

VI.—*Remarks on some Points in the Nomenclature of Salts.*

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It is very much to be regretted that the subject of chemical nomenclature is in such an unsettled state. It seems a real reproach to chemists that scarcely two text-books can be found in which the same system of names is adopted, and that there is hardly a single number of a scientific periodical which does not contain specimens of totally different systems. The extreme difficulty of teaching the science under such conditions is palpable, and it is a poor apology to say that text-books in other branches of science, and even classical text-books (*e.g.*, the Public Schools' Primer as compared with the Eton Grammar) vary greatly in their terminology. But while our ablest chemists appear to agree to differ in their views on the subject, it is hard to suggest what should be done.

The following remarks are offered with great diffidence; they may have, at most, the value of calling more attention to the subject.

The fact observed by chemists is, that certain radicles ("electronegative radicles"), of which chlorine is an example, unite in one, or more than one, definite proportion with certain other radicles ("electropositive radicles"), of which mercury is an example, to form distinct series of compounds or salts.

The problem is—

In the first place to provide a general name for each group of salts which is characterised by containing the same electro-negative or electropositive radicle.

In the next place to provide special names which may serve to distinguish the several members of each of the above groups, and to mark the position which each member holds in the series to which it belongs.

The first part of the problem has been solved by general consent (so far as regards the electronegative radicles), as follows :—

The termination of the received name of the electronegative radicle is altered into *-ide*, *-ite*, or *-ate*; the two latter terminations denoting that oxygen is considered to be present in the radicle.

Thus salts containing the chlorine radicle are all called chlorides; salts containing a radicle in which chlorine is associated with a certain amount of oxygen are called chlorites, or chlorates, according to the amount of oxygen they contain.*

It appears unlikely that these terminations will at present be changed.

The second part of the problem has been solved in two ways at least.

1. By adding a prefix, such as *proto-* (or *mono-*), *di-*, *tri-*, *per-*, &c., to the existing generic name for the salts of the electro-negative radicle; with it is associated the name of the electro-positive radicle, unchanged in form, and used either in the possessive case or adjectivally.

Thus we have “protochloride of mercury” (or mercury protochloride), and “dichloride of mercury” (or mercury dichloride or perchloride), as the respective names for the two combinations which mercury forms with chlorine.

2. By changing the termination of the name of the electro-positive radicle into *ic*, or *ous*, the generic name for the salts of the electronegative radicle being left unaltered.

* Some few substances, such as chlorine and sulphur, are found to form, in association with oxygen, more than two radicles. Probably these cases might be best met by making an alteration in the vowel immediately preceding the *-te*, as proposed long ago, by Mr. Griffin. Thus the “perchlorate” radicle might be called “chlorote.” The principle of indicating the amount of oxygen in the radicle by a change of a vowel in the name, has been already accepted there seems no reason why we should not extend it.

Thus we have the names "mercurous chloride" and "mercuric chloride" for the two mercury salts alluded to above.

The first system of nomenclature would seem preferable to the second, since—

a. It requires the minimum of change in existing names. The salts in which chlorine is the electro-negative radicle are all termed chlorides; those in which mercury is the electro-positive radicle are all termed mercury salts. When we wish to denote certain classes of chlorides, we merely add a prefix instead of interfering with the termination of a word.

b. It is the more elastic system of the two. It can be adapted to any series of salts, however extensive, while the *ic* and *ous* system is applicable only to a series consisting of two members. The latter is quite inadequate, for instance, to express the series of nitrogen oxides in such a way as to show their stoichiometrical relations.*

It is quite true that it is at present rare to find a radicle forming more than two well defined series of salts (except oxides), but what we want is a system which will adapt itself to future discoveries without giving us the trouble of re-constructing it; for the present it would be very convenient to retain the old prefixes *proto-* and *per-*; they are, to say the least, open to no greater objections than *-ous* and *-ic*.† Both indicate merely relative position; both are applicable to series consisting of only two members. But in using *proto-* and *per-* we approach most nearly to the usual nomenclature for series consisting of many members, such as the oxides (protoxides, dioxides, trioxides, &c.). There is, moreover, an occasional advantage in being able to speak of a group of substances as "protosalts," in pointing out analogies between them. I do not know that it has been proposed to talk of "ic salts" and "ous salts."

I have some difficulty in seeing the advantage of another practice which is becoming common, viz., that of calling certain

* I am quite aware that there is a very great difference in properties between oxides; between, for instance, the substance represented by the formula N_2O and that represented by the formula N_2O_3 . But I cannot help thinking that, if we must choose an alternative, it is preferable that the name should express place in a series, rather than difference in chemical properties. Monatomic mercury and diatomic mercury show, in combination, an equally remarkable contrast of properties; but we do not assign them totally distinct names; at the most we change the termination of the name.

† Perhaps *meio-*, as having a purely relative meaning, would be preferable to *proto*, cf. "meiocene."

radicles by their Latin names. Why, for instance, should we speak of "*argentic* nitrate," when we obtain (besides oxygen and nitrogen) *silver*, and only silver, from the substance.

We cause hydrogen chloride to act upon excess of *iron*, and we obtain a salt which it is proposed to call *ferrous* chloride.

It might be convenient to distinguish the atom from the molecule by some such distinct name, but, if so, the system should be carried out fully and consistently, or not at all. We must have *kalic*, *natric*, *stibic*, *hydrargic*, &c.

At present no such consistency is observed, and until we are sufficiently educated to talk of a *ferrum* saucepan, a *cuprum* tea-kettle, and an *argentum* spoon, it would seem preferable to adhere to names in common use. The more sparingly we alter ordinary names against which there is no serious objection, the more acceptable and intelligible will be our nomenclature.

I cannot help thinking that the system of terminology, originally proposed, I believe, by Mr. Harcourt, which is adopted by Professor Roscoe in his "*Lessons in Elementary Chemistry*," and by Mr. Watts in the new edition of "*Fownes' Chemistry*," has more of the elements of simplicity, permanency, yet elasticity, than any other. It differs in a comparatively slight degree from the older nomenclature, and hence old chemists have little difficulty in understanding it. It is, so far as one can see, readily adaptable to the progress of chemical discovery, and hence young students may learn it without much risk of having to unlearn it.

It is difficult to see why we should occupy ourselves in criticising the euphony of adjectival terminations (*e.g.*, *nickelic*, *ironous*) when our language undoubtedly permits us to dispense with them. No one would speak of a golden watch, a carbonic filter, or a mercuric barometer. It may not be too much to hope that the terminations *-ic* and *-ous* may disappear altogether from our nomenclature, if the purpose they serve can be fulfilled as well or better in other ways.

From the unwieldy names which we are now manufacturing for chemical substances, it would seem possible to endeavour to express too much in a name. What is mainly required appears to be that the name should be a rational and sufficiently distinct mark for the substance to which it is applied.

Professor Attfield thought the chief point about a name should be that it was unalterable. He objected to the use of vowels or of Latin or Greek numerals to express the name of a salt, as our views of the constitution of a substance sometimes change, and when such is the case, it becomes necessary to alter the name.

The President said that Mr. Madan's proposal to revert to the use of such terms as *proto-*, *sesqui-*, and *per-*, in order to designate the place of bodies which differ in their quantity of oxygen and chlorine in a series, implies that the series is known, whereas we are constantly altering our knowledge of such series. These words have been productive of considerable inconvenience and confusion, and he thought the terminations *-ous* and *-ic*, as used by most writers, including Dr. Roscoe and Mr. Watts, were far more convenient. These terminations only denote a kind of difference in the constitution of certain substances: such a difference may be ascertained as a matter of fact. We may find other terms of each series, and a body which was first may become second, but if it contains less oxygen than another, it is correctly distinguished by the termination *-ous* instead of *-ic*. Mr. Madan seems to think it necessary always to retain Latin words if they are used in certain cases. It is held by some persons that a variety of name is in many cases desirable amongst such compounds as Prussian blue, where iron figures in two capacities. He, the President, was not aware that those who advocate the view against which Mr. Madan contends have ever asserted that a Latin name, if used at all, ought universally to be employed; and if English names are insisted on, we should be led into eccentricities not less remarkable than those against which the author contends. Carbon and sulphur are Latin words which, if discarded in favour of the English words, would lead to words like charcoalic oxide and charcoalic acid, and brimstonic acid and brimstonous acid, a change which did not appear to him a very great improvement. It is exceedingly desirable that everybody should bring forward his own impression in the matter, because it is only by general consent that any important system can be established.

Mr. Vernon Harcourt thought the difficulty attaching to the choice of names was inevitable in the present state of chemistry. Either a name must be unsystematic, and merely

express one or two facts about the particular substance, *e.g.*, corrosive sublimate; or, if it be systematic, and expresses a relation between the particular substance and others, it must embody a theory not yet definitely established. With reference to English and Latin names, sulphur has for so long a time been used as an English word, that it is, in reality, no less so than brimstone. The latter, he supposed, was a German word, and sulphur was, originally Latin, but it has now become as thoroughly English as any word in the language. With regard to using *ic* and *ous*, he thought that the terminations *proto* and *per* might equally be said to express facts; and it appeared to him that the objection raised by Mr. Madan, that the terminations *ic* and *ous* served only for two terms of a series, and that this mode of expression cannot be extended in cases where the series extends beyond two terms was a just one. At the same time, he thought that, where there are two parallel series of salts (such as mercurous and mercuric salts, ferrous and ferric salts), it is a great convenience to have these terms, and "ferrous salts" is, perhaps, a better expression than "iron proto-salts," which Mr. Madan recommends as a substitute.

Mr. McLeod remarked that there is a certain excuse for the use of Latin words, for, in almost all cases, they refer to the symbol.

Dr. Odling said that Mr. Madan spoke of the convenience which occasionally attached to the use of such a word as "proto-salts," and to speaking of proto-salts in general. It would be a real advantage if all proto-salts were conceived to have the same constitution; but, as the word proto-salts does not express the constitution any more than *-ic* and *-ous*, he could not admit that argument to have any weight in favour of the use of such words as *proto-* and *per-* rather than of *-ic* and *-ous*. He was rather inclined to agree with Mr. Harcourt's observations in defence of the English. Respecting such words as mono-chloride and bi-chloride of mercury, it is quite true that, if we use them, we mean that the one contains double the quantity of chlorine in the molecule to the other, and not merely double the ratio of the mercury and the chlorine.

The President hoped it would not be understood that he insisted on Latin names in preference to the English. When Latin names are more easily modified than English, by all means use them; but, when such is not the case, refuse them.

It would not be worth while to employ English words instead of the Latin aluminium, chromium, &c.; and it should not be argued that, because we use English words in some cases, that therefore we must use them in all cases. The whole genius of the English language is at variance with such a proposition. We want an intelligible principle to guide us, instead of the fixed names, which imply particular theories of the constitution of bodies. With regard to *-ic* and *-ous* adapting themselves only to one term of a series, he conceived that, as long as we have to do with the properties of bodies in chemistry, the difference between acid and basic bodies will be one of the chief things to refer to; and, if the business of names is to recall the chief properties of bodies, he thought it must be an advantage, in describing terms of a series, to use some name to distinguish those which are not acid from those which are.

Professor Voelcker said that, in one aspect, uniformity of nomenclature has great advantages; but he was not sure that one and the same chemical compound, having two, three, or four different names, was an unmitigated evil. In teaching chemistry, he would not object to a substance being called by the empirical name, if, by this means, certain properties were fixed upon the mind of the student, by which he became familiar with a certain definite substance. He might afterwards be told to call it by another name, and then by a third; and, when he was once familiar with the real nature of the substance, it was immaterial whether he knew it by one name or the other. By the same combination having different names, the teacher would be able to illustrate the different views entertained by chemists of the constitution of a substance.

[P.S. I think we should be justified in considering such names as aluminium, &c., to be naturalised English words: if, indeed, they ever were Latin at all. But this is beside the point; exception is taken, not to the use of a Latin name *quâ* Latin, but to the use of a Latin name where there exists a respectable English name for the same substance.

That system of nomenclature seems to me preferable in which there is the *minimum* of modification (which might prove a disguise) of the names themselves: the necessary variation being gained by prefixes. Take as an instance the nomenclature of the metric weights and measures.—H. G. M.]
