peatedly cut down to the levels of the glacially lowered Pleistocene sea (*6*).

From the foregoing, it seems that living oceanic reefs, as well as reefs of continental margins, may be only thin veneers over older foundations (*8*). Fossil reefs well above present sea level, situated in many cases near shelf margins, may represent exposed parts of the Pleistocene foundation. Widely distributed, elevated marine terraces and reefs of the western Atlantic antedate the last time of widespread dune formation, which apparently occurred during the last interglacial stage. Elevated terraces of Pacific islands, frequently cited (with insufficient evidence) as effects of recent high sea level, should be critically re-examined. It seems likely that they also are of Pleistocene age.

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23 March 1960

Y-Chromosome Inheritance of Hairy Ears

Abstract. A pedigree of hairy ear rims published in Italy in 1907 indicated holandric inheritance. The recent collection of over 20 pedigrees in India appears to show conclusively that the gene for hairy ear rims is in the Y chromosome. This is further evidence of relationship between the Mediterranean race in Europe and the population of India.

When I wrote *Human Genetics* (*1*), an Italian pedigree of hairy ear rims was regarded as a prima facie case of inheritance through a gene in the Y chromosome. But, since the pedigree was published very early (1907) and not in pedigree form, it obviously needed confirmation. While traveling in Africa in 1955, I accidentally observed three cases of hairy ears (*2*) in East Indians, two of whom were from Goa. Their pedigrees, so far as they could be obtained, were consonant with holandric inheritance, but did not furnish final proof.

In a detailed examination of all possible cases of Y chromosome inheritance in the literature, Stern (*3*) rightly suspends judgment about hairy ears, suggesting that unaffected women might transmit the trait, in which case it might be an autosomal character under sex control. Transmission from a father to all his sons, which is the pattern found, shows that the gene cannot normally be in the X chromosome, because a father always transmits his X chromosome to all his daughters and his Y to all his sons.

While studying jungle tribes in India in 1959, I collected over 20 pedigrees of hairy ear rims, generally in three generations, from the ordinary Indian population. The condition proved to be relatively frequent, especially in southern India. Two cases in native tribes, one in the Kotas and one in the Adiyar, were probably the results of miscegenation with ordinary Indian men.

The pedigrees as a whole show beyond any doubt that hairy ear rims are holandric. The inheritance is always from a father to all his sons, except in rare cases of lack of penetrance. Such exceptions are not surprising, for the amount of hair in the groove of the ear rim varies widely, even in the same family.

That the daughters of affected men do not transmit the condition is shown by three sibships in one pedigree, in which a total of ten sons (ages 33 to 54) are unaffected. In two cases there is the possibility of crossover from Y to X, but other explanations are equally likely. The condition generally develops at ages 20 to 25, and it appears to be quite independent of a hairy external auditory meatus, which is frequently found in older men of European descent. The inheritance of the latter condition has apparently never been investigated.

It appears to be significant that hairy ear rims are found in Italians (of Mediterranean race) and in the Dravidian, Indide, or Brown race in India—which is generally regarded as an Eastern extension of the Mediterranean race.

It may also be worth mentioning that in a single Australian aboriginal of the Pintubi tribe, a fringe of hairs, little more than fuzz, was observed in the ear rims (*4*). That this fringe of hairs in the ears may have wider parallelisms is shown by its occurrence in certain species of marmosets and South American monkeys, but not in other species (*5*).

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2 May 1960

Locomotor Activity of Land Crabs during the Premolt Period

Abstract. When maintained in darkness, premolt specimens of *Gecarcinus lateralis*, with or without eyestalks, show variations in level of activity according to six distinct stages. Furthermore, in darkness the rhythmic pattern of premolt crabs with eyestalks resembles that of eyestalkless premolt crabs, the intervals between principal bursts of activity being generally shorter than in nonpremolt crabs.

The spontaneous locomotor activity of land crabs, *Gecarcinus lateralis* (Fréminville), has been investigated in terms of two important characteristics, namely, (i) magnitude or level, and (ii) rhythmicity. It has already been reported that the magnitude or level of activity shown by eyestalkless individuals during the period elapsing between eyestalk removal and molt fluctuates according to six distinct stages, with the level variable during stage I, relatively high in stages III and V, and relatively low or even nonexistent in stages II,

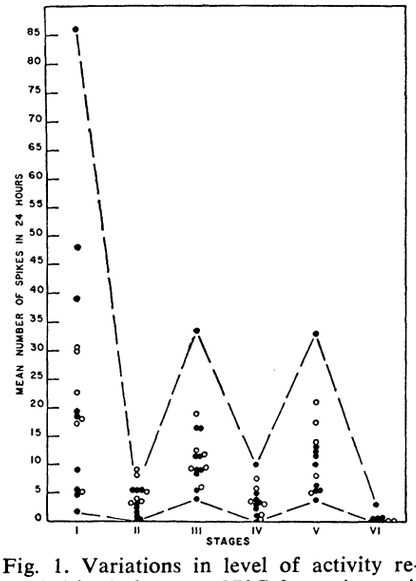

Fig. 1. Variations in level of activity recorded in darkness at 27°C from six specimens with eyestalks (open circles) and ten eyestalkless specimens (closed circles) of *Gecarcinus lateralis* during the period just prior to molt. For explanation of stages, see text.