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.

fraction of mammalian liver. Saponification of beef or hog liver fat in hot alcoholic potash for one hour yielded an orange-colored, non-saponifiable residue, which was tested on patients suffering from functional uterine bleeding. The administration by mouth of an adequate dosage completely controls the menorrhagia or metrorrhagia. Thus far our clinical observations indicate that in young women there is a cumulative effect lasting for months after its administration has been discontinued. Patients in the latter part of menopause who suffer from menorrhagia or metrorrhagia require much larger doses than the former group and show no cumulative effect, requiring treatment with each period. This apparent inverse dosage with the ovarian function suggests that its action is related to the functional activities of the gonads. Curtis[1] also has reported favorable results from the use of liver extract and of our fraction.

While it was known from the work of Dam[2] that liver fat contains the anti-hemorrhagic vitamin K, we did not consider the anti-menorrhagic factor to be related, since it withstands hot saponification. The recently reported observations of Lichtman and Chambers[3] indicate that there is a saponification-stable substance in liver fat which has some of the properties of vitamin K.

We are continuing the fractionation and testing of the anti-menorrhagic factor (produced commercially as "Anti-menorrhagic Factor"—Armour) and have begun experiments to determine the identity or non-identity of the anti-hemorrhagic and anti-menorrhagic factors.

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SCIENTIFIC BOOKS

RECENT BOTANICAL BOOKS

Economic Botany: A Textbook of Useful Plants and Plant Products. By ALBERT F. HILL. vii + 592 pp. 225 figs. McGraw-Hill Book Company, Inc., New York. 1937. $4.00.

THE author states that this book is the "outgrowth of several years' experience in presenting a one-semester course dealing with economic plants." He has expressed an aim to give the student, through a knowledge of industrial, medicinal and edible plants, a broader outlook, greater interests in the world about him and a realization of the importance of plants and plant products to mankind. Nine chapters deal with such industrial plants and plant products as fibers, wood, cork, tanning and dye materials, rubber and other latex products, gums and resins, essential oils, fatty oils and waxes and sugars, starches and cellulose products. Two chapters consider medicinal plants, fumitories and masticatories. Seven chapters discuss the history and nature of food plants, cereals, legumes and nuts, vegetables and fruits, both of temperate and tropical regions. There are two chapters on food adjuncts, including spices and other flavoring materials, beverage plants and beverages. A systematic list of species discussed, a bibliography and an index constitute the appendix. Books of this sort serve a good purpose, and the author has succeeded well in carrying out the aims expressed in the preface.

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Herbals, Their Origin and Evolution. A chapter in the history of botany, 1470–1670. By AGNES ARBER. 2nd ed. xxiv + 326 pp. 131 figs. 26 plates. Cambridge University Press, Cambridge. 1938. $7.50.

THE revival of interest in herbs and herb gardens makes unusually timely this revised and enlarged edition of Mrs. Arber's book on herbals. These curious mixtures of descriptive botany, gardening, folk-lore, medicine, wood-engraving and even cookery were so highly prized in families fortunate enough to own one that many have come down in good condition to the present time and formerly could be bought at reasonable prices. Their acquisition by institutions and private collectors has made prices soar, and good copies of the classic herbalists have become impossible except to the very wealthy.

Mrs. Arber's book offers more, however, than could be found in any one collection, since it contains excellent reproductions of the more striking of the drawings and woodcuts from a variety of sources, many inaccessible to the ordinary botanist. While nearly all the text figures and plates of the earlier edition have been retained, a few substitutions have been made, and the number has been increased. Much of the text has been rewritten and expanded. An appendix lists chronologically the more important herbals and botanical works published during the period covered.

Even libraries and individuals owning a number of herbals will find in this book valuable sidelights on the development of descriptive botany in the comparative chapters on the various countries and in the attractive and accurate accounts of the herbalists themselves.

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[1] A. H. Curtis, "Textbook of Gynecology," pp. 111, 404. W. B. Saunders Company, 1938.

[2] H. Dam and F. Schonheyder, *Biochem. Jour.*, 30: 897, 1936.

[3] A. L. Lichtman and W. H. Chambers, SCIENCE, 88: 358, 1938.