

the antiphage for paratyphosus B contains just as potent neutralizing antibodies as the other 2 antiphages, the former has no inhibiting action whatever on the same phage when *supestifer* is used as the test organism. (Table I B.)

A result practically identical with that shown in Table I A, was obtained when these sera were tested in the same manner with a phage for paratyphosus B even when a strain of typhosus was used as test organism.

The experiments are of general interest from 2 points of view. First, they suggest, as is to be expected, that similar specificities are exhibited by the reaction of phage with the heat-killed bacilli on the one hand and with antiphage on the other.<sup>4, 5</sup> Second, the use of polyvalent phages with qualitatively specific fractions makes it feasible to study antiphage reactions in such heterologous combinations of reagents as will exclude or minimize interfering agglutinin reactions which may, at times, result from injection of phage containing filtrates. Thus, in our experiments the paratyphosus A antiphage inhibits the action of the enteritidis phage when *supestifer* is employed as a test organism. (Table I B.)

In our opinion, any attempts to classify phages on the basis of specific neutralization must take into account the fact that phages may radically differ in their composition and yet share a particular fraction in common.

## 7897 C

### Colony Differences in Survival of Adrenalectomized Rats.

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(Introduced by W. W. Swingle.)

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There has been much disagreement among investigators concerning the life-span of the rat after adrenalectomy. While the majority of workers prior to 1930 found that 50% or more of their rats survived adrenalectomy, due to the presence of accessory cor-

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<sup>4</sup> Burnet, F. M., *Brit. J. Exp. Path.*, 1933, **14**, 93; *J. Path. and Bact.*, 1933, **36**, 307.

<sup>5</sup> Andrewes, C. H., and Elford, W. J., *Brit. J. Exp. Path.*, 1933, **14**, 367.

tical adrenal bodies, several more recent workers<sup>1-4</sup> have reported that all or nearly all of their animals died after adrenal removal. Gaunt<sup>5</sup> offered evidence indicating that these inconsistent results may have been in part due to inherent colony differences in the susceptibility to adrenal removal. This report offers further evidence for such colony differences.

Dr. J. T. Lewis of the Instituto de Fisiologia, Buenos Aires, one of the investigators to find high percentages of survival after adrenalectomy, sent a group of his rats to Dr. W. W. Swingle of Princeton University in the care of Dr. De Meio. He requested that they be adrenalectomized and their survival compared to colonies we had previously studied. Professor Swingle sent these animals to us to conduct this study.

To eliminate variable factors due to care, diet, climate, etc., none of the original animals obtained from Dr. Lewis' colony were used in these experiments, but only the offspring, born and raised in our laboratory, in the same room with our animals.

Operative technique and care were as previously described.<sup>5</sup> Considerable of the adrenal pedicle and adjacent fat were removed, although this precaution does not apparently influence our survival results.

*Survival Results—Mature Animals.* Thirty-seven animals of the Lewis strain, varying in weight from 148 to 236 gm., averaging 192 gm., were operated. Of the 37, 2 deaths occurred on the 14th day, 2 on the 18th day, and one death on each of the following days: 21st, 24th, 28th, 32nd, 42nd, 44th, 54th, 74th, and 87th. The total deaths were 13 in number, or 35.1% of the total. The other 24 cases (64.9%) lived in good condition until killed for autopsy from 3 to 4 months after adrenalectomy. (Table I. Lewis Colony—Adults.) These results closely parallel those obtained by Dr. Lewis, himself, who found that from 60 to 80% of his colony survives adrenalectomy.<sup>6</sup> Lascano-Gonzalez<sup>7</sup> reported a 55% survival in this same colony despite the occurrence of an epidemic of bronchial pneumonia.

The highest survival we have ever obtained in an adult control

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<sup>1</sup> Pencharz, R. I., Olmsted, J. M. D., and Giragossintz, G., *Phys. Zool.*, 1931, **4**, 501.

<sup>2</sup> Martin, S. J., *Am. J. Phys.*, 1932, **100**, 180.

<sup>3</sup> Firor, W. M., and Grollman, A., *Am. J. Phys.*, 1933, **103**, 686.

<sup>4</sup> Evans, H. M., *Memoirs of U. of Calif.*, 1934, **10**, U. of Calif. Press, Berkeley.

<sup>5</sup> Gaunt, R., *Am. J. Phys.*, 1933, **103**, 494.

<sup>6</sup> Lewis, J. T., *Am. J. Phys.*, 1923, **64**, 503.

<sup>7</sup> Lascano-Gonzalez, J. M., *Rev. Soc. Argent. Biol.*, 1933, **10**, 28.

TABLE I.  
Survival of Rats from Different Colonies and of Different Ages after Adrenalectomy.\*

	Total Mortalities	No. Surviving Indefinitely	Av. Survival in Days, with Standard Errors	Deaths during			Deaths during 13th to 30th Day	Deaths after 30 Days	Day of first death after Operation	Total Cases
				first 15 Days	13th to 30th Day	30 Days				
Lewis Colony—Adults	13 (35.1%)	24 (64.9%)	36.2 ±6.2	2 (5.4%)	5 (13.5%)	6 (16.2%)	6 (16.2%)	14th	37	
Controls—Adults	21 (87.5%)	3 (12.5%)	17.8 ±2.5	9 (37.5%)	9 (37.5%)	3 (12.5%)	3 (12.5%)	2nd	24	
Lewis Colony—30-day-old	25 (96.2%)	1 (3.8%)	8.3 ±0.83	23 (88.5%)	2 (7.7%)	0.0	0.0	3rd	26	
Controls—30-day-old	44 (95.6%)	2 (4.4%)	8.0 ±0.77	42 (91.2%)	1 (2.2%)	1 (2.2%)	1 (2.2%)	3rd	46	

\*“Lewis Colony” refers to those animals sent by Dr. J. T. Lewis from Argentina.

“Controls” refers to those animals of our colony operated at the same time as those of the Lewis Colony.

series of our own animals, generally showing from 90 to 95% mortality, was in a group of 24 operated at the same time and under conditions identical to those of the Lewis strain. Wide differences were, however, noted between the survival of these 2 colonies as seen in Table I (Controls—Adults).

*Survival Results—30-day-old Animals.* The frequent use of 30-day-old rats for adrenal experiments makes their survival of interest. Survival differences noticed between the adults of these 2 colonies were not apparent in the young animals, where both groups succumbed rapidly. The young rats were weaned at 28 days of age and adrenalectomized at 30 days.

Twenty-six of the young Lewis colony animals were operated. One survived indefinitely. The other 25 (approximately 95%) died between 3 and 18 days with an average life-span of 8.28 days (Table I).

Forty-six young animals of our colony were operated. Two survived indefinitely. The other 44 (95.5%) died between 3 and 34 days, with an average survival of 8 days (Table I).

*Cortical Accessories.* In 16 of the 24 adult animals of the Lewis strain which survived, one or 2 accessory cortical bodies in each rat were identified by histological examination. In 4 cases these accessories were distinctly macroscopic in size. In 12 cases the accessory was on the left side, either near the proximal part of the adrenal vein, or on the renal vein, or on a side branch of the adrenal vein. In 4 cases the accessory was found on the right side, near the site of the excised right adrenal, and always very near the posterior vena cava. As mentioned above, enough of the pedicle and tissues surrounding the adrenal were always removed to assure that these accessories were not fragments of the main gland left behind at operation. In only 4 of the 8 cases in which no accessories were found was there a fairly complete search made; because in the others, small macroscopic bodies were mistakenly thought to be adrenals, and no other tissues removed for microscopic study.

*Conclusions.* These results further indicate that different colonies of rats may differ markedly in their sensitivity to adrenal removal—a fact explaining, in part, the widely different reports concerning the survival of adrenalectomized rats. The logical assumption, we now are testing histologically, is that these colonies differ in the amount of accessory cortical tissue which they possess. However, rats having accessories may succumb to adrenalectomy unless some treatment is given to delay death long enough for hypertrophy of the accessories to occur. This is indicated by the fact that approx-

imately 50% of the adults of our colony survive when treated for a time after adrenalectomy either with cortical extract<sup>8</sup> or with salt,<sup>9</sup> whereas much smaller percentages survive when untreated. The work of Lascano-Gonzalez indicates that in the Lewis colony all of the animals have cortical accessories.

## 7898 C

Proteolytic Enzyme Content of Latex from the Fig Tree  
(*Ficus Carica L'*). Seasonal Variation.\*

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We have reported<sup>1, 2</sup> the isolation and proteolytic activity of the anthelmintic agent in the sap obtained from numerous species of the fig tree (genus *Ficus*), from South America, Cuba, and Alabama. The sap from *F. laurifolia* and *F. glabrata*, has been widely used as a general anthelmintic by the natives of South America and Panama and its anthelmintic action confirmed by several medical investigators who have noticed that it was particularly effective against *Trichuris trichiura*.<sup>3-7</sup>

In the present study we have followed the variation in the enzyme content of sap taken from the domestic fig, *F. carica L'*, throughout the year. Mrs. E. L. Caldwell, at the International Health Division Laboratory in Andalusia, Alabama, has collected and sent us 8 samples at regular intervals over a 12 month period. The samples were analyzed within 4-5 days after their collection.

One cubic centimeter of the sap is added to a 2% solution of gelatin and a formol titration made immediately on an aliquot portion

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<sup>8</sup> Gaunt, R., and Gaunt, J. H., *Proc. Soc. Exp. Biol. and Med.*, 1934, **31**, 490.

<sup>9</sup> Gaunt, R., Tobin, C. E., and Gaunt, J. H., *Proc. Soc. Exp. Biol. and Med.*, 1934, **32**, 134.

\* The funds for carrying out this work were given by the International Health Division of the Rockefeller Foundation.

<sup>1</sup> Robbins, B. H., *J. Biol. Chem.*, 1930, **87**, 251.

<sup>2</sup> Robbins, B. H., and Lamson, P. D., *J. Biol. Chem.*, 1934, **106**, 725.

<sup>3</sup> Caldwell, F. C., and Caldwell, E. L., *Am. J. Trop. Med.*, 1929, **9**, 471.

<sup>4</sup> Hall, M. C., and Augustine, D. L., *Am. J. Hyg.*, 1929, **9**, 602.

<sup>5</sup> Mouat-Briggs, C. E. F., *Trans. Roy. Soc. Trop. Med. and Hyg.*, 1914, **8**, 216.

<sup>6</sup> Paez, F., *Trans. Roy. Soc. Trop. Med. and Hyg.*, 1914, **8**, 217.

<sup>7</sup> Montoya, T. W., *Trop. Dis. Bull.*, 1922, **19**, 240.