DR. ROBERT S. JUSTICE joined at the end of June the scientific staff of Lakeside Laboratories, Inc., Milwaukee, in the capacity of pharmaceutical chemist.

DR. E. C. SANDEK has been appointed production manager of the Consumers Yeast Company of San Francisco.

D. N. WADIA has been elected president of the Council of the National Institute of Science of India for the year 1945. Professor S. P. Agharkar and Sir S. S. Bhatnagar have been elected vice-presidents.

IN the first ceremony of its kind, according to the *Journal* of the American Medical Association, two hundred and ninety-two recent medical and dental graduates of Harvard University, Tufts College and Boston University received army and navy commissions on June 23 in combined exercises in the Harvard Medical School Quadrangle. The Army commissions were awarded by Major General Sherman Miles, commanding the First Service Command, the Navy by Rear Admiral Felix Gyax, commandant of the First Naval District. Major General Norman T. Kirk, Surgeon General of the Army, gave the principal address. Other speakers were Dr. Leonard Carmichael, president of Tufts College, and Dr. James B. Conant, president of Harvard University. Dr. Daniel A. Marsh, president of Boston University, pointed out that the first combined exercises of the three schools of medicine demonstrated the spirit of cooperation in medical education.

A SYMPOSIUM on Mathematical Statistics and Probability will be held at the University of California at Berkeley from August 13 to 18. Speakers and chairmen will include Dean G. P. Adams, Professor E. M. Beesley, Professor B. A. Bernstein, Professor A. H. Copeland, G. B. Dantzig, Professor P. H. Daus, Professor J. L. Doob, Lieutenant Commander F. W. Dresch, Ph.D., Professor G. C. Evans, Professor Harold Hotelling, Professor P. L. Hsu, Professor J. H. McDonald, Professor A. H. Mowbray, Professor J. Neyman, Professor G. Polya, Professor Hans Reichenbach, Professor J. D. Tamarkin and Dr. Jacob Wolfowitz. Further information can be obtained by writing to the Statistical Laboratory, University of California, Berkeley 4, California.

THE National Research Council will act as adviser to the American Cancer Society in the proposed research program on the cancer problem. About a third of the five million dollars now being sought in the campaign of the society for funds will be devoted to research.

THE College of Medicine of the State University of Iowa, Iowa City, and the Iowa State Department of Health, in cooperation with the U. S. Public Health Service, will conduct at the State Hygienic Laboratory, Iowa City, from July 23 to 28, a special laboratory course in malaria and other tropical diseases.

THE *Journal* of the American Dental Association states that a group of specialists in the field of nutrition will leave shortly on a mission to help the undernourished people of Italy. Issac Schour and Maury Massler, both of the College of Dentistry of the University of Illinois, will be members of the mission, which is sponsored by the Unitarian Service Committee and the Congregational Christian Service Committee and which will go to Italy under the auspices of the United States Relief and Rehabilitation Administration. It will establish scientific standards for all large-scale feeding programs by UNRRA in newly liberated and destitute areas.

SPECIAL ARTICLES

NUTRITIVE VALUE OF THE MEXICAN TORTILLA[1]

THE per capita consumption of corn in Mexico approximates 280 grams daily, but many persons of low economic status consume as much as 700 grams daily. Essentially all this corn is eaten as *tortillas*, the daily bread of Mexico.

Perez[2] has presented data on the mineral and protein content of *tortilla*. Zozaya and Alvarado[3] have reported that a sample of *tortilla* contained no riboflavin, while samples of yellow corn and of white corn contained 0.21 mg and 0.20 mg, respectively. They did not indicate whether one of these corns was used in making the *tortillas* analyzed. A complete study of the nutritive value of *tortillas* has not been reported.

The preparation of *tortillas* has been described by Illescas.[4] One part of corn is placed in two parts of approximately 1 per cent. lime solution, heated to about 80° C for 20 to 45 minutes, then allowed to stand until the following day. Boiling is avoided, for this would produce a *masa* which adheres to the

[1] This study was conducted by the Nutritional Biochemistry Laboratories of the Massachusetts Institute of Technology, in collaboration with the Mexican Institute of Nutrition and the Rockefeller Foundation, under the auspices of the Pan American Sanitary Bureau and with the financial support of the W. K. Kellogg Foundation.

[2] M. Perez y Perez, "Contribucion al Estudio de algunos de los alimentos Mexicanos." Thesis, National University of Mexico, 1943.

[3] J. Zozaya and F. Alvarado R., Revista del Inst. Salubridad Enfermedades Tropicales, 4: 215, 1943.

[4] R. Illescas, *Soc. Mex. Hist. Nat.*, IV: 129–134, 1943.

hands and to the *comal* during cooking. On the next day the mother liquor is decanted from the corn (*nixtamal*), which is then washed two or three times with water. The *nixtamal* is ground by hand on a stone *metate* into a fine *masa*. In the larger towns the *nixtamal* is often taken to a power-driven mill for grinding, while in the cities the finished *masa* is purchased in the market.

About 50 grams of the *masa* are used to form round cakes, 15 to 20 cm in diameter and approximately 0.2 cm thick. These cakes are cooked on a *comal* (hot iron plate) for about 30 seconds, turned and cooked for 75 to 100 seconds. When it swells and becomes orange in color, the cake is turned again and cooked for another 30 seconds, when the *tortilla* curls to resemble a biconvex lens.

While people in the United States enjoy *tortillas* cooked to a hard brown cake, the Mexican removes the *tortilla* from the hot plate before it has browned and while it is still pliable. He often curls the *tortilla* and uses it as a spoon, biting off a portion with each mouthful. Frequently, the *tortilla* is rolled around a mixture of meat and chile, meat and beans or *mole* to form a *taco*.

In this study samples of corn, *nixtamal* and *masa* were obtained from small commercial mills (*molinos*) in various parts of Mexico City. In each instance, the *nixtamal* and *masa* were prepared from the same supply of corn. The *masas* were taken to bakeries (*tortillerias*) adjacent to the mills and made into *tortillas* in the usual manner. In each case, a portion of the original corn, of *nixtamal*, of *masa* and of *tortilla* was taken, frozen in carbon dioxide ice, kept frozen during transit by air and until analyzed in Cambridge within five days after collection. It had been demonstrated previously that there was no measurable loss in the vitamin content of similar foods when shipped and stored in this manner. One series with yellow corn and two series with white corn were analyzed.

Samples were prepared for analysis by grinding in an electric mill. Carotene was measured by the adsorption technique of Moore,[5] thiamine fluorometri-

[5] L. A. Moore, *Indust. Eng. Chem. Anal. Ed.*, 12: 726, 1940.

TABLE 1

NUTRIENT CONTENT DURING PREPARATION OF MEXICAN TORTILLA

	Sample[1]	Corn		*Nixtamal*		*Masa*		*Tortilla*	
		Wet basis	Dry basis	Wet basis	Dry basis	Wet basis	Dry basis	Wet basis	Dry basis
Moisture (in per cent.)	*a*	15.0	0.0	45.5	0.0	51.9	0.0	38.9	0.0
	b	13.3	0.0	43.5	0.0	53.7	0.0	43.7	0.0
	c	13.0	0.0	37.8	0.0	55.4	0.0	43.2	0.0
	Ave.	13.8	0.0	42.3	0.0	53.7	0.0	41.9	0.0
Nitrogen (in per cent.)	*a*	1.19	1.40	0.74	1.36	0.65	1.35	0.84	1.37
	b	1.34	1.55	0.98	1.73	0.71	1.53	0.92	1.63
	c	1.47	1.69	1.29	2.07	0.75	1.68	1.03	1.81
	Ave.	1.33	1.55	1.00	1.72	0.70	1.52	0.93	1.60
Ash (in per cent.)	*a*	1.17	1.38	0.92	1.69	0.81	1.69	1.03	1.69
	b	1.30	1.50	0.86	1.52	0.72	1.55	0.87	1.55
	c	1.21	1.39	0.91	1.46	0.68	1.52	0.88	1.55
	Ave.	1.23	1.42	0.90	1.56	0.74	1.59	0.93	1.60
Calcium (mgs. per cent.)	*a*	8.	9.	120.	220.	108.	224.	131.	214.
	b	7.	8.	83.	147.	82	176.	101.	179.
	c	9.	10.	87.	139.	75.	169.	101.	178.
	Ave.	8.	9.	97.	169.	88.	190.	111.	190.
Phosphorus (mgs. per cent.)	*a*	242.	285.	180.	330.	154.	320.	195.	320.
	b	246.	284.	154.	272.	136.	294.	178.	316.
	c	222.	257.	174.	280.	135.	302.	178.	314.
	Ave.	233.	275.	169.	294.	142.	305.	184.	317.
Iron (mgs. per cent.)	*a*	3.2	3.8	2.1	3.9	2.1	4.2	2.8	4.5
	b	1.7	2.0	1.7	3.0	1.6	3.5	1.8	3.2
	c	1.9	2.2	1.9	3.0	1.4	3.1	1.9	3.3
	Ave.	2.3	2.7	1.9	3.3	1.7	3.6	2.2	3.7
Carotene (mgs. per cent.)	*a*	0.45	0.53	0.24	0.44	0.21	0.44	0.19	0.31
	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Ave.[2]	0.15	0.18	0.08	0.15	0.07	0.15	0.06	0.10
Thiamine (mgs. per cent.)	*a*	0.38	0.44	0.21	0.39	0.19	0.39	0.18	0.29
	b	0.32	0.37	0.20	0.35	0.17	0.37	0.19	0.34
	c	0.32	0.37	0.20	0.32	0.16	0.36	0.21	0.37
	Ave.	0.34	0.39	0.20	0.35	0.17	0.37	0.19	0.33
Riboflavin (mgs. per cent.)	*a*	0.08	0.09	0.05	0.09	0.05	0.10	0.05	0.08
	b	0.08	0.09	0.06	0.11	0.04	0.09	0.06	0.11
	c	0.08	0.09	0.06	0.10	0.05	0.11	0.07	0.12
	Ave.	0.08	0.09	0.06	0.10	0.05	0.10	0.06	0.10
Niacin (mgs. per cent.)	*a*	1.55	1.82	0.80	1.47	0.70	1.46	0.89	1.46
	b	1.68	1.94	1.18	2.09	0.83	1.79	0.93	1.65
	c	1.70	1.95	1.15	1.85	0.85	1.90	1.07	1.89
	Ave.	1.64	1.90	1.04	1.80	0.79	1.72	0.96	1.67

[1] Sample *a* was yellow corn, *b* and *c* were white corn.
[2] Since white corn contained no measurable carotene, these averages may be insignificant.

cally according to Hennessy,[6] riboflavin fluorometrically according to Andrews,[7] niacin microbiologically according to the U. S. Pharmacopoeia,[8] phosphorus spectrophotometrically according to Fiske and SubbaRow,[9] iron spectrophotometrically according to Koenig and Johnson,[10] while water, ash, nitrogen and calcium were estimated using the procedures of the A.O.A.C.[11] The analytical results are presented in Table 1 on a wet basis; also, they have been calculated to the dry basis to allow direct comparison.

The carotene content of the white corns was too low for measurement. There was a 40 per cent. loss in the carotene of the yellow corn during the preparation of the *nixtamal* and the *tortillas*. The losses in thiamine and niacin were relatively small. No measurable loss in riboflavin was noted. The calcium content increased 2010 per cent., the phosphorus content 15 per cent., and the iron content 37 per cent. The high calcium content of the *tortilla* resulted from treatment of the corn with lime water. The Mexican has achieved an adequate calcium intake by this food practise, for an average daily consumption of 280 grams of *tortilla* furnishes more than 500 mgs of calcium.

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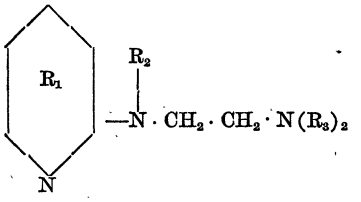
ANTIHISTAMINIC AND ANTIANAPHYLACTIC ACTIVITY OF SOME α-PYRIDINOETHYLENEDIAMINES

BOVET and Staub[1] and Staub[2, 3] described the antihistaminic and antianaphylactic activity of thymoxyethyldiethylamine (929 F), (*I*) and N,N-diethyl-N¹-ethyl-N¹phenylethylenediamine (1571 F), (*II*). The specific activities of substance *I* have been confirmed in this country by different authors[4–9]. Both substances are, however, too toxic to be used in man.

In 1942 Halpern[10] studied certain homologues of Substance *II* and observed that N¹phenyl-N¹ethyl-N-dimethylethylenediamine (*III*) and N¹phenyl-N¹benzyl-N-dimethylethylenediamine (*IV*) were much more active and much better tolerated. Clinical reports[11, 12] confirm the effectiveness of Substance *IV* in various allergic diseases.

In searching for more active substances, a series of compounds have been prepared, especially pyridine derivatives of the general formula:



The biological activities of the new compounds have been tested on the isolated intestinal strip of the guinea pig by adding them to the bath liquid one minute before the standard dose of 1 γ histamine was given, or after the histamine contraction had fully

TABLE 1
COMPARATIVE ACTIVITY IN VITRO

Compound No.	R₁	R₂	R₃	Activity*
63	pyridyl	benzyl	methyl	0.02 γ
67	"	"	ethyl	> 5 γ
52	"	phenyl	methyl	> 5 γ
76	"	"	ethyl	> 10 γ
82	"	isopropyl	methyl	> 10 γ
77	"	propyl	ethyl	> 10 γ
84	"	β-pyridyl	methyl	> 10 γ
75	"	α-pyridyl	ethyl	> 10 γ
74	β-picolinyl	benzyl	methyl	2 γ
91	α¹-picolinyl	"	"	1 γ
106	γ-picolinyl	"	"	0.2 γ

* The activity is expressed in γ per ml of bath liquid capable of neutralizing 1γ/ml of histamine diphosphate.

[1] D. Bovet and A. M. Staub, *C. R. Soc. Biol.*, 124: 547, 1937.
[2] A. M. Staub and D. Bovet, *ibid.*, 125: 818, 1937.
[3] A. M. Staub, *Ann. Inst. Pasteur*, 63: 400 and 485, 1939.
[4] S. R. Rosenthal and M. L. Brown, *Jour. Immunol.*, 38: 259, 1940.
[5] D. Minard and S. R. Rosenthal, *Proc. Soc. Exp. Biol. Med.*, 44: 237, 1940.
[6] G. A. Mc. Vicar and E. W. M. Henry, *Canad. Med. Asn. Jour.*, 44: 80, 1941.
[7] H. B. Wilcox, Jr., and B. C. Seegal, *Jour. Immunol.*, 44: 219, 1942.
[8] J. E. Bourque and E. R. Loew, *ibid.*, 138: 341, 1943.
[9] G. A. Hallenbeck, *Am. Jour. Physiol.*, 139: 329, 1943.
[10] B. N. Halpern, *Arch. Intern. Pharmacodyn.*, 68: 339, 1942.
[11] Ph. Decourt, *Presse Med.*, 50: 773, 1943.
[12] J. L. Parrot, *ibid.*, 50: 771, 1942.

[6] D. G. Hennessy, *Cereal Chemistry*, 20: 717, 1943.
[7] J. S. Andrews, *Cereal Chemistry*, 20: 3, 1943.
[8] U. S. Pharmacopoeia XII, First Supplement, 1943.
[9] C. H. Fiske and Y. SubbaRow, *Jour. Biol. Chem.*, 66: 375, 1925.
[10] R. A. Koenig and C. R. Johnson, *Jour. Biol. Chem.*, 143: 159, 1942.
[11] "Official and Tentative Methods of Analysis," Assoc. Official and Agric. Chem., 5th Ed., 1940.