large intestine (fecal pellets), (2) cecal contents, (3) lower small intestine, (4) upper small intestine, (5) stomach of the rat. Growth and multiplication of *Balantidium coli* was obtained only in the supernatant fluid from the fecal pellets and the cecal contents. A dilution of .05% of the cecal contents did not maintain life and a .25% dilution maintained life but did not promote multiplication. .5% dilution produced good growth and the effectiveness of the extract increased above this. Maximum growth was reached at a dilution of about 2%.

Casein added to .25% cecal extracts did not induce multiplication. This would tend to indicate that the factor which is missing as a result of the dilution is not the protein. Vitamin B_1 additions were not effective either.

Collodion bag filtrates were not effective so the factor is apparently not ultra-filter passing.

FURTHER WORK ON THE EFFECTS OF ANESTHETICS ON CHROMOSOME AND POLAR BODY BEHAVIOR IN THE EGGS OF THE SNAIL *NASSA*

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In a previous study on the relationship between mitosis and meiosis and of the latter to polar body formation (Moment 1938), eggs were anesthetized with chloral hydrate from ten minutes after the extrusion of the first polar body until the controls were undergoing their first cleavage. When returned to sea water such eggs form either a single giant second polar body or two second polar bodies which appear simultaneously side by side. The work since then has yielded the following additional information. As in the previous study, Feulgen's reaction was used to stain the chromosomes throughout.

The number of chromosomes in *Nassa (Ilyanassa) obsoleta* is 36 in the haploid condition. This was determined by counts of the early anaphase plates at the time of the formation of the first polar body when 36 pairs of chromosomes can be distinguished on each plate. By cutting off the antipolar (yolk) lobe with a fine glass needle so that the eggs rotate with the animal pole uppermost, it is possible to confirm this by counts of the chromosomes on the anaphase plates of the second maturation spindle.

Eggs fixed when the others were placed in the anesthetic, (i.e., ten minutes after the first polar body had been extruded) showed that at this time the first polar body and the egg cytoplasm are completely separated from each other by a membrane. The chromosomes remaining within the egg still form

a recognizable plate with darkly staining chromosomes which are so clumped that even an approximate count would be impossible.

During the time development is blocked by chloral hydrate, which may amount to almost three hours, the chromosomes remain in their discrete state and do not enter a more or less diffuse "resting" stage.

The number of chromosomes in a giant second polar body formed after such a period of chloral hydrate block can be counted after the antipolar lobe has been removed with a glass needle as indicated above. It is the haploid number or possibly less. Since the eggs do not have to be sectioned with the technique used there was no chance for chromosomes to be lost. In these eggs the chromosomes were unpaired. In eggs which formed no second polar body whatever after blocking, it was possible to see approximately the haploid number of somewhat scattered chromosome pairs within the egg. Actual counts ranged from 33 to 38 pairs.

In a number of experiments the eggs which formed a simultaneous pair of second polar bodies were separated from those which produced a single giant one. Both groups were then allowed to develop as far as the first cleavage. Invariably the eggs which had produced two second polar bodies divided some little time after those which had formed a single giant one.

REFERENCE

Moment, G. B., 1938, *Bull. Mt. Desert Is. Biol. Lab.*, p. 19.

COMPARATIVE OBSERVATIONS ON THE BLOOD CELLS OF SOME MOUNT DESERT ASCIDIANS

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The blood cells of Ascidians possess a peculiar interest due both to the close relationship of these animals to the vertebrates and to the fact that the orange, green and blue vanadium containing respiratory pigment found in them is almost unique in the animal world. However, Ascidian blood contains colorless leucocytes in addition to the colored cells so that the situation would seem to present a fundamental similarity to the condition found in the vertebrates. It is hoped, therefore, that a study of these cells may throw some light on the general problem of the variety and differentiation of blood cells.

As was recently pointed out by Johan Huus (1937) our knowledge of Ascidian blood cells is as yet extremely sketchy. He discusses three species, *Ascidia mentula, Perophora viridis* and *Ascidia atra (Phallusia nigra)*. Three or possibly four additional species from Bermuda have been investigated. The