route of which covered 170 miles and included inspection of methods of control in the U. S. National Forests, with forestry officials acting as guides; visits to modern Indian Pueblos and sites of ancient pueblos where archeological work is being done. The route of the excursion led the party through a portion of the state which is of very great geologic as well as scenic interest.

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SPECIAL ARTICLES

BROMINATION OF OPTICALLY ACTIVE METHYLPHENYL- AND PROPYL-PHENYL-CARBINOLS

IT is the general conclusion of physical chemists that every reaction of substitution by a negative group or atom following a bimolecular course is connected with a Walden inversion. Granting that in the majority of reactions thus far observed this conclusion is valid, yet there is evidence that the conclusion is not *generally* valid. In the higher members of the homologous series of methylphenylcarbinols, from propylphenylcarbinol on, the reaction of bromination by means of hydrogen bromide gas proceeds, predominantly, without inversion. Certain considerations led us to investigate the effect of the temperature on bromination from 160° C. to $-80°$ C. Dry hydrogen bromide gas was allowed to act on the carbinol. At 0° C. the reaction was practically instantaneous. The rotation of the bromide formed from *propylphenylcarbinol* (carbinol and bromide rotating in the same direction) increased markedly with lowering of the temperature of reaction.

TABLE 1

Methylphenylcarbinol $[M]^{25}_{5780.1} = -41.5°$

Propylphenylcarbinol $[M]^{25}_{5780.1} = -49.1°$

Compounds	Methylphenylbromomethane				Propylphenylbromomethane			
Temperature of Bromination	0 °C	− 30 °C	− 35 °C	− 80 °C	160 °C	0 °C	− 50 °C	− 65 °C
$[M]^{25}_{5780.1}$	+ 13.5°	+ 36.4°	−22.6°	− 27.0°	− 1.3°	− 41.7°	− 146.5°	− 154°

At the higher temperatures of reaction, the rotation of the bromide formed from *methylphenylcarbinol* under similar conditions is opposite to that of the carbinol. The bromide showed a small increase in rotation with a drop in temperature, but *when the reaction proceeded at about $-35°$ C. and at all lower temperatures, the rotation of the bromide obtained changed sign, the reaction then proceeding without inversion.*

The results are summarized in Table 1.

Thus it is evident that at every temperature two simultaneous reactions take place—one with, the other without inversion. At lower temperatures the latter predominates. That is, the reaction proceeds without inversion when the hydroxyl group has a higher mobility than the other three groups, for then the asymmetry of the molecule remains unchanged during the reaction of substitution. The reverse takes place at higher temperatures. The reason perhaps is that the mobility of the hydroxyl group has a lower temperature coefficient than that of the other groups.

This observation may also have a practical significance, since by the changes in rotation with the lowering of temperature of the reaction, it may be possible to discern whether a reaction of substitution took place with or without inversion.

A complete report will be published elsewhere.

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IS AGGLUTINATION AN EXPLANATION FOR THE OCCURRENCE AND FOR THE CHROMOMERE-TO-CHROMOMERE SPECIFICITY OF SYNAPSIS?

No current hypothesis accounts adequately for the occurrence of synapsis between homologous chromosomes. Still less do these hypotheses, electrical or otherwise, account for the one-to-one specificity displayed by hundreds of different pairs of chromomeres at synapsis.

The hypothesis here considered is that synapsis of homologous chromosomes is a process comparable to agglutination of a given kind of bacteria or blood corpuscles.

A necessary preliminary to the agglutination of a given bacterium is the formation of its specific antibody or antibodies. For example, when a rabbit is injected with bacteria, the surface materials of the