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.

ity for a comparatively short time, especially in a moist warm climate. Bermuda onion seed, which is used largely in our southern states, often gives trouble from low germination, even when the seed is not more than a year old.

Samples from a number of lots of Bermuda onion seed imported from the Canary Islands were combined and dried at a low temperature in a partial vacuum to 6.4 per cent. moisture content in November, 1924. Portions of this seed were stored (*a*) in paper packets at room temperature in the laboratory, and (*b*) sealed in air-tight containers and stored part at room temperature in the laboratory and part in a cool chamber at a temperature ranging from 5° C. to 10° C.

The seed has been tested from time to time, with the results given in Table 1.

TABLE 1
GERMINATION OF BERMUDA ONION SEED AFTER STORAGE

Length of storage	Germination after storage in		
	Paper packet in room, per cent.	Sealed tube in room, per cent.	Sealed tube in cold chamber, per cent.
Check test	94	94	94
16 months	83	88	89
3 years	36	94	93
7 years	0	89	91
11 years	..	89	87
13 years	..	90	89

This small experiment illustrates strikingly the importance of maintaining a low moisture content in stored seeds if vitality is to be preserved.

In plant breeding work, it is important to maintain original stocks of seed over long periods for purposes of comparison. This is especially important in the case of annuals and biennials. It is entirely feasible to artificially dry small lots of seed and store them in air-tight containers to preserve their viability for relatively long periods. A like procedure is practical for the storage of commercial seeds of valuable strains.

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BACTERIA OF THE LISTERELLA GROUP ISOLATED FROM FOXES

THE recent report of Graham and his associates[1] on Listerellosis of cattle and sheep in Illinois has redirected our attention to an organism isolated in early June, 1937, from silver foxes from a nearby fur farm. The disease, which spread rapidly through the sheds, killing a considerable number of the young animals, was pronounced distemper by a prominent authority on fox diseases called into consultation by the attending veterinarian.

We did not learn much about the symptoms except that the animals became prostrate and were dead a few hours later. Examination of the internal organs revealed no significant changes. Heart's blood cultures from eight of the animals were made to beef heart infusion broth, and from five of them the cultures were positive. One of the positive cultures was from a very sick fox pup which was killed and the culture made immediately afterward. The organism, which was the same in all the cultures, is a slender gram positive even-staining rod in broth culture. Films made from blood agar slants show a gram positive rod similar in size, shape and arrangement to *Corynebacterium hoffmanni*. It is sluggishly motile. Doses of 0.5 cc of a 24-hour broth culture injected into each of two 400-gram guinea pigs proved fatal in two days with recovery of the organism from the heart's blood. Mice also proved susceptible.

The organism was considered to belong probably to the Listerella group. Dr. Graham has very kindly examined the culture and tentatively identified it as a "Listerella or Listerella-like type."

We have no evidence of etiological connection of this organism with this outbreak of disease among the foxes. We feel, however, that it must have had some significance, either as a primary or a secondary factor in the illness of those animals from which it was isolated.

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THE ANTI-MENORRHAGIC FACTOR OF MAMMALIAN LIVER FAT

FOLLOWING the introduction of oral liver extracts for the treatment of anemia it was observed by some physicians that some of these preparations were useful in controlling some cases of functional uterine bleeding (menstrual bleeding of prolonged or profuse nature, not due to benign or malignant tumors). Although the original purpose of the liver therapy was to treat the secondary anemia following this bleeding, there was often noted a diminution or cessation of the abnormal hemorrhage itself, even though the blood count was unaffected. This property was found in the cruder preparations but not in the highly purified oral or parenteral solutions. Since this purification involves no treatment likely to inactivate any constituent, the fraction in question was probably removed in the process. Inactive proteins and lipoids constitute much of the material removed in the purification of parenteral solutions.

Since 1936 we have been investigating the lipoid

[1] SCIENCE, August 19, 1938, page 171.