

5-6 years: Periods slightly irregular, with two long (46 and 53 days) and one short period of 11 days.

6-7 years: Periods very irregular, varying from 3 to 87 days, with or without prolonged duration of oestrus.

Age at first service: 5 years 0·6 months, and thereafter at every oestrus for a period of 1 year 5 months; total services, 19.

Pregnancies: None.

Clinical Observations.

The head, neck and shoulders are coarse and there is a slight elevation of the root of the tail (Fig. 36). The animal accepts coitus at irregular intervals and mounts its companions and the bull.

The vestibule is narrow and examination per vaginam is not possible. Examination per rectum reveals large intrapelvic fat necrosis tumours, not involving the genitalia. The cervix is small and somewhat soft. The uterus is soft, atonic and fluctuating. The tubes are not palpable and the ovaries are large and cystic.

The udder and teats are moderately developed and yield about 200 cubic cm. of milky secretion (Fig. 36).

Slaughter Data.

Age when slaughtered: 6 years 5·3 months.

Live weight: 1,448 pounds.

"Dressed" weight: 880 pounds.

Percentage "dressed" weight: 60·8.

Sex condition: Nymphomania.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Fig. 38.)

Vulva.—Length, 12 cm. Width, 8 cm. Bartholin glands normal. Mucosa purplish pink in colour and moist.

Histological.—The epithelial layer is wide, the cells are swollen with slight cornification of the superficial squamous layer. There is intense leucocytic infiltration of the epithelium and stroma and the latter is oedematous and congested.

Vagina.—Length, 24 cm. Width, 4·5 cm. Gärtner's canals patent. The mucosa is purplish pink in colour, covered with a thin layer of clear mucus becoming more profuse towards the fornix.

Histological.—The epithelium consists of 12 to 15 rows of well-defined polyhedral cells, supporting a superficial layer of swollen goblet cells. There is intense infiltration of lymphocytes, plasma cells and neutrophiles in the mucosa. The stroma is moderately congested and oedematous.

Cervix.—Length, 8 cm. Width, 3 cm. The os is small, projects slightly into the vagina and admits one finger with difficulty. The cervix is slightly soft

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and the canal is patent. The transverse folds are not prominent. The mucosa is pale brownish pink in colour and covered with slightly opaque, tenacious mucus.

Histological.—The glandular epithelium is moderately high columnar, with oval, elongated, basally situated nuclei. The lumina contain mucus. The stroma is oedematous and slightly congested.

Uterus.

	<i>Length.</i> Cm.	<i>Width.</i> Cm.	<i>Thickness of Wall.</i> Cm.
Body.....	3.5	7.5	0.2
Left Cornu.....	33.0	5.0	0.2
Right Cornu.....	31.0	4.5	0.2

On opening the uterus, 300 cubic cm. of thin, watery, slightly opaque fluid escapes, leaving the uterus soft and flabby. The walls are very thin and semi-transparent. The mucosa is pale pink in colour and smooth, with a number of cysts up to 0.3 cm. in diameter present. Cotyledons are absent and the muscular layers are greatly reduced in thickness.

Histological.—All layers of the uterine wall show extreme atrophy (Fig. 32). The glands are reduced to 1-2 rows and the epithelium is high columnar. The stroma is oedematous. The muscle fibres are reduced in size and numbers.

Fallopian Tubes.

	<i>Length.</i> Cm.	<i>Width.</i> Cm.
Left.....	20.0	0.2
Right.....	19.0	0.3

Both tubes along their entire length show minute pinhead cysts penetrating the muscular coats and plainly visible on the serosal surface.

Histological.—The cysts are lined by a single layer of flattened epithelial cells. The epithelium of the unaffected portions of the tubes is high columnar with basal nuclei and scant ciliation.

Ovaries.

	<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
Left.....	4.5	3.3	2.9	18.7
Right.....	5.8	4.0	3.4	38.0

The *left ovary* contains 5 large cysts, 1.8, 1.9, 2.3, 2.2 and 1.4 cm. respectively in diameter and a number of immature follicles.

Histological.—The cysts show varying degrees of degeneration of the lining membrane up to complete fibrosis of the wall. The follicles present a normal structure. Luteal tissue is absent.

The *right ovary* contains two large cysts, 3.2 and 2.9 cm. respectively in diameter, and several immature follicles. The cysts and follicles present a similar structure to those observed in the left ovary. Luteal tissue is absent. What remains of the ovarian stroma is dense and fibrous.

Total weight of genitalia.—(Excluding fluid present in the uterus) 321 grams.

Mammary Glands.—The alveoli and ducts are well developed, the epithelium is swollen and shows cytoplasmic and nuclear extrusions. The ducts contain a small quantity of secretion. The stroma contains a fair proportion of connective tissue.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2.2	1.2	1.2	2.1

Anterior Lobe.—Proportional cell count: Alpha cells, 59.0; beta cells, 1.5; chromophobes, 39.5 per cent.

The *alpha cells* are large, closely packed and heavily granular (Fig. 114), mostly with large, delicate nuclei and prominent Golgi apparatus.

The *beta cells* are moderately granular with large, delicate nuclei and prominent Golgi.

The pars intermedia and nervosa are normal.

Pineal:

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.5	0.6	0.6	0.4

The pineal body contains a large number of corpora arenacea and the structure shows nothing unusual.

Thyroid.—Left lobe, 5.0 × 4.0 × 1.0 cm. Right lobe, 5.0 × 4.5 × 0.9 cm. Length (including isthmus) 22.0 cm. Weight 34.0 gm. Macroscopically normal.

Histological.—The follicles are lined by columnar swollen epithelium, with many fat droplets in the cytoplasm.

Thymus.—Shows advanced involution.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	6.0	4.0	1.2	18.0
Right.....	5.5	3.5	2.6	15.9

Many cells in the zona fasciculata and reticularis show heavily staining cytoplasm and pycnotic nuclei.

Diagnosis.

Hydrometra with cystic degeneration of the endometrium and atrophy of all layers of the uterine wall. Cystic degeneration of the tubal mucosa. Bilateral large follicular cystic ovaries, associated with nymphomania.

INFLUENCE OF DELAYED BREEDING ON FERTILITY OF BEEF HEIFERS.

Cow No. 7189. (FIG. 69.)

Date of birth: 11.5.1936. *Birth weight:* 64 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 515 days (16·9 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: One long period (29 days), otherwise normal.

4-5 years: Normal.

5-6 years: Normal, pregnant, calved.

6-7 years: Two short periods (15 and 9 days), pregnant.

Age at first service: 5 years 0·3 months.

Pregnancies: (Table XXI, Appendix II).

First: 1 service, full term, 277 days, calf, male, 40 pounds, still born. Dystocia, uterine inertia; no relaxation of genital passage prior to parturition.

Second: 4 services, slaughtered on 200th day of gestation.

Clinical Observations.

Genitalia and sexual behaviour normal.

Slaughter Data.

Age when slaughtered: 6 years 8·5 months.

Live weight: 1,560 pounds.

"Dressed" weight: 910 pounds.

Percentage "dressed" weight: 58·3.

Sex condition: Slaughtered on 200th day of pregnancy.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

Vulva.—Length, 12 cm. Width, 10 cm. Bartholin glands normal. Mucosa pale pink in colour and covered with a thin layer of clear, tenacious mucus.

Histological.—The epithelial layer is thin and compact. The stroma is dense.

Vagina.—Length, 25 cm. Width, 5 cm. Gärtner's canals patent. The mucosa is pale pink in colour and covered with dry, straw-coloured mucus.

Histological.—The thin epithelial layer is much folded and consists mainly of 3 to 4 rows of polyhedral cells, alternating with single rows of swollen goblet cells. The stroma is moderately oedematous and congested; there is slight lymphocytic infiltration.

Cervix.—Length, 13 cm. Width, 5·5 cm. The os is large and fissured and projects 3 cm. into the vagina. It admits one finger. The cervix is soft and the canal is sealed with the characteristic plug of pregnancy.

Histological.—The glandular epithelium is columnar, swollen with small basal nuclei. The lumina are distended with acidophilic secretion.

Uterus.—On account of extreme distortion through pregnancy no measurements of the component parts of the uterus were taken. The left horn contains a normal male foetus. The membranes, cotyledons and uterine wall are normal.

Fallopian Tubes.

	<i>Length.</i> Cm.	<i>Width.</i> Cm.
Left.....	23·0	0·3
Right.....	25·0	0·4

The tubes are macroscopically normal.

Histological.—The epithelium is low columnar with large, oval, central nuclei. The surface is covered with similar cytoplasmic and nuclear extrusions as observed in Cow No. 7045.

Ovaries.

	<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
Left.....	3·5	3·0	2·2	9·5
Right.....	4·0	2·5	1·5	5·0

The *left ovary* contains the corpus luteum of pregnancy 2·5 cm. in diameter, bright orange in colour. A few immature follicles and traces of old corpora lutea are visible.

The *right ovary* contains numerous immature follicles and traces of old corpora lutea. Microscopically both ovaries are normal.

Total weight of genitalia.—About 7·5 Kilograms.

Mammary Glands.—The alveoli and ducts are well developed and contain a small quantity of secretion.

Pituitary.

<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
2·0	1·3	1·1	1·7

Anterior Lobe.—Proportional cell count: Alpha cells, 44·3; beta cells, 10·2; chromophobes, 45·5 per cent.

Large numbers of *alpha cells* show partial degranulation and pycnotic nuclei—the so-called “pregnancy” cells. Some large, heavily granular cells are also present.

Beta cells in various stages are present, from large, lightly staining cells with large, delicate nuclei, to heavily granular cells with prominent Golgi apparatus. Small, degranulated cells with pycnotic nuclei are also present.

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Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.5	0.6	0.6	0.3

Shows a large number of corpora arenacea and the structure is normal.

Thyroid.—Left lobe, 5.0 × 4.5 × 1.0 cm. Right lobe, 4.5 × 4.0 × 1.0 cm. Length (including isthmus), 19 cm. Weight, 23 grams. The thyroid is macroscopically normal.

Histological.—The epithelium lining the follicles is cuboid and the cytoplasm contains fat globules and many brownish pigment granules.

Thymus.—Almost completely involuted.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	6.0	4.0	1.3	15.0
Right.....	4.5	3.5	2.5	12.5

A few cells in the zona fasciculata and reticularis show deeply staining cytoplasm and pycnotic nuclei.

Diagnosis.

Normal 200 days pregnancy.

Cow No. 7269. (FIG. 70.)

Date of birth: 5.10.1936. *Birth weight:* 65 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 541 days (17.8 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Two short periods of 15 and 16 days, accompanied by prolonged duration of oestrus (6 days). Remaining periods normal.

4-5 years: Normal.

5-6 years: Normal, pregnant, calved.

6-7 years: No periods, pregnant, aborted.

7-8 years: No periods, pregnant, calved.

Age at first service: 5 years.

Pregnancies: (Table XXI, Appendix II).

First: 4 services, full term, 281 days, male calf, 61·5 pounds, parturition normal (Fig. 70).

Second: 1 service, abortion after 123 days gestation, foetus macerated.

Third: 1 service, full term, 267 days, male calf, 49·0 pounds, parturition normal.

Clinical Observations.

Genitalia normal.

Slaughter Data.

Age when slaughtered: 7 years 10·9 months.

Live weight: 1,450 pounds.

"Dressed" weight: 870 pounds.

Percentage "dressed" weight: 60·0.

Sex condition: Slaughtered 5½ months subsequent to final parturition and 2 days after showing normal oestrus.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

Vulva.—Length, 10 cm. Width, 10 cm. Bartholin glands normal. The mucosa is bright pink in colour and moist.

Histological.—The epithelial layer is wide and the cells are swollen. There is no evidence of cornification of the superficial squamous layer. The stroma and epithelium are moderately infiltrated with leucocytic cells and the former is slightly congested and oedematous.

Vagina.—Length, 30 cm. Width, 7 cm. Gärtner's canals patent. The mucosa is bright pink in colour and covered with thin, clear mucus.

Histological.—The epithelium consists of 3 to 5 rows of polyhedral cells, supporting a superficial row of swollen, columnar mucus secreting cells (Fig. 1). The mucosa shows moderate infiltration of lymphocytic and neutrophilic cells. The stroma is oedematous and moderately congested.

Cervix.—Length, 13 cm. Width, 5 cm. The os projects 3 cm. into the vagina and admits one finger with difficulty. The cervix is firm and the canal patent. The mucosa is bright pink in colour and covered with thin, slightly opaque mucus.

Histological.—The glandular epithelium is high columnar, swollen with small, flattened, basally situated nuclei (Fig. 12). There is mucus present in the lumina. The stroma is oedematous and congested and there are a few lymphocytes present.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness of Wall.</i>
	Cm.	Cm.	Cm.
Body.....	2·5	5·0	1·0
Left Cornu.....	29·0	4·0	0·8
Right Cornu.....	28·0	4·0	0·8

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The mucosa is pale, brownish pink in colour and moist. The cotyledons are prominent. The muscular layers are normal.

Histological.—The surface and glandular epithelium are high columnar and show moderate secretory activity. The stroma is oedematous and congested.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	Cm.	Cm.
Left.....	21·0	0·3
Right.....	23·0	0·3

The tubes are macroscopically normal.

Histological.—The epithelium is high columnar with basal nuclei and scant ciliation (Fig. 76). Many cells show cytoplasmic vacuoles, similar to those described in Cow No. 6363, which appear to force the nucleus towards the centre of the cells. The stroma is slightly oedematous and congested, while the muscular coats appear normal.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	4·0	2·2	1·5	8·5
Right.....	4·5	2·5	1·8	13·0

The *left ovary* contains a number of follicles in various stages of maturity and traces of old corpora lutea.

The *right ovary* contains the corpus luteum of last ovulation (2 days previous), 1 cm. in diameter, flesh coloured with haemorrhagic centre and apex. Close to this there is another corpus luteum, that of second last ovulation, 1·2 cm. in diameter, bright yellow and firm. Numerous follicles in various stages are present.

The macroscopic and microscopic structure of both ovaries is normal.

Total weight of genitalia: 800 grams.

Mammary Glands.—The alveoli and ducts are well developed and contain a small quantity of secretion. There is a moderate proportion of connective tissue in the stroma.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2·0	1·4	1·2	2·0

Anterior Lobe.—Proportional cell count: Alpha cells, 41·9; beta cells, 19·6; chromophobes 38·5 per cent.

The *alpha cells* are large, heavily granular with large, delicate nuclei and prominent Golgi (Fig. 105).

The *beta cells* are numerous but small, degranulated, with pycnotic nuclei and indistinct Golgi apparatus.

The pars intermedia and nervosa are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.5	0.6	0.6	0.3

Contains a few corpora arenacea, apparently normal.

Thyroid.—Left lobe, $6.0 \times 4.0 \times 1.0$ cm. Right lobe, $6.0 \times 4.0 \times 1.0$ cm. Length (including isthmus), 22 cm. Weight, 33 grams. Macroscopically normal.

Histological.—The follicles are large and lined with cuboid to flattened epithelium, containing a few fat droplets and brown pigment granules in the cytoplasm.

Thymus.—Almost completely involuted.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	6.0	4.0	1.3	14.0
Right.....	5.5	3.5	2.0	13.0

There are some fine lipid granules in the cytoplasm of the zona glomerulosa, otherwise nothing unusual.

Diagnosis.

Normal.

GROUP B COWS.

Cow No. 7271. (FIG. 39.)

Date of birth: 14.10.1936. *Birth weight:* 65 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 427 days (14.0 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal.

4-5 years: One short period (5 days) and two long periods (158 and 105 days), followed by pregnancy.

5-6 years: Pregnant, calved, no periods.

6-7 years: One long period of 80 days.

Age at first service: 4 years 6.0 months.

Pregnancies: (Table XXI, Appendix II).

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One only: 3 services, full term, 290 days gestation, absence of relaxation of the genital tract, dystocia, uterine inertia, laceration of cervix and vagina. Male calf, 64 pounds, still born.

Clinical Observations.

No further services given after parturition. Genitalia normal.

Slaughter Data.

Age when slaughtered: 6 years 2·1 months.

Live weight: 1,290 pounds.

"Dressed" weight: 790 pounds.

Percentage "dressed" weight: 61·2.

Sex condition: Slaughtered 13 days after showing normal oestrus.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Fig. 41.)

Vulva.—Length, 11 cm. Width, 9 cm. Bartholin glands normal. Mucosa pale pink in colour and moist.

Histological.—The epithelial layer is narrow, the cells are compact and show slight cornification of the superficial cells. The stroma is dense.

Vagina.—Length, 22 cm. Width, 6 cm. Gärtner's canals patent. The mucosa is pale pink in colour and moist.

Histological.—The epithelial layer consists mainly of 4 to 5 rows of polyhedral cells, supporting a superficial row of flattened cells. A few swollen goblet cells are present. The stroma is dense and shows slight neutrophilic and lymphocytic infiltration.

Cervix.—Length, 11 cm. Width, 4 cm. The os projects 3 cm. into the vagina and is fissured and scarred. It admits one finger. The cervix is firm and the canal patent. The mucosa is pale, yellowish pink in colour and covered with thin, slightly opaque mucus.

Histological.—The glandular epithelium is cuboid with large, oval, pale nuclei, centrally situated. The stroma is dense and avascular.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness of Wall.</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>
Body.....	2·0	5·0	1·0
Left Cornu.....	25·0	4·0	0·5
Right Cornu.....	25·0	5·0	0·5

The mucosa is bright pink in colour and covered with a fair amount of slightly opaque, fluid mucus. The cotyledons are prominent and the muscular layers normal.

Histological.—The surface and glandular epithelium is high columnar and active secretory, the glands being distended with secretion. The mucosa is moderately oedematous and congested.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	Cm.	Cm.
Left.....	27.0	0.3
Right.....	25.0	0.2

The tubes are macroscopically normal.

Histological.—The epithelium is low columnar with large, central nuclei. The surface shows a few cytoplasmic and nuclear extrusions, similar to those observed in Cow No. 7045. The stroma is slightly oedematous and the muscular coats appear normal.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	3.4	2.5	1.8	9.0
Right.....	3.0	2.5	1.5	5.0

The *left ovary* contains the corpus luteum of last ovulation (13 days previous), 2 cm. in diameter, and a mature follicle, 1.3 cm. in diameter, as well as several smaller follicles.

Histological.—The corpus luteum and larger follicles are normal, while some of the smaller follicles are atretic.

The *right ovary* contains an old corpus luteum and a number of immature follicles, the larger one being histologically normal, while smaller follicles are in the process of atresia.

Total weight of genitalia: 500 grams.

Mammary Glands.—The alveoli and ducts are well developed, and contain a small quantity of secretion.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2.2	1.0	1.0	1.6

Anterior Lobe.—Proportional cell count: Alpha cells 39.3; beta cells, 14.3; chromophobes, 46.4 per cent.

The *alpha cells* are degranulated with pycnotic nuclei and indistinct Golgi apparatus.

The *beta cells* are heavily granular with pycnotic nuclei and prominent Golgi.

The pars intermedia and nervosa are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.5	0.7	0.5	0.3

The pineal body contains a few corpora arenacea. Shows nothing unusual.

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Thyroid.—Left lobe, 4.5 × 4.5 × 1.0 cm. Right lobe, 4.5 × 4.0 × 0.7 cm. Length (including isthmus), 18 cm. Weight, 29.0 grams, Macroscopically normal.

Histological.—The epithelium lining the follicles is cuboid and contains a few fat droplets in the cytoplasm.

Thymus.—Moderately involuted, normal.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
Left.....	6.0	3.5	1.5	15.0
Right.....	4.0	3.5	2.3	14.5

A few cells in the zona fasciculata and reticularis have pyknotic nuclei and deeply staining cytoplasm, otherwise normal.

Diagnosis.

Normal.

Cow No. 7276. (FIG. 71.)

Date of birth: 15.10.1936. *Birth weight*: 76.5 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 487 days (16.0 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal.

4-5 years: Irregular, short (9 days) and long periods, up to 84 days, followed by pregnancy.

5-6 years: Calved. One period only (49 days), followed by pregnancy.

6-7 years: Calved. Two periods of 26 and 81 days.

7-8 years: Pregnant.

Age at first service: 4 years 5.3 months.

Pregnancies: (Table XXI, Appendix II).

First: 4 services, full term, 287 days gestation, normal parturition, male calf, (Fig. 71), 64 pounds.

Second: 1 service, full term, 276 days, normal parturition, retained placenta. Female calf, 75.5 pounds.

Third: 1 service, slaughtered on 239th day of pregnancy.

Clinical Observations.

Genitalia normal.

Slaughter Data.

Age when slaughtered: 7 years 10·3 months.

Live weight: 1,315 pounds.

"Dressed" weight: 740 pounds.

Percentage "dressed" weight: 56·3

Sex condition: Slaughtered on 239th day of pregnancy.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

Vulva.—Length, 11 cm. Width, 9 cm. Bartholin glands normal. Mucosa pale pink in colour, covered with a thin layer of dry tenacious mucus.

Histological.—The epithelium consists of a thin layer of compact, stratified cells. The stroma is dense.

Vagina.—Length, 24 cm. Width, 6 cm. Gärtner's canal on the right side obliterated. On the left side patent. The mucosa is pale pink in colour and covered with dry, tenacious mucus.

Histological.—The epithelial layer is narrow and consists of small polyhedral cells, supporting a superficial row of swollen goblet cells (Fig. 7). The stroma is moderately oedematous and a few lymphocytes are present.

Cervix.—Length, 20 cm. Width, 6 cm. The os is enlarged, projecting 7 cm. into the vagina, and much fissured. The caudal transverse fold is visible and the canal admits two fingers. The canal is sealed with the characteristic plug of pregnancy. The mucosa is pale pink in colour and the transverse folds are prominent.

Histological.—The epithelium is swollen, columnar with flattened, basal nuclei (Fig. 19). Some cells have receded to a cuboid shape with collapse of the cell membrane. From these cells secretion appears to have ceased. The lumina are distended with the acidophilic plug of pregnancy. The stroma is dense.

Uterus.—On account of extreme distortion due to pregnancy, no measurements of the component parts of the uterus were taken. The uterus contains a well-developed foetus in the right horn. The membranes, cotyledons and uterine wall are normal.

Histological.—The surface epithelium and that of the glands is high columnar and active secretory. The glands are distended with secretion. The stroma is oedematous and very vascular. The muscular layers are reduced in thickness but the individual fibres are enlarged.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	Cm.	Cm.
Left.....	19·0	0·3
Right.....	21·0	0·3

The tubes are macroscopically normal

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Histological.—The epithelium is low columnar (Fig. 83), with large, central nuclei. The surface is irregularly serrated with extruded cytoplasmic globules and nuclei, similar to those described in Cow No. 7045. The stroma is dense and the muscular coats are normal.

Ovaries.

	<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
Left.....	3.5	2.0	1.3	4.2
Right.....	4.0	3.0	1.5	8.0

The *left ovary* contains a number of follicles in various stages of maturity and some old corpora lutea.

Histological.—The granulosa of one of the larger follicles is undergoing caryorrhexis and pycnosis (Fig. 104), similar to that observed in the earlier stages of cystic degeneration of the follicle. The theca interna appears intact.

The *right ovary* contains the corpus luteum of pregnancy 2.7 cm. in diameter, pale orange in colour and a few immature follicles. The ovary is histologically normal.

Total weight of genitalia: About 10 Kilograms.

Mammary Glands.—The alveoli and ducts are well developed and distended with secretion containing numerous fat globules and some cellular elements.

Pituitary.

<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
2.0	1.2	1.2	1.7

Anterior Lobe.—Proportional cell count: Alpha cells, 52.0; beta cells, 12.1; chromophobes, 35.9 per cent.

Large numbers of partially degranulated *alpha cells* are present—"pregnancy cells"—as well as many heavily granular cells with pycnotic nuclei (Fig. 108).

The *beta cells* are present in all stages. Some are large and lightly granular with large delicate nuclei. Others are heavily granular with pycnotic nuclei and prominent Golgi apparatus. The remaining cells are small, degranulated with pycnotic nuclei.

The pars intermedia and nervosa are normal.

Pineal.

<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
1.5	0.4	0.4	0.2

The pineal body is normal and contains very few corpora arenacea.

Thyroid.—Left lobe, 4.0 × 4.0 × 1.0 cm. Right lobe, 5.0 × 4.0 × 1.0 cm. Length (including isthmus), 19cm. Weight, 27 grams. The Thyroid is macroscopically normal.

Histological.—The epithelium lining the follicles is flattened and contains a few fat droplets.

Thymus.—Moderately involuted.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	5·2	3·5	1·5	11·0
Right.....	4·5	3·0	2·0	9·0

A few cells in the zona fasciculata and reticularis have deeply staining cytoplasm and pycnotic nuclei.

Diagnosis.

Normal 239 days pregnancy.

Cow No. 7277. (FIG. 35.)

Date of birth: 27.10.1936. *Birth weight:* 76 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 457 days (15·0 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal.

4-5 years: At first normal, but becoming irregular at the age of 4 years 4 months, the period varying from 2 to 34 days, accompanied by prolonged duration of oestrus up to 7 days.

5-6 years: No periods, animal refuses coitus.

Age at first service: 4 years 4 months, and for two months thereafter until coitus refused.

Pregnancies: None.

Clinical Observations.

Head, neck and shoulders coarse (Fig. 35). There is a slight depression of the lumbar region of the back, elevation of the root of the tail and relaxation of the sacro-sciatic ligaments.

The vestibule is narrow and examination per vaginam is not possible. Examination per rectum reveals a small, firm cervix, an enlarged, thin-walled, flabby and fluctuating uterus and bilateral, large cystic ovaries.

Udder and teats moderately developed and yielding a small quantity of thin, watery, fluid secretion.

The cow shows a strong inclination to mount her companions and the bull, but refuses to stand for coitus.

Slaughter Data.

Age when slaughtered: 5 years 11.1 months.

Live weight: 1,445 pounds.

"Dressed" weight: 980 pounds.

Percentage "dressed" weight: 67.8.

Sex condition: Anaphrodisia.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Fig. 37.)

Vulva.—Length, 10 cm. Width, 9 cm. Bartholin glands normal. The mucosa is purplish red in colour and moist.

Histological.—The epithelial layer is wide and the cells are swollen. There is distinct cornification of the superficial squamous cells. The epithelium and stroma are infiltrated with lymphocytes and neutrophils. The stroma is congested and oedematous.

Vagina.—Length, 27 cm. Width, 5.5 cm. Gärtner's canals patent. The mucosa is bright pink in colour and covered with thin, clear mucus, becoming profuse towards the fornix (Fig. 37).

Histological.—The epithelium consists of 5 to 6 rows of polyhedral cells with a superficial layer of flattened cells, abruptly alternating with single rows of swollen goblet cells (Fig. 9). The mucosa shows fairly intense lymphocytic and neutrophilic infiltration, while the stroma is oedematous and moderately congested.

Cervix.—Length, 7.5 cm. Width, 3.5 cm. The os is small, barely projecting into the vagina, and admits the passage of a thin probe only. The cervix is firm and the canal patent. The mucosa is pale brownish pink in colour and covered with thin, clear mucus. Towards the uterine end there are four thin-walled cysts in the mucosa, 4 to 8 cm. in diameter, similar to those described in Cow No. 6363. The transverse folds are indistinct.

Histological.—The epithelium is high columnar and swollen with small, basal nuclei. There is mucus present in the lumina and the stroma is moderately oedematous and congested.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>of Wall.</i>
			<i>Cm.</i>
Body.....	5.0	9.5	0.3
Left Cornu.....	73.0	9.0	0.15
Right Cornu.....	56.0	9.5	0.2

The uterus contains about 2,000 cubic centimetres of slightly opaque, straw-coloured, watery fluid. The walls are thin and semi-transparent. After draining off the fluid the walls are flabby and wrinkled. Large numbers of minute cysts,

up to 0.3 cm. in diameter, are present in the mucosa, giving the surface a granular appearance. Cotyledons are not visible and the process of atrophy involves all layers of the uterine wall (Fig. 31).

Histological.—The surface and glandular epithelium is low columnar and in a state of moderate secretory activity. The stroma is oedematous and the muscle fibres are much reduced in size and numbers.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	Cm.	Cm.
Left.....	20.0	0.2
Right.....	18.0	0.2

The tubes are macroscopically normal.

Histological.—The epithelium is high columnar and shows similar basal vacuolation as observed in that of Cow No. 6363. The stroma is moderately oedematous and the muscular coats appear normal.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	3.8	3.4	2.5	13.5
Right.....	4.0	3.0	2.2	14.8

The *left ovary* contains two cysts, 1.7 and 2.0 cm. respectively in diameter, and a number of immature follicles up to 0.9 cm. in diameter.

Histological.—The walls of the large cysts are completely fibrous, the granulosa and theca interna being absent. The follicles show various stages of degeneration of the granulosa and theca interna and can no longer be regarded as normal.

The *right ovary* contains 3 cysts, 2.0, 2.0 and 2.2 cm. respectively in diameter, and a number of immature follicles.

Histological.—The wall of one cyst is completely fibrous while that of the other two still shows traces of degenerate granulosa and theca interna cells. The follicles are similar to those in the left ovary.

Luteal tissue is absent in both ovaries.

Total weight of genitalia: 384 grams.

Mammary Glands.—The alveoli and ducts are moderately developed and the epithelial cells are swollen. There is a small quantity of secretion present, which is partially solidified.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2.5	1.5	1.1	2.5

Anterior Lobe.—Proportional cell count: Alpha cells, 46.4; beta cells, 2.3; chromophobes 51.3 per cent.

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The *alpha cells* are large, heavily granular, many with pycnotic and prominent Golgi apparatus (Fig. 111).

The *beta cells* vary from lightly granular to heavily granular, with prominent Golgi and many with pycnotic nuclei. The *pars intermedia* and *nervosa* are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.2	0.7	0.7	0.3

The pineal body is normal and contains a fair number of corpora arenacea.

Thyroid.—Left lobe, 5.0 × 3.8 × 1.0 cm. Right lobe, 5.0 × 3.5 × 0.9 cm. Length (including isthmus), 23 cm. Weight, 24.5 grams. Macroscopically normal.

Histological.—The follicles are small and lined with swollen, columnar epithelium, containing fat globules and brown pigment granules in the cytoplasm. There are desquamated epithelial cells present in the colloid.

Thymus.—Involution fairly advanced.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	5.5	3.8	1.3	12.2
Right.....	3.2	4.5	2.0	12.0

A few cells in the *zona fasciculata* and *reticularis* have pycnotic nuclei, otherwise normal.

Diagnosis.

Retention cysts in the cervical mucosa, which are of no consequence. Hydrometra with cystic degeneration of the endometrium and atrophy of the entire uterine wall. Small and large follicular cysts in both ovaries, associated with nymphomania and later with anaphrodisia.

Cow No. 7346. (FIG. 52).

Date of birth: 30.1.1937. *Birth weight:* 66 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 453 days (15.0 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal.

4-5 years: Normal.

5-6 years: Three normal periods at first, thereafter coitus refused.

Age at first service: 4 years 1 month, and regularly thereafter at every oestrus shown for a period of 13 months—total of 18 services. After this the cow refuses to stand for service.

Pregnancies: None.

Clinical Observations.

Head coarse and bull-like. There is a slight depression of the back in the lumbar region, slight elevation of the root of the tail and relaxation of the sacro-sciatic ligaments (Fig. 52). The cow mounts her companions and the bull but refuses to stand for service. The voice is deep and bull-like.

The vestibule is narrow and examination per vaginam is not possible. Examination per rectum reveals a normal cervix. The uterus is normal in size, doughy in consistence and atonic. Both ovaries are large and cystic. A cyst in the left ovary ruptures on slight manipulation, leaving the gonad small and atrophic. The tubes are not palpable.

The udder and teats are moderately developed and yield a small quantity of milk-like secretion.

Slaughter Data.

Age when slaughtered: 5 years 10·1 months.

Live weight: 1,578 pounds.

“Dressed” weight: 975 pounds.

Percentage “dressed” weight: 61·8.

Sex condition: Anaphrodisia.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Figs. 24, 25 and 53.)

Vulva.—Length, 11 cm. Width, 8 cm. Bartholin glands normal. Mucosa purplish red in colour and moist.

Histological.—The epithelial layer is wide, the cells are swollen and show slight cornification of the superficial squamous layer. The mucosa is fairly heavily infiltrated with leucocytic cells and the stroma is oedematous and congested.

Vagina.—Length, 22 cm. Width, 5 cm. Gärtner's canals are patent. There is a median fibrous band stretching from the floor of the vagina to its roof (Fig. 25), immediately cranial to the meatus urinarius, similar to that observed in Cow No. 6358. The mucosa is bright pink in colour and covered with a layer of thin, clear mucus, becoming profuse towards the fornix (Fig. 53).

Histological.—The epithelium consists of 4 to 5 rows of polyhedral cells with a superficial row of swollen, columnar cells, alternating abruptly with single rows of mucus secreting goblet cells. The stroma is moderately oedematous and congested and shows moderate lymphocytic infiltration.

Cervix.—Length, 8·5 cm. Width, 5·0 cm. The cervix is flattened dorso-ventrally and shows two small ostia externa, both admitting one finger (Fig. 53). The double canals are patent and are divided by a median fibrous wall, 1·5 cm. thick (Fig. 24). The mucosa is pale pink and covered with slightly turbid mucus.

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Histological.—The epithelium is swollen, columnar, with small, basal nuclei. The stroma is moderately oedematous and congested.

Uterus.

	<i>Length.</i> Cm.	<i>Width.</i> Cm.	<i>Thickness of Wall.</i> Cm.
Body.....	(pars indivisa	is absent.)	
Left Cornu.....	22·0	4·0	0·5
Right Cornu.....	23·0	4·0	0·3

The division of the cervix extends forward to the bifurcation of the cornua, thereby dividing the uterus and cervix into two completely separate tubes, each horn communicating only with the cervical canal on its own side (Fig. 24). The right horn contains a fair quantity of slightly opaque, tenacious mucus while the left horn is normally moist. The mucosa is pale pink in colour and contains a number of cysts, up to 2 cm. in diameter. The cotyledons are barely visible. The muscular layers appear normal.

Histological.—The surface and glandular epithelium is low columnar and non-secretory. The mucosa is atrophic and the stroma moderately oedematous and congested.

Fallopian Tubes.

	<i>Length.</i> Cm.	<i>Width.</i> Cm.
Left.....	20·0	0·2
Right.....	20·0	0·2

The tubes are macroscopically normal.

Histological.—The epithelium is high columnar with small, basal nuclei and scant ciliation. The stroma is slightly oedematous and the muscular coats appear normal.

Ovaries.

	<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
Left.....	3·0	2·0	1·3	3·7
Right.....	5·5	4·0	2·8	32·0

The *left ovary* contains a number of immature follicles, up to 0·5 cm. in diameter. Large cysts and luteal tissue are absent.

Histological.—The small follicles all show degenerative changes and can no longer be regarded as normal. Some show lipid granules in the granulosa and theca interna.

The *right ovary* contains two large cysts, 4·0 and 2·5 cm. respectively in diameter, and several immature follicles up to 0·5 cm. in diameter.

Histological.—The one cyst has a fibrous wall with a thin lining of degenerate theca interna cells, the granulosa having disappeared. The other cyst consists of thin layers of degenerate granulosa and theca interna within a fibrous capsule. Minute lipid granules are observed among the granulosa and theca interna cells.

The immature follicles show similar degenerative changes to those in the left ovary. One of these shows an ovum enclosed in a degenerate cumulus oophorus (Fig. 90). Remnants of a very old corpus luteum are present.

Total weight of genitalia: 300 grams.

Mammary Glands.—The alveoli and ducts are well developed and distended with secretion containing many fat globules.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2.0	1.6	1.5	2.5

Anterior Lobe.—Proportional cell count: Alpha cells, 55.3; beta cells, 6.6; chromophobes, 38.1 per cent.

The *alpha cells* are large, heavily granular, with large, delicate nuclei and prominent Golgi apparatus.

The *beta cells* are light to heavily granular with large, delicate nuclei and prominent Golgi.

The pars intermedia and nervosa are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2.0	0.6	0.6	0.3

The pineal body is normal and contains a large number of corpora arenacea.

Thyroid.—Left lobe, 6.0 × 4.0 × 0.6 cm. Right lobe, 5.0 × 4.5 × 0.5 cm. Length (including isthmus), 24 cm. Weight, 27.0 grams. Macroscopically normal.

Histological.—The epithelium lining the follicles is columnar, swollen and the cytoplasm is laden with fat droplets and brown pigment granules. The colloid contains desquamated epithelial cells.

Thymus.—Advanced involution.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	6.0	3.7	1.5	16.0
Right.....	5.5	3.5	2.3	16.0

Many cells in the zona fasciculata and reticularis have pycnotic nuclei and deeply staining cytoplasm. There are lipoid granules present in the cytoplasm of the zona glomerulosa and fasciculata cells.

Diagnosis.

Persistence of the median walls of the Müllerian ducts in the form of a median fibrous band stretching across the vagina and completely bipartite cervix and uterus. Cystic degeneration and atrophy of the endometrium. Atrophy of the left ovary. Large follicular cystic right ovary associated with nymphomania at first and later with anaphrodisia.

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Cow No. 7355. (FIG. 55.)

Date of birth: 27.2.1937. *Birth weight:* 51 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 478 days (15·8 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: At first normal; towards the end of the third year, four short periods in succession (4 to 16 days) occur, accompanied by prolonged duration of oestrus (5 days).

3-4 years: Irregular short periods (3 to 14 days), interrupted by normal and long periods (30 to 60 days) with prolonged duration of oestrus up to 7 days.

4-5 years: One long period of 237 days.

5-6 years: No periods—animal refuses coitus.

Age at first service: 4 years 3·5 months. No further services given—animal refuses coitus.

Pregnancies: None.

Clinical Observations.

Deep, bull-like voice, depression of the back in the lumbar region, elevation of the root of the tail and relaxation of the sacro-sciatic ligaments (Fig 55). The animal mounts her companions and the bull but refuses to stand for service.

Examination per rectum reveals a small, firm cervix and infantile atonic uterus. Both ovaries are enlarged and cystic. The tubes are apparently normal.

The udder and teats are moderately developed and yield a small quantity of thick, creamy yellow, flocculent secretion.

Slaughter Data.

Age when slaughtered: 5 years 7·1 months.

Live weight: 1,310 pounds.

“Dressed” weight: 750 pounds.

Percentage “dressed” weight: 57·3.

Sex condition: Anaphrodisia.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Fig. 54.)

Vulva.—Length, 13 cm. Width, 10 cm. Bartholin glands, normal. Mucosa purplish pink in colour and moist.

Histological.—The epithelial layer is thick and the cells large. The stroma is oedematous and congested and is moderately infiltrated with leucocytic cells.

Vagina.—Length, 21 cm. Width, 9 cm. Gärtner's canals patent. About midway between the cervical and vulvar extremity, on the right hand side of the floor of the vagina there is a shallow diverticulum (Fig. 54), 6 cm. in diameter covered with a loose grey pseudomembrane, which, when scraped away, reveals a bright red, swollen surface. In the centre of the diverticulum there is a raised, white papilla, 1 cm. in diameter, which is hard and almost cartilaginous in consistence. The vaginal mucosa is bright pink in colour and covered with a thin layer of slightly opaque mucus.

Histological.—The diverticulum is devoid of epithelial lining and the surface is covered with fibrinous inflammatory exudate, forming the pseudo membrane. The papilla consists of fibroblastic tissue showing inflammatory changes.

The epithelial layer of the vaginal mucosa consists of six to ten rows of large polyhedral cells, supporting a superficial row of swollen goblet cells. The mucosa is infiltrated with leucocytes and the stroma is oedematous and congested.

Cervix.—Length, 9 cm. Width, 3·5 cm. The os is small and projects slightly into the vagina. It allows the passage of a thin probe only. The cervix is firm, the canal is patent and the transverse folds are indistinct. The mucosa of the cranial half of the canal contains a number of thin-walled, semi-transparent cysts, from 2 to 4 cm. in diameter, extending some distance into the fibrous wall of the cervix. The largest one has completely penetrated the wall of the cervix and plainly visible on its dorsal surface (Fig. 54.) as a semi-transparent, rounded, elevation. The mucosa is pale pink and covered with thin mucus.

Histological.—The cysts resemble those observed in Cow No. 6363. The mucosal epithelium is columnar, swollen, with small, basally-situated nuclei. The stroma is moderately oedematous and congested.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>of Wall.</i>
			<i>Cm.</i>
Body.....	2·5	3·0	1·0
Left Cornu.....	24·0	2·3	0·4
Right Cornu.....	24·0	1·7	0·6

The mucosa is pale brown in colour and somewhat swollen. It is covered with slightly opaque, fluid mucus. A number of cysts, up to 2 cm. in diameter, are present in the mucosa of both horns, the larger one penetrating the muscular coats and visible on the serosal surface as rounded, semi-transparent elevations (Fig. 54). The lumina of the cornua are completely occluded by these cysts. Cotyledons are not visible in the mucosa.

Histological.—The surface and glandular epithelium is low columnar and secretory non-active. The cysts are lined with cuboid to flattened epithelium. The process of atrophy involves all the layers of the uterine wall, including the muscularis.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	<i>Cm.</i>	<i>Cm.</i>
Left.....	24	0·3
Right.....	20	0·3

The tubes are macroscopically normal.

Histological.—The epithelium is tall, columnar, with basal cytoplasmic vacuoles forcing the nuclei towards the centre of the cells, similar to that observed in Cow No. 6363. Ciliation is scant. The stroma is slightly oedematous and the muscular coats appear normal.

Ovaries.

	<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
Left.....	4.8	3.6	3.0	23.0
Right.....	4.0	4.0	2.8	18.6

The *left ovary* contains three cysts, 3.5, 1.5 and 1.4 cm. in diameter, and a number of immature follicles up to 0.7 cm. in diameter. Luteal tissue is absent.

Histological.—One cyst has a completely fibrous wall, while the other two show traces of degenerate granulosa and theca interna cells. The small follicles are normal while the larger ones show varying degrees of degeneration.

The *right ovary* contains four cysts, 2.3, 2.5, 1.8 and 1.4 cm. in diameter, and a number of immature follicles. Luteal tissue is absent.

Histological.—The cysts show various stages of degeneration, up to complete fibrosis of the wall with disappearance of the granulosa and theca interna. One of the cysts shows pycnosis of the granulosa and vascularisation of the theca interna (Fig. 91). The follicles show degenerative changes similar to those in the left ovary.

Total weight of genitalia: 226 grams.

Mammary Glands.—The alveoli and ducts are well developed and the epithelial cells are swollen. Secretion containing fat globules is present.

Pituitary.

<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
2.3	1.2	0.9	2.0

Anterior Lobe.—Proportional cell count: Alpha cells, 55.5; beta cells, 2.7; chromophobes, 41.8 per cent.

The *alpha cells* are large, heavily granular, with prominent, hypertrophic Golgi apparatus. Large, delicate nuclei and pycnotic nuclei are present in about equal proportion.

The *beta cells* are lightly granular, with large, delicate nuclei and prominent Golgi apparatus. The *pars intermedia* and posterior are normal.

Pineal.

<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
1.4	0.7	0.5	0.4

Contains a fair number of corpora arenacea and the structure shows nothing unusual.

Thyroid.—Left lobe, 5.5 × 4.0 × 1.0 cm. Right lobe, 5.0 × 4.0 × 0.9 cm. Length (including isthmus), 23.0 cm. Weight, 29.0 grams. Macroscopically normal.

Histological.—The follicular epithelium is cuboid to low columnar and contains fat droplets and brown pigment granules in the cytoplasm. Desquamated epithelial cells are present in the colloid.

Thymus.—Involution advanced.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	5·8	3·9	1·3	19·5
Right.....	4·8	4·0	2·5	18·6

Many cells in the zona fasciculata and reticularis have pycnotic nuclei and deeply staining cytoplasm.

Diagnosis.

Vaginal fibroma, which is of no consequence. Retention cysts in cervical mucosa. Infantile uterus with endometrial cystic degeneration and atrophy of all layers of the uterine wall. Bilateral large follicular ovarian cysts, associated at first with nymphomania and later with anaphrodisia.

Cow No. 7378. (FIG. 72.)

Date of birth: 3.4.1937. *Birth weight:* 65·5 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 550 days (18·1 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal.

4-5 years: One long period (57 days) and one short period (5 days), otherwise normal, pregnant.

5-6 years: No periods, calved, served, pregnant.

6-7 years: Normal, calved, served, pregnant.

7-8 years: No periods, pregnant, calved.

Age at first service: 4 years 0·4 months.

Pregnancies: (Table XXI, Appendix II).

First: 5 services, full term, 283 days, normal parturition, male calf, 77 pounds (Fig. 72).

Second: One service, full term, 280 days, normal parturition, male calf, 92·5 pounds.

Third: 1 service, full term, 283 days, normal parturition, female calf, 77·5 pounds.

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Clinical Observations.

Genitalia and sexual behaviour normal.

Slaughter Data.

Age when slaughtered: 7 years 4·5 months.

Live weight: 1,287 pounds.

“Dressed” weight: 720 pounds.

Percentage “dressed” weight: 55·9.

Sex condition: Slaughtered 71 days after final parturition and 12 days after the commencement of oestrus.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

Vulva.—Length, 12 cm. Width, 10 cm. Bartholin glands normal. Mucosa pale pink in colour and moist.

Histological.—The epithelial layer is narrow and the cells compact, with slight cornification of the superficial squamous cells. The stroma is dense.

Vagina.—Length, 28 cm. Width, 5 cm. Gärtner’s canals patent. The mucosa is pale pink in colour and moist.

Histological.—The epithelial layer is thin and consists of 2 to 3 rows of small polyhedral cells, with a superficial row of small, non-active, goblet cells. A few lymphocytes are present in the stroma, which is dense and avascular.

Cervix.—Length, 14 cm. Width, 5 cm. The os projects 5 cm. into the vagina and is large and fissured. It admits one finger with ease. The cervix is firm and the canal is patent. The mucosa is pale yellowish brown and covered with a thin layer of dry, tenacious mucus.

Histological.—The glandular epithelium is low columnar with large, pale, oval, central nuclei (Fig. 15). The stroma is dense and avascular and lymphocytes are present in fair numbers.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>of Wall.</i>
			<i>Cm.</i>
Body.....	2·5	4·0	1·0
Left Cornu.....	25·0	4·0	1·0
Right Cornu.....	28·0	4·0	1·0

The mucosa is dark reddish brown in colour and somewhat swollen. The cotyledons are prominent, and the muscular coats are normal in appearance.

Histological.—The surface and glandular epithelium is tall, columnar and shows secretory activity. The stroma is moderately oedematous and congested.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	Cm.	Cm.
Left.....	23·0	0·2
Right.....	22·0	0·3

The tubes are macroscopically normal.

Histological.—The epithelium is low columnar, with large, central nuclei and profuse ciliation (Fig. 79). The stroma and muscular coats show nothing unusual.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	4·0	3·0	2·0	11·0
Right.....	3·5	2·5	1·8	9·0

The *left ovary* contains a pale yellow corpus luteum of last ovulation (12 days previous), 2·5 cm. in diameter, and a number of follicles in various stages of maturity as well as traces of old corpora lutea.

The *right ovary* contains a mature follicle, 1·1 cm. in diameter, as well as several smaller follicles and traces of old corpora lutea.

Histological.—Nothing abnormal in either ovary.

Total weight of genitalia: 820 grams.

Mammary Glands.—At the time of slaughter the animal was in full lactation and the alveoli and ducts are highly developed and distended with secretion. The proportionate amount of stroma present is small.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2·5	1·2	1·2	2·2

Anterior Lobe.—Proportional cell count: Alpha cells, 35·1; beta cells, 15·6; chromophobes, 49·3 per cent.

The *alpha cells* are partially degranulated with pycnotic nuclei and indistinct Golgi apparatus. (Fig 113).

The *beta cells* show moderately heavy granulation, large, delicate nuclei and prominent Golgi. The *pars intermedia* and *posterior* are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1·3	0·5	0·4	0·2

Histologically normal.—Contains a large number of corpora arenacea.

Thyroid.—Left lobe, 6·0 × 4·0 × 1·0 cm. Right lobe, 6·0 × 5·0 × 1·0 cm. Length (including isthmus), 20 cm. Weight, 32 grams.

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The follicles are large and the lining epithelium is cuboid to flattened with a few fat droplets and brown pigment granules in the cytoplasm.

Thymus.—Advanced involution.

Pancreas: Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	6·0	3·0	1·5	13·0
Right.....	4·5	3·0	1·8	11·0

The cytoplasm of the cells in the zona glomerulosa and fasciculata contains a fair number of lipid granules.

Diagnosis.

Normal.

Cow No. 7385. (FIG. 44.)

Date of birth: 17.4.1937. *Birth weight*: 63·5 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 609 days (20·0 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal, up to the age of 3 years 7 months. Thereafter the periods become very short and irregular (2-15 days), accompanied by prolonged duration of oestrus, up to 17 days.

4-5 years: short periods (8-18 days) followed by a long period of anoestrus of 333 days.

5-6 years: Two long periods of anoestrus (95 and 134 days) followed by three short cycles of 13, 5 and 7 days, respectively, and pregnancy.

Age at first service: 4 years 0·7 months, and thereafter at every oestrus.

Pregnancies: (Table XXI, Appendix II).

One only: 8 services, slaughtered on 26th day of pregnancy.

Clinical Observations.

From the age of 3 years 7 months to 4 years 1 month the animal suffered from nymphomania associated with bilateral large cystic ovaries. This was followed by a period of sexual quiescence of 18 months duration, during which time the ovaries were small and static. At 5 years 7 months oestrus was again exhibited at short intervals and this was followed by pregnancy. The uterus remained infantile and atonic throughout.

Slaughter Data.

Age when slaughtered: 5 years 9·2 months.

Live weight: 1,360 pounds.

"Dressed" weight: 810 pounds.

Percentage "dressed" weight: 59·6.

Sex condition: 26 days pregnant.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Fig. 46.)

Vulva.—Length, 12 cm. Width, 9 cm. Bartholin glands normal. Mucosa purplish pink in colour and moist.

Histological.—The epithelial layer is fairly wide and cornification of the superficial cells is absent. The stroma is slightly oedematous and congested and moderately infiltrated with leucocytes.

Vagina.—Length, 22 cm. Width, 4·5 cm. Gärtner's canals patent. There is a median fibrous band stretching from the floor of the vagina to its roof, immediately in front of the meatus urinarius (Fig. 46), identical to that described in Cow No. 6358.

The mucosa is bright pink in colour, becoming purplish pink towards the fornix and covered with a thin layer of clear mucus.

Histological.—The epithelium consists of 4 to 5 rows of large, well-defined polyhedral cells (Fig. 5) with a superficial row of flattened cells. Goblet cells are absent. The stroma is dense and slightly congested with moderate leucocytic infiltration.

Cervix.—Length, 8·5 cm. Width, 3·0 cm. The os is small, projects 2 cm. into the vagina and admits a thin probe only. The cervix is firm, the canal patent and contains some dry, tenacious mucus; this is the commencement of formation of the plug of pregnancy. The mucosa is pale pink in colour.

Histological.—The glandular epithelium is high columnar with small, basally situated nuclei (Fig. 17). The lumen shows traces of mucus, which represents the early formation of the cervical plug of pregnancy. The stroma is moderately congested and oedematous.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness of Wall.</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>
Body.....	3·0	4·0	0·8
Left Cornu.....	20·0	3·0	0·7
Right Cornu.....	20·0	3·5	0·8

The right horn, near the bifurcation, contains a small embryo (26 days), 1·1 cm. in length, with its membranes extending in either direction for some distance into both horns. The mucosa is pale brownish pink in colour, somewhat swollen and covered with slightly opaque fluid mucus. Near the apex of each horn there are a few cysts, up to 0·8 cm. in diameter, thin-walled and semi-

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transparent, present in the mucosa. The cotyledons are almost invisible and there is no indication of attachment of the embryonal membranes. The muscular coats appear normal.

Histological.—The surface and glandular epithelium is high columnar and shows secretory activity. The mucosa is much reduced in width and the stroma is oedematous and congested.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	Cm.	Cm.
Left.....	23·0	0·2
Right.....	25·0	0·2

The tubes are macroscopically normal.

Histological.—The epithelium is low columnar with large, central nuclei (Fig. 81), and shows very marked cytoplasmic and nuclear extrusions, as observed in Cow No. 7189. The stroma and muscular coats show nothing unusual.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	3·0	2·0	1·8	4·5
Right.....	3·3	2·4	2·0	8·0

The *left ovary* contains a mature follicle, 1·2 cm. in diameter, several smaller follicles and two old corpora lutea.

The *right ovary* contains the corpus luteum of pregnancy, 2·5 cm. in diameter and several follicles up to 0·5 cm. in diameter.

Histological.—Both ovaries normal.

Total weight of genitalia: 275 grams.

Mammary Glands.—The alveoli and ducts are poorly developed and non-secretory. The glandular tissue forms small, isolated lobules in the extensive connective tissue stroma.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2·3	1·2	1·1	2·0

Anterior Lobe.—Proportional cell count: Alpha cells, 41·6; beta cells, 12·2; chromophobes, 46·2 per cent.

The *alpha cells* are partially degranulated, the majority having pycnotic nuclei—the “pregnancy” cells.

Beta cells in all stages are present; lightly to heavily granular cells with large, delicate nuclei and prominent Golgi apparatus, while the majority are small, degranulated, and with pycnotic nuclei.

The pars intermedia and posterior are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.4	0.7	0.6	0.3

The pineal body shows nothing abnormal and contains large numbers of corpora arenacea.

Thyroid.—Left lobe, $5.5 \times 4.0 \times 1.1$ cm. Right lobe, $5.0 \times 4.0 \times 1.0$ cm. Length (including isthmus), 20 cm. Weight, 23.0 grams. The gland is macroscopically normal.

Histological.—The follicles are large and lined with cuboid epithelium, containing a few fat globules and brownish pigment granules.

Thymus.—Involution advanced.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	6.0	3.8	1.8	15.0
Right.....	5.0	3.7	2.4	15.0

Many cells show deeply staining cytoplasm and pycnotic nuclei.

Diagnosis.

Persistence of the median walls of the Müllerian ducts in the form of a median fibrous band stretching across the entrance of the vaginal passage. This is of no consequence. Nymphomania, associated with ovarian follicular cysts, occurred but was followed by spontaneous recovery, a period of sexual quiescence and pregnancy. Infantile uterus with cystic degeneration and atrophy of the endometrium including the cotyledons

Cow No. 7401. (FIG. 71.)

Date of Birth: 4.6.1937. *Birth weight:* 48.5 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 478 days (15.7 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal.

4-5 years: One short period (15 days), otherwise normal.

5-6 years: Normal.

6-7 years: Normal.

7-8 years: One long period (80 days), otherwise normal.

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Age at first service: 4 years 0·6 months.

Pregnancies: (Table XXI, Appendix II).

First: 4 services, abortion after 94 days gestation, foetus and membranes fresh.

Second: Seven services, abortion after 80 days gestation, foetus and membranes macerated.

Third: 3 services, full term, 278 days, normal parturition, female calf, 49 pounds.

Clinical Observations.

Subsequent to final parturition eight services were given but no further conception followed.

The genitalia were clinically normal.

With the second abortion the foetus and membranes were partially disintegrated and the membranes showed no evidence of implantation and formation of cotyledons. The foetus was greyish green in colour, 8·5 cm. in length, and the skin was easily detached. The cow showed a small quantity of clear, fluid discharge from the vulva. Similar changes were noted with the first abortion although in this case the foetus and membranes were intact and showed no disintegration.

The period of anoestrus of 80 days, which was observed at the end of the 7th and beginning of the 8th year (see above), was possibly due to pregnancy terminating in unobserved abortion.

Slaughter Data.

Age when slaughtered: 7 years 2·9 months.

Live weight: 1,393 pounds.

"Dressed" weight: 790 pounds.

Percentage "dressed" weight: 56·7.

Sex condition: Slaughtered 10 days after the commencement of oestrus.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

Vulva.—Length, 10 cm. Width, 10 cm. Bartholin glands normal. Mucosa pale pink in colour and moist.

Histological.—The epithelial layer is moderately wide and the superficial cells show slight cornification. The stroma is dense.

Vagina.—Length, 25 cm. Width, 10 cm. Gärtner's canals patent. The mucosa is pale pink in colour and moist.

Histological.—The epithelial layer consists of 3-4 rows of small polyhedral cells with a few small, inactive goblet cells on the surface. There is intense lymphocytic infiltration of the mucosa and the stroma is dense and avascular.

Cervix.—Length, 10 cm. Width, 3·5 cm. The os projects 3 cm. into the vagina, is fissured and admits the passage of a thin probe only. The cervix is firm, the canal patent and the mucosa is pale, brownish yellow in colour and covered with dry, tenacious mucus.

Histological.—The epithelium is cuboid to low columnar and the oval nuclei are centrally situated. In some parts the lumina contain stringy mucus. The stroma is dense and avascular.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness of Wall.</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>
Body.....	2·0	3·5	0·8
Left Cornu.....	22·0	3·5	0·8
Right Cornu.....	19·0	3·0	0·8

The mucosa is dark brownish pink in colour, swollen and moist. The cytotyledons are prominent and the muscular layers are normal.

Histological.—The surface and glandular epithelium is high columnar and shows active secretion. The stroma is oedematous and congested.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	<i>Cm.</i>	<i>Cm.</i>
Left.....	23·0	0·3
Right.....	20·0	0·25

The tubes are macroscopically normal.

Histological.—The epithelium is low columnar, ciliated with large, central nuclei. There are a few cytoplasmic and nuclear extrusions present, similar to those observed in Cow No. 7045. The stroma and muscular coats show nothing unusual.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>	<i>Gm.</i>
Left.....	3·0	1·8	1·3	3·8
Right.....	4·5	2·3	1·8	9·6

The *left ovary* contains a few old corpora lutea and immature follicles.

The *right ovary* contains the corpus luteum of last ovulation (10 days previous), a follicle of 1·3 cm. in diameter, as well as several smaller follicles and old corpora lutea.

Histological.—Both ovaries normal.

Total weight of genitalia: 420 grams.

Mammary Glands.—Alveoli and ducts well developed, but non-secretory.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>	<i>Gm.</i>
2·0	1·2	0·9	1·4

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Anterior Lobe.—Proportional cell count: Alpha cells, 55·6; beta cells, 11·5, chromophobes, 32·9 per cent.

The *alpha cells* are partially degranulated, with pycnotic nuclei and indistinct Golgi apparatus.

The *beta cells* show moderately heavy granulation, large delicate nuclei and prominent Golgi apparatus.

The pars intermedia and nervosa are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1·5	0·5	0·5	0·25

The pineal body shows nothing unusual and contains a large number of corpora arenacea.

Thyroid.—Left lobe, 5·0 × 3·0 × 1·0 cm. Right lobe, 4·5 × 2·5 × 1·0 cm. Length (including isthmus), 19·0 cm. Weight, 21·0 grams. Macroscopically normal.

Histological.—The follicles are lined with flattened epithelium, the cytoplasm of which contains a few brown pigment granules and fat globules.

Thymus.—Involution fairly advanced.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	5·0	4·0	1·3	11·0
Right.....	5·0	3·5	2·0	13·5

The adrenals are macroscopically normal.

Histological.—The cells of the zona glomerulosa and fasciculata show slight lipid granulation.

Diagnosis.

Normal.

Cow No. 7496. (Fig. 43.)

Date of birth: 24.10.1937. *Birth weight:* 54 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 528 days (17·4 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Two short periods (14 and 7 days) towards the end of the fourth year, otherwise normal.

4-5 years: One long period of 37 days (double cycle?), otherwise normal.

5-6 years: Normal.

Age at first service: 4 years 0·2 months. Served thereafter regularly at every oestrus for a period of 14 months, up to the time of slaughter. Total services 21.

Pregnancies: None.

Clinical Observations.

Examination per rectum reveals a small cervix, firm, infantile uterus, normal ovaries and tubes. Vestibule narrow and examination per vaginam not possible.

The udder is moderately developed, the teats are small and yield a small quantity of watery fluid.

Slaughter Data.

Age when slaughtered: 5 years 1·8 months.

Live weight: 1,450 pounds.

"Dressed" weight: 920 pounds.

Percentage "dressed" weight: 63·4.

Sex condition: Slaughtered 10 days after the commencement of oestrus.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Fig. 45.)

Vulva.—Length, 11 cm. Width, 7 cm. Bartholin glands normal. Mucosa pale pink in colour and moist.

Histological.—The epithelial layer is moderately wide with slight cornification of the superficial cells. The stroma is dense.

Vagina.—Length, 21 cm. Width, 4·5 cm. Gärtner's canals patent. The mucosa is pale pink in colour and moist.

Histological.—The epithelial layer consists of 3 to 4 rows of polyhedral cells with a superficial row of flattened cells. Goblet cells are absent. The mucosa shows intense lymphocytic infiltration and the presence of a few neutrophils. The stroma is dense and avascular.

Cervix.—Length, 8·5 cm. Width, 3·5 cm. The cervix is somewhat soft in consistence. The os projects 2 cm. into the vagina and the canal allows the passage of a thin probe only. The mucosa is pale yellow in colour and covered with dry, tenacious mucus.

Histological.—The glandular epithelium is cuboid with central nuclei (Fig. 14). The lumina contain a small amount of stringy mucus. The stroma is dense.

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Uterus.

	<i>Length.</i> Cm.	<i>Width.</i> Cm.	<i>Thickness of Wall.</i> Cm.
Body.....	2·0	5·0	0·8
Left Cornu.....	18·0	3·5	0·6
Right Cornu.....	19·0	3·5	0·6

The mucosa is greyish pink in colour, smooth and covered with a fair quantity of slightly opaque mucus. A few cysts up to 6 mm. in diameter are present. Traces only of the cotyledons are visible.

Histological.—The surface and glandular epithelium is high columnar and shows secretory activity. The stroma is oedematous and congested. The muscularis is fairly developed, while the mucosa and cotyledons are atrophic.

Fallopian Tubes.

	<i>Length.</i> Cm.	<i>Width.</i> Cm.
Left.....	25·0	0·2
Right.....	27·0	0·2

The tubes are macroscopically normal.

Histological.—The epithelium is low columnar, ciliated, with large, central nuclei (Fig 78). The epithelial surface shows fair numbers of cytoplasmic and nuclear extrusions as observed in Cow No. 7045. The stroma and muscular coats are normal.

Ovaries.

	<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
Left.....	2·8	2·0	1·5	5·5
Right.....	4·0	2·6	1·5	8·0

The *left ovary* contains a mature follicle, 1·3 cm. in diameter, several smaller follicles and old corpora lutea.

The *right ovary* contains the corpus luteum of last ovulation (10 days previous), 2 cm. in diameter, as well as several small immature follicles and old corpora lutea.

Histological.—Both ovaries are normal.

Total weight of genitalia: 230 grams.

Mammary Glands.—The alveoli and ducts are poorly developed and contain a small quantity of secretion.

Pituitary.

<i>Length.</i> Cm.	<i>Breadth.</i> Cm.	<i>Width.</i> Cm.	<i>Weight.</i> Gm.
2·0	1·3	1·0	1·5

Anterior Lobe.—Proportional cell count: Alpha cells, 46·3; beta cells, 10·2; chromophobes, 43·5 per cent.

The *alpha cells* are partially degranulated, with pycnotic nuclei and indistinct Golgi apparatus.

The *beta cells* show moderately heavy granulation, large delicate nuclei and prominent Golgi.

The *pars intermedia* and *nervosa* are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.6	0.6	0.6	0.3

The pineal body is normal and contains a large number of corpora arenacea.

Thyroid.—Left lobe, 5.0 × 4.0 × 0.8 cm. Right lobe, 5.0 × 3.5 × 0.6 cm. Length (including isthmus), 24 cm. Weight, 28.0 grams. Macroscopically normal.

Histological.—The follicles are lined with cuboid to low columnar epithelium, the cytoplasm of which contains a few fat droplets and brown pigment granules.

Thymus.—Involution moderately advanced.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	5.5	4.3	1.1	11.0
Right.....	5.0	3.0	2.0	10.0

Many cells in the *zona fasciculata* and *reticularis* have deeply staining cytoplasm and pycnotic nuclei. The cells in the *zona fasciculata* show slight lipid granulation.

Diagnosis.

Retention cysts and endometrial atrophy. Infantile uterus. Functional sterility.

Cow No. 7470. (Fig. 33.)

Date of birth: 24.10.1937. *Birth weight:* 65 pounds.

For body weights see Table I, Appendix II.

Sex History.

Age at first oestrus: 403 days (13.2 months).

Subsequent oestrous periods: (Tables II-XX, Appendix 11).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: At first normal. At the age of 3 years 8 months there are two short periods (7 and 8 days), followed by 2 periods of 20 and 30 days, respectively during which prolonged oestrus up to 8 days duration, is exhibited.

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4-5 years: No periods recorded—animal refuses to stand for service.

Age at first service: No services given as the animal refuses coitus after the age of 4 years.

Pregnancies: None.

Clinical Observations.

Coarse head and shoulders, slight depression of back in the lumbar region, elevation of the root of the tail. Deep bull-like voice. (Fig. 33.) Mounts its companions but refuses to stand for coitus.

Examination per vaginam: The vagina contains a small quantity of slightly flocculent mucus. The os is small and contracted.

Examination per rectum: Cervix small and soft, uterus thin-walled and fluctuating, ovaries large and cystic. Tubes not palpable.

The udder is moderately developed, the teats are small and yield about 75 cubic cm. of creamy yellow flocculent secretion.

Slaughter Data.

Age when slaughtered: 4 years 11·2 months.

Live weight: 1,350 pounds.

“Dressed” weight: 860 pounds.

Percentage “dressed” weight: 63·7.

Sex condition: Anaphrodisia.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

(Fig. 34.)

Vulva.—Length, 11 cm. Width, 9 cm. Bartholin glands, normal. The mucosa is purplish pink in colour and moist.

Histological.—The epithelium is swollen and the superficial layer is slightly cornified. The mucosa shows marked lymphocytic, plasma cell, and neutrophilic infiltration. The stroma is slightly oedematous and congested.

Vagina.—Length, 25 cm. Width, 8 cm. Gärtner's canals patent. Towards the middle of the vagina, on the left side (Fig. 34), there is a shallow diverticulum in the vaginal wall, 6 cm. in diameter, lined by mucosa similar to that of the vagina. In the centre of this diverticulum there is a raised, greyish white area with uneven surface and hard, cartilaginous consistence. The vaginal mucosa is bright pink in colour and covered with clear, straw-coloured mucus.

Histological.—The raised papilliform area in the vaginal diverticulum consists of fibroblastic tissue showing inflammatory changes, similar to that observed in Cow No. 7355. The epithelial layer of the vaginal mucosa consists of 10 to 15 rows of large polyhedral cells, supporting a superficial layer of swollen goblet cells. The latter, in some places alternate with flattened cells. The mucosa is heavily infiltrated with neutrophiles and lymphocytes, while the stroma is congested and oedematous with extravasations of blood.

Cervix.—Length, 8 cm. Width, 3.5 cm. The consistence is reduced. The os is small and the canal allows the passage of a thin probe only. The mucosa is pale brownish pink in colour and covered with thin, slightly opaque mucus. The transverse folds are indistinct.

Histological.—The glandular epithelium is swollen, columnar with small basally situated nuclei (Fig. 20). The stroma is moderately congested and oedematous.

Uterus.

	<i>Length.</i>	<i>Width.</i>	<i>Thickness of Wall.</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>
Body.....	3.0	7.0	0.3
Left Cornu.....	45.0	9.5	0.2
Right Cornu.....	45.0	10.5	0.1

The uterine cavity is distended with 850 cubic centimetres of slightly opaque, watery fluid. After draining the fluid, the uterus is thin-walled, flabby and wrinkled. Both horns are constricted in two places, dividing them into several thin-walled, saccular compartments. The mucosa is pale brown in colour and studded with numerous cysts, pinhead to 1 cm. in diameter, giving the surface a granular appearance. The larger cysts penetrate the muscular layers and are visible on the serosal surface of the uterus. Cotyledons are absent.

Histological.—There is extreme atrophy of all layers of the uterine wall (Fig. 30). The glands in some parts are reduced to a single row. They show moderate secretory activity. The stroma, also reduced in width, is moderately oedematous and congested. The muscle fibres appear to be reduced in size and numbers.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	<i>Cm.</i>	<i>Cm.</i>
Left.....	20.0	0.2
Right.....	17.0	0.15

The tubes are macroscopically normal.

Histological.—The epithelium is high columnar with small, basal nuclei (Fig. 85), and scant ciliation. The stroma and muscular coats show nothing unusual.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	<i>Cm.</i>	<i>Cm.</i>	<i>Cm.</i>	<i>Gm.</i>
Left.....	4.5	3.3	2.5	19.0
Right.....	3.8	2.8	2.5	13.5

The *left ovary* contains two large cysts, 2.7 cm. each in diameter, and a few immature follicles up to 0.5 cm. in diameter. Corpora lutea are absent.

Histological.—The walls of both cysts are completely fibrous, all traces of granulosa and theca interna having disappeared. The follicles show degenerative changes.

INFLUENCE OF DELAYED BREEDING ON FERTILITY OF BEEF HEIFERS.

The *right ovary* contains three cysts, 2.5, 2.5 and 1.4 cm. in diameter, respectively, and several immature follicles. Corpora lutea are absent.

Histological.—The walls of the two larger cysts are similar to those in the left ovary. The smaller cyst shows traces of degenerate granulosa and theca interna cells. The immature follicles show degenerative changes in the granulosa cells.

Total weight of genitalia.—337 grams.

Mammary Glands.—The alveoli and ducts are moderately developed and contain secretion. The epithelial cells are swollen.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2.2	1.4	1.3	2.2

Anterior Lobe.—Proportional cell count: Alpha cells, 61.5; beta cells, 0.8; chromophobes, 37.7 per cent.

The *alpha cells* are large, heavily granular, with prominent Golgi apparatus and many with pycnotic nuclei.

The *beta cells* show light granulation, prominent Golgi and large delicate nuclei.

The pars intermedia and nervosa are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.6	0.5	0.5	0.3

The pineal body is normal and contains a few corpora arenacea.

Thyroid.—Left lobe, 6.0 × 4.0 × 0.9 cm. Right lobe, 5.0 × 4.0 × 0.8 cm. Length (including isthmus), 21.0 cm. Weight, 24.0 grams. Macroscopically normal.

Histological.—The follicles are small and lined with swollen, columnar epithelium, heavily laden with brown pigment granules and fat droplets. The colloid contains numerous desquamated epithelial cells.

Thymus.—Involution advanced.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	6.0	3.0	1.4	14.5
Right.....	4.3	3.7	2.0	13.2

Macroscopically normal.

Histological.—Many cells in the zona fasciculata and reticularis have deeply staining cytoplasm and pycnotic nuclei, while the cells in the zona fasciculata show slight lipid granulation.

Diagnosis.

Vaginal fibroma, which is of no consequence. Hydrometra with cystic degeneration of the endometrium and atrophy of the entire uterine wall. Large follicular ovarian cysts, associated at first with nymphomania and later with anaphrodisia.

Cow No. 7471. (FIG. 74.)

Date of birth: 28.10.1937. *Birth weight:* 57 pounds.

For body weights see Table I, Appendix II

Sex History.

Age at first oestrus: 419 days (13·8 months).

Subsequent oestrous periods: (Tables II-XX, Appendix II).

1-2 years: Normal.

2-3 years: Normal.

3-4 years: Normal.

4-5 years: Two long periods of 95 and 107 days, respectively, otherwise normal. Pregnant.

5-6 years: Calved. One short period (10 days) and one long period (93 days), thereafter normal.

6-7 years: Normal. Pregnant.

Age at first service: 4 years 0·2 month.

Pregnancies: (Table XXI, Appendix II).

First: 6 services, full term, 286 days. Normal parturition. Male calf, 72·5 pounds, born weak, died when 19 days old. Agalactia.

Second: 7 services, slaughtered on 184th day of pregnancy.

Clinical Observations.

Genitalia normal. The two periods of anaphrodisia which occurred during the fifth year were possibly due to pregnancies which terminated in unobserved abortions.

Slaughter Data.

Age when slaughtered: 6 years 10·1 months.

Live weight: 1,410 pounds.

"Dressed" weight: 880 pounds.

Percentage "dressed" weight: 62·4.

Sex condition: Slaughtered on 184th day of pregnancy.

Postmortem and Microscopic Examination of the Genitalia and Endocrines.

Vulva.—Length, 13 cm. Width, 10 cm. Bartholin glands normal. Mucosa pale pink in colour and covered with a thin layer of dry, tenacious mucus.

INFLUENCE OF DELAYED BREEDING ON FERTILITY OF BEEF HEIFERS.

Histological.—The epithelial layer is thin, the cells are small with compact nuclei. The superficial squamous cells are slightly cornified. The stroma is dense.

Vagina.—Length, 30 cm. Width, 6 cm. Gärtner's canal on the right side is obliterated, while on the left it is normal. The mucosa is pale pink in colour and covered with dry tenacious mucus.

Histological.—The thin, folded epithelial layer consists of two to three rows of small polyhedral cells, supporting a superficial row of swollen goblet cells. The stroma is moderately oedematous and congested, and shows the presence of a few lymphocytes and neutrophils.

Cervix.—Length, 17.0 cm. Width, 5.0 cm. Consistence soft. The os is large and projects 6 cm. into the vagina. It is fissured and dilated, the second transverse fold being visible. The canal is filled with the plug of pregnancy and admits one finger. The transverse folds are prominent. The mucosa is pale pink in colour.

Histological.—The glandular epithelium is high columnar and swollen, with small, flattened basal nuclei (Fig. 18). The lumina are distended with stringy, acidophilic mucus. The stroma is dense.

Uterus.—On account of distortion, due to pregnancy, the component parts of the uterus were not measured. The right horn contains a normal foetus. The membranes, placenta and uterine wall are apparently normal.

Fallopian Tubes.

	<i>Length.</i>	<i>Width.</i>
	Cm.	Cm.
Left.....	15.0	0.2
Right.....	18.0	0.2

The tubes are macroscopically normal.

Histological.—The epithelium is low columnar with central nuclei (Fig. 82). Cilia are scant and a few cytoplasmic and nuclear extrusions are present on the epithelial surface. The muscular coats are normal.

Ovaries.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	4.5	2.3	1.0	4.5
Right.....	5.0	3.5	1.8	11.0

The *left ovary* contains a few follicles in various stages of maturity and traces of old corpora lutea.

The *right ovary* contains the corpus luteum of pregnancy, 2.7 cm. in diameter, and several follicles.

Histological.—Some of the larger follicles show degenerative changes in the granulosa cells.

Total weight of genitalia: About 6 Kilograms.

Mammary Glands.—The alveoli and ducts are well developed and the epithelial cells are swollen and secretory active.

Pituitary.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
2.2	1.2	1.2	1.9

Anterior Lobe.—Proportional cell count: Alpha cells, 42.2; beta cells, 12.6; chromophobes, 45.2 per cent.

The *alpha cells* are partially degranulated with pycnotic nuclei—the so-called “pregnancy” cells. Some show deeply staining cytoplasm and indistinct Golgi apparatus.

The *beta cells* are present in all stages of granulation, with prominent Golgi and nuclei which vary from large and delicate to small, pycnotic.

The *pars intermedia* and *nervosa* are normal.

Pineal.

<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
Cm.	Cm.	Cm.	Gm.
1.2	0.7	0.4	0.2

The pineal body is normal, but corpora arenacea are absent.

Thyroid.—Left lobe, 6.0 × 5.0 × 0.8 cm. Right lobe, 6.0 × 5.0 × 1.0 cm. Length (including isthmus), 19 cm. Weight, 27 grams. Macroscopically normal.

Histological.—The follicles are lined with flattened epithelium, containing a few brown pigment granules and fat droplets in the cytoplasm.

Thymus.—Involution moderately advanced.

Pancreas.—Normal.

Adrenals.

	<i>Length.</i>	<i>Breadth.</i>	<i>Width.</i>	<i>Weight.</i>
	Cm.	Cm.	Cm.	Gm.
Left.....	5.5	4.0	1.5	12.0
Right.....	4.5	3.5	2.0	11.0

The cells of the *zona glomerulosa* and *fasciculata* show slight lipoid granulation.

Diagnosis.

Normal 184 days pregnancy.

APPENDIX 11.

Table 1

Body Weights

Group and No.	Date of Birth.	Birth weight lb.					
			0.5 Yrs.	1 Yr.	1.5 Yrs.	2 Yrs.	2.5 Yrs.
A.							
6292	31. 7. 34	70.0	295	440	575	758	928
6358	6. 10. 34	77.5	345	492	663	873	972
6362	23. 10. 34	53.0	282	430	561	765	860
6363	25. 10. 34	61.0	268	425	562	803	965
6423	13. 5. 35	59.0	297	438	605	805	913
6442	8. 7. 35	67.0	291	481	630	770	870
6452	7. 6. 35	59.0	272	439	586	744	836
6492	22. 10. 35	71.0	307	456	574	724	910
6496	22. 10. 35	79.5	300	460	585	722	905
7045	17. 12. 35	66.0	371	493	665	789	957
7157	2. 3. 36	58.5	433	485	615	837	1,020
7172	10. 4. 36	55.0	337	455	561	750	920
7189	11. 5. 36	64.0	386	510	680	913	1,059
7269	5. 10. 36	65.0	428	509	690	900	1,022
B.							
7271	14. 10. 36	65.0	379	454	681	800	868
7276	15. 10. 36	76.5	369	432	650	840	914
7277	27. 10. 36	76.0	392	440	630	737	835
7346	30. 1. 37	66.0	324	490	641	865	932
7355	27. 2. 37	51.0	308	470	630	730	809
7378	3. 4. 37	65.5	307	475	674	850	975
7385	17. 4. 37	63.5	277	418	576	706	804
7401	4. 6. 37	48.5	280	431	572	684	776
7469	24. 10. 37	54.0	393	523	618	778	893
7470	24. 10. 37	65.0	426	516	662	810	932
7471	28. 11. 37	57.0	384	520	648	760	860

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321-322a

321-322b 

APPENDIX II.

TABLE I.
Body Weights

Weight in Pounds at Six-Monthly Intervals at Ages Stated.

3 Yrs.	3·5 Yrs.	4 Yrs.	4·5 Yrs.	5 Yrs.	5·5 Yrs.	6 Yrs.	6·5 Yrs.	7 Yrs.	7·5 Yrs.
1,026	1,128	1,274	1,365	1,300	1,278	1,302	1,316	1,326	1,325
1,118	1,250	1,406	1,360	1,396	1,430	1,486	1,537	1,564	1,598
980	1,148	1,274	1,311	1,320	1,333	1,372	1,342	1,312	1,360
1,108	1,215	1,326	1,325	1,344	1,398	1,510	1,508	1,543	1,558
1,095	1,236	1,272	1,308	1,378	1,454	1,325	1,421	1,496	—
976	1,106	1,106	1,195	1,325	1,315	1,388	1,416	1,500	—
925	1,055	1,075	1,158	1,188	1,295	1,290	1,350	1,288	1,420
1,080	1,165	1,218	1,300	1,421	1,384	1,450	1,448	—	—
1,015	1,102	1,176	1,212	1,324	1,311	1,386	1,378	—	—
1,108	1,165	1,200	1,334	1,437	1,428	1,495	1,576	1,325	1,432
1,137	1,226	1,273	1,395	1,405	1,485	1,510	1,385	1,422	1,472
978	1,055	1,115	1,188	1,236	1,303	1,326	—	—	—
1,169	1,232	1,311	1,425	1,412	1,500	1,433	1,563	—	—
1,140	1,276	1,410	1,505	1,562	1,578	1,582	1,525	1,544	1,525
966	1,025	1,180	1,186	1,281	1,337	1,266	—	—	—
1,046	1,115	1,260	1,325	1,410	1,488	1,460	1,495	1,212	1,230
912	1,020	1,148	1,171	1,325	1,370	—	—	—	—
1,010	1,145	1,272	1,373	1,450	1,542	—	—	—	—
835	938	1,074	1,195	1,165	1,285	—	—	—	—
1,083	1,248	1,318	1,385	1,500	1,435	1,575	1,334	1,450	—
870	1,021	1,110	1,252	1,226	1,345	—	—	—	—
917	1,092	1,122	1,265	1,350	1,458	1,427	1,330	1,365	—
1,018	1,081	1,235	1,341	1,500	—	—	—	—	—
1,060	1,152	1,275	1,288	—	—	—	—	—	—
1,008	1,090	1,209	1,285	1,415	1,343	1,412	1,363	—	—

← 321-322a

321-322b

321-322c →

APPENDIX II.

Table 1

Body Weights

				Autopsy.				
7·5 Yrs.	8 Yrs.	8·5 Yrs.	9 Yrs.	Age.		“ Live ” Wt.	“ Dres- sed ” Wt.	% “ Dres- sed ” Wt.
				Yrs.	Mon.			
1,325	1,439	1,380	1,086	10	1	1,190	690	58·0
1,598	1,600	—	—	8	2	1,590	1,066	67·0
1,360	—	—	—	7	10·4	1,475	910	61·7
1,558	—	—	—	7	10·3	1,316	1,000	62·0
—	—	—	—	7	3·7	1,563	990	63·3
—	—	—	—	7	5·3	1,550	970	62·6
1,420	1,202	985	1,025	9	2·6	1,050	590	56·2
—	—	—	—	6	10·9	1,573	1,030	65·5
—	—	—	—	6	10·9	1,458	948	65·5
1,432	1,261	1,275	—	8	8·3	1,330	790	59·4
1,472	1,500	—	—	8	5·7	1,525	982	64·4
—	—	—	—	6	5·3	1,448	880	60·8
—	—	—	—	6	8·5	1,560	910	58·3
1,525	—	—	—	7	10·9	1,450	870	60·0
—	—	—	—	6	2·1	1,290	790	61·2
1,230	—	—	—	7	10·3	1,315	740	56·3
—	—	—	—	5	11·1	1,445	980	67·8
—	—	—	—	5	10·1	1,578	975	61·8
—	—	—	—	5	7·1	1,310	750	57·3
—	—	—	—	7	4·9	1,287	720	55·9
—	—	—	—	5	9·2	1,360	810	59·6
—	—	—	—	7	2·9	1,393	790	56·7
—	—	—	—	5	1·8	1,450	920	63·4
—	—	—	—	4	11·2	1,350	860	63·7
—	—	—	—	6	10·1	1,410	880	62·4

← 321-322b

321-322c