A. C. Kuhn and J. K. Senior 637 638

JPC 33 1929

J. Physical Chem.

of the diphenyl derivatives.[35] Probably the number of instances of this sort of "specific enantiomorphism" is destined to increase considerably. Nevertheless, for the present at least, the whole class forms only a small exception to the general rule that the value of $N_V(p)$ is independent of the specific nature of the univalent substituents. And it is further to be noted that even in these cases, $N'_V(p)$ and $N''_V(p)$ are true type properties.

C.

From this point on, it is necessary to assume on the part of the reader an understanding of the elementary portion of the theory of groups, as well as an acquaintance with the terminology used by workers in this field. All that is necessary in this line may be obtained from any standard work on group theory.[36]

To use the formulae herein developed, it is necessary to have access to the lists of permutation groups of given degree. Easton in his bibliography gives a resumé of the literature in this field.[37] All the permutation groups of degree less than 12 have been determined, and all the transitive permutation groups of degree less than 16 likewise. The lists of groups are given in the notation devised by Cayley and explained by him in the first paper cited.[38] The articles noted contain all that is needful for a working knowledge of the subject.

But, for the purposes of the present paper, the number of permutation groups of degree n ($n < 12$) cannot be taken just as Easton gives it. A group given as of degree n must also be considered as a group of degree $n + x$ where x is any positive integer. Hence the following table:

Degree	Number of groups (as given by Easton) (637)	Number of groups (here considered) (638)	Degree	Number of groups (as given by Easton)	Number of groups (here considered)
1	1	1	7	40	96
2	1	2	8	200	296
3	2	4	9	258	554
4	7	11	10	1039	1593
5	8	19	11	1500	3093
6	37	56			

A simple extension of the Cayley notation serves to identify the additional groups thus introduced. The symbol $(abcd)_8(c)(f)$ indicates the group $(abcd)_8$, usually thought of as of degree 4, but here considered as of degree 6; the symbol $[(abcd)\text{all}(ef)]\text{dim}(g)$ indicates the group $[(abcd)\text{all}(ef)]\text{dim}$, usually thought of as of degree 6, but here considered as of degree 7; etc., etc. In this sense, the identity group on five letters (for example) is $(a)(b)(c)(d)(e)$. Such symbols are used in Table II.

[35] Mills: J. Chem. Soc., **1928**, 1291; Kuhn and Albrecht: Ann., **464**, 91; **465**, 282 (1928).

[36] See e.g. Miller, Blichfeldt and Dickson: "Theory and Applications of Finite Groups" (1916).

[37] Easton: "The Constructive Development of Group Theory," pp. 77, 78 (1902).

[38] Cayley: Quart. Math., **25**, 71, 137; Cole: **26**, 372; **27**, 39; Miller: **27**, 99; **28**, 193; **29**, 224; **32**, 342; Am. J. Math. **21**, 287; Proc. London Math. Soc., **28**, 533; Bull. Am. Math. Soc., **1**, 67; Kuhn: **6**, 260.