grow within the area the book is said to cover had been so illustrated. That of course would make too expensive and bulky a book; in fact, it would have to run to several volumes, so one must be contented with the quantity illustrated in the present work.

Mr. House's simple clarity of description and interesting form of writing must be taken as compensation for the faulty reproductions of color in the illustrations, where the greens are especially bad, the yellows frequently too orange and the pinks and purples too weak or dull. This is possibly due in part to the imperfections of color photography, which, while satisfactory enough in many ways, still has the unsatisfactory tendency to reduce colors to monotones, not having reached the state of perfection where all tones and shades of color can be reproduced.

The rather rash promise made on the inside of the jacket that any wild flower may be quickly and easily identified by the use of this book is regrettable. Whether this statement is intended to apply to any wild flower in the United States is doubtful, but since the plants included are nearly all northeastern except for the wide-spread introduced weeds, the book is clearly applicable to that region, in which between 4,500 and 5,000 species and varieties of plants are known. Grasses, sedges, rushes and trees are omitted, probably for the popular reason of not thinking of them as wild flowers, an acceptable enough reason in a book intended for popular use, since these groups are too difficult for the average person to identify. The book, however, is such an excellent pioneer in its type of field that it becomes a fine book of reference for flower-lovers.

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THE DIATOMACEAE

An Index to the Genera and Species of the Diatomaceae and Their Synonyms, 1816–1932. By FREDERICK W. MILLS. Pts. 1–21. Wheldon and Wesley, London, 1933–1935, 1726 pp., 1 portrait.

INDEXES and bibliographies constitute some of the most valuable tools of the research worker, yet their preparation seems always to lag far behind. Some of the difficulties seem to be associated with the means of publication. A few librarians recognize the usefulness of such works for reference purposes, and specialists in particular groups acquire them, but in general they are overlooked to such an extent that publishers can not afford to risk the financial loss connected with the printing.

In the present case Mr. Mills has devoted a long life to the preparation of this index. Naturally it is not perfect; no index ever is, but he did manage to assemble some half a million important references to the literature. In order to make publication possible at all it was printed by the "multitype" (mimeograph) process and this may prove to be the solution of the problem facing many authors of reference works, only small editions of which are needed.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A MODIFIED MEDIUM FOR THE STUDY OF INTESTINAL LACTOBACILLI

FOR the cultivation of the Lactobacillus group of organisms many different kinds of special media are available, the selection depending entirely upon the purposes in view and the types of Lactobacilli studied. In this laboratory the Bacto-Peptone tomato agar, a modification of Kulp and White's medium,[1] has been employed for several years as a plating medium in the isolation and study of intestinal lactobacilli. In this medium, under properly established gaseous environment, the characteristic filamentous colonies (fuzzy X type) of *L. acidophilus* are usually obtained. The colonies remain quite small, however, and are difficult to differentiate from other microscopic colonies present.

Recently we have used Neo-Peptone (Difco) in preparing the tomato agar and have found it to offer considerable advantage in the plating of *L. acidophilus* of intestinal origin. In comparative quantitative experiments the following differences were obtained in favor of Neo-Peptone tomato agar, as compared to those obtained on the same medium prepared with Bacto-Peptone.

The results presented in Table I were obtained with pure culture strains of *L. acidophilus* in milk. The increases in plate counts varied from 12.3 to 166.0 per cent. In a general way the stimulation was most noticeable with the strains which showed the lowest plate counts in Bacto-Peptone tomato agar.

Additional evidence (not presented in the table) was obtained in quantitative platings of rat feces. From 10 to 30 per cent. higher *L. acidophilus* counts were invariably the rule in Neo-Peptone tomato agar. The medium was especially advantageous for determining the *L. acidophilus* ratio to other bacteria in feces of white rats kept on various diets. Due to their increased size and enhanced filamentous characteristic,

[1] SCIENCE, 76: 17, 1932.

TABLE I

SHOWING COMPARATIVE PLATE COUNTS OF L. ACIDOPHILUS ON NEO-PEPTONE TOMATO AGAR AND BACTO-PEPTONE TOMATO AGAR

Colonies per cubic centimeter of culture plated in:		
Neo-Peptone tomato agar	Bacto-Peptone tomato agar	Percentage increase in Neo-Peptone
627 M	559 M	12.30
670 "	592 "	13.00
854 "	746 "	14.40
900 "	774 "	16.00
601 "	518 "	16.00
673 "	577 "	16.66
145 "	123 "	17.80
459 "	376 "	22.00
885 "	713 "	24.10
1,028 "	826 "	24.40
538 "	431 "	24.80
548 "	419 "	31.00
563 "	427 "	31.80
714 "	537 "	32.90
366 "	270 "	35.00
621 "	451 "	37.60
439 "	309 "	42.00
247 "	171 "	44.00
374 "	235 "	59.00
399 "	249 "	60.20
190 "	113 "	69.10
276 "	149 "	84.90
17 "	7 "	166.00

M = millions.

the colonies of *L. acidophilus* were recognized easily under hand lens magnification.

Quantitative studies were not conducted with other types of lactobacilli. However, in comparative qualitative trials it was found that strains of *L. pentoaceticus, L. delbrücki, L. fermentatae* and *L. odontolyticus* all developed larger colonies in Neo-Peptone tomato agar than in Bacto-Peptone tomato agar. Aside from this the colony characteristics remained unchanged.

The composition and the preparation of the medium is as follows:

Tomato juice	400 cc
Peptonized milk (Difco)	10 gm
Neo-Peptone (Difco)	5 gm
Water	600 cc
Agar	11 gm

The tomato juice is obtained by filtering the contents of one No. 3 can of tomatoes through filter paper. The peptone and peptonized milk are added to the tomato juice and heated gently until dissolved. The reaction is adjusted to pH 6.8. The agar is added to 600 cc of water and melted in the autoclave. The melted agar and the tomato juice-peptone-peptonized milk solution are mixed while hot and the medium tubed. Sterilization is made by autoclaving at 120° C. for 8 minutes. The medium should be removed from the autoclave as soon as possible.

The plates inoculated with material containing *L. acidophilus* and poured with Neo-Peptone tomato agar are incubated for 48 hours at 37° C. in an atmosphere containing approximately 10 per cent. carbon dioxide.

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THE CULTURING OF FRESH-WATER AMOEBAE IN THE LABORATORY

IN growing amoebae for experimental purposes in Dr. Chambers's laboratory at New York University, we have hit upon a simple method which ensures a plentiful and continuous supply.

The method consists in having a layer of agar with starch grains in the bottom of the culturing bowls. The agar serves not only to anchor the starch grains, but also offers a good surface for the amoebae to feed and crawl upon. The agar is prepared by dissolving 1½ grams in 100 cc hot water; and pouring the solution, while hot, through a filter of absorbent cotton into a thoroughly cleaned and dried finger bowl. The amount should be in sufficient quantity to form a thin layer of about 0.2 cm thick on the bottom of the bowl. Several grains of ordinary polished white rice are dropped on the layer before the agar has set.

When the agar has hardened, 10 to 15 cc of culture water, containing as large a number of amoebae as possible, is poured into the bowl and an equal quantity of distilled water then added. Each day 5 cc of distilled water is added until the bowl contains about 50 cc of liquid. In adding the water, the contents of the bowl should be agitated as little as possible, so as not to disturb the amoebae, which tend to gather about the starch grains.

The bowls should be covered to minimize evaporation, and should be kept at a temperature (17 to 18° C.) somewhat below usual room temperature. To maintain a constant temperature, the bowls may be stored in any kind of a water bath, with water from the tap constantly circulating around it.

Cultures prepared in the way described above will, within two to four weeks, develop thousands of amoebae per bowl, and they will often last for several months without subculturing.

The presence of large numbers of Chilomonas is very favorable for the cultures, as they serve as food for the amoebae. Fresh grains of rice should be added