Use of Ferrets in Laboratory Work and Research Investigations*

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THE ferret is a member of the weasel family, *Mustelidae,* to which belong the polecat, stoat, martin, mink, and weasel. All are characterized by a fetid odor, but this is not marked in the ferret. It is further classified as a member of the genus *Mustela,* and the sub-genus *Putorius,* var. *furo.*

It is generally assumed that the domesticated ferret is an albino breed derived from the wild polecat (*Putorius foetidus*), but it differs from the latter principally in the yellowish-white color of its fur and the pink-red color of its eyes. This is commonly known as the "English" ferret.

The North American, or black-footed ferret (*Mustela nigripes*),[1] has a pale buff, or yellow, fur with a sprinkling of dark brown hairs on the back. The under parts are buff, or cream-colored; the feet, black, or dark brown; there usually is a broad, black band across the eyes; the tail is short and colored like the body, except for a short, black tip. This species is commonly referred to as the brown or fitch ferret.

During the past 12 or 13 years, the ferret has become increasingly important as a laboratory animal, particularly for virus research. Since it was first shown by Dunkin and Laidlaw[2] to be susceptible to canine distemper, it has been used to great advantage in the study of several other virus infections.

While it is the purpose of this paper to review published and unpublished data pertaining to the use of the ferret in laboratory investigations, certain limitations prevent a complete summary at this time. The comparative newness of the species as a laboratory animal, and its limited use in this respect, explain, perhaps, why there exists a paucity of data with regard to its anatomy, physiology, endocrinology, and nutritive requirements. It is hoped that this report will stimulate further investigations along these lines.

ANATOMY

For laboratory purposes, there is little demand for ferrets of definite weights; although in general an adult animal is usually desired. In using the term "adult," the breeder invariably refers to an animal 4 months of age or older. However, at this age, the ferret has not attained its full weight and growth.

Several strains have been developed for specific purposes. By selective breeding, large ferrets have been produced for rabbit and woodchuck hunting; smaller strains have served admirably for rat extermination work. There is a tendency now on the part of breeders to concentrate on the produc-

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tion of smaller animals for laboratory purposes, since this use of the ferret in recent years has completely revolutionized the industry.

The brown or fitch ferret, more regularly used in our work, will average 1,363 grams in the male at approximately 15 months, and 997 grams in the female at the same age.

The lungs are a delicate pink color in the normal state, and occasionally may show small, flat, but slightly raised, yellowish-white areas on the surface. Dunkin and Laidlaw [2] were of the opinion that these markings were lesions seen in about one-third of their cases of ferret distemper. However, we, like Shope,[3] have observed them at times in normal ferrets.

Little can be said at this time regarding the arterial and venous systems other than to note that the carotid artery and jugular vein are prominent and readily accessible.

In three brown males, bled from the ear, Slanetz [4] reports an average red cell blood count of 9,810,000 per cu. mm. His white cell counts varied from 7,120 to 21,600 per cu. mm. in four trials, the highest being found in a female.

In our similar number of counts on bloods from normal ferrets, 15 months of age, taken by cardiac puncture, the following averages were obtained:

Red blood cells	8,500,000 per cu. mm.
White blood cells	8,900 per cu. mm.
Hemoglobin	84 per cent
Polymorphonuclears	65 per cent
Lymphocytes	33 per cent
Monocytes	1 per cent
Basophiles	none
Eosinophiles	1 per cent
Young forms	9 per cent

In comparison with the 7.5–8 microns diameter of the human red blood cell, that of the ferret appears to be about 5 microns.

PHYSIOLOGY

Little is known regarding some of the physiologic processes of the ferret. Data on urine, its specific gravity, reactions, and normal constituents are nil. Not much more is recorded on blood chemistry. It is hoped that such information can be made available to laboratory workers later.

Temperature—The normal range of the rectal temperature is from 101.0° F. to 102.5° F. However, even the mildest type of restraint exercised while taking the temperature will cause its rise to as high as 104.0° F. It is always advisable, before starting critical experiments involving accurate temperature readings, to accustom the animal to the introduction of the thermometer into the rectum, by taking the temperature twice daily for several days. The thermometer should be small and well lubricated if peri-anal inflammation is to be avoided.

Respiration—This ranges between 33 and 36 per minute in the normal ferret.

Pulse—No information is available on the pulse rate. However, it is so rapid that data will have to be obtained through kymographic readings.

Blood Chemistry — Our superficial studies would indicate that normal ferret blood contains 131 mg. of sugar per 100 cc., 7.2 mg. of calcium per 100 cc. and 41.3 mg. of N.P.N. per 100 cc. This work is being continued.

Temperature Requirements — Under ordinary conditions, the ferret is a hardy animal and is able to withstand exceedingly low temperatures. It suffers somewhat, however, during extremely hot weather. At these times, if the animals are quartered inside, means should be provided for circulating the air in the animal house. No difficulty is experienced in keeping them outside even during severe winter months, provided they are housed in adequate pens.

Period of Oestrum—Information obtained from several breeders indicates that the female ferret, under conditions of climate prevalent in the East and Middle West, will come into season for the first time early in March of the year

following birth. Carnochan [5] is of the opinion that oestrum occurs fully a month earlier in some parts of the West, particularly in California.

Provided the female ferret, or jill, as it is called, is bred and gives birth to a litter, a second oestral period will usually occur in July, although there are cases in which this second period occurred as late as the middle of August. According to Hammond and Marshall,[6] oestrum persists in the ferret in the absence of coitus for as long as 5 months in some cases. Under such conditions, the animal gradually becomes emaciated and debilitation may lead to death. At least, the possibility of a second litter from such an animal during the same year becomes nil.

These investigators also point out that ovulation may take place at any time during oestrum, but only after coitus. If fertilization does not occur, false pregnancy arises and all evidences of oestrum disappear.

No difficulty is experienced in detecting the presence of oestrum. The vulva enlarges to a considerable degree and persists at such an increased size throughout the period, but is reduced to its anoestrum size as soon as pregnancy takes place.

Mating — Hammond and Walton [7] state that the average duration of coitus is about 2 hours, but it may vary between 15 minutes and 3 hours. American breeders, however, customarily place the male with the female for 24 hours early in the oestral period. These workers also determined that ovulation takes place in the female about 30 hours after coitus.

Period of Gestation—This is normally 42 days.

Size of Litters—The average size of the litter raised in this country is from 6 to 8, although occasionally there may be as many as 10 or 12. Two litters are born annually, one in May and one in September.

Development of Young at Birth—When born, the members of a litter are hairless and blind. Each will weigh approximately 10 grams.

CARE OF YOUNG—FEED REQUIREMENTS

Approximately 10 days before the litter is due, the nest box (described later) is loosely filled with wheat straw, or similar material, and pressed down in the center to form a nest. Such a box is provided for each pregnant female and her litter. As the time for parturition approaches, the mother will further prepare the nest by lining it with body hair. After the young ones are born, she prepares additional protection by pulling down over them the excess straw in the nest box.

Observations of the young should be made occasionally after the first few days following birth. It is best to do this when the mother has left the nest box to feed. If the litter is large, it is sometimes advisable to remove all over 6 of the litter and place them with a foster mother during the suckling period. In order to avoid a common condition in the nest box referred to as "sweats" by the breeders, the straw must be kept dry and periodically removed from overtop of the young ferrets. The mother insists on keeping her litter covered in this manner. Young ferrets so affected "sweat" to such an extent that their bodies become quite moist. Scours usually accompanies the condition.

The young open their eyes at about 4 weeks of age, when they can be fed for the first time. While still in the nest, they may be given a little bread soaked in milk. Occasionally, finely chopped meat can be added to this diet.

While suckling, the mother should be supplied plentifully with whole milk and bread. Small amounts of meat are also given daily.

For a short time after weaning, the young ferrets are fed thrice daily; later,

twice daily. Milk, bread, and meat are given in quantities just enough to satisfy each individual. Overfeeding is to be avoided.

Diets recommended for grown ferrets are varied, but all seem to serve their purpose. Raw meat only, once daily, seems to be quite satisfactory, but milk, diluted 50 per cent with water, should be added to such a diet. The majority of the breeders insist that all salt should be eliminated from the diet, but 0.5 to 1 per cent has been used in some of the rations without harm to the ferrets.

We have been quite successful in feeding a mush made from whole wheat flour and water. This is made in bulk for storage, without adding salt, and mixed with milk for each day's feeding.

Just enough is given once daily as will be cleaned up completely by the animal. In addition, about 4 ounces of horse meat per animal is given two or three times a week.

HANDLING

Cages—For all practical purposes under laboratory conditions, cages similar to those used for rabbits are quite satisfactory. These are made preferably of metal and are 18 inches wide, 22 inches long, and 14 inches high. The bottom is solid. All sides and the top, of a hinged or slip-on type, are made of heavy, ½ inch mesh wire. Wood-shavings, preferably cedar, are used as litter. Feed cups are suspended from the sides of the cage.

The ferret is an unusually clean animal and habitually deposits its excretions in one corner of the cage. Although it is often not necessary, the litter is removed and replaced every 2 days. The cage itself is thoroughly cleansed and steam-sterilized every week. This type of cage is used to house a single ferret on experiment, but can be used for two normal ferrets being held in reserve for subsequent use.

These cages, when they contain ferrets on experiment, should be kept widely separated. If placed side by side, infection can be spread readily from cage to cage through the open mesh work of the sides by the droplet mode of transmission. Much discouragement and wasted effort can be avoided by using an isolated room containing completely walled-in cubicles, one for each cage, when ferrets are being used in the study of a highly communicable infection.

For long-term experiments, we much prefer a more elaborate cage with an exercising run and a housing compartment containing a nest box. These are kept outdoors in a shaded area during the hot summer months. Even in extremely cold weather, the ferrets do much better in such pens than when quartered indoors. This type of cage is also ideal for breeding ferrets.

The exercise run is 24 inches wide, 24 inches high and 36 inches long. The bottom, sides, and top are of heavy, ½ inch mesh wire. One end, which may be called the rear of the complete unit, is made of tongue-grooved boards with hinges on the bottom so that it can be opened to permit feeding as well as cleaning the wire run. The housing compartment at the front of the unit is an integral part of the exercise run, and is separated from it by a board partition, at the bottom and to the side of which is a hole 4 inches in diameter to permit the ferret to pass from the compartment to the run. Over this hole in the partition is a sliding door made of thin metal. This can be opened or closed from the outside of the unit by a push rod.

The floor of the housing compartment is 24 inches square. The front is 18 inches high, 6 inches lower than the back (partition separating it from the exercising run). The roof lifts up on hinges and slopes from the rear downward to the front. The bottom, walls, and hinged roof are made of wood.

Roofing paper protects this part of the unit from rain and snow.

Inside the housing compartment is placed the nest box, made of wood, with a hinged top, into which are bored about 12 holes for ventilation purposes. The box is 13 inches long, 13 inches wide and 12 inches high. At one end, a hole, 4 inches in diameter, permits the ferret to leave or enter the box. Wood-shavings are used as bedding both on the floor of the compartment and in the nest box. During warm weather, the ferret uses the compartment. In cold winter weather, it seeks more adequate protection in the nest box.

Restraint—As a rule, it is not difficult to restrain ferrets, despite their viciousness and tendency to bite upon the least provocation. Some workers and breeders insist on using heavy rubber mittens to protect their hands and fingers. These are cumbersome and really unnecessary. It is only the occasional ferret that cannot be handled with ordinary care.

The first step in restraining the animal is to grasp it quickly by the tail with the right hand when its back is turned. This should not be attempted until the ferret's attention is attracted to something in front of it. The animal is remarkably quick and agile and can turn upon itself and "sink" its canine teeth into the offending fingers. Should this occur, the hold on the animal must be released. The ferret will then reciprocate. As long as an attempt is made to continue the restraint, the animal will hold on with its sharp teeth and cause an ugly, lacerated wound. These have never become infected in our experience and always heal by first intention.

As soon as the tail is grasped with the right hand, the ferret is lifted from the cage. While still holding the tail, it is placed on top of the cage with its fore legs over the side. In this position, it is able to obtain a degree of anchorage with the fore legs and pull against the restraining hand. While its attention is diverted in this direction, it is grasped quickly, with one swift motion, encircling the neck immediately back of the ears, by the first and second fingers of the left hand. Then, with the thumb and all fingers of the left hand, while the original position is maintained, the fore legs can be grasped and restrained. The hold on the tail is released by the right hand, which is then used to grasp firmly the hind quarters and legs. When restrained in this manner, almost anything can be done with the animal. The rectal temperature can be taken, inoculation by various routes can be accomplished, and even a cardiac puncture is possible; although, in the latter case, it is well to place the animal under light ether anesthesia.

Ether can be administered by a small cone while the animal is restrained as described. It is more practicable, however, to place the ferret under a bell jar on a desiccator plate (with legs), under which there is cotton saturated with ether.

When it is necessary to pass a stomach tube, the ferret is restrained as previously described and held up by the left hand encircling the neck and fore legs with the muzzle facing an assistant. A piece of ½ inch dowling, with a hole ¼ inch in diameter bored through it, is manipulated into place by the assistant between the upper and lower teeth. A small catheter is then inserted through the hole in the dowling and slowly and carefully passed down into the stomach. This procedure is used to administer the full dosage of a drug directly into the stomach. The drug to be given is forced into the catheter from a syringe.

COMMON NATURAL DISEASES OF THE FERRET

Without question, the most serious natural infection of the ferret is that

caused by the virus of distemper. The disease has an unusually high mortality. On two occasions, we have lost all individuals in our reserve stock through contact infection. We now avoid holding a large reserve stock and have contract agreements with a breeder to forward fortnightly shipments throughout the year. All incoming ferrets are quarantined for 10 days, during which period any incubating infection that might be brought in with them will develop.

For a complete and detailed description of distemper in the ferret, we refer to the report of Dunkin and Laidlaw.[2] Treatment is unsatisfactory.

Constant attention must be given to the prevention of "foot-rot," which is caused by a mange mite. Damp and filthy litter in the cages and nest boxes favor its development. The appearance of swollen feet, covered with scabs, calls for immediate treatment, which is quite satisfactory if started early. Some breeders use a kerosene dip. Carnochan[5] claims unfailing success by applying xylol to the affected parts after removal of the scabs with forceps. Two treatments are given at an interval of 3 days, after which Danish ointment is applied every few days. He also advises lightly dusting of the bedding with flowers of sulphur. This also acts as a flea repellent.

Scabies sometimes appears on the tail and over the back. This can be treated similarly, or with sulphur ointment. Ear canker, while not common, occurs. Ear drops containing liquid petrolatum, phenol and tannic acid are used in these cases.

Closely akin, if not identical with distemper, is another virus infection of ferrets studied by Slanetz and Smetana[8] in October, 1934, after it occurred epizoötically in their colony of ferrets. The disease was essentially respiratory and was complicated by a secondarily invading hemolytic streptococcus. Cytoplasmic and intranuclear cell inclusions in the epithelial cells of certain organs were indistinguishable from those occurring in canine distemper. While these authors were unable to demonstrate any immunological relationship between the virus of this ferret disease and the viruses of canine distemper and human influenza, we (unpublished data) succeeded in immunizing a relatively large group of ferrets against definitely known canine distemper virus with a formalinized vaccine supplied us by them, and which was composed of infected lung tissue obtained from ferrets dead of the virus infection in question. It would appear, therefore, that this virus was at least a variant of the common distemper strain.

Subsequently, in 1935, Spooner[9] apparently studied the same disease as it occurred among breeders' stocks of ferrets. It was his opinion that he was dealing with a form of distemper antigenically related to dog distemper, since his results differed only in minor points from the description of canine distemper in the ferret given by Dunkin and Laidlaw.[2]

Ferrets are also subject to "boils," which occur in the neck region and often involve the salivary glands. A variety of organisms have been isolated from these, the most common of which has been *Staphylococcus aureus*. In some quarters, it is presumed to be introduced through the feed.

A nonspecific pneumonia sometimes takes its toll in ferretries, but there is evidence that in some cases, at least, it is due to hemolytic streptococcic infection precipitated by one or more debilitating factors. Brightman[10] recovered this organism from the lung and heart blood of ferrets reacting to intranasal instillation of bacteriologically free tissue suspensions containing influenza virus. He concluded that the streptococcus was of ferret origin and

that it belonged to Group C of the Lancefield classification.

It has been the experience of Francis and MaGill [11] that some ferrets, during the winter months in particular, are carriers of hemolytic streptococci, or small Gram-negative bacilli, in the respiratory tract. A purulent rhinitis occurs sometimes. Similar observations have been made in our laboratories.

Several species of internal parasites may find the ferret a suitable host. As parasitic infections in this animal are rather uncommon, and even rare, space and time will not be given to their description. For detailed information, Mönnig's [12] text on helminthology may be referred to.

ARTIFICIAL INFECTIONS

Since the report of Laidlaw and Dunkin [13] of the results of studies on the immunization of ferrets against canine distemper, these animals have been used widely in further investigations on this disease. References are too numerous to mention here; however, brief statements will be given regarding two recent reports.

DeMonbreun [14] meticulously studied the histopathology and cytology produced by the virus and found them similar in dogs and ferrets. Dochez and Slanetz [15] used the animal to a limited extent in investigating the effect of sodium sulfanilyl sulfanilate in the treatment of canine distemper.

Distemper in the ferret can be induced very readily by exposure to contact infection and by intradermal, subcutaneous, intramuscular, intraperitoneal, intracerebral, and intranasal inoculation.

References to the use of the ferret in studies on human influenza virus are also legion. Smith, Andrewes, and Laidlaw [16] were the first to attempt the artificial infection of various laboratory animals with filtrates of throat washings. The results were negative until the ferret was used. A full description of the symptoms and pathology is given in the report of these investigators.

After the intranasal instillation of egg-influenza virus, Burnet [17] found that ferrets usually showed no symptoms or temperature rise, but such inoculation induced a high grade immunity. Francis and MaGill [11] found that influenza-immune ferrets may be encountered among stock animals not infected experimentally. They were unable to state whether or not this developed as a result of contact of human origin.

Several investigators have also used the ferret in studies on swine influenza. Smith, Andrewes, and Laidlaw [16] observed that these animals, when inoculated with virus obtained from Shope, gave rise to a disease indistinguishable from the infection caused by the human virus. Later, Shope [18] confirmed this observation and showed that after 16 serial transfers of the swine influenza virus in ferrets there was no alteration of its pathogenicity for swine. With virus emulsions from ferrets suffering from influenzal attacks caused by either human or swine virus, Laidlaw, Smith, and Andrewes [19] were able to produce a hyperimmune serum of significant potency in horses.

The literature on the use of the ferret in researches conducted on the common cold is practically nil. However, in a limited trial, Smith, Andrewes, and Laidlaw [16] failed to infect them with nasal secretions from a subject suffering from a severe common cold. There is reason to believe that more conclusive data of this nature are available, but not published.

There are a number of other infections, less extensively studied, in which the ferret has been used. Francis and MaGill [20] recovered the virus of Rift Valley fever from the respiratory tract of three human patients and transmitted it to ferrets by intranasal instillation.

The experimental disease in these animals was characterized by fever, pulmonary lesions, and hemorrhagic phenomena.

These same workers, Francis and MaGill,[21] were able to infect ferrets consistently with an unidentified virus obtained from human patients suffering from an epidemic disease similar to influenza. By the intranasal route, it produced extensive, fatal pneumonic lesions. By the subcutaneous route, it produced local granulomatous induration of the skin with enlargement of the regional lymph nodes. The investigators tentatively named the virus that of acute meningo-pneumonitis. Later, Stokes, Reimann, and Shaw [22] reported the isolation of a comparable agent from a human patient, the secretions of which produced a comatose state in 24 hours after intranasal instillation in a ferret.

Recently, Dalldorf [23] has observed that the ferret is susceptible to a symptomless form of infection caused by the virus of lymphocytic choriomeningitis. Virus may be demonstrated in the brain, spleen, liver, and blood, and intranuclear inclusion bodies are found in the cortex of the adrenals.

While working with Swiss mice on human influenza studies, Dochez, Mills, and Mulliken [24] encountered a virus prevalent in three different sources of supply. The infection was characterized by pulmonary lesions with high mortality after several passages through additional mice. This mouse virus in the form of lung suspension, when inoculated intranasally into ferrets, produced a sharp, early rise in temperature to about 105° F. This was occasionally followed by a second rise. Respiratory symptoms were sometimes seen, but the transmitted infection did not prove fatal. Subcutaneous and intraperitoneal inoculation did not result in infection.

In general, the ferret is susceptible to a number of viruses when the inoculum is introduced intranasally. Other routes of inoculation, as a rule, fail to produce clinical manifestations. However, in the case of the virus of fowl pest (not present in this country), Findlay and MacKenzie [25] were able to infect the ferret by intraperitoneal and intracerebral inoculation, as well as by intranasal instillation. The virus was distributed in the brain, liver, and spleen, regardless of the route of administration.

METHODS OF INOCULATION

The ferret is amenable to all common routes of inoculation, but as indicated previously, intranasal instillation is most frequently used. This is best performed while the animal is under light ether anesthesia. If it is attempted under ordinary restraint, the animal's sneeze reflex causes considerable difficulty, making it impossible to administer a graded dose.

After the animal has been anesthetized (lightly), Shope [18] uses a 2 cc. syringe, without needle, and applies the blunt tip of the syringe to the external nares. A small amount of the inoculum is expressed from the syringe each time the animal inspires. In this manner, the required dose may be given without the loss which occurs when the ferret sneezes. A graduated pipette serves the same purpose and permits the instillation of a drop of the inoculum at a time. Ferrets so inoculated usually react with a more severe type of the transmitted infection than when not anesthetized. This is true, particularly, when the virus used is of human or swine influenza origin.

No description of the technic involved in the use of the intradermal, subcutaneous, intramuscular and intraperitoneal routes of inoculation is necessary. To our knowledge, the intrathecal route of administration, and inoculation into special organs and with infected insects have not been practised on the ferret.

In preparation for an intracerebral inoculation, the hair over the cranial site is clipped close to the skin, which is then cleansed with alcohol and painted with iodine. The skin covering the top of the skull is then stretched to one side and held in this position. A short incision is made through the skin with the point of a scalpel. Through this incision, the skull cap is punctured with a small awl-like instrument, which can be made by driving a small brad into a piece of dowling. The head of the brad is filed down to a sharp point. During the operation, the point should not be permitted to pierce the brain substance. This can be controlled by regulating its length. After the inoculation is made by inserting the needle of a syringe holding the inoculum through the hole in the skull cap, the skin over the skull is permitted to assume its natural position, covering the puncture in the skull.

Intravenous inoculation into the ferret, is best performed by cutting down through the skin over the jugular vein before attempting to strike it with a hypodermic needle. The wound may be closed with one suture after the injection and protected with a collodion and shredded-cotton dressing.

These two latter methods of inoculation are greatly facilitated when the animal is placed under light ether anesthesia.

Trillat and Beauvillain [26] have transmitted influenza virus to the ferret, with resulting typical symptoms, by exposing the animal in an enclosed box to air charged with a fine suspension of the infectious material. They also were successful in reproducing the disease in ferrets by instilling the virus into the conjunctival sac.

COLLECTION OF SPECIMENS

Blood can be obtained in quantity with comparative ease from the ferret by cardiac puncture. The animal is held flat on its back and the needle inserted between the ribs, straight downward, just left of the xiphoid cartilage. Small quantities of blood can also be obtained by pricking rather deeply the skin of the tip of the ear. Burnet [17] mentions obtaining blood from the ferret by cutting off the extreme tip of the tail under light anesthesia.

The collection of urine and feces offers a somewhat difficult problem. However, the mere handling of the ferret quite regularly is followed by urination. Small amounts can be caught in a small container at such times. Insertion of a well lubricated, clinical thermometer into the rectum will quite often induce defecation, at which time a small specimen can be gathered.

When the ferret is used in influenza studies, the turbinate tissue is often harvested as a source of virus. The animal is destroyed by intramuscular or intracardial injection of approximately ½ grain of strychnine sulfate, then fastened to a length of board slightly longer and wider than the animal itself with the abdomen down and the legs stretched outward. A piece of cord is passed around the neck at the base of the skull, through holes bored in the board and tied underneath. The lower jaw is anchored to the board in the same manner. In this position, the head of the animal is held firmly during the succeeding operations.

The skin over the skull and down over the nose is removed completely. A small hack-saw blade is then used to cut through the bone transversely across the head from ear to ear. Another incision through the bone is made at right angles extending from the transverse cut down over and bisecting the nose. With a small, but heavy-bladed knife, the two lateral flaps of bone can be pried off the underlying sinuses. The turbinates are then removed with a sterile, small scalpel and forceps.

SUMMARY

1. *Anatomy*—The ferret presents no marked differential features, although the liver and spleen are heavier in proportion to the body weight than is the case in other small animals. The weights of males and females and blood counts are recorded.

2. *Physiology*—Data are presented on the rectal temperature, rate of respiration, a limited amount of blood chemistry and the period of gestation. More detailed descriptions are confined to oestrum in the ferret, mating, size of litters, and the development of the young at birth.

3. *Care of Young—Feeding*—The young should not be disturbed during the first few days of life. Further care and the feeding of the litter are discussed, as well as various diets used for grown animals.

4. *Handling*—Common types of cages and pens used in quartering normal and experimental ferrets and the restraint of the animal are described at length.

5. *Common Natural Diseases*—The ferret is heir to infection caused by the virus of canine distemper and a variant of this agent. Foot-rot is a common condition appearing in this animal. Hemolytic streptococci, a purulent rhinitis, "boils," scabies, pneumonia, "ear canker," and internal parasites cause less concern.

6. *Artificial Infections*—The ferret has been used principally as an experimental animal in the studies of such virus infections as canine distemper and human and swine influenza. Other viruses producing a syndrome in the animal are those of Rift Valley fever, an acute meningo-pneumonitis, fowl pest, and one found in Swiss mice.

7. *Methods of Inoculation*—The ferret is amenable to all of the more common routes of inoculation. The technic of administering an inoculum intranasally and intracerebrally under light anesthesia is described.

8. *Collection of Specimens*—Blood may be obtained with ease by means of cardiac puncture. Ear and tail bleedings are also used. The collection of urine and feces presents a somewhat more difficult problem. A method of harvesting turbinate tissues is described.

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