development of the theoretical chemical and physico-chemical principles underlying the reactions used in analysis, the lines laid down by Ostwald being followed in general, and the systematic side of analysis very completely presented. The theoretical part is elaborate and clear, and supported in large part by well devised experimental illustrations. The systematic part is thorough and critical and brings, in part, new methods. A chapter of some forty pages is devoted to the rare elements. The work must prove to be an excellent book of reference in theoretical and practical matters of qualitative analysis and, when tested and improved by longer experience, may well be destined ultimately to replace Fresenius as a standard book of reference. The writer of this believes it less well adapted for use as a laboratory manual or text-book for class instruction.

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The Chemistry of Diazo-Compounds. By JOHN CANNELL CAIN, D.Sc., editor of the Publications of the Chemical Society, joint author of "The Synthetic Dyestuffs and the Intermediate Products from which They are Derived." London: Edward Arnold. 1908. xii + 172 pp. Price, $3.00.

In this book dedicated to the memory of Griess, we have a very able presentation of the complicated and important chemistry of the diazo compounds. The methods of preparation, the reactions and the derivatives of the various types of diazo substances are first given and then the data available for considering the vexed question of the constitution of the various isomeric, tautomeric and stereoisomeric compounds are critically presented. This is done in a way that must be considered eminently fair and judicial, particularly by a chemist who has a theory of his own to produce (in the Appendix) and if one is not fully convinced by the argument in all cases, the material on which to base a judgment is well presented. The bibliography is very fully given and is a valuable feature.

In the treatment of the subject, a point of view is missed which, it is thought would make possible a clearer, simpler and more systematic presentation of diazo compounds—that is a *more pronounced* and *systematic* presentation of them simply as derivatives of the nitrous acid radicle N. In many of their most characteristic reactions (with phenols, anilines, diketones, nitroparaffins, sulphites, in their molecular rearrangements, tautomerisms, etc.), diazo compounds duplicate the behavior of the mother substance, nitrous acid, its salts, esters and other derivatives, and to a certain extent we have also the recurrence of the same problems which have been worked out for the aniline derivatives of other *acids*. In many ways it seems unfortunate that the word "diazo" was ever coined or that it cannot well be eliminated now. The functions of the two nitrogen atoms forming the "diazo group" are of course so radically different and so persistently recognizable throughout all transformations that they might almost be atoms of two different elements. In the minor question of nomenclature it would seem ever so much more definite to speak of potassium phenylimido nitrite, $C_6H_5N:N.OK$, rather than of "potassium benzenediazo oxide" (p. 99), which does not suggest a salt at all. That would make clearer, at once, the relation of such important discoveries as that of Goldschmidt that only the hydrolyzed part of the salts, the free phenylimido nitrous acid, $C_6H_5N:N.OH$, or nitrous anilide, $C_6H_5NH.NO$, is active in producing dyes, to the fact that only free nitrous acid, not its salts, attacks phenols, anilines, acetoacetic ester, etc. If the diazo-amino benzenes, $RN:N.NHR^1$, were more commonly known as amidines of nitrous acid, the relation of the question of their structure (*vide* p. 154) to that of the substituted amidines of ordinary acids, whose tautomeric forms have been shown not to exist, would be at once obvious and their molecular transformations to aminoazobenzenes would also be followed simply as further instances of the reactions of nitrosoanilines. Even so modern a substance as $C_6H_5NH.NO_2$ has been dubbed by its discoverer a "diazoic acid," which means nothing until the definition has been looked up, whereas the simple terms nitranilide, $C_6H_5NH.NO_2$, and phenylimido nitric acid, $C_6H_5N:NO(OH)$, for the tautomeric forms, would be definite and fully descriptive. In the more important question of the functions of the trivalent radicle (N) of nitrous acid, these are of course recognizable and vitally important throughout the reactions of the diazo compounds, and once brought emphatically into the foreground of the discussion, this conception makes the behavior and relations not only of the simpler compounds but also of compounds with longer chains of "nitrogen atoms," as bis-diazobenzamide, $C_6H_5N:(N).NH.(N):NC_6H_5$, much more transparent. We have here exactly the same difference as between the radicle Cl of hypochlorous acid and that of hydrochloric acid whose functions are fundamentally different, although in organic compounds they are occasionally mistaken for each other. Nitrous acid has much in common with hypochlorous acid and when electrical conceptions are more current in organic chemistry, we shall hope to follow more definitely and rigorously, (N^{+++}), the nitrous acid radicle and (N^{---}) the ammonia radicle through their varied changes just as we do (Cl^+), the hypochlorous radicle and (Cl^-) the hydrochloric acid radicle. There will be no more inviting field for the study of such relations than that of the diazo compounds.

However, in spite of the belief of the writer that in the matter both of nomenclature and of discussion, a more emphatic and systematic reference back to nitrous acid and its derivatives would form a very useful guide through the mazes of the diazo compounds, Cain's book can be cordially recommended as a clear, able and reliable presentation of an intricate and important subject.

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