cellulose is similar to those changes following hyperimmunization of horses with diphtheria toxin[2]. As a result of this observation, the antigenic properties of methylcellulose itself were investigated by the immune precipitation method. If sera of an animal treated with methylcellulose were added to methylcellulose itself, precipitation occurred, but not in the case of normal sera. This result suggests that methylcellulose is a substance possessing antigenic properties. Results of agar gel diffusion experiments confirmed those obtained by electrophoresis: the increase of one and decrease of two antigenic components was also observed by this method.

Details and discussion of this problem will be published in another paper.

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The Glass Scratch Effect and Molecular Structure

A CLOSE relation exists between the effect of scratching the wall of a glass container with the tip of a glass rod and the nature of the liquid present. Ordinary round-bottomed 5-ml. test tubes are half filled and the inside wall briskly scratched some fifty times. The result is examined under proper light, the contents stirred, allowed to settle overnight, and the sediment examined. Three types of effect are observed. (1) The rod slips. This is caused by aromatic compounds (except benzene and some simpler derivatives); some other cyclic compounds; open-chain compounds of more than ten carbons approximately. (2) The rod bites and produces glass dust, varying in amount and texture, which immediately disperses. This is caused by non-polar compounds of low weight, most ketones, and sulphuric acid. (3) The rod bites and produces abundant dust which sticks most characteristically to the wall, on which it can be smeared. This is given, in decreasing order, by: (*a*) water and monohydroxyalcohols; (*b*) dihydroxyalcohols, primary amines; (*c*) aliphatic acids, some esters, aldehydes, ketones, secondary amines. This last group is intermediate between (2) and (3).

After sedimentation, the dust yields two typical patterns, with intermediate stages, namely, an even deposit over the whole bottom of the tube, characteristic of aggregated particles, produced by most substances; or a small pellet at the very tip, characteristic of non-aggregated particles, produced only by polar compounds of low weight.

The results are easily reproduced, the only difficulty arising from highly refractile liquids, which make the dust poorly visible. The kind of glass is immaterial. The dust consists mostly of particles 1–2μ in diameter, in intense Brownian motion when of type (3). The effect in water is much decreased by electrolytes, unaffected by non-electrolytes. Solid organic compounds sufficiently soluble in non-polar solvents can also be tested, with comparable results.

It is obvious that class (1) compounds possess molecules of such size or shape, or linked in such a way, as to prevent contact between glass surfaces; classes (2) and (3) do the opposite, the peculiar effect of the latter being due, presumably, to the affinity of 'active' hydrogen for glass[1]. Some occasionally unexpected observations follow. Diacetyl (the structure of which is discussed in ref. 2) gave a slip in spite of its low weight and open chain. Benzoic acid in ether, in which it is linked to the solvent, gave a slip in much lower concentration than in chloroform, in which it forms dimers[3]. The lower alcohols up to butyl were indistinguishable; among the amyl, however, the primary ones were clearly more reactive.

Some findings must be interpreted as manifestations of spontaneous enolization, such as the smear given by some ketones[4], aldehydes, acetic anhydride, contrary to conventional formulæ. The same effect was induced in acetone by 1 per cent ferric chloride (which has been found by Meyer[5] to increase the enol fraction of aceto-acetic ester). Acetylacetone resembled class (1) substances, presumably because of internal hydrogen bonding; acetonylacetone reacted like an OH-compound, in agreement with its newer formula[6]. Finally, mixtures of compounds in varying proportions occasionally offered challenging pictures, such as non-aggregation zones in ethyl ether–chloroform (cf. ref. 7).

In mixtures the effect is seldom additive, in the sense that it does not usually give the expected sum of the effects of single components, but reflects the existence of complexes, or, more generally, physical interaction between molecular species. This manifests itself in slippery zones (for example, in the systems water/sulphuric acid[8], ethyl ether/sulphuric acid[9], acetone/carbon disulphide), which indicate the formation of molecular aggregates; in the unexpected appearance of non-aggregation (4 per cent methanol, or a trace of sulphuric acid, in ether); in the sudden passage of aggregation to non-aggregation (in water–acetone, as soon as the mole ratio exceeds 4 : 1, the point of maximum contraction[10]); in the appearance of the smear type of reaction, in compounds with an ether bond, under the influence of some salts, such as ferric chloride. An outstanding feature of the effect is its considerable variety.

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