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SCIENTIFUR.

No. 1, February 1977.

It was a great experience for me to be involved in arranging the First International Congress in Fur Animal Production. I came home with the exciting task of improving communication within the fur bearing animal production branch and in November 1976 the Introductory Issue of SCIENTIFUR was sent out, much to my satisfaction.

However when the time came to begin work on the first regular issue, the mood was rather of depression. On the 1st February we were able to register only 5o subscribers, and we had received only four contributions two to abstracts and two to current events.

In view of the interest and enthusiasm with which the idea of a Newsletter of SCIENTIFUR's type was received at the congress, one must ask why there has been such a disappointing response. It is natural to consider that there has not been enough time since the introductory issue was sent out for those interested to be able to organise subscriptions and contributions.

We have therefore decided to send the first regular issue to all these we think will be interested, so that they again have the opportunity to fix things up.

We have heard from a couple of research institutions, that it is difficult to get financial support. This is a great pity. In this connection, I will urge the various breeders organizations to follow the Danish Fur Breeders Association's (DP) example. DP has bought 2o subscriptions in order to be sure that as many as possible on the production side have this chance to keep

up to date.

I am sure that the fur breeders themselves will, in the end, profit from ensuring that researchers in this field are made aware of SCIENTIFUR and are given the financial support to enable them to subscribe.

Subscriptions should be sent direct to:

DANEBANK, ACCOUNT NO. 3oo4219.

The bank informs us, when they receive payment. As is explained on the cover we do not send accounts out.

However we would appriciate receiving your written order for SCIENTIFUR here so that there is no doubt as to where SCIENTIFUR should be sent.

We had hoped to be able to present both abstracts and original articles, which would be new to most of you, in this first regular issue of SCIENTIFUR. When you read SCIENTIFUR, you will notice that some of the abstracts are of work which is more than two years old. This is not due to nostalgia on my part, but simply to lack of material.

There were almost loo participants at the congress. With a couple of contributions from each of them every year, there will be plenty of up to the minute material for SCIENTIFUR. However, without active support from you, SCIENTIFUR can never become the Communication Centre for Fur Animal Production that it was intended to be.

We are not sure that we have been able to reach all those who may be interested in SCIENTIFUR, so if you know anyone that we don't know please draw their attention to SCIENTIFUR and its aims.

SCIENTIFUR'S FUTURE IS BASED ON BOTH SUBSCRIBERS AND CONTRIBUTORS FROM ALL SKIN PRODUCING COUNTRIES.

I LOOK FORWARD TO HEARING FROM YOU.

YOUR THINKING EDITOR

GENETIC STUDIES OF A MUSCULAR DYSTROPHY OF MINK.

G.A. Hegreberg, G.A. Padgett, D.J. Prieur and M.I. Johnson
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This report concerns a recently recognized primary myopathy of mink. Affected mink display locomotor disability and flaccid muscles with progressive atrophy of muscles of the limbs, especially the larger proximal muscles, and the head. Muscle enzymes in serum, including creatine phosphokinase (CPK), aldolase and glutamic oxalacetic transaminase (GOT) are elevated. The histologic changes appear to be confined to the skeletal muscle and involve variation in diameter size of muscle fibers, centralization and vesicular appearance of nuclei, degenerative change, and apparent increase in endomysial and perimysial connective tissue. This report presents data establishing the genetic basis of this trait in mink and further examines the occurence of the various types of muscle change in both the dystrophic mink and the known heterozygotes.

Analysis of breeding data revealed that the muscular dystrophy trait in a pedigree of mink is transmitted in an autosomal recessive manner. Variation in skeletal muscle fiber diameter size is the most pronounced and consistent change in the dystrophic mink. Other changes include centralization of nuclei, degenerative change, increase in endomysial and perimysial connective tissue and regenerative attempts. These changes are not present in known heterozygotes.

2 Tables, 1 Figure and 22 References.
The Journal of Heredity, Vol. 66, no.2, March-April 1975.

Ref. G. Joergensen

EFFECTS OF ANTIBODIES TO OESTROGENS ON IMPLANTATION IN FERRETS.

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This study was designed to investigate further the role of oestrogen in inducing implantation in ferrets by administration of specific antiserum to oestrogens during various periods of the preimplantation period. Oestradiol-17β-hemisuccinate conjugated to bovine serum albumin was injected into sheep as previously described (Nett, Holtan & Estergreen, 1973). The specificity of the antiserum was confirmed by testing its cross-reaction with various other steroids (Nett et al., 1973).

In the present study, the ferrets treated with antibodies to oestrogen gave birth at the normal time of 39-41 days, indicating that embryogenesis was not significantly delayed. The ferret uterus undergoes a size increase during the early postimplantation period (Enders & Schlafke, 1972, Beck, 1974) and involves epithelial proliferation, hypertrophy of various cells, symplasma formation and uterine gland dilatation. Oestrogen may promote one or more of these responses and antiserum treatment would thus affect uterine growth.

It appears therefore that oestrogens are not obligatory for implantation in the ferret. Their absence is characterized only by a slight reduction in size of the uterine swellings. The report of Heap & Hammond (1974) that total unconjugated oestrogens in peripheral plasma were not detectable($<$10 pg/ml) in the majority of plasma samples examined during pregnancy or pseudopregnancy in the ferret, further suggests that oestrogens do not play an obligatory role in implantation in ferrets. Wu & Chang (1973) speculate

that, during the critical period of Days 6-8, ovarian steroids are secreted which modulate or facilitate the actions of progesterone and oestrogens, resulting in normal implantation in the ferret. Data from the present study do no refute this speculation.

1 Table, 9 References.
J. Reprod. Fert. (1976) 46, 261-263. Ref. G. Jørgensen.

MUCOPOLYSACCHARIDE HISTOCHEMISTRY OF THE MINK UTERUS DURING GESTATION.

Bruce D. Murphy and Derek A. James, Department of Biology,
University of Saskatchewan, Saskatoon, Saskatchewan, Canada.

Observation of implantation and development of mink blastocysts transplanted to the ferret uterus led Chang (1968) to postulate that embryonic diapause in the mink was a condition controlled by the uterus rather than the blastocyst. Daniel and Krishnan (1969) proposed that inhibition of implantation may be due to deficiency in a uterine factor. Daniel (197o) reported blatocyst growth in the ferret occurred concomitant with an increase in maternal uterine protein, and a deficiency of this maternal uterine protein may be responsible for embryonic diapause in the mink. A specific glycoprotein is secreted throughout the early pregnant uterus of the rabbit (Daniel 1972, Johnson 1972). This glycoprotein is most certainly responsible for rabbit blastocyst growth (El-Banna and Daniel 1972) and may be involved in implantation.

Electron microscopic observations of mink uterine glands during delay and early postimplantation indicate that there is a marked change in the nature or rate of secretion at nidation (Enders et al. 1963). Further, these authors postulate that the secretory product which appears to be stored during delay is a proteinpoly-

saccharide complex. Enders (1961) briefly described the distribution of diastase-resistant (non-glycogenic) polysaccharides in the mink uterus during delay. Enders and Enders (1963) elaborated on these observations and concluded that the distribution of diastase-resistant polysaccharides was inconsistent during delay.

Buchanan (1966) made extensive observations on the pre- and post-implantation uterus of the ferret and concluded that the major secretory product of both luminal epithelium and uterine glands is a glyco- and (or) muco-protein. He further recorded the distribution of uterine glycogen and acid mucopolysaccharides in the early stages of pregnancy in the ferret.

In view of the fragmentary nature of observations of mucin histochemistry during mink gestation, an aim of this study was to visualize mucoprotein in the mink uterus by various techniques and to correlate variation in histochemical parameters with changes in the gestational status of the mink. In particular, changes in the nature and distribution of mucosubstances of pregnancy were investigated with the aim of obtaining morphological and histochemical correlates to the observed variation in uterine protein associated with blastocyst growth and implantation (Daniel 197o).

Acidic mucosubstances have been implicated in the immunoisolation of the trophoblast in mice (Bradbury et al. 1965, Currie et al. 1968) and in humans (Bradbury et al. 1969). Specifically, a sialic acid, N-acetylneuraminic acid (NAN), has been shown to mask the antigenicity of tumors (Sanford 1967, Currie and Bagshawe 1968, Herschman et al. 1972), and sialic acids are present between maternal and fetal tissues as the "fibrinoid" layer of mouse trophoblast (Bradbury et al. 1965).

A second aim of this investigation was to determine whether an

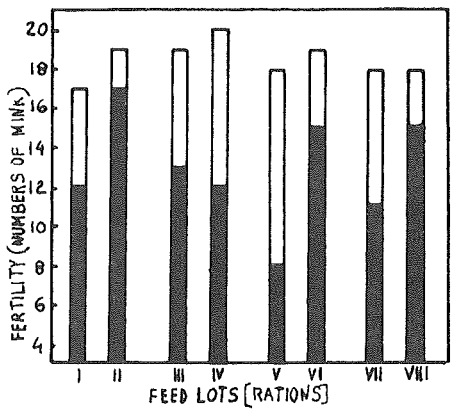
acid mucopolysaccharide (MPS) layer exists between the mink trophoblast and maternal endometrium, and if so, whether this coat persists throughout pregnancy.

Histochemical localization of polysaccharide and protein-polysaccharide complexes (mucopolysaccharides or MPS) was studied in the uteri of female mink in three phases of gestation. These phases were the period of delay which precedes nidation, days 2 to 7 postimplantation and days 13 to 16 postimplantation. Glycogen was found in uterine epithelial cells during delay, but appears to be depleted at nidation. This depletion may reflect the postnidation increases in progesterone observed in mink plasma. There is a general increase in MPS concentration in postimplantation uteri when compared with delay uteri. In addition, sulfated MPS are found in the uterine glands of postimplantation specimens, but not in the glands of delay specimens. The observed increase and shift in site of MPS production may reflect a perinidational increase in uterine protein.

An acidic MPS layer is present between fetal and maternal placental components during postimplantation pregnancy. This coat appears to be synthesized by the trophoblast and may represent an immunoisolatory mechanism.

2 Tables, 3 Pictures, 41 References.

Can.J. Zool., Vol. 52, 1974.



Ref.: Authors introduction and abstract.

CELLS OF THE ADENOHYPOPHYSIS OF THE MINK (MUSTELA VISON) IDENTIFIED BY IMMUNOHISTOCHEMICAL AND FUNCTIONAL CRITERIA.

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The secretion of at least six hormones from the anterior hypophysis of mammals has led to speculation that six morphologically or histochemically recognizable cell types exist in this gland. Although most authors accept and promulgate the "one cell, one hormone" theory, Nakane (197o,1971) has suggested that gonadotrophic cells in the rat hypophysis may contain and presumably secrete both follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Until such time as proper species- and hormone-specific antisera are available for immonolocalization of six hormones, the validity of the "one cell, one hormone" hypothesis will remain in question.

Significant progress has been made in light-microscopic (LM) (Gersten and Baker 197o, Baker et al. 1972) and ultrastructural (Nakane, 1971, Mazurkiewicz and Nakane, 1972, Tougård et al. 1973; Parsons and Erlandsen, 1974) identification of pituitary cell types in the rat by immunolocalization. Identification in other species as yet depends on tinctural and morphological characteristics. The validity of morphological methods has been questioned by Anderson et al. (197o) who stated that ultrastructural characteristics used in identification of cells may have little value in comparison of cell types between species. Conklin (1968) states that a considerable portion of the tinctural variability ascribed to different cell types at the LM level may be due to different states of activity among the cell population present.

LM identification of six cell types in the adenohypophysis of

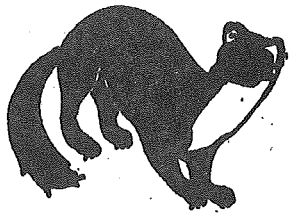
carnivores has been reported in the following species: the dog (Goldberg and Chaikhoff, 1952, Carlon and Stahl, 1964, Carlon, 1967), the cat (Herlant and Racadot, 1957) and the ferret (Holmes, 1960, 1963). In addition, the anterior hypophysis of the mink has been described by Weman (1970). Her analysis of that organ includes description of six cell types and assigment of the presumptive hormonal product to each morphological type.

Ultrastructural descriptions of cell types in the adenohypophysis of carnivores include studies of anterior pituitary of the dog (Kagayama, 1965, Gale, 1972).

Six cell types were described in the adenohypophysis of the mink, and a putative function was assigned to each type. These cells are the two types of gonadotrophic cells, at thyrotrophic hormone (TSH) cell, a somatotrophic (STH) cell, a prolactin (PRL) cell and a corticotrophin-producing (ACTH) cell. Gonadotrophic cells were identified by an immunolocalization technique using antisera to ovine LH. TSH cells and ACTH cells were identified by ablation of respective target organs and observation of the subsequent hypertrophic cells in the pituitary, as well as comparison with published descriptions in other species. STH cells were identified by comparison with published reports. PRL cells were observed in lactating animals and animals in lactational withdrawal.

1 Figure, 23 Pictures, 40 References.
Acta anat. 94, 184-203 (1976).

Ref.: Authors introduction
and abstract.



EFFECTS OF SYNTHETIC GnRH ON LITTER SIZE IN RANCH MINK BRED ONCE OR TWICE.

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Female ranch mink are usually mated during the month of March. During this period, four or more waves of follicles mature at approximately 8 day intervals during the breeding season and ovulation is induced by mating (1). Single mating of female mink results in low fertility while two matings spaced 7-8 days apart appear to provide for the greatest reproductive success. (2). Fertilized ova from all matings during breeding season develop to the blastocyst stage and remain quiescent in the uterus until implantation (3). The interval between first mating and implantation averaged 23.7 days in previous studies (4). Young born to female mink mated twice to 2 different males at intervals of 6-9 days are predominantly the result of the second mating (5).

A single mating system which could produce litters comparable to double mating would greatly reduce labor costs to fur ranchers. Studies by Adams (6) have indicated that induction of ovulation with human chorionic gonadotrophin (HCG) in lieu of the first mating results in reproductive success comparable to the usual two mating system. The following is a preliminary report of a study designed to test the effects of a single injection of synthetic GnRH instead of the first mating on reproductive success in mink. A second objective was to determine if GnRH administered immediately after the first and second mating could increase litter size.

Female ranch mink of the Pearl variety were injected with saline (1oo µl), GnRH (2 µg) or HCG (5o IU) and mated 7, 8 or 9 days later. Mean number of young in litter (± SEM) for saline treated

females was 1.4±o.87; GnRH 4.8±o.55 and HCG 3.4±o.9. A fourth group were injected with GnRH immediately after each of two matings and resultant mean litter size in this group was 5.7±o.44. The results suggest that GnRH can effectively replace the first mating in ranch mink and that GnRH after each of two matings may enhance preovulatory development and/or ovulation.

1 Table, 1o References.
Theriogenology, October 1976, Vol. 6, no.4.

Ref.: Authors introduction and abstract.

VERGLEICHENDE UNTERSUCHUNGEN AND HYPOPHYSEN UND GESCHLECHTSORGANEN GRAVIDER UND EXPERIMENTELL PSEUDOGRAVIDER FARMNERZE (MUSTELA VISON SCHREBER, 1777).
(Comparative investigations on pituitary glands and reproductive organs of pregnant and experimental pseudopregnant farm minks.)

L. Busch, Institut für Haustierkunde der Christian-Albrechts-Universität, Kiel, W. Germany.

Object of this study is a comparison of pituitary glands and reproductive organs between pregnant and experimental pseudopregnant female minks (Mustela vison Schreber 1777): a contribution to the understanding of reproductive failure in farm mink. There is a reason to believe that pseudopregnancy occurs under farm-conditions, particularly because there are special subjects in the reproductive biology of mink. Finally there are no informations about pseudopregnancy in farm mink until now.

Materials and methods: Pituitary glands and reproductive organs of 1o7 non-pregnant, pregnant and pseudopregnant female minks were studied by histological and histochemical means. Pseudo-

pregnancy was induced by copulation with vasectomized male minks or by injection of folliclestimulating hormone (FSH, Schering) and human chorionic-gonadotropin (HCG, Primogonyl, Schering).

The ovarian events during anoestrus and oestrus as well as the development in the ovary and the uterus were described. Furthermore investigations were carried out on the cells of the pars distalis of the pituitaries of pregnant and pseudopregnant female minks.

Results: 1. In the pars distalis of the female mink six different types of cells can be distinguished. Four of these types vary in their local and quantitative distribution. 2. There is one cell type which has not been described until now. Its activity of secretion is correlated with the periodic maturity of follicles and the induction of the burst of the follicle. The function of this cell type is discussed.
3. It is difficult to demonstrate prolactin cells. Their possible existance and function are discussed.
4. The hormonal regulation of delayed implantation, accompanied by follicular-growth, which may lead to the burst of additional follicles, is discussed. 5. Corpora lutea pseudograviditatis are 15o-2oo µm in diameter smaller than corpora lutea gravidiatis. 6. Ovaries of pseudopregnant female minks contain in april (= post-implantational phase of pregnant females) corpora lutea pseudograviditatis and additional Graafian follicles. 7. The gonadotrophic pituitary-cells of pseudopregnant females are increased in april and seem to be of highest secretory activity. 8. The conclusions of 6. and 7. are: pseudopregnant females of mink have a "delayed heat/oestrus". 9. The duration of the postimplantational phase in pseudopregnant females is 4-6 days shorter than the postimplantational phase of gestation. 1o. Pseudopregnancy occurs on mink-farms under normal conditions.

3 Tables, 6 Figures, 119 References.
Z. Tierzüchtg. Züchtgsbiol. 92 (1975) 35-5o.
Ref.: Authors summary.

THE EFFECTS OF LEIGHT AND SYMPATHETIC INNERVATION TO THE HEAD ON NIDATION IN MINK.

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University of Saskatchewan, Saskatoon, Saskatchewan, Canada.

Ninety primaparae female mink were bred on two consecutive days between March 11-15. Six days after first mating mink were subjected to one of the nine treatments, control (n=21); sham superior cervical ganglionectomy (Sham SCGX) (n=5); bilateral orbital enucleation (n-1o); bilateral orbital enucleation and constant light (n=16); constant light (n=19); an accelerated photoperiod of 15L, 9D + 5 min of light per day (cumulative) (n=1o); an accelerated photoperiod and SCGX (n=6); SCGX and environmental light (n=5); bilateral orbital enucleation and SCGX (n=5). The interval between first mating and calculated date of nidation (copulation to implantation (CI) interval) was compared among groups. CI interval was significantly abbreviated in accelerated photoperiod treated animals, and significantly lengthened by constant light, blindness regardless of light regime; and SCGX with accelerated photoperiod. Nonsignificant variation in the CI interval was observed in the blinded or environmental light treated SCGX animals that underwent implantation. Reproductive failure, defined as either absence of embryos in necropsied animals or failure to whelp by females alive on June 1, occurred less frequently in accelerated photoperiod animals and with considerably greater frequency in blind, SCGX,

or constant light treated intact animals. Observations in blinded animals suggest that this treatment and presumably SCGX and constant light extend the period of embryonic diapause to the point of blastocyst degeneration resulting in reproductive failure. The occurrence of nidation in some blinded, and constant light animals indicates that this event can occur independent of either retinal receptor or photoperiod. The effects of SCGX suggest that the pineal body is either not involved in nidation or has a facilitatory rather than inhibitory role.

2 Tables, 1 Figure, 3 Pictures, 47 References.
J. Exp. Zool. 187, 267-276.

Ref.: Authors abstract.

USE AND ABUSE OF ANTIBIOTICS IN ANIMAL HUSBANDRY.

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1. Introduction.

From time to time in the past few years debate, often heated, has cropped up on the advantages and disadvantages of using antibiotics as feed supplement to domestic animals.

The primary purpose of animal husbandry is to supply the population with foodstuffs with minimum risk to health and to minimum price. The use of antibiotics in animal husbandry can, thus, be seen from three points of view viz:

1. Influence on public health of concentration of drug residues, or transfer of resistance to antibiotics.
2. Influence on production.
3. Risk of bacteria, which can cause disease in domestic animals, developing drug resistance.

A painstaking evaluation of the advantages and disadvantages of antibiotic supplementation of animal feed has been carried out by D.A. Barnum from Guelph University in Canada. This report is based on the investigations carried out on the subject since the use of antibiotics was introduced to animal husbandry. The Swann report gives also a good review of the subject. This article is based largely on these reports supplemented with the results obtaine in experiments with mink.

2. Bacterial resistance to antibiotics.

After the first years promising results, both with regard to the preventative and therapeutic use of antibiotics, there followed a period where more and more disease-carrying bacteria became resistant to the drugs which previously were successfully used to combat them.

Some of the best known and most serious consequences of this are the bacterial infections which to a greatly increasing degree occur in our hospitals.

The bacteria in question e.g. staphylococca have, in some cases, become resistant to most, or all of the known antibiotics.

Bacteria can develop resistance to antibiotics in two ways. The first is by mutation, by which method a new bacteria type is produced, which is resistant to one or more antibiotics. The second is more indeterminate, and consists of transfer of resistance from one bacteria to another, or one bacteria type to another. The mechanism of bacteria's resistance is not yet fully known but it has been shown that certain types of staphylococca produce an enzyme, penicillinase, which breaks penicillin down and thus neutralizes its effect.

2.1. Resistance by mutation.

Mutations occur in connection with the reproductive process, but they are very rare. Inert a mutation from non-resistant to resistant to antibiotics can come to be important is due to the fact that bacteria multiply very quickly - some types can produce a new generation in twenty minutes - and that they are present in such huge numbers. A resistant mutant of a disease producing bacteria can live unnoticed in the organism, because it cannot multiply to an extent which will make the host animal

clinically sick, due to the normal competition with other micro-organisms present. However, treatment with the antibiotic in question combats the non resistant-microorganisms, thus removing the competition and giving the resistant bacteria maximal developmental conditions, and the result is an outbreak of sickness.

2.2. Infectious resistance.

Investigations in recent years have, however, shown that resistance also occurs without mutation, and that this is, for certain bacteria types, apparently the most common method. This form for resistance is more difficult to control, since it can spread, not merely from one bacteria to another of the same type, but can also transfer to another bacteria type.

It has also been shown that a bacteria type's resistance to several antibiotica types (multiple resistance) can be transferred all at once to other bacteria types. This can, further, occur even if the bacteria to which resistance is transferred, have never been subjected to the antibiotica in question. It is thought highly probable that a disturbingly high proportion ot the bacterial flora of the intestine is susceptible to this "infectious resistance". Development of such a resistance through prophylactic use of antibiotics can make combat of an otherwise harmless infection difficult, if not impossible.

In investigations with pigs it was shown that colibacteria, which were bearers of "infectious resistance" could transfer resistance to an otherwise sensitive type of Salmonella bacteria, which afterwards could not be combatted with the antibiotics normally used.

Coli-bacteria often produce diarrhoea in pigs. This type of infection was successfully dealt with in the 195o's by treating with the most normally used antibiotics. Today such treatment

gives considerable problems. Some investigations indicate, however, that "infectious resistance" is reversible. In some cases it has been limited, or wiped out completely by not using the antibiotic in question for a period of some months.

The resistance produced can be limited to a specific antibiotic, or it can include several. It is stated in K.O. Møller's Farmakologi, that the use of the so-called "broad spectrum" antibiotics are more likely to give rise to a multiple resistance than the more specific antibiotics.

2.3. Transfer of resistance from animals to humans.

Some bacteria types can produce disease in both animals and humans. Development of resistance through use of antibiotics in animal husbandry can thus render combat of certain infections in humans more difficult.

Much more widespread, however, is the "infectious" transfer, since both disease producing, and non-disease producing bacteria from domestic animals can transfer resistance to bacteria in the human organism, and thus make combat of disease difficult or impossible.

Investigations have also shown that transfer of resistance from animals to humans can occur through normal contact with domestic animals.

Theseobservations show that the irresponsible use of antibiotics in animal husbandry under certain circumstances can have very serious consequences for the human population.

Specific antibiotics, which are effective in combatting disease in humans, ought not to be used in animal husbandry, but be reserved enclusively for human use. This is practices in many

countries, but it is not certain that these restrictions are stringent enough.

The risk connected with preventative and therapeutic use of broad spectrum antibiotica added to feed and drinking water, ought to be carefully evaluated, with special regard to the consequences of development of multiple resistance.

3. Preventative use of antibiotics.

Investigations in the forties and fifties showed that antibiotic supplementation of feed generally gave rise to an improvement in growth and health. The result of this was that antibiotics came to be used rutinely and often indiscriminately in domestic animal feed. The reason for this improvement in growth and food utilization is not quite clear, but it is thought most probable that it is due to alterations in the intestinal flora. It is probable that these bacteria, which have a positive influence on feed utilization have more favourable conditions when some of the more harmful bacteria are put out of action by antibiotics. As long as this situation continues, everything is fine, from a production point of view.

A closer examination of the results over the last 25 years shows, however, that the influence on the animals welfare and health varied considerably. In an investigation with chickens (21 experiments) growth rate was improved from 2-15%, with the majority between 4% and 9%.

Most of the antibiotics which are used prophylactically in feed mixtures to domestic animals, are of the broad spectrum type. For example it can be named that antibiotic products such as aureamycin, terramycin and tylan. After a very careful evaluation of the experience and results which are available on the use of antibiotics as a preventive measure, the well known and

much discussed Swann report concludes that "it is hard to find any excuse in logic or theory for this practice, and even harder to find that is does any good at all".

4. Therapeutic use of antibiotics.

With the discovery of various antibiotics, it became normal practice to treat the entire stock of different domestic animals through supplement to feed or drinking water. This practice led to both less control with dosage, and to larges doses per animal, because one had to ensure that those animals which ate and drank least, also received enough of the drug to give the desired effect. On the other hand, this treatment only lasts a short time, which cuts down the risk of development of resistance in the disease producing bacteria.

Therapeutic use of antibiotics through supplement to feed or water can therefore be said to be appropriate but its practice should be limited to bacterial infections, who cause can be identified and which can be treated by antibiotics, preferably specific.

5. Advantages and disadvantages of use of antibiotics in animal husbandry.

5.1. Advantages.

The advantages which can be gained by using antibiotics preventatively as feed supplement, are generally uncertain and small, compared with the risks run. The positive result of experimental investigations must also be questioned, because of the possibility of later development of resistance in intestinal bacteria.

It is therefore doubtful whether the preventive use of antibiotics is worth the risk and the cost.

The use of antibiotics to cure disease has been a great help in animal husbandry. Treatment can be individual or collective, depending on the type and extent of the disease. The effect is, of course dependent on whether, and to what extent the disease producing bacteria have developed drug resistance. In the treatment infections, specific antibiotics should be used as far as possible, i.e. that antibiotic which has most effect on the bacteria in question. This demands diagnosis and evaluation by a veterinarian. The exact cause of the sickness should be known, and if there exists and effective antibiotic, then it can be appropriate to use mass antibiotic therapy.

5.2. Disadvantages.

The problems involved in prevention and cure of disease by antibiotics in animal husbandry can be summed up in the following points.

a) Development of drug resistance in the disease producing bacteria, which can render later treatment with antibiotics useless.
b) Transfer of bacterial resistance to human through foodstuffs, or contact with animals.

The disadvantages connected with the use of antibiotics in animal husbandry show clearly that antibiotics are "tools" which should be used carefully and after reflection. Research shows clearly that it is not enough simply to alternate between two or three antibiotics. Quite the reverse in fact because under certain circumstances this could lead to large problems with the outbreak of disease, where many types of bacteria have had time and opportunity to develop resistance to most of the known antibiotics.

Research results and experience support the thesis that antibiotics should not be used preventatively in animal husbandry. This will ensure that, the drugs have a chance of working when

acute disease breaks out.

6. Research with fur bearing animals.

Several projects with antibiotics have been carried out with a view to sickness prevention and growth promotion agent. The earliest of these investigations were carried out and published by firms which produce antibiotics. The results, therefore, must be evaluated in view of the fact that the products should "sell".

In the first half of the fifties a series of investigations were carried out on Scandinavian and American mink farms with antibiotic supplement to mink and foxes.

Investigations carried out by a drug firm in USA showed that it should be possible to improve the gain of mink by 15% during the growth period, using terramycin or aureomycin supplement. Swedish investigations in 1951, 1952 and 1953 could not confirm that result, since growth improvement varied and differences were insignificant. This was true for supplement of terramycin, penicillin and bacitracin to mink and foxes in the period from weaning to pelting. However, a growth rate increase of 2o% was observed in kits where the feed was supplemented with bacitracin in the lactation period.

A Norwegian investigation carried out in 1953 showed the same tendency as the Swedish, i.e. no significant improvement with antibiotic supplement (aureomycin) to mink and foxes in the period from weaning to pelting. In the nursing period an improvement in gain of 11% was observed.

On the other hand antibiotic supplement in a Danish investigation in 1952 gave a weight improvement of 15% for foxes and 1o% for mink.

A later Danish investigation (1962) showed increase in growth rate in the period from weaning to pelting of 5-6% in mink with aureomycin supplement. Bacitracin did not have the same effect. Difference in growth rate did not, however, give a corresponding difference in skin length.

In 1957 an American investigation found 11-14% improvement in growth from 6 weeks to pelting in mink whose feed was supplemented with terramycin or aureomycin. In this case a corresponding increase in skin length was observed.

A Danish investigation in 1975, involving tylan (tylosin phosphate) supplement to mink in the nursing period, gave a growth rate increase of 7-8%.

Several of the investigations mentioned above were begun in pregnancy. In most cases the experimental groups as well as the obtained differences were small, so one cannot come to any conclusions about the effect of antibiotic supplement on breeding results.

The report is based on the following reports:

Barnum, D.A. (1973) Antibiotic Feeding of Farm Animals and Resistance Factors in Bacteria. Can. Inst. Food Sci. Technol. 6:68.

Swann, M.M. (1969) Joint Committee on the use of Antibiotics in Animal Husbandry and Veterinary Medicine. Her Majesty's Stationary Office, London.

Møller, K.O. (1965). Farmakologi. 6. udgave. Nyt Nordisk Forlag Arnold Busck, København.

Melin, G. (1953). Antibiotika och vitamin B_{12} som tillskott till pälsdjurens foderstat. Våra Pälsdjur, 24-71.

Melin, G. (1954). Antibiotika till pälsdjur. Våra Pälsdjur, 25:127.

Høie, J. (1954). Forsøk med antibiotika til sølvrev- og minktisper og til sølvrev-, blårev- og minkkvalper. Norsk Pelsdyrblad 28:61.

Petersen, F. Haagen (1953). Antibiotika til pelsdyr. Dansk Pelsdyravl, 16:361.

Bassett, C.F., Travis, H.F., Warner, R.G. & Loosli, J.K. (1957). Antibiotikatilskud til minkfoder forøger pelsstørrelsen. Dansk Pelsdyravl, 2o:555.

Jørgensen, G., Hillemann, G. & Clausen, Hj. (1964). Forsøg med antibiotika til mink. Dansk Pelsdyravl, 27:54.

Glem Hansen, N. & Jørgensen, G. (1975). Forsøg med tilskud af tylosinfosfat (Tylan) til mink i laktationsperioden. 63. Meddelelse fra Statens Husdyrbrugsforsøg.

UNSATURATED DIETARY FAT AND LIPOPEROXIDES AS ETIOLOGICAL FACTORS IN VITAMIN E DEFICIENCY IN MINK.

Fredrik Ender and Arne Helgebostad, Department of Biochemistry and the Research Station for Furbearing Animals, Veterinary College of Norway, Oslo.

The purpose of this paper is to describe long term feeding experiments on the effect of oxidized marine oils when fed to young mink. A preliminary study on the effect of c.l.o. using five days old chicks as test animals is first described.

After a preliminary study of the toxic effect of lipoperoxides injected paranterally to five days old chicks, the present work describes the more or less adverse effect of feeding polyunsaturated fat - both fresh and rancid - to mink kits during a four years study.

The detrimental effect caused by lipoperoxides from cod liver oil increases relative to the peroxide content of dietary fat. Lipoperoxides from the same oil cause a series of different pathological changes which are described in detail. No measurable amounts of peroxides in adipose tissue were found after feeding toxic levels of lipoperoxides. A dietary supplement of 1o mg DL-α-tocopherol-acetate prevented all the pathological symptoms and exerted an excellent prophylactic effect provided the peroxide levels were not extremely high. Combined treatment with iron and vitamin E were preferable in some instances.

8 Tables, 29 References.
Acta vet. scand. 1975, 16. Suppl. 55.

Ref.: Authors summary.

MERCURY LEVELS IN GEORGIA OTTER, MINK AND FRESHWATER FISH.

P.M. Cumbie, Design Engineering Department, Duke Power Company,
P.O. Box 2178, Charlotte, N.C. 28242.

The present paper reports preliminary data on mercury levels occurring in aquatic mammals and fish from a region of the Georgia Lower Coastal Plain which is not associated with recognized point sources of mercury contamination.

The data reported here indicate that the presence of mercury in fish of relatively unpolluted Lower Coastal Plain streams results in accumulation of mercury by otter and mink which feed on these fish. Otter exhibit hair mercury levels which approach those at which symptoms of neurological disorders have been reported in humans suffering from mercurial poisoning (Birke et al. 1972).

Subtle effects on behavior resulting from sublethal mercurialism could affect the reproduction and survival of certain populations of otter or mink. Possible sublethal effects of environmental mercury or other pollutants at trace levels on native animal populations deserve further study, since such information would be useful in formulating sound policies regarding discharge of pollutants under varying circumstances. Additional investigation is needed to determine the relative contributions of natural and man-caused mercury inputs to mercury levels observed in native wildlife species.

2 Tables, 1o References.

Bull. of Environm. Contamination & Toxicology, Vol. 14, no.2, 1975.
Ref.: G. Joergensen.

EXTRAHEPATIC VEINS OF THE PORTAL SYSTEM OF THE MINK (MUSTELA VISON).

O. Jablan-Pantić and Ž. Miladinović, Dept. Anatomy, School of Veterinary Medicine, Belgrade, Yugoslavia.

Thirty mink of both sexes, 1-2 years old, which were sacrificed at the Jelen hunting and forestry estate for their fur, were used in the investigation. In order to obtain a roentgenogram and preparation of the blood vessels, minimum in linseed oil or gelatine was injected into the portal vein trunk or the v. colica sinistra, which for corrosive preparations dyed rubber or latex were used.

Study of the extrahepatic veins of the mink portal system showed the following:

The trunk of v. portae is formed by the union of three veins: v. mesenterica communis, v. gastrolinealis and v. gastropancreaticoduodenalis.

V. mesenterica communis is formed by the union of three veins: v. colica, which collects blood from the anterior part of the rectum (v. haermorhoidalis cranialis), colon descendens (v. colica sinistra) and from the colon transversum and the colon ascendens (v. colica dextra), truncus jejunalis, which collects blood from the ileum and the jejunum via a number of jejunal veins, and v. pancreaticoduodenalis caudalis, which collects blood from the caudal parts of the duodenum and the caput pancreatis.

V. gastrolienalis is formed by the union of two veins: v. licnalis, which receives branches from the omentum (vv. epiploicae sinistrae), the fundus gland region (vv. gastricae breves), and from the cauda pancreatis (rami pancreatici), cauda lienis and caput lienis, and

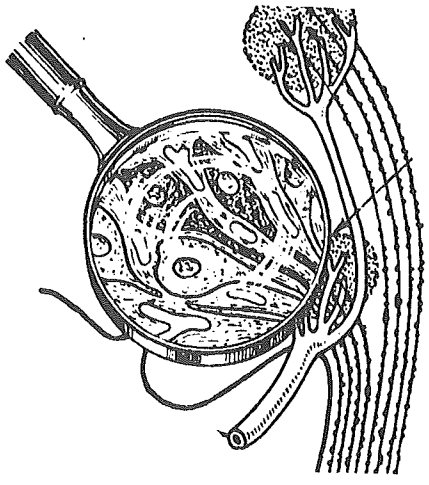
v. gastrica sinistra, which runs along the lesser stomach curvature and collects the blood from the cardiac gland region and the parietal and visceral parts of the stomach.

V. gastropancreaticoduedenalis is formed by the union of two veins: v. gastroepiploica dextra, which collects blood from the pyloric gland region (v. gastrica dextra) and the omentum (v. epiploica dextra), and v. pancreaticoduedenalis cranialis, which carries away blood from the first part of the duodenum and the corpus pancreatis.

The blood vessels of the portal system varied in different individuals. They were interconnected by numerous anastomoses. Anastomoses were observed at several places between the extrahepatic branches of the portal vein and the branches of the posterior vena cava. In the stomach, the fundus gland region in particular, there was a dense network of blood vessels. Marked stomach vascularization is a characteristic property of the mink. In the mink, unlike domestic carnivores, the cecum and the corresponding blood vessels are not present. This is the principal difference in the extrahepatic veins of the portal system between the mink and domestic carnivores.

4 Pictures, 1o References.
Archives of Biological Sciences - Arhiv Bioloških Nauka,
Vol. XX, no. 1-2, 1968.

Ref.: Authors conclusion.



BLOOD VISSELS OF MINK (MUSTELA VISON) LIVER.

Olivera Jablan-Pantić and Živka Miladinović, Inst. of Anatomy,
School of Veterinary Medicine, Belgrade, Yugoslavia.

Twenty one-year-old animals of both sexes and different weights were sacrificed for their fur at the Jelen Hunting and Forestry Estate. Blood-vessel ramification was studied with injected preparations, roentgenograms, and in part with corrosion preparations. Stained gelatin was used in injected preparations, minimum in gelatin or linseed oil for roentgenograms, and latex and stained rubber for corrosion preparations.

The trunk for the portal vein of mink is twisted so that on the outside a spiral groove and four alternate dilatations are visible. The first dilation is formed by v. mesenterica communis, v. gastrolienalis empties into the second, and v. gastropancreaticoduodenalis into the third, after which there is another dilatation before the vein enters the liver. Its inside is screw-like, the spiral ridge protruding into the lumen and being the counterpart of the groove ouside. Thus constructed, the trunk of the portal vein mixes blood from mesenteric, gastrolienal, and gastropancreaticoduodenal regions and rotates it along the spiral axis. The portal vein and the a. hepatica both bifurcate in the liver into left and right branches, which supply blood to two strictly separate regions. The right branch brings blood to the lobus caudatus and the right lateral lobe, and the left to all other hepatic lobes. Blood is supplied to lobes by branches of v. portae and a. hepatica and drained by branches of v. hepatica. The branches of the portal vein are on the visceral side, accompained by the corresponding arteries which are more dorsal and situated somewhat deeper. Hepatic veins are closer to the parietal side and at several places empty into the vena cava caudalis, which passes

through the liver. Anastomoses between the portal system and the arterial system were not found, nor did the arborizations of these two systems in mink and dog differ essentially.

7 Pictures, 11 References.
Archives of Biological Sciences - Arhiv Bioloških Nauka,
Vol. XX, no. 3-4, 1968
Ref.: Authors conclusion.

VISCERAL BRANCHES OF AORTA ABDOMINALIS IN THE FOX (ALOPEX LOGAPUS)

Olivera Jablan-Pantić and Živka Miladinović, Department of Anatomy, Veterinary Faculty, Belgrade, Yugoslavia.

In the fox, as in other carnivores, unpaired visceral branches of aorta abdominalis are: a. coeliaca, a. mesenterica cranialis and a. mesenterica caudalis, and paired branches are: aa. renales and aa. testiculares, that is aa. ovaricae. Variations in the vascularity of the gastrointestinal tract are common.

A. coeliaca branches into a. hepatica and truncus gastrolienalis. A. hepatica vascularizes the liver (aa. hepaticae propriae), corpus pancreatis (rami pancreatici), lobus pancreatis dexter and the descending portion of the duodenum (a. pancreaticoduodenalis cranialis), the cranial portion of the duodenum (rami duodenales), the pyloric part of the stomach (a. gastrica dextra, rami pylorici), the fundus of the stomach and the right parts of the omentum (a. gastroepiploica dextra).

The first branch of truncus gastrolienalis - a. gastrica sinistra, vascularizes the distal part of the esophagus (ramus oesophageus), the cardiac portion of the stomach (rami cardiaci), the parietal and the visceral side of the left part of the stomach (rami

gastrici craniales et caudales). The second branch of truncus gastrolienalis - a. lienalis, vascularizes lobus pancreatis sinister (rami pancreatici), the middle part of the stomach (aa. gastricae breves), the left parts of the omentum (aa. epiploicae sinistrae) and the spleen (ramus dorsalis et ventralis).

A. mesenterica cranialis has three branches. The caudal branch of a. mesenterica cranialis - a. pancreaticoduodenalis caudalis, vascularizes lobus pancreatis dexter and the caudal and the ascending portion of the duedenum. The cranial branch of a. mesenterica cranialis - a. ileocaecocolica, vascularizes the ileum (a. ilei), the caecum (aa. caecales), the ascending colon (aa. colicae dextrae), the transverse colon and the proximal part of the descending colon (a. colica media). A. mesenterica cranialis after giving these two branches represents truncus jejunalis which vascularizes the jejunum.

Branches of a. mesenterica caudalis vascularizes the colon descendens (a. colica sinistra) and the proximal part of the rectum (a. rectalis cranialis).

The position and the course of paired branches of the obdominal aorta in the fox are identical with those in domestic carnivores, with the exception of a. renalis dextra which gives a. phrenicoabdominalis dextra, which is not the case in the dog.

6 Pictures, 15 References.
Archives Des Sciences Biologiques - Arhiv Bioloških Nauka, 25, 1-2/1973, Beograd.

Ref. Authors abstract.

BILE AND PANCREATIC DUCTS IN THE FOX (ALOPEX LAGOPUS)

Živka Miladinović and Olivera Jablan-Pantić, Institute of Morphology and Physiology, Faculty of Veterinary Medicine, Beograd, Yugoslavia.

Resuming the investigation of the digestive tract and its glands in the fox (Miladinović et al., 1973, Jablan-Pantić et al. 1973, 1973 a, 1974) we have studied the bile and pancreatic ducts and their relationship. With regard to the signification of these organs in the process of digestion, this might contribute to an easier understanding of the problems connected with the function of these organs under conditions of intensive husbandry and rationalized nutrition.

Using the available literature concerning the bile and pancreatic ducts of domestic and other carnivores (Bradley et al., 1948, Eichorn et al., 1955, Ellenberger et al., 1943, Jablan-Pantić, 1963, Miller et al. 1969, Nielsen et al. 1954, Sisson et al., 1950) we were able to compare these systems in the fox with other carnivores and to draw corresponding conclusions. Data on foxes were lacking.

The bile passages, bile ducts and the pancreatic ducts of the fox are described and compared with the corresponding systems in domestic and other carnivores. Morphological properties of the pancreas in the fox are presented. The form and position of the right lobe of this organ is characteristic in the investigated species.

6 Pictures, 13 References.
Acta Veterinaria(Beograd), 1975, Vol. 25, no.2, 75-81.
Ref.: Authors introduction and summary.

MORPHOLOGICAL PROPERTIES AND BLOOD VESSELS OF THE FOX LIVER (ALOPES LAGOPUS).

Olivera Jablan-Pantić and Živka Miladinović, Institute of Morphology and Physiology, Faculty of Veterinary Medicine, Beograd, Yugoslavia.

As part of a detailed investigation of the vascularization of the alimentary canal, its glands and the spleen in the foxes (Pantić and Miladinović, 1973, 1973 a) intrahepatic arborization of the arteries and veins was examined in this animal. Considering the significance of the liver in the process of digestion and its role in ensuing adequate nutrition, which is an important factor for fur quality, a study of the lobar structure of the liver and its blood vessels was made. No data were found in the available literature on the macromorphological properties and blood vessels of fox liver. Nevertheless, the data obtained by other authors on intrahepatic blood vessels of domestic and other carnivores (Jankovič, 1954, Nettelblad, 1954, Pantić and Miladinović, 1968, 1968 a, Miller et al., 1964) aided this investigation of the system in the fox.

The lobar structure of the fox liver is described, as well as intrahepatic arborization of the arteries and veins. Anastomoses between blood vessel systems in the different lobes were not found, but there are some differences in the arborization of these systems between the fox and the dog.

5 Pictures, 8 References.
Acta Veterinaria (Beograd) 1974, Vol. 24, no.4, 149-156.
Ref.: Authors introduction and summary.

STUDIES ON THE FREQUENCY OF OCCURENCE OF TOXOPLASMA GONDII IN FUR-BEARING ANIMALS.

Jan Starzyk, Boleslaw Pawlik, Zenon Pawlik, Institute of Microbiology, Medical Academy, Kraków, ul. Czysta 18, Poland.

The investigations were carried out by means of Sabin-Feldman test on the frequency of occurrence of toxoplasmosis among fur-bearing animals reared in farms. Altogether there were used 210 animals from the order of Carnivora (mink, fitchew, and Alopex sp.). They did not show clinical signs of disease and derived from 5 fur farms in the Kraków area.

The obtained results proved the presence of toxoplasma antibodies in 19.5% of examined animals. Particularly high percentage of positive results (24.8%) was found in minks (Mustela vison).

It appears that to a certain extent these fur animals may constitute a reservoir of Toxoplasma gondii in nature.

1. Fur-bearing animals from the order of Carnivora reared in the farms may constitute a reservoir of Toxoplasma gondii parasites.
2. The representatives of Mustelidae family seem to be more susceptible to Toxoplasma gondii infection than the representatives of Canidae family.
3. Toxoplasma antibodies were found in a praticularly high per cent of minks (Mustela vison), among which the pastel variety appears to be the most susceptible.
4. Among 5 farms supplying the material for the investigations one (No II) can be regarded as an endemic focus of toxoplasmosis. An interview with the proprietor of this farm provided evidence on a high mortality rate among reared animals.

Acta Biologica Cracoviensia, Zoologia, Vol. XVI, 1973.
3 Tables, 8 References.
Ref.: Authors summary and conclusion.

PREPARATION OF ANTIGEN FOR THE COUNTERIMMUNOELECTROPHORETIC TEST FOR PLASMACYTOSIS IN MINK.

E. Brummerstedt, Dept. of Veterinary Virology and Immunology, Royal Veterinary and Agricultural University, Copenhagen, Denmark.

Counterimmunoelectrophoresis as a test method for making the diagnosis of plasmacytosis in mink demands the specific virus antigen. The method for preparation of the antigen according to Cho & Ingram (1972 a, b) with minor modifications is described in details, and results obtained at 62 antigen preparations are presented. In addition an ultrafiltration method is outlined which may be useful as a replacement for ultracentrifugation procedures used in the technique described by Cho & Ingram (1974).

2 Tables, 1 Picture, 9 References.
Acta vet. scand. 1976, 17, 395-4o2.
Ref.: Authors summary.

PROPHYLACTIC, POSTINFECTIOUS AND NEONATAL VACCINATION AGAINST CANINE DISTEMPER IN MINK.

Mogens Hansen & Ebba Lund, Danish Fur Breeders Association, Glostrup, and Royal Veterinary and Agricultural University, Dept. of Vet. Virology and Immunology, Copenhagen, Denmark.

Nord. Vet.-Med. 1976, 28, 585-591.

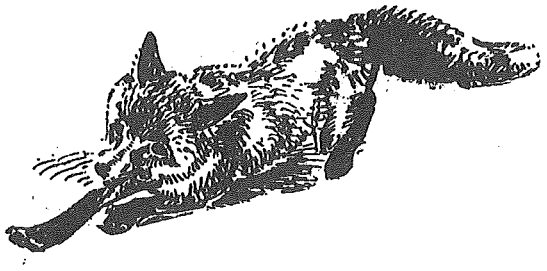
Abstracted in the introductory issue of Scientifur.

THE INFLUENCE ON BREEDING, PRODUCTION, AND ACID-BASE BALANCE WHEN MINK ARE FED ON ACIDIFIED FEED.

G. Jørgensen, J.S.D. Poulsen and P. Bendixen, Dept. of Fur Bearing Animals, The National Institute of Animal Science, Trollesminde, DK 3400 Hilleroed, The Institute of Surgery and The Department of Virology and Immunology, The Royal Veterinary and Agricultural University, Copenhagen, Denmark.

Nord. Vet.-Med. 1976, 28, 592-602.

Abstracted in the introductory issue of Scientifur.



RESERVED FOR
YOUR ABSTRACT !!!

EXPERIMENTS WITH LIGHT REGULATION IN MINK.

Jostein Reiten, Agricultural University of Norway, Dept. of Poultry and Fur Animal Science, Box 17, 1432 Ås - NLH, Norway.

The present investigations included about 1250 mink, mostly of the pastel colour type. The main purpose was to investigate how artificial light and a reduced constant daylength of six hours influenced growth and pelt development. Other objectives were to study the significance of time for initiation of light control and the effect of rearing one or two kits in the same cage, with or without nest box.

The experiments started June 19, 1975, and terminated at pelting time the same year. Adult mink were placed under light control June 19 or July 2; the kits June 25, July 2 or July 9. Most of the animals under light regulation (L) were pelted during the period from September 18 to October 20, the adults earlier than the kits. Average pelting dates of animals under normal light conditions (N) were November 15 for kits.

Artificial light and reduced constant daylength resulted in earlier shedding of summer fur than is common under normal farm conditions. Kits placed under light control on June 25, however, seemed to shed later than kits that were put under light regulation July 2 and July 9. They were also on the average pelted some days later (October 10) than the others, but still they showed a tendency of insufficient fur primeness.

Male kits under light regulation failed to reach the same body weight at pelting as male kits under normal light conditions. In spite of their reduced body weight, L-animals produced significantly longer pelts than did N-animals. Average pelt length of male L-kits was 70.7 cm as compared to 67.2 cm of male N-kits. Pelts

of females L- and N-kits measured on the averages 58.8 and 56.0 cm respectively. Pelts of adult L-females were also longer (57.6 cm) than pelts of adult N-females (55.3 cm) in spite of lower body weight of L-females.

It seemed that light regulation had different influence on various pelt quality traits. A tendency towards better quality pelts from adult L-females than from adult N-females was observed. Among kits there was a tendency in the opposite direction. The effects were fairly slight, however, and it is probable that other management factors have influenced the pelt quality traits to a greater extent than light. Thus, it was found certain effects of rearing kits two together in the same cage as compared to one animal in each cage. Some effects of giving the animals a nest box in the cage were also observed.

Pelts of adults as well as kits of L-animals had shorter guard hairs and underfur than pelts of N-animals. This was assumely caused by light regulation, but it may also to a cetain extent be connected with the possibility that L-animals were pelted at an earlier stage of pelt maturity.

13 Tables, 2 Figures, 23 References.
Scientific Report of The Agricultural University of Norway
Report no. 42, Vol. 55, 1976, no.24.

COMMUNICATION

ATTENTION !!!

I hope, that the gentleman in the Sauna, menthioned in the introductory issue of SCIENTIFUR have sent the russian book on genetics to Hugh F. Travis for translation into english.

G.J.

PANEL ON "REPRODUCTION IN FUR-BEARERS"

KRAKOW, POLAND

In conjunction with the VIIIth International Congress on Animal Reproduction and Artificial Insemination held in Krakow, Poland, July 12-16, 1976, there was a Panel on "Reproduction in Fur Bearers" under the chairmanship of Dr C.E. Adams, who had acted as convenor. Papers were presented by J. Aamdal, Veterinary School of Norway, Oslo, Norway on "Artificial Insemination in Foxes"; T. Tiba, Primate Research Institute, Kyoto, Japan on "Spermatogenesis in the Mink"; S. Jarosz, Academy of Agriculture, Krakow, Poland on "Effect of diets with various quality fat, fish and meat by-products on the reproductive performance of male mink"; and C.E. Adams, ARC Unit of Reproductive Physiology & Biochemistry, Cambridge, England on "Artificial Insemination in the Mink".

C.E. Adams

A RUSSIAN BOOK ON FUR ANIMALS

An English translation of a Russian book:

FEEDING FUR BEARING ANIMALS

has been prepared in America.

The original book by *N. Penelaik*, published in Russia 1972 includes 344 pages and deals thoroughly with nutritional requirements and feeding of mink and foxes during different periods. It also includes a large table of chemical and amino acid composition of feed ingredients (c. 30 pages).

The translation was prepared for Agricultural Research Survey, U.S. Department of Agriculture and National Science Foundation, Washington, D.C. by Mrs. Geti Saad.

The offset copy, 590 pages, is in size 4A, bound i two volumes.

PRICE: The price is 60:- Fmk + postage fee.

ORDERS: The book can be ordered from

FINNISH FUR BREEDERS ASSOCIATION

address: Box 14
00381 HELSINKI 38
Finland

phone: 90 - 558 031 (Lohi)

NORDISKE JORDBRUGSFORSKERES FORENING

SCANDINAVIAN ASSOCIATION OF AGRICULTURAL SCIENTISTS - FUR ANIMAL DIVISION.

27-28
In September 1977 the general meeting for the fur animal division will be held in Norway. (Scandinavian languages will be used).
Hardalsøen (ca 50 km. nord for Oslo)

Arrangements committee:

H. Rimeslåtten
K. Nordstoga
1 representative for Norweigian Fur Breeders Ass.

Please send suggestions for topics to Hans Rimeslåtten, to be in hand 15th March 1977 at the latest.

Theres is a possibility that the meeting can be extended by one day to include special topics.

Please contact Rimeslåtten as soon as possible, regarding suggestions or contributions.