, the peculiar bloom of *peristerite*, or the rather exceptional composition of *Bytownite*; but I object to giving to these a distinctive name instead of a distinctive epithet. This may seem at first sight a trivial criticism—to object to *peristerite*, and prefer such a term as opalescent or chatoyant *albite*, may seem to be choosing the more cumbrous instead of the more concise appellation, but I think there is a question of principle involved: the one nomenclature accentuates the distinction, and loses sight of the relation; the other, while noting the distinction, keeps prominent the relationship. This has an inevitable mental influence; diverse names mean diverse mental pigeon-holes; by giving a thing a separate name we tend to give it a separate entity as a conception. To give a rough example: I am distinguished from my brother by a separate christian name, and identified with him by the same surname; if I changed the latter, the bulk of people—all but the few who knew us intimately—would forget that we were related, and the world at large (assuming for a moment that such insignificant beings could attract notice) would be perplexed at the visible resemblances. He who augments the lists of minerals by naming a dubious

species, depend upon it, confers the reverse of a boon upon his science. If we acted on the same principle in petrology, we should exhaust the Greek lexicon or the parish lists in our search for names. I remember, indeed, some years back an ardent mineralogist, who, straying into petrology, got hold of two or three varieties of felsite, each perfectly common types, and thoroughly well known to petrologists as of wide distribution, and proceeded to confer upon them barbarous names from some outlandish villages in Britain. I have often wondered how many new species he would make out of my collection. But seriously, this tendency to individualism (not, I fear, without some root in human vanity) tends to promote a mental habit very fatal to real progress in science. It may be described in the homely phrase "not being able to see the wood for the trees." The great end of science is to determine principles and seek after laws. In the search for these distinction is in reality only a step in the process of correlation; a classification founded only on divergences would be universally admitted to have no philosophical basis. All great generalisations are made by discussing the resemblances which underlie the apparent divergences, tracing (as it were) the many distinct twigs back to the one parent stem; correlating facts, correlating phenomena, correlating principles, till they can be shown to be the result of general laws, the outcome of the forces or force of which all nature is the result.

The second point to which I desire to draw your attention seems at first sight exactly the opposite to the last mentioned. This is, a laxity in our system of classification, by means of which the mineral 'species or genus,' if I may be allowed the phrase, is made too inclusive; or, to put it more clearly, many substances are called minerals which have no real claim to the name. It is of course difficult to frame in a few words a perfectly unexceptionable definition of a mineral; but it may be described as an inorganic substance, a possible constituent of the earth's crust, distinguished from its fellows by certain definite characteristics of form, structure, and chemical composition. In regard to the first and second of these three characteristics we have to allow of some laxity in order to admit certain minerals of indefinite form,

such as opal; and in the case of the last considerable latitude is sometimes necessary because of isomorphic replacements among the chemical constituents. Still we are able to attach a fairly exact meaning to the definition of a mineral, and the difficulty here is no greater than that which frequently confronts us in the Natural Sciences. For an example, then, of the defect which I mean, I will again refer to the felspars. In some of our best text books of mineralogy I find set down under the head of "an amorphous form of orthoclase" *pitchstone* and *obsidian*, to say nothing of other substances yet more open to objection. Now, what excuse is there for terming these substances *minerals*? They have no definite form, for they are glasses, they are more or less composite in habit, and their variations in chemical composition far exceed the possibilities of isomorphic replacements. Take any table of analyses of these volcanic glasses, and you will see by a simple calculation, I might even say at a glance, that they contain much more silica than could be used up in forming a felspar; so that, if the materials were crystallised you would have a felspar with an admixture (and that a very variable one) of free quartz. Nay, I have even seen crowded together in one list under the head of 'orthoclase,' volcanic glasses which one can see from a mere study of the analyses (apart from any knowledge one may have otherwise acquired) represent mixtures of quartz and orthoclase, or of quartz and albite or oligoclase with a little of a magnesian mineral (hornblende, augite, or biotite), and mixtures of labradorite or anorthite, without any quartz and with a considerable proportion of the above magnesian minerals. I grant that these glasses, with such rocks as felspar, are commonly inserted rather apologetically, but my contention is that the student ought not to be confused by seeing them classed as *minerals* at all. They should be quoted as *rocks*, into the composition of which such and such minerals, visibly or invisibly, enter. In like way coal has no claim to be ranked among minerals; and I think that it would be much better to designate even chalcedony, flint, chert, agate, jasper, &c. as mineral aggregates (*i.e.* rocks), into the composition of which microcrystalline quartz very largely (sometimes exclusively) enters. I need not occupy your time by increasing the list of examples of this confused thinking, though it would not be difficult.

In justification, and to point the moral of these criticisms, I will make one more, speaking now as a petrologist. It is that, as a rule, we find the man of science, who is mainly a mineralogist, less helpful than we should have expected, nay, that sometimes he leads us into darkness rather than light. Perhaps I may be pardoned for giving one or two examples. In petrology the question of genesis is obviously one of the most important; yet mineralogists (I suppress names because I do not wish to attack individuals) have proposed classifications which group together such rocks as eclogite and Lherzolite simply on the ground that they are without felspar; but the former contains a considerable quantity of alumina, and if always an igneous rock (more work is still needed among the massive garnetiferous rocks) is obviously nearer to the diorites; while the latter contains hardly any alumina, and belongs to the peridotites or olivine-rocks, a group as well marked as any other in Nature. By the same author chlorite-schist and serpentine are grouped together—a more pardonable alliance indeed, but objectionable inasmuch as the former when typical is always in some sense or other a stratified rock; the latter, when typical, always to be traced back to a member of the peridotite group, which, like the dolerites, are of igneous origin. I am aware that this last statement will be disputed by some mineralogists, but I am perfectly confident of its accuracy as long as the terms are used in an exact sense. With regard to serpentine, indeed, there have been found mineralogists who in preference to this obvious and natural derivation from a peridotite have claimed for it a parentage, by some strange process of metamorphism or rather methylosis, from gabbro, diorite, hornblende-schist and the like, nay even from granulite and granite. Now confusions like these arise from the mental habit to which I have already alluded; too great concentration on minutiae has prevented the investigator from grasping the problem as a whole; the processes of change are neither apprehended in their progressive aspect nor duly weighed in the scale of probabilities; while superficial similarities blind the eyes to underlying dissimilarities. I have noted more than once that such a one has taken up this question without attaching any definite meaning to the terms

which he is using, and is asserting transmutations from one rock to another without giving any evidence (nay, with the strongest indirect evidence to the contrary) that he has ever brought to a crucial test those parts of the rock where the key of his position is hid ; nay, apparently he not seldom appears to have undertaken the investigation without any knowledge that such a key must exist, and that it is his bounden duty to find it.

I trust I may be forgiven for the bluntness of these remarks ; but, after devoting for some fourteen years all the time and money I could spare to trying to come at the truth in petrology, I may perhaps be forgiven for complaining that we petrologists receive as large a proportion of crude speculations and of unproved and unprovable statements from mineralogists, who should be exact investigators and close reasoners, as we do from the field-geologist, who barely knows quartz from felspar, and regards a microscope much as a certain person looks upon holy water. That this has happened, and that the science of mineralogy is in some other respects less progressive than it should be, is, I believe, largely due to those two defects to which I have ventured to call your attention.
