

THE UNIVERSITY *of* EDINBURGH

Title	The human omentum
Author	Kennedy, Charles
Qualification	MD
Year	1885

Thesis scanned from best copy available: may contain faint or blurred text, and/or cropped or missing pages.

Digitisation notes:

- Page 80 is missing in original numeration

Scanned as part of the PhD Thesis Digitisation project
http://libraryblogs.is.ed.ac.uk/phddigitisation

The Human Omentum

A study of the processes of growth and disease as seen in the great Omentum in Man

UNIVERSITY OF EDINBURGH LIBRARY

Thesis for the degree of M.D. of Edinburgh University April 30th 1885

Charles Kennedy M.B., C.M., Ed

[1881]

Note — The thesis consists of two parts

Part I, from the beginning to page 146 is a general description of the normal and pathological appearances in the Omentum

Part II from page 146 to the end, contains a description of each case.

The writings to which reference is made are indicated in the margin. They are few in number, as I have only referred ~~to~~ — with one or two exceptions — to observations made upon the Omentum or similar membranes. The principal authorities are Ranvier, Klein, Delafield, Hippolyte Martin, Hoggan etc.

Accompanying the Thesis is a volume of drawings and photographs executed by myself. They are grouped as far as possible in accordance with the method of description followed in the Thesis, and complete cross references have been made, from the illustrations to Thesis and from Thesis to illustrations. They vary much in magnifying power used, as when drawings were being made, the same type of microscope was not always available. The photographs of both high & low power, are less highly magnified than the drawings, as most were taken

without the eye-piece / the microscope. The photographs too vary a good deal among themselves as when I was taking them, I was at the same time learning micro photography and was experimenting with different lenses. Under each I have indicated as approximately as possibly the magnifying power used in each case. The specimens which give best results as photographs, are those treated simply with Osmic Acid; Picro Carmine staining is next best; specimens cleared up with oil of Cloves and mounted ~~not~~ in balsam are too transparent.

Accompanying these volumes is a small box of specimens ~~used~~ from which descriptions were made. The ~~many~~ majority of the remainder I have presented to Professor Greenfield, who has kindly consented to submit them to examiners for inspection.

The naked eye specimens, mounted in Glycerine Jelly have been presented to Professor Turner for the Anatomical Museum. They are referred to in the course of the thesis.

C. K.

List of naked-eye specimens. page

(1) Normal Omentum from child aged 7½ years mounted fresh without any preparation. Shews the arrangement of the large vessels & the relation of fat to them 4

(2). From child aged 4. Abnormally small Omentum, the part mounted consists of both layers spread out & separated from one another 6

(3) From child aged 4. Death from Tuberculosis small lenticular patches, more numerous in anterior layer than posterior. Little fat 126

(4) Adult Omentum. Congestion. Treated before mounting in Picric Acid. The distribution of lymphatics is described as seen in this, but on a recent inspection all trace of lymphatics had disappeared. There is little fat. 107 and 49

(5) From Case of Leucocythemia (No 90) Kept for a fortnight in Muller's fluid before mounting. Vessels all distended. Shews tortuous capillaries to the naked eye. 120

(6). From case of Uterine Fibroid. Om. adherent to Uterus. Tubular cyst extending from above Colon to ~~pelvis~~ margin attached to Fibroid 11 and 49

(7) Exceptional condition of Omentum. Fenestrae more than an inch wide replacing the membrane 15

List of Contents

Page

Introduction. Scope of work. Selection of specimens 1-2

& Term "Omentum" restricted to "Great Omentum" 3

Study confined to Human Omentum. — Object in view, processes of growth and disease. 4

Disposition of O. in Abdomen. Abnormal positions. Causes of displacement. Proportionate 5

volume in infant and adult. Occasional deficiency. - Normally delicate and transparent 6

- Transparency lessens with age. Fat pellets like 7

miliary tubercle. Patches laiteuses. Course and origin of vessels. Two layers of Om. 8

Formation of adhesions between them. Occasional absence of adhesion in adult - Hernia between layers

Appearance of O. in adult. Effects of age 9

Adiposity Emaciation. — Adhesions 10

Most frequent position. & Tumours. (Tubular 11

cyst in specimen preserved). & Hernial sacs 12

Epiplocele Changes in O. in Hernia. Position 13

of Om. Hernia. Fenestrae barely visible to naked 14

eye. Exceptional case - 2 inches wide, Fibrous 15

Polypi. Malignant growths. O. greatly thickened 16

Cancer. Ch. Tubercular Perit. O. like a rope 17

or studded with nodules. Melanotic Sarcomata 18

Diffuse Melanosis

page

Structure of O. at 40. Low power. Trabeculae. 19
Fenestrae, their shape, size. Thickness of Trab.
"Secondary Trabeculae"; areas mapped out by them 20
Contain single capillaries. (Plate XX fig 1). Large 21
fibrous bundles - not enclosing areas. Contain 22
arterioles & venule. Capillary venule & arteriole 23
Differences between arteriole & venule (Ranvier)
Measurement. Fat cells. "Fat-clumps". Rows. 24
Situation. Size of cells. Size of clumps 25
Two sets of capillaries in O. Net-work 26
in fat clumps. Single Cap.ies in Sec. Trabeculae 27
Difference in relation to cap.ies of arterioles & ven- 28
-ules. Venule dilated at junction. Great 29
difference in calibre of capillaries (Plate XXXVII)
Abnormalities. Unfenestrated patches. Thin 30
membrane filling fenestra (Pl III fig 1). Separation
of capillaries and sec. trabes. Rounded, fibrous 31
fat clumps. Examination with high power 32
Composition of trabeculae. Endothelial covering
Relation of fibres to Fenestrae (Pl II. 2). C. t. cells 33
Capillaries. Endothelium. Perithelium (Eberth) 34
Sec. Trabes. wavy. pulled upon by primary Trab. 35
Division of membraneous parts into layers (Ranvier)
Demonstration of interfascicular membrane 36
Large fib. bundles. Venule. Arteriole Muscle cells 37

Page
Rows of nuclei form a spiral (Müller) Relation 38
of fibrous tissue to vessels.
Endothelium forms continuous layer. Size of 39
nuclei, of cells. Groups of nuclei (Pl II. 7 fig 1) Stomata 40
Latter present where endothel. is detached. Connection 41
with Lymphatics. Nitrate of Silver. Distinction 42
between nuclei of endothel. & c. t. nuclei, difficult. 43
No c. t. cells in small trab. Staining with Logwood 44
and Eosine. Penciling the V. all ~~c. t.~~ cells apt
to be removed (Pl XII fig 1).
Nerves. Shewn by Picro Carmine (Plate XXXIV fig 8) 45
Hoematox. (Plates XI and XII). Delicate fibriles.
Ampullae. ~~Ep~~ Cells at Junctions. Situation in 46
Trabeculae, and in Membrane. Relation to vessels
Larger ones double outline measure 4μ across.
Non-medullated fibres. Intercalate nuclei 47
at intervals of about 250μ. 48
Function of V. Absorption. Lymphatic trunks
beside blood vessels in pairs. Glands at great Curvature 49
of stomach. Dilatation of L. vessel, tubular cyst
Lymph spaces in Connective tissue. Filled with 50
cells in inflammation (Pl XXV. 7 fig 1). Communication
with surface. Stomata. Pseudostomata. Lymph 51
Follicular Structures" Perilymphangeal. Endolymph-
angeal. Fat clumps. Invagination of L. vessels

Page
Resemblance to glomeruli 52
Growth of Omentum. Foetus. No Fenestrae 53
Endothel. continuous sheet. Vessels in pairs, surrounded by numerous cells. No fat 54
Child 22 mos (p. 146). Fenestrae, very small, round "punched out" Relation of fibrils & Fen., Relation of cells. Klein. Vacuolation. Tension. Adaptation of Endoth. to newly formed Fenestrae. 55-56
Ranvier "Formation des noelles du grand Epiploon" 57
Wandering cells, perforating. Increase in size 58
Om, two or three years. Wavy bends of fibrous tis. supporting fenestrated membrane. Anastomoses 59
Formation of capillary loops. Their spirality 60
Spirality in all pairs of vessels. Number of twists lessens with increased length (Pl VIII Fig 1)(XXIX 2. XXII 2)
Single cap. continued from extremity of loop. Splitting 61
of nerve fibrils. Ragged appearance of growing 62
vessels. Large granular—(vaso-formative) cells
Processes. Anastomoses. Vacuolation. Intra cellular 63
Intercellular. & Perilymph Structures. Large 64
granular cells. Contain fat-droplets. Growing
fat cells (Pl. X Fig 2). "Lacunes lacteures" vascular and 65-
non-vascular 66
Over four or five years. Fenestrae enlarged 67
angular. Mode of enlargement. Stretching & rupture

Page

of Trabeculae. Retraction of membrane to fibrous 68
bands. Anastomoses. Blind capillaries rare 69
in adult. Increase of fibrous tissue round
capillaries forms "Sec. Trabes."; round cap. loops 70
forms larger fibrous bands. Difference in
calibre of capillaries. Injection, natural. (Pl XXXVIII)
Proliferation of endothelium of vessels (Plates VI and VII)
in single capillaries or in vessels. No accomp. inflam. 71
Jacobs Laiteuses disappear about 9. Increase in 72
size of fat-clump due to increased size of cells. Separation
of vessels by increased volume of C. Few blind 73
Capillaries in adult, no vasc formative cells.

Atrophy. Disappearance of vessels in dense 75
fibrous bands. Conversion into rows of spindle cells
Fat varies with general adiposity. Diminished 76
with emaciation or local pressure. Case No 6. (p 209) 77
Diabetes Mellitus. No fully formed fat cells. Cells in
C. T. spaces with small droplets or granules, in Capill.
Network, or along side vessels. Their nature. Degen. 78
or infiltrated
of C. T. cells, or broken down fat cells. Cause of
development of fat-cells in special positions. Mode 79
of absorption of fat. Stages of process not always visible 81
Probability that in many fat cells, nucleus & protoplasm 82
disappear. The Haggans or fat development & retrogress. 83
developed from wandering cells, which grow with 84

Page

infiltration. In my specimens protoplasm ~~cells~~ seems to decrease 85
in quantity with infiltration (Plate X 2). Relation to each
other of "fat-tissue forming" cells, vaso-formative cells, wander-
ing cells ~~#~~ leucocytes and Endothelioid cells
Completion of resorption or retrogression followed 86
by degeneration of protoplasm, and reversion to type of
~~to and~~ wandering cell. Absence of cell wall? 87
Nature of cell wall. Similar appearances, less general
in cases of Pern. Pernic Anaemia, Dysentery, Rheumatism 88
Heart-disease etc. Unaffected fat cells side by side
with degenerate ones and obscuring them
Pigmentation. Phthisis, #Extravasation (1204) 89
iron reaction. Granules, no crystals. Cornil
and Ranvier describe same thing. Pigmentation of 91
C. T. cells in Ch. Venous congest. Fatty degen. of
Capillaries in Ch. Rheumatism and Pyaemia
Waxy disease. Seven cases examined 92
present in Obs. in all. Proportion to disease in organs 93-94
Vessels involved. Capillaries in fat-clumps 95
Methyl Aniline Violet. Apparent-waxy stain in
fat cells. Arterioles, long stretches or minute 96
patches (Plate XVI and ~~XVII~~ Vessels. Single capillaries
in secondary tubercular ~~more~~ seldom. 97.
List of cases with ~~the~~ extent of affection in each 98.
Effects on vessel. Thickening. Methyl Violet staining 99

Page

Endothel. cells of capillaries blue. Brittelheim blue
Irreg. pink mass between in elastic reticulum 100
Arterioles, nuclei & muscle cells blue, parts between 101
pink. Vessels like capillaries. Case No 91 102
in fibrous tissue (Plate XVII). Ky ber and 103
Eberth notice every change in walls of fat cells.
Advantage of studying W. disease & Ovum. Change 104
in fibrous tissue, especially elastic. Cells not 105
affected. Alteration in fibrils or ondulation?
Distribution - Comparison with Liver. Change 106
affecting the vessels directly through medium of blood?

Passive Congestion. Causes. Extent not 107
proportionate to apparent cause. Best marked case (No 1)
Plate XIX. Distension of venules & Cap.? Irregular
Fat-clumps fibrous & congested. Fib. tis. dense 108
Quantity of blood seen in specimen, fallacies.
Precautions in securing specimens (Hoggan). Permanent 109
changes Fibrous thickening. Cellular increase
(Delafield) greyish patches. Case 26. "Bud like" 110
structures (Klein) Pl. XXIII & XXXIV. Pigmentation 111
Endothel. swollen and close set. Fat cells few 112

Inflammation. Exam. of Om. in animals in 113
situ. Applic. of irritant. Congestion. Stasis. Clotting
Diapedesis. Causes of Diap. Position of escaped Leucocyte 114
relation to wandering cells.

Page

Infl. 24 to 40 hours. Distension of blood vessels 115
Clots, exuded leucocytes, sometimes filling lymph
spaces (Plate XXV) Fibrine in trabes. In acute
cases may be confest alone, not seen P. M.
During 1st week, gluing of O. to other parts, Change 116
in appearance of P.; Purulent fluid; Sup. Peritt.
Dilatat. of vessels varies, very great (Plate XXIV) 117
Clots sometimes large (Plate XXI). Threads of fibrine
with rows of w. b. cells. Endothelium, outlines 118
altered (arnold) wandering cells. Swelling of tissue
stretching of Endothel. Detaching. Proliferation. 119
Cellular Peritonitis often localised. Increase
espec. at junct. of trabes. Doubtful if cells are 120
endothelial (Hippolyte Martin) Chronic Cell P.
Chron. Phthisis. (Pl. XXX & XXXI) Congestion slight 121
cell. adhesions. Nodules like tubercle
Naked eye greyish patches. Opacity. Ascites.
Fibrous Adhesions - Causes. Inflammatory? 122
result of cellular adhesion? Type of cell same in
appearance as neo-formation. Thomas experiment 123
Fibrous bands stretching across Om. (Plate XXXII

Tubercle in Omentum. Thickening in Ch. Sub. P. 125
Caseation, giant cells (Delafield).
Acute tuberculosis. Tub. in Om. without Peritonitis

	Page
Description of specimen mounted in Glyc. Jelly	126
Miliary nodules? Like "Taches Laiteuses" Difficult to distinguish. Congestion present or absent	127
Cells round vessels. Traber. endothel. not affected. Bacilli not found. Difficulty in recognising them. Tubercle patch! & Taches Laiteuses (Plate XXIX) Hippolyte Martin. Effects of Mechanical irritation	128
Difference according to intensity. Nodules formed under the endothel. Like different kinds of tubercle nodule	129
Origin of tubercle cells. Case (11) p. 200, Changes	130
in Endothelium of vessels, Situation of tub. nodules	131
Resemblance between processes of growth, Inflammation and Tubercle formation	132
Cases of Abdominal Tumour. No. 38. Malig. Tum of Pancreas, Lymph nodules. Abn. collections of cells in small vessels (Pl. XXXV & XXXVI. Commencing Tumour growths, Origin	133
No. 77. Tumour of Pancreas & Stomach. Affecting Lymphatics No trace in Omentum.	134
Case of Melanosis. Large cells containing pigment round vessels (Plate XL) Layer brown nodules	135
Pigment at periph of cells Nucleus clear	136
Cases of Leucocythemia. No. 90. (Plate XXXVIII	137
Great distension of lymphs & Cap? exudation.	138
No. 96. Exudation but little congestion	139
Myxœdema. Fibrous tissue swollen & mucous looking	140
	143.
	144

Index of Cases

No.		Page
	Foetus at 5th Month. (Plate III Fig 2) (P. 53 of Thesis)	146
78	age 22 mos. (Nerve fibrils, round fenestrae, growing vessels etc (Plate VIII. Fig 2). Vaches laiteuses (Plate XXIX Fig 3)	146
55	" 2 years. ——— " "	147
17	" 2 " (Tuberculosis) Vaso-formative cells (Plate V. Fig 1) fat cell development, Tubercle nodules	148
18	" 2½ " (Tubercular meningitis. Phthisis.) Growing vessels growing fat cells (Plate X Fig 2)	151
16	" 3 " (Tuberculosis). T. nodules (Plate XXIX fig 1) Large cells round caps. (Plate X. Fig 1) (Plate XXX Fig 1) Growing caps. - unchannelled pieces. (Plate V. Fig 2)	154
79	" 3 " (Phthisis) Growing vessels - spirality (Plate VIII Fig 1) Nerve fibrils - hematoxyl. & Eosine staining. Congestion	156
59	" 3½ " (Tuberc. Meningit.) Fenestrae round angular. Congested vessels - clots (Plate XXI Fig 1 and 2). Fat cells fully formed	158
85	" 4 " (Scarlet-Fever - Nephritis - fluid in abdomen) Nerve fibrils (Plates XI and XII). Pencilling, minute fenestrae	160
32	" 4½ " (Caries of vertebrae - Suffocation). Fenestrae larger up to 80μ Large fat cells. Large capillary loops (Plate I fig 2)	163
51	" 4½ " (Commencing Peritonitis) Congestion. Diapedesis (Plate XXV Fig 1-2; XXIV Fig 3). Large cells round capillaries (Plate XXV. Fig 2. XXV Fig 2.) Stomata. Proliferation of Capillary endothelium	165
36	" 4¾ " (Tuberculosis) Fenest. up to 80 x 100μ. Slight congestion. Capillary loops (Plate V. Fig 3)	166

Case No.			Page
60	age 5½ years (Perforation, commencing Peritonitis). Great dilatation veins 80μ, Cap.ᵉ 50μ. Exudation (Plate XXIV fig 1 & 2)		167
74	" 5½ " (Temp. 105°) Fenestrae up to 120μ. Growing fat cells. Delicate fibrous adhesions (Plate XXXII fig 2)		168
45	" 6½ " (Temp 106.4 Typhoid). No tache laiteuses. Fat clumps growing vessels (Plate IV. Fig 2) Fenest up to 120μ		169
68	" 6½ " (Death sudden - acute ulcer. clots in heart) Slight congestn. & clotting. Taches laiteuses.		170
71	" 6¾ " (Diphtheria) F. angular up to 100μ. Space between vessels, wide.		171
67	" 8 " (") " " or more "		171
28	" 9 " (Tuberculosis) No F. in Om. Fenest. over 100μ groups of nuclei (Plate II fig 1) Cap. network in fat (Pl. I. fig 1)		172
75	" 9 " (Tuberculosis). Congestion exudation (Pl. XXIII fig 1)		173
48	" 10 " (Tuberculosis) Congestion, clots, large fen cells (Pl XXII fig 1&2) developing fat cells. Few growing vessels		174
62	" 10 " (Lymphosarcom. Lung) Om. like that of child of 4 years. Vessels surrounded by cells. Growing fat cells. Groups of Cap.ᵉ corpsct. (Pl XXIII Fig 2		175
34	" 11 " (Scrof. Lym. Cerebel.) Fenest. rounded up to 80μ. Growth relation of fib. tissue to Fenest (Pl II fig 2). Growing vessels (Pl VI and VII)		176
72	" 12 " (Sup. Peritonitis & Empyema) Congestion, clots, exudation - spec. observed by fibrin, bud-like structures.		177
7	" 16 " (Tuberculosis) Fenest up to 200μ. Slight congestion growing fat cells. Nuclei in vessels.		178
44	" ~~44~~ 18 " (Tubercular Meng) Fenest to 150μ, blind vessels Fat cells fully formed, in groups or isolated (Pl. X. fig 3)		179

Case		Page
No 27	age 19 years (Exophthal. Goitre) Blind cap's (Pl XX fig 2)	
	congestion. Fenest. to 200μ or more. Fat small	180
54	" 29 " (Temp. 106°7.) Fenest 60–200 or more. fat resorption	181
46	" 33 " (Pneumon. 104.2°7) Fenest. many more than 200μ	
	Congestion. Clots.	182
39	" 52 " (Pyaemia). Fenest. 50-250μ	183
22	" 5-8 " (Rumour-hemorrhage into Pleura). Nerve fibrils?	
	Congest. slight. Few collections of cells. Endoth. largely intact	184
63	" 59 " (Vert. Syphilis) Fluid in abdom 20z). Very fibrous	
	Fat absorption. Endothelium close set nuclei	184
22	" 63 " (Cerrhot. Kidney - anasarca).	185
10	" 69 " (Mitral regurg. etc) Grabes thick. Fat clumps fibrous	186
	Cases of Waxy Disease	187-19
69	" 7 " (Rickets, Phthisis. advanced Waxy)	
	increased cells on trab. W. change in all sorts /	
	small vessels (Pl XVI fig 1 and 2. Pl. XVII Fig 1)	187
33	" — " (Bronchiectasis? Phth Laryng. Gen W. disease)	
	Congestion, slight exudation, germination.	
	W. dis. only seen in fat clumps	190
35	" 32 " (Bronchiect. Atheroma Aorta. Gren K. Old Pericard	
	gen W. dis.) Om coarse. All groups vessels W.	191
43	" 26 " (Pyelitis. W. dis. irreg) In all groups vessels	
	very marked in few cases. Hyaline cells seen (Pl XVI fig 3	192
66	" 53 " (Bronchiect W. dis not advanced). Om. coarse	
	Congest. Slight W. in art. Fat resorption	193

Case			Page
No 89	age —	(Phthisis very advanced W. dis.) In Ova in only a few part- clumps	194
91	" 24 years	(Phthisis. very advanced W. dis) In arterioles principally & in fibrous tissue (Pl XVII fig 2)	195
		Cases of Phthisis in the adult- without wasting disease	196–208
56	" 19 "	Chronic Cell. Peritonit, (Plat. XXX fig 3 & 4. XXXI. 1 & 2) congestion - Tubercle nodules?	196
11	" 25 "	(Phthisis. Tubercl. meningit) Tubercle nodules? Collection of cells in vessels (Plates XXVII and XXVIII)	200
53	" 29 "		203
12	" 36 "	A few collections of cells properly such Fen. (Pl XXXI. 3	203
19	" 46 "	(Acute Phthisis. Pigment Peritoneum) Blue reaction with Hydrochlor Acid & Ferrocy. of Pot. - Gemmation	204
41	—	(Old & recent- slight Peritonit.) Dilatation of vessels fibrous adhesions (Pl. XXXII fig 1) Fat resorption	207
58	—	(Acute Phthisis) Increased number of cells	207–208
		Cases of Wasting disease shewing process of fat removal (in addition to Cases 41, 66, 63, 54 already described)	209–
6	age 38 years.	(Diabetes Mellitus and Phthisis) Pl. XIV	209
26	" 34 "	(Prof Pernic. Anaemia) Ova like child of 10. Red like Structures, gemmation, congestion	212
9	" 35 "	(Dysentery - Haemorrhage) Great congestion	215

(Case
No 20 age 30 years. (Rheumatism, Anaemia) Fluid in Abdom. Nodules on P.) Kaye
Fenest. very large 200µ & more. Endothel
close set on trab cordae. Walls of Caps fatty 217

47 age 37 " (Syph. Meningitis Ch. Pyaemia) Cells of Caps? fatty
Looking, Endothel lining trabec 218

Cases of Valvular Heart-Disease 219-228

49 age 30 years (Dyspnoea, stomach distended) Thin membr. parts of
Omen (Plate III fig 1) slight congestion 219

61 " 30 " Fibrous thickening - endothel remains (Pl XXXI fig 5) 220

50 " 35 " (73oz fluid in Abdom) Congestion, "fibrosis"
of fat clumps 221

20 " 40 " Congestion. fibrous thickening. Endothel (Pl XXXI fig 4) 222

52 " 41 " Congestion " 223

26 " 45 " Trabec delicate. "Bud like" structure (Pl XXXIII & XXXIV)
stomata (Pl XXXII fig 7 & 8), cellular patches 224

8 " 46 " (27oz fluid in Abdom) ~~Liq~~ Slight congestion 227
(Pl XX fig 1) slightly pigmented cells

Cirrhosis of Liver - Ascites

21 " 38 " (Fibroid Phthisis, Abdominal Adhesions in Abdom)
Fenestrae very large 400µ or 1 m.m. Endothel
covering pretty complete 229

29 40-60 (Omen small & adherent) Fenest 1 m.m or more
fat scarce, some cells breaking up 230

73 " (Peritonitis after tapping) Fibrous - & congestion
clots, cells etc 231

The Human Omentum

The study of the human omentum was suggested to me by Professor Greenfield about two years ago, and since then I have been collecting specimens of Omentum secured at Necropsies I was able to attend, at the Royal Infirmary and Sick Childrens Hospital in Edinburgh, making notes of the age of the subject, the salient Pathological changes in the different organs, and, in many cases the length of time which elapsed between death and the post mortem examination. I have to acknowledge my indebtedness to Professor Greenfield for permission to work in his Laboratory and also for the valuable advice he has so frequently given me and to Dr. Bramwell and Dr. Woodhead for the opportunity afforded me of securing material from,

from the cases examined by them.

My Work has been confined almost entirely to a microscopic examination of pieces of these Omenta, mounted usually in the fresh condition or after immersion for a few hours in weak "Müllers Fluid" or spirit, the pieces being cut from the rest while floated in a basin of "Müllers Fluid", Spirit, or water. The pieces selected were, of course, the thinnest pieces, those containing least fat and corresponding in thickness to the section of any organ, such as is usually made for microscopic work.

They almost invariably consisted of only one layer; parts where two layers of Omentum were closely adherent, being avoided as being too thick to bear satisfactory examination.

By

By the term "Omentum" I mean the great Omentum or Epiploon and the pieces mounted are usually taken from a point pretty near the colon as in the adult it is only in that position that the two layers are usually non-adherent.

I have not attempted to examine systematically the Omentum in lower animals as I found my time sufficiently occupied with this, and other laboratory work;; That has been very thoroughly done by Ranvier. Klein. and others to whose work I shall have occasion to refer frequently. Nor have I attempted to produce changes artificially in the peritoneum of lower animals, that being a position in which the effects of inflammation, the development of tubercle etc. have been very closely

closely studied. My sole object has been to observe the changes produced by disease in fibrous tissues vessels and cells, and to note the difference in appearance at different ages – the changes produced by growth.

I have almost invariably found the omentum spread out in the abdomen completely covering the coils of the small intestine and often dipping down into the Pelvis, in one case however it was reflected up over the Liver and Stomach although not fixed by adhesions of any kind, without the presence in the abdomen of any fluid and with no over-distention of the stomach or bowels. In another case, a child with peritonitis of less than a weeks standing the

the Omentum was glued to the upper surface of the Liver and stomach though easily separable and without old adhesions; in both these cases the displacement had probably only been produced a few days before death by distension of the stomach and bowels and the Omentum would probably have returned to its proper position by the movements of respiration, and of the stomach and intestines.

This displacement of the Omentum is so seldom seen post mortem, that it probably rarely occurs even temporarily.

The Omentum is stated, by Erichsen, in the Chapter on Hernia in his work on Surgery, to be proportionately smaller in the child than in the adult. It is difficult to estimate this proportion, but in the child the Omentum though rarely voluminous almost

Erichsen's Surgery Vol II p 761

almost always conceals the coils of the small intestine. In one child however it was so small that at the Post Mortem it was stated there was none, however, on examining the Transverse Colon after it was removed from the body I found a "small" Omentum attached measuring apparently less than an inch. I separated the two layers leaving the Anterior attached to the posterior at the point of junction, and the posterior layer attached to the Colon. This I mounted spread out in Glycerine Jelly ~~and it is now in Professor Greenfields possession~~. Each layer measures spread out about 2½ inches and appears perfectly healthy

Record at beginning

In most cases the Omentum is quite delicate the coils of the small intestine being easily seen through it.

Thus

This delicacy is naturally greatest in children, becoming less as they grow older In children the Omentum is quite transparent, the quantity of fat is very small only occurring as little pellets along the course of the vessels and might easily be mistaken for Miliary tubercle nodules. Along with these fat pellets are little milky spots, the "Taches laceuses" of Ranvier, which are usually along the course of the vessels but sometimes quite apart from them. The large vessels run down the anterior layer from the great curvature of the stomach arising from the Gastro Epiploic Arteries. They divide and subdivide repeatedly, giving off branches which form an anastomatic network. When they reach the free edge of the Omentum they curve

Ranvier's Traité technique p 376.

curve round it, and anastomose with vessels running across the posterior layer, from the attachment to the ascending Colon and derived mostly from the right colic branch of the Superior mesenteric Artery. The vens always accompany the arteries.

The two layers of the Omentum, are, in the child, almost invariably separated in their whole extent with the exception of about one inch at the lower extremity where they are almost always united except perhaps in the Foetus or Infant.

Adhesions gradually form between them, till, without any inflammation they are completely bound together, but this complete separation sometime persists and a case is recorded in Virchow's Archives, in which there was a hernia of the greater part of the

Sorgat
Boettcher of Dorpat
Virchow's archiv
Vol. 72. p 642

the small Intestine into the space between these two layers the bowel entering "through an opening directly in front of the position where the Jejunum enters the Peritoneal Sack."

In the adult, especially in old people the Omentum has a greyish appearance, there being many patches more opaque than the rest. As age advances too, the structure becomes coarser, and there is a greater tendency to the formation of adipose tissue. The amount of fat in the Omentum usually corresponds to the amount of general adiposity, and in some cases the Omentum appears to consist of a single sheet of fat as much as an inch in thickness. In well nourished, muscular subjects the quantity of fat is small, and in emaciated, subjects such as

as ~~of~~ cases of Phthisis or Progressive Pernicious Anoemia there is still less.

The Omentum is apt to become attached to the various organs in the abdomen with which it comes in contact and such attachments are seen when all traces of inflammation are gone or they have probably occurred in many cases without the acute changes to which some restrict the term "inflammation."

Such attachments are most frequent in the Pelvis, especially in the female, in the Pouch of Douglas. Pelvic tumours also, rising into the abdomen are apt to become attached to the Omentum, and in one case of large Uterine Fibroid, the Omentum was attached at it's lower extremity, the point of attachment having connected with it a large tubular cyst

cyst, like a distended vessel. This had a tortuous course up the anterior layer of the Omentum, inclining to the right side and passing right over the transverse colon to the great curvature of the Stomach. It followed the course of an artery and vein crossing and recrossing them several times and always keeping in front. When distended it was about half an inch in thickness, constrictions were noticeable at intervals and what looked like valves, were indistinctly seen at these positions. The fluid contained was clear and slightly blood stained. I took it to be a very much distended lymphatic vessel but before I saw it the Omentum had been removed both from its attachment to the Tumour and the Stomach.

No.

No Microscopic examination was made of its walls or its surroundings but I was able to inject the "vessel" with glycerine jelly and mount the greater part along with the attached Transverse Colon in glycerine jelly and it forms part of a collection of mounted Omenta which I have entrusted to Professor ~~Greenfield~~ Turner. The Specimen was mounted in the fresh condition without preparation of any sort, and diffusion of blood pigment has taken place to a considerable extent but the points I have described are clearly made out still.

see "note" at beginning

The Omentum is in a good many cases attached more or less to the abdominal wall and it constitutes the greater part of many irredeemable ~~Ir~~ Hernae. I secured one specimen in which it was attached

attached to the neck of a sac of an Umbilical Hernia as well as to the interior of the sac itself; the only contents of the sac, at the Post mortem being a piece of thickened Omentum of about the bulk of a hens egg. When retained in a hernial sac, as it often is in Scrotal and Femoral Hernia it acquires a very coarse texture and becomes altered in shape. "It "becomes thickened brawny and "laminated losing its ordinary "cellulo-adipose texture, and "becoming indurated. Its veins "usually assume a somewhat "varicose condition; and the "mass of the Omentum be- "comes triangular, the apex "being upwards at the abdom- "inal aperture and the base "below, broad and expanded. In"

Erichsen's Surgery Vol II p 475

"In some cases it can
"be unfolded, in others it
"is matted together into a
"cylindrical mass. Occasionally aper-
"tures form in it through
"which a coil of intestine
"may protrude thus becoming
"secondarily strangulated within
"the sac. In other instances
"(~~cogstats~~) cysts are met with
"in it, containing fluid."

Omental Hernia is said to occur most frequently on the left side as the Omentum is longer on the left than on the right

As a general rule, even in old people, the Omentum appears to the naked eye as an almost continuous membrane, the Fenestrae being so small as not to be visible except on very close inspection. The large masses of fat are along the lines of the

the large vessels and its quantity is as great at the lower margin as at the Stomach and Colon.

The Fenestrae are sometimes however more apparent and in one case the Omentum consisted of a very wide mesh work. The Fenestrae being as much as an inch or even two inches in diameter. The Trabeculae were coarse fibrous bands and attached to them were numerous small fibrous "polypi" some as large as a pea and one or two as large as a bean. Here and there an opaque membrane stretched between the fibrous bands filling partially or completely a "fenestra". I have preserved this specimen also in glycerine jelly.

The gross naked eye appearances

See "note" at beginning

: pearances in the Omentum and Peritoneum generally, produced by such conditions as malignant growths, tubercle, inflammation etc. are described in almost all pathological text books. Both in Chronic Tubercular Peritonitis and in malignant disease, the Omentum may become enormously thickened.

One specimen of colloid Cancer in the Transverse Colon and great Omentum preserved in the Anatomical Museum of Edin: burgh University shews the Omentum as a mass about one inch thick and two and a half inches long. At the Post mortem room of Edin: burgh Royal Infirmary I have also seen the Omentum transformed into a thick cord attached to the Colon, in a case of cancer; and again forming a thick glairy mass

mass connected with a malignant tumour of the ovary in a case operated upon by Dr Keith.

I have only seen two cases of Chronic Tubercular Peritonitis and in these the Omentum was only somewhat thickened containing a number of tubercle nodules and adherent to the matted coils of Intestine, but numerous cases are recorded in which it is described as forming a thick irregular rope running across the abdomen. Garlick describes it in one case as a "hard ruler like band "about an inch above the navel "extending across the ~~navel~~ abdomen "for about 5 inches." Kenoch describes it as a mass over an inch in thickness.

London Med. Recor 1881. p. 68.

London Med. Reco 1882 p. 469.

In cases which are not quite so chronic, the Omentum

is slightly thickened and studded with nodules about the size of a pea.

In the Anatomical Museum at Edinburgh University there are several specimens of Omentum studded with Melanotic Sarcomata the black nodules up to the size of a bean, hanging from it like polypi. In one case of multiple Sarcoma I saw a similar condition — at a necropsy in the Royal Infirmary. — but was unable to preserve any specimen for the microscope and in two other cases of "Diffuse Melanosis" the Omentum was thickened to about 1/4 of an inch, and brownish black in colour.

Structure of Normal adult Omentum.

In what we may call the fully developed Omentum such as is found at about the age of 40, what attracts our attention on examination with the low power of the microscope (20 to 60 diameters) is a net-work of fibrous bands, "Trabeculae", varying in length and thickness and enclosing somewhat irregular spaces "Fenestrae". These spaces are usually quadrangular or triangular, though sometimes they are polygonal, and although the angles are usually well marked they are often somewhat rounded. The majority measure across about 100 μ though many are smaller, down to 30 μ or less, and here and there some measure as much as 400 μ

The Trabeculae enclosing the smaller Fenestrae may be very delicate

delicate, as little as 4μ in thickness, that is, half the diameter of a white blood corpuscle. These delicate trabeculae however only separate two adjacent Fenestrae. The larger fenestrae have bands usually about 20 or 30μ in thickness or even as much as as 100μ The Fenestrae are usually divided into groups by bands of larger size which we may call "Secondary Trabeculae and those enclose areas varying very much in extent Some contain only a few Fenestrae or, exceptionally, only one, and may measure only 300μ across or even less but most are 700μ or 900μ wide and some as much as 1500μ (1½ m. m.) The Secondary Trabeculae vary from 40μ rarely less - to 100μ in thickness, they usually contain single capillary blood

blood vessels which form a network corresponding to these "Secondary Trabeculae, and seldom penetrating into the (secondary) "primary trabeculae". Of course that statement is rather arbitrary it being often impossible to determine, what one considers a primary or a secondary trabeculae. the presence of a blood vessel often deciding; but as a general rule this relation is well marked. The spaces so mapped out, form, like the Fenestral irregular figures and so do the Anastomosing Capillaries. Plate XX Fig 1

The Capillaries are connected with Arterioles and venules which lie together in fibrous bands of still larger size from 90 μ to 200 μ or 300 μ in thickness, these being the bands which are just easily visible to the naked eye. They arise from

from larger bands too thick to be included in pieces mounted for microscopic ex: amination, and gradually taper off, dividing once or twice dich: otomously, and become lost in the general meshwork when the vessels they contain have broken up into capillaries. On this account they do not enclose areas corresponding to those enclosed by the Secondary Trabeculae

They almost invariably contain two vessels one usually a little larger than the other and which we conclude are vennle and arteriole though they often have no distinguishing marks. If traced back however one, the smaller, becomes striped from the presence in its wall of muscular fibres; this we may call "arteriole", and the accompanying vessel "vennle" giving the

the names "Capillary arteriole" and "Capillary venule" to the vessels from the point where muscular fibres no longer exist in the arteriole to the point where the two vessels cease to lie together.

Ranvier describes the difference between arteriole and venule as seen in the Omentum, as follows, The Endothelial cells of the venules are larger and rounder than those of the arterioles. An elastic lamina which he describes as being clearly demonstrated in arterioles, is absent in venules or appears only as longitudinally arranged elastic fibrils. The great difference however is the absence in the venule of the striated appearance produced by circularly arranged muscle cells in the arterioles. These differences were also observed

Ranvier's traite technique d'histologie p. 572.

in small vessels taken from organs, but were seen to greatest advantage in the Omentum.

If there is no congestion the arteriole may measure as little as 20 μ and the vennle 30 μ.

Accompanying these vessels are clusters of fat cells "fat clumps", which are necessarily small, the parts containing larger ones being inadmissable for mounting for microscopic examination. The fat cells are crowded together nothing often being distinguishable but the rounded contours of the cells, covering each other at different focal points. They also run in rows along side the vessels or are separated by fibrous tissue, adding to the thickness of the fibrous bands, or, they occur in groups of two or three at points manally

Hoggan states that in 99 cases out of 100 fat cells tend polygonal owing to pressure upon one another, and that, of course is a characteristic of fat-cells, but in small groups in the Om. there is not the same pressure & the cells are usually spherical

usually corresponding to the bi- Plate X fig 3.
furcation of the arteriole and
vennle or a small cluster
may even be situated upon a
capillary. The individual fat
cells measure from 30 μ to
60 μ or more.

The small fat clumps, that
is, those we examine under the
microscope are visible to the
naked eye as little greyish
white patches like the nodules
of miliary tubercle, running
along the lines of the vessels;
these branch out from larger
patches of fat corresponding to
the large vessels, forming in fact
a sort of net work of fat
enclosing areas about an inch
in diameter where the fat
clumps are smaller and less
numerous, the areas in fact
from which pieces are chosen
for microscopical examination.
In a spare Omentum the

fat

fat is of course small in quantity and may not have that arrangement, while in cases of adiposity the parts that usually contain little or no fat are entirely obscured.

There are two sets of capillaries in the Omentum, one set is distributed among the fat cells the main capelaries supplying these coming off from the artery usually at nearly a right angle and splitting up into branches at once, those branches forming loops around groups of two or three cells sometimes a loop encircling only a single cell. the network so formed passes again into a single capillary which enters the vennle or capillary vennle. This Capillary network being ~~bor~~ in the fat clumps alongside the vessels does not necessarily nor indeed as a rule, leave

Plate I Fig 1

the

In several specimens I have observed a single capillary at a distance from arteriole and venule surrounded at some point in its course by a group of about a dozen fat cells ~~and~~ The capillary sometimes breaks up into a network of capillaries among these cells, the branches uniting again at the other side to form a capillary similar to that entering the fat collection

the fibrous band in which the vennle and the arteriole lie. This is not so well seen in the normal adult omentum as in that of the child where the fat cells are not so closely crowded together.

The other set of Capillaries is that already mentioned as usually found in the "Secondary Trabeculae". These Capillaries are derived from the arterioles in the same way as the others and return similarly to the Vennles forming an anastomosing network between. The spaces included by the network vary from 200μ to 1000μ or even more. In the adult the circles or angular figures formed by these are almost always complete; there are no angle vessels or vascular loops passing there way along trabeculae.

Ranvier

Ranvier describes another differ-
:ence between venules and arterioles
in their relation to Capillaries.
this again best seen in the
Omentum. He says, that to give
rise to a Capillary network
the arterioles divide and sub-
:divide, and end in terminal
branches, which are perfectly
continuous with the Capillaries
of the network. Between the
venules and capillaries on the
other hand, there is a well
marked difference, a defined limit
at the point where a Cap-
:illary apens into a venule
the latter is dilated or at
least does not taper to that
point the difference in calibre
of the venule and capillary
being very noticeable at the
point of junction, and this
is more marked, when, as
often happens, two or three
capillaries apen into a venule
at

Ranvier traité technique d'histologie p. 597

at the same point. That of course is only seen when the vessels have been injected, I have not been able to confirm Ranvier's observation though I have no doubt as to its correctness

The Capillaries undulated - with their walls collapsed - have simply a diameter corresponding to the diameter of the endothelial cells forming their walls, leaving out of account of course the fibrous tissue supporting them and which constitutes the fibrous bands in which they lie. That the Capillaries however may vary very much in calibre is very noticeable when one examines specimens in which the vessels are filled with blood. Plate XXXVII

These features mentioned form a description of the general contour of those parts of the

the Omentum which can be examined without making sections, looked at with a low power of the microscope. But in many cases peculiarities are seen which cannot be called abnormal.

The most frequent in the adult Omentum is the presence of large patches, ~~of~~ one or two m.m. in diameter where there are no Fenestrae but which consist of a thin fibrous membrane, thin enough to be transparent in which there is often a network of Capillaries (as in Photo from 49. R III fig 1)
There is usually no fat in these often not even a single fat cell, the membrane consisting of interlacing fibres, not even collected into bundles in many cases and often not forming thickenings round the Capillaries. Again in other cases

what

what I have called the "Secondary Trabeculae" and the capillaries seem to have parted company. The thicker bundles spread out over the field often radiating from the termin: : ations of the bands containing the pairs of arterioles and venules and crossed at all angles by the capillary loops and capil: : lary network, the capillaries in these cases having hardly any extra support from fibrous tissue but running at random along delicate trabeculae or cutting across Fenestrae? which are filled up by delicate mem: : brane (~~see drawing and~~ photo. Platt III Fig. Plate I fig 2

Often rounded masses of fat cells are found not in relation to an arteriole and venule, but enclosed in fibrous tissue and connected with the rest of the Omentum by Trabeculae which radiate from

from them (as seen in 10a.) the Capillary plexus in the fat mass being supplied by two or three Capillaries which pass in and out along some of the larger ~~tubes~~ trabeculae.

To make out the minute structure of the Omentum it is necessary to use a higher power (×250).

The trabeculae bounding the fenestrae consist of bundles of fibrous tissue covered with a layer of endothelial plates. As this endothelial covering is only rarely seen intact to any extent in the Sternum Omentum as removed from the body 24 hours or so after death, we may leave the description of it till later. The Fibrous tissue as Klein and Ranvier have pointed out does

Journal of Microscop. Science 1877 p 235
Ranvier traite technique d'histologie p 379.

does not surround the Fen:
:estrae in complete circlets
as was maintained by Rollett,
but the bundles divide and the
divisions join others to form
larger bundles again, so that
a fibrous bundle has a tor:
:tuous course passing perhaps
round three sides of a fenestra
curving off and dividing to bound
others, and at the same time
formed by a small bundle
which has probably passed along
the fourth side of the fenestra
(see drawing Plate II. 2) The angles
of the Fenestrae correspond to
the division giving an appearance
as if the shape of the Fenestrae
had been determined by traction
upon them, due to the contraction
of fibrous bands attached to them

In this fibrous tissue are
of course a few connecting tissue
cells, but these are seldom seen
in the smaller trabeculae than

place

Stricker's hand book of Histology Section on Connect. Tissue.

place being taken by the Endothelial cells covering the bands The Nuclei are the only parts readily distinguishable except where the cells are seen to taper off at either extremity. The Secondary Trabeculae are formed in the same way only they are more distinctly collections of bundles of fibrous tissue, and they contain more connective tissue cells. In the centre is the capillary vessel with the wavy fibrous bands round it. It consists simply of Endothelium whose nuclei are recognized distinctly dovetailing between each other their extremities formed by lines which correspond to the protoplasm of the cells forming the tube of the vessel. These walls come together in ordinary circumstances there being no blood contained in them after death. The nuclei of the cells measure

about

about 12μ to 16μ in length and
6 to 8 μ in breadth. The Connective
tissue cells outside are often clearly
seen to form a continuous
chain part of the Perithelium described by Eberth. The Secondary Trabeculae sends out and receives bundles of fibrous tissue to and from the primary trabeculae being usually inclined in the direction of the tension of the attached bands, a tension however which may have been produced in mounting the specimens, but the band has such a persistently wavy course that that can hardly be the cause.

Strickers Manual p. 206.

The thin membranous portions which occupy the position of Fenestrae, consist of interlacing wavy fibres, with here and there a connective tissue cell, Ranvier divides this into at least three layers which he has demonstrated by dosing and insufflation, raising a

Traite Technique D'histologie p 370

a layer on either side in the form of a bubble. One would naturally expect this keeping in mind the development of each layer from two reflections of the Peritoneum. He has also demonstrated that an interfascicular membrane supports the fibres. He demonstrates this by staining a small piece of Omentum, say in Carmine, stretching it tightly on the slide by fixing the edges and allowing to dry and then cutting it across before covering. A loss of substance is seen at the point of section and the cut borders are well defined. The fibres cut across terminate at this border and without having altered their position, continue their course at the other border. There is a rosy coloured background between the fibres which is absent — where there is a loss of substance owing to the

the section.

In the larger fibrous bun-
:dles there is the same struc-
:ture, though of course the con-
:nective tissue cells are more numerous.
The venule has the same
structure as the capillary to
all appearance; it is usually
slightly distended with blood
and the individual blood cells
can readily be distinguished
in its lumen. The arteriole, where
not striated, has also the
same appearance, but on tracing
it back the muscle cells begin
to appear as transversely arranged
rods. Ranvier states that it is
the nuclei of the muscle cells
which are seen, unless in spec-
:imens specially prepared, and
in a focus taking in, say,
the middle of the vessel, they
appear to run in alternate
rows one or two deep on
either side, the nuclei at the

Traite technique d'histologie p 55

centre

centre of each row being larger than those at either extremity apparently because seen at the point of greatest diameter justifying the belief that the muscle cells are so arranged that the nuclei form a long spiral round the axis of the vessel; an observation originally made by H. Müller. This Kölliker arrangement is very well seen in the Arterioles of the Omentum. The nuclei have usually a diameter of about 6 μ.

The Arteriole and vennle that lie side by side are separated by a small quantity of fibrous tissue; in this, occasional rows of fat cells appear with sometimes a Capillary, just as Capillaries and fat cells may appear outside both.

Connected with these larger bands are of course not only the

the secondary trabeculae but also the primary trabeculae enclosing the fenestrae in immediate relation to these bands; and often the fibrous tissue of the band itself, gets flattened out and one or two fenestrae appear in it

The Endothelium covering the Omentum has been often described (Recklinghausen and others) It forms a continuous layer over the trabeculae, the nuclei standing out from them and having in the case of the smallest trabeculae, a diameter greater than the trabeculae themselves They - the nuclei measure about 6 μ or 8 μ in thickness and 12 or 16 μ in length, in length the whole cell measuring 25 or even 30 μ across It is not often that a continuous covering remains in the specimens mounted

mounted of the human Omen-
-tum, but patches are retained
here and there, or individual
cells are left in position. Groups
of cells are often seen partially
detached, appearing like delicate
membranes containing a number of
nuclei. In the adult these nuclei
are usually at regular intervals
corresponding to the size of the
cell of which each forms the
centre, but often and especially
in young subjects, the nuclei,
are at points crowded together
reminding one of a giant cell.
These groups usually occur at
the points of junction of two
or more trabeculae and in
several cases have a regular
arrangement forming a circle
lying side by side, round
a central point which some-
-times contains a mass of
granular matter indistinctly
like a cell This is exactly
like

Plate II
Fig 1

Klein
Mic. Journal
1877 p 235.

like the Stomata described by Recklinghausen as seen best on the central tendon of the Diaphragm. They are present and so are their more irregular representatives, in cases where the endothelium has been almost entirely denuded thereby a closer connection with the subjacent tissue. The more indistinct ones are called pseudo stomata by many, but Ranvier denies that they have any connection with the lymphatic system and points out ~~that~~ the uselessness of the existence of such structures in the Omentum "which is already so large ly perforated, and where the passage of white blood is perfectly useless". One function however of the Omentum, I take to be that of absorption and the presence of regular stomata communicating with

Traité technique d'histologie p 385.

with the very rich lymphatic structure of the Omentum must very much assist that function.

I have not been able to define the outlines of the cells with Nitrate of Silver as is so easily done in the fresh Omenta of Animals but I have seen one specimen in Professor Greenfield's possession where the deposit of silver at the periphery of the cells is quite distinct, marking them out by a black line. This specimen was removed from the the body about twenty hours after death shewing that it is not impossible to get the silver reaction a considerable time after death.

It is difficult often to distinguish the nuclei of the endothelial cells from those of the connective tissue corpuscles underlying them. In appearance they

they are very much the same In the case of small trabeculae there is no difficulty for they contain no c.t cells. when distinctly seen projecting from the surface there is no difficulty in recognising the nucleus of an endothelial cell and when the c.t cell is seen lying between the wavy bundles of fibrous tissue there is also no doubt as to its identity, the more so as its protoplasm is seen tapering off from either extremity of the nucleus. The nuclei of the c.t cells seem to be smaller and less rounded than those of the endothelial cells and their staining is often slightly different but I am inclined to think that that is due to their position, to the pressure exercised on them by the fibres, and

because

because they are not so directly exposed to the staining agent, and are also seen through the medium of strained fibrous tissue. On staining with Eosine and Logwood in the form of Eosinated Stoematoxyllin Glycerine" a very distinct difference in staining was noticed in the nuclei, the superficial ones or endothelial nuclei staining more with Eosine, the deeper ones more with Logwood. But after some time in a specimen so stained this coloration became gradually equalised.

Pencilling the Omentum gives very instructive results the cells most easily removed are of course the endothelial cells, but the groups of nuclei are often left and so are those surrounding ~~nuclei~~ vessels, but if the pencilling is thorough these go too, and not only so

so but the Omentum is entirely deprived of cells except those in the substance of the larger and denser trabeculae, that is, in the child, only in close relation to the blood vessels, (vide No 85 of which there is a drawing) Plate XII

The Nerves of the Omentum are difficult to demonstrate except in fresh specimens treated with Chloride of gold. What I take to be Nerve fibrils are, however, seen in some of the specimens stained simply in Picro Carmine (No 96) but they come out very clearly in one case (85) that of a boy aged four years. In specimens stained in Eosinated Hæmatoxylic Glycerine. Where the Endothelium has been removed, a delicate thread is seen running along side the vessels, with Ampullae, very

3

very like nuclei, at intervals. These cross and recross the vessels, forming junctions with each other, usually through the medium of a "nucleus" with processes. Sometimes they leave the neighbourhood of vessels, running across the membranous parts of the Omentum or in fine trabeculae, and they also frequently continue along trabeculae where the vessels stop short. When examined with a high power, they are seen to have no distinctly fibrillar appearance. The larger ones measure about 3 or 4 μ across, their outlines are quite distinct, more deeply stained than the centre, and widen out to join the nuclei & or ampullae, that occur at intervals. Apart from the ampullae, their thickness is irregular, and they give

Plate XI

give rise frequently to fine threads not more than one micro across, that disappear in the fibrous tissue or form loops. They have thus just the appearance of non medullated nerve fibres as described by Klein, who calls the nuclei above described "intercalcate." Klein describes the nerves seen in the Omentum of animals, very fully, dividing them into four classes, according to size, but I need not recapitulate that here. Microscop. Journ. 1872. p. 314.

I should have mentioned above that the nerve fibrils with this staining take on a deep logwood stain like the connective tissue nuclei or vessel walls. Why they have done so in this case and not in others similarly stained, I am quite unable to say.

They are also seen in Nos 79 and 78 also

Nos 78 & 79

In these two cases the nerve fibrils were ~~only~~ not observed for more than a year after the specimens were mounted, even though parts in which nerve fibrils ~~were~~ had been seen underwent at one time the close examination entailed in making drawings, so that I have no doubt, the Ag wood staining which now marks out the fibrils was only slowly appropriated by them

also ~~in child's omentum~~ from children and have the same appearance. The intercalcate nuclei occur at ir: regular intervals but usually at intervals of about 250 μ. They can only be followed in their whole course when the Omentum is pencilled, so as to remove the endothelium. The darkly stained (Logwood) nerve fibril is then easily seen against the light background formed by the light ly stained fibrous tissue.

The Omentum is looked upon generally as a large develop: ment of the lymphatic system of the abdomen, absorption being probably its principal function, although it may also serve to lessen the friction between the Intestines and the abdominal wall. Lymphatics

In a specimen which I have mounted in Glycerine Jelly after treating it with Picric Acid solution, the lymphatic vessels

vessels are well seen with the naked eye. They run in pairs alongside the larger vessels, junc: tions being formed across at intervals. Smaller trunks are continued alongside the small ves: sels disappearing before the blood: vessels just visible to the naked eye, are reached. In this specimen the lymphatic trunks have a whitish appearance, standing out against the yellowish back: ground produced by the Picric Acid staining. The L. trunks are connected with the glands at the great curvature of the stomach

See "note" at beginning

may again refer to a specimen mounted by me, in which a large and tortuous trunk is seen running along the course of a blood vessel, cor: responding in position to one of these lymphatic trunks just de: scribed and probably due to the distension of one. The difficulty in such an opinion is, to account for the blocking

up

up of communication with neigh:
:bouring trunks, which must
have taken place to allow of,
this one to become so distended.
It was about as thick as the
little finger and fully a foot
long.

As regards the appearance of
the Lymphatics on microscopic
examination, the regular arrange:
:ment of connective tissue cells
alongside the vessels, points to the
presence of connected Lymph spaces,
these being further demonstrated
by the presence in them of rows
of small round cells (leucocytes) Plate XXV
in cases of inflammation (drawing) 7 fig 1

The Stomata and Pseudo Stomata
are supposed to allow of com:
:munication between these spaces
and the Peritoneal cavity a
communication which is largely
restricted to these openings by
the continuous covering of the
Endothelium. Klein describes this
distribution

Ueber die Peritoneal Höhle bei Frösche (Pseudostomata) Schweizer Seidel in Kopie

Klein's Anatomy of Lymphatics

distribution of the Lymphatic system in the C. but he also describes other structures which in the adult omentum, are seldom seen. These are what he calls "Lymph follicullar structures" which he divides into "Perilymphangeal" and "Endolymphangeal". The fat tissue has, he says, special re:lation to the Perilymphangeal Struc:tures, and the fat clumps are probably all that remain of these structures in the adult. In fact, I look upon these so called Peri. L. structures as simply a stage in the development of fat clumps. The Endolymphangeal structures are, he says, simply invaginations, or connected with invaginations of the Lymphatic vessels or Lymph Canalicular system accompanying the blood vessels, positions in which, accumulations of cells etc take place in in:flammation. They have a General resemblance

Gov. Blue book 1874 C-1068 p. 61

resemblance to the Glomerali of the Kidney. I have never seen anything corresponding to these, in any of my specimens, even in young subjects, but they are probably better seen on the peritoneum covering the central tendon of the Diaphragm, in which position Klein describes them

Growth of the Omentum

Examining the Omentum of a Foetus at about the fifth month we find that it is a continuous membrane no Fenestrae being present in it. It is covered with a continuous layer of Endothelium, which in my specimen is only retained here and there; but, where present, forms a continuous sheet. Stomata I have not observed. The membrane consists of delicately fibrillated fibrous tissue, the fibrils interlacing in all directions. The vessels run in pairs and terminate in loops after dividing & subdividing several times. They separate usually to about 400 or 800 μ. that being the widest space left without a vessel.—

Plate III Fig 2.

The case from which my specimens were taken was said to be one of Syphilis, so that there may have been a certain amount

amount of peritonitis, but that was not noticeable to the naked eye the O. only appearing rather thick and without that transparency characteristic of the O. in a child. The vessels are surrounded by numerous cells, and so obscured, that their structure is not readily made out. There are no fat cells nor anything approaching their formation.

I have unfortunately not been able to secure any Omentum from a child younger than 22 months, but at this age the difference from the adult Omentum is very noticeable.

Case 78 p. 146

The membrane is fenestrated, but the fenestrae are mere rounded openings, many as little as 10 μ across though the majority measure 20 - 30 μ. Groups of them are separated by extremely delicate trabeculae, often only one or two micros in thickness, which seem just

Plate VIII Fig 2

just about to give way though in none of my specimens about this age, are there any broken ends of trabeculae to be seen; the fenestrae have all very regu: :lar walls. But in parts, the Fenestrae are simply rounded openings apparently punched out of the membrane, and without any: :thing in relation to them to explain their causation. It is difficult, often impossible, to trace any fibrils in immediate relation to the Fenestrae - that is in the very smallest ones - though wavy bands pass between two or three at some distance from any of them. Sometimes a single cell is seen pro: :jecting into one, sometimes a connective tissue cell in the immediate neighbourhood. -

Microscop. Journal 1877. p. 235.

Klein describes the development of these Fenestrae in the Omen: :tum of Guinea Pigs 3-4 weeks old

old, stating that vacuoles form in the fibrous tissue and that this vacuolation separates the bundles of fibres; another way of stating, as I take it, that owing to the contraction of the fibrous tissue, and the tendency of the fibrils of the membrane to form bundles, the adjacent fibrils in places separate, leaving a small space in which fluid collects - the vacuole; that this space increases in size & a breach takes place first on one side and then on the other and a complete perforation is produced.

Proliferation of the Endothelium is always going on and new cells may readily form, or cells on either side come into contact to cover the wall of the newly made fenestra, gradually adapting themselves as it grows bigger.

H R

It is not unlikely that the connective tissue cells lying in the lymph spaces help to form this covering, for no one has been able to shew that these differ in any way from the endothelial cells.

Ranvier (Nouvelles recherches sur la formation des novelles au grand Epiploon – Archives de Phys – 74) attributes the primary formation of these fenestrae to holes left by wandering cells, that have passed right through the membrane. The cell is said to make an opening for itself on one side between two endothelial plates and then, continuing its course right through the membrane to appear at the other side in the middle of an endothelial cell, whose destruction it causes. At pp. 381 and 384 of his

also Traité tech p.382.

Traité

In No 85, in specimens pencilled numerous exceedingly minute openings are seen many of them considerably smaller than the nuclei of cells the tissue round them having an interstitial fibrillar appearance

Traité Technique d'histologie, he figures small fenestrae, some bounded by endothelium quite completely, others appearing apparently in the middle of an endothelial cell.

Once formed it is easy to account for the increase in size of these fenestrae by the tendency fibrous tissue has to contract round any point and form dense fibrous bundles. Some such explanation as Ranvier's is almost necessary to account for the extreme irregularity in the distribution of these Fenestrae in young omenta an irregularity without any rule; and for the great variety in size, along with the fact that they are absent in places, the membrane not being perforated, even in the omentum of adults.

Continuing the examination of

of the O. in children about 2 or 3 years of age, we find running across the field many wavy bands of fibrous tissue, whose course is more or less affected by the small Fenestrae situated on either side; a Fenestra usually fitting into a concave surface and a trabecula attached to a convex surface. These bands represent to a certain extent the "secondary trabeculae" found in the adult Omentum, though their course is much more irregular. Probably they ultimately form the primary trabeculae, the fine bands and membranes attached to them giving way & leaving one large Fenestra.

There are some complete anastomotic loops formed by single capillaries, like those in the "secondary trabeculae" of the adult, but most of the vessels are in

in pairs, pushing out loops in all directions the distance separating these pairs of vessels being at widest rarely more than 600 μ. Each loop is connected with both an arteriole and venule, one limb of the loop being supplied by each. The two parts of the loop lie close together - like the a. and v., the curve of the loop being quite sharp; and not only so, but in the short distance of 100 μ they often twist round each other several times in the same direction as if they had advanced with a screwing motion the twists being always in the same direction for one pair of vessels, most frequently from right to left. This spiral twist is noticeable in all the vessels in the omentum. In the older and larger ones there is a long

Plate IV

Plates
VIII. 1
XXIII 1
XXIX 2

In Fig 2 Plate I, another mode of development of capillary blood vessels is shown. Large loops with wide curves spring from the termination of an arteriole and venule. The specimen is from a child 2½ years old. The capillaries in this instance bear no relation to the fibrous bands running across the membrane, but as will be noticed later, fibrous tissue no doubt develops round such capillary loops the traction of fibrous bundles, replaces the curves by angles and other anastomoses are formed, approximating such an arrangement ultimately to that of the large capillary network in secondary trabeculae

long stretch without a crossing but if followed up for a millimetre or two a crossing is sure to be found, and repeated again about the same distance further up. Growing from the extremity of some of these loops, single vessels can be found pushing their way further ahead usually along a thickened part of the fibrous tissue. At the same point, in two specimens (79 + 85) in which nerve fibrils are easily seen, the fibrils two of which had accompanied the vessels of the loop joined to form one when the loop ceased as if the growing loop in its advance had been splitting up the nerve fibril.

There is a complete analogy here, to the "spirality" in the growth of plants

At the extremities of loops and of single capillaries the growth of blood vessels can be very well studied. Round the

the blood - vessels there is generally a considerable num: ber of cells in the position of the Perithelium, giving the vessels often a ragged appear: ance, but at the points wen: joined these cells are in still greater force. They are large, often 30 μ or more in length, very granular and with an oval nucleus. When not taking any active part in the de: velopment of a vessel they are round or eliptical, but at the growing points they are seen to be attached to the vessel or to other cells by processes sometimes a chain of these cells forming a pro: longation, in the direction the capillary is taking; occasionally such prolongations are seen ap: proaching each other from op: posite directions, - about to form an anastomoses in fact.

Plate V
Fig 1 & 2
Plate XXX
Fig 1 and 2

Arnold
Virchow's Archiv
Vols 53 + 54

I/

I have not been able to find out from my specimens in what way the lumen is formed, certainly I have never seen the vacuolation described by Klein, and also by Arnold 1877 and Zeigler and called the Intra cellular formation. My specimens point more to the intercellular formation supported by Billroth Meyer Weber and others

Microscop Journ

Arnold Virchow's Archiv Vol 80

Cohnheims Allgemein. Path Vol 1. p. 289

The fibrous tissue or trabeculae, in which these vascular loops and capillaries lie, are considerably broader than the rest of the trabecula beyond where the vessels stop short. Alongside the vessels are fat cells and fat clumps more or less fully developed.

Some correspond very closely to those described in the adult Omentum: but others are

are simply the patches which Klein calls "Perilympangeal Lymph: :follicular structures".- In these there is a considerable number of the large granular cells similar to the vasoformative cells round the capillaries, in the meshes of a close capellary network. In several cases these cells are seen in all stages of distension with fat dluplets, just like the cells of the Liver in Fatty infiltration. Only even when the droplet is small there is usually only one. Of course the nucleus is pushed to one side and with it the protoplasm which is partly absorbed, partly con: :verted into a wall for the large fat globule. In my earliest specimen, the one of 22 months there are none of these developing fat cells- all

Plate X. fig 2

all are fully formed; They are found in several of 2½ & three years, cases that were rachitic and in which nourishment had been poor & death resulted from General Tuberculosis. It is difficult to distinguish these patches especially when fat globules are not forming, from tubercle nodules, and in many of my specimens I have not been able to make up my mind as to what are tubercle nodules & what not. They appear to the naked eye in little milky spots, and so Ranvier has called them "taches lactenses," a better name, and one that does not commit one to so much as Klein's "Lymph: angeal structures". Both Klein & Ranvier extend these terms to smaller patches not in relation

relation to blood vessels at all, and consisting of an increased number of endothelial cells, a number of nuclei crowded together, with, underlying them, some thickening of the fibrous tissue and a number of connective tissue cells.-

Traité technique d'histologie p 359

As the Omentum grows older the Fenestrae increase in size, loosing gradually their rotundity, the fibrous tissue between them contracting more and more into bands forming regular trabeculae such as I have described in the adult Omentum. I do not believe however that this widening is solely due to retraction of the walls. In the young Omenta — in almost all Omenta in fact, many of the smaller fenestrae are separated from one another by extremely delicate bands often not more than a micro or two in thickness. These cannot by any possibility increase in thickness as the spaces grow larger so they must disappear altogether. — I have never been able to find any trace of such a thing having happened, in the form

form of the broken end of a trabecula or a projection from the side of a fenestra, probably the tension produced by neighbouring fibres effaces those traces. In many young Omenta - and it is very noticeable in some at about the age of eight years, fibrous bands of about 30 μ in thickness form by their junctions & divisions, irregular areas enclosing spaces about 150 μ or 300 μ across. The delicate fenestrated parts included are of course attached to these, and as the trabeculae give way successively the fenestra is often ultimately bounded only by these fibrous bands, and many fenestrae are seen in my specimens where the fibrous trabeculae are fringed or lined by a delicate membrane a few

few micros broad. There are all stages and sizes between the smaller Fenestrae and those fully formed and even in the adult, patches remain, consisting of membrane, with small round: :ed openings and in many small areas persist without any fenestrae at all.

The single capillary processes all curve round upon themselves or, as is more frequently the case, become connected with similar processes from other loops. There is hardly such a thing in the Omentum of a person over twenty, as a blind capillary. I have seen it in two cases about 30 years old. Round these cap: :illaries the fibrous tissue grad: :ually increases in quantity forming the "Secondary Trabeculae", while the capillary loops develope ultimately into the pairs of arteries,

arteries & veinules lying side by side, and the fibrous tissue in relation to them increasing in quantity form the larger fibrous bands.

The difference in calibre of different capillaries is very clearly seen when the vessels are injected. In a case of Leucocythemia to which I shall refer later on, there is a beautiful injection of the capillaries. Some at most hold only a single row of white blood corpuscles closely packed behind one another while others still evidently capillaries, are dilated to as much as 80 μ. This difference in size can only be due to some having a larger area of wall supplied by an increase in the number of cells forming it. This process is I believe demonstrated in several of my specimens, most clearly in those from a child of

Plate XXXVI

p 140

№ 34.

of eleven, of which I have several drawings. At points in the vessels there is a sudden increase in diameter due to the presence in the vessels of a large number of cells, almost blocking up the lumen. This sometimes occurs in single capillaries, sometimes in one of a pair. The nuclei of the cells, which, by the way are the only parts seen, are large 12 μ or so in length, elliptical, like the nuclei of the endothelial cells forming the walls of the capillaries. I have no doubt these cells arrange themselves so as ultimately to form a larger lumen. This process is quite unaccompanied by anything in the nature of inflammation and is quite confined to the vessel itself. Plates VII & VIII

The taches lacteuses largely disappear about the age of five, and after eight or nine, there

there is hardly a trace of them. The fat clumps grow rapidly in size and number, the increase in size of a fat clump after its formation not consisting so much in the development of new cells as in the increase in size of those already existing. In the child, a fully formed flat cell, that is, one without trace of protoplasm joined to it, measures only about 30 μ; in the adult, it may be 80 or 100 μ or even more. Even at the age of seven fat cells reach ~~read~~ 60 μ.

The fibrous bands all become thicker till a secondary trab: :eculae in the adult may mea: :sure 80 to 100 μ or more, in thickness, and those mem: :branous patches that are left, seldom remain delicate ~~them~~ but also become thickened and consist of several layers of interlacing

interlacing fibres.-

By the increase in volume of the Omentum, an increase that seems to go on after the development of vessels has stopped, the vessels are separated more widely from one another so that in the adult there is a considerably wider gap between the pairs of vessels than in the child. This stretching process which is always going on is one of the factors in the formation or at any rate the enlargement of Fenestrae. There are few developing vessels seen after 10 or 12, but I have made a drawing from a specimen from a subject aged 19, in which, there is a regular loop of the ordinary kind with a blind capillary process continuing from it for about 200 μ. Round it however there are no naso formative cells so it may be one in which growth had been arrested. In one or two still older there are also blind

Plate XX. fig 2

capillaries

capillaries but it is [redacted] ex:
=ceptional.

Atrophy.

It is difficult to estimate any atrophy occurring in the fibrous tissue, of which the Omentum is almost entirely composed. In specimens where the fibrous tissue has become very dense the connective tissue cells have largely disappeared and the blood-vessels are apparently less numerous, but this may be due to the opacity of the dense fibrous tissue obscuring the vessels. (Become converted into spindle cells in wedges which may bundles

The Fat in the Omentum, varies greatly in quantity, accumulating and being removed very much in the same way as in the sub cutaneous tissues. I have already described the appearance of the growing fat cells and their relation to the blood-vessels. In a few cases, especially in young subjects

Haggan Journal Royal Mic. Soc. 1879.

subjects, the nucleus can still be seen at the side of the cell, forming distinctly a part of it, but as a rule, in the fully formed fat clump all one sees, is a collection of spherical masses with nuclei in greater or less number, between; these nuclei however belong in great part to the capillaries. Even in cases of exhaustion such as Chronic Phthisis, or where pressure has been exerted on the cells by fibrous tissue or in inflammatory infiltration, the individual fat cells appear marked although they may be separated, and fewer in number. Fleming in an Article in Virchows Archives describes changes in the fat cells of the Omentum resulting from inflammation, the fat globules breaking up and the nuclei

of

Changes in fat cells in atrophy and inflammation
Flemming
Virchows Archiv
Vol 52 p 568
—
Fat resorption
Virchows Archiv
Vol 56. p 211

of the cell proliferating, the appearances in simple atrophy being much the same

In one case ((Nº 6) which I have described in full under the heading of "A case of Diabetes Mellitus") instead of fully formed fat cells, only granular cells, about the size of connective tissue corpuscles are seen, containing small droplets of fat. The droplets are seldom large and the nucleus is only partially pushed to one side, in many the nucleus is surrounded by a large number of minute droplets. These cells occupy the usual positions of fat cells, along side the vessels in rows and in regular groups and with small capillaries interlacing among the cells. The case was one of Diabetes terminating in Pulmonary Phthisis, with great emaciation

Plate XIV

and

and one can readily under:
:stand why the fat cells
should so break up. As to
the origin of these cells there
are only two possibilities, either
they are ordinary connective
tissue cells becoming infiltrated
with fat, or degenerating fat:
:tily, or, they are fat cells
whose fat has been disappear:
:ing. The absence of proper
fat cells, the positions in
which the fatty cells occur
and the way in which the
cells contain the fat, point Plate XIV
to the latter as their origin.
If so, it is an interesting
proof of the origin of fat
cells from connective tissue
cells, or cells modified from
these, for on the disappearance
of the fat the cells acquire
the appearance of the ordinary
c. t. cells and lie in the
same positions. The development

of

of the fat in the "Perilymph-
-angeal Lymphfollicular structures"
of Klein, is due probably to
the large amount of nutritive
material at hand, owing to
the rich blood- and lymph-
vascular supply of these struc-
-tures. The same would ac-
-count for the formation of
fat cells in the neighbourhood
of blood vessels especially at
the points of junction or
division, where they are
most commonly seen. In
wasting diseases, it is not
surprising that the store of
fat in these cells, should be
drawn upon, and

as

as this fat disappears, we should expect that the large oil globules should break up into small globules and ultimately into fat granules to be carried away by the blood, the nucleus and protoplasm gradually assuming the shape of a connective tissue cell, as the fat is removed. It is only surprising that this process is not visible in more cases. In other cases, if fat had been removed or was in process of removal at the time of death, there is nothing to show us in what way this was accomplished, for though in cases of wasting disease the fat cells and fat clumps are less numerous yet there is nothing left to shew that they had previously existed. There can be no doubt that in many of

of the large fat cells. the protoplasm and nucleus entirely disappear leaving nothing but a cell wall containing an immense oil globule over 100 μ in diameter, but in the mapority of fat cells. the vitality of the nucleus and protoplasm is no doubt still retained though very much impaired.

In a most thorough article on the development and retro: :gression of fat cells the Hoggans give a full account of the life history of the fat cell as a result of their study of that tissue principally in membranes. Two of their illustrations, figs. 7 and 8, shew exactly the same sort of cells in relation to the blood-ves: :sels as in my case of Diabetes; fig. 7. was drawn from a specimen of Omentum

Journal of the Royal Microscop society: 187 p. 353.

taken from a young man who had died of Cancer, and fig: 8: from a young man who had had Eastern Leprosy for some years. both being very emaciated at death. They have no doubt that somewhat "oval cells containing droplets of fat" are fat cells, from which fat was being removed before death. They noted similar appearances in starved mice. In addition, in starved mice that had had a full meal of cheese a few hours before death, these cells were again distended with fat, not by one large globule, but by a (~~medium~~) number of medium sized globules. They also figure, in other cases, large granular cells becoming distended with fat, like those seen in specimens 17 and 18 and referred to (p 65) as growing fat

Plate X fig 2

fat cells. They have no doubt that these large granular cells are, or were, wandering cells which found their way to the neighbourhood of the vessels from the abdominal cavity and there rapidly increased in size, basing that assertion on specimens in which they found some of these wandering cells on the surface of the membrane and others underlying the endothelium in close relation to these "growing and infiltrated cells, stating that the increase in size and in amount of protoplasm, corresponded to a certain extent to the amount of fat contained.

In my specimens these large cells measuring as much as 30 μ across, are found containing no fat, and lying beside others not any larger, which

which do contain fat
~~which~~ (and to all appearance the protoplasm seems to diminish in amount as the fat increases in quantity. The cells in fact differ in no way from the baso-formative cells which frequently are found in their immediate vicinity. Of course the whole question as to what is the origin of these baso-formative cells, as well as similar cells, and the so called endothelioid cells is still an open one, and the part which these wandering cells play in growth, repair, etc. is no more fixed than that of the white blood corpuscles, which, having escaped into the tissues outside the vessels, have the same appearance - and probably play the same part as these "wandering cells."

When the process of resorption of

of fat is completed, the Hoggans state that the fat cell assumes exactly the appearance of a connective tissue cell, and, if exhaustion still continues the cell becomes very granular and at last the granules spread out in all directions leaving only the nucleus with a small attachment of granular protoplasm, in fact, a wandering cell.

They maintain that the wandering cell having no cell wall, the fat cell can also have no cell wall, except such as is formed by the stretched protoplasm surrounding it. Ran: view by his methods demonstrates a cell wall, and so does Fleming, but the Hoggans take exception to their methods. It is an exceedingly difficult thing in any case to demonstrate the absence of a cell wall

Incube technique d. hist p. 340. archiv für Microscop. Anat Vol XII.

wall, and, granted that the fat cells originate from cells which have no cell wall it does not necessarily follow that no condensation or alteration of structure ensues at the periphery such as would produce a cell wall. In fact the conditions of tension and pressure to which the protoplasm in the cell is subjected are just those which would be most likely to lead to the formation of such a structure I have no doubt whatever that in the case of very large fat cells the protoplasm is so stretched and altered that it becomes only a delicate, tough envelope which on the removal of the fat does not resume the appearance of a cell but shrivels, breaks up and is absorbed.

Since writing the above I have

have reexamined all my speci-
:mens from cases in which
there had been exhaustion and
exsaciation, and in several,
have found appearances in the
cells near vessels, similar to
those in No. 6. The description
of these cases I have placed
immediately after that of No.
6. The reason why these
appearances escaped observation at
previous examination, is that in
all there are still numerous fat
cells and fat clumps quite un-
:altered, and the "atrophied fat
cells" lie with others among the
fully formed fat cells usually
in positions in which these latter
appear scattered. At first I
did not understand the appear-
:ances seen in No. 6, and,
indeed at one time concluded
that the fat in the cells
was an infiltration of the or-
:dinary connective tissue cells
due

due to the amount of fat carried in the blood in some cases of Diabetes. In the others the cells separating the fat cells were supposed to be an infiltration, but from the appearance of many of them there can be no doubt that they are altered fat cells. They are usually larger than those in No. 6 more like the large granular cells seen in development. The peculiarity of No. 6 is that in it, the cells are nearly all at the same stage of atrophy.

In connection with the subject of Atrophy I may refer to a case of Phthisis in which there were patches of pigmentation along the lines of the vessels. These are described fully in the description of the case. These patches were dark brown, black and granular, measuring less than 1/4 inch in length

No. 19

p 204

length. On treating them with Hydrochloric Acid and Ferro cyanid of Potassium they became blue, shewing the formation of Prussian - blue and the presence of blood pigment. The pigment was in the cells outside the vessels, and disappeared soon after ob: :servation except in the spe: :cimens subjected to the iron test. Associated with this was the presence - very doubtful - of fat granules in the endo: :thelial cells of the vessels. In any case the pigment must have been due to extravasations of blood and the extravasations were probably brought about by fatty degeneration in the walls of the vessels. I under: :stand that such pigmentation in the Peritoneum is not at all infrequent in cases of Phthisis.

The pigment had only a granular

granular appearance. no crystals were seen

Cornil & Ranvier describing hoemorrhagies in the Peritoneum state that in the great Omentum the "matière noire" appears under the form of opaque granulations, very dark brown, round or angular seated in white cells between fibres, in epithelium or in little cells grouped round fat cells. Cornil & Ranvier Pathologie Vol I p 501 (French edition)

In case No 8 (p 227), one of Velvular heart disease, with nutmeg liver etc there is slight pigmentation of C.T. cells.

In cases 30 (Rheumatism & anaemia) and 47 (Ch. Pleuria) the walls of the capillaries are distinctly fatty. Little granules of fat seen in the cells forming their walls (p 217 & 218)

Waxy Disease.

This degenerative change is so widely diffused in the body that one would naturally expect to find it in the Omentum when it is present elsewhere. It is alluded to in Wagners Pathology and both Eberth and Kyber describe changes in the Omentum in their famous discussion on Waxy desease in Virchows Archives. — Heyen also mentions it in the Gazette Medicale de Paris.

I have had the opportunity of examining specimens in seven cases of general waxy disease induced by a variety of causes, and in different degrees of advance. In all these cases there was waxy disease in the Omentum to a greater or less extent, but not by any means in constant proportion to the change in

in other organs.

It was least marked in a case of Tertiary Syphilis where the Kidneys were in the advanced atrophic stage of waxy disease, the stomach Intestines and heart markedly waxy, and the Liver and Spleen moderately so. In two cases of Bronchiectasis or Chronic (Omentum) (were) Phthisis the waxy changes in the Omentum were comparatively slight: whilst it was advanced in the abdominal organs. It was most advanced in the Omentum, in the case of a child aged seven, who shewed marked evi: dences of Rickets, had Phthisis of some years standing and extensive waxy disease, whilst it was slight in another Phthisical child whose organs were very waxy, the change in the Liver, being seen not only

only in the Hepatic Arterioles and Portal Capillaries but also in the Portal Veins, and in those radicles of the Hepatic Vein of larger size than the intralobular venules.— It was very marked in some preparations of the C. and absent in others, in a case of Phthisis, where waxy disease was very irregularly distributed in the Viscera; the Portal Capillaries, for example being only slightly involved, while the division of the Hepatic Vein gave the brown reaction with Iodine right down to to the Inferior Cava; and lastly, it was very extensive in a case of Calculus Pyelitis, where the opposite Kidney was very waxy and the Liver and Spleen only slightly so.

The waxy parts in the Omentum are

are the vessels. Those first involved are the capillaries ramifying in the fat clumps, arranged alongside the arterioles and venules, in the larger fibrous bands. Stained with Methyl Aniline Violet they appear pink, while the tissues generally stain blue and the fat cells remain unstained, except of course their nuclei, which are stained blue when visible. The fat cells sometimes appear to have a waxy stain, but that is only an appearance due to waxy capillaries lying behind them, the reflection from the pink vessels giving them apparently that colour.

Plate XVI

Next in order are the arterioles, which are usually affected at the points of junction with waxy capillaries, but not invariably so, the arteriole showing waxy change at quite irregular

irregular points and sometimes only in minute patches. The same is the case in the vessels which are involved later and to a less extent. Plates XVI & XVII

The vessels and arterioles lying side by side are often affected at the same level, but this may be accounted for by the fact that they are connected with capillaries usually in the same positions, but curiously enough this is often the case at points where there are no capillaries.

The single capillaries in the secondary Trabeculae are only sometimes involved, and this may give weight to the theory that the waxy material is something carried to the tissues in the blood, or is a degenerative change produced by means of something in the blood, and most readily affects Plate XVII fig 1

affects those parts where the circulation is slowest, for obviously, the circulation must be much slower in the fat clumps, than in the other set of capillaries, the retardation in the former being not merely due to the sharpness of the curves, but also to direct pressure upon the capillaries, which the fat cells exert. In the second set of Capillaries, sometimes a whole loop or series of loops is affected, sometimes only a minute patch here & there. In a fat clump the capillaries are usually involved in their whole length.

I may mention here briefly the extent of affection in each case I examined.

No. 69. Both sets of Capillaries :- arterioles and venules. (h 187-196)

No. 33. Only capillaries in fat clumps. No arterioles or venules.

No. /

No. 35. Fat clumps (caps) Arterioles and Venules.

No. 43. all sets of vessels only very marked in free Capillaries

No. 66. No fat clumps nor Capillaries corresponding to them. Only a trace of waxy disease occasionally in an Arteriole or Venule - quite rare in capillary

No. 89. Only in fat clumps (Capillaries).

No. 91. Arterioles to very large extent, much more than in any other case. Venule occasionally.

Capillaries in fat clumps not invariably.

Some fibrous tissue waxy.

The most noticeable effect of the waxy change on the vessels, is a considerable swelling at the point affected, the diameter being

being sometimes considerably more than doubled, and the part rendered very prominent by the contrast with the healthy parts of the vessel at either end. On this account, the condition is quite easily recognised without any selecting staining, though of course to be sure that it is not present it is necessary to stain, for it is only when it is advanced in the part that this change in size is effected.—

On staining with Methyl Aniline Violet, the endothelial cells in the Capillaries can often be made out stained blue and forming a complete lining within the wavy part.

Outside the pink mass of wavy material can also be seen a layer of cells less regular and of the branching connective tissue

tissue type corresponding apparently to what is called the Peri: :thelium of capillaries (Eberth) The waxy mass then occupies the position between Endothelium and Perithelium in which there is said to exist normally, a delicate Retículum of fibrils cor: :responding to the elastic lamina of vessels. It may therefore consist of an infiltration on the meshes of this reticulum or a swelling of its strands.

Stuckers manual p.p. 70

Ranviers Histology p. 589.

The arterioles have normally a ribbed appearance due to the muscle cells surrounding them. When waxy this appearance is exaggerated; the outline or profile of the vessel is not straight but raised into little eminences, and in the centre of each eminence, a little round blue spot can be made out, enveloped by pink waxy tissue. On careful focussing a blue tail,

Plate XVI fig 3

tail is seen, tapering to a point towards the centre of the vessel and on either side of it a pink line. These I take to be muscle cells, or at any rate their nuclei, not waxy, because stained blue, surrounded and separated by the connective tissue supporting them, which is waxy, because stained pink and swollen. This can only be made out distinctly where a small part of the vessel is involved, for when the change is more extensive and advanced, this difference is apt to disappear, the streaks of blue being replaced by a somewhat uniform pink colour. This may be due to the muscular fibres becoming waxy, but I am inclined to think with Eberth, who describes the same appearance

Virchows Arch. Vol. 80 p164

in

in arterioles that it is due to atrophy of the muscle cells resulting from pressure. When the endothelial cells are seen, they are stained blue and show no signs of being waxy.

In venules, all that can be seen at the waxy points is a thickening and diffuse pink coloration (Methyl Aniline Violet) Lying upon this pink back ground however are the blue endothelial cells, which still appear blue despite the fact that they can only be seen through the part of the wall usually waxy lying between them and the eye, and this remark of course applies to the arterioles and capillaries.

In only one case (No. 91) have I seen the waxy change elsewhere than in the wall of a vessel, and that was in the fibrils of connecting tissue between the arterioles and venules. Each fibril is seen distinctly swollen and stained pink

Plate XVII fig 2

pinks with Methyl Violet. It is noticeable sometimes at a point where one of the vessels beside it is waxy, sometimes where both are healthy or at least appear to be so, so that it could not always be an appearance produced by reflection from a waxy vessel near. It is possible that it may be due to a waxy capillary behind, but there is no other evidence of such a thing.

The few writers who have mentioned waxy disease in the Omentum do not confine it to the vessels. Hayem found in advanced waxy disease, waxy changes in the fat of the Kidney and several positions in the Omentum, sometimes the vessels, sometimes the envelopes of fat cells, their nuclei remaining unaltered. Ryberg found in the fat clumps of the Omentum, only connective tissue cells waxy or more properly the nuclei. Eberth, in advanced waxy disease of the Abdominal organs, saw

Gazette Medicale de Paris 1866 p. 101

Virchows Archiv Vol 8 p. 80. 81

fat tissue of the Omentum degenerated. The change was limited to small groups of cells in the middle of quite normal fat tissue, and indeed to the cell walls.

One advantage in studying waxy disease in the Omentum is, that in it, one sees the vessels continuously throughout the whole specimen, no section having been made, and therefore the extent to which the vessels and other structures are involved can be readily ascertained.

The specimens I have examined, along with what I have observed in the sections of organs make me inclined to support the view advanced by Eberth, that it is the fibrils of connective tissue, principally elastic, which are, mainly involved and that almost entirely in the walls of blood vessels and in basement membranes.

As not only Hayem & Kyber, but also Eberth state that they have observed the waxy change in the walls of the fat-

fat cells, one must accept their observations, but the capillaries which form so rich a plexus among the fat cells come into so close relation with the fat cells that confusion in observation made must be very likely to occur.

The observation of the waxy vessels of the Omentum shows conclusively that whatever ultimate structure is ~~ultimately~~ involved it is certainly not the cell, and again the appearance of the waxy change in small wavy bands round the muscle cells of the arterioles, and also the small swollen waxy fibrils in the fibrous tissue (in N° 91) rather go against the theory supported by Hamilton, that the "wax-like" material is something poured out into connective tissue spaces or spaces between muscular fibres, an opinion arrived at by Hamilton from observation of waxy disease in the Heart. Journal of Anat. and Phys. 1887 Sept.

As regards distribution, that in the vessels of the Omentum may with advantage be compared with that in the Liver

In the Liver it is the Hepatic arterioles and the Portal capillaries which are first involved, especially the capillaries nearest the Hepatic arterioles & Portal venules. The Hepatic - intralobular venules I have never seen waxy, in only two cases have I seen the larger divisions of the Hepatic vein waxy. In the Omentum the capillaries in the fat clumps would correspond to the portal capillaries & they are invariably waxy to some extent, & the Arterioles also seem peculiarly chosen for the waxy change. The occurrence in the venule is however more frequent & sometimes at points where capillaries enter, but the affection is never so great. In both the Liver and Omentum it would appear that the change is produced through the medium of the blood acting from within on the vessel wall

Passive Congestion.

This is naturally produced in the Omentum by the same causes which lead to Passive Congestion ~~ation~~ in the abdominal organs generally or in the Portal venous system. Chronic valvular disease of the heart, and to a less extent ~~in~~ Pulmonary Emphysema and fibroid Phthisis, are the most common causes and also more rarely cirrhosis of the liver. It is not however always present to the extent one would expect, considering the changes in other parts. The best marked specimen I have is one of the first I collected and, as I did not take a note of the case at the time I am unable to give any particulars as to age etc. But the case was one of valvular disease of the heart in an adult. A drawing and Photo illustrate the appearances very well. The ~~veins~~ veniules are enormously distended, as much as 100 μ in some places. This ~~tens~~ distension is irregular, the vessel being usually widest at it's bifurcations or at points where branches are given off, tapering down to points between. The vessels entering fat clumps are widely distended and little

Case No 1
Plate XIX

little dark brown points (the specimen is stained in Picro Carmine) are scattered thickly among the fat cells, which are somewhat obscured, indicating the blood in the distended capillaries. The arterioles alongside the vessels are not distended, but they contain a quantity of blood, a very unusual thing. The single capillaries are also widely distended and irregularly so just as the vessels. The fibrous tissue is dense and takes a deep Carmine stain with Picro Carmine. The fat clumps have a fibrous appearance, being usually enclosed in fibrous capsules, partially concealing the fat cells, which are also encroached upon by the distended capillaries ramifying among them. The Endothelium is all gone and there is no appearance of cell proliferation in the fibrous tissue.

The amount of blood one sees in the vessels in a specimen of Omentum mounted for ~~a~~ Microscopic examination is naturally rather a fallacious guide, for on cutting out a piece the blood contained in the vessels is apt to escape, unless one were

to

to adopt the procedure recommended and carried out by the Hoggans, but which I was unaware when I mounted my specimens. The procedure is to take two circles of vulcanite one just large enough to slip easily over the other, to apply the smaller one to one side of the Omentum, and placing the larger above it on the opposite side of the O. press it down over it, and cut round the larger ~~disc~~ circle with a pair of scissors in this way securing a piece stretched like a ~~de~~ tympanum.

Journal of the Royal Microscopical Society 1879 p 360

But congestion of the vessels long continued leads to permanent changes in the surrounding tissues the microscopical character of which I shall refer to later on.

To the naked eye, the Omentum appears congested, the small vessels rendered evident by distension. This may be the only abnormal appearance, but often the O. appears coarse, the layers more adherent to one another than is usually the case, and, especially if there is fluid in the abdomen, as has been pointed out by Delafield, there are greyish patches on it not unlike the tâches laiteuses of Ranvier, only larger

Pathological Anatomy vol I p. 36

These milky looking spots, under the tunica. lenticae may be simply fibrous thickenings, but there is often also an accumulation of cells both endothelial and connective tissue, and Delafield has compared these to the germinating nodules (Perilymphangeal Structures) of Klein, which are not normally found in the adult.

I do not see that they have necessarily any thing in common except the presence of an increased number of cells. This is seen to a certain extent in No. 8. a case of valvular heart disease, though not to the extent described by Delafield, the other specimens of simple backward pressure either do not show it at all, some in fact shewing no endothelium at all, others only slightly. In cases of Chronic Phthisis this is well seen constituting Delafield's Chronic Cellular Peritonitis. pp. 219-228

In connection with this I may refer briefly to a peculiar appearance in one of my specimens (No. 26) which appears to be connected with changes in cells & occurs in a case of mitral disease of the heart

The appearances are described fully in
the description of Case No. 26. p. 224

Little pear shaped or rounded bodies occur
in and of upon the trabeculae like the Plates XXXIII & XXXIV
structures described by Klein as bud-like
forms structures which he observed in the
Omentum of the rat and half grown dog Microsc. Journ. 1877 p. 235
Their structure is sometimes fibrillar, some-
times they appear to consist of the remains
of cells the outlines of which being indistinctly
seen. It is impossible to say what is their
exact significance. Possibly they are in this case due to
blocking of lymph spaces by pressure of distended blood vessels.
In most recent specimens taken from
cases of passive congestion the dilatation
is not nearly so great as in the one
just described. A few vessels are distended
and others not & some specimens show it
better than others from the same case
In some the fibrous thickening is so
great as almost to obscure the vessels.
Pigmentation of the connective tissue cells
one would expect and Delafield describes
it, but I find it in only one of my specimens (No 8)
and there it is not nearly so marked as
in the liver cells in Nutmeg liver, or

the alveolar cells of the lung in brown induration; only a few cells contain a few pigment granules. The endothelium in all my specimens has almost gone the denudation of the trabeculae having occured of course post mortem. Where it is retained, the cells are often swollen projecting more than usual from the surface of the trabeculae.

The fat cells are few in number just as the fat seen by the naked eye is small in quantity. The fat clumps are fibrous looking, the fat cells being often partially obscured by the fibrous tissue even where the ~~capillaries~~ distended capillaries do not ~~do so~~. obscure them

Classification / forms / Peritonitis

Cornil et Ranvier Vol I p 501 (Watford Edition)

Cornil. Fibrinous P. (Lymphatics blocked with fibrine – Wagner)

Hæmorrhagic P. (Alcoholism, Tubercle, Cancer)

Purulent P. primitive or consecutive vessels dilated, infiltration but Epithelium not not-ably proliferating.

Hyperplastic v adhesive Inflammation.

Blue book 1874 C-1068 p. 72

Klein.

(1) Change in Superfic. Endothelium.

Intense Peritonitis 24 to 48 hours. Sanguinolent fluid in abdomen. Proliferation of Endothelium

Less intense P. More active germination.

Chronic P. Active germination of Endothelium Stomata more easily made out.

(2) Alteration / Cellular element / matrix

Acute Inflammation. Edema. Lymphatic system dilated, some cells in the spaces, C. t. Cells more granular v nuclei constricted

Chronic Inflam. Rapid division / Connect. tissue corpuscles by lining the Lymph canalicular system. Crowded and less branched. Bulbous projections sometimes attached to cord or nodule.

Inflammation

A great deal has been written incidentally in reference to inflammation in the O. as it has formed one of the fields of study in the works of Colnheim, Ziegler, Thoma and others, in deciding the parts played by the leucocytes or white blood corpuscles and the connective tissue corpuscles, in the inflammatory process of process of repair; but I do not intend here to enter into any discussion of their work.

Owing to the facility with which the Omentum of animals in common with the ~~se~~ mesentery and other membranes, can be examined in situ with the microscope, it has naturally been used to study the effects of different reagents and of the inflammatory process on the ~~the~~ blood vessels. It is in that way that in acute inflammation, contraction of the small vessels has been observed to follow upon the application of an irritant, followed very soon by dilatation and an increased flow of blood, then by engorgement of the vessels and capillaries, coincident with a stagnation of the circulation, or stasis

Colnheim
Neue Untersuchungen über die Entzündung
Berlin 1873
" Virchows Archiv
Vol 61 p. 289.

Ziegler.
Untersuchungen über path. Bindegewebs- und Gefäss-neubildung
Würzburg 1876

Thoma
Uebermandung farbloser Blutkörperchen v. d. Blut- in das Lymphgefäss system
Virchows Archiv
vol. 74. p 360

Virchow's Cell. Path.
4 Aufl. 1871
p. 364. 450.

Colnheim
Ueber Entzündung u. Eiterung. Virc. Arc. 40
" Benoke Strauss. 41

Lassar. Virch. Arch Bd 69
Ueber Oedem und Lymphströmung bei der Entzündung

Thoma. Virch. Arch 74
Ueber entzünd Störungen des Blutkreislaufes bei Warmblütern

13 Changes in Blood vessels and Lymphatic vessels. Extensive formation of new capillaries mode of formation. Same as in normal condition

Delafield
Path. Anat. Vol I p 37

Acute P. Two forms. Cellular P. where Endothel. cells and alone involved and the irritant slight. Peritoneum bright red blood vessels injected. Cells increased in size & number. (Pertyphlitis – enclosed Abscess)

Second form. involving also fixed C. T. cells and formation of fibrine Serum and pus. Produced by wounds, intussusception etc.) When this persists it leads to formation of adhesions, ulceration etc.

Chronic P.

(1) Cellular P. (2) P. with adhesions.

(3) P. with thickening (4) P. with adhesions pus fibrine and Serum (5) Haemorrhagic P.

p. 67 Tubercular Peritonitis) In acute Tuberculosis and Ch. Pulm. Phthisis

and ~~the~~ a tendency to the formation of clots.
Diapedesis was also first noticed by Recklinghausen, in that way, and was at first thought to be due only to the inflammatory process, but it has since been observed to occur at all times to a slight extent, the escape of white blood corpuscles from the capillaries being increased by anything interfering with the blood flow, and notably in inflammation where there is both retardation of blood flow and increase in the amount of oxygen in the blood, the latter ~~Condition avoid~~ increasing the activity of the white blood corpuscles as regards their amoeboid movements and the former allowing each cell to remain longer in contact with the vessel wall. The cells escaped from the vessels pass into the connective tissue spaces surrounding the vessels in the larger trabeculae, or directly on to the surface where the capillary is only thinly covered with fibrous tissue, and escape into the abdominal cavity, where they probably throw in their lot with the wandering cells which are so plentiful there

Bowen's trans Cohn p. 613

Thus after death, the changes noticed in the Omentum which has been inflamed for 24 & 48 hours are, a greater or less destension of the blood vessels, capillary and venous, the formation of Clots in these and the presence in the fibrous tissue outside the blood vessels, of numerous small round cells which stain brightly with reagents, these being arranged according to the shape and dimensions of the spaces in which they lie, sometimes in groups of three or four, or more sometimes in single or double lines. Lying upon the trabeculae is a quantity of fibrine due to the coagulation of the liquor sanguinis which has escaped from the blood vessels along with the leucocytes and red blood corpuscles. Plates XXI to XXI

In very acute cases, with death in a few hours there may simply have been intense Congestion, which may or may not remain post mortem. Cases occur now and then where there are all the symptoms of Peritonitis but no trace of it at the post mortem examination. That may or may not be due to such a condition as I have ~~described~~ mentioned above but opinion on that point can be based on

nothing but mere conjecture. I saw such a case in November 1884 in the Belvidere Fever Hospital at Glasgow, where both the Superintendent (Dr Allan) and the resident Physician having charge of the case (Dr Hunt) had diagnosed perforation with peritonitis in Enteric Fever. At the P. M. no trace of inflammation was visible to the naked eye, though there was a perforation connected with an ulcer without however any escape of faeces.

In acute Peritonitis from the second or third day to the end of the first week or even longer, the most marked evidence of Peritonitis is glueing together of the coils of intestine and the absence of the ordinary ~~the~~ glistening appearance this being replaced by a dull, dusky, somewhat roughened look, the roughness & shagginess being produced by the lymph covering the surface. There may or may not be reddening. The fibrinous exudation may be in large quantity and then it is usually yellowish, somewhat like pus, and a quantity of purulent fluid may be found in the most dependent parts ~~The~~ of. This is called "Suppurative Peritonitis

The Omentum is glued to the coils of small intestine and covered with yellow flakes, or, if there is not much exudation it may simply have a reddened appearance. Sometimes it is displaced and in one case - a child - I found it reflected upwards and glued to the liver.

The dilatation of vessels varies very much in different cases. Sometimes they are widely distended especially the veins and capillaries and present much the same appearance as in the more marked case of passive congestion described; the distension being irregular. Clots plug up the vessel here & there. Such an appearance I have seen in one of Professor Greenfield's specimens. Plate XXIV fig 1

The dilation with accompany exudation is shewn in drawings taken from Nos 60 and 74 and 51; the clotting in drawings from Nos 19 and 48. The clots are sometimes large, distending the vessel, deeply stained and without any evident structure often however the outlines of cells can be made out in them more or less distinctly. In No 48 long threads of fibrine run along the capillaries, sometimes forming Plates XXI and XXII

Coil, and upon this thread of fibrine, rows of white blood corpuscles have settled.

Even in acute cases the changes are not confined to the vessels and connecting tissue the endothelial plates soon become affected. Germination is always occurring in patches even to a certain extent in the adult and this is stimulated by the inflammatory process. No doubt large tracts of endothelium become shed, though it is impossible to tell from specimen taken from the human subject, that this shedding has not been post mortem.

Arnold states that in inflammation of the Omentum, the lines shown by the silver process are broader and more irregular, strongly undulating and contain a large number of small black points like small and larger circles interspersed. The latter often contain granular structures, while to the former there are often clinging other granular structures easily recognisable as wandering cells. The swelling of the tissues must cause a stretching of the

Virchow's Archives. vol. 74 p. 246

endothelial covering and give rise to slight separation of the cells, accounting for the increased breadth of the silver line. Under these circumstances the cells will be very easily ~~detached~~ detached and this separation must be facilitated by the large number of openings made by the cells escaping from the surface. That however is merely a passive change, the cells also become actively affected, their nuclei dividing, their protoplasm swelling up and becoming granular. ~~When the~~

When the inflammation is not quite so acute the cellular changes are very marked and may indeed be present when there is little or no change noticeable in the vessels. This has been called "cellular peritonitis" and as such has been described and figured by Delafield who states that it is the element involved when the irritant is slight. In these cases the Peritoneum may be bright red, the blood vessels injected, and the Omentum covered with large and granular cells. It is very often associated with Purulent

Delafield's Pathol. Anat. Vol 1. p 57

or enclosed abscesses. In these cases there is previous to this general increase in endothelial cells, a proliferation of those situated at the junctions of trabeculae, and of the cells in the germinal lymphoides of Klein or the tache laiteuses of Ranvier. Hippolyte Martin has demonstrated this in his experiments ~~on~~ bearing on tubercle, archives de Physiologie 1880. where as Correction experiments, he injected into the abdomen of animals, fluid, containing oxyuris vermicularis. In these cases nodules developed in these positions, covered by a complete layer of endothelium.

This cellular Peritonitis is however, most commonly of a Chronic Character and is best seen in some of my specimens, taken from cases of Chronic Phthisis, corresponding to what Delafield calls "Chronic Cellular Peritonitis". The amount of cellular development is very great, the cells large, 25μ or more, irregularly rounded and granular, often with long processes. Clusters of them project into the fenestrae often almost filling up the smaller ones. The coating is so thick as sometimes to

obscure the fibrous tissue and vessels underlying them. There is, accompanying this, an increase also in the cells in the connective tissue spaces, but these have the same appearance as those on the surface and cannot readily be distinguished from them. At the same time, there is sometimes congestion of the vessels but not to any extent; the process is a chronic one, affecting the vessels but little. Long lines of cells may be seen taking the position of adhesions; they lie on the surface the cells joined end to end, sometimes these chains stretch across fenestral. They form what are called "cellular adhesions."

There are often large collections of cells forming opaque nodules, which are quite indistinguishable from tubercle nodules.

To the naked eye there may be little to remark. The Omentum has not the transparency found in the child, but neither has the ordinary adult Omentum. There may be little greyish patches or nodules upon it. ~~The~~ The condition is most commonly seen in Chronic Pulmonary Phthisis but also occurs to a less extent, where there is backward pressure from heart disease or Cirrhosis of the liver.

Indeed it is exceeding difficult to ascertain to what extent different kinds of cells contribute to the formation of these cells in Chronic Peritonitis and I should not be surprised if it is yet demonstrated that they are produced from wandering cells, or escaped leucocytes.

Adhesions of the Omentum to various parts are extremely common and they may be either the result of a localised acute inflammation, or a chronic process induced by pressure or some other cause. I have already mentioned attachments formed with Pelvic tumours, adhesion in the Pouch of Douglas, and in Hernial Sacs. In these cases an acute inflammation with congestion etc, may have lead to the formation of fibrous adhesions or rapid cellular growth may have produced cellular adhesions which ultimately became fibrous. It must be a process of this sort (the latter) which leads to the union of the two layers of the Omentum in the adult. So secure that, these cells must develope in relation to them fibrous tissue in the same way as do ordinary connective tissue cells. The cells are either wandering cells or they which have become modified, or they are derived from the endothelium, probably both. It is the same type of cell so far as appearance go that ~~forms the~~ constitutes the "mast formative cell" and which also by appropriation of fat forms the fat cell, only the position is different

in the latter being found in the Connective tissue spaces, the former on the free surface outside the endothelium. With the part which wandering cells play in the formation of fibrous tissue is of course bound up the function of the leucytes which escape from the blood vessels, and it was to watch the career of these cells that Thoma made his experiments, in which by means of elaborate apparatus he kept the Omentum (Mesentery) at a regular temperature & moistened with dilute 3/4% salt solution while still in connection with the body, so that he was able to examine it under the microscope from time to time. And for the same purpose Ziegler enclosed part of the Omentum between two slips of glass examining it afterwards to see what change had taken place.

Fortschritte Archives vol 74 p 360.

In some of my specimens fibrous bands are seen extending from one set of trabecular to another, passing over in their course, often a millimetre or more, a whole system of fenestral. Some of them are partially vascularised. Though all trace of cellularity is gone it is difficult to see how they could have originated otherwise than in cellular adhesions

Plate XXXII

Tubercle in the Omentum

In ordinary chronic tuberculous peritonitis the Omentum is greatly thickened, sometimes as much as an inch or an inch and a half in thickness, containing in its substance a large number of caseous masses and adherent to the viscera.

A large number of cases have been described. Sections show the giant cell systems so characteristic of tubercle and also the caseous processes associated with these. The Omentum however in this condition does not lend itself to examination by simply spreading it out on slides, as it is no longer a membrane.

Delafield's Path. Anat. 7th ed. XX

I have very frequently met with what seemed to be Tubercle in the Omentum of Children dying from acute Tuberculosis. In these cases there was no Peritonitis, just as there was no inflammation in the organs in which the tubercle nodules occured. Sometimes nodules were seen on the parietal and visceral Peritoneum, usually larger than those on the Omentum and often with congested areas

Virchows Archives vol 76. p 231 Prof. Orth (Göttingen) In gen. tuberculosis in many cases, make the Tub. in Ument. always minute often in position of fat clumps and more or less an expense of fat cells.

Delafield's Post Mortems p 164

around them. The appearances in a typical case, are best seen in a specimen which I have mounted in glycerine Jelly and which is now in Prof. ~~Greenfield's~~ Turner's possession. It is from a child about six years old who died from general tuberculosis. Both layers have been preserved, the one separated from the other. The posterior remains attached to the Colon, the anterior layer is reflected downwards and remains attached to the Posterior layer at the free border. On holding the specimen up to the light, little greyish patches are seen along the course of the small vessels and also in the spaces between them. They resemble very much the tubercles described by Ranvier only they are larger and more distinct, measuring about 1/16 to 1/8 of an inch, some are nodular On the parietal peritoneum and on the surface of the Liver were small nodules rather larger than millet seeds, projecting into the abdomen, around these there was often an area of congestion, but no congestion was noticeable in the Omentum

See note at beginning Mr. G

Apart from the presence of these "tubes" the Omentum has quite a normal appearance and is quite transparent. The amount of fat as in all children, is small, and the fat pellets along the course of the vessels are difficult to distinguish from the tubercles. So much so is this the case, that unless the tubercles are as distinct as in this case, it is ~~difficult~~ impossible to say without microscopic examination, whether they are an abnormal development or not. In Case 41, a child where small tubercle nodules were seen in the Peritoneum, the Omentum was congested as a whole. In 16 and 17, cases of general tuberculosis in children about 3 years old, nodules were seen in the Omentum as well as in the various organs, being larger ~~& slightly~~ than in 17 than in 16 and slightly yellow. In both these cases microscopic examination shews cellular patches along side the pairs of vessels forming the terminal arterioles & venules, usually at a little distance and containing either single capillaries or capillary plexuses such as one

Cornil & Ranvier Vol. I p 510 French Edition.

Tubercle in Peritoneum — In Tuberculosis or secondary; rarely alone and Primary.

Nodules projecting, lenticular, whitish, translucent. non-vascularised. Scarcely visible to the naked eye, or larger. Neighbourhood congested or "cicatricial". Preference visceral

In attacking the thickness they of the Epiploon they may form larger masses up to 2 C.m. in sometimes mistaken for Cancer. Cause inflammation, fibrinous, hemorrhagic, purulent and productive.

Delafield Path. Anat Vol I p 47.

Tubercular Peritonitis. In acute Tubercle in Ch. Pulmonary Phthisis and with tubercular infiltration of genito Urinary tract, and also as local Inflammation.

In Acute Tub. small nodules, increase in Endothel & connect. tiss. cells: sometimes a cell fibrin.

Even the smallest tubercle granulations are not composed of mere accumulations of cells but of regular arrangement of reticulated basement substance with cells imbedded in it

seen in fat clumps or tuber lactuca.
Occasionally this cellular accumulation is round the arteriole and venule, but as a rule it is actually on one or more of the capillaries connected with them. Plate XXIX fig 1
The vessels have been deprived of their blood to a large extent probably because the specimens were immersed in alcohol to facilitate a search for bacilli that proved unsuccessful; but here and there they are distended especially in relation to these nodules. The endothelium is unaffected, that is, where it remains in position. although there is occasionally a small collection of granular cells on a trabecula.

On examining with a high power, these patches are seen to be composed of cells with large nuclei, and, in specimens stained with bismarck brown & mounted in balsam they measure 20μ or more across. The nuclei are central and round or elliptical corresponding in part to the endothelioid cells described as forming part of a tubercle nodule. Where fat is present the cells are separated by a considerable number of nuclei Bacilli

Wilks and Moxon

Tubercular Ascites

Tubercular Peritonitis with Fibrine

Tubercular Peritonitis with adhesions

Bacilli have been looked for diligently by the ordinary means, but have not been found, only in specimens stained with Methyl Aniline Violet ~~Violet~~. Some areas in these patches take on a deeper stain, perhaps due to the presence of collections of bacilli in these positions. It is obviously difficult to recognise any organism that might be situated in the centre of these nodules, without making sections of them, which I have not attempted to do, these nodules being too small to admit of such sections being readily made.

Some of these patches are seen independent of blood vessels, but as a rule they are in relation to vessels. It is almost impossible to distinguish many of these "tubercle" patches from the "tache laiteuse" and this difficulty will be illustrated by two photographs I have taken, one from a perfectly healthy young Mountain, the other from a case of general tuberculosis. They are distinguished really by their greater number and larger size, the larger ones often too dense and

Plate XXIX

thick & adent of examination without section.

Hippolyte Martin has described the appearance of these little patches or nodules in his paper in the "Archives de Physiologie ~~tuberc~~ the has described similar appearances produced in the Omentum of animals by mechanical irritation. "Where acute inflammation was produced by a violent irritant, the ordinary appearances of acute inflammation appeared in a day or two. When the irritant was less severe, along with congestion these little nodular growths were observed about a fortnight or a month later, varying in appearance according to the violence of the irritant employed. In the most rapid cases, numerous small cells were noticed in them; where the development was slower they consisted mostly of large endothelioid cells and in more chronic cases still fully formed giant cells were seen. In all cases, the endothelium covering the Omentum was undisturbed, except ~~that~~ mechanically

Archives de Physiologie vol VIII, p. 49 ("sur la tuberculose spontanée et expérimentale des séreuses.")

mechanically over the swollen parts where the cells were slightly separated and their outlines irregular, owing to stretching. He describes in this connection also development of vessels in these nodules independently of previously existing vessels, and even figures blood corpuscles in their interior. These appearances are, he states similar to those produced by injecting caseous matter into the abdomen, only, that while the latter proves often generally injurious, the influence of simple mechanical irritation is confined to the abdomen.

(Ch. Kiener "étude sur la tuberculose spontanée et expérimentale des séreuses surtout," Gazette hebdomadale de med. et. Chirurgie 1879 p. 758. Comptes rendus de l'Academie des Sciences 26 Janv. 80. "Tubercle composed Cornil and Ranvier Vol. I. p. 501 of a round or fusiform swelling round a blood or lymph vessel, by the agglomeration round this of a certain number of cellules. Martin is of opinion that the cells are developed under the Endothelia from wandering cells

The appearances I have just described I have only noticed in children, who are by far the most common subjects of general tuberculosis; but the changes in the Omentum in adult cases of Tuberculosis and Phthisis have in my experience been somewhat different.

In No. 11. a man aged 25 who had suffered from Phthisis for some years and who died of tubercular Meningitis, no nuts was made of naked eye tubercle in the Peritoneum or organs but under the microscope some cellular nodules were seen causing swelling on large fibrous bands and having one or more capillaries entering them. The capillary in more than one instance was blocked by cells much larger than Leucocytes & lying adherent to the vessel, & all appearance cells produced by proliferation of endothelium. This condition of the capillaries was seen not only in relation to these nodules but also in other parts. The cells which were deeply stained did not show the large oval nuclei found in one or two specimens of young omentum in which there was also this blocking of capillaries with cells. (Drawing & photos.)

The appearances in Chronic Phthisis I have

p 200
Plates XXVII and XXVIII

Cornil describes the same appearance in tubercular Meningitis

already referred to as "Chronic Cellular Peritonitis."

In case II we might trace a chain of events such as the following; the impaction of a small ~~clot~~ embolus in a capillary, or the appropriation of bacilli by the endothelial cells of the capillaries, resulting in their proliferation, and the spread of this irritation in a few places to the surrounding tissue with the formation in that way of a tubercle nodule. The search for Bacillus Tuberculosis was in this case also unsuccessful. In the cases first described, where numerous small nodules are seen, it is noticeable that they are usually situated in the capillary "bunches" alongside the arterioles & venules, corresponding, that is to the fat clumps; or in the terminal arterioles, positions in which the blood flow is slow and the lumina of the vessels small, where naturally any poison carried by the blood would be most likely to take effect.

The resemblance of the tubercular process to that of inflammation and also to the process

of growth, points to the conclusion arrived at by many, that inflammation, is, after all, only a modification of the process of growth and related to the process of repair, while tubercle formation is only an inflammatory process modified by the constitution of the individual in which it occurs and, by the fact that it is associated with the development of an infecting medium which leads to the spread of the inflammatory process to other parts of the body

Naked eye changes produced in the Omentum by tumours growing there have been already described (p 16-18)

Cornil & Ranvier say of Tumours in the Peritoneum Primary Carcinomata are rare. Secondary - common Colloid (Primary) ~~Primarily~~ gelatinous mass with vascular lines and early metastases.

Secondary - large & small nodules. Inflammation & haemorrhage often caused.

Lymphatics form hard cords, whitish, vascularized. Coated or in networks & bind around vascularized

(Such cords I refer to, ~~as~~ (p 137) as seen on peritoneal surface of intestines in case of Cancer of Pancreas & Stomach.)

Cylindrical & pultaceous.

Sarcomata only secondary and rare

Osteoid, more frequently.

Fibromas - lamellated villous appendices formed of fatty tissue covered by serous membrane.

Arborescent lipomas.

Myxomas or pedunculated fibromas

Cases of Abdominal Tumour

No. 38. W. D. aet about 51. P.M. 9/5/83. dead 4 hours
died of Haemorrhage. General Jaundice.
Malignant tumour at head of Pancreas ulcerating
into the Duodenum. Stomach and bowels full of
blood. Secondary nodules in the Liver, Nodules
soft apparently round cell Sarcoma.

Mentium somewhat congested, moderate
amount of fat. No adhesions and no tumours
Trabecular arrangement Zonental coarse in
some parts but in others showing the typical
arrangement of primary & secondary trabeculae
Some of the vessels contain some blood
In numerous places it is in capillaries usually but
also in Arterioles & vessels there are collections
of cells larger than white blood corpuscles, forming
compact masses where they occur and in some
instances causing great increase in thickness of the
vessel at that point. There are no changes demon-
-strable in the tissues outside these, but as can be seen
from the photographs I have taken there can be little
doubt that they are commencing tumour growths
starting in the vessels. I did not notice these for several
months after the specimens were mounted and on looking
for pieces of tissue the primary tumour I found they
were in a bad state of preservation and sections made

Plates XXXV & XXXVI

were very unsatisfactory so that I am unable to state definitely whether it was a Sarcoma or a Carcinoma. The fact that there were secondary nodules in the Liver and none in the lungs is of little value, but the position of the tumour and it's partial localisation would certainly point to Carcinoma. How these growths originated in the vessels of the Omentum it is difficult to say unless starting from some embolus, but one noteworthy point is that it often occurs in two vessels side by side at the same level, though affecting one much more than the other and that one the vessels.

The endothelium of the trabeculae where still in position is unaltered.

Fat cells Rare Clumps small

No. #77. G. D. act 45. p.m. 9/1/84. 32 hrs dead
Tumour of Pancreas involving the Stomach.
Secondary nodules in Liver and Kidneys. Cancerous
infiltration of Lymphatics of Lung as seen
in the neighbourhood of Bronchi and in the inter
lobular septa. The Similar infiltration in the
walls of the small intestine, as marked by greyish
cords radiating on the peritoneal surface from the
Mesentery. Mesenteric glands involved.
Omentum unaffected except for the glands
at the great curvature of the Stomach
Under the microscope the appearance ~~of~~ one and the
same as in No. 38 only there is no growth of cells
in the vessels even in pieces taken from a
position quite close to the great curvature
of the Stomach. In that portion there is some
congestion & a few outer round cells outside the
vessels, but that is all. The Endothelium
is normal when it remains in contact with
the trabeculae

Case of Melanosis.

No. 84 (Prof. Frazer's Case) P. M. 1/2/84

Small brownish black nodules scattered throughout the body often more like infiltration with pigment than real tumour growth. In the skin it closely resembled Purpura. Affected the Brain, Viscera serosa and mucosa as well as the skin. On examining any part with the microscope ~~it was seen~~ the pigmentation was seen to be due to pigment cells in and around the sheaths of the blood vessels principally.

The Omentum was thickened & almost black only three or four very small pieces could be ~~must~~ separated for mounting. Some sections were made across the thickest part.

In the best piece seemed there is no fat (84a) but occupying the position of fat cells round the vessels are collections of large brown granular cells some projecting into the fenestrae but most confined to the fibrous tissue. The pigment is at the periphery of each cell, which is rounded the centre of the cell is usually clear & faintly stained (Carmine staining) while round it is a fringe of brown granules. The cells measure

Plate XL

from 16μ to 20μ across

In other specimens larger pigment masses have been mounted they are rounded and lie among the fat clumps some of which are free from pigment cells, but in others pigment is seen between the individual globules of fat. In some the pigmented part seems to be the protoplasm of the fat cell but in others they are simply shapeless masses of pigment. In some parts two or three pigmented cells are seen lying along side a capillary quite apart from the rest.

In the sections made the relation to vessels of fat cells is well seen. only in addition the presence of a considerable number of round cells is noticeable in the same position, some of them containing blue pigmented.

The veins are somewhat congested. Apparently no change in the endothelium

Cases of Leucocythemia

No. 90. J. M. aet. 40. (Dr Wyllie's) P.M. 19/5/84.

Spleen weighed 4 lbs. firm, some parts indurated

Liver " 8 lbs very pale lobules not marked out so clearly as usually is the case in Leucocythemia. Milky blood squeezed out in considerable quantity. Capsule smooth and tense

Kidneys large. Cortex not so much as pyramids which bulged out from the surface of the section when an incision was made. Hæmorrhages in neighbourhood of boundary area.

Blood creamy colour with tinge of red.

Lungs. Lower lobes solidified very much the appearance of Pneumonia at the stage when "red hepatization is passing into "grey hepatization"

On microscopic examination there were the changes in the organs characteristics of Leucocythemia, only in addition & masking them was intense congestion of the capillaries and veins with blood consisting principally of white blood corpuscles. In the liver the lobules were infiltrated in all three zones with small round cells these being found principally in the distended portal capillaries, large numbers however lying outside their walls, and this "congestion" was the principal cause of the solidification of the lower lobes of the lungs

The Omentum was also congested, a great many vessels being revealed to the naked eye which would not have been otherwise seen. These distended vessels were all very tortuous. In addition the O. had a thickened opaque look. I mounted the greater part of both layers - unseparated - in glycerine Jelly after having kept it spread out in Müllers Fluid for a fortnight. It is now in Professor Greenfield's possession along with the others similarly mounted.

See note at beginning p. 5

On Microscopic examination the most evident feature is the congestion of the capillaries and venules and also of the arterioles to a less extent. The capillaries form an open network over the Omentum except at a few points where they bend sharp curves forming small loops such as one finds in fat-clumps only there is little or no fat. An evident feature is the great variation in size of the capillaries though all are filled with blood some measure as much as $\frac{1}{500}$ across, others contain with evident difficulty a single chain of blood corpuscles. These blood corpuscles nearly all stain bright red with Picro carmine showing that they are leucocytes and that the red blood corpuscles are almost entirely

Concealed. ~~Hot~~ Irregularities are noticed on the course of a capillary within one m.m. similar to those seen in specimens of ordinary passive congestion, due to greater dilatation at one point than another. The arterioles contain some blood corpuscles but they bear an exceedingly small ratio in diameter to the vessels as little as 30μ to 160μ. Around the vessels here and there are collections of cells such as one sees in inflammation due probably to exudation. They can be seen sometimes by eye in distinct lymphatic spaces, but the exudation is really not great, not corresponding by any means to what is found in the outer zone of the hepatic lobules.

Only a few fat cells are seen here and there and some of these are apparently breaking up, a few having an appearance not unlike those seen in No. 6. a case of Diabetes Mellitus.

Fenestrae average about 100 to 150μ in width. Many are filled in with fibrous membrane across which run minute capillaries. The most widely distended caps. are all in well formed fibrous bands occupying the position of "Secondary Trabeculae" These may include a space of .5 m.m. or even more sometimes this is entirely filled with membrane with thickenings corresponding to Primary trabeculae

143/

No 96. N. D. aet 33. (Ref Granger Stewart's ward)

Patient died a few hours after admission.

Not so much congestion in organs as in the other case Appearance of Liver on Section more typical Caudate in peripheral zone very copious. Kidney & lung ~~was~~ had the same appearances. Blood not so pale

The Omentum did not appear so congested and was not so opaque. Had a very normal appearance in short.

Under the microscope there is some dilatation of the veins and of an occasional capillary. At three or four points in each mounted specimen, where vessels divide they are obscured by a collection of round cells infiltrating the fibrous tissue & occupying the lymphatic spaces. The fat clumps are fully formed often enclosed in fibrous capsules and in some of them a good many round cells are seen. The trabeculae are fine the fenestrae large 50 to 200 μ and there are few membranous expansions.

Case of Myxœdema

No 86.

P. M. at Morningside 23/2/84

Had been under observation as in the Asylum at Morningside for some years and recognised during that time as a case of Myxœdema presenting the typical symptoms and appearances.

The Principal feature post mortem, was the great thickening of the subcutaneous tissue and it's somewhat gelatinous look. The viscera were enlarged and flabby. On examining the Kidneys microscopically the tubules were found separated by a quantity of mucoid looking tissue. And a similar appearance was seen in other organs.

The Omentum was thickened and resembled that found in these individuals the two layers were adherent & thin pieces were secured only with difficulty for microscopic examination. The meshes of fat. had much the same appearance as the thickened ~~adip~~ subcutaneous tissue Unfortunately pieces were not preserved for section.

The pieces of either layer free from fat masses of large size which were mounted in Glycerine, show the free capillaries containing some blood and also the small vessels, but not markedly congested

There is no congestion noticeable in the fat clumps and the fat cells are not separated in any way. The penetration is not very complete there being considerable tracts of non-penetrated membrane. The fibrous tissue has all a peculiar appearance somewhat like that presented by the sections of organs but there is no infiltration with mucous tissue. The fibrous structure seems opened up & the ~~cell~~ C. t. cells are sparsely scattered. In some specimens the endothelial lining of the trabeculae is tolerably complete. The cells are slightly swollen & not so granular looking as they usually are, but there is no other change. There are groups of large oval nuclei that look like ~~stomata~~ the cells round stomata but they have no definite arrangement. They are well seen in specimens whose endothelium has been completely stripped off

Omentum at various ages

Foetus

Foetal O. at 5th months described page of thesis. Membrane without fenestrae & with continuous covering of Endothelium. Growing blood vessels.

No. 78
22 mos

No. 78. B. B. aet 22 months. (Sick Childrens Hosp.) P. M. 12/1/84 dead 24 hours. Admitted 12 hours before death. Measles three weeks previous to admission. Diphtheria - death from suffocation. Membrane in Larynx and Trachea. Collapse of lower lobes of both lungs. Heart Empty.

Naked eye

Omentum covered all the coils of small intestine, but being quite transparent, did not conceal them. Course of vessels very distinct. Alongside them little fat pellets and little greyish milky patches (Tubes lactees)

Microscope

Fenestrae are almost all round or oval average about 20μ or 40μ, a few up to 80μ many as little as 10μ. The trabeculae separating some of the smaller Fenestrae are exceedingly fine only a micro or two in thickness and evidently just giving way, though at no point can the ends of broken trabeculae be seen. Other trabeculae are broader — the Fenestrae often appearing like round Openings punched in a very fine membrane Wavy fibrous bands run across, enclosing areas

of about 100μ & 150μ and give support to the more delicate bands between. The blood vessels usually run in pairs, single capillaries being rare, and each pair of vessels usually terminates in a number of capillary loops radiating from it, described in connection with development of vessels. Alongside the vessels at a few points are cellular patches measuring often half a millimetre across and containing numerous capillaries. – Ranvier's "taches laiteuses". The fat is small in amount the fat cells often arranged in rows alongside the vessels, sometimes forming clumps often a few fat cells in relation to the "milk spots" Endothelium mostly detached. Germinating at a few places

drawing Plate VIII. 7 fig 2

photo Plate XXIX. 7 fig 3

2 years.

No 55. W. B. aet 2 years (Little Children Hosp.) p. m. 2/7/83. Dead 24 hours. Abdomen slightly green. Diphtheria. Tracheotomy. Commencing catarrhal pneumonia.

Omentum quite transparent and delicate. In one specimen (55b) the Fenestrae are larger than in the above case, as much as 80 or 100μ and many of them are somewhat angular. In another (55a) from the same omentum an almost continuous membrane is seen with

with small openings in it there being hardly any proper trabeculae. Fat clumps are well formed and so are the individual fat cells

Growing vessels not so numerous but having the same appearance as in No 78. There are more anastomoses of free capillaries

Some caches lacteres occasionally connected with imperfectly formed fat clumps

Endothelium almost entirely gone

No 17

No. 17. J. D. aet 2 years. (Sick Children Hosp.) Post mortem 2/3/83. dead 36 hours. Ill for two months. Had whooping cough previous summer caught cold in November. Badly nourished.

In both lungs infiltration with yellowish caseating tubercle - bacillus Tuberculosis discovered.

Caseating tubercle nodules in all the organs

Mesenteric glands enlarged..

Omentum. No apparent inflammation but little naked eye grayish tubercle nodules.

Microscope

Fenestrae very small & round, none larger than 5·0μ many as little as 2·5μ and numbers only 10 or 12 in a field

Plate IV Fig 1

regular trabeculae. Capillaries forming a considerable network very often forming complete

figures. irregular polygons. They have a ragged appearance due to large cells lying outside them but in the fibrous tissue in the position of Eberths Peritheleum. These cells are large measuring as much as 20 or 30μ in length and 16 to 20μ in breadth. Many of the capillaries are filled with blood. Many shoot out processes partially hollowed out which are evidently developing capilaries, and these large granular cells take an active part in this development

Drawing Plate V. Fig 1

Vasc. formative cells

Similar cells are seen in large number between and around the arteriols & vessels in the large fibrous bands. Among them are occasional fat cells which are all small, in few do the fat globule measure more than 30μ in diameter In all there is a ~~large~~ considerable quantity of granular protoplasm around the fat globule. All stages of proportion of fat to protoplasm are seen. It is these large granular cells that become infiltrated for many are seen with a tolerably large globule along side the nucleus. Here and there some of these patches cells have small round nuclei lying between them. There are no regular fat clumps but there are some rounded masses composed

Fat development

of ~~the~~ cells & fat-cells deeply with pinx carmine which are too opaque for examination. They are no doubt tubercle nodules and have a fringe of granular cells projecting into the fenestrae round about them. The endothelial covering of the Omentum is entirely gone only a cell or two projecting into a fenestra here and there.

Tubercle

No doubt the dilatation of the vessels ~~and~~ and active appearance of these large cells is associated with the presence of tubercle in the Omentum and is a condition bordering on inflammation. There no doubt that the infiltration of these ~~fat~~ cells with fat illustrates the development of the ordinary fat cells as it usually takes place in the Omentum of much younger Children but unfortunately I have been unable to secure any at a younger age than twenty two months in order to verify this

of ~~the~~ cells & fat-cells deeply with pinx carmine which are too opaque for examination. They are no doubt tubercle nodules and have a fringe of granular cells projecting into the fenestrae round about them. The endothelial covering of the Omentum is entirely gone only a cell or two projecting into a fenestra here and there.

Tubercle

No doubt the dilatation of the vessels ~~and~~ and active appearance of these large cells is associated with the presence of tubercle in the Omentum and is a condition bordering on inflammation. There no doubt that the infiltration of these ~~fat~~ cells with fat illustrates the development of the ordinary fat cells as it usually takes place in the Omentum of much younger Children but unfortunately I have been unable to secure any at a younger age than twenty two months in order to verify this

2½ years.

No 18. L. M. aet 2½ years. (Sicks Childrens Hospital)
Post mortem 2/3/83. Hydrocephalus and Rachitis.
Head began to enlarge three months after birth
Sweated a great deal. Seemed to have headache. Had
squint at one time. Bowels always torpid.
Anterior Fontanelle open. Deficiency in left frontal
bone, the size of a shilling. White gelatinous looking
tubercle nodules over the base of the brain, from
frontal lobe to Pons and extending up the sides,
also in the ventricles. Right glenoid adherent.
Bronchial glands apparently healthy. Broncho-
Pneumonia. Collapse of lower lobe of Right Lung
Staining from decomposition of abdominal organs
Peritoneum apparently healthy. No raised eye
tubercle nodules on Omentum.

Baillie's Tubercle in sections of Lung.

Fenestrae of Omentum 40 to 60μ in diameter
few layers, all rounded few distant trabeculae
Many fibrous bands radiating all over enclosing
meg. cules of about 150μ. A good many capillary
anastomoses but numbers still growing
Numerous well formed fat clumps some with
an increased number of round cells brightly stained
with Picrocarmine. Size of fat cells up to 50μ.
Most however much smaller, and many are
seen in stages of development just as in No 17.

Plate X
Fig 2

They are growing from the same type of cell. There are very few of these cells, only where a blood vessel is elongating or a fat cell forming. Hence the capillaries have not the same ragged appearance. Some of the veins and capillaries are dilated. In this case as in other growing tumours the pairs of vessels ~~are~~ cross each other usually in the same direction, practically twisting on one another, sometimes in one pair of vessels it is a left hand spiral, as in another pair a right hand spiral.

Spiral twist of capillary loops

There are ~~are~~ large stretches in which the fenestrae are very small as little as 10μ and only scattered at intervals over the ~~the~~ membrane. These openings are quite round and it is impossible to make out the relation of ~~the~~ C. T. fibres to them. They are simply holes. Sometimes a cell is seen projecting into one, again a C. T. cell is seen in close proximity but nothing to show how the opening has been formed.

I should have mentioned above that here also there are "taches laiteuses" from 300μ to 500μ in length and about 200μ broad, the appearance produced by a close capillary network ~~is~~ a ~~mass~~ considerable number of granular cells

taches laiteuses

153

not quite so large as the meso-formative or fat-forming ones but like what are usually called Endothelioid cells they are sometimes - not always in relation to fat-clumps.

The endothelium is quite gone. There are numerous groups of cells in the layer spaces between fenestrae which for convenience sake may be called "Pseudostomata." They stain very lightly with Picrocarmine

Pseudostomata

No 16
3 years.

No. 16. F. S. aet 3. (Sick Children's Hospital.)
Post. mortem 23/2/83 two days after death. Badly nourished
Hydrocephalus. Circumference of head 20 inches
Surface of brain edematous looking, numerous white
nodules on it. Lateral ventricles enormously dis-
tended with fluid. Large caseating tumour in
Cerebellum. Small tubercle nodules throughout
the left lung and pleura. Old pleurisy on right
side. Bronchial glands, some calcareous
some cheesy. Organs all apparently normal
but on microscopic examination all showed
minute tubercle nodules.

Tuberculosis

Omentum numerous small white nodules
along the line of vessels.

Tumour slightly larger than in previous cases
all rounded, a few up to 50μ or 70μ most
about 30μ, some less. Capillary anastomoses
numerous, numerous growing vessels. Nodular
collection of cells at the sides of arterioles & veins
more opaque & compact than in tubercle
sometimes enclosed in fibrous tissue, sometimes
cells apparently projecting. From 200μ to 600μ
in length and 100 to 150μ in breadth. Usually
not quite close to the side of the vessel but with
a clear space between & supplied by capillaries

Plate V
Fig 2

Tubercle nodules
Plate XXIX
Fig 1

and containing a capillary network. They are situated in fact on a capillary network accompanying the vessels, & take the place of fat clumps. In specimen stained with osmic acid little black cells appear, and on examining with a high power these are seen to be droplets in large "endothelioid" cells some as much as 30 or 40 μ across but most about 20 μ. Usually spherical, when not, only slightly elongated.

Endothelioid Cells
Plate X Fig 1
Plate XXX Fig 1

A good many cells in the membrane & large trabeculae but few are endothelial. There are a good many collections of nuclei resembling stomata

No 79

No 79 – S. aet 3 years. (Sick Children Hospital)
Post Mortem 16/1/84. dead 20 hours.

Phthisis. Large cavities in both lungs. Tubercular ulceration in intestine not far advanced.

Omentum apparently healthy to naked eye. Fenestrae many slightly angular and separated by very delicate ~~fine~~ trabeculae. A few as much as 80μ most about 20μ. Grooving vessels with spirality as seen in drawing. & Some anastomoses. Here and there in the course of these anastomosing capillaries is a small clump of large granular cells, some of them containing a large droplet of oil. Similar condition on larger scale along side arterioles and venules in the positions of fat clumps somewhat the same appearance as in preceding case (No 16) only masses are not quite so nodular. Some very vascular areas with cells corresponding to "tâches laiteuses."

Plate VIII Fig 1

Fat cells

In specimen stained with Cochineal Hæmatoxylin glycerine the endothelium has a very distinct staining, being much darker than the fibrous tissue behind, that is, the nuclei and very slender the protoplasm of the endothelial plates a medium tint & the fibrous tissue quite a faint tint

At points the endothelium has been entirely removed and in these positions the membrane – where there are no fibrous bands – is left without a single nucleus. In this case there are numerous collections of nuclei many arranged exactly as if around stomata but in the desquamated portions these are gone too. The membrane so exposed seems to have a homogeneous basement, & fine fibrils inbelieve in that enclosing the numerous fenestræ & helping to form trabeculæ. In the parts so exposed delicate lines are seen deeply stained and with ampullæ at intervals, these are slightly tortuous and anastomose including spaces 200 to 300 μ across; at the points of anastomosis are nucleiform like cells also deeply stained. These fibrils spring from others a little stouter which run alongside the vessels. There are usually two in a fibrous band, one alongside the arteriole & the other alongside the venule. Often when a loop stops the two fibrils meet beyond the loop forming a larger line which passes along & breaks up again around another capillary loop, or anastomoses with other lines. They are no doubt nerve fibrils. They were not observed when the specimen

nerve fibrils

As if the advancing capillary loop were splitting up the nerve fibrile

No 79

was first stained and mounted, and as the specimen was very carefully examined and indeed a drawing made from it showing the spirality of the pairs of vessels these nerve fibrils must have gradually taken on the logwood staining. Specimens stained in this fluid appear beautiful at first but gradually darken so much that numbers primarily very lightly stained may become quite useless. So there is no reason why structures at first unstained should not gradually take on the logwood staining.

The veins in this case are somewhat congested

No 59
3½ years.

No 59. G. B. R. aet 3½ years (Sick Children Hosp.)
Post-mortem 27/7/82. dead 20 hours.

Tubercular meningitis both vertex and base of brain involved. Commencing Catarrhal Pneumonia. Raised Peyers patches and solitary glands. Peritoneum apparently normal

Omentum. Fenestral meshes about 40μ some up to 100μ, many slightly angular. Good many anastomoses but still numerous growing capillaries. Lumen of some capillaries dilated, but not much

angular fenestrae

Clots, numerous & some of considerable length in vessels principally ~~but not~~ sometimes dilated blocking them. Some composed of fibrine & cells, others of deep carmine stained masses (picro carmine staining) larger than leucocytes (drawing). In one or two cases forming bodies just like budding tumor. No doubt blood clot. There are a few round cells outside the vessel., but very few.

Plate XXI
Figs 1 and 2

Fat cells are fully formed many as much as 1/40 in diameter. There are some fat clumps & few cellular-vascular areas.

Endothelium largely gone but collections of nuclei here and there.

No 85
4 years

No 85 D. M. aet 4 years. (Sick Childrens Hospital)
Post Mortem 13/2/84.

Scarlet-Fever? and Measles. Acute Interstitial Nephritis. Solitary glands in Intestine enlarged four ounces straw coloured fluid in Abdomen fluid also in both pleurae

Omentum ordinary marked eye appearance Tenesticae decidedly small and very irregular in distribution few close enough to each other to be separately simply by trabeculae Usually about 20 or 30μ in diameter, a few up to 40μ or even 100μ.

Growing vessels with arrangement already described numbers of nuclei - large - oval - along side of them but the granular protoplasm usually surrounding these nuclei, is invisible. Long extensive areas of close capillary networks

Fat cells fully formed some observed developing, that is, no large cells partly occupied by a fat droplet. Some well formed fat clumps

Plates XI & XII

Nerve fibrils are visible along side the vessels and even anastomosing in the membrane between even in specimens stained in Picrocarmine, but their staining is always very faint, they come out very clearly in specimens stained with Eosinated Haematoxylin & Glycerine where they have a staining as

deep as the nuclei of cells. They have just the same arrangement as in specimen 79, and the same appearance, only the ampullae are more exactly like nuclei in appearance, elliptical, measuring about 15μ in length and 5 or 6μ in breadth. There are smaller thickenings along the course of the fibrils at more frequent intervals. At the points of junction there are cellular looking bodies with processes, three or more, attached to the fibrils. A fibril either becomes so fine as to be lost to view or terminates in one of these cells. Alongside the fibril at intervals connecting tissue cells are situated, with an oval nucleus and a tapering process at either end and follow the course of the fibril, but a short distance from it. In a specimen which was pencilled before mounting so as to remove the endothelium thoroughly the fibrils can be better followed out, especially the larger ones in relation to enlargements and nodules. These measure about four microns across & have distinct outlines more deeply stained than the main body of the nerve. The ampullae- or "intercalate nuclei" (Klein) are bounded by the outline on either side. In these larger ones there is no fibrillar structure. In the parts pencilled cells or nuclei of any kind have disappeared

Pencilling

No 80

from all parts except ~~not~~ in relation to vessels. Even the nuclei lying alongside the nerve fibrils have almost entirely disappeared. The membrane so exposed is riddled with small holes, many of them only two or three microns across, brought to view by the removal of the endothelium covering them or perhaps produced by the violence used in Pencilling.

minute fenestrae

The capillaries which are growing & also which form anastomoses bear little or no relation to the more fibrous parts of the membrane but run at random over the most membranous portions with only the very slightest fibrous support; the wavy fibrous bands are much more widely distributed, radiating, joining and crossing each other at all angles.

163/

No 92
4½ years.

No 32 J. S. act 4½ (S. C.H.) P.M. 26/3/83

Two spinal curvatures the older and more pronounced at the junction of the Lumbar and Dorsal vertebrae The other at upper dorsal. No pain - inability to walk Had been wearing a plaster jacket and jury mast for four days before death. Abces corresponding to carious dorsal vertebrae (1st 2nd and 3rd) exposing the spinal cord on one side & bulging into the Oesophagus on the other, Death from suffocation a piece of meat being found in the Oesophagus opposite the abces.

No tubercle anywhere in the organs.

No inflammation in the Peritoneum.

Omentum. Fenestral meagre about 40μ & 60μ a good many up to 80μ. Many separated from one another by extremely delicate bands that could not possibly have remained intact much longer, but still there is no evidence anywhere of trabecular having given away. Many fibrous bands span out very distant areas of 100μ or more, including three or four or more of these fenestral & their very delicate outlines and would I have no doubt, in time have formed the trabecular bounding fenestra of 100μ or more. Thereon a few small patches containing minute openings. The vessels have the

ordinary arrangement. A good many are groovy and have for the necessary accompaniment of cells though not nearly so many as in 17. & 18.

The capillaries have very slight fibrous support & many do not lie in the fibrous bands but cross the membrane at random. There are some vascular areas where the capillaries are thrown out as a loops having an oval or course like the outline of a balloon. Small loops occurring within larger ones. Around these loops are a good many cells. There are some tactile corpuscles.

Large cap. loops Plate I Fig 2

Fat cells are in large quantity and most measure as much as 60μ. some 80μ, there are few small ones. The occur very freely in relation to the single capillaries sometimes only a single fat cell lies beside a capillary, sometimes two or three & often a row of cells for a considerable distance. At places two a clump is formed, completely surrounding the capillary and measuring 150 to 200μ in thickness

In this case there is a distinct advance in growth over those of an earlier age these being so far all very much alike. Here the fenestrae are larger and the fat cells more developed

No 51. J. S. aet 4½ years. (S.C.H) P.M. 19/6/83

Broncho Pneumonia. Fatty liver. Kidneys apparently in first stage of acute Interstitial Nephritis. Abdomen contained 48 oz of slightly turbid fluid. Small quantity in the other cavities.

Peritonitis

Omentum. Fenestration as in previous case, only, the primary trabeculae are as a rule thicker

Congestion

Vessels & capillaries somewhat dilated. No clots in them. Outlines of capillaries have a ragged look from presence of cells. Some patches - as in drawing - where there is a large number of cells in relation to capillary loops. Most cells are large & granular like endothelial cells but some are simply round nuclei staining deeply with Carmine & ~~log~~ logwood. A Few are seen to occur in rows or clusters in spaces with distinct outlines which are no doubt lymphatic channels; they seem to be leucocytes which have escaped from the vessels.

Large cells round cap.? Plate XXV Fig 2

Plate XXV Fig 2

Diapedesis Plate XXV Fig. 1 Plate XXIV Fig 3

Endothelium largely gone but clusters of nuclei here & there & some well formed stomata.

Fat cells numerous & well developed, among them there are often a good many round cells.

Arrangement of vessels as in previous case

Proliferation of Capillary Endothelium

In a few of the capillaries, quite apart from anything of the nature of inflammation, there are collections of elliptical nuclei as if from proliferation of the cells forming the capillary wall. This will be referred to in connection with other specimens

Evidence of slight inflammation in addition to the changes attending growth, and associated no doubt with the turbid fluid found in the abdomen

No 36
4 3/4 years

No. 36 A.H.J. aet 4 3/4 years (S. C.H) P.M. 11/4/83.
Ill over two months. Paresis of right arm & Right Bell's palsy on right side. Staggering gait with legs wide apart. Tubercle of brain and also on upper border of both hemispheres. Tumour on floor of fourth ventricle at the Right side and opposite the Anterior of the Corpora Quadrigemina. Ventricles distended

Tuberculosis Tubercle nodules in Lung Liver, Spleen & Kidney glands at curvature of Stomach enlarged. Apparent tubercle in intestine but no ulceration.

Omentum small bodies like fat pellets, grey & very distinct. No inflammation

Appearances much the same as in No. 32. Fenestrae about same size - one or two over 100μ many at 60μ. Capillaries are supported by considerable amount of fibrous tissue on either side (that is, all round)

Plate V Fig 3 Growing vessels. Fat clump well formed Several cellular patches, some fat-clumps connected with these. Nothing that can be called tubercle.

Some of the vessels dilated and here is noticeable also the marked difference in calibre of vessel & capillary at the point where the join as contrasted with the gradual transition in size between arterial & capillary. Is a condition pointed out by Ranvier.

167

No 60
5 ½ years

No 60 J. S. aet 5½ (S. P. H.) P. M. 12/9/83. died 20 hrs

Perforation Peritonitis

Catarrhal Pneumonia. Faces in abdomen, small yellow flakes on gut. Omentum very slightly glued to intestines. Perforation opposite old Typhoid Ulcer. Liver slightly fatty. Mesenteric glands enlarged. Omentum. Vessels mostly about 60 μ. Some considerably dilated up to 80 μ while the accompanying arterioles measure less than 20 μ. Capillaries also widely distended some over 50 μ while others contain no blood the latter are those directly connected with the arterioles. No clots in the vessels but numerous leucocytes in some places. Only a few have escaped into the tissues. The membrane is obscured by dark stained masses probably altered fibrine. The staining of the fibrous tissue is peculiar a somewhat brownish tint with Picro Carmine.

Plate XXIV Fig. 182

Fat Clumps & tubular lacunae as in other specimens only, a good many small round cells are seen in the fat clumps. Clusters of endothelial nuclei here & there but endothelium mostly detached.

Evidently very early stage of ~~Peri~~ Inflammation. There had been no symptoms of Peritonitis and the cause of death was not known till the Post mortem examination was made

No 74

No. 74. G.S. aet 5½ years (S.C.H) Adm. 4/1/84
Cluskey Ward prior to admission. Measles on admission
Catarrhal Pneumonia. Temp. 105°.
Tubercle nodules in both lungs.
Invaginations of Intestine with patches of congestion.
Decolorised clots in Heart.

Omentum. Fenestrae a few up to 120μ. most about 40μ. pretty well formed trabeculae. Larger fibrous bands have a definite arrangement.

Fat cells small - many consisting simply of a droplet of fat smaller than the nucleus of protoplasm, but the cells containing these are not of the large type seen in Nos. 15 & 17. A good deal of fat lies free on the section possibly it escaped from some of the cells may help to account for this appearance. There are large fat clumps but they contain a number of small rounded cells & other cells not containing fat & the fat cells are as indicated above.

Young vessels & new loops forming. Nothing special to note in that respect.

There are bands of one or two millimetres in length stretching across the membrane at a different level than the rest spreading out at their attached extremities. They stain deeply and some are vascularised a capillary loop extending some distance along them.

Plate XXXII Fig 2

169

No 45
6½ years.

J. H. aet 6½. (S.C.H) 31/5/83. dead 12 hours

Doubtful Typhoid, improved after admission, but 36 hours before death, Convulsions suddenly set in with unconsciousness which persisted. Opisthotonos Temp. at death 106·5.

Sub arachnoid spaces distended with fluid. Round Spinal cord also No congestion. Congestion of lungs Old Typhoid patches in intestine, no ulceration.

Omentum apparently normal

Trabeculae nearly all bounded by trabeculae which are very delicate. Few membranous patches. T. often 120 μ diam - most about 60 μ, few less than that. Many vessels but not many. Space between vessels often as much as 2 m.m. Capillaries well supported by fibrous tissue. Fat forming large collections round vessels & arterioles. Relation in relation to single capillaries. Endothelium good

Plate IV
Fig 2

Almost entire absence of cells of any kind on trabeculae away from the vessels

Fat cells well formed & large

No tache laiteuse

№ 68

aet 6½

№ 68. C. M. (S.C.H). P.M. 25/10/83 dead 42 hrs.
Measles? died suddenly previously progressing favorably. Ante mortem clots in Right Ventricle
Stomach distended with curdled milk. Patches of collapse in lungs. Purpuric looking spots on body.
Omentum normal in appearance
Fenestrae rather smaller than in last case & more rounded. In one specimen which happens to be stained in Eosinated Haemat. Glyc. the openings are further apart than ~~the obic~~ their own diameter & ~~are~~ are very small like what one meets with in a child of two years. The bands supporting the ~~supply~~ capillaries measure as much as 60 to 100 μ and form a regular set of secondary trabeculae. There are still many growing vessels & some "tache bourgeonnes" Fat cells fully formed and in all, the usual arrangements.
Cellular covering almost gone - a few groups of nuclei left.
Vessels & some capillaries a little dilated and containing small clots in which the individual blood corpuscles can be recognized & masses and coils of altered fibrine as in drawing ♀ 48. No reason to believe there was commencing inflammation in this case. Certainly obstruction to blood flow as shown by ante mortem Clots in Heart

No 71
6 3/4 years

~~The~~ No 71. M. 7. aet 6 3/4. (S.C.H) P.M. 14/11/83.
dead 40hrs. Diphtheria Membrane in Larynx
Trach. Bronch. & Pharynx: Right lung consolidated
Ante mortem clots in heart.
Mesenteric glands, solitary glands and
Peyers patches, enlarged
Fenestrae about 60μ some up to 600. Trabeculae
well formed, many of the 7. angular. Pretty
wide space often between vessels. over a millimetre
Fat ~~Clumps~~ clumps as usual only an occasional
trace of anything like a "tache lenteuse.

No 67
8 years

No 67. D. M. (S. C. H.) P.M. 24/10/83. dead 24 hours
Diphtheria. Sloughs on Tonsils & down trachea
Nothing abnormal in organs
Omentum normal
Fenestrae large numbers measure 100μ across
Spaces between vessels as much as 500 μ
usually much less. Some growing vessels
Fat Clumps ~~fringed~~ fringed here & there with cells
like the remains of a "tache lenteuse"
Endothelia good - Clusters of nuclei at junctions
of trabeculae - otherwise very few cells round the
fenestrae. Some vessels dilated & with a good
many small round cells in their neighbourhood

No 28
9 years

No 28 O. B. aet 9 years (S. C. H) P.M. 21/3/83
dead about 20 hours. Inf lam. of lungs nine months previously. Measles & whooping cough three months, Rt Headache since Christmas. Emaciated.

Tubercular meningitis, vertex & base. Ventricles of brain distended. Nodules size of pea scattered sparsely through Lungs Bronchial glands caseous & large. Spleen & Liver both adherent to Diaphragm Tubercle nodules on under surface of Diaphragm

Tuberculosis

Tubercle in Organs. No enlargement of Mesenteric glands

Omentum - no naked eye tubercle

Fenestrae 60 - 100μ or more most trabeculae about 15μ in thickness Fibrous bands of about 20μ enclosing areas about 150 or 200μ across containing a few fenestrae with very delicate trabeculae. Nuclei on these trabeculae, well seen in profile. Some growing vessels still seen but many anastomoses completed enclosing areas of 300μ or more. Some fat cells & clumps in relation to these, but most with larger vessels. "Taches lacteus" not seen in all the specimens and most of the fat clumps are quite free from round cells or "endothelioid" cells. What looks like new fibrils are very indistinctly seen and cannot be traced far

Plate I Fig 1

Capillary net work well seen amongst fat cells. Plate I. fig

vessels not dilated, but some contain clots.

Plate II 7 & 7 Groups of nuclei on membrane.

No. 75

No. 75. J. 7. Ret-9. (S. C. H) P. M. 5/1/84.

Acute Tuberculosis - Lungs - viscera - serosa

Under surface of Diaphragm. What looked like tubercle nodules on the Omentum. Mes glands enlarged. No peritonitis recognized by naked eye

Omentum. Stains peculiarly with Picro Carmine just like No. 60. Has a dull look, number of cells in trabeculae give a shaggy appearance.

Fenestrae average about 60 or 80 μ. Trabeculae seem swollen many 20 μ or 40 μ. Fenestrae angular

Veins & Capillaries dilated. Arterioles & Capillaries joining them not dilated. A few small clots. Some exudation of leucocytes forming collections in the lymphatics. A few cellular patches.

Fat clumps not affected. No tubercle nodules under microscope but the bodies that looked like tubercle to the naked eye were two large to mount without being cut.

Collections of nuclei on the trabeculae more frequent than usual.

10 years

No 48. C. W. aet 10 years (S. C. Hosp.) P.M. 14/6/83.
dead about 24 hours.

General tuberculosis. Tubercular meningitis.
No naked eye tubercle in Peritoneum.

Fenestral 50μ & 100μ separated by delicate trabecular from which endothelium is shed - a few groups of nuclei at points of junction of trabeculae Secondary trabeculae not as yet regularly formed
Vessels dilated - Veins as much as 60 or 80μ & capillaries 20 or 40μ nearly all contain at least a thread of fibrine which occasionally forms coils and running along it can be seen rows of white blood corpuscles (drawing) The larger ones often contain regular clots, and at many points ~~are~~ large numbers of large granular cells surround the vessels (drawing). forming patches like opened out Tubercles. The fat cells are not crowded together, few are large, and separating them are numerous cells, a few small and round, most larger & granular & containing fat globules of all sizes.

Plate XXII Figs 1 and 2

Only a few dilated spindle vessels
The ~~the~~ vascular dilatation and clotting point to commencing inflammation of which there was no naked eye evidence. Growth in fat clumps. No tubercle

62

10 years

No. 62. J. W. aet 10 years. (~~S.C.H.~~ Prof. Greenfield's Case)
Post mortem 25/9/83 dead 40 hours.

Several round tumours - Lympho sarcomata? -
firm, yellowish white not caseating - in both
Bronchial Glands not enlarged
lungs. Liver enlarged and extending to umbilicus
Spleen markedly enlarged. Fluid containg flakes
in right Pleura 3vj. In pericardium ℥ij clear fluid
Subcutaneous and Muscular tissue swollen
tumours
structure similar to ~~that~~ in lungs, in the right
leg, attached to the Fibula.

Omentum. Is very like that of a child of
four years. the Fenestrae being rounded and
usually ~~ab~~ under 30μ in diameter few being as
much as 80μ. The Capillaries are rather ragged
looking from the presence round them of large
granular cells. The fat cells are still developing
few being fully formed there are some growing
vessels (drawing) and the secondary trabeculae
~~arent~~ about form a complete network.
The veins are dilated and occasionally a
Pl. XXIII fig 2 group of capillaries connected with a dilated vessel
are also widely dilated (photo) The widest in
the photo measure 70 & 80μ ~~across~~ across
There is a large number of granular cells round these
Endothelium almost gone. Groups of nucleated cells.
The fat cells are often growing in distinct polyploid excrescences
from the side of a fibrous band

11 years

No. 34. N. g. aet 11. (Prof. Greenfield's Case)
Post Mortem 9/4/83. dead 55 hours
Hydrocephalus. Lost power of walking, without loss of ~~power~~ muscular power in legs. Headache pain on pressing over occiput. Double optic neuritis.

Scrofulous tumour in cerebellum. No tubercle in abdominal organs. Peritoneum apparently normal.

Omentum extremely delicate. Fenestral rounded usually about 80 μ but few are larger than that. Many pink bands run irregularly over the membrane. The single capillaries bear no relation to these & have almost no support. At numerous intervals these capillaries bear little swellings in which are crowded elliptical nuclei as seen in drawings. They are no doubt growing vessels, points at which the capillary is rapidly increasing in diameter. A capillary often breaks up into a small close network interlacing among 20. or 30 fat cells & then the division unite again the capillary continuing it's course as before. Fat cells are numerous but not crowded, and in none is any of the original protoplasm seen - Only the nucleus at one side. They vary from 20 μ to 100 μ. There are some single and double capillaries advancing along trabeculae. The vessels are dilated & somewhat

Pl. VI fig (1) Pl VII fig 1 and 2

Pl II. Fig 2. shews relation of fibrous tissue to fenestral

12 years.

No. 72. J. M. act 12 years. (S. C. Hosp.) P.M. 7/12/83
dead about two days.

Peritonitis

Suppurative Peritonitis ~~Acute~~ duration unknown
Left pleura aspirated ~~three~~ days ~~before death~~ about
24 hours before death and 5j purulent fluid
Emphysema with drawn. Catarrhal pneumonia, Ecchymoses
under pleura. Intestines matted together.
Omentum floated up and covering the liver
to which it was glued, it's vessels were in-
jested & beneath it was purulent fluid.
Vessels widely dilated. Some Clots. Endothelium
gone; a few groups of cells some forms rounded
or pear shaped swellings like Klein's bud-like
structures. Specimen observed by Marshby stain
patches of fibrin & debris. Some round cell exudation
round the vessels.
Growing vessels seen distended with blood
often so small as only to hold a single row
of blood cells. Fat Clumps fully formed
and injested often containing a good many cells.
Intestine 60 to 80 in some 100 μ.

16 years.

No 7. W. McM. aet 16. (Dr Muirhead's case) Miner.
P.M. 31/1/83 dead about two days.
Phthisis. Tubercular Meningitis.
Tubercle nodules in Peritoneum
Omentum, Jenestrae 100th to 200 on a rule tuberculae delicate. Regular network secondary tuberculae - not very close. the spaces enclosed are often more than a millimetre wide. Fully formed fat-clumps but areas in which there are large cells enclosing fat-globules like fat-cells in process of growth. Veins remain dilated. At a good many points the capillaries are rounded with large elliptical nuclei; but often however ill formed. They are often collected at either end of a detached piece of capillary as if the capillary had been ruptured by rough usage & the free end retracted owing to the elastic tissue in its walls. They however also occur in the continuity of the vessel.

18 years

No. 44. J. M. aet 18 (Dr Brakenridge's case)
Post mortem 28/5/83 dead about two days
Deposit of tubercle at base of brain, at lumbar enlargement of cord and in the lungs. Kidney fatty

No naked eye tubercle in the Omentum.

Fenestrae 100 to 150μ, round or oval or with remarkable uniformity four sided, often nearly square. The trabeculae may be quite delicate often they are broad and flattened out. There are many areas corresponding to Fenestrae which are filled with imperforated membrane the interlacing fibrils of which are however very clearly seen. The Secondary trabeculae are broad & thin that is flattened out they often measure 150μ across. They nearly all contain capillaries. Many capillaries stop short, that is are blind, not forming any anastomoses but there are no cells around them indicating of growth. Some are dilated more especially at their ~~com~~ junction with venules which are also somewhat dilated. The fat clamps have very little fibrous tissue in relation to them, the individual cells are only slightly compressed and nothing can be seen in any of them, of the original protoplasm except the nucleus.

Pl X fig 2

The endothelium is entirely gone, in fact there are hardly any nuclei to be seen anywhere except in the vessels and fat cells

(Case of Exophthalmic Goitre)

19 years

No 27. A. W. aet 19. dead 40 hours
p. m. 20/3/83.
Body emaciated. Curious condition of spleen

Omentum delicate. Secondary trabeculae scarce and without regular arrangement and single capillaries which ~~ought~~ to occupy these, are only developed here and there. There are numerous loops often ~~being~~ terminating in single blind capillaries pushing their way along trabeculae but not effecting anastomoses. There is congestion very irregular in its amount, some vessels widely dilated and containing clots, ~~the~~ arteriole as much as veins, and some of the blind capillaries and capillary loops are also distended with blood as seen in drawing

Pl ~~XX~~ ff 2

Fat very small in amount. Many groups of only two or three cells. There is here & there proliferation of cells & collection of cells round vessels. Endothelium largely gone.

Fenestrae all sizes up to 200 μ & and occasionally more, nearly all the trabeculae are 10 μ or less in thickness and derive little support from Secondary Trabeculae. The Fenestrae are nearly all four sided

29 years

No. 54 A. G. aet 29 (St. Affleck's case)
Post-mortem 25/6/83. dead about 50 hours
Hyperpyrexia. Pain in the head for about
a month. Before death, temperature rose
three times to 106° and was reduced by bathing
Little nodule in Cerebellum ?
Collapse at base of left lung.
Peritoneum normal.

Fenestrae of Omentum rarely less than 60 μ. often
more than 200 μ Trabeculae and many of them
over 20 μ.
~~60 μ~~ in thickness The Secondary Trabeculae
measure about 100 μ The capillaries ~~in they contain~~
are in them contain blood and the vessels
are dilated. The fat clumps ~~have~~ appear with
the low power, to be infiltrated with cells ~~they~~
The fat cells vary greatly in size and in the smaller
ones a large part of the granular protoplasm
can be seen at one field. In some smaller
still there is only a nucleus & protoplasm con-
taing a good many fat droplets just larger
than granules. There are hiatuses in the fat clumps
as if the fat had been removed from them
This is a useful specimen for comparison with
No. 6 in which the fat resorption is further advanced
and quite general.

No 54 The endothelium remains attached in a few places. There are a good many groups of nuclei at the junctions of trabeculae and some, form regular stomata.

33 years. No 46 P. P. aet 33. Post mort. 7/6/83. dead three days.

Pneumonia. Temperature at death 109.2°F. Right lung - grey hepatisation. Left L. edematous. Liver 6 lb 3 ounces. Fatty. Spleen 13 ounces. Other organs apparently healthy.

Omentum. Many fenestrae over 200 μ, often with a lining of membrane at one side. Trabeculae often 20 μ or more. Secondary trabec. 50 & 100 μ. Vessels distended & clots in some, & more frequently in the form of long threads. Capillaries injected but not much distended. Some arterioles dilated and containing coagulated fibrine. Endothelium all good - & not even any groups of nuclei present.

Fat cells only in well formed clumps which are scarce. The clumps are injected.

52 years.

No. 39. W.B. aet 52. (Prof. Frazer Case)
Post Mortem 10/5/83.

Pyaemia. due to cut in hand. Lived several months. Abscess in Buttock, Shoulder, & pleura. Bacteria found in the blood during life. Infarction in Lung. Punctiform ecchymoses under the ~~pleura~~ epicardium. No inflammation in the Peritoneum.

Omentum. Vessels mostly 50 - 100μ a few above 200μ Trabeculae 10 & 20 & 20μ a good many lined with endothelium. The layer over - the Secondary Trab. are very dense & stain deeply. Vessels are not injected. Fat clumps well formed Here & there in membranous parts, numbers of granular cells but no fat cells apparently undergoing change.

45 years.

No. 28. D.R aet 58. (Mrs. Bell's case).
Post-Mortem 15/3/83 dead 20 hours. Run over 16 hours before death, the wheel passing over the thorax. Lung torn. R. Pleura contained 70 oz. blood. Right Kidney torn. No peritonitis Heart Hypertrophied no valvular disease

and Kidneys apparently healthy except for the presence of a few cysts. Lungs emphysematous Liver enlarged

Mesentery & Omentum. Fenestrae very much in evidence Some membranous parts. Vessels injected Indications of nerve fibrils with intercalated nuclei. Fat cells normal Some parts with collections of cells both inside and outside the fibrous tissue. Endothelial covering complete in some parts.

59 years No 63. A. M. aet 59. (Dr. Wyllie's Case)
Post Mortem 3/10/83 dead 46 hours.

Tertiary Syphilis. Depressed nasal ridge. Pericardium & Endocardium thickened, hard tubercular like nodules in lower part of Left Lung. Old cicatrices in Right L. Abdomen Contained 20oz serum. Umbilical Omental Hernia. Intestine mesentery and to a slight extent the Omentum studded with greyish nodules apparently tubercle. Omentum coarse looking.

Under the microscope large tracts are membranous with only an occasional rounded ~~fossa~~ fenestra and vascular loops. Other parts are fenestrated in

No. 83. the ordinary way and the fenestrae vary large-ly. The vessels are injected. Fat Clumps as usual, but they are patches in which they are scattered and they vary much in size, the Spaces between ~~beh~~ being occupied by other cells some large and granular, others containg fat granules and there are a few containg a fat globule about 10μ in diameter & completely surrounded by ~~prot~~ protoplasm. Evidence here of fat absorption.

The Endothelium forms a complete covering to many of the trabeculae ~~but th~~ and in some places the nuclei are pretty closely set.

6 3 years. No. 22. E. M. aet 63. (Prof Greenfield's case) Post Mortem 7/3/83. dead 84 hours.

General Anaemia. cirrhotic Kidneys. Hypertrophied heart. Capsule of liver thickened. Brown induration of lungs. Fluid in Pleurae and abdomen Omentum coarse looking, Voluminous, Fenestrae and trabeculae very irregular some of the latter very thick. There are delicate membranous expansions running across which are vessels without any support just as fine as those in

1867

a post child. The fat cells are separated here and there and there are a good many cells amongst them. Vessels injected.

Endothelium almost entirely gone but where seen it has the ordinary appearance

69 years. No. 10. A. P. act 69. (Prof Greenfield's case Post mortem 6/2/83. 33 hours dead

Mitral regurgitation. Brown induration of lungs. Nutmeg Liver. Cystic Kidneys

Apparent extravasations over small intestine also onto cellular tissue outside Stomach.

Omentum. The secondary trabeculae are about 100 or 120μ in thickness, enclosed regular areas, usually four sided, about 300 or 400μ across, containing eight or nine fenestrae each measuring less than 100μ. The primary trabeculae are often as much as 50μ thick. Fat Clumps enclosed in distinct fibrous capsule. Membranous expansion with capillary network & in one of these there is a large collection of round cells outside a vessel.

Endothelium gone

Cases of Waxy Disease

No. 69.

M.L. (Sick Childrens Hospital) Aged 7.
Post mortem 29/10/83 dead 54 hours.

Rickets — Marked case of Rickets, evidences in head, joints, ribs, etc. Large Caseous tubercular de-

Phthisis — posits in both lungs Firm Pleural adhesions. Ante mortem clots in heart.

Spleen:- marked "Sago waxy". Kidney large pale and smooth but not giving the "waxy"

advanced general "waxy" disease — reaction with Iodine, although ascertained on microscopic examination to be in an advanced stage of "waxy" disease. Intestines and Liver also "waxy"

Mentum:- Normal naked eye appearance

Picro Carmine staining.- Evident increase in cells lining the trabeculae, cellular patches like tâches laiteuses only that many of the cells are evidently endothelial are seen here & there usually non vascular. Fat cells well developed. The capillaries in the fat clumps have a bright yellow colour, are thickened and somewhat tortuous. The same bright yellow staining, thickening & irregularity are seen also in the arterioles & vessels in a good many places usually at the junction ~~of a~~ with a

capillary. It is greater in the arterioles than in the venules and their outline is more irregular.

Methyl Aniline violet staining — The contrast between "waxy" and non-waxy parts, is very distinct. The only parts giving the "waxy" stain are those indicated above as colored yellow by Picro Carmine. Almost all the capillary loops in the fat clumps are involved In addition the capillaries running singly in the smaller trabeculae are waxy but not to the same extent. Those connected immediately with venules seem as much involved as those spring ing from arterioles. The extent to which the arterioles, and venules are involved varies some times only a portion of the circumference & that only for 10 or 20 micros, usually the whole circumference and sometimes for as great a stretch as .5 m.m. The thickening of the arteriole is sometimes not great but one measurement gave 60μ across the vessel at the "waxy" part, while in that "non waxy" immediately adjoining and continuous the diameter was only 32μ. A capillary is often doubled in thickness at the point

Pl XVI fig 1
Pl XVII fig 1

where the waxy disease commences.

In the interior of the pink stained waxy Capillaries blue cells are often seen, - the unaffected endothelium, - and the same is noticeable in the venules. In the arterioles they are also seen but in addition, blue bands are seen at places running across them though not extending right across in the same focus but tapering off at one or both ends. When the middle of the vessel is focussed so that the sides are seen in profile little round blue bodies about the size of red blood corpuscles are seen these form one extremity of bands that taper off to the middle & are surrounded but pink ("waxy") circles and separated by pink lines. They are I have no doubt the muscular elements forming a single layer in the arteriole, it being the tissue between the muscle elements which is involved in the waxy change. This appearance is only made out clearly at a few points though the irregularity in appearance which it produces is always noticeable in the arterioles. No cells of any kind take on the "waxy" staining. The fat

Pl XVI fig 2

Plate XVI 7 fig 2

Cells as in all specimens stained in Meth. Violet are nearly white, except in one or two specimens which were mounted after the immersion of the omentum for about a year in weak Muller's fluid. In these specimens they have a peculiar tint midway between the blue of the normal tissues & the pink of those that are "waxy." In other specimens a few of the fat cells appear to take on the "waxy" stain, but, on careful focusing this is found to be due to light reflected from or passing through a "waxy" vessel in immediate contact. There are a good many growing vessels but these do not seem to be specially selected by "waxy" change

No. 93. P.M. 5/4/84. Dead about 40 hrs. Age about 30

A.A. (Dr Brakenridge) Cavities (Bronchiectatic?) in both lungs. Phthisis Laryngea. Waxy Liver, Spleen, Kidney, Intestine, Glands. A little fluid in the abdomen

Omentum delicate, not much fat, no naked eye change.

Microsp. exam. Vessels congested, vessels filled with leucocytes, tissues round them contain large number of nuclei.

Endothelium almost entirely gone, but

Case 33 (Waxy)

in some places gemmation is going on, forming projections from the surface. There are some nodular swellings but not so marked as in No. 26 though somewhat similar in appearance

"Waxy" change as brought out by Methyl Violet Staining is almost entirely confined to capillaries in fat clumps. There are a few growing vessels. No signs of atrophy of individual fat cells though the fat clumps appear to be few and small.

none of the other capillaries are involved and no arteriole and vessels.

"Waxy change then in this case is slight.

No 35.

W. T. aged 32 (Dr Turnbull) post mortem 9/4/83 dead about 40 hours.

Uraemia. Waxy and granular Kidney Sago Spleen. Some matting of intestine. no pain in abdomen before death. Hypertrophy of Heart, Atheroma of Aorta, Aortic valves competent. Bronchiectasis

Omentum, adherent to intestine but not firmly. no injection. Difficult to secure thin pieces for microscopic examination

Fibrous tissue dense and vessels seen with difficulty, but in many places tortuous thick

and giving the "waxy" reaction. Distribution of waxy change as in 69 ~~and 73~~ only the veins seem more involved in proportion and only a capillary here and there is affected outside the fat clumps

No. 43.

J. F. aet 26

Pyelitis of over one years duration, left Kidney involved. Right Kidney large and very waxy. "Sago Spleen" Liver slightly waxy.

Omentum. Capillaries in fat clumps all waxy arteriols and venules to moderate extent. Change very marked in the free capillaries and in these the thickening at the waxy points is very great the difference in diameter of the waxy and non waxy parts of the same capillary being as much as three to one.

No. 66 ____ (St. Brakenridge's case) aet 53.
Post-Mortem -/10/83 dead about 48 hours.

Bronchiectasis? of long standing. Body emaciated. Cavities in apex of both lungs.

Kidney markedly "waxy" and fatty. Liver (4lbs 10z) slightly waxy and fatty with scar on surface. Spleen very slightly "waxy" (sago)

Omentum. Trabeculae coarse fenestral angular and measuring on an average about 40μ across. Mapped out into tolerably regular groups by larger or "secondary" trabeculae the spaces so mapped out being on an average about 300μ across, these trabeculae all contain each a single capillary. This description may be taken as the type of what is usually seen in the adult Omentum only not often so clearly marked as here.

The veins are distended with blood to some extent. There is practically no fat and ~~so~~ there are no plexuses of capillaries corresponding to fat-clumps. Only a trace of waxy disease is noticeable here & there in the wall of an arteriole and venule and quite rarely in a capillary. There are cells with fat granules & small globules round the nucleus

No 89 ——— (Sick Children Hospital) 7/5/84

Phthisis. Advanced "waxy" disease in viscera
In the Liver the waxy change was seen not merely in the Hepatic Arterioles and Portal Capillaries but also in the Portal Veins and in those radicles of the Hepatic Vein of larger size than the intra-lobular venules.

Omentum. Waxy change only seen in a few of the fat clumps affecting the capillaries there. Hence only slight in the omentum while very advanced in the various organs.

No 91

No 91. A.M. aet 24 (Dr Wyllie's case) P.M. 26/5/84

Phthisis. great excavations in upper lobes of both lungs, broncho-pneumonic condition in lower lobes. Bronchi & arteries waxy reaction with Iodine, & same reaction also in Pulmonary vessels & Heart (endocardium).

Liver.- only anterior edge had typically waxy appearance hard and giving a uniform ~~waxy~~ brown stain with Iodine solution The rest of the Liver ~~gave a very irregular~~ stained very irregularly and slightly, the division of the Hepatic vein stained deep brown right down to the inferior Cava.

Kidney Spleen and intestines also waxy

Mentum. Arterioles very extensively waxy, in one specimen an arteriole is affected almost continuously for 5 m.m its breadth when waxy is about 80μ, non waxy about 60μ. The accompanying vessels is only occasionally waxy and for only a limited extent never the whole circumference and usually for a length of about 80 or 100μ. The Capillaries in the fat clumps are by no means always

involved The arterioles of smaller size than about 60μ are only slightly affected only here and there does ad "free" capillary give the pinkish colour with Meth. Violet.

Pl XVII Fig 2

The greatest peculiarity of this case however is the participation in the change of the fibrous tissue between the arterioles and bundles lying side by side. The individual fibrils affected are swollen and almost like cells in fact it would be difficult to prove that they are not cells. This only occurs to a very limited extent and in a few places sometimes along side a vessel which is many sometimes quite apart from any other vascular part.

Cases of Phthisis, in the adult.

No. 56. P. M. aet 19 (Dr. Wyllie's case) P.M. 4/7/83 dead Colon

Phthisis of four years standing. Extensive breaking down, partially bronchiectatic? in both lungs Tubercular intestine. No ovarey disease. No tubercle in organs. No inflammation of Peritoneum

Omentum somewhat coarse in places, numerous small opaque patches, no naked eye tubercle Two layers considerably adherent. Little fat. Covered whole of small intestine, dipping into the Pelvis.

The mounted specimen have a very cellular appearance exactly like the Chronic cellular Peritonitis described by Delafield as occurring in Phthisis

Delafield's Patth. Anat. vol p. 43.

The cells have nearly all elliptical nuclei, with 15 micros long, with one or two very distinct nucleoli Only here and there are any seen on the primary trabeculae but when present they shew that undoubtedly all the trabeculae had been thickly covered with them, in fact they seem sometimes to be piled one on top of the other. In one place three fenestrae seen are formed out of one the division being made by by chains of cells. A collection of cells - like Delafields "germinal buds" projecting into the fenestrae, a cell at the extremity, the layers

to a point, and from this point an exceedingly delicate process, less than a micro in thickness is carried across the fenestra, to become continuous with a similar cell on the opposite trabecula, ninety micros distant. Cells exactly the same in appearance as those on the trabeculae are found in large numbers in and upon the secondary trabeculae These cells are just like the vaso formative, or fat-formative cells in the child, only, as a rule they dont measure more than 20 or 25 micros The fenestrae measure from 50 to 150 μ with a few of larger size. The Secondary Trabec. are 50 to 100 μ in thickness & enclose, a very regular series of spaces from 200 to 1000 μ across. The capillaries they contain are dilated often to 50 or 60 μ & so are the venules.

The specimen stained in logwood and mounted in Canada Balsam a procedure which on account of the dehydration necessary in alcohol, removes the cellular covering almost as thoroughly as penicilling, these large cells are almost entirely absent, not only from the primary trabeculae but also from the adjacent connective tissue spaces as well as from the surface of the larger fibrous bands The dilatation of

No. 56

of the vessels is better seen and at many places such as angles & divisions, collections of deeply stained round nuclei are seen, evidently escaped white blood corpuscles.
Returning to the Picro Carmine stained specimens we find in them fibro-membranous patches in which are numerous granular cells and here and there an opaque rounded patch, composed of similar cells if one may judge from those seen at the periphery: exactly like what I have already described as a tubercle nodule.
The fat-cells are scarce, seldom crowded together with rings of granular cells round them.
There are some which shew the "atrophic" changes described in Case No. 6 and also by the Drs. Hoggan

In this case the dilatation of vessels with accompanying exudation might point to commencing acute inflammation associated with these tubercular lobby nodules, but it must be remembered that the condition of the lungs was such as to interfere with the flow of blood and cause passive congestion. The great cellularity is certainly an inflammatory and the chains of cells are such as one finds in the formation of cellular adhesions and this cellular inflammation is usually accompanied by a certain amount of congestion.

~~No. 25~~. No. 11. A. D. act 25 (5. Afflicks case)
P. M. 8/2/83. dead about two days. Temperature
at death 104.° 7. maniacal for some time.
Phthisis of some years - cavities in both
lungs. Adherent pericardium. Mitral disease
Commencing tubercular meningitis

Omentum. Trabeculae average about 80μ
about vary much in size. The primary trabeculae
are very delicate few being more than 10μ in
thickness. The secondary trab are often as little
as 35μ and form a pretty continuous net-
-work. There are no growing vessels. Some
membranous patches with capillary network in them.
Some capillaries dilated. At many points
on the small vessels are thickenings with increase
to about twice the thickness - with deep staining. These
are seen to be composed of cells blocking up the
lumen and continuous with the cell wall.
The cells do not show the elliptical nuclei seen
in similar patches in Case 34 and other growing
tumors they have a more compressed appearance. Plate XXVIII
They ~~extend~~ run along considerable tracts of the vessels 7 & 15
sometimes for one or two hundred micros. They
occur both in single capillaries and in one or
both of two companion vessels, oftenest the vessels

No. 11

but it is exceedingly difficult to decide that, as only here & there ~~on the~~ do the arterioles contain muscle cells in their walls. I have no doubt these collections of cells are due to proliferation of the endothelium of the vessels. It is often unassociated with any development of cells outside, but sometime there is and in drawings and photographs I have shewn an instance of this which in it's extent & I may say is exceptional. (Plate XXVII fg 1-3 & XXVIII) There is first a thickened part of a fibrous band measuring from 100 to 300 μ in thickness at different points. In it no structure but that of cells can be made out, except a few wavy fibres at the side at one extremity where it is tapering off the outlines of a vessel begin to appear in the centre measuring about 30 μ across and entirely filled with cells like those outside. This vessel rapidly narrows as it emerges from the "nodule" ~~when~~ it's diameter falling to 20 μ and then to 16 μ but for some distance about 240 μ it is still crowded with irregularly shaped darkly stained cells usually lying athwart it; at that distance in it's course is a collection of about a dozen cells closely jammed in it and slightly distending it and beyond this the vessel has a normal appearance, only at short intervals one or two more cells than usual

appear.

The fat cells are usually seen in their whole circumference with their sides not flattened, that is, they are not compressed. They are usually seperated by a number of small round cells, which are often in such quantity as partially to obscure the fat-cells. They occur in the usual position.

Almost all the endothelium is gone, and there is nothing at all like the general cellularity seen in the last case (No. 36.) so that although a case of Chronic Phthisis, there is no "Chronic cellular peritonitis". The changes in the vessels are like those seen in growing vessels but that is unexpected in a person aged 25 years. Taken along with the occasional cellular nodules associated with this & also the fact that there was commencing tubercular Meningitis, there can be little doubt that it is an example of one of the ways in which tubercle is spread, may be by direct embolism of tubercular matter or from irritation by tubercle bacilli taken up from the blood by cells. The specimen was carefully examined however for bacilli but none were found. It is curiously like, in fact identical with what we find in a case of abdominal tumour (No. 30) Plates XXXV and XXXVI

No 53. R. L. aet 29 (Prof. Greenfield's case)
Post Mortem. 21/6/83 dead 30 hours
Phthisis. Emaciation. Edema of extremities
Extensive cavities in both lungs. Liver fatty.
Omentum - very little fat.
The Fenestral vary very much in size in different parts, in some rounded & small about 20μ like those in child of 9 years in others very large 200μ or 300μ separated by extremely delicate long trabeculae. The secondary Drab. are ~~so~~ as thick as from 8 μ to 100 μ. The capillaries are often dilated. The endothelium is largely gone, only in some of the trabeculae & there often the largest & finest, complete chains of cells are found. The nuclei pretty close together, and swollen.
In parts very well formed Stomata are seen. The fat clumps are well formed & the cells compressed against one another, with no small cell infiltration.

No 12. D. R. aet 36 (Dr. Braebenridge's case)
post mortem 19/2/83 dead about two days
Chronic Phthisis. Cavities in both lungs
Omentum. Fenestrae, vessels, trabeculae etc

as usual. Fat Clumps, ordinary appearance but in some, there ~~are~~ are a considerable number of brightly stained points - small round cells - between the fat cells. Endothelium almost gone, but in some places evidence of increase - from one of which a drawing was taken. Plate XXXI fig 2

No. 19. H.H. aet 46: (Prof. Greenfield's case) Post mortem 5/3/83.

Acute Phthisis. Recent alcoholic history. Phthisis Laryngea, Both lungs consolidated - nodules & small cavities. Mottling of Skin. Angioma in liver. Pigmentation of Peritoneum. Adhesion of Omentum to Right broad ligament and to small Uterine fibroids.

The pigment-patches on the Omentum were along side the vessels. from an eighth to a quarter of an inch in length and very numerous. They appeared as black granular patches.

When examined fresh these patches were found to consist of cells containg brownish granular material and on treating with weak ~~HCl~~ Hydrochloric acid and Ferrocyanide of Potassium solution the granules became blue. When stained with Picro Carmine

No 19

they of Course became green, and have retained that colour (mounted in Glycerine) for over two years. The only change that has taken place is a slight diffusion of the coloration into surrounding parts but the green tint is deepest in the cells. The reaction shews that the pigmentation is due to blood pigment from blood extravasated comparatively recently. Specimen mounted in glycerine which shewed the ~~granules~~ the pigment as brownish granules, very soon shewed no trace of them, the prussian blue being much more stable than the pigment itself has remained unacted upon. At no time were crystals seen in these patches. They occur sometimes in fat clumps more often in relation to capillaries & ~~about~~ adventitial vessels. In specimen treated with 1% solution of Peroxide Acid, there are little blue granules in the vessels and one is almost inclined to believe that they can be seen in the endothelial cells of the vessels, but the appearance is not sufficiently clear to enable one say so definitely.

There is dilatation sometimes pretty considerable of the capillaries and it is noticeable that this dilatation is irregular, the fibrous tissue

of the bands in which they lie not permitting equal dilatation. This dilatation taken along with a fatty degeneration in the walls of the vessels would readily account for extravasation of blood, and Dr. Greenfield states that such pigmentation is not unfrequent in the peritoneum of Phthisical subjects.

The fat though ~~sp~~ scarce is normal in appearance. The meshworks of the Omentum is peculiar the Fenestrae as a rule being small - about 50 μ - and ~~the~~ rounded, while the fibrous intervals between them are broad like those in the Child only much more dense and fibrous. The system of secondary trabeculae is well developed.

The endothelium is almost entirely stripped off but here and there are germinating buds and patches and I have little doubt that the O. was covered with a thick layer of cells that is that there was Chronic Cellular Peritonitis

No. 41. C. M. (age unknown). Ref Francis Case.
P. M. 16/5/83.

Numerous small caverns in both lungs, which are consolidated. Thickened Pleurae. Typical tubercular Ulceration in small and large intestine. Little nodules on liver and parietal Peritoneum. Enlarged Mesent and Caseous mesenteric glands. Omentum slightly adherent.

Fenestrae visible only here & there, Fibrous bands - adhesions? - running across the general lie of the vessels, sometimes vascularised and branching the vessels communicate with proper Omental vessels. At some points it looks like a separate membrane adherent. Vessels dilated and containing clots & thread of fibrine, tissue round them contains a large number of cells of all kinds. Plate XII fig 1

Numerous round cells and at places cells in all stages of infiltration with fat, in the form both of large & small granules - fat-resorption.

No. 58. —— age unknown (Ref Greenfield's case)
P. M. 16/7/83. dead 21 hours. Acute Phthisis - 3 months Sept. lung "Caseating Catarrhal Pneumonia" Right lung

numerous cavities. No further examination made

Omentum secured by cutting through the ~~big~~ diaphragm from the thorax. Appeared healthy, the two layers almost entirely non adherent.

Vessels not ~~adherent~~ dilated, but the veins and capillaries contain a good deal of clotted blood

Trabeculae of pretty uniform size, about 16 μ Gradually 20 - 40 μ. Lined with cells here & there, sometimes a cluster projecting into a fenestra Stomata. Fragments of darkly stained material lying on the surface + fibrin? Fat clumps well formed partially obscured by cells. Smaller groups of fat cells here and there. A good many large granular cells in the fibrous tissue both in relation to fat cells and apart from them. No cells partially infiltrated with fat

Case of Diabetes Mellitus

No. 6. L.L. aet 38. (Dr Kyllie's) p.m. -/1/83

Diabetes of about 18 months duration. Death from Phthisis Pulmonalis. Blood did not seem milky, was not examined microscopically. Liver and Spleen apparently normal.

The Omentum was rather coarse and it was difficult to secure pieces thin enough to mount. There were no "pellets" of fat visible in all the specimens mounted there is a notable absence of the ordinary fat clumps. In one or two there are rounded fibrous patches like the ordinary rounded fat clumps but not containing the typical fat cells. In specimens stained with Osmic Acid black points are seen with the low power, scattered over these patches at intervals of 30μ 4 or 5 or 6 or 7μ; measurements corresponding to the diameter of fat-cells. They lie in the spaces between bundles of fibrous tissue and capillaries are seen more or less distinctly between them. Similar black points are situated in fibrous patches one to two m.m. in breadth, such as are frequently seen in the adult O. though there, they are not so numerous. These black points also lie alongside the vessels in the trabeculae, in the position

Plate XIV

both of connective tissue cells and rows of fat cells which so often accompany vessels. In one specimen (6th) there "fatty cells" are seen in the spaces between the loops of a capillary network just as separate fat cells are often placed. Plate XIV fig 5

On examining these cells with a high power they are seen to consist of granular protoplasm and vary greatly in size. Some contain a pretty large fat globule as much as 15μ or 20μ in diameter, the nucleus and granular protoplasm being pushed to one side just as in a cell, say of the Liver, becoming infiltrated with fat. In many there are two or more, droplets of fat, either lying together and pushing the nucleus aside or situated round the nucleus and in others again the protoplasm of the cell contains a large number of minute fat granules, obscuring the nucleus. These different appearances are seen in drawings and photos. (Plate XIV figs 3-5) and correspond to what are found both in fatty infiltration and degeneration of cells

As to their origin, there are only two possibilities, either they are connective tissue cells becoming infiltrated with fat or they are fat cells whose fat has been disappearing.

The absence of proper fat cells, the position in which the "fatty cells" occur and the way in which the cells contain the fat, point to the latter as being their origin.

In specimens stained with Osmic Acid, little black points are seen in the blood vessels probably little granules of fat in the blood which would have been disguised in the blood had that been examined. The arterioles in some of the specimen as seen in the low power photo are slightly tortuous and appear to have very rigid walls. In sec 6a stained with picro-carmine some of the vessels contain plugs of dark carmine-stained material. They vary in size from less than a red blood corpuscle to 2 or 3 times the diameter of a leucocyte. The larger ones have smaller ones attached to them sometimes three or four forming a graduated row, just like the buds of Tomato Carcinoma. They no doubt consist of altered blood, a somewhat similar appearance is seen in the case 5a of which there is a drawing (Plate ~~XXI~~ fig 2)

The general appearance of trabeculae and blood vessels corresponds pretty closely to any description of the adult human Omentum. The endothelium is almost entirely gone

33 years

No. 15. S. D. aet 33 (Prof. Greenfield's case)
Post Mortem. 22/2/83. dead about 20 hours.
Recent Peritonitis. Pyaemia Splenic Abscess (abscess in Spleen and neighbourhood
penetrating the diaphragm & extending also into
the Pelvis behind the Uterus. No suitable piece
of Omentum secured for microscopic examination

34 years.

No. 24. D. C. aet 34 (Prof. Maclagan's case)
Post Mortem 17/3/83. Dead 17 hours.
Progressive Pernicious Anaemia.
Leukodermic spots on abdomen. Heart pale
and covered with fat. Cicatrices of ulcers
in Ileum and Caecum. Abdomen contained
a little clear fluid. Omentum a good deal
of very light-coloured fat.
Fenestral nay much in size At some parts they
are from 100 μ to 200 μ across and are bounded
by trabeculae over 20 μ in thickness, at others
they are quite small & the trabeculae exceedingly fine,
while in some places there are thin fibro-membranous
patches of considerable size. At two places
I observed "bud like structure" like those in
number 26. One of them was like a minute
polypus and had no structure beyond the presence
in it of three large elliptical nuclei, with nucleoli

"bud-like" structure

No. 24

lying close together & leaving a good margin outside them of structureless tissue. Here & there ~~groups~~ groups of granular cells are situated on the trabeculae projecting into the fenestrae, such as one finds occasionally in passive congestion. The Secondary trabeculae form a ~~net~~ network & many of them contain no vessel for part of their course, there being a good many capillaries which stop short & about complete anastomoses. The vessels and some of the capillaries contain blood but are not much distended. The fat is small in quantity, many of the fat cells are shrivelled and contain crystals of margaric acid. A good deal of fat is lying free in their neighbourhood which will account for their collapse. The cells are separated and among them are some with a nucleus surrounded by numerous small fat globules, others, only a few, present appearances similar to those in No. 6. and indicating resorption of fat. The ~~the~~ protoplasm round the nucleus containing a good many fat granules. These were at first overlooked owing to their situation among a lot of unaltered fat cells. In addition are a good many round ~~cell~~ cells.

gemmation

which, according to Haggard's theory (he would be) ~~and~~ the cells corresponding to wandering cells which result from the complete removal of fat.

A few endothelial cells remain attached to the trabeculae, and there are many groups of nuclei and some well formed stomata.

The omentum in some places looks like that of a much younger person than one aged 72-34 and the presence of so many of what one might call "incomplete capillary loops" is suggestive of arrested development. The alteration in the fat cells, is due to the exhaustion associated with progressive pernicious anaemia. There are no signs of fatty degeneration in the vessels or elsewhere

35 years

No. 9. J. J. aet 35. (Dr. Wyllie's case)
Post-Mortem 5/2/83. dead 30 hours.

Dysentery for about two months.
Ulcers in rectum with bleeding. Copious
discharge - Symptoms. Large intestine ulcer-
-ated like the Rectum.

Omentum adherent - & intestine.

Vessels engorged. All the capillaries contain
blood, some only a single row of blood cells
others measuring as much as 60 & 70 μ in
diameter the smallest vessels sometimes
as much as 100 μ. The distension is very
irregular. The fenestrae are large the small
ones are 100 μ across others from 200 to
400 μ Trabeculae are 20 to 50 μ. Secondary
ones often over 100 μ. ~~Stained~~ The fibrous
tissue stains intensely carmine with Picro-
-Carmine. The fat is small in amount, and
among the fat cells are many large granular
cells such as ~~the~~ one sees in growing fat. Clumps
Their outlines are irregular and some contain
fat globules. Their presence however is difficult
to explain on any other supposition than that they
are cells which once contained fat.
Some of them have escaped into the fenestrae

at least there are cells situated in neighbouring fenestrae exactly like them. There are found membranous patches containing a number of these large granular cells but no fat cells.

I have not just an exact note of the condition of the organs in this case, but the adhesion of the C. to the intestines would account for the congestion though there may have been found other cause of obstruction to the flow of blood. The slight evidence of absorption of fat from the fat cells would be accounted for by the exhaustion and emaciation produced by two months violent dysentery associated with bleeding.

The endothelial lining of the trabeculae is quite gone. ℞

Rheumatism. Anemia

38 years

No. 30, E. F. aet 38 (Prof. Greenfield's case)
Post-Mortem 22/3/93. dead two days.
Sub acute Rheumatism. Anemia.
Lateral ventricles of brain, and sub arachnoid space distended with fluid. Nodules in Costal pleura and diaphragm. Liver somewhat atrophied & bile stained. Spleen adherent.
Seven oz. fluid in Abdomen, containing coagula
Omentum - much fat; one or two adhesions.
Fenestrae large many over 200μ others above 100
some of the trabeculae are over 50μ. others down to
20 or 10μ. In places the thicker trabeculae
most especially have got a complete investment
of endothelium the nuclei of which are nearly circular
measure about 12μ & are situated quite close
together, the interval between them being just big
enough to allow one to see the protoplasm there.
The vessels are not congested. The walls of
many of the capillaries are distinctly fatty
Fat cells are scattered only one or two
here & there except of course in large fat clumps
there are however granular & round cells taking
their place the protoplasm of which often
contain fat granules or globules

Pyaemia - Suppurative Meningitis.

37 years. No 47. A. D. aet 37 (Prof. Greenfield's case)
Post Mortem. 11/6/83. dead two days.
Chronic Pyaemia, first sign three weeks before death.
- Suppurative Meningitis - vertex.
Abscess in Symphysis Pubis. Old inflammation in left broad ligament of Uterus.
Liver fatty. Kidney granular. Blood stained fluid in serous cavities.
Omentum. Excess of fat, otherwise apparently healthy.
Fenestral zone 50 - 100μ - most from 100 - 150μ a good many over 200μ. Trabeculae not coarse to covered pretty continuously by endothelium the nuclei of which are as a rule far apart but their protoplasm can be distinctly seen filling up the interval. Vessels not congested the cells of the capillaries are decidedly granular and fatty looking. Fat cells few. Among them a good many granular cells & in some of them a good deal of the protoplasm can be seen. Membranous patches contain a good many granular cells. At a few places, similar cells are crowded upon the trabeculae & project into the fenestral

Cases of Valvular Heart disease

No. 29. J. McM. aet 30. (Prof. Greenfield's case) Post mortem 18/6/83. dead over two days

Pain in abdomen lasting for ~~some~~ several weeks intense in some days. Sudden death from Syncope

Aortic and Mitral disease.

Stomach enormously distended with gas, pylorus end of great Curvature came ~~so~~ right down to the Pelvis, almost to the Pubes.

Omentum thickened & opaque looking, little fat, veins congested.

In the pieces mounted ~~the~~ a few of the vessels here & there and some capillaries, are moderately dilated, must contain very little blood. The fibrous tissue round the larger ones is thickened, only there are some minute capillaries which run freely over thin membranous portions often a millimetre wide, which have absolutely no fibrous support (see Photo) The Fenestrae average about 150 μ many are as small as 200 or 200μ and one or two in a specimen measure as much as 1500 μ across that is 1½ m.m. The trabeculae separating two of the ~~boundary~~ the smaller ones may be very fine, but the usual thickness is about 20 or 30μ. There are a good many fat cells lying in the fibrous bands Endothelium quite gone

Plate III fig 1

No 61. J. D. about 30 or 40. Post. Mortem 24/9/83. nearly three days after death. No signs of putrefaction.

Universally adherent pericardium. Aneurism, size of an egg just above Aortic Valves. Heart weighed 1lb 11oz Right Pleura contained 16z fluid. L. Pl. 34z fluid Commencing Pneumonia in L. lung. 9 ounces amber coloured fluid in Abdomen. Spleen enlarged, indurated, & adherent to diaphragm Left Kidney weighed 9oz. slightly granular Right Kidney " 1½oz. normal appearance though small.

Whole peritoneum thickened and cellulitish looking. Omentum somewhat opaque & cellulitish, little fat. Fenestral smallest 50 to 100μ, even these are usually bounded by Fenestral 20 to 40μ in thickness. Many F. are 300μ or more across Regular areas varying very much in size are mapped out by secondary trabeculae some of which are 80 or 100μ in thickness most are about 50μ they nearly all contain a single capillary Some of these capillaries are dilated, most are not. There are few large tho fibrous bands containing arteriole & venule, the venule is only slightly dilated. There is exceedingly little fat, there being practically no fat cells apart from fat clumps, which are so far apart, that

it has been easy to mount specimens not containing any. Although the O. was removed from the body so long after death as three days much of the endothelium is still in position attached in some positions. The nuclei of the cells project from the surface of the trabeculae & are pretty close together - not separated by more than half the length of one. Plate XXXI fig 5

No. 50. A.D. aet 35 (Prof Maclagan's) P.M. 18/6/83. 6½ hours after death. ~~Blood~~ Body still warm. General anasarca. Hypertrophied Heart. Atheroma Aortic incompetence. Abdomen contained 7¾ blood stained fluid. Apoplexies in lungs. Nutmeg Liver. Omentum. Congested appearance, semitransparent, little fat.

Many of the Fenestrae in the O. as little as 50 μ most 80 to 100 μ round up to 200 μ. Most primary trabeculae under ~~30~~ 20 μ. "Sec. Trabec" 50-90 μ area included 300 μ & upwards. Capillaries in them mostly dilated, but difference in distension considerable. Both vena & arteriole dilated, no clots. Fat clumps very fibrous, some almost like little rounded fibrous polypi containing a few fat cells

Although the O. was removed only a few hours after death & while the tissues were still quite warm, yet the endothelium is quite gone not so much left even as in No. 61, where death had occurred three days before the autopsy.

No. 20. J. R. aet 20 (Prof. Greenfield's case) P.M. 6/3/83 dead 48 hours. Mitral Stenosis & Aortic incompetence Brown induration of lungs. Nutmeg liver. Old infarct in Spleen. Three ounces blood stained fluid in abdomen Omentum. Trabeculae all thick few less than 20μ most primary about 30. Secondary many 150μ some 50μ Others 300μ or more. Many Sec. trabeculae seem to contain no capillaries, but they are thick & deeply stained so that the capillaries may be concealed. The pairs of vessels are widely separated from others pairs. The vessels are dilated but not much. Fat sparing in amount.

Many of the trabeculae are lined by complete rows of cells. the nuclei of which measure about 15μ and are separated from one another by about 10μ that is as seen in profile.

Pl. XXXI fig 4

Pl

No 52. R. B. aet 41. (Dr Brakenridge's case) P.M. 19/6/83

Cyanosis many years. Anasarca for several months. Haemoptysis some days. Emphysema in both lungs which and very full of blood. Kidneys & Spleen congested Nutmeg Liver. Heart both ventricles greatly hypertrophied. Auricles dilated & thickened No evident valvular disease, but the orifices were all somewhat narrow. The papillary muscles of the left ventricle were much thickened & shrunken & would probably have been the cause of mitral incompetence which was diagnosed during life

Omentum. Congested. Both layers completely separated in almost their whole extent.

Great thickening of Secondary Trabeculae, many 200μ in breadth & containg collections of fat cells which are often separated from one another. The capillaries in them are not readily visible but where seen are often widely distended. There are some thick fibrous patches nearly a millimetre in breadth.

The primary trabeculae are, in many of them quite delicate & almost giving way but others are 20 or 40μ in thickness. The Vessels are about 150μ across - some 200μ, others down to 50. Endothelium quite gone, no cells

except fat cells, seen anywhere.

Fibrous thickening in this case probably due to long continued congestion, but it is a curious thing that, with that in one so old as 41, the two layers of the ~~omen~~ Omentum should not have become adherent

No. 26. W. C. act 25, (Prof. Fraser's case) P.M. 19/3/83 dead 36 hours.

Commencing Pneumonia on both sides.

Vegetations on Aortic Cusps due to old endocarditis. Some vegetations on Mitral Cusps. Some hypertrophy of the heart and slight dilatation. Nutmeg Liver. Purpuric spots on both arms, thighs and abdomen. Red patches on Omentum, especially the upper layer, evidently Hæmorrhages.

4½ ounces of blood stained fluid in abdomen

Unfortunately the Omentum was placed in weak spirit over night and in the morning all the hæmorrhagic patches were gone so they were not available for microscopic examination.

Tunica media mostly small, about 50 to 100μ with trabeculæ about 20 or 20μ in thickness. Sec. Trabeculæ about 60μ. Papillæ

well marked but not containing much blood
Probably that disappeared in the spirit along with
the hemorrhages. Fat small in amount and
fat cells usually separated by a small internal
lumen of nearly every fat cell visible, few
measure so much as 60μ, a small size for
fat cells in the adult. Endothelium all
gone but numerous stomata which are
receeding by well marked (photo & drawing) Pl XXXIV
fig 7 & 8

The peculiarity in this specimen is the occur-
-rence of structures I have not met with in
any other case. They are little nodular
swellings situated in the trabeculae, some
measure 100 micro mm, and are com-
-pletely surrounded by fibrous tissue fibrous
bundles separating & meeting again beyond
so as to enclose them. Others nearly as large
seem to project from the surface & some seem Pl XXXIII & XXXIV
to have a cord running through them

There are many small ones which are simply
swellings on small trabeculae, increasing the
diameter of the affected from about 4μ to
10μ or 20, and projecting on either side
They are granular, some seem to have an
indistinct concentric arrangement

and in others the indistinct outlines of cells can be seen, and even what looks like nuclei. These bodies correspond in appearance and position to "bud-like" structures Klein has described, in the Omentum of the rat and half grown dog. He was able to stain with nitrate of Silver and found that they underlay the endothelium, which covered them completely. They were pear-shaped, conical or flat, just like those in my specimen; granular or slightly fibrillar and some contained "remnants of nuclei" indicating that they were probably formed from endothelial cells". He is unable to say what may be their significance, or give a decided opinion as to their origin and it is as impossible to decide from my specimen, but they occur not only on the surface of the fibrous tissue but in spaces between fibrous bundles and according to Klein they underlie the endothelium so that if cellular in origin they are most probably derived from connective tissue cells in the trabeculae, and might be due to the blocking of the lymphatic system by the pressure of distended blood vessels. That however is mere vague conjecture and could not

Microscop. Journal 1877 p. 235

No. 26. very well explain their appearance in the Omentum of the Rat and half grown dog.

~~In this~~ The appearance of these bodies is well seen in Photos which I managed to take, and in some drawings. In one of these drawings what looks like some fibrils are seen ~~about~~ - ~~and the vessels~~ connected with a "branching cell". They can also be traced alongside the vessels but not so well as in the young Omentum of 79 & 85. Plate XXXIV H 8

There are some cellular patches resembling "tache laiteuses" only without the capillary networks. These are stated by Delafield to occur pretty frequently where there is fluid in the abdomen Delafield's Path. Anatom. Vol I. p. 40

No. 8. R. 7. act 46. (Prof Maclagan's case) P.M. 2/2/83.

Aortic Incompetence. Hypertrophy of Heart. Nutmeg Liver. Liver adherent to Diaphragm.

27 ounces of yellow fluid in Abdomen.

Secondary Tubercles of C. 50 to 100 μ thick and seldom enclosing area wider than 500 μ, with only a few fenestrae in each, about 50 or 100 μ across. Primary Tubercles 20 μ or less

Pl XX
fig 1

Capillaries indistinct, but not dilated. Some of the larger vessels are, and contain clots. Endothelium almost entirely shed from trabeculae. A good many cells round vessels and in membraneous parts, these are large granular & seem to contain some pigment. The nucleoli of those endothelial cells left are very prominent. And these cells seem also pigmented. The fat cells are separated and many are surrounded by a number of round cells

Cirrhosis. Ascites

38 years.

No 21. S. M. (Dr. Wyllie's case) Post. Mort. 7/3/83.
Fibroid Phthisis. Compressed right lung. General Anasarca. Strong alcoholic History. Epithelioma of Cervix Uteri. Liver fatty & fibrous. Slight Perihepatitis Adhesion of Intestine at a few places. Eight ounces fluid in Abdomen.

Tenesticae of Omentum large. Few under 100 μ. Many over 400 μ some up to 1 m.m. Trabeculae often 100 & 200 μ thick. There are some only 30 or 40 μ. Vessels few.

Large fibro-membranous areas with plexus of vessels. No fat cells in the specimen mounted.

Endothelium in places forms a continuous covering. Round the nuclei are closely set.

This specimen is the most fibrous in my collection, except perhaps with the exception of the following case and one from a man aged 69. The fibrous condition may be associated with the traces of chronic inflammation in the Abdomen. Such as adhesion of intestine to one another, and the perihepatitis, and also with the alcoholic history and the somewhat cirrhotic condition of the liver.

No 29. M. D. (40-60)? age unnoted. (Dr Wyllie's case)
P. M. 22/3/83. Ascites. Cirrhotic liver, contracted and adherent to surrounding parts. Spleen enlarged. Kidneys small. Heart Hy pertrophied. Uterine fibroids. 38 oz. fluid in ~~cavity~~ abdomen with coagula.

Omentum small only extending for three inches below the transverse colon. Fat dry looking. Adherent by bands to Colon, Liver and abdominal wall.

Fenestrae very large, many over 1 m. m. and trabeculae long and thin, others from 100 to 200 μ thick. Vessels scarce. Not congested. Fat in clumps here and there single cells. Endothelium mostly removed.

Some fibrous bands stretch across several Fenestrae. There are some cells in the fibrous tissue containing small fat globules probably degenerate fat cells.

The remarks made on the last case also apply to this one

No. 73. ____ (Dr. Muirhead's case)
Peritonitis about 30 hours. Tapped for
Ascites about 20 hours before death, inflammation
appeared to have begun at point of puncture
Cirrhotic Liver.

Omentum coarse covered with flakes
of "lymph" and slightly glued to surrounding
parts. Tenestral grandraugular average 50μ
with tolerably stout trabeculae. Fibrous
tissue swollen & staining deeply with Picro-
-carmine. Quantities of granular brownish
stained matter here & there obscuring the structure.
Vessels & capillaries dilated but irregularly
so the dense fibrous tissue of the larger
trabeculae apparently interfering with this
dilatation at intervals. Clots in larger
vessels. No signs of diapedesis to any extent.
Fat clumps unaltered. enclosed many of
them in fibrous "capsules." Endothelium
entirely removed. No cells in any but
the larger trabeculae - those over 50μ in
thickness.