are young". A striking parallel exists between these results and the data obtained for the removal of mixed oils from wool. It has been shown that mineral oil is extremely difficult to remove from wool by emulsification, owing to high oil-water interfacial tension and high adhesion. The difficulty can be overcome by the addition to mineral oil of polar compounds which reduce the oil-water interfacial tension without increasing adhesion so far as to make emulsification difficult. Fatty acids, and glycerides such as olive oil, were found to be ineffective compared with oleyl alcohol, which causes ready emulsification in 6 per cent concentration. Similarly, certain alcohols from lanolin may be used to confer emulsifiability on mineral oil, a mixture containing 15 per cent being emulsified with as much ease as olive oil.

The parallel between these two sets of results suggests that the incidence of dermatitis and tumours may be caused by the difficulty of removing mineral oil from skin by means of soap solution, and that lanolin is effective only in so far as it affects emulsifiability. Working on this hypothesis, Prof. R. D. Passey, director of cancer research of this University, has commenced experiments with mixtures of mineral oil and polar compounds possessing the necessary critical oil-water interfacial tensions. The inherent probability of the view that ease of removal of mineral oil from skin must lessen the risk of cancer formation, impels us to say that, on the basis of the work on emulsification, mixtures of mineral oil and derivatives of wool fat were prepared for use on textile machinery, but simply on account of their improved lubricating properties and ready emulsifiability. The possibility of such mixtures being non-carcinogenic was in no way foreseen.

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[1] Speakman and Chamberlain, NATURE, **130**, 274; 1932.

### Inheritance of Acquired Characters

THE interesting letter from A. F. Dufton in NATURE of Oct. 1, p. 508, suggests a statistical method of study of the possible transmission to the offspring of mental characteristics acquired during their life by their parents, the possibilities and limitations of which seem to have been little explored or discussed. Mr. Dufton takes the age distribution of the fathers at the birth of 1000 eminent persons from the fourteenth edition of the "Encyclopædia Britannica", and shows that these ages are distinctly higher than the ages of the fathers of 100,000 children less than one year of age at the Census of Scotland in 1921. At first sight the inference might be drawn from this fact that the superior ability of the children was due to the increased wisdom acquired by their parents during their experience of life; but, before drawing this conclusion, there are one or two preliminary points to be considered.

(1) It is certain that during the relevant period the upper and middle classes married on the average some few years later than the general population. Presumably, the ages of fatherhood in these classes were also somewhat retarded. If, as one might suppose, the 1000 eminent persons chosen by Mr. Dufton came disproportionately from these classes, this alone would explain the greater age of paternity. A more satisfactory comparison would be between the ages of paternity for the eminent persons, and those of their less eminent brothers and sisters. This reduces itself to a comparison between eminent and non-eminent persons from the same families according to order of birth.

(2) In comparisons between selected and unselected children according to order of birth, great care is unfortunately necessary to eliminate the effects of death in childhood. It is a mistake to assume, for example, that corresponding to every sixth child, there is one child of each preceding birth order, who might equally have become eminent. In families of six or more, some of the first five children will have died before attaining an age at which their talents might have raised them to eminence. Again, among families terminated voluntarily, the sex ratio of the last child must be much disturbed in favour of males, and more than half of the 1000 eminent persons are doubtless of this sex. A just comparison will require the proportion of eminent to all the surviving non-eminent, according to birth rank and size of family, for the two sexes separately. Such a tabulation would be full of interest.

(3) Supposing the sociological and statistical difficulties of the comparison were overcome, it would be a matter for further inquiry whether the differences observed (supposing them to be in the same direction as those found by Mr. Dufton) were due to the inheritance of environmental modifications, or to environmental modifications themselves. There is little doubt that children brought up in close contact with others slightly older than themselves are somewhat more precocious (in reading and writing for example, and in acquiring a vocabulary) than others without this advantage. Again, if parents increase in wisdom with years, should not this wisdom be partly applied in improving the upbringing of the later children? I mention these points, not to discourage inquiry into the effects of birth rank, but to show that the specific question of a Lamarckian factor is not more easily disentangled in this than in other modes of inquiry.

(4) Some doubt might be felt whether all forms of capacity do increase greatly with increasing age, say from 30 to 43, to take the quartiles of Mr. Dufton's distribution for the fathers of the eminent. Should we not expect that the fathers of athletes, aeronauts and possibly artists and poets, and any occupations showing enterprise, receptivity and a capacity to learn, should be younger than the average, while those of misers and politicians should be conspicuously older? Opinions will doubtless differ widely as to the position of men of science.

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### Diamagnetism of Molecules

FOR diatomic homopolar molecules the bond-forming electrons are imagined to be concentrated within the region of the two nuclei and to experience the attractions of the different centres. The resulting torque causes a continual transference of angular momentum between the electron and the nuclei, and, as has been shown by Van Vleck, the average square of the electronic angular momentum, and