veins located on the lateral aspect of the tibio-tarsal or hock joint.

After complete immobility was secured, these sheep were connected with the instruments generally used for making graphic records of circulatory and respiratory movements. Sheep of from 55 to 69 pounds weight recovered spontaneously after the intravenous injection of 0.4 to 0.8 cc of the extract despite the inhibition of respiration lasting from one to several seconds.

Almost immediately after the injection of one cubic centimeter of the extract there occurred an apnoea of 20 seconds followed in turn by a few irregular, shallow respiratory movements and another period of apnoea which was accompanied by an elevation of 50 mm in blood-pressure. This rise of blood-pressure was brought back to normal after a short period, 10 to 12 seconds, of artificial respiration only to be followed two minutes later by another period of apnoea enduring for a full minute. Altogether there occurred four asphyxia-like rises of blood-pressure, varying from 44 to 108 mm of Hg above the previous normal, whose inceptions were preceded by apnoea enduring from one third to one minute before the animal recovered. These asphyxia-like rises of blood-pressure were always reduced to normal by means of artificial respiration, following which, except in the fourth case, there occurred irregular respiratory movements, displaced in their turn by a succeeding apnoea.

The circulatory system of sheep responds to intravenous injections of the extracts of *Zygadenus gramineus* in one of several ways. In the majority of instances there is a rise of blood-pressure accompanied by an acceleration of the cardiac rate. Some of the responses showed little if any change, and still others showed a fall in blood-pressure. In two instances in which a depression of blood-pressure occurred there was very little change in heart rate, indicating a vasodilation. This condition was frequently seen in similar experiments performed upon dogs and rabbits. The latter asphyxial rises of blood-pressure are undoubtedly of a secondary nature.

Believing that the chief toxic action of *Zygadenus gramineus* for sheep was in its great power for depressing the respiration, thus causing asphyxia, the writer, after an hour had been allowed for the animal to recover from the effects of an intravenous injection of the extract, closed the tracheal cannula and produced a graph very similar to one of the asphyxial rises of blood-pressure described above. When extracts of *Zygadenus gramineus* have been injected intraperitoneally or given by means of the stomach tube to rabbits, evidence of asphyxia, such as gasping and convulsive struggles associated with oxygen want, have been observed.

In his experiments with the alkaloidal substances isolated from Zygadenus Reid Hunt[3] found that caffein or diuretin given to rabbits and sheep in conjunction with large amounts of the alkaloidal materials caused such a rapid excretion of these toxic substances that no symptoms of poisoning resulted. The writer has observed that, after intramuscular injection of one grain of caffein dissolved in physiological salt solution with the aid of sodium benzoate, five times as much of the extract of Zygadenus was required to elicit the same response to this extract from a rabbit as was needed before the injection of the caffein. A sheep, following an intravenous injection of an extract of Zygadenus, exhibited a respiratory rate and amplitude of 53.6 and 1.9, respectively. A recovery to 42.1 and 11.6 mm, respectively, was recorded three minutes after the injection of one grain of caffein sodio-benzoate. These results and others of a similar nature furnish supplemental evidence to the findings of Hunt relative to the value of caffein as an antidote for animals poisoned by this plant.

SUMMARY

An extract of *Zygadenus gramineus*, "death camas," from which most of the resins had been removed was given intravenously to sheep prepared for recording blood-pressure and respiratory movements.

Following the intravenous injection of this extract there occurred a respiratory inhibition which in the case of the injection of larger amounts of the extract was followed by asphyxia-like rises of blood-pressure.

The graphic record of this asphyxial condition was practically duplicated by closing the tracheal cannula for a short time following the recovery of the animal from the effects of the plant extract.

Although, from a field standpoint, no satisfactory antidote has been found, it has been demonstrated that caffein sodio-benzoate possesses marked powers of stimulation for the respiratory center affected by the depressive substances found in *Zygadenus gramineus*.

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