

Cutaneous Arachnoidism Experimentally Produced with the Glandular Poison of *Loxosceles Laeta*¹

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WHEN eleven cases of cutaneous arachnoidism, with gangrenous lesions, made their appearance in Antofagasta, Chile,³ there was some doubt as to the etiology of these accidents. Some physicians were sure that they were produced by the bite of mosquitos or other insects. At that time, the writer undertook certain investigations in an attempt to prove which of the arachnids found in the city might possibly be the cause of the above mentioned condition. This proved to be a long hard task, undertaken because of a firm conviction that was based, partly, on the assurance of patients that the accidents were caused by the bite of a spider; partly, on the markings left by the insect's stingers, and partly, on the similarity between these accidents and others described elsewhere in the world. The author's belief was later justified by his being able to reproduce experimentally, in various types of animals, the same lesions produced by these spiders in humans.

It was not until after the above mentioned investigations were terminated that the writer was able to obtain a specimen of the spider in question (*L. laeta*). Specimens were secured again and again after this. Even though it may be possible for other spiders to provoke similar accidents, it is impossible to deny to the above named species its role as causative agent of cutaneous arachnoidism, or gangrenous spot of Chile.

In 1942, while in Guayaquil and later, in Lima the author frequently found *L. laeta* in the homes thereabouts. He often wondered why accidents produced by this species were not more frequently reported. Though it has not been possible yet to determine the reason for the spider's biting, it is true that numberless cases are reported from the same place and at the same time, even though years may go by afterwards without one such accident occurring.

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3. A. Macchiavello, Cutaneous arachnoidism or gangrenous spot of Chile. Puerto Rico J. Pub. Health and Trop. Med., 22:425-467, 1947; La *Loxosceles laeta*, causa del aracnoidismo cutáneo o mancha gangrenosa de Chile. Rev. chilena de hist. nat., 41:11-19, 1937.

The author recently completed experiments with the glandular poison of *L. laeta*, and the present note is by way of presenting as yet unpublished observations made since 1934.

MATERIAL AND METHODS

Material. With the help of the personnel of the *Servicio Nacional Antipestoso*, of Chile, some 57,000 spiders were collected in the northern part of Chile, especially around Antofagasta, Iquique, and Tocopilla. The majority of these spiders were of the house variety, also found in warehouses, cellars, and rocky places. The areas where the spiders were collected were usually free of natural vegetation; there were few public parks or even artificially cultivated gardens. The spiders were the same in every place. Dampness, darkness, and dirt characterized the places where they most abounded, which was true of the mud and straw huts where some of them were taken.

Some "migalas" were found in rocky spots. In the interior of Calama *L. mactans* was observed; here it is known by the name of "koma." In Guayaquil and Perú, the specimens were limited exclusively to *L. laeta*, the only difference between these and the ones found in Chile being absence of a black abdomen in the former.

With the aid of Professor Carlos Porter, of Chile, Professor Mello Leitão, of Brazil, and Professor N. Banks, of the United States, the material was classified in the following manner. The species mentioned below represent about 95 percent of the arachnids found in the northern part of Chile.

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| 1. <i>Saliciscus scenicus</i> | 10. <i>Pholcus phalangioides</i> (Tues.) |
| 2. <i>Metazygia dubia</i> (Keys), comb. n. | 11. <i>Tentana grossa</i> (Koch) |
| 3. <i>Ariadna coarctata</i> (Nic.) comb. n. | 12. <i>Zilla x-notata</i> (Clerk) |
| 4. <i>Ariadna maxima</i> (Nicolet) Simon | 13. <i>Thanatus retentus</i> , Chamb. |
| 5. <i>Loxosceles laeta</i> (Nicolet) | 14. <i>Theraphosid</i> sp. |
| 6. <i>Theridion ambiguum</i> (Nicolet) | 15. <i>Aranea audax</i> |
| 7. <i>Theridion gracile</i> (Keys) | 16. <i>Dysdera maxima</i> |
| 8. <i>Theridion tepidariorum</i> (Koch) | 17. <i>Latrodectus mactans</i> |
| 9. <i>Cleocnemis junior</i> (Nic.) comb. n. | 18. "Migala" |

Experimental animals. The first experiments utilized rabbits, rats, and white mice but were afterwards limited to guinea pigs alone. In the experiments showing spontaneous biting, the spider was placed in a glass tube that was fastened with adhesive tape to the shaved portion of the guinea pig's abdomen. After the spider bit, the lesion was permitted to follow the usual course.

If the spider did not bite spontaneously after one or two days'

contact, it was excited artificially. The experiment was considered negative if the spider had not bitten the guinea pig by the third day. The shaved portion of the experimental animal was examined with a magnifying glass for spider bites at least four times daily. A different animal was used for every experiment, except where otherwise indicated.

The glandular solution to be injected was prepared by dissecting, under the microscope, the glands found in the stingers of the spider, macerating them in a mortar, and then carefully dissolving them in saline solution. The dose injected took into consideration the size and age of the spider, which varied with every specimen from 0.045 mg. to 0.325 mg. in young ones and 0.088 mg. to 0.350 mg. in the adults. The former had double the quantity of poison than the latter. The route of inoculation also varied.

One series of experiments was for the purpose of studying exclusively the aggressiveness, rapidity, and method of attack of the spiders when biting other spiders of the same or different sex or species. *L. mactans* and the *Dysderidae* were found to remain attached to their victims by their stingers after attacking, whilst *L. laeta* bit and withdrew immediately. Vellard⁴ writes that these spiders move very slowly, or rather, with great cautiousness, but when they attack, they are extraordinarily quick. Their legs begin to vibrate; the spider withdraws slightly and then jumps, rather than walks, distances of 4 to 5 cm. in order to fall upon its prey and exterminate it. Generally, the younger specimens with black abdomen and greenish-copper thorax and legs attack with tremendous daring. On being discovered, they do not appear to play possum but rather try to flee, sometimes turning and facing the enemy, counterattacking, and stinging quickly.

EXPERIMENTS

Table 1 details the results of 352 experiments that tended to demonstrate (a) the aggressiveness of the different species of spiders used (a different guinea pig was utilized in each experiment) and (b) the type of lesion resulting from such biting. Analysis of Table 1 shows the following findings. (a) The spider seldom stung spontaneously. (b) Two specimens that stung spontaneously left the marks of the stingers only. (c) A third group of four specimens provoked only minimal and localized lesions, such as edema and small necrotic areas, usually nodular in character. Gen-

4. J. Vellard, Le venin des araignées (Paris: Masson et Cie., 1936).

TABLE 1
Results of Spontaneous or Induced Stinging of Guinea Pigs by Spiders
Maximal Period of Observation, 3 Days

Species	No. of Experiments	No. of Guinea Pigs Stung	No. of Guinea Pigs with Symptoms: Local-General		No. of Guinea Pigs Died
<i>Loxosceles laeta</i>	75	28	28	0	0
<i>Salticus scenicus</i>	6	0			
<i>Dysdera maxima</i>	50	7	3	4	4
<i>Metazygia dubia</i>	20	0			
<i>Ariadna coarctata</i>	19	1	1	1	0
<i>Theridion ambiguum</i>	15	5	5	0	0
<i>Cleocnemis junior</i>	23	0			
<i>Theridion gracile</i>	15	1	1	1	0
<i>Pholcus phalangioides</i>	15	0			
<i>Tentana grossa</i>	12	0			
<i>Zilla x-notata</i>	30	2	0	0	0
<i>Thanatus retentus</i>	7	1	0	0	0
<i>Theraphosid sp.</i>	12	9	0	9	9
<i>Latrodectus mactans</i>	25	18	3	18	14
<i>Aranea audax</i>	10	1	1	0	0
<i>Eperia diadema</i>	5	0			
"Migala"	3	3	3	3	3

eralized signs consisted of muscular contractions, nervousness, and pain but all of short duration. (*Aranea audax* belongs in this last group.) (e) The fourth group was made up of the species the bite of which provokes nervous disorders that, in turn, develop into a general intoxication with absence of localized symptoms. (f) The last group consisted of *L. laeta* specimens exclusively. Twenty-eight out of 75 specimens (37.3 percent) stung the guinea pigs; 7 times spontaneously before one hour had elapsed; three times, between one and three hours; once, between three and twelve hours. In the remaining specimens, the bite was produced by previous hostilization of the spider after periods fluctuating between several seconds to more than three hours.

The character of the lesion provoked by the bite was more or less the same in all cases, except for the intensity of the lesion, that is, (1) edema without induration or necrosis; (2) edema with induration; (3) gangrenous spot followed by necrosis and ulcer; and was the same, step by step, as that described in human cases: bite, edema, gangrenous spot, blister, induration, necrosis of the skin, dry eschar, and sloughing off, leaving an ulcer with hardened edges but clean inside, where one could see the underlying tissues, the ulcer later healing rather slowly. There were no apparent general signs. The size of the necrotic area varied between 2 and 10, or more, cm. (Figs. 1, 2, and 3.)

The *Theraphosid* and "migalas" killed the experimental animal instantly, or in a few minutes. The *Dysderidae* provoked death less

TABLE 2
Results Obtained from the Intradermal Injection of Guinea Pigs with the Glandular Poison of *L. laeta*^a

Exper. No.	L. laeta	Age	Guinea Pigs Used																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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^aThe experiments are listed according to the quantity of glandular poison injected; said quantity is expressed in fractions of both glands, previously macerated and dissolved in saline or distilled water. The guinea pigs in each experiment were all injected with the same preparation. The results are listed as follows: +, indicates number of hours before death occurred; 0, indicates absence of lesion.

Numbers and decimals indicate size in cm. of ulcer provoked; P—papule, E—edema, I—induration, G—pinpoints of necrosis.

A sixth guinea pig was inoculated in Exper. No. 6 of Series 1, developing an ulcer 4 cm. in diameter.

violently and, at times, there arose at the site of the bite small dry gangrenous lesions followed by a small ulcer. The bite of the *Latrodectus* produced the same nervous symptoms in the guinea pig as it did in man, death occurring between four to eighteen hours. A fourth of the experimental animals in this series recuperated, however.

2. *Intradermal injection of the glandular poison of L. laeta.* These experiments are summarized in Table 2. As the spider bites with both stingers, simultaneously, inoculating the poison from both glands, the writer has thought it convenient to specify the dose in fractions, or multiples of the two glands after being macerated and diluted in saline. In the first experiment already described, both young and adult specimens of *L. laeta* were utilized; it was observed here that the former contained a more active poison. However,

TABLE 3

Results Obtained from the Intradermal Injection of Guinea Pigs with the Glandular Poison of *L. laeta* of Different Coloration^a

Series No. <i>L. laeta</i>	Coloration: Abdomen	Size	Series No. Guinea Pig	Results
37	Light	Large	71	Pronounced induration; black eschar 1 x 0.5 cm.
38	Light	Medium	72	Pronounced induration; black eschar 0.5 x 0.2 cm.
39	Light	Large	73	Pronounced induration; pin-point necrosis
40	Rose	Large	74	Negative
41	Rose	Large	75	Slight edema
42	Rose	Large	76	Intense edema; no eschar
43	Dark brown	Medium	77	Small black eschar
44	Dark brown	Large	78	Slight induration
45	Dark brown	Large	79	Pin-point necrosis
46	Dark brown	Large	80	Black eschar and ulcer 8 x 3 cm.
47	Dark brown	Medium	81	Negative
48	Light brown	Medium	82	Black eschar; round ulcer 0.8 cm. in diameter
49	Light brown	Large	83	Edema. Death after 6 hr.
50	Light brown	Large	84	Slight induration
51	Lead gray	Medium	85	Eschar; deep ulcer 3 x 4 cm.
52	Lead gray	Medium	86	Exanthema (?); purulent ulcer 2 cm. in size
53	Lead gray	Medium	87	Black eschar; ulcer 3 x 5 cm.
54	Black	Small	88	Pin-point ulcer
55	Black	Medium	89	Negative
56	Black	Medium	90	Black necrotic spot 2.5 x 3 cm.
57	Black	Medium	91	Black necrotic spot about 0.3 cm. in size; death after 4th day
58	Black	Medium	92	Necrosis; ulcer about 2 x 3 cm. ^b
59	Black	Large	93	Deep round ulcer, hard, about 0.5 cm.
60	Black	Medium	94	Ulcer about 2 x 12.5 cm.
Distilled water controls			95-98	Negative
Saline solution controls			99-102	Negative

^aEach guinea pig was given a dose equal to two glands macerated and dissolved in 0.2 cm. of distilled water or saline solution.

^bSpider found in bed-linen.

there was a definite variation in the action of the poison of one spider and another. The author also established that one fiftieth part of poison matter (2 glands) was sufficient to provoke typical cutaneous lesions, even though small.

3. *Relation between the action of the glandular poison and the variation in size and color of the abdomen of L. laeta respectively.* Table 3 details the data established as to the relation between the size and color of *L. laeta* and the potency of its glandular poison. To all

TABLE 4

Action of Various Dilutions of Glandular Poison of L. laeta in Guinea Pigs Injected by Intradermal Route^a

Series No. Guinea Pig	Dose (cc.)	Dilution (cc.)	Results ^b
<i>Exper. No. 1. Dilution of 0.1 cc. saline-to 2 glands of L. laeta</i>			
V-1	0.1	None	Eschar; ulcer 2 x 7 cm.
V-2	0.1	+0.2	Eschar; ulcer 3 x 5 cm.
V-3	0.1	+0.5	Pin-point eschar
<i>Exper. No. 2. Dilution of 0.1 cc. saline-to 1 gland of L. laeta</i>			
V-4	0.1	None	Pin-point eschar
V-5	0.1	0.2	Eschar 0.2 x 0.5 cm.
V-6	0.1	0.5	Negative
<i>Exper. No. 3. Dilution of 0.1 cc. saline-to 0.4 gland of L. laeta</i>			
V-7	0.1	None	Eschar 3 x 7 cm.
V-8	0.1	0.2	Negative
V-9	0.1	0.5	Pin-point eschar
<i>Exper. No. 4. Dilution of 0.1 cc. saline-to 0.2 gland of L. laeta</i>			
V-10	0.1	None	Round eschar about 0.5 cm.
V-11	0.1	0.2	Eschar about 2 cm.
V-12	0.1	0.5	Pin-point eschar
<i>Exper. No. 5. Dilution of 0.1 cc. saline-to 0.1 gland of L. laeta</i>			
V-13	0.1	None	Eschar 3 x 2 cm.
V-14	0.1	0.2	Pin-point eschar
V-15	0.1	0.5	Edema without eschar
<i>Exper. No. 6. Dilution of 0.1 cc. saline-to 1/25 gland of L. laeta</i>			
V-16	0.1	None	Pin-point eschar
V-17	0.1	0.2	Negative
V-18	0.1	0.5	Slight edema

^aTwo hundred stingers of *L. laeta* (with light and dark brown and black abdomens) were macerated, finely ground, and dissolved in 10 cc. of physiological saline.

^bInjection was given into shaven abdomen of guinea pig.

appearances, size and color seem to be the same in all young specimens, the abdomen being darker than in adults. Said abdomen becomes lighter in color with age and time in captivity. As has already been mentioned in another article, the patients bitten by this insect always mentioned the fact that they were stung by a "black or greyish black" spider.

The relation of color to the sexual cycle of the spider has not been established. Table 4 shows that the glandular poison of spiders with a black abdomen had greater potency, but it may be possible that the true relation is between the color and the age of the spider, age perhaps having a more direct bearing on the potency of the poison.

4. *Relation between the action and concentration of the poison.* Even in the first experiments, the writer noted that there was a well-defined relation between the potency of the poison and the dilution, as could be seen by the necrosis provoked in the guinea pigs. Table 4 summarizes some of the findings that tend to confirm this fact. The same quantity of glandular matter seemed to have more intensity even though less diluted; there were times when the glandular matter was diluted just sufficiently to make it soluble, yet the resulting cutaneous lesions were smaller than when the dilution was greater. In the writer's opinion, this fact was due to a mass coagulation of the tissues which impeded any more ample diffusion of the concentrated poison.

5. *Action of the glandular poison of L. laeta injected by various routes.* In this experiment, 20 glands were dissected from the stingers of 10 spiders, macerated, and dissolved in 5 cc. of physiological saline. The experiments outlined in Table 5 were carried out with such a dilution. The data show that the glandular poison acted only on the tissues of the skin.

TABLE 5

Action of Glandular Poison of L. laeta in Guinea Pigs Injected by Various Routes

Series No. Guinea Pig	Dose	Route	Results
VI-1	2/5 Gl.	Subcutaneous	Negative
VI-2	1 Gl.	Subcutaneous	Slight edema
VI-3	2/5 Gl.	Intradermal	Eschar 2 x 3 cm.
VI-4	1 Gl.	Intradermal	Eschar approximately 7 cm.
VI-5	2/5 Gl.	Intraperitoneal	Death from peritonitis
VI-6	1 Gl.	Intraperitoneal	Negative
VI-7	2/5 Gl.	Intravenous	Slight convulsions
VI-8	1 Gl.	Intravenous	Passing discomfort; eschar formed on ear at site of injection

6. Hemolytic action of the glandular poison of *L. laeta*. In order to prove hemolytic action by the glandular poison of *L. laeta*, 200 glands were dissolved in physiological saline so that every cc. of dilution represented the poison of 10 glands. Decreasing quantities of glandular matter were utilized for the purpose of finding out whether or not the poison would act *in vitro* on the red cells of the experimental rabbits or guinea pigs, either directly or in the presence of fresh serum from a guinea pig complement. The negative findings are outlined in Table 6, which shows that the poison of *L. laeta* is not hemolytic for the red cells of either guinea pig or rabbit.

TABLE 6
Hemolytic Action of Glandular Poison of *L. laeta*^a

Quantity of poison in terms of glands used	10	5	1	1/2	1/5	1/10	1/50	1/100	
Physiological saline added		1 cc.	1 cc.	1 cc.	1 cc.	1 cc.	1 cc.	1 cc.	
Rabbit RBC at 2 percent	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Hemolysis	0	0	0	0	0	0	0	0	I
Rabbit RBC at 2 percent	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Fresh guinea pig serum	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Hemolysis	0	0	0	0	0	0	0	0	II
Guinea pig RBC at 2 percent	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Hemolysis	0	0	0	0	0	0	0	0	III
Guinea pig RBC at 2 percent	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Fresh guinea pig serum	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Hemolysis	0	0	0	0	0	0	0	0	IV

^a1 cc. represents the poison of 10 glands; dilutions have been made at 1/10 and 1/100 in order to handle the fractions of glands used. These experiments were not repeated.

7. Variation in the action of the glandular poison of *L. laeta* while the insects were caged and fasting. Twelve *L. laeta* which had already stung guinea pigs, provoking cutaneous lesions of varying sizes, were caged for periods ranging from fifteen days to three months. Every fifteen days, two specimens were placed over the freshly shaved stomachs of guinea pigs and incited to sting. Only five stung spontaneously. The stingers of these spiders, as well as of the seven that did not bite, were later macerated, dissolved in physiological saline, and inoculated intradermally in guinea pigs. The results of these experiments were not tabulated, since all were negative except for two where pinpoint lesions were only obtained after fifteen days and a month, respectively. The action of the glandular poison diminished while the insect was caged.

8. Variation in the toxic power of *L. laeta* poison after various bites. It was rather difficult to make the same spider sting more than one

guinea pig. On two occasions, the author succeeded in getting one specimen to sting twice and another, three times. However, the lesions after the first bite were practically nil, while the initial ones were only 2 cm. by 0.2 cm. at the last measurement, when ulcers formed.

It was much easier to make the spiders sting others of the same species, after the latter had been deprived of their stingers. After the third bite, the poison from the stingers was found to be practically inactive.

9. Action of the glandular poison of *L. laeta* after being submitted to heating. Table 7 shows that the glandular poison of *L. laeta* preserves its necrotizing power after half an hour of heating at 37° C. but is destroyed at 90° C.

TABLE 7
Action of Heat on the Glandular Poison of *L. laeta*

Poison Heated at 37° C. for 1/2 Hr.				Poison Heated at 90° C. for 1/2 Hr.			
Series No. Guinea Pig	Route	Dose	Necrosis	Series No. Guinea Pig	Route	Dose	Necrosis
1	Intraderm.	1 Gl.	7 x 3.5 cm. ulcer	2	Intraderm.	1 Gl.	Negative
3	Intraderm.	1/2 Gl.	Pin-point	4	Intraderm.	1/2 Gl.	Negative
5	Intraderm.	1/5 Gl.	2 x 3 cm. ulcer	6	Intraderm.	1/5 Gl.	Negative

10. Relation of the glandular poison of *L. laeta* to the arachnolysin obtained from this same species. These experiments tended to establish the relation or difference existing between both of these poisons. The results are outlined in Tables 9, 10, 11, and 12, which refer to the action of the arachnolysin extracted from the cephalothorax or abdomen of *L. laeta* on rabbits and guinea pigs. Table 8 shows that there was no cross immunity between the arachnolysin and the glandular poison of this species. These findings established the fact that the arachnolysin acted quite differently from the glandular poison; it was not necrotizing but, rather, intensely hemolytic. Said action was more apparent in rabbits injected by the intravenous route. The hemolytic action of the arachnolysin on the red blood cells of the guinea pigs was less intense than on the red blood cells of rabbits.

The last experiments were motivated by an observation of Escudero,⁵ who attributed hemolytic activity to the glandular poison of *L. laeta*.

5. F. E. Escudero, Un caso de aracnoidismo mortal en Chile. Rev.chilena de hist.nat., 39:339, 1935.

TABLE 8

Action of Intradermal Injection of Glandular Poison of *L. laeta* in Rabbits and Guinea Pigs Immune to Arachnolysin from Same Species

Series No.	Dose	Results
Guinea Pig 1	1/2 Gl.	Local ecchymotic lesion; edema
Guinea Pig 2	1/5 Gl.	Ulcer 0.5 x 0.3 cm.
Guinea Pig 3	1/10 Gl.	Ulcer 2 x 1 1/2 cm.
Rabbit 1	1/2 Gl.	Ulcer 6 x 3.5 cm.
Control Guinea Pig	1/10 Gl.	Ulcer 3 x 0.7 cm.

TABLE 9

Action of Arachnolysin from Cephalothorax of *L. laeta* Injected into Guinea Pigs and Rabbits through Various Routes^a

Series No.	Dose Equivalent to	Route	Results
<i>First Series</i>			
Rabbit No. 1	1/2 cephalothorax	Subcutaneous	Slight edema
Rabbit No. 2	1/2 cephalothorax	Subcutaneous	Negative
Rabbit No. 3	1/5 cephalothorax	Subcutaneous	Negative
Rabbit No. 4	1/5 cephalothorax	Subcutaneous	Negative
Rabbit No. 5	1/2 cephalothorax	Intradermal	Redness; papule
Rabbit No. 6	1/2 cephalothorax	Intradermal	Edema; induration; no eschar
Rabbit No. 7	1/5 cephalothorax	Intradermal	Negative
Rabbit No. 8	1/5 cephalothorax	Intradermal	Slight papule; induration
Rabbit No. 9	1/2 cephalothorax	Intravenous	Hemolysis; death in 3 hr.
Rabbit No. 10	1/2 cephalothorax	Intravenous	Hemolysis; death in 14 hr.
Rabbit No. 11	1/5 cephalothorax	Intravenous	Hemolysis; death in 47 hr.
Rabbit No. 12	1/5 cephalothorax	Intravenous	Hemolysis; death in 38 hr.
Rabbit No. 13	1/2 cephalothorax	Intraperitoneal	Hemolysis; death on 3d day
Rabbit No. 14	1/2 cephalothorax	Intraperitoneal	Death in 12 min.
Rabbit No. 15	1/5 cephalothorax	Intraperitoneal	Peritonitis; died
Rabbit No. 16	1/5 cephalothorax	Intraperitoneal	Death in 48 hr.
Guinea Pig 1	1/2 cephalothorax	Subcutaneous	Slight edema
Guinea Pigs 2-4	1/5 cephalothorax	Subcutaneous	Negative
Guinea Pig 5	1/2 cephalothorax	Intradermal	Negative
Guinea Pig 6	1/5 cephalothorax	Intradermal	Induration, ecchymosis
Guinea Pig 7	1/2 cephalothorax	Intravenous	Negative
Guinea Pig 8	1/5 cephalothorax	Intravenous	Hematuria; death in 48 hr.
Guinea Pigs 9-10	1/5 cephalothorax	Intravenous	Negative
<i>Second Series</i>			
Rabbits 17-20	1/2 cephalothorax	Subcutaneous	Local hemorrhage in 2
Rabbits 21-24	1/2 cephalothorax	Intradermal	Papule in 3; negative
Rabbits 25-28	1/2 cephalothorax	Intravenous	Negative
Rabbits 29-32	1/2 cephalothorax	Intraperitoneal	Peritonitis in 1; death after 10 days
Guinea Pigs 11-14	1/2 cephalothorax	Intravenous	Hematuria in 1; recovered
Guinea Pigs 15-16	1/5 cephalothorax	Intradermal	Negative

^aSuspension was made from the cephalothorax of 10 *L. laeta* (without stingers) in physiological saline filtered after 6 hr. (1 cc. equals 2 cephalothorax). Two types of spiders were utilized; in the first series, spiders with black abdomens; in the second series, spiders with light brown abdomens.

TABLE 10

Action of a Suspension Made from Abdomen of *L. laeta*^a

Series No.	Dose	Route	Results
<i>First Series</i>			
Rabbit No. 33	1/2 abdomen	Subcutaneous	Local hemorrhage
Rabbit No. 34	1/2 abdomen	Intradermal	Edema, papule
Rabbit No. 35	1/2 abdomen	Intravenous	Death occurred in 20 m.
Rabbit No. 36	1/2 abdomen	Intraperitoneal	Negative
Guinea Pigs 17-18	1/2 abdomen	Intradermal	Negative
Guinea Pigs 19-20	1/2 abdomen	Intravenous	Negative
<i>Second Series</i>			
Rabbit No. 37-39	1/2 abdomen	Subcutaneous, Intradermal & Intravenous	Negative
Rabbit No. 40	1/2 abdomen	Intraperitoneal	Peritonitis; death occurred in 18 hr.
Guinea Pigs 21-24	1/2 abdomen	Intravenous	Negative
Guinea Pigs 25-26	1/2 abdomen	Intradermal	Negative

^aTwo types of spiders were utilized: in the first series, spiders with black abdomens; in the second series, spiders with light brown abdomens. (1 cc. equals 2 abdomens).

TABLE 11

Action of Arachnolysin Obtained Either from Cephalothorax or Abdomen of *L. laeta* on Immune Rabbits Protected by Injections of Anti-hemolytic Serum^a

Series No.	Dose	Route	Results
<i>I. Arachnolysin obtained from cephalothorax (1 cc. = 2 cephalothorax)</i>			
Rabbit No. 41	1 cephalothorax	Intravenous	Negative
Rabbit No. 42	1/2 cephalothorax	Intravenous	Negative
Rabbit No. 43	1 cephalothorax	Intraperitoneal	Negative
Rabbit No. 44	1/2 cephalothorax	Intraperitoneal	Purulent peritonitis; died on 4th day
Control	1 cephalothorax	Intravenous	Hemolysis; death in 25 min.
Control	1/2 cephalothorax	Intravenous	Death in 4 hr.
Control	1 cephalothorax	Intraperitoneal	Hemolysis; death in 1 1/2 hr.
Control	1/2 cephalothorax	Intraperitoneal	Hematuria; death in 2 hr.
<i>II. Arachnolysin obtained from abdomen (1 cc. = 2 abdomen)</i>			
Rabbit No. 45	1 abdomen	Intravenous	Negative
Rabbit No. 46	1/2 abdomen	Intravenous	Negative
Rabbit No. 47	1 abdomen	Intraperitoneal	Negative
Rabbit No. 48	1/2 abdomen	Intraperitoneal	Negative
Control	1 abdomen	Intravenous	Hemolysis; death in 48 hr.
Control	1/2 abdomen	Intravenous	Hematuria; death in 48 hr.
Control	1 abdomen	Intraperitoneal	Hematuria; death in 48 hr.

^aAntihemolytic serum was prepared by increasing doses of arachnolysin.

TABLE 12

Hemolytic Action of Extract from Cephalothorax of L. laeta

Arachnolysin in terms of fractions of cephalothorax Physiological saline	1 1 cc.	1/2 1 cc.	1/10 1 cc.	1/50 1 cc.	1/100 1 cc.	1/500 1 cc.	1/1000 1 cc.	1/10,000 1 cc.
Rabbit RBC at 2 percent + complement Hemolysis	0.2 T	0.2 T	0.2 T	0.2 T	0.2 T	0.2 T	0.2 P	0.2 P
Guinea Pig RBC at 2 percent + complement Hemolysis	0.2 T	0.2 T	0.2 T	0.2 P	0.2 P	0.2 O	0.2 O	0.2 O

Red blood cell controls—no hemolysis

SUMMARY AND CONCLUSIONS

In a series of experiments, the writer has attempted to show that, when guinea pigs are stung spontaneously by *L. laeta*, or when these animals are injected intradermally with the glandular poison of said spider, the lesions provoked are exactly the same as those produced in man when bitten by this spider.

The glandular poison of *L. laeta* is coagulant, necrotizing and thermolabile, but not hemolytic for the red blood cells of the rabbit or the guinea pig. It differs from the poison (arachnolysin) from the cephalothorax of this same species, since the latter is intensely hemolytic, especially for the red blood cells of the rabbit.



Fig. 1



Fig. 2



Fig. 3

FIGS. 1, 2 and 3. Photographs of necrotic lesions, showing varying size.
GRAB. 1, 2 y 3. Fotografías de las lesiones necróticas producidas experimentalmente, demostrando su tamaño variado.