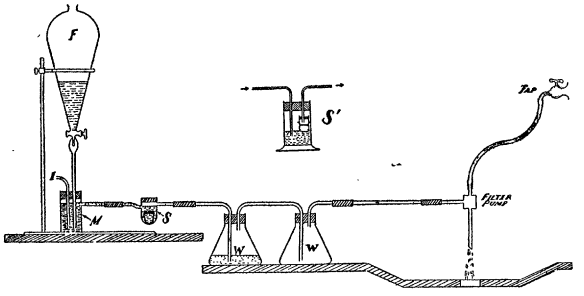
proved more satisfactory because *L. acidophilus* develops larger colonies than are produced in the original medium. Quantitative plate counts are also usually higher with this new medium. Extensive comparative tests have indicated that this medium is as good or better than any of the more complicated digest mediums previously advocated by the senior author and others for plating *L. acidophilus*.

WALTER L. KULP
VINTON WHITE
CONNECTICUT AGRICULTURAL COLLEGE,
STORRS, CONNECTICUT

APPARATUS FOR VERY GRADUAL CHANGE OF FLUIDS

THIS apparatus, as set up in the text figure, is recommended in the treatment of tissues used for cytological studies. It also can be used for specimens which do not require a gradual change and can be run through the alcohols more rapidly. The tissues to be treated are placed in a perforated crucible and the crucible is stoppered with a finely perforated cork.



This crucible is placed in the specimen bottle (S). The replacing fluid in the Walter's special separatory funnel for single drops (F) is started dropping at the desired rate, the flow being regulated by the stopcock. The suction from the filter pump draws air from the inlet (I) through all the containers and carries the excess fluid from the mixing bottle (M) and the specimen bottle (S) into the waste bottle (W). The air bubbling into the mixing bottle (M) will insure a quick and thorough mixing of the fluids in both the mixing bottle (M) and the specimen bottle (S).

For smaller and more delicate specimens the specimen bottle (S'), shown in the inserted diagram, may be used. This is constructed by cutting the bottom from a small homeopathic vial, tying a piece of bolting silk to the stopper-end of the vial to prevent loss of specimens in the outlet tube, and attaching this vial to the outlet tube by means of a cork.

For higher alcohols or clearing agents the air passing into the inlet (I) should be dried by passing it through a calcium chloride tube or through a bottle containing sulphuric acid or absolute alcohol. Very little water can be absorbed from the waste bottle (W) since the air currents will pass away from the specimen bottle (S) and toward the waste bottle (W). It is necessary to introduce a second waste bottle in order to prevent a back-flow of the water from the filter pump in case the water pressure from the tap is reduced.

Large specimens, such as termatodes, have been successfully transferred from 95 per cent. alcohol to water in three hours. The success is probably due to the constant mixing of the fluids before coming into contact with the specimens instead of the usual abrupt change from one grade of alcohol to the other. This apparatus facilitates washing since it can be done in the same container in which the specimens can be stained and run up through the alcohols.

(This apparatus was constructed through the courtesy of the Empire Laboratory Supply Company of New York City.)

J. HENRY WALKER, JR.
DEPARTMENT OF ZOOLOGY,
UNIVERSITY OF ALABAMA

SPECIAL ARTICLES

FERROUS IODIDE AS A SUBSTITUTE FOR VITAMIN A IN RATS[1]

IN view of the observations of Chidester, Eaton and Thompson[2, 3] that small doses of syrup of ferrous iodide can substitute for vitamin A in the cure of xerophthalmia and promotion of growth in rats on vitamin-A deficient diets, the author has reinvestigated this subject, using the same dosage of ferrous iodide, and supplying irradiated ergosterol as a source of vitamin D throughout the experiment. Observations include the effect of ferrous iodide on (1) xerophthalmia, (2) terminal infections of the glands about the mouth, (3) age at which xerophthalmia appears, (4) age at which constant weight is reached, (5) age at death, (6) weight at death, and (7) food consumption.

The animals used were albino rats from a stock raised for generations on Sherman Diet 13, and were placed at 4 weeks of age on Sherman vitamin-A free

[1] Published with the approval of the Director, West Virginia Agricultural Experiment Station, as Scientific Paper No. 107.

[2] F. E. Chidester, A. G. Eaton and G. P. Thompson, SCIENCE 68, 1766, 432, 1928.

[3] F. E. Chidester, A. G. Eaton and N. K. Speicher, *Proc. Soc. Exper. Biol. & Med.* 28, 187, 1930.

diet No. 380 plus irradiated ergosterol (1 mg per 1,000 gms of diet). Two series were studied: Series I, in which the syrup of ferrous iodide, 1–350 dilution, was given daily, in doses of 3 or 5 drops, as a curative measure, after xerophthalmia had developed; and Series II, in which the iodide solution was given daily in the same dosage, as a preventive measure, from the beginning of the experimental period. The animals were compared with litter mates on the same diet, but without added iodide solution; and also with control rats receiving cod-liver oil as a source of vitamin A, with and without iodide solution. Since the control rats were consistently negative for xerophthalmia, terminal infections, or other pathology, they are not included in the results given here.

In Series I, 45 rats were given iodide treatment daily, when xerophthalmia appeared—usually at about 9 weeks, when constant weight was reached; and were compared with 21 litter mates on the same diet without added iodide solution. The dilute syrup of ferrous iodide was made up fresh each week, and given to the individual rats daily by pipette, calibrated to deliver drops of the solution containing 0.000098 grains of iodine, and 0.0000216 grains of iron. Treatment was continued until death, when autopsy was performed. Weights were taken once or twice a week, and observations made on the eyes three times a week. Three criteria of xerophthalmia were used: (1) swelling of the lids, (2) appearance of blood, first at the inner canthus, later generalized over the lid; and (3) exudate, first serous, later purulent. The degree of these symptoms was described from day to day by plus signs, grading from (+) to (+++).

In practically all the animals, bleeding about the eyes was the same in amount and character in the treated as in the untreated rats; and there was no detectable difference in the swelling or exudate. In a few cases, the iodide seemed to exert a temporary inhibiting effect on bleeding about the eye; but bleeding always reappeared, and xerophthalmia progressed through the usual stages. Since this same phenomenon appeared in a few of the untreated rats also, it can not be regarded as due to the iodide.

Iodide treatment had no effect whatever on the incidence of terminal infections of the glands about the mouth so characteristic of vitamin-A deficient rats. In 100 per cent. of the animals, both with and without iodide treatment, pus was found at death in one or more of the following loci: submaxillary gland, sublingual gland, thyroid, nasal sinuses, and frequently in the middle ear.

Death was hastened by ferrous iodide by an average of 12 days; although the weight at death was about the same for iodide treated as for untreated rats, the difference being 5 grams or less. Food consumption was decidedly less in the iodide treated rats, the average difference being 25 grams, and probably representing what might be expected from the shortened life of the rats treated with iodide.

In Series II, 18 rats were given daily doses of 3 or 5 drops of dilute syrup of ferrous iodide from the beginning of the experimental period, until their death. When so given, the iodide had no effect upon the incidence of terminal infections of the glands about the mouth, nor upon the incidence or course of xerophthalmia, although it did delay the onset of xerophthalmia, and the time of appearance of constant weight and death. It also increased the food consumption.

The results of these experiments, therefore, confirm the work of Mason,[4] who found syrup of ferrous iodide without effect on the xerophthalmia of vitamin-A deficient rats, and further show that ferrous iodide can not substitute for vitamin A in the cure or prevention of terminal infections characteristic of vitamin-A deficiency in rats.

HAZEL C. CAMERON
AGRICULTURAL EXPERIMENT STATION,
WEST VIRGINIA UNIVERSITY

DUAL ENDOCRINE ACTIVITY OF THE TESTES

EXPERIMENTS, the results of which are now being prepared for publication, and a review of the literature, establish the following facts:

(1) The castration of male rats results in changes which can be placed in two distinct groups, namely, (a) those in which secondary sex characteristics are lost and the secondary sex glands (prostate and seminal vesicles) atrophy, and (b) those in which the pituitary gland undergoes hypertrophy and becomes hyperfunctional; the adrenals also hypertrophy.

(2) Testicular extracts prepared with fat solvents will prevent the atrophy of the secondary sex glands if administered immediately after castration. If the glands are permitted to atrophy the testicular extracts will cause regeneration.

(3) The comb-growth-promoting substance from male urine[1] has the same physiological properties as the hormone extracted from testes. The known chemical and physical characteristics of the hormone from testes and that from urine would indicate that they are identical.

(4) The hormone from urine or blood is derived from the testes since it is not found in the body fluids of castrated men, although it is readily demonstrable in normal men.

[4] Karl E. Mason, *Anat. Record* 51, No. 1, Supplement, 57 (1931) Abstract.

[1] Formula $C_{9}H_{26}O_{2}$—A. Butenandt, *Zeit. für Angewandte Chemie*, 1931, 46, S. 905.