of this type of change. From this hypothesis it is predictable that mammalian chromosomes other than the X, that is autosomes, Y and another X, should have numerous minute loci characterized by these (three) features and their distribution on the chromosomes should correspond specifically to the state of the major differentiation of the cell.

This pattern of distribution of the inactivated DNA in autosomes in resting mammalian cells must be very difficult to observe directly because these inactivated portions are so small in these chromosomes and furthermore their identification is complicated by the whirling and intercalation of many long and thin resting chromosomes packed in a small space inside a nucleus. However, distribution of late-replicating loci in the mammalian chromosomes has already been detected by ^{3}H-thymidine autoradiography by many investigators[35–38]. These findings strongly favour our hypothesis that the pattern of gene inactivation is actually distributed also in the whole set of the mammalian chromosomes.

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Change in Sex Ratio in an African Butterfly

In butterflies, the sex ratio is 1 : 1, or nearly so. Random collections often show a slight excess of males over females, because males are the more active and hence are more often seen and collected.

Acraea encedon L. (Acraeidae) is a common butterfly throughout tropical Africa, inhabiting grassy places and forest edge. It is a slow-flying species and individuals of both sexes are easily caught on the wing. In 1909–12, C. A. Wiggins, at the suggestion of E. B. Poulton, of Oxford University, collected random samples of *A. encedon* from the area between Entebbe and Kampala, Uganda. Poulton was at the time interested in finding the relative frequencies of model and mimetic butterflies, and *A. encedon* is a polymorphic Müllerian mimic. The collection made by Wiggins is preserved in the Hope Department, Oxford, and comprises 96 males and 54 females, suggesting a normal sex ratio. In 1963–64, in order to see if the relative frequency of the polymorphic forms had changed, a random collection of 546 specimens was obtained from the same area. Only nine were males. This change in sex ratio from 64·0 per cent male in 1909–12 to 1·6 per cent male in 1963–64 is highly significant ($P < 0{\cdot}001$). *A. encedon* occurs in all months and there are two or three generations in the year, so that this drastic reduction in the frequency of males must have occurred in 100–150 generations.

No other large random collections are available for comparison, but in the extensive collections from most parts of Africa in the British Museum and in the Hope Department, the sex ratio appears normal. Three of the nine males collected in 1963–64 were found in copulation with females, but usually when a 'pair' was found flying together as if in sexual display they proved to be females. Broods reared from wild-caught females have produced only females. The possibility of parthenogenesis is being investigated, but whatever the explanation of this highly unusual sex ratio, the present situation has evidently been reached in the past fifty years.

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PSYCHOLOGY

Constancy and the Geometric Illusions

Gregory has proposed[1] and defended[2] an account of the geometric illusions based on the notion of 'misplaced constancy scaling'. Following Tausch, he suggests that all illusion figures have features indicating depth by perspective which bring into play size constancy scaling, leading to expansion of some parts of the figure relative to others. For this theory he makes the claim that "so far no valid objections seem to have been raised"[2]. The theory nevertheless needs challenging.

Gregory's thesis is this: Illusions result from the operation of a "primary constancy scaling mechanism" triggered by the presence in the figure of (learned) distance cues. This scaling occurs despite the fact that the observer is not conscious of depth in the figure and actually sees it as flat; "primary scaling" is thus distinguished from "secondary scaling" which depends on seeing apparent depth. A theory which appeals to the idea of automatic compensation for unconsciously perceived depth is in obvious danger of being irrefutable. If Gregory's claim to have provided an explanation of the illusions is to be credited he must be able to bolster his theory experimentally in either of two ways, namely: (1) by demonstrating the reality of primary scaling independently of the illusions; (2) by showing that the cues supposed to trigger primary scaling are under some conditions actually treated as cues to depth. His failure in both respects is considered below.

(1) The hope of demonstrating primary scaling independently of the illusions is rendered forlorn by the nature of the concepts involved. The term 'illusion' may be taken to embrace all cases of plane figures the perceived configuration of which differs from the real physical configuration. But this inevitably includes any figure that is constructed to demonstrate primary scaling since such a demonstration must make use of plane figures in order to exclude the apparent depth effects which would activate secondary scaling. Thus the concept of primary scaling is tied to the illusions and cannot be adduced as a general phenomenon of which the illusions are only a specific instance.