functions have been analysed genetically, seems to be relatively, but not entirely, inert. That is to say, a heterochromatic region of a chromosome has fewer genes per unit length (as measured at mitosis) and these genes seem to be mostly ones the phenotypic effects of which are individually slight. Duplications or deficiencies of heterochromatic regions are likely to affect the viability of the organism much less than duplications or deficiencies of comparable length in the euchromatic segments. Thus the amount of heterochromatin may be expected to vary more from species to species than the length of the euchromatic segments. But this variation is clearly not haphazard and without significance, since in the megaheterochromatic species the increase of the heterochromatic regions usually seems to have taken place in a very regular and orderly manner in all the chromosomes. Heterochromatin seems to be an invariable constituent of every chromosome, that is to say, all chromosomes contain one or more heterochromatic segments, which may be long or short.

We unfortunately know very little as yet about the role of heterochromatin in the physiology of the cell; but it is certainly bound up in an intimate way with the whole nucleic acid and protein-synthesis cycle. It is thus quite likely that general differences of a physiological nature may exist between megaheterochromatic and microheterochromatic species. The latter have seldom been studied in detail by cytologists, since it is the presence of conspicuous heterochromatic blocks (rather than their absence) which has attracted attention. Most of the authors cited above who have studied megaheterochromatic species were primarily interested in the phenomenon of non-homologous 'pairing' between the heterochromatic segments, that is, the fact that the ends of the chromosomes are stuck together at certain stages of mitosis and meiosis to form 'chromocentral' associations. This seems, however, to be merely incidental to the megaheterochromatic state.

It may be worth pointing out that a comparison between resting somatic nuclei from the same kind of tissue in a number of related species is usually quite sufficient to determine the amount of heterochromatin in a rough manner: in the megaheterochromatic species the chromocentral masses will be very much larger. Eventually, perhaps, we shall have some kind of quantitative index to express the amount of heterochromatin in a species; at the moment all that seems necessary is a pair of terms to describe the extreme members of what is really a long series. Where heterochromatic supernumerary chromosomes are present in varying numbers in a species (as in the case of the B-chromosomes of maize and the supernumerary X's of the bed bug[5,6]), this series exists within the species, so that we can distinguish between megaheterochromatic and microheterochromatic individuals. This is clearly an unusual situation, but an investigation designed to detect slight physiological differences between these individuals might throw considerable light on the more general problem of interspecific differences in the amount of heterochromatin present.

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Aqueous Soap Solutions of Carcinogenic Hydrocarbons

THE fact that carcinogenic hydrocarbons are insoluble in water has limited the means of administering them experimentally to the use of oily solutions or colloidal suspensions. In feeding experiments, it is a practical advantage to be able to administer substances dissolved in drinking water. Lorenz and Stewart[1] have used hydrocarbons dissolved in stable oil-in-water emulsions. Their method was adopted in some experiments in this laboratory. Where it is desired to achieve rapid absorption of a carcinogenic hydrocarbon from a mucous membrane or from the site of parenteral injection, an aqueous solution has obvious advantages.

Use was made of the mutual miscibility of ether soap and water to prepare aqueous soap solutions of several carcinogenic hydrocarbons. The following method was found to give good results: Up to 120 mgm. of 20-methylcholanthrene or 3 : 4-benzpyrene are dissolved in 10 c.c. of ether, and this solution is added to 50 c.c. of ethereal soap solution. This is the stock solution. Immediately before use, the stock solution is slowly mixed with as much water as is necessary to obtain the desired percentage of hydrocarbon and of soap. The ether is driven off by heating to boiling point. 1 c.c. of the ethereal soap solution used contains 1·8 gm. soap. To obtain a 0·01 per cent solution of hydrocarbon, 6 c.c. of stock solution is mixed with 120 c.c. of water, the percentage of soap being 7·5 per cent by weight. This strength has been used in practice. Fluorescence spectroscopy reveals identical bands for 3 : 4-benzpyrene in aqueous soap solution and in acetone.

After dilution with water, the hydrocarbon solution is at first quite clear, but opalescence gradually develops in the course of a few hours. Even so, the particles are much smaller than those of colloidal suspensions.

Rats show no aversion to drinking 0·01 per cent hydrocarbons in 7·5 per cent aqueous soap solution, and have showed no toxic effects after drinking it daily for six weeks.

After intravenous injection of such aqueous soap solution of 3 : 4-benzpyrene into mice, biliary excretion occurred in the same way as after similar injections of colloidal suspensions[2].

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Regulated Degradation of 1.3 Polysaccharides

IT has been shown[1] that when 1,4 polysaccharides, such as starch or cellulose, are treated with periodic acid solution, the carbon chain in each sugar unit is ruptured between carbon atoms 2 and 3, the —CHOH groups at these positions being oxidized to —CHO. Acid hydrolysis of these oxidized polysaccharides yields solutions containing glyoxal and erythrose. It has now been shown in this laboratory that aqueous solutions of periodic acid-oxidized starch or cellulose yield, when treated with phenylhydrazine acetate, a yellow amorphous precipitate. When the mixture is heated on the water-bath,