

It is, I suppose, just a natural human passion to like to have something definite to do, just as it is to find out something which no one else knows. To observe the beetles of the parish of Edvin Loach in a diffuse and general way probably leads nowhere except to an interest in something else; to set out to make a list of them is a defined purpose which will have the stimulus and joy of approximate achievement and be punctuated by exciting discoveries—new to the parish, new to the county, possibly new to Britain. Incidentally, it will lead to the accumulation of a great deal of knowledge of how the local beetles live and breed, and possibly to the differentiation of fresh forms; the list will, of course, be all the better if some of this is incorporated.

Local lists are, in short, one of the classical techniques of natural history in Great Britain; they have been the framework in which much of the best work has been set, and there is, I think, every reason to expect that the method will be equally fruitful in the future. The average naturalist has not generally got very much spare time and he cannot be a trained scientific biologist, but he can and does serve the same ideal to very good effect.

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#### Inheritance of Acquired Characters

IN NATURE of October 1, p. 508, is published an interesting communication from A. F. Dufton to the effect that the fathers of eminent persons tend to be older at the time of birth of the eminent (or shall we say pre-eminent?) child than is typical of fathers of children who do not attain eminence. Mr. Dufton's communication is a confirmation on a more extensive scale of a relationship reported by Francis Galton<sup>1</sup>, A. H. Yoder<sup>2</sup>, and Havelock Ellis<sup>3</sup>, in their more limited studies. It is in keeping with the discovery by Minnie L. Steckel<sup>4</sup> of a positive correlation between age of parent and intelligence of child among the school population of Sioux City, Iowa.

In NATURE of October 15, Dr. R. A. Fisher comments upon Mr. Dufton's letter, one of his suggestions being that "A more satisfactory comparison would be between the ages of paternity for eminent persons, and those of their less eminent brothers and sisters". This comparison has been made upon small series by Yoder and by Ellis with conflicting results. Yoder<sup>2</sup> found the distribution of great men in the older as compared with the younger half of the sibship to be 24 to 13. Ellis<sup>3</sup> found a slightly greater frequency of genius in the position of first-born than of genius in the position of last-born (97-67).

There is available, however, more direct evidence of a positive relationship between parent age and intelligence (or between birth order and intelligence, since parent age and birth order are at present inextricably interwoven). In a study<sup>5</sup> of children examined at the Illinois Institute for Juvenile Research there was found to be a definite tendency for later-born children to exceed their earlier born siblings in intelligence quotient. This finding was confirmed by Dr. Steckel<sup>6</sup> in a study of nearly 7,000 children in the school system of Sioux City, Iowa. In both of these studies, comparisons were made only between siblings and in this way any possible distortions resulting from a correlation of intelligence with age of marriage or family size were eliminated. That these findings were not due to an inadequate standardisation of the tests is indicated by the fact that these relationships were still present when test

results were re-standardised upon the child populations from which this sibling material was drawn.

While it is entirely possible to explain this relationship by assuming the inheritance of acquired characters, it is, as Dr. Fisher points out, by no means necessary to make this assumption. Parents are apt to be more experienced in child training and in better economic condition when their later children arrive and it is difficult to judge the possible advantage which an older sibling may give to a younger child's intellectual development. If an explanation is to be sought upon the biological level, I personally should be more inclined to seek it in the physiological effects of the prolonged labour and difficult deliveries with their attendant risk of brain damage which are more common with the earlier born children, than in the inheritance of acquired characters.

The question of order of birth in relation to the development of the child has also been discussed at some length by H. E. Jones<sup>7</sup>.

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<sup>1</sup> Galton, Francis, "Hereditary Genius", Second edition, London: Macmillan, 1892; p. 78.

<sup>2</sup> Yoder, A. H., "The Study of the Boyhood of Great Men", *Ped. Sem.*, 3, 134-56; 1894.

<sup>3</sup> Ellis, Havelock, "A Study of British Genius". London: Hurst and Blackett, 1904.

<sup>4</sup> Steckel, M. L., "Parental Age and Intelligence of Offspring".

*J. Educ. Psychol.*, 22, 212-220; 1931.

<sup>5</sup> "Order of Birth, Parent-Age, and Intelligence", by L. L. Thurstone and Richard L. Jenkins. Behavior Research Fund Monograph, University of Chicago Press, 1931.

<sup>6</sup> Steckel, M. L., "Intelligence and Birth Order in Family". *J. Soc. Psychol.* 1, 329-344; 1930.

<sup>7</sup> Jones, H. E., "Order of Birth in Relation to Development of Child", Chap. vii, Handbook of Child Psychology published by Carl Murchison, Clarke University Press, Worcester, Mass., 1931.

#### A Method of Extending the Frequency Range of the Cathode Ray Tube

THE cathode ray tube could be employed on several present-day problems if records could be obtained at somewhat higher frequencies than those obtainable at present. The use of brighter tubes, lenses of wider aperture, faster films and higher film speeds should achieve the required improvement. With regard to lenses, where a cinema lens is used the following arrangement should be found useful:—A long focus collimating lens receives the light from the cathode ray tube and renders the rays parallel. A short focus cinema lens of large aperture receives these parallel rays and focuses them on to the photographic emulsion. The reason for using two lenses in preference to a single lens is that these lenses are usually designed to receive parallel rays, and therefore if they receive rays which are not parallel the definition suffers unless the aperture is reduced. It will be noticed that the collimator is a long focus lens compared with the convergent lens. In consequence a reduced image of the end of the cathode ray tube is formed in the plane of the photographic plate or film.

The advantage of this arrangement is that since the image is smaller than the object, the spot of illumination on the plate is correspondingly smaller than that on the end of the cathode ray tube. Consequently, if the plate is moving at a constant rate at right angles to the deflection of the cathode ray, the precision of observation in the direction of travel will be increased in the same proportion as the size