

FUNCTIONAL DISORDERS
OF THE LARGE INTESTINE
AND THEIR TREATMENT
JACOB BUCKSTEIN



Harper's Medical Monographs

FUNCTIONAL DISORDERS OF THE LARGE INTESTINE AND THEIR TREATMENT

By

JACOB BUCKSTEIN, M.D.

INSTRUCTOR IN GASTROINTESTINAL ROENTGENOLOGY, CORNELL UNIVERSITY MEDICAL COLLEGE; ALIMENTARY TRACT DIVISION, ROENTGEN DEPARTMENT, BELLEVUE HOSPITAL; CONSULTANT IN GASTROENTEROLOGY, U. S. VETERANS BUREAU, CENTRAL ISLIP AND ROCKAWAY BEACH HOSPITALS; ASSOCIATE ATTENDING GASTROENTEROLOGIST, SYDENHAM HOSPITAL, NEW YORK

*With 60 Drawings in the Text and
40 Reproductions of Radiographs*



HARPER & BROTHERS PUBLISHERS

New York and London

MCMXXXII

Harper's Medical Monographs

PRACTICAL MONOGRAPHS FOR THE PRACTITIONER

ADVISORY EDITORS

W. C. ALVAREZ, Rochester, Minn.

G. W. CRILE, Cleveland

N. B. FOSTER, New York

L. HAMMAN, Baltimore

A. T. OSGOOD, New York

E. A. PARK, Baltimore

H. C. TAYLOR, New York

G. B. WEBB, Colorado Springs

U. J. WILE, Ann Arbor



FUNCTIONAL DISORDERS OF THE LARGE INTESTINE AND THEIR TREATMENT

By JACOB BUCKSTEIN, M.D.



There have previously appeared in this series:

SYPHILIS, *by* Charles C. Dennie, M.D., *Kansas City*

ANGINA PECTORIS, *by* Harlow Brooks, M.D., *New York*

DIABETES MELLITUS, *by* William D. Sansum, M.D., *Santa Barbara*

CANCER OF THE BREAST, *by* William Crawford White, M.D., *New York*

DISEASES OF THE BLOOD, *by* Paul W. Clough, M.D., *Baltimore*

UTERINE TUMORS, *by* Charles C. Norris, *Philadelphia*

TREATMENT OF INJURY, *by* Clay Ray Murray, *New York*

INFECTIONS OF THE KIDNEY, *by* Meredith F. Campbell, *New York*

Volumes on the following subjects are now in the course of preparation and will be published in the near future. They will be uniform with this work.

ASTHMA AND HAY FEVER, *by* Robert A. Cooke, *New York*

ACUTE ENCEPHALITIS, *by* Sidney I. Schwab, *St. Louis*

PEPTIC ULCER, *by* I. W. Held and A. A. Goldbloom, *New York*

INDUSTRIAL POISONS, *by* Alice Hamilton, *Boston*

RALPH G. STILLMAN

Managing Editor

8 West 16th Street, New York, N. Y.

HARPER'S
MEDICAL MONOGRAPHS

FUNCTIONAL DISORDERS
OF THE
LARGE INTESTINE
AND THEIR TREATMENT

FUNCTIONAL DISORDERS OF THE
LARGE INTESTINE AND THEIR TREATMENT
COPYRIGHT, 1932, BY HARPER & BROTHERS
PRINTED IN THE UNITED STATES OF AMERICA
FIRST EDITION
G-C

E7113
Dec. 21, 1931.
Cox 1772.10 (O. F. 475.00) near top.

16H
B85

TO MY WIFE

ILLUSTRATIONS

<i>Fig.</i>		<i>Page</i>
1.	MUCOUS MEMBRANE RELIEF FORMATIONS	5
2.	THE DIGESTIVE SYSTEM	6
3.	ROTATION OF INTESTINAL CANAL	8
4.	TYPES OF HUMAN CECA	9
5.	NON-ROTATION OF INTESTINE	10
6.	NON-ROTATED CECUM	11
7.	NON-ROTATION OF CECUM	12
8.	NON-ROTATED CECUM	14
9.	DISPLACEMENT OF CECUM INTO PELVIS	15
10.	UPWARD DISPLACEMENT OF CECUM	16
11.	LARGE INTESTINE	18
12.	ILEO-CECAL VALVE	19
13.	FORMS OF ILEO-CECAL VALVE	20
14.	ILEO-COLIC JUNCTION OF OWL	21
15.	ILEO-COLIC JUNCTION OF CONGER EEL	21
16.	ILEO-COLIC JUNCTION OF FLOUNDER	21
17.	ILEO-COLIC JUNCTION OF MONKEY	22
18.	THE HUMAN CECUM	23
19.	PELVI-RECTAL FLEXURE AND RECTUM	24
20.	HOUSTON'S VALVES IN RECTUM	24
21.	INTERIOR OF SIGMOID AND RECTUM	25
22.	PASSAGE OF FOOD THROUGH INTESTINE	26
23.	PASSAGE THROUGH LARGE INTESTINE	27
24.	NORMAL PERISTALSIS OF COLON	28
25.	EFFECT OF FOOD UPON COLON	31
26.	FUNCTIONAL STATES OF ILEO-CECAL REGION	32
27.	SPHINCTERS OF THE LARGE INTESTINE	34
28.	SMALL MOVEMENTS OF COLON	36
29.	PENDULAR MOVEMENTS OF COLON	37
30.	CONTOUR OF COLON IN DIFFERENT LOCATIONS	38
31.	EFFECT OF MOVEMENTS IN COLON	39
32.	SEGMENTATION OF COLON	39

<i>Fig.</i>		<i>Page</i>
33.	EFFECT OF FOOD ON COLON	41
34.	CONSTIPATION DUE TO UNSUITABLE DIET	44
35.	LINES OF FORCE ANCHORING VISCERA	49
36.	NEURO-MUSCULAR SECTIONS OF ALIMENTARY TRACT	53
37.	CONSTIPATION OF ASCENDING TYPE	60
38.	CONSTIPATION OF ASCENDING TYPE	62
39.	STASIS OF ASCENDING COLON	63
40.	STASIS OF ASCENDING COLON	63
41.	CONSTIPATION OF ASCENDING TYPE	64
42.	STASIS OF TRANSVERSE COLON	67
43.	DYSKINETIC CONSTIPATION	70
44.	CONSTIPATION OF ASCENDING TYPE	70
45.	PROCTOGENIC CONSTIPATION	74
46.	PROCTOGENIC CONSTIPATION	75
47.	CHRONIC FECAL IMPACTION	75
48.	EFFECT OF VITAMIN DEFICIENCY ON COLON	88
49.	COLON AFTER PILOCARPINE AND ATROPINE	100
50.	COLON AFTER ATROPINE	101
51.	EXERCISES—SET NO. 1	116
52.	EXERCISES—SET NO. 2	118
53.	EXERCISES—SET NO. 3	118
54.	CECUM MOBILE	130
55.	STENOSIS OF DUODENUM FROM MOBILE CECUM	132
56.	GANGRENE FROM TORSION OF MOBILE CECUM	134
57.	POSTURE—CORRECT AND INCORRECT	144
58.	ABDOMINAL FAT AND VISCERAL TONE	145
59.	STRASBURGER'S FERMENTATION TUBES	165
60.	SPASTIC DIARRHEA	177

ROENTGENOGRAPHS

I.	NORMAL COLON	227
II.	COLON WITH INCREASED HAUSTRAL FORMATION	227
III.	HIGH SPLENIC FLEXURE WITH EVENTRATION OF DIAPHRAGM	228

*Fig.**Page*

IV. HIGH SPLENIC FLEXURE IN HERNIATION THROUGH DIAPHRAGM	228
V. NON-ROTATION OF COLON	230
VI. INVERTED CECUM	230
VII. INCOMPLETE DESCENT OF CECUM	232
VIII. HYPERROTATION OF CECUM	232
IX. REDUNDANCY OF SIGMOID	234
X. REDUNDANCY OF SIGMOID	234
XI. REGURGITATION INTO SMALL INTESTINE	236
XII. SPASM OF ASCENDING COLON	236
XIII. SPASTIC CECO-COLIC SPHINCTERIC TRACT	238
XIV. GAS IN SPLENIC FLEXURE	238
XV. CHANGE IN POSITION OF TRANSVERSE COLON	240
XVI. REGRESSION OF COLONIC CONTENTS INTO CECUM—24 HRS.	240
XVII. REGRESSION OF COLONIC CONTENTS INTO CECUM—48 HRS.	242
XVIII. SPASTICITY OF DESCENDING COLON AND DELAYED COLONIC ACTIVITY—6 HRS.	242
XIX. SPASTICITY OF DESCENDING COLON AND DELAYED COLONIC ACTIVITY—24 HRS.	244
XX. SPASTICITY OF DESCENDING COLON AND DELAYED COLONIC ACTIVITY—48 HRS.	244
XXI. SPASTICITY OF DESCENDING COLON AND DELAYED COLONIC ACTIVITY—72 HRS.	246
XXII. ILEAL STASIS AT 24 HRS.	246
XXIII. STASIS IN RIGHT HALF OF COLON—24 HRS.	248
XXIV. STASIS IN SAME PATIENT—96 HRS.	248
XXV. STASIS IN SAME PATIENT—144 HRS.	250
XXVI. STASIS IN CECUM, ASCENDING COLON, AND RECTUM	250
XXVII. DYSCHYZIA	252
XXVIII. DYSCHYZIA	252
XXIX. FECAL TUMOR IN RECTUM	254
XXX. LOW, DILATED CECUM—6 HRS.	254
XXXI. APPEARANCE IN SAME PATIENT—24 HRS.	256
XXXII. PTOSIS OF TRANSVERSE COLON—6 HRS.	256

<i>Fig.</i>		<i>Page</i>
XXXIII.	PTOSIS OF TRANSVERSE COLON—24 HRS.	258
XXXIV-A.	NORMAL APPENDIX—24 HRS.	258
XXXIV-B.	NORMAL APPENDIX—48 HRS.	258
XXXV.	FUNCTIONAL HYPERMOTILITY OF COLON	260
XXXVI.	SPASTICITY OF DESCENDING COLON	260
XXXVII.	GASEOUS DISTENTION OF LARGE INTESTINE	262
XXXVIII.	GASEOUS DISTENTION OF SPLENIC FLEXURE	262
XXXIX.	MEGACOLON	264
XL.	MEGACOLON	264

INTRODUCTION

In the large majority of patients coming to the physician for relief of symptoms of abdominal distress, no organic lesion can be determined. The underlying cause is to be found rather in a derangement of functional behavior in some part of the gastro-intestinal tract. This is particularly true regarding many of the disorders affecting the large intestine.

An attempt has been made in this monograph through a careful survey of the literature, to describe the more common functional disturbances of the colon, their causes and treatment.

I have drawn from every available source that might help to clarify the subject.

I am particularly indebted to my secretary, Miss Mary Fellers. She has made all the excellent drawings and reproductions of radiographs used in this monograph.

FUNCTIONAL DISORDERS
OF THE
LARGE INTESTINE
AND THEIR TREATMENT

CONTENTS

Chapter

Page

INTRODUCTION

xiii

I. THE NORMAL COLON

A. THE VISUALIZATION OF THE COLON	1
B. EMBRYOLOGICAL CONSIDERATIONS	5
C. ANATOMICAL CONSIDERATIONS	17
D. PHYSIOLOGICAL CONSIDERATIONS	22

II. THE CAUSES OF CONSTIPATION

A. DEFICIENT FOOD INTAKE	43
B. LACK OF EXERCISE	45
C. ENDOCRINE DISTURBANCES	45
D. SPASTICITY OF THE COLON	46
E. BANDS AND ADHESIONS	49
F. KEITH'S THEORY OF INTESTINAL STASIS	51
G. ILEAL STASIS IN RELATION TO CONSTIPATION	54
H. DIFFUSE COLON STASIS	59
I. STASIS IN THE CECUM AND ASCENDING COLON	60
J. ANTIPERISTALSIS AS A FACTOR IN STASIS IN THE RIGHT HALF OF THE COLON	65
K. STASIS LIMITED TO THE TRANSVERSE COLON	67
L. REDUNDANCY OF THE COLON	69
M. STASIS IN THE CECUM AND ASCENDING COLON ASSOCIATED WITH DISTAL COLON STASIS	71
N. STASIS LIMITED TO THE SIGMOID AND RECTUM (DYSCHIEZIA)	72

III. SYMPTOMS

77

IV. TREATMENT OF CONSTIPATION

A. THE SIGNIFICANCE OF HABIT FORMATION	84
--	----

B. DIETETIC MEASURES	86
C. THE RÔLE OF BRAN IN CONSTIPATION	98
D. DRUGS IN CONSTIPATION	99
E. THE RÔLE OF MINERAL OIL	105
F. ENEMATA. RECTAL STIMULATION	111
G. THE SOPER TREATMENT	114
H. TRANSDUODENAL LAVAGE	115
I. EXERCISE IN CONSTIPATION	120
J. HYDROTHERAPY, MASSAGE, ETC.	121
K. THE INTESTINAL FLORA IN RELATION TO CONSTIPATION	122
L. SURGERY IN THE TREATMENT OF CON- STIPATION	126
V. THE CLINICAL SIGNIFICANCE OF THE MOBILE CECUM	129
A. ETIOLOGY	130
B. SYMPTOMATOLOGY	132
C. TREATMENT	135
VI. ENTEROPTOSIS	
A. ETIOLOGY	136
B. SYMPTOMATOLOGY	138
C. TREATMENT	143
VII. DIFFERENTIATION OF THE PAIN OF RIGHT COLON STASIS AND CECUM MOBILE FROM THAT OF CHRONIC DISEASE OF THE APPENDIX	148
VIII. FUNCTIONAL HYPERMOTILITY OF THE COLON	
A. DIARRHEA OF NERVOUS ORIGIN	158
B. DIARRHEA CAUSED BY CONDITIONS EX- TRINSIC TO THE COLON	
1. THE EFFECT OF SPECIFIC FOODS	161
2. CHANGE IN TEMPERATURE	162
3. GASTROGENIC FACTORS	162
4. HEPATOGENIC FACTORS	163

CONTENTS

ix

Chapter

Page

5. PANCREATOGENIC FACTORS	163
6. ABNORMAL FERMENTATION AND PUTREFACTION	163
7. DIARRHEAS OF TOXIC ORIGIN	172
8. ENDOCRINE DISTURBANCES	172
9. DEFICIENCY DISEASES	173
10. POST-OPERATIVE CAUSES	176
11. DISTURBANCES OF CIRCULATION	176
12. CEREBROSPINAL LESIONS	176
 IX. IRRITABILITY OF THE COLON ASSOCI- ATED WITH THE PRODUCTION OF MUCUS	
A. ETIOLOGY	179
B. SYMPTOMATOLOGY	180
C. TREATMENT	188
 X. GASEOUS DISTENSION OF THE LARGE INTESTINE	
A. SWALLOWING OF AIR	193
B. INTESTINAL FERMENTATION	194
C. CIRCULATORY DISTURBANCES	196
D. SYMPTOMATOLOGY	197
E. TREATMENT	199
 XI. MEGACOLON	
A. ETIOLOGY	202
B. SYMPTOMATOLOGY	204
C. TREATMENT	208
 INDEX	213

CHAPTER I

THE NORMAL COLON

A. *The Visualization of the Colon.*—A considerable advance in our knowledge of the functional behavior of the large intestine resulted from the introduction and development of the roentgen method.

Prior methods for the determination of the position and pathology of the colon were those of air inflation^{1, 2} and fluid injection³ combined with percussion.

In 1898 Cannon⁴ published the results of his classical experiments on the physiology of the stomach by roentgen observation after the administration to a cat of bismuth subnitrate mixed with food.

In a later paper⁵ for a study of the intestinal

¹ Curschmann, H.: "Einige Bemerkungen zur Behandlung des durch acute Darmverschliessung bedingten Ileus," *Deutsch. med. Woch.*, 1887 Nr. 31:445.

² Ziemssen, V.: "Die kunstliche Gasaufblähung des Dickdarms zu diagnostischen und therapeutischen Zwecken," *Deutsch. Arch. f. klin. Med.*, 33:235, 1883.

³ Minkowski, O.: "Zur Diagnostik der Abdominaltumoren," *Berl. klin. Woch.*, 25:617-620, July, 1888.

⁴ Cannon, W. B.: "The Movements of the Stomach Studied by Means of the Roentgen Rays," *Am. Jour. Physiol.*, 1:359, 1898.

⁵ Cannon, W. B.: "The Movements of the Intestine Studied by Means of the Roentgen Rays," *Am. Jour. Physiol.*, 6:251, January, 1902.

movements, he not only employed the administration of a bismuth mixture by mouth, but devised a method of studying the large bowel by the direct intra-rectal administration of a radiopaque enema. "The enema consisted of 100 c.c. of milk, one egg, ten to fifteen grams of bismuth subnitrate, and two grams of starch to hold the bismuth powder in suspension." He obtained actual roentgenograms of the colon of the cat, and was able to record his observations of motor function, antiperistalsis, and the effect of emotions.

It remained particularly for Rieder⁶ to emphasize the extreme value of the method for study in the human being not only of the stomach, but of the physiological behavior of the intestinal canal as well.

Schule⁷ succeeded in demonstrating the outline of the entire colon in man, from the rectum to the ileo-cecal valve, by direct rectal introduction of an enema of 300 to 400 c.c. of oil to which bismuth subnitrate was added. The method had obvious advantages for the study of the large intestine over such means as the introduction of sounds or of non-opaque fluids combined with succussion.

Rieder similarly outlined the colon by administration of an enema consisting of 75 grams of bismuth carbonate, 250 grams of bolus alba, and a thousand grams of water. The enema was first in-

⁶ Rieder, H.: "Radiologische Untersuchungen des Magens und Darms beim lebenden Menschen," *Münch. med. Woch.*, 51:1548-1551, 1904.

⁷ Schule: "Ueber die Sondierung und Radiographie des Dickdarms," *Archiv. für Verdauungskrank.*, Berlin, 10:111-118, 1904.