ELEPHANT, EAST AFRICAN BUSH
LOXODONTA AFRICANA KNOCHENHAUERI, M-PROBOSCIDEA, ELEPHANTIDAE

SEX: F
AGE: 46 Y SM
WEIGHT: 3505 KG
STAY: > 30 Days

MANNER OF DEATH: EUTHANASIA
TIME OF DEATH: 06:45A
TAG/BAND/TATTOO: NANCY
DEATH LOCATION: ELEPHANT HOUSE YARD
SUBMITTOR: YATES
OWNER/ANIMAL DEPT: DOM

HISTORY AND CLINICAL OBSERVATIONS:
Nancy became increasingly painful, presumably due to degenerative joint disease (carpus, hips?), over the past month. She refused to take her oral antiinflammatory drugs for the past week. She began to show increased discomfort and moved with great difficulty. Euthanasia was elected due to her poor prognosis, severity of her clinical symptoms, and advanced age. Euthanized with xylazine sedation, M99 (Etorphine), Euthanasia solution.

GROSS DESCRIPTION:
This African elephant is in poor to fair body condition as evidenced by minimal amounts of subcutaneous and body caviary fat stores. There is an intravenous catheter in the ear vein of the convex surface of the pinna. All four feet have four toenails each and the most lateral nail of the right foreleg is necrotic and fractured. The left forelimb, from the carpus distally, is swollen and there is an inactive fistulous tract beneath the toenail. Both tusks are present and surgically blunted to 22cm in length. There is longitudinal ridging of the joint surfaces of the humeroulnar joint of the left leg. The head of the right femur contains a longitudinal erosion effacing the articular cartilage on the medial aspect of the joint surface measuring 1.5x8cm. The left coxofemoral joint surfaces are roughened in a similar location but the erosion is not completely through the cartilage. There is lipping of the edges of both the carpal and one joint mice is present in each joint. On the right carpus, the both carpus is 43x13x22mm and on the medial aspect of the joint. The synovial sac of the right carpus is distended with excessive, clear, watery fluid. On the left carpus, the joint mice is 20x6x6mm and on the caudolateral aspect. Both mmmary glands are enlarged (2X). The left axillary lymph nodes are pale and edematous. The retropharyngeal lymph nodes are congested and edematous. The thyroid gland weighs 705.2g; the right side is 20x8x12cm and the left is 12x8x5cm. A pale cavity contains approximately 4 liters of clear, pale yellow fluid. Both adrenal glands are enlarged; the right is 39x7x1.5cm and 252.1g and the left is 26x7x2cm and 303.4g. Within the lateral medulla of the narrow end of the cortex invaginates into the medulla forming a three-layered segment on cross-section. The left kidney weighs 10.75kg and the right weighs 11.42kg. The left kidney is more congested due to dependent post-mortem change. The pancreas weighs 1.22kg and is normal. The spleen is 112x32x4.5cm, weighs 16.2kg and is normal. The right lobe of the liver is 71x33x1cm and the left is 82x45cm. The entire liver weighs 66kg. Within the right lobe of the liver is a lcm diameter flat, light tan, soft mass. The large bile duct is filled with myrillad <3mm diameter green-black, soft, gritty calculi. There are few, lmm,
flat, white foci in the cortex of the hepatic lymph nodes and these nodes are generally edematous. A 4x4cm section of the rostromedial corner of the left upper dental arcade is separated from the bulk of the tooth. The 6x7cm new tooth is erupting caudal to the existent tooth in the left lower arcade. The cardiac portion of the stomach is empty and shows early mucosal erosion with mild hemorrhage. The small intestines contain normal ingesta. The cecum and contains dense vegetative fibrous digesta with a layer of sand and gravel at the base. There is a liter or more of gravel and und digested fruit within the colon along with normal vegetative cecal contents. The mucosal surface of the mucosa surrounded by a raised edge of colonic mucosa. There is normal fecal material within the large intestine and rectum. The ovaries are approximately each and appear inactive with no follicles or evidence of recent cycling. The tips of the uterine horns are covered with numerous multiple 1-15mm cysts and recesses from the uterine bifurcation to 10cm from the tips of the uterine horns. The cysts contain clear to red-tinted fluid. There are three, pedunculated polyps within the vestibule; two papillomatous masses measuring 7x2x2cm and 3.5x1.5x2cm each and one smooth, firm, multilobulated growth with a cystic component, measuring 7x6x2.5cm. The bladder contains approximately 50cm of cloudy, yellow urine and appears normal. On the anal mucosa, there is a 1cm abscess containing yellow/green supplicative material with a draining tract. The heart weights 16.5kg and is surrounded by fat that has undergone serous atrophy. The right atrioventricular (AV) valve is 37.5cm in circumference and the left AV valve is 34cm. The pulmonary arterial valve is 37cm in circumference and the aortic valve is 32cm in circumference. The tracheobronchial lymph nodes are slightly enlarged and the medullae are pale yellow on section. Some have granular nodules 3-5mm in diameter. The lungs contain multiple firm granulomatous masses. On section, these are pale tan, punctate to coalescing to cavitating tissue with the left lung more affected than the right. Interstitial, normal lung tissue is moderately congested but floats in Missouri’s solution. On section, the lobules of lung are consolidated and contain coalescing yellow-white foci, which are gritty and caseous appearing, and in some large areas of yellowish-green cavities containing greenish, liquefied exudate. There is yellow/green, tenacious, mucoid substance within the right frontal sinus cavity, directly dorsal to the brain. The ethmoid area near the orbitofrontal plate is brown, friable and coated with mucoid substance. The brain is normal. The pituitary bodies are within normal limits: tongue, esophagus, trachea, diaphragm, mucosal surfaces of trunk.

The following measurements were taken according to the SSP Elephant Necropsy Protocol:
Tip of trunk to tip of tail 718 cm, length of trunk 190 cm, length of tail 133 cm, shoulder height 302 cm, dorsum height 292 cm, trunk tip to base 182 cm, trunk tip width 12 cm, trunk base width 26 cm, head dorsal length 96 cm, head ventral length 65 cm, head neck height 87 cm, head width between ears 73 cm, head width between temporal glands 68 cm, head width between eyes 62 cm, head width between mouth 41 cm, ear anterior width 69 cm, ear posterior width 79 cm, neck height 93 cm, neck length 29 cm, length 267 cm, body bottom length 261 cm, body width at back 110 cm, body height at front 80 cm, body width at mid 125 cm, body width at back 110 cm, body height at front of hindlimb 144 cm, body height at front of hindlimb 140 cm, tail length (excluding hair) 133 cm, tail hair 27 cm, tail width at base 30 cm, forelimb length 206 cm, forelimb width at top 66 cm.

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forelimb width at bottom 39 cm L x 30 cm W, hindlimb length 129 cm, hindlimb width 56 cm, hindlimb width at bottom 47 cm L x 27 cm W, left front foot has 4 toenails, right front foot has 4 toenails, left hind foot has 4 toenails, right hind foot has 4 toenails; teeth total number of plates: R bottom 11, L bottom 9+3 (new tooth), R top 12, L top 10; teeth total length: right top 25 cm, left top 24 cm; teeth maximum width (right) 7.5 cm, maximum grinding length of entire grinding surface (right top, longest of 4 teeth) 22 cm, 2 tusks present, tusk length from gum line to base 22 cm (other tusk measurements not taken because tusks were large cut off years ago), clitoris circumference at base 4.5 cm diameter, clitoris circumference at head 6.5 diameter.

PRELIMINARY DIAGNOSES:
Left axillary and trachobronchial lymph nodes, granuloma, multiple pneumonia, granulomatous, severe with acid fast bacilli
Degenerative osteoarthritis, hips, carpi, elbow joints
Cystic endometrial hyperplasia
Papillomatosis of uterus
Polyposis, vestibule
Mammary gland, hyperplasia, secretory
Foot, left sinus tract, toenail
Foot, right onychitis, toenail
Cholelithiasis
Ascites
Sinusitis
Healing ulcer in colon

LABORATORY STUDIES:
Culture, cytology, and fluid analysis of ascitic fluid
Cholecyst analysis
Culture and cytology of tracheobronchial, axillary, retropharyngeal, hilar LN
Culture and cytology of joint fluid
Left and right foot feet CAT scanned and perfused for future dissection

TISSUE STATUS:
Tissue taken for trimming
Tissue samples ultrafrozen
Tissues fixed for EM: temporal gland, spleen, left and right ventricles, left and right atria, intervertebral septum, vestibule
abscess with draining tract, containing yellow/green mucoid material
Ultrafrozen: salivary gland, retropharyngeal LN, uterine papillomatous nodule, mesenteric LN, thyroid, temporal gland, ovary, cranial cervical LN, mammary gland (right), muscle, skin, lymph node, right adrenal, pancreas, spleen, uterus, diaphragm
vaginal/uregenital canal, hepatic LN, kidney, liver, urinary bladder, urethra, small intestine, cecum, stomach, spinal cord, sciatic nerve, clitoris, brain, trunk, bronch/tracheal LN, axillary LN, trachea, lung, great vessels, pituitary, esophagus, heart, tongue, uterine horn polyp, rib, eye, large intestine, colon, large intestine lesion, axillary LN (left front)

SPECIAL REQUESTS:
Disposition: Infectious disease present. Carcass cremated including skull and tusks. Limb parts to USMNH for fixation and perfusing. Whole fixed brains sent to Dr. William J. Kupsky (Harper Hospital, 3990 John R. Detroit, MI 48201, via Dr. Shoshoni, Morgan State University.

HISTOLOGY:
1. COLON: Small lymphoid aggregate bridging muscularis focally. HEART:

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Multifocally, globular, yellow brown pigment is present in cardiomyocyte cytoplasm.

2. GREAT VESSEL: WNL. STOMACH: Few rod-shaped bacteria in lumen. TONGUE: WNL.

3. NERVE: WNL. PYLORUS: Infiltration in moderate numbers of eosinophils in the lamina propria. PYLORUS, COLON: Moderate numbers of plasma cells and brown, globular pigment laden macrophages in shallow submucosa with fewer eosinophils and neutrophils. Occasional PMNs transmigrating vessel walls. Submucosa is expanded by edema and has multifocal pockets of neutrophilic and eosinophilic infiltrates. Similar inflammatory infiltrates present in low numbers in interstitial fibrous tissue of muscular layers. Multifocal mineralization of epithelial cells at mucosa surface.

4. SUBMANDIBULAR GLAND: WNL.

5. LYMPH NODE (two tiered): Multifocal erythrophagocytosis, preponderance of mature lymphocytes and plasma cells. Interstitial lymphatics are dilated. Hyaline degeneration of vessels in some germinal centers. Moderate amount of edema. OTHER TWO LYMPH NODES: Prominent germinal centers with mild lymphoid necrosis. Vessels in sinus area are thickened and have enlarged nuclei. Sinuses contain histiocytes and cellular debris. Multifocal clusters of epithelioid macrophages, multifocal anthracosilicosis. ACID FAST STAIN: No acid fast organisms seen.

6. VESTIBULAR POLYP: Expanding the dermis and extending to the epithelium and edges of the section is a mass composed of dense fibrovascular tissue. Nuclei are plump to dense and spindloid and sparsely placed. Subepithelial capillaries are prominent and branching. Epithelium is cuboidal and multilayered and occasionally glandular with basally located nuclei. Near the epithelium, few lymphocytes, plasma cells, and eosinophils and small vessels have narrow cuff of surrounding edema. ADIPOSE TISSUE: WNL.

7. SPINAL CORD: WNL. LYMPH NODE: Prominent germinal centers and focus of mineralization. Sinuses contain moderate numbers of neutrophils and eosinophils and macrophages, some of which contain cellular debris. Few germinal centers contain a core of necrotic debris and infiltrates of neutrophils.


9. ADRENAL GLAND: Disruption in normal architecture with islands of medullary tissue, redundant cortical tissue and multifocal cortical fibrosis. Capsule varies from 1-4 times normal thickness. SKELETAL AND SMOOTH MUSCLE: WNL.

10. LIVER: Diffusely, most hepatocytes contain globular, brown pigment within the cytoplasm. Occasional hepatocytes contain indistinct, finely granular, amphiphilic vacuoles. Multifocal polyoidal cells. IRON STAIN OF LIVER: Minimal iron within hepatocytes. Hepatic pigmentation interpreted as bile. PIGMENTED EPITHELIUM: Bacteria within keratin layer and on surface. BILE STAIN: Negative for bile.

11. SPLEEN: Moderate cytoplasmic pigmentation in solitary or aggregated MOs (hemosiderosis). Active erythropagocytosis also present. Hemolymph centers are somewhat depleted. TEMPORAL GLAND: WNL. THYROID: Focus of atrophic gland. Other glands are up to 3 mm in diameter.

12. SPLEEN: See slide 11.

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14. KIDNEY, PELVIS: Tubules separated by edema. Rare tubules filled with bacterial colonies. Multifocally, tubules are lined by cells with irregular-shaped, darkly basophilic nuclei. In the peritubular area, there is globular eosinophilic material and a small amount of karyorrhectic debris. Multifocal tubular mineralization. Focus of granulocytes within collecting tubule.

15. TONGUE: Multifocal aggregates of lymphocytes variably arranged in parallel rows. VESTIBULAR POLYPS: There are two papillomatous masses on this slide. #1: This mass is composed of interlacing bundles of dense fibrous tissue with oval to polygonal to elongate, nuclei with stippled chromatin. Nuclear population ranges from sparse in some areas to very dense in others. There are multiple cystic spaces lined by cuboidal to squamous cells and containing no or minimal amorphous, eosinophilic debris. The surface of the mass is thrown into many papillary projections and is lined by a single layer of cuboidal to flattened epithelium. Papillary projections are composed of amorphous eosinophilic material, few nuclei and occasional globules of eosinophilic material. #2: This mass is similar architecturally to #1 but is generally more sparsely nucleated.

16. SKIN: Focus of epidermal proliferation with acanthosis, anastomosing rete pegs and orthokeratotic hyperkeratosis.

17. TRACHEA: WNL. SKIN: WNL. FOSSA OF TEMPORAL GLAND: At periphery of section there is an area of lymphocytic and multinucleated giant cell infiltration surrounding a foreign body. Multifocal mineralization of fibrous tissue and below BM of ducts.

18. ADRENAL: The medullary tissue has a defined cluster of cells with variably indistinct cell borders; moderate amounts of vacuolated to fibrillar eosinophilic cytoplasm; and containing one centrally to eccentrically located nucleus with finely stippled chromatin and one prominent, magenta nucleolus. Where these cells interface with normal cortical tissue there is a faint band of fibrovascular tissue and a focus of hemorrhage. Normal adrenal tissue is similar to that on slide 9.

19. UTERINE POLYP (SKIN FROM VESTIBULE?): This mass extends to the cut edges and the epidermis and is composed of interlacing bundles of fibrovascular tissue within which lies elongate to spindloid, basophilic nuclei. The epidermis is stratified and occasionally throws short rete pegs into the underlying connective tissue. Infiltrates of lymphocytes and plasma cells are present in moderate numbers just below the epithelium.

20. CECA L U C E R: 98% of the mucosa is absent from this section and the submucosa is diffusely expanded by fibrous connective tissue and infiltrates of plasma cells, lymphocytes and neutrophils in moderate to high numbers.

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Multifocally, surface tissue are necrotic and associated with bacteria. Similar inflammatory cells are present in low numbers in the perivascular area of the tunica muscularis. ACID FAST AND PAS STAINS: No acid fast or PAS positive organisms seen. LYMPH NODE: Marked lymphocyte depletion with few germinal centers remaining.

21. PITUITARY, ANTERIOR: Multifocal mineralization. Multifocal infrequent cysts up to 1mm diameter. STOMACH: Infrequent, mildly ectatic glands. URINARY BLADDER: WNL.

22. MAMMARY GLAND: Periductular focus of lymphocytes and plasma cells, some of which are necrotic. Overlying duct epithelium is attenuated and has transmigrating inflammatory cells. Diffuse periductular lymphoplasmacytic infiltrate. UTERUS: Focal mineralization within vessel walls. Atrophic glands with dilated lymphatics. NEURAL TISSUE: WNL. OVARY: Vascular mineralization. Serosal surface contains small papillary projections similar to that on slide 15.

23. TONGUE: WNL. OVARIAN FIMBRIA: WNL.

24. LYMPH NODE: Prominent germinal centers with multifocal lymphocyte necrosis. Focally extensive area of marked lymphoid depletion and low numbers of brown, globular pigment-laden macrophages. LYMPH NODE: Prominent germinal centers with multifocal lymphoid necrosis. Sinuses draining moderate numbers of neutrophils. ACID FAST STAIN OF LYMPH NODE: No acid fast organisms seen.

25. LYMPH NODE: 70% of node is markedly lymphoid depleted. Remaining tissue has dense aggregates of lymphocytes. Depleted areas contain epithelioid MC. LYMPH NODE: Interstitial areas contain moderate numbers of plasma cells and neutrophils. ACID FAST STAIN OF LYMPH NODE: No acid fast organisms seen.

26. OROPHARYNX [holocrine secretory glands (sebacous)]: WNL. LYMPH NODE: Congestion, prominent germinal centers, high mitotic rate and increased numbers of blast cells. Vessel walls are thickened and contain plump nuclei. Multiple nodes of lymphoblastic proliferation and occasional necrotic foci. LYMPH NODE: WNL.

27. MIXED SALIVARY GLAND: Multifocal mineralization. TEMPORAL GLAND: WNL. PANCREAS: Mild interstitial fibrosis.

28. PANCREAS: See slide 27.


31. CARDIAC MUSCLE: Vascular congestion, mild. See also slide 30.

32. LIVER: Multifocal congestion. Small amounts of globular, brown pigment in cytoplasm of scattered hepatocytes. Scattered hepatocytes have peripherialized nuclei and amphophilic, granular cytoplasm. Lightly basophilic, glassy structures occasionally seen within Kupffer cells and, less frequently, hepatocytes.

33. CARDIAC MUSCLE: See slide 30. Mineralization of great vessel at subintimal plane. Rare degenerating myocardial fibers. SKELETAL MUSCLE WITH

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3.4. MAMMARY GLAND: WNL.

35. UTERINE CYST: Two adjacent cysts: one 10x5mm and one 5x1.6mm with 120mm band dividing the two. LYMPH NODE: Moderate lymphocyte depletion. SMALL INTESTINE: Moderate eosinophilic infiltrate with fewer lymphocytes and plasma cells.

36. STOMACH: WNL. COLON: Plasma cells and lymphocytes present in low moderate numbers in the lamina propria and into the tunica muscularis. PMNs also present in increased numbers.

37. FIBROCARDIAGEOUS TISSUE: WNL.

38. URETHRA: High number of neutrophils in vasculature. DUODENUM: Mild increase in plasma cells, lymphocytes, and neutrophils. Occasional MOs contain brown globular pigment.

39. SMOOTH MUSCLE: WNL. COLON: Small to large amounts of intracytoplasmic, globular, brown pigment within MOs and fibroblasts multifocally in submucosa.

40. EYE: WNL.

41. EYE: WNL.

42. LUNG: There are multifocal granulomas and areas of necrosis. Alveoli not obliterated by granulomas contain edema and free macrophages, plasma cells and lymphocytes. Multifocally, pulmonary parenchyma is replaced by fibrovascular tissue with aforementioned inflammatory cells. ACID FAST: Low to moderate numbers of acid fast organisms are present within granulomas.

43. LUNG: Approximately 40% of this section contains necrotic and granulomatous material. Sharp demarcated from and compressing surrounding granulomata, edema and histiocyte filled alveoli and interstitial fibrosis with lymphoplasmacytic/histiocytic inflammation. ACID FAST: High numbers of acid fast bacilli are present multifocally within necrotic area.

44. LUNG: Approximately 20% of this section is affected by changes similar to those described for slides 42 and 43. Multifocally, within normal tissue, there is mild interstitial fibrosis lymphoplasmacytic infiltrates and intraalveolar edema. ACID FAST: Low numbers of acid fast bacilli are located in necrotic areas.

45. LUNG WITH ATTACHED PLEURA: Near the pleural surface, alveolar septae are thickened by fibrous tissue and multifocal aggregates of lymphocytes and plasma cells. No acid fast organisms seen.

46. LUNG: Multifocally, alveolar walls are thickened by fibrous tissue and small lymphoplasmacytic aggregates. One large bronchiole is filled with mucinous material, and sloughed epithelial cells and inflammatory cells. No acid fast organisms seen.

47. LUNG: Lesions in this section are similar to those on slide 42. ACID FAST: Low numbers of acid fast bacilli are present in necrotic areas.

FINAL DIAGNOSES:
1) SYNDROME, TUBERCULOSIS, MYCOBACTERIUM BOVIS

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2) LUNG, TUBERCULOSIS, MYCOBACTERIUM BOVIS
3) LUNG, PNEUMONIA, PYOGRANULOMATOUS, MYCOBACTERIUM BOVIS
4) LYMPH NODE, BRONCHIAL, TUBERCULOSIS, MYCOBACTERIUM BOVIS
5) LYMPH NODE, THORACIC, TUBERCULOSIS, MYCOBACTERIUM BOVIS
6) INTESTINE, LARGE, COLITIS, GRANULOMATOUS, ULCERATIVE
7) JOINT, MULTIPLE SITES, OSTEOARTHRITIS, DEGENERATIVE
8) BONE, PHALANX, OSTEOARTHRITIS, CHRONIC
9) FOOT, PODODERMATITIS, SUBACUTE
10) ABDOMINAL CAVITY, ASCITES
11) BILE DUCT, CALCULUS, BILE
12) UTERUS, CYST, ENDOMETRIAL, MULTIPLE
13) VESTIBULE, EPITHELOPLASIA, MULTIPLE
14) SINUS, SINUSITIS, SUPPURATIVE, MYCOBACTERIUM AVIUM
15) FAT, ATROPHY, SEROUS, PERICARDIAL
16) ADRENAL, HYPERPLASIA, MEDULLARY, MILD
17) ANUS, FISTULOUS TRACT, SUPPURATIVE
18) INTESTINE, LARGE, CECUM, FOREIGN BODY, SAND

CAUSE OF DEATH:
EUTHANASIA, INFECTIOUS, BACTERIAL, MYCOBACTERIUM BOVIS

REMARKS:
This African elephant (Nancy) was euthanized due to progressive arthritis and chronic osteomyelitis of a digit in the left front foot, for which she had been treated with ibuprofen, prednisone, imuran, tylanol and phenylbutazone intermittently since May 1997. Beginning in 1998, regimens of localized IV injections of amikacin and trimethoprim sulfadiazine, and betadine flushes of the fistulous tract were used to treat the lesions from the osteomyelitis. The elephant had also exhibited a chronic discharge, occasionally septic, from her mammary glands and eventually developed a fistulous toe lesion in the right front foot. She began losing weight (from 10,000+ lbs.) in December 1998. Her apparent discomfort worsened in the month before euthanasia and she began refusing medication and food and became refractory to the analgesics. At necropsy, moderate degenerative joint disease was found in the humeroulnar, coxofermoral, and carpal joints. However, the most significant finding was an extensive granulomatous pneumonia involving 60% of the pulmonary parenchyma and affecting the tracheobronchial lymph nodes. The pulmonary granulomas were cytologically positive for acid fast bacilli which were also identified in the histological preparations. Cultures and PCR analysis of the lung lesions and tracheobronchial lymph nodes at NVSL, Ames, IA and NML Reference Laboratories in Cypress, CA were positive for Mycobacterium bovis (CP 2000-2521, 2522, 2523). Cultures of the exudate from the frontal sinus grew M. avium (CP 2000-2529). The left axillary lymph node showed involvement by other bacteria, probably due to the active digital infection of the cribriform plate did not reveal any acid fast organisms (CP 2000-2527). It is possible that this elephant acquired a latent M. bovis infection in the thoracic cavity that later became progressive. Evidence supporting this hypothesis is present in an organized and calcified granuloma which also shows areas of active infection. Such a lesion, the prednisone and imuran used to treat the elephant's other illnesses, the extent of the pulmonary tuberculous involvement suggests a 1-2 year timeline, which coincides with the initiation of these drugs. The M. avium exposure is isolated from the sinus infection also supports this premise. The elephant's exposure to M. bovis was possibly from black rhinoceros kept near the disseminated tuberculosis caused by Mycobacterium bovis (pathology number 2000-2527).
1978-339, accession number 287501. Cultures of ultrafrozen lung lesions banked from that animal are underway to compare with the DNA fingerprint type of M. bovis from this elephant's lung to determine if the organisms are the same. Other significant post mortem findings in the elephant include ascitic fluid (noted clinically) that may have been due to the chronic ingestion and stasis of moderate amounts of gravel within the cecum leading to the elephant's sometimes high bloated appearance. Although bacterial rods were found within cells of this fluid, no definitive organisms could be isolated on culture (CP 2000-2520). Culture of the right carpal joint fluid did not reveal any organisms (CP 2000-2531). A high M:E ratio in the bone marrow cytology supported a response to the chronic inflammatory processes noted (CP 2000-2530). Bile duct sand/stone analysis by Dr. Carl Osborne at Michigan State showed 100% intact biliary stones which could be attributed to accelerated weight loss during the last few months of her life (CP 2000-2699). The small "mass" noted in the right lobe of the liver was not detected histologically. The extensive tuberculous involvement of the elephant's respiratory tract indicates a high probability of mycobacterial dissemination into the environment. Frequent monitoring for mycobacterial disease in the three Asian elephants using trunk washes and cultures is now underway to detect early signs of any possible transmission of the disease to these animals.

Viner
Prosector

Montali
Pathologist

12/14/00
Date Completed

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