the greatest number of abortions appears to occur during the summer months.[21]

Apart from the evidence provided by the lower vertebrates, the fact that the lowest number of conceptions, the greatest number of menstrual irregularities and the greatest number of abortions occur in the human species wherever investigated during the summer months indicates that the reproductive life of man is in some way influenced by climatic factors. That these factors are probably fairly complex should, for methodological purposes at least, be assumed, for it now seems unlikely that any one single factor such as light or temperature alone can be considered as the sufficient cause of these reproductive phenomena. The low summer conception rates among the Eskimo of Greenland as given by Bertelsen[22] and referred to by Whitaker is yet another illustration of this apparently universal relation between low reproductivity and the summer months. What the nature of this relation is here, as elsewhere, is a problem which remains to be investigated. The purpose of the present communication is to make it clear that such a relation exists.

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VITAMIN B_1 IN SOIL[1]

WILLIAMS and Spies[2] have advanced the theory that thiamin (vitamin B_1) may be present in soils. Since certain thiamin-requiring fungi are able to detect minute quantities of this substance (0.05 micrograms per liter), the writers undertook to test this theory. Duplicate soil samples were obtained from two different localities in the vicinity of Morgantown, W. Va. The first was taken from a cultivated field, and the second from a sharply sloping and sparsely wooded tract that has never been under cultivation. The soil sampler was driven to a depth of 4 feet and cores of soil one inch in diameter and 48 inches long were secured. The cores were divided into 4 one-foot lengths and separately extracted with pyridine water (3:1) for 5 hours on a steam bath. The extract was filtered off, taken to dryness under reduced pressure, repeatedly dissolved in water and dried until all traces of pyridine disappeared, and the pyridine-free extract was added to the basic medium containing the essential mineral salts, amino acids and dextrose. One half of the extract from each sample of soil was added to 50 ml of the nutrient medium, solidified with 2 per cent. purified Bacto agar, poured in test-tubes, sterilized and inoculated with the test organisms. The other half of the extract was tested without the addition of agar. The following organisms were used: (a), *Phytophthora erythroseptica,* a fungus that requires thiamin for its growth; (b), *Phycomyces blakesleeanus,* capable of growing in the presence of either thiamin or a mixture of the two moieties of thiamin—thiazole and pyrimidine; (c), *Pythiomorpha gonapodioides,* which grows equally well in the presence of either thiamin or pyrimidine only; (d), *Mucor ramannianus,* capable of making equally good growth in the presence of thiamin or thiazole alone, and (e), *Sordaria fimicola,* which does not grow in the presence of thiamin or its moieties alone, but must have one of the bioses—biotin. The control medium failed to induce growth in any of the foregoing organisms, while all five fungi flourished in both solid and liquid media containing soil extract. The extract from the surface foot of soil induced a better growth than that from the lower ones, but even the fourth foot of soil contained enough thiamin to induce fair to good growth.

Cores of soils taken at a depth of 8 feet from a pasture land showed that the soil contained enough pyrimidine seven feet under the surface, where the microflora is very sparse, to induce a rich growth in pyrimidine-requiring organisms; enough thiazole to induce a fairly good growth in *Mucor ramannianus,* and sufficient thiamin to promote some growth in *Phytophthora erythroseptica.* This shows that not all the thiamin or its moieties found in the soil remain associated with living organisms but that some may leach into the clay and remain adsorbed on the particles.

Robbins[3] and White[4] have shown that thiamin is essential for the cultivation of excised roots of tomato, while Bonner[5] has found that in certain plants root formation is induced only when thiamin is added to the rooting medium. Biotin is essential for numerous microorganisms, and since it is present in many plant and animal tissues, eventually it may be found to be of considerable importance in the biological processes. It may be possible that the presence of thiamin and biotin in soils will give added significance to the role of organic matter in soil fertility.

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PRESERVING THE VIABILITY OF BERMUDA ONION SEED

IT is well known that many seeds retain their viabil-

21 W. Millar, *Human Biol.,* 6: 279, 1934.

22 A. Bertelsen, *Meddelelser om Grønland,* 117: No. 1, 1935.

1 Published with the approval of the director of the West Virginia Agricultural Experiment Station as Scientific Paper No. 216.

2 Williams and Spies, "Vitamin B_1," p. 381. Macmillan Company, New York, 1938.

3 Robbins and Bartley, SCIENCE, 85: 246–247, 1937.

4 White, *Plant Physiol.,* 12: 803–811, 1937.

5 Bonner, paper read at Richmond meeting of A.A.A.S., 1938.