MINK DISEASES

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Urinary Tract Infections

IN THEIR travels, the three legendary Princes of Serendip were in the habit of finding by chance valuable things they were not seeking. Their story reminds me of an accidental finding in fur animal research that has paid off in solving a problem of considerable importance.

Two modern day searchers, Hartsough and Shackelford (neither a prince, by the way) independently decided to implant diethylstilbestrol pellets into mink to see if the synthetic hormone had any effect on furring out. While the treated animals were on trial, both workers recorded unexpected deaths in the males due to urinary tract infection. In a similar experiment, Cochrane and Shackelford (1955) confirmed and amplified the previous observations. They found occasional deaths due to urinary tract infection in males that were fed 100-500 micrograms of stilbestrol for a few weeks.

The Mink Farmers Research Foundation then established a project at the University of Wisconsin to nail down the role of stilbestrol in urinary tract disease. The experiments carried on by Dr. Lloyd Laurman were well conceived and carefully conducted. Laurman first did some preliminary bacteriological examinations of the urinary tract. Interestingly enough, the same types of bacteria were isolated from the prepuce of normal mink as were found in the bladder with urinary tract infections.

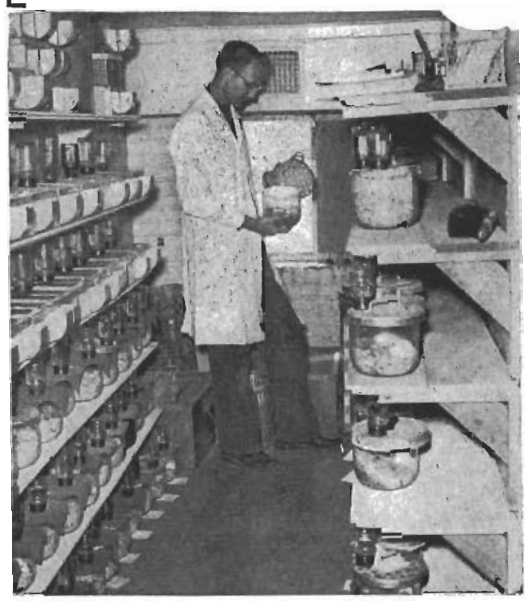
The key to the problem was evident. Could the stilbestrol feeding cause bacteria, commonly found in the prepuce of healthy mink, to ascend the urethra (a tube-like passage which conducts the urine from the bladder to exterior) and cause infection of the entire urinary tract with progressive destruction of the kidneys?

In the summer of 1958 male kittens were fed stilbestrol and urinary tract infections were again produced. However, Laurman showed **why** the infection occurred. The accompanying drawing depicts the sequence of changes leading to urinary tract infections with calculi.

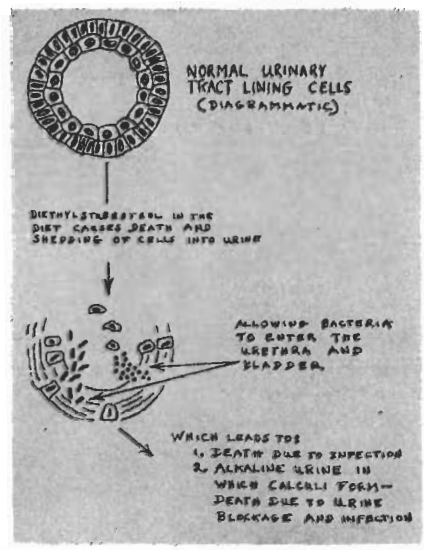
The predominating type of bacteria present is responsible for the kind of urinary tract disease. If the **Proteus** bacteria is concerned, an enzyme splits urea in the urine liberating ammonia. This results in an alkaline urine. Thus, phosphates and carbonates are precipitated around bacteria, or perhaps sloughed lining cells, forming stones. (It is about the same process as a grain of sand getting inside the shell of an oyster. The oyster covers the sand with layers of pearl-making substance until a pearl is formed). Frequently, the calculus becomes lodged at the penis bone. On the other hand, staphylococcus infection leads to the formation of solid plugs composed of fibrin and pus. They are as effective as stones in obstructing urine flow.

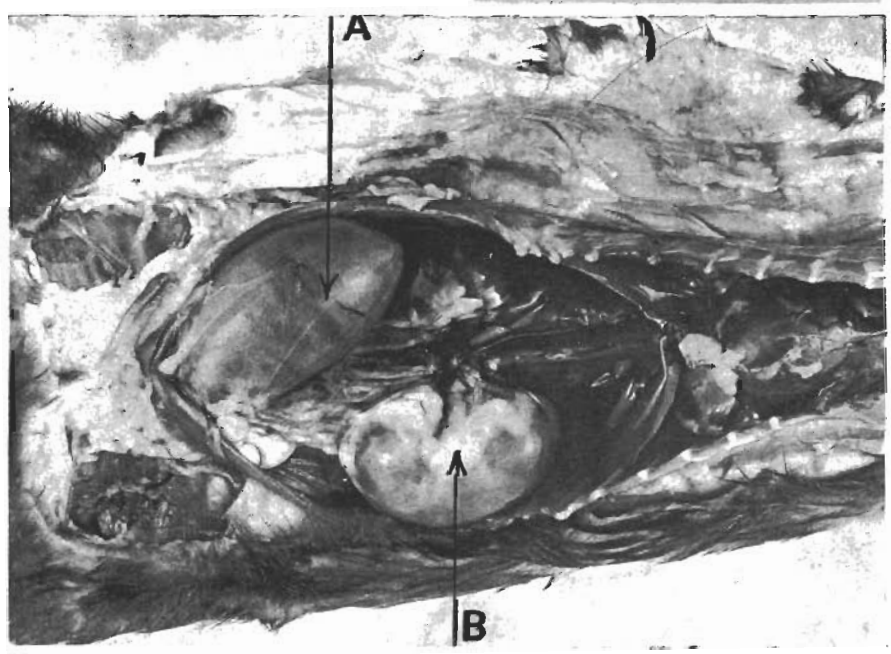
To complete the story, Laurman found mink ranchers reporting severe outbreaks of urinary tract infections following the feeding of chicken heads. Of particular interest on one of these ranches where 80% of the male kits succumbed, the females were showing signs of

Continued on page 31



Dr. Lloyd Laurman inspects some of his experimental animals.





Urinary tract infection in a male kit. Note the enlarged bladder (A) which contains purulent fluid (pus) and blood. The kidneys are partially destroyed by the inflammatory process. The left kidney (B) is almost twice normal size. (WSU photo)

Mink Feeding Patterns

Continued from page 13

Table III — 1959 "Medium" Cereal Ration

				Lbs.	Cost
Muscle Meats	@	11	c	20	$2.20
Poultry and Meat By-Products	@	5	c	32	1.60
Fish	@	5	c	20	1.00
Liver	@	12	c	3	.36
Mink Food	@	6.75c		25	1.69
Total Dry Ration				100	$6.85
Added Water				50	.....
Total Wet Ration				150	$4.57*

* Cost/100 lbs. wet ration.

Table IV — 1959 "High" Mink Food Ration

				Lbs.	Cost
Muscle Meat	@	11	c	20	$2.20
Poultry and Meat By-Products	@	5	c	21	1.05
Fish	@	5	c	20	1.00
Liver	@	12	c	3	.36
Mink Food	@	6.75c		36	2.42
Total Dry Ration				100	$7.04
Added Water				72	.....
Total Wet Ration				172	$4.09*

* Cost/100 lbs. wet ration.

In the above rations enough water was added to make the cereal or mink food equivalent to a 70% moisture, 30% dry matter meat product. Therefore, the 1945 ration, the 1959 moderate cereal ration and the high mink food ration all supply the same amount of dry matter per 100 lbs. of wet ration. As you can see by using the moderate level of cereal, 100 lbs. of wet ration would cost $1.49 less than the 1945 ration. Furthermore, if the 1959 mink food was so formulated to be used at the 36% level, the cost of 100 lbs. of the 1959 ration could be reduced another .48.

These illustrations show the economic advantages for the maximum levels of mink food. Undoubtedly, the trend to higher levels of mink food will continue, if for no other reason than that of more favorable economics. Many of you ranchers do not think it possible to feed a 36% level of mink food at the present and you will be slow to take advantage of the higher levels to come. Let me assure you that beautiful mink have been raised on the present high levels and will be raised on the higher levels to come. It can be done. It will be done. You are only kidding yourself and robbing dollars from your own pocket if you do not take advantage of these developments.

The third major trend of today which will help shape the patterns of the future is that of using the so-called Complete Mink Food. Here I refer to a dry type product, which can be carefully controlled chemically throughout its production. This product needs no further additives to support excellent reproduction, growth and pelts. This product can be stored without refrigeration and needs only water added to be fed. A product of this type is considered new. Actually, it is merely a modern ration with the moisture removed without affecting the nutritional quality or the palatability. The next two tables illustrate what I mean:

Table V—1959 Growing and Furring Ration

	%	Moisture	Protein	Fat
Horsemeat	10	7.0	1.8	1.0
Beef By-Product Mix	20	14.0	3.0	2.8
Turkey Heads	15	10.5	2.7	1.5
Whiting	14	10.6	2.2	0.6
Inedible Animal Fat	5	....	....	5.0
Mink Food	36	3.6	7.9	1.5
Total	100	45.7	17.6	12.4
% on a Dry Matter Basis		0	32.4	22.8

Table VI—Guaranteed Analysis Of A Complete Mink Food

Protein	30%
Fat	22%

For many ranchers with the facilities and those that are finding it increasingly difficult to buy high quality fresh meat products, this type of ration has great appeal. Undoubtedly more mink ranchers in the next two or three years will be using Complete Mink Food. Some will use this type of ration only during part of the fur production cycle. I think without a doubt that the Complete Mink Food feeding pattern will never entirely replace the fresh or frozen meat type program. However, as ranchers become accustomed to it, and further developments are made on the Complete Mink Foods, larger numbers of ranchers will find it satisfactory and use it exclusively.