

GRASSHOPPER (*Phymateus leprosus* Fabr.) POISONING IN A BANTU CHILD

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On 5 October 1961 I received from Dr. W. E. Laufer, Medical Superintendent, Mahamba Methodist Hospital, Swaziland, a grasshopper under cover of his letter dated 2 October. As this is, to my knowledge, the first definite case of grasshopper poisoning in Southern Africa, I am quoting Dr. Laufer's 'case history' in full:

*Case History*

L.N., a Swazi female aged four years, was brought to this hospital by her mother, who stated that the child had eaten a brown locust that morning. The locust, known to the Swazis as poisonous, is not eaten by them, but some bigger boys had dipped the locust in hot water and had given it to the child, who did not know any better and ate the entire insect with the exception of the hind legs and wings. This happened at about 9 a.m., and when the mother returned home about midday she found the child vomiting profusely. The vomitus was clear. There was no diarrhoea. It is assumed that the child had by then got rid of such pieces of locust as remained in the stomach and that any damage which might occur would be from absorption.

As the child did not stop vomiting, she was brought to us at about 3 p.m. Her general condition was good, she was fully conscious and able to stand and to talk, but she was vomiting incessantly and salivating profusely at the same time. There were no focal neurological signs, and the circulation and respiration were both clinically normal. It was a rather cool day, and I decided to stop the vomiting at all costs, before anything further could be done. I did not want to use chlorpromazine, since I was not sure what cerebral effects the locust poison might have, and thus decided on a full dose of atropine together with nikethamide. Accordingly, the child was given by the subcutaneous route atropine sulphate, gr. 1/150, together with nikethamide, 0.3 ml. The vomiting ceased after about twenty minutes, but the salivation merely decreased somewhat and full atropine effect was never obtained, i.e. the pupils did not become fully dilated, and there was no rise in pulse rate. However, since I considered both the atropine and the nikethamide doses adequate, we did not give any more. We just watched the child, put her on a half-hourly pulse chart, and told the nurses to save any vomitus there might be.

The child remained conscious, breathing normally and conversing with the nurses. Vomiting ceased entirely. At about

6 p.m. the child suddenly collapsed, with cessation of breathing and heart action. I was on the scene within two minutes and started artificial respiration as well as closed cardiac massage. After a struggle of 45 minutes the heart recommenced beating and the breathing started again. Intracardiac adrenaline, 2 minims, had been given by myself during the resuscitation, and oxygen was administered through an endotracheal tube. Much secretion had to be removed from the larynx and bronchial tree before breathing became really effective. The child regained consciousness at 6.50 p.m.; a stomach tube was then passed, but only a little mucus was obtained. Intubation of the duodenum yielded a few millilitres of bile-stained fluid. There was no evidence of any locust particles. Since the child's condition was then satisfactory, she was left in the care of a sister, still on continuous oxygen—a funnel being used as face piece.

At 7.50 p.m. the child again collapsed, breathing ceased and no pulse could be felt. Again I was on the scene within two minutes of the catastrophe, and repeated the measures used previously. This time, however, there was no result, and all efforts were stopped at 9.30 p.m. This child died from failure of the medullary vital centres.

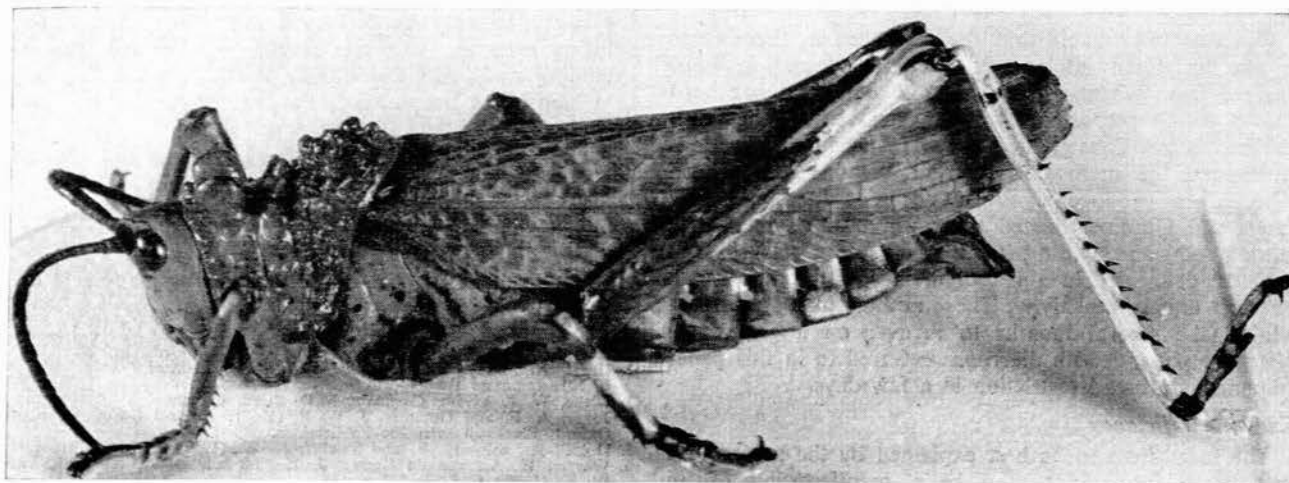
## BIOLOGICAL TESTS

At my request Dr. Laufer kindly sent me a supply of the above grasshoppers for biological tests.

The grasshoppers (see Fig.) which were full-grown and dead, showed no signs of decomposition. They were finely minced. The minced material had a dark reddish-brown colour and an unpleasant odour.

Three full-grown rabbits were dosed by stomach-tube with 10.0, 40.0 and 90.0 G. (suspended in tap-water respectively) of the freshly minced grasshoppers. The first two recovered after having shown symptoms of stimulation of the central nervous system, including the respiration. Unfortunately, the pulse-rate could not be determined since the animals were too restless and excited. The animals appeared normal on the fourth day after dosing. They showed lack of appetite and quite pronounced listlessness on the second and third days after dosage.

The third rabbit, which received 90.0 G. of the minced



*Phymateus leprosus* Fabr. (Natural size: Length 2½ inches.)

grasshoppers, showed a very rapid pulse within 20 minutes after dosage. It became restless and developed pronounced symptoms of asphyxia. There was fibrillation of the pectoral muscles. Within 25 minutes after dosage, the animal became comatose and the heart suddenly stopped while the animal gasped for breath. There was severe general cyanosis. It was obvious that the poison attacked primarily the cardio-respiratory system.

#### Postmortem Appearances

Pronounced general cyanosis. Heart very flabby, both ventricles extremely dilated. Other organs normal, except that they showed signs of pronounced general cyanosis. Signs of irritation of the gastric mucosa.

#### DISCUSSION

In 1919 Samsonoff<sup>3</sup> described an outbreak of an extremely severe disease among cattle, sheep and goats, which followed the invasion of Palestine by dense swarms of migratory locusts. Circumstantial evidence pointed to the probability that the water from wells, some of which were filled with the dead bodies of larval locusts, poisoned the animals. The symptoms, which appeared about half-an-hour after the animals had drunk water from the polluted wells, were mainly of cerebral origin — after signs of vertigo, the animals became comatose and died.

Similar symptoms appeared in cattle, buffaloes and sheep after having eaten sorghum leaves which had previously been attacked by locusts. Samsonoff concluded that the greenish-yellow secretions of the locusts poisoned the animals. However, he also stated that it is well known that animals can consume dead locusts without suffering any harmful effects.

In 1934 Curasson<sup>1</sup> described cases of locust poisoning in cattle, buffaloes and sheep in Palestine and North Africa, similar to those recorded by Samsonoff.<sup>3</sup> Curasson<sup>1</sup> succeeded in killing guinea-pigs and rats within a few minutes with subcutaneous injections of 0.125 ml. of the greeny-brown fluid which consisted of secretions of the salivary glands, the stomach glands and other glands associated with the digestive tract. Two to 4.0 ml. of this fluid injected subcutaneously, or 8.0-15.0 ml. given by mouth to sheep and goats, induced salivation, excitement, muscular spasms, accelerated respiration, vertigo, coma and death. Curasson obtained as much as 0.1 ml. of this fluid from one locust. In his experiments, Curasson used the secretions from the mouth of *Locusta migratoria*, var.

*migratorioides*, *Schistocerca gregaria* and *Cyrtacanthracis ruficornis*.

Wickware<sup>5</sup> described deaths in turkeys, apparently not only as a result of the hard parts (spiny legs) of grasshoppers irritating and actually puncturing the crop, but also because these insects contained poisons. The grasshoppers referred to by Wickware are *Melanoplus femurrubrum*, Deg. and *M. mexicanus* Souss.

According to Völker<sup>4</sup> the long-horned grasshopper, *Decticus verrucivorus* 'and other grasshoppers' are used as irritant diuretics in folk medicine.

Robertson<sup>2</sup> described locust poisoning in a Bantu man and woman who had eaten cooked locusts. The man's symptoms were severe abdominal pain, unconsciousness with loss of reflexes, rapid weak pulse and cold extremities, followed by coma and death. The woman recovered after the administration of a large dose of epsom salts — after having exhibited symptoms similar to the above. He rightly stated that locusts could be contaminated by arsenic or other poisons used to destroy them, or through their eating poisonous plants. However, some species of locusts or grasshoppers may by nature be poisonous.

#### SUMMARY

It appears that the Bantu child died from a grasshopper which actually contained some or other poison which it either produced in itself or had accumulated as a result of feeding on some poisonous plant. The grasshopper concerned is often seen feeding on the leaves of the plant *Asclepias fruticosa* (wild cotton, milk-bush) and on *Nerium oleander* (Ceylon rose). Both plants are active heart poisons, and it is quite possible that the child concerned died as a result of heart-failure caused by the eating of the suspected grasshopper, which had fed on plants like *Asclepias fruticosa* and/or *Nerium oleander*.

I am very much obliged to Dr. W. E. Laufer, Medical Superintendent of the Mahamba Methodist Hospital, Swaziland, for bringing this interesting case of poisoning to my notice, and to Mr. Lee, Chief of the Locust Division of the Department of Agricultural Technical Services, Pretoria, for the identification of the grasshopper and for supplying me with information about this insect.

#### REFERENCES

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