A HISTOLOGICAL STUDY OF THE SPINAL CORD AND PERIPHERAL NERVOUS SYSTEM IN SCRAPIE DISEASE OF SHEEP.

A thesis submitted for the degree of Doctor of Philosophy of the University of Edinburgh

by

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VOLUME II.

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TABLE I.

MATERIAL USED IN STUDY.

Groups of sheep.	Total No.of sheep used.	Tissues examined.					
		Spinal cords.	Spinal ganglia.	Gasserian ganglia.	Stellates, thoracic sympathetic trunk ganglia; coeliaco-mesenteric ganglia.	Anterior cervical sympathetic ganglia.	Posterior mesenteric ganglia.
Naturally occurring scrapie.	75	68	30	5	30	5	5
Experimentally induced scrapie.	40	30	10	5	15	5	5
Control sheep.	54	43	10	5	11	5	5
Totals.	169	141	50	15	56	15	15

TABLE II.
NATURAL SCRAPIE.

THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case number.	Breed.	Sex.	Age at death in years.	Days under observation.	Predominant Clinical Signs.	Clinical Classification.
S 1	C	F	$2\frac{1}{2}$	30	Mild pruritus, particularly of head, very slight incoordination.	Non-A.
S 2	Sw	F	$2\frac{1}{2}$	5	Moderate pruritus, severe incoordination particularly of hind quarters, asthenia, ultimately paresis.	A.
S 3	C	F	$2\frac{3}{4}$	56	Severe pruritus, lumbar region denuded of wool, purulent dermatitis, twitching of lower jaw & fasciculation of muscles of face, incoordination & paresis.	A.
S 4	Sw	F	$2\frac{3}{4}$	25	Moderate pruritus, asthenia and incoordination.	A.
S 5	C	F	$2\frac{3}{4}$	60	Moderate pruritus, severe emaciation, advanced paresis.	A.
S 6	S	F	3	2	Moderate pruritus, ataxia, trembling and fasciculation of face and shoulder muscles, and hyperaesthenia.	A.
S 7	Sw	F	$2\frac{3}{4}$	83	Roughening of wool, slight pruritus, lethargy and mild asthenia.	Non-A.
S 8	Sw	F	$2\frac{3}{4}$	89	Severe pruritus, incoordination, lethargy & asthenia, progressing to paresis.	A.
S 9	C	F	3	167	Moderate pruritus, lethargy, emaciation, cautious incoordinated gait, progressive paresis.	A.
S10	S	F	3	34	Moderate pruritus, Hyperaesthesia and generalised faciculation of superficial muscles, advanced incoordination & ataxia	A.

TABLE II.
(continued)
NATURAL SCRAPIE.

THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case number.	Breed.	Sex.	Age at death in years.	Days under observation.	Predominant Clinical Signs.	Clinical classification.
S11	S	F	2 3/4	59	Moderate pruritus, generalised twitching and intermittent jerking of head, moderate incoordination, paresis.	A.
S12	BLxC	F	2	9	Constant tremor of head and fore limbs, mild ataxia. Inappetence.	A.
S13	S	F	2 1/4	88	Moderate pruritus and mild ataxia.	Non-A.
S14	BLxC	F	2	12	Slight pruritus, dullness, haematomas on face and in sacral region.	Non-A.
S15	S	F	2	73	Moderate pruritus, twitching of jaw, salivation, paresis.	Non-A.
S16	C	F	2	36	Moderate pruritus, very slight ataxia.	Non-A.
S17	S	F	2 1/4	122	Severe pruritus, marked nibbling response, cuddy trot giving place to ataxia, ultimately advanced paresis.	A.
S18	S	F	3 1/2	119	Severe pruritus, grinding of teeth, moderate ataxia.	Non-A.
S19	S	F	2 1/2	12	Roughening of wool, mild pruritus of head only.	Non-A.
S20	Sw	F	2 1/4	61	Moderate pruritus, cuddy trot progressing to ataxia, salivation & regurgitation of ruminal contents, lethargy and generalised weakness.	A.
S21	S	F	2 1/2	99	Primary severe pruritus became much milder & ultimately confined to head.	Non-A.

TABLE II.
(continued)
NATURAL SCRAPIE.

THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case number.	Breed.	Sex.	Age at death in years.	Days under observation.	Predominant Clinical Signs.	Clinical classification.
S22	S	F	3½	159	Severe pruritus & incoordination, generalised weakness, laboured breathing.	A.
S23	S	F	2½	107	Moderate pruritus, grinding of teeth, moderate exopthalmos, mild ataxia and generalised weakness.	Non-A.
S24	S	F	3	9	Mild pruritus.	Non-A.
S25	S	F	3	13	Mild pruritus, occasionally rather stumbling gait, emaciation.	Non-A.
S26	C	F	3	9	Mild pruritus of limbs and sacral region, slight incoordination.	Non-A.
S27	S	F	2½	21	Moderate pruritus of thoracic region, hyperaesthesia, midl cuddy trot and mild incoordination.	A.
S28	BL	F	5	8	Severe pruritus of hind quarters and marked incoordination, particularly of hind limbs.	A.
S29	BL	M	3	5	Moderate pruritus & slight ataxia. Progressive asthenia & ultimate paresis.	A.
S30	S	F	2½	2	Severe pruritus & severe ataxia. Hyperaethesia with marked tremor. Progressive paresis.	A.
S31	SxC	F	3	28	Mild pruritus, cuddy trot, incoordination particularly of hind limbs, very marked ataxia.	A.

TABLE II.
(continued)
NATURAL SCRAPIE.

THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case number.	Breed.	Sex.	Age at death in years.	Days under observation.	Predominant Clinical Signs.	Clinical classification.
S32	Sw	F	2½	4	Mild pruritus, and slight incoordination. Salivation & regurgitation of ruminal contents. Lethargy.	A;
S33	BL	M	5	14	Severe pruritus & marked incoordination of hind limbs. Lethargic, dull continuous nodding of head, salivation. Progressive paresis.	A.
S34	S	F	3½	26	Marked cuddy trot & ataxia, progressing to advanced paresis.	A.
S35	Sw	F	3½	25	Mild pruritus and slight ataxia.	Non-A.
S36	Sw	F	3½	33	Severe pruritus, particularly at base of tail, severe ataxia, hyperaesthesia, shaking and trembling of head.	A.
S37	Sw	F	3½	25	Moderate pruritus & marked nibbling response. Early hyperaesthesia gave way to lethargy and slight incoordination.	Non-A.
S38	BL	F	2½	2	Severe pruritus, incoordination and very prominent nibbling response. Mild exophthalmos. Multiple subcutaneous abscess on limbs and nose. Asthenia.	A.
S39	C	F	2½	19	Mild pruritus.	Non-A.
S40	WxS	F	2½	41	Moderate pruritus, amaurosis aimless running, early cuddy trot & hyperaesthesia, later incoordination and paresis of hind legs.	A.

TABLE II.
(continued)
NATURAL SCRAPIE.
THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case number.	Breed.	Sex.	Age at death in years.	Days under observation.	Predominant Clinical Signs.	Clinical classification.
S41	S	M	3	37	Severe pruritus, skin denuded of wool, inflamed and excoriated, moderate ataxia with more marked incoordination of hind limbs.	A.
S42	CxBL	F	3	5	Slight trembling of head. Rather lethargic, incoordination of forelegs marked particularly on rising or lieing down.	A.
S43	C	F	3	28	Mild pruritus.	Non-A.
S44	C	F	3	65	Mild pruritus, cuddy trot, moderate ataxia	A.
S45	S	F	2½	1	Paresis.	A.
S46	Sw	F	3	26	Mild pruritus and very slight ataxia.	Non-A.
S47	C	F	2	1	Mild pruritus, nibbling response.	Non-A.
S48	S	F	3	330	Severe pruritus and moderately severe ataxia. Difficulty in standing up.	A.
S49	S	F	3	153	Mild pruritus.	Non-A.
S50	S	M	3	61	Severe pruritus & moderately severe ataxia	A.
S51	D	F	2	32	Moderate pruritus and slight incoordination.	Non-A.

TABLE II.
(continued)
NATURAL SCRAPIE.
THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case Number.	Breed.	Sex.	Age at death in years.	Days under observation.	Predominant Clinical Signs.	Clinical classification.
S52	CxBL	F	2¼	52	Severe pruritus, skin in lumbo-sacral region denuded of wool, excoriated and inflamed. Moderate incoordination particularly of hind legs.	Non-A.
S53	S	F	2¾	28	Mild ataxia, Very marked nibbling response, moderately severe incoordination leading to advanced paresis, unable to stand without support.	A.
S54	S	F	3¾	133	Long-standing mild pruritus, splaying of hind legs & moderate ataxia. Lethargic.	A.
S55	Sw	F	2½	116	Mild pruritus, moderate ataxia, dull, lethargic appearance.	A.
S56	Sw	F	2½	118	Mild pruritus, mostly only seen rubbing hind quarters, hyperaesthesia, and very marked incoordination.	A.
S57	Sw	F	5	118	Mild pruritus particularly in base of tail, moderate ataxia, lethargy, ultimately paresis.	A.
S58	Sw	F	2½	117	Mild pruritus, swaying gait and incoordination of hind limbs.	Non-A.
S59	Sw	F	2¼	27	Moderate pruritus, ataxia and ultimately paresis.	A.
S60	Sw	F	2¾	29	Severe pruritus, & marked incoordination.	A.
S61	BLxC	F	5	80	Moderate pruritus and incoordination.	A.

TABLE II.
(continued)
NATURAL SCRAPIE.
THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case number.	Breed.	Sex.	Age at death in years.	Days under observation.	Predominant Clinical Signs.	Clinical classification.
S62	S	F	4	122	Marked pruritus and incoordination.	Non-A.
S63	Sw	F	2 3/4	41	Severe pruritus and very severe ataxia. Progressive paresis.	A.
S64	Sw	F	2 3/4	48	Mild pruritus and slight incoordination. Dull, lethargic appearance.	Non-A.
S65	Sw	F	2 3/4	51	Pruritus and mild ataxia. Lethargic appearance.	Non-A.
S66	S	F	4	278	Moderate pruritus & marked incoordination	A.
S67	Sw	F	2 3/4	61	Severe pruritus & marked incoordination. Ultimately lethargic appearance.	A.
S68	Sw	F	3	21	Mild pruritus at base of tail. Moderate incoordination.	Non-A.
S69	S	M	3	87	Mild pruritus, moderate incoordination and paresis.	A.
S70	S	F	2	86	Mild pruritus and advanced ataxia. Ultimately paresis.	A.
S71	BLxC	F	2	8	Marked pruritus, generalised tremor, hyperaesthesia and mild ataxia.	A.
S72	Sw	F	3	35	Advanced pruritus, moderate ataxia, lethargic appearance and paresis. Unable to rise without assistance.	A.

TABLE II.
(continued)
NATURAL SCRAPIE.
THE BREED, SEX, AGE AND PREDOMINANT SYMPTOMS OF 75 NATURAL CASES.

Case number.	Breed.	Sex.	Age at death in years.	Days Under observation.	Predominant Clinical Signs.	Clinical classification.
S73	C	F	2¼	46	Moderate pruritus particularly of head, nibbling response marked, incoordination, asthenia and ultimate paresis.	A.
S74	S	F	2¼	10	Advanced pruritus, moderate incoordination and ataxia. Ultimate paresis.	A.
S75	S	M	3¼	5	Moderate pruritus, particularly of base of tail and lower limbs, Incoordination of hind limbs, stiffness of back, ataxia, asthenia.	A.

C = Cheviot; Sw = Swaledale; S = Suffolk; BL = Border Leicester;

D = Dales bred; W = Wensleydale.

F = Female; M = Male.

A = Advanced; Non-A = Non-advanced.

TABLE III.

EXPERIMENTAL SCRAPIE.

THE BREED, SEX, ROUTE OF INOCULATION, AGE INOCULATED AND PREDOMINANT SYMPTOMS IN 40 EXPERIMENTAL CASES.

Case number	Breed.	Sex.	Route of inoculation.	Age inoculated.	Age killed.	Predominant Clinical Signs.
E 1	C	N	S/C	12 mths.	1¾yrs.	Severe pruritus, skin of flanks, chest, and hind legs denuded of wool and inflamed. Cuddy trot. Asthenia.
E 2	C	F	S/C	12 mths.	2 yrs.	Moderate pruritus, incoordination, splayed hind legs. Legs dragged at fetlocks, ataxia and paresis for last 2 days
E 3	C	F	S/C	10 mths.	2¼yrs.	Moderate pruritus, cuddy trot seen for 2 months, incoordination & hind legs markedly splayed. Paresis for last 2 days
E 4	C	N	I/C	9 mths.	1¼yrs.	Severe pruritus & severe incoordination of hind legs. Paresis.
E 5	C	N	I/C	12 mths.	2¼yrs.	Earlier severe pruritus seemed to regress. Incoordination particularly of limbs of left side & with splaying of hind limbs. Ataxia and one attack of clonic spasms.
E 6	C	F	S/C	10 mths.	2¼yrs.	Earlier severe pruritus. Cuddy trot & later incoordination with splaying of hind legs. Progressive asthenia & paresis for 2 days prior to slaughter.
E 7	C	N	S/C	10 mths.	2¼yrs.	Progressively severe pruritus. Cuddy trot, posterior incoordination with splaying of hind legs. Terminal lethargy.
E 8	C	F	S/C	10 mths.	2¼yrs.	Earlier severe pruritus regressed. Exopthalmos. Hyperaesthesia.
E 9	C	F	I/C	9 mths.	1½yrs.	Severe pruritus. Incoordination with splaying of hind legs. Ataxia & ultimate paresis.

TABLE III.
(continued)

EXPERIMENTAL SCRAPIE.

THE BREED, SEX, ROUTE OF INOCULATION, AGE INOCULATED AND PREDOMINANT SYMPTOMS IN 40 EXPERIMENTAL CASES.

Case number	Breed.	Sex.	Route of inoculation.	Age inoculated.	Age killed.	Predominant Clinical Signs.
E10	C	F	I/C	8 mths.	1½yrs.	Moderate pruritus. Cuddy trot & posterior incoordination. Terminal lethargy.
E11	C	M	I/C	10 mths.	1¼yrs.	Severe pruritus with hindquarters denuded of wool. Moderate posterior incoordination.
E12	C	F	I/C	10 mths.	1¾yrs.	Severe pruritus with hindquarters and flanks denuded of wool. Moderate ataxia progressing to terminal lethargy. Pruritus predominant feature.
E13	C	F	I/C	birth	6 mths.	Moderate pruritus & nibbling response. Severe posterior incoordination & ataxia
E14	C	M	I/C	birth	7 mths.	Slight pruritus. Very severe ataxia and incoordination leading to paresis for 2 days prior to death.
E15	C	F	I/C	birth	8 mths.	Severe pruritus & severe posterior incoordination.
E16	C	M	I/C	birth	8 mths.	Moderate pruritus & severe posterior incoordination.
E17	C	M	I/C	birth	9 mths.	Moderate pruritus & severe posterior incoordination. Ataxia progressing to terminal lethargy.
E18	C	F	S/C	6-7yrs.	7 yrs.	Moderate pruritus of approx. 4 months duration. Incoordination & ataxia progressing to paresis for 3 weeks before destroyed. Lambed on same day as destroyed.

TABLE III.
(continued.)

EXPERIMENTAL SCRAPIE.

THE BREED, SEX, ROUTE OF INOCULATION, AGE INOCULATED AND PREDOMINANT SYMPTOMS IN 40 EXPERIMENTAL CASES.

Case number	Breed.	Sex.	Route of inoculation.	Age inoculated.	Age killed.	Predominant Clinical Signs.
E19	C	F	S/C	6-7 yrs.	7 yrs.	Moderate pruritus of 4 months duration. Incoordination. Paresis for 3 weeks before destroyed on day of lambing.
E20	C	F	S/C	6-7 yrs.	7 yrs.	Moderate pruritus of 4 months duration. Progressive incoordination particularly of hind legs leading to paresis for 3 weeks before destroyed on day of lambing
E21	C	N	I/C	6-7mths.	1 yr.	Moderate pruritus & posterior incoordination. Inability to extend left digit, walking on fetlock.
E22	C	F	I/C	birth	10mths.	Moderate pruritus for about 2 months followed by rapidly developing severe posterior incoodination, ataxia & paresis.
E23	C	F	I/C	birth	10mths.	Moderate pruritus, severe posterior incoordination with splaying of himd legs & dragging posterior legs at fetlocks.
E24	C	F	I/C	birth	10mths.	Severe pruritus, moderate posterior incoordination. Very emaciated.
E25	C	F	I/C	10 mths.	2 yrs.	Severe pruritus & marked nibbling response. Rapidly developing incoordination & ataxia leading to paresis.
E26	C	M	I/C	4 mths.	1 yr.	Moderate pruritus & severe posterior incoordination with splaying of hind legs.

TABLE III.
(continued.)

EXPERIMENTAL SCRAPIE.

THE BREED, SEX, ROUTE OF INOCULATION, AGE INOCULATED AND PREDOMINANT SYMPTOMS IN 40 EXPERIMENTAL CASES.

Case number.	Breed.	Sex.	Route of inoculation	Age inoculated.	Age killed.	Predominant Clinical Signs.
E27	C	M	I/C	birth	1 yr.	Severe pruritus with hind quarters denuded of wool. Severe incoordination and lethargic nodding of head.
E28	C	N	I/C	9 mths. and 20 mths.	2¼yrs.	Severe pruritus & severe ataxia both of rapid developement. Inappetence & paresis for last 2 days before death.
E29	C	N	I/C	9 mths.	2¼yrs.	Severe and prolonged pruritus with hind quarters & flanks denuded of wool & tail excoriated & bleeding. Slight cuddy trot.
E30	C	N	I/C	9 mths. and 20 mths.	2¼yrs.	Moderate pruritus & apparently mild posterior incoordination followed by paresis
E31	C	N	I/C	15 mths.	2 yrs.	Severe pruritus with hind quarters denuded of hair. Incoordination & splaying of hind legs which were dragged at fetlocks.
E32	C	N	S/C	1 yr.	2½yrs.	Severe pruritus. Incoordination and splaying of hind legs.
E33	C	F	I/C	birth	5mth.	Severe pruritus. Severe incoordination of fore and hind legs, asthenia and lethargic nodding of head.
E34	C	N	S/C	1 yr.	1¾yrs.	Moderate pruritus, incoordination of hind legs.
E35	C	F	I/C	8 mths.	1¾yrs.	Moderate pruritus. Cuddy trot & incoordination leading to ataxia and paresis.

TABLE III.
(continued.)

EXPERIMENTAL SCRAPIE.

THE BREED, SEX, ROUTE OF INOCULATION, AGE INOCULATED AND PREDOMINANT SYMPTOMS IN 40 EXPERIMENTAL CASES.

Case number.	Breed.	Sex.	Route of inoculation.	Age inoculated.	Age killed.	Predominant Clinical Signs.
E36	C	F	I/C	birth	6 mths	Moderate pruritus. Hyperaesthesia, later severe posterior incoordination & ataxia.
E37	C	F	S/C	12 mths.	1½yrs.	Severe pruritus. Skin of hind quarters denuded of wool. Moderate incoordination.
E38	C	N	I/C	15 mths.	2 yrs.	Severe pruritus. Cuddy trot and incoordination leading to paresis.
E39	C	N	I/C	15 mths.	2 yrs.	Severe pruritus. Incoordination of hind quarters with marked swaying of hind quarters & back. Terminal lethargy.
E40	C	F	S/C	1 yr.	2 yrs.	Moderate pruritus. Posterior incoordination with splaying of hind legs and dragging of hind fetlock.

C = Cheviot;

F = Female; M = Male; N = Castrated male.

S/C = subcutaneous; I/C = intracerebral.

TABLE IV.
CONTROL SHEEP.

THE BREED, SEX, AGE AND CLINICAL DIAGNOSIS OF 54 CONTROL SHEEP.

Case number.	Breed.	Sex.	Age at death.	Clinical Diagnosis.
C 1	C x B	F	10 Mths.	Healthy
C 2	C x B	F	10 "	"
C 3	C x B	F	10 "	"
C 4	C	F	1 yr.	"
C 5	C	F	1 "	"
C 6	B	M	1¾ "	"
C 7	C	F	2 "	"
C 8	C	F	2 "	"
C 9	C	F	2 "	"
C10	C	F	2 "	"
C11	C	N	2 "	"
C12	B	N	2½ "	"
C13	C	F	2¾ "	"
C14	C	F	3	"
C15	B	F	7 "	"
C16	C x B	F	8 mths.	"
C17	C x B	F	8 mths.	"
C18	C x B	M	10 "	"
C19	C	F	1¼ yrs.	"
C20	M	F	1¾ "	"
C21	C	N	1¾ "	"
C22	C	N	1¾ "	"
C23	C	N	1¾ "	"
C24	C	N	2 "	"
C25	C x B	M	2 "	"
C26	C	F	2¼ "	"
C27	B	F	3 "	"
C28	B	F	3 "	"
C29	C	F	5 "	"
C30	C	F	5 "	"
C31	C	F	5 "	"
C32	B	F	5 "	"
C33	B	F	7 "	"
C34	B	F	7 "	"
C35	B	F	7 "	"
C36	B	F	7 "	"
C37	C x B	N	1 "	"
C38	C	F	1 "	"
C39	C	N	1 "	"
C40	B	F	1 "	"
C41	B	F	1 "	"
C42	B	F	1 "	"
C43	B	F	1 "	"
C44	S	F	1 "	"
C45	C	N	2 "	"
C46	C	M	2 "	"
C47	C	F	6 "	"
C48	C	F	1 "	Louping ill.
C49	B	F	1¾ "	Louping ill.
C50	B	F	1½ "	Louping ill.
C51	C	F	1 "	Russian Spring summer encephalitis.
C52	C	F	1 "	Russian Spring summer encephalitis.
C53	C x S	F	1 "	Coenurus cyst in the mesencephalon.
C54	S	M	3 "	Intraspinal abscess.

C = Cheviot; B = Blackface; S = Suffolk; M = Merino.

F = Female; M = Male; N = castrated male.

TABLE V.
HISTOLOGICAL CHANGES IN THE SPINAL CORD.
NATURAL SCRAPIE GROUP.

Case No.	Vacuolation.	Chromatolysis.	Degeneration.**	Necrosis.	Neuronophagia.	Perivascular infiltrations.
S 1	+	+	+	-	-	-
S 2	+ + + +	+ + +	+ + + +	+ + +	+ +	+
S 3	+ + + +	+ +	+ + +	+ +	+	-
S 4	+	+	+	+	-	-
S 5	+ +	+ + +	+ + +	+	+	-
S 6	+ + + +	+	+ + +	+ +	+	+ + +
S 7	+	+	+	-	-	-
S 8	+ + +	+	+	+	+	+
S 9	+ + +	+ + +	+ + +	+ + +	+	-
S10	+ + + +	+ + + +	+ + + +	+ + +	+	+
S11	+	+ +	+	-	-	-
S12	+ + + +	+ + +	+ + +	+ + + +	+	+
S13	+	+ +	+	+	-	-
S14	+	+	-	-	-	-
S15	+ + + +	+ + +	+ + +	+ + +	+ +	-
S16	+	+	-	-	-	+ +
S17	+ +	+ + +	+ +	+ +	+	+
S18	+	+	+	-	-	-
S19	+	+	+	+	-	+
S20	+ + + +	+ + +	+ +	+ +	+	+
S21	+	+ +	+	+	-	+
S22	+ + +	+ +	+ + +	+	+	+
S23	+ +	+ +	+ +	+	-	+
S24	+	+	-	-	+	+
S25	+	+	-	-	-	-
S26	+	+	+	+	-	-
S27	+ + +	+ + +	+ +	+ +	+	+
S28	+	+	+	-	-	-
S29	+ +	+ +	+ +	+	-	-
S30	+ + +	+ +	+ +	+	+	-
S31	+	+	+	-	-	-
S32	+	+ +	+	+	-	-
S33	+ +	+ +	+ +	+	+	+
S34	+ +	+	+	-	+	+
S35	+ +	+	+	+	+	+ +
S36	+ + + +	+ + + +	+ + + +	+ + + +	+ + +	+ + +
S37	+	+	-	-	+	-
S38	+	+	+	-	+	-
S39	+ +	+ + +	+ +	+	+	-
S40	+	+	-	-	-	-
S41	+ +	+	+	+	+	-
S42	+ +	+ +	+ +	+	-	-
S43	+	+	+	-	-	-
S44	+ + + +	+ + +	+ + +	+ + +	+ +	-
S45	+	+	-	-	-	-
S46	+	+ +	+	+	-	-
S47	+	+	-	+	-	-
S48	+ + +	+	+	-	+	-
S49	+	+	+	+	-	-
S50	+ + +	+ + +	+	+	+	-
S51	+	+ +	-	+	+	-
S52	+	+	-	-	+	-
S53	+	+	-	-	-	-
S54	+	+	+	-	+	-
S55	+	+ +	+	-	+	-
S56	+ + + +	+ + +	+ + + +	+ + + +	+ +	+
S57	+ +	+ + + +	+ +	+	-	+
S58	+	+ +	+	+	-	+
S59	+ +	+ +	+ +	+ +	+	+
S60	+	+	+	-	-	-
S61	+ +	+ +	+	+	+	+
S62	+	+ +	+ +	-	-	+
S63	+	+	+	-	+	-

S64	+	+	+	+	-	-
S65	+	+	-	-	+	-
S66	+	+	-	-	-	-
S67	+ + +	+	+ +	+	+	-
S68	+	+	+	+	-	-

\+ = a few cells affected.

\+ + = moderate numbers of cells affected.

\+ + + = considerable numbers of cells affected.

\+ + + + = very extensive changes.

* * includes acute swelling, sclerosis, and severe cell change.

TABLE VI.

HISTOLOGICAL CHANGES IN THE INTERMEDIOLATERAL COLUMN OF THE SPINAL CORD.
NATURAL SCRAPIE GROUP.

Case number.	Vacuolation.	Chromatolysis & neuronal degeneration.	Case number.	Vacuolation.	Chromatolysis & neuronal degeneration.
S 1	+	+	S35	+ +	+ + +
S 2	+	+	S36	+ + +	+ + +
S 3	+	+ +	S37	-	+ + +
S 4	+	+	S38	+ + + +	+ + + +
S 5	+ +	+	S39	+ + + +	+ + + +
S 6	+	+	S40	+ + + +	+ +
S 7	+	+ +	S41	+	+ + + +
S 8	+ + + +	+	S42	+ +	+
S 9	+	+ + + +	S43	+ + +	+ +
S10	+	+	S44	+	+ + + +
S11	+	+	S45	-	+
S12	+ + + +	+ + + +	S46	+ +	+ + +
S13	+ + +	+ + +	S47	+	+ +
S14	-	-	S48	+ +	+ + + +
S15	+	+ +	S49	+	+ +
S16	+ + +	+ +	S50	+	+ +
S17	+	+ + +	S51	+ +	+ + + +
S18	+	+	S52	-	+ + + +
S19	+	+ + +	S53	-	+ + +
S20	+ + +	+ +	S54	+	+
S21	+	+ + +	S55	+ +	+ + +
S22	+	+ +	S56	+ +	+ + + +
S23	+	+ + +	S57	+ + +	+ +
S24	+	+ + +	S58	+ + +	-
S25	-	-	S59	+	+ +
S26	+ + +	+ +	S60	+	+
S27	+	+ + +	S61	+ + +	+
S28	+	+ +	S62	-	+ +
S29	+ + + +	+ + +	S63	-	+
S30	+	+ +	S64	+	+
S31	+	+	S65	+	+
S32	+ +	+ +	S66	+ +	+ + +
S33	+	+	S67	+ +	+ + +
S34	-	+	S68	+	+

+ = a few cells affected.

+ + = Moderate numbers of cells affected.

+ + + = Considerable numbers of cells affected.

+ + + + = Very extensive changes.

TABLE VII.
HISTOLOGICAL CHANGES IN THE SPINAL CORD.
EXPERIMENTAL SCRAPIE GROUP.

Case No.	Vacuolation.	Chromatolysis.	Degeneration.**	Necrosis.	Neuronophagia.	Perivascular infiltrations.
E 1	+	+	-	-	-	+
E 2	+	+ +	+	-	-	+
E 3	+	+	-	-	-	-
E 4	-	+ +	-	-	-	-
E 5	+	+ + +	+	-	-	+
E 6	+	+	+	-	-	-
E 7	+	+	+	-	-	-
E 8	+	+ +	-	-	-	+
E 9	+	+ +	+	-	-	-
E10	+	+	-	-	-	-
E11	+	+	+	-	-	-
E12	+	+	-	-	-	-
E13	+	+	-	-	-	-
E14	+	+	+	+	-	-
E15	+	+	-	-	-	-
E16	+	+	-	-	-	-
E17	+	+	-	+	-	-
E18	+	+ +	+ +	-	-	-
E19	+	+ +	+	-	-	+
E20	+	+	-	-	-	-
E21	+	+	-	-	-	-
E22	+	-	-	-	-	-
E23	+	-	-	-	-	-
E24	+	+	-	-	-	-
E25	+	-	-	-	-	-
E26	+	-	-	-	-	-
E27	+	+	+	+	+	-
E28	+	+	-	-	-	-
E29	+	-	-	-	-	+
E30	+	+	-	+	-	-

+ = a few cells affected.

+ + = moderate numbers of cells affected.

+ + + = considerable numbers of cells affected.

+ + + + = very extensive changes.

** includes acute swelling, sclerosis, and severe cell change.

TABLE VIII.

HISTOLOGICAL CHANGES IN THE INTERMEDIOLATERAL COLUMN OF THE SPINAL CORD.
EXPERIMENTAL SCRAPIE GROUP.

Case number.	Vacuolation.	Chromatolysis & neuronal degeneration.	Case number.	Vacuolation.	Chromatolysis & neuronal degeneration.
E 1	-	+ +	E16	-	-
E 2	-	+	E17	-	-
E 3	+	-	E18	+ +	+ + +
E 4	-	+ +	E19	+	+
E 5	+	+	E20	-	+ + +
E 6	+	+	E21	-	+
E 7	-	+	E22	+	-
E 8	+	-	E23	-	+
E 9	+	+	E24	+	+ +
E10	+	+ +	E25	+	-
E11	-	-	E26	-	-
E12	+	-	E27	+	+
E13	-	-	E28	-	+ +
E14	-	+	E29	-	-
E15	-	+	E30	+	+

+ = a few cells affected.

+ + = moderate numbers of cells affected.

+ + + = considerable numbers of cells affected.

+ + + + = very extensive changes.

TABLE IX.

THE OCCURRENCE OF PERIVASCULAR INFILTRATIONS IN NATURALLY OCCURING SCRAPIE, EXPERIMENTAL SCRAPIE AND HEALTHY CONTROL SHEEP.

	Natural scrapie sheep.	Experimental scrapie sheep.	Control sheep.
Proportion of cases showing infiltration when 200 sections were examined.	55%	25%	33%
Proportion of cases showing infiltrations when 50 sections were examined.	43%	10%	10%
Average number of vessels affected per 200 sections.	3.4	1.6	1.6
Range of the number of vessels affected per 200 sections.	1 - 12	1 - 2	1 - 3
Average number of vessels affected per 50 sections.	1.7	1	1
Range of the number of vessels affected per 50 sections.	1 - 4	1	1
Proportion of affected vessels observed in the white matter.	54%	44%	40%
Proportion of affected vessels observed in the grey matter.	38%	56%	60%
Proportion of affected vessels observed partly in the white matter and partly in the grey matter.	8%	-	-
Proportion of affected vessels observed in the dorsal horn.	46%	60%	50%
Proportion of affected vessels observed in the ventral horn.	54%	40%	60%

TABLE X.

INCIDENCE OF PHLOXINOPHILIC INCLUSIONS OF DIFFERING SIZES IN 15 CONTROL SHEEP AND 15 SHEEP AFFECTED WITH NATURALLY OCCURING SCRAPIE DISEASE.

	Number of cases in which inclusions were observed.			Total number of cells containing inclusions in 15 cases.			Mean of number of cells containing inclusions per case.			Range per case of number of cells containing inclusions.		
	Large	Medium	Small	Large	Medium	Small	Large	Medium	Small	Large	Medium	Small
Controls	2	7	15	2	27	2402	0.13	1.8	160	0 - 1	0 - 10	39-271
Scrapies	10	15	15	132	376	4848	8.8	25	323	0 - 75	3 - 75	63-715

TABLE XI.

THE INCIDENCE OF PHLOXINOPHILIC INCLUSIONS COMPARED WITH CLINICAL SEVERITY & VACUOLATION IN 15 SHEEP AFFECTED WITH NATURAL SCRAPIE.

Case No.	Breed.	Age in Years.	Sex	Number of cells with small, medium & large inclusions in 20 sections.			Clinical severity.	Number of vacuoles in 50 sections.
				Small	Medium	Large		
S36	Sw	3½	F	97	8	-	Advanced.	1431
S15	S	2	F	63	9	2	Non advanced.	480
S10	S	3	F	219	3	-	Advanced.	441
S12	BLxC	2	F	379	58	10	Advanced.	348
S30	S	2½	F	550	35	75	Advanced.	197
S27	S	2½	F	422	30	6	Advanced.	106
S17	S	2¼	F	257	12	1	Advanced.	86
S41	S	3	M	364	75	32	Advanced.	69
S39	C	2½	F	84	12	1	Non-advanced.	62
S33	BL	5	M	715	24	1	Advanced.	58
S23	S	2½	F	304	20	3	Non-advanced.	50
S40	WxSw	2½	F	298	17	-	Advanced.	40
S21	S	2½	F	520	20	-	Non-Advanced.	37
S28	BL	5	F	406	23	-	Advanced.	36
S14	BLxC	2	F	170	30	1	Non-advanced.	3

C = Cheviot; Sw = Swaledale; S = Suffolk;

BL = Border Leicester; W = Wensleydale.

F = Female; M = Male.

TABLE XII.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
ADVANCED SCRAPIE GROUP.

Case number.	Number of vacuoles per 20 sections at 10 segments of the cord.										Total No. of vacuoles in 200 sections.
	C_4	C_6	C_7	C_8	T_1	T_6	L_3	L_5	L_6	S_1	
S36	318	1106	1451	991	1093	331	283	460	482	421	6936
S10	102	157	258	223	168	49	88	213	386	323	1967
S12	128	280	278	366	228	80	58	138	153	190	1899
S30	44	79	120	159	101	93	20	56	118	78	868
S20	87	93	78	73	75	148	86	58	71	63	832
S27	28	52	76	88	48	20	25	46	64	136	583
S 9	20	63	40	60	27	52	13	42	77	69	463
S17	5	42	55	63	27	16	13	51	86	75	433
S33	11	12	64	39	9	20	6	6	17	8	192
S28	8	15	26	22	3	13	6	7	21	42	163

TABLE XIII.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
NON-ADVANCED SCRAPIE GROUP.

Case number.	Number of vacuoles per 20 sections at 10 segments of the cord.										Total No. of vacuoles in 200 sections.
	C_4	C_6	C_7	C_8	T_1	T_6	L_8	L_5	L_6	S_1	
S15	72	217	417	548	340	38	43	242	393	294	2603
S35	17	22	21	22	21	72	10	38	59	72	354
S39	2	22	44	39	19	52	7	9	21	22	237
S23	9	11	10	31	16	14	11	20	56	20	198
S43	6	8	12	11	1	30	32	4	5	3	112
S21	12	12	10	9	3	10	29	5	12	1	103
S19	4	7	2	1	3	36	2	1	4	28	88
S26	1	2	2	-	4	26	7	2	3	3	50
S24	2	5	14	7	-	9	8	-	-	-	44
S14	4	-	3	2	4	-	-	3	1	3	20

TABLE XIV.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
EXPERIMENTAL SCRAPIE GROUP.

Case number.	Number of vacuoles per 20 sections at 10 segments of the cord.										Total No. of vacuoles in 200 sections.
	C_4	C_6	C_7	C_8	T_1	T_6	L_3	L_5	L_6	S_1	
E 5	3	5	15	9	5	6	2	-	11	13	69
E18	5	5	2	13	3	6	3	6	4	7	54
E 2	-	1	4	5	-	-	-	4	2	19	35
E 6	2	4	2	3	1	-	7	-	11	2	32
E 7	-	1	-	-	2	4	3	12	2	8	32
E 9	2	6	-	6	5	1	1	6	-	4	31
E 1	-	8	3	-	2	3	-	3	7	2	28
E 3	3	-	2	-	-	1	-	5	-	11	22
E10	-	4	-	-	4	1	2	3	-	6	20
E 8	1	1	3	5	1	1	3	3	-	-	18
E17	1	-	1	7	4	-	-	-	-	-	13
E12	5	-	-	-	5	-	1	-	-	1	12
E19	-	3	-	-	-	3	2	-	-	3	11
E14	-	1	-	-	8	-	-	-	-	-	9
E16	4	-	-	-	1	-	-	1	1	-	7
E15	1	1	-	-	1	-	-	1	-	2	6
E13	1	3	-	-	-	-	-	-	1	1	6
E20	-	-	1	-	-	1	-	2	1	-	5
E11	1	1	-	-	-	-	-	1	-	-	3
E 4	-	-	-	-	-	-	-	-	-	-	-

TABLE XV.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
ADVANCED SCRAPIE GROUP.

Case number.	Number of vacuoles in each zone in 200 sections from ten segments of the cord.			Total No. of vacuoles in 200 sections.
	Zone A.	Zone B.	Zone C.	
S36	6044	861	31	6936
S10	1890	75	2	1967
S12	1744	122	33	1899
S30	849	14	5	868
S20	779	25	28	832
S27	575	5	3	583
S 9	448	9	6	463
S17	419	6	8	433
S33	185	1	6	192
S28	149	7	7	163

TABLE XVI.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
NON-ADVANCED SCRAPIE GROUP.

Case number.	Number of vacuoles in each zone in 200 sections from ten segments of the cord.			Total No. of vacuoles in 200 sections.
	Zone A.	Zone B.	Zone C.	
S15	2765	136	2	2603
S35	333	9	12	354
S39	192	5	40	237
S23	196	-	2	198
S43	77	7	28	112
S21	97	1	5	103
S19	78	-	10	88
S26	24	-	26	50
S24	37	3	4	44
S14	20	-	-	20

TABLE XVII.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
EXPERIMENTAL SCRAPIE GROUP.

Case Number.	Number of vacuoles in each zone in 200 sections from ten segments of the cord.			Total No. of vacuoles in 200 sections.
	Zone A.	Zone B.	Zone C.	
E 5	66	-	3	69
E18	47	-	7	54
E 2	32	3	-	35
E 6	30	-	2	32
E 7	18	14	-	32
E 9	28	2	1	31
E1	26	-	2	28
E 3	21	-	1	22
E10	16	1	3	20
E 8	17	-	1	18
E17	13	-	-	13
E12	11	-	1	12
E19	7	-	4	11
E14	9	-	-	9
E16	7	-	-	7
E15	6	-	-	6
E13	6	-	-	6
E20	5	-	-	5
E11	3	-	-	3
E 4	-	-	-	0

TABLE XVIII.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
NATURAL SCRAPIE GROUP.

Case number.	Number of vacuoles per ten sections from five segments of the cord.					Total No. of vacuoles in 50 sections.
	C_4	C_7	T_6	L_3	S_1	
S 2	32	180	24	68	70	374
S 5	-	18	25	6	5	54
S 6	48	126	38	26	132	370
S 8	9	23	78	28	51	189
S 9	10	20	26	6	38	100
S10	51	129	24	44	193	441
S12	64	139	40	29	76	348
S14	2	1	-	-	-	3
S15	36	208	19	21	196	480
S16	-	5	16	10	3	34
S17	2	27	8	6	43	86
S18	4	7	6	1	7	25
S19	2	1	18	1	2	24
S20	43	39	74	43	35	234
S21	6	5	5	15	6	37
S22	38	60	12	12	40	162
S23	4	6	7	5	28	50
S24	1	7	4	4	-	16
S26	1	1	13	3	1	19
S27	14	38	10	12	32	106
S28	4	13	6	3	10	36
S29	7	15	21	10	12	65
S32	22	60	46	10	59	197
S33	5	32	10	3	8	58
S34	24	12	22	-	28	86
S35	8	11	36	5	29	89
S36	159	725	165	141	241	1431
S37	4	-	5	2	1	12
S38	-	1	23	2	7	33
S39	1	22	26	3	10	62
S40	3	3	7	20	7	40
S41	3	27	15	11	13	69
S42	6	29	11	7	24	77
S43	3	6	15	16	2	42
S44	51	247	13	90	271	672
S45	-	1	-	3	-	4
S47	-	2	7	-	3	12
S48	6	23	17	8	84	138
S49	1	22	9	6	5	43
S50	8	73	8	24	22	135
S51	-	2	22	1	12	37
S52	-	2	-	-	1	3
S53	1	18	4	3	13	39
S54	5	17	5	11	7	45
S55	2	27	6	6	6	47
S56	43	452	68	24	120	707
S57	6	17	35	11	21	90
S58	-	-	8	7	6	21
S61	6	16	22	13	9	66
S62	6	-	3	-	5	14

TABLE XIX.
VACUOLATION OF NEURONES IN THE SPINAL CORD.
NATURAL SCRAPIE GROUP.

Case number.	Number of vacuoles in each zone in 50 sections from five segments of the cord.			Total No. of vacuoles in 50 sections.
	Zone A.	Zone B.	Zone C.	
S 2	336	37	1	374
S 5	43	3	8	54
S 6	358	10	2	370
S 8	159	3	27	189
S 9	94	3	3	100
S10	420	19	2	441
S12	308	24	16	348
S14	3	-	-	3
S15	461	18	1	480
S16	22	1	11	34
S17	81	1	4	86
S18	21	2	2	25
S19	19	-	5	24
S20	212	8	14	234
S21	34	-	3	37
S22	146	14	2	162
S23	49	-	1	50
S24	14	-	2	16
S26	6	-	13	19
S27	103	2	1	106
S28	31	2	3	36
S29	41	8	16	65
S32	190	4	3	197
S33	55	-	3	58
S34	86	-	-	86
S35	80	3	6	89
S36	1243	173	15	1431
S37	12	-	-	12
S38	13	-	20	33
S39	41	1	20	62
S40	24	-	16	40
S41	62	1	6	69
S42	67	2	8	77
S43	25	3	14	42
S44	629	38	5	672
S45	4	-	-	4
S47	7	1	4	12
S48	125	4	9	138
S49	38	1	4	43
S50	128	2	5	135
S51	31	-	6	37
S52	3	-	-	3
S53	38	1	-	39
S54	41	-	4	45
S55	40	-	7	47
S56	630	70	7	707
S57	76	2	12	90
S58	10	-	11	21
S61	54	1	11	66
S62	14	1	-	14

TABLE XX.
VACUOLATION OF NEURONES IN THE SPINAL GANGLIA.
NATURAL SCRAPIE GROUP.

Case No.	Number of vacuoles per 16 sections in ganglia from three regions of the cord.			Number of unilocular, bilocular and multilocular vacuoles.			Total No. of vacuoles in 48 sections.
	Cervical intumescentia region.	Mid-thoracic region.	Lumbo-sacral intumescentia region.	Unilocular single vacuoles.	Bilocular vacuoles or 2 vacuoles per cell.	Multi-locular or multiple vacuoles.	
S 1	2	4	2	8	-	-	8
S 6	-	3	-	3	-	-	3
S 9	-	-	-	-	-	-	-
S10	-	6	-	6	-	-	6
S12	-	-	-	-	-	-	-
S14	-	-	6	-	6	-	6
S15	2	3	9	11	3	-	14
S17	5	3	8	13	2	1	16
S19	-	-	1	1	-	-	1
S20	-	1	-	1	-	-	1
S21	3	-	4	3	-	4	7
S22	-	-	1	1	-	-	1
S23	7	5	4	13	-	3	16
S24	1	-	3	3	-	1	4
S25	-	2	-	2	-	-	2
S26	3	-	-	3	-	-	3
S27	8	-	8	16	-	-	16
S28	1	-	-	1	-	-	1
S29	9	2	2	13	-	-	13
S30	-	-	2	2	-	-	2
S32	-	-	-	-	-	-	-
S33	-	-	-	-	-	-	-
S35	1	4	9	13	1	-	14
S36	3	7	8	10	-	8	18
S38	-	-	-	-	-	-	-
S39	6	-	-	5	1	-	6
S40	-	-	3	-	3	-	3
S41	4	7	-	9	2	-	11
S43	-	1	-	1	-	-	1
S44	5	1	5	11	-	-	11

TABLE XXI.
VACUOLATION OF NEURONES IN THE SPINAL GANGLIA.
EXPERIMENTAL SCRAPIE GROUP.

Case No.	Number of vacuoles per 16 sections in ganglia from three regions of the cord.			Number of unilocular, bilocular and multilocular vacuoles.			Total No. of vacuoles in 48 sections.
	Cervical intumescentia region.	Mid-thoracic region.	Lumbo-sacral intumescentia. region.	Unilocular single vacuoles.	Bilocular vacuoles or 2 vacuoles per cell.	Multi-locular or multiple vacuoles.	
E 1	1	-	-	1	-	-	1
E 2	4	-	-	4	-	-	4
E 3	-	-	-	-	-	-	-
E 4	16	-	3	19	-	-	19
E 5	-	-	-	-	-	-	-
E 6	-	2	-	2	-	-	2
E 8	4	2	2	6	2	-	8
E 9	9	4	4	14	-	3	17
E10	-	-	-	-	-	-	-
E21	-	-	8	3	2	3	8

TABLE XXII.

VACUOLATION OF NEURONES IN THE SPINAL GANGLIA.

CONTROL GROUP.

Case No.	Number of vacuoles per 16 sections in ganglia from three regions of the cord.			Number of unilocular bilocular and multilocular vacuoles.			Total No. of vacuoles in 48 sections.
	Cervical intumescentia region.	Mid-thoracic region.	Lumbo-sacral intumescentia region.	Unilocular single vacuoles.	Bilocular vacuoles or 2 vacuoles per cell.	Multi-locular or multiple vacuoles.	
C 6	-	-	-	-	-	-	-
C12	2	1	7	9	1	-	10
C13	7	5	3	5	4	6	15
C14	3	-	3	5	1	-	6
C15	2	-	-	2	-	-	2
C27	-	-	2	2	-	-	2
C28	3	1	4	7	1	-	8
C34	-	4	2	2	-	4	6
C35	10	-	-	-	10	-	10
C53	1	1	1	3	-	-	3

TABLE XXIII.
VACUOLATION OF NEURONES IN THE SYMPATHETIC GANGLIA.
NATURAL SCRAPIE GROUP.

Case No.	Number of vacuoles per 16 sections.			Number of unilocular, bilocular and multilocular vacuoles.			Total No. of vacuoles in 48 sections.
	Stellate ganglia.	Sympathetic thoracic trunk ganglia.	Coeliaco mesenteric ganglia.	Unilocular single vacuoles.	Bilocular vacuoles or 2 vacuoles per cell.	Multi-locular or multiple vacuoles.	
S 2	1	1	-	2	-	-	2
S 6	-	-	-	-	-	-	-
S 7	-	-	-	-	-	-	-
S 8	-	-	-	-	-	-	-
S10	-	-	-	-	-	-	-
S12	3	-	4	5	-	2	7
S14	10	-	-	10	-	-	10
S17	-	-	-	-	-	-	-
S18	1	-	-	1	-	-	1
S19	-	1	2	3	-	-	3
S20	1	2	1	4	-	-	4
S21	-	-	-	-	-	-	-
S22	2	-	-	2	-	-	2
S23	2	1	-	3	-	-	3
S24	2	-	-	2	-	-	2
S25	5	-	-	5	-	-	5
S26	1	1	1	3	-	-	3
S27	-	-	1	1	-	-	1
S36	1	-	1	2	-	-	2
S37	-	-	2	2	-	-	2
S38	2	-	-	2	-	-	2
S39	-	-	-	-	-	-	-
S40	-	-	2	2	-	-	2
S41	1	2	-	3	-	-	3
S44	-	2	1	3	-	-	3
S46	-	-	-	-	-	-	-
S68	-	-	-	-	-	-	-
S70	1	1	-	2	-	-	2
S71	-	-	2	2	-	-	2
S72	-	2	-	2	-	-	2

TABLE XXIV.
VACUOLATION OF NEURONES IN THE SYMPATHETIC GANGLIA.
EXPERIMENTAL SCRAPIE GROUP.

Case No.	Number of vacuoles per 16 sections.			Number of unilocular, bilocular and multilocular vacuoles.			Total No. of vacuoles in 48 sections.
	Stellate ganglia.	Sympathetic thoracic trunk ganglia.	Coeliaco mesenteric ganglia.	Unilocular single vacuoles.	Bilocular vacuoles or 2 vacuoles per cell.	Multi-locular or multiple vacuoles.	
E 8	-	-	-	-	-	-	-
E21	-	-	1	1	-	-	1
E32	1	-	-	1	-	-	1
E33	2	-	-	2	-	-	2
E34	-	-	-	-	-	-	-
E35	-	-	-	-	-	-	-
E36	-	-	-	-	-	-	-
E37	-	1	-	1	-	-	1
E38	1	-	-	1	-	-	1
E39	-	-	-	-	-	-	-

TABLE XXV.
VACUOLATION OF NEURONES IN THE SYMPATHETIC GANGLIA.
CONTROL GROUP.

Case No.	Number of vacuoles per 16 sections.			Number of unilocular, bilocular and multilocular vacuoles.			Total No. of vacuoles in 48 sections.
	Stellate ganglia.	Sympathetic thoracic trunk ganglia.	Coeliaco mesenteric ganglia.	Unilocular single vacuoles.	Bilocular vacuoles or 2 vacuoles per cell.	Multi-locular or multiple vacuoles.	
C 2	1	-	5	4	-	2	6
C 8	2	-	2	4	-	-	4
C 9	-	-	-	-	-	-	-
C11	-	1	-	1	-	-	1
C14	-	-	-	-	-	-	-
C15	-	1	-	1	-	-	1
C22	-	-	1	1	-	-	1
C23	4	3	-	7	-	-	7
C28	-	-	-	-	-	-	-
C33	1	1	1	3	-	-	3
C34	2	-	-	2	-	-	2
C35	-	-	-	-	-	-	-
C37	-	-	-	-	-	-	-
C38	1	-	-	1	-	-	1
C39	1	-	-	1	-	-	1

Fig. 1. Central chromatolysis in a neurone from the spinal cord. A small accumulation of basophilic material is present on one side of the eccentric nucleus. Natural scrapie, H & E.

Fig. 2. More advanced central chromatolysis in a spinal cord neurone. The nucleus is eccentric and shrunken, and its membrane is indented and thickened by an accumulation of basophilic material. Natural scrapie, H & E.

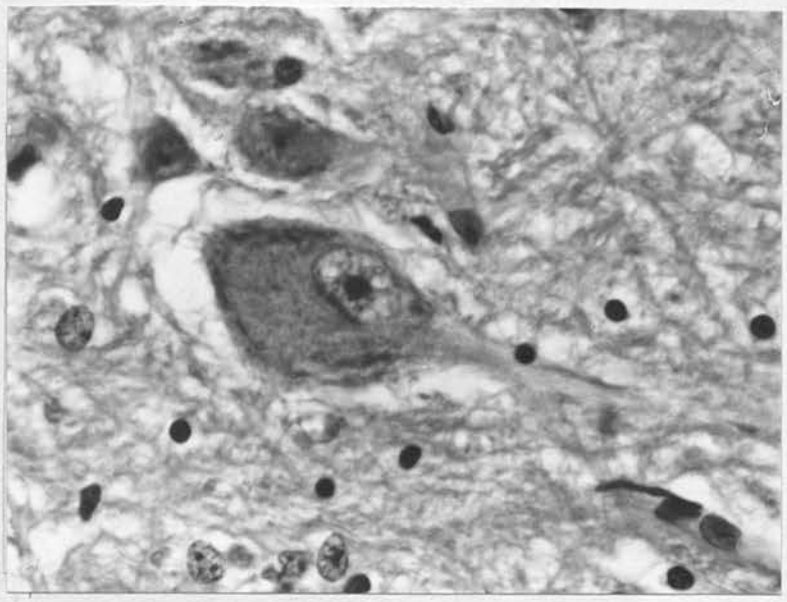


Fig. 1 X 680

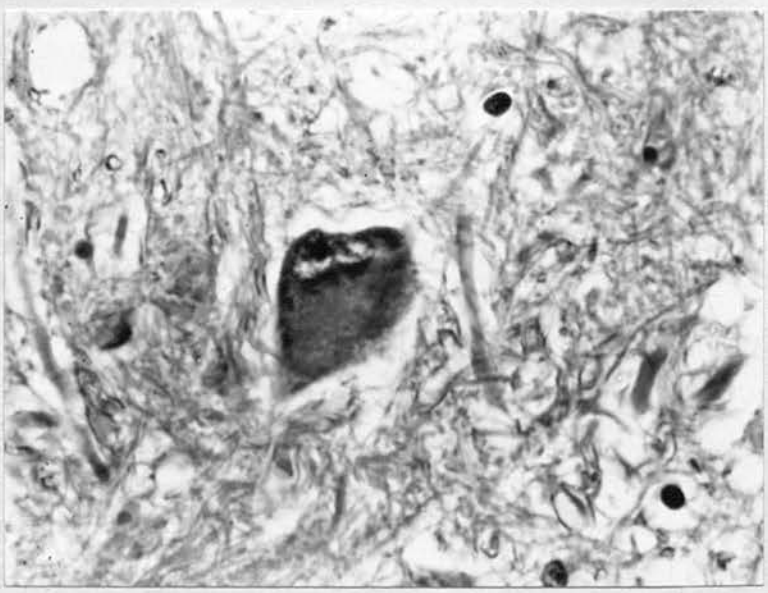


Fig. 2 X 680

Fig. 3. Diffuse chromatolysis in a very swollen neurone from the spinal cord. Experimental scrapie, H & E.

Fig. 4. Early acute swelling in a neurone from the spinal cord. The cell and its processes are very swollen and the Nissl substance is finely powdered. Natural scrapie, H & E.

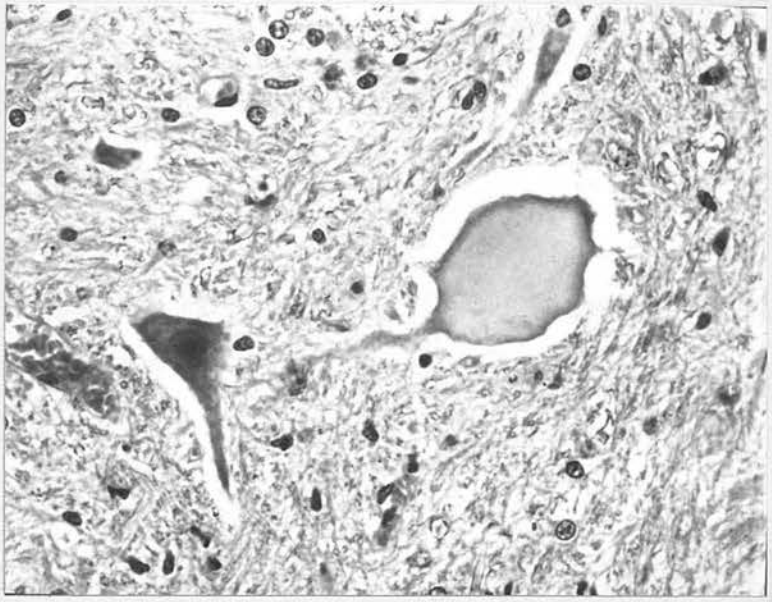


Fig. 3 X 440

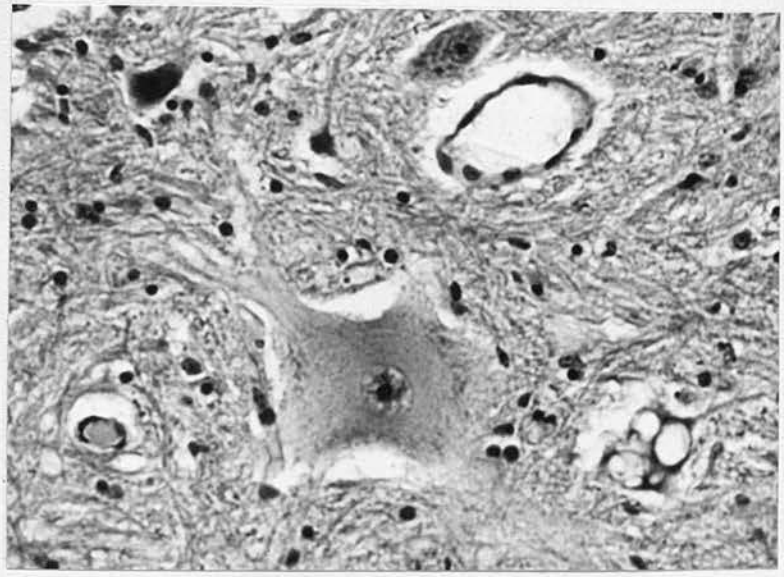


Fig. 4 X 300

Fig. 5. The process of an acutely swollen neurone from the spinal cord. The pale areas of early cavitation in the cytoplasm suggest an advanced stage of degeneration approaching severe cell change. Note the dividing nuclei of the glial cells near the process. Natural scrapie, H.& E.

Fig. 6. Degenerating and chromatolytic neurones in the spinal cord. The large neurone to the right of the centre of the figure shows severe cell change. The nucleus is pyknotic and eccentric and the cytoplasm eosinophilic and showing small cavities near the periphery. Natural scrapie, H.& E.

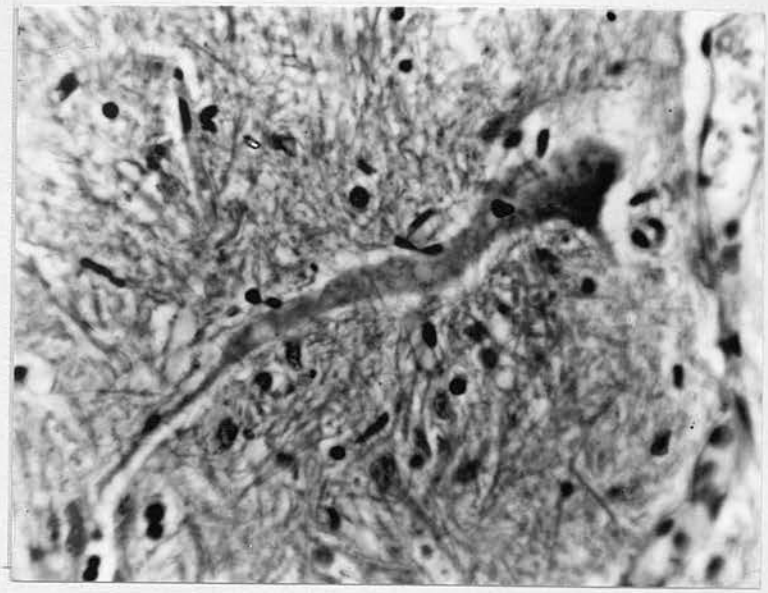


Fig. 5 X 680

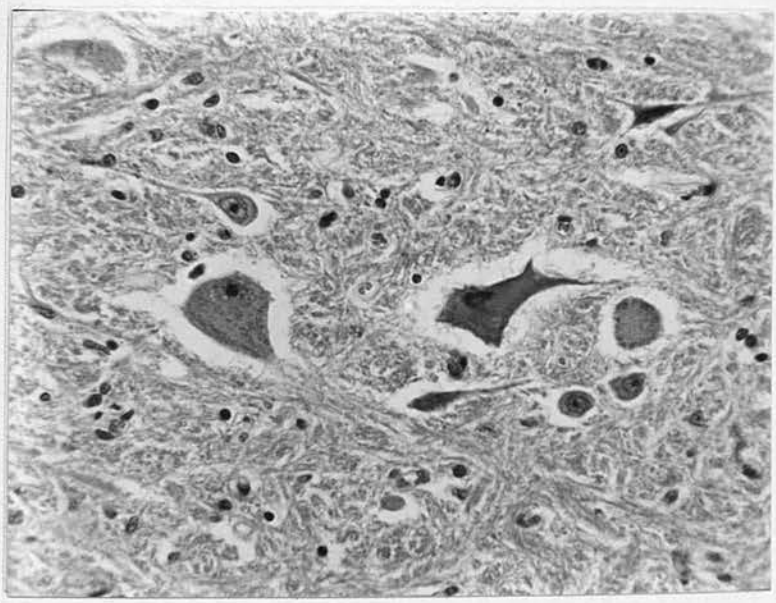


Fig. 6 X 220

Fig. 7. Appearance of the neurofibrils in a neurone from the spinal cord of a healthy control sheep. Holmes' method.

Fig. 8. Coagulation and fragmentation of the neurofibrils in severe cell change in a neurone of the spinal cord. Natural scrapie, Holmes' method.

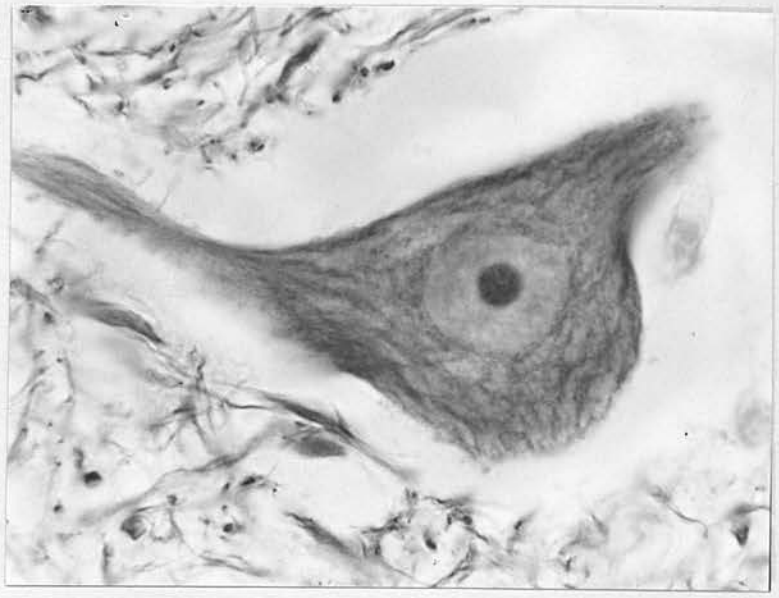


Fig. 7 X 1800

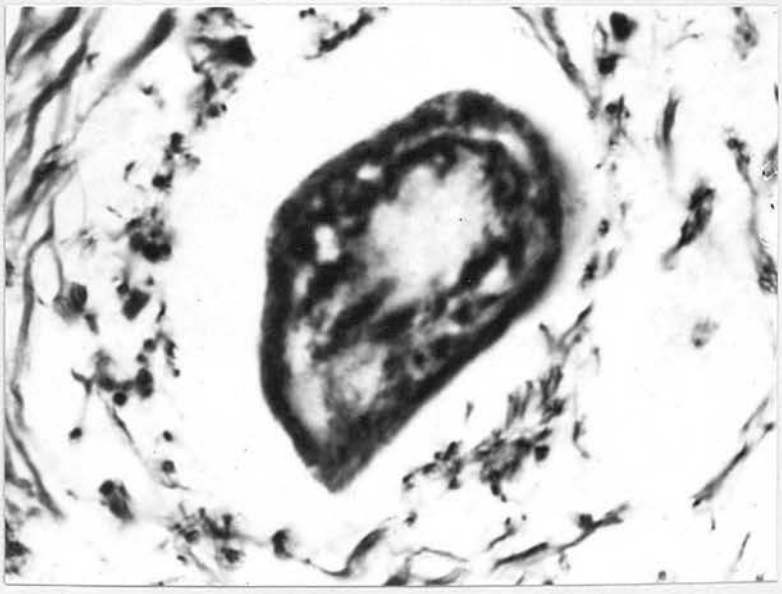


Fig. 8 X 1800

Fig. 9. Sclerotic neurone from the spinal cord. The cell is shrunken, the neurofibrils coagulated, and the process long and tortuous. Natural scrapie, Holmes' method.

Fig. 10. Early acidophilic necrosis in a neurone from the spinal cord. The cytoplasm of the neurone is eosinophilic and the pyknotic, shrunken nucleus is eccentric. Natural scrapie, H & E.

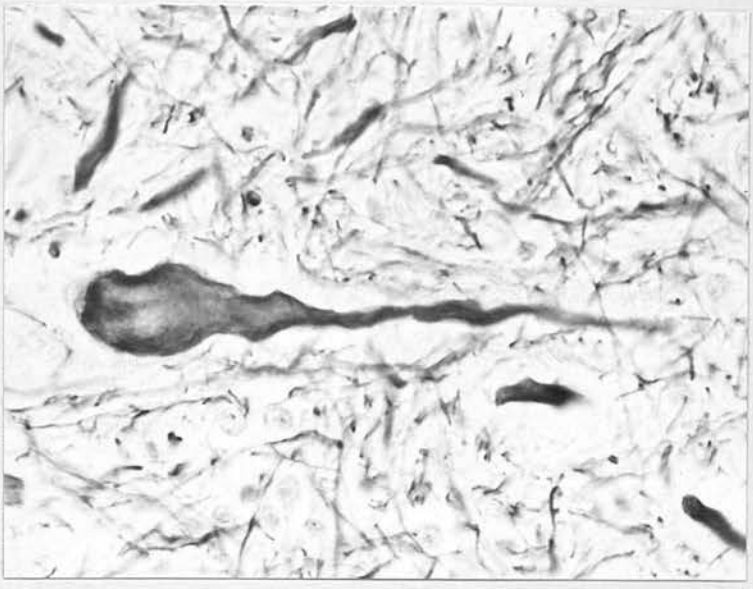


Fig. 9 X 720

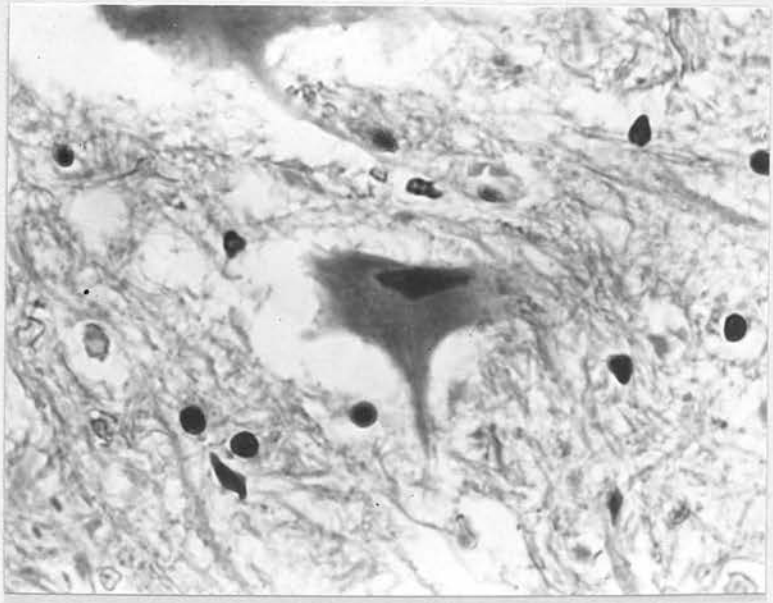


Fig. 10 X 680

Fig. 11. A similar neurone to that illustrated in Fig. 10, but in a more advanced stage of acidophilic necrosis. Natural scrapie, H & E.

Fig. 12. Completely necrotic neurone from the spinal cord. No nucleus is visible and the cytoplasm is homogenous and eosinophilic. The single process may be beginning to break down. Natural scrapie, H & E.

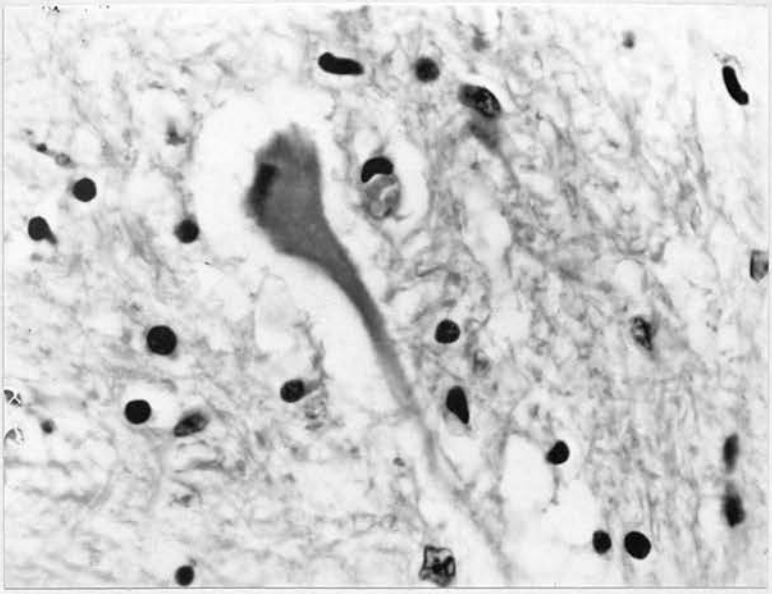


Fig. 11 X 680

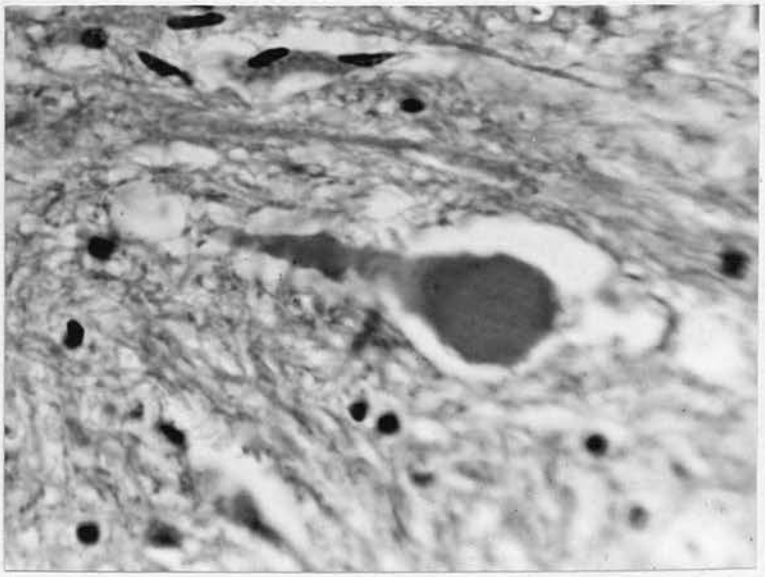


Fig. 12 X 680

Fig. 13. Two nuclei in a neurone from the spinal cord. Natural scrapie, H & E.

Fig. 14. Small single vacuole in the cytoplasm of an apparently normal neurone from the spinal cord. Natural scrapie, H & E.

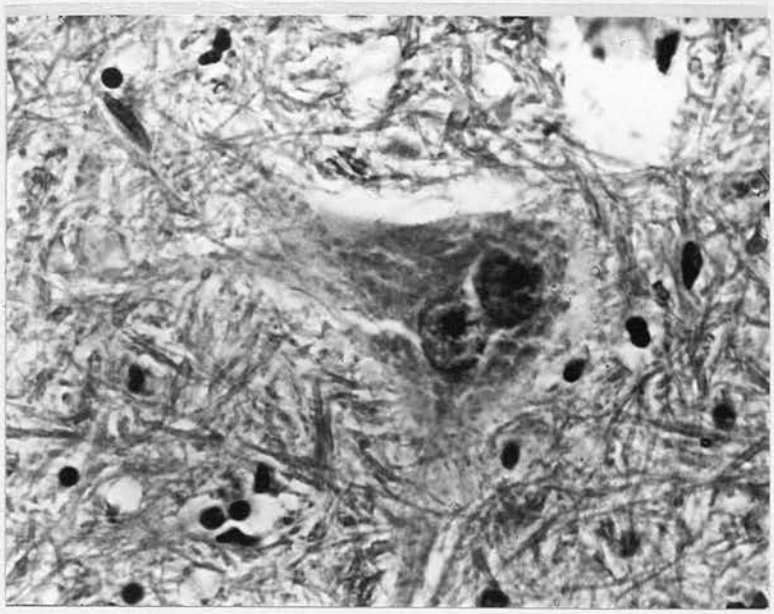


Fig. 13 X 680

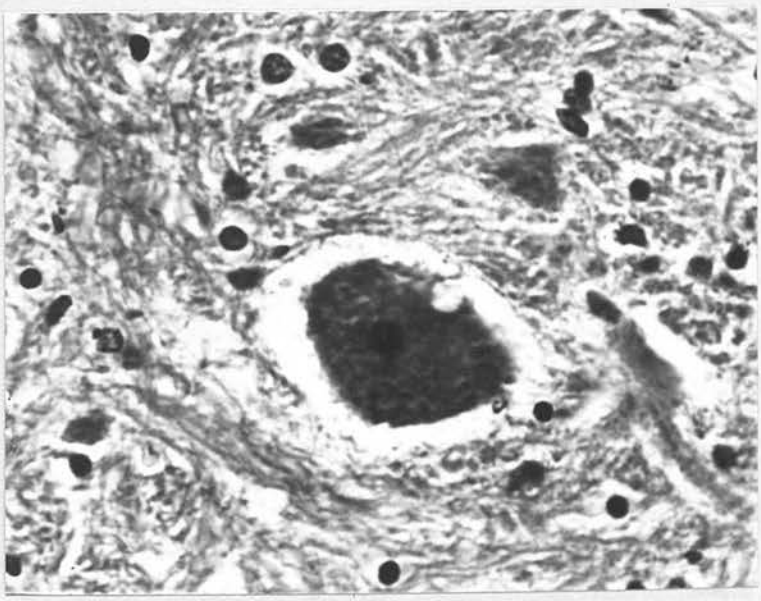


Fig. 14 X 680

Fig. 15. Unilocular vacuolation in the spinal cord. The small vacuolated neurone is almost normal except for slight chromatolysis around the vacuole. In the neurone on the right the vacuole is much larger, and Nissl substance is powdery except near the nucleus which is pyknotic and shrunken. The vacuole on the left is very large and only an eosinophilic rim of cytoplasm remains. Natural scrapie, H & E.

Fig. 16. A small vacuole lying near the periphery of a spinal cord neurone, which also shows diffuse chromatolysis. Natural scrapie, Gallocyanin chromalum.

Fig. 15 X 440

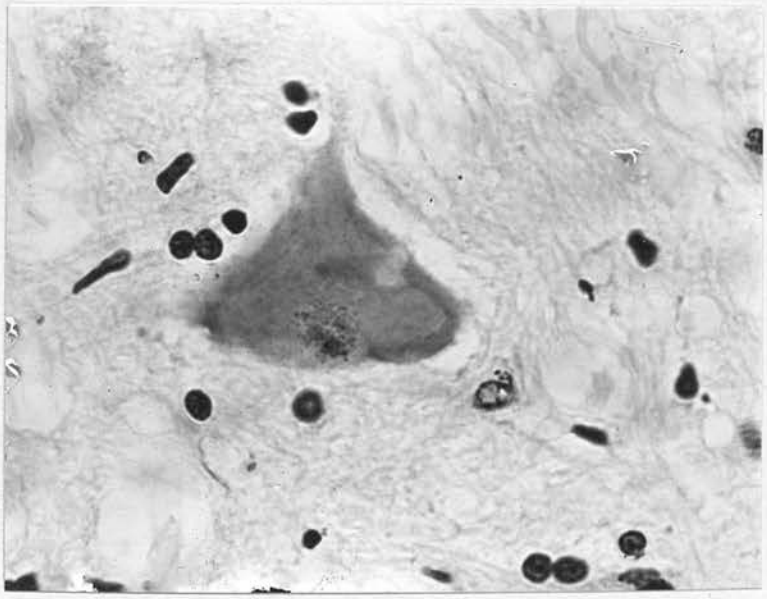


Fig. 16 X 680

Fig. 17. A sclerotic neurone showing two small vacuoles, one on the periphery of the cell. From the spinal cord of a case of natural scrapie. H.&.E.

Fig. 18. Two vacuoles in a spinal cord neurone showing early chromatolysis. The Nissl substance is present but is finely granular near the vacuoles and condensed into coarse lumps near, and particularly to the right of, the nucleus. Natural scrapie, H.& E.

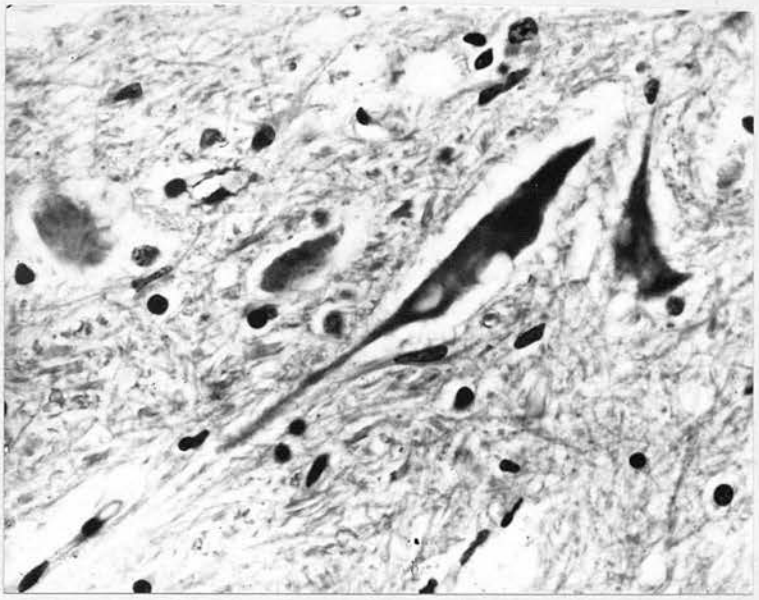


Fig. 17 X 680

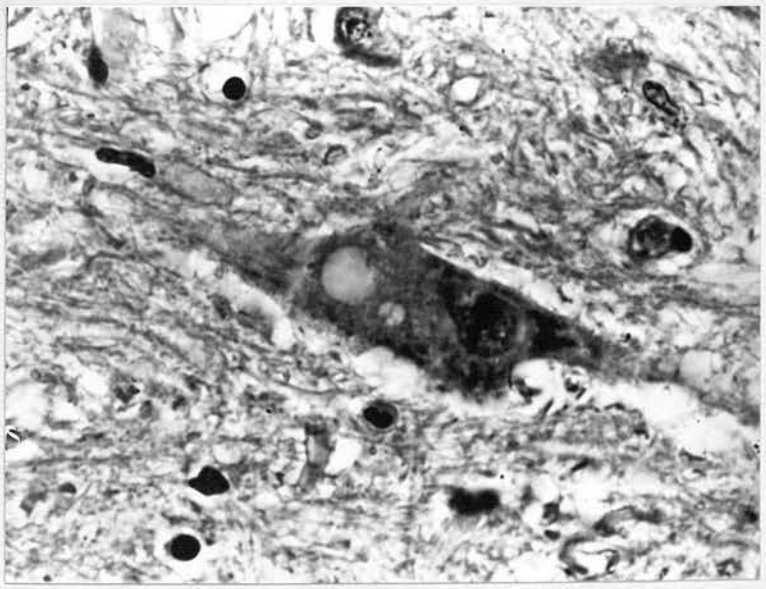


Fig. 18 X 680

Fig. 19. The spinal cord neurone on the left shows small multiple vacuoles and is in an advanced stage of chromatolysis. The nucleus is eccentric. Natural scrapie, H & E.

Fig. 20. Small multiple vacuoles in a severely degenerated spinal cord neurone. The eccentric nucleus is pyknotic and the periphery of the eosinophilic cytoplasm is cavitated. Natural scrapie, H & E.

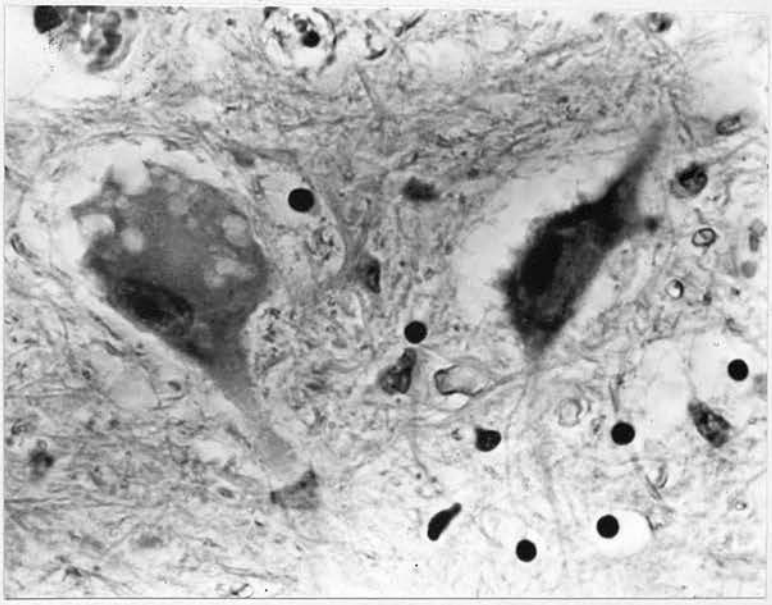


Fig. 19 X 680

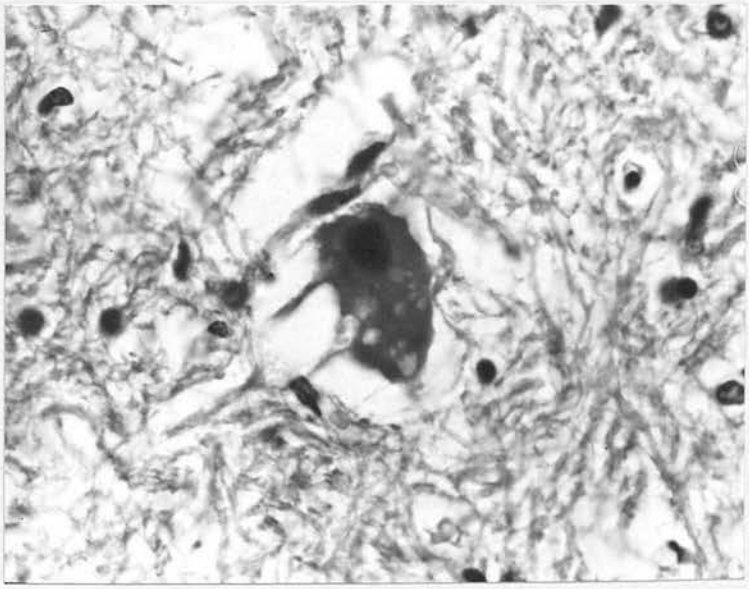


Fig. 20 X 680

Fig. 21. Large and small multiple vacuoles in a spinal cord neurone showing moderate chromatolysis and eccentric nucleus. The increasing size of the vacuoles appear to be converting the intervacuolar cytoplasm into thin septa such as are seen in a multilocular vacuole. Natural scrapie, H & E.

Fig. 22. Multilocular vacuole in a spinal cord neurone. In this example the nucleus has remained centrally situated and the Nissl substance, apart from in the thin walls of the vacuole, is largely unaltered. Natural scrapie, Gallocyanin chromalum.

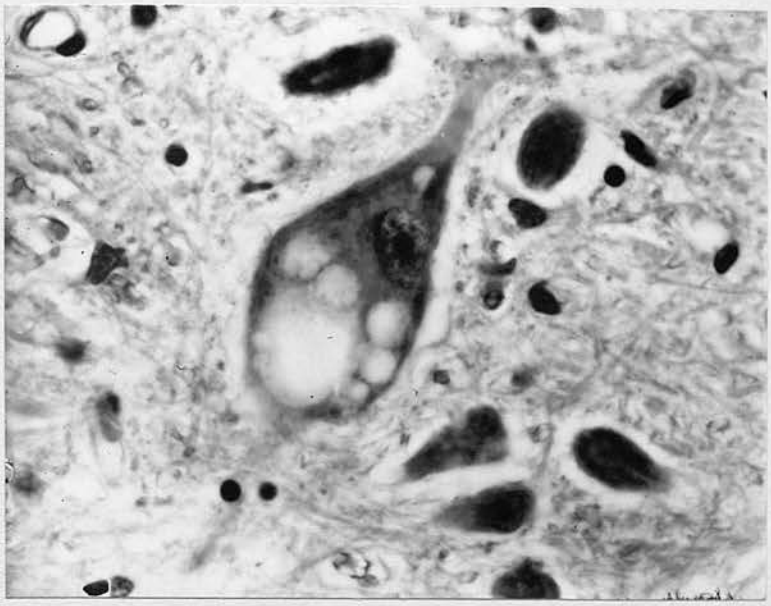


Fig. 21 X 680

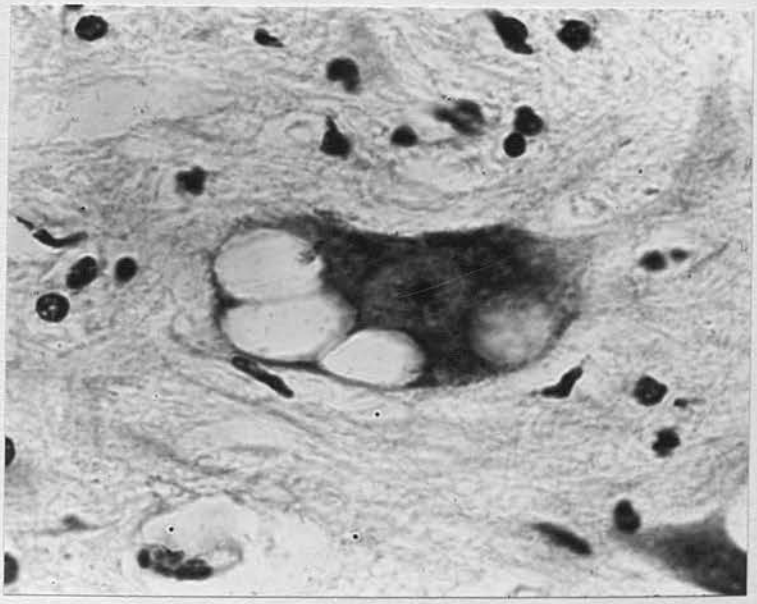


Fig. 22 X 680

Fig. 23. Large multilocular vacuoles in a chromatolytic neurone from the spinal cord. The eccentric nucleus is of normal appearance. Natural scrapie, H & E.

Fig. 24. Extensive multilocular vacuolation in a spinal cord neurone which is completely chromatolytic except for a small amount of basophilic material on the nuclear membrane. Natural scrapie, Cresyl fast violet.

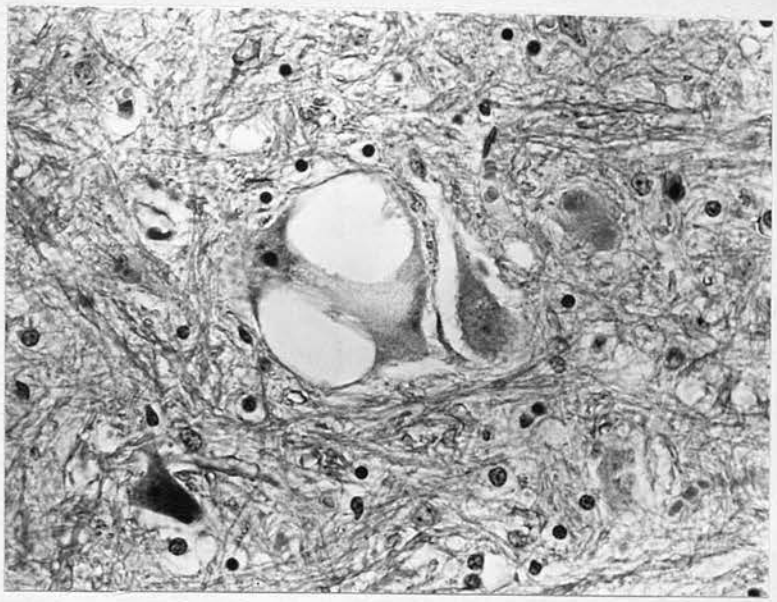


Fig. 23 X 440

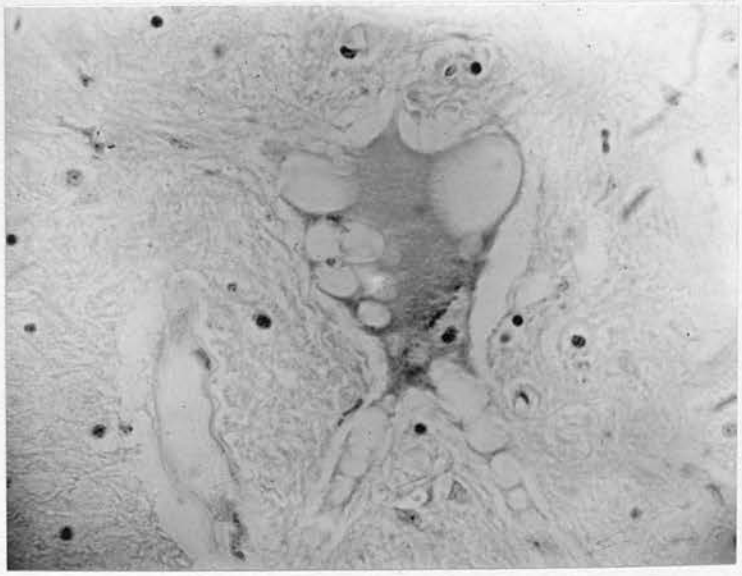


Fig. 24 X 680

Fig. 25. Extensive multilocular vacuolation of both the body and processes of a spinal cord neurone. The nucleus is small and eccentric, and little Nissl substance remains in the cytoplasm, parts of which are becoming necrotic. Two phagocytosing glial cells are present. Natural scrapie, H & E.

Fig. 26. Neuronophagia of a necrotic vacuolated neurone from the spinal cord. Only two phagocytosing glial cells are present, and their nuclei can be seen in the collapsed walls of the vacuole at the right hand side of the neurone. Natural scrapie, H & E.

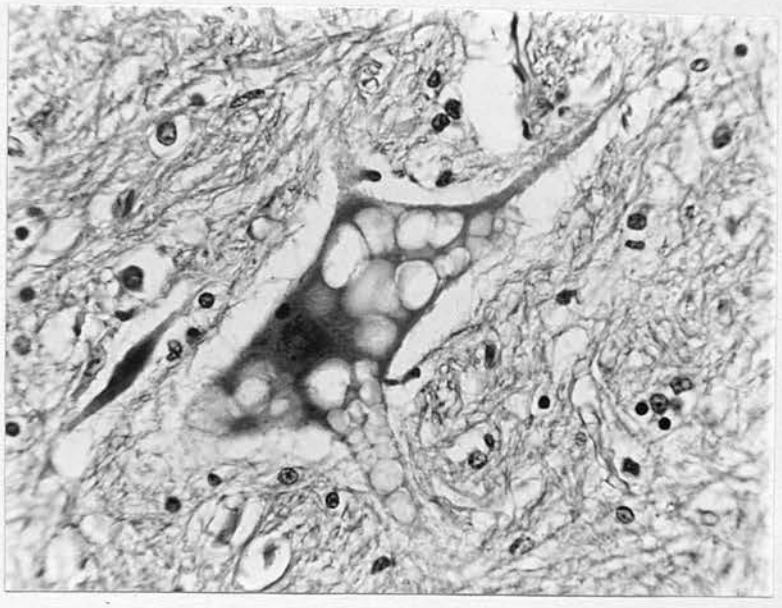


Fig. 25 X 680

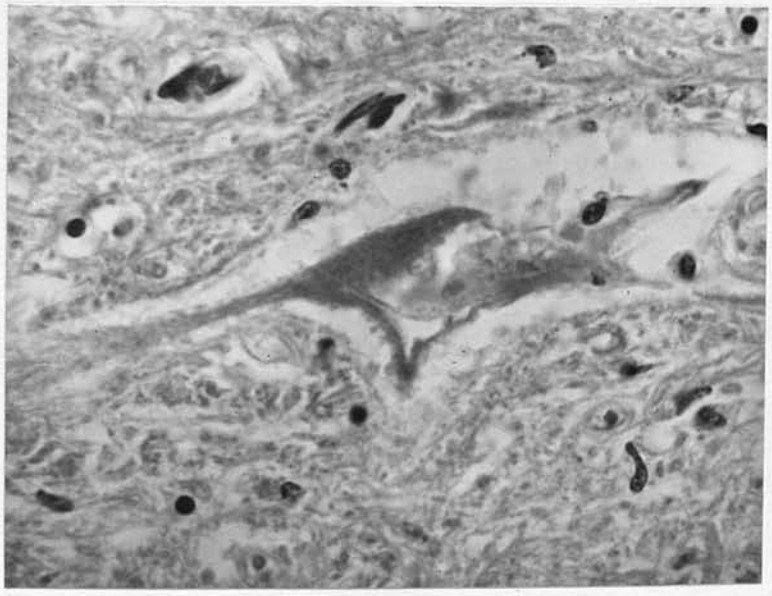


Fig. 26 X 680

Fig. 27. A vacuolated spinal cord neurone with apparently normal neurofibrils elsewhere in the cytoplasm. Natural scrapie, Holmes' method.

Fig. 28. Early vacuole formation in a neurone from the spinal cord. Beneath the nucleus is a small region of dust like disintegration of the neurofibrils, and above the nucleus are two small but, distinct vacuoles. Natural scrapie, Holmes' method.

Fig. 27 X 1800

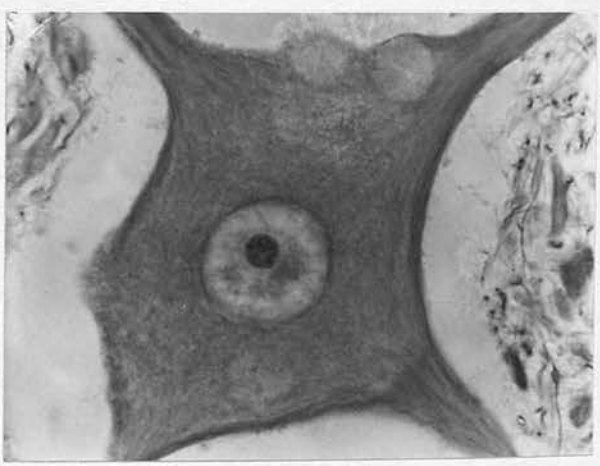


Fig. 28 X 1800

Fig. 29. Vacuolation of the process of a neurone from the spinal cord. The cell body and its Nissl substance are of normal appearance. Natural scrapie, H & E.

Fig. 30. A blood vessel passing through the cytoplasm of an apparently normal spinal cord neurone. Healthy control sheep, H & E.

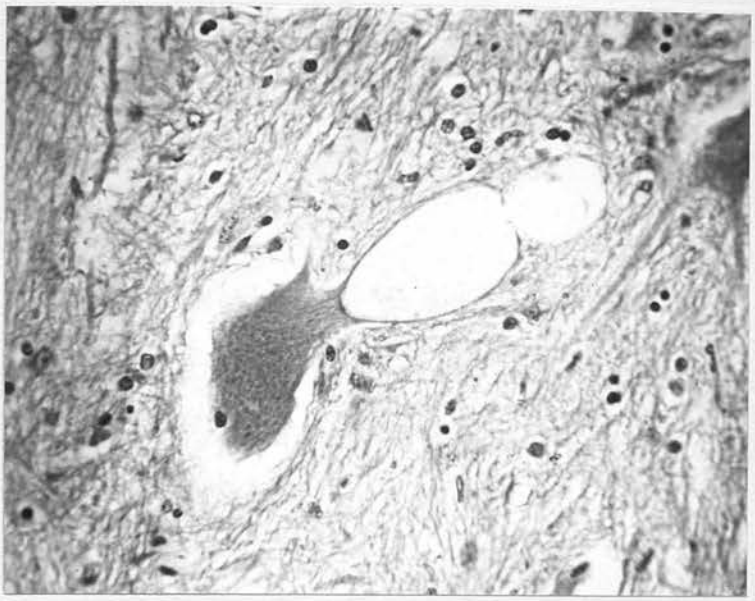


Fig. 29 X 480

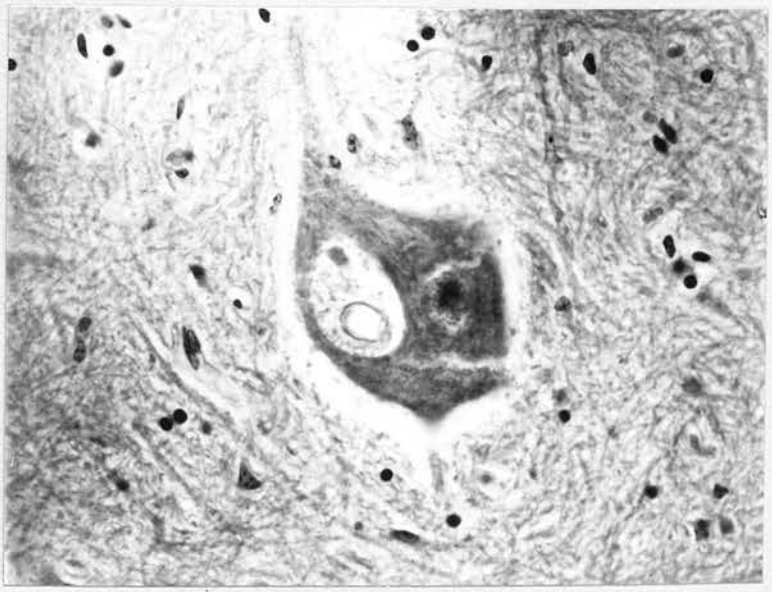


Fig. 30 X 480

Fig. 31. Granules of lipofuscin in the cytoplasm of a ventral horn neurone from the spinal cord. Healthy control sheep, P.A.S./Light green.

Fig. 32. Phloxinophilic bodies in the cytoplasm of a ventral horn neurone from the spinal cord. Natural scrapie, Haematoxylin / Phloxine / Tartrazine.

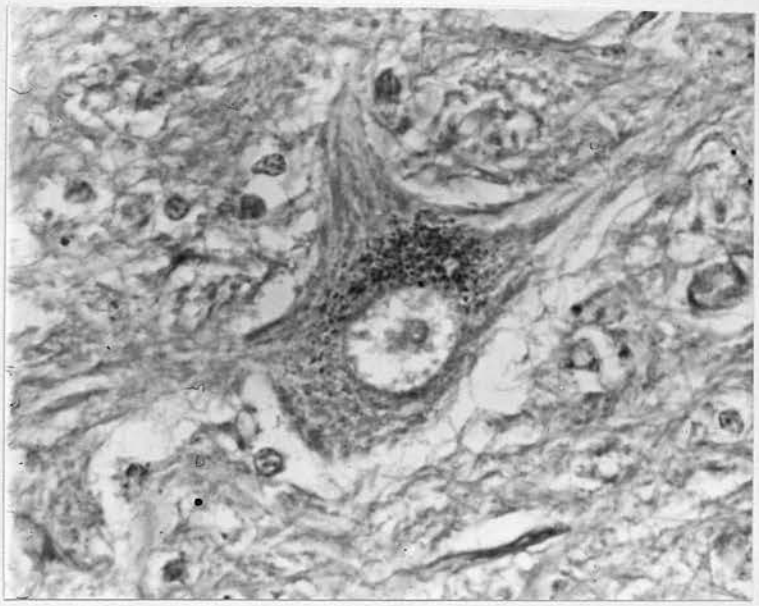


Fig. 31 X 680

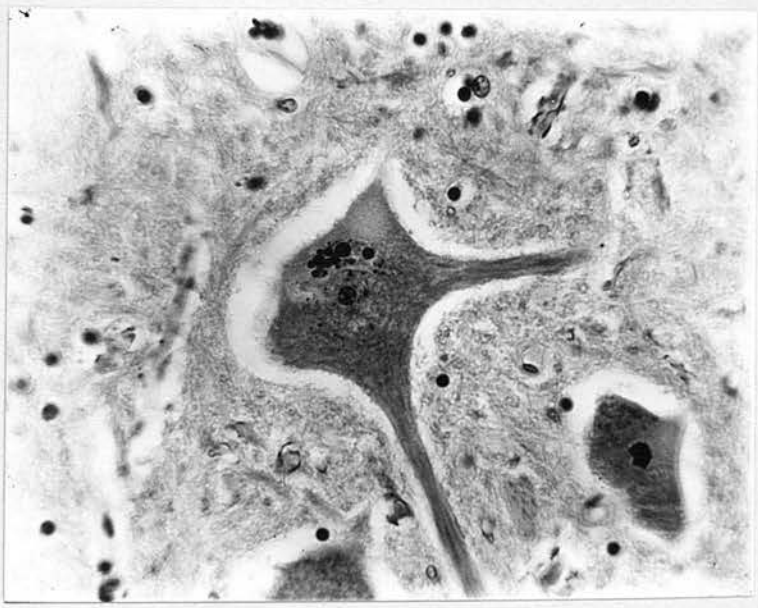


Fig. 32 X 440

Fig. 33. Neuronophagia of degenerating ventral horn neurones in the spinal cord of a case of Louping ill. H & E.

Fig. 34. Nodule of histiocytes at the site where neuronophagia of a spinal cord neurone has taken place. Louping ill, H & E.

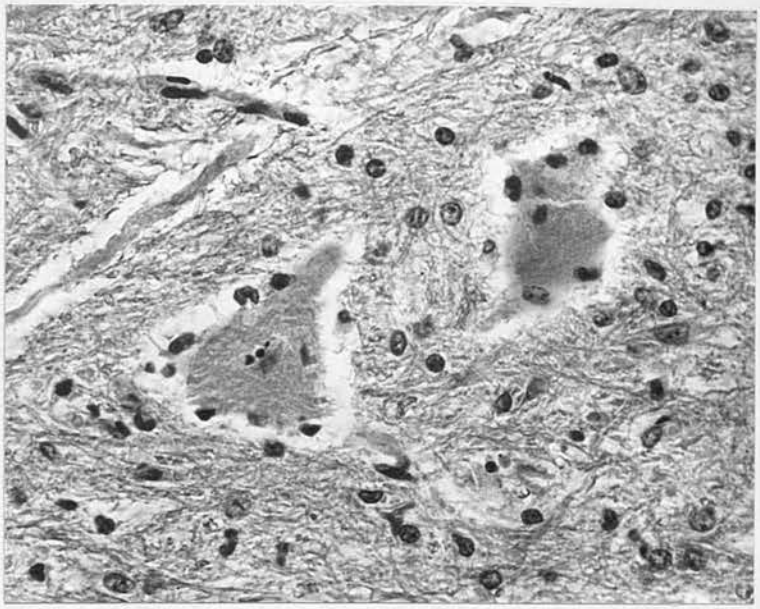


Fig. 33 X 440

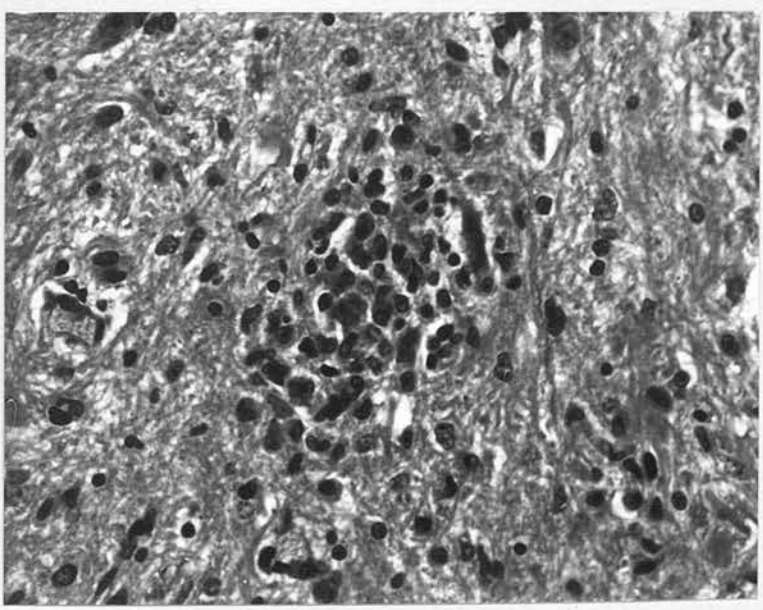


Fig. 34 X 440

Fig. 35. Unusually severe neuronophagia of an isolated neurone from the spinal cord of a case of natural scrapie. Compare with the more usual type of neuronophagia seen in scrapie in Fig. 26. P.T.A.H.

Fig. 36. Severe multilocular vacuolation of a degenerating spinal cord neurone in natural scrapie. There is no evidence of neuronophagia. H & E.

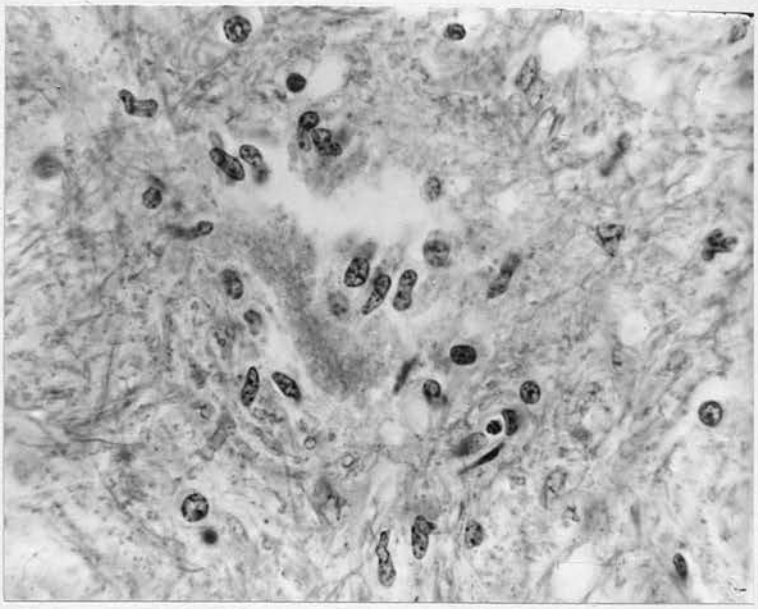


Fig. 35 X 680

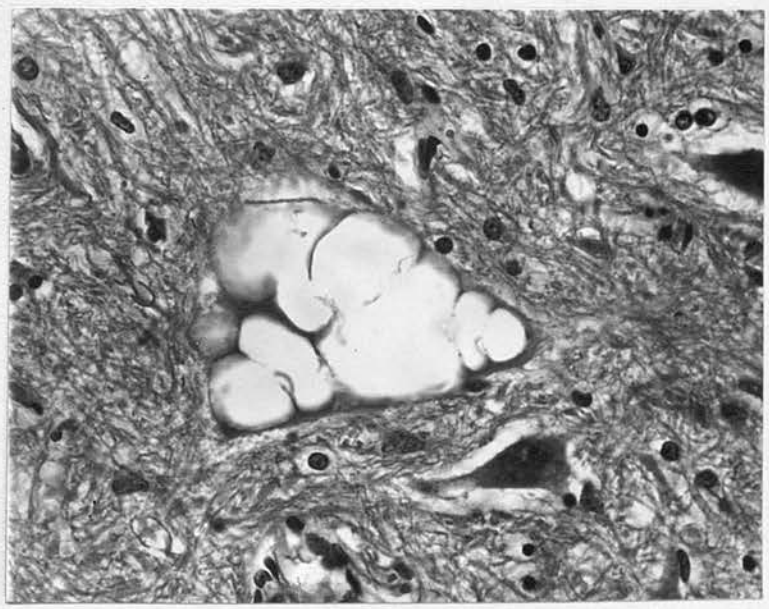


Fig. 36 X 440

Fig. 37. Astrocytes in the intermediate zone of grey matter of the spinal cord of a healthy control sheep. Cajals' gold chloride sublimate.

Fig. 38. Astrocytes in the intermediate zone of the grey matter of the spinal cord of a sheep affected with natural scrapie. Cajals' gold chloride sublimate.

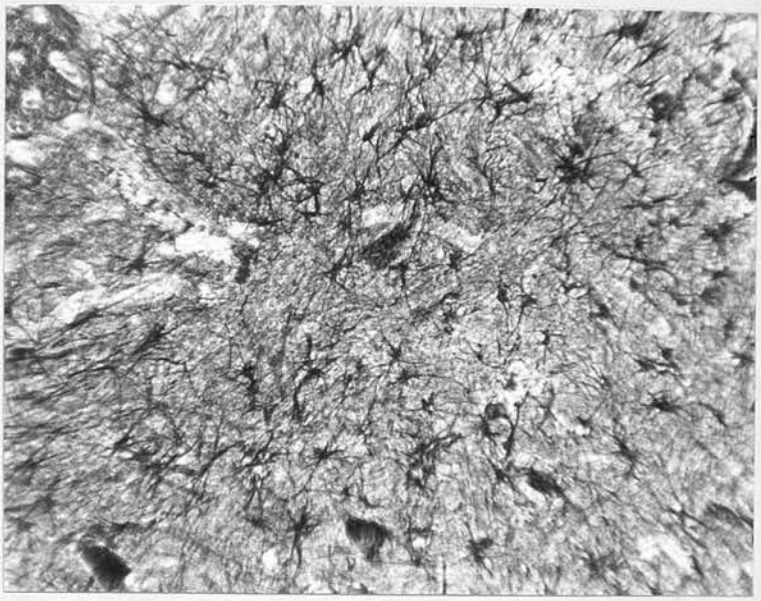


Fig. 37 X 140

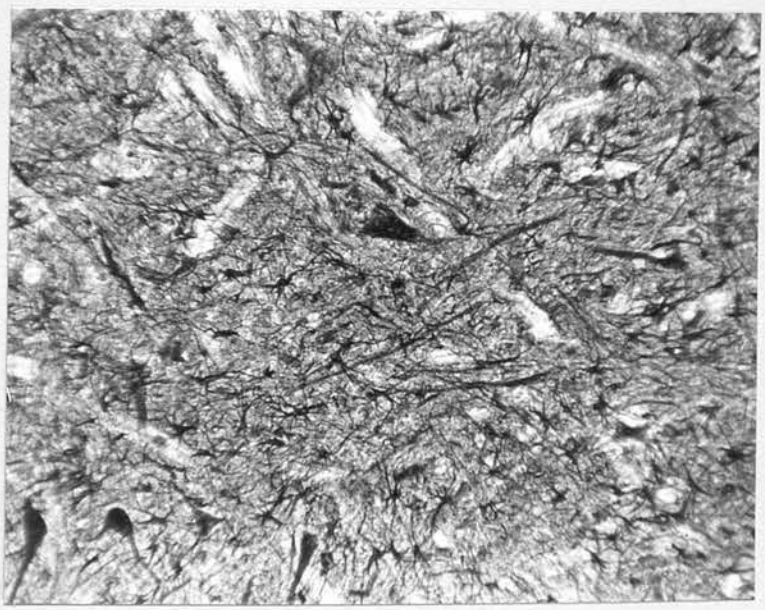


Fig. 38 X 140

Fig. 39. Large phloxinophilic intranuclear inclusion in an astrocyte in the grey matter of the spinal cord. Natural scrapie, Haematoxylin / Phloxine / Tartrazine.

Fig. 40. The nucleus of an astrocyte towards the top left of the photograph contains a very large inclusion of the type shown in Fig. 39. Lying just above the upper process of the neurone are three small glial cells with dark coloured lipofuscin in their cytoplasm. Some lipofuscin is also present in the vacuole of the neurone and appears much darker than the pale spheroidal material which is often seen in scrapie vacuoles. Natural scrapie, P.A.S. / haematoxylin.

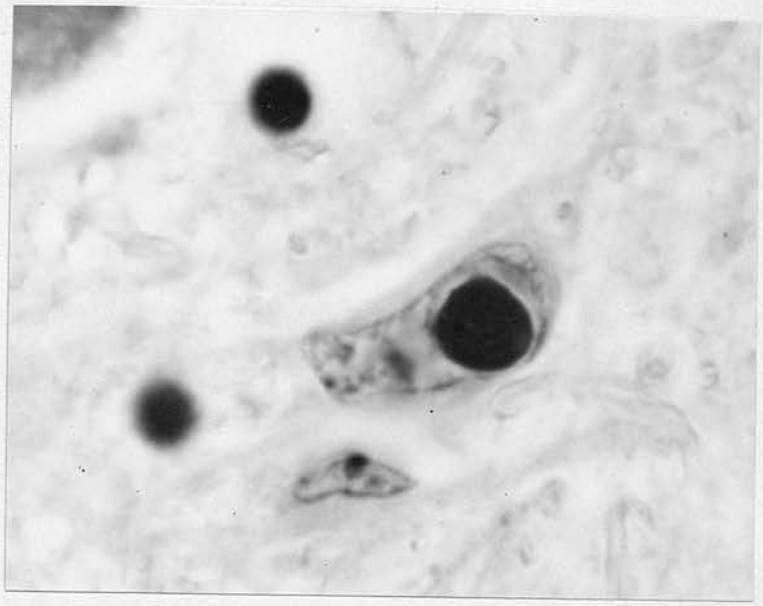


Fig. 39 X 2000

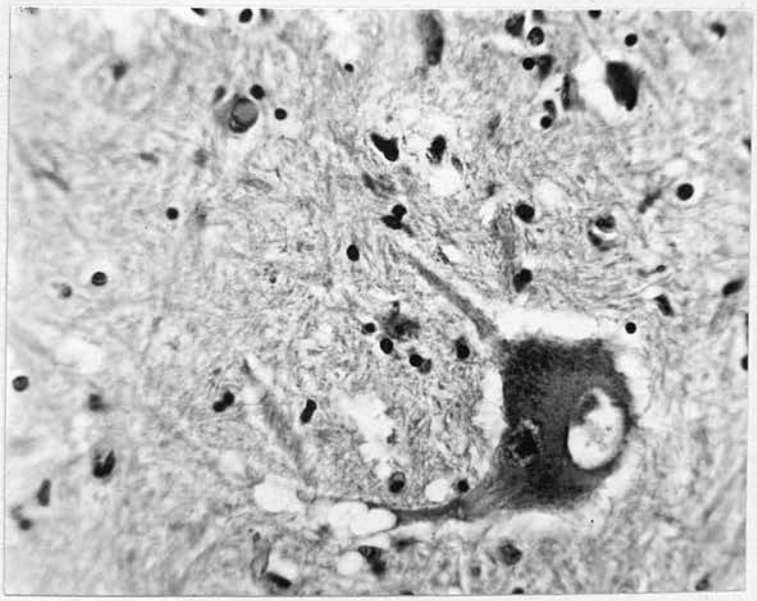


Fig. 40 X 480

Fig. 41. Perivascular infiltrations of leucocytes at the junction of the grey and white matter of the spinal cord. Natural scrapie, H & E.

Fig. 42. Perivascular infiltration of leucocytes in the grey matter of the spinal cord. A chromatolytic neurone containing a unilocular vacuole is seen to the right of the blood vessel. Experimental scrapie, H & E.

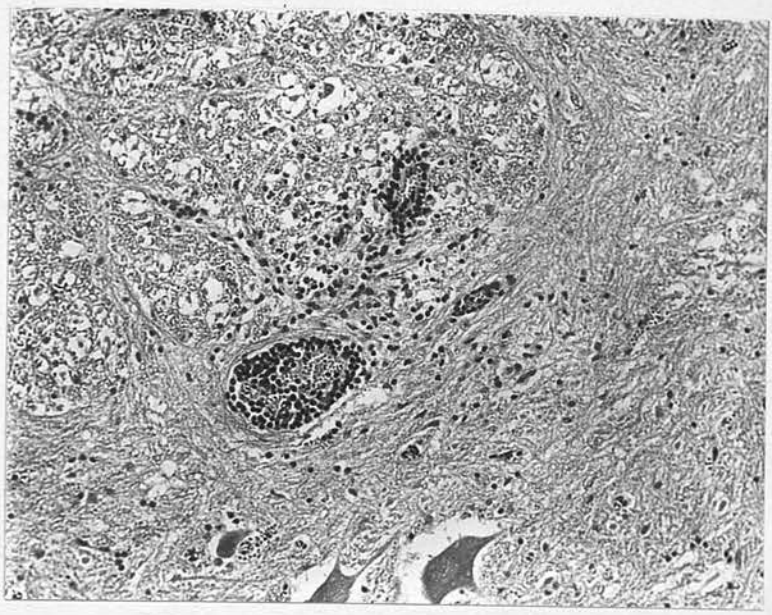


Fig. 41 X 160

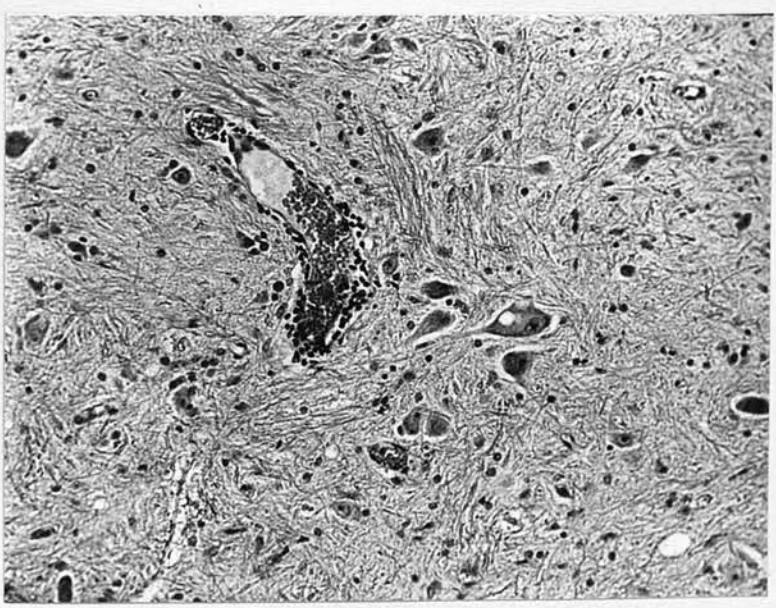


Fig. 42 X 160

Fig. 43. Perivascular infiltration of leucocytes at the junction of the grey and white matter of the spinal cord. Healthy control sheep, H & E.

Fig. 44. Perivascular infiltration in the grey matter of the spinal cord. The lymphocyte-like appearance of the infiltrating cells and their location in the Virchow-Robin space can be seen. Natural scrapie, H & E.

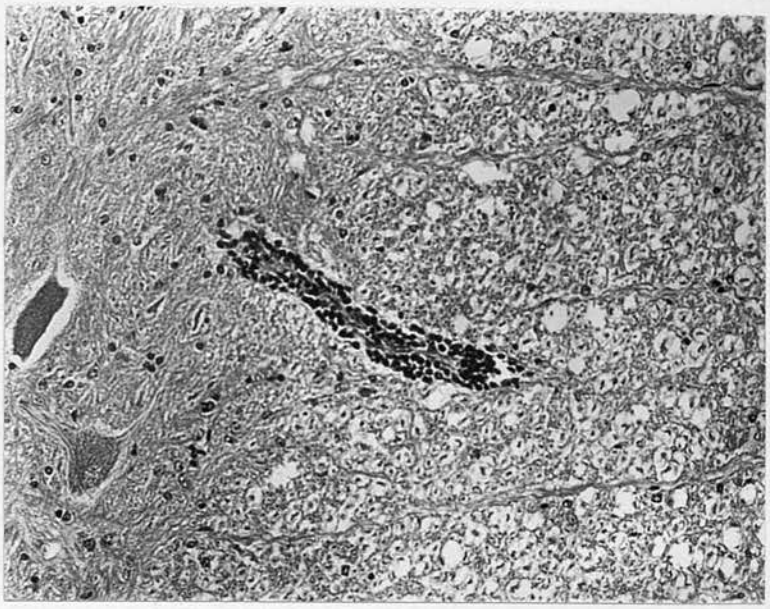


Fig. 43 X 160

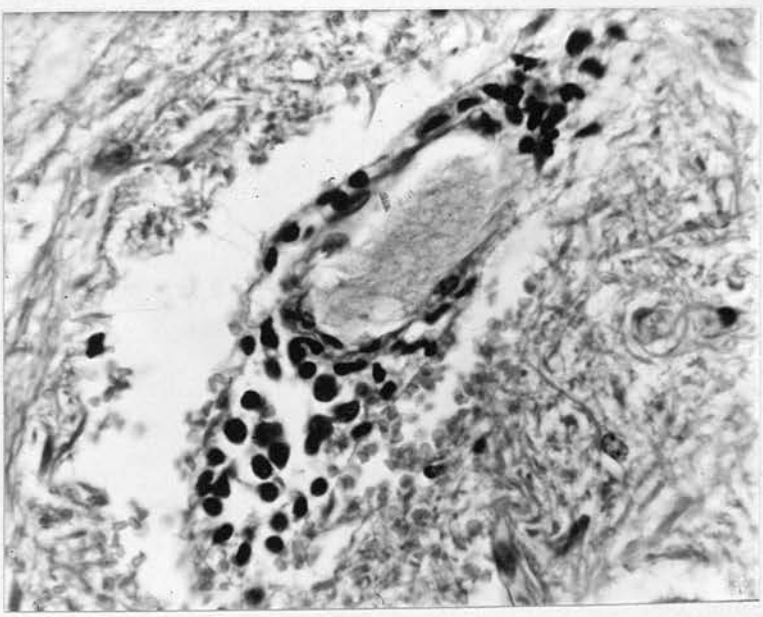


Fig. 44 X 680

Fig. 45. Demyelinated areas (light coloured in the photograph) can be seen in the ventral and lateral funiculi. This was one of two cases of natural scrapie showing unusually marked secondary degeneration in the white matter of the spinal cord. Frozen section, Weil's method.

Fig. 46. Longitudinal section of the ventral funiculus of the same case as illustrated in Fig. 45. The overall absence of myelin, and the presence of digestion chambers and myelin ovoids can be seen. Frozen section, Spielmeyers' method.

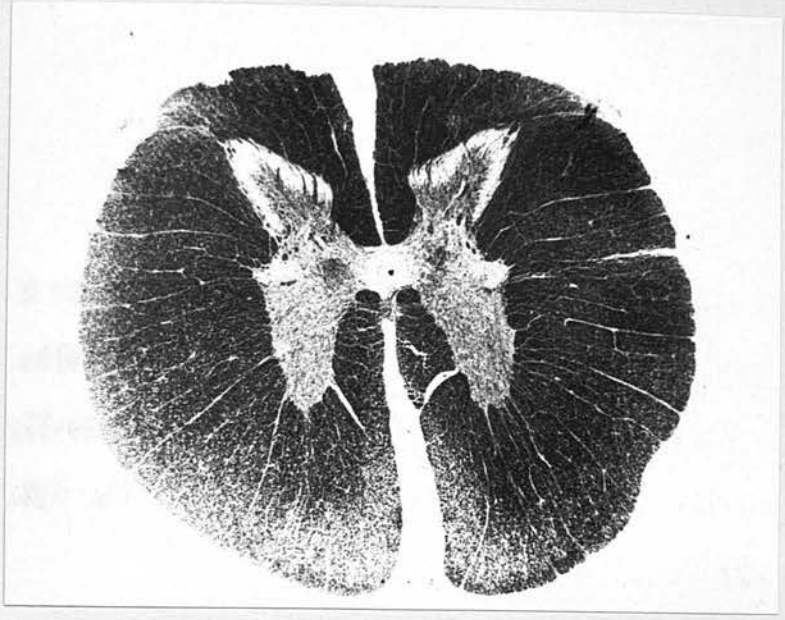


Fig. 45 X 7

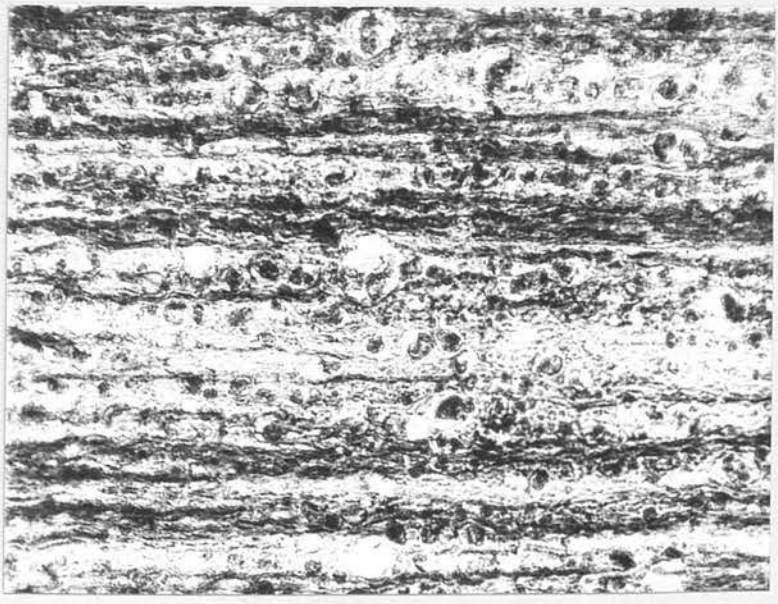


Fig. 46 X 120

Fig. 47. Gitter cells lying in a digestion chamber in the white matter of the spinal cord. Natural scrapie, H & E.

Fig. 48. A myelin ovoid lying in a digestion chamber in the white matter of the spinal cord. Neutral fat droplets appear as small black dots in this photograph of a relatively early stage in the breakdown of the myelin mass. Natural scrapie, frozen section, Sudan IV.

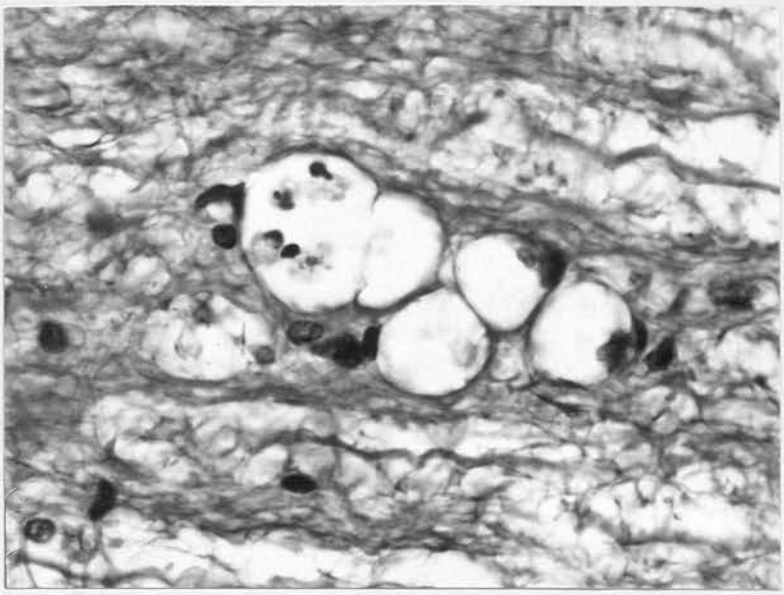


Fig. 47 X 720

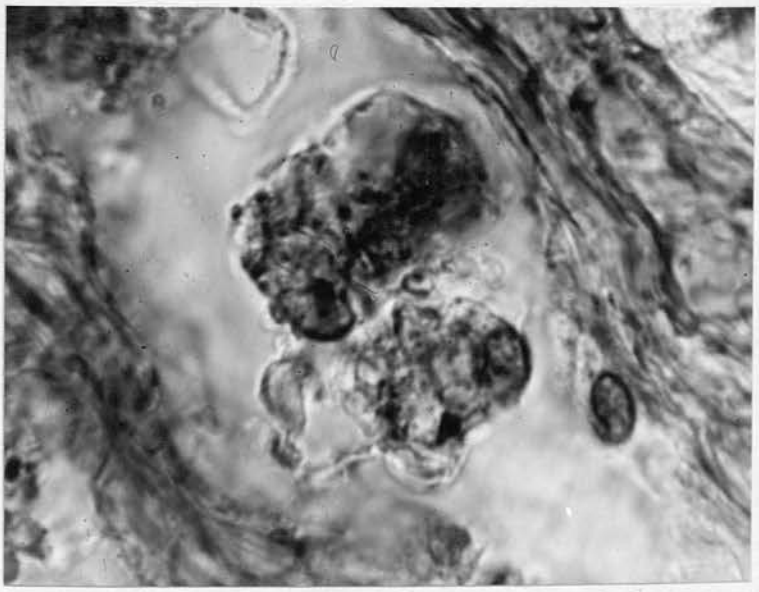


Fig. 48 X 1800

Fig. 49. Degenerating axon in the ventral funiculus of the spinal cord of a natural case of scrapie. The axon is markedly swollen and covered by a granular argentophilic deposit. Frozen section, Bielschowsky - Glees method.

Fig. 50. More advanced stage of axon degeneration than that illustrated in Fig.49. There is beaded swelling and vacuolation of the axon. Natural scrapie, frozen section, Bielschowsky - Glees method.

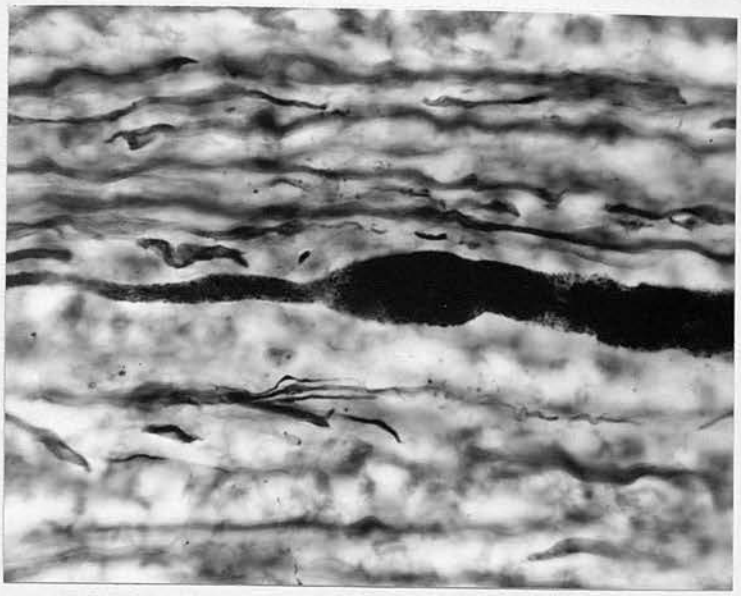


Fig. 49 X 480

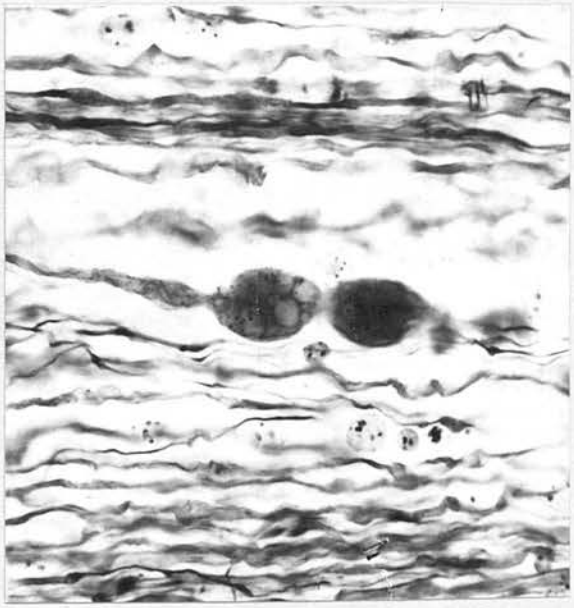


Fig. 50 X 480

Fig. 51. Degenerating axon in the white matter of the spinal cord showing swelling, advanced vacuolation and commencing fragmentation. Natural scrapie, frozen section, Bielschowsky - Glees method.

Fig. 52. Fragmentation of two degenerated axons in the white matter of the spinal cord. The axons are broken down into small rings and bizarre shaped pieces. Natural scrapie, frozen section, Bielschowsky - Glees method.

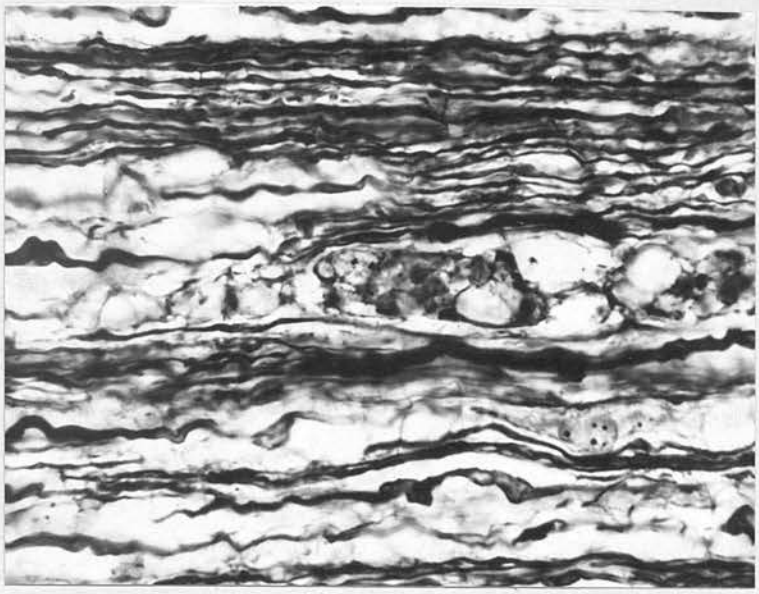


Fig. 51 X 480

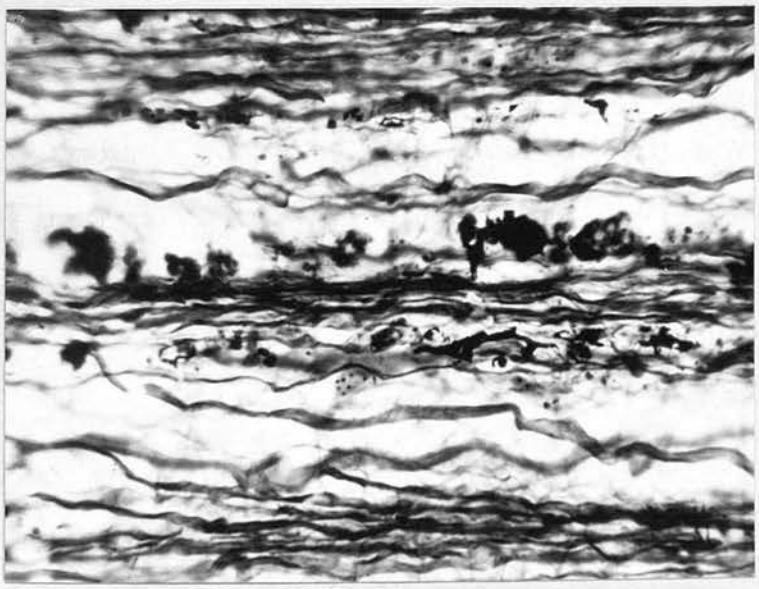


Fig. 52 X 480

Fig.53a. The major nuclei in the cervical intumescentia of the spinal cord, and their relationship to the arbitary zones used for vacuole counting purposes. The photograph is of a 100 μ thick frozen section from the spinal cord of a healthy control sheep, stained by Rexeds' method.

Fig.53b. Diagramatic representation of Fig. 53a. Zone A lies between the two broken lines and Zone B lies below the lower broken line. Zone C is not present in this region of the cord. The positions of the major nuclei are shown as follows:-

1. Nucleus proprius cornu posterioris.
2. Nucleus reticularis spinalis.
3. Nucleus cornucommissuralis posterioris.
4. Cellulae disseminatae posteriores.
5. Cellulae disseminatae intermedio.
6. Nucleus intermedio medialis.
7. Cellulae subst. grisea centralis.
8. Nucleus cornucommissuralis anteriores.
9. Cellulae disseminatae anteriores.

10. Nucleus motorius medialis dorsalis.
11. Nucleus motorius medialis ventralis.
12. Nucleus motorius lateralis dorsalis.
13. Nucleus motorius lateralis intermedius.
14. Nucleus motorius lateralis ventralis.

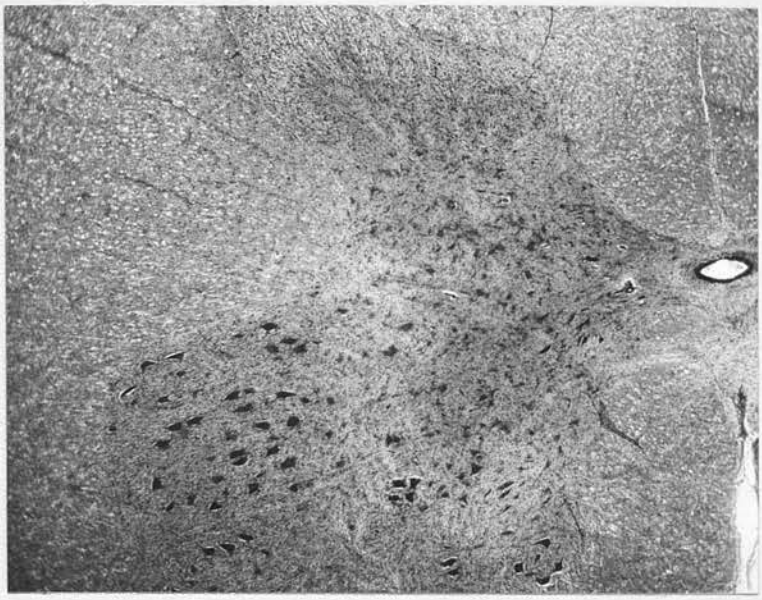


Fig. 53a X 15

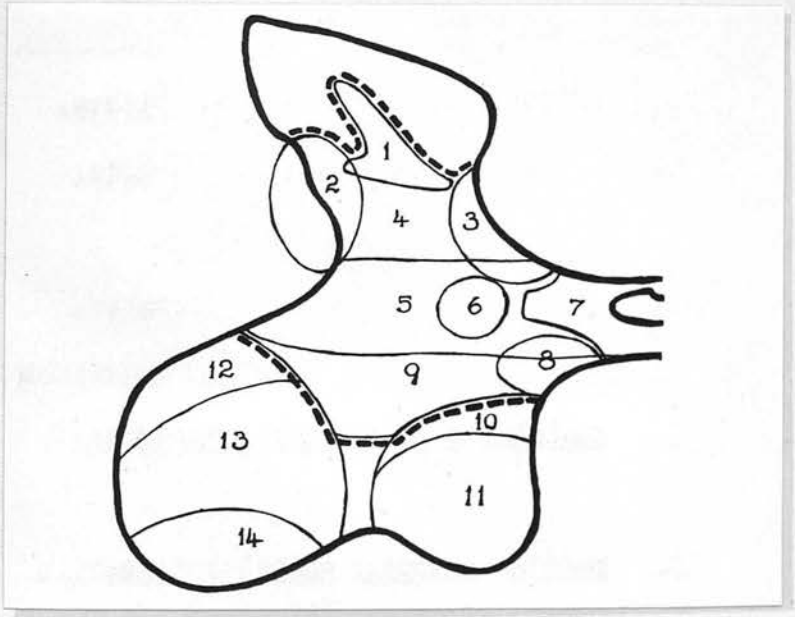


Fig. 53b

Fig. 54a. The major nuclei in the mid lumbar region of the spinal cord of a healthy control sheep. 100 μ thick frozen section stained by Rexeds' method.

Fig.54b. Diagramatic representation of Fig. 54a. Zone A lies between the two broken lines, Zone B below the lower broken line, and the small Zone C is seperately labelled. Clarke - Stillings' column (6) is very prominent in this region of the cord. The major nuclei are shown as follows:-

C. Zone C; the nucleus intermediolateralis.

1. Nucleus proprius cornu posterioris.
2. Nucleus reticularis spinalis.
3. Nucleus cornucommissuralis posterioris.
4. Cellulae disseminatae posteriores.
5. Cellulae disseminatae intermedio.
6. Clarke - Stillings' column.
7. Cellulae subst. grisea centralis.
8. Nucleus cornucommissuralis anteriores.
9. Cellulae disseminatae anteriores.

10. Nucleus motorius medialis.
11. Nucleus motorius lateralis.

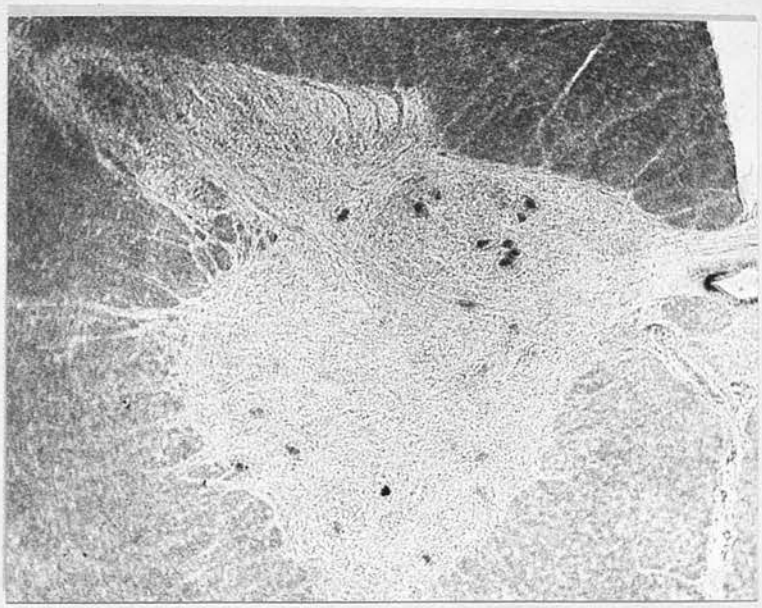


Fig. 54a X 15

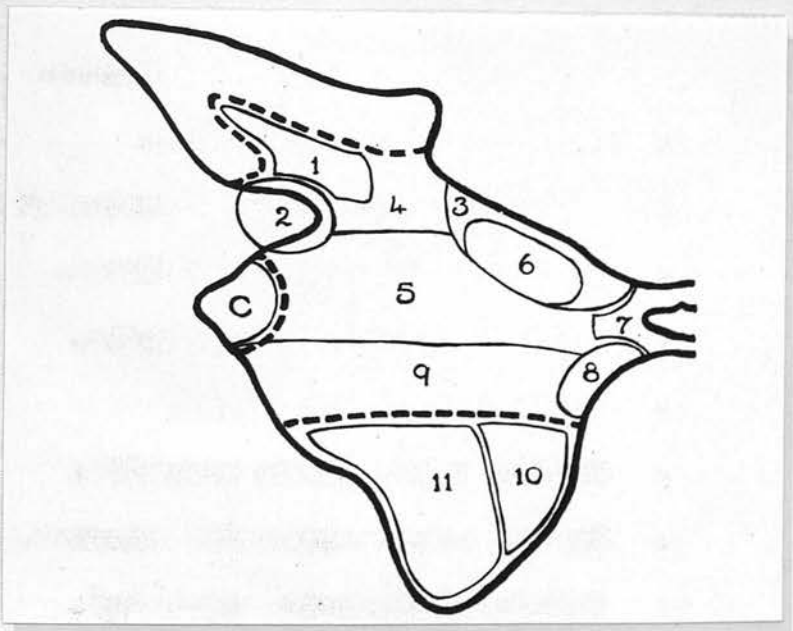


Fig. 54b

Fig. 55a. The angio-architecture of the grey matter in the cervical intumescentia of the spinal cord. Healthy control sheep, Lepehne - Pickworth method.

Fig. 55b. Diagramatic representation of Fig. 55a. showing zones A and B. Zone C is not present in this region of the cord. By comparing this diagram with Fig. 53a, it can be seen that the area where the largest numbers of vacuoles occurr (zone A), also has a richer supply of larger arteries and arterioles.

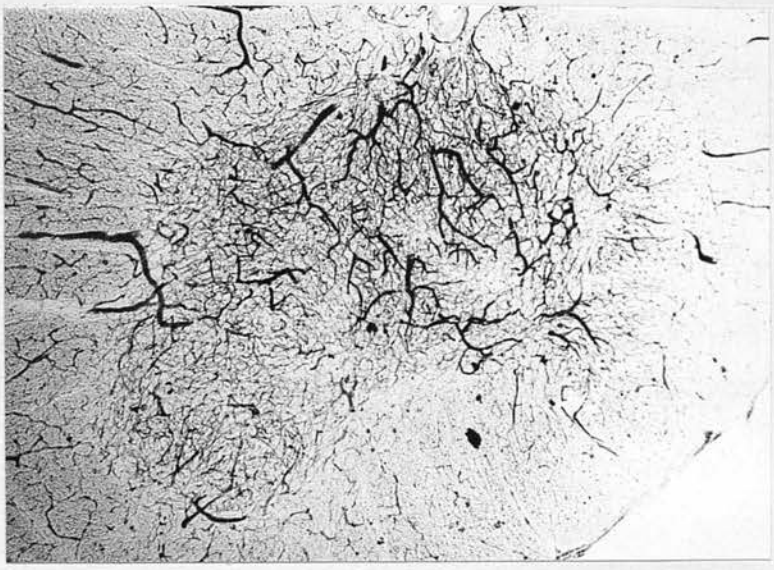


Fig. 55a X 10

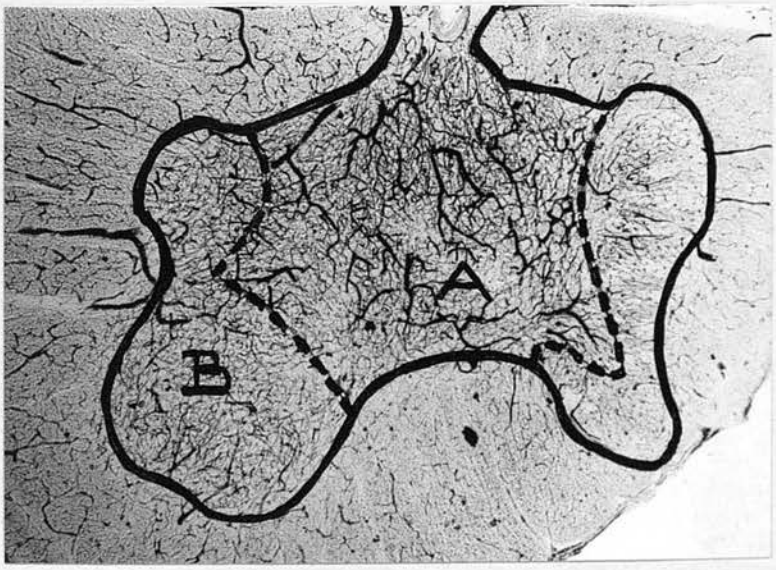


Fig. 55b

Fig. 56a. The angio-architecture of the grey matter in the mid-thoracic region of the spinal cord. Healthy control sheep, Lepehne - Pickworth method.

Fig. 56b. Diagramatic representation of Fig. 56a, showing zones A, B, and C. As in the cervical intumescentia, the larger blood vessels are prominent in the zones of maximum vacuolation (A and C).

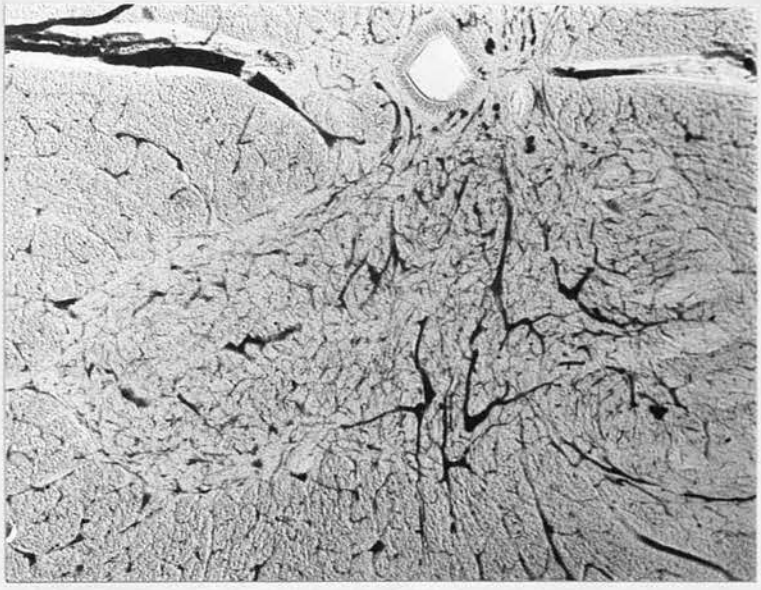


Fig. 56a X 44

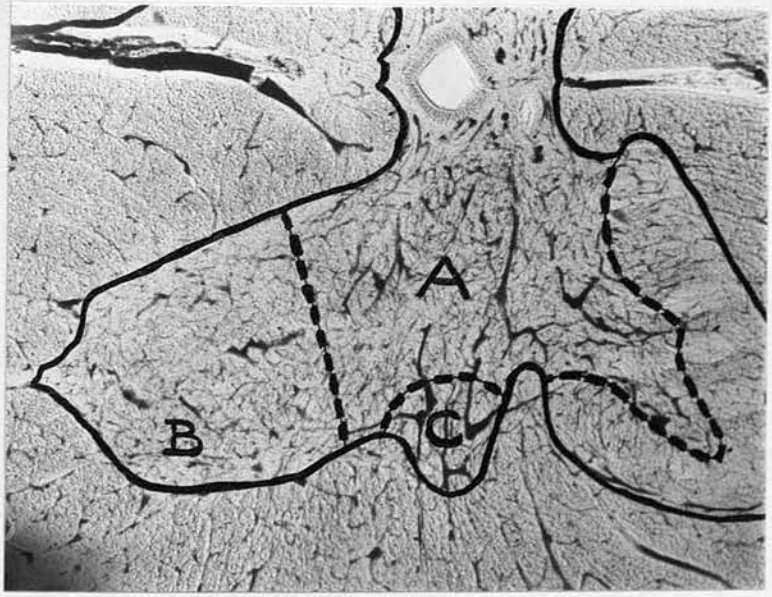


Fig. 56b

Fig. 57. Vacuolation and degeneration of neurones in the nucleus cornu commissuralis anteriores, which was included in zone A in the present study. Thirteen vacuolated neurones can be clearly seen in the photograph in the region of this nucleus. Natural scrapie, H & E.

Fig. 58. Vacuolation and degeneration of neurones in the Zona intermedio (cellulae disseminatae posterioris et intermedio), which was included in zone A. Natural scrapie, H & E.

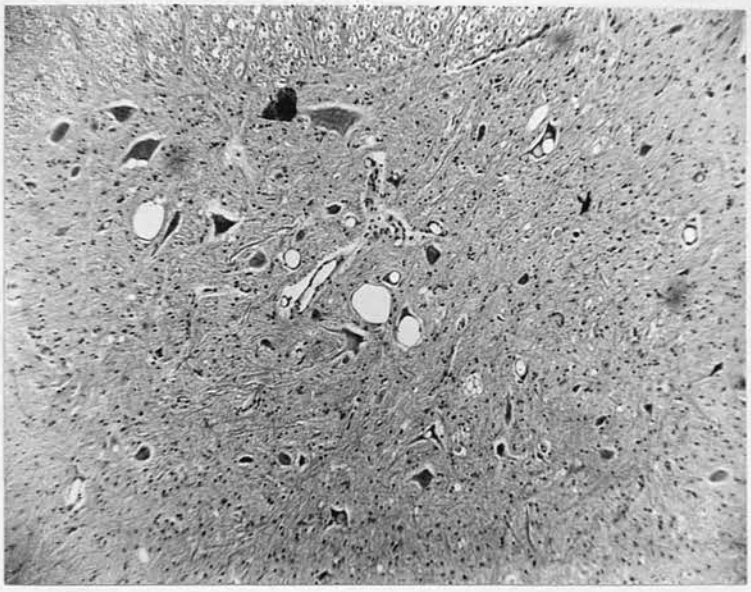


Fig. 57 X 120

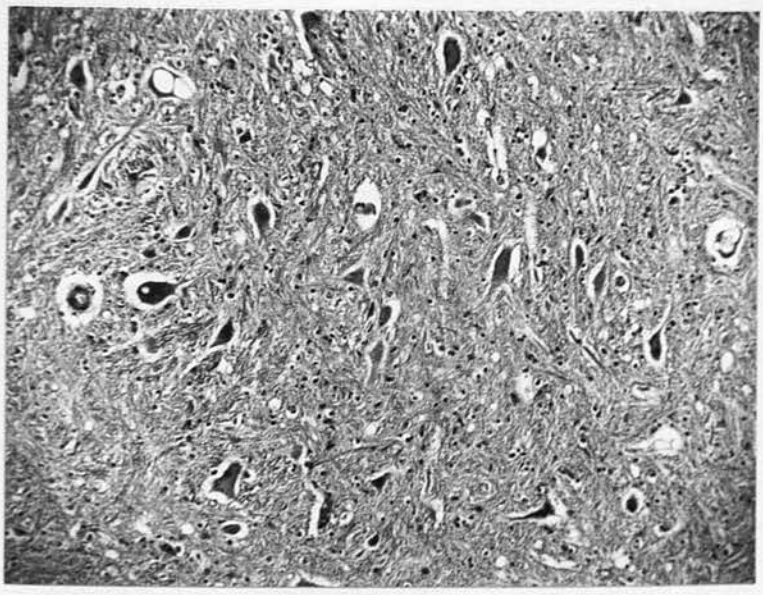


Fig. 58 X 120

Fig. 59. Vacuolation and degeneration of neurones in the Zona intermedio (cellulae disseminatae anteriores) which was included in zone A. Homogenous eosinophilic spheroids can be seen arranged around the inner margin of the unilocular vacuole in the neurone lying to the left of the blood vessel. Natural scrapie, H & E.

Fig. 60. Vacuolation and degeneration of neurones in the nucleus cornu commissuralis posterioris which was included in zone A. Intravacuolar material and spheroids were prominent in this case and can be seen in the vacuoles of the small neurones of this nucleus. Natural scrapie, H & E.

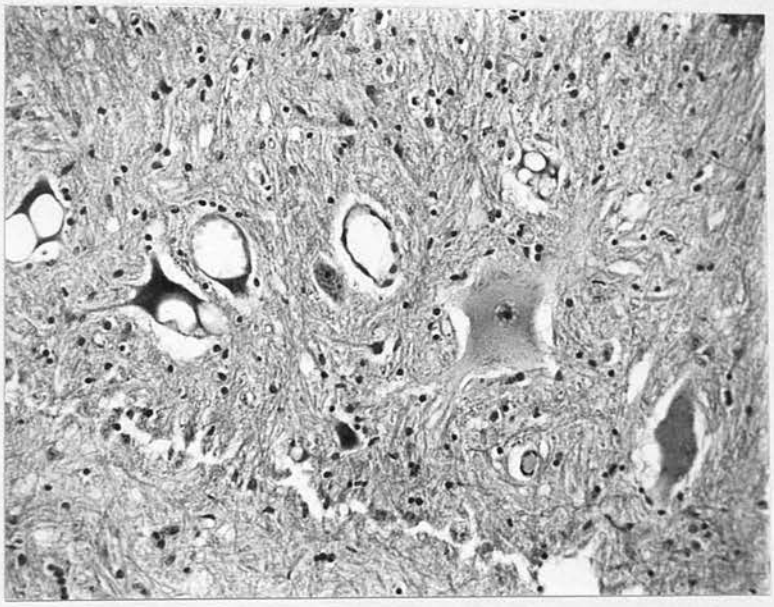


Fig. 59 X 220

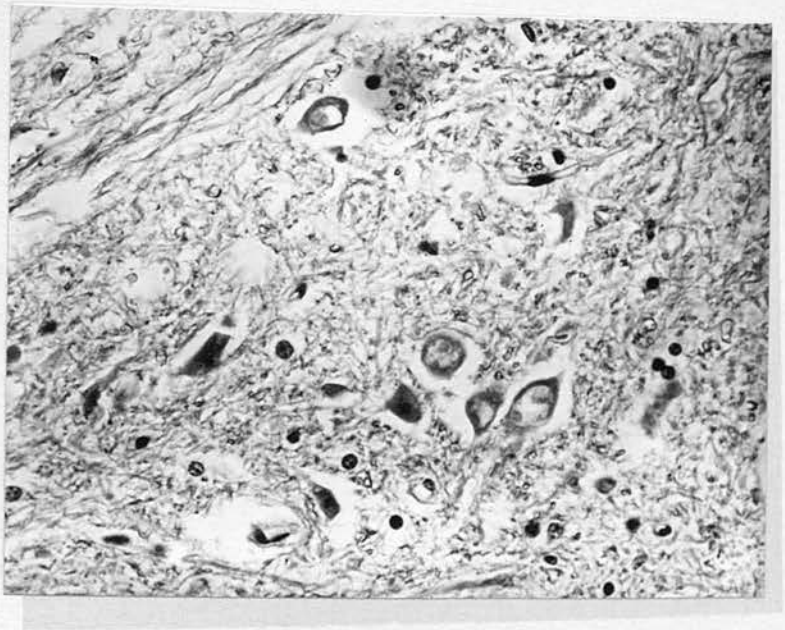


Fig. 60 X 440

Fig. 61. Vacuolation and degeneration in a chain of neurones in the subs. grisea centralis, which was included in zone A. Natural scrapie, H & E.

Fig. 62. The nucleus intermediolateralis, or preganglion sympathetic neurones, of a healthy control sheep. This nucleus, which does not usually show more than the six or seven neurones shown in the photograph in any single section of the spinal cord, is the sole component of zone C. Healthy control sheep, H & E.

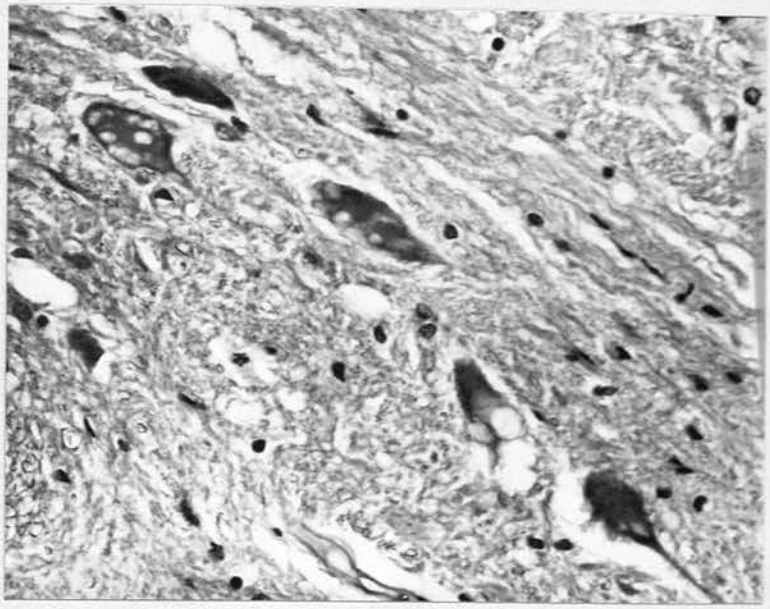


Fig. 61 X 440

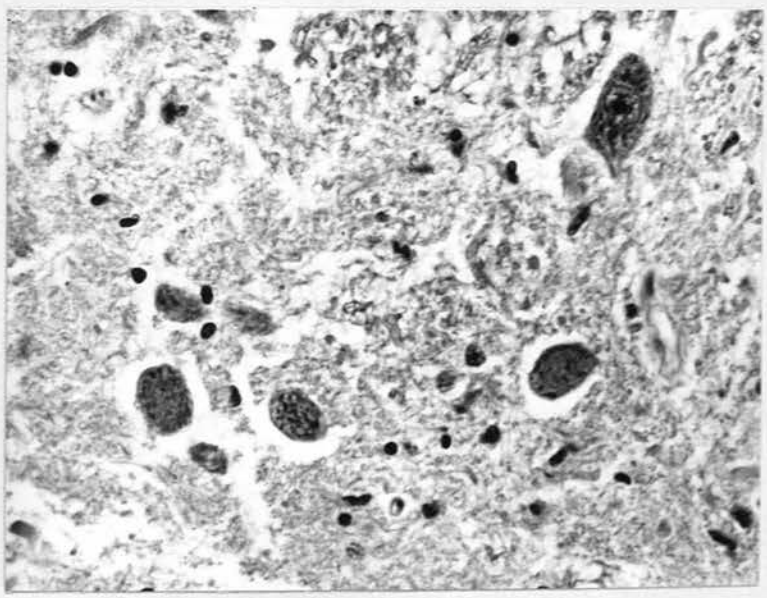


Fig. 62 X 440

Fig. 63. The nucleus intermediolateralis, zone C, showing vacuolation, chromatolysis, and swelling of the neurones. Experimental scrapie, H & E.

Fig. 64. The nucleus intermediolateralis, zone C, showing vacuolation, chromatolysis, and swelling of the neurones. Natural scrapie, H & E.

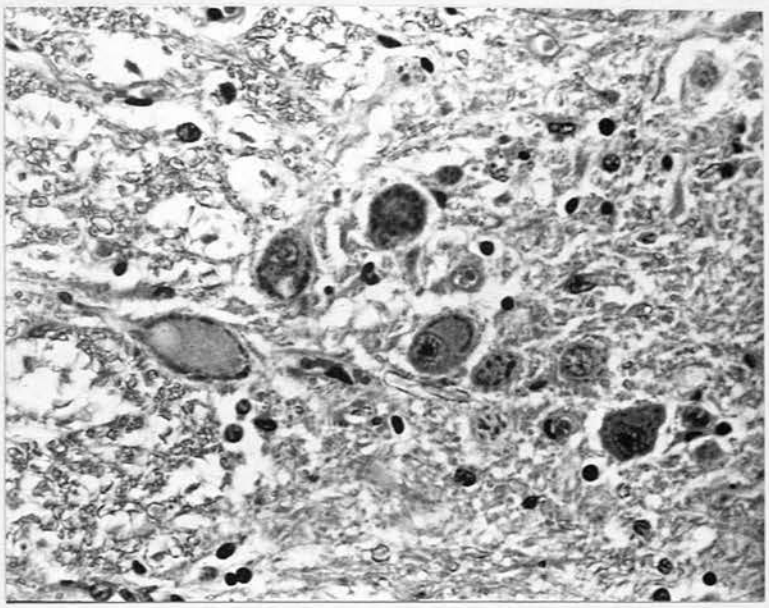


Fig. 63 X 440

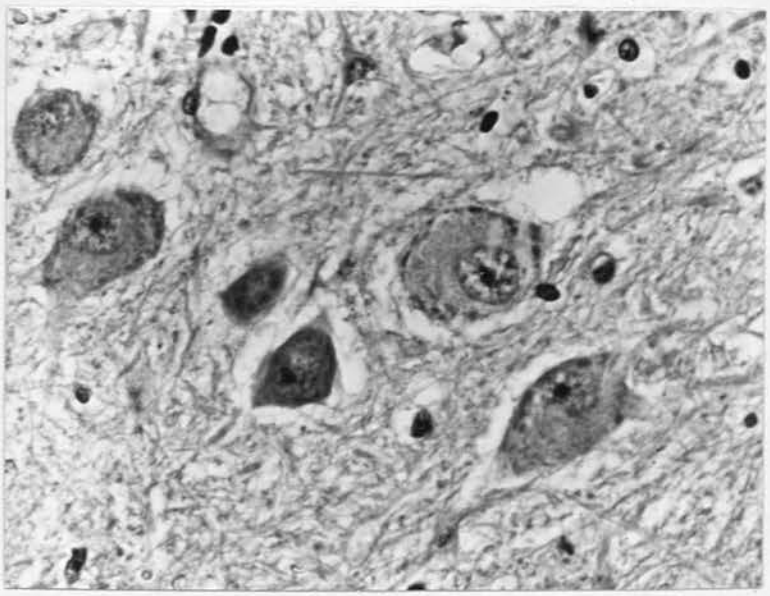


Fig. 64 X 620

Fig. 65. Unilocular vacuole containing a fine reticulum of eosinophilic debris in a neurone from the spinal ganglion of a case of natural scrapie. Apart from the vacuole the neurone appears unaltered. H.& E.

Fig. 66. Multilocular vacuole in a neurone from the spinal ganglion of a healthy control sheep. Apart from the vacuole, the neurone appears unaltered. Gallocyanin chromalum.

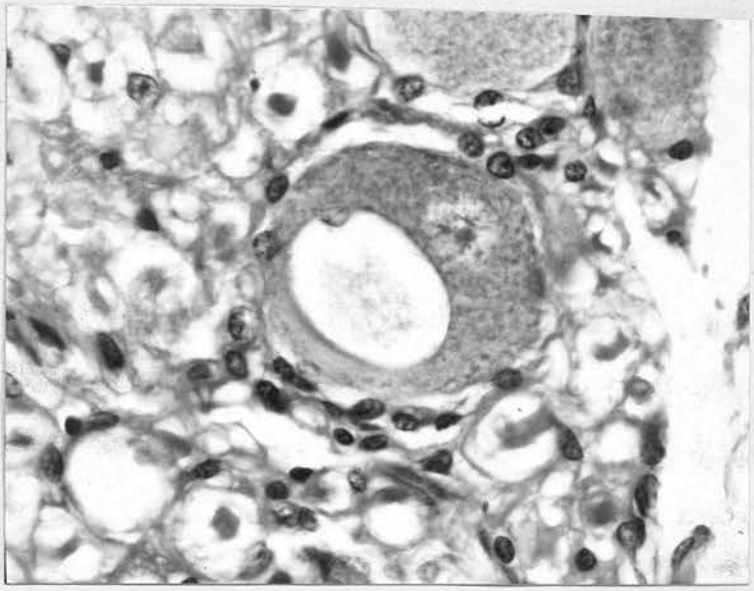


Fig. 65 X 720

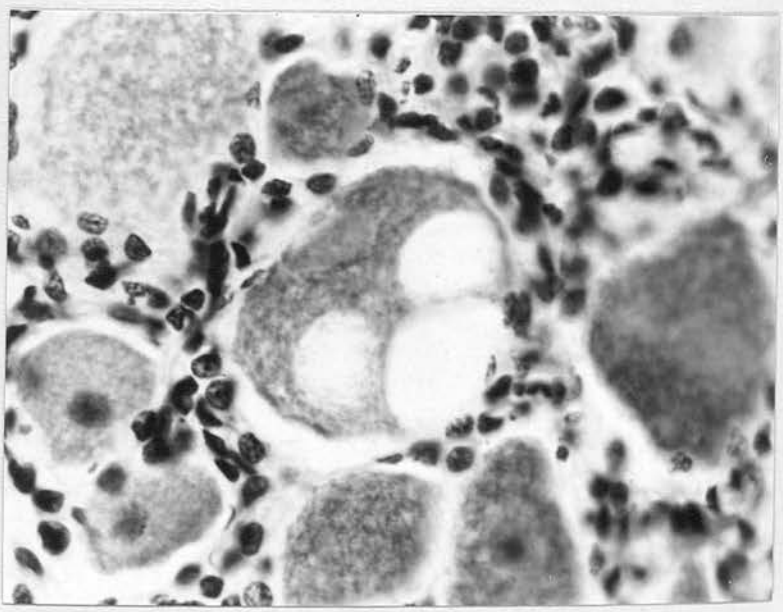


Fig. 66 X 720

Fig. 67. Frozen section of the spinal ganglion of a sheep affected with natural scrapie, stained for neutral fat. There is no evidence of fat in the vacuole. Sudan IV / haematoxylin.

Fig. 68. Five vacuolated neurones are visible in this photograph of a relatively small section of a Gasserian ganglion. Healthy control sheep, H & E.

Fig. 67 X 450

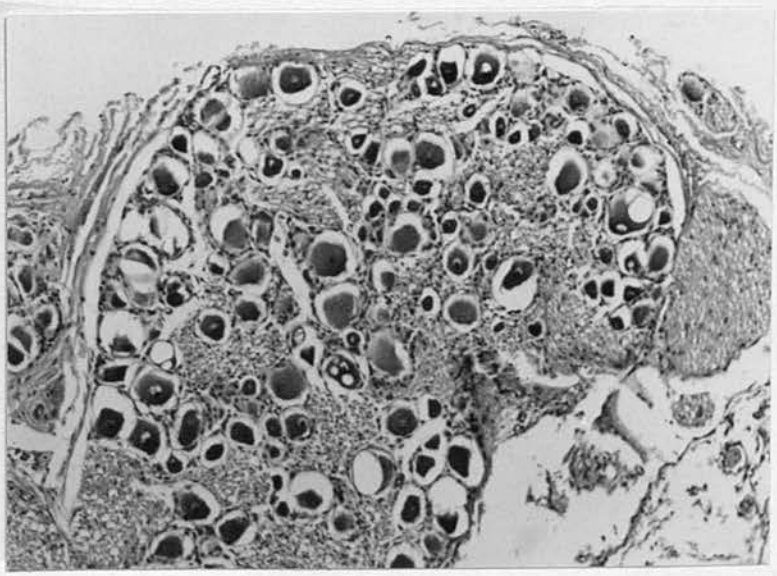


Fig. 68 X 180

Fig. 69. The distinct reticulum of the neurofibrils seen in this neurone is the normal appearance of neurofibrils in the spinal ganglia of sheep. Natural scrapie, Holmes' method.

Fig. 70. Fenestrated neurone, with ansiform loops uniting to make up the axon, from a spinal ganglion of a natural case of scrapie. Atypical neurones, including this type, were uncommon in both healthy control and scrapie sheep. Cajal's silver impregnation method.

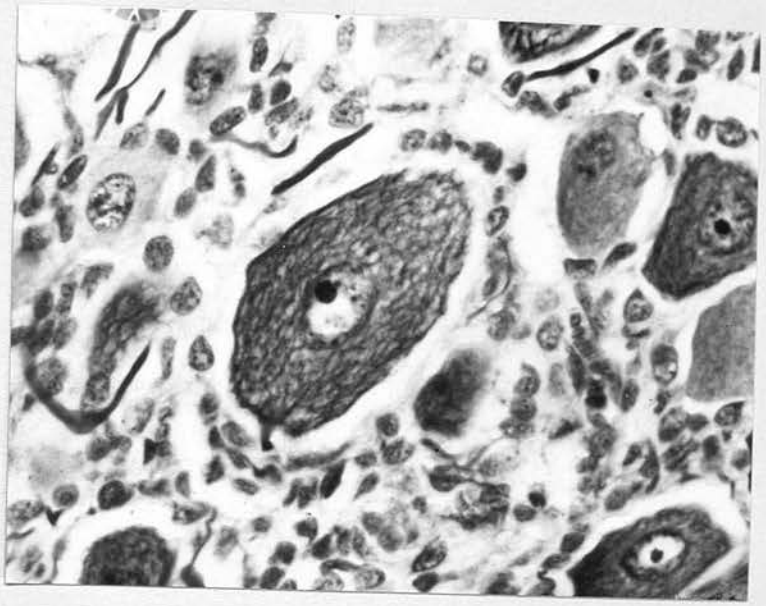


Fig. 69 X 720

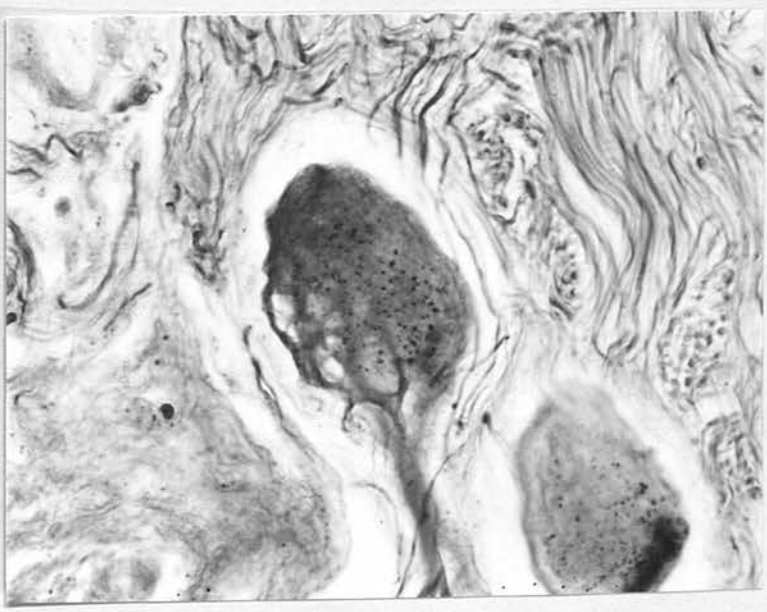


Fig. 70 X 720

Fig. 71. Reticulated subcapsular network (glomerulus) with a medium size end bulb, in a spinal ganglion neurone from a healthy control sheep. This type of atypical cell was again uncommon in both scrapie and healthy control sheep. Cajals' silver impregnation method.

Fig. 72. Spinal ganglion neurone with a very large end bulb embedded in a concavity of the neurone's cytoplasm. The end bulb probably arises from an axon collateral. It is suggested that in H & E preparations such large end bulbs may cause the appearance described by some authors as a pathological deposit. Healthy control sheep, Cajals' silver impregnation method.

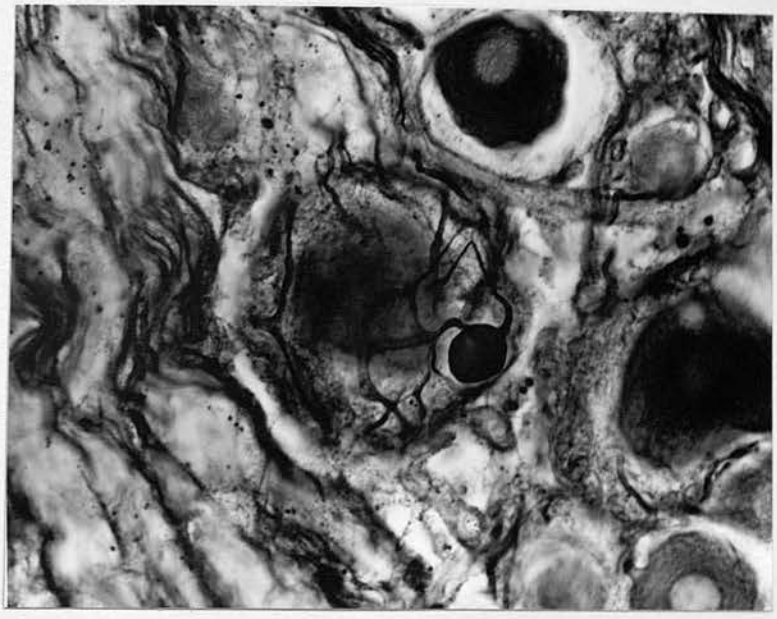


Fig. 71 X 720

Fig. 72 X 720

Fig. 73. Intracytoplasmic bodies in a spinal ganglion neurone. The small accumulation of relatively large bodies in the neurone towards the left side of the photograph, is the phloxinophilic type of inclusion. The aggregation of smaller bodies in the neurone at the lower right is lipofuscin granules. At the top centre is a neurone with an extranuclear nucleolus lying at the end of a transcytoplasmic tract, both of which are presumed to be artefacts. Natural scrapie, Iron haematoxylin / aldehyde fuchsin / light green.

Fig. 74. Neuronophagia of a spinal ganglion neurone. Natural scrapie, H & E.

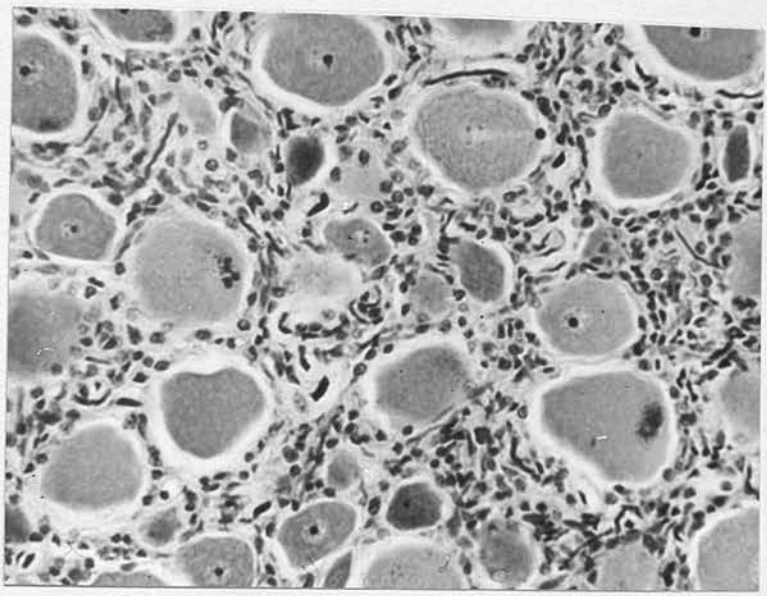


Fig. 73 X 280

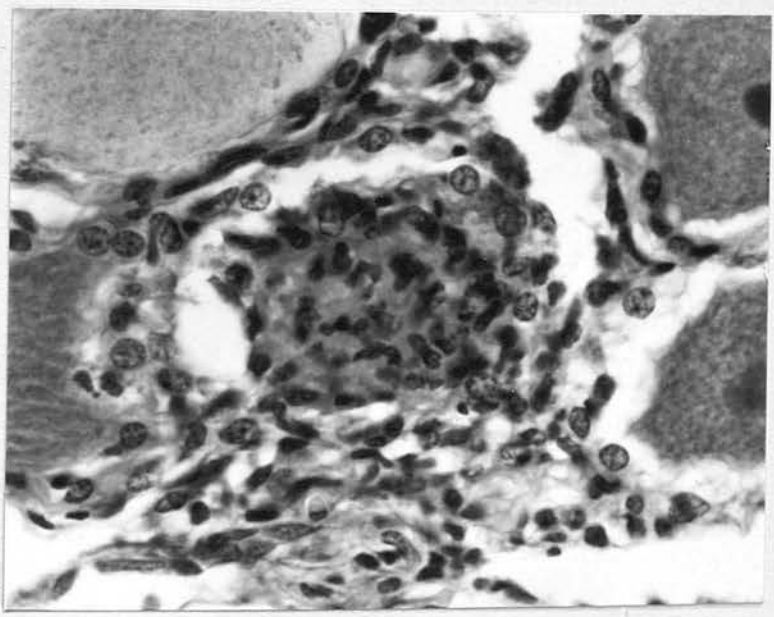


Fig. 74 X 720

Fig. 75. Ring like appearance of axons in the nerve root of a spinal ganglion. These structures occurred near the end of the nerve fibres and are a post mortem artefact produced by cutting the axons before fixation. Healthy control sheep, Holmes' method.

Fig. 76. Swollen and corkscrew appearance of axons in the nerve root of a spinal ganglion. These are artefacts caused in a similar manner to those described in the legend to Fig. 75. Healthy control sheep, Holmes' method.

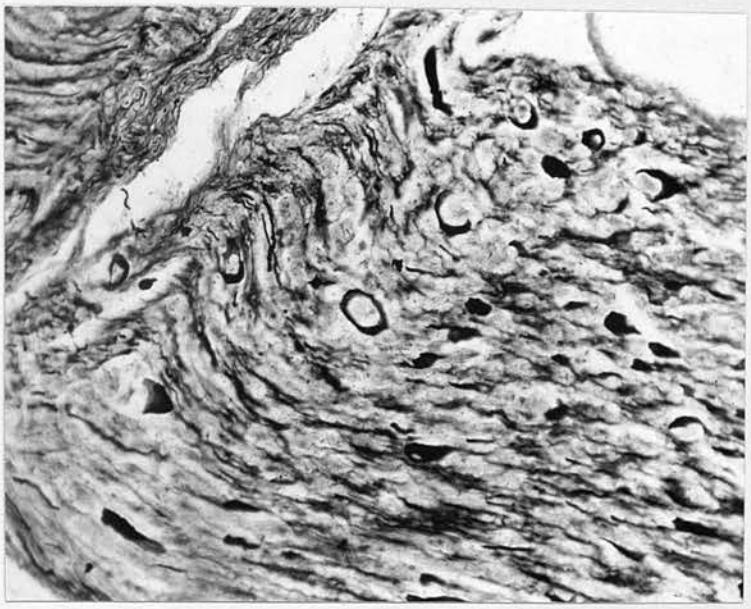


Fig. 75 X 640

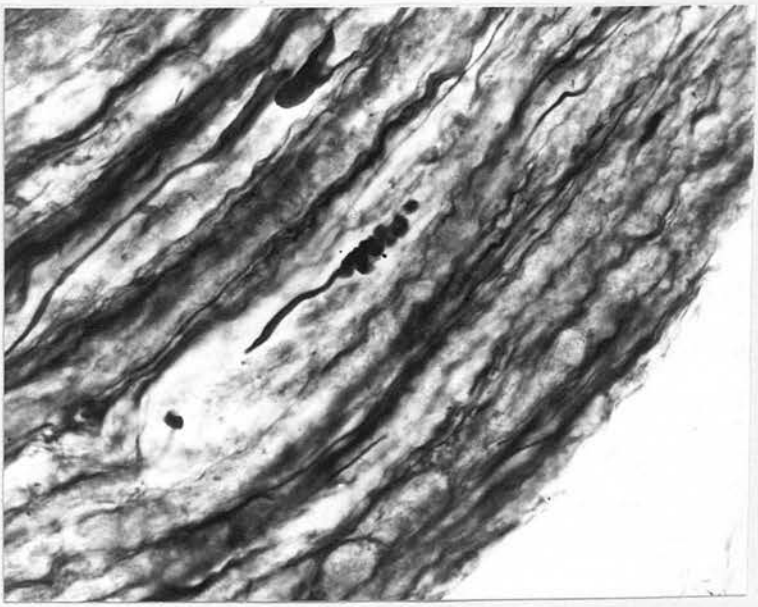


Fig. 76 X 640

Fig. 77. Chromatolysis in a sympathetic ganglion neurone. Nissl substance is absent from all but the periphery of the cell. The nucleus is very eccentric and almost extruded from the cell. Natural scrapie, Gallocyanin chromalum.

Fig. 78. Early necrotic change in a sympathetic ganglion neurone. The cell body is devoid of Nissl substance and eosinophilic, and the nucleus is shrunken, pyknotic, and eccentric. Natural scrapie, H & E.

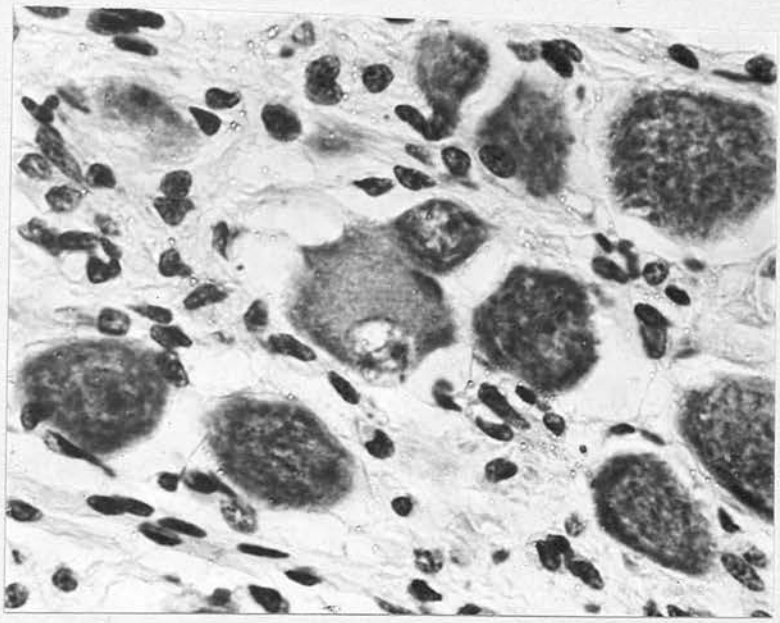


Fig. 77 X 720

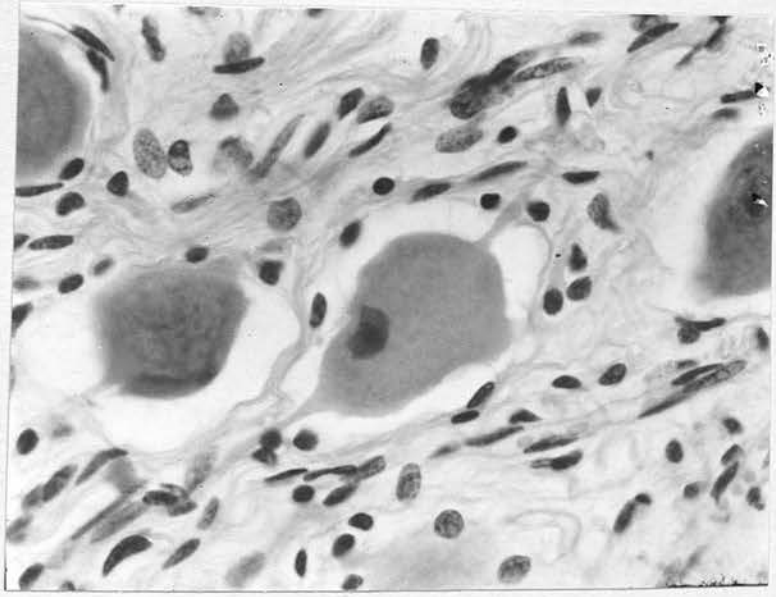


Fig. 78 X 720

Fig. 79. Very swollen neurone showing granular necrotic degeneration. Sympathetic ganglion of a healthy control sheep. H & E.

Fig. 80. Normal distinct appearance of the neurofibrils in the neurone of a sympathetic ganglion. Natural scrapie, Holmes' method.

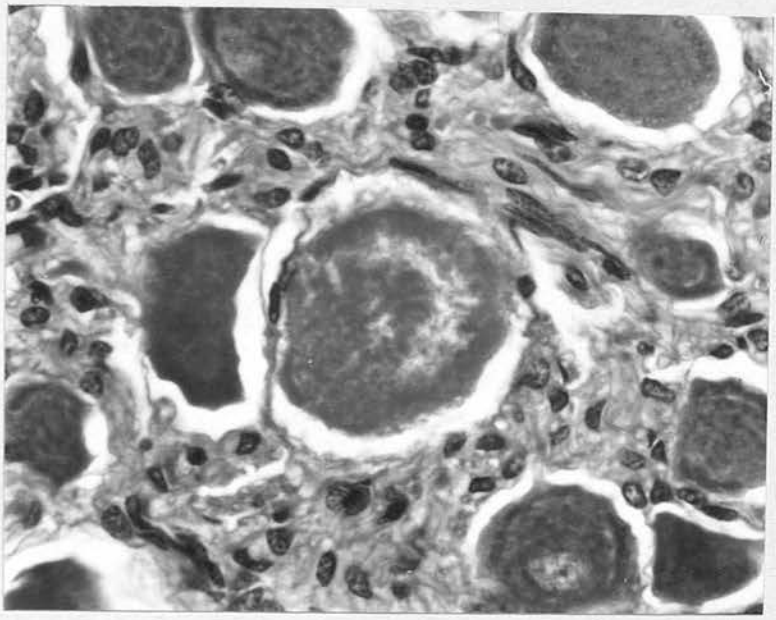


Fig. 79 X 640

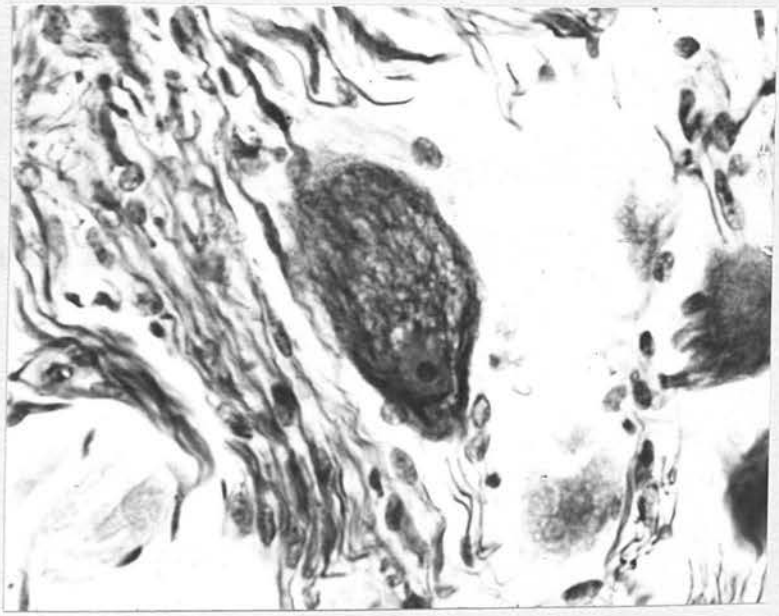
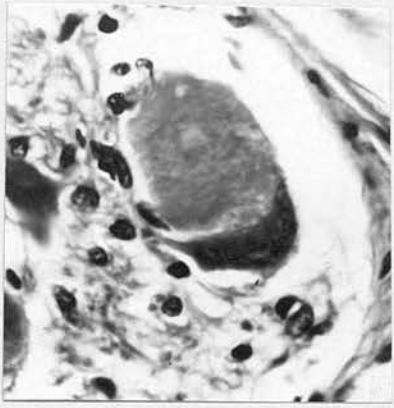
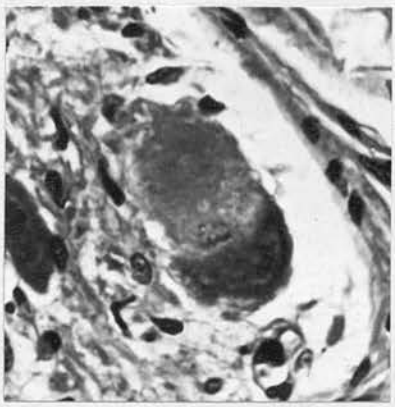


Fig. 80 X 720

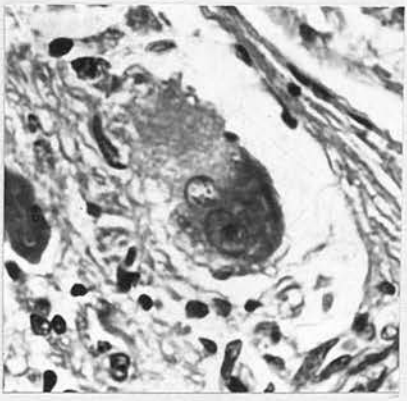
Fig. 81. Serial sections of a large eosinophilic, hyaline mass lieing alongside a neurone in a sympathetic ganglion. In the first section (a), the hyaline mass on the left appears to lie in a concavity in the remains of the neurone's cytoplasm. In subsequent sections (b, c, and d,) the neurone is seen to possess a normal body, Nissl substance, and nucleus. This suggests that a part only of the neurone's cytoplasm has become necrotic, and lies close to the remaining healthy body as a hyaline mass. Healthy control sheep, H & E.



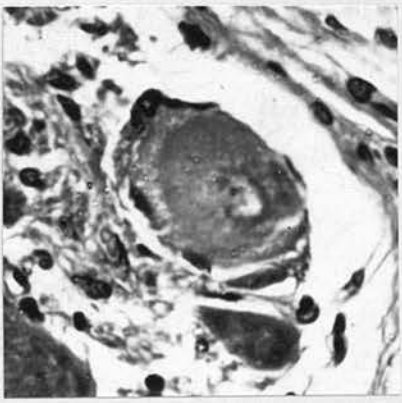
a



b



c



d

Fig. 81

X 720

Fig. 82. Unilocular vacuole in a neurone from a sympathetic ganglion. This vacuole contains a diffuse mass of faintly eosinophilic material which is just visible in the photograph. The Nissl substance is unaltered. Natural scrapie, Gallocyanin chromalum.

Fig. 83. Double nucleoli in a neurone from a sympathetic ganglion. One nucleolus is larger than the other and is surrounded by a clear halo. Natural scrapie, H & E.

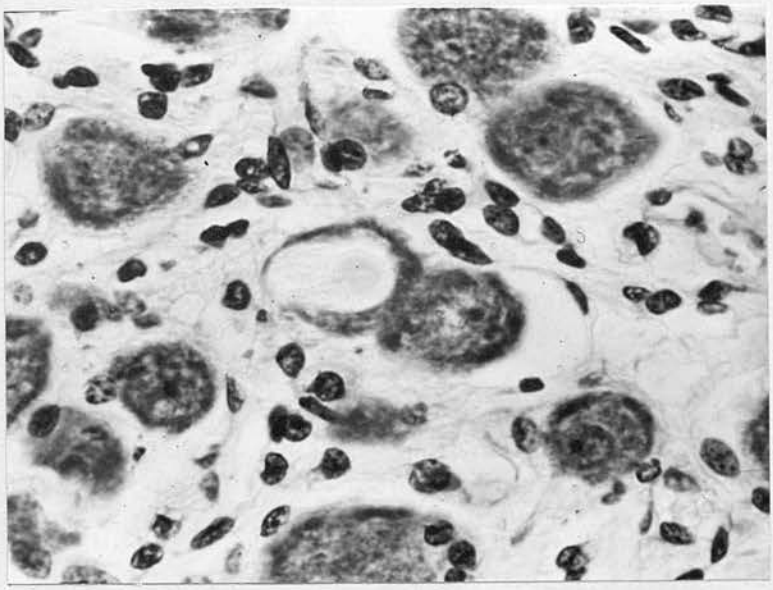


Fig. 82 X 720

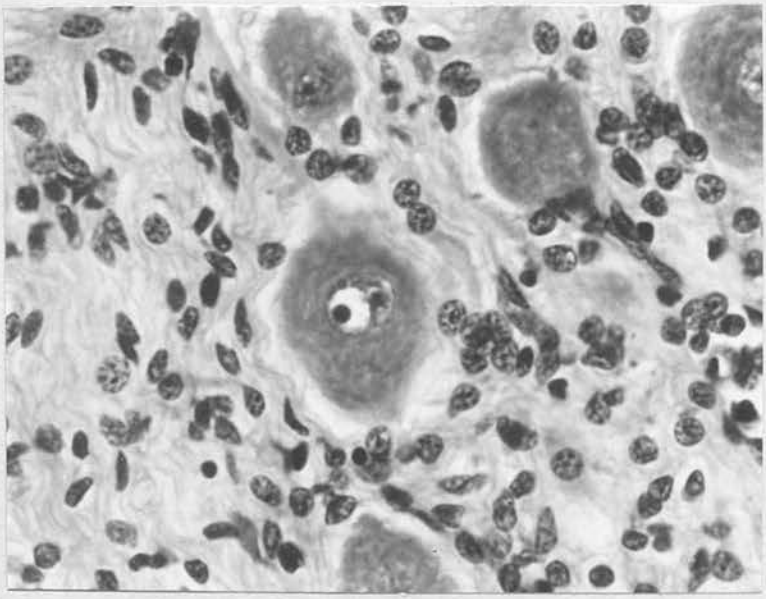


Fig. 83 X 720

Fig. 84. Multiple intranuclear bodies in a neurone from a sympathetic ganglion. Natural scrapie, Haematoxylin /phloxine/ tartrazine.

Fig. 85. Sympathetic ganglion neurones containing fine granules of P.A.S. positive lipofuscin. Large globules of P.A.S. positive pigment are present outside the neurone. Healthy control sheep. P.A.S./ Light green.

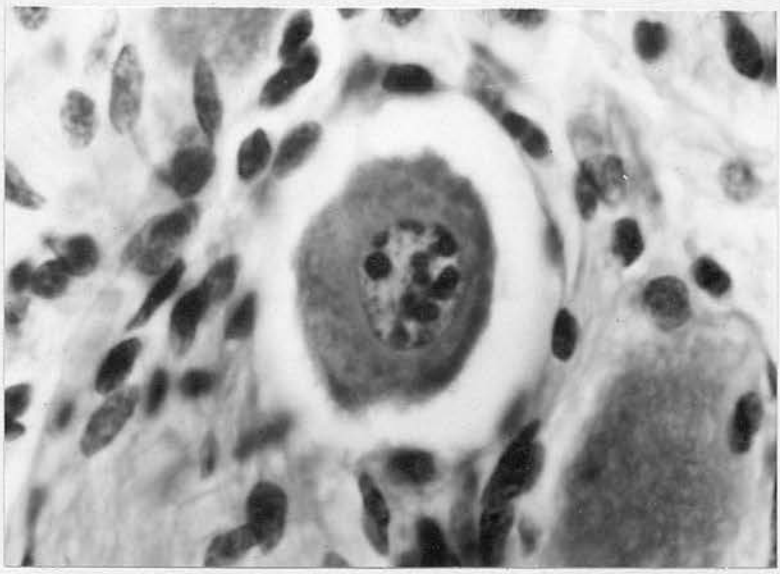


Fig. 84 X 1080

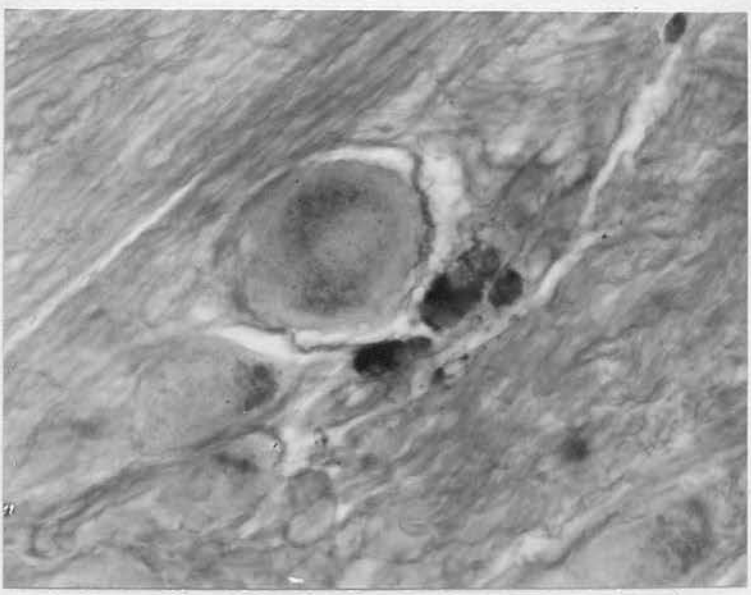


Fig. 85 X 640

Fig. 86. Replacement of a degenerated neurone by a collection of amphicytes to form a residual nodule. Sympathetic ganglion from a natural case of scrapie. H & E.

Fig. 87. A diffuse infiltration of cells in a sympathetic ganglion. Natural scrapie, H & E.

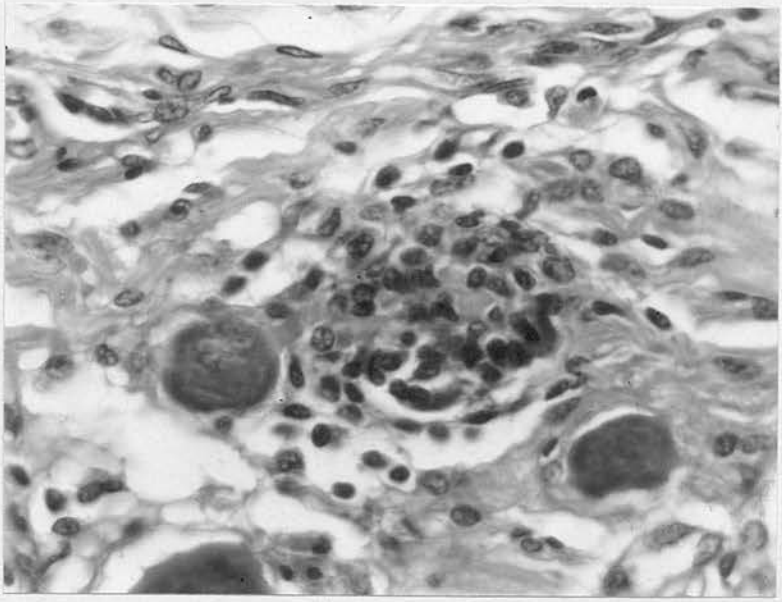


Fig. 86 X 640

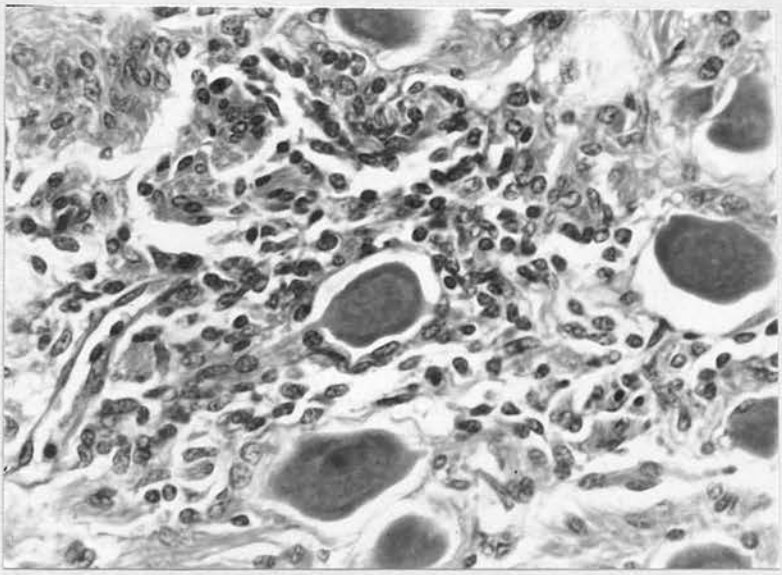


Fig. 87 X 520

Fig. 88. A paraganglia-like structure in a sympathetic ganglion. The connective tissue capsule and the central capillary running longitudinally through the structure can be identified. Natural scrapie, H & E.

Fig. 89. A smaller paraganglia-like structure in a sympathetic ganglion. The granular nature of the cytoplasm of the cells composing the structure can be seen. Healthy control sheep, H & E.

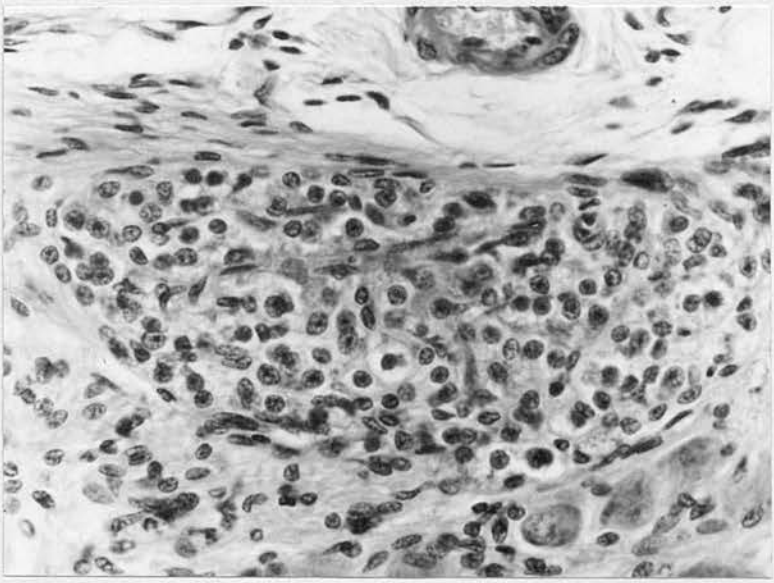


Fig. 88 X 420

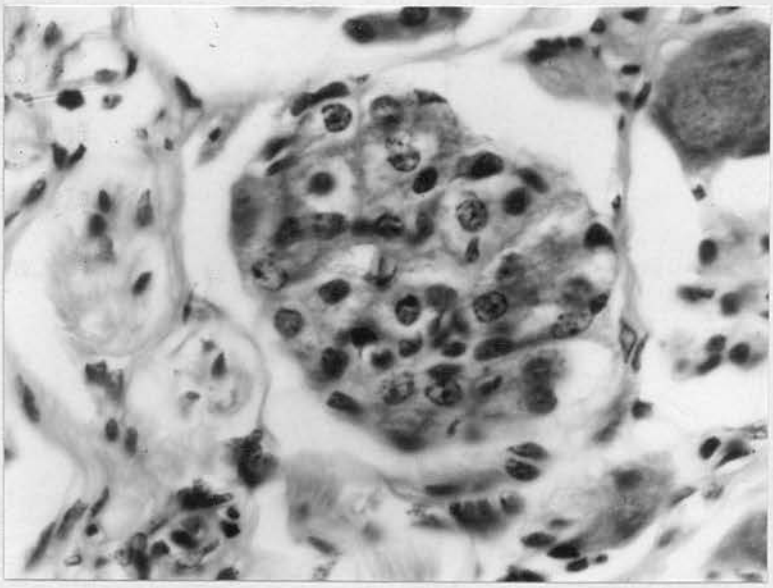


Fig. 89 X 720

Fig. 90. Neurosecretary vacuoles in the supraoptic nucleus of the hypothalamus of a male domestic fowl. P.A.S. / Haematoxylin.

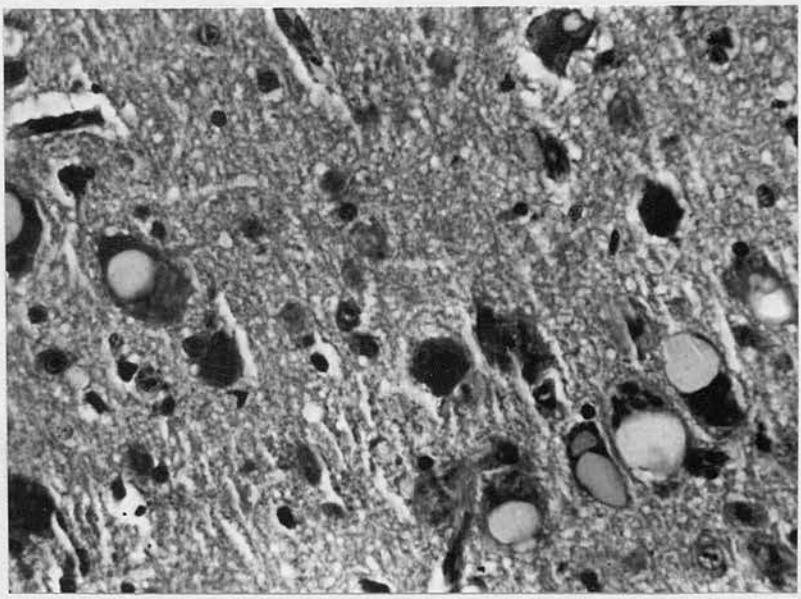


Fig. 90 X 320