He was not given sufficient time or opportunity to meet the charges, nor to engage counsel for his defense.

He was dismissed on the eve of the commencement of the then academic year after being paid only one month's salary for that year.

This board finds that the dismissal was without due process, and, therefore, unjustified; *therefore, be it*

Resolved:

1. That the action of the board in adopting the resolution of Sept. 13, 1917, terminating the relation existing between Professor William A. Schaper and this university be, and it hereby is, in all things rescinded, and the said resolution be, and hereby is, in all things expunged from the minutes and records of this board.

2. That Professor William A. Schaper be reinstated to the faculty of this university, with the rank of professor of political science emeritus.

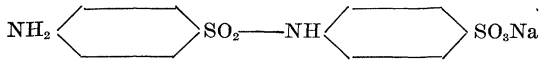
3. That Professor William A. Schaper be paid, out of the funds of this university, the sum of $5,000 in reparation of his loss of salary for the academic year 1917–18, and said sum is hereby appropriated for such purpose.

4. That a copy of this resolution be transmitted to Professor William A. Schaper by the secretary of this board.

SPECIAL ARTICLES

THE TREATMENT OF CANINE DISTEMPER WITH A CHEMOTHERAPEUTIC AGENT, SODIUM SULFANILYL SULFANILATE[1]

IN the following account, a preliminary report is given of results obtained from the treatment, with a chemotherapeutic agent, of animals infected with the virus of canine distemper. The compound used was sodium sulfanilyl sulfanilate and was prepared by the Calco Chemical Company. It has the following formula:



This compound is a white crystalline substance highly soluble in water and of neutral reaction. It is readily absorbed by way of the gastro-intestinal tract and has little or no toxicity for small animals in doses equivalent to one gram per kilogram of body weight. Ferrets, rabbits and cats have received one gram per day for periods as long as two weeks without loss of weight, appetite or other untoward symptoms.

An 8-kilogram dog was injected intravenously with 1.9 grams of sodium sulfanilyl sulfanilate, and the continued presence of the drug in the blood and the rate of its excretion in the urine were studied. The results are shown in Table I.

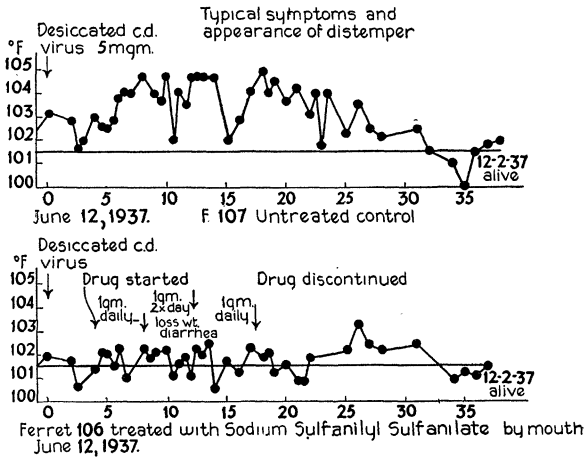
TABLE I

Time after administration of blood sample	Gamma of drug per ml of blood	Total amount of circulating drug
5 minutes	320	1.28 grams
2 hours	30	0.12 "
20 "	0	0.00 "
Time of urine sample	**Volume of urine**	**Grams of drug recovered**
20 hours	340 ml	1.5
44 "	300 "	0

The above table indicates that the chemical circulates in the blood in high concentration for relatively short periods of time, and that a large dose was completely excreted in the urine within twenty-four hours. The animal manifested no symptoms of intoxication and suffered no apparent bad after-effects from the treatment.

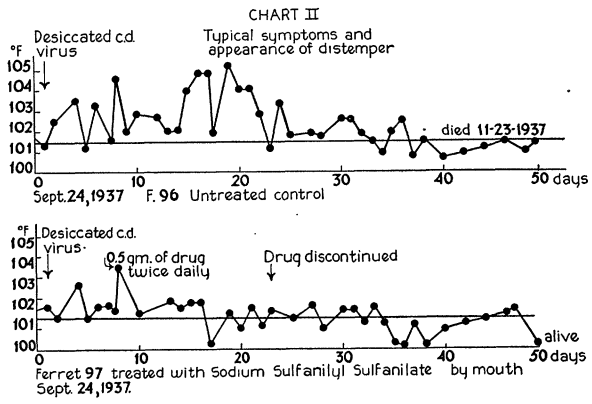
The therapeutic action of the drug has been tried on animals infected with the virus of canine distemper. In ferrets experimentally given this disease, sodium sulfanilyl sulfanilate has been found to have a remarkable therapeutic effect. It both prevents the development of the disease in animals treated within the incubation period, and cures the disease promptly in animals treated after the first rise in temperature and the appearance of symptoms. The action of the drug is equally efficacious whether dried living distemper vaccine virus Lederle is used for infection or fresh virus-containing filtrate obtained from dogs suffering from the spontaneous disease. The following chart illustrates the course of experimental canine distemper in two ferrets, one a control and the other treated with sodium sulfanilyl sulfanilate. Both ferrets were inoculated subcutaneously with 5 mgm of dried living canine distemper virus Lederle. Treatment was started four days after inoculation and before the appearance of symptoms. The treated animal was given 1–2 gms of the drug daily.

CHART I
Typical symptoms and appearance of distemper



[1] From the Department of Medicine and the Department of Animal Care, College of Physicians and Surgeons, Columbia University, and the Presbyterian Hospital, New York City.

Two additional ferrets were inoculated subcutaneously with 5 mgm of dried living canine distemper virus Lederle. Treatment was started on the eighth day after inoculation. Both animals developed fever on this day, the temperature of the control being 104.6° F. and that of the treated animal 104° F. The temperature of the treated ferret dropped to normal within twenty-four hours and the animal continued without symptoms thereafter. The untreated control displayed the characteristic symptoms of distemper in the ferret induced by inoculation of living distemper vaccine virus. The course of the disease in the two animals is shown in Chart II.



Following the successful treatment of ferrets inoculated with canine distemper vaccine virus, the therapeutic action of the drug was tested on ferrets inoculated with canine distemper virus freshly prepared from dogs in the acute early stage of the disease.

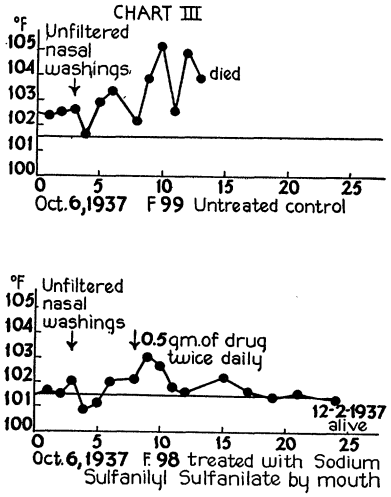
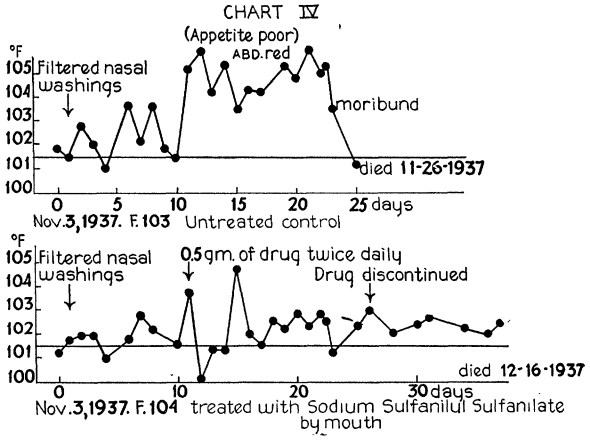


Chart III illustrates the course of the disease in two ferrets inoculated subcutaneously with unfiltered nasal washings of a dog suffering from distemper. The treated animal received orally 0.5 gm twice daily. The treatment was started on the fifth day following inoculation.

Two additional ferrets were next inoculated subcutaneously with the nasal washings of a dog in the acute stage of distemper. In this instance the washings were filtered free from bacteria by passage through a Berkefeld N filter. Treatment was started on the tenth day following inoculation. Symptoms of the disease first appeared on this day, the temperature of the control rising to 105° F. and that of the treated animal to 103° F. The treated animal received 0.5 gm of the drug twice daily. The results of the experiment are shown in Chart IV.



These experiments clearly indicate that sodium sulfanilyl sulfanilate, when administered to ferrets experimentally infected with canine distemper, both prevents the disease when given before the appearance of symptoms, and cures the disease promptly when administered shortly after the development of characteristic symptoms and fever. There is some evidence to indicate that serious secondary bacterial infection accompanying the distemper may destroy the favorable action of the drug. One treated ferret died twenty-five days after the discontinuance of the drug. At autopsy consolidated areas were found in the lungs, the exact nature of the disease not being apparent. Whether this animal died because of latent activity of the virus or was reinfected from a nearby diseased ferret is unknown.

Treated ferrets remain remarkably free from symptoms, maintain a good appetite and in general gain weight. No toxic manifestations were observed with a dosage of 1 gm daily. When the dose was increased to 2 gms daily, diarrhea and loss of weight appeared.

We have also given the drug a short clinical trial in spontaneous canine distemper in dogs. So far the effects seem to be of equal value to those observed in the experimental disease. Of twenty-eight animals treated at varying stages of the disease twenty-six have recovered. Symptoms and fever disappear rap-

idly and the appetite promptly returns. The animals remain well after the cessation of treatment. One animal treated on the fifth day of the disease recovered within forty-eight hours and thereafter remained well. Of the two fatal cases one animal died and the other was sacrificed. Both were in an advanced stage of the disease when first treated and had already developed severe secondary pulmonary infection. The amount of drug administered to dogs has been 1 gm twice daily. Eighteen cats suffering from a spontaneous disease commonly known as cat distemper or influenza have also been treated with the drug. Its effect in this condition is in all respects similar to that in canine distemper.

Sodium sulfanilyl sulfanilate therefore appears to be the first chemical agent to have such definite therapeutic action in an infection due to a filtrable virus. The range of its activity in virus diseases remains to be explored.

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THE EFFECT OF LIGATION OF THE LUMBOADRENAL VEINS ON THE COURSE OF EXPERIMENTAL DIABETES IN DOGS AND CATS[1]

HOUSSAY[2] was able to ameliorate the course of pancreatectomy diabetes by hypophysectomy. Subsequently, Long[3] produced a similar effect on depancreatized dogs and cats by complete adrenalectomy and maintenance with cortin. A new method for the alleviation of diabetes and some results obtained with this procedure are presented in this report.

In 20 cats and 4 dogs the lumboadrenal veins were ligated proximally and distally to the adrenal gland and the entire pancreas simultaneously removed. It should be emphasized that these animals at no time received either insulin, cortin or sodium chloride therapy. That the intensity of the diabetes is greatly diminished by the ligation of the lumboadrenal veins is shown by the following:

(1) *Survival.* The survival of completely depancreatized dogs and cats is usually less than 7 days. As a result of adrenal vein ligation, the range of survival has been increased in cats to 11–98 days; the average is about 20 days, excluding the cat living 98 days. The period of survival of dogs to date is 18, 11, 35 and 8 days. The first animal is still alive. The last 3 succumbed. However, the death of the dog on the eighth day was due to a post-operative complication and not diabetes.

(2) *Chemical Studies.* The values for blood sugar, blood fat, glycosuria and ketonuria of these dogs and cats are much lower than those observed in depancreatized animals without ligation of lumboadrenal veins. Occasionally marked hypoglycemia was observed, and in two cats fasting rendered the urine free of sugar.

The D:N ratio was well below the value of 2.8, characteristically associated with pancreatectomy diabetes. Respiratory quotients above 0.70 were obtained in every animal studied. The changes in carbohydrate metabolism are not secondary to alterations in blood total base. In many of the animals, the blood electrolytes were normal in concentration.

Gross and microscopic autopsy findings revealed complete absence of pancreatic tissue. Histological examination of the adrenal and pituitary glands are being made to determine the involvement of these organs.

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THE LIQUEFACTION OF SPONTANEOUS TUMORS OF THE MAMMARY GLAND IN MICE BY HEPTYL ALDEHYDE[1]

RECENT data[2] have shown that certain characteristics of spontaneous tumors of the mammary gland in mice may be influenced by the daily administration of the true oil of gaultheria in the diet of those mice showing such neoplasias. These effects have to do with the clinical course and histological appearance of the tumors. It has been demonstrated that in early cases the connective tissue of the tumor seems to have been materially enhanced by a such a treatment. Similar results could not be produced by the use of redistilled synthetic methyl salicylate.[3] In an attempt to isolate the active agent of the true oil which had the above inhibitory action on spontaneous tumors, the true oil was subjected to fractional distillation. From this work, it was shown that the active inhibitory agent was contained in the low boiling point fraction, that is, in that fraction which distilled over below the boiling point of methyl salicylate.[4] It was demonstrated that the low fraction had a pronounced effect on: (1) the

[1] This research was aided by a grant from the National Research Council.
[2] B. A. Houssay, *Am. Jour. Med. Sci.*, 193: 581, 1937.
[3] C. N. H. Long, *Medicine*, 16: 215, 1937.

[1] This experiment has been made possible by grants from the International Cancer Research Foundation and the Anna Fuller Fund. Acknowledgment is also due to the Fluid Research Funds of Yale University School of Medicine. Dr. W. Bergmann has very kindly redistilled the commercial C.P. heptyl aldehyde used in this experiment.
[2] L. C. Strong, *Am. Jour. Cancer*, 28, 550, 1936.
[3] *Idem.*, *Am. Jour. Med. Sci.*, 192, 546, 1936.
[4] *Idem.*, (in press) *Am. Jour. Cancer.*