Although polymyxin was found to be the most effective antibiotic, of those studied, for the control of the Gram-negative bacteria that infect yeast and fermentations, it is entirely possible that other antibiotics will be superior to polymyxin in the control of the lactic acid rods and cocci that infect brewer's yeast and fermentations. For example, penicillin is more active than polymyxin against the lactic acid bacteria in finished unpasteurized beer and a combination of antibiotics such as penicillin and polymyxin may be required for the complete control of bacterial contaminants of brewer's yeast. It was, however, surprising to find that polymyxin is more active against the Gram-positive lactic acid bacteria in finished beer than any of the other antibiotics tested, with the exception of penicillin. Polymyxin is generally considered as being specific for Gram-negative bacteria. A more thorough study of its activity in beer may help to elucidate its mode of action.

The stimulation of the fermentation by polymyxin is interesting. The same type of stimulation was observed when a bactericidal concentration of terramycin and aureomycin was added to the fermentation. It seems possible, therefore, that this stimulation is related to the elimination of bacterial action during the fermentation and may not be a direct effect of the antibiotic on the yeast.

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NOTES AND COMMUNICATIONS

Weeds Contain Valuable Chemical Compounds

As a result of our increasing population and rising standard of living it becomes economically important to investigate the chemical possibilities of some noneconomic plants that can be grown readily and in good yield. Results of analyses, by acceptable methods, of representative samples of several such plants are listed in Table I. These data indicate that smartweed, poverty grass, sedge, and the stalk of the Jamestown weed have industrial possibilities on the basis of their high content of furfural, cellulose, or α-cellulose. Purslane, for example, is especially rich in pectic compounds. Noneconomic plants may have an important role in meeting soil and economic conditions in the future.

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Table I. A Partial Chemical Analysis of Several Noneconomic Plants

(On an ash- and moisture-free basis)

Plant	Total Soluble Sugars, %	Total Pectic Compounds, %	Total Furfural, %	Cellulose %	α-Cellulose %
Smartweed, *Polygonum hydropiper* L.	5.32	6.33	8.18	42.11	72.20
Nettle, *Urtica dioica* L.	4.33	2.98	7.23	25.42	67.13
Jamestown weed (stalk), *Datura stramonium* L.	7.28	7.99	11.55	46.13	65.40
Poverty grass, *Aristida dichotoma* Michx.	2.86	Trace	15.25	49.76	61.89
Milkweed, *Asclepias syriaca* L.					
Leaves	4.60	1.27	5.54	30.26	59.47
Stalk	11.62	1.79	6.85	31.79	...
Curled dock, *Rumex crispus* L.	6.90	2.17	6.33	30.93	64.44
Wild lettuce, *Lactuca scariola* L.					
Leaves	4.40	2.88	5.26	19.29	66.83
Stalk	14.65	1.16	8.95	38.23	68.16
St. John's-wort, *Hypericum perforatum* L.	7.60	1.44	7.98	39.14	59.53
Lambs quarter, *Chenopodium album* L.	0.85	5.00	7.85	32.27	56.96
Butterweed, *Erigeron canadensis* L.					
Leaves	2.74	2.12	4.74	16.88	71.47
Stalk	4.90	3.43	11.32	49.09	64.83
Purslane, *Portulaca oleracea* L.	2.91	9.14	6.63	25.01	...
Couch grass, *Agropyron repens* (L.) Beauv.	8.75	0.55	11.95	42.34	62.56
Golden rod, *Solidago rugosa* Ait.	2.62	4.65	8.49	37.72	64.87
Aster, *Aster* sps.	4.17	3.22	10.18	44.29	67.86
Sedge, *Scirpus atrovinens* Willd.	10.75	1.33	11.54	43.93	65.85
Catnip, *Nepeta cataria* L.	6.17	4.44	8.98	40.25	66.27
Wild carrot, *Daucus carota* L.	8.75	3.50	8.88	38.31	65.40
Flagroot, *Acorus calamus* L.	7.32	3.40	7.81	30.87	62.37
Joe-Pye weed, *Eupatorium maculatum* L.	5.62	2.88	7.00	23.22	63.91
Yarrow, *Archillea millefolium* L.	3.59	0.87	9.73	33.62	64.23
Sumac, *Rhus typhina* L.					
Leaves	7.50	2.35	4.10	20.23	52.69
Blossom	5.62	2.21	9.79	31.00	62.07
Hardhack, *Spiraea tomentosa* L.	3.02	2.00	7.67	29.54	...
Dock, *Arctium minus* (Hill.) Bernh.					
Leaves	3.90	1.69	5.45	21.72	...
Stalk	11.43	1.18	9.03	36.74	...
Ragweed, *Ambrosia artemisiifolia* L.	2.80	3.95	6.46	23.61	65.40

Water Culture Crops Designed to Study Deficiencies in Animals

Sir: A paper by McClendon and Gershon-Cohen (*2*) appearing in a recent issue of this journal contains a number of statements that merit comment.

To the best of our knowledge, this is the first attempt to produce feeds for special nutrition studies by means of hydroponics. As such, the paper is of considerable interest to everyone working in the field of mineral metabolism.

The authors implied that they produced a fluorine deficiency in rats fed plants grown according to their directions. The "fluorine-free" ration contained 30% yellow corn, 30% sunflower seed, 20% sunflower leaves, 10% yeast, and 10% sucrose. The corn and sunflowers fed this group were raised in water. The "control" animals received a similar diet, with the corn and sunflowers grown in soil. The drinking water for the latter group contained 20 p.p.m. of fluorine. A basic tenet of the scientific method requires that the control rats be fed plant materials grown under exactly the same conditions as those used for the mineral-"free" group plus the mineral being studied. If that had been done, then any growth stimulation resulting from the addition of pure fluorides would have been good evidence that the diet contained less of this element than that required by the rat.

The difference in weight gains of the rats on the fluorine-free and control diets might have been due to the presence in the foods raised on soils of substances other than fluorine. The rats on the fluorine-free ration gained less than 5 grams per week, while the control rats gained 10 grams. (Good growth for albino rats is 25 to 35 grams per week.) Growth as poor as that of the control rats indicates that both rations were deficient in substances other than fluorine. Under such conditions, the addition of any one of the deficient substances to either diet might produce a growth stimulation. Studies involving the addition of pure compounds to the "fluorine-free" diet will be required before one can be certain that the 5-gram-per-week growth stimulation was due to fluorine.

Other workers have been unable to stimulate growth when fluorine was added to a ration low in that element. Evans and Phillips (*1*) found that mineralized milk, of all substances they analyzed, had the lowest concentration of fluorine. These workers added sodium fluoride to the milk, but found that none of the levels used (up to 20 p.p.m. of fluorine) produced any growth over that of the rats on the basal diet. Results comparable to these were obtained by Sharpless and McCollum (*4*). Both groups of investigators concluded that fluorine was not essential for the growth of rats, unless needed in amounts smaller than that present in their rations.

There are other questionable data in the paper which can be mentioned only in passing. No analytical data were given to prove that the plants grown by the author's methods were free of the minerals studied (fluorine, iodine, chlorine, and sodium). In the absence of analytical results on the fluorine content of the diets developed by these workers, it is impossible to make any comparisons with published fluorine values. However, sucrose may have contributed some fluorine to their diets, since it was used both in the diet and in the media on which the yeast for their diets was grown. According to Machle, Scott, and Treon (*3*), a sample of sucrose contained 0.32 p.p.m. of fluorine. There is no assurance that McClendon and Gershon-Cohen considered the possibility of fluorine in their sucrose. No specific information is given as to the type of diet fed the control rats in the iodine-deficiency study. No data are given for the rats raised on a chloride-free diet which "showed no difference from the controls" after 2 months on the diet.

On the basis of the work presented by McClendon and Gershon-Cohen, it is difficult to determine the value of hydroponics as a means of producing plants that are deficient in trace elements. It is still more difficult to accept their implication that the addition of fluorine to the drinking water was the factor which increased the growth of their rats.

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SIR: Our experiments have been repeated every year for 10 years. We controlled the rat-feeding experiments, but the numbers of rats were so small that the results were never accepted for publication. Field-grown crops for control allow for large numbers of rats, but with limited funds we have never been able to grow enough corn by water culture to feed large numbers of rats. However, the results with controls, fed water-cultured diets, are the same as those obtained with field-grown crops. In previous experiments, we have added calcium, lysine, methionine, and cystine to the diets, but the results were essentially the same.

Everything, including the air, was analyzed for fluorine and iodine in our experiments. We found fluorine, iodine, and sodium chloride in the air. The iodine, at least, was entirely in the dust, as it could be filtered out by passing the air through the walls of an Alundum crucible. There were traces of halogens in the seed used the first year and they passed into the crops. The rats received fluorine through the placenta and mother's milk and the teeth and bones retained this fluorine tenaciously on the fluorine-free diet. The urine and feces of the rats on the fluorine-free diet were free from fluorine. The same applies to iodine and the thyroid glands. It was impossible to prevent the inheritance of trace elements from the mother, and rats on fluorine or iodine-free diets would not bear viable young. We found that different batches of sugars varied in fluorine content, raw sugar containing the highest concentrations. Sucrose, as free as possible of fluorine, was used to add calories and in order to feed a larger number of rats on a limited crop. We used the term "fluorine-free," as analyzed by the methods used, and in the sucrose fluorine was present in concentrations of 0.01 p.p.m. As to the chloride- and sodium-free diets, they were consumed by the rats before deficiency symptoms appeared. The work on sodium chloride was included only to show that it is possible also to use water culture for these elements. We have no doubt that these elements are essential.

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Corrections

In the article entitled "Food Analysis, Detection of Ethylvanillin in Vanilla Extract" [J. AGR. FOOD CHEM., **1**, 783 (1953)] a typographical error in the procedure resulted in the recommendation of 0.5 ml. instead of 0.25 ml. of 1*N* sodium hydroxide. The color distinction between vanillin and ethylvanillin is greatly diminished or eliminated with an increase in sodium hydroxide. However, there is a minimal alkalinity content necessary to obtain the reaction. Since there is a possibility of variation due to reagents, each investigator may need to determine the optimum alkalinity conditions for himself.

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In the article on "Improvement in Whole Yellow Corn with Lysine, Tryptophan, and Threonine" (Sure, Barnett, *et al.*, J. AGR. FOOD CHEM., **1**, 626 (1953), the first line of the second column should read: "presence of lysine and valine, stimulated."

In the article on "Pesticides Formulation. Liquid Concentrates Problems" [Selz, Edgar, J. AGR. FOOD CHEM., **1**, 381 (1953)] on page 285 the captions of the figures should be: Figure 1. Appearance of a 24-hour-old DDT emulsion. Figure 2. Appearance of the same emulsion after one inversion.

In the article on "Enhancement of Anticholinesterase Activity in Octamethylpyrophosphoramide by Chlorine" [Spencer, E. Y., and O'Brien, R. D., J. AGR. FOOD CHEM., **1**, 716 (1953)] in the second and fourth formulas on page 716 and the third and fourth formulas on page 717, the double-hyphen bond oxygen has been wrongly shifted from the phosphorus to the adjacent oxygen atom. In the third and fourth formulas on page 717, the $—N(CH_3)_2$ has also been shifted from the phosphorus to the adjacent oxygen atom.

In the article on "Tracer Studies, Insecticides. Preparation of Carbon-14 Labeled DDT" [Pearce, G. W., and Jensen, J. A., J. AGR. FOOD CHEM., **1**, 776 (1953)] the third sentence in the first paragraph should read: "Presumably the ring was labeled." On page 777 the ninth line in the second paragraph should read: "addition of 50 ml. of 20% sulfuric acid."