



UNIVERSITEIT VAN PRETORIA

**FAKULTEIT VEEARTSENYKUNDE
FACULTY OF VETERINARY SCIENCE**

**7th Faculty Day
de Fakulteitsdag**

September 27, 1990

PROGRAM EN OPSOMMINGS
PROGRAMME AND SUMMARIES



SmithKline Beecham

Fakulteit Veeartsenykunde, Universiteit van Pretoria

Faculty of Veterinary Science, University of Pretoria

SEWENDE FAKULTEITSDAG

SEVENTH FACULTY DAY

27 September 1990

Sponsored by / Geborg deur: **SmithKline Beecham Animal Health Division, A Division of
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Proff R.I. Coubrough, J.G. van der Walt, M.M.S. Smuts,
B.L. Penzhorn, F.J.M. Verstraete, I.B.J. van Rensburg;
Drr W.A. Schultheiss, J. Ferreira; Mev. C. van Vuren, Mnr Beukes

PROGRAM / PROGRAMME

FAKULTEITSDAG 27 SEPTEMBER 1990 FACULTY DAY

07:30-08:15 **REGISTRASIE EN KOFFIE / REGISTRATION AND COFFEE**

08:15-17:00 **VIEWING OF ART AND PHOTOGRAPHS**

08:15-08:30 **VERWELKOMING DEUR DEKAAN / WELCOME BY THE DEAN**

08:30-09:15 **SIR ARNOLD THEILER MEMORIAL LECTURE / GEDENKLESING**

The impact of controlled breeding on the cattle industry in Southern Africa.

Die inslag van beheerde teelt op die beesbedryf in Suidelike Afrika.

● Dr A. Schutte

09:15-09:45 **FOKUS OP: DEPARTEMENT ANATOMIE**

FOCUS ON: DEPARTMENT OF ANATOMY

09:45-10:15 **CLINICAL PROGRAMME/KLINIESE PROGRAM**

Session I / Sessie I

Chairman: Prof I.B.J. van Rensburg:

1. The use of ultrasound in clinical veterinary andrology.
J.O. Nothling, D.H. Volkmann & H.J. Bertschinger.
2. Intestinal mastocytoma in a lion (*Panthera leo*).
M.C. Williams.

10:15-10:30 **TOEKENNING AAN "DOSENT VAN DIE JAAR"**

"LECTURER OF THE YEAR" AWARD

10:30-12:00 **BRUNCH (for registered participants)**

12:00-13:30 **NAVORSINGSPROGRAM / RESEARCH PROGRAMME**

Sessie I / Session I

Voorsitter: Prof T. Naude:

1. The safety of dimetridazole alone and in conjunction with oxytetracycline in Hereford crossbred steers.
G.E. Swan, A. Shakespeare, M.S.G. Mulders & P.P. Minnaar.
2. Zoletil anaesthesia of sheep.
J. Taylor, C.J. Botha, G.E. Swan, M.S.G. Mulders & M. Grobler.
3. Die effek van asetielpromasien op die stress respons in ponies gedurende vervoer.
G.F. Stegmann.

Session II / Sessie II

Chairman: Prof. D.G.A. Meltzer.

4. Uptake and metabolism of urea in sheep with out a hindgut.
J.G. van der Walt & J.H.F. Meyer.
5. Changes in kidney function and plasma aldosterone concentrations with salt loading in sheep.
R.A. Meintjes & H Roesch.
6. Voeding van gefossileerde rotsfosfaat aan voerkraalosse - effek op beenmineraalstatus.
W.A. Schultheiss & R.I. McCrindle.

13:30-14:30 **REFRESHMENTS AND VIEWING OF POSTERS**

VERVERSINGS EN BESIGTIGING VAN PLAKKATE

Voorsitter: Prof J.G. van der Walt

14:30-15:30 **NAVORSINGSPROGRAM / RESEARCH PROGRAMME**

Sessie III / Session III

Chairman: Prof G. Bath.

7. Arthritis in slaughter pigs.

G.V. Turner, C.M. Veary, M.G. Collett & Charlotte Kruger.

8. The meat hygiene significance of goose carcasses and viscera after delayed evisceration.

C.M. Veary, G.V. Turner & Sharon de Wet.

9. Air pollution as a cause of copper toxicity in ruminants.

C.J. Botha & B. Gummow.

10. Beef bull performance, scrotal circumference and semen quality.

H.J. Bertschinger, W.J. Ehret, R. Wood & R.J. Coertze.

15:30-16:30 **KLINIESE PROGRAM / CLINICAL PROGRAMME**

Session II / Sessie II

Voorsitter: Prof D. Volkmann.

3. Further studies of the in vivo administration of the protein synthesis inhibitor, puromycin.

Shirley Yeates, S. Maeder, U.H. Tubessing & B.V. Mendelow.

4. Pox virus infection in captive juvenile caimans in South Africa.

Mary-Louise Penrith, J.W. Nesbit & F.W. Huchzermeyer.

5. Clinical report of an outbreak of equine herpes myeloencephalopathy on a stud farm.

J.S. van der Berg & R. Bester.

6. A novel treatment for pyometra in the bitch involving a surgical uterine flushing using Betadine saline.

K.G.M. de Cramer.

16:30-16:40 **DEAN'S AWARD - BEST RESEARCH AND CLINICAL PAPERS, AND POSTER**

DEKAANSTOEKENNING - BESTE REFERATE (KLINIES EN NAVORSING), PLAKKAAT

16:40-16:45 **AFSLUITING/CONCLUSION** Prof J.G. van der Walt.

16:45-17:00 **OPENING VAN KUNSUITSTALLING / OPENING OF ART EXHIBITION**

(as well as **UNVEILING OF TAPESTRY / as ook ONTHULLING VAN MUURBEHANGSEL**.)

● Prof N.O. Roos.

17:00-17:10 **AWARD FOR BEST PHOTOGRAPH / ARTWORK**

TOEKENNING VIR BESTE FOTO / KUNSWERK

17:10-19:00 **COCKTAIL PARTY / SKEMERPARTYTJIE**

All welcome - Almal welkom.

SUMMARIES - SCIENTIFIC PROGRAMME
OPSOMMINGS - WETENSKAPLIKE PROGRAM

Paper 1

THE SAFETY OF DIMETRIDAZOLE ALONE AND IN CONJUNCTION
WITH OXYTETRACYCLINE IN HEREFORD CROSSBRED STEERS

G.E. Swan¹, A. Shakespeare², M.S.G. Mulders¹ & P.P. Minnaar¹

¹Department of Pharmacology and Toxicology

²Department of Medicine.

Dimetridazole 40% m/m (Emtryl, Maybaker) is a nitro-imidazole compound recommended for the treatment of trichomoniasis in bulls. It is used orally at a dose rate of 50-100mg kg⁻¹ for 5d either alone or in conjunction with parenteral antimicrobial treatment. Many animals have been treated with dimetridazole orally with only mild adverse reactions, such as a mild indigestion, temporary reduction in appetite and a fall in milk yield. However, due to the occurrence of unexplained mortalities in cattle on two separate occasions when dimetridazole was used concurrently with oxytetracycline, a trial was conducted to evaluate the safety of this treatment regimen.

Dimetridazole was given intraruminally, with and without oxytetracycline, to 6 healthy, 10-11 month-old Hereford crossbred steers. Dimetridazole was added to the rumen through a fistula at 75mg kg⁻¹ daily for 5d, while the oxytetracycline was injected intramuscularly at 10mg kg⁻¹ on days 1 and 3 of the dimetridazole treatment. The animals were observed at various intervals throughout the trial period for adverse clinical reactions, including effects on ruminal activity and motility, changes in live mass, venous acid/base balance, haematology and ruminal and serum ammonia levels.

Dimetridazole, whether alone or in conjunction with oxytetracycline, markedly effected ruminal function. Within 6h, the ruminal pH fell dramatically to values below 5, but then returned to pretreatment values over the next 24-48h. This was followed by the eradication of the ruminal protozoal population in all animals and an increase in the methylene blue reduction time to more than 6min. Ruminal motility remained unaffected. During the week of treatment, the mean live mass of the animals dropped by 13-20 kg. A mild to severe watery diarrhoea, which continued for 1-2d, occurred in 4 cattle after the first dimetridazole treatment. Systemically, the treatment caused a compensated metabolic acidosis and an increased haematocrit. The initial rise in rumen ammonia levels, which was rapid and transient, did not result in a concurrent rise in serum ammonia levels.

Except for one, all animals had recovered without intervention by the end of the trial period. However, in the one exception it was necessary to administer fresh rumen content to re-establish ruminal activity. From the acid-base data, it appeared that the recovery of the animals in the dimetridazole plus oxytetracycline treatment group lagged behind those treated with dimetridazole only.

ZOLETIL ANAESTHESIA OF SHEEP

J.Taylor¹, C.J.Botha², G.E. Swan², M.Mulders², M.Grobler¹

¹Department of Physiology, ²Department of Pharmacology and Toxicology

Zoletil is a 1:1 combination of tiletamine hydrochloride and zolazepam hydrochloride. Tiletamine is an analogue of ketamine, but is two to three times more potent than its congener. Administered alone, tiletamine produces a cataleptoid anaesthesia with profound analgesia. However, it may also induce convulsive seizures and clonic muscular contractions. Zolazepam is a pyrazolodiazepine which produces potentiation of the anaesthetic effects of tiletamine, muscle relaxation, abolition of convulsions, and smoother recovery from anaesthesia when combined with tiletamine. Very little is known about the use of this anaesthetic in sheep. The anaesthetic effects of Zoletil were therefore examined in sheep. Atropine was used to prevent excessive salivation. In addition, the cardiovascular effect of atropine in conjunction with Zoletil was examined.

Two groups were used, one of six adult ewes and one of six lambs. Replicates of three animals each were formed by restrictive randomisation according to mass and age. Animals in each replicate received either 9, 12 or 15 mg kg⁻¹ of Zoletil, with or without atropine, using a cross-over design. One replicate per day was examined. Body temperature, heart rate, respiratory rate and blood pressure were measured hourly. Blood samples were evaluated for blood gases, acid-base balance and haematocrit, both before and after Zoletil injection. Time intervals to induction, cataleptoid anaesthesia, surgical anaesthesia, emergence and recovery were recorded.

Cardiovascular or respiratory depression was minimal. Induction was smooth and rapid. The response to anaesthesia was variable in individual sheep. Atropine did not appear to complicate cardiovascular function during anaesthesia. Blood pressure rose dramatically in all the sheep during the first five minutes of anaesthesia. Recovery was uneventful and the analgesic effect good.

Zoletil appears to be a safe anaesthetic for use in sheep.

EFFEK VAN ASETIELPROMASIEËN OP DIE STRESS RESPONS IN PONIES GEDURENDE VERVOER

G.F. Stegmann

Departement Chirurgie

Wanneer 'n dier aan skadelike stimuli blootgestel word, stimuleer dit 'n reaksie. Die simpatiese senuweestelsel is betrokke by die akute reaksie, terwyl metaboliese veranderinge oor die langer termyn deur hormone veroorsaak word. Plasma kortisol konsentrasie is een metode wat gebruik word in die evaluasie van 'n stress reaksie. Die doel van die ondersoek was om te bepaal of kalmering 'n versagende effek op die stress reaksie gedurende vervoer het.

Vier Walliese Ponies is by twee geleenthede vir 'n tydperk van twee ure in 'n perdewa vervoer, met of sonder asetieelpromasieë behandeling. Bloedmonsters is halfuurliks geneem en plasma kortisol konsentrasies is bepaal m.b.v. radioimmunotegnieke. Kontrole waardes is geneem terwyl die ponies gedurende die periode op stal gestaan het.

Die gemiddelde plasma kortisol konsentrasies is getabuleer (Tabel 1), en grafies teenoor tyd voorgestel (Fig. 1). Vir die onbehandelde ponies op stal is 'n stabiele, maar dalende neiging gevind; terwyl die konsentrasie skerp toegeneem het met die aanvang van vervoer, en meer geleidelik begin daal het met die beëindiging van vervoer. Asetieelpromasieë het gedurende vervoer die styging in kortisol voorkom, maar het in stede in die periode daarna voorgekom. 'n Soortgelyke styging is ook in die gekalmeerde perde gesien wat net op stal gestaan het.

'n Duidelike stress reaksie is aangetoon in die ponies gedurende vervoer deurdat die plasma kortisol konsentrasies verhoog het en hoër gebly as die kontrole ponies wat op stal bly staan het. Die stress effek van vervoer is waarskynlik net deur asetieelpromasieë uitgestel en nie voorkom nie. Die piek in kortisol konsentrasie wat ook in die gekalmeerde, rustende ponies voorgekom het laat die gedagte ontstaan dat asetieelpromasieë slegs die vrystelling van kortisol tydelik inhibeer en dus nie die moontlike ongewenste kataboliese nuwe effekte voorkom nie.

TABLE 1	TRANSPORT		STABLE REST	
	NO DRUGS	ACP	NO DRUGS	ACP
BEFORE	MEAN 43.7	52.2	39.2	58.8
	MIN 35.4	41.6	28.4	44.0
	MAX 55.7	58.2	58.7	81.6
	SEM 2.7	2.0	3.5	4.7
DURING	MEAN 74.9	57.5	32.1	51.0
	MIN 71.6	53.3	29.1	48.6
	MAX 79.6	59.9	35.2	53.6
	SEM 1.7	1.5	1.3	1.0
AFTER	MEAN 49.6	68.8	32.0	61.7
	MIN 41.1	54.1	26.2	56.7
	MAX 60.1	93.4	39.9	76.7
	MEAN - DAY 56.1	59.5	34.4	57.2

UPTAKE AND METABOLISM OF UREA IN SHEEP WITHOUT A HINDGUT

J.G. van der Walt¹ & J.H.F. Meyer²

¹Department of Physiology, ²Animal Nutrition, ADSRI, Irene

Sheep in which the hindgut is bypassed maintain their nitrogen balance, provided that a good quality diet is fed. The role of the hindgut in recycling urea to the rumen for microbial synthesis was investigated using sheep with an ileorectal anastomosis (IRA).

SA Mutton Merino wethers (n = 8), 4 with an IRA, were fed 1kg day⁻¹ Bloubuffelsgras (*Cenchrus ciliaris*) mixed with urea, molasses and salts. PVC catheters were placed in the portal, mesenteric, hepatic and jugular veins and posterior aorta of all sheep. ¹⁴C- Urea and sodium ¹⁴C-bicarbonate solutions were separately infused (7 days apart), each for 24h, into the jugular vein of each sheep on 2 separate occasions. Blood was sampled (3 ml) from each catheter 5 times over the last hour of infusion and analysed for urea and bicarbonate concentration and radioactivity.

Whole-body turnover of urea was higher in normal than in IRA sheep (53,8 and 40,4 mMol h⁻¹ respectively). A considerable proportion of the urea was derived from bicarbonate (54% and 69% in normal and IRA sheep respectively), while negligible amounts of CO₂ were derived from urea (%). While the loss of the hind gut appeared to reduce the overall turnover rate of urea, the interchange with CO₂ increased. Organ uptake data showed that the net production of urea by the liver was increased from 123,7 to 281 mMol.h⁻¹ in IRA sheep. The net uptake of urea by the rumen (96,2 mMol h⁻¹) in normal sheep, which accounted for about 80% of the net production from the liver, decreased slightly (78 mMol h⁻¹) in IRA sheep.

Since these drastic changes in urea flux and uptake did not affect the overall nitrogen economy of IRA sheep, adequate amounts of protein nitrogen must have been taken up via the small intestine. On a diet containing sufficient protein, urea recycling becomes unnecessary.

CHANGES IN KIDNEY FUNCTION AND PLASMA ALDOSTERONE CONCENTRATIONS WITH SALT LOADING IN SHEEP

R.A. Meintjes & H. Roesch

Department of Physiology

In spite of large changes in the intake of electrolytes such as sodium and potassium, remarkably constant concentrations of these substances in the extracellular fluid are maintained through the activity of the kidneys. The response of kidney function to salt loading in SA Mutton Merino sheep was studied in this experiment. Plasma aldosterone levels were also monitored because of the pivotal role played by this hormone in the renal uptake of sodium and potassium.

SA Merino sheep ($n = 6$) with rumen cannulae were individually housed in metabolic crates. The sheep were fed chopped lucerne hay, and fresh drinking water was available ad libitum except during phase 2. No additional salt was given during phase 1 (control phase). Salt loading was achieved via the drinking water during phase 2 (isotonic saline) and via the intraruminal route (10% saline) during phase 3. Each phase lasted about 1 week.

Plasma samples were obtained daily for determination of aldosterone, sodium, potassium and creatinine concentrations. Urine parameters measured included 24h volume, as well as the concentrations of sodium, potassium, and creatinine. The 24h glomerular filtration rate was determined on the basis of endogenous creatinine clearance.

Values for 24h glomerular filtration rate rose from a mean value of 96 l d^{-1} (phase 1) to about 115 l d^{-1} (phases 2 & 3). Fractional reabsorption of sodium dropped from 99,8% (phase 1) to 89% (phases 2 & 3). Potassium excretion by the kidney, in excess of filtered potassium, dropped from a mean of 168 mEq d^{-1} (phase 1) to 106 mEq d^{-1} (phases 2, 3). Concurrently, plasma potassium rose from 4,3 (phase 1) to 5,0 mEq l^{-1} during the salt loading phases, while plasma sodium remained constant over all 3 phases. Plasma aldosterone concentrations decreased significantly for each animal with salt loading.

Method of salt loading had little effect on kidney function or plasma aldosterone because the amount of salt dosed per day per sheep was the same in phases 2 and 3. The decrease in fractional reabsorption of sodium and decreased excretion of potassium by the kidney during phases 2 and 3 are explained by the withdrawal of the aldosterone effect on the distal tubule. Proximal tubular reabsorption of sodium would also have been inhibited during these phases.

VOEDING VAN GEFOSSILEERDE ROTSFOSFAAT AAN VOERKRAALLOSSE - EFFEK OP BEENMINERAALSTATUS

W.A. Schultheiss¹ & R.I. McCrindle²

¹Dept Veterinêre Etologie, ²Chemiese Wetenskappe, Technikon, Pretoria

Bemarkingsmoontlikhede van 'n gefossileerde rotsfosfaatbron (Langebaanrotsfosfaat) vir gebruik as veevoer is raakgesien. Aangesien die materiaal normaalweg vir akkerboubemesting aangewend word, maar 'n hoë Fluoor-inhoud (2-2,5% hoofsaaklik CaF₂) bevat, is ondersoek ingestel na die veiligheid en geskiktheid van die materiaal as voorvereiste vir registrasie as veevoer onder Wet 36 (1947).

Ses speenosse is ewekansig toegeken aan elk van die volgende ses behandelingsgroepe: Negatiewe kontrolegroep het geen fosfaatbron in rantsoen gekry nie, in teenstelling met die positiewe kontrolegroep wat 'n kommersieelbeskikbare fosfaatbron gekry het. Die volgende drie groepe is óf proefmateriaal, verhitte proefmateriaal óf Superfosfaat gevoer. In die dubbelproofmateriaal groep het diere dubbel hul daaglikse fosfaatbehoefte ontvang (NRC, 1976). Alle diere is daaglik per rumenfistel met een van die fosfaatbronne op grond van die diere se gemiddelde daaglikse kragvoerinnome (0,25% fosfaatinhoud) van die vorige week gevoer. Tefhooi het ongeveer 40% van die diere se droëmaterinaalinname uitgemaak. Stertwerwelbiopsies van elke bees is op dag 0 (aanvang van fosfaatbronvoeding per rumenfistel) dag 29, dag 70, dag 92 en by slagting (dag 120) gemaak. Kalsium-, fosfaat-, magnesium- en fluorbepalings is op elke biopsiemonster uitgevoer.

Die beenkalsium, -fosfaat en -magnesiumwaardes het geen oorwegende tendens van styging of daling oor die voerperiode getoon nie. In al die groepe waar enige vorm van proefmateriaal gebruik is, sowel as in die Superfosfaatgroep, het daar 'n geweldige styging in beenfluoorvlakke voorgekom. Ses diere (5 uit die Superfosfaatgroep en 1 uit die dubbelproofmateriaalgroep) het as gevolg van akute Fluoorvergiftiging nie die proef oorleef nie.

Resultate toon dat die proefmateriaal ongeskik is vir gebruik as fosfaatbron in voerkraalrantsoene. Verder is dit insiggewend dat daar geen betekenisvolle verskil in groei- en karkasparameters was tussen negatiewe- en positiewekontrole diere nie.

ARTHRITIS IN SLAUGHTER PIGS

G.V. Turner¹, C.M. Veary¹, M.G. Collett² & Charlotte Kruger¹

¹Department of Veterinary Public Health, ²Department of Pathology

Over the past few years there has been a noticeable increase in the number of pig carcasses condemned for arthritis at abattoirs in the Republic of South Africa. The economic loss associated with this significant increase in condemnations prompted an investigation into the problem. The objectives of the study were the following:

- to determine which micro-organisms were involved with infectious arthritic lesions,
- to describe the patho-anatomical nature of the arthritis in the pig carcasses.

Joints, which had been diagnosed and recorded as being arthritic by the meat inspectorate, were obtained for further examination from four abattoirs. Standard microbiological and pathological procedures were used to examine the joints.

Of the 262 joints examined, osteochondrosis was diagnosed in 93 (35,5%) of the joints. Non-specific sterile synovitis, characterised by mild to severe hyperaemia of the joint capsule with or without periarticular bruising, was found in 64 (24,5%) of the joints. Sixteen (6,1%) joints yielded bacteria. Organisms cultured included *Staphylococcus aureus* and *Streptococcus* spp.; no *Erysipelothrix rhusiopathiae* were isolated. Miscellaneous periarticular lesions such as abscesses were found around 6 (2,3%) joints. No changes were found in 83 (31,7%) of the joints and these were considered as being normal.

Infectious arthritis appeared to be far less common than expected. The majority of the joints examined were either normal or affected with non-infectious conditions. Osteochondrosis played a significant role in many of these cases. This work confirmed the necessity for accurate diagnosis and the correct evaluation of pig carcasses showing joint lesions.

THE MEAT HYGIENE SIGNIFICANCE OF DELAYED EVISCERATION ON GOOSE MEAT

C.M. Veary¹, G.V. Turner¹ & Sharon de Wet²

¹Department of Veterinary Public Health, ²Veterinary Research Institute, Onderstepoort

In South Africa, the slaughter of poultry requires humane killing techniques followed by evisceration as soon as possible. The delayed evisceration of poultry processed for commercial purposes is not permitted. In order to avoid damage to the friable livers obtained from young geese raised for the production of pâté de foie gras, it is necessary to delay evisceration. The microbiology of liver or muscle tissue obtained from geese slaughtered in this manner has not been recorded. The objectives of this project were:

- to establish the microbiological status of tissues obtained from uneviscerated goose carcasses 24 hours and 48 hours after being slaughtered,
- to measure the deep liver and muscle temperature of uneviscerated goose carcasses during a storage period of 24 hours at 2 °C.

Four groups of 5 goose carcasses were used in the study. Aseptic samples obtained from liver and muscle were examined for aerobes and anaerobes according to standard microbiological procedures. Deep tissue temperature readings were recorded hourly, using an electronic thermometer. No micro-organisms were isolated from either group. Mean deep tissue temperatures of below 10 °C were obtained within 9 hours of chilling in all the carcasses.

Microbiology and temperatures of liver and muscle from goose carcasses uneviscerated for up to 48 hours compared favourably with those sampled soon after slaughter and these products can therefore be considered safe, sound and wholesome.

AIR POLLUTION AS A CAUSE OF COPPER TOXICITY IN CATTLE

C.J.Botha¹ & B.Gummow²

¹Department of Pharmacology and Toxicology, ²Toxicology Section, Veterinary Research Institute.

In May 1989 reports were received of cattle dying on a farm in the Phalaborwa area after showing signs characteristic of a haemolytic crisis. A total of 39 cattle died and copper poisoning was provisionally diagnosed. Since copper toxicity is rare in cattle it was decided to investigate this outbreak.

The objectives of the investigation were to confirm the diagnosis of copper poisoning, to establish the source of the copper and to prevent further mortalities from taking place.

Necropsies were performed on 3 cattle that died on the farm. Portions of liver were collected in 10% formalin from 15 animals that died between the beginning of May and the end of July. Eight of these samples were accompanied by kidney samples. These organs were analysed for copper concentrations using an atomic absorption method. Since it was postulated that the source of copper causing the toxicity was either air pollution or the copper-rich, ore-bearing earth, samples of soil and grass were collected on the farm and the adjacent Kruger National Park (KNP). Soil samples were taken from the surface layer (top 2-3cm) and again at a depth of approximately 30cm. The soil and grass samples were processed and analysed for copper content according to standard atomic absorption techniques.

The sick animals were treated with ammonium molybdate and zinc sulphate *per os*. A prophylactic lick containing zinc sulphate and sulphur was made available to the rest of the herd.

Liver copper levels ranged from 161 - 600 ppm on a wet mass (WM) basis while the concentration of copper in the kidney ranged from 6 - 83 ppm WM. The mean level of copper in the surface soil on the farm was 103,1 ppm and that of the deep soil 16,6 ppm. In the KNP, the level in surface soil averaged 39,4 while the level in deep soil was found to be about 2 ppm. The highest copper level in or on the grass was 1275 ppm.

The pathological, chemical and epidemiological findings showed that cattle on the farms under investigation died of copper poisoning, which probably arose from air pollution caused by a copper smelting unit. Prophylactic treatment of cattle with zinc sulphate and sulphur seemed to be successful.

BEEF BULL PERFORMANCE, SCROTAL CIRCUMFERENCE AND SEMEN QUALITY

H.J. Bertschinger¹, W.J. Ehret², R. Wood² & R.J. Coertze³

¹Department of Theriogenology, ²Johannesburg City Health Department, ³Department of Animal Science

Annually, 20 to 40 of the top Bovelder bulls are selected on growth performance from a crop of about 1000 bull calves as potential AI sires. When these are screened for breeding soundness, about 8-15% are culled on account of deficient spermatogrammes. The aim of this study was to investigate the relationship of growth performance to semen quality and scrotal circumference, and scrotal circumference to semen quality in potential AI bulls.

A total of 136 bulls, born in groups of 20-40 in each of the years from 1983-1987, were available for the study. The relationship of parity of the dam, birth mass and various growth performance parameters of the bulls to scrotal circumference and semen morphology (% normal sperm, % major defects), when the bulls were 18 months old, was analysed. The influenced of scrotal circumference on semen morphology was also analysed.

Parity of the dam was found to be curvilinearly related ($p < 0,05$) to scrotal circumference, reaching a maximum with the 6th calf. Birth mass influenced scrotal circumference significantly ($p < 0,01$). Significant linear relationships were found between all growth performance parameters and scrotal circumference at 18 months of age. No statistical relationship could be established between growth performance parameters and semen morphology. Scrotal circumference, on the other hand, showed a curvilinear relationship to sperm morphology ($p < 0,001$ for both parameters) and the circumference for optimal semen quality was found to be 38 cm.

In conclusion, it was found that growth performance did not influence semen quality, and secondly, that optimal semen quality coincided with a scrotal circumference of 38 cm at 18 months of age. The reason for a drop in semen quality once this circumference is exceeded remains to be elucidated.

OPSOMMINGS - KLINIESE PROGRAM
SUMMARIES - CLINICAL PROGRAMME

Paper 1

THE USE OF ULTRASOUND IN CLINICAL VETERINARY ANDROLOGY

J.O. Nöthling, D.H. Volkmann & H.J. Bertschinger

Department of Theriogenology

Ultrasonography was used to examine reproductive organs of bulls and rams. The aims of the examinations were to determine which anatomical structures can routinely be identified, to become familiar with the ultrasonographic appearance of normal structures and to determine which pathological conditions could be diagnosed by means of ultrasound.

A portable, linear-array scanner (Aloka SSD 210) with a transrectal probe (5MHz) was used. Intrapelvic organs of bulls were scanned by manipulating the probe in the rectum. In rams, the intrapelvic organs were examined with the probe fixed in a rigid casing. This allows the probe to be introduced into the rectum and to be directed in any longitudinal plane. The scrotum and its contents were examined by applying the probe directly onto the scrotum and aiming it at the appropriate structures.

Structures that could be identified routinely include the following: *scrotum, tunica vaginalis, testis (tunica albuginea, mediastinum testis, parenchyme), epididymis (clauda, corpus and caput), plexus pampiniformis, glandula bulbourethralis* (in rams only), *urethra pars pelvina, glandula vesicularis* and *ampulla ductus deferens*.

Pathological conditions so far identified on ultrasound examination, that were also confirmed by examination of the organs on surgical excision or slaughter, include the following:

- focal disseminate calcification of the testis,
- diffuse testicular calcification,
- diffuse testicular fibrosis,
- chronic epididymitis,
- testicular neoplasia and
- hydrocoele.

Ultrasound evaluation of male reproductive organs is a valuable aid in diagnosing lesions that are either small, deep seated, or in organs that are inaccessible by other means of examination.

INTESTINAL MASTOCYTOMA IN A LION (*Panthera leo*)

M.C. Williams

Department of Pathology

An eight-year-old lioness showing anorexia, chronic weight loss and weakness was laparotomized to remove an intestinal foreign body. In addition to the foreign body, nodular lesions were found incidentally in the wall of the jejunum. These were submitted in formalin for histological examination.

Microscopically, the affected submucosa was markedly widened by abundant, dense, fibrous connective tissue in which was embedded pockets and cord of atypical mast cells. The cells in these nests were crowded together and the cell borders were indistinct, giving the aggregations a syncytial appearance. The cytoplasm of these cells was eosinophilic and highly vacuolated and the nuclei were oval and vesicular. Abundant eosinophils were observed in and around the pockets of mast cells. The *lamina propria* and *tunica muscularis* were irregularly infiltrated by groups of mast cells. With Giemsa staining, moderate numbers of metachromatic granules, which were moderately PAS-positive, were demonstrated in the cytoplasm of the mast cells.

Based on the histological findings, intestinal mastocytoma was diagnosed. This mastocytoma is quite unlike those found in the skin and spleen of domestic cats and dogs. It does, however, closely resemble the distinctive intestinal mast cell neoplasms of domestic cats reported by Alroy *et al* (1975). Histologically, the neoplastic cells found in this tumour are identical to those previously thought to arise from argentaffin cells in the feline intestinal tract (carinoid tumour). The morphologic distinctions between the cell types found in intestinal and typical mastocytoma suggests that these tumours may arise from different mast cell subpopulations.

FURTHER STUDIES OF THE *IN VIVO* ADMINISTRATION OF THE PROTEIN SYNTHESIS INHIBITOR, PUROMYCIN

Shirley Yeates¹, S. Maeder², U.H. Tubessing¹ & B.V. Mendelow³

¹Department of Medicine, Faculty of Veterinary Science, University of Pretoria, ²Central Animal Unit, University of the Witwatersrand, ³Department of Haematology, SAIMR and University of the Witwatersrand Medical School.

In vitro studies have disclosed a possible role for the protein synthesis inhibitor puromycin as a component of multidrug combination, chemotherapeutic regimens which are useful in the treatment of various lymphoproliferative disorders. Studies carried out in rodents suggested that *in vivo* exploitation of these findings in a therapeutic context is feasible with respect to pharmacokinetics and safety. Studies in myeloma-bearing mice confirmed a synergistic therapeutic beneficial effect of puromycin in combination with cyclophosphamide or phenylalanine mustard, with regard to tumour growth, paraprotein production and survival. In high-dose studies carried out in baboons, there appeared to be synergistic toxicity with regard to combinations of puromycin and cyclo-phosphamide, although doses of puromycin alone, equivalent to those used in mice were tolerated.

A phase trial was initiated in dogs with various forms of malignant lymphoproliferative disorders. Increasing dosages of puromycin up to 5 mg kg⁻¹ i.v. followed by cyclophosphamide up to 300mg per i.v. injection were given to consecutive patients. This was combined with prednisolone (2mg kg⁻¹ per day). Toxicity was monitored by means of repeated clinical, haematological and biochemical evaluations.

Results to date indicate that these drug combinations at the above mentioned dosages are well tolerated and are not associated with any serious toxicity.

In addition to a low toxicity, this therapeutic regimen also proved to be effective in the treatment of canine lymphomas as was demonstrated by clinical remission in all treated dogs. Efficacy of this regimen, followed by vincristine (0,75 mg m⁻¹ i.v. x 3) as compared with standard therapy (without puromycin) is currently being evaluated in a phase II veterinary trial.

POX VIRUS INFECTION IN CAPTIVE JUVENILE CAIMANS IN SOUTH AFRICA

Mary-Louise Penrith¹, J.W. Nesbit², F.W. Huchzermeyer³

¹Final year BVSc, ²Department of Pathology, ³Veterinary Research Institute, Onderstepoort.

Slightly raised, circular, light grey lesions developed in the skin and mouths of eight juvenile caimans kept in the quarantine section of the reptile park at the National Zoological Gardens, Pretoria.

The gross, histopathological and ultrastructural features of the lesions are commensurate with pox virus infection.

This outbreak closely resembles the disease described in three juvenile captive caimans in Florida, U.S.A.

CLINICAL REPORT OF AN OUTBREAK OF EQUINE HERPES MYELOEN- CEPHALOPATHY ON A STUD FARM

J.S. van den Berg¹ & R. Bester²

¹Department of Medicine, ²Private practitioner

An outbreak of ataxia and paralysis on a Thoroughbred stud farm is reported. The cause of the disease was attributed to equine herpes virus infection that stemmed from two abortions (7 and 10 month gestation) on the stud farm.

Of the 27 pregnant mares, 7 showed ataxia and paralysis. Of these, only one died. None of the 13 barren or maiden mares, the 2 stallions, 1 pony and 22 foals were affected. Of the 27 pregnant mares, 10 aborted and 9 foals were born, all with congenital equine herpes virus infections. Of these, 8 foals died soon after birth. Only 1 foal born from a mare with neurological symptoms survived.

The neurological syndrome manifested itself in two cycles. Initially, 4 pregnant mares showed ataxia and paralysis and 8 abortions occurred. All the pregnant mares were isolated and vaccinated twice with a 14 day interval (*Pneumabort K, Fort Dodge Laboratories*). Two abortions occurred 1 month after the last vaccination. About 6 weeks after the last vaccination, when the remaining pregnant mares were stabled before foaling, 8 foals were born with congenital herpes virus infections and 3 mares showed ataxia and paralysis. No more clinical cases occurred after the last foal was born.

Mares affected by the neurological syndrome showed ataxia, subcutaneous oedema of the hind limbs and perineum, decreased tail tone, decreased perineal reflex, atonic bladder and recumbency.

Mares affected by neurological symptoms were treated with prednisolone, dimethylsulfoxide and penicillin for 3 days. All recumbent mares were supported in slings. Seven of the 8 mares recovered from the neurological syndrome, but 2 of the recovered horses had to be euthanased due to bladder complications.

A NOVEL TREATMENT FOR PYOMETRA IN THE BITCH - FLUSHING THE UTERUS SURGICALLY WITH BETADINE SALINE

K.G.M. De Cramer¹

¹Department of Theriogenology

Pyometra in adult bitches is typically a post-oestral syndrome associated with a variety of clinical and pathological manifestations of genital disease. Antibiotic therapy in cases of pyometra is very seldom effective. Antibiotic therapy combined with prostaglandin F₂ therapy does resolve some cases but there is a high incidence of recurrence. Furthermore, the use of prostaglandins in dogs is hazardous. Ovariohysterectomy is currently the safest choice of therapy preferred by most clinicians in practice.

In this study, the uterus in six bitches suffering from pyometra was flushed surgically using a 5% betadine saline solution. The technique involves passing a pipette through the cervix using a proctoscope, massaging the uterine content out of the uterus via a laparotomy incision and then flushing the uterus several times with betadine saline to remove all uterine debris.

Antibiotic therapy commenced one day prior to the flushing and continued for a further 10 days. No prostaglandins were administered. All six bitches recovered fully within 10 days of flushing and came into season within the normal range for their breed. Furthermore, all the bitches conceived at their next cycle and subsequently whelped normal-sized litters.

From this trial, it can be concluded that flushing the uterus with a 5% betadine saline solution does resolve cases of pyometra and that this technique may be considered for the treatment of pyometra in valuable breeding bitches.

SUMMARIES - POSTERS
OPSOMMINGS - PLAKKATE

Poster 1

SOME EXPERIENCE WITH THE PREPARATION OF TEASER BULLS

W.J. Ehret¹, H.J. Bertschinger², R.O. Gilbert², D.H. Volkmann²

¹Johannesburg City Health Department, ²Department of Theriogenology

In cattle, it has become a common practice to prepare teaser bulls in such a way that intromission during mounting is impossible. This is done to prevent the spread of venereal disease. The purpose of this study was to compare the success rate of three different surgical methods of preparing such teaser bulls.

In total, 56 bulls were prepared as teasers. Eight of these were prepared by sectioning and removing 2-3 cm of the apical ligament (AL), 10 cm caudal to the caudal border of the *glans penis*. Thirteen bulls were prepared by surgically shortening the retractor penis muscles (RPM), 15-25 cm below the *tuber ischii* while another 35 bulls were prepared using the *corpus cavernosal* block method (CCB). As a precautionary measure, vasectomies (n=2) or epididymectomies (n=54) were performed on the bulls to prevent insemination in case intromission was achieved.

All 8 bulls prepared by sectioning the AL were able to serve without difficulty. Only 6/13 bulls prepared by shortening the RPM could not serve. With the CCB method, 33/35 bulls could not serve. One of the CCB bulls was able to serve following placement of "soft-hoof" acrylic dorsal to the sigmoid flexure, while another bull was lost due to accidental injection of the acrylic into the *corpus spongiosum* which occluded the penile urethra. A useful and simple test which determines the patency of the urethra post-operatively in the CCB method is to massage the seminal vesicles via the rectum and to observe seminal fluid flow. Two of the CCB bulls which were successfully used for a full breeding season developed urethral obstruction and urine retention 4,5 months after surgery due to the development of necrotic changes at the site of acrylic deposition.

In conclusion, the CCB method was the most successful. However, this success depends on accurate placement of the "soft hoof" acrylic in the distal curvature of the sigmoid flexure, the proper texture of fluid, avoiding fluid placement in the *corpus spongiosum* and the use of a retaining suture. In addition, epididymectomy proved to be an easier technique than vasectomy in ensuring sterility of teaser bulls.

EFFECT OF MICROCLIMATE ON L₃ OF *HAEMONCHUS CONTORTUS* ON IRRIGATED PASTURE

R.C. Krecek¹, H.T. Groeneveld² & J. Maritz³

¹Department of Parasitology, ²Department of Statistics, ³Department of Information Management

Alternative strategies of control for gastrointestinal nematodes of ruminants are needed to complement the application of anthelmintics, particularly in light of nematode resistance to these chemicals. An understanding of the effect of environment on the pasture stages of wireworm may lead to such novel control strategies. The effect of microclimate on *Haemonchus contortus* third-stage larvae (L₃) on irrigated kikuyu pasture was measured.

During 1988, three replicates of four strata samples were collected at five diurnal intervals on 18 collection days. Upper and lower herbage, mat and soil strata samples were processed and larvae recovered. The log₁₀ mean larval counts were analysed by a step-wise regression model. For upper herbage, the predictor of the log counts was soil moisture with an r² value of 0.31; predictors for lower herbage were air temperature, soil temperatures (mat and 2 cm depth), temperature under the sheep faeces and windspeed with an r² value of 0.40. Predictors for the mat stratum included relative humidity and soil moisture (r² value 0.35). Log counts of L₃ in the soil were predicted by relative humidity, radiation and illumination with an r² value of 0.18. With further development, such a model could eventually be integrated into measures for control of *H. contortus* in sheep grazing on irrigated pasture.

DEVELOPMENT OF A FILAMENTOUS BACTERIUM ATTACHED TO CYATHOSTOMES

R.C. Krecek¹, H.J. Els² & A.D. Botha³

¹Department of Parasitology, ²EM Unit, Medunsa, ³Roodeplaat Research Laboratories.

Microorganisms attached to the anal and vulvar pores of female cyathostomes in the hindgut of zebras were observed during helminthological surveys. This microbial community consisted of different morphological types of bacteria some of which were filamentous. The development of one of these filaments is described.

Scanning and transmission electron microscopy were used to examine the adherence and *in situ* morphology of this organism attached to its cyathostome host. Standard methods of preparation were employed.

This organism was a smooth-walled or continuous multicellular filament. Based on these results, the following developmental cycle was proposed. Filament growth commences either with the attachment of a cylindrical initiating cell to the cuticle of the cyathostome or growth of this cell from a complex germinating source on the cuticle. This cell elongates by the addition of intercellularly formed septa (or disc-shaped elements). When these septa undergo further division in a plane perpendicular to the existing septa, numerous rod-shaped units result giving rise to a multicellular filament bound by a common cell wall. The older filaments release these units which attach to the cyathostome cuticle and may act in a reproductive capacity.

This is the first description of a development cycle of such a continuous, multicellular filament and contributes to our basic understanding of this microbial community: cyathostome-host relationship.

FATAL HAEMOGREGARINE INFECTION IN A CAPTIVE, JUVENILE
CALIFORNIAN KINGSNAKE

Mary-Louise Penrith¹ and J.W. Nesbit²

¹Final year BVSc, ²Department of Pathology

A case of apparently fatal haemogregarine infection in a captive, juvenile Californian kingsnake is described. Histopathology showed gamonts, free and within erythrocytes, in the blood as well as other stages of a protozoan disseminated throughout virtually all organs and tissues, including brain and bone marrow. The parasites resembled stages in the life-cycle of a *Schellakia* spp. The heavily infected liver showed severe inflammation and necroses.

SERUM AMYLASE ASSAY: A COMPARISON BETWEEN CANINE SERUM AND COMMERCIAL CONTROL SERA USING EIGHT DIFFERENT ASSAY METHODS.

F. Reyers

Department of Medicine.

Over the past decade, approximately 8 new amylase assay methods have been introduced annually while manufacturers have withdrawn about two methods per annum. Some of these methods give widely differing reference ranges. Differences in affinity for some of the new substrates have been reported for human, bovine and porcine amylases as well as between salivary and pancreatic isoenzymes.

Since the discovery of high maltase activity in canine serum, veterinary laboratories have tended to use cumbersome non-saccharogenic methods for the assay of canine serum amylase. In order to evaluate the new automated, defined substrate methods for the assay of canine serum amylase, the following trial was executed.

Sera from 20 healthy Beagle dogs were compared with bovine serum-based control sera containing added porcine pancreatic amylase (*Wellcome and Boehringer*) at 6 different amylase activity levels. Two dyed-substrate methods (*Phadebas and Amylochrome*), a saccharogenic tetraoside UV method (*Technicon*), one non-blocked pnp-hexaoside method (*Lennon*) and four blocked pnp-heptaoside methods (*Human, bioMerieux, Technicon and Abbott*) were used.

Normal canine serum showed the same affinity for the dyed substrate methods as the control sera, a higher reactivity with the tetraoside UV method and a markedly lower affinity for the pnp- hexa- and heptaoside methods.

The dyed substrate and pnp-oligosaccharide methods appear to be suitable for the assay of amylase activity in dogs, provided that cognisance is taken of the reduced affinity with the latter methods which yielded a much lower reference range.

PEMPHIGUS FOLIACEUS IN A HORSE

N. Ronen

Department of Medicine

A 3 year-old Thoroughbred horse was admitted to the Equine Clinic for routine follow-up examination, about 4 months after laryngoplasty surgery.

The horse had lost weight and was depressed. Severe ventral, limb and preputial oedema was present. The horse had extensive skin lesions, which included diffuse scaling and alopecia.

Clinical pathology showed a leukocytosis, neutrophilia with a left shift and a hypergammaglobulinemia, without a hypoalbuminemia. Skin scrapings and bacteriological and fungal cultures were negative.

Routine histopathology of a skin biopsy showed subcorneal pustules in which typical acantholytic cells were present, indicating pemphigus foliaceus.

Specific anti-IgG direct immunofluorescence testing showed typical intercellular deposition of IgG in the sub-corneal area, confirming the diagnosis of pemphigus foliaceus.

Treatment with a combination of prednisolone and myocrisin was initiated, and within 2 weeks the oedema, alopecia and scaling decreased while new hair began to grow.

WATER HOMEOSTASIS IN DESERT DWELLING HORSES

*J. C. Sneddon¹, J. Van der Walt¹ and G. Mitchell²*¹Department of Physiology, ²Department of Medical Physiology, University of Witwatersrand

Total body water of horses has been determined in a number of studies. However, few estimates of water turnover, or any other measure of water homeostasis under normal and dehydrated conditions have been done. The extent to which horses can tolerate water deprivation, or to which they are adapted to desert environments, is therefore largely unknown. Current knowledge suggests that horses are adapted to wet, temperate zones.

In this study, we report an initial assessment of body-water homeostatic mechanisms in Namib horses during normal hydration and after 72h dehydration. Hydration status was compared in 6 feral horses from the Namib Desert and in 6 Boerperd (Farmhorses) under conditions of normal hydration and after 72h dehydration.

Under normal hydration, the 2 groups did not differ significantly in the amount of water intake ($l\ kg^{-1}$), plasma sodium and potassium concentrations ($mmol\ l^{-1}$), plasma osmolality ($mOsm\ l^{-1}$), haematocrit (%), total plasma protein ($g\ l^{-1}$), body water content ($ml\ kg^{-1}$), or water turnover ($ml\ kg^{0.82}$ per day). The Namib horses were significantly smaller ($p < 0.0001$), and turned over less water than the Boerperd during normal hydration ($5\ l\ d^{-1}$) and during dehydration ($4\ l\ d^{-1}$). The Namib horses showed greater increases in plasma sodium concentration after 72h dehydration ($p < 0.05$). Rehydration resulted in the restoration of 95% of weight loss (12%) within 30 min of access to water, in both groups.

It was concluded that horses can easily tolerate water deprivation resulting in a 12% reduction in body mass. The feral horses of the Namib desert were not significantly different, per unit mass, from domestic horses regarding indices of total body water content under conditions of normal hydration and after 72h dehydration. However, the smaller size and hence water turnover of these horses might be one of the mechanisms that make survival in the Namib Desert possible.

LARGE VOLUME BLOOD COLLECTION SYSTEM FOR HORSES

D.H. Volkmann and Valery M. Killeen

Department of Theriogenology

Large volumes of blood need to be collected from horses for various clinical purposes. These include fresh blood transfusions to anaemic horses, plasma transfusions to hypogammaglobulinaemic or septicæmic foals and the harvesting of plasma for the large scale production of equine chorionic gonadotrophin. In this study, we describe an economical method for collecting 2,5-3,0 l of blood from a horse in as little as 5-10 min.

The procedure has been made possible by the production of a 3 l blood bag by SABAX, South Africa. The pyrogen-free bag is supplied with the correct amount of anti-coagulant (acid citrate dextrose) and resembles the conventional 1 l blood bag in every other way. The bag is suspended in a wide-mouthed 3 l vacuum jar with only the inlet tube protruding through the lid of the jar. A second port through the lid of the jar is connected to a conventional vacuum pump.

Before collection, the horse is restrained in a crush and a small area over the jugular vein is prepared for surgery. A small volume of 1-2 ml lignocaine is injected subcutaneously over the jugular vein, after which a 15-18g hypodermic needle is inserted. A large-bore blood collection tube (*SABAX*) is connected to the needle and allowed to fill with blood. Once filled, the tube is connected to the inlet of the 3 l blood bag and the vacuum pump is switched on. In this manner, the vacuum in the jar transmits to the blood tube which significantly speeds up the flow of blood. Once filled, the bag is sealed and removed from the vacuum jar.

An outlet tube on the bag allows it to be used as a transfusion bag without further processing. If only the plasma is required, the bag can be suspended up-side-down for 4-12 h at 4 °C to allow the red cells to sediment and be drained. The plasma can then be used for transfusion or stored at -18 °C for future use.

This system is far less expensive and time consuming than other methods, while it provides all the advantages of a pyrogen-free, closed blood collection system.

SEXUAL DEVELOPMENT IN MALE POUCHED MICE, *SACCOSTOMUS*
CAMPESTRIS (GRAY 1844).

Westlin-van Aarde, L.M. & H.M. Dott*

Dept. Theriogenology.

*Mammal Research Institute, Univ. of Pretoria

Pouched mice, *Saccostomus campestris*, are African rodents included in the subfamily *cricketomyinae* (*Cricetidae*). They are only found south of the Sahara, where they are widely distributed. Published information on the physiology of reproduction in African small rodents is scarce in comparison to what is available on rodents from other continents.

The docile nature of pouched mice make them particularly suitable for laboratory studies of a non-domesticated species. Recent studies on pouched mice revealed that under optimal conditions in a constant environment, breeding success does not decrease during the austral autumn or winter.

The present study aimed at gaining basic knowledge of sexual development in male pouched mice, on which further studies may be based. The changes in testicular histology and hormone levels of male *Saccostomus campestris* were measured between the ages of 25 and 70 days.

The first spermatids were seen at 45 days at the same time as the seminiferous epithelium achieved its maximum width and the concentration of androstenedione reached a peak (27 ng/ml). Spermatozoa were first seen in the cauda epididymides on day 55 when testosterone reached a peak (2.58 ng/ml). Seminiferous tubule diameter was still increasing slowly at 70 days of age by which time both androstenedione and testosterone had settled back to adult levels. At no time was the concentration of testosterone greater than androstenedione, which is as yet not known to be the case in any other mammal.



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