nucleoli, while in the female they remain, like the other chromosomes, in a diffused condition. This indicates that during these periods these chromosomes play a more active part in the metabolism of the cell in the female than in the male. The primary factor in the differentiation of the germ cells may, therefore, be a matter of metabolism, perhaps one of growth.

6 (98). **"Experimental hepatic cirrhosis in dogs from repeated inhalations of chloroform": C. A. HERTER** and **WM. R. WILLIAMS.**

The difficulty of inducing pronounced interstitial hepatitis in dogs by means of poisons makes it of interest to report the well-defined results obtained as a consequence of repeated inhalations of chloroform vapor. Experiments of this character were made upon three dogs. In one experiment the animal received chloroform three times a week on eighteen occasions, each inhalation having been continued for an hour. For six subsequent inhalations the duration of the narcosis was one and a half hour. The duration of the entire experiment was about eight weeks. The liver everywhere was found to be the seat of an abundant, richly cellular, connective tissue growth between and into the lobules. The bile ducts were proliferated, and the liver cells showed much fatty and hyaline degeneration.

In two other dogs similar experiments were carried out with the exception that in each of these instances a highly satisfactory control was secured by first removing a small portion of normal liver for subsequent comparison with the damaged liver. In one of these dogs the inhalations were given eighteen times in about six weeks. The animal lived somewhat longer than five months and showed a well-marked though not extreme cirrhosis. The third dog was narcotized forty-nine times and lived about eight months. The changes in this instance were perfectly distinct, but less advanced than in either of the other animals mentioned.

The liver tissue from the first dog was subjected to an analysis which showed a distinct fall in the normal percentage of the arginin constituent of the protein molecule. Similar analyses show that the arginin yield from protein may fall rapidly after even very short exposure to toxic influences and these results, indicating early

damage to living protoplasm, give much force to the contention that the connective tissue overgrowth in these cases of hepatic cirrhosis is secondary to changes in the chemical constitution of the liver cell. A further feature of interest is the fact that in two of the dogs the liver cells contained little fat at the time of autopsy. Finally, it may be mentioned that although a considerable loss in weight was observed in the dogs during the period of repeated narcotization, this loss was subsequently recovered in spite of the persistent cirrhotic changes.

These observations open the question whether the fatty and parenchymatous degenerations of the liver, which in some cases follow narcosis by chloroform in the human subject, may not occasionally pass on to interstitial cirrhosis — a single narcosis in man being sufficient to induce the primary damage to the protoplasm of the liver cell.

7 (99). **"Color sense in different races of mankind": R. S. WOODWORTH.**

The evolution of the color sense is very imperfectly understood. Scarcely any direct evidence is at hand regarding the color sense of animals, though some indirect evidence that various classes distinguish colors is afforded by the facts of protective and attractive coloration.[1] We do know from human experience, that there exists a form of color vision (red-green blindness) which is less complete than the usual human type, and as it appears not to be pathologic, it may be a reversion. In the absence of subhuman data, it is of some value to ascertain whether those races of mankind which seem to represent the more primitive stages in human development are especially subject to color-blindness. The results of various authors go to show that other races are perhaps even less subject to it than the white race. Some previously untested races were examined by the author in association with Mr. Frank G. Bruner, under the Anthropological Department of the St. Louis Exposition. Of 252 adult male Filipinos (including Christians and Moros), 14 were red-green blind, or 5.6 per cent.; of 75 males of the "wild tribes" of the Philippines (Igorots, Tinguianes and Bagobos), 2 were red-green blind, or 2.7 per cent.; of

[1] See Grant Allen: The Color Sense, Its Origin and Development, 1879. W. A. Nagel: Der Farbensinn der Tiere; Wiesbaden, J. F. Bergmann, 1901.