India. One of these Indian species of *Dryopithecus* (*D. punjabicus*) is apparently related to the gorilla; another (*D. giganteus*), perhaps to the chimpanzee; an allied genus, *Palæosimia,* bears a significant resemblance to the orang; a fourth type, *Palæopithecus sivalensis* Lydekker, is a synthetic form with resemblances to the gorilla, chimpanzee and gibbon. In the reviewer's opinion all these are more primitive than any of their modern relatives and indicate that in the Upper Miocene northern India was not far from the center of evolution of the anthropoids and man.

The important genus and species *Sivapithecus indicus,* from the Lower and Middle Siwaliks, rests upon fragments of the lower jaw and dentition. From these Dr. Pilgrim has attempted a restoration of the lower jaw that shows a subhuman divergence of the opposite rami and a very short, man-like symphysis. Pilgrim regards this genus as in or near the ancestral line of *Homo sapiens.*

The reviewer regrets to report that after a careful study of the evidence he believes Dr. Pilgrim has erred in attributing the above-mentioned human characteristics to *Sivapithecus,* the jaw of which, in the reviewer's opinion, should be restored rather after the pattern of the female orang jaw. The evidence for this conclusion will be given elsewhere. The reviewer would also dissent from Dr. Pilgrim's allocation of *Sivapithecus* to the Hominidæ, preferring to place it by definition in the Simiidæ, since it had ape-like canines and front premolars, and, as the reviewer interprets the evidence, also an ape-like symphysis.

William K. Gregory

CASTLE AND WRIGHT ON CROSSING OVER IN RATS

In a recent number of Science (August 6) Castle and Wright describe a case of linkage in rats. One point of general interest indicated by their results is not pointed out by these authors; namely, that crossing over occurs in both sexes. This conclusion depends on the appearance, in F_2 of their cross (red-eyed yellow by pink-eyed yellow), of doubly recessive rats. They state that two such rats appeared, this being inferred from the fact that two of the F_2 pink-eyed yellows, when mated to red-eyed yellows of stock, "produced only red-eyed (yellow) offspring." This result must mean either that these two rats were not sufficiently tested, and were not really double recessives; or else, if they were double recessives, that there had been crossing over in both sexes of F_1 rats. As to the first possibility, the crucial point is the number of red-eyed offspring produced in the test mating. Unless this number was large enough to completely rule out the possibility of the F_2 pink-eyed rats having been only heterozygous for the red-eye factor, the second alternative is not necessarily true. If the second possibility be true it follows that the relation of crossing over to sex determination is different here from that in *Drosophila* (Morgan) and the silkworm moth (Tanaka), where no crossing over occurs in the sex which is heterozygous for the sex factors[1] (male in *Drosophila,* female in the silkworm moth). Since the evidence from sex-linkage and cytology shows that in several mammals (man, cat, etc.) the male is heterozygous for the sex factor, we should expect, if the relation to crossing over is a general one, that no crossing over would take place in the male mammal.

A. H. Sturtevant

August, 1915

SCIENTIFIC BOOKS

A Monograph of the Existing Crinoids. Volume 1. *The Comatulids:* Part 1. By Austin Hobart Clark, Assistant Curator, Division of Marine Invertebrates, United States National Museum. Bulletin 82. Washington, Government Printing Office. 1915. 4to. Pp. vi + 486; with 513 text-figures, and 17 plates.

The last general treatise upon the Recent Crinoids is contained in the monumental volumes of P. Herbert Carpenter upon the "Stalked Crinoids and the Comatulæ," published in 1884 and 1888 by the British government as part of the results of the voyage of H. M. S. *Challenger.* Although based chiefly

[1] See Sturtevant, A. H., *Amer. Nat.,* XLIX., 1915.