

The virulence test on *Nicotiana tabacum* was performed for tobacco necrosis and on *Nicotiana glutinosa* for tobacco mosaic and gave the results shown in Table I.

TABLE I.

	Control	3,000 atmospheres	5,500 atmospheres	8,000 atmospheres
Tobacco necrosis on <i>Nicotiana tabacum</i>	lesions	lesions	0	0
Tobacco mosaic on <i>Nicotiana glutinosa</i>	66	121	90	39

The second experiment confirmed the first one in regard to tobacco mosaic virus, the destructive action of pressure being more than 8,000 atmospheres which is well above the usual lethal pressure for certain viruses and close to the denaturing pressure for globulin. On the other hand, tobacco necrosis is inactivated between 3,000 and 5,000 atmospheres, the usual virus lethal pressure.

It might be of interest to note that in both experiments the number of lesions for tobacco mosaic was somewhat higher after the virus had been pressed between 3,000 and 6,000 atmospheres than when pressed at lower or higher pressures. This fact might be of importance if duplicated.

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Effect of Autoclaving on Vitamin Potency of Nicotinic Acid.*

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Smith and Hendrick¹ and Goldberger, Wheeler, Lillie, and Rogers² of the U. S. Public Health Service showed that the vitamin B value of yeast, as then understood, was due, in part, to the anti-neuritic substance which was destroyed by autoclaving, and, in part,

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¹ Smith, M. I., and Hendrick, *U. S. P. H. Rep.*, 1926, 41, 201.

² Goldberger, Jos., Wheeler, G. A., Lillie, R. D., and Rogers, L. M., *U. S. P. H. Rep.*, 1926, 41, 297.

to a more heat-stable factor which was able to withstand autoclaving. The term "autoclaving" is used advisedly, since evidence submitted by Kennan, Kline and Elvehjem³ indicates that the antineuritic factor is more stable to dry heat than is the factor which withstands autoclaving. Goldberger and his associates demonstrated to the satisfaction of most investigators that pellagra is a vitamin deficiency disease, apparently due to a lack of the factor in yeast which is uninjured by autoclaving. Since canine blacktongue develops on the same type of deficiency which produces pellagra, is characterized by similar symptoms and is cured by the same food factors, it is reasonable to conclude that it is an analog of pellagra. Consequently many tests for curative factors have been carried out on dogs suffering from artificially produced blacktongue.

The observation by Elvehjem, Madden, Strong, and Woolley⁴ that nicotinic acid (the simple pyridine carboxylic acid) would cure blacktongue in dogs has been corroborated by Dann,⁵ Street and Cowgill.⁶ It was soon demonstrated that it had a similar curative value in human pellagra by Fouts, Helmer, Lepkovsky and Jukes,⁷ Smith, Ruffin and Smith,⁸ and Spies.⁹

The question naturally arises as to whether or not the curative properties of nicotinic acid are decreased or destroyed by autoclaving. The following experiments were designed to answer this question:

Ten dogs were allowed to develop blacktongue on a modification of Goldberger's diet No. 123, as used in this laboratory, the details of which were published recently by Smith, Persons and Harvey.¹⁰ When blacktongue was well developed the animals were divided into 5 groups of 2 dogs each, paired according to weight. Dog No. 1 in each group was given autoclaved nicotinic acid and dog No. 2 the unautoclaved. The concentration found most satisfactory was a solution of 5 mg. per ml. For oral use the acid was dissolved in distilled water and for parenteral use in sterile saline. The nico-

³ Kennan, J. A., Kline, O. L., and Elvehjem, C. A., *J. Nutrition*, 1935, **9**, 63.

⁴ Elvehjem, C. A., Madden, R. J., Strong, F. M., and Woolley, D. W., *J. Am. Chem. Soc.*, 1937, **59**, 1767.

⁵ Dann, W. J., *Science*, 1937, **86**, 616.

⁶ Street, H. R., and Cowgill, G. R., *PROC. SOC. EXP. BIOL. AND MED.*, 1937, **37**, 547.

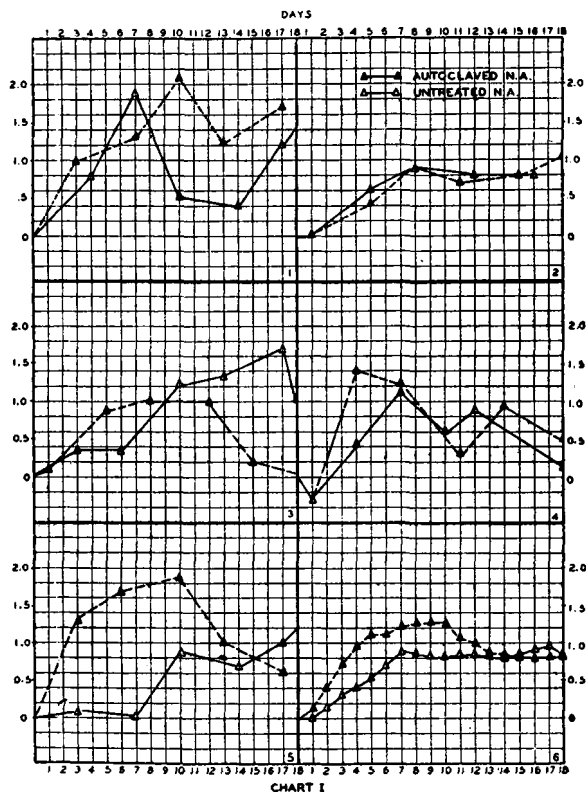
⁷ Fouts, P. J., Helmer, O. M., Lepkovsky, S., and Jukes, J. H., *PROC. SOC. EXP. BIOL. AND MED.*, 1937, **37**, 405.

⁸ Smith, D. T., Ruffin, J. M., and Smith, S. G., *J. Am. Med. Assn.*, 1937, **109**, 2054.

⁹ Spies, T. D., *Lancet*, 1938, **234**, 252.

¹⁰ Smith, D. T., Persons, E. L., and Harvey, H. I., *J. Nutrition*, 1937, **14**, 373.

tinic acid solution was autoclaved for 2½ hours at 15 lb. pressure and a second portion for 5 hours at 15 lb. pressure. Only 2 dogs were given the material autoclaved for 2½ hours; since the 5-hour material proved equally effective it seemed unnecessary to test further the nicotinic acid which had been autoclaved for only 2½ hours. The dose varied from 1 to 10 mg. per kilogram given daily for a 10-day period. Previous tests had indicated that within these limits the size of the dose makes little if any difference.



Weight Curves of Dogs with Experimental Canine Blacktongue Treated with Nicotinic Acid for Ten Days.

Fig. 1. Dogs receiving 1.0 mg. N.A. per kilo of body weight.

Fig. 2. " " 2.0 " " " " " " " " " "

Fig. 3. " " 10.0 " " " " " " " " " "

Fig. 4. " " 1.5 " " " " " " " " " "

Fig. 5. " " 1.5 " " " " " " " " " "

Fig. 6. Each curve represents an average of the five dogs in the preceding figures.

Results. Mouth symptoms healed quickly with both the autoclaved and unautoclaved nicotinic acid. There was an almost immediate increase in weight as shown in Chart 1. No difference

could be detected between the curative action of the autoclaved and that of the unautoclaved solution. The average length of time at which blacktongue symptoms reappeared after treatment ended was 17 days for the autoclaved and 16 days for the unautoclaved solution.

We conclude, therefore, that nicotinic acid has little if any of its vitamin potency destroyed by autoclaving. It thus resembles in this respect, as well as others, the P.P. factor of Goldberger.

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Successful Transmission of Cutaneous Leishmaniasis by the Bites of *Stomoxys calcitrans*.

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The experiments carried out by Sergent, Sergent, Parrot, *et al.*,¹ Adler and Theodor,^{2, 3, 4} incriminated the sandfly as the probable vector of cutaneous leishmaniasis. This hypothesis has been supported by the fact that it has been possible to infect sandflies under experimental conditions, and to produce the cutaneous lesions by the injection of crushed infected sandflies. Furthermore, the sandfly theory of transmission of cutaneous leishmaniasis has been attractive because of the readiness with which leishmanias exflagellate and multiply in the alimentary tract of these insects, and the epidemiological evidence apparent in the close correspondence of the distribution of certain species of sandflies with the distribution of cutaneous leishmaniasis. However, we have not been entirely satisfied with the sandfly theory of transmission because of the following facts:

1. Critical experiments designed to demonstrate the transmission by the bite of the sandfly have regularly failed. Although it is conceivable that infection may be accomplished by crushing an infected sandfly at the site of the bite, the likelihood of this occurring would appear to be rather remote to any person who has attempted to destroy a sandfly while in the act of biting.

¹ Sergent, Ed. *et Et.*, Parrot, L., Donatien, H., *et* Beguet, M., *Arch. Sc.*, 1921, **173**, 1030.

² Adler, S., and Theodor, O., *Ann. Trop. Med. and Parasit.*, 1925, **19**, 365.

³ *Ibid.*, 1926, **20**, 175.

⁴ *Ibid.*, 1927, **21**, 89.